NSSAB MEETING ATTENDANCE

Full Board Meetings

FY 2012

October 2011 through September 2012

Name	10/12/11	1/18/12	2/15/12	3/21/12	4/11/12	5/16/12	7/18/12	9/19/12	Maximum Terms Limit
MEMBERS									
Kathleen Bienenstein	✓	✓	✓						2014
Matthew Clapp	✓	✓	✓						2017
Daniel Coss	✓	✓	✓						2017
Thomas Fisher	✓	✓	✓						2017
Arthur Goldsmith	✓	✓	✓						2017
Donna Hruska	✓	✓	✓						2016
Robert Johnson	✓	✓	✓						2012
John McGrail	✓	✓	✓						2014
Barry LiMarzi	✓	✓	✓						2017
Gregory Minden	✓	✓	✓						2016
Michael Moore	✓	✓	✓						2016
Michael Voegele	✓	✓	✓	RS					2016
James Weeks	✓	✓	✓						2013
Walter Wegst	✓	✓	✓						2012
Mitzie Wilson	✓								2017
LIAISONS									
Cielomina Gumabon	✓	½							2012
John Klenke		✓	✓						
Phil Klevorick	✓	✓	✓						
Justine Leavitt	✓	✓							2012
Tim Murphy	✓	✓	✓						
Genne Nelson		✓	✓						
Scott Wade	✓	✓	✓						

Key:

√ = Present

E = Excused U = Unexcused

RM = Removed RS = Resigned

Term Limit

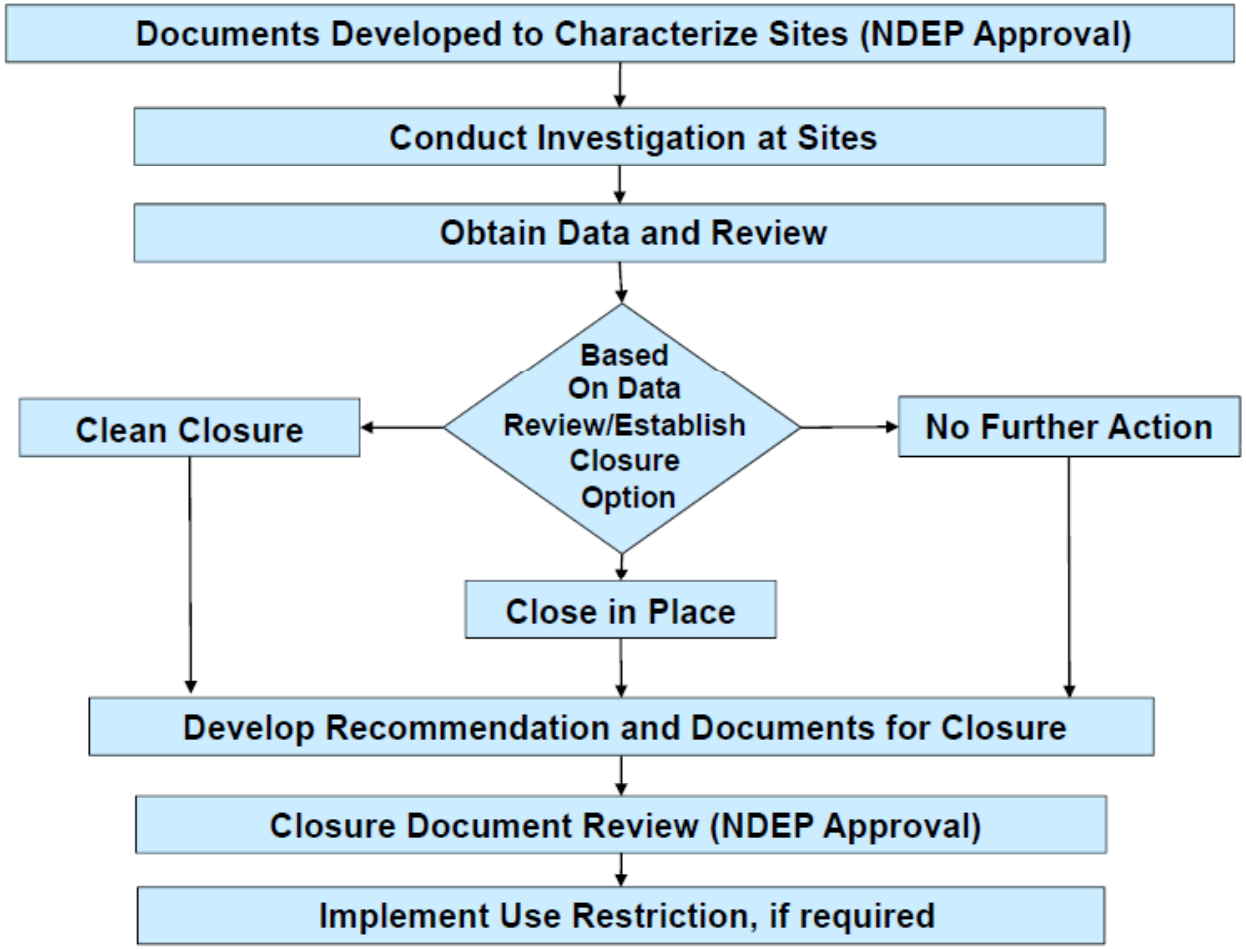
Use Restrictions and Long-Term Monitoring at Industrial Sites

