ASSESSMENT OF QUALIFICATION OF RSG-GAS REACTOR OPERATOR IN INDONESIA

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Abstract
The reactor operator and supervisor who operate the reactors have important tasks to ensure the safe operation of the facilities. For that reason, personnel who are in charge to operate the reactors, both operators and supervisors, shall possess working license issued by Bapeten according to the Act No. 10/1997.

To implement the Act No. 10/1997 especially relating to the personnel who operates a nuclear reactor in Indonesia, Bapeten has enacted the guidance which is required by operator/supervisor to fulfill the requirements obtaining license to nuclear installation and ionization radiation utilization installation, such as Government Regulation No. 64/2000 and Decree of Bapeten Chairman No. 17/1999.

In this paper, the objective of the assessment of the operators and supervisors of RSG-GAS Reactor is performed to identify that operating organizations (in that case, for Center for Multi Purpose Reactor, the operating organization has managed the RSG-GAS Reactor) has implemented the Bapeten provisions and requirements. This paper describes the qualification for operators and supervisors of RSG-GAS Reactor and the assessment of the operators and supervisors of RSG-GAS Reactor.

1. INTRODUCTION

Indonesia has three research reactors i.e. RSG-GAS Reactor at Serpong, TRIGA 2000 Reactor at Bandung and Kartini Reactor at Yogyakarta. For operating nuclear reactor, it is needed some reactor personnel. Nuclear installation operating organizations shall ensure that the designated reactor personnel fulfilling the requirements to operate nuclear reactor according to the Act No. 10 Year 1997 Article 19 clause (1). It stated that any employee who operates a nuclear reactor and other nuclear installation and in the installations that use ionizing radiation sources shall possess a license.[1].

2. REGULATION

The training, qualification and working license are based on the following regulations:
- The Act No. 10 year 1997 on Nuclear Energy
- Government Regulation No. 64 Year 2000 on Licensing of Nuclear Energy Utilization
According to Chapter 3 of Government Regulation No. 64 Year 2000, the operating organization shall have qualified personnel for nuclear energy utilization [2], and the personnel operating or control the reactor operation or personnel related to safety shall obtain working license issued Bapeten before the personnel performs the duty. [2, 3, 4].

In Decree of Bapeten Chairman No.06 /Ka-BAPETEN/V-99 Article 10 is governed that [4]:

1. The expert and the personnel who act as a nuclear reactor operator shall have a working license from Bapeten.
2. The working license is issued by Bapeten after the personnel has passed the exam.
3. The working license is issued for some period and to be renewed.

According to Decree of Bapeten Chairman No.06 /Ka-BAPETEN/V-99 Article 24 clause 2.c., the operating organization shall establish the training programme for reactor personnel, and in Decree of Bapeten Chairman No. 17/Ka-Bapeten/IX-99 in Chapter 5 is governed that any reactor should be operated by some capable and skill personnel, at least consisting of [5]:

a. one operator
b. one supervisor
c. one radiation protection officer
d. one maintenance personnel

Article 6 stipulates that the personnel shall have the training and pass the examination to proof her/his qualifications. The Decree of Bapeten Chairman concludes that reactor personnel shall perform the training in the accreditation organization/institution. He/she has carried out an examination by Bapeten for a working license.

3. TRAINING AND QUALIFICATION

A. Preliminary Training Programme (Qualification Programme)

Preliminary training programme shall provide the understanding on the basic principles of nuclear technology, nuclear safety, radiation protection, reactor design and reactor utilizations, etc. for application in field.

That training for operators and supervisors shall contain an adequate theoretical and practical knowledge on function, location and operation mode of reactor, and also shall emphasize to the importance of limiting and condition of operation, and the consequences of violation the limit, and the safety consequences of fault procedures.
B. Programme of Qualification Examination

After passed the training examination, the candidate of operator and supervisor shall be examined and evaluated in the final training before examination by BAPETEN for a working license suitable for his professionalism.

The method of evaluation by Bapeten consists of:

1. Written examination
2. Oral examination (can be done in the class or as a part of practical examination in facility), and or
3. Practical examination on normal and emergency operation condition.

C. Requalification Programme

Requalification programme is based on the systematic approximation to ensure that the knowledge, skill and attitude of operating personnel can be preserved. If necessary his skill and knowledge can be increased. Any personnel having task in the field of reactor safety shall perform this programme. The programme is carried out every two years. The requalification programme includes the selected topics from preliminary training, supporting important tasks for reactor safety operation, infrequent and difficult task. The programme shall also include periodical training and case studies in emergency conditions and events by operating organization.

D. Programme of requalification Examination

Operators and supervisors which will renew the working licensing shall take part in programme of requalification examination. The programme of requalification examination is conducted by Bapeten.

The method of evaluation on the requalification examination by Bapeten is the same with the method of evaluation of the qualification examination.

E. Promotion

The promotion of their occupations is used to be provided in all facilities. When the operator is assured to be capable of a reactor supervisor, his/her experiences, leadership and communication capability shall be taken into account. He/she as a new professional worker shall be trained to increase his/her knowledge and skill.

4. THE REQUIREMENTS OF QUALIFICATION EXAMINATION

The requirements of operator and supervisor examination are following:

a. The operator shall be graduated at least from scientific or engineering senior high school. The supervisor shall be graduated at least from Bachelor of science or engineering. He/she should have two year experiences in nuclear field.

b. In general, the operator and supervisor shall have good health and physical condition. Therefore it is assumed that there is no unanticipated failure or fault resulting in the
hazard for the health and safety publics, for example: epilepsy, psyche, diabetes mellitus, hypertension, heart, unconsciousness, ear or eye disability and other mental and physical condition.

