

# NRRPT® NEWS

## National Registry of Radiation Protection Technologists

Spring 2011 Edition

Incorporated April 12, 1976

### Chairman's Message

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Kelly Neal

As the new Chairman, I would like to start by thanking outgoing Chairman Dave Biela for his outstanding service. Dave has devoted significant amounts of personal time to the NRRPT since joining the Panel of Examiners in 1990. In addition to being an Arthur F. Humm, Jr. Award recipient, Dave has served as Chairman of the Board, Vice-Chairman of the Board,

Chairman of the Exam Panel, Vice-Chairman of the Exam Panel, and continues to serve as Chairman of the Executive Committee and as the NRRPT's Testing Administrator. Dave's selfless example of service is an inspiration to us all.

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Our winter meeting this year was held in conjunction with the Health Physics Society's mid-year meeting in Charleston, SC. A new Vice-Chairman, Dave Tucker and new Secretary-Treasurer, Chris Whitener were elected and will begin their terms January 1, 2012. We also voted in two new Board members, Karen Barcal (transitioning from Exam Panel Chair) and Kelli Gallion who will also begin their terms next January.

During this last meeting, the NRRPT created a new membership category for Student/Associate Members. Student/Associate Members are students or personnel not fully qualified to sit for the NRRPT Exam. Student members are engaged in full or part time study in a field allied with one or more health physics disciplines and possessing sufficient interest in radiation safety to apply for membership. Associate members are engaged in full or part time

employment in a field allied with one or more health physics disciplines and actively preparing for the examination upon satisfactory completion of examination requirements. Additional information on this new category will be included in this and future newsletters.

The next Board and Panel meetings will be held in conjunction with the Health Physics Society annual meeting June 25-28 in Palm Beach, FL. Please remember that all members of the registry are welcome at these meetings. We hope to see you there!

Respectfully,  
Kelly Neal  
NRRPT, Chairman of the Board

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## Welcome New Members

Congratulations to the following individuals who successfully passed the Canadian  
NRRPT January 30, 2011 examination:

Yuri Bass  
Penny L. Howlett  
Lee M. Nowak  
David C. Thomas

Congratulations to the following individuals who successfully passed the  
NRRPT February 26, 2011 examination:

Fredrick R. Abbott  
Jason A. Barney  
Philip A. Bishop  
Gary L. Chadwick  
Christopher F. Coufalik  
David M. Denning  
Rod O. Derleth  
Kevin J. Dolman  
Gregory S. Dungan  
Steven K. Edelman  
Richard S. Grace  
Michael D. Groff  
Andrew S. Handley  
Matthew B. Hayes  
Scott M. Holden  
Shannon S. Jones

Sean P. Joyce  
Milton (Jim) R. Knowles  
Christopher R. Kovalovsky  
Ronald R. Labrecque  
Rebecca D. Levack  
John Daniel Marsh, Jr.  
Markilee R. Martinez  
Dennis R. Mitton  
R.K. Morrison  
Robert E. Murphy  
Walter L. Neumann  
Eric R. Newcomb, Sr.  
Christopher G. Nordquist  
Edgar F. Parido  
Helmer B. Pearsall  
Brian J. Perri

Ryan E. Pitt  
Eric L. Renn  
William G. Rowley  
Theresa C. Ruiz  
Matthew P. Russell  
Shannon M. Sauers  
Brent L. Silcox  
Dale A. Thorne  
Neil C. Traub  
Tyrone F. Trent  
Sean D. Tullock  
Mark S. Vonderhaar  
Linwood E. Wadsworth  
Laura K. Weber  
Thomas J. Woffinden

**New Members:** If you do not have access to the "Members Only" portion of the website, please contact the Executive Secretary ([nrrpt@nrrpt.org](mailto:nrrpt@nrrpt.org)). Your email address must be on file in order for you to gain access.

## Arthur F. Humm, Jr. Award Presented to Dave Tucker



Dale Perkins Presents the Humm Award to Dave Tucker

The 2010 Arthur F. Humm, Jr. Award was awarded to Dave Tucker at the 75th Board of Directors/Panel of Examiners meeting in Charleston, SC on February 6th, 2011. This award is presented to individuals who have shown outstanding support to the Registry, the Board or Exam Panel. With this understanding, the Awards committee nominated Mr. Dave Tucker for his outstanding support in coordinating, writing, and implementing the Canadian Exam. Dave was instrumental in the development of the Canadian examination but did not stop there. Dave actively marketed the Registry and the benefits of registration in Canada. The result was the wide acceptance of the Registry and enthusiasm to achieving registration.

