

The MNB Interview

BIOGRAPHY

Thomas Koshy,

Section Head, Nuclear Power Technology Development Section, International Atomic Energy Agency (IAEA)

Thomas Koshy joined the IAEA in September 2011 to head the Section on Nuclear Power Technology Development at the IAEA Department of Nuclear Energy. Before his appointment to Vienna, he was a government regulator and researcher for the United States Nuclear Regulatory Commission (USNRC), involved in nuclear systems design, testing and operations. For the past five years, he was Branch Chief for Mechanical and Electrical Engineering at USNRC managing the development and regulatory issues related to new and operating pressurised water reactors (PWRs) and boiling water reactors (BWRs). Earlier in his career, he worked as Senior Resident Inspector and System Design Engineer for PWRs, BWRs. He served on the US President's Commission on US-Canada Power System Outage Task Force as an electrical and operations expert and was Technical Advisor to the Canadian Regulator in the evaluation of the blackout response at Pickering Nuclear Generating Station in Canada.



Assessing New Reactor Technologies

The accident at Fukushima revealed the importance of having reactor technologies which are safe, reliable and able to withstand extreme external events. *MNB* Editor Judith Perera asked Thomas Koshy, head of the IAEA's Nuclear Power Technology Development Section, how the Agency is helping states select new technologies which meet these criteria.

JP: What are the main tasks of your Section?

TK: Our section looks at existing and new technologies, seeks solutions to existing problems, and helps industry to adopt a new technology if it is appropriate. Our work is divided into four areas:

1. Advanced reactors, especially small and medium-size reactors;
2. Non-electricity applications such as hydrogen, which is much more easily stored than electricity;
3. Desalination — the use of energy from a nuclear plant to purify seawater for consumption as well as to produce electricity. This could be especially useful for the Middle East and other areas short of water;
4. Gas-cooled reactors and advanced water-cooled reactors.

JP: How have the events in Japan affected your work?

TK: The events in Japan mean we have had to realign our resources. Fukushima has caused a delay in the growth of nuclear power for energy needs in certain countries but did not reverse it. We now see that the problems which led to the events can be addressed effectively and efficiently. The nuclear industry has advanced remarkably through finding solutions that were revealed through plant events with other comparable technologies in aerospace and the petrochemical industry. Similarly, the vulnerabilities now identified because of the Fukushima accident can all be resolved. The capability to design a system that can withstand flooding has been used in other applications and it is within the technical capabilities that exist now.

JP: What are the main lessons of Fukushima?

TK: Nature presents us with challenges. As far as nuclear plants are concerned, we have been successful in dealing with very severe earthquakes but we need to advance our capabilities to overcome the effects of tsunamis of large magnitude. So now we know we have to be able to keep a reactor cooled, despite flooding. Our group is gathering the collective wisdom from the member states to share some short term solutions to address such problems for the existing fleet of reactors. Also we plan to work with member states to make available some toolkits – technical guidance

and mitigating measures – to more effectively deal with future comparable scenarios.

JP: What are the priorities for technology development?

TK: We need to explore some possibilities to improve the performance of safety systems when faced with severe external events. Looking to the future we will also review the designs of new reactors to assess their resilience in the face of Fukushima-type events. In the long term we hope to facilitate designs which are fully resistant to such problems. We will be looking, for example at passive cooling systems and increasing the robustness of emergency cooling systems.

JP: Do advanced reactors offer solutions to these problems?

TK: There are advanced reactor designs in large and small units. The design of this category has selectively utilised passive cooling systems, optimised the safety systems to improve its performance, and expanded diversity and redundancy to achieve a greater level of nuclear safety.

Advanced small and medium-sized reactors (SMRs) at a power rating of less than 300MWe are not yet commercially available although several countries are moving in this direction: for example, Argentina is starting the site excavation for the CAREM reactor in the country; in China, two modules of gas-cooled reactors, called HTR-PM, are under construction for domestic use; SMART in the Republic of Korea is in the final stage of design approval; in Russia, two KLT-40S floating nuclear power plants are under construction and excavation for the SVBR-100 reactor is starting; and in the US, at least two advanced SMR designs have been prioritised for design review by the Nuclear Regulatory Commission. One of the tasks of the Agency's Nuclear Power Technology Development Section is to review advanced reactors again in the light of Fukushima.

