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REPORT OF THE

INTERNATIONAL REGULATORY REVIEW TEAM (IRRT)

TO

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INTERNATIONAL REGULATORY REVIEW TEAM
conducted under IAEA Technical Co-operation Project RER/9/052:-
Nuclear Safety Regulatory Infrastructure

DEPARTMENT OF TECHNICAL CO-OPERATION
Division for Europe, Latin America and West Asia

DEPARTMENT OF NUCLEAR SAFETY
Division of Nuclear Installation Safety

FOREWORD

by the

Director General

The IAEA International Regulatory Review Team (IRRT) programme assists Member States to enhance the organization and performance of their nuclear safety regulatory body. Such a regulatory body must work within the framework of its national legal system which in turn should ensure both the independence and the legal powers available to the regulatory body. Additionally the national administrative and legislative system should ensure that the regulatory body has sufficient funding and resources to carry out its functions of reviewing and assessing safety submissions; licensing or authorizing nuclear safety activities, establishing regulations and criteria; inspecting nuclear facilities and enforcing national legislation. The regulatory body should be resourced and staffed by capable and experienced people to a level commensurate with the national nuclear programme. IRRT missions focus on all these aspects in assessing the regulatory body's safety effectiveness. Comparisons with successful practices in other countries are made and ideas for improving safety are exchanged at the working level.

An IRRT mission is made only at the request of a Member State. It is not an inspection to determine compliance with national legislation, rather an objective review of nuclear regulatory practices with respect to international guidelines. The evaluation can complement national efforts by providing an independent, international assessment of work processes that may identify areas for improvement. Through the IRRT programme, the IAEA facilitates the exchange of knowledge and experience between international experts and regulatory body personnel. Such advice and assistance will enhance nuclear safety in all nuclear countries. An IRRT mission is also a good training ground for observers from newly formed regulatory bodies in developing countries who follow the evaluation process. This approach, based on voluntary co-operation, contributes to the attainment of international standards of excellence in nuclear safety at the regulatory body level.

Essential features of the work of the IRRT experts and their regulatory body counterparts are the comparisons of regulatory practices with international guidelines and best practices, and a joint search for areas where practices can be enhanced. The implementation of any recommendations or suggestions, after consideration by the regulatory body, is entirely voluntary.

The number of recommendations, suggestions and good practices is in no way a measure of the status of the regulatory body. Comparisons of such numbers between IRRT reports from different countries should not be attempted.

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SUMMARY

At the request of the Hungarian Government authorities, an IAEA team of eight experts visited the Hungarian Atomic Energy Authority (HAEA) to conduct an International Regulatory Review Team (IRRT) mission. The purpose of the mission was to review the effectiveness of the regulatory body of Hungary and to exchange information and experience in the regulation of nuclear, radioactive waste and radiation safety.

The HAEA has been allocated the responsibilities typically associated with a regulatory body. There are several responsibilities shared with other authorities, i.e. emergency preparedness, radioactive waste management and radiation protection. In the opinion of the team, the HAEA is a highly competent organisation which has the technical capability to deal with the regulatory and technical areas for which it is responsible. The HAEA has recently taken a number of initiatives to improve its effectiveness. These initiatives included the development of a comprehensive system of guidelines, a self-assessment of the HAEA-Nuclear Safety Directorate (NSD) structure and operation, development of a training program for the regulatory staff, strengthening its role and capabilities in emergency preparedness. The team also noted preparations for a new organizational structure and a more effective operation of the HAEA-NSD resulting from the self-assessment performed.

The team believes that the following items should be priorities because they were identified in several of the review areas or because the reviewers consider that they will have the most significant positive effect on performance of the Hungarian regulatory body:

- improvements in the legal basis and overall independence of the regulatory body;
- preventing any activities that would undermine the effectiveness, authority, and staffing of the regulatory body;
- further steps towards effective co-ordination of activities among all the regulatory bodies involved in the oversight of nuclear facilities and related activities;
- preparation for and performing inspections and training of site inspectors; and
- implementation of all assigned responsibilities in the area of radioactive waste management, decommissioning and radiation protection.

The reviewers identified a number of good practices which have been recorded for the benefit of other nuclear regulatory bodies. They also made recommendations and suggestions which indicate where improvements are necessary or desirable to further strengthen the regulatory body in Hungary. These recommendations and suggestions are made to an organization which is seeking to improve its performance, and many of them are related to areas in which the HAEA has already implemented a programme for change.

The HAEA staff put considerable effort into the preparation for the mission. During the review there was full cooperation during technical discussions with the HAEA personnel and the organization and administrative support was very good. The HAEA counterparts were enthusiastic and interested in obtaining international advice, and team members appreciated the opportunity to identify lessons for their own organizations from the HAEA practices.

INTRODUCTION

At the request of the Hungarian Government authorities, an IAEA team of eight experts visited the Hungarian Atomic Energy Authority (HAEA) to conduct an International Regulatory Review Team (IRRT). The Mission composition of the team is given in Annex III. The purpose of the mission was to review the effectiveness of the regulatory body of Hungary and to exchange information and experience in the regulation of nuclear, radiation, and radioactive waste safety in the following specific predetermined areas: legislative and governmental responsibilities; authority, responsibilities and functions of the regulatory body; organization of the regulatory body; authorization process; review and assessment; inspection and enforcement; development of regulations and guides; emergency preparedness; radioactive waste management in nuclear facilities and decommissioning of nuclear facilities; and technical radiation protection in nuclear facilities. On request of the HAEA, radioactive waste management, decommissioning, radiation protection, and emergency preparedness were reviewed only to the extent which is under responsibility of the HAEA.

The review was conducted from 22 May to 2 June 2000. Before taking part in the mission the experts reviewed the Advanced Reference Material provided by HAEA. During the mission, a systematic review of the predetermined areas was completed using interviews with staff and direct observation of working practices. The HAEA made available to the team a large number of legal, regulatory and internal documents in English, and these are listed in Annex I.

Most of the IRRT activities took place at the HAEA headquarters in Budapest. During the mission three members of the team visited the Paks nuclear power plant, one expert visited Modular Vault Type Dry Spent Fuel Storage at the Paks site and two experts visited 10 MWth research reactor at Atomic Energy Research Institute in Budapest to observe inspection practices and to discuss related issues. Members of the team visiting the Paks NPP spent also time with the managers of the NPP. A meeting was also organized with the representative of PURAM, an organization established by the Government for the final disposal of waste, interim and final disposal of spent fuel, and for the decommissioning of nuclear facilities. There was also a visit to the Center for Emergency Response, Training and Analysis (CERTA) of the HAEA.

Scope of the mission was focused primarily on responsibilities of the NSD of the HAEA. However all responsibilities of the HAEA directly related to the NSD activities were also addressed. In formulating recommendations and suggestions for future improvements, distinction was made between those directed to the NSD and to the HAEA.

1. LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES

Experts: J. Scherrer, G. Giersch

1.1. PRINCIPAL LAWS OR OTHER LEGAL PROVISIONS

As in many countries the Hungarian legislation on the peaceful use of nuclear energy is hierarchically structured following the lines of a pyramid. It is governed by the Act on Atomic Energy (AAE). Governmental/Ministerial decrees represent the second level of the nuclear legislation; followed by detailed Nuclear Safety Regulations. Safety Guidelines without legally binding power supplement the nuclear legislation on the lowest level.

1.1.1. Legislation

The principal documents of the Hungarian legislation are listed below:

- Act on Atomic Energy (Act CXVI of 1996)
- Governmental Decree on the Duties and Scope of Authority of the Hungarian Atomic Energy Commission and on the Scope of Duty and Authority, and Jurisdiction of Imposing Penalties of the Hungarian Atomic Energy Authority (Decree 87/1997(V. 28.))
- Governmental Decree on the Procedures of the Hungarian Atomic Energy Authority in Nuclear Safety Regulatory Matters (Decree 108/1997 (VI. 25.))
- Governmental Decree on the Safety Zone of Nuclear Installation and Radioactive Waste Storage Installation(Decree 213/1997 (XII. 1.))
- Governmental Decree on the Creation of an Organization for the Disposal of Radioactive Wastes and Spent Fuel, as well as the Decommissioning of Nuclear Facilities and the Financial Resources for its Activities(Decree 240/1997(XII. 18.))
- Governmental Decree on the National Nuclear Emergency Prevention System (Decree 248/1997 (XII. 20.))
- Decree on Disposition of the President of the National Environment Protection and Nature Conservation Authority on the Rules of Protection of Air Related to the Nuclear Power Plant (Decree 1/1980 (II. 6.)OKTH)
- Ministerial Decree on Building Rules of the Nuclear Installations (Decree 11/1984 (VIII. 1.) EVM)
- Decree of the Minister of Social Welfare and Health on the execution of Council of Ministers Decree 12/1980. (IV. 5.) MT ruling on execution of Act I. of 1980 on Atomic Energy. (Decree 7/1988(VII.20.)SZEM)
- Decree of Minister of Industry, Trade and Tourism on the Geological and Mining Requirements of Siting and Design of Nuclear Installations and Installations for Deposition of Radioactive Wastes (Decree 62/1997. (XI. 26.) IKIM
- Decree of Minister of Industry, Trade and Tourism on the Operation and Procedural Order of the Central Nuclear Financial Fund (Decree 67/1997. (XII. 18.) IKIM)

- Decree of Minister of Interior on Police Tasks Related to Use of Atomic Energy (Decree 47/1997. (VIII. 26.) BM)
- Common Decree of the Minister of Industry, Trade and Tourism and Minister of Cultural Affairs and Education on Professional Training, Retraining of Employees Working in the Nuclear Power Plant, as well as in the Research and Training Reactors, and on the Domain of Persons Qualified to Exercise Activities Related to Use of Atomic Energy (Decree 49/1998. (VI. 25.) IKIM-MKM)

1.1.2. Nuclear Safety Regulations

Nuclear Safety Regulations are set out in the Decree 108/1997 (VI. 25.). They are divided in 5 schedules to the Decree and regulate the mandatory safety requirements for nuclear facilities as follows:

1. Regulatory Procedures Applied to Nuclear Power Plans
2. Quality Assurance Regulations of Nuclear Power Plants
3. General Design Requirements of Nuclear Power Plants
4. Safety Requirements for Operation of Nuclear Power Plants
5. Nuclear Safety Regulations of Research Reactors

1.1.3. Nuclear Safety Guidelines

The Director General (DG) of the HAEA is entitled to issue safety guides in order to provide guidance how to comply with and how to implement the mandatory requirements of the regulations. The detailed safety guidelines being prepared and set into force amend the legal provisions of the regulatory body. Each year a number of guidelines are identified for review and are changed/amended if necessary.

The experts concluded that the legal framework generally meets the requirements for the development of a legal basis for establishing a regulatory body and other actions to achieve effective regulatory control.

1.2. LEGAL DEFINITION AND POSITION OF THE REGULATORY BODY

The AAE applies to:

- *to the peaceful use of atomic energy, the associated rights and obligations, as well as the protection of humans and the living and non-living environment against the detrimental effects of ionising radiation of natural and artificial origin.*

The AAE shall not apply:

- *to activities related to radioactive materials, as well as equipment which - due to the character and extent of ionising radiation that can be created - do not qualify as hazardous to human life and health, as well as to the animate and inanimate environment.*

The fundamental safety principles/requirements are laid down in Section 4 and Section 5 of the AAE .

The general rules of applying atomic energy through regulation and control are set out in Chapter II of the AAE. In Section 8(4) the AAE positions the HAEA as a central public administration organization in the field of the use of atomic energy:

- *In the field of the peaceful use of atomic energy, the HAEA is a central public administration organisation with autonomous tasks and regulatory authorisation under the control of the Government, providing preliminary review of legislation and regulatory rules related to the use of atomic energy. The Director General and the Deputies will be appointed and dismissed by the Prime Minister.*

The general regime of regulatory licensing, inspection and supervision is covered in Chapter III of the AAE.

The primary responsibilities regarding the peaceful use of atomic energy are clearly assigned to users of Atomic Energy, Section 10 of the AAE stipulates:

- *Users of atomic energy are responsible for the safe application of atomic energy and compliance with safety requirements*.
- *The licensee - in its scope of activity - is obliged to provide the technical, technological, financial and personnel conditions required for the safe use of atomic energy and for maintaining and developing safety, and furthermore to monitor continuously the radiation conditions in accordance with the most recent certified results of science, international expectations, as well as experience. The general public shall be informed regularly - at least on a monthly basis - about results of monitoring the environmental radiation conditions.*
- *The licensee is obliged undertake continuous activities to upgrade safety, taking into consideration its operational experience and new knowledge regarding safety.*

In Chapter III of the AAE, Section 17(2) specifies the scope of activities of the HAEA: licensing and inspections of nuclear facilities are under control of the HAEA for all stages of the facility lifetime. However, final storages of radioactive waste are not considered as nuclear facilities. The fulfilment of obligations related to final disposal of radioactive waste as well as the interim storage and final disposal of spent fuel and the decommissioning of nuclear facilities is legally considered as a matter of national interest. The AAE stipulates that the responsibility for performing these obligations...*"shall be the responsibility of an organization designated by the government..."*. Therefore, in the future the responsibility for any nuclear facility will be transferred from its present operator to that designated organisation.

Though the execution of the provisions being laid down in Sect. 40 of AAE is regulated comprehensively through Decree 240/1997, questions still remain open. For example, timing and procedures due to the transfer of ownership and related responsibilities in respect to spent fuel are not defined. Decommissioning issues within the Safety Analysis Report are to be updated every two years (HAEA Safety Code No.1). This issue will be further discussed in Section 1.2 and 9 of this report.

In discussions with the regulatory body the experts identified a general concern regarding interpretations of responsibility assigned to authorities and co-authorities. Furthermore, uncertainties in justifying enforcement actions legally seem to be sometimes a point at issue. This was thought to be a result of the complex legal framework for the peaceful use of atomic energy (e.g. involvement of 11 ministries plus additional governmental bodies) and relatively recent introduction of a new national judicial system.

During review and discussions the experts identified areas where the legislative framework could be improved and/or amended.

1.2.1. Recommendations and Suggestions

(1) **BASIS** - The IAEA Requirements for Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, Safety Standard Series GS-R-1 (hereafter called SSS GS-R-1) includes, among the facilities and activities to be covered by the legal framework, paragraph 1.4.(12), the *"decommissioning or closure of nuclear facilities and site rehabilitation"*. It also requires, in paragraph 2.2.(6), that *"adequate infrastructure arrangements shall be made for decommissioning, close-out or closure, site rehabilitation, and the safe management of spent fuel and radioactive waste"*. In addition SSS GS-R-1 requires in paragraph 2.4.(8) that the legislation *"shall provide for continuity of responsibility when activities are carried out by several operators successively and for the recording of the transfer of responsibility"*.

a) **Recommendation: The legislative framework regarding decommissioning, interim storage and final disposal of spent fuel and radioactive waste should be reviewed and amended to provide for continuity of responsibilities and for the recording of the transfer of responsibility when obligations are taken over from the present operators of the nuclear facilities to be carried out by the designated organization.**

(2) **BASIS** - SSS GS-R-1 requires sufficient structures and resources for the regulatory regime. Paragraph 2.1.(4) demands to provide *"the regulatory body…with adequate authority and power, and it shall be ensured that it has adequate staffing ... to discharge its assigned responsibilities"*.

a) **Suggestion: Strengthening of the legal support/advice for the regulatory authority should be considered as a priority assignment to provide for legal backing to the authority in making regulatory decisions within this complex legal framework.**

1.2.2. Good Practices

(1) **BASIS -** SSS GS-R-1 paragraph 2.4.(13) requires that the legislation *"shall set out the responsibilities and obligations with respect to financial provision for radioactive waste management and decommissioning"*.

a) **Good Practice: The legislative framework provides for a funding system through a separate fund exclusively earmarked for financing the construction and operation of disposal facilities, for the final disposal of radioactive waste as well as for the interim storage and final disposal of spent fuel and the decommissioning of nuclear facilities. The licensees are obliged to cover the costs. The payments are determined by law on an annual basis.**

(2) **BASIS** - According to SSS GS-R-1, paragraph 5.28 *"In developing regulations and guides, the regulatory body shall take into consideration…the feedback from experience."*

a) Good Practice: The need of periodical review of the nuclear safety Codes once in every five years, with regard to scientific achievements and international experience, legally required by the Act on Atomic Energy, and put into concrete terms by governmental decree, is considered to be a binding contribution to an effective implementation/execution of safety regulations.

1.3. INDEPENDENCE OF THE REGULATORY BODY

According to AAE, Chapter II, the Hungarian Atomic Energy Commission (HAEC) shall prepare positions and proposals for the Parliament and the Government on:

- the application of atomic energy ;
- the domestic measures required by the general trends of international development in the field of application of atomic energy ;
- issues of national and international significance related to the regulatory system.

In these activities the HAEC appears in a prominent position regarding the execution of the governmental tasks described in the AAE. These activities are of promotional and regulatory nature, as at governmental level all activities related to the use of atomic energy have always to be addressed.

