A space shuttle ready to launch has numerous connections to the launch pad that require careful attention to assure a safe liftoff.

The ground umbilical carrier plate, called the GUCP, is one of those connections.

The GUCP is at the end of the gaseous hydrogen vent arm on the fixed service structure. It attaches to the shuttle's orange external tank.

The plate holds a large-diameter pipe that collects excess hydrogen gas from the tank as it's being filled with liquid hydrogen.

The venting system funnels it to a larger pipe that takes it down the fixed service structure and out to a flare stack that burns the excess hydrogen off safely.

At liftoff, the GUCP retracts away from the tank, cutting off the connection.

The vent arm pulls back to the tower, safely away from the shuttle as it climbs straight up.

Because the GUCP's connection to the tank is so important, it has sensors in place to watch for hydrogen leaking.

Launch controllers track the readings from those sensors closely and when readings are outside the limits, the countdown is halted.

After the external tank is drained of its liquid hydrogen and liquid oxygen and cleared of excess hydrogen,
technicians can go out and make any repairs or modifications necessary to fix the leak.