Inter-Agency Committee on Response to Nuclear Accidents

Working Group on Joint International Exercises

Exercise Report

ConvEx-3 (2005)

International Emergency Response Exercise

LIMITED DISTRIBUTION

This report has been prepared by the:

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CONVEX-3 (2005) EXERCISE REPORT
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Foreword

The Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency are the prime legal instruments that establish an international framework to facilitate the exchange of information and the provision of assistance in the event of a nuclear accident or radiological emergency. Along with States Party to these Conventions, the World Health Organization (WHO), the World Meteorological Organization (WMO) and the Food and Agriculture Organization of the United Nations (FAO) are full Parties.

The International Atomic Energy Agency (IAEA) has specific functions allocated to it under these Conventions. These include the responsibility to inform States Parties, Members States, and other States of a nuclear or radiological emergency. The IAEA receives reports of an emergency from a designated competent authority in a State and verifies any unconfirmed reports of an emergency. It establishes primary functional links with the reporting State and any potentially affected States as appropriate, providing direct communication with the respective official national emergency response coordinating structures. It also establishes functional links with the WMO, WHO, FAO and other organizations, as appropriate.

The IAEA regularly convenes the Inter-Agency Committee on Response to Nuclear Accidents (IACRNA)[1], whose purpose is to coordinate the arrangements of the relevant international intergovernmental organizations ('international organizations') for preparing for and responding to nuclear or radiological emergencies. Although the Conventions assign specific response functions and responsibilities to the IAEA and the Parties, various international organizations have — by virtue of their statutory functions or of related legal instruments — general functions and responsibilities that encompass aspects of preparedness and response.

It has been recognized that good planning in advance of an emergency can avoid problems and substantially improve the response. With this in mind, the IAEA, the organizations Party to the Conventions, and some other international organizations that participate in the activities of the IACRNA have developed and maintain the "*Joint Radiation Emergency Management Plan of the International Organizations*" (the Joint Plan). This Plan describes: the objectives of response; the organizations involved in response, their roles and responsibilities, interfaces among them and between them and States; operational concepts; and preparedness arrangements. These practical arrangements are reflected in the organizations' own emergency plans.

At the 17th Regular Meeting of the IACRNA it was decided to conduct the next international emergency response exercise in 2005 under the designated name of ConvEx-3 (2005).

A draft report was already made available, in July 2005, during the Third Meeting of the Representatives of Competent Authorities identified under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency. The conclusions, recommendations and lessons identified were discussed. The Meeting expressed its appreciation for the work done by Romania in hosting the ConvEx-3 (2005) exercise. Noting with appreciation the timeliness of the preparation of the draft report, the Meeting recommended that the Secretariat arrange for the publication of the report and urged the Secretariat and all competent authorities to take prompt and relevant actions on key lessons identified.

This final report of the IACRNA Working Group on Joint International Exercises presents a comprehensive analysis about the performance of the international organisations and some Member States during the

[1] The Inter-Agency Committee for the Coordinated Planning and Implementation of Response to Accidental Releases of Radioactive Substances (now renamed as IACRNA) was established following a meeting of representatives of FAO, UNEP, ILO, UNSCEAR, WMO, WHO and IAEA at the Special Session of the IAEA General Conference in September 1986.

ConvEx-3 (2005) exercise as well as the conclusions, recommendations and lessons identified. Some of the lessons identified have already been addressed in the IAEA's Incident and Emergency Centre response arrangements. In addition, these lessons will be presented to the IACRNA and, to the extent possible, will be addressed in the new edition of the Joint Plan (EPR-JPLAN 2006) and ENATOM (EPR-ENATOM 2006).

Vienna, August 2005

Contents

Section 1

1 INTRODUCTION

1.1 Background Information

Over the past decade, many international nuclear emergency exercises have taken place, and much experience has been gained in the important fields of emergency preparedness and management. In order to more efficiently plan, conduct, analyse and share the results of international nuclear emergency exercises, the Inter-Agency Committee for Response to Nuclear Accidents (IACRNA), for which the IAEA provides the Secretariat, serves as a coordination point for these activities. The IACRNA is made up of representatives from relevant international intergovernmental organizations involved in the preparedness for and/or management of nuclear emergencies, including the European Commission (EC), the International Atomic Energy Agency (IAEA), the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (NEA/OECD), the United Nations Office for the Co-ordination of Humanitarian Affairs (OCHA), the World Health Organization (WHO), and the World Meteorological Organization (WMO).

It has been recognized that coordination and joint sponsorship of international nuclear emergency exercises can reduce the total number of exercises undertaken, helping to optimize resource utilization for both national and international organizations. Coordination can also extend the scope of the objectives addressed by such exercises, and national and international participants can profit from a broad range of proposed objectives. At the same time, results and analyses can be more effectively shared.

The purpose of ConvEx-3 (2005) was to test and evaluate exchange of information and coordination of assistance on the international scale during the early phase of a major emergency. The ConvEx-3 (2005) provided an opportunity to identify possible shortcomings in the national and/or international emergency response systems that might hamper the response aimed at minimizing the consequences of a nuclear accident.

ConvEx-3 (2005) was based on the 2005 Romanian national exercise at the Cernavoda nuclear power plant (Unit 1) and took place on 11 and 12 May 2005. The exercise progress was relatively fast in the first stage and slow in the second stage. It included releases in the first hour due to containment isolation failure and a containment controlled depressurisation through the stack between 26-30 hours after the initiating event.

The scenario for the exercise was prepared by Cernavoda nuclear power plant together with the Romanian National Commission for Nuclear Activities Control (CNCAN) – the National Competent Authority-NCA(D)- for a Domestic Accident within the framework of the IAEA's ENATOM arrangements, in the framework of the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

1.2 IACRNA Working Group on Joint International Exercises

For the implementation of the Second International Emergency Response Exercise, ConvEx-3 (2005), a working group was established under the auspices of the IACRNA. This group was composed of representatives of the following international organizations: EC, IAEA, NEA, OCHA, WMO and WHO (NATO/EADRCC participated as an observer). In addition, representatives of Romanian neighbouring countries Bulgaria, Hungary, Moldova, Serbia and Montenegro, Turkey and the Ukraine participated in this working group. A representative of the Romanian National Controllers Team was assigned to assist the working group with the planning and coordination.

The working group, based on input from their respective organisations/countries, defined the general objectives of ConvEx-3 (2005) and coordinated and harmonized the specific objectives of each participating international organization and their constituencies. In addition this group also prepared the international aspects of the exercise.

1.3 Common Exercise Objectives

The Working Group on Joint International Exercises approved five common objectives and related evaluation criteria. The common objectives were as follows[2].

Objective 1:	To test whether the (*Organization*)'s staff responds to media reports and inquiries about a nuclear accident in an appropriate and timely manner.
Objective 2:	To test whether activation procedures of (*Organization*)'s emergency response systems (ERS) are timely and appropriately implemented.
Objective 3:	To test whether relevant actions according to procedures for exchanging information are timely and appropriately implemented.
Objective 4:	To test whether media information is issued in a coordinated manner, timely and appropriately.
Objective 5	To test whether (*other response actions)*[3] are applied in a timely and justified manner.

It was also agreed that international organizations and Romanian neighbouring countries would use these five objectives and a common evaluation process in order to conduct a harmonized evaluation of the exercise.

[2] National organizations participating in the exercise could choose to address any or all of the objectives.

[3] A list of these major tasks for International Organizations are found in EPR-JPLAN, Section 3.4 Concept of Operations, Table 1. Response tasks and responsible organization and in EPR-ENATOM Emergency Class: General Emergency.

1.4 Exercise Participants

1.4.1 States

The following countries participated in the ConvEx-3 (2005). Countries in bold are Romanian neighbours.

#	Country	#	Country
1	Algeria	32	Lithuania
2	Argentina	33	Luxembourg
3	Armenia	34	Madagascar
4	Australia	35	Malaysia
5	Austria	36	Mauritius
6	Belarus	37	Mexico
7	Belgium	38	**Moldova**
8	Brazil	39	Morocco
9	**Bulgaria**	40	Netherlands
10	Cameroon	41	Norway
11	Canada	42	Pakistan
12	China	43	Philippines
13	Croatia	44	Poland
14	Czech Republic	45	Portugal
15	Denmark	46	**Romania**
16	Finland	47	Russia
17	France	48	Senegal
18	Germany	49	**Serbia and Montenegro**
19	Ghana	50	Slovakia
20	Greece	51	Slovenia
21	**Hungary**	52	South Africa
22	Iceland	53	Spain
23	India	54	Sweden
24	Indonesia	55	Switzerland
25	Iran	56	Syria
26	Ireland	57	Tunisia
27	Italy	58	**Turkey**
28	Japan	59	**Ukraine**
29	Kazakhstan	60	UK
30	Korea	61	USA
31	Latvia	62	Venezuela

1.4.2 International Organizations

The following international organizations participated in the ConvEx-3 (2005).

#	International Organization	Acronym
1	European Commission	EC
2	Food and Agricultural Organisation of the United Nations	FAO
3	International Atomic Energy Agency	IAEA
4	NATO Euro-Atlantic Disaster Response Coordination Centre	NATO/EADRCC
5	OECD Nuclear Energy Agency	OECD/NEA
6	United Nations Office for the Coordination of Humanitarian Affairs	UNEP/OCHA
7	World Health Organization	WHO
8	World Meteorological Organization	WMO

1.5 Scope of Participation

ConvEx-3 exercise provided Member States and international organisations with an opportunity to test their response in the case of a transnational/transboundary impact of a severe nuclear accident.

Participation in the ConvEx-3 exercise identified deficiencies and areas requiring improvement that could not be identified in national exercises.

Countries and international organisations participating in ConvEx-3 (2005) exercise could choose between the following two levels of participation.

Minimal Participation
At this level contact points under the Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency were receiving messages/information from the IAEA (fax messages, ENAC) and/or Romania (according to bilateral agreements) and EC (ECURIE), and were expected to confirm receipt of the messages that declare or reclassify the emergency class (according to EPR-ENATOM (2004)). The primary aim of this level of participation was to test basic communications and to train/drill/test response personnel in using ENAC over an extended time period.

Active Participation
At this level of participation the State or international organisation tested elements of its emergency response system to identify deficiencies and areas requiring improvement. Participating neighbouring States and international organisations used all five common objectives and evaluation criteria in order to produce a harmonized evaluation process. Other participating States had the opportunity to do the same.