The HAEA is designated as a *"central public organization with autonomous tasks and regulatory authorization under the control of the Government"* and *"is to co-ordinate or accomplish the regulatory tasks, as well as the related information activity, in connection with the safe application of atomic energy".* Thus the HAEA is to be considered as the nuclear safety regulatory body of Hungary. The Director General and the Deputies of the HAEA are appointed and dismissed by the Prime Minister. This statement of the Act gives a very high rank to the HAEA. But, on the other hand, the Act also stipulates that *"the Government shall exercise supervision over HAEA through the President of HAEC",* who is appointed by the Prime Minister *"from among the members of the Government".* Presently, the President of the HAEC is the Minister in charge of Economic Affairs.

The reporting line of the HAEA to the Government is thus channelled through a member of the Government who is also in charge of promotional activities as Minister of Economic Affairs. Even though Decree 87/1997 stipulates that *"Government supervision of HAEA shall be exercised by an appointed member of the Government independent of his responsibility toward his ministry"*, it is difficult for the experts to conclude that the regulatory body of Hungary is *"effectively independent from organizations or bodies charged with the promotion of nuclear technologies or responsible for facilities or activities".*

In another field, the final disposal of waste, according to the AAE, the interim and final disposal of spent fuel and the decommissioning of nuclear facilities are the responsibilities of a special organization designated by the Government. This organization, called Public Agency for Radioactive Waste Management (PURAM), has been created by Decree 240/1997 and is presently the licensee operating the interim storage of spent fuel on the site of Paks NPP. PURAM is presently applying to be a holder of existing licenses for the entire spent fuel facility. The Director General of the HAEA legally established PURAM and

among others he is in charge of appointing the managing director and the supervisory board of PURAM. PURAM is financed through the Central Nuclear Financial Fund. The President of the HAEC is disposing of this fund and the HAEA is the Manager of the Fund (Section 62 of the AAE). The Director General of the HAEA is the Chairman of the Expert Committee evaluating proposals for PURAM's long-range, medium-range and annual work plan. The position of the Expert Committee shall then be approved by the President of the HAEC, on the basis of a proposal presented by the HAEA. In addition, according to Decree 67/1997 on the Operation and Procedural Order of the Central Nuclear Financial Fund, *"counter-signing by the HAEA is required for the announcement of tenders for the execution of all duties…, as well as for the conclusion of contracts, if the Fund is covering the costs incurred through such"*. This means that the HAEA has to counter-sign all decisions of PURAM inducing expenses as practically all financial resources of PURAM are coming from the Fund.

In conclusion, it is again difficult for the experts to conclude that the regulatory body of Hungary is *"effectively independent from organizations or bodies ... responsible for facilities or activities"*. In addition, the Director General of the HAEA is the second instance for all appeals concerning the regulation of nuclear facilities and activities. As PURAM in its legally designated functions has to apply for authorizations in the field of nuclear safety, the specific role of the Director General of the HAEA in the management of the Central Nuclear Financial Fund may clearly conflict with his responsibility for regulating safety.

The annual budget of the HAEA is allocated as an independent item within the budget of the designated ministry. Such practice provides some security, flexibility and independence in spending.

1.3.1. Recommendations and Suggestions

(1) **BASIS** - According to SSS GS-R-1, requirements are listed which shall be fulfilled by the legislative and governmental mechanisms of Member States. It is written :

> in paragraph 2.2.(2) "A *regulatory body shall be established and maintained which shall be effectively independent from organizations or bodies charged with the promotion of nuclear technologies or responsible for facilities or activities*";
>
> in paragraph 2.2.(5) *"No other responsibility shall be assigned to the regulatory body which may jeopardize or conflict with its responsibility for regulating safety".*
>
> In paragraph 4.1. it is also written :
> *"The regulatory body's reporting line in the governmental infrastructure shall ensure effective independence from organizations or bodies charged with the promotion of nuclear or radiation technologies, or those responsible for facilities or activities"*.

a) Recommendation: The reporting line of the HAEA should be channelled through persons, bodies or organizations that are not, directly or indirectly charged with the promotion of nuclear energy. The same provisions should be applied regarding the Government supervision of its activities through the HAEC.

b) Recommendation: The HAEA should not be involved in the establishing of any organization or body financing and operating facilities or performing activities

in the field of the use of atomic energy. **At present, it applies to the establishing of PURAM and the managing function of the Central Nuclear Financial Fund.**

1.4. BUDGET AND FINANCIAL RESOURCES OF THE REGULATORY BODY

The year 2000 budget of the HAEA is of about one billion Hungarian Forint (HUF). About 70% of that budget is paid by the nuclear facility as a supervisory fee to the HAEA according to section 19A of the AAE. The remaining 30% are provided by the State budget in order to cover the supervision costs of the State organizations operating facilities or performing activities in the regulatory scope of the HAEA (mainly the research reactors and PURAM).

For 1999 and 2000 budget, the level of fees was determined by the same section 19A of the AAE, on the base of the nominal thermal capacity (MWth) of the nuclear facility, at 146 992 HUF/MWth/year.

For 2001, the HAEA is proposing an increase of its budget of 10% which correspond to new activities in the field of waste treatment (mainly in connection with PURAM), off-site emergency preparedness, preparation to EU accession, revision of regulation and guidelines and strengthening the principal regulatory activities of the regulatory body. The AAE will have to be modified accordingly in order to increase the financial resources provided by fees.

According to national policies of reducing staff in state offices, the first draft of the 2001 budget is proposing a decrease of two people from the existing staff of the HAEA of 88 people. The IRRT experts were not sure that this overall reduction of staff, completed by internal reallocation of staff inside the HAEA will provide the regulatory body (mainly NSD and some supporting units of other parts of the HAEA) with adequate human resources in order to fulfil its responsibilities.

1.4.1. Recommendations and Suggestions

(1) **BASIS** - According to principle (3) of the IAEA Safety Fundamentals "The Safety of Nuclear Installations", Safety Series No. 110 : the regulatory body *"shall have adequate ... resources to fulfil its assigned responsibilities."*
According to SSS GR-R-1, Paragraph 2.2.(4) *"It shall be ensured that it* [the regulatory body] *has adequate staffing and financial resources to discharge its assigned responsibilities"*

a) **Suggestion: Policies of the Government that could conflict with the assigned responsibilities of the regulatory body should not be applied to the regulatory body; thus general decisions of reducing staff of public offices or level of taxes or fees recovered on activities or facilities should only be applied to the nuclear, radiation, radioactive waste or transport safety regulatory body if they do not jeopardize its efficiency and effectiveness.**

b) **Suggestion: The Act on Atomic Energy should be modified so that regular increase of the level of fees can be decided by other legal procedure, for example the yearly Act for Finance determining the state budget of Hungary.**

2. AUTHORITY, RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

Experts: J. Scherrer, G. Giersch

2.1. CO-ORDINATION BETWEEN AUTHORITIES

According to section 67 and 68 of the AAE, more detailed legal requirements in the field of nuclear safety are established by the Government and by the minister supervising HAEA.

According to section 5 of the Governmental Decree 87/1997, the Director General of the HAEA is entitled to present, in agreement with the President of the HAEC, propositions to the Government in connection with matters falling under the authority of the HAEC and HAEA and requiring a decision by the Government. According to section 8, subsection (2), of this Decree, The Director General of the HAEA is entitled to issue guidance documents in the field of nuclear safety.

According to section 17 of the AAE, *"the following activities fall into the scope of the HAEA :*

a) nuclear safety licensing required for the siting, construction, enlargement, commissioning, operation, modification, putting out of operation, decommissioning of nuclear facilities ;
b) nuclear safety inspection of nuclear facilities ;
c) regulatory licensing and controlling of structures connected to nuclear facilities [i.e. civil works and constructions] ;
d) with regard to nuclear equipment, nuclear safety and technical radiation protection licensing and inspection of activities related to the design, manufacture, installation (fitting in), commissioning, operation, modification (repair), imports from abroad, putting out of operation and decommissioning ;
e) monitoring of the quality assurance system ... [of the operating organization and its suppliers] or having such systems inspected by an institution designated by the HAEA";

Items f) to l) of Section 17 adds responsibilities to the HAEA for recording, licensing of imports and exports, transport control, research and development and international co-operation.

By this list of activities, the responsibilities of the HAEA in the fields of nuclear safety and technical radiation protection are limited to nuclear facilities and connected activities. The regulatory control of non nuclear activities such as the use of radioactive sources or generating of ionising radiation, or waste disposal facilities and the supervision and inspection of the radiation protection service of the nuclear facilities, the protection of the workers and the general public from ionizing radiations fall under the scope of responsibility of the Minister of Health (which replaced the Minister of Public Welfare designated in the AAE).

According to section 19 of the AAE, six Ministers (Interior; Agriculture; Industry, Trade, and Tourism; Transport, Communication, and Water Management; Environmental Protection and Regional Development; Public Welfare [now Health]) shall enforce the considerations related to their responsibilities *"through an organization designated in a separate legal regulation"* which will act as co-authorities of the HAEA, as well as both the Building Authority and the Hungarian Mining Authority.

For the Minister of Health scope of responsibilities, according to section 21 of the AAE, the same Ministers (except of course the Minister of Health) again "through an organization designated in a separate legal regulation" and the same Authorities are designated as co-authorities of the Minister of Health. The HAEA is not designated in the AAE as such a co-authority of the Minister of Health.

According to the discussions that the IRRT experts had with their counterparts, it appeared that some of the Ministers had designated by new regulations, or did consider as clearly designated by existing regulations the bodies that were in charge of enforcing their responsibilities. However, the IRRT experts did not find evidence that the Minister in charge of Environment designated such a body. On an other hand, the relations between the Minister of Health and HAEA, which have both regulatory responsibilities in the field of nuclear, radiation, radioactive waste and transport safety, were not clearly established mainly by a lack of some regulation on the side of the Minister of Health ; at the moment of the IRRT mission a decree had been drafted in co-operation between the HAEA and the Ministry of Health but it was not yet published.

According to section 8, subsection 2) of the AAE, the HAEC shall:

b) "*in its co-ordinating responsibility, co-ordinate the activities related to the safe application of atomic energy which fall within the scope of authority of ministries, HAEA and other central public administration organizations defined by the Act*";

The IRRT experts got the feeling that this responsibility for co-ordination was not sufficiently used when difficulties occurred between different authorities in the application of the AAE.

Through their discussions the IRRT experts were informed that, due to this situation, the operating organization is sometimes arguing that some co-authorities considered as relevant by the HAEA are not to be involved in certain licensing processes. In addition, listing of the *"pressure vessels and piping which contain or can be contaminated by radioactive materials"* (section 21 (4) of Decree 108/1997) is not completed yet and therefore the part of those which is not classified is controlled by any authorities at all and is only under the supervision of the utility.

2.1.1. Recommendations and Suggestions

(1) **BASIS** - SSS GS-R-1 requires in Paragraph 3.4 that "*the regulatory body shall co-operate with other relevant authorities, ..., in the following areas, as necessary :*

(1) environmental protection ;
(2) public and occupational health ;
.....
(4) radioactive waste management (including determination of national policy);

.....
(7) water use and ....”

SSS GS-R-1 requires in Paragraph 4.2 that *“If the regulatory body consists of more than one authority, effective arrangements shall be made to ensure that regulatory responsibilities and functions are clearly defined and co-ordinated, in order to avoid any omissions or unnecessary duplication and to prevent conflicting requirements being placed on the operators.”*

a) Recommendation: The legal and governmental infrastructure of Hungary with distributed regulatory responsibilities, involving up to nine authorities, should be more thoroughly co-ordinated in order to avoid any omission or overlap and to provide for effective co-operation between those authorities.

b) Suggestion: In case of difficulties occurring in the co-operation with other authorities, the HAEA should appeal to the governmental level co-ordination; in the present situation the HAEC has that governmental level co-ordination responsibility.

3. ORGANIZATION OF THE REGULATORY BODY

Experts: J. Scherrer, G. Giersch

3.1. ORGANIZATIONAL STRUCTURE

Chapter II Section 8 of the AAE designates the HAEA as, "*a central public administration organization with autonomous tasks and regulatory authorization under the control of the Government, providing preliminary review of legislation and regulatory rules related to the use of atomic energy."* The HAEA reports through the President of the HAEC to the government. Governmental supervision over the HAEA is exercised through the President of the HAEC.

Within the HAEA, the NSD acts as the authority of first instance, in all nuclear safety regulatory issues of nuclear facilities. It is headed by a Deputy Director General (DDG) who reports to the head of the HAEA represented by the Director General(DG). A second directorate (General Nuclear Directorate) carries out duties mainly in matters related to nuclear and radioactive materials (e.g. safeguards, illicit trafficking), external relations (international organizations and international co-operation) and governmental relations. A separate Department of Finance and Economy reporting directly to the DG of the HAEA provides for general administrative support.

The organizational structure of the Nuclear Safety Directorate reflects the main regulatory obligations being assigned to the NSD i.e. licensing, inspection and assessment. The NSD meets these obligations through three departments (Department for Licensing, Department for Inspection, Department of Technical Support). Each department is subdivided in divisions with specific duties (e.g. Licensing of Facilities, System Licensing, I & C, Analysis, Emergency Preparedness etc.).

The present organisational structure has been discussed, including exchange of views on its improvements. No evidence of organisational problems inside of the HAEA-NSD was identified. The experts concluded that no major changes in the organisational structure are required to perform well; minor changes proposed as the result of the NSD self-assessment are planned for implementation soon.

Recently the DG appointed a new staff member being assigned with duties to introduce a Quality Assurance (QA) system for the whole HAEA. The appointed QA officer is directly attached to the DG's office. The medium term objective is to obtain an ISO 9000 certification from an authorized outside organization. Within this project the HAEA-NSD has launched a first self-assessment programme of the regulatory process in order to determine among others the efficiency of licensing and supervision activities to improve the quality of results and to make the work of the HAEA-NSD more transparent. The main regulatory processes have been identified. The findings revealed among others that:

- responsibility based teamwork is important
- the role of technical support should be increased
- regulatory control of operational safety has to be strengthened, taking into account early signs of declining safety culture

- more systematic training of professional and administrative staff within the HAEA-NSD is needed.

3.1.1. Recommendations and Suggestions

(1) **BASIS** - According to SSS GS-R-1(4.5) requires *"The regulatory body shall establish and implement appropriate arrangements for a systemeatic approach to quality management which extend throughout the range of responsibilities and functions undertaken."*

a) Recommendation: The HAEA should proceed to improve its internal QA system with high priority. Quality management in regulatory bodies is a prerequisite to increase its effectiveness and an essential contribution to an integral approach facing the new regulatory challenges.

3.1.2. Good Practices

(1) **BASIS** - It has long been recognized that enhancement of nuclear safety in the time to come will go along with improvements in safety culture and especially with self assessment.

a) Good Practice: The self-assessment of the HAEA-NSD structure and operation was an important initiative to improve organisational performance and safety culture.

3.2. STAFFING AND TRAINING

The HAEA-NSD employs at the moment thirty-eight technical people. The qualification requirements for professional staff assigned to nuclear safety matters are specified in Decree 9/1995.(II.3). At least a B.Sc. degree or equivalent is a prerequisite for recruitment in the NSD. Further professional skills are specified in the Training Procedures of the HAEA-NSD for current staff as well as for newly hired people.

The need for a comprehensive policy on staff training and re-qualification of personnel had been identified by the HAEA-NSD. A new training system has been established and recently approved by the Head of the NSD. A major input to this training programme was retrieved from a staff survey in which employees were asked to indicate their needs for further training. Special training courses have already been conducted involving the whole staff of the NSD (e.g. in the subject areas of emergency preparedness and comprehensive training on new safety regulations and guides).

It is recognized that in most public administrations, the tendency is evolve to reduce personnel and to cut budgets. The IRRT observed the Hungarian administration has made decisions like this. On the other hand the Hungarian Government committed itself in the AAE Sec. 4 paragraph 2 to ensure that "*In the use of atomic energy, safety has priority over all other aspects."* The team understands the commitment of the HAEA that among other responsibilities in the peaceful uses of atomic energy, the government should be prepared to devote all effort necessary to provide for a strong, competent, independent and well resourced regulatory body.

New tasks and responsibilities have been assigned to the HAEA-NSD. Among others:

- With effect from February 2000 a new licensee (PURAM) has to be regulated and supervised
- New responsibilities for off-site emergency preparedness
- Transfer of R&D administration to the NSD
- Preparations for EU accession (e.g. review/adaptation of the legislative framework with respect to. the European Norms (EN) such as Directives on Radiation Protection)
- New tasks with respect to regulatory control of ageing life extension and decommissioning of NPPs.

Taking into account this additional burden on the HAEA NSD, the experts came to the conclusion that some an increase of staff will be necessary for effective execution of the new tasks and challenges.

3.2.1. Recommendations and Suggestions

(1) **BASIS**: There is broad international consensus on requirements regarding staffing and qualification of regulatory bodies. According to to SSS GS-R-1(405): *"The regulatory body shall employ a sufficient number of personnel with the requisite qualifiactions, experience and expertise to undertake its functions and responsibilities."*

a) Recommendation: A review of the resources including staffing of the HAEA-NSD should be performed, taking into account the new tasks and responsibilities being assigned to the HAEA-NSD and future regulatory challenges.

b) Suggestion: The need for reviews of resource allocation should be performed periodically keeping in mind that regulating and supervising the use of nuclear energy effectively, is an evolutionary process rather than a static one. The periodic review should also consider potential needs of salary adjustments. Incomes of regulatory staff should be comparable for the equivalent positions of counterparts within the nuclear industry.

