LOW-LEVEL RADIOACTIVE WASTE FORUM, INC.

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MINUTES OF AGENDA SESSIONS RE DISUSED SOURCES

Fall 2015 LLW Forum Meeting
Salon A, B, C & D
Embassy Suites Downtown/Lakefront Hotel
Chicago, Illinois

Friday—October 23, 2015

9:50 a.m. – 10:20 a.m. Implementation of Revised Branch Technical Position on Concentration Averaging and Encapsulation (CA BTP)

- EPRI-led initiative to develop implementation guidance document — Karen Kim, EPRI
- technical and policy considerations
- anticipated impact on waste management and disposal options

Presentation:

- See Karen Kim slides (presentation prepared by Mike Snyder), pp 11-12.
- Information is intended to maintain disposal safety and inform flexible disposal options for management and disposition of waste.
- EPRI recognizes that NRC has developed a very clear and good guidance document. The purpose of EPRI's involvement is to bring experience.
- Karen reviews membership of working group including facility operators, state representatives and NRC staff.
- Currently in process of collecting examples to include as part of the implementation guide.

- Next working group meeting will be held on November 5-6, 2015 in Dallas, Texas. The goal of this meeting is to vet the current draft and various examples on implementation.

- EPRI anticipates that the final report will be available in spring 2016.

- The 2016 EPRI International LLW Conference and Exhibit Show will be held the week of June 20, 2016 in Orlando, Florida

Questions and Discussion:

- Joe Weismann asks if it will be publicly available? Karen says initially probably available only to members, then released publicly. However, after the LLW Forum meeting, Karen spoke to others that are more familiar with the project and confirmed that the report will be made available to the public.

10:20 a.m. – 10:50 a.m. Financial Planning Requirements and End-of-Life Management of Certain Radioactive Byproduct Material

- background: historical overview, scope, methodology and opportunities for stakeholder feedback — Ryan Whited NRC

- topical areas and issues for consideration as identified by NRC in recent *Federal Register* notice

- path forward and next steps

Presentation:

- See Ryan Whited slides, pp 13-14.

- Ryan gives summary re 2010 Interagency Working Group report. (See document in DSWG meeting packets for additional information.)

- Key recommendations of Interagency Working group report included in Radiation Source Protection and Security Task Force (RSPSTF) report, but recognized problems with establishing projections for disposal costs.

- Ryan reviews recommendations from 2014 RSPSTF report.

- See slide 7 re issues identified by NRC staff.

- According to Ryan, it looks like somewhere in the neighborhood of 12 to 15 entities have submitted comments on proposed byproduct material financial scoping study including DSWG, CRCPD, NNSA, and OAS.

- See slide 9 re path forward.

- Report on byproduct material financial scoping study is due to Commission in spring of 2016.

Questions and Discussion:

- Leonard Slosky compliments NRC for taking up this issue; as Chair of first working group, this is one of key elements to making progress.

- Ed Hammerberg asks if will look at EPA regulations to see if anything will translate to waste arena? Ryan says yes, and also look at state regulations.

10:50 a.m. – 11:10 a.m. *break*

11:10 a.m. – 12:40 p.m. Scoping Session: Management and Disposition of Disused Sources *(Moderated by Larry McNamara)*

- case study of non-compliant LLRW licensee — Kelly Grahan, Illinois

Scoping Session Presentations:

- See Kelly Horn slides, pp 15-18. (Note that slides were prepared by Kelly Horn, but presentation was given by Kelly Grahan.)

- Once problem was identified, the company switched to possession only license and continued to accept waste.

- The Illinois Emergency Management Agency (IEMA) pushed them into a decommissioning only license via Administrative Law Judge. They switched to a possession only license.

- The company was not paying bills on timely basis, which was a problem because of implications to shutting off electricity. IEMA seized their financial assurance as a result.

- See slides re decommissioning schedule.

- The license was terminated in September 2014
- IEMA had $425,00 financial surety to do work and came up only $5,000 short.
- During the process, IEMA found some deficiencies in regulations. IEMA will be reviewing and making updates.
- Larry McNamara comments that this shows that financial planning may not be as comprehensive of a tool at people anticipate.

- development of suggested state regulations and consideration of financial assurance programs	Michael Klebe Consultant

- See Mike Klebe slides pp 19-21.
- Mike Klebe comments that financial assurance does not provide a bucket of money for licensee to use; instead, it is financial protection for the regulatory authority.
- Financial assurance applies to both unsealed and sealed radioactive material.
- 47 of 50 staets have basically the same program; 54 when include DC and other jurisdictions.
- On Klebe slide titled, FA for Nationally Tracked Sources, the highlighted ones are the 14 Category 1 sources that would require financial assurance at $113,000 level; the other 6 do not require any financial assurance.
- See slide re financial assurance program variants.
- For State of Florida slides, high risk and low risk not defined but worked out with regulator. By statute, State of Florida only allows surety bonds for purposes of financial assurance.

- need for and access to technical support from Los Alamos	William Stewart LANL

- William Stewart says that we need to understand what resources are being applied to the Source Collection and Threat Reduction (SCATR) program currently and limitations on how they can be applied in a broader sense.
- Currently SCATR is a cost-sharing program. Each year, however, it will be reduced. At some point, it will hopefully be turned over completely to commercial sector.

- Currently disposing of commercial sources for which commercial disposal is available.

- Starting a pilot study to push boundaries of revised Branch Technical Position on Concentration Averaging and Encapsulation (CA BTP). Russ Meyer has reached out to Richland and Waste Control Specialists (WCS). They have created two pilot programs with both presented to each facility equally to determine if this will be an acceptable form for the waste to be accepted at facility, how do we respond to that, can this be applied to commercial facility, and so forth. (Note: This may be a follow-up item for spring 2016 LLW Forum meeting.)

- The Off-Site Source Recovery Program (OSRP) recovers sources that do not have a commercial disposition pathway. It includes devices containing Greater-than-Class C (GTCC) and transuranic (TRU) waste. This program is expected to continue on until have commercial option.

- assistance from states and for special conditions — Ray Fleming Texas

- See Ray Fleming slides, pp 22-23.

- Ray says need to allowed brokers and processors to receive sealed sources via shipments on bill of lading as materials. He is not suggesting that we circumvent compacts and acknowledges that there will still be a need to get import and export permits. However, he believes that this will help move the process along.

- Ray suggests considering a performance based approach. He encourages everyone to think outside of the box. As regulators, he feels we have really painted ourselves into a corner.

- Ray says a crucial issue is defining when radioactive material becomes a waste.

- Ray recommends collection of sources via radioactive material shpments not to circumvent compacts, but to save dollars and make it easy to collect sources from small generators.

- Ray notes that it is crucial to always document original generators.

- Ray says that leaking sources could be as low as 1 in 100, although probably more likely 1 in 1,000 based upon tests upon receipt in Texas.