1.6 Exercise Timeline

Exercise preparation, conduct and evaluation timeline[4] is presented in Table 1.

Table 1: Exercise timeline

#	Date	EVENT	LOCATION
9	2002-11-15	Invitation to Member States to host ConvEx-3 (J3.81.1/EPRU/ENATOM)	IAEA/Vienna
10	2003-10-13	First proposal to host ConvEx-3	Slovenia
11	2003-11-18	Second proposal to host ConvEx-3	Romania
12	2003-12-10	IACRNA acceptance of Romanian proposal	Luxemburg
13	2004-02-04	First IACRNA Working Group Meeting	CNCAN/Bucharest
14	2004-06-30	Second IACRNA Working Group Meeting	CNCAN/Bucharest
15	2004-08-26	Invitation to MS to participate in the exercise	IAEA/Vienna
16	2004-11-30	Third IACRNA Working Group Meeting	CNCAN/Bucharest
17	2004-12-15*	Invitation to MS to observe the exercise	IAEA/CNCAN
18	2005-01-28*	Designation of evaluators and controllers	Participating org.
19	2005-03-15*	Training of evaluators and controllers	Participating org.
20	2005-03-15	Fourth IACRNA Working Group Meeting	CNCAN/Bucharest
21	2005-03-22*	Distribution of Exercise Manual and Guide for Players	IAEA/Vienna
22	2005-04-27	Announcement of communication test	IAEA
23	2005-05-04	08:00 UTC Communication test between Romania, IAEA, EC, and participating neighbouring countries	CNCAN/Bucharest
24	2005-05-05*	Briefing of evaluators and controllers	Participating org.
25	2005-05-04	Coordinated Press Release about the exercise	IAEA/Vienna
26	**2005-05-11**	**STARTEX**	Cernavoda

[4] Exercise schedule was agreed by Secretariats of all participating international organizations and representatives of Romanian neighbouring countries with the Romanian side, and it was used for planning purposes.

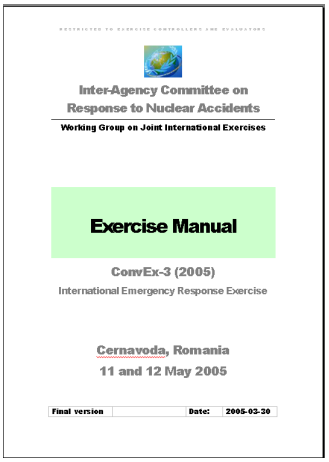
#	Date	EVENT	LOCATION
27	**2005-05-12**	**ENDEX**	Cernavoda
28	2005-05-13	Coordinated Press Release on outcomes of the exercise	IAEA/Vienna
29	2005-05-16	National (Romanian) exercise debriefing	Bucharest
30	2005-06-27	Fifth IACRNA Working Group Meeting – Exercise debriefing	IAEA/Vienna
31	2005-06-30*	Draft Exercise Report posted on IACRNA web site	IAEA/Vienna
32	2005-07-13	Review of the Exercise Report at Third NCA Meeting	IAEA/Vienna

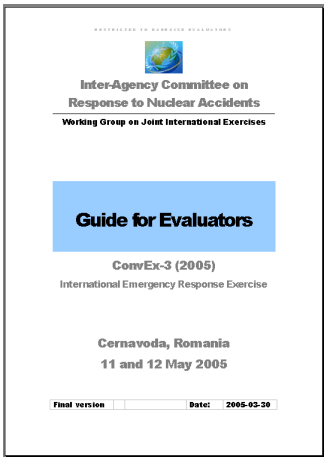
* No later than this date

1.7 Exercise Documents

In the exercise preparation phase the following exercise documents were prepared and distributed to all participating States and international organisations:

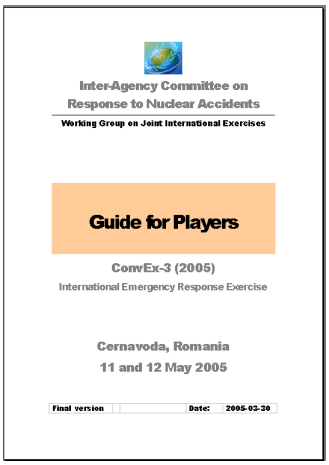
- Exercise Manual
- Guide for Evaluators
- Evaluator Report Template
- Guide for Players





The **Exercise Manual** describes common exercise objectives, scope of participation, exercise-planning schedule, and scenario with exercise data and additional information from the 'Accident State'. Critical exercise conduct time line with anticipated events and expected major actions are also presented. In addition, the Manual defines the roles of exercise controllers, evaluators and players and gives instructions regarding public information issues. The Manual was restricted to exercise controllers and evaluators.

The **Guide for Evaluators** communicates to exercise evaluators the instructions and criteria for the evaluation of the exercise conduct. In addition, it contains instructions for preparing harmonized exercise reports together with the **Evaluator Report** template.



The **Guide for Players** provides to all exercise players of all national participating bodies and international organisations the necessary basic information about the exercise needed to facilitate their full participation.

Exercise chief controllers and evaluators were encouraged to prepare customized 'Guides' or specific additional documents for use in their respective countries or international organisations.

Section 2

2 FACTUAL ANALYSIS

2.1 Scenario

The 'accident' occurred at the Unit 1 of the Cernavoda nuclear power plant. The initial status was as follows:

- 100% of nominal power, alternate mode
- Emergency Core Cooling System (ECCS) pump 3432-P2 breaker from Emergency Power Supply (EPS) under work permit
- Primary Heat Transport System activity:
  - I-131 equivalent = 1 MBq/tonne
  - Tritium = 25 TBq/tonne

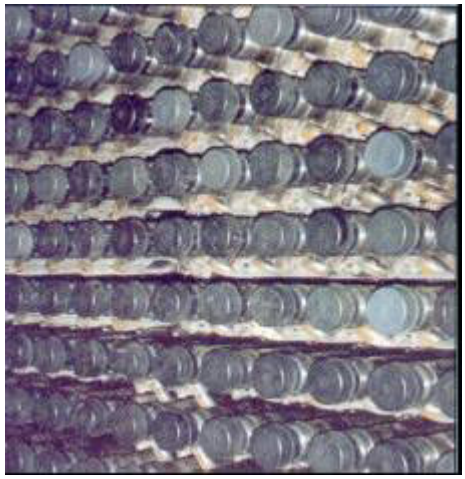


Figure 1: End fitting plugs and fuel bundles.

The first event was channel Q11 ('A' side) end fitting failure. This event induced automatic reactor trip, containment isolation and ECCS injection.

However containment isolation failed (+ 0h02min). This was equivalent to failure of inlet ventilation (a set of two valves – PV13, PV14 – in series) and failure of outlet ventilation (another set of two valves – PV15, PV16 – in series).

Also, eight of ECCS valves on the broken loop failed to open (+ 0h04min) resulting in degradation of fuel cooling in this loop.

Containment isolation was re-established (+ 1h00min) following repair activities and releases outside containment are stopped.

Injection to broken loop partially restored (+ 2h00min), after successful opening of two injection valves powered from the EPS, for 90 minutes when both ECCS pumps fails (+ 3h30min) and degradation of fuel cooling started again.

Following repair attempts one ECC pump started and ran successfully (+ 12h00min), ending the fuel degradation in the broken loop.

Due to high pressure, controlled containment depressurization through the stack took place on the next day (+ 26h00min) and lasted for 4 hours.

The probability of the occurrence of this scenario was estimated[5] to be less than 2 x 10^{-10} events/year. The use of this low probability event was necessary to provide the off-site consequences to support the exercise of the county, national, neighbouring countries, IAEA and other organizations emergency plans.

The total source term (releases of radioactive material) consisted of three components (see Table 2):

- the activity released following end fitting failure and subsequent failure of containment isolation logic event (first hour of the event);
- the activity released according to authorized leakage from containment (between 1-26 hours after initial event); and
- the activity released during controlled containment depressurization through the stack (between 26-30 hours after initial event).

Total source term for time interval 1-30 hours was conservatively overestimated based on Large LOCA (Loss Of Coolant Accident) without ECCS initiation. Activity releases for this time interval were based on Cernavoda NPP Safety Report.

Table 2: Total source term

Nuclides	Releases [TBq]			TOTAL [TBq]
	0-1 hours	1-26 hours	26-30 hours	
H-3	1.572E+02	-	-	1.572E+02
I-131	6.253E+01	4.130E-01	1.212E+01	7.506E+01
I-132	8.330E+01	6.292E-01	1.737E+01	1.013E+02
I-133	1.481E+02	7.022E-01	1.308E+01	1.619E+02
I-135	1.382E+02	3.221E-01	2.005E+00	1.405E+02
Kr-83m	1.772E+01	6.021E+00	1.692E-01	2.391E+01
Kr-85m	4.408E+01	4.469E+01	1.155E+02	2.043E+02
Kr-85	2.210E-01	9.534E-01	2.866E+01	2.983E+01
Kr-88	1.202E+02	7.192E+01	3.260E+01	2.247E+02
Kr-89	6.983E+01	4.000E-06	0.000E+00	6.983E+01
Xe-133m	6.720E+00	2.803E+01	7.621E+02	7.969E+02
Xe-133	2.189E+02	9.332E+02	2.648E+04	2.763E+04
Xe-135m	3.759E+01	5.527E+01	3.387E+02	4.316E+02
Xe-135	2.629E+01	2.957E+02	6.041E+03	6.363E+03
Xe-138	1.756E+02	6.77E-01	7.029E-28	1.763E+02
Cs-134	1.144E+00	-	-	1.144E+00
Cs-137	2.189E+00	-	-	2.189E+00
Cs-138	1.144E+02	-	-	1.144E+02

[5] Estimation performed by the NPP Cernavoda.

For the following conditions:

- weather forecast conditions: 2 m/s wind speed, normal diffusion, no rain (stability class F);
- without taking into consideration building wake effect; and
- considering release height 15 m,

the projected doses (external dose due to plume and deposition and internal dose due to inhalation) to the population were as in Table 3.

Table 3: Projected doses to the population calculated with RASCAL 3.0.1 computer code

Distance from Release [km]	Effective Dose [mSv]	Thyroid Dose [mSv]
1	74	1500
2	34	730
3	20	440
4	14	300
5	11	230
6	8.6	180
7	7.1	150
8	6	130
9	5.1	110
10	4.5	96
15	2.6	58
20	1.8	40

2.2 NPP's Critical Time Line

The critical time line for Cernavoda NPP Unit 1 is shown in detail in Table 4.