3.3. ADVISORY BODIES TO THE HUNGARIAN ATOMIC ENERGY AUTHORITY

Section 8, subsection (5) of the AAE, stipulates that *"In order to ensure the scientific basis for the governmental, regulatory and nuclear emergency preparedness measures, a Scientific Board shall support the work of the HAEC and HAEA."*

Section 7 of Decree 87/1997 stipulates: "*(1) The Scientific Board, assisting the work of the HAEA and HAEC, shall consist of no more than 12 experts with a national reputation in the field of atomic energy. The Scientific Board shall, taking into account modern scientific achievements, present its opinion on the most important theoretical and research and development matters related to nuclear safety, radiation protection and nuclear emergency preparedness."*

Hungary has such a body whose mission is based on the legal requirements. This body is appointed by the President of the HAEC on the basis of the HAEA recommendations. The

members are mainly high ranking scientists representing a broad range of scientific disciplines. About half of them are members of the Hungarian Academy of Science, others are directors of research institutes. The safety director of Paks NPP is also a member of the Board. The Board meets on an average twice a year. In the opinion of the experts the work of the Scientific Board does not concentrate on the regulatory process of the HAEA-NSD. The subject of the Board appears to be more oriented towards general safety policy matters. The findings of the Board are addressed to the President of the HAEC.

3.4. RELATION BETWEEN THE REGULATORY BODY AND THE OPERATOR

The format, content and time scales of information and documentation between the operator and the regulator necessary for the licensing and supervision process is specified in safety codes and guides. Beyond this exchange of information, annual meetings are convened between the HAEA-NSD management and the senior management of the operator. It is worth mentioning that no representative of the license holder (Corporate Level) attends these meetings. The NPP is mainly represented by the General Manager, Heads of Directorates (operation, technical affairs , maintenance, safety) and Department Heads of the Directorate for Safety. The HAEA-NSD is represented by the DDG and all managers of the NSD's departments. Besides a general exchange of experience, subject areas on the agenda include review of safety performance, reassessment of events with the emphasis on identify any trending, effectiveness and efficiency of co-operation. In addition to the aforementioned review activities the annual bilateral meetings are considered as a confidence building forum with the objective of achieving an appropriate balance between formality and a direct professional relationship. This practice is in line with the Basic Principles of Operation and Safety Policy of NSD, Chapter 7. (Relationship with licensee) stipulates among others *"relationships be characterised by the atmosphere of openness, mutual confidence and respect .... decisions be constructive, forward-looking, the rejection be established and justified" and "efforts have to be made to reach consensus, however compromise at the expense of the safety is not allowed."*

3.4.1. Recommendations and Suggestions

(1) **BASIS** - Management of safety at the installations as well as its control and monitoring by the safety authorities become a key to the use of nuclear energy. One important element is to provide a work environment necessary for developing a good safety culture through openness. It is important that there be effective co-operation and intensive two-way communication between all parties concerned within the regulatory process. SSS GS-R-1(4.11) requires: *"Mutual understanding and respect between the regulatory body and the operator, and frank, open and yet formal relationship, shall be fostered."*

(a) Suggestion: Matters of improved safety should be considered as an ongoing commitment. The HAEA-NSD should therefore consider the involvement of a representative of the Corporate Level particularly if matters of safety culture are an agenda item at the annual meetings between NPP and Regulatory Body. The same principles should also be applied for other nuclear installation.

3.5. INTERNATIONAL CO-OPERATION

Hungary was one of the first countries to sign the Convention on Nuclear Safety. The Convention was promulgated in Hungary by Act No. I of 1997

The HAEA is the authorized counterpart of the IAEA and of the OECD-Nuclear Energy Agency (NEA). The HAEA-NSD staff takes part actively in bilateral and multilateral co-operation regimes of the IAEA and OECD-NEA. The HAEA-NSD maintains contact and exchanges experience with other nuclear regulatory bodies. Employees of the HAEA-NSD function as national IRS and INES co-ordinators. The experts concluded that close international co-operation was exercised in the past and that the HAEA-NSD policy on this issue strongly supports international co-operation in the future.

4. AUTHORIZATION PROCESS

Experts: M. Maris, P. Hughes

The scope of authority of the HAEA-NSD covers the nuclear safety and technical radiation safety of all nuclear installations used for peaceful purposes. These include at present at the Paks NPP, the research reactor of Central Research Institute for Physics-Atomic Energy Research Institute (KFKI-AEKI), the training reactor in the Technical University of Budapest (TUB) and the interim spent fuel storage. It includes fire protection, building structures, technical radiation protection and the on-site emergency planning. Other aspects related to these installations, like site security and final storage of radio-active waste, as well as uses of ionising radiation, are regulated, licensed and inspected by other authorities and are outside the scope of the evaluation.

The granting of authorisations is based on the demonstration of safety, submitted by the applicant and reviewed and assessed by the HAEA-NSD. Review and assessment in relation to authorisation is performed by a well defined process, developed by the HAEA-NSD, in accordance with the applicable administrative and nuclear laws, decrees, regulations and guidelines. The project management of the review and assessment activities follows clearly defined practices, which are supported by the use of a computer based information system. There is a graded approach to the authorisation process and to the extent of the regulatory review, depending on the safety significance and extent of the submission.

The HAEA-NSD has issued regulatory guides on the format and content of documents to be submitted by the operator in support of applications for authorisation. The HAEA-NSD makes regulatory decisions, which may approve or reject the application. An authorisation imposes, if appropriate, conditions or limitations on the operator's subsequent activities. These decisions contain in each case the basis for these decisions.

4.1. LEGAL BACKGROUND OF THE AUTHORIZATION PROCESS

The legal basis for the authorizations of the different phases in the life cycle of nuclear facilities is comprised in the "General Rules of State Administration" (Act IV of 1957) and in three basic laws, for each of which a separate leading authority is assigned to issue a main authorization. Indeed, as several authorities are involved in issuing particular authorizations concerning the same installation, a leading authority has been appointed by each of these basic laws to verify that all needed authorizations have been issued before issuing its own. These three basic laws and their leading authorities are:

- Act CXVI of 1996 on Atomic Energy (HAEA-NSD)
- Act LIII of 1995 on the General Rules of the Protection of the Environment (Environment Authority)
- Act XLVIII of 1994 on Production, Transport and Supply of Electricity (Hungarian Energy Office of the Ministry of Economy)

These laws govern the authorization process of a new nuclear facility and relate respectively to nuclear safety, environmental protection and energy supply. Once the nuclear

facility has received its authorizations for operation, it can request authorizations for safety related modifications, generally within the framework of the AAE but also in specific cases within the framework of the Environmental Act (eg. Interim spent fuel storage). The HAEA-NSD has no duty in organizing public hearings.

In the case of nuclear facilities, there are many other co-authorities involved and the licensing process is therefore relatively complicated. It is however the duty of the licensees to verify that all the applicable laws are satisfied and to obtain the needed authorizations from these co-authorities before introducing an application for authorization to the HAEA-NSD. On the other hand, the HAEA-NSD receives an overview of all the resolutions and their contents, issued by the co-authorities, as these resolutions are to be attached to each of the licensee's applications for authorization. The HAEA-NSD has the duty to verify that the needed resolutions exist.

The authorization process is well established and described in regulations. The regulatory resolutions include conditions, time limits and argumentation. These resolutions have to be delivered within 30 days after the submission of the application, with a possible extension of another 30 days. The AAE allows for a period of 6 months in case that the application concerns siting, construction, enlargement, commissioning, operation, modification, putting out of operation and decommissioning of nuclear facilities. However, in the case of modifications there does not always seem to be the same interpretation of these legal provisions by the HAEA-NSD and the Paks NPP.

The Hungarian legal practice always provides for the possibility for an appeal. The decisions of the HAEA-NSD, who is the authority of first instance, can be appealed against by the applicant or licensee, or anyone concerned in the specific case can introduce an appeal to the DG of the HAEA, who is the authority of second instance. In that case the resolution of the HAEA-NSD is not effective in its entirety until a final decision is made, even if the appeal concerns only part of the resolution. If the licensee does not agree with the decision of the DG of the HAEA he can appeal to court. In case of immediate urgency however the HAEA-NSD's resolution must be carried out, even if there is an appeal.

4.1.1. Recommendations and Suggestions

See also Section 1, Legislative and governmental responsibilities.

(1) **BASIS** - Article 516 of the draft Safety Guide on "Review and assessment by the Regulatory Body for Nuclear Facilities" states that *"the regulatory body should indicate to the operator the period of time considered necessary for the review and assessment process, so as to facilitate the process and minimise delays in granting of any necessary authorisations. The regulatory body should exert its best efforts to complete its review and assessment process within the tentatively agreed schedule, but this objective should in no way compromise the regulatory body's responsibility".*
The time limits that are imposed on the HAEA-NSD trough the Administrative Act (30 calendar days, which can be prolonged for another 30 calendar days) or through the AAE (6 months) are not compatible with this principle.

a) Recommendation: The time period in which the resolutions of the HAEA-NSD are to be delivered should not be constrained to avoid compromising the regulatory body's responsibility.

b) **Suggestion: The HAEA-NSD should agree with applicants on timescales for the submission of documentation in advance of a formal licence application to provide flexibility in their licensing, review and assessment activities. The Act on Atomic Energy should be revised accordingly.**

4.2. TYPES AND STAGES OF AUTHORIZATION

4.2.1. Authorization of nuclear facilities, nuclear equipment and fuel, buildings

The AAE Section 7(2) requires that a parliamentary *"approval in principle"* is needed *"to initiate activities of preparing for the establishment of a new nuclear facility or radioactive waste facility and to ass further unit containing a nuclear reactor to an existing nuclear power plant."* It is not clear in the Act what *"initiate activities"* means in practice. This is because other bodies involved in the authorization may start at different times and it is unclear to the HAEA-NSD at what point they should become involved in the authorization process in the absence of a parliamentary *"approval in principle"* for the NPP.

In accordance with the AAE, article 17, the HAEA-NSD is responsible for issuing authorizations for the whole life cycle of nuclear facilities, which is comprised of the following types:

- site (valid for 5 years until issue of the construction licence)
- construction (valid for 5 years until issue of the commissioning licence)
- commissioning (valid for 2 years until issued of the operating licence)
- operation (valid as specified but no longer than the design lifetime of the plant)
- operation (valid as specified but no longer than the design lifetime of the plant)
- final shut down and decommissioning

Operating authorizations have at present a validity period of several years.

The HAEA-NSD also has the duty to issue authorizations for individual or standard permits for safety related equipment and fuel. The authorizations are for:

- manufacturing (domestic) or import (foreign)
- installation
- commissioning and operation
- modification
- dismantling

The HAEA-NSD has also authorization duties regarding buildings and building structures of nuclear facilities (similar to nuclear equipment and fuel).

The AAE specifies in its Article 18 that *"In regulatory matters involving the nuclear safety of a nuclear facility, in the event the HAEA and another authority entitled to licensing or inspections have a conflict concerning the scope of authority, the HAEA is entitled and obliged to proceed until such legal dispute is settled".* This article entitles the HAEA-NSD to give priority to nuclear safety, if this safety would be impacted by positions of other authorities. It seems however that there is a need for harmonization of the different acts in order to exclude as much as possible overlaps of other regulatory authorities with the HAEA-NSD.

It can be concluded that the HAEA-NSD is in full control of the authorization process of new nuclear installations, safety related components and nuclear fuel, and that the different steps

in the authorization process follow the general approach for authorization of complex facilities, except for siting and decommissioning.

4.2.1.1. Recommendations and Suggestions

(1) **BASIS** - Article 2.4 (2) of the IAEA Draft Requirements of Legal and governmental infrastructure for nuclear, radiation, radioactive waste and transport safety states that *"Legislation shall be promulgated to provide for the effective control of nuclear, radiation, waste and transport safety. The legislation shall specify facilities, activities and materials that are included in the scope of the legislation and what is excluded from the requirements of any particular part of the legislation."*

a) Recommendation: The Act on Atomic Energy or related legislative documents should be revised to make clear what is meant by *"initiate activities".*

(2) **BASIS** - Article 4.2 of the IAEA Draft Requirements of Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety states that *"If the regulatory body consists of more than one authority, effective arrangements shall be made to ensure that regulatory responsibilities and activities are clearly defined and co-ordinated to avoid any omissions or unnecessary duplication or conflicting requirements being placed upon the operator. The main functions of review and assessment, and inspection and enforcement shall be organized in such a way as to achieve consistency and the necessary feedback and exchange of information. In addition, the disciplines concerned in the regulatory process, such as those in nuclear radiation, radioactive waste and transport safety, shall be effectively co-ordinated."*

The recommendation as formulated in section 2.1.1 of this report also applies to this section.

4.2.2. Licensing of Modifications of Nuclear Facilities

Safety related modifications are defined as:

- changes related to systems and components which lead to a new situation which is not covered by the safety justification valid before the modification
- any other change having an impact on safety; this covers for instance all changes to technical specifications for operation, to accident management procedures, to management or to organizational structure

The following authorizations are issued by the HAEA-NSD in relation to modifications:

- approval of the modification concept
- manufacturing/import of components related to the modification
- installation of components
- modification (authorization for connection to the plant systems and for testing, allowing for maximum 3 months operation of the component or system)
- operating authorization for the component or system (after successful closure of the modification activities)

Fuel reloads are under control of the HAEA-NSD. It issues a yearly authorization until the equilibrium core is reached. Afterwards, the HAEA-NSD will resume its authorization

process when modifications are introduced, like the present case of another fuel. If needed and according to the AAE, Article 14, point 4, the HAEA-NSD has the authority to withdraw an authorization, so that in the case of reloads it can oblige the licensee to submit a safety justification. On a regular basis, the HAEA-NSD receives the complete list of modifications, which gives it the opportunity to identify possible cases with safety relevance which would have been overlooked by the licensee. Power increases are considered to be plant modifications, not requiring a licensing procedure as for a new installation.

4.2.3. Authorization of Manufacturers and of Sub-contractors Providing Services to the Licensees

The licensee has the responsibility to perform the necessary actions, described in its QA program, to qualify manufacturers and sub-contractors. The necessary quality control activities are carried out by the licensee's dedicated personnel. The HAEA-NSD inspects the QA program and indicates the witness or hold points for those activities it wishes to attend. This includes visits to manufacturers, together with licensee delegates, to witness construction or test activities.

The licensees discharge full responsibility for the purchasing of equipment and services and the HAEA-NSD has the authority and practice to evaluate the licensee's program and to observe particular activities.

4.2.4. Licensing of Selected Plant Personnel

The legal and other documents, applicable to NPP personnel requirements are:

- The AAE (very general statement)
- Governmental Decree and its schedules (the Nuclear Safety Codes): a very general statement on the need of qualified staff and need for training
- Decree 48/1998 (Section 3 describes the basic training requirements, Section 10 describes the refreshing training). Reference was made to a decree that specifies which courses are needed to obtain a specific educational certificate. The NPP has training courses leading to the certificate of "reactor operator", which is an educational requirement to apply for vocational training to become a licensed reactor operator.
- Decision by the HAEA-NSD on which NPP operational and maintenance posts should be authorised by the Regulatory Body.
- Examination procedure, prepared by Paks NPP and submitted to the HAEA-NSD for approval
- The yearly training program for all positions including initial and continuing training prepared by Paks NPP and submitted to the HAEA-NSD for approval.

On the basis of the above, the HAEA-NSD has authorization duties regarding key operational and maintenance personnel.

The HAEA-NSD issued a decision, which defines the positions for which NPP staff need a licence issued by the HAEA-NSD. This decision also specifies the examination boards in which the regulatory authority has to participate. The HAEA-NSD participates as a rule in all examination boards, which examine new candidates, and the boards, which examine licensed operating control room staff in view of re-licensing.

4.3. REQUIREMENTS ON THE INFORMATION TO BE SUBMITTED IN EACH STAGE OF THE AUTHORIZATION PROCESS

The Nuclear Safety Code, Volume 1, includes prescriptions for the content of the SAR to be submitted for obtaining authorizations for NPPs. As no new plants are planned, this subject was not further evaluated.

The HAEA-NSD Guideline 1.5, Licensing Documentation for Modification of Nuclear Power Plant Systems and Components defines the needed documentation, to be submitted for each of the stages of the authorization process for modifications.

4.4. THE INTERNAL AUTHORIZATION PROCESS OF HAEA-NSD

The HAEA-NSD has implemented a project management approach for the authorization process. This approach underlines the importance of team work within the organization and of making best use of the available human resources. The Licensing Department is usually the one responsible for managing the different activities related to one submission and usually provides the responsible officer, who acts as project manager.

The HAEA-NSD has established a general internal procedure for handling an application for authorization, but in view of promoting openness towards the licensees, it has issued this procedure as the Guideline No.1.13.
The HAEA-NSD organizes meetings with the licensee to discuss matters and obtain more information that is needed to support its judgement.

