Dose Reconstruction and Special Exposure Cohort Process Overview

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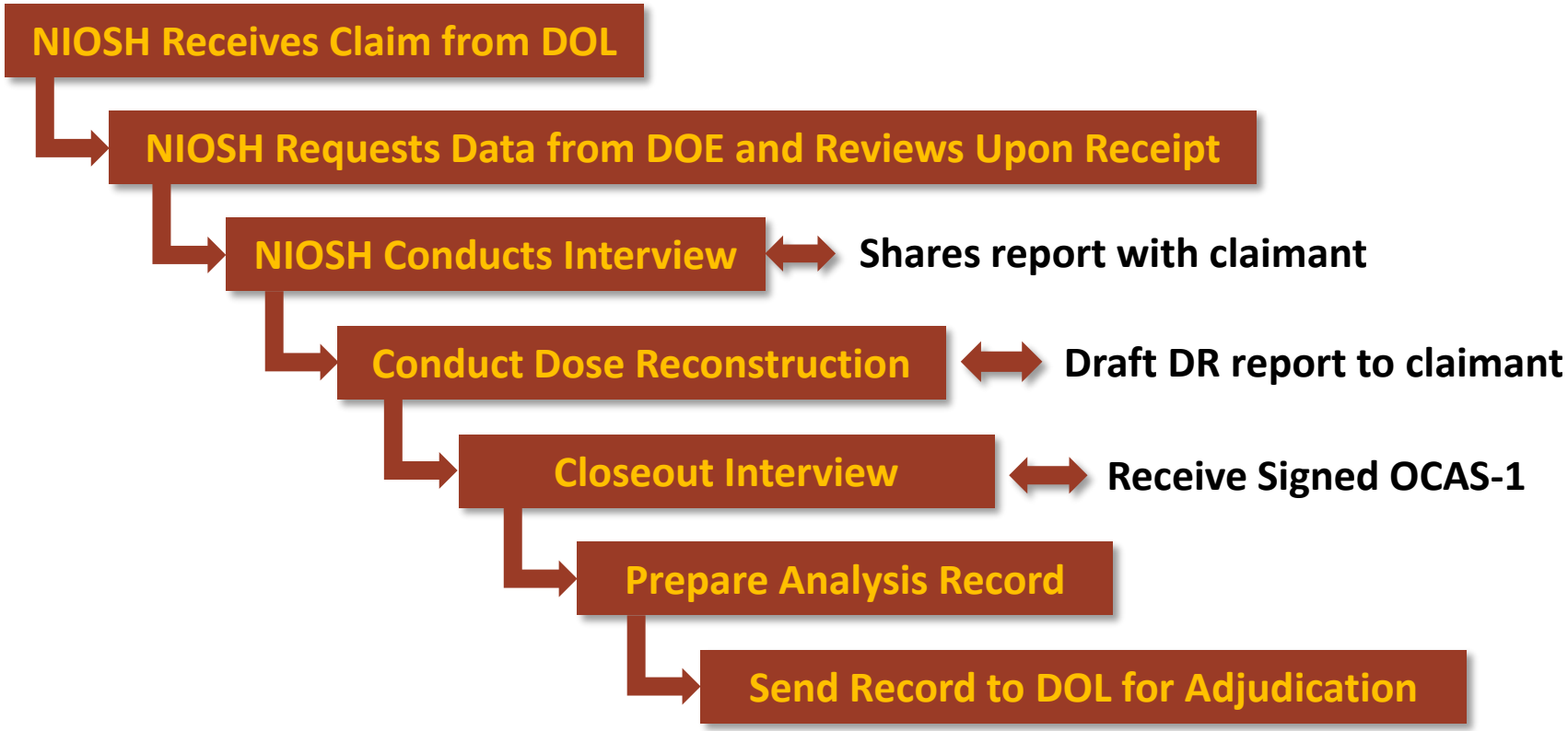
NIOSH's Role Under EEOICPA

- Reconstructs Dose
- Develops methods to reconstruct dose
- Develops Probability of Causation methods
- Evaluates Special Exposure Cohort Petitions
- Supports the Advisory Board for Radiation and Worker Health (ABRWH)

