

MDEP: producing results in a challenging time for nuclear power

by L. Burkhart*

The Multinational Design Evaluation Programme (MDEP) continues to pool the resources of its ten member countries for the purposes of 1) co-operating on safety reviews of designs of nuclear reactors under construction and undergoing licensing in several countries, and 2) exploring opportunities and potential for harmonisation of regulatory requirements and practices. The International Atomic Energy Agency (IAEA) is closely involved in MDEP activities to ensure consistency with international requirements and practices.

The MDEP involves representatives from the regulatory authorities of Canada's Nuclear Safety Commission (CNSC), China's National Nuclear Safety Administration (NNSA), Finland's Radiation and Nuclear Safety Authority (STUK), France's Nuclear Safety Authority (ASN) with support in working groups from France's Institute for Radiation Protection and Nuclear Safety (IRSN), Japan's Nuclear and Industrial Safety Authority (NISA) with support from Japan's Nuclear Energy Safety Organisation (JNES), the Republic of Korea's Institute of Nuclear Safety (KINS), the Russian Federation's Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor), South Africa's National Nuclear Regulator (NNR), the United Kingdom's Office for Nuclear Regulation (ONR), and the United States' Nuclear Regulatory Commission (NRC). Since the last NEA News update on this subject, MDEP regulators with assistance from some of their technical support organisations continue to work together to make regulatory design reviews more focused on safety and to leverage regulatory resources to ensure the safe operation of tomorrow's operating reactors. The events of 11 March 2011 at the Fukushima Daiichi nuclear power plant further highlight the need to continue this effort, and the lesson learnt from Fukushima will be appropriately incorporated into MDEP activities.

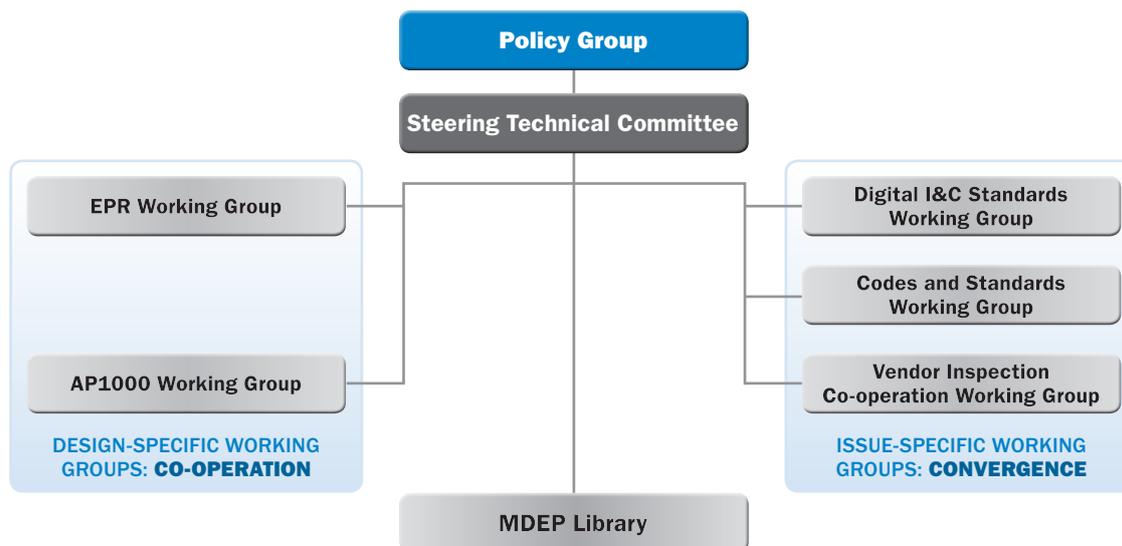
The MDEP has been making progress with its stated goals since the pilot project began in 2006 to explore the feasibility of working together in the MDEP, and even more so after the ten-member Policy Group (PG), which consists of the heads of each regulatory authority, approved the MDEP's current mandate and organisational structure. This structure consists of the Steering Technical Committee (STC), which is responsible for the implementation and day-to-day operation of the MDEP, and five working groups. Two working groups focus on co-operation regarding the safety reviews of specific

reactor designs. One group is examining AREVA's EPR design (the EPR working group or EPRWG) and involves Canada, China, Finland, France, the United Kingdom and the United States. The other is reviewing Westinghouse Electric Company's AP1000 design (the AP1000WG) and involves Canada, China, the United Kingdom and the United States. Three issue-specific or generic working groups involve all MDEP countries and are exploring the potential to harmonise regulatory requirements and practices in the areas of: 1) vendor inspection co-operation (VICWG), 2) mechanical codes and standards (CSWG), and 3) digital instrumentation and control (DICWG).

Highlights of the progress being made by the MDEP and examples of the Policy Group's goal to communicate activities to other stakeholders, including non-MDEP regulators and other regulatory organisations, reactor vendors and licensees, standards development organisations, and key industry groups, are the MDEP products that were made available on the MDEP public web pages (www.oecd-nea.org/mdep) in March 2011. These products include three issue-specific common positions. The first concerns the digital instrumentation and control area and addresses simplicity in design, the use of software tools and communication independence between safety and non-safety systems. The second is a design-specific common position on the EPR digital instrumentation and control design of important safety systems. The third concerns technical guidelines for the design and safety bases for the large squib valves that will be used in the AP1000 design to initiate passive cooling of the reactor core in emergency conditions. MDEP common positions are generated and discussed by the relevant working group and approved

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MDEP organisational structure



by the Steering Technical Committee prior to making them public. A common position captures the agreed upon technical and regulatory aspects of a particular safety issue; it is not mandatory but represents a recommended best practice in the area. Each MDEP regulator will incorporate the common position into the regulatory body's practices consistent with the national legal and regulatory framework as well as its need to support near-term safety reviews. Other stakeholders, such as non-MDEP regulators and industry organisations, are encouraged to review the common positions and to use them as appropriate as well as, when necessary, to provide feedback on the positions. The MDEP seeks to involve relevant stakeholders in working group discussions before common positions are established so that the final products are fully informed and widely accepted.

