

# **Responding to Public Fears on Trans boundary Radioactive Contamination from Fukushima Daiichi Accident**

**Marina Mishar, Amizah Othman & Mohd. Firdaus Md. Shah**

Atomic Energy Licensing Board, Ministry of Science Technology and Innovation  
43800 Dengkil, Selangor D.E., Malaysia

---

## ***Abstract***

The consequences of the Fukushima Daiichi disaster go beyond Japan and beyond technological factors. Since Chernobyl, this accident is arguably the only other accident that had a major impact on the Malaysian public, testing the preparedness and response of Malaysian government in allaying all of its public's concerns. The national radiological response center, established in 2007 was required to operate 24/7 to address Malaysian public concerns against transboundary radioactive contamination from the Fukushima Daiichi nuclear accident. The effects of nuclear accidents respect no borders and noting the planned nuclear power program within the South East Asian's region, Malaysia's ERP should be enhanced as the final boundary to safety. Valuable lessons were learnt in responding to public fears on Fukushima Daiichi accident and these lessons should put Malaysia on the right track forward.

**Keywords:** emergency response, transboundary, fukushima daiichi

## **Introduction**

On 11 March 2011 at 2.46 pm, an earthquake at the magnitude of 9.0 Richter scale hit Northeast of Japan and this was followed by a tsunami around forty minutes later. Seven of the ten nuclear power plants that were in operation automatically and immediately shut down while the remaining three were already in shutdown state. The impact of the tsunami was what had been identified as the cause for the damage of the emergency cooling system and subsequently causing partial meltdown of the core and the release of radioactive materials to the environment. Finally, on 12 April 2011, after reassessment and confirmation of data, this accident was classified as Level 7 under the International Nuclear Scale Event (INES).

Malaysia is situated at around 5,000 kilometres away from Fukushima Daiichi Station, the Nuclear Power Plant Station affected by the tsunami. This major accident is considered the nearest in distance to Malaysia. Japan also is very near to the Malaysian public especially with the "Look East Policy" by the Malaysian Government which resulted in numerous Japanese companies established in Malaysia, the importation of various Japanese products, a significant number of Malaysian students pursuing higher education in Japan and in the recent years, various travel holiday packages to Japan. Therefore, majority of the Malaysian public and industries is understandably very concerned of the impact of the accident for various reasons.

## **Actions By Malaysian Authorities**

An avalanche of phone calls were received by Atomic Energy Licensing Board (AELB) and Malaysian Nuclear Agency (MNA) after news about the accident started to appear in various media - newspaper, television, radio, Internet and various social media sites. Confirmations were sought and as these two agencies were identified to be related to nuclear activities in Malaysia; these two agencies are considered the reliable source about the accident. The accident occurred on Friday afternoon and Saturday/Sunday are public holidays in Malaysia. Therefore, all calls were forwarded to the security guards, the only personnel working during public holidays. As these personnel are non-technical staff, they were unable to address all the queries received.

AELB was identified as the technical lead agency for nuclear disaster in Malaysia through the Directive No. 20, issued by the National Security Council under the Prime Minister's Department. In implementing this responsibility, AELB had acquired fund under the 8th and 9th Malaysian Plan to establish a National Radiological Emergency Centre (NREC), situated at its headquarters in Dengkil, Selangor. This centre initially started operation on July 2007 and is still in the process of building up its capability. By end of 2010, six Environmental Radiological Monitoring System (ERMS) situated at various sites all over Malaysia had just been commissioned and all monitoring data are transmitted real-time to this centre at the interval of 15

minutes. A US led initiative; the Mega Port Initiatives where Radiation Portal Monitors are installed at two Malaysian major seaports, namely Pelabuhan Klang and Pelabuhan Tanjung Pelepas had also established a mirror site at this centre. Readings and captured picture of detection can be analysed at the NREC. AELB had also acquired a number of Radiation Portal Monitors under the 9th Malaysian Plan, installed at all Malaysian international borders - international airports and at the border between Malaysia-Thailand. Real-time video at these sites can also be observed at NREC. Coincidentally, NREC had also just been equipped with a toll-free emergency line on December 2010 where calls to inform about real/suspected radiological emergency can be made. This line is opened 24 hours a day and manned by a member of the Radiation Detection and Emergency Section in AELB.