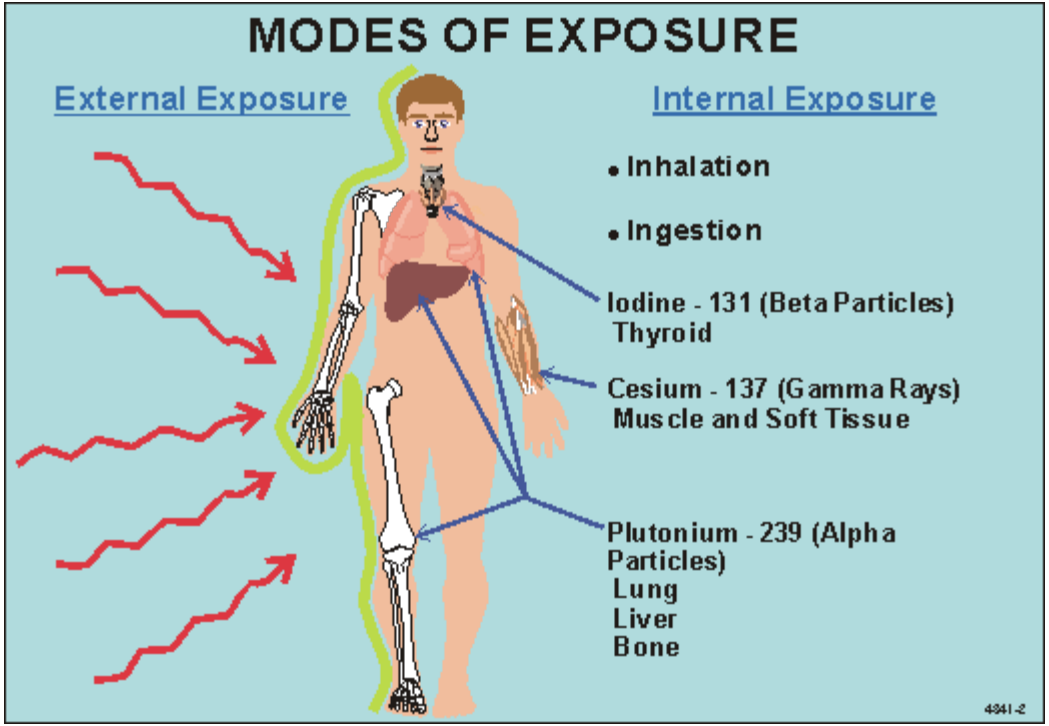
Dose Reconstruction Process



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

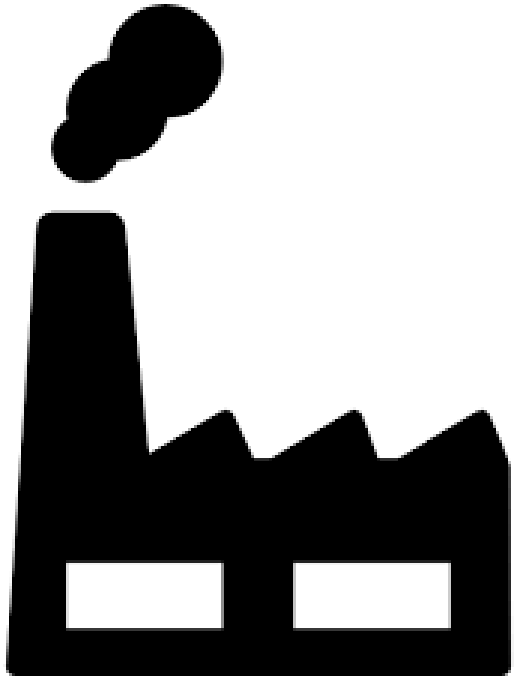
Occupational Medical Dose

- Diagnostic X-rays required as a condition of employment
- Excludes diagnostic X-rays from illness or injury,
- Excludes dose from nuclear medicine tests or radiation therapy

Frequently Used Terms - continued

Environmental Dose

- The dose measured on and around facilities
- Includes external and internal dose (airborne radioactivity)
- Used in some cases where no personnel dosimetry records exist



Frequently Used Terms - continued

- **Overestimate –** efficiency approach
- **Best Estimate –** detailed dose analysis
- **Underestimate –** efficiency approach
- **Partial Estimate –** parts of dose reconstruction infeasible (SEC)

Factors Impacting Dose Reconstructions

- Recorded Dose (dosimeter results, bioassay results)
- Exposure Rate (high dose in short time vs. low dose over long time)
- Missed Dose (dose below detection limit)
- Radiation Types & Energies (alpha, beta, gamma, neutrons)
- Cancer Type & Number
- Age of cancer development
- Latency (time between exposure and cancer)
- Ethnicity (Skin Cancer)
- Smoking History (Lung Cancer)
- Claimant Favorability
- Special Exposure Cohort Designation (infeasibility)

