



The NRRPT NEWS

OFFICIAL NEWSLETTER of the *National Registry of Radiation Protection Technologists*

September 2016

Incorporated April 12, 1976

Chairman's Message

Greetings fellow RRPTs !

In my final newsletter Chairman's Message, I would like to begin with what is happening with the nuclear power industry and its recognition as a vital part of the Green Power movement. Green power is a subset of renewable energy that represents those renewable energy resources and technologies that provide the highest environmental benefit. Nuclear Power is finally beginning to be recognized as a Green Power source at the state government level.

While those that work in nuclear power are aware of the low environmental impact and positive local economic impact, this is the beginning of recognizing nuclear power as an important part of the overall power reliability that Americans need in a green economy.

According to *The Washington Post* (August 1, 2016), in an article about states going green, New York's Public Service Commission approved a Clean Energy Standard backed by Gov. Andrew Cuomo. The Clean Energy Standard seeks to get New York to 50 percent renewable electricity by the year 2030 — while also retaining the six nuclear reactors that currently provide more 30 percent of the state's electricity.

On a sad note, Claude Hooker, a founding member of the Registry, has passed away. I have been involved with the business of the Registry since 1999 and since that time I have heard many wonderful stories of what Claude and his wife, Bunnie, have done for this organization. He was there from its inception through the Health Physics Society vision to seeing its ranks rise to over 2500 Registered Technologists during his time on the Board of Directors and Panel of Examiners. We, as Registered Technologists, owe a great debt to visionaries, such as Claude, that systematic applied their overall knowledge of radiation protection to build an organization that is recognized world-wide. Please take time to read the article in this newsletter about Claude and the impact that he had on his



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family and friends through his faith and his belief in making radiological protection technologist a recognized national certification.

I have had the honor to serve as the **NRPT** Chairman for the past three years and have seen this organization continue to increase its ranks by offering the exam to our Canadian neighbors. This growth will continue as the Registry is on the cusp of implementing the International Exam to all other nations beginning in 2017. I dare to say that the founders of this organization never fathomed in 1975 that the vision they had would enrich and enhance the working lives of so many involved in the field of radiation protection. Given that, please take the time to promote the Registry to those within your organization. Many of your coworkers have not taken the opportunity to increase their overall knowledge of the radiation

protection field. Remind them that being a Registered Technologist makes them a more valued member of their organization.

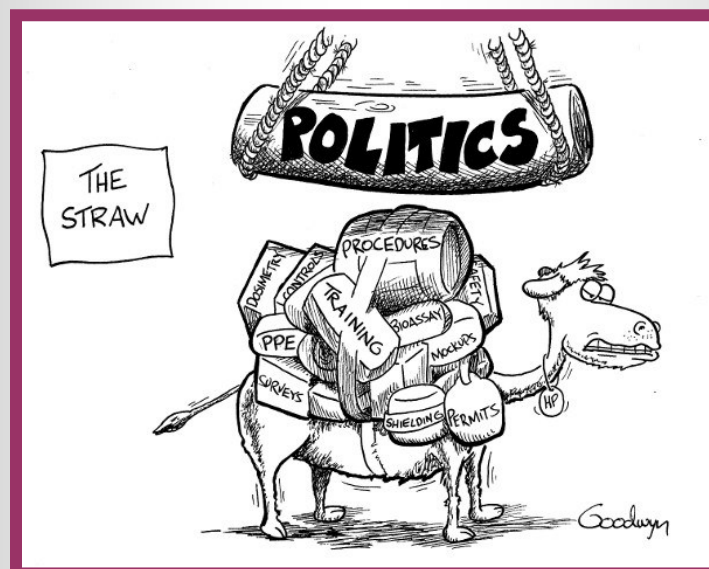
In closing, I would like to thank all those friends and acquaintances that have had a part in making my time as Chairman a valuable and entertaining learning experience. I especially want to thank DeeDee McNeill DeGrooth for putting up with my shortcomings and keeping me on the straight and narrow when dealing with the internal workings of the Registry. To Dave Tucker, incoming **NRPT** Chairman, I give you access to my knowledge gained through this position and my promise to assist you and the members of the Registry on taking this organization to the next level of recognition.

Respectfully,
Eddie Benfield
NRPT, Chairman of the Board



Watch for These Articles in Our Next Issue!

