# Status of ANS-2.15 Dispersion Modeling Standard

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# Background

- Idea: produce the following voluntary consensus standards for atmospheric modeling:
  - ANS 2.15
    - Routine releases of radiological material from nuclear facilities
  - ANS 2.16
    - Design basis accidental releases
  - ANS 3.8.10
    - Real-time accidental releases
- Group decided to create each sequentially
  - Build off of previous work

# Process for Creating a Standards Documents

- Form working group
- Create Project Initiation Notification (PIN)
  - Defines scope and intention
- Create standards document
- Subcommittee technical content approval
- Consensus committee and public review
- Review for compliance with ANSI
- Approval as American National Standard

# Subjects Considered in 2.15

- Models
  - Model types
  - Reference frames
- Time scales
- Release modes
  - Sources
  - Ground-level and elevated releases
  - Mixed-mode releases
  - Plume rise
  - Aerodynamic effects of buildings

# 2.15 Subjects (continued)

- Removal mechanisms
  - Radioactive decay, wet and dry deposition
- Geospatial data
- Meteorological data
- Meteorological networks
- Quality assurance
- Note: Standard applies only to offsite areas

# Recirculation

- Subgroup formed to investigate influence of complex flow systems including recirculation
  - No studies found that specifically address this issue!
  - Found multiple studies showing:
    - Magnitude of consequence increases
    - Frequency of occurrence
- Unanimous recommendation:
  - Eliminate recirculation factor
  - Explicitly treat complex flow if that might have significant effect on results

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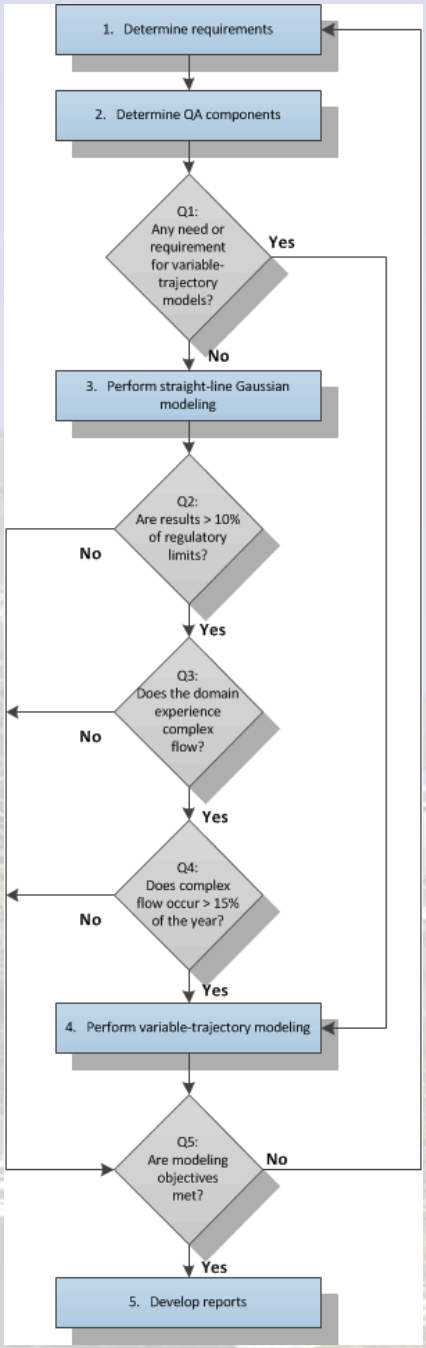
# Modeling Process

- Added “Modeling Process” as first section of 2.15 document
- Explicitly treats:
  - Requirements
  - Quality assurance
  - Complex modeling processes
- Requires variable-trajectory modeling under some circumstances



# Variable-trajectory Models Shall Be Used IF…

- You have a requirement to use them OR
- Straight-line Gaussian modeling results are > 10% of regulatory limits AND
  - You have the potential for complex flow within your domain AND
    - Complex flow occurs > 15% of the year

# Potential for Complex Flow Determined By:

- Documented flow features
  - Requires qualified meteorologist
- Or known topographical features:
  - Large bodies of water (> 500 km^2)
    - Smallest area with documented recirculation
  - Mountain(s)
    - Can ignore < 150 m tall mountains unless 2 km from release
  - Valleys more than 50 m deep

# Frequency of Complex Flow

- Can be difficult to determine
- Must quantify how often complex flow features happen
  - Left to modelers
  - Allwine & Whiteman (1994) method is acceptable
    - Uses one profiler
      - Assumes uniform wind field
    - Currently investigating practical implementation of this process

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# ANS 2.15 Document

- Final (Rev. 1) finished
  - Sent to ANS-24 February 16, 2011
- ANS-24 review completed
  - Comments returned April 15, 2011
- Next steps:
  - Incorporate comments
  - Return to ANS-24
    - Once approved, send to consensus committee (Nuclear Facilities Standards Committee)

# ANS 2.16 (Design Basis Accident Modeling)

- First working group meeting held April 14, 2011
  - Need DOE design basis modeling expert
- Jeremy Rishel added as co-chair
- Working meeting to be held at June 2011 NUMUG meeting
- Still issue of complex modeling role in design basis accident modeling

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# Questions?

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