

RF TECHNICAL NOTE

200kW COAXIAL RF LOAD REPLACEMENT

NOTE: Removing one of these loads from a waveguide transition constitutes opening a 6-1/8" EIA coaxial flange connection on the 350MHz waveguide system, and therefore involves rules regarding Radiation Safety Devices. An APS Work Request and a Configuration Control Work Permit (CCWP) must be completed, submitted, and approved for this work before it can be started. This work request must include an attached procedure that outlines the validation process used to verify radiation safety when the work is completed.

1. Remove the plexiglass cover over the load (see Figure 1). *If this work is being performed during a run or intervention period, do this **prior** to load replacement to reduce downtime.*



Figure 1 – Typical 200kW coaxial RF load installation.

2. Notify the Water Group technicians and request their assistance in removing the water lines from the load.

If this work is being performed during a run or intervention period, notify MCR to page Water Group technicians approximately ½-hour prior to the load change to reduce downtime.

NOTE: Work that involves removal or replacement of water lines from rf loads but does not involve removal of the rf load from the waveguide requires only an approved APS Work Request. An approved CCWP is not required for such work.

3. All RF Group personnel performing this work are required to LOTO **ALL** rf stations.
4. After water group technicians have removed the water connections, unbolt the load from the waveguide transition flange and remove the load.

NOTE: ONLY RF GROUP PERSONNEL ARE AUTHORIZED TO LOOSEN THE LOAD FLANGE BOLTS AND REMOVE THE LOAD FROM THE WAVEGUIDE TRANSITION.

5. Inspect the load and transition rf contacts for any sign of excessive wear, arcing, overheating, or poor contact. *Clean the rf contacts with Scotchbright if necessary.*
6. Install the new load, applying 17.5 ft-lbs torque to all bolts. Have a second person verify that the bolt torque meets specification (see Figure 2).

NOTE: ONLY RF GROUP PERSONNEL ARE AUTHORIZED TO INSTALL THE LOAD TO THE WAVEGUIDE TRANSITION AND TORQUE THE FLANGE BOLTS.



Figure 2 – Bolts attaching RF load flange to waveguide transition.

7. After all water connections are made and flow is established, check for leaks.
8. After rf system start-up, perform an rf sniff around the load flange to verify that no rf leakage is present.

NOTE: “Sniffing” for rf leakage must be performed with a measurable and detectable level of rf power in the waveguide. Detuning some of the rf cavities slightly will result in a measurable amount of rf power being dissipated in hybrid loads.

The rf power dissipated in a circulator load can be read directly from dedicated envelope detector readouts on the rf screens. RF power dissipation in any water load can be determined from calorimetric calculation using the temperature rise and flow of the load cooling water using the following formula:

$$\text{RF power in kilowatts} = (.264)(\Delta T \text{ in } ^\circ\text{C}) (\text{flow in GPM})$$

9. Drain ALL water from the removed load and re-package it in the box that held the replacement load. The load will be shipped back to the manufacturer for analysis and refurbishment.

Move the re-packaged load to a convenient location in front of the 420 truck doors for rigger pickup.

10. Log the sniffing and torquing of the load flange bolts in the RF Personnel Safety System Logbook *immediately after the work is performed.*
11. Log the work performed in the HLRF-Klystron maintenance logbook at the appropriate rf station (S36 – RF2, S37 – RF3, S38 – RF4, S40 – RF1) *immediately after the work is performed.*
12. Log the sniffing and torquing of the load flange bolts in the RF Group On-Line Waveguide Flange Logbook *as soon as possible after the work is performed.*