1. Arc Flash Event by Seth Kanter, Radiological Engineering Manager, Idaho National Lab
2. Charles D. (Bama) McKnight Memorial Award presented to a worthy individual
3. **NRPT** Panel Member visits the Hanford B Reactor



C-14 Testing in Environmental Air Samples / A Dose Pathway Study

By Robert Wills RRPT – GEL Laboratories, LLC

Abstract

The purpose of this study is to identify improved field sampling methods for C¹⁴ in a CO₂ matrix for environmental health physics. The physical characteristics outlined in the study required a solid sample collection matrix in a standard 2.27 inch diameter x 1.04 inch thick cartridge. This sample cartridge is the typical format used by US nuclear utilities for I¹³¹ testing and would not require any new or additional field sampling equipment.

Additionally the cartridge would need to be field deployed for seven calendar days running twenty four hours per day without CO₂ break-through. A combination of sample volume, bench chemistry and counting capabilities must be designed to provide a low level of sample activity such that the minimum detectable concentration (MDC) values allow for meaningful dose calculations. By the end of the study GEL Laboratories, LLC (GEL) developed a product (GEL-SORB C-14) which has a field proven analytical MDC of 0.0185 Bq/M³ (0.5 pCi/M³) or less. This provides a calculated exposure pathway to the child of less than 0.1 mSV/yr (10 mRem/yr).

Introduction

As radiological monitoring programs in the US have developed an otherwise overlooked isotope for environmental pathway assessment was C¹⁴. In the early age of nuclear energy and reactor fuel reprocessing C¹⁴ was considered a minor dose contributor compared to Sr⁸⁹⁻⁹⁰, I¹³¹, I¹²⁹, H³ and other fission and or activation products that are discharged to the environment via stock effluents.

In the early days of nuclear power the calculated dose contribution of C¹⁴ was less than 0.1% of the total exposure pathway, however, as ALARA programs have matured and reactor fuel integrity has improved we now live in a different world. Today C¹⁴ is the largest dose contributor to the general public via air borne environmental pathways accounting for almost 90% of the total dose to members of the public. This is based on a typical NRC 10-mile ingestion pathway zone with sampling locations at 0.5, 2.5, and 10 miles from the center of the plant.

The United States Nuclear Regulatory Agency requires in Title 10 CFR 50 Appendix I that all power reactors perform assessment for the following.

1. Provide Data on Measurable Levels of Radioactive Material Released in Liquid and Gaseous Effluents
2. Provide Data on Measurable Levels of Radioactive Material Released in the Environment
3. Identify Changes in Principal Exposure Pathways

Starting in 2012 GEL Laboratories; LLC started a field testing program at three US nuclear power plants to determine if GEL-SORB-C¹⁴ would provide sampling results at or below an MDC of 0.0185 Bq/M³ (0.5 pCi/m³). After almost two years

of testing the cartridge has a proven track record and is considered a state of the art field sampling tool for environmental health physicist. .

Prior to 2010 C^{14} was not a reportable isotope in reactor effluents or radiological environmental monitoring programs. After this date the NRC required utilities to report C^{14} releases as part of the effluents regulatory guide 1.21 "MEASURING, VALUATING, AND REPORTING RADIOACTIVE MATERIAL IN LIQUID AND GASEOUS EFFLUENTS AND SOLID WASTE".

Since the utilities did not have an available analytical method to determine the amount of C^{14} the plant was discharging they chose to perform an activation and production calculation based on effective full power reactor hours. This method was used to provide the frame work to calculate the discharge of C^{14} . This approach had two several basic flaws.

1. The calculation did not take into account different plant operating modes as some plants perform continuous discharge and others may discharge only a few times a year
2. The calculation did not account for discharges due to reactor depressurization during refueling and maintenance outages – a non stack release
3. The calculation did not take in account different plant equipment for off gas treatment "gas recombiner" turning organic gas to CO_2

Additionally the problem with the calculation methodology is that it falls short in several key areas,

- Calculated Doses tend to yield higher results (overestimated) when compared to measured results
- Calculation model does not account for normal venting events, maintenance and outages

With no real field data taken the GEL team approached several PWR and BWR US reactors and performed a two year study on the utilization of GEL-SORB- C^{14} . The cartridge not only meets design expectations but performed well in high heat and high humidity environments.

With the introduction of GEL-SORB- C^{14} the environmental health physicist can now perform true atmosphere testing for C^{14} in the environment.

Field Results

GEL deployed GEL-SORB C^{14} at three nuclear power plants from 2012 to 2014. The results showed lower detection levels "MDC" than our original test model assumed resulting in "lower calculated child pathway dose assessment". Field cartridge testing has proven to be a quality tool with MDC values ranging from 0.0185 Bq/m³ (0.5pCi/m³) to just over 0.037 Bq/m³ (1.0 pCi/m³).