Kevin Cabble
Industrial Sites Federal Sub-Project Director
Briefing to Nevada Site Specific Advisory Board (NSSAB)
March 21, 2012

Objective

- Provide the NSSAB with information re¸ardin¸ Industrial Sites Long-Term Monitoring Use Restrictions so the Board can develop a recommendation re¸ardin¸:
  - Use Restriction reduction
  - Frequency of inspections
  - Inspection criteria
  - Potential enhancements

Use Restriction Evaluation Flow Chart



Designation of Use Restrictions

- Necessary when contamination remains after site remediation activities are completed
- Risk is always considered when implementing
- Must be accepted by State of Nevada Division of Environmental Protection (NDEP)

Examples of Use Restrictions

- Use Restrictions are posted and recorded in Facility Information Management System (FIMS) to prevent inadvertent intrusion

Postings are placed so they are easi.,

125 of the 1,814 closed Industrial Sites are Use Restricted

Monitoring of Use Restriction Sites

- Periodic inspections conducted by federal and contractor staff
  - NDEP participates
- On an annual or every five (5) year schedule (some Resource Conservation and Recovery Act [RCRA] sites are inspected quarterly or bi-annually)
  - Schedule documented in the Closure Report

Monitoring of Use Restriction Sites (continued)

- Inspection criteria Include:
  - Subsidence
  - Erosion
  - Integrity of fencing
  - Condition of signs
  - Animal burrows
  - Site-specific requirements

Monitoring Costs

- The total annual cost to perform inspections averages $60,000 (approximately $500 per site)
- Site repair (subsidence, fencing, sign reposting) is sometimes required
  - Approximately 35-45% of sites require repair
- Average annual cost of repairs is:
  - $125K for seven (7) RCRA sites
  - $135K for 118 non-RCRA sites
  - $50K for Tonopah Test Range sites

Current Effort to Evaluate Current Practices

- An evaluation is underway to determine if some Use Restriction sites can be eliminated
- A set of criteria was developed to evaluate each Use Restriction site:
  - Landfills – due to the size and cost of removal, landfills are not being considered for Use Restriction removal
  - Revised Final Action Levels – a review of sites in relation to revised action levels may allow the removal of Use Restrictions due to:
    - Changes in action levels due to implementation of a risk-based approach
    - Changes to action levels based on Environmental Protection Agency revisions to threshold concentrations

Current Effort to Evaluate Current Practices
(continued)

  - Additional Sam. lin_ – Sam. lin_ where ori_inal data is limited
- Anticipated analysis of Use Restriction sites could allow reduction of 20-30 sites
- After evaluation, sites that remain restricted will be further evaluated to potentially reduce the frequency of inspection based on past results (i.e., demonstrated effectiveness of closure)

Planned Path Forward

- Evaluation of 125 Use Restriction sites complete - 6/1/12
- Removal of Use Restriction where no Field Work is required - comparison to revised Final Action Level will be used – 9/30/12
- Removal of Use Restriction where additional sampling wi.. be ..q...ed – 6/1/13
- Evaluate inspection frequency - 9/30/12
- All revisions regarding Use Restriction will require NDEP approval

NSSAB Recommendation

- DOE solicits a recommendation from the NSSAB on the following:
  - Is the Use Restriction evaluation plan appropriate from a community perspective?
  - What criteria should be used to determine if the frequency of inspections can be reduced?
  - Are there ways to enhance inspections?
  - Is the field monitoring inspection criteria appropriate?
  - Are there ways to enhance the criteria?
  - NSSAB recommendation needed by May 31, 2012

Inspection Requirement: **Annual** (through December 2011)
then **Every 5 Years** (through December 2036)

POST-CLOSURE INSPECTION CHECKLIST

CAU 5, LANDFILLS – CAS 23-15-03, DISPOSAL SITE

Inspection Date and Time:	Reason for Inspection:
Date of Last Post-Closure Inspection:	Reason for Last Post-Closure Inspection:
Responsible Entity: NSTec Environmental Restoration, Nevada National Security Site, Mercury, Nevada	
Responsible Facility Owner: Thomas A. Thiele, Project Manager, Industrial Sites, Environmental Restoration Project	
Chief Inspector:	Title:
Assistant Inspector:	Title:

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information and/or appropriate references to other documents that have the information.
- All documentation must be legible and clear.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?		■	
2. Have the previous inspection reports been reviewed?		■	
3. Were anomalies or trends detected on previous inspections?	■		
4. Were maintenance or repair activities performed since the last inspection?	■		
a. If yes, has site repair resulted in a change from as-built conditions?	■		**NA**
b. If yes (to 4a), are revised as-built plans available that reflect repair changes?		■	**NA**