- access to transportation resources and challenges posed by limited availability of Type B casks — Scott Kirk, WCS

- Scott Kirk says that WCS role in transport is very limited.
- WCS receives sealed sources, but only has one cask for transport of sealed sources.
- First container of waste received at WCS was sealed sources from Vermont.
- Scott points out that there is an option re CA BTP; have not found any problems with pilot program to date.
- Scott sees issue as federal vs. state. If dispose in commercial facility, have more hurdles re curie limit, application of import fees, need to go through compact commission, etc. (William Stewart disagrees, saying that they chose devices that were in-compact for pilot program and that if device is Class A, B or C, it should be disposed in commercial facility.)

Mark Lewis
Energy*Solutions*

- See Mark Lewis slides, pp 24-25.
- Energy*Solutions* owns 97 casks, but only 11 of them are Type B casks.
- See slides titled "History-Pre October 1, 2008," which shows which casks had pre-October 1, 2008 and went out of service thereafter due to changes in regulations
- On slide titled, "History Pre November 2014," Mark says 8-120B(4) cask used primarily for utility resins, but can also be used for disused sources. Midus cask used primarily for other uses, but also can be used for some sources.
- Note slide re DOE licensed auxillary shields for 10-160B casks that can be used for sealed sources and then disposed along with sources; however, it can be an expensive proposition.
- Future slide shows casks that are in development.

Temeka Taplin
NNSA

- Temeka Taplin clairifies that liners have been used for OSRP shipments, but are certified by NRC.

- Temeka also clarifies that auxillary shields are licensed by NRC.

- See prior slides re two containers in development; first one expected to be fabricted in November 2106.

- National Nuclear Security Administration (NNSA) is continually revising the Certificate of Compliance (CoC) for additional uses.

- Designs will be made available for 435-B if anyone wants to fabricate on their own. NNSA is expecting costs to be around one million dollars. Temeka says that it does seem that there are some companies that are interested in purchasing casks. They are working on their end to make these more commercially viable.

- NNSA recognizes that there are some instances which may require OSRP to continue picking up devices.

- For larger cask, SAR should be sent to NRC in about 6 months with a 12-month review and fabrication anticipated in 2018.

- licensing process, issues and updates re Type B casks	Bernard White NRC
- path forward and next steps	
- lessons learned re implementation of Part 37 physical protection of Cat 1 and 2 quantities of rad material	

- See Bernard White slides, pp 26-28.

- He reviews licensing process and certification, as well as implementation of Part 37.

- On Certification Process slide, Bernard says the first box (pre-appliation meeting) is the most significant step of process. He stresses that most stakeholders don't take advantage of this opportunity and that delays the process because applications are often not comprehensive.

- According to Bernard, the problem with thinking outside of the box is that it is a big box. Regulations have been in place for 30 plus years and used for internationally shipments as well. Bernard says NRC looked in 2005-2006 at dual-purpose cask, but it did not go well.

- *Bernard says that if stakeholders have ideas for how to change process, they can submit a petition for rulemaking.*

- In re Part 37 implementation, Bernard notes that there is a requirement from Congress for NRC to prepare report on implementation of Part 37 for first two years of process. That report is due in December 2016. They expect another GAO review on security issues once submitted.

- Bernard believes that there is currently a proper balance between security and performance based requirements.

- NRC staff is developing a *Federal Register* notice to collect stakeholder assessment on implementation of Part 37 process.

- Assessment of Part 37 and Cybersecurity are both happening now.

- broker and processor perspectives re difficulties related to the disposition of sources	John McCormick Bionomics S.J. Snipes Perma-Fix Environmental

- See John McCormick and S.J. Snipes slides, pp 29-32.

- John and Tibby say that there are problems getting sources encapsulated and consolidating.

- Perma-Fix is new to process; learning as they go along. They are making collective effort throughout the country. According to John and Tibby, 99% have disposal options.

- Regulations relatively unchanged for past 20 years. Pricing has been fairly consistent.

- Bionomics has disposed of over 100,000 sources in last three years and recycled approximately 5,000 sources.

- John says that people that do it under exemptions (i.e., ADCO), do not have to carry insurance. This is problematic because if have an accident, then all automobile policies exclude radioactive waste.

- John feels there is not a big market for recycle and reuse. The problem is that liability remains. For gauges and devices, 90% of them, can pop source out, but have contamination issues.

- Inconsistent regulations is also a problem—i.e., every state, compact have different regulations. John says that there needs to be more consistency with regard to what happens state-to-state and compact-to-compact.

- The lack of Type B shipping containers is a problem. According to John, domestic overpacks are needed. He discusses concern re can ship internationally but not domestically.

- In regard to medical sources, John doesn't think he has disposed of any of them. Instead, he says that medical licensees just hoard them.

- Return sources are usually sent to disposal.

- Probably have about an 80% participation rate with SCATR program.

- The biggest impediment is cost because there is no regulatory driver. Another excuse often repeated is that licensee may use this again one day.

Travis Snowder
Qal-Tek Associates

- See Travis Snowder slides, pp 33-35.

- According to Snowder, recycle is difficult and driven by economics.

- Qal-Tek has a different way of doing business and operate on a material license. Qal-Tek is not a licensed broker, but rather a radiological services company.

- Snowder says most sealed sources have some reuse or recycle value, particularly portable gauges, somewhat fixed density gauges. If medical sources can not find use for medical purposes, often other purposes such as research, testing, and so forth. Often issue raised is economics, but says that there is an educational gap.

- Licensees are often shocked once do financial analysis re cost of disposition. As a result often put into storage because do not have financial means for disposition.

- See slides re How Do We Incentivize Generators to Get Rid of Materials.

- QalTek reuses sources—see last 3 slides.

- Tracking of materials is a very complicated process. In light of DSWG report, reuse and recycle has increased to 6%.

Scoping Session Questions and Answers:

- How do financial assurance regulations apply to facilities that operate under a radioactive materials license? Klebe responds that there is a disconnect between regulations and how they are applied. Snowder says maintain liability for reuse, so substantially below limits; most critically, it is up to regulators to maintain oversight of inventories. Grahn says that the biggest thing that they have noticed is that need to keep close handle on inventory vs. possession limit because if way over, then may not have funds to address any potential issues that may arise.

- Joe Klinger says somewhat comforted by discussion. He recognizes that there are a lot of challenges, but also believes that there is support for programs within the industry. The problem for so many decades has been that it is cheaper to let things sit in storage, which is the reason that the SCATR program has been so successful.

- Klinger asks how industry can incentivize—i.e., maybe offer discounts on certain radionuclides for limited time period. Snowder says need to recognize economies of scale so that if an asset comes back in, then it can reduce cost. McNamara says alternative is that, when have a company that has something listed as an asset for a long period of time (i.e., 20 years) and then wants to get rid of it, then this creates a huge problem. Snowder says that Qal-Tek reached out to the Southwestern Compact and is trying to figure out how to assimilate into the compact sytstem.

