BOARD BRIEFING BOOK

Evaluating the Reliability of Occupational Dose Reconstruction at the Pinellas Plant
An Evidence-Based Scientific Assessment of SEC-00256

Presented at the Advisory Board on Radiation and Worker Health – Meeting #167
Marriott Tampa Westshore
1001 N Westshore Blvd.
Tampa, FL 33607
August 26-27, 2026

CONTENT

1. SUMMARY

Purpose of this Briefing
This briefing evaluates whether the historical evidence supporting SEC-00256 satisfies the scientific requirements necessary for reliable occupational dose reconstruction under the SEC statutory standard.

Scientific Question
Does the available historical evidence provide sufficient scientific confidence that occupational radiation doses for the proposed Pinellas Plant worker class can be reconstructed under the SEC standard?

Scientific Finding
Reliable dose reconstruction requires evidence that is complete, representative, reliable, and independently validated across relevant operations, radionuclides, worker populations, monitoring programs, and exposure pathways.

Key Scientific Principle
The central scientific issue is not whether historical records exist. The question is whether the totality of the historical evidence provides sufficient independent evidence to reconstruct occupational radiation doses for the proposed worker class under the SEC standard.

2. THE SCIENTIFIC FRAMEWORK FOR DOSE RECONSTRUCTION
An Evidence-Based Framework for Evaluating SEC-00256

Figure 2-1 Occupational dose reconstructability is evaluated through a sequential framework in which each evidence category contributes to the overall scientific confidence supporting the SEC determination.

Scientific Question

What historical evidence must be demonstrated before occupational radiation doses can be reconstructed with scientific reliability under the SEC standard?

Scientific Finding

Scientific confidence depends on demonstrating that each category is adequately supported by complete, representative, reliable, and independently validated historical evidence.

3. WHY THE PINELLAS PLANT WAS SCIENTIFICALLY UNIQUE

Figure 3-1. The operational complexity of the Pinellas Plant increased the amount and diversity of historical evidence required to reconstruct occupational radiation dose with scientific confidence.

Scientific Question
How does the historical complexity of the Pinellas Plant affect the evidence required for reliable dose reconstruction?

Scientific Finding
The Pinellas Plant combined multiple radionuclides, precision weapon-component manufacturing, classified and unclassified missions, research integrated with production, evolving manufacturing processes, and diverse worker populations. This complexity increased the range and detail of historical evidence needed to support reliable dose reconstruction.

Principal Characteristics
- Multiple radionuclides and changing radiological processes.
- Concurrent research, production, and classified activities.
- Diverse worker populations operating across changing missions and contractors.

Scientific Implication
This complexity requires historical evidence base capable of validating reconstruction assumptions across the full scope of facility operations.