Dave graduated from McMaster University with an Hons. BSc in Applied Physics (Health and Radiation) in 1988 and an MSc in Medical Physics in 2005. He was NRRPT(R) in 1994, CHP in 1995 and CRPA(R) in 2005.

He worked as a Health Physicist/Section Head at AECL Chalk Laboratories from 1998 – 1989. Responsible for various areas of the radiation protection program at

various times – favourites were running the radiation safety training program, operational RP support to the research reactors and providing HP support for the emergency preparedness program.

Dave now works at McMaster University in Hamilton Ontario as the Senior Health Physicists, responsible for radiation safety at the McMaster Nuclear Reactor and the University's accelerators and research labs. Also a Special Lecturer responsible for teaching graduate operational health physics courses in health physics and nuclear engineering programs.

Dave is Past President of the Canadian Radiation Protection Association; Past Member of the ABHP Part II Exam Panel; and has an awesome wife (Christine) and three awesome teenage boys (Michael, Scott and Jon).

Thank you Dave, for your dedication to the Registry and congratulations on this well deserved award!

## Creation of the Canadian NRRPT Exam

By Dave Tucker

Interest in the **NRRPT** exam amongst Canadian radiation protection practitioners goes back to the early days of the registry. However, the need to learn US based regulations was often cited as barrier for otherwise motivated and qualified candidates to write the exam. None the less, several Canadians did write the exam. In the 1990s, I was involved in work at AECL's Chalk River Labs to formally recognize **NRRPT** Registration as a promotion criteria for technologists. We organized delivery of a prep course and study sessions and several of us wrote the exam. These initial experiences left me convinced of the value of **NRRPT** Registration as a goal to drive and recognize continuing development in our industry.

In 2004, Ontario Power Generation identified the availability of a Canadian version of the exam as a career development goal for radiation protection staff and an important step in assessing the qualifications of contract personnel working at their sites. Jeff Schaefer was assigned the task of exploring how to make this happen. He decided to approach McMaster University and seek our assistance to get a Canadian exam going. Jeff and I had worked together for many years at AECL, and I was **NRRPT** registered and had a strong interest in this project, I was happy to volunteer to take the lead in this on behalf of the University.

Jeff and I were invited to meet with the **NRRPT** Board at the 2004 HPS Conference in Washington DC. We were very pleasantly surprised to find that, not only was there interest in this from the **NRRPT**, but that they had actually formed a working group to establish a Canadian exam and made some initial attempts to get the ball rolling. The only thing that was missing was some Canadians to participate. As the saying goes, it was the beginning of a beautiful friendship (several, actually). With the strong support, encouragement and guidance of the current Chairman of the Board Kelli Gallion and the current Exam Panel Chairan Dave Biela, we set out to establish a Canadian version of the exam.

The next day, we met with the exam panel and reviewed a representative set of questions to see what we had taken on. Of 150 questions reviewed (one exam's worth) we determined that 100 were "good to go", that about 20 needed to be modified to reflect differences like dose limits or ICRP 60 versus ICRP 26 methodology, and the remaining 30 needed brand new questions.

Bruce Power was approached and expressed interest and commitment to participate. We formed a working group consisting of Jeff Schaefer (OPG), Kevin Lenestour (Bruce Power) and myself. We recruited another former AECL colleague Terry Donohue – one of the few Canadians around who had passed the exam – to review the first question set with us. We were very careful to stay as true to the original exam question as possible – so that we weren't messing with the **NRRPT** formula that had been so successful for so long.

By 2006 February, we had a large enough body of questions to draw from, all reviewed and "Angoffed" by the full exam panel, that we were ready for the first Canadian exam. OPG had lined up a good set of candidates and provided them with a prep course and the exam was a great success.

With strong support from the subsequent Chairmen of the Board (Dave Biela and now Kelly Neal) and Exam Panel (Karen Barcal) and Executive Secretary (DeeDee McNeill) work has continued to comb through the exam bank and create a Canadian equivalent question wherever needed. As new questions are added to the bank, they undergo the same review and a modified Canadian question is created if needed. Canadian exams have been run nearly every year since, in each case hosted by OPG.

