

## **ANALYTICAL STUDY OF ARCHITECTURAL DESIGN FOR NUCLEAR POWER PLANTS**

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### **Abstract**

This paper aims to study the architectural design and components of nuclear power plants (NPPs). Its main objective is to set general guidelines for architects who will design these plants. They should be aware of the basics of nuclear facilities designs and components. An onshore nuclear power plant consists of a nuclear reactor, a control building, a turbines building, cooling towers, service buildings (an office building & a medical research center) and a nuclear & radiation waste storage building. The paper is also focusing on the simulation system (simulator). It aims to study the architectural principles and standards used in designing and planning of onshore nuclear power plants. In drawing up a master plan of an onshore nuclear power plant, the methods used in town planning should be used. These methods are centralized, linear, radial, clustered and grid. This paper aims also to study the special features of the master plan of an onshore nuclear power plant. The buildings in an onshore nuclear power plant should be segregated according to the levels of radioactivity in each one of them. There are cold areas, warm areas and hot areas. Furthermore, this paper aims to study the recent design concepts of offshore (ocean) nuclear power plants to help the engineers from different departments who will design these plants. The development of design concepts of offshore nuclear power plants have continued due to initiatives taking place in France, United States, Russia, and South Korea. Submerged - Type Offshore NPP designed by a research group in France and Gravity Based Structure (GBS) - Type Offshore NPP designed by a research group in South Korea have been studied. In addition, Floating (Spar Type) Offshore NPP designed by a research group in United States of America and Russias first Floating Offshore NPP (Akademik Lomonosov) utilizing the (PWR) technology have been studied. At the end of this paper, conclusions and recommendations on the architectural aspects of nuclear power plants are revealed. This paper is important as it reveals the need to study nuclear facilities and give recommendations to the architects on how to deal with these vital facilities that have an increasing demand on the international, regional and national levels.