4.4.1. Good Practices

(1) **BASIS** - Article 5.10 of the IAEA Draft Requirements of Legal and governmental infrastructure for nuclear, radiation, radioactive waste and transport safety states that *"The regulatory body shall prepare its own programme of review and assessment of the facilities and activities under scrutiny."* The IRRT team has observed that the internal authorization process is well structured and the instructions issued to the various levels of the organization that participate in the review and assessment as well as the written evaluations are documented and traceable. The use of the internal information and communication system has facilitated internal communication. The requests for review and assessment are managed and approved at appropriate levels. Use is made of the results of former safety reviews. The advice produced by the experts are usually in written form and are independently reviewed by at least the heads of division, who have a broad view of safety aspects. Internal meetings contribute to the integration of all advises to a global regulatory position and to consistency in the authorization practice. For large projects (like periodic safety reviews) the HAEA-NSD uses a planning system as support for its management.

a) Good Practice: The HAEA-NSD has implemented an effective project management system, using modern technology and promoting team work. Through the use of this system the HAEA-NSD is achieving excellent control and traceability of the authorization process and is building corporate know-how which serves as a basis for future assessments and authorizations.

5. REVIEW AND ASSESSMENT

Experts: P. Hughes, M. Maris

5.1. REVIEW AND ASSESSMENT PRINCIPLES

The HAEA-NSD conducts review and assessment of plant modifications, safety analysis and Periodic Safety Reviews (PSR). In addition, information is gathered from the plant to analyse the cause of events.

The review and assessment is performed by a well defined process, developed by the HAEA-NSD in accordance with the applicable administrative and nuclear laws, decrees regulations and guidelines. The project management of the review and assessment activities follows clearly defined practices, which are supported by the use of a computer based information system.

The HAEA-NSD has issued regulatory guides defining the principle and associated criteria on which its judgements are based and set out how their assessment of the operator's technical submissions will be carried out.

5.1.1. Principles and Criteria

It is important that a regulatory body define and makes available to the licensee details of the principles and associated criteria on which the regulatory body bases its judgements.

From the structure of Regulations for Nuclear Safety the HAEA-NSD identified that the Nuclear Safety Codes 1 through 5 attached as Schedules to the Governmental Decree 108/1997 set out HAEA-NSD's principles and criteria. In addition, for each Code Guidelines are provided, that interpret how the HAEA-NSD will work to satisfy the requirement of the Code. The Codes cover licensing Operations, Design Quality Assurance and a sixth Code is under development for regulating spent fuel storage facilities. The Codes and Guidelines are publicly available documents.

5.1.2. Relations with the Licensee and TSO

Issuing Guidelines involved consultation and a review by the NPP staff. During the assessment review process of safety submissions, questions raised by the HAEA-NSD are formally communicated to the NPP. A review of the questions is then undertaken through direct contact with the NPP to address the questions. The results of these meetings are formally recorded and any resolutions needed are issued formally.

The HAEA-NSD has easy access to the TSOs, (mainly KFKI and VEIKI). A general contract has been agreed that allows the HAEA-NSD staff to ask questions directly for 'free' but, if deeper analysis is required, this would need another contract.

5.1.3. Completeness of Submitted Documentation

As the HAEA-NSD set out the form and content of the safety submission they require, they are able to establish, as part of their assessment, whether or not the NPP has submitted all that is required. Should more detailed information be needed to complete the review and assessment, the HAEA-NSD can specify what the licensee needs to provide.

5.2. ORGANISATION OF THE REVIEW AND ASSESSMENT

5.2.1. Project Organisation

From the discussions with HAEA-NSD it was clear that they were applying sound project management practices to their review and assessment activities. During the discussions under Section 4, the review and assessment of modifications had been covered. In order to illustrate another aspect of the review and assessment process, the HAEA-NSD described how they organised the review and assessment of the Paks Periodic Safety Review (PSR). Currently Paks PSR for Unit 1 and 2 was completed in 1997 and Unit 3 and 4 is under review by the HAEA-NSD.

The HAEA-NSD organisational process nominated the Head of Licensing of Facilities to lead the cross-divisional team assessing the PSR. A regulatory requirement had been written and issued as an attachment to a regulatory requirement letter, that set out the structure of the PSR and identified by Chapter and Section the content that the NPP needed to provide to the HAEA-NSD for its assessment. These specific requirements were referenced within the Guidelines to the Codes and other Guidelines such as Design so that it was explicitly made clear to the NPP what information had to be provided and what criteria would be applied in judging safety.

Besides the Guideline issued to the NPP defining the information and review process, the HAEA-NSD prepared an internal guideline that set out how the review and assessment would be managed. Each of the chapters of the PSR was delegated to a Chapter Review Team. The Chapter Review Teams were led by appropriate expert inspectors and their teams consisted of inspectors from Licensing, Inspection and Technical Support. In at least one area a Technical Support Organisation (TSO) was asked to provide input.

The team leader responsible for reviewing chapter 5 of the PSR on Operational Aspects and Experience Feedback explained the review and assessment. These regulatory requirement and internal procedure document use the standard format that includes:

- an introduction,
- the status of the document,
- its position in the legal framework,
- the deadlines for the review of the work (eg. six months from the receipt of the submittal),
- the time base for the state of the plant (eg. 31/9/1998 for Units 3 and 4),
- the principle areas for assessment included:
    - that a QA system for the PSR had been used
    - the plant used the agreed methodologies
    - that the assessed risk is being reduced with the correct priority.

The regulatory requirement document uses the IAEA topic list for subjects to be covered by the PSR.

In addition, findings from the assessment of the Paks Units 1 and 2 PSR were added that were relevant to the review of Units 3 and 4.

The stage of the review has been reached where comments from the team have been produced and consolidated and forwarded to the Licensing of Facilities Group for consolidation with the comments from the reviews from the other Chapters Review Teams. The comments have yet to be issued to the NPP for discussion and resolution.

5.2.1.1. Recommendations and Suggestions

(1) **BASIS** - Article 516 of the draft Safety Guide on "Review and assessment by the Regulatory Body for Nuclear Facilities" states that *"The regulatory body should exert its best efforts to complete its review and assessment process within the tentatively agreed schedule, but this objective should in no way compromise the regulatory body's responsibility."* The extent to which review and assessment needs to be performed varies, depending on the stage in the regulatory process and the potential magnitude and nature of the hazard. It is of concern that the assessment of such a complex safety justification as a PSR should be limited to six months. This implies that the depth of assessment, the pursuit of regulatory concerns and the extent to which a new safety concern can be pursued with the licensee before the end of the 6 month period, will necessarily be curtailed. The HAEA-NSD should not be constrained in their review and assessment process.

See Recommendations and Suggestions in Section 4.4.1.

5.2.1.2. Good Practices

The team level of effective project management was observed in the review and assessment of the PSR as was observed in the authorization process. See also Sec. 4.4.1.

5.2.2. Conduct of Review and Assessment

The HAEA-NSD applies good engineering judgement in their review and assessment activities. In a number of technical areas an excellent or good level of competence has been achieved, while some other areas need further development. The HAEA-NSD manages the allocation of the review and assessment activities based on the available resources. In addition, it has access to external institutions (TSOs) that can deliver independent review of safety analysis, in particular in the areas of thermal hydraulics and probabilistic safety assessment. Where feasible, members of TSOs are integrated in the HAEA-NSD's assessment teams.

The HAEA-NSD indicated that they had completed independent assessment in the area of thermohydraulics by the TSOs as the HAEA-NSD's policy is not to conduct such analysis by themselves.

Considerable effort has been invested by the NPP in developing the thermohydraulic model for the Paks plant, through the AGNES project. The TSOs are used by both the NPP and the HAEA-NSD, to carry out safety analysis and independent assessments. There are arrangements within TSO to ensure that staff providing advice to the regulatory body are not

involved in the development of the models or in producing the safety analysis for the NPP, so that the advice provided to the HAEA-NSD is independent.

The independent assessment group in the TSOs use the same codes as the group which performs the original calculations for the NPP; that is not an unusual situation for VVERs. For independent review to be effective, the HAEA-NSD needs to have a clear understanding of the scenarios to be studied and of the assumptions in the safety analysis to be tested. The HAEA-NSD holds official versions of the computer codes MAAP, MELCOR, RELAP and CONTAIN. Four HAEA-NSD inspectors (one for each computer code) are designated as the point of contact with VEIKI and KFKI-AEKI and are expected to become familiar with the codes. The scope of the safety analysis to be produced by the NPP is defined in HAEA-NSD Guideline 3.10. The definition of the scope of the independent assessment was less clear. For thermohydraulic analysis the HAEA-NSD relies on the TSOs to decide on the scope and depth of assessment. For other simpler fault analysis the definition of what to consider is provided by HAEA-NSD assessors.

5.2.3.1. Recommendations and Suggestions

(1) **BASIS** - Article 5.9 of the IAEA Draft Requirements of Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety states that *"A primary basis for review and assessment is the information submitted by the operator. A thorough review and assessment by the operator's technical submission should be performed by the regulatory body. In doing this, the regulatory body shall acquire an understanding of the design of the facility or equipment, the safety concepts on which the design is based and the operating principles proposed by the operator".*

   a) **Recommendation: The HAEA-NSD should further develop its competencies for specifying the scope and depth of the independent review of safety analysis to be carried out by the Technical Support Organizations (such as criteria for sensitivity studies, evaluation of safety margins).**

   b) **Recommendation: The HAEA-NSD should develop further its in-house competencies for the assessment and understanding of thermohydraulic safety cases.**

5.2.3.1. Good Practices

(1) **BASIS** - Article 2.6 (10) of the IAEA Draft Requirements of Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety states that *"the regulatory body should have the authority to obtain such documents and opinions from private or public organizations or persons as maybe necessary and appropriate"*. Implementing this is a significant challenge for the regulatory body of a small country.

   a) **Good Practice: The HAEA-NSD's general contract arrangements with its Technical Support Organizations provides a rapid and easy access for technical advice needed during the course of its authorization, review and assessment processes.**

5.2.4. Document Control Related to HAEA-NSD's Review

The HAEA-NSD has a structured documentation control system from the receipt of documents from the NPP, through notification of the appropriate inspectors to the final review and issue of resolutions. There are many document transactions involved, such as requesting work, requesting resources from other divisions, recording work, issuing comments to colleagues, transmitting comments to the NPP, notes of formal meetings, formal capture of agreements, and issuing of resolution. While many original documents are on paper, many of the internal transactions are conducted electronically using Lotus Notes to provide an electronic signature.

5.2.5. Operational Experience Feedback

The HAEA-NSD identified three main external sources of information for Operational Experience Feedback:

- Incident Reporting System (IRS)
- International Nuclear Event Scale (INES)
- Paks NPP.

The HAEA-NSD have a practice that gathers the information via their IRS and INES co-ordinators, with some filtering of information on IRS reported events being carried out by the IRS co-ordinator. Currently, the HAEA-NSD is further developing their practice and internal guidance in this area.

Paks NPP provides reports quarterly and the procedure to control the activity is set out in Guideline 1.24 (Periodic Reporting Obligation). The HAEA-NSD developed an internal guide, following the structure of Guideline 1.24, identifying the sections in the regulatory body who are involved in the analysis of the licensee's periodic reports. The Division for Licensing of Systems carries out systematic analysis of the events (and the regular reports of the nuclear installations) that it collates and specifically for Paks NPP it:

- besides a review of the current years events, the analysis revisits the previous two years data to look for trends
- reviews the regulatory activities at the site
- presents safety indicator information
- summarizes events, reactor scrams and causes of events.

The report is issued to the licensees and TSOs. This year the HAEA-NSD posted the report on their Internet site. It was also of interest to the experts that the HAEA-NSD and VEIKI were using the event data to re-examine the validity of their analysis models (ie. event precursors, and Risk Supervisor). The PSA model is regularly updated to reflect modifications to the plant and could form the basis of a living PSA model. The HAEA-NSD recognizes the limits of the present model in informing them about the risk from the plant.

5.2.5.1. Recommendations and Suggestions

(1) **BASIS** - Article 3.3 (7) of the IAEA Draft Requirements of Legal and governmental infrastructure for nuclear, radiation, radioactive waste and transport safety states that *"In order to carry out its main responsibilities"*, as outlined in Paragraph 3.2, *"the*

regulatory body shall ensure that operating experience is appropriately analysed and that lessons to be learned are disseminated." While there appeared to be good quality derived information generated by the HAEA-NSD report, it was the view of the experts that the information did not appear to be used to its full extent in targeting inspection at the plant.

a) **Suggestion: The HAEA-NSD should make better use of the event analysis in defining their basic inspection plan.**

5.2.5.2. Good Practices

BASIS - Article 2.6 of the IAEA Draft Requirements of Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety states that *"The regulatory body shall have the authority to make available, to other government bodies, national and international organisations and the public, information on incidents and abnormal occurrences and other information as appropriate".*

a) **Good practice: The HAEA-NSD this year posted its yearly event analysis report on its Internet site for public access.**

5.2.6. Research and Development

The AAE in its Article 17 (2, k) identifies as one of the activities of the HAEA the evaluation and co-ordination of research and development related to the safe use of atomic energy. Since a few years, the yearly HAEA budget contains a part which is earmarked for research purposes. It is the HAEA-NSD's authority to use the available funds for subcontracting research activities to its TSOs or other organisations, as it judges appropriate.

The HAEA-NSD establishes a 3-year research plan, which is reviewed on a yearly basis. Its policy is to concentrate on research leading to improved understanding of or insights in phenomena important for nuclear safety, like ageing, design basis and beyond design basis accident analysis. The general principles governing the HAEA-NSD's research activities from specifying through contracting up to final review and use have been laid down in an internal guide. After review of research reports, the results are promulgated to the concerned staff, which form expert networks for specialised technical areas.

In particular, the HAEA-NSD has initiated the development of computer codes, diverse from those used by the NPP, for evaluation of design basis and beyond design basis accidents and of containment behaviour.

5.2.6.1. Good Practices

(1) **BASIS** - The article 520 and 521 of the draft Safety Guide on "Review and assessment by the Regulatory Body for Nuclear Facilities" states that "*Additionally, there may be situations in which the regulatory body requires independent research and development so that it can apply suitable critical considerations in its review and assessment. etc." and " Moreover, the regulatory body may need to conduct or contract research and development in support of its regulatory functions".*

a) **Good practice: The HAEA-NSD is actively developing with its Technical Support Organizations diverse computer codes to improve its independence in the evaluation of design basis and beyond design basis accident studies.**

6. INSPECTIONS AND ENFORCEMENT

and on site inspections

Experts: M. Lipar, J. Linville

6.1. ORGANIZATION OF THE HAEA INSPECTORATE

The objective of the inspection program is to control and monitor the enforcement of legal regulations related to the application of atomic energy. The responsibility of the HAEA is clearly described in Act CXVI of Atomic Energy and relevant Government decrees 108/1997 and 87/1997. The methods used to discharge the responsibilities of these legal documents are inspections, review and assessment.

The HAEA is responsible for nuclear safety inspections of nuclear facilities, including inspection of activities related to the design, manufacture, installation, commissioning, operation, modification, repair, and decommissioning. HAEA is further responsible for monitoring the QA system, inspection of packaging of radioactive materials and conduct of inspections at any user of atomic energy.

Through regular analysis and on-site inspection, the HAEA verifies whether the technical condition and operation of the facilities and equipment using atomic energy meet the safety requirements based on an acceptable level of risk and the provisions set forth in the regulatory licenses issued by the HAEA.

According to Government Decree 108/1997, the HAEA NSD shall in all phases during the life cycle of nuclear facilities inspect the following:

- provisions prescribed in applicable laws including the QA of the nuclear facility and in the regulations;
- conditions representing the basis for licenses; and
- the execution of instructions issued by the HAEA

The overall inspection function is managed by the head of the inspection department who is located in the HAEA headquarters in Budapest. His department consist of five site inspectors at Paks Nuclear Power Plant and a site supervisor. There are two mechanical engineers, one civil engineer, one physicist and one chemist with experience in commissioning and postgraduate courses in nuclear reactor technology. The inspection group has limited expertise in several important safety areas such as operational safety verification, instrumentation and control, electrical equipment, radwaste, and radiation protection.

Based on a recent self-assessment, the HAEA plans to move the Operational Safety Assessment Division to the Department of Inspection. This is intended to more clearly define inspection activities and enhance team-work.

6.1.1. Recommendations and Suggestions

(1) **BASIS -** IAEA Draft requirements GS-R-1 "Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety," states that regulatory inspections and enforcement activities shall cover all areas of regulatory responsibilities. In addition sections 216 and 217 of Draft Safety Guide GS-G.1.1, "Organization and Staffing of the Regulatory Body for Nuclear Facilities," states that in cases where sufficient expertise is not available within the regulatory body, part of the inspection activities may be contracted out. Inspectors may form a permanent part of the inspection unit or may be drawn from other parts of the regulatory body as required.

a) Recommendation: The HAEA-NSD should assess inspection resources in a manner that takes into the account the integrated nature of their inspection responsibilities. Specific attention to resource needs should address the development of personnel competencies and the use of other options such as the use of technically competent staff from other parts of the organization or contractors teamed with inspectors to meet short term needs.

6.2. TRAINING AND QUALIFICATION OF INSPECTION STAFF

The HAEA site inspectors are qualified in several of the engineering and scientific disciplines that are needed to provide an effective review and assessment function to support the manufacturing products, quality assurance, outage maintenance, tests, fuel and the core safety issues involving NPPs and other nuclear and radioactive waste facilities. These individuals are well motivated and were observed to carry out their responsibilities professionally. However, there is limited operational experience among the HAEA inspectors.

