13. Never Again

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Firstly, let me express my deepest sympathy to the Japanese people for all the suffering they had and still have to endure due to the consequences of the March 11 earthquake and the ensuing tsunami. Let me also express my admiration for all the brave and dedicated crews who have worked and still work so hard to manage an unforeseen and unprecedented situation at the Fukushima plant and its surroundings.

In April 1986, I served at the Swedish emergency management center when a radioactive cloud from Chernobyl deposited about as many terabequerels of iodine and cesium over Swedish soil as have been released at Fukushima, at the same time as we realized that the situation at the Chernobyl reactor was not under control for weeks. The radioactivity was spread out over much larger areas than at Fukushima so there was no need for evacuation of people, but strict food control programs had to be implemented. This experience has helped me when trying to understand at least to some extent the challenges you have to cope with in Japan. I have tried to follow developments at Fukushima from the first days, mainly via the TEPCO, NISA and NHK websites. I am impressed by the information you managed to provide in English, especially taking into account that so much instrumentation was destroyed and access to various parts of the plants was very limited.

So, how should we proceed with further improvement of nuclear safety, based on the lessons that so far have been learned from Fukushima? Already in late March, I became a member of an informal ad hoc group on the Internet of 17 “nuclear safety veterans” from 11 countries, mainly former and present members of IAEA INSAG. On May 31, our group published a statement entitled “NEVER AGAIN: Suggestions for Achieving the Essential Goal of Nuclear Safety”[1], which lists safety issues that the group believes need to be reassessed in each country with nuclear power plants without waiting for a full analysis of lessons learned from Fukushima. My following observations are largely based on that document.

Firstly, I believe that the events, features and processes taken into account in the design and the design objectives should be reassessed for both new and existing nuclear power plants, and the appropriate safety improvements implemented. The reassessments should include both of the following types of events:

- Events and conditions (internal and external) with which the plant shall be able to cope without significant radioactive releases and without irreparable damage, thus enabling return to power production in at most a year or two. Design objectives of these first level events include protection of the public and of the

national electricity supply.

- Events and conditions that will likely lead to more severe damage to parts of the plant, including the core, but with which the plant should be able to cope without requiring significant off-site emergency response, such as evacuation up to tens of km from the plant. The main design objectives of these second level events are protection of the public and the associated societal structure.

Secondly, I believe on-site accident management capabilities should be reassessed and strengthened at all plants. Such capabilities include specific plant design features as well as availability of appropriate mobile equipment for back-up of essential safety functions if needed, and last but not least staff who is well trained in applying appropriate accident management procedures.

Such reassessments of the capabilities to cope with also very unlikely accident conditions (known as "stress tests") are now well underway in the European Union and some other European countries. In Sweden, we anticipate that the severe accident management capabilities implemented at all Swedish plants in the 1980's (see fig 1) will contribute substantially towards a good "score" in these stress tests. Nevertheless I cannot at this point exclude that additional measures may be needed to ensure that these accident management capabilities will function also under much more severe conditions than originally envisaged.

Thirdly, I believe the international nuclear safety regime should be strengthened. Binding international safety standards should be considered. Such standards should include requirements that safety culture and safety management in industry as well as in government authorities are put under constant vigilance by means of rigorous audits, including international peer reviews. These audits and reviews should address the existence of a questioning attitude and a quest for excellence at least as much as formal compliance with existing national and international standards.

If all nuclear countries proceed along the route indicated here (and described more in detail in the statement of the ad hoc "veteran group" referred to above), I believe that nuclear technology can achieve the trust needed by politicians, investors and the general public so that nuclear power can continue to play an important role in many countries as a part of an energy supply mix that combines security of supply with minimal release of greenhouse gases.

