



# Dose Reconstruction Process Overview

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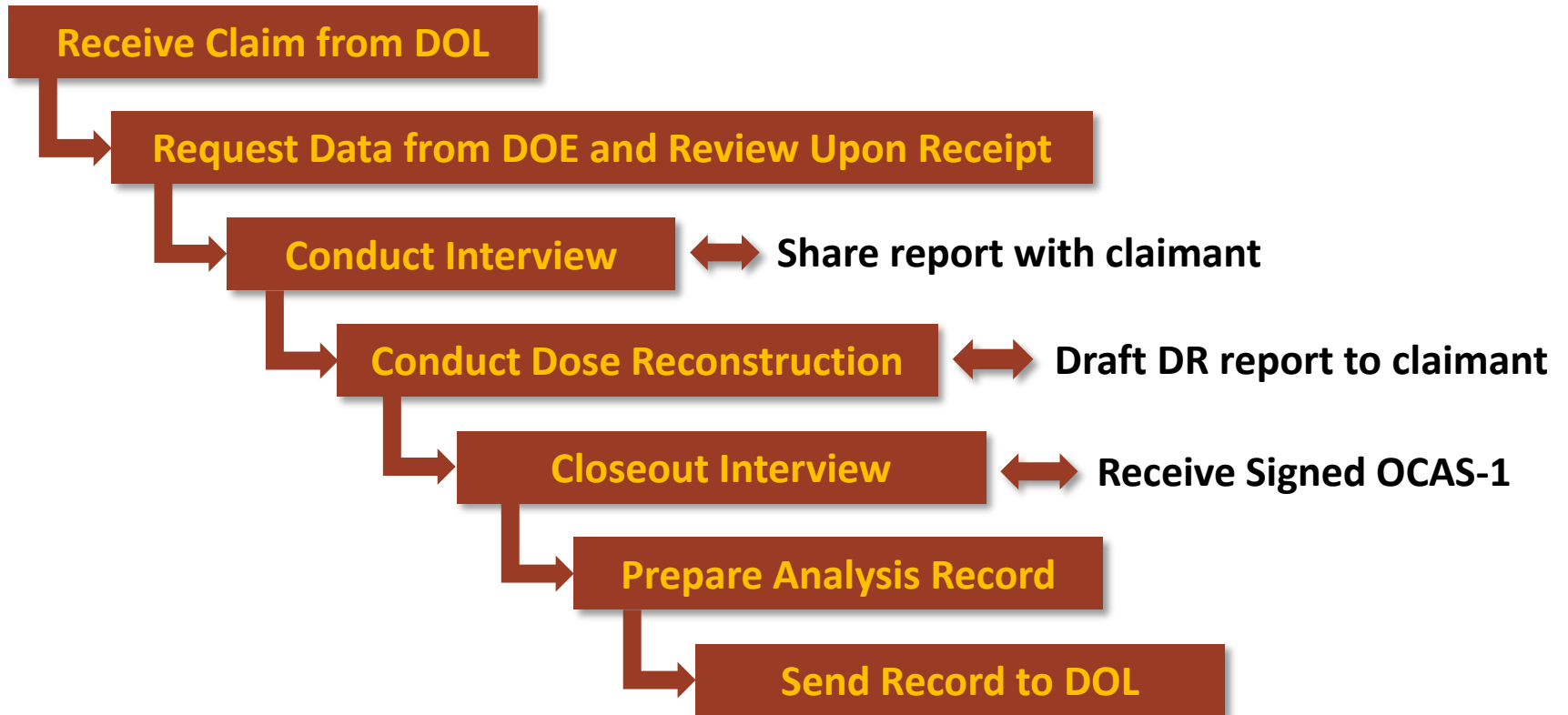
**National Institute for Occupational Safety and Health**

