

NRRPT® NEWS

National Registry of Radiation Protection Technologists

February 2013 Edition

Incorporated April 12, 1976

Chairman's Message

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Kelly Neal

Greetings fellow RRPTs!

We recently held our winter meeting in Scottsdale, AZ in conjunction with the Health Physics Society's mid-year meeting. A new Chairman, Eddie Benfield and Vice-Chairman, Dale Perkins were elected and will begin their terms next year on January 1,

2014. Chris Whitener graciously agreed to serve another term as Secretary-Treasurer. We also voted in two Board members, Dwaine Brown (returning to the Board) and Ed Lohr who will also begin their 5 year terms next January. Lastly, Terry LaFreniere was elected to the Board of Directors for a 2 year term that also begins next January. Please join me in offering your congratulations to them.

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During this last meeting, we continued our discussions on expanding the NRRPT exam to other countries. Past Vice-Chairman Dave Tucker has volunteered to continue taking the lead on these discussions. Dave is ideally suited to this role as he was instrumental in the expansion of the NRRPT exam into Canada.

As I start my final year as Chairman, I would like to express my thanks to our Board and Panel members. These folks volunteer their time and energy to keep the Registry going strong. Additionally, many thanks go out (as always) to our Executive Secretary, DeeDee DeGrooth, who keeps us going and on task!

The next Board and Panel meetings will be held in conjunction with the Health Physics Society annual meeting July 5 – July 9 in Madison, WI. 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

Welcome New Members

Congratulations to the following individuals who successfully passed the
NRRPT special examination on December 1, 2012:

Corey M. Abbott

Peter T. Logoyda

Cris S. Mingus

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

Marketing Committee News

By Todd Davidson

The NRRPT Marketing Committee met on Saturday, 01/26/2013. There were quite a few attendees including: Terry LaFreniere, Dave Wirkus, Rick Rassmussen, Dave Tucker, DeeDee McNeill DeGrowth, Danny McClung, Kelly Neal, Eric Mickelsen, Dave Biela, Bob Wills, and Todd Davidson

Generally, the sponsorship of the NRRPT has dropped. To try to reverse this trend, the committee will contact the former sponsors to find out how the NRRPT can become sponsored again. If any of you, as registrants, own a company or think that your employer would be interested in sponsorship, please contact us as listed at the end of this article.

It is time for us to get more trinkets for the NRRPT booth. We have a couple of items that we are considering. If you have an opinion of something we can use to remind folks of the value of the NRRPT, let us know. We especially like to use items that can be used at a place of business.

We have been approved for making changes to our booth, including the update of our panels to include the new NRRPT logo. You will see a Newsletter article when the change has been completed, so please keep an eye out for it. The article will request that you take a look at the updates to our booth.

You've probably read this before, and I guarantee you will read it again, but take a look at the NRRPT Facebook page and please "like" us.

A member of the committee has been working on a Market Branding strategy for the NRRPT. The chair of the committee will review the strategy and will try to incorporate it to help the NRRPT attract more interest.

Contact me at either of the following email addresses:

t-davidson@sbcglobal.net
todd.davidson@envirachem.com

Bio on Our Board Member

Danny K. McClung, BS, RRPT
Health Physics Consultant
Office of Public Health
Post-Deployment Strategic Healthcare Group
Veterans Health Administration



Danny McClung is the lone Health Physicist in VA Central Office in Washington, DC. He serves as consultant for all issues pertaining to radiation exposure, including formulation of medical opinions for Veteran claims. Dan is a member of the VHA National Radiation Safety Committee, which oversees the National Health Physics Program and regulation of a 115 facility permits under the NRC master materials license. As a part-time detailed employee to the VHA Office of Emergency Management, Dan is program manager, technical advisor, and a team member of VHA's Medical Emergency Radiological Response Team.

Dan began his professional career in the US Army. Highlights of his 16 year stint in military radiation protection (out of 21 years of service) include assignments at Walter Reed Army Medical Center; Health Physics Instructor at the US Army Academy of Health Sciences; Chief of Radiation Safety for Defense Nuclear Agency at the Nevada Test Site; Senior Reactor Operator at Armed Forces Radiobiology Research Institute; and First Sergeant for the 133rd Preventive Medicine Detachment in Hanau, Germany. He retired from the Army in October 2000.

