

The NEA Programme in the Area of Nuclear Emergency Planning, Preparedness and Management

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ABSTRACT

As a result of this interest by its member countries in emergency planning and preparedness for nuclear accidents, the Nuclear Energy Agency (NEA) has for some time been actively involved in this area. A list of NEA publications in this area is included here as Annex 1. The International Nuclear Emergency Exercise programme (including INEX 1 and INEX 2) is an outgrowth of a variety of NEA emergency planning and preparedness activities. INEX 1, a table-top exercise, took place in 1993 with the participation of 16 countries. The experience from this exercise is summarised in the NEA document, "INEX 1: An International Nuclear Emergency Exercise". This experience led to three NEA Sponsored Workshops (Short-Term Countermeasures, 1994, Agricultural Aspects of Radiological and/or Nuclear Emergency Situations, 1995, and Emergency Data Management, 1995) to investigate, in detail, various aspects of emergency planning, preparedness and response. All these activities contributed to the development of INEX 2, which took place between 1996 and 1999. Based on experience from these exercises, a new monitoring and data management strategy for nuclear emergencies was developed. It is currently planned to test this strategy in the INEX 2000 exercise, scheduled for February 2001. The NEA's Working Party on Nuclear Emergency Matters is also, based on its experience to date, developing a long-term strategy for addressing issues in nuclear emergency planning, preparedness and management. This paper will focus on the experience and lessons learned from the INEX 2 series of exercises, on the planning for INEX 2000, and on the Working Party's long-term strategy.

INTRODUCTION

The NEA's programme in nuclear emergency exercises began in the early 1990's with the planning and execution of the first international nuclear emergency exercise, INEX 1. This table-top exercise took place in 1993 with the participation of 16 countries. The experience from this exercise is summarised in the NEA document, "INEX 1: An International Nuclear Emergency Exercise". This experience led to three NEA Sponsored Workshops (Short-term Countermeasures, 1994, Agricultural Aspects of Radiological and/or Nuclear Emergency Situations, 1995, and Emergency Data Management, 1995) to investigate, in detail, various aspects of emergency planning, preparedness and response. This experience led to the development of the INEX 2 series exercises where there were much more wide-reaching and realistic than the INEX 1 exercise.

INEX 2

The INEX 2 exercise was actually a series of four regional, command-post exercises with the simultaneous, real-time participation of many countries and international organisations. The structure of INEX 2, for each Regional Exercise, is based on an "Accident-Host" country which will superimpose the INEX 2 objectives and requirements on top of a previously-planned and scheduled national-level command-post exercise. Bordering countries will participate simultaneously, activating their own emergency command posts and utilising existing bilateral and multilateral notification and communication agreements, as well as such agreements with international organisations (IAEA, CEC), to receive and transmit information. Countries not bordering the accident host ("Far-Field countries") will also participate simultaneously, either with full or partial command-post exercises, again using their existing bilateral and multilateral notification and communication agreements, as well as agreements with international organisations (IAEA, CEC). Only the information gathered through these normal channels will be used as the basis of decision-making (countermeasures, public information, data management. etc.).

The four Regional INEX 2 Exercises which are currently completed or scheduled include Switzerland (November 1996), Finland (April 1997), Canada (April 1999) and Hungary (November 1998). The INEX 2 Programme has received wide support both inside and outside the NEA. A total of 30 countries and 3 international organisations participated in the Swiss Regional INEX 2 Exercise, 28 countries and 5 international organisations participated in the Finnish Regional INEX 2 Exercise, 34 countries and 3 international organisations have agreed to

participate in the Canadian Regional INEX 2 Exercise, and 30 countries and 3 international organisations participated in the Hungarian Regional INEX 2. A list of participating countries is included in Annex 2.

