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Uranium Intakes Values for Classifying ISA Worker Exposure Events

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Topics

- Requirement
- Chronology
- Staff Actions/Observations
- Interim Staff Guidance
- Next Steps

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Requirement

- 70.65(b)(7) calls for "description of proposed quantitative standards used to assess the consequences…from acute chemical exposure"

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Chronology

- NRC previously approved ISA standards of 40 and 75 mg U for high consequences, 30 mg for intermediate consequences
- In 2007 NEI submitted a document proposing increasing the standard for worker exposure
  - High – 500 mg soluble U
  - Intermediate – 100 mg soluble U
- In early 2009 NRC provided NEI with comments on the document
- In 2009 NEI submitted a revised document in response to NRC comments

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Staff Actions

- Conducted detailed review of 2009 NEI document
- Conducted detailed review of broader uranium toxicity literature
- Studied correlations between renal concentration and renal effects
  - Royal Society analysis of DU chemical toxicity
  - U.S. Army analysis of DU chemical toxicity (Capstone Study)
  - National Research Council review of U.S. Army study
- Compared language of consequence definitions in 70.61 with language of various uranium toxicity benchmarks

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Staff Observations

- Limited data for events approximating high and intermediate effects
- Use of models to reconstruct exposure events provides better basis for correlating exposure to effects
- General consistency between Royal Society, U.S. Army and National Research Council conclusions

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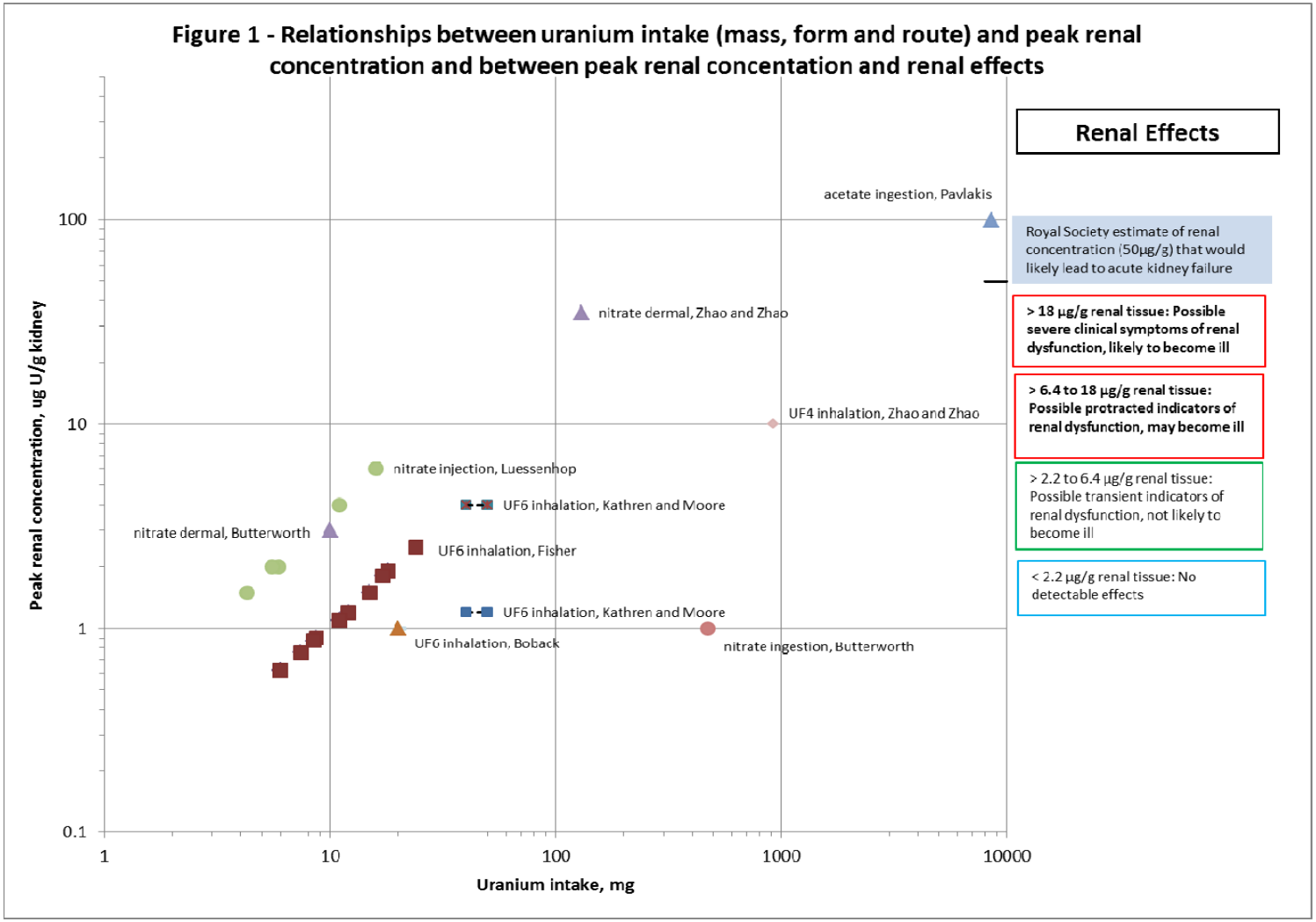
Information Summary

Figure 1 - Relationships between uranium intake (mass, form and route) and peak renal concentration and between peak renal concentation and renal effects



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Staff Observation

- Renal concentration-health effects relationships provide the best current basis for estimating renal concentrations resulting in high and intermediate effects

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Staff Actions

Developed recommended values based on:

- Identified “high” and “intermediate” renal concentrations by comparing definitions in 70.61 with language characterizing renal effects for renal concentrations
- Converted “high” and “intermediate” renal concentrations to uranium intake quantities assuming inhalation intake and Class F (soluble) solubility
- Resulting numerical values
  - High consequences 400 mg soluble U
  - Intermediate consequences 150 to < 400 mg soluble U

Staff – NEI Interaction

- Staff discussed effort and results in March 2014 public meeting with NEI
- Staff believes there is general acceptance of technical approach

Interim Staff Guidance

Prepared interim staff guidance that discusses data and development of regulatory position

- Numerical values are
  - High consequences 400 mg soluble U
  - Intermediate consequences 150 -400 mg soluble U
- Allows for other values if assumptions about intake pathway and uranium solubility class can be supported

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Next Steps

- Obtain concurrence on draft ISG and FRN
- Publish draft ISG for public review and comment