Epic Fail: Électricité de France and the "Evolutionary Power Reactor"

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Electricité de France (EdF), the French nationalized electricity utility, banked its nuclear future on the European Pressurized Reactor (EPR) design from Areva (also an almost entirely government-owned corporation.) But the promise for this most "revolutionary" generation III+ reactor has instead disintegrated into an epic tale of failure.

The EPR -- known in the U.S. as the "Evolutionary Power Reactor" -- was touted as the newest, most improved reactor design. Areva claimed the EPR would be "a reactor with an unparalleled level of security, extremely resistant to both internal and external risks."

A total of seven EPR units were originally slated to be built in the U.S at: Bruneau, Idaho; Calvert Cliffs, Maryland; Nine Mile Point, New York; Callaway, Missouri; Bell Bend, Pennsylvania; and Victoria Co., Texas (2 units.) See the Beyond Nuclear booklet -- *STOP EPR.* Four more were slated for the Darlington site in Ontario, Canada but none are moving forward today. The end of EdF's North American misadventure came in October 2010 when EdF's American partner, Constellation Energy, pulled out of the EPR "reference" reactor project at the Calvert Cliffs, Maryland site. Faced with no U.S. partners, EdF could no longer comply with the Atomic Energy Act that forbids sole foreign ownership, although this may yet be undermined by efforts of the Nuclear Regulatory Commission to undo it -- a move that could gain support in the Republican majority House and Senate.

Today, there are precisely zero EPR reactors under construction in the U.S. The "flagship" EPR in Flamanville, France, and its evil twin at Olkiluoto in Finland, are mired in massive cost over-runs, long delays, and litigious squabbles among the various partners.

The two-unit EPR project slated for the U.K. at the notorious and embattled Hinkley C site in Somerset, has been challenged in court by Austria as illegal due the Cameron government's decision to lavish massive subsidies on the project that would fill the EdF coffers while fleecing the British public. In the deal struck with the U.K. government, EdF is due to get £92.50 ($139) per megawatt hour for 35 years, double the current rate for electricity.

As in the U.S., EdF lost its Hinkley U.K. partner, Centrica, early on, and is now relying on foreign investors, mainly from China. EdF was hoping to finalize its U.K. deal in March, but the U.K.'s parliamentary watchdog has predicted that state support would not be finalized before the May general election. Consequently, the watchdog has abandoned plans to scrutinize the deal before then. The current price tag for Hinkley C is $36 billion.

In France, the Institute for Radiological Protection and Nuclear Safety (L'Institut de Radioprotection et de Sûreté Nucléaire, abbreviated as IRSN), a far from radical authority, has called out a number of safety flaws in the EPR. These deficiencies, says the IRSN, make the EPR actually less safe than the already dangerous traditional reactors currently in operation. (A detailed analysis of this can be found on the website of *Le Journal de l'Énergie.*

The once heavily touted EPR may never become anything more than a concrete white elephant. (Photo: Flamanville site in 2014.)

The Flamanville project began in December 2007 before any safety reports on the EPR had been made public. Setbacks on the construction site began early on with faulty concrete pours and problems with rebar. The reactor is already four years beyond its originally predicted completion date and its cost has ballooned to at least $12 billion. A French parliamentary report noted that it was very difficult to predict the true costs of electricity production at so-called third generation reactors such as the EPR at Flamanville and that these had likely been under-estimated from the start.

The EPR at Olkiluoto, which began construction in August 2005, has suffered similar delays, quality control problems and is at least nine years behind schedule and 280% over budget (close to $12 billion.) Siemens, originally a 34% partner, pulled out of the project in 2009 (and out of the nuclear business altogether) and the Finnish utility TVO has been at loggerheads, and is in litigation, with Areva.

All of this has contributed to increasing debt burdens and financial chaos for both EdF and Areva. According to the 2014 *World Nuclear Industry Status Report* (pg. 125) EdF ended 2013 with a $49 billion debt. Likewise, Areva filed losses at the end of 2013 to the tune of $683 million. Areva still maintains a BBB- rating from Standard & Poors.

The EPR clings on in China where two units are under construction, but safety margins and oversight there are shaved to a bare minimum. In reality, the bold predictions for the EPR revolution have faded into virtual oblivion as EdF and Areva continue to lose bids to other unproven, risky designs. It appears that the tale of the EPR was full of sound and fury, but signifying nothing.

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