THE STUDY OF LINEARITY OF OPTICALLY STIMULATED LUMINESCENCE (OSL) DOSIMETER BASE ON PERSONAL DOSE EQUIVALENT IN 0.07 mm DEPTH TISSUE (Hp(0.07), mSv) USING GAMMA Co-60 SOURCE.

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TABLE OF CONTENT

ABSTRACT

Secondary Standard Dosimetry Laboratory (SSDL) Department, of Malaysian Nuclear Agency (nuclear Malaysia) is responsible for monitoring radiation worker in Malaysia. All radiation workers in Malaysia is monitor using two kind of personal dosimeter either film badge or thermo luminescent (TL) dosimeter .In the year 2015, SSDL Nuclear Malaysia plan to terminate all film badge services and switch to Optically Stimulated Luminescene (OSL) dosimeter. This OSL dosimeter is the new kind personal dosimeter in Malaysia. OSL dosimeter is sensitive to low dosage as low as 0.05 miliSievert (mSv) up to 10000 mSv. OSL can detect photon (x-ray and gamma ray), beta and neutron radiation. It can be re-read and very simple to maintain. OSL dosimeter can estimate and detect deep dose or personal dose equivalent in 10 mm tissue (Hp(10)mSv), shallow dose or skin dose or personal dose equivalent in 0.07 mm tissue (Hp(0.07),mSv) and also can detect lens dose or personal dose equivalent in 3 mm in lens tissue (Hp(3),mSv). Radiation exposure in OSL dosiemeter is measure using Microstar Reader , this happen when by stimulating the detector that is aluminium oxide (Al2O3:C) crystal, with a green Light Emitting Diode (LED) array causing the luminescent phenomena which proportion to the amount of radiation absorbed. During the stimulation only some trapped electrons are released so the dosimeter can be re-read. Currently SSDL-Nuclear Malaysia already purchases nearly 2000 new OSL dosimeter. As a new dosimeter this OSL dosimeter need to undergo some type testing such as linearity response test, energy response test, angular response test and repeatability response test. This research project will use irradiation facility and OSL MICROSTAR READER situated in SSDL Nuclear Malaysia facility. This research proposal is to study the linearity of OSL dosimeter base on the response of shallow dose or skin dose or personal dose equivalent in

CHAPTER 1

INTRODUCTION

1.1 Background of study

Radiation can be defined as a process in which energetic particles or energetic waves that travels through a vacuum, or through a matter-containing media that are not required for their propagation. Radiation has a wide range of energy that forms the electromagnetic spectrum as shown in figure below.

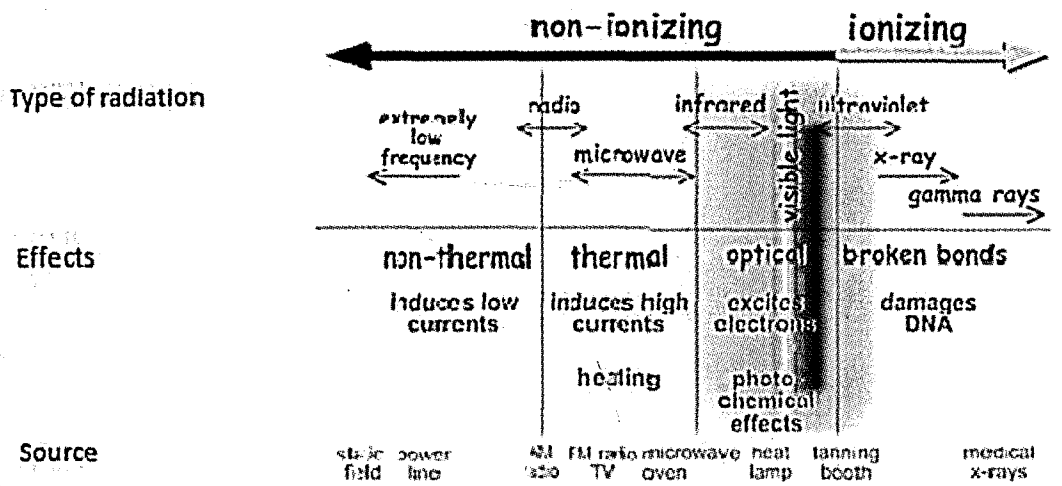

Figure 1.1: Type of radiation in the electromagnetic spectrum.