During the last five years, ten site inspectors left the group and three new ones were hired. Six of the ten were transferred to Paks NPP Nuclear Safety Directorate to perform pressure vessel inspections. The Department Head and Division Head have identified training needs for each inspector to complete initial qualification. Some course work has been completed at Paks NPP in reactor technology and mechanical systems, other course work in areas such as quality assurance auditing and the inspection process have been completed abroad. Additional course work in operations is planned for the future at Paks NPP. In 1999, site inspectors and other technical staff were trained on codes and standards. The HAEA has recently developed a comprehensive training program to provide and maintain technical competence to support inspection needs.

The new training program will add training in QA, radiation protection, fire protection, industrial safety, nuclear technology, simulator and systems training on the nuclear facilities to name a few. In addition there is more focused specialized training in areas such as PSA. Training methods will include formal classroom training, training conducted by external experts, self study, and on the job training. At the end of two years new staff will be examined by a qualification board. While this will not be required of the existing technical staff, they have been surveyed to identify areas currently needing attention.

6.2.1. Recommendations and Suggestions

(1) **BASIS -** During observation of inspection activities IRRT reviewers noted insufficient knowledge of inspection techniques and integrated plant operations to facilitate the broad review of an area being assessed. These observations indicated a need for a systematic training program, as described in Section 4.7 of IAEA Draft Safety Requirements No. SSS-GS-R-1, "Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety", which requires that members participate in well defined training programs.

a) Recommendation: The HAEA-NSD should implement the new training and development program to improve the capabilities of the inspection staff and ensure that the personnel who perform inspections are appropriately trained and qualified in effective methods of inspection and integrated plant operations, and maintain technical competence.

b) Suggestion: The HAEA-NSD should develop training profiles for each individual performing inspections, which records training experience and prescribes refresher and further training needs.

6.3. METHODS OF INSPECTION

According to government decree 108/1997, the HAEA shall be entitled to conduct inspections at licensee and supplier facilities with advance notice, or without notice in justified cases. Based on the HAEA procedures there are the following types of inspections:

- frequencies are daily, quarterly, occasional, and exceptional
- subject areas include manufacturing, maintenance, normal operation, inspection of surveillance tests, commissioning, initial criticality after refueling and research reactors.

Daily inspections involve collecting the data from the shift engineer log book. Examples of quarterly inspections include:

- housekeeping in the reactor hall
- documents governing the work permit process
- temporary modifications
- radiation protection measurers during outages
- status of QA documents.

Surveillance inspections cover observation and results of operator‘s activity during safety systems surveillance. According to the AAE there are opportunities for both announced and unannounced inspections but the HAEA inspectors usually perform announced inspections and they are accompanied by NPP nuclear safety division personnel. In addition, the HAEA inspectors performed indirect inspections which cover review of NPP databases.

The fundamental inspection competencies of the HAEA result in narrow administratively oriented inspections. A review of inspection protocols indicates that in general, the HAEA inspections reflect a narrow perspective in reviewing the interested area.

6.3.1. Recommendations and Suggestions

(1) **BASIS** - Observations by the Team indicated that the guidance provided to the HAEA inspection personnel is insufficiently detailed to ensure that the inspection program will be effective. Expectations for the methods of conducting inspections are described in chapter 5 of IAEA Draft Safety Guide No. GS-G.1.4 Regulatory Inspection of Nuclear Facilities and Enforcement by the Regulatory Body. In addition, IAEA Draft Requirements No. GS-R-1 Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety state in paragraph 5.15 that inspection by the regulatory body, both announced and unannounced, shall be a continuing activity.

a) **Suggestion: The HAEA-NSD should provide specific and detailed guidance for the approach, conduct, methods, and expectations necessary to be carried out for inspections. Additionally, this guidance should ensure that a proper level of supervisory attention is focused on the selection of the HAEA personnel that employ proper inspection and technical competencies.**

b) **Suggestion: The HAEA-NSD should consider including more unannounced inspections.**

6.4. INSPECTION PROGRAM AND PLANNING.

Regulatory inspection programmes should be comprehensive and should be developed within an overall regulatory strategy. These programmes should be thorough enough to provide a high level of confidence that operators are in compliance with the regulatory requirements and are identifying and solving all actual and potential problems in ensuring nuclear safety.

The HAEA has developed only a partial inspection programme based on inspection procedures for certain types of inspections. However there is not a comprehensive inspection policy and programme prepared based on the results of previous inspections, safety analysis, regulatory review and assessment, performance indicators, operational experience and lessons learned from other nuclear facilities and inspection programmes of regulatory bodies of other countries.

6.4.1. Recommendations and Suggestions

(1) **BASIS -** IAEA Draft Requirements No. GS-R-1 Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety paragraph 5.14 states that regulatory body shall establish a planned and systematic inspection programme. Additionally, paragraph 5.12 states that regulatory inspection activities shall cover all areas of regulatory responsibility. The detailed guidelines are given in Section 4 of IAEA Draft Safety Guide No.GS-G.1.4. Regulatory Inspections of Nuclear Facilities and Enforcement of Regulatory Body.

a) **Recommendation: The HAEA-NSD should develop an integrated inspection plan that provides for consistent and effective verification of the level of operational safety performance of nuclear installations.**

b) Suggestion: The HAEA-NSD should consider the use of Section 4 Regulatory Inspection Programme and Planning of IAEA Draft Safety Guide No. GS-G.1.4. Regulatory Inspections of Nuclear Facilities and Enforcement of Regulatory Body for preparation of the inspection plan to cover all areas.

6.5. INSPECTION PROCEDURES AND REPORTS

The HAEA has developed inspection procedures consistent with Act No. CXVI of 1996 which requires that the HAEA regularly monitor compliance with the stipulations of the license as well as with safety regulations considering an acceptable level of risk. The scope of the HAEA inspection procedures includes activities related to design, manufacture, installation, commissioning, operation, modification, imports and decommissioning of nuclear facilities. Applicable facilities include Paks NPP, the spent fuel facility, the Budapest Research Reactor of the KFKI-AEKI and the Training Reactor of the TUB.

The HAEA procedures provide for guidance for inspection of NPPs made up of the following elements:

- routine announced daily, quarterly and occasional and some unannounced extraordinary inspections during routine reactor operations
- inspections of safety class 1 and 2 manufacturing products
- inspection of maintenance during planned outages including walkdowns
- inspection of tests during shutdown, general overhaul and start-up activities
- inspections of the nuclear fuel and core
- inspections of the NPP quality assurance system
- following of the work procedure for plant modifications having a bearing on safety (i.e. more than verification of submitted documentation), including all QA requirements established by the licensee.

The HAEA has provided limited guidance on the contents of the inspection reports. They describe the scope of the inspection and the findings, and are signed by both the inspector and an NPP representative. If there are findings, the NPP protocol responding to the findings is attached. This review of inspection reports indicates that, in general, the HAEA inspections reflect a narrow perspective in reviewing the area of interest. In addition, inspectors are required to prepare a monthly report to management summarizing their activities, focusing management attention on matters of importance such as repeat findings and attaching their protocols. The HAEA managers discuss these reports with Paks NPP managers and are considering making them available to NPP. The inspection department is also in the process of creating a data base of inspection protocols accessible from either the site inspector's office or headquarters in Budapest.

6.5.1. Recommendations and Suggestions

(1) **BASIS** - IAEA Draft Requirements GS-R-1 “Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety”, paragraph 5.17 states that *“regulatory inspectors shall be required to prepare reports of their inspection activities and findings, which shall be fedback into the regulatory process.”* The use and contents of inspection reports is described in paragraph 522 of IAEA Draft Safety Guide No. GS-G 1.4, “Inspection and Enforcement by the Regulatory Body for NPPs.” HAEA

developed inspection reports did not always conform to this guidance in areas such as details of facilities areas assessed or records of problems relating to safety.

a) **Recommendation: The HAEA-NSD should improve the content and effectiveness of inspection reports according to the IAEA guidelines.**

6.6. REGULATORY ACTION AND ENFORCEMENT

The HAEA has a defined enforcement authority enumerated in Act CXVI of 1996 and Decree 87/1997. The IRRT reviewers noted that, consistent with international practices, the regulatory body has a number of graduated measures available to ensure that licensees take corrective action in a timely fashion. The available sanctions include the power to withdraw a license and the ability to oblige the licensee to pay a fine for violating a legal safety regulation for failing to comply with an obligatory standard or with the provisions set forth in an individual regulatory license issued based on the above. The limits on the amounts of the fines are specified.

HAEA relies upon management meetings and warning letters for offenses which would not rise to the level of enforcement described above such as multiple or recurrent minor violations. The principle vehicles for articulating minor compliance concerns to NPP licensees are to articulate findings of inspectors on the spot in inspection protocols which are acknowledged by NPP representatives and for which the response is articulated in an NPP protocol which is attached to the HAEA protocol.

6.6.1. Recommendations and Suggestions

(1) **BASIS**- The ability of the HAEA to impose fines has not yet been demonstrated and the only case which has occurred to date was withdrawn upon appeal to the second level of review. While there were apparently several reasons that this case was withdrawn, one was the lack of a policy with criteria for determining what the amount of the fine should be depending upon the nature of the offense.

a) **Suggestion: The HAEA-NSD should develop the necessary policy to eliminate any barrier to imposing fines in appropriate circumstances and thereby establish the credibility of this sanction with its own staff and the licensee.**

7. DEVELOPMENT OF REGULATIONS AND GUIDES

Experts: M. Maris, P. Hughes

In the present Hungarian legal framework, the AAE describes the objectives to be reached. Decree N° 108/1997 contains in its annexes a structured system of regulations. These regulations (Nuclear Safety Codes) contain the mandatory principles and criteria. They authorise the HAEA to issue non mandatory guidelines, which describe how the Nuclear Safety Codes should be complied with. The HAEA and the licensees develop, under their own responsibility, their internal procedures, instructions or guidelines. This whole system constitutes the nuclear safety regulatory pyramid in Hungary.

For other safety aspects, which are in the scope of other authorities, the same approach is applied, but the implementation is at various stages of completion. This explains why the interfaces between the HAEA and the other authorities, regulating different aspects of safety for the same utility, is not always as clear as it could be.

The system of regulations and guides seems to suit the legal system of Hungary and the nature and extent of the facilities and activities to be regulated. The most important regulations exist and quite an effort is still being devoted to establish the guidelines: about half of the planned guidelines has been issued and a number of them is in preparation. In the mean time, revisions of guidelines are going on. While carrying out these activities the HAEA discusses the issues with the licensees or takes into consideration their remarks. Due consideration is given to other developments on the international level and in particular to developments within the framework of the IAEA NUSS programme.

7.1. REGULATORY APPROACH

7.1.1. Background, Regulatory Policy and Strategy

In the past, the nuclear regulatory body was concentrated on the integrity of pressurized systems and components. The corresponding Hungarian regulations, existing in 1979, were established partly on the basis of codes and standards of the former Soviet Union origin, except two Hungarian ones that addressed licensing process and conditions for pressurized components and electrical, instrumentation and control components. The authority did not develop guidelines at that time.

Starting from this background, in the mid-eighties the present the HAEA developed the policy to establish a comprehensive regulatory framework within the boundaries of its legal authority. The adopted strategy was to create a new and structured set of regulations and guidelines. The regulations are intended to address all aspects of nuclear and radiation safety within the HAEA's scope of work. The objective of the guidelines is to confirm the good practices, agreed with the licensees, to support good understanding of the expectations of both the HAEA-NSD and the licensees, to promote regulatory openness and consistency.

7.1.1.1. Good Practices

(1) **BASIS** - The IAEA Draft Requirements Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety states in its paragraph 4.10 that *"Mutual understanding and respect between the regulatory body and the operator, and a frank, open and yet formal relationship, shall be fostered",* and in its paragraphs 5.27 and 5.28 that *"Guides, of a non-mandatory nature, on how to comply with the regulations shall be prepared, as necessary. These guides may also provide information on data and methods to be used in assessing the adequacy of the design, analysis and other documentation submitted to the regulatory body by the operator. In developing regulations and guides, the regulatory body shall take into consideration comments from interested parties and the feedback of experience."*

a) Good Practice: An important element of the HAEA-NSD's policy is to promote regulatory openness and consistency. It has therefore put an impressive effort during the last years into the consolidation of regulatory requirements and good practices through the establishment of nuclear safety codes and guides.

7.1.2. Existing Regulations and Guides

The structure of the present set of Codes has been based on the earlier IAEA pyramid of NUSS safety codes. The Codes address all the fields that are under the regulatory authority of the HAEA-NSD. In addition, the Codes are established per type of nuclear utility. The five existing Nuclear Safety Codes, which describe the mandatory safety requirements for nuclear facilities are already listed in Section 1 of this report.

The spent fuel storage is in operation on the site of the Paks NPP and is covered by the existing Codes. As this nuclear facility recently came under the responsibility of a new licensee, the national waste management agency, PURAM, a sixth Code, addressing spent fuel storage, is in preparation.

The regulatory guides have been established in groups, each of the groups supporting the implementation of one particular Code. They have been chosen and structured on the base of the national needs.

The HAEA-NSD has invested an important effort in the establishment of the present Codes and Guides. The technical content of the guides also represents a consolidation of the HAEA-NSD's corporate knowledge.

7.1.2.1. Recommendations and suggestions

(1) **BASIS** - The IAEA Draft Safety Guide Documentation Produced and Required in Regulating Nuclear Facilities, paragraph 212 says that *"The system of regulations should provide advance information to the operator on the requirements for each major authorization stage. This will assist the operator in making sound plans and decisions with respect to safety in the design, siting, construction, commissioning, operation, decommissioning or closure of nuclear facilities".* Siting aspects like earthquake, man-made risks have already been included in the Periodic Safety Reviews of existing nuclear facilities, but there does not exist a comprehensive regulation on siting.

a) **Suggestion: The present set of Codes and Guides does not cover the subject "Siting" and it is suggested to introduce this subject at an appropriate time.**

The suggestion on guidelines for decommissioning of nuclear facilities, formulated in Section 2 of this report, is also relevant.

7.1.3. System for Development and Review of Regulations and Guides

The HAEA-NSD has used international experience, through various contacts and assistance programs, in order to build its own concept for creation of regulations and guides. The HAEA-NSD has put into force a system for managing the development of codes and guides.

The Nuclear Safety Codes have been drafted by the HAEA-NSD and have been issued after consultation with the licensees. The basis information used was the set of the IAEA codes of the NUSS program as well as the available draft version of the new IAEA safety guides, USNRC and NII documents and input from the NPP.

The corresponding guidelines consolidate the good practices within the country but contain also elements drawn from foreign regulatory documents, as far as they could be applied for the VVER reactors in Hungary. Due to this approach, the Hungarian guidelines, compared with the IAEA guidelines, are more country specific. The HAEA-NSD established a prioritized list of guidelines to be produced, giving highest priority to those subjects which were covered by the old regulations, in order not to create a regulatory gap. A medium priority was attributed to issues which were well implemented but needed consolidation, and a last priority was given to the remaining subjects. At present about 36 guidelines have been issued, and about 21 are in preparation and are planned to be issued in 2000. An internal HAEA order was issued, defining the standard format and content of the Codes and guides. A senior staff member was appointed to manage the process, liaise with the licensees and technical support organizations, and organize the document control aspects. For some guidelines, the licensees, the Hungarian design organization or the technical safety organizations have been asked to contribute or to act as first authors or to perform some research, in order to avoid major gaps in the technical content and to alleviate somewhat the work load on the regulator.

The generalized use of foreign codes, guides or standards can only be regulated at the level of the Government or Parliament. For particular applications, the HAEA-NSD can accept the use of foreign regulations, guides or standards, as proposed by the licensee in the framework of an application for an authorization. It is however the HAEA-NSD's policy, as it should be, to accept only a consistent set of regulatory documents.

The Decree 108/1997 requires a review every 5 years, which means that a review of all Codes has to be accomplished in 2002. This review process has already started. Remarks from the licensees and from the HAEA-NSD staff, established on the experience with the Codes and guides, are accumulated during a period of about a year and a series of codes and guides are identified for review on a yearly basis. The Director General of the HAEA issues the new versions of the guides. The reviewed codes will be submitted to the government for official approval in 2002.

7.1.3.1. Recommendations and Suggestions

(1) **BASIS** - The IAEA Draft Safety Guide Documentation Produced and Required in Regulating Nuclear Facilities, paragraph 602 says that *"A systematic approach should be adopted for the production of regulations and guides, and the regulatory body's quality assurance system should cover these activities. Procedures should be developed, establishing the general method for the development of regulations and guides, in accordance with the national legal system. These should cover the composition of working groups; the drafting and review process, including the dissemination of drafts; the time available for comments by interested parties; and the procedures for disposing of these comments. The procedure for formal approval and promulgation of the regulations and guides should be established in accordance with the Member States' legal systems".*

a) **Suggestion: The HAEA-NSD will benefit from the establishment of the procedures and instructions that support the establishment, review and approval of nuclear safety codes and guides.**

The recommendation in Section 3.1.1 on QA is also relevant.

7.2. FUTURE DEVELOPMENT

7.2.1. Plan for Development of Future Regulations and Guides

The plan for development of future guidelines is established. A new Code for regulating spent fuel storage facilities is in preparation. The level of coverage of the nuclear safety and radiation safety aspects is estimated at present to be relatively large and will develop further. It is, indeed, recognized that the development of codes and guides is a lengthy and resource consuming process.

