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7.0 PACKAGE OPERATIONS

The following information contains the significant events relating to the routine use of fuel assembly shipping packages. Complete detailed instructions are outlined within the individual plant operating procedures and quality control instructions pertinent to each specific operation.

7.1 PACKAGE LOADING

7.1.1 Preparation for Loading

7.1.1.1 Receive Shipping Package

- Unload the shipping package from the truck.
- Report any obvious damage to the package engineer.
- Prepare a package identification route card.

7.1.1.2 Clean Shipping Package

- Use soap or a suitable detergent and water to clean the package.
- Hose down the package and direct a high pressure water stream.
- Move the package to the refurbishing or lay down areas.

7.1.1.3 Refurbish Shipping Package

- Check package upper and lower outerpack exterior for damage.
- Open outerpack and check for internal damage or excessive wear.
- Repair/rework as required.
- Check clamshell for loose parts, and if found, secure per specifications and drawings.
- Vacuum package to collect foreign debris.

7.1.1.4 Configure Package for Fuel Assembly Loading

- Configure (install) top axial restraint and axial spacers for specific fuel assembly type.
- Check accelerometers for QC seal, calibration, and tripped condition. Install or replace as necessary.

7.1.1.5 Inspection

- Verify that the package interior/exterior outerpack and clamshell are clean, and in good condition.
- Verify that the top axial restraint, axial spacers and grids pads are present and in good working condition.
- Verify that outstanding package ECN's have been cleared prior to release for loading.

7.1.2 Loading Contents and Closing Package

- Raise shipping package to vertical position and lockout support arms.
- Loosen upper outerpack swing bolts.
- Remove upper outerpack bolts on one side of the package.
- Swing open upper outerpack door.
- Remove the hinge pin and open clamshell top access door.
- Loosen and remove clamshell top head and axial restraint.
- Open lower clamshell doors by turning latches to open position.
- Install clamshell door stops.
- Check upper and lower accelerometers are not tripped.
- Install fuel assembly by resting on clamshell bottom head.
- Check grid pads are positioned at fuel assembly grids and nozzles.
- Remove door stops.
- Close lower clamshell doors and secure latches by turning to lock position.
- Remove fuel tool.
- Install clamshell top head and tighten axial restraint.
- Close clamshell top access door and install hinge pin.
- Close the upper outerpack.
- Rotate outerpack swing bolts into bracket and torque to 20 ± 1 foot pounds.
- Install outerpack bolts and torque to 60 ± 5 foot pounds.
- Unlock upper support arm and lower package to horizontal position.

7.1.2.1 Inspection

- Verify that the fuel assembly has been released.
- Verify that the fuel assembly is properly oriented in the package.
- Verify that the grid pads are located at the grids and nozzles.
- Verify the accelerometers are sealed, calibrated and not tripped.
- Verify general cleanliness and absence of debris inside the package prior to closing the upper outerpack door.
- Verify that the swing bolts are torqued to 20 ± 1 foot pounds and the outerpack bolts to 60 ± 5 foot pounds.
- Verify one approved tamper proof security seal is installed on opposite side of the package.
- Verify that the required decals, license plates, labels, stencil markings, etc. are present and legible.

7.1.3 Preparation for Transport

7.1.3.1 Truck Loading of Shipping Packages

- Place shipping package on trailer equipped to permit chaining down of package.
- Center and place package lengthwise on trailer.
- Install spacer bars, if required, and install quick release lockout pin.
- Secure packages to trailer bed with stops.
- Chain packages to trailer using “come along” tighteners and chains of 3/8 inch minimum diameter.
- Place webbing swings over spacer bars, if required, and secure to trailer.

7.1.3.2 Regulatory

- Conduct direct alpha surveys on both the packages and the accessible areas of the flatbed.
- Perform the removable alpha and beta-gamma external smear surveys on both the packages and the accessible areas of the flatbed. If any single alpha measurement exceeds 220 dpm/100 cm² or beta-gamma measurement exceeds 2200 dpm/100 cm², notify Regulatory Engineering for instructions on decontamination.

7.1.3.3 Inspection

- Verify that packages are properly stacked and secured.
- Verify that required Health Physics, Radioactive and any other placards or labels have been properly placed.
- Verify that two tamper proof security seals have been properly placed on each package.

7.2 PACKAGE UNLOADING

7.2.1 Receipt of Package from Carrier

- Conduct radiation and contamination surveys as outlined in site specific procedures.
- Perform an external inspection of the unopened package and record any significant observations.
- Verify that two tamper proof security seals have been properly placed on each package. If either seal is missing or damaged, record the damage and follow site procedures for possible security issues.

7.2.2 Removal of Contents

- Install package into the upender.
- Remove all but one of the upper outpack bolts on one side of the package. (All other hinge bolts remain in place).
- Raise the package to full vertical position and lockout upender support arms.
- Remove the remaining hinge bolt from the one side.
- Loosen upper outpack swings bolts and rotate away.
- Open upper outpack door a full 180 degrees.
- Check upper and lower accelerometers for tripped condition.
- Remove the clamshell top hinge pin and open clamshell access door.
- Loosen and remove clamshell top head and top axial restraint assembly.
- Install and latch the plant fuel tool.
- Tension crane cable between 300 to 500 pounds.
- Turn lower clamshell door latches to open position and open doors.
- Install clamshell door stops.
- Lift fuel assembly at least 1.5 inches above clamshell bottom head.
- Carefully remove fuel assembly from clamshell.
- Move fuel assembly to dry storage.
- Prepare to close clamshell by removing clamshell door stops.
- Close lower clamshell doors and secure latches.
- Install clamshell top head and axial restraint.
- Close clamshell top access door and install hinge pin.
- Rotate outpack swing bolts into bracket and torque to 20 ± 1 foot pounds.
- Install outpack bolts and torque to 60 ± 5 foot pounds.
- Unlock upender support arms and lower package to horizontal position.

7.3 PREPARATION OF EMPTY PACKAGE FOR TRANSPORT

- Verify the package is empty of contents.
- Verify radiation levels do not exceed limits prescribed in 49 CFR 173.421 (a) (2).
- Verify non-fixed radioactive surface contamination does not exceed limits prescribed in 49 CFR 173.421 (a) (3).
- Verify the package does not contain more than 15 grams of uranium-235.
- Verify the packaging is in unimpaired condition and is securely closed.
- Verify the internal contamination does not exceed 100 times limits prescribed in 49 CFR 173.428 (c).
- Remove any previously applied labels affixed for fuel shipments.
- Affix an "Empty" label.

7.4 APPENDICES

7.4.1 References

None.