

A Discussion on How to Ensure Long-period Operation for RFCCUs

Cai Kaipeng

(SINOPEC Jingmen Company, Jingmen Hubei 448039)

[Abstract] RFCCUs are currently the main units for secondary processing of crude oil in China. As the crude oil processed by RFCCUs is increasingly heavy and low quality, refiners are facing tougher challenges to maintain long-period operation of RFCCUs. The average length of period of operation of RFCCUs in China is about three years, considerably lower than that of units of the same type in developed countries (for example, the RFCCUs of Exxon's refineries and Phibro's Houston refinery can generally run four to five years in a row). Unscheduled downtimes caused by various factors happen in domestic units from time to time. According to Sinopec's 2008 statistics of unscheduled downtimes in RFCCUs, breakdown of static and dynamic equipment is the No.1 factor leading to unscheduled downtimes, followed by corrosion, coke and scale deposition and misoperation, and malfunctions of public utilities, instruments and electrical appliances. Sinopec Jingmen Company has two RFCCUs and has made important progress in ensuring the long-period operation of these units. In the last two production cycles, the 0.8Mt/a DCC RFCCU operated 1118 days and 1339 days in a row respectively and the 1.2Mt/a RFCCU operated 970 days and 1072 days in a row respectively. This article reviews the company's experience on ensuring long-period operation of RFCCUs and concludes that reliable equipment protection, rigorous process management, good mechanical and electrical equipment maintenance, stable public utility system, solid operator training, safety-centered philosophy and excellence of technological innovation are the foundation and guarantee for ensuring long-period operation of RFCCUs.

[Keywords] RFCC; unscheduled downtime; long-period unit operation; discussion on experience

· 能源链接 ·

世界核电发展历程

世界核电发展历程大致可分为以下四个阶段:

①实验示范阶段(1954~1965年)。1954~1965年,世界共有38个机组投入运行,属于早期原型反应堆,即“第一代”核电站。期间,1954年前苏联建成世界上第一座核电站——5MW实验性石墨沸水堆;1956年英国建成45MW原型天然铀石墨气冷堆核电站;1957年美国建成60MW原型压水堆核电站;1962年法国建成60MW天然铀石墨气冷堆;1962年加拿大建成25MW天然铀重水堆核电站。②高速发展阶段(1966~1980年)。1966~1980年,世界共有242个机组投入运行,属于“第二代”核电站。由于石油危机的影响以及被看好的核电经济性,核电得以高速发展。期间,美国成批建造了500~1100MW的压水堆、沸水堆,并出口其他国家;前苏联建造了1000MW石墨堆和440MW、1000MW VVER型压水堆;日本、法国引进、消化了美国的压水堆、沸水堆技术;法国核电发电量增加了20.4倍,比例从3.7%增加到40%以上;日本核电发电量增加了21.8倍,比例从1.3%增加到20%。③减缓发展阶段(1981~2000年)。1981~2000年,由于1979年美国三里岛以及1986年前苏联切尔诺贝利核事故的发生,直接导致了世界核电的停滞,人们开始重新评估核电的安全性和经济性,为保证核电站的安全,世界各国采取了增加更多安全设施、更严的审批制度等。④开始复苏阶段(21世纪以来)。21世纪以来,随着世界经济的复苏,以及越来越严重的能源、环境危机,促使核电作为清洁能源的优势又重新显现,同时经过多年的技术发展,核电的安全可靠性进一步提高,世界核电的发展开始进入复苏期,世界各国都制定了积极的核电发展规划。美国、欧洲、日本开发的先进轻水堆核电站,即“第三代”核电站取得重大进展。

(供稿 舟丹)