Plant initial status:
- 100% of nominal power (alternate mode)
- ECCS pump 3432-P2 breaker from EPS under work permit
- Primary Heat Transport System activity: I-131 equivalent = 1 MBq/tonne and Tritium = 25 TBq/tonne
- Failure not detected on 3432-P2 pump breaker from class III

Table 4: Critical time line for Cernavoda NPP Unit 1

#	Time [UTC]	Event	Consequence
		DAY 1	
1	03:00	Channel Q11 ('A' side) end fitting failure.	Loop 2 broken (RIH8-ROH5) **EXERCISE STARTS**
2	03:02	Automatic reactor trip on low Primary Heat Transport System (PHTS) pressure/pressurizer low level.	Reactor power reduced to decay levels
3	03:02	High activity inside reactor building detected on containment radiation system.	Containment isolation signal generated.
4	03:03	Failure of containment isolation logic. Two 30" Reactor Building (R/B) ventilation lines remain open due to failure	Release outside containment.

		to close of associated containment isolation valves (PV13, PV14, PV15, PV16 failed to close).	
5	03:04	Dousing not initiated. Auto Emergency Core Cooling (ECC) injection initiated. (5 kPa < R/B pressure < 14 kPa)	Dousing is not initiated. ECCS injection partial successful.
6	04:00	Eight ECC valves (3432-MV43/44/45/46/59/60/61/62) on the broken loop fail to open (failure to open on class IV or class III electrical power). All ECCS injection valves on intact loop open. Intact loop isolation successful.	Injection to broken loop failed. Degradation of fuel cooling in the broken loop.
7	04:30	Containment integrity ensured following successful repair / closure on one valve in each open line. Actual R/B pressure 3 kPa.	Releases outside containment stopped.
8	05:00	Decision taken to start Emergency Power Supply (EPS) Diesel Generators.	
9	05:30	Successful opening of the 3432-MV43/44 powered from EPS.	Injection to broken loop partially restored.
10	06:30	R/B pressure increases to 4.5 kPa (increasing rate = 1 kPa/h).	
11	06:30	Transfer to low-pressure ECCS stage – 3432-P1 fail while running.	Injection to broken loop failed again.
12	06:30	3432-P2 fail to start due to pump breaker from EPS under work permit and from class III burned (failure not detected).	Degradation of fuel cooling starts again in the broken loop.
13	07:00	Intact loop at 120^0C and cooled through thermosyphoning.	
14	15:30	Following repairing activities 3432-P2 starts and run successfully. R/B pressure increases to 12.1 kPa (Increasing rate = 0.8 kPa/h).	Fuel degradation in the broken loop stops.
15	17:30	R/B pressure 13.85 kPa. Increasing rate = 0.7 kPa/h.	
16	23:00	R/B pressure increases to 16.6 kPa. Increasing rate = 0.5 kPa/h.	
DAY 2			
17	05:00	R/B pressure: 17.8 kPa. Increasing rate: 0.2 kPa/h. Conditions for containment depressurization through the stack (R/B pressure ≤ 18 kPa). Containment controlled depressurization through the stack is started (depressurization rate max. = 5 kPa/h).	Off-site radioactive release (plume).
18	09:00	Containment depressurization through the stack is finalized.	Off-site radioactive release stops.
19	10:00	Plant under control – ECCS in service / Containment closed.	**EXERCISE ENDS for CERNAVODA NPP**

2.3 Messages to the IAEA sent by Romania

In Table 5 the messages sent by the CNCAN to the IAEA are shown together with the times when the information was valid, when the message was posted on ENAC[6] and when the message/information was published on ENAC[7]. All times are in UTC.

Table 5: Time analysis of messages received by the IAEA and published on ENAC.

#	Type	Information time	ENAC		Subject
			Time submitted	Time published	
Exercise start: 03:00 on 11 May 2005					
1.	GENF	03:14	04:49	06:31	General Emergency – initial notification
2.	GENF	04:06	05:43	07:24	Plant status; protective actions initiated
3.	GENF	04:38	06:13	08:15	Plant status; release stopped
4.	GENF	05:24	06:32	08:22	Plant status; INES rating revised
5.	GENF	05:51	07:11	08:24	Plant status; source term
6.	GENF	05:51	07:57	08:26	Plant status; source term revised
7.	GENF	07:20	09:11	11:09	Plant status; core damage
8.	MPA	08:10	09:33	11:22	Off site measurements
9.	GENF	13:00	14:19	14:38	Plant status
10.	MPA	14:00	14:49	15:35	Off site measurements; protective actions
11.	MPA	16:00	15:57	16:25	Off site measurements; protective actions
12.	MPA	17:00	17:37	17:57	Off site measurements; protective actions
13.	GENF	18:00	18:20	18:32	Plant status; pressure in reactor building increases
14.	MPA	20:00	20:10	20:16	Off site measurements; protective actions
15.	GENF	20:15	21:06	21:12	Plant status; pressure in reactor building increases
16.	GENF	22:27	22:39	22:44	Plant status; pressure in reactor building increases
12 May 2005					
17.	GENF	00:09	00:19	00:34	Plant status; controlled release possible
18.	GENF	01:30	01:36	02:37	Plant status; additional protective actions
19.	GENF	04:28	05:09	06:35	Plant status; controlled release time estimated
20.	MPA	05:50	05:51	06:41	Off site measurements; revised protective actions
21.	GENF	06:05	07:05	07:47	Plant status; controlled release started
22.	GENF	09:15	11:18	11:31	Plant status; controlled release stopped
23.	MPA	12:15	12:27	12:42	Off site measurements; revised protective actions
24.	GENF	12:50	13:41	13:44	Plant status; no new release projected
25.	MPA	15:00	15:05	15:08	Off site measurements; revised protective actions
26.	MPA	15:15	15:30	15:36	Off site measurements; revised protective actions
27.	GENF	16:05	16:31	16:37	Plant status; emergency reclassification (down)
Exercise end: 17:00 on 12 May 2005					

[6] Time when the massage was received by the IAEA.

[7] Time when the message/information was available to international players.

2.4 Exercise Data

Several types of data were used during the course of the exercise. They were divided into four categories and provided by the Accident State:

- plant data;
- radiological data;
- meteorological data; and
- other data.

Internationally, the exercise was conducted based on real weather conditions. However, in the first hour of the exercise the Romanian players conducted the exercise under simulated meteorological conditions.

2.5 Exercise Evaluators and Controllers

2.5.1 Lead Controller

Mr. Rafael Martincic, from the IAEA was the Lead Controller for the international part of the exercise. He was responsible for:

a) Exercise coordination with the Accident State's representative and controllers from the participating organizations; and
b) Immediate termination of the international aspect of the exercise if a real event were to occur (in coordination with the Accident State's Lead Controller).

2.5.2 Chief Controllers – Controller Team Leaders

Each participating organization designated the following person as a Chief Controller – controller team leader:

International Organizations		Romania and neighbouring countries	
EC	V. Tanner	Romania	F. Baciu
FAO	S. Raswant	Bulgaria	S. Andonov
IAEA	R. Martincic	Hungary	K. Horvath
NATO/EADRCC	I. Erdos	Moldova	I. Apostol
OECD/NEA	B. Ahier	Serbia and Montenegro	S. Markovic
UNEP/OCHA	R. Nijenhuis		S. Jovanovic
WHO	Z. Carr	Turkey	Y. Gülay
WMO	P. Chen	Ukraine	A. Ananenko

2.5.3 Communication Channels

Specific communication channels among participating organizations and the Accident State were available for controllers' communications only.

2.5.4 Lead Evaluator

Mr. R. Martincic, from the IAEA was the Lead Evaluator for the international part of the exercise.

2.5.5 Chief Evaluators - Evaluation Team Leaders

Each participating organization designated the following person as a Chief Evaluator – evaluation team leader:

International Organizations		Romania and neighbouring countries	
EC	V. Tanner	Romania	M. Dudita
FAO	S. Raswant	Bulgaria	M. Nizamska
IAEA	M. Hug	Hungary	K. Horvath
NATO/EADRCC	I. Erdos	Moldova	I. Apostol
OECD/NEA	B. Ahier	Serbia and	S. Markovic
UNEP/OCHA	R. Nijenhuis	Montenegro	S. Jovanovic
WHO	Z. Carr	Turkey	Y. Gülay
WMO	P. Chen	Ukraine	S. Chupryna

Section 3

3 EXERCISE EVALUATION

The scope of evaluation of response (five common objectives) was limited to the following four areas:

(1) Management area
(2) Communications area
(3) Technical area
(4) Public Information area

The generic guide for evaluators was prepared in the exercise preparatory phase defining and explaining evaluation process and providing detailed instructions and guidance on 'guide customisation' and on the preparation of evaluator's report.

After the completed evaluation each objective (see Section 1.3) was scored according to the following grading.

Grade	Comment
Excellent (E)	Action completed smoothly and with confidence; no problems encountered
Satisfactory (S)	Action completed however weaknesses were observed
Unsatisfactory (U)	Action not completed due to deficiencies in planning, training or resources

To characterize the magnitude and type of any deficiency the following criteria were used:

Deficiency		Problem area
Critical	The deficiency significantly impairs the ability of the (*Organisation*) to perform its role and responsibilities or jeopardizes personnel safety/security	Planning Training Resources
Major	The deficiency or weakness significantly reduces the response effectiveness of the (*Organisation*) but does not prevent it from performing its role, and does not jeopardize personnel safety/security	
Minor	The weakness reduces the response effectiveness	

The summary of evaluations from available exercise reports is shown in Table 6.

Table 6: Summary of evaluation reports

State or International Organisation	O1	O2	O3	O4	O5	Comments
Accident State						
Romania		E	S	U	S	Objective 1 was not exercised
Romanian neighbouring States						
Bulgaria	E	E	E	S	E	
Hungary	E	E	E	E	E	
Moldova	S	S	E	S	S	
Serbia and Montenegro						No information available; comments were given
Turkey	E	E	E	S	E	
Ukraine	E	E	S	S	S	
States within 1000 km from NPP Cernavoda that provided evaluation						
Austria						No information available; comments were given
Italy						No information available; comments were given
Germany						No information available; comments were given
Greece	E	E	S	E	S	
Pakistan						No information available; comments were given
Portugal						No information available; comments were given
Russia						No information available; comments were given
Slovenia	S	S	E	S	S	
International Organisations						
EC		S	S	U	S	Objective 1 was not exercised
FAO			S			Other objectives were not exercised
IAEA	S	S	S	S	S	
UNEP/OCHA	U	U	U	U		Objective 5 was not exercised
WHO	S	S	S	E	S	Objective 1 was not fully exercised
WMO		E	E			Other objectives were not exercised

O1 to O5 are five common exercise objectives (see Section 1.3).