In Sweden, it seems that the Fukushima accident has so far had limited impact on public opinion. In May 2011, an opinion poll showed that 79% supported continued operation of existing reactors, compared to 84% in August, 2010. As to decisions on replacement of existing Swedish reactors with new build, it seems that Swedish utilities will wait some time while assessing ongoing developments in the regional electricity market, including impact of new build underway in Finland and Russia. Moreover, I believe we need a much broader political agreement in the Swedish parliament on a stable, long term nuclear policy than seems possible at present. The frequent changes in policy over the past 30 years have no doubt made utilities and investors wary, when looking at the political risks associated with the very large and long term investments that new nuclear build requires.

(Note 1) The statement was transmitted to DG Amano at the IAEA on May 31, 2011. See cover letter

August 2011

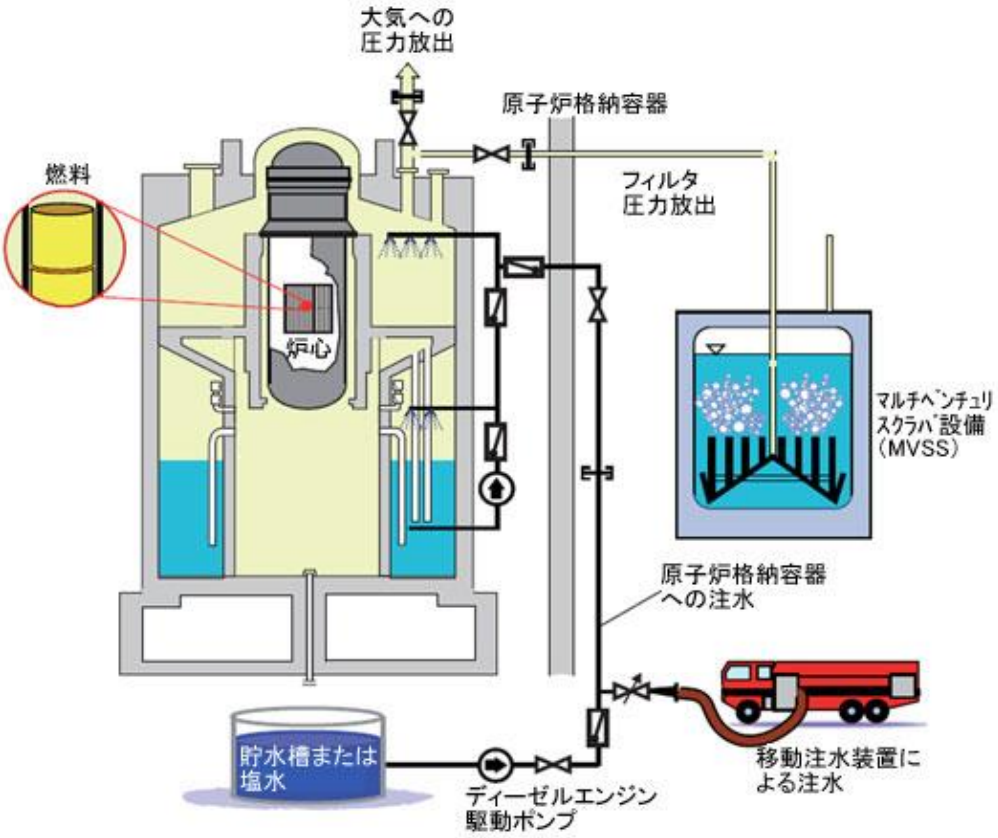

図 1　1980 年代にスウェーデン国内の全原子炉に導入されたシビアアクシデント・マネジメント

主な機能：
- LOCA 時に圧力抑制機能が故障した場合、急速に格納容器ベントを行い再閉止する機能（BWR のみ）
- 最終ヒートシンク長期喪失時の格納容器フィルタベント
- 炉心を超える水位まで格納容器に水を満たす可能性
- 可搬式の独立した電源系及び給水系

設計目標は、炉心溶融事故における環境へのセシウム放出を約 200 TBq 未満（及び長期的な土壌汚染を招くその他の放射性核種のこれに相当する量）に抑える。これにより多くの住民の避難や移転といった長期的な社会的影響を制限する。

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