The objectives of the INEX 2 Regional Exercises are based on the experience of INEX 1 and the three workshops. These objectives are as follows:

- **The real time exchange of information:** in order to exercise under conditions as close as possible to those of an actual emergency situation, each participant's actual communications hardware, software and procedures will be used to send and receive information from other countries and international organisations, and this will be done in real time. This will involve the use of all standing early notification conventions, notably those of the IAEA and the EC, as well as all appropriate bilateral and multilateral agreements that participating countries may have with other participating countries. The advantage of such an exercise is that programmatic and procedural aspects requiring further development can be highlighted, and at the same time personnel can receive valuable training and experience.
- **Public information:** the many aspects of public information were not well exercised in INEX 1, and as such many participants felt that the exercise was not as realistic as it could have been. In view of this, INEX 2 will include public information components, such as press releases, public briefings, media interactions and pressures, co-ordination of public information, etc. This will include such
 - Providing information to the public on what action to take - or not to take - based on the recommendations of government officials.
 - Questioning of various public officials and utility representatives by the media, at least by telephone, regarding the situation, actions taken or expected to be taken, and the reasons for not taking certain actions.
 - Conducting one or more press briefings in which media representatives have the opportunity to ask questions of government officials and utility representatives.
 - Providing information feedback to the players in the form of production of simulated news or radio programs based on the information collected by the media simulators.
- **Decision making based on limited information and uncertain plant conditions:** in order to exercise the decision-making process in each participating country, the pre-release and immediate post-release phases of an accident will be simulated in INEX 2. The use of realistic data (in quantity, quality, and flow rate) will exercise participants' programmes and procedures for making decisions based on incomplete data, that is, preliminary and/or incomplete plant status and radionuclide release data, which is often limited in scope and certainly pre-dates any detailed information as to the scale, duration and effects of a release. In addition, the decision making process immediately post-release will be exercised, thus providing information as to a programmes ability to adjust to quickly evolving situations. Although rapid countermeasure decision making may be less essential for Far-Field Countries, early decisions regarding travel, tourism and advice to embassies may well be necessary. In this same spirit, it is suggested that real weather conditions be utilised. The World Meteorological Organisation (WMO) will participate, as appropriate, in providing real-time information as to local, regional and global weather trends during the exercise.

For each Regional Exercise, all participating countries produced Country Exercise Summary Reports and attended a Regional Exercise Summary Meeting, from which generic conclusions and recommendations were drawn. This forms the basis for a Final Regional Exercise Report. After the completion of these four Regional Exercises, an INEX 2 Summary Meeting was held, in December 1999, to review the experience to date, and to recommend new areas to be addressed by the NEA's programme in the future.

In summarising the experience and lessons learned during the four INEX 2 regional exercises, four areas of interest were discussed:

- Lessons learned for the preparation of emergency exercises
- Lessons learned for decision making based on limited information and on plant conditions
- Lessons learned on the real-time exchange of information, and
- Lessons learned in public and media communications.

A complete report on the experience from the INEX 2 regional exercises will be published during the first half of 2000, but a brief, preliminary summary of lessons is provided here.

PREPARATION OF EMERGENCY EXERCISES

Much was learned, particularly by the four Accident Host countries, in terms of the preparation of emergency exercises. It was agreed by all four accident-host countries that while such preparations are very time consuming, they are, in themselves, very good learning experiences. The following is a brief list of the most important points:

- Preparation of the exercise is the key part of the exercise
 - Preparation of a detailed checklist will help to identify strong and weak areas,
 - The preparation process is useful to refine existing processes and procedures.
- Having an international component of the exercise facilitates convincing management as well as local communities to participate in the exercise.
- The use of real time weather versus “historical” weather:
 - To exercise pre-defined post release issues, the use of historical weather seems to be favourable;
 - Real-time weather is preferable to exercise forecast uncertainties, and real-time plume dispersion calculations
- It is very difficult to realistically simulate public and media information, and public and media feedback. It is fairly sure, however that the impact of such feedback in a real situation would result in different responses from decision makers.
- Communication during exercises must use the same channels as those established for real events.

Decision making based on limited information and on plant conditions

The first of the three objectives for the INEX 2 Regional exercises concerned the making of decisions based on limited information, and on plant conditions. The original objective had referred only to plant conditions, however, after the Swiss and Finnish Regional Exercises, it was decided to expand this objective to include limited information situations to make the objective more generically applicable to border and far-field countries. In general, it was stressed that decision making goes well beyond the implementation of the three classic short-term countermeasures (sheltering, evacuation and the use of KI). Many other decisions, concerning travel, tourism, transportation, background information, recommendations to foreign nationals, etc. are also important areas that decision makers will have to address. Tools and training for such decisions are thus very important. A brief list of other significant lessons is provided here.

