NRRPT® NEWS

National Registry of Radiation Protection Technologists

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Chairman's Message


Kelli Gallion

Success in Georgia!! Georgia House Bill 353, cited as the "Industrial Hygiene, Health Physics, and Safety Profession Recognition and Title Protection Act," was signed into law May 9, 2005 and became e ffective July 1, 2005. This Act provides legal recognition to the professions of industrial hygiene, health physics and safety (see page 7 for details).

The Registry was represented in June at its **first** Canadian Radiation Protection Association (CRPA) conference in Winnipeg, Canada. A presentation was given on the history and development of the NRRPT, which sparked a great deal of interest and lots of inquiring minds at the **NRRPT** booth in the exhibit area. Our goal was to inform the CRPA members that an **NRRPT** Canadian exam had been developed and would be administered August 13, 2005. Thank you to **Dave Tucker** and **Jeff Schaefer** for their support and coordination efforts. We look forward to future meetings with the CRPA.

The Board and Panel just concluded its 64th meeting held in conjunction with the HPS Annual Meeting in Spokane, Washington July 10-14, 2005.

The Registry was approached by Michael Krstich with the Office for Domestic Preparedness (ODP) requesting our support of the Homeland Defense Equipment Reuse (HDER) Program. The goal of the HDER program is to provide excess radiological detection instrumentation and other equipment, as well as training and technical support, to emergency responder agencies nationwide to enhance their domestic preparedness capabilities. The Health Physics Society (HPS) is a huge supporter of the HDER Program. HPS roles and responsibilities include: coordination with the HDER Services Management Tool, equipment field checks and maintenance, refresher training, and serves as a local source of expertise. I anticipate that the Registry will join the HPS in their efforts in making the HDER Program a success. Please visit the HDER Program website at www.ojp.usdoj.gov/odp for more information.

Elections: Dave Biela resigned as Exam Panel Chairman and **Karen Barcal** was elected as Exam Panel Chairman. **Mark Bayless** was elected to the Board of Directors and **Dave Biela** was elected Board Vice-Chairman. Terms begin January 2006. Congratulations to you all!!!

“Save the date!!!” Next summer marks the celebration of our **30th** Anniversary in Providence, Rhode Island.

Best wishes and thank you for your continued support!!

Sincerely,
Kelli Gallion

Photos from the NRRPT Board and Panel Meeting in Spokane, WA

Mrs Ong, Mr. Ong, Auggie Ong & Paul Harvey

Barry Kimray, Jim Miller, Steve Lancaster, Eddie Benfield, Kelly Neal (standing) & Rick Rasmussen (sitting)

More meeting photos on pg 6 & 9

New Members: If you do not have access to the private side of the web page please contact the Executive Secretary (nrrpt@nrrpt.org). She must have your email address on file in order for you to gain access.

RP2020?

By Tim Kirkham

No, RP2020 is not the new dose goal for the industry nor is it a new technology to measure EDE. RP2020 is a Radiation Protection Strategic Plan developed to help determine what the field will look like in the year 2020. This article will explain the meaning of RP2020 but not until I share a little industry background.

To prove what we already know, Figure 1 shows how dose to radiation workers has been steadily decreasing up to about 1998. Granted, this is not total dose or even dose per worker because it only includes doses above 1 Rem. Does this mean that ALARA has reached its end point? Of course not, but it does indicate that more efforts need to be put into dose reduction techniques and hints toward development of new innovative techniques for dose reduction. Furthermore, considering the possibility of an NRC adjustment in the annual dose limit from 5 Rem/year to 2 Rem/year, this chart implies that we cannot wait for "someone else" to figure it out or wait for the new generation of nuclear power plants.