- McCormick says that SCATR has been successful because CRCPD collects and diseminates information. The benefit is that they do multiple collections at one time. The problem is that they get snipped off the list and then hazardous waste consultant will third party it out to others. He believes that success is dependent upon strong regulatory program. Some states that have strong programs include Illinois, Ohio, California, Texas, and Florida. This year, there are close to 500 participants in SCATR. *(Note: why not make presentations at OAS and CRCPD annual meetings directly to states?)*

- Steve Kowalewski suggests that the U.S. Nuclear Regualatory Commisison (NRC) and the U.S. Department of Energy (DOE) get together with the U.S. Department of Transportation (DOT) to establish a reciprosity program for their casks.

- William Stewart clarifies that inserts used by DOE are very specific and will not necessarily translate well to commercial programs.

1:00 p.m. ***Meeting Adjourned***

EPRI Development of Nuclear Power Plant Implementation Guide for NRC Branch Technical Position on Concentration Averaging and Encapsulation

EPRI Development of Nuclear Power Plant Implementation Guide for NRC Branch Technical Position on Concentration Averaging and Encapsulation

Presented by Karen Kim, Sr. Technical Lead, EPRI
on behalf of Mike Snyder, Sr. Technical Lead, EPRI

LOW-LEVEL RADIOACTIVE WASTE FORUM, INC.

Fall 2015 Meeting

Chicago, Illinois

October 22-23, 2015

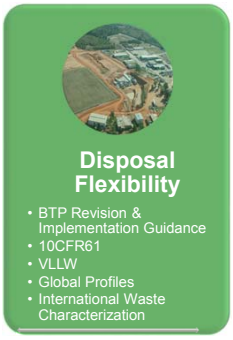
Project Objectives

- Create an Implementation Guide for the Branch Technical Position on Concentration Averaging and Encapsulation, Revision 1
  - Specifically for nuclear power plant wastes.
  - Common Understanding of **Key** Concepts
    - Averaging Constraints
    - Hot Spots
    - Waste Streams and Types
    - Characterization and classification
    - Discrete Items
    - Blending
    - Encapsulation and Solidification
  - Consistent Implementation
  - Reliable Acceptance and Enforcement

EPRI LLW R&D: Three Prong Strategy

BTP = Branch Technical Position on Concentration Averaging

Facilitate Disposal



Objective: Produce a sound technical basis to more accurately assess the hazard and risk associated with LLW

- **Use this information to inform discussions related to regulatory changes**
- **Maintain disposal safety**
- **Potentially increase disposal flexibility**

Review of Project History

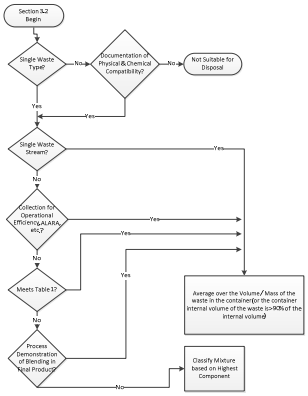
- 2005 ACNW Issues White Paper on the Need for an Updated Framework for LLW
- 2006 EPRI Begins Investigating Bases and Technical Options
- 2007 NRC Strategic Assessment Opens the Door
- 2007-2012 EPRI Research Identifies Opportunities for Regulatory Change and Supports BTP Revision (EPRI Report 1021098)
- 2012 Draft BTP Revision 1 Issued by NRC (May)
- 2012 EPRI Research and Comments (EPRI Report 1025302)
- 2015 BTP Revision 1 Issued by NRC (February)

Revision of BTP and EPRI Project Role

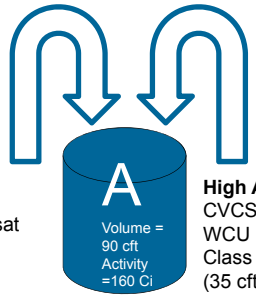
- Revision 1 of the BTP:
  - NRC's intention was clarification
    - New BTP should mean what it says
  - NRC recognized existing methods and tried to accommodate them
  - Explanations in the BTP revision also clarify the positions in the 1995 BTP CA (which is still applicable).
- EPRI Project's Role:
  - Bring together various stakeholders' perspectives of the BTP, as it is written, and document a common understanding and interpretation of the BTP to develop an Implementation Guide for nuclear power plant wastes.
- Development Supported by Working Group:
  - Utility and industry shipping subject matter experts, representatives from disposal sites, representatives of disposal site state regulatory bodies, representatives of the NRC

Topics Addressed in BTP

- Provide Guidance and Examples for
  - Blending of Resins and other wastes
  - Solidification of shredded filters
  - Justification for Treatment of Cartridge Filters as Blendable
  - Concentration Averaging of Discrete Items
- Averaging now with respect to Class limits rather than container average



How It Works



Low Activity Resin
SGDB/Condensate/RW
Class A or VLLW/LLW
(55 cft, 10 Ci)

High Activity Resin
CVCS/Crudburst/SFP/RWCU
Class B/C or ILW
(35 cft, 150 Ci)

Implementation Guidance Content

- Describe what each chapter/section of the BTP means and how to implement it for each applicable waste stream.
- Compare the new BTP guidance with the old, identifying what has changed and providing an analysis of the impact of this change.
- Provide flow charts and examples
- Evaluate alternative approaches discussed in the BTP; when they may be appropriate and what to consider.

Deliverables

- Draft Guidance Document (Spring 2015)
  - Outline
  - General Language
  - Identification of Examples
  - Working Group Provided comments and feedback
  - Incorporated into draft
- Currently collecting examples for analysis and inclusion into Implementation Guide
- Working Group will reconvene on November 5 & 6
  - Final review
  - Goal is to vet the current draft content, examples and ensure all previous comments have been addressed to the satisfaction of the working group.
- Final Report (Spring 2016)

NRC Byproduct Material Financial Scoping Study Update

NRC Byproduct Material Financial Scoping Study Update

October 23, 2015
LLW Forum Meeting
Chicago, IL

Ryan Whited,
Senior Project Manager
LLW Branch
Division of Decommissioning, Uranium Recovery and Waste Programs
Office of Nuclear Material Safety and Safeguards

Objective

- Provide some brief background on NRC's byproduct material financial scoping study
- Summarize stakeholder comments received at an NRC public meeting on October 7, 2015
- Discuss the schedule and next steps for the NRC's review

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Background

- NRC's regulatory threshold (10 CFR 30.35) for decommissioning radioactive sealed sources is higher than most Category 1 and 2 sources
- For sources below the threshold, there is no requirement for decommissioning or end-of-life financial planning
- This does not relieve the licensee from the responsibility of proper end-of-life management
- Financial burden may be significant and unanticipated

