Malaysian Nuclear Agency through its Medical Physics Group has been providing Quality Control (QC) services for medical X-ray apparatus used in diagnostic radiology to private clinics and hospitals since the year 1997. The Medical Physics Group services is endorsed by the Malaysian Ministry Of Health (MOH) and is in accordance with the Malaysian Standard MS 838 and the Atomic Energy Licensing Act, 1984. Until today, the scopes of testing services also include all types of medical X-ray apparatus. The quality control (QC) in diagnostic radiology is considered as part of quality assurance program which provide accurate diagnostic information at the lowest cost and the least exposure of the patients to radiation. Many experience and obstacles were faced by Medical Physics Group. This paper will discuss the experiences and achievements of providing QC service from early stage until now so that it can be shared by the citizens of the Malaysian Nuclear Agency. The results of quality assurance inspection of all types of X-ray apparatus for medical conducted by Agency Nuclear Malaysia will be presented in brief.

INTRODUCTION

Quality control (QC) checks for the X-ray apparatus is an important practice in quality assurance programs in medical diagnostic radiology. The World Health Organization (WHO) has described quality assurance in medical diagnostic X-ray as a business carried on by the employee to inspect the equipment to ensure that diagnostic images produced are of high quality, provide enough information on the cost of the lowest minimum radiation exposure to the patient. The Medical Physics Group was established in 1995 with the objective, among others, is to control the quality of X-ray diagnostic apparatus in the country. Malaysia Nuclear Agency (NM) has been approved conducting related activities in 1997. This approval covers inspection, testing and verification of irradiation apparatus and the monitoring of radiation protection for medical purposes. Until today the scope of testing already covers all X-ray modalities such as general X-ray, fluoroscopy (including lithotripter), mammography, dental, bone densitometry, and computed tomography (including PET CT).

OBJECTIVE

This paper will discuss the experiences and achievements of providing QC services to radiological centers including clinics and hospitals throughout the country.

RESULT AND DISCUSSION

Table 1 indicates medical X-ray apparatus QC achievements that are based upon Nuclear Malaysia QC from the year 1998 to 2014. During the QC services, namely from 1998 to 2000, more than 400 clients have been dealing with Malaysian Nuclear Agency. Clients are comprised of hospitals and government clinics, medical centers and private clinics throughout the country. Majority of customers is made up of a medical practitioner clinics. Throughout the experience conducting QC, no major problems are observed concerning the safety of the mechanical and electrical installations. The X-ray apparatus has been installed properly and satisfactorily.

Table 1 : The table indicates achievements during the year 1998 to 2014 according to the type of apparatus and the X-ray test

<table>
<thead>
<tr>
<th>Type of Apparatus</th>
<th>Number of machine</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General X-ray</td>
<td>2894</td>
<td>72.2</td>
</tr>
<tr>
<td>Fluoroscopy</td>
<td>497</td>
<td>12.8</td>
</tr>
<tr>
<td>Mammography</td>
<td>184</td>
<td>4.7</td>
</tr>
<tr>
<td>Computed Tomography</td>
<td>124</td>
<td>3.2</td>
</tr>
<tr>
<td>Dental</td>
<td>211</td>
<td>5.4</td>
</tr>
<tr>
<td>Bone Densitometer</td>
<td>63</td>
<td>1.6</td>
</tr>
</tbody>
</table>

At the beginning, most of the X-ray apparatus does not meet the standard and performance criteria as set by the Ministry Of Health (MOH). For example, in 2000, QC testing was done by using Malaysian Nuclear Agency protocol. The measurement are done by using Malaysian Nuclear Agency protocol with the approval of the MOH. The equipments used (test tools) have valid calibration certificate. This standard was developed based on the Malaysian Standard MS 838 and some other International Standards. In cases where the performance of the X-ray apparatus does not comply with the standards allowed, non-compliance are reported clearly and owner of X-ray apparatus is informed for the purposes of repair.

In general, QC of facilities for X-ray apparatus comprises three main aspects;
I. Mechanical and electrical safety checks
II. Radiation protection checks
III. Performance and safety standards of X-ray tube & generator
IV. QC test of associated facilities such as darkroom and film processor

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After the implementation of QC, many clinics are realizing the importance of the security aspects of radiation protection and take steps to comply with the safety standards of radiation protection as specified. On this day nearly all the clinics have an X-ray apparatus with a systematic organization of radiation protection. In providing services to Sabah and Sarawak, logistical and financial problems are among the challenges that had to be faced. However, all these problems are solved through cooperation between the staffs.

CONCLUSION

Service quality control in diagnostic radiology is the core and the strength of the field of Medical Physics in Malaysia Nuclear Agency, whose activities involve huge investments and efforts to improve health services and contribute to the income of the Malaysian Nuclear Agency. The existence of the Medical Physics Group as one of the QC provider is important in providing benchmarking R&D in order to constantly improve or enhance the Quality Assurance program in Diagnostic Radiology in Malaysia. The aim is to improve the understanding of the R&D and innovation in QA services in diagnostic radiology.

REFERENCES