- In order to optimise decision making, relevant information should reach the decision makers as completely and in as timely a fashion as possible.
- In regions where the overall situation is comparable, it is important that decision-making be co-ordinated, and that resulting decisions are somewhat in harmony. To assist this aim, decision makers should use similar, and co-ordinated criteria for the implementation of various countermeasures.
- Background information on potential accident sites should be collected in advance and stored in an easily available and transmittable format.
- The role of international organisation in assisting the decision making in an affected country should be clearly defined in advance.
- Taking no countermeasures is a very important information that has to be explained to public and media.
- Use of the INES Scale of event severity is problematic. Discussions are necessary to clarify the use of INES as an immediate communication tool to be based on whatever limited knowledge is available; as a communication tool to express upper bounds to consequences, etc. Whether the INES scale should be modified as knowledge improves was another question seen as needing some discussion.
- International harmonisation of intervention levels is necessary.
- In order to assure that national response processes are initiated in a sufficiently timely fashion, the decision to activate is often taken without official notification. To accomplish this, there is a need to follow national and international news services.

Real time information exchange

Information exchange was seen as one of the keys to decision making and population protection, and thus much of the participant’s focus was in this area during the four exercises. Particularly for border and far-field countries, the collection of sufficient information to support their decision-making needs was a key to these exercises.

In general, it can be said that much has been learned in terms of the type, quality, and volume of information that will be needed in such emergency situations, and in terms of what information will be available

through currently existing channels. It has been noted by many exercise participants that more information than is currently available would be necessary, in the case of a real emergency, to assure that decisions and public communications are based on appropriately knowledge. In addition, the currently existing procedural and technological means for information and data transmission have been shown to be in need of improvement and modernisation.

In this context, experience from the INEX 2 programme is leading to a consensus regarding future emergency notification and communication programmes. Specifically, the INEX 2 exercises have shown that the use of modern “World-Wide Web” technology can help to optimise the exchange of information, and to minimise the amount of redundant information transmitted. The technical details of how a reliable and secure network, based on active sending and passive retrieval of information, could be established are being investigated, and will be tested in an “INEX 2000” exercise. Included in this concept is the identification of “key data” to be transmitted at various phases of an accident, as well as an optimisation of emergency environmental monitoring strategy. It is hoped that the use of such a communications network will serve as a basis for reducing the redundancy of efforts now codified in two international notification conventions; one through the IAEA and a second through the EC. A few other important points were also noted, and are briefly summarised here.

- Currently available communication systems (telephone, fax, etc.) are not sufficiently effective and efficient to meet information exchange needs.
- Decision makers need more information more quickly to ensure that decisions and public information are based on appropriate knowledge.
- A communication network using World Wide Web technologies would allow effective communications.
- Using modern communication means, a “push / pull” approach could be adopted to best met countries’ diverse needs. First notification of an accident (alert) and important new information must be actively sent (“pushed”) to appropriate contact points. Other information could be made available to be taken (“pulled”) from an electronic source.
- Various aspects of “good practice” for information exchange were identified, such as
 - It is essential to identify the sender / source of information.
 - The time (UTC and Local) for which information in a message is valid should be included in any messages.
- To facilitate the exchange of information, particularly among far-field countries, international organisations and diplomatic channels should be more effectively used.

Public information and media

Public and media information was the third area explored during the four Regional INEX 2 exercises, and all participants agreed that this aspect significantly improved the realism of the exercises. However, because it was not possible to adequately simulate the full force of the type of media coverage that would inevitably follow any type of nuclear accident, participants agreed that the experience, particularly of upper-level decision makers, was not fully representative of an actual situation. In spite of this, however, the media aspects were greatly appreciated by participants, and the following general lessons were learned.

- There still exists a significant language problem in terms of sending complex messages in a language other than one’s own (to the media or to other governments and international organisations), and with communicating with foreign nationals.
- It is important to establish communication channels with the public and the media before an accident occurs.
- It is essential to inform and involve public and media as one of the first countermeasures in case of a nuclear emergency, and to maintain such links throughout all crisis stages.
- The use of Internet and web technology can greatly facilitate communications with the media and the public.
- It is essential that all governmental bodies within a country, and internationally if possible, co-ordinate information being sent to public and media.