It was a great experience working with the **NRRPT** Board and Exam Panel members to get this process going. It is an exceptionally dedicated and hard working group of volunteers that have been extremely welcoming to the lonely foreigner in their midst.

## A Straight Forward Approach to Radioactive Material Shipping

By Dwaine Brown

The International Atomic Energy Agency (IAEA) estimates that between 18 and 38 million packages containing radioactive materials are transported each year throughout the world. This material may be radioactive waste, medical isotopes, industrial radiography sources, well logging sources, research materials, and of course nuclear fuel cycle materials. These shipments are made by land transport, air, or by sea.

There are various agencies that regulate the commercial movement of radioactive materials and with minor variations primarily related to how a shipment is documented. The requirements are consistent for the control of exposure to radiation between the International Civil Aviation Organization (ICAO) as implemented through the International Air Transport Association (IATA) regulations, the International Maritime Organization (IMO) as implemented through the International Maritime Dangerous Goods (IMDG) Code, and specific country regulations that address the ground transportation of radioactive materials such as the United States Department of Transportation (USDOT).

Each agency has adopted requirements for the control of package contents and external radiation levels based on the criteria presented in IAEA Safety Standards Series, Requirements, No. TS-R-1 (ST-1 Revised) and it is the basis of these Regulations that will be discussed in this presentation.

Prior to 1959 the United States Interstate Commerce Commission regulations served as the basis for the various national and international controls for the transport of radioactive materials. The rapid growth of the nuclear industry made the development of controls for the transport of all types and quantities of radioactive materials the highest priority of the IAEA shortly after its formation.

The objectives of this paper are to show how to:

- Properly identify the material to be shipped
- Properly classify a package containing radioactive material
- Properly label and mark a radioactive materials package for shipment
- Properly prepare shipping documentation

Radioactive Material (49 CFR 173.403) is any material containing radionuclides where both the activity concentration\* and the total activity in the consignment\*\* exceed the values specified in the table in 49 CFR 173.436 or values derived according to instructions in 49 CFR 173.433.

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\* Activity concentration is also called specific activity

\*\* Consignment is a package or group of packages or load of radioactive material offered by a person for transport in the same shipment.

**2011 USA NRRPT Exam Date**

**August 6, 2011**

Deadline for application: June 10, 2011

\*\* Exam applications may be  
downloaded  
from our web page \*\*

**[www.NRRPT.org](http://www.NRRPT.org)**

**Radioactive Material (Redacted Table)**

Radionuclide	Activity Concentration for Exempt Material Bq/gm	Activity Limit for an Exempt Consignment Bq/gm
Am-241	1 X 10 <sup>0</sup>	1 X 10 <sup>4</sup>
Co-57	1 X 10 <sup>2</sup>	1 X 10 <sup>6</sup>
Co-60	1 X 10 <sup>1</sup>	1 X 10 <sup>5</sup>
Cs-137	1 X 10 <sup>1</sup>	1 X 10 <sup>4</sup>
Gd-153	1 X 10 <sup>2</sup>	1 X 10 <sup>7</sup>
I-131	1 X 10 <sup>2</sup>	1 X 10 <sup>6</sup>
Ir-192	1 X 10 <sup>1</sup>	1 X 10 <sup>4</sup>
K-40	1 X 10 <sup>2</sup>	1 X 10 <sup>6</sup>
Ra-226	1 X 10 <sup>1</sup>	1 X 10 <sup>4</sup>
T(Tritium) H-3	1 X 10 <sup>6</sup>	1 X 10 <sup>9</sup>
Th-natural	1 X 10 <sup>0</sup>	1 X 10 <sup>3</sup>
U-Natural	1 X 10 <sup>0</sup>	1 X 10 <sup>3</sup>

Next we must classify the material by asking the following questions:

- Is it fissile?
- Is it a Type A Quantity?
- Is it fissile excepted?
- Is it Special Form?
- Is it a Limited Quantity?

