= Three Mile Island : A Nuclear Crisis in Historical Perspective =

Three Mile Island : A Nuclear Crisis in Historical Perspective is a scholarly history of the Three Mile Island accident , written by J. Samuel Walker and published in 2004 . Walker is the Nuclear Regulatory Commission 's historian and his book is the first detailed historical analysis since the accident .

The 1979 accident at Three Mile Island Nuclear Power Station in Pennsylvania was " the single most important event in the fifty @-@ year history of nuclear power regulation in the United States " , according to Walker . Many commentators have seen the event as a turning point for the nuclear power industry in the United States .

= = Author = =

Three Mile Island is J. Samuel Walker 's fourth book as the official historian of the U.S. Nuclear Regulatory Commission (NRC) . In the book 's preface , Walker tells readers that he had complete independence in its authorship ? that the NRC placed no restrictions on what could be said . However , Walker provides an historical account and does not assess the performance of the NRC .

= = Background and introduction = =

The Three Mile Island power station is near Harrisburg , Pennsylvania in the United States . The accident described in Three Mile Island began on Wednesday , March 28 , 1979 , and ultimately resulted in a partial core meltdown in Unit 2 of the nuclear power plant . Unit 2 's pressurized water reactor was of 900 MWe capacity . The scope and complexity of this reactor accident became clear over the course of five days , as a number of agencies at the local , state and federal levels tried to solve the problem and decide whether the ongoing accident required an emergency evacuation , and to what extent .

Walker 's objective in Three Mile Island was to write a comprehensive and authoritative history that would serve as an authoritative record for both the interested public and the NRC . The book provides a detailed account of the causes of the accident and the response to it by the NRC , the state of Pennsylvania , and the White House .

The early chapters of Three Mile Island provide historical background for the accident , giving a short overview of the expansion of commercial nuclear power , supported by government , in the 1960s and 1970s . The emerging controversy during that period over nuclear power safety is also examined . The public were concerned about the risk of nuclear accidents and about routine low @-@ level releases of radioactivity .

= = Analysis = =

The main part of the book consists of six chapters , with a chapter covering each of the five days (Wednesday , March 28 , 1979 , to Sunday , April 1 , 1979) of the crisis stage of the accident and another chapter covering its immediate effects . Walker draws on a wide range of sources , but mainly on the report of the Kemeny Commission , which President Carter appointed immediately after the accident , and the Rogovin Report , which resulted from the NRC 's own inquiry .

The chain of events that led to the crisis at the TMI plant included several minor equipment failures that operator errors drastically compounded , resulting in a major accident . The Three Mile Island accident is largely seen as a failure of crisis management . According to one reviewer of the book :

Reactor operators were not trained to deal with accident conditions , and the NRC had not established effective communication with utilities . Moreover , once the accident occurred , the lines of authority proved to be ill defined . The public received conflicting reports that caused needless panic and evacuations . It was these systemic weaknesses in the regulatory system that allowed gifted people to make the mistakes they did .

Large portions of the TMI @-@ 2 reactor core melted , though the fact that a meltdown had

occurred was not established until 1985 . The greatest concern during the TMI accident was a hydrogen bubble in the top of the pressure vessel which held the core :

Although opinions differed , some reactor experts feared that over time the hydrogen bubble might become flammable or , less likely , explosive by combining with free oxygen in the vessel . If the bubble burned or exploded , it could rupture the pressure vessel and force the damaged reactor core into the containment building . The loss of the vessel would not make a breach of containment inevitable , but it would increase the risk of a disastrous release of radioactivity .

In the end , the Three Mile Island accident , though it " caused a grave crisis , did not produce a public health disaster " . The pressure vessel held when faced with a core meltdown and there was no breach of the power plant 's containment structure . Only " tiny amounts of the most dangerous forms of volatile radiation escaped to the atmosphere " . It took 11 years to clean up TMI @-@ 2 and this cost about US $ 1 billion .

Walker suggests that the TMI accident incited widespread criticism of nuclear power technology , the nuclear industry , and the NRC . Critics faulted the industry and the NRC for their poor performance both before and after the accident . The international attention garnered by the crisis redoubled the determination of , and enhanced the credibility of , the anti @-@ nuclear movement . Arguably , the United States nuclear industry has never recovered .

Walker reports that " studies looking for long @-@ term radiation effects resulting from the accident have reached conflicting conclusions " , but it seems " that any increase in cancers is slight enough to have occurred by chance " .

= = Conclusions = =

Walker concludes that the TMI @-@ 2 accident left a mixed legacy . It did force regulatory and operational improvements on a reluctant industry , but it also increased opposition to nuclear power . In Walker 's analysis , neither the critics nor proponents are completely vindicated . Anti @-@ nuclear advocates were right : a nuclear accident was likely , and the industry was not prepared for it . But their predicted worst @-@ case accident , called the " China Syndrome " , did not eventuate . For its part , the industry said that it had reformed itself , but perhaps by then few were listening .

= = Reception = =

There have been several published reviews of Three Mile Island . John F. Barber from The University of Texas states that Walker 's insightful book captures the " high human drama surrounding the TMI accident " , sets it in the context of the contentious debate over nuclear power in the seventies , and discusses the social , technical , and political issues it raised . Walker 's authoritative account of the days and events surrounding the TMI accident captures the complexities of the situation , clears up some misconceptions , and discusses the aftermath and implications . According to Barber , Walker provides " thoughtful and sober grounds for the continued debate over the role of nuclear power in our contemporary world " .

In a review for Times Higher Education , Jack Harris says that Walker is an extremely good writer and even those who do not specialise in technical fields will derive enjoyment from the book . According to Harris , Walker has unique experience as historian to the NRC which has placed him in an unrivalled position to tell the TMI story . But Harris identifies some omissions in the book . There is little on the other two major nuclear that threatened large civilian populations : the Windscale fire (UK , October 1957) , and the Chernobyl disaster (Ukraine , April 1986) . Harris states that Windscale threw up similar problems to TMI , particularly relating to whether large @-@ scale evacuations should have been initiated , but he could find no reference to the Windscale accident in the book 's index which is surprising in a book that aims to put TMI in historical perspective .

In a review for New Scientist , Rob Edwards states that Walker provides a lucid account of the Three Mile Island accident , which is " riveting because of its detail " . It gives a graphic insight into the chaos and confusion of the five @-@ day crisis , and shows how the nuclear industry , the regulators and the government all " initially played down the risks , then had to eat their words " .

Some 144 @,@ 000 people were evacuated , but Walker points out that " if the full extent of the core meltdown had been known at the time , hundreds of thousands more would have been told to go " . Edwards says a " catastrophe was avoided ? but only by luck " .

Thomas Wellock from Central Washington University recommended the book " for all libraries and students of politics , government bureaucracy , and environmental history " .

Bernard L. Cohen , from the University of Pittsburgh , criticized the book in terms of the scope and quality of its technical content : " The book contains little technical information , and many of the technical explanations that do appear range from inadequate to misleading to incorrect . "