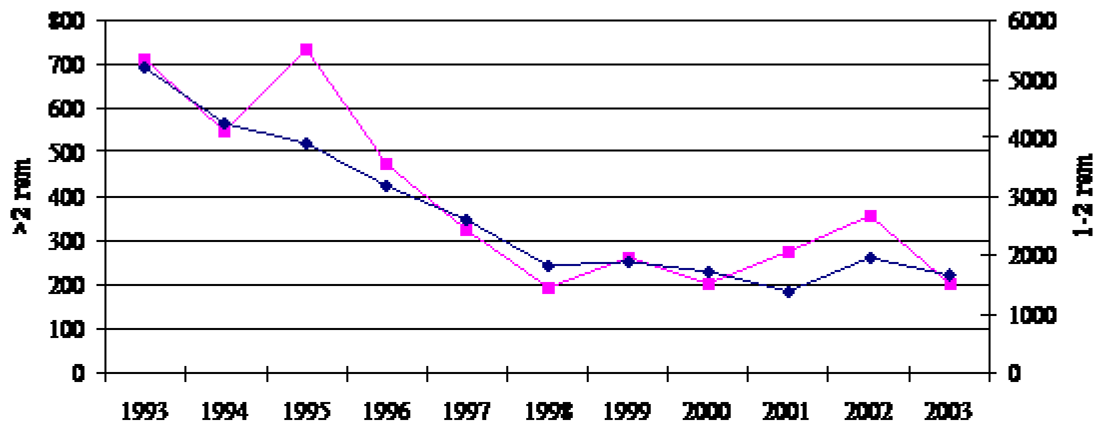

Figure 1. Numbers of Workers with Dose

Figure 2 shows the Radiation Protection cost in dollars per Megawatt-hour. Again, you can see where our costs were slowly reducing until about 2002. Why? I could speculate but then that would only get me in trouble. The real message is that we must find a way to reduce costs considering that all power companies are reducing their radiation protection budgets while expecting our performance indicators to improve.

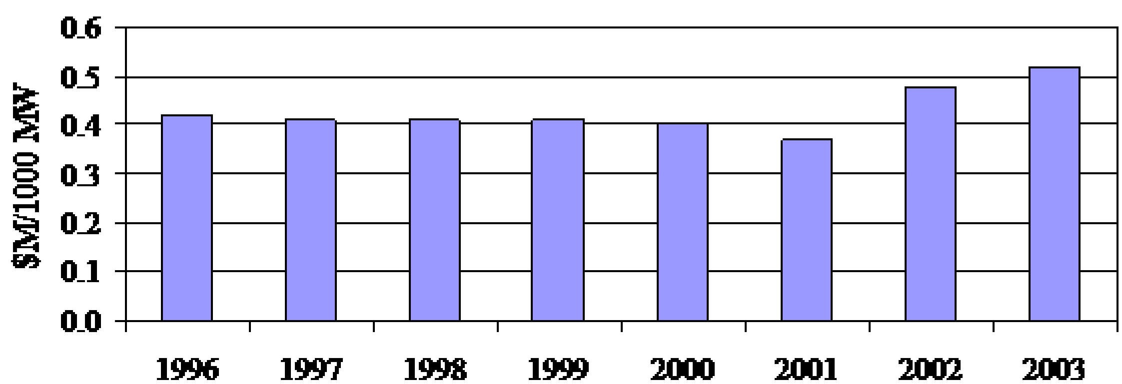

Figure 2. Radiation Protection Costs

Somebody Stop the Madness

Now that I have your attention – this is what RP2020 is all about. NEI (Nuclear Energy Institute), in conjunction with INPO and EPRI (Electric Power Research Institute), initiated a program a few years ago aimed at determining what the industry was going to look like in the year 2020. The Health Physics Task Force of NEI decided that to determine the future of radiation protection, an initiative would be needed that began planning now for our future; this became known as RP2020.

Several planning/brainstorming sessions were held and, in a nutshell, several challenges presented themselves for our future:

- Radiological Protection performance and cost trends are not improving
- Workforce turnover is projected to increase with difficulty replacing staff and retaining knowledge
- Emerging RP standards imply lower dose limits and increased regulatory burden

These challenges are really opportunities in disguise – right? By initiating a plan to address these challenges now, we can influence our industry in the future.

