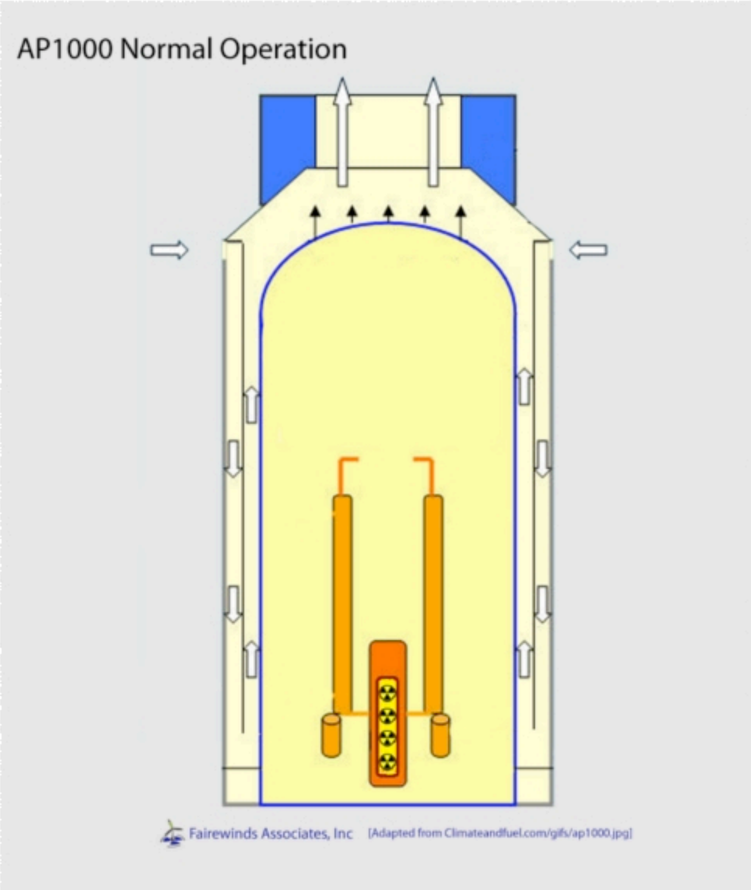
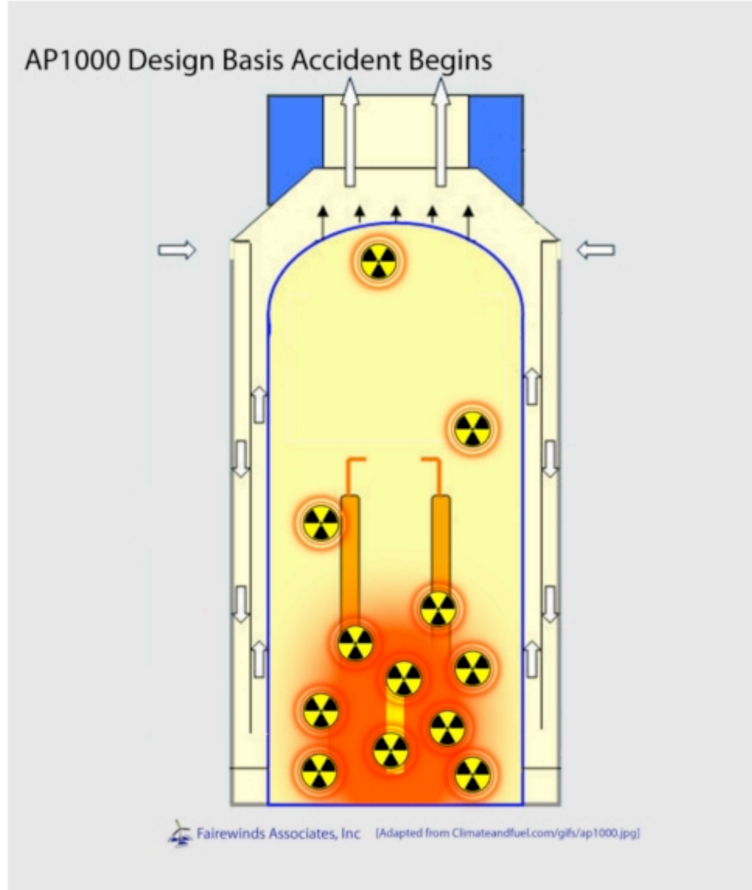
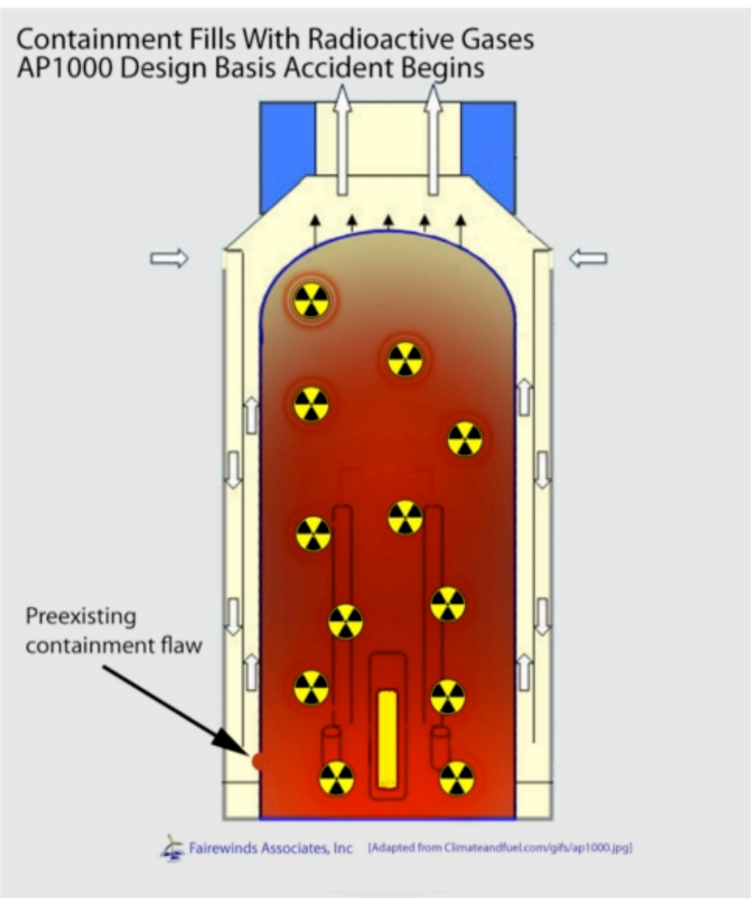
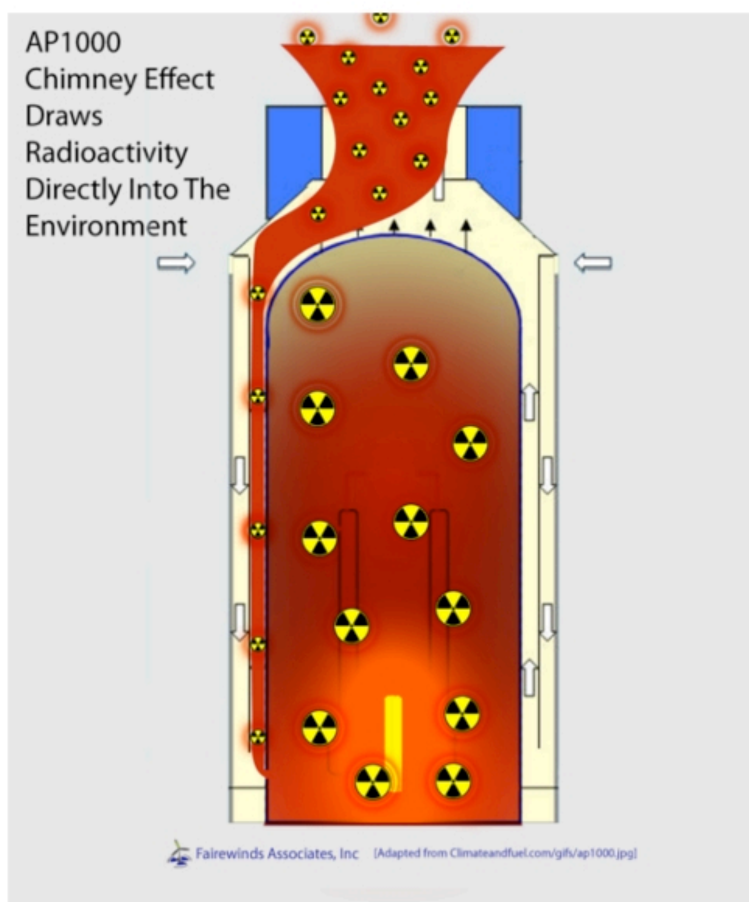