Due to an immense request for information or for confirmation were received, a meeting among AELB Emergency Response Team members was called to analyse the accident situation and its impact to Malaysia and to organize actions to be taken. The analysis during that time was, core meltdown would be the worst-case scenario while minimal impact is expected to Malaysia due to the distance between Malaysia and Japan. However, in order to address public, industry and media queries, a directive was issued to all AELB staffs to direct queries to NREC so that standardized information and answers can be issue to avoid misunderstanding among Malaysians. Other immediate decisions and actions made to address dissemination of information were:

- a. Directives to AELB staffs (guards, clerks etc including technical staffs) to forward queries to NREC or to official websites (AELB, MNA, Ministry of Science, Technology and Innovation (MOSTI), Ministry of Health, Ministry of Foreign Affairs , Japan's official websites - MEXT, METI etc and the International Atomic Energy Agency). In fact, a drafted standardized script were distributed to all staffs especially security guards and the receptionist to be used to answer any calls received about the accident;
- b. NREC was manned 24 hours a day in two shifts to answer calls received through the Emergency Toll Free Line, fixed AELB lines and also questions submitted through email to AELB;
- c. Established a list of anticipated FAQ (Frequently Asked Questions) i.e. issues that would be asked by the public with answers in simple language and uploaded at AELB, MNA and MOSTI website by 16 Mac 2011;
- d. Opened NREC for visits by media – pictures of the facility and equipment available managed to reassure the public that the relevant authorities and there are authorities in Malaysia that do monitor and is able to address the impact that may affect Malaysia from this accident. As AELB had a low profile due to no civilian nuclear power activities in Malaysia, AELB's activities is relatively unknown among the majority of the public in Malaysia;
- e. Sharing of ERMS's weekly data on AELB's website to show current ambient radiation readings;

- f. Offered free radioactive contamination screening to the public coming back from Japan at NREC and MNA for reassurance purposes as verbal confirmation that they are not affected or do not have the possibility being contaminated did not seem to assure them;
- g. Daily press release, followed by twice daily and reduced to weekly, twice monthly and finally declaration of safe situation when all affected nuclear power reactors achieved cold shutdown. In the press release, information on the status of the accident, actions being taken by Japanese authorities, actions taken by various Malaysian authorities and where to get further information were given. The press releases issued were also in cooperation with Ministry of Health and Ministry of Foreign Affairs so that standardized information are given by all three ministries. In MOSTI, three separate agencies, namely AELB, MNA and the Meteorology Department also work together to supply information in one press release, coordinated by AELB and authorized by MOSTI before they were released to the media and uploaded in various websites; and
- h. Similar information including the authorized press release text was also posted on AELB, MNA, The Meteorological Department, MOSTI, Ministry of Health and Ministry of Foreign Affairs' websites. However, each agency also had additional or detailed information related to the accident that is relevant to its responsibilities.

### **Analysis of Public Concerns**

Analysis on queries received showed that intense request for information lasted about one month where it gradually reduced after 15 April 2011 (Figure 1). Among the reasons calls were becoming fewer after one month are because adequate information can be obtained on AELB website and further information were also attainable from Japanese and IAEA websites. Most calls to NREC were logged and analysis of most asked questions were done and subsequently, the FAQ list on the website was extended to include new frequently asked questions. Survey result confirmed this where 56% agreed that AELB website have good information about the Fukushima Accident. At the same time, any rumors (such are radioactive rain) spread through text messaging or social media sites were immediately addressed on AELB website - giving the factual and correct information.

