

**MULTINATIONAL DESIGN EVALUATION PROGRAMME
PILOT PROJECT AND ASSESSMENT**

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MDEP PILOT PROJECT REPORT

FORWARD

The Multinational Design Evaluation Programme (MDEP) is a multinational initiative to develop innovative approaches to leverage the resources and knowledge of the national regulatory authorities who will be undertaking the review of new reactor power plant designs. MDEP is organised under the Nuclear Energy Agency, which performs the technical secretariat function for the programme.

Under MDEP, nuclear regulators are aiming to enhance safety worldwide through increased cooperation. The enhanced cooperation among regulators will improve the efficiency and the effectiveness of the design review process, aiming at increased convergence of regulatory practices. The participating countries retain their sovereign authority over all licensing and regulatory decisions at all times. The programme is directed by a Policy Group consisting of the heads of regulatory authorities of the participating countries. A Steering Technical Committee (STC), formed of senior level representatives of the ten participating regulatory authorities, was established to implement the activities. A one-year pilot project was initiated to identify areas of potential convergence of regulatory requirements and enhanced cooperation among regulators. This report discusses the conclusions of the MDEP pilot project and the resulting programme of work.

The Policy Group was chaired by Mr. André-Claude Lacoste (ASN, France) and member countries include Canada, China, Finland, France, Japan, Republic of Korea, Russian Federation, South Africa, United Kingdom, and the United States.

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EXECUTIVE SUMMARY

The Multinational Design Evaluation Programme (MDEP) is a multinational initiative to develop innovative approaches to leverage the resources and knowledge of the national regulatory authorities who will be tasked with the review of new reactor power plant designs. MDEP was originally envisioned as a three stage process: Stage 1 involved multilateral cooperation within existing regulatory frameworks; Stage 2 focused on enhanced multinational cooperation and convergence of codes, standards, and safety goals; and Stage 3 was envisioned as the implementation of Stage 2 products to facilitate licensing processes for new reactors, including those being developed by the Generation IV International Forum. A year-long pilot project was initiated to assess the feasibility of the Stage 2 goals. This report provides the findings of the pilot project and future actions for the programme including a restructuring of the stages into a single programme.

The pilot project consisted of two working groups to assess the feasibility of the programme. The first group was tasked with evaluating the similarities and differences in the licensing basis, scope of design review and safety goals of the participating countries. The second group was tasked with assessing the regulatory requirements and review associated with the manufacturing processes for components for use in nuclear power plants. The project was to assess both the regulatory requirements and programmes associated with licensing new nuclear plants. To facilitate completing this task within one year, the programme was focused on three selected areas, namely, Severe Accidents, Emergency Core Cooling System performance, and Digital Instrumentation and Control (I&C) Systems. The study of these selected areas provided insights into both these specific areas, and more broadly, the overall licensing basis, scope of design review, and use of safety goals in the participating countries. By considering a broad range of vendor, utility, and regulator activities for each of these three topics, a sufficiently broad understanding of the regulatory activities in each country was developed.

The pilot project demonstrated that there is a significant benefit in continuing a multilateral effort to cooperate on new reactor reviews. The pilot project also demonstrated that MDEP provides a reasonable tool for working together to identify areas for cooperation.

The results of the pilot project indicate that full convergence of regulatory requirements is not feasible in the short-term (i.e., for the reactor designs currently under review). However, participating countries should continue with cooperation initiatives, as increased cooperation is a prerequisite to convergence. Cooperation will allow a better understanding of each other's processes to encourage and facilitate eventual convergence. Increased understanding developed through cooperation will also allow increased use of the regulatory assessments carried out by other regulatory authorities, while ensuring that the ultimate decision making authority remains with each country's regulatory authority. In addition, there is benefit to formalising interactions and cooperative arrangements for specific reactor designs. The programme concluded that convergence should be pursued on specific reference regulatory practices which will help in further cooperation. Convergence on practices is considered more useful and feasible, as a first step, than convergence on regulations because regulatory practices are generally not written into law and are easier to change than the regulations themselves.

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Opportunities for enhanced cooperation were identified in specific technical areas within existing regulatory frameworks. The programme also identified areas where enhanced cooperation will be facilitated by establishing reference regulatory practices. These opportunities will be pursued through the development and implementation of a revised Multinational Design Evaluation Programme. The new programme combines all stages of MDEP into a single programme. The focus of the new programme will be on enhanced cooperation on design evaluations and inspections. The specific recommendations developed from the pilot project constitute the foundation of the new programme, and successful implementation of the recommendations will result in tools that can be used to enhance the ability of regulatory authorities to cooperate in reactor design evaluations, vendor inspections, and construction oversight, leading to more efficient and more safety-focused regulatory decisions.

