



# U.S. Department of Energy Nuclear Air Cleaning

Patrick Frias  
General Engineer, EHSS-31  
Office of Nuclear Safety Basis  
and Facility Design



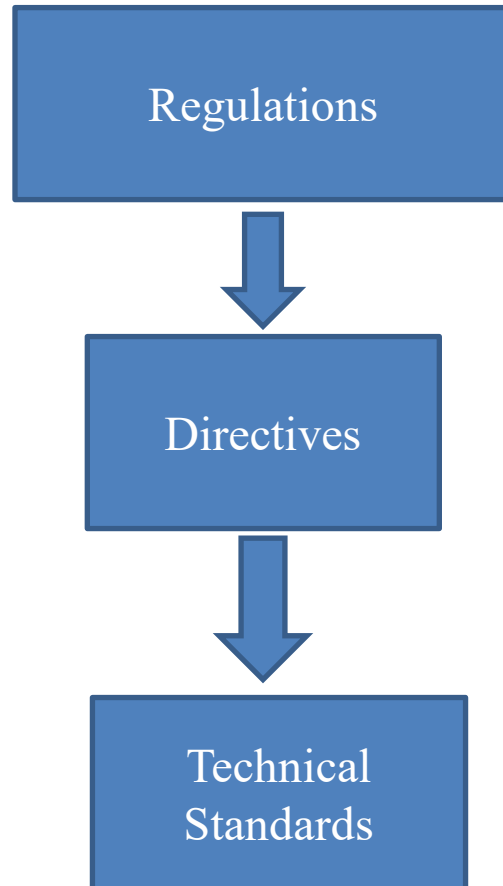


# Objectives

- Review of DOE Regulatory Document Structure
- Identify DOE Nuclear Air Cleaning Documents
- Status of DOE Document Revisions
- Continued Discussion for DOE Integration into ASME AG-1
- Discussion of DOE-HDBK-1169-2022 and DOE-STD-1269-2022



# Safety Framework Implementation



Title 10 – Energy → Chapter III –  
Department of Energy →  
10 CFR 820      10 CFR 830  
10 CFR 835      10 CFR 851

Over 65 Policies, Orders,  
Manuals, Handbooks, and  
Guides that relate to safety and  
quality assurance

Over 145 active DOE Standards  
and Handbooks and 2000  
adopted Voluntary Consensus  
Standards



# It's Not Just a Good Idea – It's the Law

- ❖ National Technology Transfer and Advancement Act of 1995
  - The Act mandates that all federal agencies use technical standards developed and adopted by voluntary consensus standards bodies, as opposed to using government-unique standards.
  
- ❖ OMB Circular No. A-119, “Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities”
  - The circular requires federal agencies to participate fully on voluntary consensus standards bodies through voting, as well as standards body governance, as equal parties to ensure that they represent the agency’s mission and goals.



# DOE Nuclear Air Cleaning Relevant Standards and Handbooks

- Standards
  - DOE-STD-3020-2015, *Specification for HEPA Filters Used by DOE Contractors*
  - DOE-STD-3025-2022, *Quality Assurance Inspection and Testing of HEPA Filters*
  - DOE-STD-1269-2022, *Air Cleaning Systems in DOE Nuclear Facilities*
- Handbooks
  - DOE-HDBK-1169-2022, *Handbook for Use with DOE -STD 1269, "Air Cleaning Systems In DOE Nuclear Facilities"*
  - DOE-HDBK-1132-1999, (Reaffirmed 2014) *Design Considerations*



# DOE-STD-3020-2015

- “Specification for HEPA Filters Used by DOE Contractors”
- Latest issue is dated 2015
- Much of the technical content may be contained in ASME-AG-1
- Additional technical content contained in other DOE documents
- Options in addition to revision include incorporating into AG-1 and other DOE STDs
- Current Gap-Analysis



# DOE-STD-3025-2022

- “Quality Assurance Inspection and Testing of HEPA Filters”
- Latest issue is dated 2022; prior 2007