AP1000 Normal Operation
Fairewinds Associates, Inc
[Adapted from Climateandfuel.com/gifs/ap1000.jpg]


AP1000 Design Basis Accident Begins
Fairewinds Associates, Inc
[Adapted from Climateandfuel.com/gifs/ap1000.jpg]


Containment Fills With Radioactive Gases
AP1000 Design Basis Accident Begins
Preexisting
containment flaw
Fairewinds Associates, Inc
[Adapted from Climateandfuel.com/gifs/ap1000.jpg]


AP1000
Chimney Effect
Draws
Radioactivity
Directly Into The
Environment
Fairewinds Associates, Inc
[Adapted from Climateandfuel.com/gifs/ap1000.jpg]

AP1000 Press Conference Statement

Arnie Gundersen, Chief Engineer, Fairewinds Associates, Inc

I earned my BS and Master's degree in nuclear engineering cum laude from Rensselaer Polytechnic Institute. I was a licensed reactor operator and a Senior VP for a nuclear licensee; I also managed a non-destructive Inspection Division. I have worked at or provided services to more than 70-nuclear reactors around the country and in Europe. This is the third containment analysis and expert report I have submitted to the NRC. (MP3, BV, AP1000) Additionally, as an expert witness regarding the accident at Three Mile Island (TMI) nuclear plant, I have analyzed the containment response to containment pressure spikes during the TMI accident.