Further analysis on what issues were of concerned to the Malaysian public showed that radiation levels in Japan and Malaysia is the issue of most concerned/asked followed by information about radioactive screening (at the airports and also at AELB and MNA offices), queries on whether container screening are carried out at Malaysian seaports and whether imported Japanese products are safe. The industries were increasingly requesting screening on industrial items coming from Japan to be carried out by AELB. AELB however deemed this action as unnecessary as the goods did not come from the affected area while no items in the affected area are allowed to shipped out. These requests mostly came in the later period of the

accident and AELB are being continually pressured to do screening on industrial goods. To handle the situation, AELB gave briefings to the industry to disseminate factual information about the accident and its impact. Four briefings were given involving major importers and port authorities. However, the industries were also given the choice to send their goods for analysis at MNA for confirmation (for a fee).

Other queries received were about AELB, screening of food products and travel advice. As food screening is under the jurisdiction of Ministry of Health, all queries regarding food product were forwarded to the Ministry of Health. To assure the public, the Ministry of Health carried out food sampling and analysis for every shipment received from Japan, shared results of the analysis and on 15 May 2011 enforced that all food products from Japan shall come with a certificate, confirming they are free from radioactive contamination.

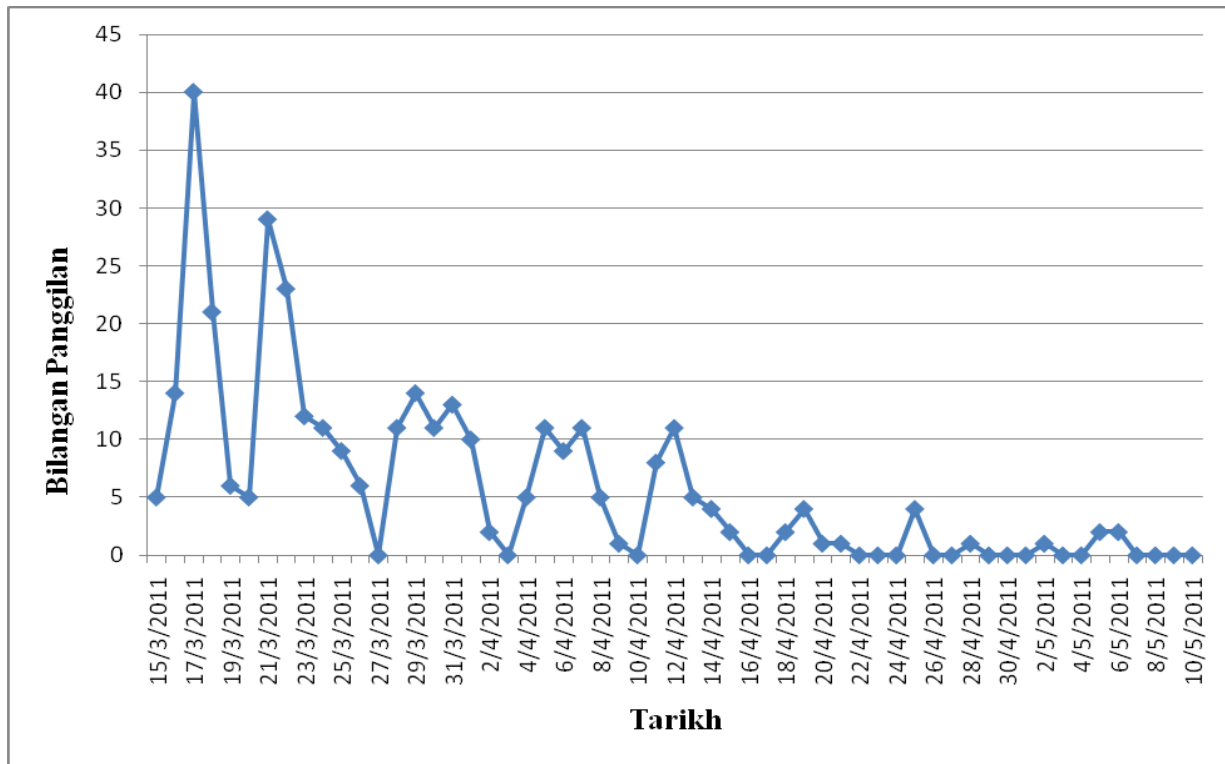


Figure 1: Numbers of calls received through AELB Toll Free Emergency Line

Analysis on types of groups called, showed that in the initial month, more calls from the public (39% of all calls) received and this shifted to more calls from the industries (44% of all calls) in the second month after the accident (Table 2). This showed concerns on health and safety is the initial concern and after reassurances about health and safety, the concern now shifted to impact on economy. The Malaysian media attention on the accident is also short-lived where interest waned after the second month. This may be contributed by the proactive action

taken in distributing press release text to the media on periodical basis as mentioned above. Quite a number of queries received from other government agencies in Malaysia and this showed the role AELB as the lead technical agency in nuclear and radiological emergencies in Malaysia is also becoming known due to this accident.

Table 2: Numbers of Calls Received by NREC: March - May 2011

	Industries	Media	Government Agencies	Public	Total
March	65 (27%)	52 (21%)	32 (13%)	96 (39%)	245
April	36 (44%)	9 (11%)	8 (10%)	29 (35%)	82
May	1	1	1	3	6