After military service, Dan was a Health Physicist for CSI-Radiation Safety Academy at the National Institutes of Health, and then served in the federal government at Walter Reed Army Medical Center and the NIST Center for Neutron Research. For the five years immediately prior to joining the VA, he was employed as the Assistant Radiation Safety Officer for the University of Louisville, which housed a robust medical center, cancer center, and academic and medical research facilities. While at UofL, Dan was a member of the Staff Senate and also served on the Technology Transfer committee.

Dan is a graduate of Excelsior College, Albany, New York, with a Bachelor of Science Degree in Technology (sp. in Nuclear Technologies). He was admitted to the ranks of the National Registry of Radiation Protection Technologists in 1990. Dan recently started a 5 year term on the NRRPT Board of Directors and is a member of the exam panel. He is also a plenary member of the Health Physics Society and having completed a 4 year stint on the HPS nominating committee, with 2 years as Chair, is now assigned to the Society Support Committee.

Dan and his wife, Donna, reside in Thurmont, MD; outside the hustle and bustle of city life, and as Dan likes to say, "well outside of the blast zone." They are parents to 3 adult children (Kevin, Amanda, and Andrew), whom they visit with as often as possible.

**** PLEASE SUPPORT OUR NRRPT® SPONSORS! ****

Awards Committee News

By Ed Lohr

The Awards Committee met on January 27, 2013, at the NRRPT mid-year meeting in Scottsdale, AZ. Due to a conflict, the committee chairman, Dale Perkins, was not able to attend. Ed Lohr, acting on his behalf, with the invaluable assistance of Chris Whitener, Todd Davidson, and DeeDee DeGrowth, conducted the meeting.

Items of old business that were completed included finalizing two applicants for the NRRPT Student/Associate Scholarship award and two Member Emeritus applications which were considered in the July 2012 meeting. The Student/Associate awardees, Risha F. Smith and Zapata M. Tate, will receive letters announcing their one-time scholarship awards of \$500.00 each.

There were several items of new business that were addressed. Two new applications for the NRRPT Student/Associate Scholarship were reviewed and awarded. Congratulations to Hattie White and James West for their one-time \$500.00 scholarship awards. Derek J. Berg was approved for \$1000.00 under the Memorial Scholarship to continue in his pursuit of a BS in Engineering at Washington State University. Letters

will be sent to all, announcing their awards. Many of these NRRPT scholarship awards are made possible by a generous scholarship grant from Cabrera, for which the NRRPT is extremely grateful.

The committee selected and approved the Arthur F. Humm award for one of our distinguished members. The awardee's name is being withheld until the award plaque is presented to them at our Summer 2013 meeting. Be sure to attend the summer meeting to enjoy their surprise (and usual embarrassment) as well as to congratulate them on this very prestigious award.

A list of the scholarship recipients will be added to the Membership Handbook and posted on the NRRPT webpage. If you would like to nominate anyone for an award or to apply for one of our many scholarship awards, please contact any of the Award Committee members, Dale Perkins, Chris Whitener, or Todd Davidson (their contact information is in your membership handbook). You may also contact DeeDee DeGrowth at the NRRPT office.

2013 USA NRRPT Exam Date

August 17, 2013 - Deadline for application: Jun 21, 2013

2014 USA NRRPT Exam Date

February 22, 2014 - Deadline for application: Dec 31, 2013

August 9, 2014 - Deadline for application: Jun 13, 2014

2013 USA CANADIAN Exam Date

August 30, 2013 - Deadline for application: Jul 19, 2013

Thanks to Server Solutions

By Todd Davidson

If you have ever wondered about the design of the **NRRPT** website, or who maintains it, or who performs upgrades on it – the answer is Vince Bishop, and his corporation of ServerSolutions.

This article, and the thanks we owe Vince, is because of the great support that he has given to the **NRRPT** over the last 11 years. Particularly, he has made it possible to perform online reviews of the Registration Maintenance worksheets as well as improving the functionality of that review. He has maintained the database of registrants and has helped us in our administration of the registry. Because of this and all of the other great support he gives, this article is our way of showing thanks.

If anyone out there needs professional support in content management, web design, server setup & maintenance, or many other software and hardware skills, please contact Vince Bishop at Server Solutions. Please go to his website at serversolutions.com for a complete list of his skills and services. His work is great, he's very responsive, and he has years of experience. Furthermore, he has a radiation protection background, and therefore he has insight into pragmatic solutions in our scientific/technical fields.