Executive summaries from available exercise reports are presented in the subsections that follow.

3.1 Accident State – Romania

Romania reported that the objectives of the exercise were essentially met. Romanian Chief Evaluator rated the completion of objective 2 as 'excellent', objectives 3 and 5 as 'satisfactory' and objective 4 as 'unsatisfactory' while objective 1 was not exercised. Major deficiencies were characterized in the problem areas 'training' and 'planning' and minor ones in the problem area 'resources'.

The exercise revealed the following major findings:

a) All the staff were trained in activation procedures in the exercise preparation phase. The exercise showed that at present the notification and activation aspects of the emergency plans are well performed at all levels: local, county and national.

b) Inside the National Intervention Co-ordination Centre the re-evaluation of the situation was not based on each incoming message but after several incoming messages. The dissemination of information between Emergency Response Organisations at local, county and national level was not timely and appropriately implemented. The following corrective actions are suggested: proper procedures for disseminating the

information between the local/county and national levels (radioactivity measurements, protective actions, decisions and status of implementation of the chosen protective actions) have to be developed and management staff training in information exchange aspects during a nuclear emergency is needed.

c) The Public Information Groups at national level did not function in an appropriate manner. That resulted in uncoordinated press releases between local/county and national levels (their tasks were accomplished by Technical Groups of the Emergency Response Organisations). At the local and at the county level, the NPP liaison persons were actively supporting the media releases of the authorities. However, the media representatives were briefed in the location of the Local Committee for Emergency Situations, disturbing, in part, the activities of the committee. The following corrective actions are suggested: training of persons responsible for Public Information during nuclear emergencies and proper planning and procedures for public information during nuclear or radiological events have to be developed.

d) The following response actions were exercised: initial evaluation of the radiological situation, nuclear safety assessment, radiological consequences assessment, environmental monitoring, protective actions implementation, decision-making at local/county and national level, medical response and traffic control. The exercise showed that National Response Management was not efficient and that decision makers' responsibilities are not clearly defined (specifically when local authorities are to implement decisions taken at the national level). The following corrective actions are suggested to effect an improvement: training of national and local/county authorities on decision-making including tabletop exercises and drills.

3.2 International Organisations

3.2.1 EC – European Commission

The EC reported that unit TREN H.4 (Radiation protection) exercise activities were primarily intended to test the agreed ECURIE information exchange procedures. The primary focus was to assess the message transmission and message logging routines used by the TREN H.4 ECURIE duty officers in Luxembourg. TREN H.4 also activated the unit emergency team in order to practise emergency teamwork and use of the RESPEC support. Common objective 1 was not exercised, since the Commission emergency operations are initiated only on receiving official alert messages from the ECURIE network States or from the IAEA. Other Commission emergency services (EU Civil protection unit, EU health authorities' alert network and the crisis room of the Commission external relations department) were kept informed about the situation development, but did not actively participate in the exercise. The Commission security office in Brussels carried out its function as the 24h contact point throughout the exercise.

The exercise also involved the ENSEMBLE long-range atmospheric dispersion forecast system, managed by the REM group at the JRC Ispra. This allowed the exercise participants to download atmospheric dispersion forecasts based on the exercise accident scenario from the system web site. In addition the ECURIE States were requested to turn the EURDEP environmental radiation data exchange to emergency mode, i.e. send data from their national radiation monitoring networks every hour (emergency mode) instead of once a day (routine mode).

The exercise showed that, in general:

a) The ECURIE alert and subsequent message transmission was carried out according to planned procedures, but there is still room for improvement and more exercising is needed to bring this action to an automated level.

b) The CoDecS system is able to transmit the messages more quickly and in a more controlled and clearer manner than the fax system. In high message load situations, delays occur in both systems.

c) Lack of suitable experience and unfamiliarity with all the pre-prepared files and procedures clearly illustrated the need to improve and further exercise the work of the TREN H.4 emergency team.

d) The exercise timeline allowed TREN H.4 to exercise working in 9 hour shifts. It is very important to allocate enough overlap time between shifts in order to make sure the next shift knows what the pervious shift has done.

e) ENSEMBLE system worked well and provided useful information to all participants accessing the system.

f) RESPEC support was found very helpful. The support arrangements enabled the emergency team to keep other Commission services well updated on the situation development. Team instructions need to be revised in terms of frequency of information updates, co-operation procedures with the Commission spokesman service and use of the available web site tools (ENAC, EURDEP, ENSEMBLE, etc.).

g) Co-ordination of public information releases with the IAEA failed, since the emergency team was not able to reach the responsible service in the IAEA.

h) TREN public information personnel were not sufficiently familiar with emergency preparedness issues. TREN H.4 needs to provide the spokesman service with more information on the preparedness arrangements.

i) The basic staffing at the TREN H.4 emergency room was 2 ECURIE duty officers and 2 emergency team members. This is sufficient for an exercise, but in a real event more staff would need to be mobilised.

j) Lack of activity by other Commission units decreased the workload of the TREN H.4 emergency team (fewer phone calls, emails, etc.) and therefore reduced the exercise value also at TREN H.4. More effort is needed in future exercise preparations in order to fully involve all the services concerned.

The exercise proved to be valuable in maintaining the ECURIE service procedures, training new ECURIE staff and improving the emergency team tools and procedures. Combining the exercise with an ENSEMBLE exercise made it more realistic and provided the ECURIE States with a valuable demonstration of the system and its current state of development.

3.2.2 FAO – Food and Agricultural Organisation of United Nations

While the FAO headquarters in Rome should be contactable at all times, the FAO desk in IAEA's IEC provides the initial response.

During the exercise, the FAO Liaison office in Vienna manned the desk in the IAEA's IEC, and worked with the IAEA's technical experts to develop a preliminary impact assessment. In conformity with the elected 'minimal level' of participation, the FAO in Rome responded to faxes as required and kept in contact with the FAO Liaison office in Vienna. The FAO Nuclear

Emergency Crisis Network (ECN) of technical experts at headquarters was put on stand-by as requested.

The exercise highlighted several areas for improvement:

a) A preliminary impact assessment may take longer than 24 hours, which has implications for the scope and use of available FAO emergency response information.

b) Information gaps and access/copyright issues still exist which may prevent an effective short and longer-term response from FAO.

c) More emphasis is needed on preparedness and scaling up of FAO's response to the media, and arrangements for coordination of press releases with other UN Agencies (particularly WHO) need to be explored.

d) Procedures for contacting FAO regional and sub-regional offices need to be established.

e) FAO's medium term response lacks clear procedures for addressing requests under the Assistance Convention, i.e. participation of FAO experts in field missions; there is a requirement for establishing procedures and training.

f) Given the range and variation between national and international standards, there is a need for FAO policy guidance on the application of intervention levels with respect to radionuclides in food.

g) More attention should be given to issues associated with food bans, i.e. disposal of milk from lactating cows in the event of a ban on fresh milk consumption.

h) In a heavily forested environment, which includes parts of Romania, consideration should have been given to warnings to keep people away from the forests and prevent use of non-wood forest products, given the potential spatial variability in radionuclide deposition.

3.2.3 IAEA – International Atomic Energy Agency

The concept of the Agency's response is summarized as follows. The Accident State sends a notification. The Emergency Response Manager authenticates and verifies the message, activates the IEC, and transmits the notification to all States. Subsequent incoming messages received by fax, phone or web are quickly scanned, authenticated, and verified. Direct liaison with the Accident State competent authority is established. All messages from the Accident State and relevant messages from Affected States are published on the protected emergency web site and important messages are also distributed by fax to all contact points and permanent missions. A technical team reviews the incoming information, checks for inconsistencies, analyses trends, and identifies countries that might be affected. Advice and assistance is facilitated on request. Liaison officers keep contact with competent authorities and with international organizations. The IEC provides authoritative information to the Division of Public Information (MTPI), who manages public and media information through the Agency's web site, press releases or press conferences. The IEC Steering Group makes strategic decisions on the Agency's response.

The exercise showed that the Agency essentially met its obligations under the Early Notification and Assistance Conventions. Member States were kept informed of the situation at the Cernavoda NPP, they were appropriately and timely provided information about the expected path of the radioactive release, offers of good office were made at the appropriate times and international

assistance was offered by international organizations such as WHO and FAO and coordinated by the IEC.

There were 80 IAEA staff involved in the exercise conduct, and 373 messages were handled in total. The IAEA Chief Evaluator rated the completion of all the exercise objectives as 'satisfactory'.

The exercise revealed the following major findings:

a) Although the activation goal of 120 min was met, the performance for the first shift activation was not timely. The process used to activate the IEC staff needs to be improved.

b) Any additional expectations over and above the legal obligations of the Agency need to be more clearly defined, especially regarding the scope and technical support of the Agency's media functions. Preparedness arrangements will then need to be adjusted to meet these expectations.

c) The IEC facility was not adequate for response to emergencies that last for long periods (inadequate space, too high sound levels, slow internet connections); these issues should be resolved.

d) Technical tools were not used as effectively as they might have been. Checklists proved useful but in some cases were not used. Twenty procedure improvement opportunities were identified. Exercise controllers had to direct some actions to keep the exercise on track. These identified shortfalls demonstrate that a more systematic programme of regular training and drills is needed and more shared ownership and active support from management are required.

e) The ENAC protected web site was effective in streamlining communications with the IAEA Member States improving typical publishing times from over an hour in the last exercise to between 5 to 15 minutes in this exercise. Lessons learned from ENAC implementation need to be used to produce a more efficient and effective information management system within the Agency that would obviate the need for so much paper handling and reduce the risk of errors.

f) The procedures for IAEA IEC to request specialized meteorological products from the WMO RSMCs and to provide these products were not followed. Corrective actions such as training and routine testing are needed to improve implementation of the procedures.

