The NRRPT NEWS

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

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Chairman's Message

Greetings fellow RRPTs !

As the new Chairman of the NRRPT allow me to introduce myself. My name is Edwin M. Benfield, but my momma and friends call me Eddie. I have been actively engaged in the science of Radiation Protection since 1981. I have included a short bio at the end of this article to give you more information about myself.

We recently held our winter meeting in Baton Rouge, Louisiana in conjunction with the Health Physics Society's mid-year meeting. A new Vice-Chairman of the Board, Dwaine Brown with Energy Solutions will begin his term next year on January 1, 2015. Dwaine will be taking the place of outgoing Dale Perkins. Chris Whitener with Duke Energy-McGuire Nuclear Station graciously agreed to serve another term as Secretary-Treasurer. We also voted in two new Board members, Bob Wills and Mark Bayless. Both are returning Board Members and will also begin their 5 year terms in January 2015. Please join me in congratulating these new Board of Directors members.

During the Baton Rouge meeting, we continued our discussions on expanding the NRRPT Registry to other countries. Past Vice-Chairman Dave Tucker has volunteered to continue taking the lead on these discussions and actions. Dave is ideally suited to this role as he was instrumental in the expansion of the NRRPT exam into Canada. Currently, the Registry is developing an International exam based on the International Atomic Energy Agency (IAEA) Safety Standards. The first International NRRPT exam is tentatively scheduled for 2015 in South Africa and will expand the Registry to expand beyond Canada into other countries as we begin the Nuclear Renaissance.

As the Chairman of the Board, I am excited that the Panel of Examiners had their first external participant during the "Angoff"

Inside This Issue

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River Bend Nuclear Station participated in this session and gave the Panel an independent viewpoint at how each question is judged on the basis of what they feel a "minimally qualified" candidate (with 5 years of experience) would score on that question. "The probability value is a subjective estimate of the likelihood that the minimally-qualified person' will answer correctly. The average rating of each question is used to establish the passing point for the specific exam. All NRRPT Registered Practitioners are encouraged to attend Board and Panel meetings and participate in the "Angoff" sessions. The Registry will be reaching out to Practitioners in attendance at future Board and Panel meetings to provide support of Angoff sessions.

As I am typing this Chairman's Message, I am proctoring the Winter 2014 exam at my site. Five of the eight exam candidates have less than 7 years in the nuclear industry and it does my heart good to see these new individuals to the radiation safety field want to upgrade their professional stature by undertaking the additional study time and preparation to sit for the Registry exam. Many utility personnel experts are projecting that during the next five to ten years, many utilities will lose 50% of their current workforce to retirement across all job classifications, including radiation safety professionals. As a Registered Practitioner, please encourage those new employees in your organization to prepare for and take the NRRPT Registration exam. When current and future employers see that an individual has undertaken the additional effort to become a Registered Radiation Protection Technologist they see an employee willing to go the extra mile to better themselves and the industry as a whole.

As I begin my first 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 11 – July 15 in Baltimore, MD. Please remember that all members of the Registry are welcome at these meetings. We hope to see you there!

Edwin (Eddie) M. Benfield Bio

Currently, I am the Supervisor of Nuclear Station Sciences for the Radiation Protection department at Duke Energy's Catawba Nuclear Station with oversight of six direct reports that are responsible for regulatory compliance and industry best practices. I have been in this position for two years and prior to that I worked as a field level technician in the areas of Surveillance and Control, Compliance, Respiratory Protection, Instrument Calibration, Radiation Protection Instructor responsible for Initial and Continuing Training, and Radiological Effluents supervisor. All told, I have 32 years of experience in the Radiation Protection field.

In 1996, I became a Registered Radiation Protection Technologist and have served as a member of the NRRPT Panel of Examiners, Chairman of the Awards/Scholarship committee, Vice-Chairman of the NRRPT Board of Directors and Chairman of the Exam Performance Committee.