**Division of Compensation Analysis and Support**

**June 2, 2022**

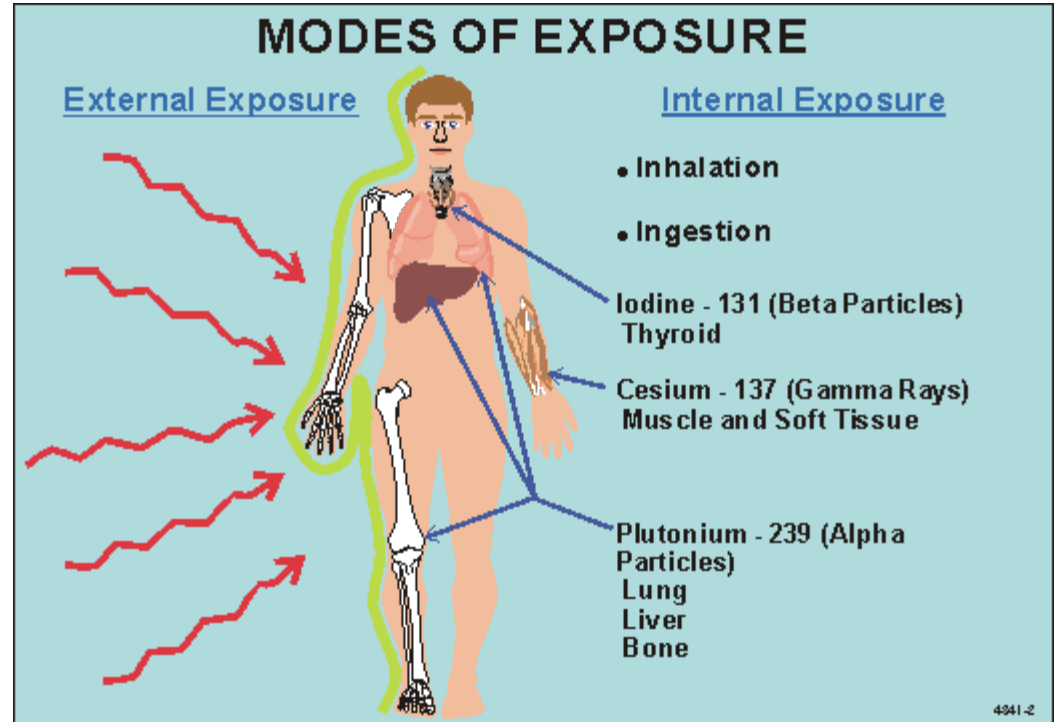
**Aiken, South Carolina**

# Dose Reconstruction Process



# Frequently Used Terms

- **External Dose**: Dose received from radiation originating outside the body.
- **Internal Dose**: Dose received from radiation originating inside the body.



# Frequently Used Terms - continued

## Occupational Medical Dose

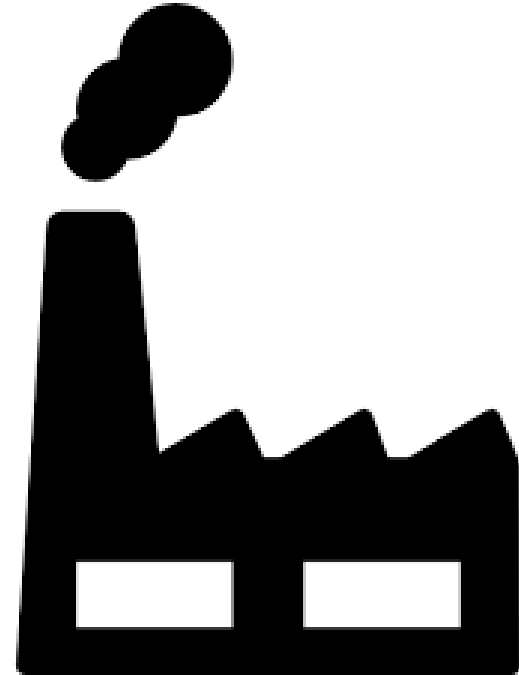
- Includes diagnostic X-rays required as a condition of employment.
- Does not include X-rays resulting from illness or injury, diagnostic X-rays performed for diagnosis of illness, or dose resulting from nuclear medicine tests or radiation therapy.



# Frequently Used Terms - continued

## Environmental Dose

- The dose measured on and around these facilities.
- Includes external radiation as well as airborne radioactivity.
- Most useful in cases where no dosimetry records exist.