INEX 2000

As mentioned above, the use of modern communication means for the sending and exchange of information during emergencies was partially tested during the four INEX 2 Regional exercises, and was seen as a very promising path for future evolution in this area. To move forward, the NEA has developed a monitoring and data management strategy for nuclear emergencies. A report will be issued on this subject in early 2000,

however one of the main focuses of this strategy involves the use of modern technology to establish an electronic network for emergency communications. This will involve the use of both electronic messages (which are actively sent) and of electronic “web pages” where information can be accessed by authorised users. To test this approach, a test network is being established in several countries, and the INEX 2000 has been developed as a “road test” of such an approach. France has offered to act as the accident host country for this INEX 2 like exercise that will take place in early 2001.

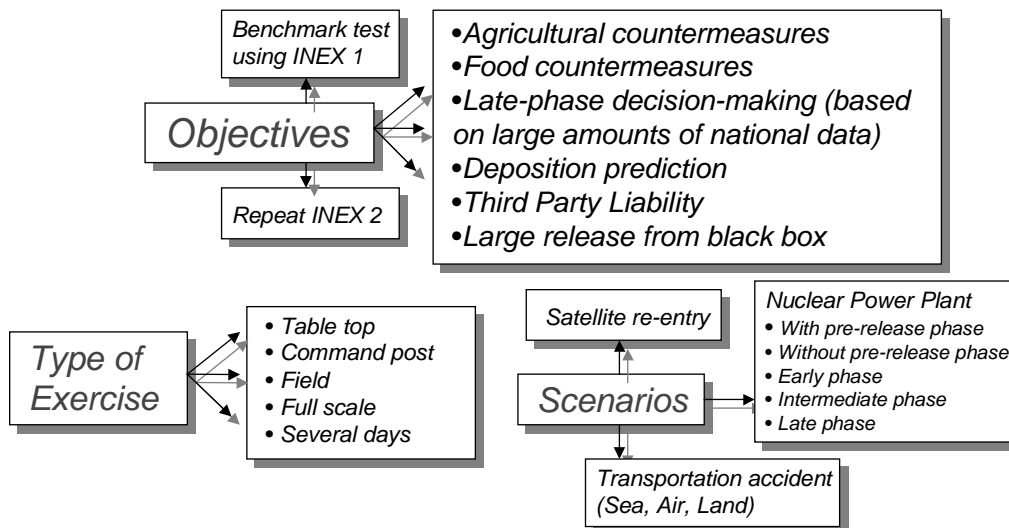
In addition INEX 2000 will be the first exercise to test a new, co-ordinated international approach to exercises. Several international organisations will jointly sponsor this exercise, each developing its own objectives, having its own organisational structure and participants, and conducting its own lessons learned and summary meetings. All such preparations and summaries are run in as parallel or joint a fashion as possible to most efficiently utilise national and international resources. The NEA, the IAEA, the WHO and the WMO will jointly sponsor INEX 2000.

Another unique feature of the NEA’s objectives for the INEX 2000 exercise will be the addressing of civil liability considerations. The NEA’s Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy is developing objectives to exercise how the various international conventions on third-party liability would be implemented in the case of a transboundary nuclear accident.

LONG-TERM STRATEGY

Based on the NEA’s experience to date in these areas, a long-term strategy is being developed which will focus on using various types of exercises (table-top, command post, field exercises, workshop exercises, etc.) to address emergency planning, preparedness and management emerging needs. The format and style of each exercise will be chosen to best address the exercise objectives. The figure below shows the types of objectives, formats and scenarios being considered.