7.2.1.1. Recommendations and Suggestions

(1) **BASIS** - The IAEA Draft Safety Guide Documentation Produced and Required in Regulating Nuclear Facilities, paragraph 604 mentions that *"A program for production of documents for each facility should be established by the regulatory body, taking into account the facilities to be authorized and the available human and financial resources."* The scope of regulatory authority has however developed with time.

The same Draft Safety Guide presents in its Appendix B a suggested list of topics to be covered by specific regulations, license conditions or guides.

a) **Suggestion: In view of the new regulatory responsibilities that were attributed to the HAEA, the prioritization for the establishment for future guidelines should be re-evaluated, for instance for emergency planning.**

b) **Suggestion: In view of further completion of the regulatory guidelines HAEA-NSD should compare the present set of topics covered with the list attached to the Draft Safety Guide Documentation Produced and Required in Regulating Nuclear Facilities. The topic "human factors" is one of the subjects that should be addressed in the future.**

(2) **BASIS** - The IAEA Draft Requirements Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety states in its paragraph 4.2 that *"If the regulatory body consists of more than one authority, effective arrangements shall be made to ensure that regulatory responsibilities and activities are clearly defined and co-ordinated to avoid any omissions or unnecessary duplication or conflicting requirements being placed upon the operator. The main functions of review and assessment, and inspection and enforcement shall be organised in such a way as to achieve consistency and to enable the necessary feedback and exchange of information. In addition, the authorities responsible for the different disciplines concerned in the regulatory process, such as those in nuclear, radiation, radioactive waste and transport safety, shall be effectively co-ordinated."*

The recommendation already formulated in Section 2.1.1 of this report also applies to this section.

8. EMERGENCY PREPAREDNESS

Experts: M. Lipar, J. Linville

Emergency Preparedness in Hungary has a firm basis in law. The HAEA has a small, dedicated professional team who are committed to maintaining good emergency preparedness within the HAEA. They also provide training to the HAEA.

8.1. LEGAL BASIS

The organization of Hungarian crisis management changed on January 1, 2000 when Act LXXIV on the organization and control of protection against catastrophes became effective. The Act created a single leading Governmental Coordination Committee headed by the Minister of Internal Affairs for all types of catastrophes. In the case of nuclear emergencies the DG of the HAEA is the Deputy to the Minister of Internal Affairs. Two subcommittees including the National Defence Committee and the Operational Staff assist in decision making during nuclear emergencies. The members of these subcommittees are expert representatives of the ministries and national organizations. A National Emergency Directorate including the national civil protection organization and the national fire service operates a Nuclear Emergency Information Centre as well as a dedicated Nuclear Emergency Centre.

The HAEA operates its nuclear emergency centre, CERTA, with its Emergency Preparedness Organization (EPO). The role of the HAEA-EPO is to give expert advice to the decision makers of the Governmental Coordination Committee concerning the status of the facility involved, the possible consequences of the accident and recommended protective actions.

8.2. RESPONSIBILITIES OF THE HAEA EMERGENCY PREPAREDNESS ORGANIZATION

As the regulatory body in all matters related to the safety of nuclear facilities, the HAEA-NSD has the right to accept (or reject) the nuclear emergency plan of the nuclear facilities. As a result of the new Act described above, the HAEA is developing a new Nuclear Emergency Plan and is leading the ad hoc committee that is developing a new National Emergency Plan.

The HAEA is responsible for evaluating the possible off-site consequences of any nuclear incident or accident at any nuclear facility. The HAEA-EPO is expected to do an analysis of any reactor accident including a forecast of the possible consequences and an estimate of the actual and possible future source term following a release from a damaged reactor. In the past, the HAEA has developed the tools and expertise necessary to accomplish these tasks.

The HAEA-EPO is also expected to determine the source term from a radiological emergency in Hungary or elsewhere when the radiological consequence may affect Hungary.

Although much has been learned from the IAEA Harmonization Project, the HAEA is still in the process of developing the capability to accomplish this task.

The new Act and framework for Hungarian crisis management have broadened the responsibilities of the HAEA-EPO in nuclear and radiological emergencies. In addition to the responsibilities described in the preceding two paragraphs the HAEA-EPO must now estimate the propagation of radioactive material following a release and recommend appropriate countermeasures. Although the HAEA has the tools necessary to accomplish these tasks, the organization must develop the knowledge and practice to be fully capable of performing these tasks. The HAEA is the contact point for receiving notifications of any nuclear or radiological emergencies within Hungary or internationally. The HAEA Duty Inspector receives such notifications on a twenty four-hour basis from Hungarian nuclear facilities as well as the international community. The international community includes the IAEA and neighbouring countries with which Hungary has signed bilateral agreements. Upon receipt of a notification, the HAEA Duty Inspector alerts the EPO. There are parallel notifications to the ministries of foreign and internal affairs respectively to alert the operative and logistic branches respectively. Subsequent notifications are then received by the HAEA-EPO in the CERTA crisis centre. For outgoing notifications, the HAEA EPO is the single contact point in Hungary responsible for the notification of the international community on any nuclear or radiological event having a potential effect on the population. Similarly, the HAEA is the contact point in case of the application of the assistance convention.

8.2.1. Recommendations and Suggestions

(1) **BASIS** - HAEA currently has no defined role for providing information to the public in the event of an emergency, although the Governmental Coordination Committee described in section 8.1 does. IAEA Draft Safety Requirements GS-R-1 Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety says in paragraph 2.6(12*) "The regulatory body shall have the authority to make available to other government bodies, national and international organizations, and the public, information on incidents and abnormal occurrences, and other information, as appropriate."* In addition, IAEA Draft Safety Guide GS-G.1.1 Organization and Staffing of the Regulatory Body for Nuclear Facilities says in paragraph 238 that the regulatory body should be organized to provide information to the public regarding its activities in relation to abnormal events. The information provided to the public should be factual and unbiased reflecting the body's independence.

   a) **Recommendation: The HAEA should define its role as an independent and credible spokesperson during nuclear emergencies with respect to public information in both the National and Nuclear Emergency Plans currently being revised to take into account the provisions of the new Act.**

8.3. RESPONSE AND TRAINING OF HAEA EMERGENCY PREPAREDNESS STAFF

HAEA staff responsibilities in the event of a nuclear emergency are defined in procedures. Emergency response training has been undertaken by the staff. Their response is also periodically rehearsed in exercises and drills.

In the event of an emergency, the HAEA staff are alerted by the HAEA Duty Inspector who notifies the leader responsible for the Crisis Management Group who alerts with mobile

phones the leaders of the Analysis Group, the International Information Group and the Logistics Group who assume their roles upon arrival at the emergency centre, CERTA, according to their assignments. The leaders of these groups staff the groups from a prioritized tree of qualified staff with three to five persons per position. A Duty Site Inspector is also dispatched to the site Emergency Information Centre to monitor the actions of the NPP staff and to communicate with the HAEA staff in the CERTA. There are procedures to define the roles of each of the individuals and groups previously mentioned as well as the operation of CERTA. An additional set of operational procedures provides support for early and rapid analysis of a nuclear accident when there is only limited information available. As a result of recent changes in the Act, the EPO is being changed to incorporate the added responsibilities for radiological analysis and propagation forecasts.

The CERTA includes three dedicated rooms and all equipment and software needed to respond to an emergency. Among the systems available in the CERTA are a CERTA-VITA safety parameter display system which collects 2000 of the most important data points on line from the NPP and source term estimation codes such as InterRAS. The CERTA-VITA system can be connected to the NPP simulator for exercise purposes. In addition, there are a number of databases available and the centre has its own emergency diesel generator and uninterruptible power supply.

In preparation for an INEX exercise in 1998, the HAEA conducted extensive training for the EPO. However, all site inspectors did not receive this training as indicated by limited knowledge of the facilities and their responsibilities during a tour of the NPP Emergency Information Centre (EIC). In addition, there was no document package pre-staged for the HAEA site observer in the EIC as there was for the NPP responders.

8.3.1. Recommendations and Suggestions

(1) **BASIS** - During a review of EPO training records, the IRRT found that some site inspectors did not receive emergency preparedness training and were not provided with pre-staged documents in the NPP EIC. These observations indicate the need for a more systematic training program as described in Section 4.7 of IAEA Draft Safety Requirements No.GS-R-1, Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, which requires that members participate in well defined training programs.

a) **Recommendation: The HAEA-NSD should assure that all Emergency Preparedness Organization staff receive emergency response training and have pre-staged guidance available in emergency centres needed to carry out their responsibilities., including radiological impact assessment.**

8.4. EMERGENCY EXERCISE PROGRAMME

Drills and exercises on different levels are important to show the effectiveness of the HAEA EPO and to demonstrate the ability to co-operate with different organizations and particularly with Paks NPP. Regular drills and exercises of the HAEA started in 1998. Three main types of exercises are conducted: alerting, mini- or thematic exercises, and full-scale exercises. In the first type of exercise the HAEA EPO is alerted with or without arrival at CERTA. In a mini-exercise one or more selected groups perform their task without the

participation by the other groups. In a full-scale exercise the entire Emergency Preparedness Organization is involved preferably with its external co-operating organizations. Mini exercises are based on prepared materials. Full-scale exercises usually utilize Paks NPP simulator and a scenario is prepared by Paks NPP.

In 1998 the HAEA conducted two alert, two mini and two full- scale exercises. In addition an international exercise INEX 2 HUN was conducted in Hungary. After the exercise, an extensive self-assessment was performed and a corresponding action plan was developed. In 1999, besides the participation in the INEX 2 conducted in Canada the HAEA has organized a full-scale exercise with Paks NPP and with the Secretariat of the Governmental Co-ordination Committee for Accidents. In the year 2000 two alerting exercises, three mini exercises and two full-scales are planned.

No national comprehensive full-scope exercise with involvement of all parties and ministries has been conducted yet. There has not yet been a demonstration of coherent, orderly and effective co-operation of national, regional and local governments, and Paks NPP according to the national emergency plan. This is also important because of recent changes in emergency organizations introduced by Decree 40/2000.

8.4.1. Recommendations and Suggestions

(1) **BASIS** - Draft Safety Requirements- Preparedness and Response for Nuclear and Radiological Emergencies, Section 3.75, Training, Drills and Exercises, states: *"Drills and exercises shall be held at suitable intervals to ensure that individuals and Intervening Organizations maintain their effectiveness, some of which shall be witnessed by the regulatory body. Plans and arrangements shall be updated in the light of experience gained."* Section 3.77 - Training, Drills and Exercises, states: *"Exercise programmes shall ensure that all key emergency response functions and all organizational interfaces are tested at least once every five years".*

a) **Recommendation: The HAEA should address the need for a national comprehensive full scope exercise, consistent with the five year cycle in revising the national and nuclear emergency plans.**

8.4.2. Good Practices

a) **Good practice: The HAEA performed an extensive self-assessment and subsequently developed a corresponding action plan following the INEX 2 HUN exercise is considered a good practice.**

8.5. INTERNATIONAL ACTIVITIES

A number of international co-operation programs have contributed to the development of the HAEA emergency preparedness, mainly co-operation with IAEA, the European Union, the British Government, the French IPSN and the Slovak Nuclear Regulatory Authority.

Hungary is a party to the Convention on Early Notification of a Nuclear Accident or Radiological Emergency and to the Assistance Convention.

Further, it is a party to several bilateral agreements with neighbouring countries and some other countries in the field of early notification. The HAEA took an active part in several international projects and exercises related to emergency preparedness.

9. RADIOACTIVE WASTE MANAGEMENT IN NUCLEAR FACILITIES AND DECOMMISSIONING OF NUCLEAR FACILITIES

Experts: S. Suksi, J. Misak

9.1. LEGISLATION, ORGANISATIONS AND FINANCING

The AAE requires that a license for the application of atomic energy shall be granted only if the safe storage or final disposal of the radioactive waste and spent fuel generated by the licensed activity can be assured in accordance with the most recent proven results of science, internationally accepted norms, and experience.

Radioactive waste, the radioactive waste disposal facility and the interim storage facility for radioactive waste are defined in Sec. 2 of the AAE. The safe use of these facilities is the duty of the licensee according to Sec. 10 of the AAE and the operator *"shall ensure that the generation of radioactive waste through their activity is held to the lowest level practically possible"* according to Sec. 4. According to Sec. 40 of the AAE, the performance of tasks related to the final disposal of radioactive waste, as well as to the interim storage and final disposal of spent fuel and the decommissioning of a nuclear facility shall be the responsibility of an organization designated by the Government. The legal framework for the management of radioactive waste at the site of nuclear facilities and decommissioning of nuclear facilities is provided by the AAE and Decree 108/1997.

The existing documents provide the regulatory authority for the HAEA to regulate the radioactive waste (radwaste) and spent nuclear fuel generated and stored at the NPP operated by Paks Nuclear Power Plant Co. Ltd, at the research reactor operated by KFKI-AEKI and at the training reactor operated by the TUB. According to the AAE and Decree 240/1997, the Central Nuclear Financial Fund was set up on the 1st of January 1998 to finance radioactive waste disposal, interim storage and disposal of spent fuel as well as decommissioning of nuclear facilities. As required by the AAE, the Government authorized the DG of the HAEA to set up the PURAM, now operational since the 2nd of June 1998. The Minister supervising the HAEA has jurisdiction over the fund, while the HAEA is responsible for its administration. PURAM took over the tasks of the collection, treatment, transport, storage and disposal of radwaste of small scale producers, like medical, industrial and research facilities, and at the same time the operation of the Radwaste Treatment and Disposal facility at Püspökszilágy was turned over to it. At the moment, PURAM is the licensee of the interim dry storage of spent fuel at the power plant site, contracted the Paks NPP to operate it. Moreover, PURAM will be in charge of disposal of radioactive waste of nuclear power plant origin.

According to Decree 108/1997, the HAEA-NSD in the first instance and the DG of the HAEA in the second instance perform the function of the state supervision for all activities related to the use of nuclear energy, safety and radioactive waste management, as well to the decommissioning of nuclear facilities, nuclear components, and fuel. The HAEA-NSD activities related to radwaste management are limited to the systems and components on the site of nuclear facilities when being parts of them.

In radioactive waste management the licensing authority is the State Public Health and Medical Officer Service (on behalf of the Minister of Health). It is responsible also for inspection and enforcement, based on the countrywide network. It is supported by the Frederic Joliot-Curie National Research Institute on Radiobiology and Radiation Hygiene as a part of "Fodor József" National Centre for Public Health. In the licensing procedure all other public administration organizations participate as special co-authorities, in their scopes of authority and responsibility identified by separate legal regulations.

Final depositories of radioactive wastes, and the mining and milling tailings at the closed uranium mine are not classified as nuclear facilities by the present Hungarian legislation and as such are not under supervision of the HAEA, but under Ministry of Health. It is therefore clear that during and after the decommissioning there will be not only transfer of responsibility from one operator to another, but also from one regulatory body to another. Effective co-ordination between these authorities is needed as minimum due to the fact that materials resulting from decommissioning shall be acceptable for the final depository.

9.2. CLASSIFICATION OF WASTE

According to the Hungarian standards (MSZ 14344/1-80) supported by ministerial order (Decree 23/1997) radioactive waste is classified on the basis of activity concentrations or, if the determination of the radioactivity concentration of solid waste is not feasible, by the surface dose rate as low, medium or high level waste. Basic terms concerning radioactive wastes are defined in another national standard (MSZ 14344/2-1989) for radioactive waste management and in the HAEA-NSD Guideline No. 4.4 (March, 2000) Radiation Protection and Managing Radioactive Wastes during Operation of Nuclear Power Plants belonging to Nuclear Safety Code Volume 4. According to the guide all solid waste originating in the controlled area of NPP should be regarded as radioactive wastes, unless it is not excludable on the basis of surface dose rate or activity (Decree 23/1997).

The current legislation does not define clearance levels for radioactive material as recommended in the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (BSS-115). In the Ministry of Health a basic executive Decree which defines clearance in terms of doses is in the preparation phase and will be issued in the near future. In operational work it is not practical to use the clearance criteria in terms of doses. Therefore, the regulatory authority should develop derived radionuclide or nuclide group specific clearance levels in terms of activity concentrations or activity and NSD could encourage the initiating and progression of the work. Although the radiological criteria of clearance are similar to the exemption criteria, derived clearance levels are generally less than to the exemption levels presented in the BSS.

The purpose of clearance levels is to optimize the amount of radioactive waste handled, stored and disposed of, consistent with radiation protection requirements. It is important to segregate waste arising from different areas of the NPP to distinguish material that can be considered as being practically uncontaminated and may be cleared, from material, which needs a more controlled waste management approach. An important feature of decommissioning would also be the possibility to clear waste material for recycling, reuse or conventional disposal. The Paks NPP has implemented its own internal standard for exemption of radioactive wastes from regulatory control approved by the Head of State Public Health and Medical Officer Service.

9.3. SOURCES AND HANDLING OF LOW AND INTERMEDIATE LEVEL RADWASTE

In Hungary the main waste producer of low and intermediate level wastes (L/ILW) is the Paks NPP.