4. RECONSTRUCTING THE HISTORICAL WORKPLACE

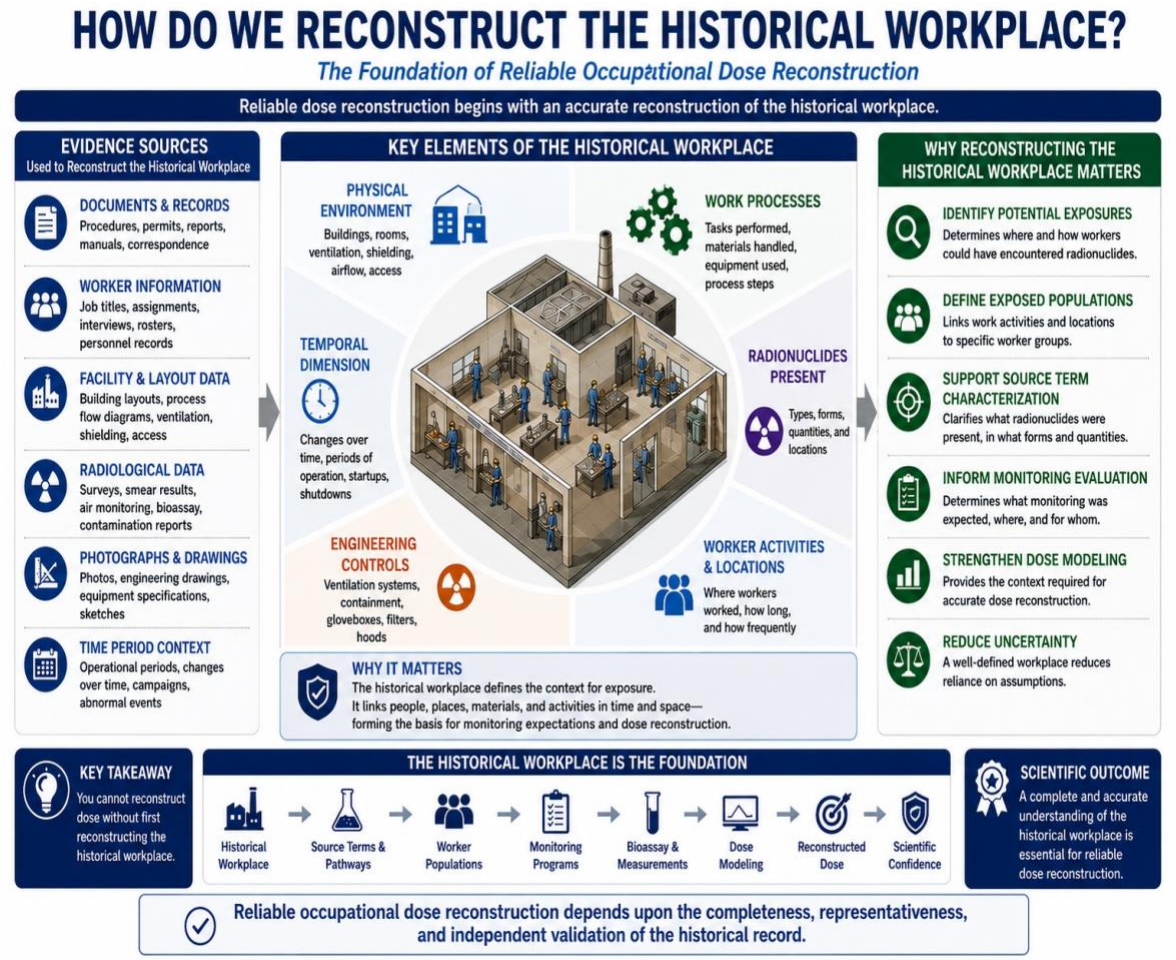

Figure 4-1. Accurate reconstruction of the historical workplace establishes the foundation for evaluating source terms, worker populations, monitoring, documentation, and all subsequent reconstruction assumptions.

Scientific Question

Can occupational radiation doses be reconstructed without first accurately reconstructing the historical workplace?

Scientific Finding

No. Dose reconstruction begins with an accurate reconstruction of the historical workplace. Establishing where work occurred, which radionuclides were present, how operations changed, and who performed the work is essential to determining whether doses can be reconstructed with scientific confidence.

Key Principle

Dose reconstruction cannot exceed the quality of the historical workplace reconstruction on which it is based. Establishing where work occurred, what radionuclides were present, how operations changed, and who performed the work is the essential first step in determining whether occupational radiation doses can be reconstructed with scientific confidence.