Further Generation of INEX Exercises



One of the areas on which INEX 3 will certainly focus is third party liability aspects of accidents with transboundary effects. The four international conventions or protocols covering national obligations in this area are as follows:

- **The Paris Convention:** Convention on Third Party Liability in the Field of Nuclear Energy of 29th July 1960, as amended by the Additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982 (for full text see http://home.nea.fr/html/law/nlparis_conv.html)
- **The Brussels Convention:** Convention of 31st January 1963 Supplementary to the Paris Convention of 29th July 1960, as amended by the additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982 (for full text see <http://home.nea.fr/html/law/nlbrussels.html>)
- **The Joint Protocol:** Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (for full text see http://home.nea.fr/html/law/nljoint_prot.html)
- **The Vienna Convention:** Vienna Convention on Civil Liability for Nuclear Damage (for full text see <http://www.iaea.or.at/worldatom/glance/legal/inf500.html>)

The OECD is the depository of the Paris Convention, and the negotiations leading to the Brussels Convention took place within the framework of the OECD. NEA's Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy, whose members were involved in the development of these conventions, has for some time been interested in investigating how these conventions could be implemented. Specific exercise objectives to test convention implementation are being developed for the INEX 2000, and these aspects will most likely figure prominently in the INEX 3 series of exercises. The IAEA, which is the depository for the Vienna Convention and the Joint Protocol, will be invited to contribute to this programme.

CONCLUSIONS

In conclusion, the NEA's work in the area of emergency planning, preparedness and management, including the INEX 1 exercise, the INEX 2 exercise, the INEX 2000 exercise, and various workshop, has proved to be a very successful, and relatively unique in its international nature. Strong interest has been shown, by NEA member and non-Member countries alike, in the area of nuclear emergency matters and international exercises, indicating that the NEA's program in this area has been useful and successful. Owing to the NEA's unique position as a well-respected international organisation which does not have responsibilities in the area of emergency response, the NEA is seen by all participants as very well placed to organise and analyse the results of this type of international exercise. It is hoped that the NEA's long-term strategy, and any future INEX 3 exercises and their follow-up, will be continue to be successful and appreciated by all participating countries.

REFERENCES

Nuclear Emergency Management, Preparedness and Planning Related Publications

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- NEA98 “Second International Nuclear Emergency Exercise: INEX2”, OECD/NEA, Paris, 1998
- NEA00 “Monitoring and Data Management Strategies for Nuclear Emergencies”, OECD/NEA, Paris, 2000

ANNEX 2: Countries Participating in the Regional INEX 2 Exercises

	SWISS Exercise	FINNISH Exercise	CANADIAN Exercise	HUNGARIAN Exercise
1	Austria	Austria	Austria	Austria
2	Belarus	Bulgaria	Belarus	Brazil
3	Belgium	Denmark	Bulgaria	Bulgaria
4	Bulgaria	Estonia	Canada	Czech Republic
5	Canada	Finland	Chinese Taipei	Denmark
6	Chinese Taipei	France	Denmark	Egypt
7	Czech Republic	Germany	Estonia	Estonia
8	Denmark	Greece	Finland	Finland
9	Estonia	Hungary	France	France
10	Finland	Iceland	Greece	Germany
11	France	Ireland	Hungary	Greece
12	Germany	Italy	Iceland	Hungary
13	Hungary	Japan	Ireland	Ireland
14	Ireland	Korea	Italy	Japan
15	Italy	Latvia	Japan	Kazakhstan
16	Japan	Lithuania	Kazakhstan	Latvia
17	Korea	Netherlands	Latvia	Lithuania
18	Lithuania	Norway	Lithuania	Luxembourg
19	Luxembourg	Poland	Luxembourg	Netherlands
20	Netherlands	Portugal	Mexico	Norway
21	Norway	Romania	Netherlands	Poland
22	Portugal	Russia	Norway	Portugal
23	Romania	Slovak Republic	Peoples' Republic of China	Romania
24	Slovak Republic	Slovenia	Portugal	Slovak Republic
25	Slovenia	Spain	Romania	Slovenia
26	Spain	Sweden	Russia	Spain
27	Sweden	Switzerland	Slovak Republic	Sweden
28	Switzerland	United Kingdom	Slovenia	Switzerland
29	United Kingdom		Spain	Ukraine
30	United States		Sweden	United States
31			Switzerland	
32			Ukraine	
33			United Kingdom	
34			United States	

International Organisations Participating in the Regional INEX 2 Exercises

	SWISS Exercise	FINNISH Exercise	CANADIAN Exercise	HUNGARIAN Exercise
1	EC	EC	EC	IAEA
2	IAEA	IAEA	IAEA	EC
3	WMO	WHO	WMO	WMO
4		WMO		
5		UNDHP		