## Frequently Used Terms - continued

- **Overestimate**
- **Best Estimate**
- **Underestimate**
- **Partial Estimate**

## Factors impacting Dose Reconstructions

- **Time**
- **Claimant favorability**
- **Reasonable**
- **Special Exposure Cohort**

# Basics of Dose Reconstruction

- **Use all available worker and workplace information to reconstruct dose**
- **Evaluate all doses of record for data quality shortcomings**
- **Evaluate potential for undetected dose**
- **Use recommendations established by national and international organizations**

## **Basics of Dose Reconstruction - continued**

- **Prefer to use individual monitoring data if available and of sufficient quality**
- **Use standard methods to evaluate “missed dose”**
- **Rely on use of area dosimeters, radiation surveys, and air sampling if individual data is not available**
- **If no monitoring data, then use available data on source term, etc.**



## **Basics of Dose Reconstruction - continued**

- **Annual organ doses will be computed from date of first employment (as verified by DOL) to date of diagnosis**
- **When possible, provide an estimate of uncertainty**
- **Dose output will be compatible with the probability of causation software (IREP)**

## **Basics of Dose Reconstruction - continued**

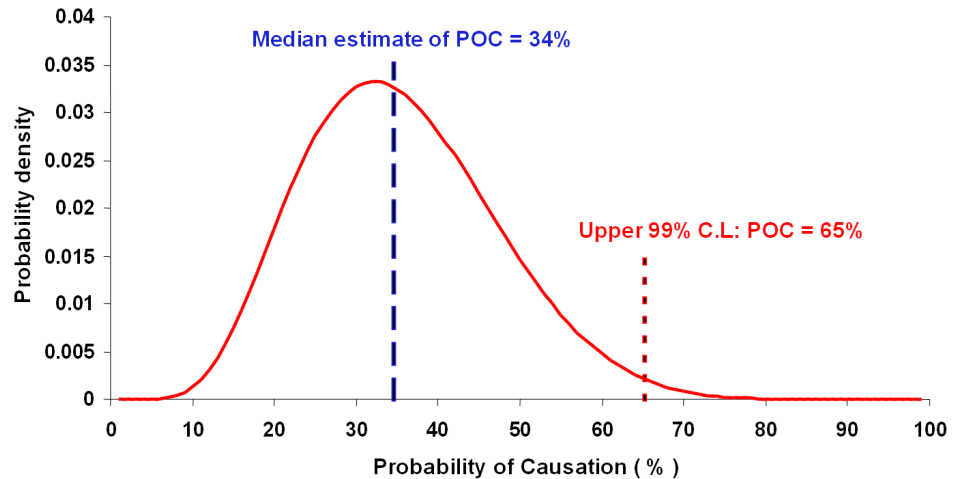
**When individual dose monitoring results are not available doses can be estimated using:**

- **Co-exposure Models**
- **Surrogate Data**
- **Source-term modeling**

# Probability of Causation

- The Act set the guidelines for determining probability of causation (PC or PoC).
- Eligible for compensation if the cancer was “at least as likely as not” caused by radiation on the job.
- $PoC \geq 50\%$