JP: Are fast reactors an option for the future?

TK: Fast reactors are more convenient for countries with a strong technical and nuclear base and where the technology can be tested and proven. Their use should begin in countries such as France, India, Russia and the US. Once the early operational challenges are solved, it would be ready for newcomer countries.

JP: What do you see as the key issues here?

TK: It is important to re-establish public confidence in pursuing the nuclear option. We can offer technology but it is also important to protect the health and safety of the public. We need to improve public understanding of nuclear power and build confidence in people that Fukushima type problems can be adequately addressed. We will be exploring other potentially challenging scenarios and providing guidance for preserving nuclear safety and thus protecting the health and safety of the public.

JP: How do you support member states in their choices?

TK: A new document will be available for technology assessment. This document would help a newcomer country to ask for the required details in going out for bids and it would further help member states to more effectively evaluate the capabilities of the design and to judge their suitability to particular conditions. We offer training and assistance to newcomer countries to make the most appropriate decision. For instance, we are now looking to see how we can use less water to operate a nuclear plant for cooling, by improving the efficiency of the equipment and improving the heat removal capability.

JP: What other services are offered from your group for newcomers?

TK: We are advancing our services to see to the needs of countries considering introducing nuclear power in their energy mix. We assist the governmental organisations to supplement technical expertise to build their level of confidence in proceeding with the nuclear power option. Our experts are available to provide technical assistance for an independent review of the feasibility study that is conducted in the initial phases of launching into nuclear power production.

Another important service that we offer is the sharing of technical information through data bases. One of the frequently accessed IAEA databases is the Advanced Reactor Information System (ARIS, <http://aris.iaea.org/ARIS/aris.cgi>). It provides a good overview of all reactor types in one standard format.

JP: Are there any other services for operating reactors?

TK: We work with member states by facilitating working groups to address technical challenges. We have a few more databases providing insights into material issues, ageing management, research work and some others, for preserving the lessons the industry has learned. Such information forms a repository of knowledge available to new organisations and young professionals entering in the field to get a head start in addressing their plant specific issues.