Conclusion

Nuclear utilities no longer need to provide exposure pathway assessment by utilizing calculations. The use of GEL-Sorb C^{14} air sample cartridges allow the utility to assess the discharge of C^{14} with detection limits and dose assessments in line with all other gas and particulate releases the plants ODCM require.

Special Award Presented to Dave Biela

By Ed Lohr

A Special Award was presented to Dave Biela at the NRRPT Night-Out on July 17, 2016 in Spokane, WA. The award was in recognition of his many years of service and devotion to the Registry. Over the many years he has been active in the NRRPT (registered in 1986) Dave has served in many leadership positions including, the Exam Panel Chairman, the NRRPT Vice Chairman and the Chairman of the Board. He worked with Dave Tucker and others to create the first Canadian exam. Dave is active on the Exam Performance, Administrative Maintenance, and International Exam Committees as well as a member of the Exam Panel. Dave is a 2002 Fellows member and a 2007 recipient of the Arthur F. Humm, Jr. Award. He lives and works in upstate New York with his lifelong sweetheart and wife, Diana.





NRRPT Night-Out in Spokane, WA

*** Thank you to our generous NRRPT
Night-Out sponsors ***



John Arrowsmith (Frham Safety Products), Ken Baugh (B&B Environmental Safety),
Eddie Benfield (Duke Energy), Tom Hansen (Ameriphysics),
Jay Tarzia (Radiation Safety & Control Services), Bob Wills (GEL),
Terry Donohue (Radsafe Canada Ltd) and Todd Davidson (Envirachem)



Fellows Awards Presented at Night-Out

By Ed Lohr

Two very active **NRRPT** members, Todd Davidson and Dave Tucker, were presented with certificates for their 2015 selection as Fellows at the **NRRPT** night-out in Spokane, WA. Fellow status is awarded by the Board of Directors to registered individuals in recognition of their outstanding contribution to the **NRRPT**.

Todd serves on many committees including the Panel of Examiners, Awards, Continuing Education, and Marketing. He is the Newsletter Editor and has been an RRPT since 2003. Todd, through his business, Envirachem, is an **NRRPT** Gold Corporate Sponsor. Along with his wonderful wife, Laura, he lives in Union, Missouri.

Dave is the current Vice-Chairman of the Board and serves on the Academic Expansion, Expansion and Reach Out, Exam Performance, International Exam, and Marketing committees. He has been an RRPT since 1996 and has the distinction of being the first Canadian member on both the Panel of Examiners and the Board of Directors. He calls the land above, Ontario, Canada home with is lovely wife, Christine.



Dave Tucker accepts his Fellow Award certificate from Awards Chariman Ed Lohr

Class Clown Todd Davidson accepts his Fellow Award certificate from Awards Chariman Ed Lohr