1) We need to organize and focus industry RP resources in a common mission
2) Update the RP paradigm to reflect advances in science, policy and practice
3) Reform RP regulations and oversight to reduce unnecessary burden

The RP2020 plan

Mission Statement for RP2020
Reshape radiological protection at nuclear power plants to achieve significant improvements in safety performance and cost-effectiveness

Priority Issues
In order for this industry to apply its resources to identified issues, we needed to determine our main issues and then 'bin' them into priority areas. They fell out into 4 main priorities:

Staffing

- Providing support and advice for ongoing industry workforce initiatives
- Develop programs to preserve and transfer current RP knowledge base to the next generation
- Develop an industry program to align industry resource allocations to minimize the impact of workforce trends

Standardization

- Develop a structure and process for standardizing criteria and practices where appropriate to achieve increased effectiveness and efficiency
- Develop standardized training and qualification programs for RP technicians and rad-workers documented through a PADS-like system
- Develop standardized guidelines for technology implementation

Technology

- Develop an industry program to identify and integrate new technologies into RP and plant processes in an effective and efficient manner
- Develop an industry program to assess and improve the effectiveness of existing technologies implemented in RP programs
- Develop an enhanced dose-field reduction program

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RP Standards

- Support ongoing initiatives to influence emerging RP standards to be science-based and flexible
- Develop an industry program to align industry dose performance to minimize the impact of emerging RP standards

Teams of Task Force members have been assigned tasks under these priority areas and have begun developing measures of success, deliverables and future steps. Table 1 shows these proposed measures of success.

Table 1. Proposed Measure of Success

RESULT AREA	MEASURE	OBJECTIVE
Dose	RP dollars/MW-hr	Decreasing trend
Cost	Person-Rem/MW-hr # workers >2 Rem # workers 1-2 Rem	Decreasing trend Zero Decreasing trend
RP Events	Significant Defined events	Zero Decreasing trend
Workforce	Attrition vs. new hires Experience/qualification	To be developed by NEI HR task force
Regulatory	Burden factor ($) New/revised rule-making	To be developed by NEI HP task force
Technology	# accessed high rad areas # technology-based events	Decreasing trend Decreasing trend

Several organizations are involved in this work –

INPO	EPRI
NEI	BWR ALARA owners group
ISOE-North American	Technical Center (NATC)
NRRPT	American Nuclear Insurers (ANI)
Joint Defense Group	Nuclear Suppliers Association
ANS (invited)	PWR ALARA owners group (invited)
Health Physics Society (invited)	

As you can see, the **NRRPT** is a part of this work and the organization has formed an Ad Hoc Committee to work with NEI on this project.

What does this mean to me?
Obviously, there is a lot more information and work being done in all these areas and I will not enumerate them here. The purpose for this article is to communicate to all of you what is being done to ensure our future as Health Physics and Radiation Protection professionals. The first thing you can do to help this endeavor is to complete a survey that has been posted on the **NRRPT** web site. If you do not have access to the Web, or would prefer completing a hard copy, please contact the author. Our representative (the author of this article) is a member of the Staffing project and has taken the task of assessing our technician work-force as to the why's and why-not's of our aging workforce.

Let's Share the Wealth

On the **NRRPT** web site (www.nrrpt.org), there is a forum section that has been in service for over a year, but has been used very little. Here is an opportunity for our registry to keep in touch with each other and to help each other with the transfer of information. Why reinvent the wheel, if you need ideas about how to get something done, ask on line. Let's help each other. We will set up a thread where you can just say hi, so individuals can see how well the forum is being viewed. Hope to see you at the forum.