3

Early NRC Staff Activities

- 2007 Low-Level Waste Strategic Assessment
  - Identified byproduct material financial scoping as a high priority
  - Resource limitations and other priorities postponed action
- 2010 Interagency Working Group Report on Financial Assurance for Disposition of Category 1, 2, and 3 Radioactive Sealed Sources
  - Working group comprised of NRC, other Federal and State subject matter experts
  - Resulting report identified key challenges regarding end-of-life management
  - Summary recommendations included in 2010 Radiation Source Protection and Security Task Force Report

4

Recent NRC Initiatives

- Current effort arose from a Commission briefing on radioactive waste issues on September 18, 2014
- Staff stressed the timeliness of completing the byproduct material scoping study recommended in the 2007 Strategic Assessment citing:
  - March 2014 Report by the LLW Forum Disused Sources Working Group
  - August 2014 Radiation Source Protection and Security Task Force Report
- Resulting Staff Requirements Memorandum directed staff to "*provide results of the byproduct scoping study and recommendations for next steps*"

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Request for Comments

- Federal Register Notice (FRN) issued on August 3, 2015
  - NRC conducting a scoping study to determine if financial planning requirements for decommissioning and end-of-life management for some radioactive byproduct material are necessary
  - NRC staff seeking broad stakeholder input
- Areas for consideration:
  - Recommendations from recent studies, such as the Disused Sources Working Group and Task Force reports
  - Relevant domestic and international activities
  - Specific questions posed by the NRC staff
- Public meeting on October 7, 2015
- Comment period closed on October 19, 2015

6

Issues Identified by NRC Staff

- Consideration of disposition paths other than disposal
- Establishing funding requirements for dispositioning
- Timeliness in declaring disused sources
- Source characteristics
- Compatibility with Agreement State requirements
- Applicability to general licensees
- Characteristics and qualifications of the fund custodian
- Tracking

Feedback from October 7 Public Meeting

- Financial assurance should be required for all Category 1, 2 and 3 sealed sources
- Financial assurance requirements should be based on cost estimates that are periodically reevaluated
- Fixed dollar amounts established by regulation are not desirable – each situation is unique
- Need to be careful in defining “end-of-life”, particularly for applications that may require periodic use of sources

Path Forward

- NRC staff will analyze the input received and compile a report
- Results/recommendations to Commission by Spring 2016
- Staff recommendations could include:
  - Rulemaking
  - Development of guidance
  - Generic communication
  - No action

Questions?

ADCO: A Case Study of a Non-Compliant Low-Level Radioactive Waste Licensee

Illinois Emergency Management Agency

ADCO: A Case Study of a Non-Compliant Low-Level Radioactive Waste Licensee
Kelly Horn
October 23, 2015

ADCO Services Inc.,
Tinley Park, IL

Where To Begin??

Time After Time

[(DAW lbs *(drum-equivalent basis)*) × 3.75]
+ [(lbs of biological waste *(drum-equivalent basis)*) × 9.00]
+ [(lbs of sealed sources *(drum-equivalent basis)*) × 4.59]
+ [(total activity in mCi) × 0.38]
+ [(DIS volume in ft³) × 0.9333]

Licensed acquired in 1987 from the NRC

2004 Violation of Condition 15b

2006 Violated of Condition 6 and 15b

2007 - The Great Scrap Incident NOV

2007 Settlement Agreement

2007 - NOV for failure to comply with 32 IAC 609, LC 15b, and others

The Hokey Pokey Period 2008-2011

2008 NOV

2009 NOV

2011 Former RSO Allegation and Inspection

2011 NOV

Will it ever end?? 2011

Inventory Discrepancies

IEMA issues Order to recover fees

ADCO's Plea

2011 NOV
Condition 6, 32 IAC 310.40, Condition 22

Not so timely or the hand holding is over

2011 - ADCO fails to submit license renewal in a timely manner

Possession Only license issued until January 2012

2011 - Notification of waste acceptance

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Crescendo 2012

January NOV

More Evidence of Unlicensed Brokering

January NOV

IEMA issues Termination Order and Notice of Opportunity for Hearing

Director's Final Decision issued

Illinois Emergency Management Agency

Decommissioning

- Review and comment of Decommissioning Plan.
- IEMA finds ADCO's ability to create, implement, and service their DP insufficient.
- IEMA issues letter to ADCO's creditor of non-renewal of ISLOC.
- IEMA captures ADCO's Financial Surety.

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Decommissioning

- Continued oversight while Request for Proposal is issued.
- Early September of 2013 freezer waste RFP is issued followed by an emergency contract.
- Followed by RFP for decommissioning.
- December of 2013 bids awarded.
- January of 2014 Task One started.

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Freezer Waste

Illinois Emergency Management Agency

Warehouse A

Illinois Emergency Management Agency

Compactor in Warehouse A

Illinois Emergency Management Agency

Warehouse B

Illinois Emergency Management Agency

Decommissioning

- Task One completed in March 2014
- Task Two started in May 2014 and completed in July of 2014.
- IEMA conducted Confirmatory Survey and Sampling in concert with the contractor.
- Final Status Survey Report submitted to IEMA in August of 2014.
- IEMA terminates ADCO's license in September of 2014.

Illinois Emergency Management Agency

Adjusted MARSSIM Approach

Nuclide[a]	Average	Maximum
Alpha Emitters (Removable)	33 dpm /100cm^2	100 dpm/100cm^2
Alpha Emitters (Total Fixed)	1,000 dpm/100cm^2	5,000 dpm/100cm^2
Beta-Gamma Emitters (Removable) **all beta-gamma emitters except Hydrogen-3*	222 dpm/100cm^2	1,110 dpm/100cm^2
Hydrogen-3 (Removable)	2,220 dpm/100cm^2	11,000 dpm/100cm^2
Beta-Gamma (Total Fixed)		250 µRem @ 1 cm

Illinois Emergency Management Agency

Lessons Learned

- The regulator must be vigilant and persistent with its inspection and enforcement.
- Financial Surety must be robust, maintained, and thoroughly reviewed.
- IEMA found deficiencies in our regulations and we are reviewing and updating our regulations.
- Request For Proposal and contract issues, "The Devil is in the details".

Kelly Horn,
217-558-5135
Kelly.Horn@illlinois.gov

Financial Assurance Overview

Michael E. Klebe, P.E.
Michael Klebe & Associates, Inc.
www.michaelklebe.com

What is Financial Assurance?

