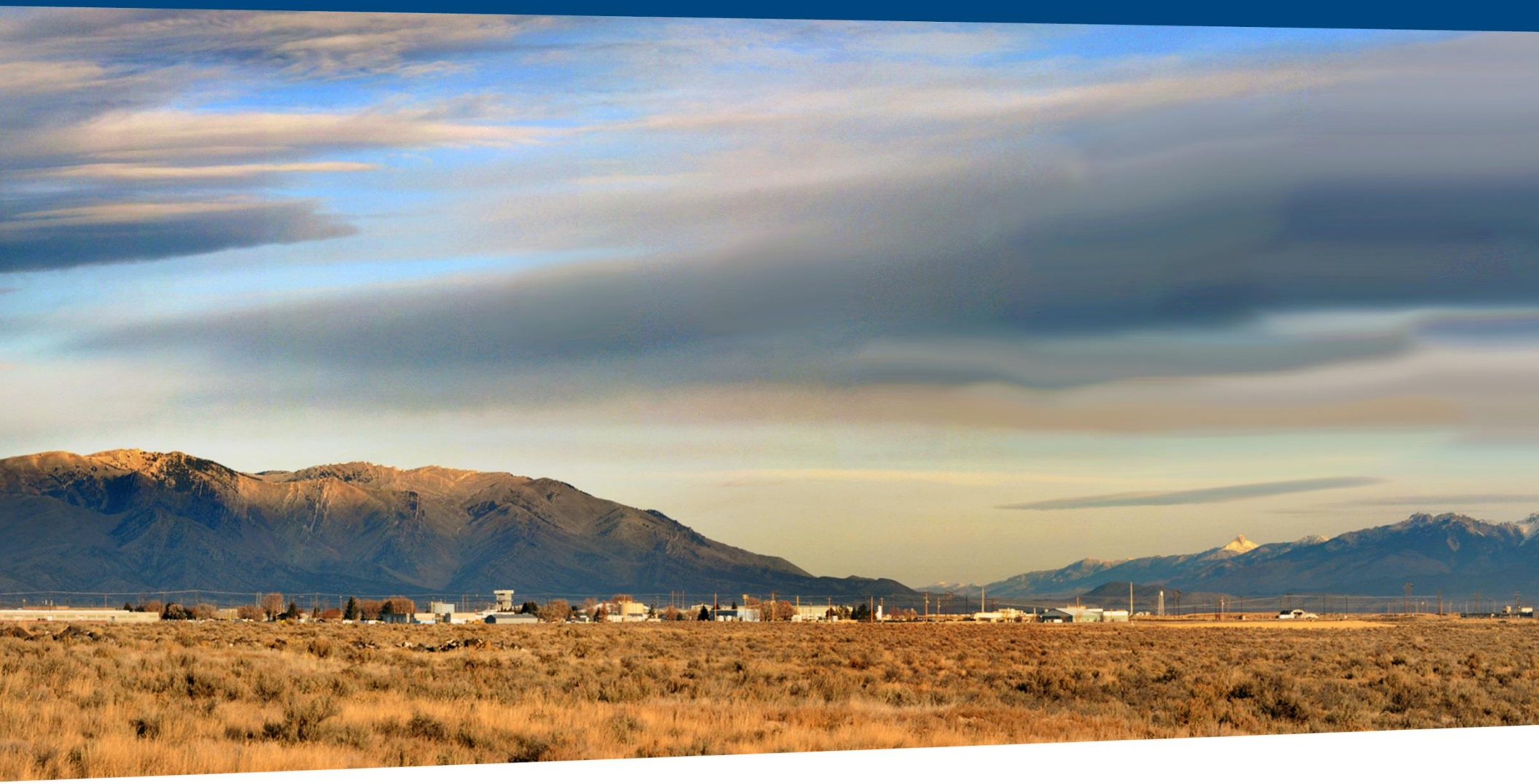
Qualifying a New Cask to Ship TRIGA Fuel to/from the Idaho Nuclear Technical and Engineering Center (INTEC)



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Casks that have been used to ship TRIGA and PULSTAR Fuel to INTEC

- **NAC-LWT (US)**
  - TRIGA STD/Instrumented/FFCR/Failed
  - PULSTAR
- **GNS-16 (Germany)**
  - TRIGA STD Elements
- **TN- 6/3 (France)**
  - TRIGA FFCR/Instrumented
- **JNS- 18.5T (Japan)**
  - TRIGA STD/Instrumented
- **BRR (US)**
  - TRIGA STD
  - TRIGA Instrumented
  - TRIGA FFCR