The revised programme will be implemented under the MDEP Policy Group and the Steering Technical Committee (STC), with NEA continuing to serve the Secretariat function. Two types of working groups will be formed under the STC:

- Design specific working groups to share information and cooperate on specific reactor design evaluations. A working group will be created for each new reactor design that is under review by multiple countries. Participants in these working groups will be the countries who are actively reviewing, or preparing to review, the specific reactor design. A working group will absorb the activities currently being undertaken by the US, Finland and France to share information on the EPR review as part of MDEP Stage 1.
- Issue-specific working groups to address regulatory process issues such as component manufacturing oversight and technical issues such as digital instrumentation and control standards.

The working groups identified above will be responsible for implementing the following activities. These activities were identified as actions that are both beneficial and achievable in the near term, and will result in improved international cooperation.

MDEP activities:

1. Share information and cooperate on specific reactor design evaluations under current reviews
2. Undertake a multinational vendor inspection cooperation programme
3. Converge on codes and standards for pressure boundary components by completing an evaluation of their similarities and differences
4. Evaluate the similarities and differences in other codes and standards, beginning with a comparison of the digital instrumentation and control standards.
5. Complete the evaluation of the similarities and differences in the overall scope of the regulatory review and analysis for severe accidents and develop a draft reference scope of review
6. Compare how top level safety goals are derived, expressed, achievement is judged among the participating countries, and determine the extent to which they can be considered equivalent.
7. Compare the approaches used for taking account of operating experience in regulatory reviews for new reactors.

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8. Develop a programme to collect, share, and use construction experience feedback in regulatory reviews.
9. Develop a legal framework and the necessary agreements that will support the free exchange of information, including the results of independent analysis and research, among MDEP participants.
10. Establish a “library” to collect and share regulatory documents of common interest describing design requirements and guidance, review process and inspection programme of new reactors. Complement this regulatory library with a list of technical review already performed and available for free exchange of information on request

Background information and preliminary implementing strategies for each of these activities is included in the body of the report.

PART I BACKGROUND INFORMATION

1. Objectives

The main objective of MDEP, as set in the original Terms of Reference, was to establish reference regulatory practices and regulations to enhance the safety of new nuclear reactor designs. This goal is based on the concept that convergence of regulatory practices and regulations associated with the reactor design reviews would allow for enhanced cooperation among regulators, improving the effectiveness and efficiency of the regulatory design reviews, which are part of each country's licensing process. The establishment of reference regulatory practices and regulations would also: enable and encourage safer global standardised reactor designs; facilitate the design reviews of new reactors in many countries; and further public understanding and acceptance of safety goals on an international basis.

The expected results of MDEP, as set in the original Terms of Reference, were to:

- Increase knowledge transfer through the exchange of information on regulatory practices used by the participating countries in their design reviews, covering inter alia technical evaluations, codes, standards and safety goals, inspection practices, licensing requirements, safety research and operating experience.
- Identify similarities and differences in regulatory practices and obtain insights in order to better understand the technical basis for the differences.
- Seek for and achieve convergence on reference regulatory practices in order to facilitate more efficient and effective design reviews, if reasonably practicable.
- Implement the results on specific designs for new reactors.
- Further understanding of regulatory practices on an international basis.
- In completing its work, it is anticipated that the outcome will constitute a very useful input to upgrade the IAEA Safety Standards.

Ultimately, this is expected to lead to a convergence of codes, standards and safety goals in the participating countries. To this end, a pilot project, consisting of two working groups, was launched. The first working group investigated the licensing basis for new nuclear reactor designs, the scope of design safety reviews and overall safety goals. The second examined regulatory oversight of components manufactured for new nuclear reactors.

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2. Organisation

MDEP is governed by a Policy Group (PG) and implemented by a Steering Technical Committee (STC), each consisting of representatives from each of the participating countries.

Participation in the Policy Group and STC is intended for interested countries that already have commitments for new build or firm plans to have commitments in the near future for new reactor design. Ten countries were members of MDEP, including seven NEA members (*): Canada*, China, Finland*, France*, Japan*, the Republic of Korea*, the Russian Federation, South Africa, the United Kingdom* and the United States*. In addition, the International Atomic Energy Agency (IAEA) takes part in the work of MDEP by contributing to the STC, working group and technical experts meetings. NEA performs the technical secretariat function.

The Policy Group consists of the heads of the participating regulatory authorities. The Policy Group approves the Terms of Reference, provides guidance to the STC, and monitors the progress of the programme.

The STC manages and approves the detailed programme of work, defines the topics and working methods, performs as a working group for broad scope topics to exchange information and produce reports, establishes technical expert groups, and reports to the PG.