**NRRPT Board of Directors and
Panel of Examiners
working in Spokane, WA**

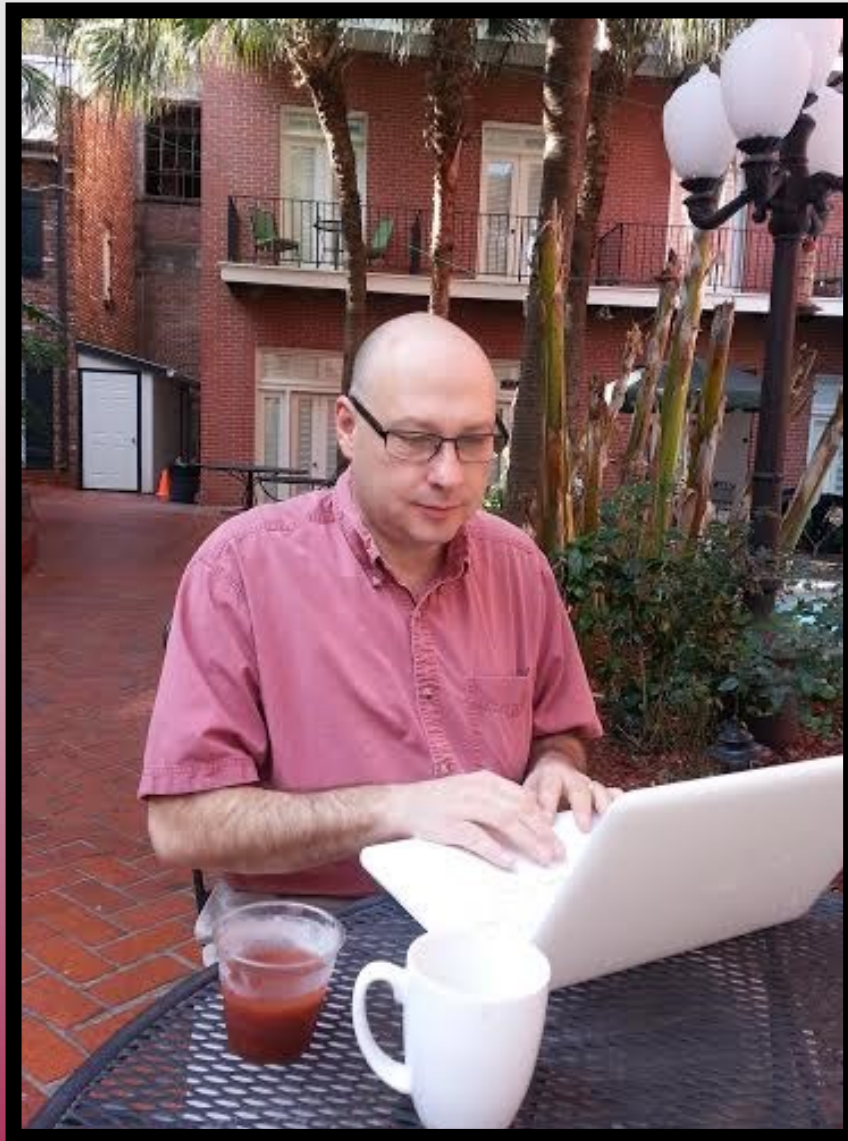


Dan Green, One of the New Panel Members

Dan has over twenty-five years of experience in radiation protection and occupational safety and health. He began his career in 1989 working at the Nevada Test Site (Nevada National Security Site). He is currently employed at Los Alamos National Laboratory. Prior to joining LANL, he worked on the American Centrifuge Project at a site in Ohio. Over the years, he has had the opportunity to be involved and work in several disciplines of the radiation protection field such as training, waste management, and D&D to name a few. Dan is a hands-on type of person who prefers to be on the floor or out in the field rather than behind a desk. He also enjoys mentoring and training new RCTs entering the field.

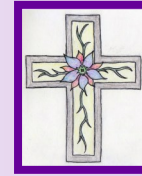
Dan joined the registry in 1997. He holds a degree in electrical engineering and a B.S. in Education.

Dan and his wife live in Sante Fe, NM. Hiking during the day and listening to live music in the evening are two of their favorite activities. Dan is a wine fanatic and devotes much of his free time learning about wine, collecting, and sharing his favorites with friends and family. His travels include time dedicated to finding the perfect bottle.





Saying Goodbye to One of the Original NRRPT Board Members



CLAUDE DALE "C.D." HOOKER, JR of Kennewick, WA completed his work here on earth on September 1, 2016 and has joined family and friends who have gone before him. He had recently shared with his sister that "It will be good to see mom and dad again!" C.D. was born in Cody, Wyoming, on September 19, 1932, to Claude and Zona Hooker. The family moved to the Tri-Cities, WA in 1947 where he played basketball and baseball at Kennewick High School, graduating in 1950. He married his childhood sweetheart, Verna Mae "Bunnie" Allaway, on December 24, 1950.

C.D. was one of the first Board members of National Registry of Radiation Protection Technologists (**NRRPT**) which was established in 1975 and incorporated in April 1976. The **NRRPT** was founded to *"encourage and promote the education and training of radiation protection technologists and, by doing so, promote and advance the science of health physics"*. As one of the trailblazing pioneers, C.D. knew the importance of establishing this avenue in which radiation protection technicians could demonstrate their broad knowledge of health physics through passing a national examination. He was proud to hold positions on the Board of Directors, Panel of Examiners and serve as Secretary/Treasurer during his 16 year tenure with the organization.

In 1996, both C.D. and his wife Bunnie received the Arthur F. Humm, Jr. award. This is awarded by the **NRRPT** Board of Directors to persons who have given outstanding support to the **NRRPT** organization. This is the most prestige award the **NRRPT** offers. C.D. received the award for his pioneering role and years of dedicated service and Bunnie received the award for supporting C.D. in the **NRRPT** and establishing the **NRRPT** Executive Secretary position.



Twenty years as a snowbird in Yuma allowed him to touch many lives as he sang, played guitar and composed music for regular jam sessions. He spent many hours boating with family on area waterways and enjoyed camping with kids and grandkids throughout the years. C.D. and Bunnie were fortunate enough to be able to travel extensively throughout the United States. Dad/Grandpa/Papa Hooker was always quick with a smile, a joke or a jingle to make us laugh.