# DOE-STD-1269-2022

- “Air Cleaning Systems in DOE Nuclear Facilities”
- New Standard written to extract key requirements statements from HDBK-1169-2003
- Technical content references AG-1 as much as practical
- Published April 2022



# DOE-HDBK-1169-2022

- “Handbook for Use with DOE Standard 1269”
- 2003 version outdated, being revised
- Over 700 “must”, 1054 “should”, 597 “may”, and 13 “shall”, statements each needed to be evaluated and moved to STD 1269, and removed, or retained and changed to a should/may in HDBK 1169
- Published April 2022



## DOE-HDBK-1132-99 (Reaffirmed 2014)

- “Design Considerations”
- Issued in 1999, re-affirmed in 2014
- The Handbook is a collection of guidance from DOE Order 6430.1A, *General Design Criteria*, that was captured when Order 6430.1A was cancelled.
- Contains guidance overlap found in DOE G 420.1-1A, *Nonreactor Nuclear Safety Design Guide for use with DOE O 420.1C, Facility Safety*
- Discusses design considerations for U and Pu facilities, spent fuel pools, decommissioning, and tritium



## DOE-HDBK-1132-99 (Reaffirmed 2014)

- Need to address how much design is within the scope of AG-1
- Does AG-1 scope need revision?
- Is AG-1 the right place?
- Would AG-1 want to include design? To what degree?
- Would the Board on Nuclear Codes and Standards (BNCS) endorse any needed scope change?



# Issues for Consideration

- How much of each of these DOE documents can be incorporated into future revisions of AG-1?
- Are there areas that do not fit into AG-1? What are they, and what does DOE need to keep as DOE guidance? If there are areas, where would be the best place to keep them?
- How much is CONAGT and by extension BNCS willing to add to AG-1?



## Issues for Consideration (cont'd)

- Does CONAGT have the right expertise to incorporate the DOE guidance? If not, where can the expertise come from?
- Can DOE guidance be added to existing AG-1 sections, or does there need to be DOE-specific sections? (Similar to the gas processing sections being distinct from ventilation air cleaning)
- What is the timeline for incorporation?
- Who are the responsible individuals?



# DOE Areas of Interest

- Issue Code Section FM High-Strength HEPA Filters
- Consider preparing a Section on Ultra Low Penetrating Air Filters or endorsing the IEST Standard
- Consider providing details for visual inspections of HEPA filters in one place such as the ASME N511 Mandatory Appendix I Visual Inspection Checklist
- Consider extending filter design requalification to every 10 years
- Consider recommending a sampling method purchasers could use when conducting additional performance testing of purchased HEPA filters



## Summary – DOE Integration

- Ongoing discussions and monthly meetings on DOE integration into AG-1.
- Start of a significant amount of work in the upcoming years.
- Plans will need to be fluid and subject to change; various moving parts
- The commitment of CONAGT is crucial to success.



## Summary – DOE Integration (cont'd)

- Success will
  - satisfy federal mandates for DOE
  - consolidate nuclear air cleaning requirements and guidance
  - eliminate redundancy and inconsistencies
  - create one universal and international consensus document
  - provide that CONAGT and ASME are the recognized entity (entities) responsible for air cleaning documents for all types of nuclear facilities



# EHSS-31 - Nuclear Air Cleaning Efforts

- DOE-HDBK-1169 – Nuclear Air Cleaning Handbook
- DOE-STD-1269 – New Nuclear Air Cleaning Standard



# Importance of Nuclear Air Cleaning

- Essential for nuclear facilities to have properly-maintained air-cleaning systems to minimize radioactive exposure and protect the safety of workers, neighbors, and the environment.
- Play a crucial role in protecting public health on a regular basis and in the event of a nuclear disaster by filtering out dangerous particles and removing radioactive substances from the air.
- During an unplanned release of nuclear material, the air-cleaning systems in the nuclear plant serve as essential defense to mitigate the radioactive exposure.



# History of Nuclear Air Cleaning

- Nuclear facilities have radioactive by-products that could be harmful to the safety of workers and the environment. In the 1940s and 1950s, the U.S. government made sure there were federal regulations in place to support public health and the environment.
- Stringent U.S. regulations in place to govern the operation, maintenance, and testing of nuclear air-cleaning systems.