LEADS			
EU stress tests show need for harmonisation	1	Russia consults neighbours on Baltic NPP	30
France debates nuclear cutbacks	3	Newbuild briefs	30
Iran report impacts IAEA credibility	4	PLANT OPERATIONS	
FUKUSHIMA UPDATE		Canada's Bruce A-1 loads fuel	31
Cold shutdown on track	7	Florida NPP upgrades boost local economies	32
Earthquake and Tsunami warnings ignored	7	Plant operation briefs	32
Safety: Advisory panel wants council oversight	9	SUPPLY CHAIN EQUIPMENT	
Stress Tests Continue	9	Canadian valve maker gets China deal	33
All but nine reactors offline in December	9	Equipment briefs	33
Tepco sells assets	10	SAFETY & SECURITY	
Nuclear costs reassessed	11	US NRC head highlights safety challenges	33
IAEA team offers praise and advice	11	US institute compiles Fukushima data	34
Radiation monitoring continues	11	US congressman seeks hearing on cracked NPP	35
Robots for remediation	12	Sodium fire hits Idaho lab	35
Waste management challenges	12	UK Leak delays Dounreay award	35
Fukushima briefs	13	Japanese cyber attack nets NPP data	36
BUSINESS		Refuelling may increase radiation release	36
Rio wins battle for Hathor	14	Safety briefs	36
Uranium One reports record revenue	15	URANIUM	
B&W revenues increase	15	China seeks to double uranium production	38
USEC reports Q3 losses	16	Cameco production down	39
Paladin reports Q3 loss	16	Uranium One increases Tanzania resource	39
Armenia takes financial control of Metsamor	17	Forsys focuses on Namibia	40
Business briefs	17	Deep Yellow African resources up	40
GENERAL DEVELOPMENT		Uranium Energy acquires Arizona property	41
South Korea reveals export ambitions	19	Uranium licence for Greenland	41
Vietnam moves on long-term plans	19	Uranium briefs	41
Turkish NPP ahead		FUEL - ENRICHMENT TO STORAGE	
of schedule	20	UAE seeks 15-year supply deal	43
Spain's nuclear stance may change	21	AREVA to assist with Kazakh fuel plant	43
E.ON sues over German NPP exit	21	UK's Dounreay to ship breeder fuel to Sellafield	43
Czech CEZ juggles several NPP projects	21	Ukraine's fuel plant moves ahead	44
Australian PM seeks India ban reversal	22	Russia's MCC gets investment boost	44
India clarifies liability rules	22	Russia's Mayak under investigation	44
Russia prepares to boost exports	23	Fuel briefs	45
Belarusto get Russian loan	24	WASTE MANAGEMENT	
Russian weapons centres get more funding	24	Babcock consortium gets	
Public opinion affected by Fukushima	25	Scottish site contract	45
General briefs	25	Dounreay starts construction on LLW vaults	45
NEW BUILD		Protests delay last waste train to Germany	46
Tennessee reactor construction		Waste briefs	46
progress improves	29	CLEAN UP	
Russia Kalinin-4 nears start-up	29	Clean up for central Asia's uranium dumps	47
		Clean up briefs	47
		DECOMMISSIONING	
		UK Magnox decommissioning gets underway	47
		Swiss decommissioning estimates up	47
		More EU aid for former Soviet states	48
		Slovak NPP decommissioning enters stage two	48
		Decommissioning briefs	49
		NUCLEAR MATERIALS	
		Growing interest in rare earth minerals	49
		NEW TECHNOLOGIES	
		US reports major fusion science advances	49
		Boost for Myrrha research reactor	50
		China plans small, modular reactor	50
		Russia launches liquid metal test facility	50
		ITER status reviewed	50
		New technology briefs	51
		RESEARCH & DEVELOPMENT	
		New UK research centre opens	51
		UK committee calls for R&D commitment	51
		Netherlands NRG pushes for Pallas	52
		Research briefs	52
		EDUCATION & TRAINING	
		China to establish security training centre	52
		Education briefs	53
		PEOPLE	
		On the move	53
		THE MNB INTERVIEW	
		Thomas Koshy, Nuclear Power Technology	54
		COUNTRY PROFILE	
		US research and development	56
		NUCLEAR PLATFORM	
		Dr Michael Dunne	58
		REGULARS	
		Uranium Market Round up	59
		Outage Watch	61
		Carbon Market View	61
		S&P's Global Energy Indices	62
		Competing fuels, power prices and carbon	62
		Global Nuclear Capacity	63
		Nuclear Business Share Prices	64
		Events Calendar	65

IHS McCloskey Nuclear Business

Senior Vice President IHS
Michael Dell

Publisher & Managing Editor
John Howland
john.howland@mccloskeycoal.com

Editorial Managing Editor
Scott Dendy
scott.dendy@mccloskeycoal.com

Editor
Judith Perera
judith.perera@mccloskeycoal.com

US Correspondent
Thecla Fabian

Marketing Marketing Manager
Alina Bucur
alina.bucur@ihs.com

Production Production Manager
Emma Duncan

Production Assistant
Liam McEwan
production@mccloskeycoal.com

Editorial Address
IHS McCloskey
Unit 6, Rotherbrook Court
Petersfield, GU32 3QG, UK

Sales and Subscriptions
Nicola Tame
nicola.tame@mccloskeycoal.com
Tel: +44 (0)1730 265 095

Published once a month
Annual subscription £1,075*
(hard copy and email)
Annual subscription £920* (email only)
* Plus VAT where applicable

Published by IHS McCloskey

Registered Office
IHS Global Limited
Willoughby Road
Bracknell, Berkshire, RG12 8FB, UK



This publication was produced using FSC® certified paper