C. SITE INSPECTION PREPARATION

Assemble the following, as needed, to conduct inspections:

- ***Pre-arrange access to both the WSI Training Facility and the Area 23 Landfill***
- ***Obtain key from Waste Generator Services to access the site***
- Radio, pager, etc.
- Previous letter report, inspection checklists, repair records, and as-built plans
- Camera, digital storage drive, extra batteries, and other miscellaneous support equipment

D. SITE INSPECTION

- ***The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

1. Site Markers (Area 23 Landfill):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any posts been damaged or their anchoring weakened?	■		
b. Are all use restriction signs legible?		■	
c. Are any use restriction signs damaged or missing?	■		
d. How many damaged or missing signs need to be replaced?			
e. Are any use restriction signs down?	■		
f. How many down signs need to be re-hung?			

POST-CLOSURE INSPECTION CHECKLIST

CAU 5, LANDFILLS – CAS 23-15-03, DISPOSAL SITE

2. Waste Unit Cover (Area 23 Landfill):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?			
b. Is there evidence of erosion (wind or water)?			
c. Is there evidence of human intrusion onto the site?			
d. Is there evidence of large animal intrusion onto the site?			
3. Site Markers (WSI Training Facility):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any posts been damaged or their anchoring weakened?			
b. Are all use restriction signs legible?			
c. Are any use restriction signs damaged or missing?			
d. How many damaged or missing signs need to be replaced?			
e. Are any use restriction signs down?			
f. How many down signs need to be re-hung?			
4. Waste Unit Cover (WSI Training Facility):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?			
b. Is there evidence of erosion (wind or water)?			
c. Is there evidence of human intrusion onto the site?			
d. Is there evidence of large animal intrusion onto the site?			

Photograph Instructions:

- Ÿ Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the annual post-closure report.
- Ÿ Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Ÿ Other photographs are optional.
- Ÿ A photograph log entry will be made for each photograph taken.

5. Photograph Documentation:	YES	NO	EXPLANATION
a. Have photographs been taken of the site?			
If yes, how many photos were taken?			
If yes, has a photographic log been prepared?			File Location: S:\NTS\ER Share\Photos\CAU 5_____

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Are more frequent inspections required?			
2. Are existing maintenance/repair actions satisfactory?			
3. Are maintenance/repair actions necessary?			
4. Is there an imminent hazard to the integrity of the landfill cover?			

POST-CLOSURE INSPECTION CHECKLIST

CAU 5, LANDFILLS – CAS 23-15-03, DISPOSAL SITE

5. Field Conclusions/Recommendations:_____

_____

_____

_____

F. CERTIFICATION: I have conducted this inspection in accordance with the Post-Closure Plan as recorded on this checklist and attachments.	
Chief Inspector's Signature:	Date:
Printed Name:	Title:

G. VERIFICATION: I have reviewed this checklist and attachments and have verified that they are complete.	
Signature:	Date:
Printed Name: Thomas A. Thiele (or designee)	

Radioactivity and Radioactive Decay

Nevada Site Specific Advisory Board

Walter F. Wegst, PhD

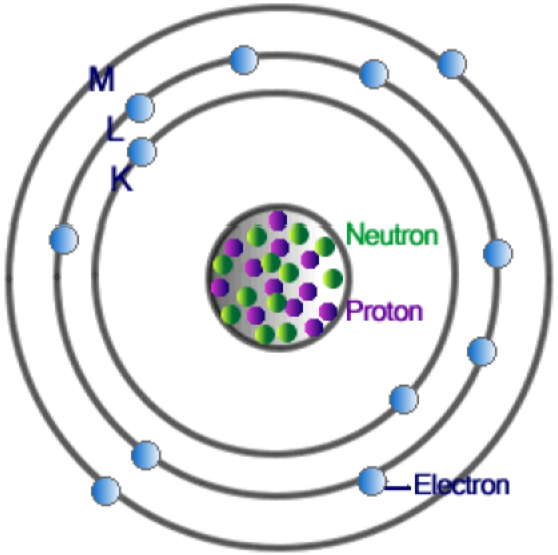
March 21, 2012

Radioactivity and Radioactive Decay

- Radioactivity originates in the nucleus of an atom.
- Therefore, radioactivity (half-life) is not affected by the chemical or physical state of the atom.

Bohr Model of Atom

Electrons create chemical bonds with other atoms to form compounds.



Nucleus contains protons and neutrons.

Proton mass is = 1 amu, charge = +1

Neutron mass is = 1^{+} amu, charge 0

(amu = atomic mass unit)

Nucleus

Number of protons designated by Z.

Z determines the element.

Changing number of protons creates a new element.

Total mass of nucleus designated by A.

Therefore, number of neutrons N equals A – Z.

Changing the number of neutrons creates a new isotope of the same element.

