Implementation of filtered containment venting systems during a severe accident for Ukrainian NPP units with reactor facility V-320

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In accordance with a complex program to improve the safety of Ukrainian NPP units, a number of "Post-Fukushima" upgrades are being implemented. The upgrades were identified based on the results of "stress-tests" performed after the accident at the Fukushima nuclear power plant (Japan) and aimed at preventing or managing a severe accident.

One of the main modifications for all Ukrainian NPPs units with reactor facility V-320 is the realization of modernization "Implementation of filtered containment venting systems (FCVS)" in order to improve safety in the severe accidents management.

The implementation is carried out by the company Skoda JS a.s., together with the company Framatome GmbH, which is the developer of the wet filtration technology, and with the company ES Group Europe s.r.o., which develops technical documentation and the necessary calculation-analytical justifications.

As part of the implementation, design documentation and safety analyses report were developed, as well as calculation-analytical justifications of the introduced equipment adequacy and effectiveness. These justifications were agreed by the NPP operator and were reviewed by the Regulatory Body.

Main component of FCVS is Scrubber Venturi that represents the pressure vessel filled with a chemical solution in which Venturi nozzles and an aerosol filters are placed.

For Ukraine, a unique design of FCVS including Scrubber Venturi was designed. Since the installation of a Scrubber is planned in the reactor compartment building at level 29.4 m (the AB810 room) in which it is not possible to transport the one-piece Scrubber, a unique technology for assembling from small sections was developed. In this case, the Scrubber is assembled in two stages. First, the elements of the Scrubber are tightened with bolts, in the next stage, welding of the assembled structure is performed.

As a result, in the coming years all the Ukrainian NPPs with reactor facility V-320 will be equipped with a system that will preserve the integrity of the containment in the case of a severe accident and which will eliminate one more safety deficit.