The Spokane River

Bill Peoples, Bob Wills & Steve Lancaster

Progress in Professional Recognition and Title Protection

By Kyle Kleinhans, CHP

Background

An Ad Hoc Committee on Professional Recognition and Title Protection was formed by the Academy in 2003. The original committee included Ed Maher, Regis Greenwood, Kyle Kleinhans, and Kenny Fleming as the Acting Chair. The purpose of this Ad Hoc Committee was to determine the feasibility and methods that may be used to protect the CHP designation and how legislation may be utilized within future regulatory efforts as a means of considering CHPs to be competent persons to conduct specified work in a jurisdiction.

The scope of the professional recognition and title protection program was later expanded into a joint effort with the Health Physics Society, as described below, into a wider initiative to include health physicists and registered radiation protection technicians.

The Ad Hoc Committee transitioned at the Augusta 2004 Midyear Meeting of AAHP. During the Augusta Executive Committee Meeting it was decided to modify the objective of the Ad Hoc Committee to one of implementing some specific actions aimed at improving the Academy's posture relative to protecting the CHP title through legislative action at the State level. Howard Dickson was selected to chair the modified Ad Hoc Committee and the following members were appointed: Regis Greenwood, Ed Maher, Frazier Bronson, Tom Essig, and Judson Kenoyer. It was decided to pursue professional title protection via legislative means, i.e. a Profession Title Protection Act.

The purpose of a Profession Title Protection Act is to provide legal recognition to the profession of health physics, as well as provide assurance to the public that individuals representing themselves as being involved in the profession of health physics have met minimum qualifications, thereby protecting the public health and safety.

The Academy has been successful in negotiating a Tripartite Agreement with the Health Physics Society (HPS) and the American Industrial Hygiene Association (AIHA) to mutually pursue professional recognition and title protection. The Tripartite Agreement outlines the duties and responsibilities of all parties and discusses financial arrangements. In essence the HPS and AAHP are buying services from AIHA and sharing that cost between us.

The next major hurdle was to prepare the language that would go into model legislation. Rather late in December 2004, the HPS and AAHP agreed on the "health physics" language for the model legislation. In addition the National Registry of Radiation Protection Technologists (NRRPT) concurred with the model legislation language and their RRPT title was included. The AIHA accepted our recommended language with very slight modification.

Now we are engaged in the legislative process. Based on recommendation from Aaron Trippler, Director of Government Affairs for AIHA, we targeted Ohio and Georgia this year. AAHP President Tom Buhl and HPS President Ray Guilmette sent a joint letter to the HPS Chapters in Ohio (3) and Georgia (2) informing them of the professional recognition/title protection initiative and requesting their support. We encountered nothing but enthusiasm and supportive folks in the Chapters.

Success in Georgia

Georgia House Bill 353, cited as the 'Industrial Hygiene, Health Physics, and Safety Profession Recognition and Title Protection Act' was signed into law May 9, 2005 and becomes effective July 1, 2005. This Act amends Title 43 of the Official Code of Georgia relating to professions and businesses, so as to provide legal recognition to the professions of industrial hygiene, health physics, and safety.

The AAHP and HPS are particularly appreciative of the work of AIHA Executive Director Steven Davis in crafting the agreement and of Aaron Trippler, the individual primarily responsible for the success of this bill. AAHP's Howard Dickson and HPS's Ken Kase coordinated the health physics aspects of the bill. Once the bill was drafted, HPS Director and Atlanta Chapter President Robert (Bob) Whitcomb worked to notify and encourage the Atlanta Chapter to support this legislation.

An excerpt of the act is provided below:

Purpose

The purpose of this Act is to provide legal recognition to the professions of industrial hygiene, health physics, and safety, as well as provide assurance to the public that individuals representing themselves as being involved in the professions of industrial hygiene, health physics, and safety have met minimum qualifications, thereby protecting the public health and safety.