The wastes produced by institutional producers are stored by the producer on-site under special circumstances waiting for the collection and removal to the disposal site. At Püspökszilágy is operated a radioactive waste repository of L/ILW for wastes originating from small producers and research reactors. Solid L/ILW from Paks NPP was earlier moved there, but this was prohibited four years ago.

The Paks NPP produce annually L/ILW solid waste about 210 m^3 and liquid waste about 250 m^3. The total amount of L/ILW arising during the lifetime of the Paks NPP depends on the technology of the waste treatment. L/ILW at Paks is stored in the adjacent radioactive waste buildings. Last year there was commissioned the reconstructed part of the auxiliary building Nr.1 for better handling of solid L/ILW. The free capacities of the tanks in the first and second buildings at the end of 1999 were 28 % and 7 %. Waters of high salinity are treated by evaporation. The steam produced is condensed and cleaned by ionexhange resins. Evaporated water after passing through ionexchange filters is returned back to the process, or it is released into the river Danube. Evaporator concentrates are drawn by pipeline to the liquid waste storage tanks. After the boric acid recovery and cesium removal the residue is planned to be cemented (MOWA). Cesium removal or conditioning of the evaporation concentrates has not started yet.

Waters of low salinity leaving the process are cleaned in the purification systems of the plant by ionexchange. Average production of spent ionexchange resins is 0.6 m^3 per year for four units. The annual amount of other miscellaneous active liquid waste (oils, organic solvents) is around 0.5 m^3 per unit. The spent resins are planned to solidify by cementation.

Compactable solid LLW at power plant is collected in 50 liter polyethylene bags. The solid waste in bags having a dose rate less than 100 μSv/h is put into a segregation box, and the waste below 1 μSv/h is handled like a clearance one. The rest solid waste is placed in 200-liter steel drums and compacted. The volume reduction factor is about 5. Metal LLW/ILW with sharp edges is collected directly in drums. The annual accumulation of dry solid wastes after treatment is less than 100 m^3 for the four units.

9.3.1. Recommendations and Suggestions

(1) **BASIS** – IAEA Safety Series Number 111-F, Safety Fundamentals - Principles of Radioactive Waste Management, principle 7 states: *"The generation of radioactive waste shall be kept to the minimum practicable, in terms of both activity and volume, by appropriate design measures and operating and decommissioning practices. This includes the selection of and control of materials, and the implementation of appropriate operating procedures. Emphasis should be placed on the segregation of different types of waste and materials to reduce the volume of radioactive waste and facilitate its management."*

a) Recommendation: The HAEA-NSD should evaluate the optimization of waste management procedures at the nuclear facilities and request as necessary implementation of improved waste handling techniques.

9.4. LOW AND INTERMEDIUM LEVEL RADWASTE EMPLACEMENT

In 1976 the Radwaste Treatment and Disposal (RWTD) facility was commissioned to condition and dispose of institutional L/ILW near Püspökszilágy, about 40 km north of Budapest. It is a near surface type repository with concrete trenches and disposal wells. In the beginning the facility was operated by the Capital Institute of State Public Health and Medical Officer Services (SPHAMOS). On the 2nd of July 1998 the operation was taken by PURAM and financed by the Central Nuclear Financial Fund.

To date about 4800 m^3 of solidified waste have been placed in the disposal site and about 3000 m^3 have been sealed. 2300 m^3 of solid waste in the drums has originated from Paks NPP. Because there has not been final disposal site for L/ILW arising from the Paks NPP and on-site the solid waste can be stored in limited capacity, the disposal site at Püspökszilágy accepted to dispose of the NPP waste under restricted conditions (waste type, activity contents and package).

9.5. INTERIM STORAGE FOR THE SPENT FUEL

Fuel of Paks NPP just as from all other European VVERs was supplied in the past by the Soviet Union and (later) by Russia. As a part of the agreement with Hungary on fuel supply the Soviet Union took back all spent fuel for reprocessing by sending no waste of any kind back to Hungary.

In 1995 the likely interruption of the spent fuel reshipment led to a fairly immediate problem in Hungary. The spent fuel ponds became totally full by the end of the 1995 refuelling. With free storage capacity in its spent fuel pools running low, and future acceptance of spent fuel by Russia became uncertain, the Paks NPP awarded a contract for the construction of a modular vault dry storage (MVDS) system at the NPP's site. The license for its construction was issued in February 1995 and for the commissioning of the first phase (1350 assembly) of the project in February 1997.

By the end of December 1997, 450 spent fuel assemblies were loaded in the MVDS. The second phase has been put into operation with a capacity for 1800 spent fuel elements. The first seven modules (each for 450 assemblies) are in operation. The construction of the next four modules have started. The facility is designed for the interim storage for a period of 50 years. The total capacity of this interim storage facility will be enough for all the spent fuel assemblies of the full operational time of the NPP not sent back to Russia and offers time for Hungary in closing the nuclear fuel cycle.

9.6. INSPECTION OF WASTE MANAGEMENT ACTIVITIES

The inspection activities of HAEA NSD on radioactive waste management are limited to the systems and components on the site of the nuclear facilities when being parts of them. There are no special requirements concerning waste treatment systems compared to the other nuclear safety related systems and components and the licensing process is the same. Waste treatment systems are classified to the safety class 3. After commissioning the implementation and operation of systems are followed in connection to the daily, quarterly and maintenance inspections. These ordinary inspections can be focused specially to waste treatment systems if in their operation problems are discovered. One example mentioned was an operational

inspection, where the compliance of operational procedures for the evaporating system of high salinity liquids was inspected. Another inspection was aimed to the activity content of a waste tank by comparative measurements.

On the basis of reporting requirements set on the basis of the Nuclear Safety Codes and Guideline 1.24, May 2000 revised, the licensee has to make annually a special report on waste management, which is delivered to different organizations. NSD Department of Inspections reviews the report.

Inspection of radioactive waste management activities is described in the new Guide 1.22, approved in May 2000. The guide includes inspection of collection, treatment and internal transport of L/ILW, and HLW solid and liquid wastes as well abnormal wastes. Inspections of the new guide do not include the observation of implementation of ALARA principle, which in other hand is mentioned as one of the basic principles in the requirements for operator.

9.6.1. Recommendations and Suggestions

(1) **BASIS** – Paragraph 5.12 of the IAEA Draft Safety Requirements for Legal and Governments Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, GS-R-1 states that *"Regulatory Inspection and enforcement activities shall cover all areas of regulatory responsibility. The regulatory body shall conduct inspections to satisfy itself that the operator is in compliance with the conditions set out."*

a) Recommendation: The HAEA-NSD should reflect ALARA principle in the inspection guidelines for radioactive waste management and perform inspections accordingly.

9.7. FINAL WASTE DISPOSAL

At present there is no final repository for any type of radioactive waste arising from Paks NPP available in Hungary. In 1993 a National RW Management Project was launched to solve handling and disposal of LLW/ILW of the Paks Nuclear Power Plant and to elaborate a complex strategy for the management of radwastes from the NPP including HLW, spent fuel and wastes from the decommissioning.

In the site selection process of the LLW/ILW disposal facility a nation-wide screening for suitable areas was carried out, prospective areas were covered by field reconnaissance, and further exploration is going on to identify the site for detailed research. Great importance is attached to public acceptance and public relations. Detailed exploration of a potential site would take place only if public acceptance is assured.

To get the tasks described in the Act, Sec. 40, various implementation activities are to be completed. The work aiming to prepare and construct a repository for L/ILW will be a direct continuation of the activities carried out in the National Project.

The HAEA stated that the Public Agency for Radioactive Waste Management (PURAM) recently reviewed and evaluated the time schedule for siting and completion of the low and intermediate level waste (LILW) repository.

Uranium mining resulted more than 18 million tons of waste rocks. The recultivation and remediation of this area is going on framework of long term program that was launched by the government and supported by international assistance.

The comprehensive strategy for final disposal of high level radioactive waste elaborated in the framework of the National Project has foreseen that by 2040 a final disposal facility - serving either for direct disposal of the spent fuel assemblies or of the high level waste produced by reprocessing and packed into containers - should be commissioned.

The Hungarian Atomic Energy Committee regular reviews and evaluates the Strategy on Spent Fuel Management in Hungary and it was done in 1997 and 1999.

9.8. DECOMMISSIONING OF NUCLEAR FACILITIES

In accordance with the AAE, Sec. 10, the licensee - operator of a nuclear facility (NPP, research reactor) is responsible for its safe operation, while (Sec. 40) *"as the solution of such matters is in the national interest, the performance of tasks related to the decommissioning of a nuclear facility shall be the responsibility of an organization designated by the Government."* According the Decree 108/1997, Sec. 13, decommissioning can only be done by qualified and certified organization and staff. At present, the only such organization is PURAM. However, the PURAM is not yet authorized to perform any decommissioning activity. Funding of the decommissioning is and will be covered from the Central Nuclear Financial Fund (See Section 1). It is also to be said that there is at present no nuclear facility under decommissioning in Hungary. It is nevertheless obvious that according to the present legislation, in the future there will be transfer of the responsibility from one operator to the another one on the same nuclear facility. The borderlines between the operators and clear procedure for transfer of responsibility should be specified. This issue is also addressed in Section 1 of this report.

Only general requirements of HAEA for decommissioning are available. They are contained in Sec. 3.24 of Nuclear Safety Standards, Vol. 3 on General Requirements for the Design of Nuclear Power Plants. These requirements state that the decommissioning should be feasible, quantity of resulting radioactive material as well as radiological impact should be minimized and contamination of the environment should be prevented. The Decree also requires that the Preliminary Decommissioning Plan should be prepared. However, neither detailed regulatory guidance on the format and contents of the Preliminary Decommissioning Plan nor internal review guidelines have not been developed yet. Such guidance is already needed in spite of the fact that there are no decommissioning activities ongoing or to be started in the near future. It is required that the Preliminary Decommissioning Plan will be included as a chapter in the Safety Analysis Report (SAR). The format and contents of the SAR is required to be in accordance with the US NRC Reg. Guide 1.70, but there is no such guidance for the Preliminary Decommissioning Plan. The decommissioning chapter will be first time developed this year and submitted by the operator for regulatory review. For the future, there is the requirement for yearly updating of SAR including decommissioning plan. For research reactors, the same requirements regarding the decommissioning apply as for the NPP.

There is no organizational unit specifically devoted to the decommissioning activities within the HAEA. The work will be organized on the project basis. It is planned to involve not only all qualified HAEA specialists, but also to invite external experts, if needed.

9.8.1. Recommendations and Suggestions

(1) **BASIS** - The IAEA Requirements for Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, Safety Standards Series GS-R1 in the para 4.2 states that *"If the regulatory body consists of more than one authority, effective arrangements shall be made to ensure that regulatory responsibilities and functions are clearly defined and co-ordinated, in order to avoid any omissions or unnecessary duplication and to prevent conflicting requirements being placed on the operator. ...the authorities responsible ...for nuclear, radiation, radioactive waste ... safety, shall be effectively co-ordinated."*

   a) **Recommendation: Formal relationship between the HAEA-NSD and Ministry of Health and their responsible organisations and organisation units should be established to provide for their adequate link between their separate responsibilities in the field of decommissioning of nuclear facilities.**

(2) **BASIS** - The IAEA Requirements for Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, Safety Standards Series GS-R1 in the Appendix, para A.1 states that *"...the regulatory body shall review and assess: .... (7) Arrangements for decommissioning and for management of radioactive waste"* (already before authorizing the construction of NPP). According to the para 5.10 *"The regulatory body shall prepare its own program of review and assessment of the facilities and activities... from initial selection of the site, ... to decommissioning, ...".* IAEA Safety Series No. 105 which is a Safety Guide on The Regulatory Process for the Decommissioning of Nuclear Facilities provides recommendations for establishing the regulatory process for decommissioning of nuclear facilities and for evaluating a decommissioning process.

   a) **Suggestion: The HAEA should issue regulatory guidance for the key documents covering decommissioning and radioactive waste management and internal regulatory review guidelines.**

9.8.2. Good Practices

Establishment of the Central Nuclear Financial Fund has already been considered (See Sec. 1) as a good practice.

10. TECHNICAL RADIATION PROTECTION IN NUCLEAR FACILITIES

Experts: S. Suksi, J. Misak

10.1. LEGISLATIVE FRAMEWORK AND HISTORICAL DEVELOPMENT

Decree No. 7/1988 SZEM of the Minister of Public Health (former authority of health) lays down the general radiation protection requirements that should be applied to all activities where nuclear energy and ionising radiation are used.

The present system of radiation protection regulations is based on ICRP 26, anew regulatory framework is in the last phase of issue, however, which will be based on ICRP 60 instead.

The Decree No. 7/1988 SZEM stipulates that a radiation protection service should be set up in all installations using nuclear energy. All users are obliged to prepare an internal radiation protection standard, which should be approved by the competent authority (the State Public Health and Medical Officer's Service in this case). The annexes deal with the limits of the doses of workers and members of the public; the radiation safety principles of workplaces, radiation protection training; dosimetric control; the treatment of those suffering from a radiation injury; the tasks of the radiation protection service, the handling of accidents, the special radiation protection requirements for nuclear power plants and the disposal of radioactive waste.

The present situation in regulatory supervision of the radiation protection area has its origin in the 1970s, during the period of the design and construction of Hungarian NPP. In the first Atomic Act of 1980, a decision was made to adopt a distributed system of regulatory responsibilities, with many authorities involved. The Nuclear Safety Inspectorate was a part of the technical safety inspectorate and its work was mainly focused on integrity of pressure retaining boundaries. Radiation protection was fully the responsibility of the Ministry responsible for Public Welfare (its successor is Ministry of Health).

The new AAE adopted in 1996 underlined the independence of the regulatory body, centralised to some extent the scope of distributed regulatory system, recognised the importance of nuclear safety, and established the HAEA as the new regulatory body for nuclear safety. A major part of the radiation protection still remained under the authority of the Ministry of Health, which discharges its responsibility through the State Public Health and Medical Office Service. This Service has its offices distributed over the whole country and performs a regulatory function in the area of health effects of radiation from any source of radioactivity.

The HAEA became in 1997 responsible for technical radiation protection. This means supervising all technical efforts to in reduce doses/dose rates to workers and to the population. Its responsibility is, however, limited only to nuclear facilities (NPP, two research reactors, and dry spent fuel storage) and does not cover such facilities as radioactive waste storage outside the fences of nuclear installation and depositories.

Due to the present sharing of responsibilities, two main co-authorities in the radiation protection and radioactive waste areas need to co-operate closely. Problems in this co-operation arise from two main facts:

- in the present legislation, the HAEA-NSD is not identified as the co-authority for authorization processes with Ministry of Health as the main authority
- there is a considerable delay in developing legislative basis which is under the responsibility of Ministry of Health; e.g. a decree containing new dose limits and also clarifying the role of the HAEA as co-authority has not been issued yet.

It is therefore difficult to clarify fully the interfaces between the two authorities. This is one of the reasons why implementation of HAEA responsibilities in the field of radiation protection is still in its initial phase. Another reason was, that development of the regulatory guidelines for the new responsibilities had a very low priority compared with many other HAEA duties. Therefore, the regulatory guidelines on Inspections for Technical Radiation Protection were issued only recently, in spring of the year 2000.

10.1.1. Recommendations and Suggestions

(1) **BASIS** – In accordance with the AAE there are many responsible Ministries in activities related to radiation protection being separately developing new legislation. In accordance with the Draft Safety Requirements, SSS-No. GS-R-1, Paragraphs 2.6 and 3.3, effective communication and co-ordination is required for such circumstances. Implementation of the requirements in the new act and ICRP 60 has ceased as separate regulatory bodies have been waiting the issue of each others' regulations.

Relevant recommendations are already included in section 2.1.1 of this report.

10.2. RADIATION PROTECTION AT PAKS NUCLEAR POWER PLANT

On the basis of reviewing the annual report of Paks NPP, these discussions were reported between the plant personnel and the inspection made by NSD inspector during the visit to the controlled area of the Paks plant unit 4 which was shut down for refuelling maintenance, it could be observed that the radiation protection of workers is implemented in the design, normal operation of the plant; low contamination and dose rate levels existed, extensive monitoring and good dosimetry follow-up were conducted. ALARA goals were set and they were implemented into the management and daily operation of the plant.

Reporting by the Paks Radiation Protection Department to the separate regulatory bodies involved in regulation of radiation safety, including HAEA-NSD, is extensive.

10.3. TECHNICAL RADIATION PROTECTION ACTIVITIES OF HAEA-NSD

The scope of technical radiation protection licensing and inspection activity of HAEA-NSD covers:

- the equipment related to the operation of a nuclear facility, the radiation field generated by or radioactive material released from - a source term – may present a potential or effective radiation hazard for a living person with the exception of sealed radioactive sources,

- the equipment limiting or reducing harmful effect of the source term,
- the equipment providing information on the radiation conditions of the source term or of the space including the source term.

Technical radiation protection related inspections of the HAEA-NSD are performed with the same frequency as the other types of inspections.

10.3.1. Inspection of Technical Radiation Protection

The scope of the inspections is specified in Nuclear Safety Guidelines 4.4 (Technical Radiation Protection during the Operation of Nuclear Power Plants), 1.20 (Technical Radiation Protection Inspection) and 1.22 (Inspection of Radioactive Waste Management) the issuance of which is in progress.