Such a change generally (though not always) creates an unstable or radioactive nucleus.

Nomenclature: $_{92}U^{232}$

Z = 92 = element uranium

A = 232 = atomic mass

N = 140 (A – Z)

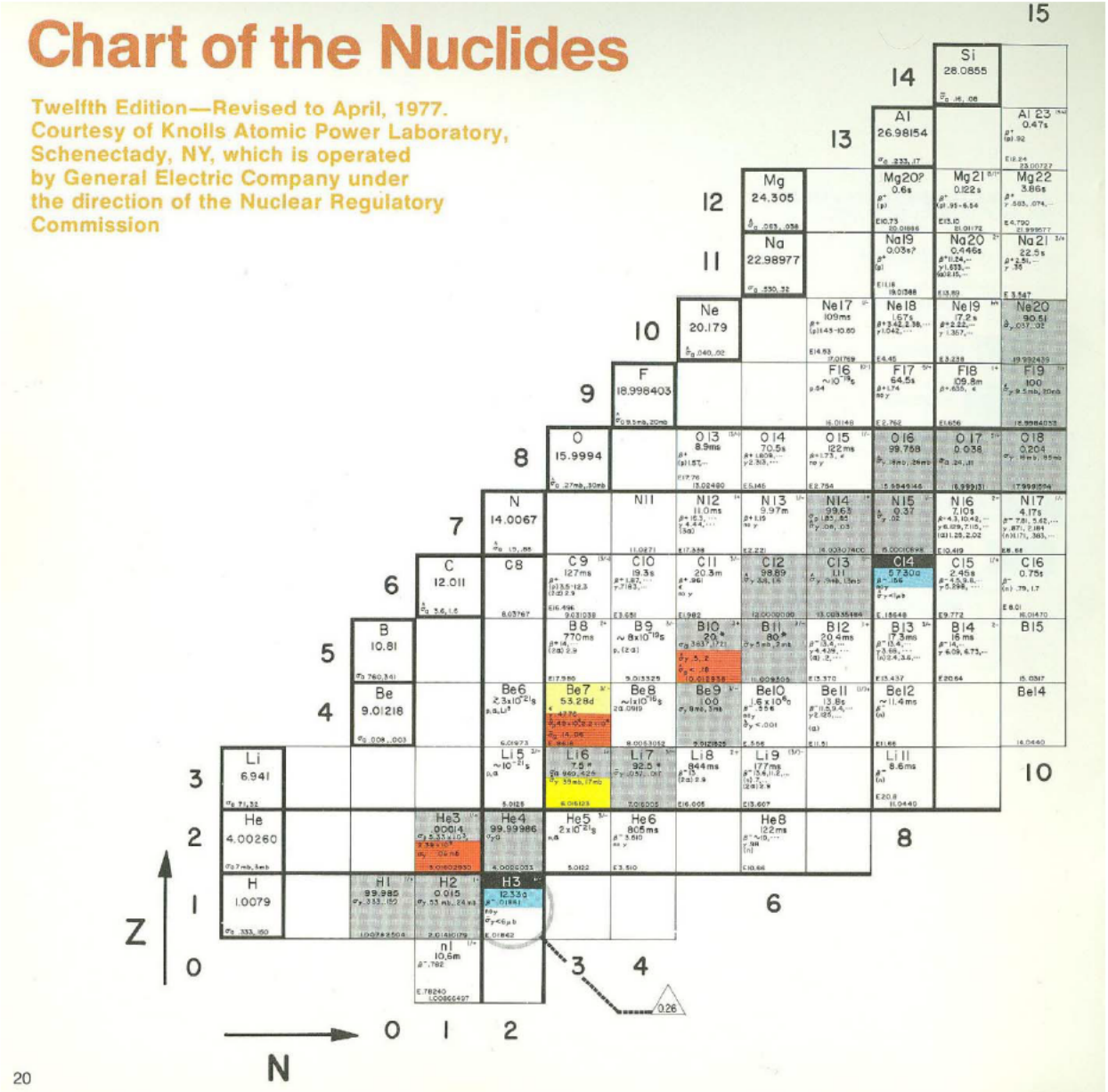


Chart of the Nuclides
Twelfth Edition—Revised to April, 1977.
Courtesy of Knolls Atomic Power Laboratory,
Schenectady, NY, which is operated
by General Electric Company under
the direction of the Nuclear Regulatory
Commission
Z
N
20

Radioactivity

All elements with Z less than or equal to 82 (lead) have a stable form of the nucleus.

Above Z of 82, no stable nuclei exist, although there are some elements (e.g. Uranium, thorium, that have quasi-stable states, that is very long radioactive half lives.

Half life of Uranium-238 is 4.468×10^9 years.
Approximately the age of the earth.

As the number of neutrons in the nucleus changes up or down from the stable number(s) the nucleus becomes more and more unstable.

Radioactive Decay

An unstable nucleus emits some particle to move toward a stable configuration.

