

NRRPT® NEWS

National Registry of Radiation Protection Technologists

February 2008 Edition

Incorporated April 12, 1976

Chairman's Message

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Dave Biela (Chairman of the Board) & Kelli Gallion (Past Chairman of the Board)

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Winter is part way over and I hope everyone is doing good and staying warm. You may have noticed for the first time, there are two people on the cover of the newsletter; myself as the new Chairman and Kelli as the past Chairman. I asked for both pictures because I didn't think the registry was ready to go directly from Kelli's picture on the cover to mine. I didn't want to scare readers away!

I would like to take the opportunity to thank Kelli for all her fine work. During her time leading the **NRRPT**, the registry has strengthened our relationships with other organizations within the nuclear community here in the United States and Canada. We have administered our first Canadian specific **NRRPT** exam and have welcomed our first Canadian Panel member.

During my time as Chairman I have two main initiatives. The first is to use the registry to make guidance counselors and students throughout the United States and Canada aware of the potential future short-ages of workers in the nuclear industry. We will be gathering data that will be used in newsletter articles and put in hand-outs that could

be used at jobs fairs, etc. The other initiative is for individuals that are already part of the registry to encourage technicians to sit for the **NRRPT** exam and to help them study for it. When I was preparing for the exam back in 1986, several of the already registered technicians I worked with took the time to put together study groups to help prepare us for the exam. The individuals in the study group typically did well and the help from the other technicians was greatly appreciated.

Our winter meeting this year was held in conjunction with the 2008 North American ALARA Symposium/EPRI Radiation Protection Conference. At the Symposium we provided three PEP courses that were good towards Continuing Education Credit. We also voted in two new Board members, Lindsay Nelsen and Dave Wirkus, will begin their term January 1, 2009. I would highly recommend future ALARA Symposium meetings for both the range of topics and the hospitality. Remember that **NRRPT** Board and Panel meetings are open to the registry. The next Board and Panel meeting is in Pittsburg, PA in conjunction with the HPS annual meeting from July 12th to the 17th. More information will be in the next **NRRPT** News.

Respectfully,
Dave Biela
NRRPT, Chairman of the Board



Dave Biela Presents Outgoing Chairman Kelli Gallion with a Gavel Plaque

2008 USA NRRPT Exam Date

August 2, 2008

Deadline for application: June 15, 2008

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downloaded
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Registry Spotlight ** New Officers **



Eddie Benfield (Vice-Chairman), Dave Biela (Chairman) & Barry Kimray (Secretary/Treasurer), left to right

With the upcoming Presidential elections, 2008 will be a year of change. The New Year has also marked “a changing of the guard” within our Registry. And while New Years is a time of reflection: a time to recall the successes of our predecessors, it is also a time of great anticipation. It is a time to imagine how our organization will change under the purview of new leaders. Our new leaders are not new faces though, but rather are faces we have known for years. We thought that placing an article in this newsletter would be a great way for you to get to know them better. This Registry Spotlight is on Dave Biela, Eddie Benfield and Barry Kimray.

Dave Biela took over as Chairman of the Board of Directors (BOD) on January 1st after Kelli Gallion had finished a very successful 4 years in this role. Until this year, Dave was the Vice-Chairman of the BOD and was previously a long-standing Chairman of the Panel of Examiners. He became registered in 1986. When not working on Registry matters, Dave is the Radiation Safety Manager at West Valley Environmental Services in New York. He enjoys hunting, playing hockey as a “goal tender” and officiates high school basketball. On a more personal level, David has been married for 32 years and has four sons and one daughter. When asked about the more notable accomplishments that he was involved in during his tenure with the Registry, he stated that, “expanding the exam to Canada” and “establishment of an

internal examination processing system” was most significant.

Eddie Benfield is the successor to Dave Biela’s former position as Vice-Chairman of the BOD. Prior to this year, he had spent two years on the BOD and had been on the Panel of Examiners since 2000. He became registered in 1996. Eddie’s day job is working for Duke Energy at the Catawba Nuclear Station as a Radiation Protection Supervisor. He enjoys traveling, playing guitar in the rhythm section at his church and spending time with his family. Eddie has been married for 25 years and has one son that is 20 years old. When asked about the most notable accomplishment that he was involved in, he responded without hesitation: “implementation of the Bama McKnight Award!” Not only does this award reflect on Bama for his achievements and support of the Registry, but the cause is a most worthy one. It recognizes people like Bama that are outstanding trainers.

The third person in the spotlight is Barry Kimray. This year Barry was handed the baton from Kelly Neal, becoming the new Secretary/Treasurer. Prior to this appointment, he had been on the BOD since January 2007 and served on the Panel of Examiners prior to that. Barry first became registered in 1997. When not serving the

Continued on page 6

A General Review of Detection and Measurement of Radioactivity

By Augustinus Ong, Dartmouth College

The purpose of this review, in the format of questions and answers, is to remind readers of some of the basic aspects of calculations dealing with detection and measurement of radioactivity.