## Applying Credibility Limit



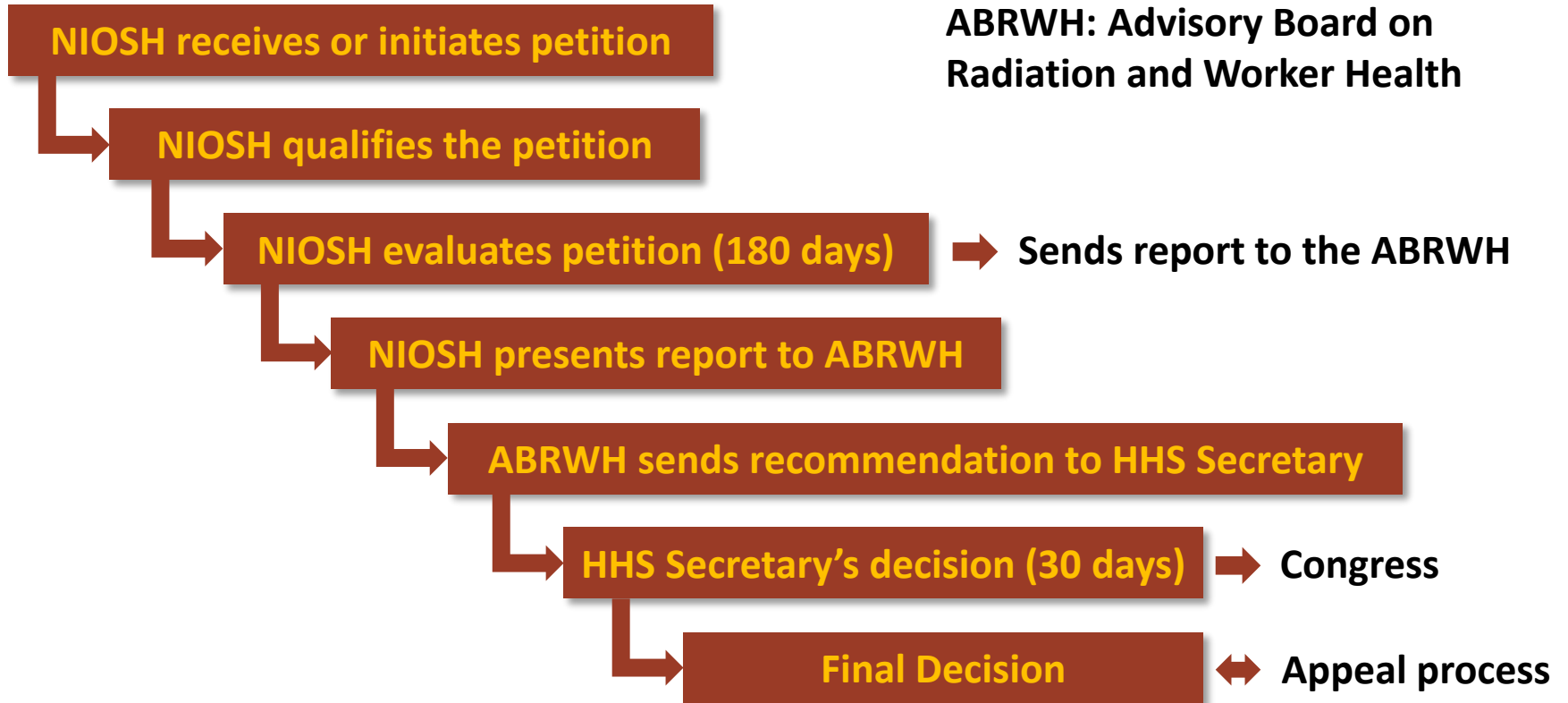
# Claimant Favorable Approach

**When a choice must be made between different approaches and there is no information about which approach is most technically accurate, NIOSH chooses the approach resulting in the highest probability of causation.**

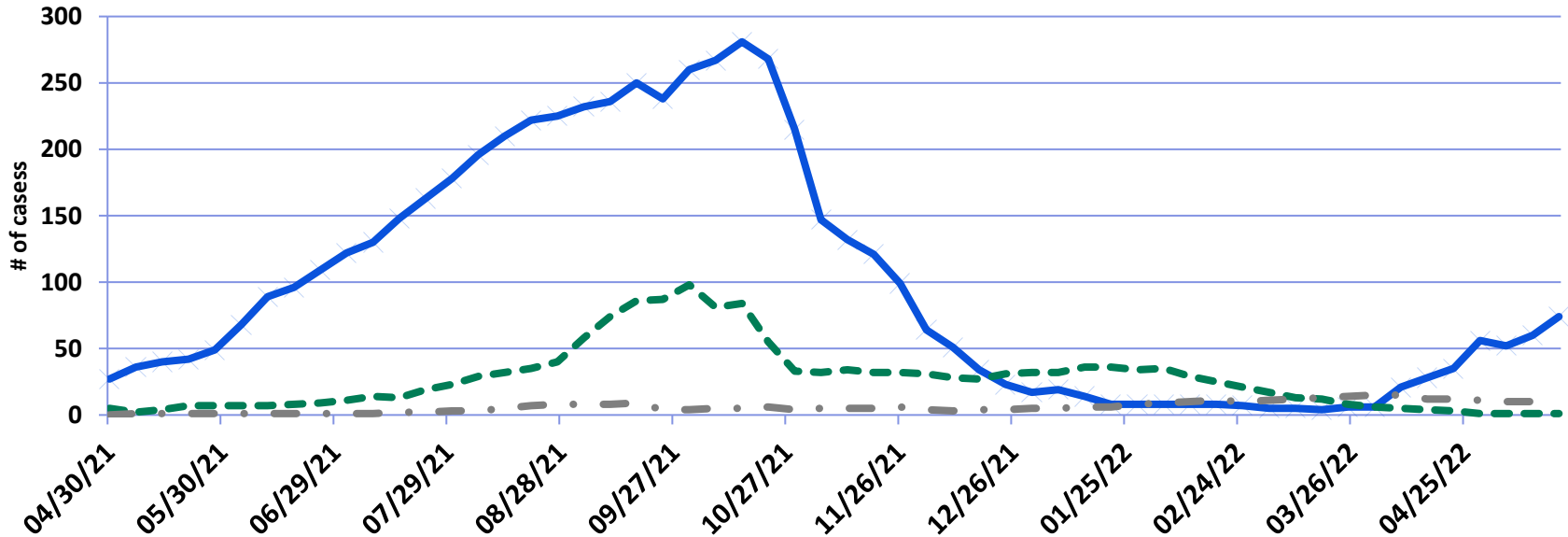
Some examples include:

- Conservative Dose Conversion Factors
- Addition of potential missed dose
- Solubility class of radionuclide for internal dosimetry
- Aged Pu with Am buildup
- Upper 99<sup>th</sup> percentile of credibility limit to determine PoC.

# Special Exposure Cohort Petitioning Process



# Age of Cases Since the Pause Began



This graph represents the amount of time cases reside with DCAS. The times are measured from the date the case is received from DOL to the date the draft dose reconstructions are sent to the claimants. DCAS goal is to complete dose reconstructions within 5 months of the receipt of the last data required for dose reconstruction.

— 6-9 mo    - - - 9-12 mo    · · · > 12 mo

# General Information

513-533-6825  
dcas@cdc.gov

SEC Petition Counselor  
Phone 513-533-6831  
[jkinman@cdc.gov](mailto:jkinman@cdc.gov)

Denise Brock  
NIOSH Ombudsman  
636-856-0487 or 636-236-0932  
[CKO7@cdc.gov](mailto:CKO7@cdc.gov)

DCAS Website  
[cdc.gov/niosh/ocas](https://cdc.gov/niosh/ocas)

# Questions?

For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.





**Extra Slides**

**IT Modernization**

# IT Modernization: Discovery

- NIOSH discovered potential security vulnerabilities in DCAS systems in May of 2021
- Existing systems for processing dose reconstructions and SEC petitions were shut down
- This was done without warning to not bring attention to any vulnerabilities
- There were no known breaches of data of any kind

# IT Modernization: Path Forward

- A short-term solution is mostly in place and provides manual methods for completing dose reconstructions and Special Exposure Cohort (SEC) petition evaluations.
- Cases that built up when the pause started in May of 2021 have been mostly processed.
- We will continue to add improvements to the short-term solutions to increase production and maintain quality control.
- A long-term solution is in development and will provide a fully automated processes for completing dose reconstructions and Special Exposure Cohort (SEC) petition evaluations

**Petition and claims information**

The Act



42 CFR 83

**Subpart A: Introduction**

**Subpart B: Definitions and specific cancer list**

**Subpart C: Procedures for adding SEC Classes**

**83.6** – Overview

**83.7** – Who can submit a petition?

**83.8** – How is a petition submitted?

**83.9** – What information must a petition include?

**83.10** – If it includes everything in 83.9, will it become an SEC?

The Act



42 CFR 83

83.11 – What happens to petitions that don't satisfy all requirements in 83.7 to 83.9?

83.12 – How will NIOSH notify stakeholders of petitions that will be evaluated?

83.13 – How will NIOSH evaluate petitions?

83.14 – How will NIOSH evaluate a claimant petition whose dose reconstruction could not be completed under 42 CFR 82?

The Act



42 CFR 83

83.15 – How will the ABRWH consider and advise the HHS Secretary on a petition?

83.16 – How will the HHS Secretary decide the outcome?

83.17 – How will the HHS Secretary report a final decision?