More specifically this law was enacted for the purposes of:

1) Prohibiting an individual from representing that the individual is a certified associate industrial hygienist, certified health physicist, certified industrial hygienist, certified safety professional, construction health and safety technician, occupational health and safety technologist, or registered radiation protection technologist unless the individual meets certain qualifications;
2) Prohibiting a business entity from identifying, representing, or advertising itself as a provider of industrial hygiene, health physics, or safety services furnished by a certified associate industrial hygienist, certified health physicist, certified industrial hygienist, certified safety professional, construction health and safety technician, occupational health and safety technologist, or registered radiation protection technician unless the business entity meets certain qualifications; and
3) Providing or recognizing certain qualifications for individuals and business entities using certain titles or making certain representations relating to the provision of industrial hygiene, health physics, or safety services.

Penalties

Any person who violates this chapter shall be guilty of a misdemeanor and, upon conviction, shall be punished by a fine not exceeding $1,000.00.

Future Activities

Legislation similar to that passed in Georgia is currently being pursued this year in the state of Ohio under the Tri-Partite Agreement. AAHP and HPS plans call for the introduction of similar legislation in approximately two new states each year in collaboration with AIHA.

The Ad Hoc Committee is expected to become a Standing Committee of the Academy with a dedicated mission to promote professional recognition and support title protection legislation.

Sonya & Tim Kirkham

DeeDee McNeill, Steve Lancaster, Kelli Gallion & Rick Rasmussen

Mr. & Mrs. Dave Wirkus & daughter

Kelly & Tina Neal

Gary Kephart, Dwaine Brown & Eddie Benfield

Dr. & Mrs. Jim Miller

A General Review of Detection and Measurement of Ionizing Radiation

By Augustinus Ong, Dartmouth College

The purpose of this review, in the format of questions and answers, is to remind ourselves of some of the basic aspects of detection and measurement of ionizing radiation.

1. Why is the concept, air kerma in the units of gray (Gy), is used to equate the exposure to radiation traditionally measured by the Roentgen?

   It was the practice to express radiation exposures in the units called the roentgen (R). The roentgen is equal to the amount of radiation that will produce 2.58 x 10^{-4} coulombs of charge in 1 kilogram of air. In order to facilitate the use of more appropriate units the concept of air kerma was developed. Air kerma, which is expressed in the units of gray, allows for the exposure to be expressed in terms of an absorbed dose, such that an exposure of 1 R is approximately equal to an absorbed dose of 8.7 mGy.

2. Why is the amount of energy that is transferred to a material per unit length of travel in soft tissue is termed LET?

   The ability of radiation to cause ionization in living tissues is related to the linear energy transfer (LET). This unit helps to express the relative biological effect of different types of ionizing radiation based on the amount of ionization occurring along the path in tissue traversed by the radiation. By their very nature of being highly penetrating, x rays and gamma rays are associated with low LET and produce less ionization per unit length of travel than those of high LET alphas which are not very penetrating at all.

3. Why does LET of an x-ray or gamma photon have a low keV / micron?

   Because x rays and gamma rays have a high degree of penetrability and, therefore, deposit only small amounts of energy per length of travel. These types of radiation are said to have a low LET and low ionization potential.

4. Each time an x-ray beam scatters, its intensity at 1 m from the scattering object is approximately what fraction of its original intensity?

   a. 0.1 b. 0.01 **c. 0.001** d. 0.0001

5. The short interval of time during which a radiation counter is unable to respond to radiation exposure is called:

   a. Interval time b. Recharge c. Recycle time **d. Dead time**

   The time interval during which a detector is unable to respond to an additional exposure of radiation is called its dead time. Because detectors with long dead time, they cannot be used to measure short-lived radiation events such as those associated with pulsed x-ray sources.

6. The x-ray photon interaction with matter that is responsible for the majority of scattered radiation reaching the Luxel (optically stimulated luminosity) dosimeter is:

   a. Classical scatter b. Thompson scatter **c. Photoelectric effect** d. Compton scatter

In the photoelectric effect, relatively low-energy photon uses all its energy to eject an inner-shell electron of a target atom, leaving an electron shell vacancy. An electron from the outer shell drops down to fill that vacancy, and in doing so gives up a characteristic x-ray. This type of interaction gives radiation dose to tissue. In Compton scatter, a high-energy incident photon ejects an outer-shell electron of a target atom; however, the energy of the incident photon is not completely used up, but instead it retains some of its energy and exits the target as a scattered ray (see Question #4). In classical scatter, a low-energy photon interacts with an atom but does not cause ionization; instead, the photon changes direction without any loss of energy. Thompson scatter is also called classical scatter.

