

## 10.25 EMERGENCY HIGH PRESSURE MAKEUP (EHPM) SYSTEM

### 10.25.1 Power Generation Objective

The Emergency High Pressure Makeup (EHPM) System provides makeup water to the reactor vessel during shutdown and isolation from the main heat sink to replace the normal makeup sources or Emergency Core Cooling Systems during a fire event for the sole purpose of reducing the Core Damage Frequency and Large Early Release Frequency.

### 10.25.2 Power Generation Design Basis

The EHPM system operates manually to maintain sufficient inventory in the reactor vessel in response to a fire event such that normal and emergency inventory systems are not available. Provision is made for remote manual operation of the system by an operator. The power supply for the system is provided by energy sources of high reliability in order to provide a high degree of assurance that the system will operate when necessary. Provision is made such that periodic testing can be performed during plant operation, in order to provide a high degree of assurance that the system will operate when necessary.

### 10.25.3 Safety Objective

The objective of the EHPM System is to reduce the Core Damage Frequency and Large Early Release Frequency for an event that involves the loss of the Emergency Core Cooling Systems (ECCS) in conjunction with a fire event. The EHPM system has no nuclear safety functions. The EHPM system has no important to safety functions.

### 10.25.4 Description

The EHPM System consists of a motor driven pump unit and associated valves and piping capable of delivering makeup water to the reactor vessel. The EHPM System includes dedicated medium and low voltage electrical components to ensure EHPM system power independence from existing site power distribution to the extent practicable. The pump takes suction from the condensate system via the bottom of the condensate storage tank (CST) and discharges into either the reactor feedwater line for delivery to the reactor vessel or to a full flow return test line to the condensate storage tank. A minimum flow bypass line to the full flow return test line is also provided for pump protection. The EHPM system provides emergency makeup water from the CST to the reactor vessel during fire events where the fire results in the normal (e.g. reactor feedwater) and emergency (e.g., emergency core cooling systems and RCICs) methods of reactor vessel inventory control are non-functional or ineffective.

Following any reactor shutdown, steam generation continues due to heat produced by the radioactive decay of fission products. The EHPM system provides inventory to a shutdown and isolated reactor vessel to compensate for inventory loss due to boil-off and reactor coolant leakage. During fire events where the normal (e.g., reactor feedwater) and emergency (e.g., emergency core cooling systems and RCICs) methods of reactor vessel inventory control are non-functional or ineffective, the EHPM system has a makeup capacity sufficient to maintain the core in a safe and stable state.

The EHPM system is manually initiated and controlled. This initiation and control is capable of being performed from either the EHPM system panel located in the main control room or locally in the vicinity of the pump via the EHPM system local control panel. The EHPM system is provided with its own designated unit specific reactor vessel level and pressure indication at both of these locations for use in its manual control scheme. The pump controls provide automatic trip of the EHPM pump motor upon receiving a low-low suction pressure signal, to prevent damage to the pump. The EHPM system piping is designed in accordance with USAS B31.1.0, 1967 edition.

#### 10.25.5 Safety Evaluation

Due to the non-safety related classification of the EHPM system, no portion of this system requires protection from the adverse effects of design basis external events such as earthquakes, tornadoes, floods, rain, or transportation accidents to support the safe shutdown of the plant.

#### 10.25.6 Inspection and Testing

A design flow functional test of the EHPM System may be performed during plant operation by taking suction from the condensate storage tank and discharging through the full flow test return line back to the condensate storage tank. The discharge valve to the feed line remains closed during the test and reactor operation is undisturbed. Control system design provides manual return from test to operating mode if system initiation is required during testing. Periodic inspection and maintenance of the motor-drive pump unit are based on manufacturer's recommendations and sound maintenance practices. System process indication, as well as system alarms, are displayed in both the control room and the local control panel for the pump unit.