C.D. is survived by his loving wife of 66 years, Verna "Bunnie" Hooker, of Kennewick; children Michael (Debbie) Hooker; Shelley Ledbetter (Justin); Peggy (Del) Albertson; and many grandchildren and great-grandchildren. A strong Christian, he woke daily at 5:00 a.m. to study his Bible and pray for his family. He is walking the walk with Jesus, and he is now in the presence of the King! A celebration of life was held on Sunday, September 18, 2016 in Kennewick, WA. The family invites you to sign their online tribute wall at: www.muellersfuneralhomes.com

Welcome New 2016 NRRPT Members

Congratulations to the following individuals who successfully passed the
NRRPT Examination on February 20, 2016:

Timothy Bigler
Jeff A. Carey
Judith M. Coffey
Eduardo B. Farfan
Derek Fowers
Cecila Greene
Aaron D. Hansen
Ahaileas V. Harisis
Jeremy T. Heer
Kathleen M. Helle

Carolyn Lachance
Kelly Nead
Kevin Ockerman
Chris P. Schnieders
Bryan Sims
Stan W. Stevens
Adrian B. Thompson
Robert L. Wade
Marni L. Wittman

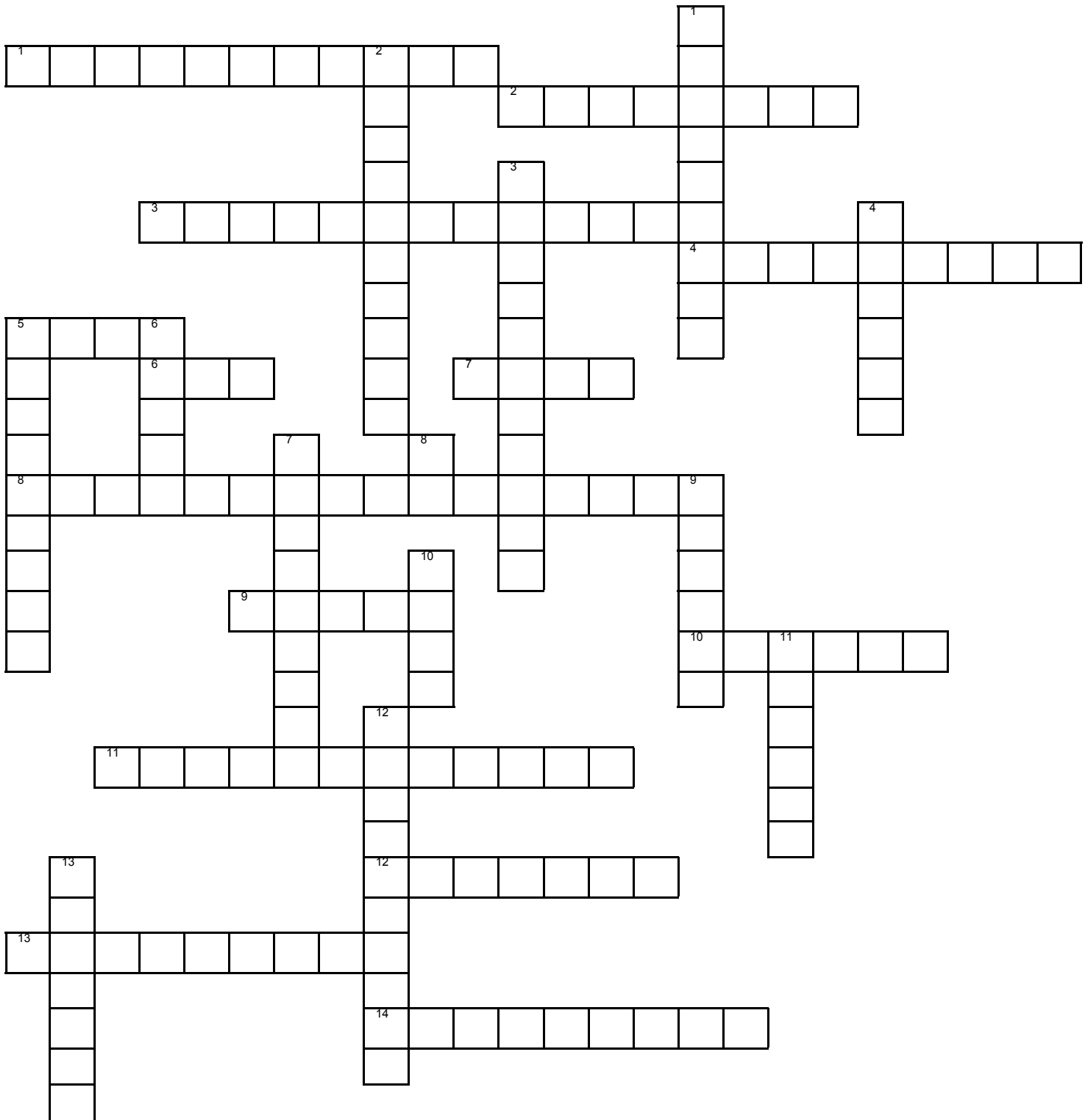
Congratulations to the following individuals who successfully passed the
NRRPT Examination on August 13, 2016:

Sandra Anderson
Adam Archer
Erwin Arias
Jonathan E. Biela
Jordan T. Bristow
William B. Brockman
Ben L. Coffey
Melissa M. Cogdill
Jason C. Combs
James R. Duncan
Matthew W. Eberstein
Michael D. Franklin
Mark S. Gallant
Adam L. Gilliam
Bradley A. Glasco
Brian Hallett
Cory Hayes
Jesse W. Hendricks
Troy W. Holmberg
Majid H. Khalaf
Kenneth D. Kuhns
Kenneth M. Lawson

Ivey R. Lee
Sagan Lewis
Raj K. Maharjan
Patrick B. McDermott
Jason A. Meade
Andrea K. Murphy
Lawrence J. Nolte
Wayne R. Petersen
Sarah J. Rees
Thomas E. Reichard
Lark Scott
Brian R. Skiles
Christy L. Speal
Mitch Staniek
Robert W. Stueve
Kevin P. Sumrell
Seyed M. Tabatabai
Fabian L. Warren
Benjamin C. Willoughby
Devin M. Wood
Wilson Yarbrough
Xavier J. Zubiate

Rad Crossword Puzzle

Solution on Page 19



Rad Crossword Puzzle

Across

- 1 The presence of an absorbing material in the path of radiation can greatly affect the _____ of the counter.
- 2 It is the antiparticle of a positron.
- 3 A device that detects the light that flashes from phosphors is called a _____ counter
- 4 A G-M survey meter response is not directly proportional to the energy absorbed in the _____ volume.
- 5 The probability of a neutron interaction (Cross-section) is expressed in what unit.
- 6 In an emergency in a DOE regulated facility, exposure to personnel must be voluntary if it may exceed a whole body exposure of 5 ____.
- 7 One of the first personal dosimeter devices was the photographic _____ badge
- 8 An acute, whole body (DDE) radiation exposure of approximately 8 Gy will likely suffer symptoms of up to which level of the Acute Radiation Syndrome
- 9 _____ is the energy per unit mass transferred to charged particles by uncharged particles passing through a substance.
- 10 The _____ dosimeter is a cadmium shielded dosimeter and detects thermal neutrons leaving the body of the wearer
- 11 In its original design, the ion chamber was used in the form of an _____
- 12 A tissue depth of 0.007 cm is used for _____ dose measurement.
- 13 For an _____ use vehicle transporting radioactive materials, radiation levels on contact with any external surface of the vehicle must not exceed 2.0 mSv/hour.
- 14 The loss of hair is called _____.

Down

- 1 The probability that a count will be recorded if radiation enters the sensitive volume is called the _____ efficiency of the detector
- 2 Using a sampling velocity that is exactly equal to the velocity of the gas stream at the point of sampling is called _____ sampling.
- 3 Absorbed dose may be measured by _____ since much of the energy lost by radiation in matter appears in its final form as heat.
- 4 The main application of _____ scintillation counting is for identification of low energy beta emissions.
- 5 The relationship between the ionization of the gas in an ionization chamber to the dose in the wall material is the _____ principle.
- 6 This wonderful organization encourages and promotes the education and training of radiation protection technologists.
- 7 Isotopes are forms of the same chemical element that contain _____ numbers of neutrons
- 8 The elemental symbols for Beryllium is _____.
- 9 LET is the _____ Energy Transfer
- 10 The mean free _____ the average distance of photon travel in a medium between interactions.
- 11 _____ spheres can be used to determine neutron spectra
- 12 Radionuclides with a high probability of attaching to bones are called _____-_____.
- 13 Pulse height resolution is the ratio of full width at half _____ to photopeak energy.

Key West, Florida

By Dan Green

The **NRRT** will be holding the mid-year meeting in Key West, Florida. A few years back, a cruise ship that I was on experienced mechanical problems, so I found myself on the island for three unexpected days while the ship was repaired. Not knowing much about Key West and with no agenda, I set out to discover Key West.