5. WORKER POPULATION, MONITORING, AND BIOASSAY

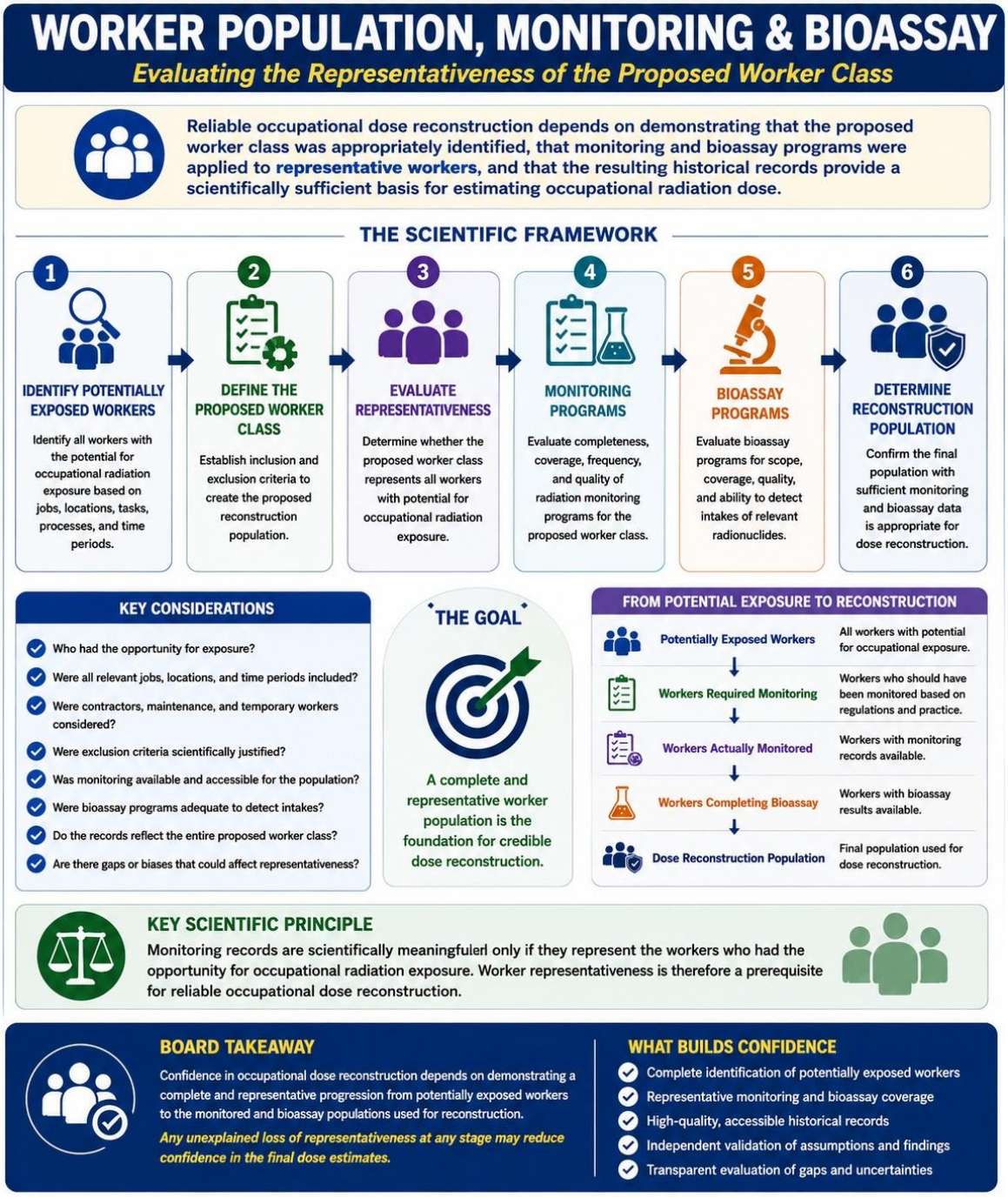

Figure 5-1. Confidence in reconstructed doses depends on demonstrating that the monitored and bioassay populations accurately represent the workers with potential occupational radiation exposure.

Scientific Question
Does the historical record demonstrate that the population used for dose reconstruction accurately represents all workers with potential occupational radiation exposure?

Scientific Finding
Dose reconstruction depends on a documented and verifiable progression from potentially exposed workers to the final dose reconstruction population. Scientific confidence requires evidence that worker identification, monitoring enrollment, bioassay participation, and record completeness are representative, consistently applied, and independently supported throughout each stage.

Scientific Takeaway
Reliable dose reconstruction requires evidence that monitored and bioassayed workers represent the full population with meaningful exposure potential—not merely evidence that some monitoring records exist.

6. PLUTONIUM SOURCE TERMS AND HISTORICAL EVIDENCE
Evaluating Historical Evidence Supporting Internal Dose Reconstruction

Figure 6-1. Plutonium source terms are best characterized by integrating operational chronology, shipment records, workplace evidence, environmental information, and bioassay rather than relying on any single source.

Scientific Question
Does the historical evidence adequately characterize plutonium source terms and potential occupational exposure opportunities relevant to occupational dose reconstruction?

Scientific Finding
Multiple historical evidence sources—including operational chronology, documented material shipments, facility records, environmental information, and bioassay results—contribute to evaluating plutonium source terms. Scientific confidence depends on integrating these evidence sources rather than interpreting any single record in isolation.