3.2.4 Joint UNEP/OCHA Environmental Unit

The Joint UNEP/OCHA Environment Unit (Joint Unit) participated in this exercise at a 'minimal level'. Based on the evaluation, two major deficiencies, both characterized as 'critical' have been identified. The deficiencies led to the situation that the Joint Unit's (OCHA's) Emergency Response System was not activated. The deficiencies identified are as follows:

a) Pre-exercise communication test failure (test fax from IAEA not received)

b) In total 10 fax messages were received by OCHA Registry and were forwarded to the Emergency Response System leader only. No copies were sent to other relevant staff such as colleagues of the Joint Unit, Field Coordination Support Services (in charge of mobilising the UNDAC system) and/or desk officers. During the exercise, the ERS was absent.

Clarifying and improving the internal communication procedures and alerting system within the Joint Unit as well as between the Registry/Duty Roster System and the Joint Unit can solve these deficiencies.

It should also be noted that not all the fax messages received from the IAEA were marked with the code word 'exercise'.

3.2.5 WHO – World Health Organisation

The exercise showed that WHO is in general ready to fulfil its obligations on medical assistance; however, further improvement needs for the operating procedures have been identified.

WHO started the exercise after receiving the fax message from the IAEA, authenticating it and confirming its receipt. Subsequent steps were identical: every message received from the IAEA, was authenticated and verified, and was forwarded to the REMPAN network and Regional Offices of the WHO. The focal points for the WHO response system were in turn expected to authenticate and verify the message. All incoming confirmations of receipts were timed.

A close link was established with the European Regional Office of the WHO (EURO). Two videoconferences were held with EURO colleagues: at the beginning and at the end of the exercise.

Duty officers reviewed the incoming information and acted according to the situation. WHO's Internal Nuclear Emergency Advisory Committee was formed according to the WHO Standard Operating Procedures. The Committee consulted with external experts from the REMPAN network by means of telephone conferencing, fax, and e-mail. Advice and assistance was facilitated on request. In line with earlier arrangements, information about victims of the accident with request of assistance, and request of consultation on radiation protection measures for the public was injected by the IAEA into the scenario to give an opportunity for the WHO emergency response system to exercise to its full extent.

The exercise showed that the WHO essentially met its obligations under the Early Notification and Assistance Conventions. Focal Points of the WHO Radiation Emergency Response System were kept informed of the situation at the Cernavoda NPP. Offers of good office were made at the appropriate times and the Collaborating Centres and Liaison Institutions offered international assistance as expected.

There were 15 WHO HQ staff, 12 WHO EURO staff, and 29 Centres of WHO REMPAN network involved in the exercise, and some 200 messages were handled in total. The WHO Chief Evaluator rated the completion of all the exercise objectives as 'satisfactory'.

The exercise revealed several areas where further improvement is needed:

a) WHO Radiation and Environmental Health Programme does not have sufficient man power to furnish emergency response needs; currently employed staff need to be trained better; other Programmes may be trained and involved (Alert and Response Operations, Chemical Safety, Food Safety, Health Action in Crises, etc).

b) WHO Standard Operating Procedures need further improvement accounting for better integration of Regional and National levels of contact.

c) Communication via fax is not the most appropriate choice and e-mail is preferable. An express procedure for setting up a telephone- or videoconference on an emergency basis is necessary. Better means of communication need to be explored and established

for outreach REMPAN contact points – if primary contact is on travel, on sick leave, has no access to internet/fax at home, etc.

d) The SHOC facility was not wholly adequate for response to emergencies that last for long periods (a few IT related problems with access to e-mail and internet, slow machines, no room for rest at night, no clock with world time zones, etc); these issues should be solved.

e) Revision and re-inventory of REMPAN expertise and available experts by Centre needs to be done. The exercise showed that REMPAN needs a formal External Advisory Group. Terms of reference for such a group will be developed; experts will be nominated at the next REMPAN coordination meeting in April 2006.

f) WHO in general remained distanced from the exercise mainstream. It might have been beneficial to agree beforehand and incorporate into the scenario of the exercise closer involvement of the WHO with the national and public health authorities, including the role of the WHO Country and Regional Offices.

g) WHO had limited access to ENAC web site. Some training on the utilization of web-based interactive tools for emergency communications may be useful.

3.2.6 WMO – World Meteorological Organisation

The operational delivery of the WMO's support to nuclear emergency response is summarized in the 'Regional and Global Arrangements' (the 'Arrangements'), which were established in coordination with the IAEA to provide National Meteorological and Hydrological Services (NMHS), through their respective operational National Meteorological Centres (NMC), with access to specialized, pre-defined products from designated Regional Specialized Meteorological Centres (RSMC) with the specialization in nuclear environmental emergency response. These products are the outputs of numerical simulations of the movement and dispersion of radioactive materials in the atmosphere and ground-level deposition, and are based on operational large-scale global numerical weather prediction (NWP) models. The Arrangements permit pre-authorized Delegated Authorities and the IAEA to make requests to the RSMC(s). The RSMC(s) respond by generating the products, issuing the 'Joint Statement' regarding the products, transmitting products by fax as well as making the products available through password-protected websites to pre-determined National (meteorological) Operational Contact Points (at NMCs) and/or the IAEA. It is expected that these Contact Points provide meteorological services to their respective national authorities for radiological protection and would have adequate competency in meteorology and meteorological operations to interpret the specialized products. The procedures are defined in regulatory text in the WMO Manual on the Global Data-Processing and Forecasting System (WMO - No. 485), and described in the Joint Radiation Emergency Management Plan of the International Organizations. In this exercise the pre-defined WMO Lead-RSMCs were RSMC Exeter (UK) and RSMC Toulouse (France) in WMO Region VI.

Seventy-three NMHSs had indicated to the WMO Secretariat their intention to participate in the exercise. As a preliminary observation, outside the WMO Region VI (Europe), few NMHS were involved in any way during the exercise, although a majority of these received or accessed information copies of the specialized products of the RSMCs. In the Region of the accident scenario, several Delegated Authorities for requesting RSMC products did make requests to either RSMC Toulouse or RSMC Exeter. No Delegated Authority made a request to RSMCs in the other 5 Regions.

Normal meteorological operations at NMCs, RSMCs and the Regional Telecommunications Hub (RTH) Offenbach are maintained '24/7', to monitor weather conditions and to issue weather forecasts and early warnings of hazardous weather conditions, as well as maintaining the

supporting operational infrastructure. The NMHSs are the national authorities on meteorological services within their respective countries; however the Arrangements or other arrangements or contingency plans among NMHS/NMCs could be invoked to obtain assistance and guidance.

According to the procedures established under the Arrangements, the RSMC Toulouse and RSMC Exeter were activated as the WMO Lead-RSMCs. RSMC Obninsk (Region II) was also activated. RSMC Montréal and RSMC Washington (responsible for Region III and IV) were activated on 11 May only. RSMC Melbourne (Region V) was activated on 11 May only. RSMC Beijing and RSMC Tokyo (Region II) were not activated. The WMO RTH Offenbach, interfaced with IAEA's IEC, received the IAEA notification messages and uploaded them on to the WMO Global Telecommunication System (GTS). It also confirmed notification receipt with the Lead-RSMCs.

The National Meteorological Administration of Romania (Bucharest) used the specialized products from RSMC Exeter and RSMC Toulouse, which well complemented its own atmospheric dispersion model's products throughout the ConvEx-3 exercise. Their assessment of the Lead-RSMCs products was that they were both timely and useful, and the access via the Internet to the products posted on the Lead-RSMCs' web sites was fast and reliable. In summary, once the first IAEA notification and request for Lead-RSMC support were confirmed, there were few and minor deficiencies in the operations of the WMO related centres (RSMCs and RTH Offenbach). Present procedures at the interface between IAEA IEC and WMO Centres need to be reliably implemented to assure information exchange and requests for Lead-RSMCs support.

There was no media contact made with either the RSMCs or with the WMO Secretariat. The meteorological authority first resides with the NMHSs in each of the national organization involved in emergency response management, for example in the Accident State, or a Neighbouring State. RSMCs provide scientific support to these NMHSs. RSMCs are prepared to provide input to assist NMHSs to assess the actual meteorological conditions and forecasts, but do not have the role to interface with the media regarding the accident or incident.

The exercise was the first opportunity to experience how the IAEA ENAC web site was to function 'operationally'. For posting of relevant meteorological products and information, it is felt that some technical and management issues need to be addressed, such as which products should be posted, managing updates, naming conventions, hyperlinks to web sites, etc.

3.3 Affected States – Romanian Neighbouring Countries

3.3.1 Bulgaria

The procedure in Bulgaria can be summarized as follows: The Accident State sends a notification to the Emergency Response Centre (ERS) at the Nuclear Regulatory Agency (NRA). The Emergency Response Manager authenticates and verifies the message, notifies the NRA managers and activates the ERS, and transmits the notification to the National Crises Centre at Permanent Commission for Protection of the Population in Case of Disasters, Accidents and Catastrophes (located at the Civil Protection State Agency (CPSA)). Subsequent incoming messages received by fax, phone or web are quickly scanned, authenticated, and verified and send to the CPSA Direct liaison with the Accident State competent authority is established. All messages from the Accident State and relevant messages from Affected States are published on the protected emergency web site and important messages are also distributed by fax to the contact points of neighbouring and other countries with which Bulgaria had a bilateral agreement. An expert radiation protection team reviews the incoming information, checks for inconsistencies, analyses trends, and identifies the necessity of protection measures. The prepared information and the suggestion for protection measures and other activities (as frequent radiation measurements) are sent to the CPSA. The Advice and assistance is facilitated on request. The NRA keeps contact with national authorities,

local emergency response teams and with international organisations. The NRA provides authoritative information to Permanent Commission, who manages public and media information.

The exercise allowed Bulgaria to test and further improve its emergency arrangements. The exercise objectives were essentially met and the exercise proved to be a voluble tool for identifying the areas needing improvement. All regions located in North Bulgaria (14 regions) participated in the exercise (NPP Cernavoda is located 48-km Northeast of the Bulgarian border). The following organisations took active part in the exercise:

PCPPNDAC	Permanent Commission for Protection of the Population in Case of Disasters, Accidents and Catastrophes (National Level Decision Taking)
NRA	Nuclear Regulatory Agency
CPSA	Civil Protection State Agency
NIMH	National Institute of Meteorology and Hydrology
MOEW	Ministry of Environment And Water
MH	Ministry of Health
MTC	Ministry of Transportation and Communications

The exercise showed that the NRA essentially met its obligations under the Early Notification and Assistance Conventions and bilateral agreements. It allowed Bulgaria to test and further improve its emergency arrangements.