Thank you Vince Bishop and Server Solutions!

NRRPT Now on Facebook®!

By Danny McClung

In keeping with the ever growing global presence of NRRPT, and the immense popularity of social media, NRRPT is now on Facebook. The Board of Directors, at the January 2013 annual meeting, renewed their commitment to use social media as a means of communication amongst our membership. Our Facebook page will be used to post notices of important events in NRRPT, other noteworthy happenings, and health physics related news.

Our page is located at: <http://www.facebook.com/pages/National-Registry-of-Radiation-Protection-Technologists/246860891997820>.

Please direct your comments/questions to the page administrator (Danny McClung) using nrrpt.fb@nrrpt.org.

If you are on Facebook, please view our page and give us a LIKE! If you are not on Facebook, don't you think it's about time?

Server Solutions

Server Solutions, Inc. has been developing and hosting web-based applications since 1996. SSI specializes in applications using database back ends, allowing input and retrieval of data using a web browser. Technologies used include Windows 2000/2003 Servers, ColdFusion MX, MySQL and Microsoft Access databases. SSI's content management system provides a means for users to update web content without having to learn HTML or other web languages. Standard web page hosting and email services are also offered. Contact: Vince Bishop (850) 527-8362

Testing, testing...

By Todd Davidson

Welcome again to this recurring feature that sometimes gives example problems, sometimes gives test-taking strategies, and is always great fun.

Problem (from last issue)

An air sample of a long-lived radionuclide is collected after 5.75 hours of sampling. The sampler flow rate is 24 lpm. The efficiency of the low background instrument used to count the samples is 25.3% for alpha and 26.2% for beta/gamma. The sample is counted for 15 minutes and collects 5 counts in the alpha channel. The background is counted on this instrument for 60 minutes and collects 7 counts in the alpha channel. The sample collection efficiency is 95% for both the alpha and beta channel. For these air samples, there is a self-absorption factor of 0.70 for alpha and 0.95 for beta/gamma.

What is the activity concentration and uncertainty for this air sample? Calculate the minimum detectable concentration (MDC) for this sample. Is the activity concentration greater than the MDC?

Solution

Note that, although it wasn't specified which activity concentration (AC), uncertainty (UNC), and minimum detectable concentration (MDC) were requested, only calculate these values for alpha radiation.

The variables and constants in the following equations are described as follows.

e_{cnt} is the counting efficiency

e_{smp} is the sample collection efficiency

SAF is the self-absorption factor

FR is the sampler flow rate

ST is the sample time

2.71 is Currie's constant

1.65 and 4.65 are the appropriate statistical constants for the 95% confidence level.

$$AC = \frac{(Smp\ cpm - Bkg\ cpm)}{2.22 \times 10^6 \frac{dpm}{\mu Ci} \times \epsilon_{cnt} \times \epsilon_{smp} \times SAF \times FR \times ST}$$

$$AC = \frac{(\frac{5}{15} cpm - \frac{7}{60} cpm)}{2.22 \times 10^6 \frac{dpm}{\mu Ci} \times 0.253 \frac{cpm}{dpm} \times 0.95 \times 0.70 \times 24 \frac{l}{min} \times 5.75 h \times 1000 \frac{ml}{l} \times 60 \frac{min}{h}}$$

$$AC = 7.0 \times 10^{-14} \frac{\mu Ci}{ml}$$

$$Unc = \frac{1.65 \times \sqrt{\frac{Smp\ cnts}{Time_{Smp}^2} + \frac{Bkg\ cnts}{Time_{Bkg}^2}}}{2.22 \times 10^6 \frac{dpm}{\mu Ci} \times \epsilon_{cnt} \times \epsilon_{smp} \times SAF \times FR \times ST}$$

$$Unc = \frac{1.65 \times \sqrt{\frac{5}{15^2} + \frac{7}{60^2}} \text{ (cpm)}}{2.22 \times 10^6 \frac{\text{dpm}}{\mu\text{Ci}} \times 0.253 \frac{\text{cpm}}{\text{dpm}} \times 0.95 \times 0.70 \times 24 \frac{\text{h}}{\text{min}} \times 5.75 \text{ h} \times 1000 \frac{\text{ml}}{\text{l}} \times 60 \frac{\text{min}}{\text{h}}}$$

