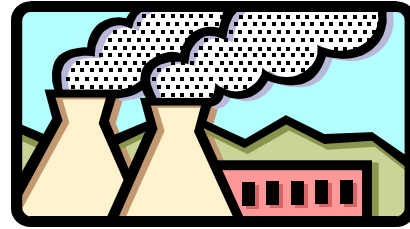# EXSYS Case Study

Nuclear Power Station System for Emergency Management

Hong Kong

A knowledge automation system was built with EXSYS based on the Daya Bay Contingency Plan in Hong Kong. Decision-making is often a challenging job for disaster managers as they often need to make quick and high quality decisions under stress based on scratch, inadequate, unstructured information. The seriousness of consequences in the event of an accident at the Guangdong Nuclear Power Station resulting in the release of radioactive materials, prompted expert disaster managers to develop a knowledge automation system using EXSYS software. Even though they have a comprehensive contingency plan with detailed rules and procedures in hardcopy format and human experts, it is difficult and time-consuming for disaster managers to retrieve, study and organize such information and expert knowledge to cope with real emergencies under great pressure. The development of the DBCP Advisor ensures that proper and prompt actions are taken if an accident should occur to protect the health and safety of the general public.

The system is divided into two parts – the activation and action checklist, and recommended countermeasures. The system guides managers through stipulated procedures according to 6 different sources of notification. After confirming the notification message, the system will guide the disaster managers to clarify the emergency level of the accident in order to determine the activation level. Classification levels include: emergency standby, plant emergency, site emergency, and off-site emergency. Based on this information the system determines the final activation level and provides an action checklist.

The knowledge automation system also advises disaster managers of appropriate counter-measures to be taken during different levels of emergency. Several initial and radiological risk factors are taken into consideration including meteorological - plume track location and arrival time; and plant status – defence-in-depth degradation.

The user interface is a simple multiple-choice selection, which derives the activation level and corresponding action checklist. The "recommended counter-measures" part of the system gets information on relevant parameters to derive the Total Risk Level by calling from external databases in relevant government departments.

The DBCP Advisor was tested by Emergency Support Units of the Security Bureau. They concluded that the Advisor's recommendations were very close to those given by human experts. A user survey also determined the system to be well received in its usefulness, logic, design and user-friendliness.