83.18 – How can petitioners obtain an administrative review of a final decision?

83.19 – How can the HHS Secretary cancel or modify a final decision?



The Act



42 CFR 83



DCAS-PR-004

Energy Employees Occupational Illness Compensation Program Act (EEOICPA) of 2000

Procedures for Designating Classes of Employees as Members of the Special Exposure Cohort Under the EEOICPA of 2000

Internal Procedures for the Processing of Special Exposure Cohort Petitions

# Submitting an SEC Petition

- [SEC FAQs](#)
- [Petition Counselor](#)
- Help Line: 1-877-222-7570

[DCAS-PR-004](#)

[Form A](#)  
83.14

Use only if NIOSH has reported to you in writing that it cannot complete the dose reconstruction

[Form B](#)  
83.13

NIOSH has **not** reported to you that it cannot complete the dose reconstruction [\[Goto 83.13 process\]](#)

[Authorization](#)  
[Form](#)

Representing an employee or a survivor of an employee requires written authorization

- Safe storage
- Privacy Act compliance
- Quality Assurance

# DCAS-PR-004; Form B, 83.13 – Processing SEC Petitions

## Petition

- **180 days** to qualify or not qualify
- 42 CFR 84 §7384q (c)

## DCAS 6.1.1

- Receives Petition
- Acknowledge receipt to petitioner
- Assign DCAS HP
- DCAS/ORAU pend claims if necessary

# DCAS-PR-004; Form B, 83.13 – Processing SEC Petitions

## DCAS 6.1.2

- Establish qualification of petitioner
- DCAS/ORAUT Consult Call

## DCAS 6.1.3

- Confirm scope of the proposed class
  - Limited to single facility
  - Time frame, occupations, etc.

# DCAS-PR-004; Form B, 83.13 – Processing SEC Petitions

## DCAS 6.1.4

- Other concurrent petitions?
- Combine as necessary

## DCAS 6.1.5

- Review petitioner(s) basis
  - Inadequate records or information?

# DCAS-PR-004; Form B, 83.13 – Processing SEC Petitions

## DCAS 6.1.6

- **30 days** from receipt of petition
- **DRAFT** Petition Qualification Report
  - Not qualified: 30 days to revise
  - Qualified: create team and plan

## DCAS 6.1.7

- **75 days** from receipt of petition
- **FINAL** Petition Qualification Report

There are provisions to extend the 180 days deadline in DCAS-PR-004 with proper justification.

**Claimant Favorability**

# **Claimant Favorable Approach – continued**

## **External Dose**

- **Dose conversion factor selection typically conservative**
- **External co-worker data calculations are highly claimant favorable due to inclusion of missed dose**
- **External co-worker data assignment approach is claimant favorable (50<sup>th</sup> or 95<sup>th</sup> percentile selection)**
- **Unmonitored neutron dose using neutron/gamma ratios is based on claimant-favorable assumptions**
- **Technical Basis Documents (TBDs) often default to worse case exposure assumptions for unmonitored workers**



# **Claimant Favorable Approach – continued**

## **External Ambient Dose**

- **TBD values are typically based on highest measured data**
- **Unknown work locations leads to selection of highest TBD values**
- **Values sometimes include natural background dose**
- **Ambient dose sometimes double counted if worker was monitored and background subtraction process not known**
- **30-250 keV default energy assumption**

# **Claimant Favorable Approach – continued**

## **Occupational X-ray Dose**

- **Photofluorography (PFG) assumption in some cases when no clear evidence**
- **Default TBD frequencies are generally claimant favorable**
- **TBD frequencies assumed if data are not available, even if claimant interview indicated no procedures occurred**
- **In some cases procedures are counted even if voluntary**
- **Claimant-favorable assumptions applied for skin cases based on entrance skin exposure**

# **Claimant Favorable Approach – continued**

## **Internal Dose**

- **Solubility class assumption – can affect dose by orders of magnitude**
- **Radionuclides that result in highest organ dose are selected when there is uncertainty**
- **Organ selection for internal dose calculation is often claimant favorable (e.g., lymphomas)**
- **Missed dose is based on earliest possible intake date**
- **Dose assignment for unmonitored workers is based on internal co-worker data if any exposure potential**