A Component Manufacturing Oversight Working Group was formed for the Pilot Project and was given the task of assessing the regulatory requirements and review associated with the manufacture processes for components for use in nuclear power plants. The working group consulted with the MDEP STC as necessary (and provided progress reports) to facilitate the effort. The nuclear industry participated in the activities of the working group.

3. Conduct of Pilot Project

The Pilot Project consisted of two working groups to assess the feasibility of the programme. The first group was tasked with evaluating the similarities and differences in the licensing basis, scope of design review and safety goals of the participating countries. The second group was tasked with assessing the regulatory requirements and review associated with the manufacturing processes for components for use in nuclear power plants. The project was to assess both the regulatory requirements and programmes associated with licensing new nuclear plants.

To facilitate completing the first task within one year, the Pilot Project focused its attention on: 1) the regulatory requirements; and 2) the regulatory programmes and practices in three selected technical areas, namely, Severe Accidents, ECCS Performance, and Digital Instrumentation and Control (I&C) Systems. The study of these selected areas was expected to provide insights into both these specific areas, and more broadly, the overall licensing basis, scope of design review, and use of safety goals in the participating countries. By considering a broad range of vendor, utility, and regulator activities for each of these three topics, a sufficiently broad understanding of the regulatory activities in each country was developed, to support findings and recommendations to the MDEP Policy Group.

The Pilot Project activities included a survey in which the same set of questions was asked in each technical area. The survey was answered by technical experts in each participating regulatory authority and relevant information was provided by the IAEA. The survey results were distributed to the MDEP participants and their national experts. The survey results identified that in some aspects there were sufficient similarities in the responses in each area to treat them as “generic” and a separate expert group was set up to evaluate these further. The areas covered by this group included overall safety requirements, quality assurance, role of external bodies in the reviews. The participants also determined that additional

meetings of technical experts in the three specific areas were necessary to provide more complete information on the regulatory policies and practices in each country and to identify similarities and differences.

Each aspect of regulatory requirements and programmes was categorized depending on the level of similarity among the participating countries, as follows:

- A) High degree of similarity – Significant opportunities for cooperation now and a high potential for convergence in the near-term.
- B) Moderate degree of similarity – Moderate potential for cooperation and/or convergence in the near-term.
- C) Low degree of similarity – Limited opportunity for cooperation in the near-term. Significant technical and programmatic obstacles to achieving convergence.

Qualitative cost/benefit factors were considered for each area. Factors that were included in judging the potential benefit or value of cooperation on an issue include the potential for knowledge transfer of technical information, the applicability of safety-related information, enhanced safety decision making, increased public confidence in safety decisions, and the potential for effectiveness and efficiency gains. Factors that were considered in judging the difficulty and the direct costs of increased cooperation include, the need for formal regulatory programme changes (e.g. changes in staff practice vs. changes in regulations vs. changes in national laws or decrees), regulatory complexity relative to an existing regulatory framework, resource investment required to achieve convergence and applicability of an approach or issue to a particular reactor design under consideration. The topic experts made a judgement about the potential benefits and difficulties or costs associated with cooperation and convergence.

The Working Group on Component Manufacturing Oversight (WGCMO) was given the task of assessing the regulatory requirements and review associated with the manufacturing processes for components for use in nuclear power plants. In addressing this subject, the working group focused on the highest safety class pressure boundary components (e.g.: pumps, valves, piping, and pressure vessels). In carrying out its work, the working group focused its review on the use of codes and standards, quality assurance/management programmes, and inspection programmes by the manufacturer, designated third party inspection agency, the customer (i.e. licensee, applicant), and the regulatory authority.

To achieve its task the participants shared information on how their respective organisations performed regulatory oversight on the manufacturing of major components especially quality assurance programmes. This was followed by the issuance of a survey. Based on the results of this survey and group discussions, a supplementary group of questions was derived. The purpose of asking these supplementary questions was to identify points of convergence and divergence among regulatory practices in order to develop a potential path to reconciling the differences and leading to increased regulatory cooperation between regulators in the review and approval of the highest safety class pressure boundary components.

In addition to the survey and group discussions, the group communicated with and met with other interested and affected parties including vendors (AECL, Westinghouse, Areva and Doosan), and codes and standards organisations (ASME, AFCEN/RCCM, KEA/KEPIC and JSME). Additionally, members visited and communicated with manufacturers (Doosan, Japan Steel Works, Areva and Mitsubishi) producing high safety class pressure boundary components in order to better understand their respective Quality Assurance/Management programmes and how they meet various international standards imposed by different MDEP countries. The working group developed a final report addressing: areas of commonality and areas of differences; the nature, importance, and basis for the differences; potential areas

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for increased regulatory cooperation; and areas for potential programme modifications to minimise or eliminate those programme differences where appropriate.