If you would image a nuclear reactor as a pressure cooker, then its containment would be the leak-tight building surrounding that pressure cooker. Containment systems are critically important because they are the last line of defense in an accident. Once the reactor's coolant system is breached, the containment barrier is the *only* thing stopping the release of radiation to the environment. Containment systems on current Pressurized Water Reactors are constructed of steel and concrete, and together form multiple barriers that work to limit radiation releases after an accident.

Research shows that there have been more than 80-documented problems with containment systems in the U.S. during the past 45-years. Four of these 80 cases have been through-wall rust holes that completely penetrated the steel containment liner. In 2009 alone, there were three significant containment problems on existing reactors.

1. <u>Beaver Valley</u>: A rust hole that completely penetrated through the steel containment liner was discovered by a visual inspection during Beaver Valley's April 2009 refueling outage.

2. Crystal River: While cutting a hole to install replacement components, contractors uncovered a 60-foot long crack called a delamination in the concrete containment.
3. Bellefonte: Post-tensioned containment tendons snapped, making a gun shot noise. This 35-year-old containment system is at a plant that has not yet been operated and also has not been inspected for containment integrity.
4. Additionally, there are numerous cases of containment leak-rate testing failures during outages. In plain English, this means that inspectors periodically pressure-test valves and the entire containment system during which time excess leakage of radioactivity has been measured.

In 2009, after it was made aware of the containment hole at Beaver Valley, the Nuclear Regulatory Commission's (NRC's) Advisory Committee on Reactor Safeguards (ACRS) acknowledged the magnitude of containment problems at existing reactors. Subsequently, the ACRS continues to ask the NRC staff serious questions about containment integrity. The steel containment systems on existing Pressurized Water Reactors (PWRs) are backed up by a secondary containment that are able to collect any radiation that may leak out. The ACRS has expressed concerns, and appears to be taking time to analyze the problem on operating reactors.

The Westinghouse AP1000 design is unlike any Pressurized Water Reactor design that has come before it. The steel containment in the AP1000 design has no backup secondary concrete containment behind it to capture post accident radiation that leaks out. Again, the problem with the AP1000 is that there is no backup system. Nuclear plants have been licensed under redundant safety features in order to protect public health and safety, and the containment redundancy is missing from the AP1000. It is therefore critically important that the ACRS immediately extend its concern over containment integrity to the proposed AP1000 projects before any Federal funding is approved for construction of these reactors.

The AP1000 design is entirely different than previous reactor designs. Immediately outside the AP1000 steel containment is the so-called "shield building" that is as yet unapproved by the NRC. The AP1000 shield building does not collect radiation and trap it as in existing designs. Rather, the AP1000 shield building has a hole in its roof allowing radiation to escape. The AP1000 design uses a chimney effect to draw up contaminated air that leaks out of the steel containment and releases it directly into the environment through the hole in the roof. Radiation that leaks from the steel containment is neither captured nor filtered.

This gap between the concrete "shield building" and the AP1000 steel containment allows for numerous locations where rust can develop on the steel containment. Moisture and corrosive agents can flourish in this gap outside the containment. Inspection of these inaccessible locations in the AP1000 is extraordinarily difficult to detect until the rust creates a hole completely through the steel. Due to the unique AP1000 design features, the likelihood of a hole caused by rust in the AP1000 containment is much greater than the rust holes that have already occurred in existing steel containment liners.

The net effect of these AP1000 design differences is that it is more likely that a rust hole will develop that is the size of the hole at Beaver Valley. If an accident occurs with a hole of this size, the radiation dose to the population could be ten times greater than the NRC allows. It would be impossible to evacuate people quickly enough for them to exceed NRC emergency dose restrictions.

There is a solution to this problem but the NRC has not required Westinghouse to implement it. Implementing this solution would increase Westinghouse's construction costs. To my knowledge, Westinghouse has not evaluated previous industry experience with holes in containments and assumes radiation breaching the containment is an extremely remote probability event. This is an erroneous conclusion given the fact that there have already been four holes in U.S. reactor containment systems. When Westinghouse applies these extraordinarily low likelihoods of failure, it attempts to show that the AP1000 does not need to filter post accident releases. My analysis and that of an

Italian nuclear engineering professor indicate that the AP1000 should be required to install filters in the roof-hole of its “shield building” in order to capture any gases that may leak out of the containment and through a rust hole similar to that at Beaver Valley. This step must be taken to protect public health and safety.

I therefore call on the ACRS and the NRC to review the AP1000 containment design in light of existing containment failures.

I also call on the NRC and ACRS to require that all AP1000 reactors install filters in the roof of the shield building in order to protect the public health and safety.

Finally, I call for a licensing slowdown and a delay in federal funding of the AP1000 design until these issues are completely addressed.

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