- An administrative program to protect the regulator
- Used when a licensee fails to properly terminate their license
- Does not provide funds for licensee use

Regulatory Basis –

- Initial rules established in 1988 as part of a decommissioning rulemaking
- 10 CFR 30.35 – Byproduct material
- 10 CFR 40.36 – Source material milling
- 10 CFR 70.25 – Uranium enrichment and SNM
- Modified several times since

10 CFR 30.35

- Applies to –
  - Unsealed (loose form)
  - Sealed Source
- Based on license limit
- 47 of 50 states have basically the same program

FA Sealed Source Threshold –

- Applies to specific licensees
- Half-life greater than 120 days
- Based on Part 30 Appendix B
  - Fixed $113,000 for sealed source exceeding 10^{10} times Appendix B limit
  - Decommissioning Funding Plan for sealed sources exceeding 10^{12} time Appendix B limit

FA for Nationally Tracked Sources –

Radioactive material	Category 1 (Ci)	Category 2 (Ci)	Part 30 App. B (μCi)	10^{10} x App B (Ci)	10^{12} x App B (Ci)
Actinium-227	540	5.4	0.1	1,000	100,000
Americium-241	1,600	16	0.01	100	10,000
Americium-241/Be	1,600	16	0.01	100	10,000
Californium-252	540	5.4	0.01	100	10,000
Cobalt-60	810	8.1	1	10,000	1,000,000
Curium-244	1,400	14	0.01	100	10,000
Cesium-137	2,700	27	10	100,000	10,000,000
Gadolinium-153	27,000	270	10	100,000	10,000,000
Iridium-192	2,200	22	10	100,000	10,000,000
Plutonium-238	1,600	16	0.01	100	10,000
Plutonium-239/Be	1,600	16	0.01	100	10,000
Polonium-210	1,600	16	0.1	1,000	100,000
Promethium-147	1,100,000	11,000	10	100,000	10,000,000
Radium-226	1,100	11	0.01	100	10,000
Selenium-75	5,400	54	10	100,000	10,000,000
Strontium-90	27,000	270	0.1	1,000	100,000
Thorium-228	540	5.4	0.01	100	10,000
Thorium-229	540	5.4	0.01	100	10,000
Thulium-170	540,000	5,400	10	100,000	10,000,000
Ytterbium-169	8,100	81	0.1	1,000	100,000

FA Program Variants -

- State of Florida
  - Risk equation
- State of Illinois
  - 1 Ci, Major Possessor
- State of Tennessee
  - No FA for sealed sources

State of Florida -

Half-Life of Radioisotope	Risk Multiplier
Greater than 6 years	30
6 months to 6 years	10
120 days to 6 months	5
Less than or equal to 120 days	0
	Multiplier Used

Radioisotope	Risk Multiplier
Transuranic isotopes, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, Ac-225, I-129	50
Th-natural, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133, I-125, H-3, C-14	5
U-natural, U-235, U-238 and associated decay products	1
Any isotope not listed above	1
	Multiplier Used

State of Florida -

Activity	Risk Multiplier
Greater than 100,000 curies	2000
10,000 to 100,000 curies	1000
100 to 10,000 curies	500
10 to 100 curies	30
1 to 10 curies	2
Less than 1 curie	1
Multiplier Used	

Facility – Radioactive Materials Use and Storage Area		Risk Multiplier
Greater than 5,000 Ft²	High Risk	30
	Low Risk	10
500 to 5,000 Ft²	High Risk	10
	Low Risk	5
Less than 500 Ft²	High Risk	5
	Low Risk	1
	Multiplier Used	

State of Florida -

Procedures - Radioactive Materials Use or Storage	Risk Multiplier
License issued for manufacturing, benefaction or processing non-encapsulated radioactive materials	3
Licensed issued for storage only	3
Sealed sources not contained in a device with integral solid shielding	3
Sealed sources contained in a device with integral solid shielding	1
	Multiplier Used

Physical Form of Radioactive Materials	Risk Multiplier
Non- encapsulated forms such as solid, powders, liquids, colloids, plasmas, gases (not to include noble gases).	20
Single encapsulated source or source plated	3
Double encapsulated source or noble gases	1
	Multiplier Used

State of Florida -

Calculate using Assigned Risk Multipliers

A. Half-Life _____
B. Radioisotope x_____
C. Activity x_____
D. Facility x_____
E. Procedures x_____
F. Physical Form x_____
Product Total =_____

If Product Total is greater than 30,000 then a bond is required. The dollar value of the required bond is the product of risk factors.

Decommissioning Funding Plan -

- Detailed cost estimate for decommissioning:
  - Work performed by independent contractor
  - Unrestricted use
  - Contingency factor
- Description of FA instrument
- Signed original FA instrument
- Periodic re-evaluation

Financial Assurance Instruments -

- Cash Value
  - Prepayment
  - Surety bond, letter of credit, insurance
  - External Sinking Fund
- Guarantee
  - Self guarantee
  - Parent company guarantee
  - Must meet financial tests

Questions?

Michael E. Klebe, P.E.
217-622-8807
michael@michaelklebe.com

www.michaelklebe.com

FA for Nationally Tracked Sources –

Radioactive material	Category 1 (Ci)	Category 2 (Ci)	Part 30 App. B (μCi)	10^{10} x App B (Ci)	10^{12} x App B (Ci)
Actinium-227	540	5.4	0.1	1,000	100,000
Americium-241	1,600	16	0.01	100	10,000
Americium-241/Be	1,600	16	0.01	100	10,000
Californium-252	540	5.4	0.01	100	10,000
Cobalt-60	810	8.1	1	10,000	1,000,000
Curium-244	1,400	14	0.01	100	10,000
Cesium-137	2,700	27	10	100,000	10,000,000
Gadolinium-153	27,000	270	10	100,000	10,000,000
Iridium-192	2,200	22	10	100,000	10,000,000
Plutonium-238	1,600	16	0.01	100	10,000
Plutonium-239/Be	1,600	16	0.01	100	10,000
Polonium-210	1,600	16	0.1	1,000	100,000
Promethium-147	1,100,000	11,000	10	100,000	10,000,000
Radium-226	1,100	11	0.01	100	10,000
Selenium-75	5,400	54	10	100,000	10,000,000
Strontium-90	27,000	270	0.1	1,000	100,000
Thorium-228	540	5.4	0.01	100	10,000
Thorium-229	540	5.4	0.01	100	10,000
Thulium-170	540,000	5,400	10	100,000	10,000,000
Ytterbium-169	8,100	81	0.1	1,000	100,000

TEXAS Department of State Health Services

Licensing Perspectives on Waste Brokering

Ray Fleming, Manager
Radioactive Material Licensing Group

Resistance to Disposal

- Storage costs less than disposal
- No disposal requirement in rule
- Waiting for a government handout (ex. SCATR or OSRP)
- Packaging and shipping waste is too difficult
- Navigating the rules is too difficult

Storage Vs. Disposal

- Explain hidden storage costs (ex. inventory, leak tests, shutter tests…)
- Increase fees
- Add realistic financial planning costs
- Increase costs for security

Storage Time Limits

- Storage time limit in rule
- Generally licensed device storage time limit rule must be enforced

