



Research for a better future

# Spent Fuel DataBase

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# Spent Fuel Database

- Why?
  - Need to organize data
  - Qualified data required by
    - NRPA
    - Cask producer
    - Re-processor
    - Fuel treatment
  - Requirements expected to change.
  - Need to accommodate varied types of fuel information.

# Scope of problem

- Data
  - About 1500 test fuel rods (almost as many different types)
    - Special data
      - Instrumentation
      - Fuel additives
      - Cladding treatment
    - About 6200 driver/booster fuel rods (much fewer types).
    - Plus more fuel elements at Kjeller
  - Relevant information
    - Fuel isotopics
    - Structural components
    - Power history?
    - Fission gas release?
    - Cladding integrity?

# Where to get the data from?

- Existing data
  - Safeguards database, Halden
  - Safeguards reports, Kjeller
  - TFDB ..
  - Data-sheets

# Users

- Current – needs definable
  - Safeguards
    - Fissile material accounts
    - IAEA inspections
  - Criticality
    - Limits on placement of fissile material
  - Transport coordinator
- Future – plan for ability to accommodate needs
  - Characteristics
  - Spent fuel management
    - Loading schemes for stores
    - Planning storage casks

# Main principals

Repeatability  
Portability  
Authority/verifiability  
Traceable  
Uniqueness  
Extendible  
Security  
Accountable  
Longevity  
Accessible  
Objectivity/validity  
Integrity  
Scope-of-coverage, comprehensiveness  
Composition and organization

# It's all about the Data and Users not the Database

- Quality depends on use of data
  - Quality - Resolution of data, e.g. burnup or power history, fissile content or detailed isotopics
  - Use – safety case – will fuel survive a drop during transport?
    - Need to know cladding properties after irradiation.
    - No credit for cladding integrity after drop – more expensive transport container and shipments required.
- Time required depends on quality
  - Cost of collation of data vs. cost of storage/transport/disposal solution
    - Note: Choice of storage/transport/disposal solution not yet known

# Challenges

- Need to say what is where
  - Restricted information
  - Increased security
- Need to plan what can go where
  - Plans should be recorded and shareable.
    - Evaluations could form basis for ordering casks or planning shipments
  - Need to know starting point for logistics
    - Handling cost of planned end point needs to be considered
  - Tools and assessment needs for such planning not currently known
    - Flexible solution to allow future development.



# Solution (so far)

- Documents
- Data objects – physical objects
- Data packages (managed)
  - Safeguards
  - Isotopic inventory
  - PIM/BIM
- Reference to underlying documentation
- Users (managed)
- Roles (access control, managed)
- Tasks (story line, user defined)
- Connections – on given task

# Why?

- A description of location and condition of fissile material at IFE is a MAJOR deliverable and will be required by all future decommissioning activities related to spent fuel.
  - Design authority
  - Expert knowledge management

# What?

- Document based database
- Supporting independent data packages linked to role and task



# Keep it simple