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Casks Currently Authorized At INTEC To Bring in Or Ship TRIGA Fuel

NAC-LWT

BRR

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Items That Influence Cask Selection

- Cask (size, availability, number of casks)
- Basket configuration
- Fuel
- Funding/scheduling of activities
- Safety basis documents

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Cask

- Length of Cask
- Cask outside diameter (OD)
- Cask interior diameter (ID)
- Cask handling options (trunnions, eyebolts, shackles, etc.)
- Cask shipping options (ISO, skid, Trailer, etc.)
- Safety Basis (SARP) and C of C Approved for specific fuel
- SARP, address cask drops
- Cask authorized to ship failed fuel

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Baskets

- Baskets available, length and handling options
- Number of baskets
- Basket capable of shipping for failed elements
- Safety analysis addresses basket drops
- Safety analysis addresses moving loaded cask basket

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Fuel

- Fuel type
- Fuel dimensions
- Type of elements (IFE, FFCR, STD, cluster)
- Number of elements
- Condition of elements (cladding)
- Time out of reactor
- Decay heat
- Radiation level (for shielding considerations) and contamination level (for contamination control)
- Cooling times

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Funding/Schedule Activities

- Prepare Scope of Work (SOW) and cost estimate
- Formalize cost estimate (Senior Management review & approval)
- Develop detailed schedule(s) and budget

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Engineering Analysis/Design/Fab

- Cask drop analysis
- Cask seismic analysis
- Develop as necessary Technical and Functional Requirements
- Design/fab any cask and basket handling tools needed
- Perform functional tests of tooling and equipment

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Safety Basis Documents

- **Determine what safety basis documents require change**
  - Facility safety documents
    - Criticality Safety Evaluation(s)
    - SAR/TSR documents

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Readiness Preparations

- **Perform Verification of Readiness to Startup/Restart**
  - Part 1: Facility Manager answers two questions to determine if readiness assessment is needed
    - Is restart a resumption of routine operations after a short interruption?
    - Is restart conducted using existing operating procedures?
      - If “yes” no readiness review
      - If “no” a second evaluation is needed to determine readiness level

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Readiness Preparations (cont)

- **Perform Verification of Readiness to Startup/Restart**
  - Part 2: If a readiness assessment is needed as determined by the facility manager then a Part II evaluation checklist is completed.
    - 12 questions are evaluated (sample of questions)
      - Is this initial startup of a new facility?
      - Is this a initial startup after a conversion of an existing facility?
      - Is this a restart of a facility, activity, or operation that has upgraded its hazard category?
      - Is this an initial startup of a new activity?

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Readiness Preparations (cont)

- **Perform Verification of Readiness to Startup Restart**
  - Part 3: Following the Part II checklist the facility manager scores 15 statements which determines the level of readiness assessment. (sample questions)
    - Does the activity/operation cause a resumption of facility that has been shutdown for greater than 6 months?
    - Does the activity involve physical modification of safety-signifcant SSC's?
    - Are any of the personnel new to this operation/activity (percentage of personnel)?
    - Does nonsafety equipment require modification?

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Perform Readiness Assessment

- Perform dry run with cask and equipment
- Revise procedure(s) (as needed)
- Issue final procedure(s)
- Complete readiness documentation
- Conduct assessment of readiness
- Document findings and develop corrective actions
- Close out corrective actions and write closeout letter
- Issue approval letter

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Operations/Training

- Develop and write operations procedures
- Develop and perform training
- Develop lift plans for cask, fuel baskets and fuel
- Write As Low As Reasonably Achievable (ALARA) plan and Radiological Work Permit (RWP)
- Develop dry run training

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Summary

To qualify a new cask, the following is needed:

- Cask and basket information
- Cask and fuel basket tools and equipment (design, analysis and fabrication)
- Revised safety basis documents revised (SARP, SAR/TSR, etc.)
- Procedures and training
- Fit and function dry run
- Assessment of readiness
- Approval to receive

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Conclusion

- **Estimated cost to receive and qualify a new cask for use at INTEC is between 700 K to 1000 K**
  - Costs do not include cask lease
  - Costs do not include what would be incurred for an update of the cask SARP or new basket design/analysis and fabrication.
- **Questions?**

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