### Lessons Learned and Way Forward

The Fukushima Accident did not posed radiological impact to Malaysia. Results of analysis and monitoring did not show elevated level of radiation level or any radioactive contamination detected in Malaysian waters and environment. Screening on passengers, crews and cargoes originated from flights from Japan also did not detect any radioactive contamination. The results are in line with the initial analysis by AELB on the impact of Fukushima Daiichi Nuclear Accident to Malaysia. However, the Malaysian public, media and industry were not satisfied with only reassurances but require proof through data, measurements and actions taken. Therefore, actions required to be taken is not necessarily in line with the threat level but a more involved and higher level of actions needed to be taken to reassure the public and industry.

This incident however, provided valuable experience to AELB in particular as the lead technical agency on nuclear and radiological emergency in Malaysia on further improvements needed to be taken. As a follow-up to actions taken by AELB, a post mortem was carried out to rate the facilities and capabilities in handling emergency situation in Malaysia. A survey was carried out on all responders involved in carrying out various duties such as manning the emergency hotline, working at NREC (analysing media reports, drafting FAQs, press releases etc), monitoring, sample collection, screening etc. namely to rate crisis and communication management, available facilities (infrastructure, technological and equipment), on NREC itself, monitoring and sampling activities and conclusion on all actions taken. Result of the survey combined with survey on the public is shown in Table 3 where rating 1 represents very weak and rating 5 represents very good. However, to ensure objective analysis on NREC, a gap analysis was carried out and "Ohio Emergency Operation Center Grant Funding Mandatory Criteria" was utilized as the standard criteria for an emergency operation center. Gap analysis result showed 25 (89.3%) out of set 28 criterias has been fulfilled. The three criterias unfulfilled by NREC are

Table 3: Result of Survey on Responders Involved

<b>Crisis Management</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Preparedness				X	
Arrangement of Resources/Logistics including schedule				X	
Media Arrangement			X		
Reporting on Accident			X		
<b>Communication Management</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Information on AELB Website				X	
Customer Response/Service through MNR-Customer				X	
Coordination of Flight Schedule				X	
Information of Latest Directives			X		
<b>Facilities - Infrastructure, Technology &amp; Equipment</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
NREC				X	
ERMS/RPM			X		
Monitoring Equipment				X	
Decontamination and Swipe Kit			X		
Responders' Working Facilities				X	
<b>Monitoring and Sampling</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Responders' Experience and Knowledge			X		
Monitoring at Airports and Seaport				X	
Swipe Sampling and Environmental Sampling				X	
<b>Summary of Actions Taken</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Customer Satisfaction				X	
Technical Achievements			X		
Quality of Service				X	
Acceptance of Service					X
Time Effectiveness				X	
Achievement of Objectives					X
Achievement of AELB Mission and Vision					X