Integrated Finding
Reliable plutonium dose reconstruction requires a source term corroborated by operational chronology, material records, workplace and environmental evidence, and bioassay—not merely evidence that plutonium was present.

7. INDEPENDENT VALIDATION OF THE HISTORICAL RECORD
Evaluating Reconstruction Assumptions Using Historical Evidence

Figure 7-1. Independent validation strengthens scientific confidence by confirming reconstruction assumptions through multiple, independent historical evidence sources.

Scientific Question
Can the historical evidence supporting occupational dose reconstruction be independently validated?

Scientific Finding
Independent validation is a fundamental component of scientific confidence. Reconstruction assumptions are strengthened when they are corroborated by multiple historical evidence sources. Where independent validation is limited by incomplete, unavailable, or classified records, confidence depends on whether the remaining evidence is sufficient to support dose reconstruction.

The Role of the DOE Tiger Team Assessment
The DOE Tiger Team Assessment did not reconstruct worker doses. It independently evaluated records management, radiological protection, quality assurance, environmental management, and operational controls—systems that affect the reliability of the historical evidence used in dose reconstruction.

Classification and Independent Validation
Classification does not itself establish unreconstructability. It becomes scientifically relevant when it prevents independent verification of operations, radionuclide inventories, exposure opportunities, monitoring practices, or reconstruction assumptions.

Scientific Takeaway
Reconstruction assumptions are strongest when corroborated by independent evidence. Where records are incomplete, unavailable, or classified, the remaining evidence must still be sufficient to validate those assumptions.

8. EVALUATING CUMULATIVE UNCERTAINTY
Why Scientific Confidence Depends on the Entire Evidence Chain

Figure 8-1. Scientific confidence is determined by the combined performance of interconnected evidence categories; uncertainty in one component may influence confidence throughout the reconstruction process.

Scientific Question
Should reconstruction uncertainties be evaluated individually or as an interconnected scientific system?

Scientific Finding
Dose reconstruction depends upon an interconnected chain of historical evidence. Scientific confidence is determined by the cumulative effect of uncertainties across the entire evidence chain rather than by any single uncertainty considered in isolation.

Scientific Principle
One uncertainty rarely determines reconstructability. Confidence is established—or reduced—by the cumulative effect of all evidence considered together.