**A<sub>1</sub> and A<sub>2</sub> Values for selected radionuclides (Redacted Table)**

Radionuclide	A <sub>1</sub> Values	A <sub>2</sub> Values	RQ Values
Am-241	10 TBq (270 Ci)	0.001 TBq (0.027 Ci)	0.00037 TBq (0.01 Ci)
Co-57	10 TBq (270 Ci)	10 TBq (270 Ci)	3.7 TBq (100 Ci)
Co-60	0.4 TBq (10.8 Ci)	0.4 TBq (10.8 Ci)	0.37 TBq (10 Ci)
Cs-137	2 TBq (54 Ci)	0.6 TBq (16 Ci)	0.037 TBq (1 Ci)
Gd-153	100 TBq (270 Ci)	9 TBq (240 Ci)	0.37 TBq (10 Ci)
I-131	3 TBq (80 Ci)	0.7 TBq (19 Ci)	0.00037 TBq (0.01 Ci)
Ir-192	1 TBq (20 Ci)	0.6 TBq (16 Ci)	0.37 TBq (10 Ci)
K-40	0.9 TBq (24 Ci)	0.9 TBq (24 Ci)	0.037 TBq (1 Ci)
Ra-226	0.2 TBq (5.4 Ci)	0.003 TBq (0.08 Ci)	0.0037 TBq (0.1 Ci) **
T(Tritium)H-3	40 TBq (1100 Ci)	40 TBq (1100 Ci)	3.7 TBq (100 Ci)
Th-natural	unlimited	unlimited	**
U – Natural	unlimited	unlimited	**

**RQ is the reportable quantity. US requirement.**

\*\* The method to determine the RQs for mixtures or solutions of radionuclides can be found in paragraph 7 of the note preceding TABLE 1 of this appendix. RQs for the following four common radionuclide mixtures are provided: radium-226 in secular equilibrium with its daughters (0.053 curie); natural uranium (0.1 curie); natural uranium in secular equilibrium with its daughters (0.052 curie); and natural thorium in secular equilibrium with its daughters (0.011 curie).

Excepted Package Limits

Nature of contents	Instruments and Articles		Materials
	Item Limits	Package Limits	Package Limits (RAM-Limited Quantity)
Solids			
Special Form	$10^{-2}A_1$	$A_1$	$10^{-3}A_1$
Other Forms	$10^{-2}A_2$	$A_2$	$10^{-3}A_2$
Liquids	$10^{-3}A_2$	$10^{-1}A_2$	$10^{-4}A_2$
Gases			
Tritium H-3	$2 \times 10^{-2}A_2$	$2 \times 10^{-1}A_2$	$2 \times 10^{-2}A_2$
Special Form	$10^{-3}A_1$	$10^{-2}A_1$	$10^{-3}A_1$
Other Forms	$10^{-3}A_2$	$10^{-2}A_2$	$10^{-3}A_2$

Excepted Packages Defined as:

Materials (limited quantity)

Instruments and articles (item limits)

Instruments and articles (package limits)

Instruments and manufactured articles are clocks, electronic tubes, or apparatus having radioactive material as a component part.

- Capability of installing a tamper proof seal
- Forces on tie-down attachment must not damage package during transport
- Temperature range -40oC to + 70oC
- No loss or dispersal of material or a 20% increase in radiation level after water spray, free drop, stacking, and penetration tests.

**General Requirements for Packaging**

- Easily and safely handled and transported
- Strong lifting attachments when necessary
- Free from protruding features
- Surface will not retain water
- Withstand effects of acceleration and vibration
- Physically and chemically compatible components
- Temperature range from -40° C. to +55° C.

**Special Form requirements**

- Indispersible solid or sealed capsule which meets the following:
  - ♦ Capsule can only be opened by destroying it
  - ♦ Have one dimension not less than 5mm
  - ♦ Design received unilateral approval
- Demonstration of compliance with the standards can be done by performance, reference to previous tests, or calculations
- Subjected to impact test, percussion test, leaching test, volumetric leakage test, bending test, and heat test
- Would not break or shatter under the impact, percussion or bending tests

**Type A Package Requirements**

- Meet General Package requirements
- Smallest outside dimension  $\geq 100$  mm

- Would not melt or disperse in the heat test
- Would not leak

### Package Label requirements

Must be:

- Readily visible and legible
- "Type A" must be stamped or printed as required
- Proper shipping name
- UN Number
  - ◆ Excepted packages only require UN Number
- Shipper and Consignee with addresses
- Gross mass if exceeding 50 kg
- Identification of primary hazard
- Able to withstand open weather exposure
- Two labels which conform to the appropriate category on two opposite sides of the package or on the outside of all four sides of the freight container
- Labels must not be folded
- Label must not overlap
- Cargo Aircraft Only label for goods transported into or out of US
- Category Labels must have
  - ◆ Contents – symbol of radionuclide – mixtures as space permits
  - ◆ Activity in Bq can have Ci in parentheses
  - ◆ Transport Index for category II and III