Objectives of the HAEA-NSD inspection for technical radiation protection are as follows:

- inspection of ALARA programme according to 4.4; such an inspection is performed annually reviewing and assessing the report delivered by the Paks NPP,
- inspection of the possible source terms, e.g. due to leaking of fuel assemblies, activated corrosion products, refuelling with activated components,
- preventive inspection during normal operation, e.g. ventilation and filtering systems, gas purifying and hydrogen burning systems, water cleaning systems, integral tightness of the containment,
- inspection proceeding during maintenance work, e.g. existence of containment dose maps, dose rates near the main components, existence of temporary shields, decontamination methodology,
- inspection related to radioactivity with potential to exceed the operating limit values, like main loop decontamination technologies, technologies for handling radioactivity in the secondary circuit and outside the radiologically controlled zone,
- inspection of documentation and administrative measures regulating radioactive release
- inspection of radiation protection and control systems,
- inspection of collecting and managing radioactive wastes, e.g. documentation, qualification, temporary storage, conditioning.

Pre-planning of the inspections is done. An inspection protocol is prepared and given to responsible counterparts at NPP and sent ahead to NSD headquarters. Inspections are focused to separate tasks in the field of radiation protection, such as supervision or technical details and dose rate measurements repeating or checking operators procedures or observations. Interfaces between different organisational units of the plant (e.g. operation, maintenance, technical support, contractors), fulfilment of set requirements and whether they are appropriate in the main work process taking into account aspects of radiation protection, are not adequately implemented into the inspections.

10.4.1. Recommendations and Suggestions

(1) **BASIS** - IAEA Draft Safety Requirements for Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, GS-R-1, paragraph 4.7 states that *"In order to ensure that the proper skills are acquired ad the adequate levels of competence are achieved and maintained, the regulatory body shall ensure that its*

staff members participate in well defined training programmes. This training should ensure that the staff are aware of technological developments and new safety principles and concepts."

a) **Recommendation: In order to fully implement the recently issued guidelines on technical radiation protection, training of inspection personnel is needed on the use of the applicable guidelines.**

(2) **BASIS** - IAEA Draft Safety Requirements for Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, GS-R-1, states in addition to paragraph 5.12 (already mentioned in basis of the Recommendation 9.6.1 a.) that *"...Regulatory inspections shall not diminish the operator's prime responsibility for safety or substitute for the control, supervision and verification activities that the operator must carry out."* Paragraph 5.14 specifies that *"the regulatory body shall establish a panned and systematic inspection programme."* The completion of good results in radiation protection presume that all functions of the main work process are appropriate.

b) **Recommendation: The inspection of the implementation of the NPP's radiation protection programme should not be an isolated activity, but be integrated in the overall inspection plan. As the NPP's radiation protection activities are part of a global process, the HAEA-NSD's inspection activities should be organised accordingly.**

LIST OF ACRONYMS

AAE	Act on Atomic Energy
AEKI	Atomic Energy Research Institute
AGNES	Advanced General and New Evaluation of Safety
ALARA	As Low As Reasonably Achievable
BCF	Boda Claystone Formation
BSS	Basic Safety Standards
CERTA	Centre for Emergency Response, Training and Analysis
DG	Director General
EIC	Emergency Information Centre
EPO	Emergency Preparedness Organization
HAEA	Hungarian Atomic Energy Authority
HAEC	Hungarian Atomic Energy Commission
HLW	High level Waste
IAEA	International Atomic Energy Agency
ICRP	International Commission in Radiological Protection
ILW	Intermediate level Waste
INES	International Nuclear Event Scale
INEX	International Nuclear Emergency Exercise
IRRT	International Regulatory Review Team
IRS	Incident Reporting System
KFKI	Central Research Institute for Physics
L/ILW	Low and Intermediate Level Waste
LLW	Low Level Waste
MVDS	Modular Vault Dry Storage
NPP	Nuclear Power Plant
NSD	Nuclear Safety Directorate
NUSS	Nuclear Safety Standards
OECD-NEA	Organization for Economic Co-operation and Development-Nuclear Energy Agency
PDP	Preliminary Decommissioning Plan
PSA	Probabilistic Safety Assessment
PSR	Periodic Safety Review
PURAM	Public Agency for Radioactive Waste Management
QA	Quality Assurance
RW	Radioactive Waste
RWTD	Radwaste Treatment and Disposal
SAR	Safety Analysis Report
SPHAMOS	State Public Health and Medical Officer Services
SSS	Safety Standard Series
TSO	Technical Support Organization
TUB	Technical University of Budapest
USNRC	United States Nuclear Regulatory Commission
VEIKI	Institute for Electric Power Research
VVER	Water-Coded water-Moderated Power Reactor (Russian Design)

ANNEX I HAEA DOCUMENTS REVIEWED DURING THE IRRT MISSION

1. IRRT Advance Reference Material- Hungary.

2. Translation of Act CXVI. Of 1996 on Atomic Energy (as amended).

3. Translation of Government Decree 108/1997. (VI.25) Korm. On the Procedures of the Hungarian Atomic Energy Authority in Nuclear Safety Regulatory Matters.

4. Translation of the Nuclear Safety Code Volume 1. Authority Procedures Applied to Nuclear Power Plants (the schedule No. 1 to the Decree above).

5. Translation of the Nuclear Safety Code Volume 3. General Requirements for the Design of Nuclear Power Plants (the schedule No. 3 to the Decree above).

6. Translation of the Nuclear Safety Code Volume 4. Operational Safety Requirements for the Nuclear Power Plants (the schedule No. 4 to the Decree above).

7. Translation of the Government Decree 87/1997. (V.28) Korm. On the Duties and Scope of Authority of the Hungarian Atomic Energy Commission and on the Scope of Duty and Authority, and Jurisdiction of Imposing Penalties of the Hungarian Atomic Energy Authority (as amended).

8. Translation of a typical license for the Paks Power Plant asan example (Subject: Modification license in principle for the introduction of fuel cycle based on BNFL manufactured fuel assemblies).

9. Translation of the Guideline No.1.13 Procedure for Handling of Licence Application.

10. Translation of the Procedure on Inspection of Normal Operating Activity of Nuclear Power Units, Rev 3 of June 1998.

11. Translation of the Procedure on Inspection for Maintenance, Performed during General Overhaul of Nuclear Power Plant Units, Rev. 2 of January 1999.

12. HAEA-NSD, Protocols of Paks NPP Site Inspectors, March-May 2000.

13. Translation of the Guideline No.4.4, Radiation Protection and Managing Radioactive Waste during Operation of Nuclear Power Plants.

14. Translation of the Guide No.1.24, Regular Report Obligations of the Nuclear Power Plant.

15. Translation of the Governmental Decree 240/1997 (XII.18.) Korm. on Establishment of the Organization designated for Implementing Radioactive Waste Disposal and Spent Fuel, as well as Decommissioning of Nuclear Installations, and on the Financial Source Performing Tasks.

16. Ildikó Czoch, Radioactive Waste Management in Hungary. Regional Public Information Seminar on Peaceful Uses of Nuclear Energy in Central and Eastern Europe, Budapest, 4-6 April 2000.

17. HAEA-NSD, Basic Principles of Operation and Safety Policy of NSD.

18. List of the members of the Scientific Board assissting the work of HAEC and HAEA.

ANNEX II - SYNOPSIS OF RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

Recommendations

R.1. **The legislative framework regarding decommissioning, interim storage and final disposal of spent fuel and radioactive waste should be reviewed and amended to provide for continuity of responsibilities and for the recording of the transfer of responsibility when obligations are taken over from the present operators of the nuclear facilities to be carried out by the designated organization.**

R.2. **The reporting line of the HAEA should be channeled through persons, bodies or organizations that are not, directly or indirectly charged with the promotion of nuclear energy. The same provisions should be applied regarding the Government supervision of its activities through the HAEC.**

R.3. **The HAEA should not be involved in the establishing of any organization or body financing and operating facilities or performing activities in the field of the use of atomic energy. At present, it applies to the establishing of PURAM and managing function of the Central Nuclear Financial Fund.**

R.4. **The legal and governmental infrastructure of Hungary with distributed regulatory responsibilities, involving up to nine authorities, should be more thoroughly co-ordinated in order to avoid any omission or overlap and to provide for effective co-operation between those authorities.**

R.5. **The HAEA should proceed to improve its internal QA system with high priority. Quality management in regulatory bodies is a prerequisite to increase its effectiveness and an essential contribution to an integral approach facing the new regulatory challenges.**

R.6. **A review of the resources including staffing of the HAEA-NSD should be performed, taking into account the new tasks and responsibilities being assigned to the HAEA-NSD and future regulatory challenges.**

R.7. **The time period in which the resolutions of the HAEA-NSD are to be delivered should not be constrained to avoid compromising the regulatory body's responsibility.**

R.8. **The Act on Atomic Energy or related legislative documents should be revised to make clear what is meant by "initiate activities".**

R.9. **The HAEA-NSD should further develop its competencies for specifying the scope and depth of the independent review of safety analysis to be carried out by the Technical Support Organizations (such as criteria for sensitivity studies, evaluation of safety margins).**

R.10. The HAEA-NSD should develop further its in-house competencies for the assessment and understanding of thermohydraulic safety cases.

R.11. The HAEA-NSD should assess inspection resources in a manner that takes into the account the integrated nature of their inspection responsibilities. Specific attention to resource needs should address the development of personnel competencies and the use of other options such as the use of technically competent staff from other parts of the organization or contractors teamed with inspectors to meet short term needs.

R.12. The HAEA-NSD should implement the new training and development program to improve the capabilities of the inspection staff and ensure that the personnel who perform inspections are appropriately trained and qualified in effective methods of inspection and integrated plant operations, and maintain technical competence.

R.13. The HAEA-NSD should develop an integrated inspection plan that provides for consistent and effective verification of the level of operational safety performance of nuclear installations.

R.14. The HAEA-NSD should improve the content and effectiveness of inspection reports according to the IAEA guidelines.

R.15. The HAEA should define its role as an independent and credible spokesperson during nuclear emergencies with respect to public information in both the National and Nuclear Emergency Plans currently being revised to take into account the provisions of the new Act.

R.16. The HAEA-NSD should assure that all Emergency Preparedness Organization staff receive emergency response training and have prestaged guidance available in emergency centres needed to carry out their responsibilities, including radiological impact assessment.

R.17. The HAEA should address the need for a national comprehensive full scope exercise, consistent with five year cycle in revising the national and nuclear emergency plans.

R.18. The HAEA-NSD should evaluate the optimization of waste management procedures at the nuclear facilities and request as necessary implementation of improved waste handling techniques.

R.19. The HAEA-NSD should reflect ALARA principle in the inspection guidelines for radioactive waste management and perform inspections accordingly.

R.20. Formal relationship between the HAEA-NSD and Ministry of Health and their responsible organisations and organisation units should be established to provide for their adequate link between their separate responsibilities in the field of decommissioning of nuclear facilities.

R.21. In order to fully implement the recently issued guidelines on technical radiation protection, training of inspection personnel is needed on the use of the applicable guidelines.

R.22. The inspection of the implementation of the NPP's radiation protection programme should not be an isolated activity, but be integrated in the overall inspection plan. As the NPP's radiation protection activities are part of a global process, the HAEA-NSD's inspection activities should be organised accordingly.

Suggestions

S.1. Strengthening of the legal support/advice to the regulatory authority should be considered as a priority assignment to provide for legal backing to the authority in making regulatory decisions within this complex legal framework.

S.2. Policies of the Government that could conflict with the assigned responsibilities of the regulatory body should not be applied to the regulatory body; thus general decisions of reducing staff of public offices or level of taxes or fees recovered on activities or facilities should only be applied to the nuclear, radiation, radioactive waste or transport safety regulatory body if they do not jeopardize its efficiency and effectiveness.

S.3. The Act on Atomic Energy should be modified so that regular increase of the level of fees can be decided by other legal procedure, for example the yearly Act for Finance determining the state budget of Hungary.

S.4. In case of difficulties occurring in the co-operation with other authorities, the HAEA should appeal to the governmental level co-ordination; in the present situation the HAEC has that governmental level co-ordination responsibility.

S.5. The need for reviews of resource allocation should be performed periodically having in mind that regulating and supervising the use of nuclear energy effectively, is an evolutionary process rather than a static one. The periodic review should also consider potential needs of salary adjustments. Incomes of regulatory staff should be comparable for the equivalent positions of counterparts within the nuclear industry.

S.6. Matters of improved safety culture should be considered as an ongoing commitment. The HAEA-NSD should therefore consider the involvement of a representative of the Corporate Level particularly if matters of safety culture are an agenda item at the annual meetings between NPP and Regulatory Body. The same principles should also be applied for other nuclear installations.

S.7. The HAEA-NSD should agree with applicants on timescales for the submission of documentation in advance of a formal licence application to provide flexibility in their licensing, review and assessment activities. The Act on Atomic Energy should be revised accordingly.

S.8. The HAEA-NSD should make better use of the event analysis in defining their basic inspection plan.

S.9. The HAEA-NSD should develop training profiles for each individual performing inspections, which records training experience and prescribes refresher and further training needs.

S.10. The HAEA-NSD should provide specific and detailed guidance for the approach, conduct, methods, and expectations necessary to be carried out for inspections. Additionally, this guidance should ensure that a proper level of supervisory attention is focused on the selection of the HAEA personnel that employ proper inspection and technical competencies.

S.11. The HAEA-NSD should consider including more unannounced inspections.

S.12. The HAEA-NSD should consider the use of section 4 Regulatory Inspection Programme and Planning of IAEA Draft Safety Guide No. GS-G.1.4. Regulatory Inspections of Nuclear Facilities and Enforcement of Regulatory Body for preparation of the inspection plan to cover all areas.

S.13. The HAEA-NSD should develop the necessary policy to eliminate any barrier to imposing fines in appropriate circumstances and thereby establish the credibility of this sanction with its own staff and the licensee.

S.14. The present set of Codes and Guides does not cover the subject "Siting" and it is suggested to introduce this subject at an appropriate time.

S.15. The HAEA-NSD will benefit from the establishment of the procedures and instructions that support the establishment, review and approval of nuclear safety codes and guides.

S.16. In view of the new regulatory responsibilities that were attributed to the HAEA, the prioritization for the establishment for future guidelines should be re-evaluated, for instance for emergency planning.

S.17. In view of further completion of the regulatory guidelines it is suggested to compare the present set of covered topics with the list attached to the Draft Safety Guide Documentation Produced and Required in Regulating Nuclear Facilities. The topic "human factors" is one of the subjects that should be addressed in the future.

S.18. The HAEA should issue regulatory guidance for the key documents covering decommissioning and radioactive waste management and internal regulatory review guidelines.

Good Practices

G.1. The legislative framework provides for a funding system through a separate fund exclusively earmarked for financing the construction and operation of disposal facilities, for the final disposal of radioactive waste as well as for the interim

storage and final disposal of spent fuel and the decommissioning of nuclear facilities. The licensees are obliged to cover the costs. The payments are determined by law on an annual basis.

G.2. The need of periodical review of the Nuclear Safety Codes once in every five years, with regard to scientific achievements and international experience, legally required by the Act, and put into concrete terms by governmental decree, is considered to be a binding contribution to an effective implementation/execution of safety regulations.

G.3. The self-assessment of the HAEA-NSD structure and operation was an important initiative to improve organisational performance and safety culture.

G.4. The HAEA-NSD has implemented an effective project management system, using modern technology and promoting team work. Through the use of this system the HAEA-NSD is achieving excellent control and traceability of the authorization process and is building corporate know-how which serves as a basis for future assessments and authorizations.

G.5. The HAEA-NSD's general contract arrangements with its Technical Support Organizations provides a rapid and easy access for technical advice needed during the course of its authorization, review and assessment processes.

G.6. The HAEA-NSD this year posted its yearly event analysis report on its Internet site for public access.

G.7. The HAEA-NSD is actively developing with its Technical Support Organizations diverse computer codes to improve its independence in the evaluation of design basis and beyond design basis accident studies.

G.8. An important element of the HAEA-NSD's policy is to promote regulatory openness and consistency. It has therefore put an impressive effort during the last years into the consolidation of regulatory requirements and good practices through the establishment of nuclear safety codes and guides.

G.9. The HAEA performed an extensive self-assessment and subsequently developed a corresponding action plan following the INEX 2 HUN exercise.

ANNEX III - TEAM COMPOSITION

Ms. Sonia Crozier	IAEA, Engineering Safety Section Division of Nuclear Installation Safety Department of Nuclear Safety
Mr. Gunter Giersch	IAEA, Safety Assessment Section Division of Nuclear Installation Safety Department of Nuclear Safety
Mr. Peter Hughes	Health & Safety Executive Nuclear Installations Inspectorate United Kingdom
Mr. James Linville	Nuclear Regulatory Commission, REGION 1 Office of the Regional Administrator U.S.A
Mr. Miroslav Lipar	Nuclear Regulatory Authority (UJD) Slovak Republic
Mr. Marcel Maris	Association Vinçotte Nuclear, AVN Belgium
Mr. Jozef Mišak, Team Leader	IAEA, Safety Assessment Section Division of Nuclear Installation Safety Department of Nuclear Safety
Mr. Jean Scherrer	Direction de la Sûreté des Installations Nucléaires (DSIN), France
Ms. Seija Suksi	Radiation and Nuclear Safety Authority (STUK) Nuclear Reactor Regulation Finland