Typically (though again not always) these emissions will be:

Alpha particle

Beta particle

Gamma ray may accompany the emission of a particle.

Names are the first three letters of the Greek alphabet and denote the order of discovery of these radiations.

For the case of U-232 and U-233 almost all of the decays necessary to reach a stable isotope of Pb are alpha decays accompanied by one or more gammas.

Radioactive Decay (continued)

ALPHA particle is: 2 protons and 2 neutrons

Hence mass = 4 amu and charge = +2

This particle is actually the nucleus of a He atom.

BETA particle is: 1 electron

Mass = very small (approx. 1/1836 of a proton) and charge = -1.

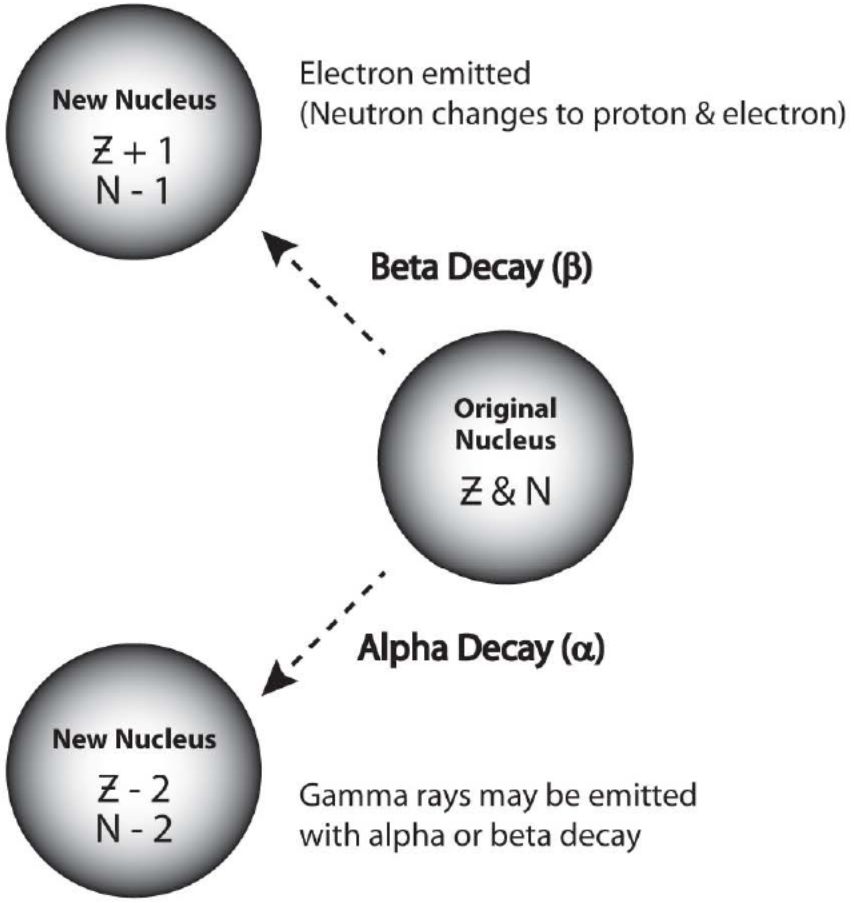
GAMMA RAY is pure electromagnetic wave.

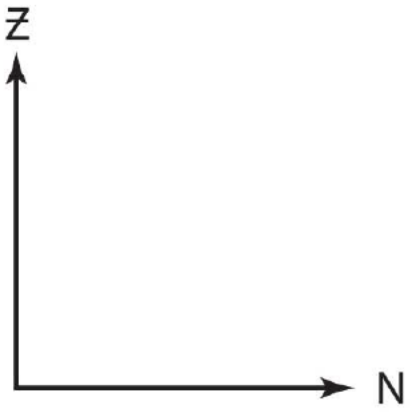
Mass = 0, charge = 0

A gamma ray is exactly like an X-ray and interacts with matter the same as an X-ray. The name difference is used to denote the origin of the radiation. Gammas come from the nucleus and X-rays come from the atomic electrons.