7. In which type of monitoring device does radiation release electrons by their interaction with air?

a. Pocket dosimeter b. Film badge c. TLD d. OSL

Ionization is the principle of operation of both the film badge and the pocket dosimeter. In the film badge, the film's silver halide in the emulsion is ionized by radiation. The pocket dosimeter contains an ionization chamber, which contains air, and the number of ions of either sign formed in the chamber is equated to radiation exposure. TLD (thermoluminescent dosimeter) uses lithium fluoride crystals. Once the TLD is exposed to ionizing radiation and then heated, the crystal gives off light proportional to the amount of absorbed radiation. OSL crystal, once absorbed the ionizing radiation and then subjected to laser beam, gives off luminescence proportional to the amount of absorbed radiation.

8. Under what circumstances might a radiographer wear two dosimeters?

a. During pregnancy or performing vascular procedures
b. During pregnancy or performing mobile radiography
c. During pregnancy or performing chest radiography

Radiographers typically wear one dosimeter, positioned at their collar and worn outside a lead apron. During pregnancy, a second dosimeter is worn at the abdomen, under the lead apron. During vascular procedures, the dose to the radiographer can be significantly high; that is because the leaded protective curtain is often absent from the fluoroscope head and because of the extensive use of cineradiography. As a result, the radiographer's upper extremities can receive a high dose. So, the radiographer also wears a ring badge.

9. Which of the following types of detection device is normally classified as an exposure rate meter?

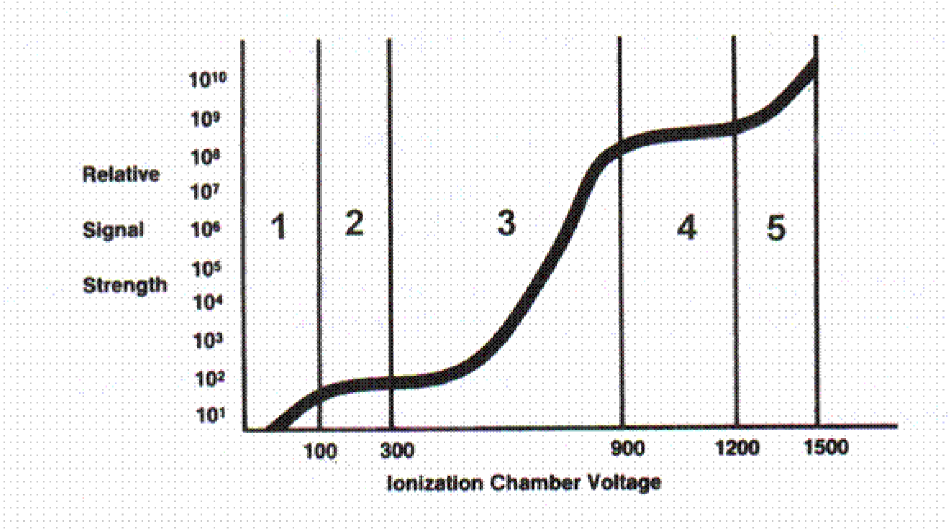
a. TLD **b. Geiger-Muller detector** c.Pocket dosimeter d. Film badge

In order to determine the amount of scattered radiation from a contaminated surface requires the use of a portable device that can determine the exposure rate. Geiger-Muller detector is an ionization-type survey detector that can be used to detect certain type of radioactive contamination, such as a P-32 spill.

10. How does a scintillation detector that has a photo-multiplier tube work to detect radiation?

Ionizing radiation deposits some of its energy in a scintillation crystal that coverts the energy into small amount of light. The light in turn is captured by the photo-multiplier tube that converts the light photons into electrons. These electrons are accelerated and multiplied by a series of charged dynodes that generate a detectable electrical signal.

