

## **SECTION C**

### **Attachment C-A-B Sample Fuel Movement Plan Flow Sheet And Descriptions**



## Sample Fuel Movement Plan Flow Sheet Description

### 1.0 Delivery of Spent Fuel Shipping Cask

- The DOE owned cask will be delivered to the truck bay by DOE/M&O Contractor equipment operators.

### 1.1 Receive Shipping Cask in Truck Bay

- This area provides receiving and shipping services for the shipping and transfer cask and carriers.
- Fuel elements would be received at the facility in the Peachbottom shipping casks, transported by truck and trailer.
- The Truck bay would be long enough to receive the transport package but not less than 85 feet.
- This area would also support minor decontamination cleaning and maintenance of transportation packages.

### 1.2 Radiation Survey and Decontamination

- Cask surfaces would be surveyed for contamination and direct radiation.
- Instruments would be traceable to a National Bureau of Standards calibration laboratory.
- This survey is done to determine if the cask is to be received in the facility or if radiation readings are above the facility acceptance criteria.

### 1.3 Wash and Remove Shipping Cover

- Although none of the site owned casks will have shipping covers, future off-site casks may. Space would be provided to store these once removed. Road grime would be washed off.
- Cask wash down capability and collection systems would be provided for decontamination
- An inline holding tank would be provided to collect, monitor, and dispose of effluent. The Contractor would be responsible for any required treatment and disposal of these waste systems.

### 1.4 Radiation Survey and Decontamination

- Following any receipt decontamination, an additional survey would be required.

### 1.5 Remove Impact Limiters, Tie-Downs, & Prepare for Lifting

- Although none of the site owned casks have impact limiters, overpacks, shipping covers or personnel barriers, future off-site casks may. Space would need to be provided to store these items once removed from the casks.
- Tie-down rigging would be removed from the cask and transport trailer.
- Scaffolding or platforms or facility design would provide access.

- Lifting yokes, slings, or other devices necessary for the removal of shipping cask from the transportation vehicle would be designed and installed on the cask to lift it from the trailer. Space would be provided for the storage of this equipment. Sketches of the casks and possible lifting hardware is shown in Attachment C.
- An auxiliary crane may be needed to handle rigging, scaffolding, shipping covers, etc.

#### 1.6 Lift Cask from Shipping Skid or Transporter

- For the on-site casks, the shipping skid would be part of the trailer.
- A handling crane would unload the casks from their trailer. This would be designed to the greatest anticipated load to meet NRC and OSHA requirements based on casks listed in Attachment C.

#### 1.7 Move the Cask to a Preparation Area.

- Equipment would be provided to move the cask into the area for preparation of the cask prior to moving into the hot cell.

#### 1.8 Prepare Cask to be Moved into the Hot Cell Area.

- The preparation area would include a work location of sufficient space to accommodate the largest cask to be processed.
- This location would include (a) a work area around the various casks at each required work elevation; (b) space to store secondary cask lids, tools and equipment; (c) a means for sampling and purging casks; (d) access to pressurized air, water, vacuum, and off-gas treatment systems and any other utilities needed to prepare the casks.
- Cask support systems would restrain the cask during fuel handling. This can be done with hold down fixtures, floor wells, cask tie-downs or other positive restraints.
- Equipment required to remove minor radioactive contamination from the exterior of the cask, whether loaded or empty would be needed. Wash-down capability and collection system would be provided. An inline holding tank would be provided to collect, monitor, and dispose of wash-down effluent.
- Gas samples would be taken from the cask internal cavity to determine if any abnormal radiological conditions exist.
- The cask lid retaining bolts could be removed at this time to prevent remote handling or a hot cell entry.

#### 1.9 Move Cask into the Hot Cell.

- Handling equipment would be provided for this transfer.
- Hot Cell doors, airlocks, barriers, HVAC controls, etc. would be provided to prevent the spread of contamination.

#### 2.0 Receive Shipping Cask From Preparation Area

- Cask support systems would restrain the cask during fuel handling. This can be done with hold down fixtures, floor wells, cask tie-downs or other positive restraints.