5. APPLICATION OF WORKING LICENSE

The licensing applicant shall fill the application form and enclose:

i. Documents of applicant abilities on the methods of safe reactor operating. For supervisor, the applicant shall understand his/her job and responsibilities. These documents include a certificate or recommendation from the examination team. The certificate or recommendation consists of: the detail course, course hours, start-up and shut down experiences.

ii. Physician recommendation from his/her medical check up.

6. WORKING LICENSE

Bapeten will give a working license for a participant passing the exam. The working license is one of significant documents presented capabilities as a reactor operator or supervisor. The working licenses has been valid for two years.

The expired license will be come into effect, if the licensee renews his/her license. The renewal application must be enclosed as following:

i. Documents on applicant experiences including total hour.

ii. A letter of recommendation from operating organization stated that the applicant has implemented his/her working very well.

iii. Medical check up results.

iv. A certificate of requalification training.

The duration of working license can be renewed if:

a. The operator or supervisor has good health and physical condition so that there is no unanticipated failure or fault resulting in the hazard on the health and safety publics.

b. The operator/supervisor has performed his/her task actively or and he/she is able to continue his tasks.

c. He/she has passed the examination arranged by Bapeten. For participant not passing this exam, he/she may take the examination at another occasion.
Reactor operator or supervisor license can be revoked if:

a. The operator or supervisor has not a good health and physical condition. The requirements in section 4.b. has not yet been fulfilled.
b. His/her fault can cause any accident increasing the radiation hazards and contamination for personnel, member of publics and environment.

7. ASSESSMENT OF QUALIFICATION FOR RSG-GAS REACTOR OPERATOR AND SUPERVISOR

A. Method of Assessment

The assessment of RSG-GAS operators’ and supervisors’ qualification has performed by comparing the RSG-GAS operators’ and supervisors’ licensing documents with the DCB No. 17/1999 and DCB No. 04P/2003.

B. Result and analysis/assessment

RSG-GAS reactor is research reactor in Indonesia, and has potential radiation hazard, therefore to operate it, it is needed some qualified operators and supervisors. The requirements of the operator and supervisor license has been established by Decree of Bapeten Chairman No. 17/Ka-Bapeten/IX-99. For identifying whether the RSG-GAS operator and supervisor have fulfilled the qualification in accordance with the provisions issued by Bapeten, it is needed to assess the qualifications of RSG-GAS reactor operators and supervisors.

The background education requirements to be a reactor operator or supervisor is according to the examination requirements of sec. 5.a. In this case, RSG-GAS reactor operators and supervisors graduated at least from scientific or engineering senior high schools and Bachelors of science or engineering, and having experience in nuclear field minimum of 10 years.

The requalification for operator and supervisor will renew the working license. The training requalification programme is performed periodically by Center for Multi Purpose Reactor (CMPR) for minimum 2 years.

According to sec. 5.b. the requirement of physician and health condition, CMPR is to perform medical check up for the operator and supervisor candidates. The operator and supervisor may renew the working license.

In table 1 can be shown the results of assessment of the qualification for operator and supervisor to fulfill the provisions/requirements issued by Bapeten.
TABLE 1: ASSESSMENT RESULT OF THE QUALIFICATION RSG-GAS REACTOR OPERATOR AND SUPERVISOR

<table>
<thead>
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<th>No.</th>
<th>Provision/Requirement</th>
<th>Regulation</th>
<th>Assessment Result</th>
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| 1.  | a. The operator shall be graduated at least from scientific or engineering senior high school and experienced in nuclear field minimum 2 years  
    b. The supervisor shall be graduated at least from Bachelor of science or engineering. He/she should have two year experiences in nuclear field | DBC No. 17/1999 Annex II. 2.1      | a. Education for operators : generally scientific or engineering senior high school : 22 persons with experience between 2-14 years  
    b. Supervisor education: scientific or engineering senior high school : 6 persons and Bachelor of science or engineering 4 persons with experience more than 10 years. |
| 2.  | having good health and physical condition. Therefore it is assumed that there is no unanticipated failure or fault resulting in the hazard for the health and safety publics, for example: epilepsy, psyche, diabetes mellitus, hypertension, heart, unconsciousness, ear or eye disability and other mental and physical condition. | DBC No. 17/1999 Annex II.2.1.      | The physician and health condition of RSG-GAS reactor operators and supervisors are good condition, is proved by the medical check up reports. |
| 3.  | Attending the preliminary training programme for the operator and supervisor candidates and the requalification programme for the operator and supervisor which will renew the working licensing programmed by operating organization. | DBC No. 17/1999 article 6 DCB No. 04P/03 | Operators and supervisors have followed the qualification (preliminary programme) and requalification programmed by CMPR, is proved by training certificates. |
| 4.  | Performing the qualification and requalification examination arranged by Bapeten.         | DBC No. 17/1999 Article 6, 10, Annex II.2.1. and 5.1 DCB No. 04P/03 | Passing the examination, proving by the working license issued by Bapeten. |

8. CONCLUSION

Reactor personnel operating nuclear reactor shall fulfill the requirements in regulation, because they will determine whether the reactor operation is safe or not. One of the requirements is working license. This license will be submitted after the personnel has attended the training by the accreditation training organization/institution and has passed the examination by Bapeten.

From Table 1 can be concluded that RSG-GAS reactor operating organization –CMPR has complied the Bapeten provisions for arranging the qualification and requalification training programme for the operators and supervisors. The RSG-GAS reactor operators and supervisors have followed the qualification and requalification trainings and examinations.
REFERENCES