Given the island's history and location, Key West is what happens when you swirl U.S, Cuban, and Bahamian influences together. Key West is the kind of place that offers something for everyone. Those looking for rest and relaxation will enjoy the beaches and sunset views from Mallory square. Active vacationers will appreciate the diving, fishing, and boating opportunities. History buffs will want to make the trip to Dry Tortugas National Park and explore Fort Jefferson. Unlike many tourist destinations, Key West has not become over run with chain stores and restaurants. Many of the stores and restaurants remain independently owned. At night, Duval Street, the commercial hub of Key West, transforms into a carnival like atmosphere. And everyone makes a stop at the Southern most point in the continental U.S. for a photo.

In a way, Key West is like an individual person, unique and a little quirky. After all, what other city in the U.S. has live chickens roaming the streets or a house where the cats living there now are as famous at the author who once did. And in April of 1982 during a dispute with the U.S. Border Patrol, in a tongue-in-cheek fashion, Key West declared its independence from the United States and dubbed itself the Conch Republic. "Discover the Florida Keys" is a well-known advertising slogan. Perhaps a more appropriate slogan would be "Discover the Florida Keys in You". There are many reasons to visit Key West, and now **NRRT** members have one more reason to visit.



Don Krause, Bio on a Panel Member



Don has worked in commercial, DOE, and academic nuclear/radiological activities for over 40 years. His experience is broad, with positions in management, engineering, and operations including over 10 years in health physics, training, and emergency planning. Don has also worked over 10 years supporting DOE and commercial uranium, tritium, thorium, and plutonium D&D projects. He became RRPT registered in 2013 while he was the RPM/RSO at GE Hitachi's Vallecitos Nuclear Center near Pleasanton California and currently serves on the NRRPT Panel of Examiners. Don is currently with the Nuclear Regulatory Commission as the Resident Inspector at the Monticello Nuclear Generating Plant. Don has held two Senior Reactor Operator licenses and served 6 years in the U. S. Navy Nuclear Power Program. Don has a Masters of Engineering in Nuclear Engineering from the University of Virginia and a B. S. from Virginia Tech. Don and his wife enjoy SCUBA diving when time and weather permit and are PADI SCUBA instructors always looking to share their diving enthusiasm.

Thank you Don Krause for the
NRRPT Rad Crossword Puzzles!!



We appreciate our NRRPT Corporate Sponsors!



NRRPT Mid-Year Meeting

The 2017 **NRRPT** Board and Panel mid-year meetings will be held in Key West, FL. The **NRRPT** Board meeting is Friday (January 20), Saturday (January 21) and Tuesday (January 24). The **NRRPT** Panel meeting is Sunday (January 22) and Monday (January 23). All **NRRPT** members are welcome to attend!

Thank you sponsors!

If you'd like to join the Panel of Examiners please contact one of the following:

Exam Panel Chairman—Dave Wirkus—David.Wirkus@amwtp.inl.gov

Executive Secretary—DeeDee McNeill DeGrooth—nrrpt@nrrpt.org



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



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San Onofre Nuclear Generating Station



For more than 40 years, SONGS generated power for Southern California – in fact, units 2 and 3 were capable of generating 2,200 megawatts of electricity, enough power to serve 1.4 million average homes at any point in time. SCE announced in June 2013 that Units 2 and 3 will be permanently retired. Unit 1 was retired in 1992.

SCE is committed to a safe and timely decommissioning of the San Onofre nuclear plant that protects the environment and our customers' economic interests. SCE established a set of guiding principles focused on safety, stewardship and engagement that will guide the successful decommissioning of SONGS and can make San Onofre a model for the industry.

SONGS is proud of its' continued dedication of registered RRPT members that are represented in various organizations across the station.