The findings and recommendations of the technical experts and the working group were evaluated in the development of integrated recommendations to the MDEP Policy Group. The recommendations were chosen based on the likelihood of success, including the support of the participating regulatory authorities for each activity, as well as the resources required. The lower priority recommendations were not put forward, recognising the limited resources available. However, there is an understanding that the working groups may decide to pursue additional efforts, such as the lower priority recommendations, based on resources available and the success of the initial recommendations. The participating regulators focused on proposing results-oriented recommendations with clearly defined actions and goals. The feedback and lessons-learned from the MDEP Stage 1 on-going activities were considered in developing the recommendations. The recommendations were incorporated into a revised MDEP programme of work discussed in part III of this report.

PART II FINDINGS

This section provides a consolidated summary of the findings of the Pilot Project.

All regulatory programmes include the concepts that the health and safety of workers and the public must be assured. This goal has been developed and restated in many ways, leading to a myriad of different requirements with different degrees of detail. Some of these are at the level of safety goals, whereas others set out specific objectives but still at a high level. More prescriptive regulatory regimes define more explicitly the design approaches to be employed, the procedures and analysis approach to be used, and the specific objectives which must be met.

In all cases, the need to protect the worker and public from the effects of accidents is recognised. Some countries address the safety requirements in terms of frequencies of release to the environment or doses to individuals, others in terms of damage states without associated frequencies whereas others provide requirements in terms of system performance. Laws, regulatory requirements and practices, as well as design and manufacturing codes and quality assurance requirements related to high safety class pressure boundary components, differ from country to country.

There are some important differences in legal bases and regulatory regimes which may be major difficulties to obtaining full harmonisation of requirements and may also impose limitations on using the work of other Regulatory Authorities, including:

- the form in which top level safety goals are expressed and developed;
- whether meeting regulatory standards is mandatory;
- the degree and form of licensee/vendor documentation;
- the processes used in the regulatory review; and,
- the way operating experience is incorporated in the regulatory review;
- the nature of the regulatory authorities' quality assurance system.

The basis of many regulations is strongly coupled to historical and social /political factors. Past events and accidents as well as research results have played a key role in the regulatory approaches being followed currently. There was a clear realization among the participants that there remains inertia behind existing regulatory frameworks that could pose obstacles when considering changes to existing regulations.

The ECCS expert group found commonalities in approaches to ECCS evaluation and regulation. These commonalities are often based upon reactor types, and offer the potential for harmonisation of licensing bases and safety goals in this area. In particular, a process that relies on sharing technical data and analysis capabilities will lead to opportunities for greater technical cooperation that could lead to a technical consensus for a performance based framework to regulation. The expert groups discussed the

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potential for achieving harmonisation given the current set of various regulatory approaches followed and concluded that a successful path to harmonisation would be to “start anew” with a performance-based framework of regulations.

The ECCS expert group found that placing an emphasis initially on specific reactor types provides the most common ground upon which to cooperate and share results of design reviews. This work will be a catalyst for further technical cooperation and sharing of results.

In the area of digital I&C requirements, there appears to be a higher degree of similarity regarding the regulatory requirements imposed on the licensee/designer than on the regulatory assessment practices.

The expert group on severe accidents concluded that a significant degree of similarity exists in the regulatory processes for reviews performed to ensure that design requirements have been met, and independent analyses and calculations performed by the regulators to verify and/or validate the acceptability of the design. Many countries follow the basic objectives defined in IAEA Safety Guide GS-G-1.2, “Review and Assessment of Nuclear Facilities by the Regulatory Authority.” All participating countries perform detailed reviews of the safety analysis to various extents, including independent confirmatory analyses and calculations. The group also noted that there is a general level of design requirements that is in line with the IAEA Safety Requirements in applying a deterministic approach, for example defence in depth, single failure criteria, and safety margins. Likewise, there are similarities in the application of probabilistic methods in complementing the deterministic approach.

The experts concluded that a considerable degree of similarity exists regarding the Severe Accident qualitative requirements, including the scope, level of defence-in-depth approach, supporting principles, deterministic analysis, and probabilistic safety assessment quality, scope and methodology. However, it was concluded that the numerical safety goals were different.

The MDEP participants identified opportunities for greater technical cooperation in areas such as sharing technical data and analysis capabilities among the participating countries. The added cooperation among MDEP members will allow for increased knowledge transfer through the exchange of information and will help in convergence of multinational regulatory practices.

The Working Group on Component Manufacturing Oversight (WGCMO) found that component manufacturing is currently subject to multiple inspections and audits similar in scope and in safety objectives, but conducted by different organisations. The formation of multi-national regulatory teams to perform inspections of component manufacturers will improve effectiveness and efficiency in the regulatory assessment of highest safety class components. This approach, using a multi-national auditing or inspection team, may also be viable for the nuclear power plant owners, similar to the NUPIC process in the United States.

