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## **RADIATION PROTECTION ORGANIZATION IN GUANGDONG NUCLEAR POWER STATION (GNPS)**

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### **1. INTRODUCTION**

Comparable achievements in radiation protection have been reached through different way of management were selected by different countries or companies, among them, the way of "Electricite De France (EDF)" is quite characteristic, which is:

- Radiation protection is the common responsibility of all workers working in nuclear power plants. Each worker is responsible for his own radiation safety and he must ensure that his activities do not affect the safety of others.
- Different level of managers are responsible for the radiation protection organization and management of their services especially observance of radiation protection regulations.

This way of management works well in French nuclear power plants mainly because of:

- The experience of French workers for working in radiation conditions and their high radiation safety consciousness.
- The technical support and service from EDF technical support centers and from French manufacturers.
- The advanced monitoring and surveillance equipment.
- High level of plant management and radiation safety commitment from the managers.

The French way has been adopted by Guang Dong Nuclear Power Station (GNPS) but there are some differences in the organization as practical conditions in GNPS are considered.

### **2. GENERAL DESCRIPTION OF GNPS RADIATION PROTECTION ORGANIZATION**

Under the overall management of the plant manager, the safety and health manager manages nuclear safety, licensing and health physics branches. A Radiation Protection Section has been set up in the Health physics branch with 24 staffs. (Appendix)

To ensure ALARA of radiation protection, a commission is going to be set up under plant nuclear safety committee for work coordination, ALARA planning, achievement reviewing and experience feedback of critical plant activities, people from management, operation, maintenance, Health physics etc shall be included.

Radiation safety can only be ensured by self-disciplining and cooperation of all the staff and services in GNPS. No matter what his position is, each staff working in GNPS site must be appropriately trained and authorized in radiation protection to fulfil the responsibilities assigned to him, to protect himself and to ensure his activities do not affect the safety of others.

Each maintenance work inside controlled area in GNPS is initiated by a "work request", the work shall be performed in 3 phases: preparation, blocking and implementation. In the preparation phase, work preparation staff are not only responsible for technical but also for radiation protection

preparation. Radiation protection measures are a chapter of each maintenance procedure, radiation protection is a part of the overall work preparation but not a attachment. With support and advices provided by radiation protection staff, radiation and contamination risks, reference levels and radiation protection measures shall be defined in this phase, a "Work order" shall be issued with all the technical, safety and radiation protection instructions, a "Blocking permit" shall be initiated if necessary. Then the related system shall be blocked by blocking manager according to the "Blocking permit" and taking into account of operation and maintenance conditions to prevent contamination from spreading and to limit dose rate. In the implementation phase, according to the "Work order", a work site shall be set up. For each worksite, a work supervisor shall be specially designated who shall be in charges of not only technical implementation but also radiation protection of the worksite. He is responsible for decision making in emergency situation, ensuring appropriate protection to be taken, reference levels and radiation protection regulations to be respected, radioactive material generated in the worksite to be properly packaged and lagged and no contamination on his worksite after work completion. He may request support and advice from radiation protection staff at anytime when necessary.

Radiation protection staff do not take over the radiation protection responsibilities from the scope of worker's and supervisor's, but they shall be actively involved in site radiation protection activities and work mainly in the following areas:

- Establishing radiation protection rules and regulations to be followed in the plant, patrolling on site to supervise if the rules and regulations have been followed or not and taking corrective actions when necessary;
- Providing advice and technical support to other services concerning radiation protection in the whole process from procedure writing, work planning, work implementation and experience feedback;
- Providing training, refresh training and making examination to the staffs;
- Performing individual dose monitoring and management, making periodic analysis and assessment of individual dose status of the plant, performing periodic radiation and contamination monitoring of the site, demarcating the site accordingly and renewing the radiation warning signs;
- Radiation monitoring for radioactive material transport to make sure related regulations to be followed;
- "Radiation work permit" (RWP) management;
- Performing investigation, analysis and experience feedback to radiation accidents or incidents;
- Overall management of all the sealed sources in the plant;
- Specific radiation protection material defining and quality control;
- Radiation monitoring device management, periodic test and calibration, maintenance of the portable part;
- Organizing radiation safety propagation activities by different ways;
- Writing radiation protection assessment report periodically to managers and authorities.

### 3. SPECIAL MEASURES HAVING BEEN TAKEN IN GNPS

Considering the practical condition, the following measures have been taken in GNPS to ensure radiation safety, which are:

#### 3.1 Full scope management by procedures and quality assurance

Procedures have been written concerning each aspect of radiation protection. There are administrative procedures (AD) to define the task sharing, scope of responsibilities of different services and to define the basic radiation protection rules to be followed; there are implementation procedure(IP) to interpret

the basic rules defined in the AD procedures and to implement them in specific activities; for each radiation monitoring device, there are procedures of technical specification, periodic test and calibration; for each radiation protection activity, there is procedure to define the way to be followed and abnormality treatment guidance. All these procedures shall be timely updated and followed in practical work.

For main radiation protection activities, quality assurance has been taken into account, procedures have been written and appropriate measures have been taken.

### **3.2 Reinforced radiation protection training and authorization**

As most of the workers working in DaYa Bay nuclear power plant do not have radiation protection experience, a reinforced radiation protection training programme has been carried out.

Radiation protection training has 2 levels: RP1 and RP2. RP1 is for staffs, after the training they are expected to be capable of self protection; RP2 is for work supervisors, as work group leaders, they are expected to be able to protect not only themselves but also their costaffs. RP1 training takes 5 days and RP2 training takes another 5 days after passing RP1 training, corresponding level of authorization shall be granted by the plant manager after the staffs passed the examination. Refresh training is organized once 2 years, staffs are reauthorized after having attended and passed the refresh course.

Only people authorized in radiation protection are allowed to work in controlled area which is controlled by " Controlled Area Access pass"

### **3.3 Setting up radiation protection operation and technical support team**

A operation team has been set up in the Radiation Protection Section aiming to solve problems instantly on site. They work on shift in controlled area mainly to provide advice and support to operation and maintenance staff, to supervise the observance of radiation protection regulations, to perform radiation and contamination survey, to monitor radioactive material packaging and transport, to check and sign "Radiation work permit", to follow the implementation of ALARA working plan, to have immediate treatment of radiation incident or accident and to follow the status of fixed radiation monitoring systems etc.

GNPS is a isolated nuclear power plant, the technical support and service it can get is very limited compared with that of French nuclear power plants. As a result , a technical support team has been set up in the radiation protection section. The team is mainly responsible for: worker's internal and external dose monitoring, analysis, assessment and management; radiation monitoring device management, renewing, periodic test and calibration; specific radiation protection material defining and quality control; portable radiation monitoring device maintenance; plant sealed radioactive source management etc.

## **4. PRESENT STATUS**

Before unit I criticality, all the concerned radiation protection procedures had been issued; about 1500 GNPS and contractor staffs had passed RP1 or RP2 training and been authorized; all the concerned fixed radiation monitoring systems had been put into service; all the portable radiation monitoring devices had been calibrated; the electronic dosimetry system, the thermoluminescent dosimetry (TLD) system, the whole body counting system and the individual dosimetry file had been available; different kinds of specific radiation protection materials had been put into place; all the radiation protection staff had been trained and authorized , the operation and technical support team had been in service. We are confident that good radiation protection result shall be achieved in the future in GNPS.

APPENDIX