specific communication room for radio, telephone and other support system; ability to monitor the weather; and access to emergency notification system. During the Fukushima Accident response in Malaysia, AELB worked in close contact with the Meteorological Department and that department supplied weather information.

Based on the input from the survey on responders to the response on Fukushima Accident in Malaysia, several issues required further improvements were highlighted:

- a. Handling media queries - unsure to answer media questions especially during the early phase. AELB, as mentioned, had a low profile in Malaysia due to no nuclear power plants and therefore are not normally sought by the media. A sudden and heavy media interest caught most of AELB officers unguarded;
- b. Preparation of report especially on what happened at the nuclear power plants - since Malaysia do not have nuclear power plants, most of AELB officers especially those that were put onto task to analyze reports from Japan and IAEA reports are not knowledgeable in the technical issue especially with various different units used. A sudden need for a high number of responders to carry out various activities during the accident phase put a strain on AELB limited number of officers. Some of these officers are still required to carry out AELB's core business such as license and application processing, inspections, enforcements etc. Therefore, additional manpower was required and obtained from MNA and also from a group of fresh graduates recently contracted into AELB (6 officers). These personnel, clearly were still not well versed with nuclear power plants technicalities.
- c. Knowledge and capabilities of responders - similar to point (b.) above, as a number of responders are newly hired or did not receive specific training, their knowledge and experience is also very limited.
- d. Ratings on technology also rated fair as the expectation of the responders were higher. The ERMS and RPM were just recently commissioned and quality assurance activities weren't carried out yet when the accident occurred. Some teething problem was still being identified and immediate attention on these systems are needed during the responding stage, which exhausted the limited number of resources available.

Several best practices were also identified during the response phase and AELB will capitalize further on these and will include these practices in future radiological emergency response and preparedness:

- a. Coordinated information release to the public, media and industry through cooperation with various ministries and agencies. Consistent, factual information by various authorities, national and internationally reassured and comforted the public and industry;
- b. Various avenues for information dissemination ensured information can be obtained and received by all that required them;



- c. Close cooperation with the Japanese Embassy in Malaysia in providing latest information including briefings by the Japanese Official provided a platform to gain more official information that could then be disseminated to the Malaysian public, media and industry;
- d. Timely actions on information dissemination including anticipated questions by the public and media; and
- e. Evidence of the NREC, its facilities and equipment ensuring public, media and industry that Malaysia do have the means and capability to monitor and protect its people, environment and property.

In working forward and towards the anticipation of more new power plants in the Asian region specifically in the Southeast Asia, AELB had identified enhancement and improvements to be made in the area of radiological emergency preparedness and response. AELB had identified immediate enhancement to be made based on lessons learned in responding in Malaysia during the Fukushima Accident (Figure 4). All the improvements are expected to be complete by end of 2012.

Figure 4: AELB Follow-up Action Plan Based On Fukushima Accident Response Post Mortem