# History of DOE-HDBK-1169-2003 Version

- The 2003 handbook (drafted 2000-2002 by a large team of technical experts) is the 4<sup>th</sup> edition of a series of DOE issuances dating back to the 1970s and 1960s.
- Used alongside U.S. NRC documents and consensus standards such as ASME-AG-1.
- Voluminous document, 408 pages, 11 chapters, 3 separate appendices, introduction, 3 forewords, over 180,000 words, many illustrations, charts, graphs, tables.
- Writing style is irregular, but default construction is a “must” or “shall” requirement statement, of which there are over 700.
- Format is a series of topical essays and unorthodox format.



# History of Revision Effort #1

- Project to revise and update the handbook began Fall 2013, with issuance of a PJS
- Task led by AU-33, supported by some 25 experts from DOE, academia, and the DNFSB.
- Actual work commenced October 2015, with issuance of a “Project Plan.”
- Schedule called for issuance of a new Handbook “in FY 2018.”
- No discernable progress made by September of 2018.



## History of Revision Effort #2

- New effort led by EHSS-31 (formerly AU-31) commenced in September 2018, relying on the 2013 PJS.
- Effort began with close analysis of NACH 2003 to determine the best course of action.
- Decision made by EHSS-30 management to break up the existing handbook into a *new* DOE standard (for requirements – far less than 700) and a *revised* DOE handbook (for information and best practices).
- New documents would be drafted in parallel using current EHSS-30 document style and format practices.



## Revision Effort #2 - Main Objectives

- Develop two (2) documents:

New DOE standard with DOE-unique requirements in coordination with related industry-wide consensus documents;

Revised DOE handbook containing the industry's most updated information; removing obsolete outdated information and using a structure with no "shall" requirement statements.



## Revision Effort #2 – 2019 Tasks

- Internal analysis and outlines completed by early 2019.
- Spring 2019: various working groups (WGs) formed – all-volunteer membership included many names appearing in the first revision effort.
- Several conference calls held to check status and answer questions.
- Value-added comments received from SME's during RevCom period



## Revision Effort #2 – 2020 Tasks

- Jan to Mar 2020 - Initial drafts of both revised handbook and new standard distributed to working group lead members and key stakeholders.
- Draft Standard mid-January 2020; 4-week review
- Draft Handbook mid-March 2020; 4-week review
- Mid-March 2020; Start of COVID-19 Pandemic
- Entered RevCOM mid-July 2020; Comments received mid-Sept 2020
- Fall 2020 – Comment Response Negotiations



## Revision Effort #2 – 2021 Tasks

- Extensive RevCOM technical comments addressed and negotiated with key nuclear air cleaning SMEs from various DOE sites
- Finalized Documents Fall 2021 into Early 2022; included final coordination with certain program offices



## Revision Effort #2 – 2022 Tasks

- RevCom Concurrence from various DOE Program Offices
- Final Publication – April 2022
- Rollout Training – Plans being developed
- Creating Forum Discussions



# DOE EHSS-30/31 Team

- Patrick Frias, EHSS-31, [patrick.frias@hq.doe.gov](mailto:patrick.frias@hq.doe.gov)
- Brian DiNunno, EHSS-31, [brian.dinunno@hq.doe.gov](mailto:brian.dinunno@hq.doe.gov)
- Andy De La Paz, EHSS-30, [andrew.delapaz@hq.doe.gov](mailto:andrew.delapaz@hq.doe.gov)
- Tom Hiltz, EHSS-30, [thomas.hiltz@hq.doe.gov](mailto:thomas.hiltz@hq.doe.gov)
- Ron Bellamy, [rrb1rrb1@verizon.net](mailto:rrb1rrb1@verizon.net)
- Bill Shields, [bill@shieldsnuclear.com](mailto:bill@shieldsnuclear.com)
- David Compton, [david.compton@hq.doe.gov](mailto:david.compton@hq.doe.gov)