$$Unc = 8.3 \times 10^{-14} \frac{\mu\text{Ci}}{\text{ml}}$$

$$MDC = \frac{4.65 \times \sqrt{\frac{\text{Bkg cnts}}{\text{Time}_{\text{Bkg}}^2} + 2.71}}{2.22 \times 10^6 \frac{\text{dpm}}{\mu\text{Ci}} \times \epsilon_{\text{cnt}} \times \epsilon_{\text{smp}} \times \text{SAF} \times \text{FR} \times \text{ST}}$$

$$MDC = \frac{4.65 \times \sqrt{\frac{7}{60^2} + 2.71} \text{ (cpm)}}{2.22 \times 10^6 \frac{\text{dpm}}{\mu\text{Ci}} \times 0.253 \frac{\text{cpm}}{\text{dpm}} \times 0.95 \times 0.70 \times 24 \frac{\text{h}}{\text{min}} \times 5.75 \text{ h} \times 1000 \frac{\text{ml}}{\text{l}} \times 60 \frac{\text{min}}{\text{h}}}$$

$$MDC = 1.4 \times 10^{-12} \frac{\mu\text{Ci}}{\text{ml}}$$

This value is larger than that for AC so the answer is no, the AC is not greater than the MDC

At this point, it is valuable to discuss a subject that I feel very strongly about: unit conversion and unit analysis. In many standardized tests, if you are capable of performing unit conversion well, you can work your way through a problem and get the correct answer simply by arranging the given data while using a knowledge of the units required for the final answer. Starting with the next issue of the Newsletter and continuing for several more, there will be problems presented which emphasize unit conversion. So, review everything you know about unit conversion. That, of course, includes one of my favorite devices used in science and technology – the “train-track method.”

While you’re waiting for the next installment of this feature, feel free to contact me with types of problems you’d like to see. You may contact me by either of the following email addresses:

t-davidson@sbcglobal.net
todd.davidson@envirachem.com

2013 NRRPT Sustaining Dues

**Ask your fellow registered member --
have you paid your 2013 dues?**

If you haven't paid yet, please submit to the Executive Secretary's office as soon as possible!

NRRPT Logo Merchandise

The NRRPT Executive Secretary has an assorted selection of NRRPT logo apparel for sale. The inventory is listed below and broken out by the old logo (US only) and new logo (US and Canada). Please contact DeeDee at nrrpt@nrrpt.org if you are interested in purchasing any of the items.

| Items (Old Logo) | Size | Quantity | Cost |
|--|------|----------|---------|
| OuterBanks Polo (white w/blue logo) | Lg | 1 | \$17.00 |
| OuterBanks Polo (blue w/white logo) | Lg | 1 | \$17.00 |
| Long sleeve denim w/blue logo | Lg | 1 | \$15.00 |
| Short sleeve denim w/white logo | Lg | 3 | \$14.00 |
| Short sleeve denim w/white logo | XL | 2 | \$14.00 |
| Long sleeve white denim w/blue logo | 2XLT | 1 | \$15.00 |
| Devon & Jones Pima Polo (tan w/tan logo) | XL | 1 | \$22.00 |
| Devon & Jones Pima Polo (green w/white logo) | XL | 1 | \$22.00 |
| Devon & Jones Pima Polo (brown w/brown logo) | XL | 1 | \$22.00 |
| Sweatshirt (navy w/white logo) | Med | 4 | \$13.00 |
| Sweatshirt (navy w/white logo) | Lg | 7 | \$13.00 |
| Sweatshirt (navy w/white logo) | XL | 2 | \$13.00 |
| Sweatshirt (navy w/white logo) | 2XL | 1 | \$13.00 |