Referring to the ionization chamber voltage curve, answer questions 11-14:



11. The area of the chamber voltage curve, number 1, represents the primary operating region for the:

    a. Ionization chamber   b. Proportional counter
    c. Geiger-Muller counter   **d. Ion pair recombination**

12. The area of the chamber voltage curve, number 2, represents the primary operating region for the:

    a. Ionization chamber   b. Proportional counter
    c. Geiger-Muller counter   d. Continuous discharge

13. The area of the chamber voltage curve, number 3, represents the primary operating region for the:

    a. Ionization chamber   **b. Proportional counter**
    c. Geiger-Muller counter   d. Continuous discharge

14. The area of the chamber voltage curve, number 4, represents the primary operating region for the:

    a. Ionization chamber   b. Proportional counter
    c. Geiger-Muller counter   d. Ion pair recombination

15. The area of the chamber voltage curve, number 5, represents the primary operating region for the:

    a. Ionization chamber   b. Proportional counter
    c. Geiger-Muller counter   **d. Continuous discharge**

Use of Weighting Factors for External Exposure at SONGS

OBJECTIVE: Review changes to the HP program for assigning whole body dose from external radiation (scheduled to be implemented at SONGS in October 2005).

REFERENCES: ICRP Recommendations, 10 CFR Part 20, NRC Regulatory Information Summary Reports, ANSI N13.41, NRC Approval of SCE's Application to Use Weighting Factors for External Exposure at SONGS.

Health Physics Program Change

TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) means the sum of the EDE (external whole body dose) and CEDE (internal whole body dose).

Effective Dose Equivalent (EDE) replaces Deep Dose Equivalent (DDE) as the external whole body dose quantity.

EFFECTIVE DOSE EQUIVALENT (EDE) is the sum of each whole body dosimeter measurement modified by its appropriate weighting factor.

$$EDE = sum\ DDE_C * W_C$$

where:

DDE_C *is the deep dose equivalent (measured by a dosimeter) for whole body compartment "C"*

W_C *is the weighting factor for whole body compartment "C"*

The definition of TODE is unchanged. TODE = DDE + CDE

History of EDE

In 1977, the International Commission on Radiological Protection Publication 26 introduced the basic concept of EDE.

In 1992, this basic concept was incorporated into 10 CFR Part 20. Weighting factors for various organs or tissues were specified and used to calculated internal dose. Until the NRC issued specific guidance, a weighting factor of 1.0 would be used for external dose and the highest whole dosimeter measurement assigned.

In 1992, the DOE facility at the Savannah River Site began using weighting factors and dosimeter measurements to calculate EDE.

In 1997, the Conference of Radiation Control Programs recommended a formula for calculating EDE when medical personnel wearing lead aprons were exposed to x-rays. (EDE = 1.5 * DDE-waist + 0.04 DDE-neck)

In 1997, the American National Standards Institute published ANSI N13.41, "Criteria for Performing Multiple Dosimetry", recommending a method of calculating EDE like the one in use at Savannah River.

In 2002, the NRC published Regulatory Information Summary (RIS) 2002-06 permitting the use of the EDE for x-rays.

RIS 2003-04 encouraged the use of EDE in place DDE without prior NRC approval, for EP, ALARA, effluents, environmental, skin contamination, other calculated dose.

RIS 2004-01 approve a front-back dosimeter combination to calculated EDE (when the source was NOT closer than 12 inches from the body)

In May 2005, the NRC approved SCE's application to use EDE in place of DDE using ANSI N13.41 compartment (weighting) factors (no distance limitation).

ANSI N13.41

ANSI 13.41 provides a method for assessing EDE based on measurements of DDE at specific areas of the body called "compartments" and applying weighting factors. Each weighting factor "relates the fraction of risk to the organs underlying the measurement location to the total risk from uniform irradiation of the whole body."

