Physical Protection of Nuclear Facilities in Finland

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ABSTRACT: This paper will present some legislative, regulatory and administrative measures to establish, implement and maintain a physical protection regime for nuclear facilities in Finland. It will review the design basis threat and the system for evaluation of the current threat. Furthermore the paper will discuss the security, safety and safeguards aspects of nuclear facilities. The potential subordination of any of these three aspects should be avoided; instead the need for co-operation is pointed out. Finally some conclusions and concerns regarding physical protection of nuclear facilities will be described.

1 INTRODUCTION

There are four nuclear power reactors (two BWR's in Olkiluoto and two VVER's in Loviisa), and one research reactor in Finland presently. In the middle of October 2003 the power company TVO informed that it will continue the negotiations with the preferred bidder based on their offer on a PWR with an electric output of about 1600 MW. Olkiluoto was selected as the location for this projected fifth NPP unit in Finland. TVO's goal is to finalize the negotiations so that the contract on the plant supply could be made by the end of 2003 and subsequently to submit the construction license application as soon as possible.

The arrangements used for the physical protection of nuclear facilities and transports of nuclear material depend on the type of facility and mode of transport. This paper will focus on physical protection of nuclear facilities in Finland and some cornerstones on which the protection regime is built. The words *nuclear facility* could in practise be substituted with *nuclear power plant* (or vice versa) in this paper since the research reactor probably will be decommissioned in a near future and as there are no other nuclear fuel cycle facilities yet in Finland.

2 LEGISLATIVE BACKGROUND

The utilization of nuclear energy and related activities requires a licence prescribed by our Nuclear Energy Act (NEA). According the NEA it is the licence-holder's obligation to assure the safe use of nuclear energy. In particular it is the licence-holder's obligation to assure such physical protection and emergency planning and other arrangements, necessary to ensure limitation of potential nuclear damage, which do not rest with the authorities. Also, physical

protection shall be sufficient during different lifetime phases, such as planning, construction, operation and decommissioning, of a nuclear facility.

For historical reasons, nuclear power plants in Finland are guarded primarily by the guards of the power company or a separate subcontractor company or both companies. This system requires clearly defined responsibilities. As an example, the Nuclear Energy Decree requires the licence-holder to appoint a responsible manager who has a duty to see to it that the provisions of the NEA, the rules and regulations issued by virtue of it, and the licence conditions concerning the safe use of nuclear energy, the arrangements for physical protection and emergencies, and the safeguards control, are complied with. Furthermore, the licence-holder shall appoint a person who is responsible for the physical protection of the nuclear facility. The persons who are appointed to the duties referred to above must have an approval granted by the Radiation and Nuclear Safety Authority (STUK) for their specific jobs. The licence-holder shall see to it that these persons have such a position in their work that they have enough authority and a factual opportunity to attend to their duties effectively.

The Radiation and Nuclear Safety Authority STUK is responsible for the supervision of the safe use of nuclear power. In addition STUK shall be responsible for attending to the supervision of physical protection and emergency planning, and for the necessary control of the use of nuclear energy to prevent the proliferation of nuclear weapons. In order to carry out the tasks mentioned above, STUK shall in particular:

- participate in the processing of licence applications pursuant to the NEA;
- supervise the observance of licence conditions as well as set detailed requirements concerning the operations referred to in the licence;
- issue detailed regulations and put forward the proposal for the general regulations concerning safety as well as physical protection and emergency planning;
- supervise the observance of the regulations referred to in the point above;
- set qualification requirements for persons involved in the use of nuclear energy and control that the requirements are met;
- provide expertise for other authorities and act as the competent authority required in certain cases;
- carry out research and development work necessary for supervision and participate in international co-operation in the field; and
- put forward proposals and issue statements occasioned by supervision.

STUK shall also be in charge of passing judgements on such licence applications pursuant to the NEA as have been prescribed to be determined by STUK, and of supervising that indemnification regarding liability in case of a nuclear damage has been arranged as prescribed. STUK may also, upon request by anyone planning to use nuclear energy, check the plan drawn up by them and issue preliminary instructions on what should be taken into account with respect to safety, physical protection and emergency planning.

3 DESIGN BASIS THREAT (DBT)

First a few definitions for clarification of the following resolution only:

- *physical protection* refers to measures to be taken to thwart any unlawful activities against a nuclear facility;
- *unlawful action* refers to a deliberate activity or measure aimed at endangering a nuclear facility's safety or the integrity of nuclear material, or posing other kind of a direct or indirect threat to nuclear or radiation safety, or other negligent, damaging act against a nuclear facility; and

- *threat* refers to an event during which unlawful action against a nuclear facility is ascertained or suspected.

The resolution of the Government on the general regulations for physical protection of nuclear facilities (VNP 396/1991) prescribes, that the design basis for the planning of physical protection is that unlawful action can be taken by an individual working at a nuclear power plant, or a group of people or a person not employed at the plant who can be assisted by a person working at the plant. An individual or a group of people attempting unlawful action can also have arms and explosives as well as such information and expertise as are not available to the public. Physical protection shall be based on the assessment of risks and the need for protective measures arising from unlawful action. Furthermore, physical protection shall be consistent with the operation of and emergency response arrangements for a nuclear facility. Physical protection shall also be consistent with the rescue service and emergency plans made by the authorities in provision against nuclear facility accidents. The DBT is considered more elaborately in the corresponding STUK guides (classified).