### Proper Shipping Names

- Radioactive Material, Excepted Package, Limited Quantity of Material, UN2910
- 'Radioactive Material, Excepted Package, Instruments' or 'Radioactive Material, Excepted Package, Articles', both UN2911
- Radioactive Material, Excepted Package, Articles Manufactured From 'Natural Uranium', 'Depleted Uranium', or 'Natural Thorium' all UN2909
- Radioactive Material, Excepted Package, Empty Packaging, UN2908
- Radioactive Material, Type A Package, Non-Special Form, Non Fissile, UN2915
- Radioactive Material, Type A Package, Special Form, Non Fissile, UN3332
- "RQ" indicated on the declaration when required
- RQ, Radioactive Material, Type A Package, Special Form, Non Fissile, UN3332

Transport Index

Category	Maximum Radiation Level at any Point on External Surface	Transport Index
I-WHITE	Not more than 0.005mSv/hr (0.5 mrem/hr)	0 (< 0.05)
II-YELLOW	More than 0.005 mSv/hr (0.5mrem/hr) but Not more than 0.5 mSv/hr(50 mrem/hr)	0 to < 1
III-YELLOW	More than 0.5 mSv/hr(50 mrem/hr) but Not more than 2 mSv/hr(200 mrem/hr)	1 to < 10
III-YELLOW and also Under exclusive use	More than 2 mSv/hr(200 mrem/hr) but not more than 10 mSv/hr(1,000 mrem/hr)	More than 10

The sum of the transport indices cannot exceed 50 for a single shipment.

**Cargo Aircraft Only**

**Empty Packages**

- Previously contained radioactive material
- Well maintained and securely closed
- No loose contamination
- Any labels which may have been displayed are no longer visible

**Overpacks**

- An enclosure that is used by a single consignor to provide protection or convenience in handling of a package or to consolidate two or more packages.
- Packages of radioactive material may be combined in an overpack for transport.
- Only the shipper is permitted to take a direct measurement of the radiation level to determine the TI.

Must have:

- Proper shipping name
- UN number
- All labels except for the "Type A" package label that are required on the inner package must be reproduced on the outside of the overpack
- Markings required by other international regulations are permitted
- In addition to the languages of the State of Origin, English should be used.
- RQ marked on package for shipments entering or leaving the US

### Additional Package Markings IMDG

- Requires a shippers mark be placed on the package or overpack – initials of the company (ex: HES) at least 2 inches in height
- Tracking number (ex: the RMA number) or other locally generated serial number
- City of destination
- Number of packages (ex: 1 of 1, 1 of 2)

### Placarding

- Four placards front, back and both sides
- Required for Category III in US
- May be required for all Category labels outside US – check local rules
- Enlarged category labels may be used in place of placards (ICAO and IMO only, not US Ground)

### Shippers Declaration for Dangerous Goods

- Two copies completed and signed
- Proper shipping name
- Class- Radioactive Material class 7
- UN number
- Number of Packages
- Subsidiary risk
- Indication of Passenger or Cargo-Only
- Indication of Radioactive or Non-Radioactive
- Special handling information
- Indication if an overpack has been used
- Full name and address of shipper and consignee

- Airport or City of departure and destination
- The words Radioactive Material if not contained in the shipping name
- Name or symbol of Radionuclide(s)
- Activity in Bq, may have Ci in parentheses
- Description of physical and chemical or a notation that it is Special Form
- Competent Authority Certificate mark
- Category Label, I, II, or III
- For II and III Transport Index and package dimensions
- Emergency contact information
- SIGNATURE certifying shipment

### Airway Bill

- Must contain a statement to indicate that dangerous goods are described on accompanying DGD
- When applicable indicate Cargo Aircraft Only or CAO
- For Excepted Packages – in the Nature and Quantity of Goods box list proper shipping name with UN number

### Additional Documentation

- Competent Authority Certificates
- Sealed Source Certificates
- Leak Test Certificates
- Emergency Response Guide
- Locally required transportation documents

### Night-Out Sponsors:

**AmeriPhysics**  
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**Frham Safety Products**

**GEL**  
**Lancaster Services, Inc.**  
**Pangea Group**  
**Structural Integrity Associates**

## Photos from the NRRPT Night-Out in Charleston, SC

The NRRPT "Night-Out" included dinner, drinks, the Arthur F. Humm, Jr. award presentation to Dave Tucker, and Super Bowl fans rooting for their favorite team. Over 30 people attended the evening in Charleston, SC. Thank you to the generous contributions of our "Night-Out" sponsors!