Bulgaria reported that the exercise revealed only two major issues (one in the problem area 'resources' and one in the problem area 'training/planning'). All minor deficiencies fall under the area 'training' and partially in the area 'planning'. The Bulgarian Chief Evaluator rated four objectives as 'excellent' and one as 'satisfactory'. The following two major deficiencies were identified: press releases were not co-ordinated and lack of sufficient technical means needed for efficient response at regional levels. The corrective actions suggested are mainly in the area of more effective and elaborate training.

All available communication and presentation means (fax, e-mail, Internet and telephones, Emergency Response System) were used and tested. At national and district/county level 947 staff participated in the exercise and 831 messages in total were handled during the exercise conduct.

3.3.2 Hungary

The Hungarian organizations were well prepared for accomplishment of their functions and the exercise objectives were fulfilled. The players of the working committees of the Governmental Coordination Committee (GCC), the departmental and county level organizations have performed their tasks at high level; the necessary decisions on protective actions were adequately supported, made and communicated. In the course of preparation, conduction and evaluation of the exercise more than 1000 persons were involved. The Hungarian Chief Evaluator rated the completion of all exercise objectives as 'excellent'.

According to the IAEA scenario, the detailed national scenario was elaborated by the Preparatory Committee. Considering that environmental consequences, calculated on the basis of the release determined in advance and on the typical weather conditions of the last 16 years, were not expected in the territory of Hungary, the Hungarian Nuclear Emergency Response System held a rehearsal on May 5, 2005 with a much more severe scenario and weather conditions in order to comprehensively test all exercise objectives.

a) The early notification from the IAEA was received by the Emergency Inspector on Duty at 7:30. The leaders of the HAEA Emergency Response Organization and of the Operative Staff of the GCC decided to activate the national system at 7:50. The

activation of the organizations was performed within the prescribed time limit (National Competent Authority was activated within 60 minutes after alerting).

b) The nuclear and radiological analyses were made based on the received information and the meteorological forecast. The consequences did not require any urgent countermeasures in Hungary.

c) Following the analysis of the expected consequences, introduction of increased radiation protection control of public and cargo traffic on the border between Hungary and Romania was decided and implemented. Additionally a decision was made on informing those travelling to Romania about the scope of the incident, its consequences and the protective actions implemented by the Romanian partner.

d) The competent organizations issued (mock) press releases, which were harmonized through the central Public Information Group.

e) Wide scope harmonization was performed between the organizations. The communication is made through a dedicated governmental electronic mailing system (MARATHON).

f) Three shifts were exercised, however only duty personnel were available at most organizations (according to the decision of the GCC, based on the analysis of the expected consequences).

The following good practices were identified:

a) As an improvement measure based on the experiences of the national exercise held in 2004, the national working committees worked in the same centre. Therefore the time needed for communication between them was reduced and the cooperation was improved.

b) A media simulator team consisting of journalists was established for the rehearsal. Its task was to keep the response organizations under media pressure.

And the following areas of improvement:

a) Both the IAEA and the Romanian contact point sent all messages (i.e. early notification and additional messages) to the fax number dedicated to early notification. Consequently the Duty Officer was totally buried with forwarding messages from his mobile communicator to the number dedicated to additional EMERCON reports. The IAEA, the EU repeated (forwarded) the Romanian fax messages. Consequently three copies of each message were received. The Romanian partner asked confirmation of each report.

b) The national scenario and conduction plan should be less prescriptive and detailed. In the frame of the Hungarian Emergency Response Plan more freedom should be given to the controllers and the players.

c) Besides complex exercises aiming at testing of coordination and cooperation, further smaller drills should be organized in the future in order to test the individual and organizational skills.

d) Three decision support systems exist in Hungary, whose results showed differences. The cause of the differences should be revealed. The software, the results of which will be the basis of decision-making, should be adopted.

e) An organization should be assigned on national level, which will be responsible for issuing press releases until the activation of the central Public Information Group (i.e. its time limit for activation is 4 hours, since it includes experts from different ministries).

f) The experience and skills of the second and third shifts should be improved.

3.3.3 Moldova

Moldova reported that the objectives of the exercise were essentially met. The Moldovan Chief Evaluator scored the completion of four objectives as 'satisfactory' and one as 'excellent' (see Table 6). One of the major deficiencies identified was weak knowledge of English (translators had to be used), which hampered assessment of the situation and timely decision-making. Most other deficiencies reported fall under the problem area 'training' and few under 'planning' and 'resources' (procedures, logistics, not enough trained staff, unstable Internet connections, etc.).

The exercise revealed the following strong points:

a) Notification on bilateral agreement was very efficient (the first notification message from Romania received 27 minutes prior to IAEA's one);

b) Capabilities of IAEA and other international organisations were available at Moldova's request;

c) Meteorological products were provided through Moldavian State Meteorological Service by WMO;

d) Many sources of information were used; advantages of special web sites were clearly demonstrated;

e) Coordination of media releases was very important and efficient as Moldova's citizens have free access to all (Romania and the Ukraine) mass media sources, especially to national TV channels and radio;

f) The National Observation and Laboratory Control Network (monitoring system) of Moldova have demonstrated good preparedness.

And the following weak points were identified:

a) Lack of human resources led to work in two shifts that partially affected efficiency;

b) Using of domestic telephones for initial warning of staff is not sufficient (GSM, pagers should be used as well);

c) Insufficient training of personal;

d) Based on bilateral agreements, exchange of information with neighbouring countries was weak from Moldova's site because of insufficient exercising at bilateral level;

e) Lack of resources, especially of technical equipment for warning and communication at local and regional level;

f) Pure English language and computer/INTERNET skills;

g) There is no specialized web site available at DES of Moldova.

3.3.4 Serbia and Montenegro

Due to lack of emergency response plans at national, regional and at the local level and undefined responsibilities regarding response to nuclear or radiological emergencies (there is no adequate regulatory authority in the country, proposal for Radiation Protection law has been submitted to the parliament) Serbia and Montenegro decided on the 'minimal' level of participation.

Two organisations participated in the exercise: VINCA Institute for Nuclear Sciences from Serbia and Centre for Ecological Research of Montenegro from Montenegro. In Montenegro the exercise was used as an opportunity to demonstrate monitoring capabilities of the Centre and to establish links and provide information to the Montenegro government.

The exercise showed that much has to be done in Serbia and Montenegro to achieve minimal emergency preparedness at least.

3.3.5 Turkey

According to Turkey's Evaluator Report exercise objectives were fully met. Turkish Chief Evaluator rated the completion of four objectives as 'excellent' and one as 'satisfactory' (objective 4). Only one minor deficiency had been identified in the problem area 'planning': Turkish Emergency Management Agency has no specific web page, which could be consulted when writing press releases.

3.3.6 Ukraine

Ukraine reported that three national organisations participated in the exercise: the State Nuclear Regulatory Committee of Ukraine (SNRCU), the Ministry of Ukraine of Emergencies and Affairs of Population Protection from the Consequences of Chernobyl Catastrophe (MES) and the Ukrainian Hydrometeorological Centre (UHC).

The Emergency and Information Centre of the SNRCU (EIC) was fully activated for the first 9 hours of the exercise. For the rest of the exercise the EIC functioned in partially activated mode of operation. Some EIC positions were filled by substitutes from the State Scientific Technical Centre on Nuclear and Radiation Safety. At the MES and the UHC the duty services, as well as departments in near-border regions, participated in the exercise. In addition to that, a special MES group simulated actions of MES operating staff and interministerial operating staff.

All objectives of the ConvEx-3 were met. Based on the discussions held at the exercise evaluation meeting, the evaluators from all three participating organisations identified deficiencies and corrective actions to be implemented. In their evaluation report the completion of two objectives is rated as 'excellent' and three objectives as 'satisfactory'. Deficiencies mainly fall under the problem area 'training' and 'resources'.

The following positive lessons were learnt:

a) The WMO meteorological products are proved to be very useful tool, taking into account the absence of adequate domestic capabilities in Ukraine for long-distance atmospheric dispersion modelling.

b) The ENAC and the websites of the Romanian and Bulgarian regulatory authorities demonstrated that the Internet is an efficient way to disseminate information during an emergency.

c) Bilateral arrangements might be a good channel for early notification as a backup to Early Notification Convention. Although, according to the Bulgarian-Ukrainian bilateral agreement, the parties notify each other about events on their territories, during this exercise Bulgaria notified Ukraine about the accident in Romania, and that notification came 70 minutes earlier than the IAEA notification.

The following areas for improvement were identified:

a) In case of emergency abroad, the SNRCU as a competent authority under Early Notification Convention receives notification and follow-up information from the IAEA. The SNRCU shall more clearly define in its emergency procedures what expertise the SNRCU provides to other national players along with received information.

b) Procedures in case of emergency abroad are general and do not address differences in types of events. It is expedient to revise them taking into account event categorization presented in the EPR-ENATOM manual: site area emergency in countries within 1000 km, general emergency in countries within 1000 km, satellite re-entry, etc. The IAEA guidance in this area would be beneficial.

c) Except the national weather organization UHC there are other users of the WMO products in Ukraine. It was concluded that SNRCU experts need additional training to be familiarized with WMO products and arrangements.

3.4 Other Countries

The following countries sent to the IAEA their comments or their evaluator's reports: Austria, Italy, Germany, Greece, Pakistan, Portugal, Russia and Slovenia.

Austria participated in the exercise to test information exchange on international and national levels, to test tools for analysing the consequences of nuclear emergencies (such as the RODOS system) and to exercise to some extent the preparation of information for the public. Concerning the international information pathways, Austria is of the opinion that the exercise clearly demonstrated some weak points which could become critical points in case of a real radiological or nuclear emergency with trans-boundary impacts. Both international systems for early notification and information exchange (the IAEA ENAC and the EC ECURIE system relevant for EC Member States) distributed the same or similar information in parallel. This fact caused unnecessary confusion and time delays. There was an information overflow, which was aggravated by the fact that two information systems worked in parallel. Due to the time delay of the ECURIE messages (up to ~2 hours) compared with the EMERCON messages posted on ENAC and a missing clear reference of the ECURIE message to the number of EMERCON message all messages had to be read and investigated in detail which created delays unnecessarily. Therefore, Austria recommends a harmonization and an automatic link between both international information systems. The ENAC-homepage was always accessible and provided a good overview on the status of the exercise.