Broker-centric Collection Strategy

- Privately funded organization operates the registry of sources needing disposal instead of DOE
- Brokers and recyclers bid on jobs as they come in
- DOE notified if no commercial disposal pathway
- Federal and/or state rebates go to the broker so they are largely transparent to the waste generator
- Works with a variety of financial planning mechanisms
- Verification of timely disposal/disposition

Benefits of a New Collection Strategy

- Encouraging immediate disposal
- More brokers have an opportunity to get business
- Local businesses benefit by having local services
- Brokers can focus on specific states and compacts improving efficiency
- Private industry driven
- Reduced cost to taxpayers
- More price competition

Packaging and Shipping

- Allow brokers to receive waste on a bill of lading instead of a waste manifest. There is no health, safety or security reason to require more than a bill of lading.
- More type B containers available
- Think out of the box about type B container requirements
  - Should there be an intermediate container standard
  - Should exemption powers be used in some cases
  - Device specific standards should be acceptable
  - Performance based instead of proscriptive

Regulatory Challenges

- Consistency between agencies policies and rules
- Defining when RAM becomes a waste
- Licensing differences between RAM and waste
- Stopping the chain of waste transfers as RAM
- Service companies collecting waste as RAM
- Mixed vs. blended, sealed vs. loose
- Do the standard mixed waste rules make sense when a site accepts out-of-compact waste?
- Should mixed waste fees be based on a percentage of out-of-compact waste when both are accepted?

Compact Challenges

- Import and export agreements are an impediment
- Potential violations of export/import rules when waste shipped as RAM
- How important are enforcement actions to compacts?
- Price difference between in and out-of-compact disposal rates incentivises cheating

Advice to Brokers

- Come up with a broker driven process to replace SCATR/OSRP
- Push for collecting waste through RAM shipments
- Advocate for consistent regulation
- Advocate for streamlined regulation
- Document original generators
- Leak test sources on receipt on contact if possible
- Treat all sources as possible leakers

Contact Information

Ray Fleming at (512) 834-6688 x2206 or
ray.fleming@dshs.state.tx.us

Sealed Source Transport Review

Mark Lewis, General Manager
Cask Division, Logistics Department

EnergySolutions
problemsolved

All you need in radioactive and hazardous waste management

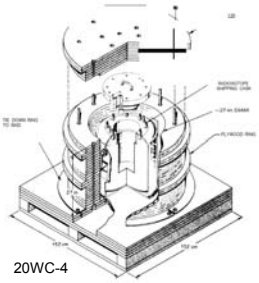
History – Pre October 1, 2008

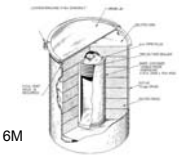
- Energy*Solutions* (Chem-Nuclear) Type B casks:
  - 1-13G with or without auxiliary shields
  - 1-13C (2)
  - 3-55 (2)
  - 8-120B (4)
  - 10-142B (3)
  - 10-160B
- Some other non-ES Options:
  - 20WC-1, 2, 3, 4 ,5, 6
  - 6M
  - Spec 55 prior to 1985
  - TN-RAM
  - DOE 10-160B



History – Pre October 1, 2008

DOT General Design Type B Packagings


20WC-4



6M

History – Pre October 1, 2008


History – Post September 11, 2001

- Concern over future terrorist attacks
- Concern of terrorists hijacking or stealing radioactive material in order to make and explode a dirty bomb
- Sealed sources a likely target due to high concentration, low weight, and lack of protection
- Programs put in place to protect the publ
  - Off-Site Source Recovery Program (OSRP)
  - RAM-QC (Quantities of Concern)
  - Source Registry

History – Pre November 2014

- Energy*Solutions* (Chem-Nuclear) Type B casks:
  - 8-120B (4) w/ Aug 2012 activity restriction
  - 10-160B
  - DOE licensed auxiliary shields for 10-160B
  - Midus
- Some other non-ES Options:
  - Croft 3977A
  - Croft 3979A
  - Croft 2999A
  - Croft 3940A
  - TN-RAM
  - DOE 10-160B

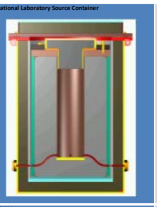

Current

- Energy*Solutions* fabricates 4 new 8-120B
- Energy*Solutions* (Chem-Nuclear) Type B casks:
  - 8-120B (8) w/ Aug 2012 activity restriction
  - 10-160B (license renewed on 8/14/15)
  - DOE licensed auxiliary shields for 10-160B
  - 3-60B
  - Midus
- Some other non-ES Options:
  - Croft 3977A, 3979A, 2999A, 3940A
  - TN-RAM
  - Robatel RT-100 (3)
  - DOE 10-160B

DOE Approved Auxiliary Shields

10-160B Inner Packaging Description Ship per USA/9204/B(U)F-96 (DOE)	Content Limits	Overall Physical Dimensions	DOE-Approved Cribbing Materials
Shield Inserts			
Shield Insert A 	• 10,000 Curies of Cobalt-60	Weight: 8,000 lbs Cribbing weight: 1500lb(w)-5000 lbs(s) Total Payload weight: 9550lb-13,000 lbs Insert Height: 44 ¼" Insert Width: 24" (diameter)	Steel/Wood
Shield Insert B 	• 12,970 Curies of Cobalt-60; or • 40,568 Curies of Cesium-137; or • 32,626 Curies of Iridium-192; or • 82,988 Curies of Selenium-75; or • 24,300 Curies of Strontium-90.	Weight: 8,000 lbs Cribbing weight: 1500lb(w)-5000 lbs(s) Total Payload weight: 9550lb-13,000 lbs Insert Height: 44 ¼" Insert Width: 24" (diameter)	Steel/Wood

DOE Approved Auxiliary Shields

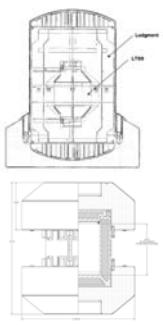
Argonne National Laboratory Source Container 	• 4,030 Curies of Cobalt-60; and • 3.49 Curies of Radium-226-Beryllium Sources.	Weight: 11,000 lbs Cribbing weight: 1000 lbs Total Payload: 12,000 lbs Height: 52 5/8" Width: 38" (diameter)	Wood
Gammacell 200 	• 9,000 Curies of Cobalt-60 Sealed Sources only; or • Combinations of Cobalt-60 Sealed Sources with Cesium-137 Sealed Sources, not to exceed 138.46 Watts Thermal, or • 27,700 Curies of Cesium-137 Sealed Sources only.	Weight: 5203 lbs Cribbing weight: 1350 lbs Total Payload: 6553 lbs Height: 34 ¾" Width: 32" pallet sides	Wood