This resolution of the Government from 1991 and the corresponding STUK guides from 1992 have remained essentially unchanged and served their purpose well. The tragic events of September 11, 2001 and the plans for a fifth NPP unit in Finland however made it quite clear, that at least some complementary physical protection guidelines were needed. This essentially gives the background to STUK's Decision in 2002 on the Specified Physical Protection Principles (classified). This decision does not change the previous regulations, but on the other hand reviews some new requirements for the facility's design and physical protection, such as:

- structural strength and lay-out of the facility (large passenger airplane crash etc.);
- safety and working conditions of the personnel (chemical/biological toxins etc.);
- electromagnetic interference (radio frequency weapons etc.);
- information security.

Plans exist on how to integrate the above mentioned documents and issues into a more elegant form of regulations. Reviewing and rewriting the legislation and regulations is by definition a process without ending.

4 EVALUATION OF THE CURRENT THREAT

One fundamental principle adopted is that *physical protection should be based on the current evaluation of the threat.* This principle is important among others because the threat situation tends to change with time and there might also be delays in the way these changes are reflected into the legislation and regulations. STUK convened already in the 1990's a group of experts on physical protection, the so called "Threat Group", whose mission is evaluation of the current threat (risk assessment). The purpose of this group is also inter alia promotion of co-operation between the member organisations, which except STUK include among others Intelligence, Security and Border Guard Authorities. The NPP security managers are also participating, when appropriate, in order to promote the exchange of information and to ensure their rapid response to new threat situations, if needed.

5 SECURITY, SAFETY AND SAFEGUARDS

The Radiation and Nuclear Safety Authority STUK deals with the security, as well as the safety and safeguards, aspects of the nuclear facilities in Finland. There are undoubtedly synergies between these aspects. As an example the fundamental principles of physical separation, subdivision and redundancy as well as diversification works for both safety and security objectives. Traditionally safeguards has existed more separately as an intrusive accounting activity, with safety and security concerns mostly related to storage and transportation of nuclear materials or nuclear waste management. The co-operation between the different departments of STUK in security, safety and safeguards issues has however always been excellent, and subordination of any of these three aspects has not been observed.

Today, in Euratomland, the Euratom Safeguards Activities are however pointing towards a direction of concern, where safety and security of our nuclear facilities might be at some risk. One concrete minor example of this is the behaviour of one Finnish Euratom Inspector at one of our nuclear facilities in September 2003, shortly after the second anniversary of the September 11, 2001 attacks. In order to make a long story very short (and with the resulting risk of perhaps oversimplifying), the inspector in question:

- did not understand the difference between authorisation (which was never questioned) and identification (which was the topic, and should be in the interest of all parties);
- did not recognize the plant procedures for personal identification, which were in fact the same as those in use by our Ministry of the Interior at border crossing points etc;
- did not recognize the plant procedures for security check of his luggage, or at least claimed that the check was too careful, lasted for too long a time etc;
- accused the security personnel, who were only following their procedures, for being rude.

This event was considered as a serious incident from the Euratom side and correspondingly they demanded certain immediate actions from the licence-holder. Of course Euratom never sent STUK a copy of their fax-correspondence with the licence-holder. I will leave the conclusions to the reader, but let me finish this part of the paper with a quotation from one Euratom Safeguards Report (June 2003): "*The Quality Survey on ESO activities is one of the first measures adopted by the Commission in order to put into practice one of the main HLEG recommendations, which is, that the European Commission should introduce a much higher transparency in ESO activities. In practice, this means that the Commission should consequently define ways to strengthen the collaboration and the exchange of views with the facility operators, who are considered as partners and not just as the subject of inspections.*"

6 CONCLUSIONS AND CONCERNS

Finland has, in my opinion, taken appropriate legislative, regulatory and administrative measures to establish, implement and maintain a national physical protection regime applicable to nuclear facilities (and nuclear material) with the aim of:

- protecting nuclear facilities (and material) against sabotage and other unlawful actions and mitigating or minimizing the radiological consequences of such actions;
- ensuring that the responsibilities for implementing the various elements of physical protection within the country are clearly identified and the prime responsibility for the implementation of physical protection of nuclear facilities (and material) rests with the holders of the relevant licenses;

- establishing applicable physical protection requirements and means to enforce these requirements and conditions, including effective sanctions;
- including a system of evaluation, licensing and inspection of nuclear facilities (and transports) to grant authorization or verify compliance with applicable requirements and conditions of the license.

In addition, the physical protection regime is based on the current evaluation of the threat as described previously. The new reactor of TVO, the projected fifth NPP unit in Finland, is the first time that the present legislation, guidelines and administrative measures are applied to a full-scale plant project. How this challenge is managed remains to be seen!

One of the difficulties and concerns is that the physical protection arrangements should be well balanced and at the same time robust enough. As an example, a demonstration by some NGO (say Greenpeace as an example), known to be mostly peaceful, should probably not be handled in exactly the same way as the actions of violent extremist organisations. On the other hand, terrorists could very well put on Greenpeace overalls and take advantage of the possible subsequent confusion. Or if the terrorists are smart enough, they will obtain Euratom Inspector Cards (which are easy to falsify compared to any state passport) and subsequently have direct unrestricted entrance into the nuclear facility, if we adopt the previously described Euratom philosophy. It seems to me, that the European Commission is not too concerned about the terrorist threat.

Anyway, nuclear facilities of today cannot exist for long without a solid foundation based on sound safety principles, credible safeguards, and robust security arrangements.