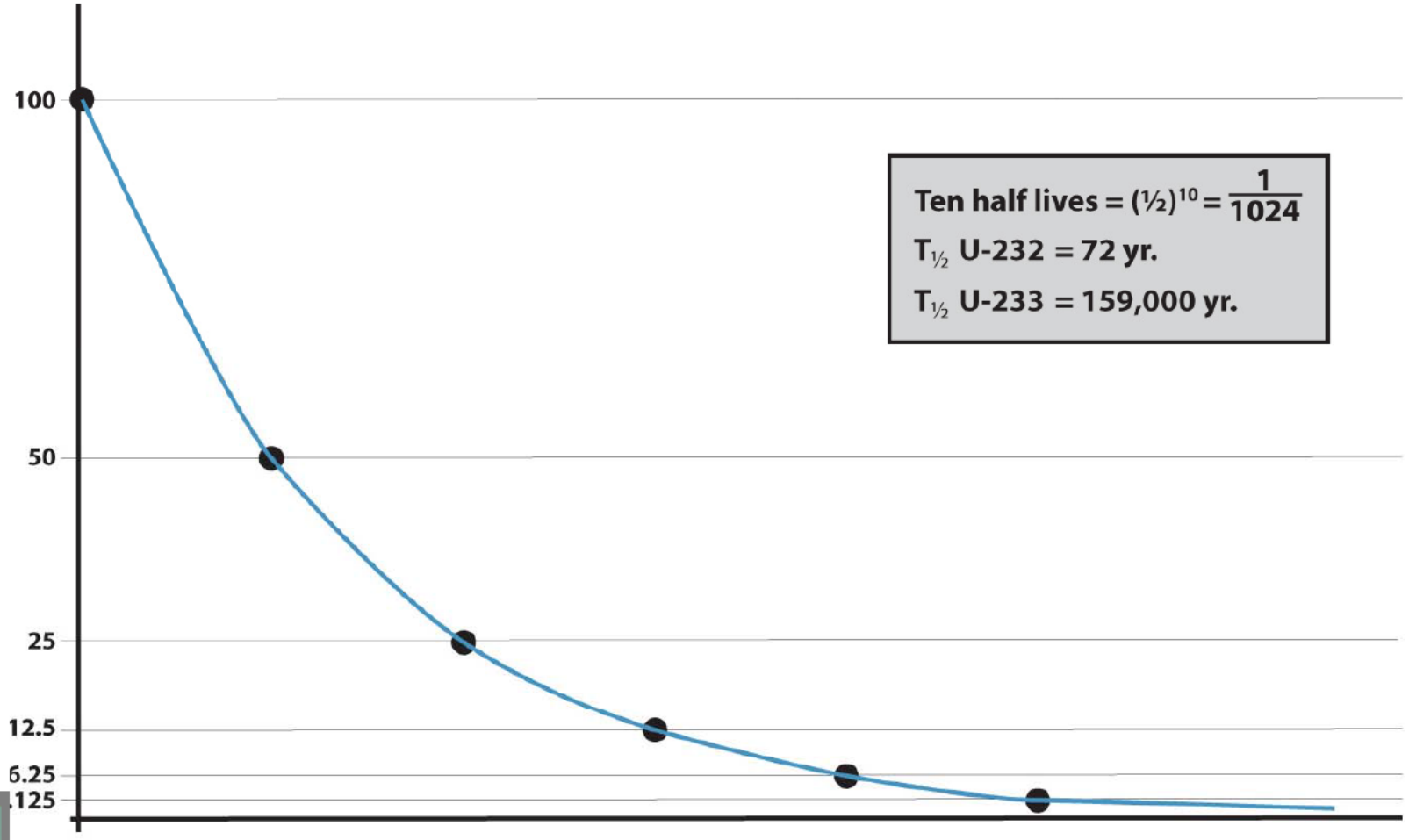
Note that both alpha and beta decay change the Z of the nucleus and hence result in a new element being formed.

Diagram of Alpha and Beta Decay





Half Life Decay

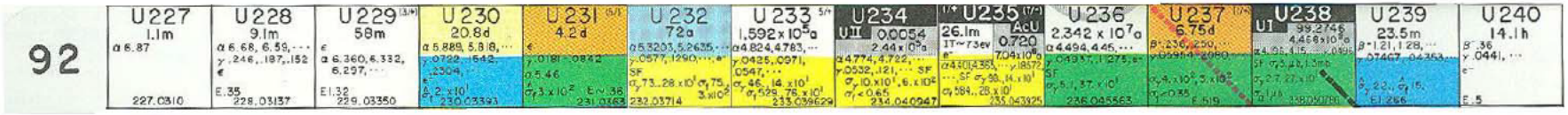


Ten half lives = $(½)^{10} = \frac{1}{1024}$

$T_{½}$ U-232 = 72 yr.

$T_{½}$ U-233 = 159,000 yr.