DOE Approved Auxiliary Shields

Gammacell 200 (Extra Shielding Band) 	• 9,000 Curies of Cobalt-60 Sealed Sources only; or • Combinations of Cobalt-60 Sealed Sources with Cesium-137 Sealed Sources, not to exceed 138.46 Watts Thermal, or • 27,700 Curies of Cesium-137 Sealed Sources only.	Weight: 6118 lbs Cribbing weight: 1350 lbs Total Payload: 7468 lbs Height: 34 ¾" Width: 32" pallet sides	Wood
Gammacell 220 	• 13,000 Curies of Cobalt-60 Sealed Sources only; or • Combination of Cobalt-60 Sealed Sources with Cesium-137 Sealed Sources, not to exceed 200 Watts Thermal; or • 40,000 Curies of Cesium-137 Sealed Sources only.	Weight: 7705 lbs Cribbing weight: 1350 lbs Total Payload: 9055 lbs Height: 34 ¼" Width: 32" pallet sides	Wood

Future

- Energy*Solutions* (Chem-Nuclear) Type B casks:
  - 8-120B (8) w/NRC licensed auxiliary shields
  - 10-160B w/ NRC licensed auxiliary shields
  - DOE licensed auxiliary shields for 10-160B
  - Midus
- Some other non-ES Options:
  - Croft 3977A, 3979A, 2999A, 3940A
  - TN-RAM (2)
  - DOE 10-160B
  - WMG cask similar to 8-120B
  - OSRP 435-B
  - OSRP 380-B



U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

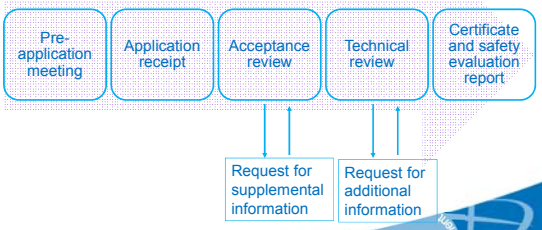
NRC Type B Package Certification Process, Issues and Updates

Bernard White
Senor Project Manager
Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards
LLW Forum
October 22, 2015

NMSS
Division of Spent Fuel Management

Certification Process

U.S.NRC



NMSS
Division of Spent Fuel Management

Key Messages

U.S.NRC

- Predictable certification process
- Quality of applications impacts
  - Scope
  - Resources, and
  - Review length
- Schedule depends on complexity and priority.

NMSS
Division of Spent Fuel Management

Radioactive Material Security: Current Activities

Bernard White
Senor Project Manager
Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards

U.S.NRC
Protecting People and the Environment

10 CFR Part 37: Physical Protection of Category 1 & 2 Quantities of Radioactive Material


Subpart A – General Provisions


Subpart B – Background Investigations & Access Control Programs


Subpart C – Physical Protection During Use


Subpart D – Physical Protection in Transit


Subpart F - Records


Subpart G - Enforcement

2

10 CFR Part 37: Physical Protection of Category 1 & 2 Quantities of Radioactive Material


GAO-12 -925, Security of Radiological Sources at U.S. Medical Facilities, September 2012


GAO-14-293, Security of Industrial Radiological Sources, June 2014


FY 2015 Omnibus Appropriation Act, Section 403, Report to Congress, 10 CFR Part 37 Evaluation due December 2016

3

10 CFR Part 37 Assessment

Retrospective program review to ensure an effective and efficient security framework


NRC and Agreement States have created strong national regulatory framework for the management and control of radioactive material


Committed to ensuring safe and secure use, transport and storage of the nation's civilian byproduct material through the use of effective and efficient programs


Optimized mix of performance based and prescriptive requirements for security of Category 1 and 2 materials

10 CFR Part 37 Assessment

Internal Self Assessment

Independent Assessment Review Panel

Assessment

International Regulations and Standards

Stakeholder Outreach

5

10 CFR Part 37 Assessment

- Gathering data through self-assessment team, ongoing-Spring 2016
- Publish FRN, Fall 2015
- Webinars and Public Meeting, Fall 2015-Winter 2016
- External Panel Assessment, Fall 2015-Winter 2016
- Staff analysis and formulate recommendations, Spring 2016
- Notation Vote Paper to Commission, Summer 2016
- Report to Congress, December 2016

6

Materials Program Cyber Security

NRC Cyber Security Roadmap (SECY-12-0088) June 2012

Materials Cyber Security Working Group July 2013
NMSS, NSIR, OGC, Regions I, III & IV, and OAS

Identify potential vulnerabilities
- Information gathering
- Consequence analysis

Materials Program Cyber Security

- Continue consequence analysis & information gathering
- Information Paper to Commission September 2016
- Notation Vote Paper to Commission Fall 2016

QUESTIONS?

DISPOSITION OF LOW LEVEL SEALED SOURCES

John McCormick
Bionomics, Inc.

No Real Difficulties

- Sources less than 10 curies
- 99% have disposal options
- Regulations relatively unchanged past 20 years
- Costs little higher after Barnwell closure
- Disposed 100,000 Sources
  - WCS and ES
  - Over past three years

Basics, not really Difficulties

- Burial Site Acceptance Criteria
- Generator tracking cradle to grave
- Compact Export and/or Import
- Higher Operating Costs
  - Permitting and Licensing
  - Insurance
    - Most polices do not cover radioactive
  - Transportation
    - Cant just FedEx the stuff around the country

Inconsistent Regulations

- State VS State
- NRC VS State
- Within NRC
- Compact by Compact
- Leaves it Open for Interpretation
  - Doesn't say I cant therefore I can
  - Ship as material not waste to avoid the regulations

Difficulties with Disposition

- Transuranic Sources over 27 mCi
- Multi Curie Sources
- Gauges, devices, etc.
  - Removal of source may be difficult
  - Contamination concerns
  - Damaged
  - Higher volume = higher cost
  - More effort = higher cost

Potentially Reusable or Waste?

- Multi-Curie Sources; possible
- Kr85; possible
- Large Am; possible
- Medical Sources; never to highly unlikely
- Industrial Gauges; highly unlikely
- Devices; never to highly unlikely
- Check Sources and Standards; rarely if ever

Recycling; Dollars or Sense?