Head and neck	0.10
Thorax, above diaphragm	0.38
Abdomen, including pelvis	0.50
Upper right and left arm	0.005 (each)
Right and left thigh	0.005 (each)

SONGS Implementation

Combine thorax and abdomen weighting factors into single chest compartment weighting factor of 0.88. When no dosimeter is worn at a body compartment, the closest dosimeter measurement is assigned.

Continue to use dosimeter placement and selection criteria in accordance with current NRC guidance. Inspection procedure 71121.01, states that assuming a dose gradient of 1.5 or more, relocate or assign additional dosimeters if the missed dose is likely to exceed 30 mrem DDE/shift or 250 mrem DDE/job. These criteria are applied to each compartment and *within each compartment.*).

The "unintended exposure occurrence" performance indicator is still defined as >100 mrem DDE.

Electronic Dosimeter Set Points

EDE is used for both record and estimated whole body dose. The electronic dosimeter set points are calculated based on the REP Dose Limit and the dose gradient between body compartments.

Example: Worker repairing pressurizer heater is issued a Head/Chest set; the REP dose limit is 300 mrem; the head-to-chest dose rate ratio "R" is 3-to-1.

Chest set point = RWP Limit / (W_C + W_H * R)

= RWP Limit / [(0.88+0.01) + (0.10+0.01)*R]

= RWP Limit / (0.89 + 0.11 * R) = 246 mrem

Head set point = Chest set point * R = 738 mrem

HP Planning determines the expected head to chest dose ratio (R = 3/1). The weighting factors for the right and left thighs are added to the chest-weighting factor (0.88 + 0.01). The weighting factors for the right and left arms are added to the head-weighting factor (0.88 + 0.01)

Reporting Dose On NRC FORM-5

Example continued. Head/Chest Set TLD or PED Results:

If:
Chest dose = 100 mrem DDE/LDE/SDE
Head dose = 300 mrem DDE/LDE/SDE

Then:
EDE = 300 DDE * 0.11 + 100 DDE * 0.89 = 122

NRC Form-5

DDE	=	0.122
LDE	=	0.300
SDE_{WB}	=	0.300
SDE_{ME}	=	0.300
CEDE	=	NR
CDE	=	NR
TEDE	=	0.122 (TEDE = EDE + CEDE)
TODE	=	0.300 (TEDE = DDE + CDE)

Comments Section of NRC Form-5: *Effective Dose Equivalent reported in place of DDE and used to calculate TEDE*

Conclusion

Simply assigning the highest dosimeter is an approximation that breaks down in highly non-uniform radiation fields. Use of ICRP-26 weighting factors improves the accuracy of dose assessment. NRC encourages the use of EDE in place of DDE for all sources of occupational dose.

For further information or questions contact Mike Russell at 949-368-7638.

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Nevada Technical Associates, Inc. provides training courses in radiation safety including an **NRRPT** Exam Review Course.
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Bob Corbett, RPM
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San Onofre Nuclear Generating Station is proud to have over 60 registered **NRRPT** members in our Health Physics, Training, Chemistry, Engineering, Operations, Oversight, and Maintenance organizations. We are especially proud that Kelli Gallion of our HP Planning group was a member of the Panel of Examiners, Board of Directors, and is currently the **NRRPT** Chairman.

San Onofre is a three unit site with two operating 1170 MWe Combustion Engineering reactors and one early Westinghouse unit in decommissioning. The station is located in Southern California on the Pacific Ocean and midway between San Diego and Los Angeles.

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Bill Bullard, RPM
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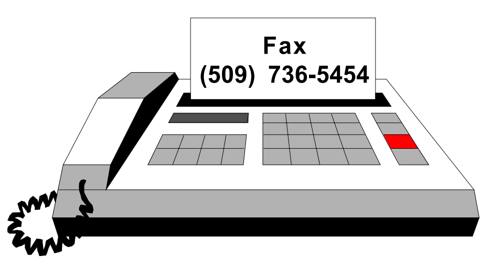

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