Penambahanbaikan Hasil Post Mortem Pengendalian Krisis Fukushima Daiichi								
Bidang : (i) Pengurusan Krisis;(ii) Pengurusan Komunikasi;(iii) Kemudahan Infrastruktur,Teknologi & Peralatan; (iv)Pusat Informasi Radiologi; dan (v) Pemonitoran & Persampelan								
Bidang		Project Completed By:						Responsibility
○ ○ ○ ○ ○	b) Menyerap pakai Prosedur Kerja	● ● ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	c) Menyerap pakai Pelan Tindakan Radiologi & Peranan MKN	● ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	d) Persijilan Sistem Kualiti							SPKS
	<b>2 Peningkatan Keupayaan Bilik Operasi Bencana</b>							
○ ○ ○ ○ ○	a) Susunan Semula Bilik Operasi	● ● ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	b) Petugas Sepenuh Masa Waktu Pejabat	● ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS/ICT
○ ○ ○ ○ ○	c) Melengkapkan Sistem Teleconferencing	● ○ ○ ○ ○ ○ ○ ○ ○ ○						ICT
○ ○ ○ ○ ○	d) Pembelian Kemudahan : Mesin Cetak, Komputer dll	● ○ ○ ○ ○ ○ ○ ○ ○ ○						ICT
○ ○ ○ ○ ○	e) Sistem Wireless - distabilkan	● ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
	<b>3 Pembangunan Keupayaan Petugas Kecemasan</b>							
○ ○ ○ ○ ○	a) Pembangunan Kompetensi Asas	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						DKS
○ ○ ○ ○ ○	b) Mengenalpasti jenis latihan diperlukan	● ● ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	c) Pembangunan Kit Maklumat Asas Petugas Blk Operasi	● ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	d) Pelaksanaan Latihan : Klinik Peralatan/Latihan (NyahC	● ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	e) Taklimat "Code of Conduct" Petugas Kecemasan	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	f) K/sama Penambahan Petugas dari Agensi Sokongan Agensi Nuklear Malaysia	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	g) Analisis Keupayaan Petugas (fizikal, kesihatan dll)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
	<b>4 Peningkatan Keupayaan Peralatan Teknikal</b>							
○ ○ ○ ○ ○	a) Menaiktaraf ERMS - Perisian	● ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	b) Menaiktaraf RPM - Pentauliahani/Perisian/Prosedur TB	● ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	c) Pembelian Mobile Lab	● ● ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	d) Syor Pembelian RPFMERMS Tambahan (2013-2014)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	e) Melengkapkan Cawangan	● ● ○ ○ ○ ○ ○ ○ ○ ○						SPKS/SokTek
○ ○ ○ ○ ○	f) K/sama Awal Dengan Agensi Sokongan	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						DKS/SPKS
○ ○ ○ ○ ○	g) K/sama KDRP/Port Authority PTP	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						DKS/SPKS
	<b>5 Makluman Awam/Media</b>							
○ ○ ○ ○ ○	a) Laman Web Kecemasan Khas	● ● ○ ○ ○ ○ ○ ○ ○ ○						SPKS
○ ○ ○ ○ ○	b) Prosedur FAQ Kecemasan	● ● ○ ○ ○ ○ ○ ○ ○ ○						SPKS
	<b>6 Pengurusan Logistik</b>							
○ ○ ○ ○ ○	a) Aturan khas tempahan kapal terbang segera	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						Khidmat Pengurusan
○ ○ ○ ○ ○	b) K/sama Jadual Ketibaan Awal	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						DKS/SPKS
○ ○ ○ ○ ○	c) K/sama Kws Larangan MAB	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						DKS/SPKS
○ ○ ○ ○ ○	d) Malaysia - Penempatan Sampul Segera	○ ○ ○ ○ ○ ○ ○ ○ ○ ○						Khidmat Pengurusan

References:

1. Jirka, G.P. 2006. Equipping and Arranging an Emergency Operations Center (EOC) for Miami Township. Leading Community Risk Reduction. Miami Township Division of Fire and EMS. August.
2. National Security Council, 1997. The Policy and Mechanism on National Disaster and Relief Management, Directive No. 20. Prime Minister's Department, 11 May.
3. Press Release 12 April 2011. INES (the International Nuclear and Radiological Event Scale) Rating on the Events in Fukushima Dai-ichi Nuclear Power Station by the Tohoku District - off the Pacific Ocean Earthquake. Ministry of Economy, Trade and Industry.