| Items (New Logo) | Size | Quantity | Cost |
|---|------|----------|---------|
| 35th Anniversary Polo (heather grey w/black logo) | Sm | 2 | \$30.00 |
| 35th Anniversary Polo (heather grey w/black logo) | Med | 4 | \$30.00 |
| 35th Anniversary Polo (heather grey w/black logo) | Lg | 8 | \$30.00 |
| 35th Anniversary Polo (heather grey w/black logo) | XL | 4 | \$30.00 |
| 35th Anniversary Polo (heather grey w/black logo) | 2XL | 1 | \$30.00 |
| 35th Anniversary Polo (heather grey w/black logo) | 3XL | 5 | \$30.00 |
| Long sleeve t-shirt (light blue w/dark blue logo) | Sm | 2 | \$17.00 |
| Long sleeve t-shirt (light blue w/dark blue logo) | Med | 4 | \$17.00 |
| Long sleeve t-shirt (light blue w/dark blue logo) | Lg | 9 | \$17.00 |
| Long sleeve t-shirt (light blue w/dark blue logo) | XL | 13 | \$17.00 |
| Long sleeve t-shirt (light blue w/dark blue logo) | 2XL | 5 | \$17.00 |
| Long sleeve t-shirt (light blue w/dark blue logo) | 3XL | 9 | \$17.00 |

| Items Available to Order (New Logo) (visit our website to see merchandise details) | Size | Cost |
|---|----------|---------|
| Polo shirt (blue w/white logo) | Sm-4XL | \$30.00 |
| Short sleeve t-shirt (dark brown w/tan logo) | Sm-4XL | \$15.00 |
| Baseball cap (khaki w/black logo) | one size | \$12.00 |

Add \$7.00 for shipping/handling (per order); Add \$13.00 for Canadian orders

NRRPT Night-Out in Scottsdale, AZ

The NRRPT "Night-Out" continues to be a tradition for Board & Panel members and family & friends of the Registry. Over 40 people attended the Night-Out. This tradition continues due to the generous contributions of our "Night-Out" sponsors and supporters. Thank you to the sponsors below!!



Left to Right:: Mike Reeves (UniTech), Bob Wills (The GEL Group),
Todd Davidson (Envirachem), Tom Hansen (Ameriphysics),
Ken Baugh (B&B Environmental Safety), Fred DeGrowth (Structural Integrity),
Not pictured: John Arrowsmith (Frham Safety Products) and
John Ellison (Day & Zimmerman)

NRRPT Night-Out Photos



Karen Barcal and Mike Reeves

More NRRT Night-Out Photos



Rick Rasmussen and wife Janneke



Terry LaFreniere



Todd Davidson and wife Laura



Dave Wirkus and Bob Wills



Dean & Jennifer Motl and Fred DeGroot

How Fast To Frisk?

By Dennis Mitton, NRRPT
Copyright 2012

How fast to frisk? Your manager – and the regulator looking over their shoulder – says to slow down. The technician looks at a pile of metal plate to be released and groans. Most sites use a working speed of either two inches per second for normal frisking or about half of that if there is a rise in the count rate. I wondered about how this seemingly universal speed was derived and if the two inches per second rule-of-thumb was mathematically optimal and accurate.

I was surprised to learn that calculations for frisking speed aren't easy to find. I read through the standard texts without success. Then I found Appendix J of the MARSSIM manual (Rev. 1) which gives a clear and concise explanation of a scanning speed calculation used for alpha detectors. In this brief paper I will outline the calculation and point out some of the ramifications for its use in the field. Please note that the calculation is specific for 4ø detectors and that the MARSSIM appendix refers only to alpha emissions but the concepts carry over to all instruments.

The formula used to calculate scanning speed – in this case for alpha detection – is a simple one that yields interesting results:

$$P(n \geq 1) = 1 - e^{-(GE\delta)/(60v)}$$

The formula is a probability calculation that answers the question: " what is the probability (P) of detecting one or more counts ($n \geq 1$) on a surface with an activity of (G) dpm/100 cm² using a 4ø detector with an efficiency of (E) with a width in the direction of scan of (d) using a scanning speed of (v) cm/sec? Easy right? Let's parse it a bit. Unless otherwise noted I will use the same activity of 500 dpm/100 cm² used in the MARSSIM appendix. I'll set the efficiency at 0.17 and use an Eberline 43-93 probe with an open window area of approximately 13.4cm x 6.4 cm.

A probability of 1 indicates a one hundred percent assured outcome. The probability of getting 'heads' when you flip a two headed penny is 1. Flip a normal penny and your probability is 0.5. Using this calculation for radiation detection, and specifically for scanning speed, we are answering the question 'what chance is there that a radiation event will be detected depending on the speed of the probe?'