- 1 in 1,000 low level sources have value
- Rarely an actual use of the radioactive materials
  - "returned" sources sent for disposal
  - Housings may be recycled or scraped
  - Recycling Revenue wont pay the labor
- Speculative collection hoping for future value
- Concentrating the problem
- Low Security and tracking standards

Lack of Type B Shipping Containers

- Large Multi Curie Sources
- Casks
  - High Cost
  - Limited Availability and Uses
- Domestic Over packs Needed
  - International Over packs Approved

Generator Reasons Not to Dispose

1. Cost
2. No Regulatory Pressure
3. Maybe someday it will be used
4. Not in the way
5. Waiting on DOE to take it for free
6. Too much trouble

Thoughts

- Consistent regulations and enforcement across the country
- Encourage generators to disposition unwanted sources on regular basis
- Quickly develop or resurrect simple Type B over packs for smaller sources

BROKER AND PROCESSOR PERSPECTIVES RELATED TO THE DISTRIBUTION OF SOURCES

John McCormick S.J. Snipes II

Source Disposition

- Sources less than 10 curies
- 99% have disposal options
- Regulations relatively unchanged past 20 years
- Costs little higher after Barnwell closure
- Bionomics Disposed 100,000 Sources in last three years
  - WCS and ES
- Perma-Fix has Recycled or Disposed of ~5,000 Sources in last three years
  - NNSS and WCS via Bionomics
  - Recycled Sources (no monetary value gained)

Basics for Disposition

- Burial Site Acceptance Criteria
- Generator tracking cradle to grave
- Compact Export and/or Import
- Higher Operating Costs
  - Permitting and Licensing
  - Insurance
    - Most polices do not cover radioactive
  - Transportation
    - Regulated: Can not simply FedEx radioactive sources around the country

Difficulties with Disposition

- Transuranic Sources over 27 mCi
- Multi Curie Sources
- Gauges, devices, etc.
  - Removal of source may be difficult
  - Contamination concerns
  - Damaged
  - Higher volume = higher cost
  - More effort = higher cost

Difficulties with Disposition (cont.)

Inconsistent Regulations

- State VS State
- NRC VS State
- Within NRC
- Compact by Compact
- Leaves it Open for Interpretation
  - Not specifically prohibited, therefore, interpreted as allowable
  - Ship as material not waste to avoid the regulations

Difficulties with Disposition (cont.)

Lack of Type B Shipping Containers

- Large Multi Curie Sources
- Casks
  - High Cost
  - Limited Availability and Uses
- Domestic Over packs Needed
  - International Over packs Approved

Potentially Reusable or Waste?

- Multi-Curie Sources – potentially reusable
- Kr85 – potentially reusable
- Large Am – potentially reusable
- Medical Sources – highly unlikely/never reusable
- Industrial Gauges – highly unlikely/never reusable
- Devices – highly unlikely/never reusable
- Check Sources & Standards – rarely/never reusable

Recycling: Dollars or Sense?

- 1 in every 1,000 low level sources may have value
- Rarely is there a secondary use for the radioactive materials
  - "returned" sources sent for disposal
  - Housings may be recycled or scraped
  - Recycling Revenue will not pay the labor
- Speculative collection hoping for future value
- Concentrating the problem
- Low Security and tracking standards

Generator Reasons Not to Dispose

1. Cost
2. No Regulatory Pressure
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6. Too much trouble

Thoughts

- Consistent regulations and enforcement across the country
- Encourage generators to disposition unwanted sources on regular basis
- Quickly develop or resurrect simple Type B over packs for smaller sources

PERSPECTIVES OF SEALED SOURCE DISPOSAL MARKET

Qal-Tek

Revolutionizing Radiation Safety In Your World

Qal-Tek is a radiological services company which offers consulting and support services to licensees across the entire United States.

Qal-Tek has worked with over 1800 clients in all 50 states covering dozens of different markets and material users.

INSTRUMENT CALIBRATION, TESTING & REPAIR

- ISO 17025 Accredited by A2LA
- Approx. 25,000 instruments calibrated annually
- Designed and installed barcoding and instrument tracking system for New York City
- Performs testing, design and inspection for multiple manufacturers

mEyeCal

PORTABLE DENSITY GAUGE CALIBRATION

- First ISO 17025 Accredited Organization
- Provides Onsite and Laboratory Calibration & Repair in 32 States.

A2LA ACCREDITED

RADIATION SAFETY SUPPORT SERVICES

- Assists licensees with their license and regulatory obligations
  - License and Regulatory Obligations
  - Facility/Gauge Survey & Inspections
  - Leak Testing
  - RSO & User Training
  - Rad Program Assessment & Review
  - Procedure & Program Development

RADIOLOGICAL RESPONDER TRAINING

- 2008 - Began onsite live source responder trainings
- 2012 - Began offering larger scale response trainings at Guardian Centers in Georgia
- Trainings have been spotlighted on CNN and CBS
- Military, Joint Task Forces, Civil Support Teams, Local Responders

REUSE/RECYCLING/DISPOSAL

- Measurement Systems
  - Portable Density Gauges
  - Fixed Density Gauges
- Medical Sources

These sources have potential for reuse beyond their original intended use.

WHO USES SEALED SOURCES?

GENERATOR (LICENSEE) VIEWS

- To licensees, the sealed sources are assets, not just a liability.
- Licensees may show materials/devices as a depreciated asset with disposition liability.
- Acknowledging the cost of disposal is an important part of owning sealed sources and more manufacturers & licensees are now acknowledging this.
- Licensees are finding out that the cost to dispose of their materials can sometimes outweigh the acquisition cost by large multiples.
- High costs result in licensees retaining their materials as long as they can.

HOW DO WE INCENTIVIZE GENERATORS TO GET RID OF MATERIALS

1- REDUCE COST AND INCREASE OUTLETS

- Raise stakeholder awareness of disposal costs
- Are the consolidation points for radioactive materials to decrease costs and improve packaging efficiency?
- Are the generators, brokers, processors able to reduce the volume of sealed sources?
- Varying complications from the disposal sites.
- Regulators and compacts should support competition in the collection, brokering and processing of radioactive waste.

2- RADIATION IS A TECHNOLOGY

- The uses of Radioactive Materials are largely irreplaceable. However, there are few instances where RM have been replace by new technologies.
- New systems are still entering the market and are now often manufactured with foreign byproduct materials.
- There is a market demand for reuse of some of these materials vs. disposing of them, which generators have been led to believe is their only option.

3 – AVOID FURTHER COMPLICATION

- New regulations can create reduced incentives for the disposal of materials.
  - Establishment of new limitations on a licensee to dispose of their "assets" in a set time frame will limit many licensee's ability to meet their business and market needs.
  - Rather than restricting, focus should be on incentivizing licensees to reuse or dispose of their materials.

QAL-TEK'S PROGRAM

Qal-Tek reuses sealed sources internally for our own activities & services and/or transfers to another licensee for their reuse prior to disposal.

QUALITY IN PERFORMANCE

- All Qal-Tek operations are operated under an ISO 17025 Management Plan.
- Qal-Tek's operations and Radiation Program is overseen by a Radiation Safety Committee.
- Qal-Tek operates under Part 37 Physical Protection Requirements.

QAL-TEK CONTINUALLY STRIVES TO IMPROVE OUR PROCESSES TO ENHANCE SOLUTIONS AND SUPPORT TO THE INDUSTRY.

- Qal-Tek has voluntarily established a timeline for radioactive material re-use before disposal.
- Qal-Tek has developed a robust SQL server tracking system for management of sources.
- Qal-Tek has shown marked increases in reutilization and recycling opportunities as support continues to grow.