

**Some answers to NRC questions on filtered
containment venting systems in Swiss NPPs**

(1) What are they and what experience had the Europeans had with them?

(1.a) due to decision of some European Safety Authorities (French, Swiss, German, Sweden and Finland) in 1980s all the power plants in these countries are equipped with containment venting filters from different European vendors. The installations took place in 1990s.

(1.a) due to some decisions (I do not know whether by regulators or voluntary) in some east European some VVERs have been also equipped. Recently we have heard that CANDU in Rumania will also be equipped with a venting filter system.

(2) Do they provide filtering and venting for all accidents, or just some?

To my knowledge and the way the requirement is defined in Swiss Safety Authority's venting requirement, there is no scenario defined for which the venting is or is not needed. Venting has to be done in order to avoid slow pressurization of the containment according to Swiss Safety Authority. The Swiss Authority's venting requirement is a public document and available in their Internet site.

(3) What kind of decontamination factors (DFs) (of releases) do they provide?

(3.a) the DFs: In Switzerland the current Regulatory requirement (the same as it is first issued and not revised considering the last about 20 years research results) asks for 100 for elemental iodine and 1000 for aerosols. I do not have the regulatory requirements in the other countries.

(3.b) the DFs offered by different containment venting filter systems. EPRI ACE Phase A tests conducted in 1990 provided some DFs for aerosols for the filter models provided by different vendors. Since the containment venting filter system from a Swiss company (SULZER, now owned by IMI-CCI) was not ready for testing we (PSI) conducted a thorough qualification program using the same test apparatus of ACE regarding aerosol generation and provided very high aerosol retention factors for many different conditions.

(3.c) if you are interested to have a comparison of DFs, operational limitations of all currently available commercial venting filter systems, etc. we need to discuss separately.

(4) Would releases that pass through a filtered vent results in minimal land contamination such that long term evacuation would not be necessary?

Answer is ideally yes, however, the DF is one decision point however, whether depending on how much amount of activity that the filter is receiving (elemental iodine, organic iodide, and aerosols, including non-active aerosols), whether the DF for each of the activity type the vendor is providing is sufficient to eliminate or limit the environmental consequences (dose and land contamination) is a different issue. If you need to dig into it we need to discuss separately since there are many other aspects of the venting filter systems, such as coping with multiple venting, revolatilization, resuspension, autonomous time frame not requiring operator intervention, medium and long term management of the

flb

accumulated activity, etc.

(5) What is estimate cost of a filtered vent (capital cost plus maintenance cost over the life of the equipment)?

I cannot give you a figure since different vendors ask for different prices that you never know the real value and what the scope of the delivery includes.

(6) How is land contamination costs are considered in regulatory analyses, and what cost-benefit analyses have been performed and conclusion reached?

As far as I know (I checked also with ENSI) there is no such an evaluation for the cost-effectiveness for decision making in Europe, as once done in US.

(7) What type of nuclear power plants have filtered vent implemented?

All PWRs and BWRs in Switzerland, France, Germany, Sweden and Finland, some VVERs in Europe are equipped. Now the Candu in Romania, many units in China and a CANDU (I think one unit) in Canada are in the process. I know that Japanese, Koreans, Belgians, and Spanish utilities are intensively working on the issue. I also know that there is a plan to replace the sand bed filters of all EdFs plants with filters which are also good for both main gaseous iodine species.