Christine and Dave Tucker



Packer Fan Donna McClung



Dale Perkins explains the official plaque was held up in shipping so he and his wife BK crafted a handmade plaque for this presentation



Dave & Christine Tucker with their Canadian Friends Terry and Marquerite Donahue



### Outgoing Chairman Dave Biela Passes the Gavel to Kelly Neal

Please join the Board of Directors and the Panel of Examiners in congratulating Kelly Neal in his election as the Chairman of the Board of Directors which title is truly a misconception. I say this since not only is Kelly to be responsible for the leadership of the Board of Directors, but this position also entails oversight of the Panel of Examiners, various committees that administer various aspects of the actual running of the national Registry and keeping both the Board and Panel on track to ensure that the Registry is maintained to the highest standards and continues to be the recognized authority for Radiation Protection Technologists in all radiological applications.

Kelly brings to this new position not only several years of experience with the Board as treasurer and a member of the Panel of Examiners but extensive experience as a Technologist and most recently a Health Physicist with broad responsibilities for the operational aspects of programs within the Department of Energy.

This experience starting with the U.S. navy nuclear program (skimmer), but as a technologist in both commercial and DOE programs serves him and our Registry well.

Kelly is known to be the type of individual that has the ability to look at an issue, evaluate the guiding requirements and work to develop the most reasonable approach to compliance.

We are very fortunate to have Kelly as our new Chairman of the Board and look forward to his leadership in the coming years.

Welcome Aboard Kelly!

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### Remember.....

Job openings can be placed on the "Private Side" of the **NRRPT** website

Email information to the Executive Secretary's office ([nrrpt@nrrpt.org](mailto:nrrpt@nrrpt.org))



## ENERGIZE YOUR CAREER AND JOIN THE BARTLETT TEAM!

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**Send resumes to\*:** nuclear@bartlettinc.com " Fax (508) 746-8588

*(\*Please reference NRRPT when sending in your resume)*

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## Southern California Edison

Mark Lewis, RPM  
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San Clemente, CA 92672  
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mark.lewis@sce.com

San Onofre Nuclear Generating Station is proud to have over 30 registered NRRPT members in our Health Physics, Training, Chemistry, Engineering, Operations, Oversight, and Maintenance organizations. We are especially proud that Kelli Gallion, our Emergency Planning Supervisor, was a member of the Panel of Examiners, Board of Directors, elected Chairman of the Board, and served as the Executive Committee Chairman. Kelli was (again) elected to the Board of Directors and will begin her term January 1, 2012.

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.

### AmerenUE-Callaway Plant

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Detroit Edison operates the Fermi 2 Nuclear Power Plant located in Monroe, MI along the shores of Lake Erie. Fermi is a 1200 MW power plant supplying electricity to the metropolitan Detroit area. Fermi's USA Supplier of the Year TLD lab provides dosimetry services to USA facilities and other non-power plant entities.

## Duke Energy Corporation

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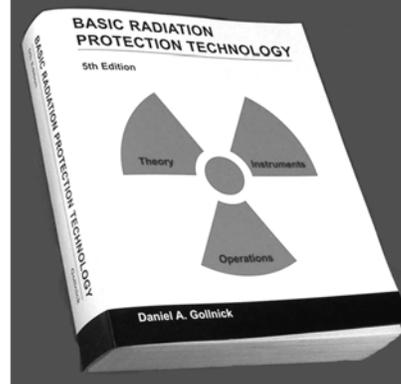
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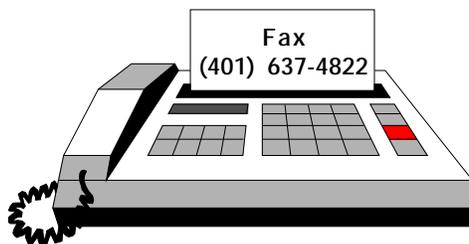
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