Scenario: You have been assigned to determine the activities of known radionuclides found on a charcoal filter used in the stack monitor at a nuclear reactor. Your fellow colleague provides you with the following data to get started:

Detector Calibration Data

Gamma Energy (keV)	Calibration Source (gamma/sec) decayed-corrected	Ge(Li) Detector (net counts/1000 seconds)
60	2,000	84,000
88	1,800	96,000
121	1,600	79,000
344	1,500	31,000
768	700	9,000
963	800	7,500
1,408	1,200	8,300

Charcoal Filter Sample Measurement

Peak Energy (keV)	Ge(Li) Detector (net counts/1000 seconds)
122	7,310
136	11,000
265	8,540
280	5,300
401	630

Possible Radionuclides in Charcoal Filter

Radionuclide	Half-Life (Days)	Gamma Energy (keV)	Yield = Number of Gammas Emitted per Disintegration (%)
Co-57	271.8	122.1	85.9
		136.5	10.3
Se-75	119.8	121.1	17.3
		136.0	59.0
		264.7	59.2
		279.5	25.2
		400.7	11.6
Hg-203	46.7	279.2	81.5

Q1. Calculate the counting efficiency at each gamma-photon energy for the charcoal filter used in the stack monitor at that nuclear reactor.

A1. The equation for counting efficiency E per gamma is

$$E = (C / T) / S, \text{ where}$$

C = net count

T = counting interval

S = source strength

Efficiency per Gamma

Gamma Energy (keV)	Efficiency per Gamma
60	0.042
88	0.053
121	0.049
344	0.021
768	0.013
963	0.009
1408	0.007

Q2. What are the possible radionuclides detected on the charcoal filter and their respective activities?

A2. First identify the radionuclide whose detected energy peak has no interference from other radionuclide's emission peaks. Only Se-75 fits this selection criterion; therefore, estimate the activity of Se-75 using energy peak at 401.1 keV. Then estimate the efficiency at 401.1 keV by either plotting the efficiency per gamma on a log-log plot or interpolate between the two values of 0.021 and 0.013 from above table. The result should be 0.02

$$\text{Activity} = (\text{Net Count} / \text{Time}) (1 / \text{Efficiency}) (1 / \text{Yield})$$

Activity (Se-75) =

$$(630 \text{ counts} / 16.67 \text{ min}) (1 / 0.02 \text{ counts per gamma}) (1 / 0.116 \text{ gamma per decay})$$

Activity (Se-75) = 28700 dpm

Use this result and the estimated efficiencies of the remaining Se-75's gamma peaks, to determine counts in other peaks due to Se-75's contribution.

$$\text{Expected Counts} = \text{Activity} \times \text{Efficiency} \times \text{Yield} \times \text{Time}$$

Peak Energy (keV)	Efficiency	Expected Counts	Actual Count
121.5	0.05	4138	7300
136.2	0.04	11291	11000
265.0	0.03	8497	8540
279.2	0.03	3617	5300

Based on the results, we can conclude that 265.0 keV peak is emitted by Se-75 only. The actual counts at 121.5 keV peak indicates that in addition to the Se-75's counts, there may be a contribution from Co-57.

Activity (Co-57) =

$$(7300 - 4138 \text{ counts} / 16.67 \text{ min}) (1 / 0.05 \text{ counts per gamma}) (1 / 0.859 \text{ gamma per decay})$$

Activity (Co-57) = 4416 dpm

The actual counts at 279.2 keV peak indicates that in addition to the Se-75's counts, there may be a contribution from Hg-203 too.

Activity (Hg-203) =

$$(5300 - 3617 \text{ counts} / 16.67 \text{ min}) (1 / 0.03 \text{ counts per gamma}) (1 / 0.815 \text{ gamma per decay})$$

Activity (hg-203) = 4129 dpm

We will continue with more questions and answers next time.

Continued from page 3

Registry, he is a Radiation Protection Scientist at Duke Energy's Catawba Nuclear Station. Barry enjoys gardening, traveling and spending time with family and friends. He and his wife will be celebrating 25 years of marriage in May. He has two sons. Barry indicated that the "RP 2020 Initiative" to establish presentations for high schools and community organizations was one of the most notable achievements that he has been involved in. He felt that it was of paramount importance to educate and promote our field to the surrounding community.

The three individuals that are the subject of this spotlight are achievers and represent the excellence that the Registry is known for. Each are proven and will provide leadership into a new decade. It was a pleasure to take this opportunity in welcoming these esteemed members into their new positions. Through the insight and perseverance of these and other members of our Registry, the future looks very bright.

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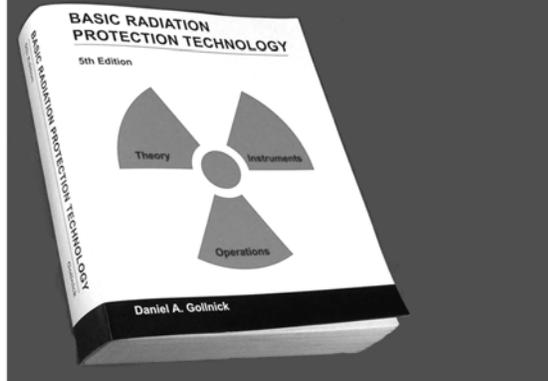
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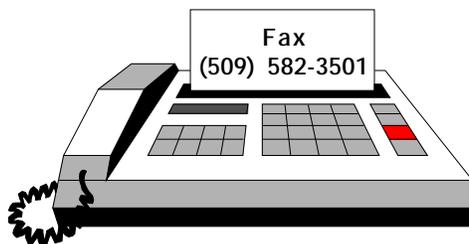
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