I have been married to my wonderful wife, Anita, for 30 years, and have a 26 year old son, Clinton. My hobbies include playing the guitar, going to the beach, salt water angling, golfing with my son, traveling and spending time with my wife.

Respectfully,
Eddie Benfield
NRRPT, Chairman of the Board

DECONTAMINATION AND DECOMMISSIONING OF NUCLEAR POWER PLANTS

by Bob Wills RRPT – MBA

INTRODUCTION

Today we see the closure of nuclear power plants not because of ageing but the units are losing competitive advantages as compared to natural gas. In addition several units have equipment issues that made them too expensive to operate in an increasingly competitive environment. Drivers for Decontamination and Decommissioning of Nuclear Power Plants include;

- Nuclear Plants are reaching the end of their effective life
- Deregulation and low cost natural gas are driving the economic decisions to shut down units
- Equipment or facility issues (SONGS and Crystal River)

These and other issues have resulted in an untimely closure of US nuclear power reactors. The timely removal of the existing nuclear plant in accordance with the DECON option found acceptable to the NRC. It is expected to result in the complete dismantlement and restoration of the site. The facilities remaining will be to support dry storage of the fuel until the fuel has been received by the Department of Energy (DOE).

The following activities are anticipated to occur during the dismantlement period:

1. Perform primary system decontamination,
2. Establish a site construction power system,
3. Remove asbestos insulation in conjunction with plant piping systems,
4. Remove turbine control oil,
5. Establish a spent fuel pool cooling system independent of existing plant systems,
6. Construct an Independent Spent Fuel Storage Installation (ISFSI) for dry cask storage,
7. Establish a monitoring location to allow deactivation/dismantlement of the control room,
8. Dismantle systems, structures and components not required for safe storage of spent fuel,
9. Conduct decontamination of facility surfaces, components and piping surfaces,
10. Conduct soil remediation as necessary,
11. Ship and properly disposition all radioactive and non-radioactive materials, and
12. Perform a comprehensive final status survey to demonstrate compliance with approved site release criteria.

Of key importance to RP are several steps that allow the unit to undergo D&D in an ALARA nature.

1. Chemical decontamination of the primary system (dose rates reduced up to 90%)
2. Installation of a decommissioning power supply
3. Significant hazard reduction that includes asbestos, sodium pentaborate, acid and caustic solutions, and
4. Significant plant equipment removal including the generator and exciter.

INTEGRATED MANAGEMENT APPROACH

Together, the utility management staff and its employees will oversee waste processing, shipping and disposal. Additionally the utility will provide contractor oversight and control in all areas of waste processing, classification and disposal. The utility will provide the oversight in the form of RadWaste

assessment teams. Utility and contractor personnel will perform 100% of the waste sorting at the site and will identify any components requiring special waste handling. The escalating disposal costs require this integrated waste processing approach. Project management and on-site and offsite radioactive waste services are key to meeting schedule and budget needs. In most cases waste will be shipped via rail transportation and over road trucking to an in-ground disposal facility.
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WASTE STREAMS AND QUANTITIES

An assessment must be made of the waste streams and quantities early in the D&D efforts. A list of typical waste streams is outlined bellow.

Metal waste types may include; stainless steel, brass, bronze, aluminum, inconel and copper. The waste forms of the metals will come from pipe and pipe components, tubing, structural shapes such as I-beams, angles and channels. The Dry Active Waste is defined as material such as; paper, cloth, wood, plastic, rubber and cardboard. Asbestos waste includes materials such as insulation, panels, tiles and gaskets. Concrete materials will include; building foundations, site structures, shield walls, and residues from on-site decontamination activities. Contaminated lead will consist of sheets, plates, bricks and blankets. Decommissioning equipment may include fork trucks, pallet jacks, rigging equipment, miscellaneous hand tools, generators and welding machines, transfer bins/boxes and equipment, and scaffolding.