Basics of Dose Reconstruction – Data Hierarchy

- Individual radiation monitoring data
- Co-exposure data if necessary (exposure of other workers with same work history)
- Workplace radiation monitoring data (area monitoring, surrogate data)
- Workplace knowledge of radiation sources and processes

Basics of Dose Reconstruction - Procedures

- NIOSH developed procedures (implementation guides, technical documents)
- Use recommendations established by national and international organizations
- Evaluate all doses of record for data quality shortcomings
- Evaluate potential for undetected dose (missed dose, unmonitored dose)

Basics of Dose Reconstruction - IREP

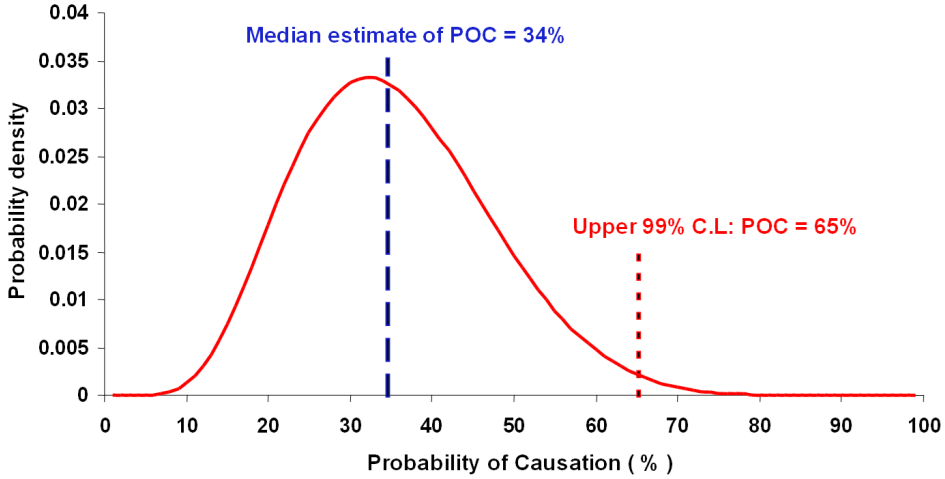
- Annual organ doses computed from date of first employment (as verified by DOL) to date of diagnosis
- Estimate of uncertainty if possible
- Dose output compatible with IREP (Interactive RadioEpidemiological Program) - probability of causation software
- DOL uses IREP in adjudicating claims under EEOICPA

Basics of Dose Reconstruction – Probability of Causation

- The Act set the guidelines for determining probability of causation (PC or PoC)
- Congress directed use of 1985 NIH cancer risk tables in judging radiation cancer claims
- 34 different cancer risk models in use
- Based on radiation cancer studies from epidemiologic research (A-bomb survivors and others)

Basics of Dose Reconstruction – Probability of Causation – cont.

- Calculated based on each claimant's unique situation
- Claim is compensable when POC is greater or equal to 50 %



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

Examples:

- Conservative dose conversion factors
- Addition of potential missed dose
- Solubility class of radionuclide for internal dosimetry calculations
- Favorable uncertainty assumptions
- Composition of radionuclide mix (plutonium)
- Upper 99th percentile credibility limit to determine POC

