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PRESENT AND FUTURE OF CHINA ON ESTABLISHING SPACE NPS SAFETY MECHANISM

Abstract

With the development of deep space exploration in China, the application of space Nuclear Power Source (NPS) is becoming increasingly intense when solar energy can not meet the mission requirements. Establishing a comprehensive and efficient safety mechanism is an essential means to ensure the safety of the whole NPS application process. The Safety Framework for Nuclear Power Source Applications in Outer Space (Safety Framework) was jointly developed by UNCOPUOS and IAEA, providing safety and technical guidelines for all countries. Countries can flexibly adjust the Framework according to their situation to adapt to the institutional structure of their space NPS applications. According to the practical application needs of space NPS, the US has developed and implemented its domestic safety mechanisms. The comprehensive safety mechanism for space NPS applications in the US is strictly consistent with the Safety Framework, and its relevant national laws are consistent with the three categories of the guidance contained in the Framework, namely, the guidance of the Government, Management and Technology. China's space NPS application is in its infancy. Although China has tried to implement the relevant suggestions of the Safety Framework in China's Chang'E-3 and -4 moon missions, there is still no long-term national space NPS safety mechanism. Based on the Safety Framework and the experience of the US, considering the safety practice of space NPS in China, this article puts forward several suggestions for further improving China's comprehensive space NPS safety management mechanism: (1) establish or improve the national laws and regulations system to ensure that all responsibilities and procedures for the safety of space NPS applications are effectively fulfilled; (2) establish or improve the safety mechanism of space NPS applications at the government level, to ensure the whole elements and process of space NPS applications safety; (3) strengthen the safety technology reserve of space NPS applications, so that relevant departments have and maintain the technical capacity of safety application. In the context of the drafting of China's national space law, decision-makers of space NPS application should draw on the international rules such as the Safety Framework and the safety management mechanism of space NPS in major space countries, and formulate the safety management mechanism applicable to China's space NPS application, which will be conducive to the early realization of China's space NPS application safety system and meticulous management to ensure the smooth implementation of the space exploration mission.