Waste Stream Types

Potentially Clean Metals
Potentially Clean Concrete
Dry Active Waste
Asbestos
Radioactively Contaminated Metals
Activated Metals
Radioactively Contaminated Concrete
Activated Concrete
Radioactively Contaminated Lead
Contaminated Soil
Contaminated/Potentially Clean Decommissioning Equipment
Large Components Included in Rad Metals

WASTE TREATMENT AND PROCESSING

Dry Active Waste Processing

The Dry Active Waste (DAW) will consist of various incinerable, compactable, and noncompactible materials such as clothing, respirators, trash, paper, scaffolding, wood, rope, etc. Whenever possible, DAW suspected to be potentially clean material will be identified, segregated and loaded into containers. Potentially clean DAW will be monitored by technicians using standard survey instruments or through automated monitoring and conveyance systems It may be possible for a supplier to provide a reduced cost method for disposal of clean contact trash

Asbestos and Hazardous Waste Processing

Asbestos material will be removed by others from the plant during decommissioning activities. This material will have to be clearly segregated and marked to prevent mixing with other waste streams. Asbestos material will also be segregated into potentially clean and contaminated waste. Due to the hazardous nature of asbestos, no sorting or incineration is considered an effective option. Hazardous wastes will likewise be segregated as clean or radioactively contaminated. Nonradiological hazardous materials such as PCB contaminated oil, mercury vapor lamps, lead and lead contaminated paint are expected to be generated from decommissioning activities.

Resin Processing

The resin expected to be generated will be handled through on-site dewatering and transferred to a cask for direct shipment.

Metal Processing

Metal equipment, components and materials are expected to be the largest type generated during the decommissioning. The three different categories of metals expected are presented below:

Metal Categories

Metal Category Radiological Condition Contaminated Metal Exterior or interior surfaces are contaminated such that the metal is considered to a Surface Contaminated Object.

Clean Metal that is characterized as clean, free of radiation, and able to be released for unrestricted use or disposal.

Activated Metal that has become radioactive from exposure to neutron irradiation and the total object is inherently radioactive.

As with the other waste streams, the metal components will be categorized as clean or radiologically contaminated. The metal will be size reduced as necessary for additional surveys and free release. Contaminated metal will likely consist of systems exposed to the corrosion and activation products carried during the steam cycle (e.g., condensate system, cooling water supply system, etc.). This waste stream will include the following materials;
Tanks Piping Pumps
Valves Heat Exchangers Conduit
Cable Trays Pipe Hangers Grating

The metal will be sized to allow DOT legal weight transport in available packages such as 20-foot Sea/Land containers, B-25 boxes and 55-gallon drums. Contaminated metals will be staged and prepared for shipment to the processing facilities. This metal waste will typically be evaluated and processed in accordance with the following methods;

1. Decontamination for free release
2. Preparation for disposal at Clive or WCS
3. Metal melting
4. Decontamination and shipment
5. Preparation for disposal

The types of metals best suited for decontamination for free release include large components, structural members, large diameter piping, high density metal and high value alloys. Decon methods for metals include.

1. Manual wiping and scrubbing with solutions
2. Vacuuming
3. Blasting with media (water, ice, CO_2, or sponge)
4. More aggressive blasting (grit, shot)
5. Rotoblasting and electropolishing, and
6. Chemical decontamination

The metal material will be size reduced to optimize the number, size and surface area of the pieces for handling and processing in the decontamination facilities. Metals will be cut using a variety of methods such as plasma and other cutting torches, burning bars, and pneumatic saws.

Concrete Processing

Concrete will generally be processed as low level waste, however, concrete that is surveyed clean may be removed to a industrial landfill. A clean survey is one that does not detect any radiological activity with an minimum detectable concentration (MDC) at or below the levels equal to the derived concentration guideline levels (DCGLs). May be sent to an industrial landfill pending regulatory approval.

NRRPT Meeting in Baton Rouge, LA

Some of the Board and Panel members that attended the February 2014 meeting in Baton Rouge, LA.

NRRPT
Night-Out in
Baton Rouge, LA

A very enjoyable night-out for the Board & Panel members and family & friends.