9. APPLYING THE SEC RECONSTRUCTABILITY STANDARD
Evaluating the Collective Historical Evidence

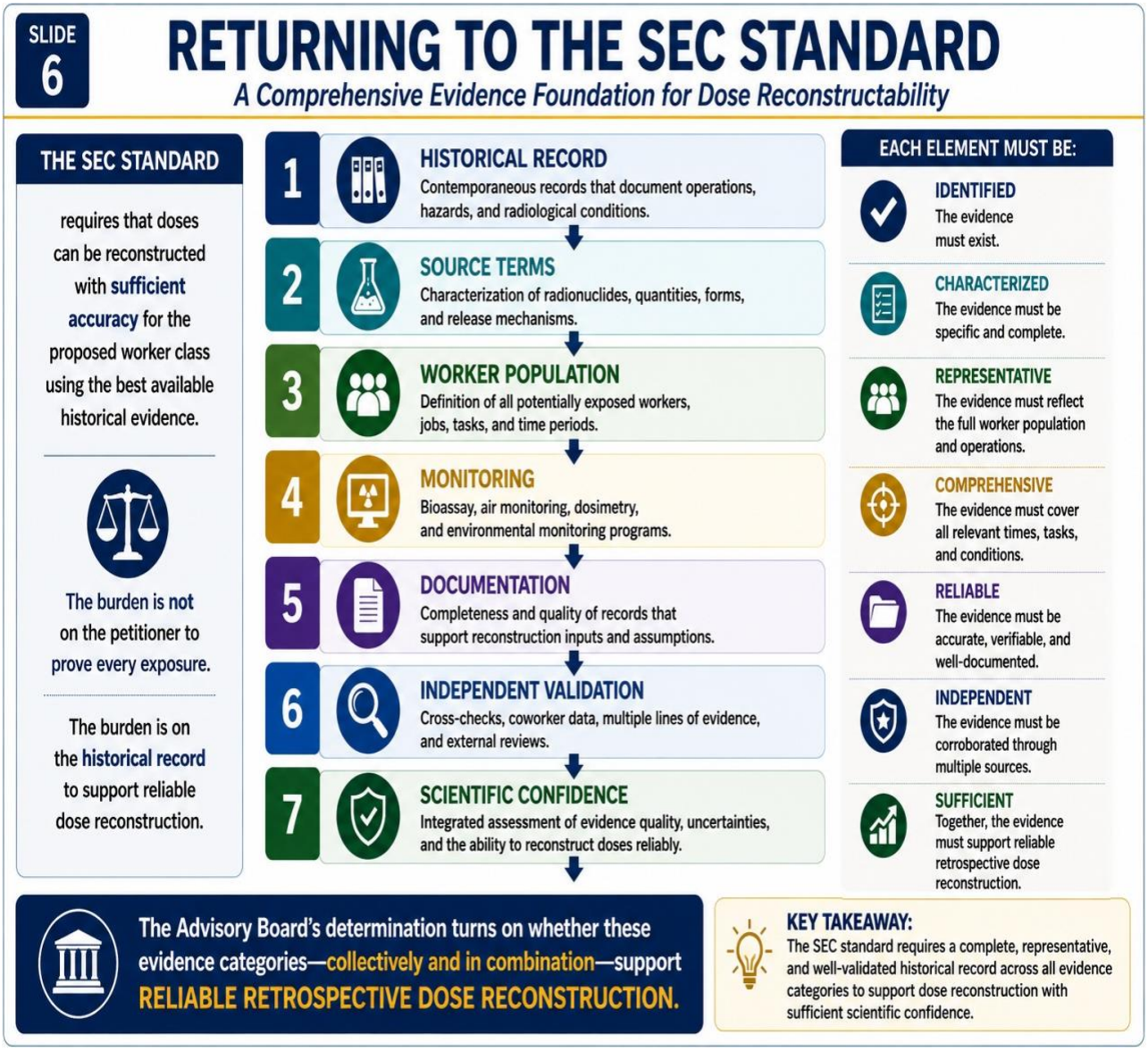

Figure 9-1. The SEC reconstructability standard is evaluated by considering the collective strength of all major evidence categories rather than any single document, monitoring result, or analytical assumption.

Scientific Question

What historical evidence must be demonstrated before occupational radiation doses can be reconstructed under the SEC standard?

Scientific Finding

The SEC reconstructability standard is satisfied only when the collective historical evidence supports dose reconstruction for the proposed worker class. This determination

depends on the integrated evaluation of all major evidence categories rather than any single document, monitoring result, or reconstruction assumption.

Characteristics of Reliable Reconstruction
Confidence in dose reconstruction is strengthened when the historical evidence is:

✓ Complete — The available records adequately describe the relevant operations and exposure conditions.

✓ Representative — The evidence reflects the workers, radionuclides, operational periods, and exposure scenarios under evaluation.

✓ Reliable — Historical records are internally consistent and suitable for scientific interpretation.

✓ Independently Validated — Key reconstruction assumptions are supported by multiple independent lines of historical evidence.

✓ Scientifically Sufficient — The collective evidence provides an adequate basis for reconstructing occupational radiation doses.

These characteristics should be considered collectively rather than independently.

10. FINAL SCIENTIFIC SYNTHESIS

Figure 10-1. The final assessment of reconstructability is based on integrating historical evidence into an overall determination of scientific confidence under the SEC standard.

Scientific Question
Does the collective historical evidence provide scientific confidence that occupational radiation doses for the proposed Pinellas Plant worker class can be reconstructed under the SEC standard?

Scientific Finding
Reconstructability must be determined from the combined evidence concerning the historical workplace, source terms, worker population, monitoring and bioassay, documentation, independent validation, and cumulative uncertainty.

Final Board Takeaway
The question is not whether individual records exist or isolated uncertainties can be bounded. The question is whether the total historical evidence provides scientifically defensible occupational doses for the proposed Pinellas Plant worker class under the SEC standard.

11. Scientific Principles Supporting Reliable Dose Reconstruction

Scientific Principle 1

Scientific confidence—not simply record existence—is the central question.