Other MDEP products are being made available publicly such as the Vendor Inspection Co-operation Working Group (VICWG) Witnessed and Joint Vendor Inspection Protocol that clearly explains the roles of the different regulators who may take part in witnessing and participating in VICWG-coordinated inspections. This document was generated based on experience gained from over 30 VICWG-coordinated inspections and activities which include observing fellow MDEP regulator's inspections. The vendor inspection protocol has been shared with vendors and other organisations which may be subject to such inspections. This protocol is being used by other design-specific working groups that are carrying out vendor inspections in particular areas of design and manufacture such as the manufacturing of Olkiluoto 3's main coolant lines and the design of the EPR digital instrumentation and control systems.

The STC's work on comparing the approaches of the MDEP regulators' definition and expression of safety goals is summarised in a document entitled "MDEP Steering Technical Committee Position Paper on Safety Goals". That paper and its more detailed companion "The Structure and Application of High-level Safety Goals" were used as input to the 11-15 April 2011 IAEA technical meeting to discuss safety goal approaches. Both of these documents are available online. The safety goal issue is a good example of one that was addressed by the MDEP STC, worked to a point of some maturity, and then transferred to a more appropriate organisation for follow-up and further elaboration (in this case the IAEA). Other issues, such as discussing different safety classification schemes of systems, structures and components, may also be handled in a similar fashion.

The Policy Group and the Steering Technical Committee are encouraging the working groups to continue producing relevant documents such as common positions, communicating with key stakeholders on important safety issues and addressing key areas of safety design reviews of new reactors and harmonisation. Products that should be made available by the MDEP in the near future include a mechanical codes comparison for Class 1 components (CSWG) and a comparison of quality assurance requirements among the ten MDEP countries, as augmented by comparison to IAEA standards and the US NRC's 10 CFR Appendix B requirements (VICWG). The DICWG is working on several potential common positions in areas including software common cause failures in safety systems, verification and validation, complex electronics, interactions between safety and security, configuration management of software, and factory and site acceptance testing, among others.

The NEA recently organised, under the direction of the MDEP Policy Group and with the assistance of the Steering Technical Committee, the 2nd MDEP Conference on New Reactor Design Activities. It was held at the OECD Conference Centre on 15-16 September 2011 and was a follow-up to the first conference held in September 2009. Mr. André-Claude Lacoste, ASN President and Chair of the MDEP PG, opened the meeting, and Mr. Luis Echávarri, NEA Director-General, provided welcoming and introductory remarks. Conference topics included the status of the five working groups, industry initiatives on new reactors and standardisation, and the Fukushima Daiichi accident, including the status of recovery efforts in Japan and MDEP efforts to incorporate lessons learnt into its activities. Over 120 people attended representing 24 national regulatory authorities and technical support organisations, major reactor vendors and licensees, as well as a dozen national, regional and international organisations such as the IAEA, various mechanical and electrical standards development organisations, the Western European Nuclear Regulators' Association (WENRA), the NEA Committee on Nuclear Regulatory Activities (CNRA), the European Commission (EC), the World Nuclear Association (WNA) and the World Association of Nuclear Operators (WANO). This conference was another step on the path of communicating MDEP activities to important stakeholders.

The Policy Group has also recently discussed the potential expansion of MDEP membership. Several national regulatory authorities have expressed interest in joining the MDEP including India, the Netherlands,

Turkey, the United Arab Emirates and Vietnam, among others. The PG is currently considering India's nomination as a full member and should take a decision shortly. Other countries have expressed interest in becoming associate members because they are exploring particular designs and would like to co-operate on related safety reviews. The PG will consider those requests in a timely manner and ensure that a number of basic criteria are consistently met to ensure the most effective and efficient programme. In parallel, it will seek to meet the needs of those regulators that must perform safety reviews of new reactor designs in the near term.

In summary, over several years of activities, the MDEP has fostered close and important relations among the MDEP regulators participating in the working group activities, and the programme is meeting its expected outcome of enhancing co-operation among regulators involved in safety reviews of new reactor designs. The MDEP has reached some maturity and is making products available to key stakeholders, including non-MDEP regulators, so that these products, such as common positions, may be used to enhance safety reviews and to promote standardisation to benefit safety. Since the first MDEP conference in September 2009, there have been numerous interactions among MDEP representatives and other regulators and industry representatives which have helped the production of MDEP documents. The Fukushima Daiichi accident further highlights the need to increase the safety of new reactors, and the need for regulators to work closely with other stakeholders to ensure the safety of the new reactor fleet worldwide.



Speakers at the press conference organised during the 2nd MDEP Conference on New Reactor Design Activities in September 2011. From left to right: K. Nakamura (NISA, Japan), G.B. Jaczko (US NRC), A.C. Lacoste (ASN, France) and L. Echávarri (OECD/NEA).