The WGCMO found that for the design and manufacture of highest safety class pressure boundary components, adherence to design codes and standards is a minimum requirement in showing adequacy. Additional country specific criteria also needs to be satisfied by design and manufacturing organisations. From a survey conducted amongst the regulatory authorities it was clear that regulatory requirements were fundamentally the same for all of the highest safety class components that are part of the pressure boundary. The various design codes and standards are not fundamentally different, although their scope may differ. Further convergence by the code organisations could be beneficial but would require substantial effort. Initially, it is beneficial to establish a retrievable data base of the differences.

PART III CONCLUSIONS AND ASSESSMENT

1. General Conclusions of the Pilot Project

Completion of the pilot project, and the experience gained to date from cooperation among France, Finland and the U.S. on the EPR design review, provided sufficient information to support the following general conclusions:

1. increased multinational cooperation on new reactor regulatory activities is highly desirable and highly feasible;
2. convergence on selected reference regulatory practices is feasible and should be pursued;
3. convergence on reference regulatory requirements should remain a long term goal and progress towards that goal will be facilitated by the near-term MDEP programme of work.

The use of “regulatory practices” as used in this report, is defined as programmes and processes used by the regulators to accomplish safety reviews. Regulatory requirements are the criteria and standards that the regulators apply in making regulatory and safety decisions.

The pilot project demonstrated that is a significant benefit in continuing a multilateral effort to cooperate on new reactor reviews. The pilot project also demonstrated that MDEP provides a reasonable framework for working together to identify areas for cooperation. The goal of MDEP is not to independently develop new regulatory standards, but to build upon the similarities already existing and existing harmonisation in the form of IAEA and other safety standards.

The results of the pilot project identified that full convergence of regulatory requirements is not feasible in the short-term (i.e., for the reactor designs currently under review). However, participating countries should continue with cooperation initiatives, as increased cooperation is a prerequisite to convergence. Cooperation will allow a better understanding of each other’s processes to encourage and facilitate eventual convergence. Increased understanding developed through cooperation will also allow increased use of the regulatory assessments carried out by other regulatory authorities, while ensuring that the ultimate decision making authority remains with the each country’s regulatory authority. In addition, there is benefit to formalizing our interactions and cooperative arrangements for specific reactor designs. The Policy Group concluded that convergence should be pursued on specific reference regulatory practices which will help in further cooperation. Convergence on practices is considered more useful and feasible, as a first step, than convergence on regulations because regulatory practices are generally not written into law and are easier to change than the regulations themselves.

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2. Next Steps

Opportunities for enhanced cooperation were identified in specific technical areas within existing regulatory frameworks. The pilot project also identified areas where enhanced cooperation would be facilitated by establishing reference regulatory practices. These opportunities will be pursued through the development and implementation of a revised Multinational Design Evaluation Programme. The focus of the new programme will be on enhanced cooperation on design evaluations and inspections. The specific recommendations developed from the pilot programme activities constitute the foundation of the new programme, and successful implementation of the recommendations will result in tools that can be used to enhance the ability of regulatory authorities to cooperate in reactor design evaluations, vendor inspections, and construction oversight, leading to more efficient and more safety-focused regulatory decisions.

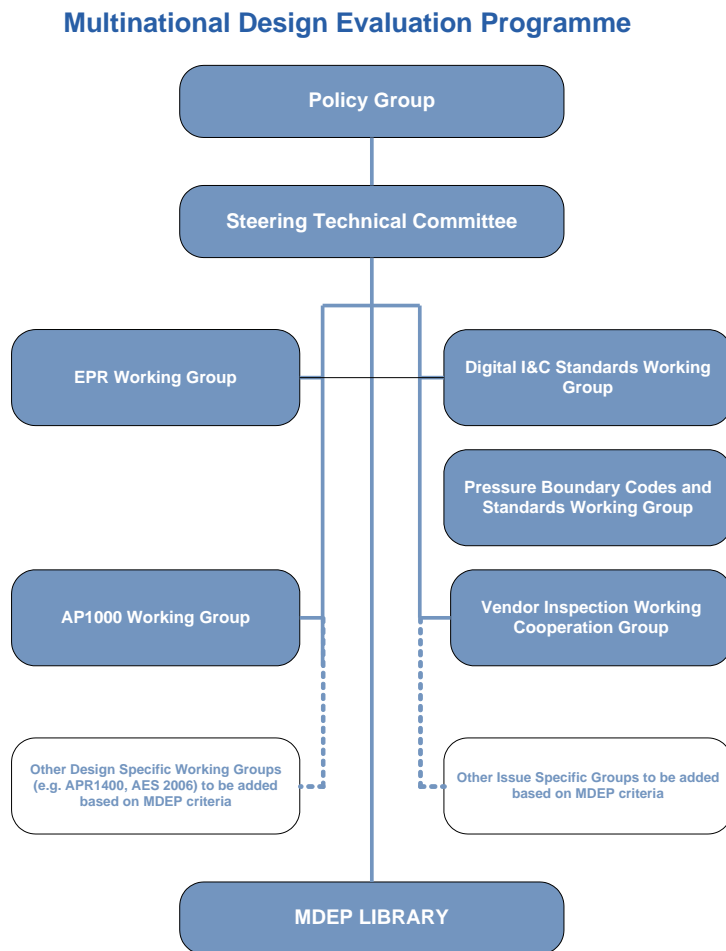
The goals of the revised programme are to:

1. increase knowledge transfer through the exchange of information on regulatory practices used by the participating countries in their design reviews;
2. identify similarities and differences in regulatory practices;
3. move toward convergence on specific reference regulatory practices in order to facilitate more effective and efficient reviews of new reactor designs;
4. increase stakeholders understanding of regulatory practices on an international basis; and
5. enhance the ability of regulatory authorities to cooperate in reactor design evaluations, vendor inspections, and construction oversight.

The revised programme will be implemented under the MDEP Policy Group and the STC, with NEA continuing to serve the Secretariat function. Two types of working groups will be formed under the STC:

1. Design specific working groups to share information and cooperate on specific reactor design evaluations. Criteria for establishing design specific groups is: the interest of three or more regulators with a formal request or application from a vendor or utility for regulatory action, a commitment to active participation in the topics, and a commitment to provide current information through the MDEP library. A working group will absorb the activities currently being undertaken by the US, Finland and France to share information on the EPR review as part of MDEP Stage 1.
2. Issue-specific working groups to address regulatory process issues such as component manufacturing oversight, and technical issues such as digital instrumentation and control standards. Participation in issue specific groups will be open to interested MDEP regulators and to IAEA, and will be based on active participation in the topic and the availability to provide up to date information through the MDEP library.

The chart below illustrates how the programme will be organised.



The working groups identified above will be responsible for implementing the following activities. These activities were identified as actions that are achievable in the near term, and will result in improved international cooperation. The implementing strategies discussed below are preliminary. Actual methods and schedules will be developed by the STC or the appropriate working group.

MDEP Activities

1. Share information and cooperate on specific reactor design evaluations under current reviews.

Background: Based on the experience of cooperation on the review of the EPR design between Finland, France and US, a working group will be created for each new reactor design that is under review by three or more of the participating countries. Participants in these working groups will be the countries who are actively reviewing, or preparing to review, the specific reactor design. The goal will be to maximize interaction and cooperation on design reviews among experts to make technical analysis more robust and to optimize the resources needed to perform national assessments.

Implementing Strategy: This action will be implemented by design specific working groups. The working groups will first identify the similarities and differences in the designs submitted by

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applicants in each country and ensure a clear understanding of the basis for those differences (regulatory requirements; utilities requirements to the vendor...). Based on the findings, the working group will focus technical cooperation through knowledge transfer on technical reviews already performed and mutual assistance on technical reviews to be performed. To be efficient, each country involved in a working group will identify a delegate for meeting preparation and send relevant experts according to the agenda of the meetings. Meetings will be hosted and take place in participating countries. Interaction with the vendor of the specific design may take place based on the programme of work. The NEA will provide secretariat services for the meetings and activities. The working groups will share the results and outputs of their interactions with non-participating countries as appropriate. The EPR working group will continue and a new Working Group will be created for the AP1000 design. Additional groups for designs such as the ESBWR, APR 1400 and the AES 2006 may be set up based on the established criteria.

2. Undertake a multinational vendor inspection cooperation programme

Background: If a determination can be made by the various national regulatory authorities that the design and quality codes taken as a whole are equivalent, i.e., they provide an acceptable level of quality and safety, then it may be possible for one country's regulatory authority to credit inspections performed by other countries to the extent inspections are performed. It should be noted that the level of vendor oversight by regulators varies considerably from country to country. This variability also needs to be taken into account in deciding how much of another regulators work can be credited. Also, some countries have unique requirements. With the large number of vendors supplying nuclear grade components, both electrical and mechanical, it will not be possible for any regulatory authority to inspect all but a fraction of the vendors. While it may not be possible to fully credit another regulator's vendor inspection programme and limited scope inspections may be necessary for notification of substantial defects or specific requirements applicable in other countries, a multi-national vendor inspection programme will be able to provide insights on the effectiveness of quality programmes of a larger number of vendors which, can be shared by all participating countries. It should be noted that several inspections of component manufacturers have already been carried out with multinational participation and/or observation.