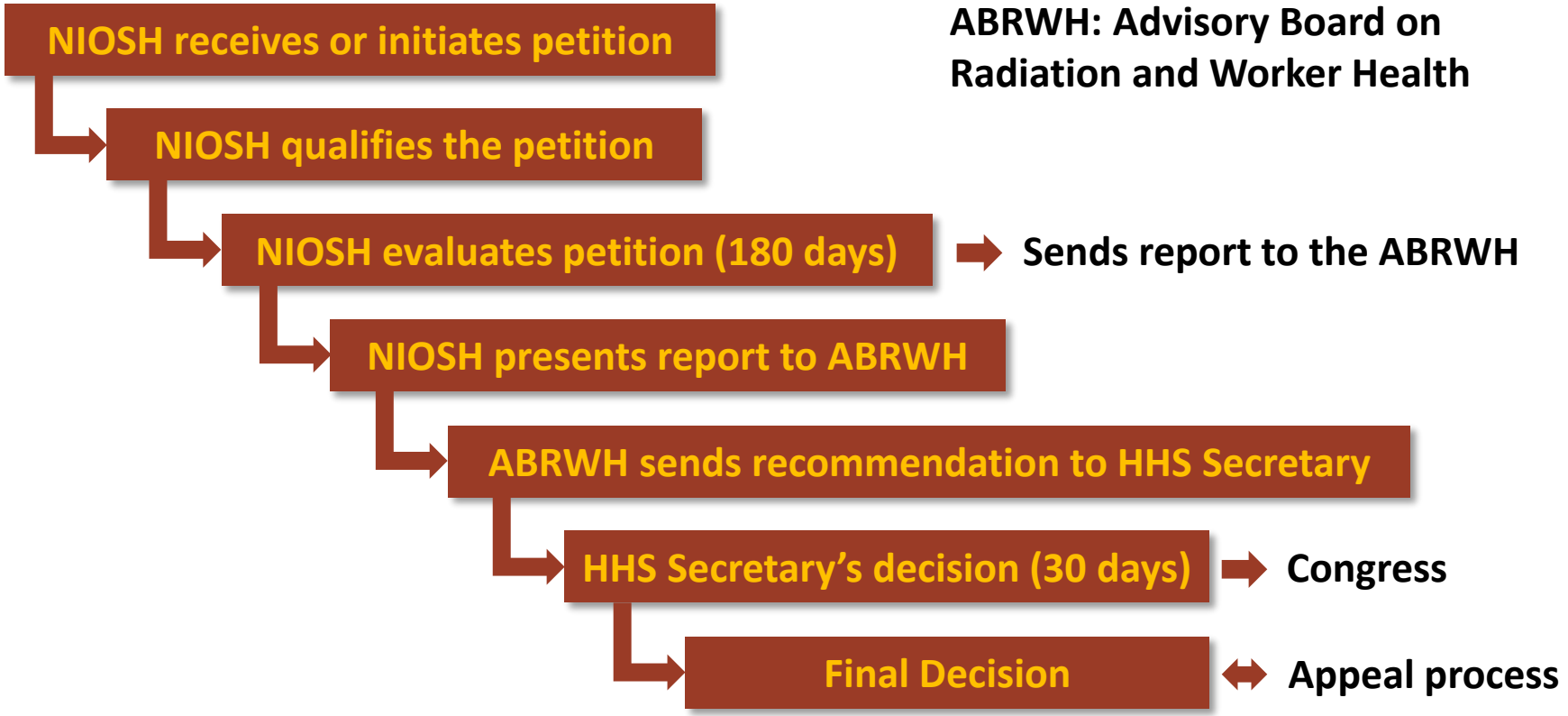
SEC petition process – Who can file a petition?

- Former or current worker
- Survivor of a former worker
- Labor organization representing a worker or class
- Anyone authorized to represent any of the above

SEC petition process – Petition Basis

- Description/Evidence/Affidavit of the basis that records are unavailable or inadequate to place upper bound on radiation dose
- Based on:
  - Lack of monitoring
  - Destruction, falsification, or loss of records
  - Scientific or technical reports

Special Exposure Cohort Petitioning Process (42 CFR 83)



ABRWH: Advisory Board on Radiation and Worker Health

Cancers Covered by the SEC

Anytime
Bone cancer
Kidney cancer
Lung cancer (other than in-situ cancer that is discovered during or after a post-mortem exam)

Onset 2 Years after First Exposure
Leukemia (other than chronic lymphocytic leukemia)

Onset 5 Years after First Exposure
Multiple myeloma
Lymphomas (other than Hodgkin's disease)
Primary cancer of the:

- Bile ducts
- Brain
- Breast (female)
- Breast (male)
- Colon
- Esophagus
- Gall bladder
- Liver (except if cirrhosis or hepatitis B is indicated)
- Ovary
- Pancreas
- Pharynx
- Salivary gland
- Small intestine
- Stomach
- Thyroid
- Urinary bladder

Oak Ridge Area Current SEC Classes

All employees *[at the site during the period listed below]* who were employed for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more classes of employees included in the SEC.

Site	Period
ORNL (X-10)	Jun 17, 1943 – Jul 31, 1955
Y-12	Mar 1943 – Jul 31, 1979
K-25	1943 – Feb 1, 1992
Clinton Engineer Works	1943 – Dec 31, 1949
Oak Ridge Hospital	May 15, 1950 – Dec 31, 1963
ORISE	May 15, 1959 – Dec 31, 1963

General Information

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636-856-0487 or 636-236-0932
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DCAS Website

www.cdc.gov/niosh/ocas

Questions?

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

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