

"Phénix" means "phoenix". The phoenix: a mythical bird which, being the only one of its kind, was unable to breed. After living for hundreds of years, it would burn itself on a pyre, then to be reborn from its own ashes. This was the name given, by analogy, to the nuclear power plant whose story is told in this book: a reactor capable of producing energy anew from by-products of the burn-up of its own core.

That was the practical aim of the reactor's designers and those who put France (and more specifically its atomic energy commission Commissariat à l'Énergie Atomique and its national electricity utility Électricité de France) on the road to fast neutron reactors. In 1974, on the symbolic date of 14 July (Bastille day), its design and construction phases completed, the Phénix power plant went into power operation.

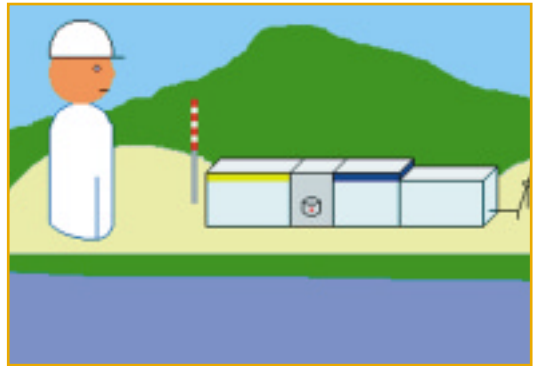
In this book we look back over the thirty years that have passed since then, to consider the history of the plant and the contribution it has made. Because often the past fades as it recedes in time and important facts are overshadowed by more recent events. Furthermore, objectives and working methods have changed in thirty years.

"*The past is always golden!*" Perhaps, but although the Phénix plant's results were often better than its designers had hoped, it sometimes took considerable effort to achieve that. On the other hand, if one only remembers the trials and tribulations, one forgets how innovative solutions were deployed to overcome them. For a balanced assessment we need to look at the whole story, moments of elation and times of trouble alike.

Highly motivated men and women succeeded in tackling each successive challenge. Of those who started up the Phénix plant, there

are few who have not yet reached retirement age. Some, alas, have already passed away. Writing this book involved assembling the available written information and profiting from the memories of those involved. This assessment is also a way of paying homage to all those who have put their hearts and their energies into the tremendous human adventure of running a power plant that is, in many respects, unique.

The story of the Phénix plant is essentially a scientific and technological tale, even if humans – the people who ran it – are ever-present. To tell that story, therefore, we have divided it into **seven periods** of five to six years, each centred on a specific issue. The little man and his power plant on the drawing below will be with us all the way through.



- From 1968 to 1974, once France had opted for fast neutron reactors and the main options of the project were decided on, construction of the plant and the commissioning tests ran smoothly,
- From 1974 to 1980 were the first years in power production. The project's characteristics were verified in practical terms, its limits began to be extended, the first major incidents on the intermediate heat exchangers were overcome.



- From 1980 to 1986, after repair of the steam generators where sodium-water reaction had occurred, the prosperous phase continued: the reactor gave complete satisfaction and the records were beaten.
- From 1986 to 1992, all continued as well as before, but there were warning signs of the trouble to come, both in the Phénix plant and in other facilities.
- From 1992 to 1998, safety upgrading studies were in the news. Plant operation varied in inverse proportion to the scale of the studies.
- From 1998 to 2003, production was out of the question: it was time for a thorough renovation of the entire facility.
- From 2003, when power operation was restored, preparations began for the end of the power plant's life: the last irradiations and the final dismantling.

To avoid weighing down the main text of the book, the **technical explanations** regarding the Phénix plant's design and operation have been put together at the end, in a descriptive appendix and a glossary of abbreviations and technical terms specific to the power plant. More detailed information can be found in documents and conference proceedings, of which there is a partial list at the end of the book.

The author had free rein in writing the book; despite the great care taken by those who kindly agreed to read the manuscript, the author assumes full responsibility for the content and any errors or omissions the book may contain.



INTRODUCTION