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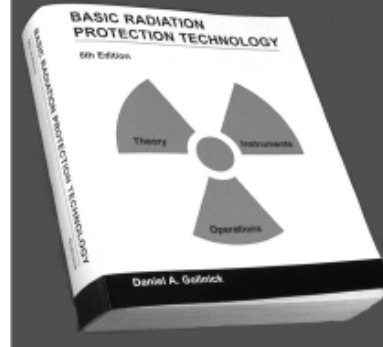
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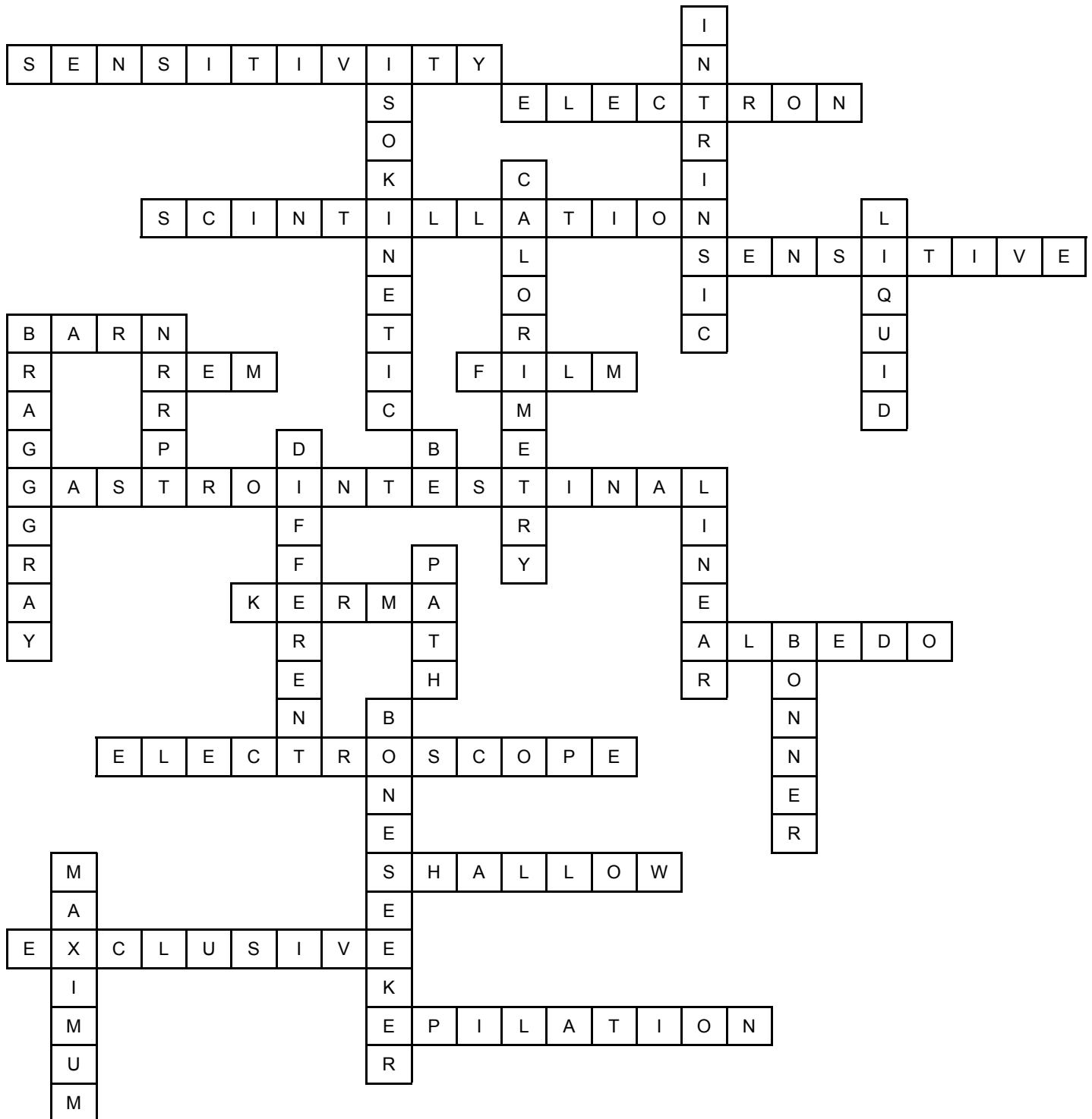
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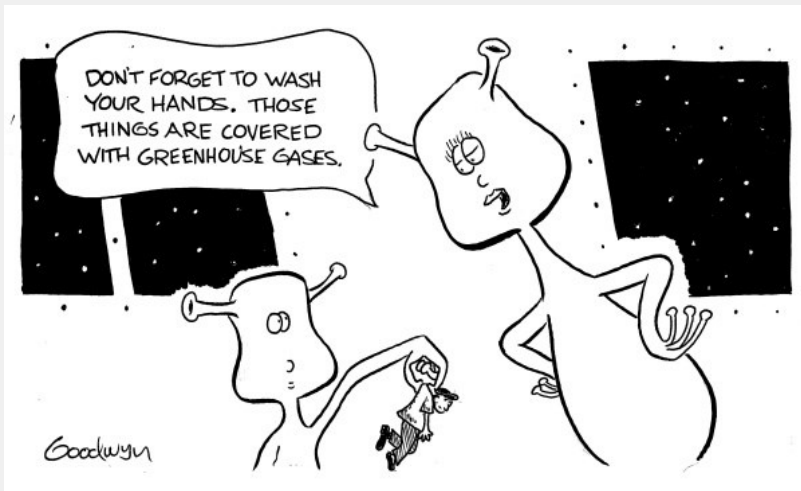
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