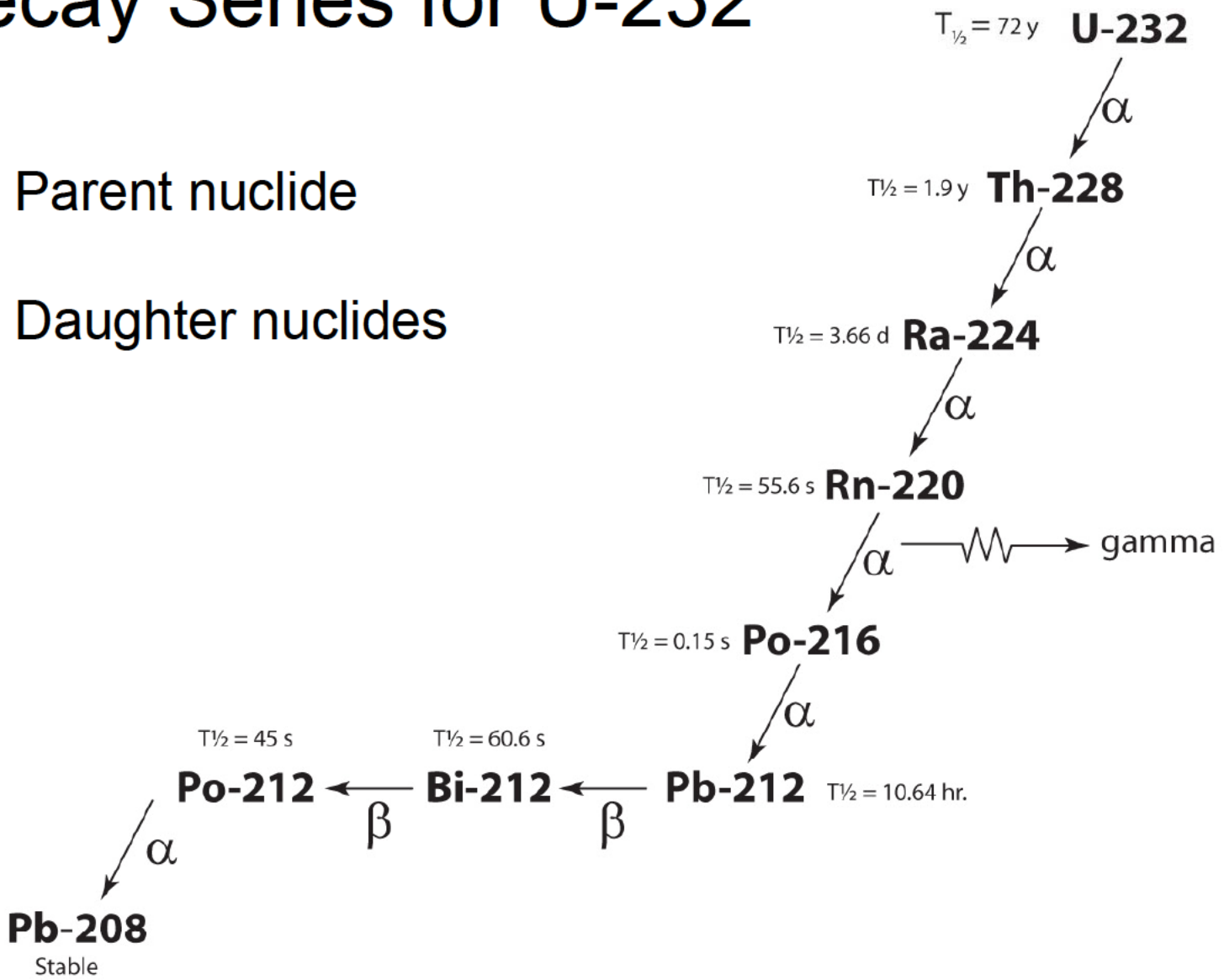
Uranium Isotope Series



Decay Series for U-232

Parent nuclide

Daughter nuclides



Decay Series for U-232 (continued)

There are six alpha decays in this chain indicating a mass change of 24, i.e. from U-232 to Pb-208.

The six alpha decays represent 12 protons, offset by the two beta decays for a net change of 10 protons, i.e. from Z=92 to Z=82.

Most of the alpha decays are accompanied by one or more gamma rays. The most energetic gamma accompanies the transition from Rn-220 to Po-216.

Interesting Sidebar

- Approximately 1.7 billion years ago the abundance of U-235 in natural Uranium would have been 3% or higher, as compared to 0.72% today (due to radioactive decay).
- This abundance is high enough that with sufficient water present (as a moderator), a natural nuclear reactor could have occurred.
- During the French mining of natural uranium in Oklo in the Gabon Republic in Africa just such a natural reactor was found. This "reactor" has been estimated to have generated a total of 15,000 megawatt years. (A large modern nuclear reactor generates approximately this much energy in 4 years of operation.)
- This natural reactor generated Pu-239 and studies of the deposit indicate that this Pu was "locked up" in the grains of the ore for a time comparable to its 24,110 year half-life. Further, at least half of the fission product elements have remained immobilized in the ore.
- All this with no help from man.

Janet Appenzeller-Wing
Acting Waste Management Project Director
U.S. Department of Energy, Nevada Site Office
P. O. Box 98518
Las Vegas, NV 89193-8518

SUBJECT: Recommendation on Proposed U-233 Disposition
at the Nevada National Security Site (NNSS)

Dear Ms. Appenzeller-Wing,

The Nevada Site Specific Advisory Board (NSSAB) has completed an extensive review and discussion of the proposed disposal of Oak Ridge National Laboratory (ORNL) U-233 Consolidated Edison Uranium Solidification Project (CEUSP) waste at the NNSS.