- 2.1 Remove Shipping Cask Lid
  - Handling equipment would be provided for all cask lids listed in Attachment C.
  - Shielded operating galleries would control and monitor remote handling operations.
  - HEPA filtration would control air releases from the cell.
  - Space would be provided to place the cask lids when fuel is being handled.
- 2.2 Lift Fuel from Shipping Cask
  - Special remote tooling or handling fixtures would be designed and fabricated to handle the different types of fuel.
  - Viewing capabilities (video cameras, mirrors, etc.) are required to enable the operators to see the lifting lugs and verify positive engagement of the tools of handling fixtures. Fuel identification would be verified and recorded.
- 2.3 Prepare Fuel for Storage
  - Fuel preparation ( drying, characterization, etc) would be done at this time.
- 2.4 Place Fuel in Storage Handling Units.
  - Depending upon the type of fuel storage system designed, it may be desirable to load the individual fuel elements into buckets or liners to maintain fuel configurations and storage canister packing. The loaded buckets or liners would then be stacked into the storage system.
- 2.5 Repeat Cycle for all Fuels
  - Because a single shipping cask may not contain enough fuel to fill a storage system, “lag” storage would be provided in the hot cell. This would enable consolidation of different fuel configurations and fuel receipt schedules before placement into storage.
  - Lag storage space would be shielded to enable personnel access into the hot cell for repairs or modifications.
- 2.6 Replace Shipping Cask Lid
  - Handling equipment would be provided.
- 2.7 Move the Shipping Cask Back to the Cask Preparation Area.
  - Handling equipment would be provided.
- 3.0 Receive Empty Cask from the Hot Cell.**
  - Cask support systems would restrain the cask during fuel handling. This can be done with hold down fixtures, floor wells, cask tie-downs or other positive restraints.
- 3.1 Radiation Survey and Decontamination
  - Cask surfaces would be surveyed for contamination and direct radiation. This survey is being done to determine if the cask is empty of all fuel debris.
  - Decontamination would meet criteria for shipping.
  - Instruments would be traceable to a National Bureau of Standards calibration lab.

### 3.2 Prepare Cask for Return to the Customer

- Cask preparation would include installing cask bolts, and the outer shipping lid if present.
- The transport cask would be placed back on the transport and prepared for return. Impact Limiters, overpacks, shipping covers, tie-down, personnel barriers, and any other customer owned hardware would be surveyed, decontaminated and returned to the transport truck.
- Total turn-around time from receipt of the cask into the facility, to return of the cask to DOE, would be less than 48 hours.

### 3.3 Return Spent Fuel Shipping Cask

Once the fuel Storage Handling Units have been filled, they would be moved to the Independent Spent Fuel Storage Installation.

### 4.0 Receive the Transport Cask in the Truck Bay.

- Handling equipment and a transporter would be provided for the type of storage system is to used. This may include a cask to handle the storage system if the storage system is to be stored in other shielded containment.

### 4.1 Prepare Storage System/Cask to be Moved into the Hot Cell Area.

- The preparation area would include a work location of sufficient space to accommodate the largest cask to be processed.
- This location would include a work area around the various casks at each required work elevation, space to store cask lid, tools and equipment.
- Equipment required to remove minor radioactive contamination from the exterior of the cask, whether loaded or empty may be needed. Wash-down capability and collection systems may be needed.
- The cask lid retaining bolts could be removed at this time to prevent remote handling or a hot cell entry.

### 4.2 Move Storage System/Cask into the Hot Cell.

- If the storage system is to unshielded and handled in a cask, the cask containing the storage system would be moved into the Hot Cell.
- Handling equipment used to move the storage system/cask would be compatible.

### 5.0 Receive Storage System/Cask from the Preparation Area.

- A storage system/cask support device would restrain the storage system or cask during fuel handling. This could be done with hold down fixtures, floor wells, cask tie-downs or other positive restraints.

### 5.1 Place Fuel Storage Handling Units into the Storage System/Cask.

- Remote handling equipment would handle the fuel.

- 5.2 Move Loaded Storage System/Cask into the Preparation Area
  - Handling equipment would be provided.
- 6.0 Receive the Loaded Storage System/Cask from the Hot Cell.**
  - Cask support systems would restrain the cask during fuel handling. This could be done with hold down fixtures, floor wells, cask tie-downs or other positive restraints.
- 6.1 Prepare Storage System for Storage
  - Perform final preparation of the storage system for interim storage or transport.
  - If the storage system is required to be filled with inert gas, the lid welded on, or leak checked, this could be done at this time.
- 6.2 Radiation Survey and Decontamination
  - Cask surfaces would be surveyed for contamination and direct radiation.
  - Decontamination may be required to meet criteria for shipping and storage.
  - Instruments would be traceable to a calibration lab.
- 6.3 Install Transfer Cask Lid
  - Handling equipment would be provided
- 6.4 Place Cask on Transporter
  - A handling crane would be provided to load the casks onto the transporter. This crane would be designed to the greatest anticipated load to meet NRC and OSHA requirements.
- 6.5 Move Transporter to ISFSI.
  - Roads would be designed to the greatest anticipated transporter weight.
- 7.0 Place Loaded Storage System/Cask in the ISFSI.**
  - A method would be defined for placing the loaded fuel storage system into shielded storage.
- 7.1 Return Transported to DTF
  - An area would be provided to park the transporter outside of the DTF when the truck bay is in use.