Austria is also of an opinion that the time elapsed from the initial event at the Cernavoda Unit 1 to the first international notification (about two hours later) would be too long for efficient implementation of short-term countermeasures, if necessary.

Italy participated in the exercise to test the communications in the context of ENATOM and ECURIE and to verify key elements of the national response plan for nuclear and radiological emergencies. The following organisations participated: Department of Civil Protection, acting as NCA(A) in the context of ENATOM and as competent authority in the context of ECURIE system, the National Agency of Environmental Protection and Technical Services (APAT) – acting as National Warning Point (NWP) and Contact Point respectively for the ENATOM and ECURIE systems, as well as technical support organization of the Department of Civil Protection – the Centre for Data Elaboration and Evaluation, made up of representatives of different administrations (APAT, National Meteorological Service, Ministry of Interior-Fire Brigades Corp, National Institute of Health, National Institute for Occupational Prevention and Safety, Regions), entitled to provide advice to decisional bodies during emergencies. The Department of Civil Protection also exercised the preparation of press releases. In general, the exercise findings were as follows:

a) The national system was alerted in a reasonable time frame, taking into account the relevant distance from the location of the affected plant. However, there is some room for improvements, in particular in relation to the alert time frame of neighbouring countries.

b) The first alert message was received by the NWP from the ECURIE system and not from the IEC, which, however, later contacted the Italian NWP. The notification message by fax was however received by the NCA(A) in a timely manner.

c) During the exercise the availability of expertise and technical documentation on the CANDU system at the nuclear safety authority (APAT) allowed an interpretation of the event evolution at the NPP. However, the availability of common technical references on basic technical characteristics of different NPPs and related safety features, possibly made available via the ENAC web site, would be quite useful in future.

d) The ENAC web site was the key information tool used to follow the evolution of the event (some problems were encountered in confirming the reading of the published messages). In relation to its demonstrated usefulness it is important that all necessary efforts to ensure its reliability in a real emergency case are undertaken. The parallel receipt of information via fax by the ECURIE system created in the initial phase some confusion, while in the subsequent phases participants devoted the main attention to the ENAC web site. The pieces of information, provided via the ECURIE CoDecS system, on countermeasures adopted in different Member States of the European Union were, however, very useful for promoting harmonization in relation to this relevant topic. In respect to the ENAC system, that also provided useful information on countermeasures undertaken by some of the affected countries, it must be noted that the information provided in this regard by Italy was to some extent misinterpreted (the summary report indicated a level of countermeasures beyond that actually undertaken).

e) Some additional burden for the authorities was generated by the need to separately provide the same information to both the ECURIE and ENAC. This confirms the importance of the efforts to harmonize ECURIE and ENAC.

f) The exercise provided an opportunity to test the national early warning monitoring networks and the mechanism of data exchange with the EURDEP platform as well as the data communication to ENAC web site.

g) The prompt availability of long range dispersion models results provided by the WMO Regional Centres, as well as the intercomparison of results provided by the

ENSEMBLE system of the EC JRC of Ispra, gave the opportunity to complement and compare the results with the results of national model (ARIES), and so providing better bases for support the decision making bodies.

Italy is of the opinion that the exercise was an opportunity to identify areas where improvements in the national response procedures, capabilities and support systems would be needed; nevertheless, the general response tested during the exercise was at a good level.

Germany reported the following findings:

a) The information exchange between IAEA, European Union, Romania and Germany has worked very well. The parallel information of the NCA via fax and publication on the ENAC web page has proved to be helpful. Especially the distribution of information via the ENAC web page allowed a rapid information transfer to other national organisations besides the NCA. One problem was that the ENAC web page was partly not accessible during the exercise, e.g. between 16:55 and 18:15 (UTC) on Wednesday, 11.May 2005. All information flow within the NCA (Federal Ministry of Environment, Nature Conservation and Nuclear Safety, BMU) and between the NCA and other national organisations was tracked (for the first time) with an automated communication system. This communication system called ADONOS (Arbeitssorganisation und Dokumentenmanagement für den Notfallschutz) is innovative workflow-management software adapted for the support of the document management and archiving of the German national radiation emergency response system. ADONOS itself is based on the DOMEA solution provided by the Open Text company, which is a certified software for eGovernment organisations in Germany with the aim to eliminate paper-based systems and streamline business processes. During the exercise several suggestions for improvements of ADONOS and its use have been made for better communication and interaction to solve job-related problems in an emergency case.

b) Due to their continuously improving features, the Internet search engines and the web-based systems for information exchange between the staffs of the national organisations during the exercise will gain greater significance in future. During the exercise a national web-based information system (ELAN) was extensively used to collect and distribute all necessary information amongst the participating national organisations. Apart from a few areas where the need for further improvements was identified, the system proved to be very reliable, helpful and operational. The access to local (Romanian) emergency information via the Internet was also used and appreciated, especially the results from local dispersion calculations (RODOS).

c) At the evaluation of the exercise the players agreed that it would be helpful to prepare, where appropriate, the reply on the national level to the IAEA by filling out the standardized pieces of information in advance.

d) Simulating the information to the public and the involvement of the media should play a more important role in future exercises on nuclear emergency matters. During the exercise one of the national support organisations established a simulation cell for public inquiries. This simulation cell produced about 40-50 inquiries to the participating organisations, mainly to the NCA. The inquiries included telephone calls, emails and fax from individuals, media, commercial organisations and non-participating public organisations. Most of the inquiries were answered in a timely manner, and 7 press releases were produced by the NCA during the exercise.

e) The exercise gave the opportunity to improve the activating procedures of the authorities to the German players, which are part of national nuclear or radiological emergency response system and to learn from the experience made at the last exercise in October 2004. The emergency organisation of the NCA (BMU) was established without problems far below one hour after notification. Also, according to the new approach mentioned, the activation of the national support organisations (BfS, GRS, DWD) worked very well.

f) In the exercise the following topics with international aspects were highly relevant as precautionary radiation protection measures for German citizens, and they played a role in the internal discussions between the different national organisations: renunciation of holiday travel and avoidance of journeys in contaminated areas, bans on consumption and limitation of import for contaminated foodstuff and also (as long as relocation/resettlement countermeasures could be being carried out in the destination area) the question of national actions to support citizens to come back home from abroad.

g) Links with additional information were provided in the ECURIE messages (e.g. the ENSEMBLE homepage), but were not noticed immediately. Such important information could be better highlighted in the messages.

Greece reported that the exercise did not reveal any major issue. Chief Evaluator rated three objectives as 'excellent' and two as 'satisfactory'. The following minor deficiencies were identified: there was no prompt response on the initial notification message and the problem area identified was 'training', and some difficulties were encountered when transferring the meteorological data from the National Meteorological Organisation to Greek Atomic Energy Commission (GAEC). The problem area was identified as 'planning' and the following corrective actions were suggested: daily performance testing of dispersion codes and their quality control and cross checking the results.

Pakistan actively participated in the exercise. The National Radiation Emergency Coordination Center **(**NRECC), PNRA being the NWP was manned throughout the exercise utilizing available communication channels to keep NCA(A) informed and updated about the developing situation. Different observations and recommendations were made during the exercise. However, some of the recommendations to the IEC are as follows:

a) The IEC should seek collaboration of National Regulatory Bodies with international organizations like the WHO, WMO, FAO, etc. not only during such exercises but also during actual emergency situations;

b) The IAEA should set up mechanism to identify the time frame for dissemination of information after an accident;

c) The assistance or advice should/may be asked from the countries other than neighbouring countries to the affected country; and

d) The IEC should help the NCAs to plan and conduct such exercises at national level in collaboration with national agencies involving relevant off-site authorities.

Pakistan is of the opinion that the exercise provided an opportunity to identify gaps in national and international emergency response infrastructure that might hamper the response aimed at minimizing the consequences of a nuclear accident. Moreover, this exercise has helped to enhance capabilities of NWP's and NCA's personnel in the field of emergency preparedness and response.

Portugal actively participated in the exercise with the following national objectives: to test, train and evaluate the exchange of information at national and international level (IAEA, EC, bilateral agreements); EURDEP data transmission in emergency mode; submission of information to the national authorities; publishing information to general public; capacity of response in case of an emergency abroad for an extended period; adequacy of internal procedures; and in addition to identify any shortcomings in the national emergency response system that might hamper the response. Communication channels used in the exercise were fax, CoDecS, e-mail and Internet. Information was also obtained through several web sites or web site based systems (CNCAN web site, ENAC, ENSEMBLE, RODOS, Danish site, EURDEP and MeteoFrance e MetOffice).

Evaluation of communications revealed several weaknesses in EURDEP, CoDecS and ENAC/ENATOM. Portugal complained that ENATOM has no clear instructions regarding response in ConvEx-3 exercises. Therefore Portugal is suggesting that the next edition of the ENATOM Manual be revised to include the clear procedure that should be followed in ConvEx-3 exercises (information receipt confirmation on ENAC or by fax), and this procedure should be no different from the procedure used in actual emergency.

Russia in its preliminary report communicated to the IAEA the following issues:

a) International system for notification and communication worked well.

b) In Russia, there were three organizations/institutes that performed model calculations on possible impacts on Russia (projected doses) and a good agreement between predictions was achieved.

c) Recommendations on protective actions were based on the IAEA-TECDOC-955 and the IAEA-TECDOC-1092. The players found those two documents very useful.

d) The Romanian exercise web site with all the information from relevant Romanian organisations proved to be very useful being easily accessed by different response organisations inside Russia.

Slovenia reported one major and one critical issue (beside several minor deficiencies in national response system). The Slovenian Chief Evaluator rated four objectives as 'satisfactory' and one as 'excellent'. The major deficiency was connected to the unsatisfactory dispersion modelling while the lack of procedures regarding the response in case of 'nuclear accident abroad' was characterized as 'critical'. Development of adequate procedures was suggested. Slovenia also reported that the ENAC system was extremely efficient in exchanging information internationally. Slovenia proposed to the IAEA to consider development of a version of ENAC, which could be customized for national use. That would also make the transfer of information to 'international' ENAC in future emergencies simple and effective.