Implementing Strategy A working group will be established. The group will identify areas of commonality and differences between regulatory practices of participating countries in the area of vendor inspection programmes. The working group will develop an overall framework and timeline for the conduct of inspections of vendors and a protocol for sharing results among national regulatory authorities. Longer term, the working group will develop a draft international inspection programme and conduct a pilot vendor inspection with a multinational regulatory team to test the programme. The programme of inspections should be coordinated with the design specific working groups.

Near-term outputs will be accomplished in one year. Longer term outputs will be accomplished in approximately two years.

The NEA will provide secretariat services for the meetings and activities. Representatives from the participating countries with knowledge of vendor inspection and quality programmes will participate as necessary to accomplish the stated outputs.

3. Converge on codes and standards for pressure boundary components by completing an evaluation of their similarities and differences

Background: The primary expected output of this activity is a retrievable data base of the similarities and differences among the codes and standards used in the design of pressure boundary components. The initial effort will emphasize similarities and differences among the codes and standards used in the U.S. (ASME), France (RCCM), Japan (JSME), and Korea (KEPIC). Owing to the history of these codes and standards, and previous efforts to compare them, these codes and standards are believed to be a credible starting point. Subsequent activities to reconcile any differences or determine the equivalence of similar requirements among these codes are the province of the code organisations but the database of similarities and differences will be useful to designers and to regulators. Recognising that Codes and Standards are periodically revised, an additional output is the development of a protocol to keep the database current. As a following effort, comparisons of these codes and the Russian codes and standards will be undertaken to identify the similarities and differences with the other codes and standards.

Implementing Strategy: A working group will be established. The group will perform an assessment of the similarities and differences and develop a preliminary database for the ASME, RCCM, JSME, and KEPIC codes and standards within approximately one year. Efforts regarding the Russian codes and standards will continue for at least another year. The working group will act as enablers for the codes and standards organisations who, by the nature of this work, will ultimately perform the tasks.

The NEA will provide secretariat services for the meetings and activities. Representatives from each of the participating countries with knowledge of codes and standards will participate, and will interact with representatives of the codes and standards bodies to identify the similarities and differences. The Working Group members will provide the effort needed to structure the database.

4. Evaluate the similarities and differences in codes and standards in all areas beginning with Digital Instrumentation & Control standards.

Background: In moving towards convergence, the codes and standards used in design, manufacture, installation and construction of new reactor designs are fundamental. It will be useful, therefore, to carry out a regulatory comparison to identify the similarities and differences. In the case of the latter, an evaluation should be conducted of whether the differences are significant, or merely different ways of expressing essentially the same requirements. The codes and standards considered should include those related to quality assurance, design change control, and any others that might have an affect on the safety of the facility. The programme has already identified that a comparison of the Digital I&C standards is worthwhile.

Implementing Strategy A working group will be established for digital I&C standards. The working group will interact with the organisations in charge of the standards to seek their participation in performing a comparison exercise. The working group will then analyse the result of the comparison exercise and identify which differences should be rated as priority for increased convergence work. As a long term goal, the working group should interact again with the relevant organisations with the aim of getting increased convergence. Discussions on this issue will also take place in the design specific working groups and, therefore, effective coordination is required to ensure adequate exchange of information and to avoid duplication.

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Other potential issues (following digital I&C) that may be looked at are conventional components (e.g., diesel generators, pumps, etc.) to be used in nuclear systems.

5. Complete an evaluation of the similarities and differences in the overall scope of the regulatory review and analysis for severe accidents and develop a draft reference scope of review

Background: The goal of this activity is agreement by the MDEP participating regulatory agencies on a reference level of the overall scope of the regulatory review and analysis. This could be based on IAEA recommendations. A long term goal is a harmonised scope of the regulatory review and analysis in the area of severe accidents.

Implementing Strategy Work on this issue is currently being performed in NEA and IAEA. It is necessary to assess this ongoing work before proceeding with any activities under MDEP. Accordingly, the STC will review and assess the issue and provide any proposed actions at the next PG meeting.

6. Compare how top level safety goals are derived, expressed, achievement is judged among the participating countries, and determine the extent to which they can be considered equivalent.

Background: The overall goal of safety regulation is to ensure that licensees operate their facilities so that risks to people and the environment are at an acceptable level. This goal is expressed in the form of top level goals which are used to derive more detailed goals for particular situations and equipment. The top level goals are expressed in different ways and this means that, firstly, it is not obvious if they are equivalent and, secondly, lead to different approaches to and forms of, the more detailed goals. To enhance cooperation in using other regulators assessments and understanding of how decisions have been reached, it is important to have a good understanding of these top level goals and the extent to which they are equivalent.