If we plug in our rule-of-thumb frisking speed of 2" (5 cm)/sec we calculate a probability of 0.98 which will fall within any program's acceptable parameters. But what if we speed up just a little? What happens if we speed up to 3" (7.5 cm) / sec? Our P drops to 0.92 – acceptable for some programs but not for others. What about 'turbo frisking'? What probability do we have of detecting activity if we increase our scan speed to 6" (15 cm)/sec? Plugging 15 cm/sec in to our V variable gives us a P of 0.71 indicating that we would be unable to measure a large portion of activity. MARSSIM Appendix J shows several graphs which all show a rapid decline in the probability of detection with an increase in scanning speed. So your supervisor is right: it pays to slow down.

At what speed would it become likely that we miss more counts than we detect? If P is set at 0.49 – one point less than fifty percent – we derive a frisking speed of almost 11" (26.5 cm)/sec. Turbo frisking by any measure!

Continued on page 12

Kicking it Old School – With a Plaque

By Todd Davidson

Are you one of the many RRPTs out there who never bought the plaque to celebrate passing the NRRPT examination?

If you're feeling nostalgic, if you still want to celebrate that uplifting feeling, if you want to commemorate the many hours of time you spent studying, worrying, and taking the test, if you thought that you missed your chance, don't despair! You can still order a plaque for the year you passed the examination.

Of course, it will cost you. Aside from the cost in effort and time for study, there is a price of \$80 for the plaque.

Here's what to do:

1. Contact DeeDee McNeill DeGroot at nrrpt@nrrpt.com.
2. Give us your name.
3. Give us the purchase price of \$80.
4. Receive the plaque which celebrates that you passed, complete with the signature of the Chairman of the Board from that year.
5. Display the plaque proudly at home or work.

Celebrate your past – you passed!

Continued from page 11

Note that the calculation considers the dimension of the detector in the direction of the scan. The calculations above assume moving perpendicular to the long axis of the 43-93 which has an open length of approximately 13.4 cm. What happens when we move parallel to the long axis? Input 6.4 into the calculation as d and we see that even at 2"/sec our P drops to 0.83 for a 15% decrease in activity recognition.

How does the level of activity alter the probability? Can we prove a greater probability of detection at higher rates? If we increase the level of G to 1000 dpm/100cm² while maintaining our scan speed of 2"/sec we calculate a P of 0.99 for an almost statistical certainty. What about for lower rates? An activity level of only 100 dpm/100 cm² - lower than the "background rate at many sites - gives us a P of only 0.53. This argues for doing timed static counting for low-level activity or release surveys. When the other parameters are equal, slowing to about ¼" (0.5 cm)/sec brings P back up to near certainty at 0.99.

So we can draw a few conclusions. The first is that the rule-of-thumb of 2"/sec is a mathematically defensible speed. Secondly, a technician can have confidence that if they are scanning at this speed they should, in most cases, be able to detect whether or not radiation is present. Thirdly, we can see that the practice of slowing our scan speed or even doing static counting makes mathematical sense for very low levels of contamination. Finally, using the concepts in the calculation can give a technician or manager guidance in selecting the right detector for a particular type or energy of radiation.

The final word: slower is better.

NRRPT Board & Panel Meeting in Scottsdale, AZ



Exam Panel Chairman Rick Rasmussen Leads the Panel Meeting



NRRPT Exam Panel Positions Available

If you're interested in joining the
NRRPT Panel of Examiners,
please contact
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Rick Rasmussen
at rickras@lanl.gov





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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.

Duke Energy Corporation

Larry Haynes
 526 S. Church Street, MS-EC07F
 Charlotte, NC 28202
 (704) 382-4481
 (704) 382-3797 (fax)
 larry.haynes@duke-energy.com
 www.duke-energy.com

The new Duke Energy, which is the product of a merger with Progress Energy, is the largest electric power holding company in the United States with more than \$100 billion in total assets. Its regulated utility operations serve more than 7 million electric customers located in six states in the Southeast and Midwest. Its commercial power and international business segments own and operate diverse power generation assets in North America and Latin America, including a growing portfolio of renewable energy assets in the United States. Headquartered in Charlotte, N.C., Duke Energy is a Fortune 250 company traded on the New York Stock Exchange under the symbol DUK.

Duke currently operates twelve power reactors in the Carolinas and Florida and is proud to support the NRRPT.

F&J Specialty Products, Inc.