Section 4

4 CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations[8] are divided into general and specific to respective evaluation area (management, communication, technical and public information). General exercise conclusions are as follows:

1 The exercise allowed participating countries and international organisations to test their emergency arrangements and identify areas for further improvements. The exercise objectives were essentially met and the exercise highlighted several areas that, if not improved, could compromise the efficiency and effectiveness of the response.

2 Due to its continuously improving features, the Internet and the web based systems for national and international information exchange proved to be very useful but practical and tested procedures are required to ensure proper and timely handling of information during the emergencies. A common international platform for the exchange of information with possible interfaces to national web based systems would be extremely beneficial. However, information exchange via fax through data security network (DSN) lines should be maintained in parallel.

3 The issue of coordinating media information on a national and especially on the international level remains very important and should be kept on the list of objectives for future emergency exercises. Coordination of information needs to be improved through the development, implementation and testing of procedures for liaison and public information exchange between organisations and authorities.

4 Exercise preparation, conduct and evaluation was satisfactory but there is still room for improvement especially in the exercise evaluation process. The lack of completeness of evaluators' information, in some cases, can be attributed to insufficient/incomplete instructions and to lack of customisation of guides for evaluators. In future exercises more efforts and time should be invested in adequate training of evaluators.

The following common exercise findings and corresponding recommendations are specific for each evaluation area.

[8] These conclusions and recommendations were discussed at the Fifth Coordination Meeting of the Working Group on Joint International Exercises (overall exercise evaluation), which took place in Vienna on 27 June 2005.

4.1 Management Area

5 Most of the deficiencies reported fall under the problem area 'training'. Identified shortfalls demonstrate that there is a clear need for more systematic and planned training of responders and management at all levels: local, regional, national and international.

Recommendation 1: NCA(A)s and other response organisations should develop/upgrade and implement systematic training programmes. They should strive for more shared ownership and active support from management regarding training of emergency staff together with appropriate commitment.

4.2 Communication Area

6 Dedicated national and international web sites (e.g. ENAC) proved to be an efficient way of communicating the information.

7 Manifold reporting on the international level of essentially the same information without cross referencing (ENAC, ECURIE, bilateral agreements) created information overflow and unnecessary workload. Bilateral agreements on information exchange proved to be an efficient tool for timely notification.

8 In the exercise most of the NCA(A)s used paper-based systems for document management and archiving, however, some used electronic systems to track the information flow. The exercise showed that this innovative information flow-management streamlined document management and archiving.

Recommendation 2: The IAEA Secretariat and NCA(A)s together with relevant international organisations are urged to speed up the development of a strategy for enhancing international emergency communications system(s) in accordance with the 'International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies'. In this respect a common platform for information exchange should be considered as part of possible solutions.

4.3 Technical Area

9 Specialized meteorological products currently prepared and provided by the WMO RSMCs under the Regional and Global Arrangements were generated and provided according to operational procedures. Users of these products expressed general satisfaction. In addition to these WMO products, products from the ENSEMBLE system (EC's Joint Research Centre, Ispra) as well as from RODOS were made available during the ConvEx-3 exercise. The availability of multiple numerical modelling results could potentially retard or confuse decision-making. It was felt that the development of a scientifically sound and technical viable solution for real-time 24/7 operational emergency response, which reliably synthesizes the multiple results, could enable emergency management specialists to more efficiently analyse data and information for recommending protective actions.

10 The ConvEx-3 demonstrated utmost importance of the WMO products for national authorities as a competent source of information on long-distance atmospheric dispersion modelling. In addition to national weather organizations, other users of WMO products should have certain knowledge of WMO arrangements; and application of WMO products in countries should be exercised periodically as one of elements of response to emergencies abroad.

11 Long-range atmospheric dispersion forecasts posted on the ENSEMBLE web site were well received by the participants - especially by those who did not have modelling capability themselves. National Competent Authorities are recommended to encourage and support the use of ENSEMBLE at national level in terms of dispersion forecast submission and consultation and to consider making this facility part of the operational emergency arrangements.

Recommendation 3: The IAEA Secretariat and WMO, in conjunction with NCAs and with other relevant international organisations, should review the status of development and implementation of improvements to the current meteorological products or new products, including the use of ensemble forecasting techniques, that could assist in the reliable synthesis of multiple numerical modelling results for real-time support to nuclear emergency response.

Recommendation 4: The IAEA and NCAs with WMO and other relevant international organizations should determine an optimal interface for meteorological data and information to emergency management decision-making mechanisms and systems.

Recommendation 5: For countries it would be beneficial to test usage of the WMO meteorological products during national exercises. The process and the frequency of tests needs to be agreed upon with WMO – for example, not more often than once per year per country.

12 The IAEA ENAC web site provides an excellent facility for communicating authoritative information in an emergency situation to a large group of contacts. The effective management of important, authoritative time-critical and potentially rapidly changing status information is essential for real-time emergency management.

Recommendation 6: The IAEA should review the content management of its ENAC web site and develop an effective method to reliably maintain or provide access to essential and useful information in a timely fashion as an emergency incident evolves.

13 Some NCA(A)s were lacking technical information on CANDU reactors to be able to assess independently possible 'accident' development/scenarios and some others had no procedures regarding the response to 'nuclear accident abroad'.

Recommendation 7: The IAEA Secretariat is encouraged to develop more comprehensive guidance for the NCA(A) response in case of 'transboundary emergency' which could be included for example in ENATOM. Under the auspices of the IAEA a nuclear knowledge portal including technical information about different types of power reactors and accessible to all NCA(A)s could be developed (for example Power Reactor Information System - PRIS could be extended to cover technical questions regarding nuclear emergencies).

4.4 Public Information Area

14 The need for coordination of media information between various participants, countries, and international organisations has already been discussed many times and is still seen as an open and important issue during nuclear emergencies. Apart from the coordinated actual press releases prior to and after the exercise there was little coordination of information 'provided' to the media during the exercise itself. The importance of issuing coordinated press releases is still underestimated by the response staff[9].

[9] A similar lesson was identified in previous exercises but obviously not learned.

15 It is important that public information personnel are educated with basic nuclear emergency issues and correct terminology before any emergency takes place. Especially the meaning of the INES rating needs to be made very clear to all persons interfacing with the media or the general public.

Recommendation 8: Exercising coordination of information to the public and the involvement of the media should play a more important role in future exercises. Specific exercises might be developed to test public information arrangements.

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Section 5

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5.1 Explanation of terms used

Accident State	State, whose facilities or activities or those of persons or legal entities under whose jurisdiction or control, a nuclear or radiological (radiation) emergency occurs or is likely to occur.
Affected State	State other than the accident State for whom, following a nuclear accident or radiological emergency resulting in a transboundary impact, the consequences are of radiological safety significance.
Competent Authority	A contact point that is authorized to issue a notification, advisory, request for assistance or other emergency information as appropriate, and to reply to requests for information or assistance. A Member State may have more than one competent authority.
Contact Point	A generic term for an organization, designated by a State or an international organization, that has a role to play in international exchange of information in response to a radiation emergency.
Notification	(1) A report submitted promptly to a national or international authority providing details of an emergency or a potential emergency; for example, as required by the Convention on Early Notification of a Nuclear Accident. (2) A set of actions taken upon detection of emergency conditions with the purpose of alerting all organizations with responsibility for emergency response in the event of such conditions.
Verification	The process of determining whether the quality or performance of a product or service is as stated, as intended or as required. The process of confirming that the information in a message is properly understood.
Warning Point	A contact point that is staffed 24 hours for promptly responding to, or initiating a response to, an incoming notification, advisory message, request for assistance or request for verification of a message as appropriate, from the IAEA.

5.2 Acronyms

The following acronyms are used in this report.

BfS	Federal Office for Radiation Protection (of Germany)
CANDU	Canada Deuterium Uranium
CNCAN	National Commission for Nuclear Activities Control, Romania
CoDecS	Coding Decoding Software (used for ECURIE system)
ConvEx	Convention Exercise
DES	State Department of Emergency Situations (of Moldova)
DWD	German Meteorological Service
EADRCC	Euro-Atlantic Disaster Response Coordination Centre
EC	European Commission
ECC	Emergency Core Cooling
ECCS	Emergency Core Cooling System
ECN	FAO Nuclear Emergency Crisis Network
ECURIE	European Community Urgent Radiological Information Exchange
EMERCON	Emergency Convention
ENAC	Emergency Notification and Assistance Convention web site
ENATOM	Emergency Notification and Assistance Technical Operations Manual
ENSEMBLE	A system to reconcile disparate national forecasts of medium and long-range atmospheric dispersion (EU States)
EPS	Emergency Power supply
ERS	Emergency Response System
EURDEP	European Radiological Data Exchange Platform
FAO	Food and Agricultural Organisation of United Nations
GENF	EMERCON General Emergency at Nuclear Facility Form
GRS	Gesellschaft für Anlagen- und Reaktorsicherheit
HAEA	Hungarian Atomic Energy Authority
IACRNA	Inter-Agency Committee for Response to Nuclear Accidents
IAEA	International Atomic Energy Agency
IEC	Incident and Emergency Centre of IAEA
INES	International Nuclear Event Scale (of IAEA)
JRC	Joint Research Centre - European Commission
LOCA	Loss Of Coolant Accident
MPA	EMERCON Radiation Measurements and Protective Actions Form
MTPI	IAEA Division of Public Information
NATO	North Atlantic Treaty Organisations
NCA(A)	National Competent Authority for an Emergency Abroad
NCA(D)	National Competent Authority for a Domestic Emergency
NEA	Nuclear Energy Agency of OECD
NMC	National Meteorological Centres
NMHS	National Meteorological and Hydrological Services
NPP	Nuclear power plant
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Cooperation and Development
PHTS	Primary Heat Transport System
R/B	Reactor Building
REM	Radioactivity Environmental Monitoring
REMPAN	Radiation Emergency Medical Preparedness and Assistance Network (of WHO)
RESPEC	Radiological Emergency Support Project for the European Commission
RODOS	Real-time Online Decision Support System (of EC)
RSMC	Regional Specialized Meteorological Centres
SHOC	Strategic Health Operations Centre (of WHO)
TREN	European Commission Directorate-General Energy and Transport
UNDAC	United nations Disaster Assessment and Coordination
UNEP	United Nations Environmental Programme
UTC	Universal Time Coordinated (= Greenwich Mean Time - GMT)
WHO	World Health Organisation
WMO	World Meteorological Organisation

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