Implementing Strategy Work on this issue is currently being performed in NEA and IAEA. It is necessary to assess this ongoing work before proceeding with any group in MDEP. The programme will monitor IAEA and NEA publications due out at the end of 2008. The STC will review and assess the issue and provide any proposed actions at the next PG meeting.

7. Compare the approaches used for taking account of operating experience in regulatory reviews for new reactors.

Background: All new reactor designs claim to be improvements on previous/current designs in terms of safety and effects on the environment. An important factor in demonstrating this improvement is to consider the operational experience feedback (OEF) from similar plants, other reactors and relevant non-nuclear facilities, both within the country and internationally. The initial survey showed a wide range of approaches used in different countries and it is necessary to understand these differences and how they affect the regulatory review process if use is to be made of other regulators reviews. A particular issue is the approach used by regulators when considering completely new types of reactor design for which no direct operating experience is available.

Implementing Strategy Work in these areas is being performed by the CNRA Working Groups on Operating Experience (WGOE), on Regulation of New Reactors (WGRNR) and on Inspection Practices (WGIP). MDEP members will communicate and exchange information with these groups and report back to the STC on how operating experience is being applied to new reactors and how construction experience is being collected, shared and used for new build.

8. Develop a programme to collect, share, and use construction experience feedback in regulatory reviews.

Background: New plant construction is currently underway in several countries and several are in the process of reviewing applications or assessing new reactor designs. Sharing information concerning construction experience and inspection will be helpful. The CNRA Working Group on Regulation of New Reactors (WGRNR) will prepare a report on the collection of construction experience for reactors or other nuclear facilities including methodology, criteria, etc. This new data base should allow regulators to share experience during the coming new phase of construction which can be incorporated into their regulatory oversight and improving their inspection programmes.

Implementing Strategy: Based on the CNRA initiative, a specific MDEP working group will not be established in the near term. The MDEP members will observe the activities of the CNRA WGRNR and provide a forum for communicating information between the MDEP members and the CNRA working group. NEA will facilitate this action.

9. Develop a legal framework and the necessary agreements that will support the free exchange of information, including the results of independent analysis and research, among MDEP participants.

Background: In order for the MDEP to be successful at fulfilling its goal of leveraging the work of peer regulators in the licensing of new nuclear power plant designs, a legal framework needs to be developed that will facilitate the sharing of technical information among MDEP participants. Because each country has its own unique policies and requirements regarding the release/sharing of information, including security considerations, a legal framework must be developed that is acceptable to all participating MDEP regulators.

Implementing Strategy: The expected output of this action is an agreement document that details the procedures regarding the access and dissemination of technical information among MDEP participants. The NEA will take the lead in drafting the legal document. The goal is to reach agreement on a legal framework within 6 months.

10. Establish a “library” to collect and share regulatory documents of common interest describing design requirements or guidance, review process and inspection programme of new reactors. Complement this regulatory library with a list of technical reviews already performed and available for free exchange of information on request

Background: Enhanced cooperation can be fostered through the use of modern information technology, such as, the creation and maintenance of an interactive, regulatory knowledge management system, available to all MDEP participants, for collecting and sharing information relevant to new reactor design evaluations. Such cooperation should take the form of sharing regulatory documents of common interest describing design requirements and guidance, the review process, and the inspection programme for new reactors. These documents should be provided by, and accessible to, the participating regulatory authorities. This will address the MDEP goal of increased knowledge transfer among regulatory authorities

Implementing Strategy: A list of reviews already performed and available for free exchange of information on request will be included in the library. To enhance cooperation, it will be beneficial to include in this list a brief summary of the content and regulatory background of each document. A standard model for this summary will therefore be developed.

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Modern, information technology tools and methods will be employed to facilitate such sharing and cooperation. This could consist of an information technology application such as an interactive website on which research by topics, countries and reactor design could be performed.

A searchable working library of publicly available documents should be available for use by the end of 2008. The NEA will have the lead for establishing the library with oversight by the STC.

3. Structure of MDEP going forward

It is the judgment of the Policy Group that the best way to meet the long terms goals of MDEP is to focus on cooperation and convergence of regulatory practices that will eventually develop into convergence of regulatory requirements. Progress towards harmonized regulatory practices and requirements for Generation IV reactor designs will be a natural outgrowth of the activities discussed above, and may be implemented through a separate working group under the STC in the structure proposed. The eventual inclusion of future reactor activities as a working group, in addition to the inclusion of the current Stage 1 activities as a design specific working group, obviates the need for a three stage programme. Therefore, all stages of MDEP will be combined into a single programme with the structure previously described.

Funding is necessary in order for the technical secretariat to carry out its support functions and will be collected equally from each of the participating countries. Membership of MDEP will remain as is for the present time. The programme will explore methods to share information with other non-MDEP countries interested in new build.