Frank M. Gavila
 404 Cypress Road
 Ocala, FL 34472
 352.680.1177/352.680.1454 (fax)/fandjspecialty.com

ISO 9001:2008 certified manufacturer of traditional and advanced-technology air sampling instruments, airflow calibrators, filter holders, consumables and accessories.

Air Sampler product lines include; high and low volume, tritium, C-14 and battery-powered air sampling systems. Various models are available for both portable and environmental sampling systems. Consumable product line includes; filter paper, TEDA impregnated charcoal cartridges and silver zeolite cartridges. F&J provides comprehensive collection efficiency data for radioiodine collection cartridges.

F&J manufactures the premier line of small lightweight emergency response air samplers which can operate from line power, on-board batteries or an external DC power source. Battery powered units have on-board charging systems.

171 Grayson Rd.
 Rock Hill, SC 29732
 (803) 366-5131
 frhamsc@frhamsafety.com



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 Nashville, TN. 37210
 (615) 254-0841
 frhamtn@frhamsafety.com

Incorporated in 1983, Frham Safety Products, Inc. continues its sole purpose of manufacturing and distributing products to the Nuclear Power Utilities, DOE, DOD, Naval facilities as well as several industrial accounts and related users of safety supplies and equipment.

From the creators of proven products such as the Totes Overshoe and the Frham Tex II, Frham continues their objective to provide products and services which meet or exceed the specifications set forth by customers and the industries that it serves. These revolutionary new concepts include Life Cycle Cost Management (LCCM), Mobile Outage System Trailer (MOST) and Certified Disposable Products (CDP).

- LCCM offers products through a systematic approach of life cycle pricing to include disposal at the purchase point.
- MOST provides onsite product storage stocked systematically specified by the customer for easy access and stringent inventory control.
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Among these services and products, Frham also supplies chemical, biological and radiological equipment which will support applications for domestic, biological, nuclear, radiological or high explosive incident sites. This equipment is able to sample, detect and identify chemical warfare agents and radiological materials as well as provide safe-barrier, personal protection from chemical warfare, biological warfare, radiological and TIC/TIM environments.

General Engineering Laboratories, LLC

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 Charleston, SC 29407
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 (843) 766-1178 (fax)
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GEL provides the nuclear industry with radiochemistry, bioassay and analytical chemistry support. GEL is a provider of 10CFR61, REMP and hazardous waste characterization to commercial nuclear reactor sites, DOE sites and DOD facilities throughout the US. For information regarding analytical services please contact Bob Wills.



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HI-Q ENVIRONMENTAL PRODUCTS COMPANY, INC.

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HI-Q Environmental Products Company is an ISO 9001:2008 certified designer/manufacturer that has been providing air sampling equipment, systems and services to the nuclear and environmental monitoring industries since 1973. Our product line ranges from complete stack sampling systems to complex ambient air sampling stations. HI-Q's customers include the National Laboratories and numerous Federal and State Agencies in addition to our domestic and international commercial customer base. Our product catalog includes: Continuous duty high & low volume air samplers, radiation measurement instrumentation, radiation monitoring systems, air flow calibrators, radioiodine sampling cartridges, collection filter paper and both paper-only or combination style filter holders. Along with the ability to design complete, turn-key, stack and fume hood sampling systems, HI-Q has the capability to test ducts and vent stacks as required by ANSI N13.1-1999/2011.

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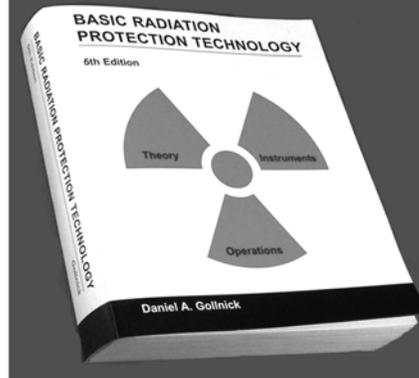
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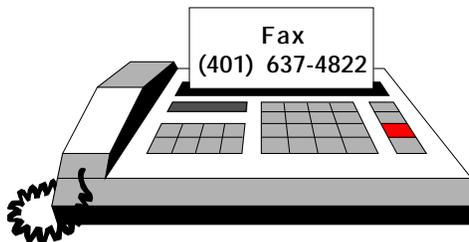
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