The fundamental scientific issue is not whether historical records exist, but whether the collective historical evidence provides sufficient scientific confidence to reconstruct occupational radiation doses for the proposed worker class.

Scientific Principle 2

Dose reconstruction is an evidence-based scientific process.

Reliable occupational dose reconstruction depends upon integrating multiple categories of historical evidence rather than relying on a single document, monitoring result, or analytical assumption.

Scientific Principle 3

Scientific confidence requires complete, representative, reliable, and independently validated evidence.

The strength of dose reconstruction depends upon the quality of the underlying evidence across all major reconstruction categories. Evidence should be evaluated collectively rather than individually.

Scientific Principle 4

Facility complexity determines evidence requirements.

As operational complexity increases, the quantity, diversity, and specificity of historical evidence required to support reliable dose reconstruction also increase. Scientifically complex facilities require correspondingly robust documentation.

Scientific Principle 5

Reconstruction begins with the historical workplace.

Reliable dose reconstruction begins by accurately reconstructing where work occurred, which radionuclides were present, how operations evolved, and who performed the work. Every subsequent reconstruction step depends upon this historical foundation.

Scientific Principle 6

Dose reconstruction cannot exceed the quality of the historical workplace reconstruction.

Limitations in reconstructing historical operations necessarily limit confidence in all subsequent reconstruction assumptions.

Scientific Principle 7

Worker populations must be demonstrably representative.

Scientific confidence requires evidence that monitored and bioassayed workers accurately represent the full population of workers with meaningful occupational exposure potential.

Scientific Principle 8

Source terms require multiple independent evidence sources.

Reliable characterization of radionuclide source terms depends upon integrating operational history, material records, environmental information, workplace evidence, and bioassay rather than interpreting any single record in isolation.

Scientific Principle 9

Independent validation strengthens scientific confidence.

Reconstruction assumptions are scientifically stronger when supported by multiple independent lines of historical evidence rather than by a single source of information.

Scientific Principle 10

Classification becomes scientifically relevant when it limits validation.

Classification alone does not establish that dose reconstruction is impossible. Its scientific importance arises when it prevents independent verification of operations, radionuclide inventories, exposure opportunities, monitoring practices, or reconstruction assumptions.

Scientific Principle 11

Scientific confidence depends upon cumulative evidence.

Dose reconstruction should be evaluated as an interconnected scientific system. Confidence is determined by the combined effect of uncertainties across the entire evidence chain rather than by any single uncertainty considered in isolation.

Scientific Principle 12

Reconstruction assumptions should not be evaluated independently.

Historical workplace characterization, source terms, worker populations, monitoring, documentation, validation, and uncertainty function as interconnected components of a single reconstruction process.

Scientific Principle 13

The SEC standard evaluates the collective historical evidence.

Whether occupational doses can be reconstructed depends upon the integrated strength of all major evidence categories rather than any individual document or reconstruction assumption.

Scientific Principle 14

Reliable reconstruction possesses identifiable scientific characteristics.

Scientific confidence is strengthened when the historical evidence is:

- Complete
- Representative
- Reliable
- Independently validated
- Scientifically sufficient

These characteristics should be evaluated collectively rather than separately.

Scientific Principle 15

Final reconstructability is an integrated scientific judgment.

The ultimate determination of reconstructability results from evaluating the combined evidence concerning the historical workplace, source terms, worker populations, monitoring and bioassay, documentation, independent validation, and cumulative uncertainty.

Core Scientific Message

Reliable occupational dose reconstruction is not established by isolated records, individual monitoring results, or individual analytical assumptions. It is established when the collective historical evidence demonstrates—with sufficient scientific confidence—that occupational radiation doses for the proposed worker class can be reconstructed under the SEC standard.

References

- NIOSH SEC-00256 Evaluation Report.
- NIOSH response to the petitioner's weight-of-evidence submission, March 25, 2026.
- SC&A interim and supplemental SEC-00256 reviews.
- Pinellas occupational internal and external dose TBDs.
- DOE Tiger Team Assessment.
- Controlling plutonium bioassay or monitoring reports.
- Principal shipment or operational record used in the plutonium argument.
- Relevant Pinellas Work Group or Board transcript.
- Denise De Garmo (2024) Working Bibliography for Pinellas Plant SEC-00256