***** Our generous NRRPT Night-Out sponsors *****

Left to right: Bob Wills (The GEL Group), Eddie Benfield (Duke Energy), Todd Davidson (Envirachem), Ken Baugh (B&B Environmental Safety), Not pictured: John Arrowsmith (Frham Safety Products)

Tim Kirkham with wife Sonya

Enjoying happy hour at the night-out

Karen Barcal and Kelli Gallion

Some of the group

Kelli A. Gallion

Recipient of the
Arthur F. Humm Award

The Arthur F. Humm, Jr. Memorial Award is presented to persons who have given outstanding support to the **NRRPT**. Kelli Gallion was selected for the prestigious award in 2013 and it was presented to her at the **NRRPT** Board and Panel Night-Out in Baton Rouge, LA on February 9, 2014. Ed Lohr, Chairman of the Awards Committee, made the presentation and was followed by Dwaine Brown, Kelly Neal, Dave Biela, and DeeDee McNeill DeGrooth who all added lively descriptions of Kelli's contributions to the **NRRPT**.

Ms. Gallion earned the Arthur F. Humm, Jr. Memorial Award from her many years of dedicated service and activities with the **NRRPT**. She became a registered radiation protection technologist in 1998 and has been on the Panel of Examiners since 2000. Her many contributions include serving on the Board of Directors from 2003 to 2007, of which she was elected the first female to serve as the Chairman from 2004 to 2007; being instrumental in the ACE credit recommendation process; and actively serving on many **NRRPT** committees. Additionally, she currently is the Chairman of Administrative Maintenance Committee.

Kelli is a NASCAR fan (Jimmie Johnson seems to have caught her eye) and loves animals. Please congratulate her on receiving this well-deserved award.

Congratulations Kelli!

**** Kelli Gallion ****
she doesn't know she's the Humm Award recipient yet!

NRRPT Board of Directors Officers

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Chris Whitener
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Vice-Chairman:
Dale Perkins
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Contact a Board officer if you have any questions regarding the NRRPT organization.

NRRPT Exam Panel Officers

Chairman:
Rick Rasmussen
rickras@lanl.gov

Vice-Chairman:
Dave Tucker
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Contact Rick or Dave if you're interested in joining the exam panel!

NRRPT Mid-Year Meeting

The 2015 **NRRPT** Board and Panel meetings will be in conjunction with the HPS Mid-Year meeting in Norfork, VA. The **NRRPT** Board meeting is Saturday, January 31 and Tuesday, February 3. The **NRRPT** Panel meeting is Sunday February 1 and Monday February 2. All **NRRPT** members are welcome to attend!

FOUR PART HARMONY (Part 3)
"BY THE NUMBERS"

by Dave Biela

The third section of "Four Part Harmony" will be highlighting the calculations and what their role was in the Open Air Demolition (OAD) of the Cement Solidification System (CSS) and the Vitrification Facility Ex-Cell Off-Gas (NOx abatement equipment) System building (01-14 for short) at the West Valley Demonstration Project (WVDP).

While the D&D crew was preparing the 01-14 building for demolition and the Radiological Control Technicians (RCTs) were gathering radiological data through December of 2012 the Radiological Control Engineers (RCEs) were performing and peer reviewing the calculations needed to determine if the building was ready for open air demolition.