If the Department of Energy (DOE) completes all of the necessary documentation (i.e. Nevada National Security Site Waste Acceptance Criteria, Performance Assessment, Transportation Plan, Documented Safety Analysis, Vulnerability Assessment, shipper's Emergency Response Plan, etc.) and determines that the proposed actions are compliant with all regulations and required processes, then the NSSAB supports the acceptance of ORNL's U-233 CEUSP waste material at the Nevada National Security Site for disposal.

Through review and discussion, several additional, related topics were identified which the NSSAB would recommend for consideration by the DOE.

- The DOE actively work with local governments to ensure their concerns are addressed regarding this waste stream, including emergency responders training and other needs

- The DOE should research all transportation routes to the NNSS rather than assuming the current routes to the NNSS should be used

- ORNL and the Nevada Site Office should review *Dr. Ruth Weiner's May 6, 2009 Risks of Transportation Along Various Routes to the Nevada Test Site* transportation study (enclosed).

The NSSAB would like to review all publicly-releasable documentation as it becomes available. In addition, it is requested the DOE provide status updates throughout the planning and project execution process.

The time and effort taken by the DOE staff in developing such comprehensive briefings, particularly those in response to the NSSAB's questions, was very much appreciated. The NSSAB values the opportunity to review the disposition of this waste stream and supports disposal at the NNSS.

Sincerely,

Kathleen L. Bienenstein
Chair

Enclosure

Recommendation letter concerning draft Soils Risk-Based Corrective Action Decision (RBCA) process document

March 21, 2012

Mr. Rob Boehlecke
Environmental Restoration Project Director
U.S. Department of Energy, Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

SUBJECT: Recommendation on Draft Soils Project Risk-Based Corrective Action Evaluation Process

Dear Mr. Boehlecke:

The Nevada Site Specific Advisory Board (NSSAB) approved Work Plan Item number 14 is to review the draft Soils Project Risk-Based Corrective Action Evaluation Process Document and to provide comments regarding possible improvements to either the process or the actual document.

The NSSAB has completed the requested review. The Board concurs with and supports the concept of basing corrective actions on relative risk. The overall concept should provide for the most cost effect clean up of the various sites, and allow the limited funding available to be best utilized.

Regarding the specifics of the technical process and the document itself, the NSSAB does not feel it has the technical or regulatory expertise to offer much improvement or suggestions. We understand this document will be submitted to the State of Nevada Division of Environmental Protection (NDEP), as the appropriate regulator, for review and approval. The NSSAB is of the opinion that if the final document is approved by NDEP, it should be acceptable for its intended use.

The NSSAB appreciates the opportunity to review this document and provide meaningful input to the DOE. We look forward to your response.

Sincerely,

Kathleen L. Bienenstein,
Chair

EM SSAB CHAIRS MEETING
April 2012

Topics/Issues for EM-1 (No more than two topics)

1. Student Liaison Educational Project
   - A two-year educational project to develop a Nevada National Security Site Environmental Management education tool is being developed in conjunction with West Career and Technical Academy
   - Led by the NSSAB student liaisons, the project will –
     - Conduct a survey to determine the level of experience and knowledge of high school students regarding the NNSS EM Program
     - Based on survey results, develop an educational tool focusing on the EM Program
     - Launch the educational tool, and
     - Evaluate the success of the educational tool by conducting and analyzing a closing survey

2. U-233 Waste Disposition
   - It is early in the process and the majority of evaluations are still in process
   - The Board's recommendation stresses the importance of the successful completion and acceptability of all evaluations

3. Membership Recruitment
   - The membership recruitment, review and appointment process remains a lengthy one, hindering the ability to retain qualified, interested candidates

4. Other ?????

Cross-cutting Issue (one topic)

1. Waste disposal

2. Communication between sites when Board discussion affects other sites

3. Sharing of process methods

Department of Energy
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

MAR 0 9 2012

Darrell Lacy, Director
Nye County Nuclear Waste Repository Project Office
2101 East Calvada Blvd., Ste #100
Pahrump, Nevada 89048

U-233 WASTE FOR AREA 5 LOW-LEVEL WASTE FACILITY

Reference Nye County letter dated January 31, 2012, subject as above.

I received your letter regarding proposed U-233 waste shipments from Oak Ridge, Tennessee, for disposal at the Nevada National Security Site (NNSS). Additionally, I was also present at the Nevada Site Specific Advisory Board meeting on February 15 during which you made public comments regarding the waste stream. Based on your letter and comments, I feel it would be beneficial to schedule a meeting to discuss this waste stream in detail. Please contact Marla Libidinsky, of my staff, at (702) 295-7063 to make arrangements when it is convenient for you.

As Nye County is the location of the NNSS, we recognize the importance of open, ongoing communication with your office.

Scott A. Wade
Assistant Manager
for Environmental Management

WMP:8359.JC

cc via e-mail:
C. M. Gelles, DOE/HQ (EM-43) CLVRLF
Colleen Cripps, NDEP, Carson City, NV
D. M. Rupp, NSSAB, Las Vegas, NV
NNSA/NSO Read File