EXAMPLE OF HOW RCT DATA WAS USED

Location	Pipe Number	Description	OD (in)	Length (in)	Total Area (cm^2)	dpm/100cm^2 Alpha	dpm/100cm^2 Beta	Total Alpha dpm	Total Beta dpm	Comments	Isotope Table
Vertical Pipe Chase	64-P-10-002	Main VIT Off Gas	10.00	60.00	1.22E+04	1.00E+03	2.20E+06	1.22E+05	2.68E+08	#163842	#10 HEPA
	6-71-1 1/2-719	Concentrates from 5D15A to VIT	1.50	60.00	1.82E+03	2.00E+04	4.00E+05	3.65E+05	7.30E+06	#164505 Same as 6-71-2-025	#21 LWTS
	6-71-1 1/2-029	7D13 to 5D15B	1.50	60.00	1.82E+03	5.00E+01	1.00E+03	9.12E+02	1.82E+04	#164505(11)	#21 LWTS
	6-71-1 1/2-711	Feed from 35104 to WDV	1.50	60.00	1.82E+03	2.00E+04	4.00E+05	3.65E+05	7.30E+06	#164462 and 164505/Same as 6-71-1-006 (Ratio off of dose)	#21 LWTS
	64-P-1-017	01 Cell Sump Discharge	1.00	60.00	1.22E+03	9.50E+01	2.30E+03	1.16E+03	2.80E+04	#165964	#10 HEPA

1. The pipe/equipment/surface data that was to be left behind was identified.
2. After the RCT survey, the remaining contamination levels were determined and the isotopic profile for that item was determined.
3. The number in the comments block was the survey number for easy future reference.

EXAMPLE OF ISOTOPIC TOTALS

	Isotope 1	Isotope 2	Isotope 3	Isotope 4	Isotope 5	Isotope 6	Isotope 7	Isotope 8	Isotope 9	Isotope 10	Isotope 11	Isotope 12
TOTAL MAR (uCi)	5.62E+04	2.23E+04	1.72E+03	1.56E+03	2.38E+03	1.69E+03	3.77E+04	1.32E+00	1.74E+00	1.45E+00	2.58E+00	2.33E+01
MAR after Sealed	2.83E+04	1.49E+02	6.97E+00	1.83E+01	9.54E+00	6.90E+00	3.88E+02	1.25E+00	1.68E+00	7.99E-01	7.66E-01	7.98E-01
DR	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
ARF	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03
LPF	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
TOTAL ST (uCi)	2.83E-01	1.49E-03	6.97E-05	1.83E-04	9.54E-05	6.90E-05	3.88E-03	1.25E-05	1.68E-05	7.99E-06	7.66E-06	7.98E-06

1. Material At Risk (MAR) – ALL the radiological material remaining.
2. MAR after sealed items removed – MAR after items such as SEALED tanks that are coming out whole are removed from the equation.
3. Damage Ratio (DR) – Fraction of MAR actually Impacted by Demolition "Takes into account items like fixatives" (DOE-HDBK-3010-94 - Page 7-68)
4. Airborne Release Factor (ARF) – Fraction of Radioactive Material Released in the Air as an Aerosol Available for Transport (DOE-HDBK-3010-94 - Page 5-3 Explosive Stress)
5. Leak Path Factor (LPF) - Fraction of Radionuclides that go through some containment "such as fogging/ filtering" (DOE-HDBK-3010-94 - Page 7-4)
6. Source Term (ST) - Total quantity of respirable material releasable to the atmosphere.

Once the ST is determined, this information can be inserted into programs such as AERMOD which is the U.S. EPA preferred dispersion model for near-field impact assessments for regulatory applications. In our case our goal was to be less than 0.02 DAC/hr at a 30m perimeter around the 01-14 building. If the results of the calculations are outside the goal, than source material would have be removed from the facility or additional controls put in place to limit the amount of material that could be released to the air. The 4th part of my report will recap the RCTs role in controlling the work activities and monitoring the work area to maintain and verify the established goals.

NRRPT Night-Out in Baltimore, MD

Another enjoyable night-out for the Board & Panel members and family & friends. Thank you to our sponsors!

Board of Directors Chairman Eddie Benfield welcomes everyone to the NRRPT night-out and acknowledges the sponsors

Thank You

to our generous NRRPT Night-Out sponsors!

Todd Davidson (Envirachem)
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Our NRRPT and Health Physics Exam Review courses prepare students with sample questions and answers, as well as test-taking tips.

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"I passed the CHP Part 2 exam! Thanks again for the encouragement and for the availability of the review course you offered. I will recommend it to anybody else who is interested in trying to become certified."
-Mike Roberson Senior Health Physicist, Division of Radiation Safety

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