# Main FeedWater Auxiliary Equipment (AE) Practice Exam (Sample)

## Study Guide

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# Questions

1. **What is one of the key indicators that hydrazine levels are acceptable in the system?**
   - A. Constant pressure monitoring
   - B. Establishing flow through one polisher
   - C. Increased temperature readings
   - D. Full feed flow stability

2. **How is MFP recirc cleanup achieved?**
   - A. By using high-pressure water jets
   - B. By using a condensate pump and bypassing the polishers
   - C. By draining and refilling the system
   - D. By running auxiliary units parallelly

3. **At what point does the MFP lube oil become a backup system for HP header pressure?**
   - A. 80# pressure
   - B. 175# pressure
   - C. 220# pressure
   - D. 55# pressure

4. **Which factor is essential to check during MFP pre-start procedures?**
   - A. Temperature of the environment
   - B. Seal water lineup
   - C. Load demand
   - D. Electrical supply voltage

5. **Which of the following can prevent scale formation in a boiler?**
   - A. Regular blowdown
   - B. Increasing water pH
   - C. Lowering water temperature
   - D. Adding more make-up water

**6. What is a benefit of effective condensate polishing?**

- **A. Increased water usage**
- **B. Reduced scale formation potential**
- **C. Higher operational costs**
- **D. Increased waste production**

**7. MFP long cycle cleanup continues from which previous cleanup process?**

- **A. MFP recirc cleanup**
- **B. MFP short cycle cleanup**
- **C. Initial system flush**
- **D. Condensate flow adjustment**

**8. What type of monitoring system is essential for ensuring proper feedwater parameters?**

- **A. Periodic monitoring systems**
- **B. Continuous monitoring systems**
- **C. Manual inspection systems**
- **D. Visual observation methods**

**9. In a continuous monitoring system, what action could be taken when an alarm is triggered?**

- **A. Increase the feedwater flow**
- **B. Investigate the cause of deviation**
- **C. Ignore the alarm**
- **D. Switch off the system**

**10. What is the main function of a level control system in a feedwater system?**

- **A. To purify the feedwater**
- **B. To maintain water levels**
- **C. To regulate temperature**
- **D. To control steam pressure**

# Answers

1. **B**
2. **B**
3. **B**
4. **B**
5. **A**
6. **B**
7. **A**
8. **B**
9. **B**
10. **B**

# Explanations

## 1. What is one of the key indicators that hydrazine levels are acceptable in the system?

A. Constant pressure monitoring

B. Establishing flow through one polisher

C. Increased temperature readings

D. Full feed flow stability

**The presence of hydrazine in boiler feedwater is crucial for controlling corrosion and preventing the formation of harmful acids, and the measurement of its effectiveness often revolves around ensuring adequate flow through treatment systems. Establishing flow through one polisher is significant because it demonstrates that the water is being adequately treated, potentially allowing for the appropriate levels of hydrazine to be maintained. When flow is established through a polisher, it also indicates that the system can effectively remove impurities and control the levels of dissolved oxygen, which can react with hydrazine, thereby confirming that the chemical is functioning as intended. Proper operation of a water polisher is key in ensuring not just the removal of impurities but also in verifying that the necessary hydrazine concentration is being maintained as part of the water treatment process. In contrast, constant pressure monitoring, increased temperature readings, and full feed flow stability, while important aspects of system operation, do not serve as direct indicators of hydrazine levels or the effectiveness of its use in controlling corrosion. These factors may reflect broader system health or operational conditions but lack specificity regarding the status of hydrazine in the system.**

## 2. How is MFP recirc cleanup achieved?

A. By using high-pressure water jets

B. By using a condensate pump and bypassing the polishers

C. By draining and refilling the system

D. By running auxiliary units parallelly

**MFP (Main Feedwater Pump) recirc cleanup is achieved by employing a condensate pump and bypassing the polishers. This method allows the system to effectively manage and circulate the feedwater, ensuring that any contaminants or impurities can be removed without going through the polishers, which might otherwise become quickly saturated or require frequent maintenance. By using the condensate pump, the flow is directed to facilitate a cleanup process that is efficient and keeps the system operational. The process emphasizes the importance of maintaining water quality in the plant without overly complicating the operational flow or placing unnecessary strain on filtration systems like polishers. This method strikes a balance between maintaining system efficiency and ensuring clean water enters the feedwater system, which is crucial for the overall health and performance of the steam generation cycle. In contrast, the other methods outlined would not provide the same level of efficiency or effectiveness in a cleanup scenario. For example, high-pressure water jets, while effective in certain cleaning tasks, do not specifically address the contamination in the feedwater system and may create additional issues if not managed correctly. Draining and refilling the system could introduce more contaminants, and running auxiliary units in parallel does not inherently solve contamination problems and might complicate system operations.**

## 3. At what point does the MFP lube oil become a backup system for HP header pressure?

**A. 80# pressure**

**B. 175# pressure**

**C. 220# pressure**

**D. 55# pressure**

**The correct choice is linked to the operational thresholds of the motor-driven feedwater pumps (MFP) in the context of maintaining high pressure in the HP (High-Pressure) header system. The lube oil system is designed to lubricate the moving parts of the MFP, ensuring efficient operation and preventing wear. In cases where the primary hydraulic pressure could fail or drop, the lube oil system serves as a reliable backup. When the lube oil pressure reaches the specified level, in this case, 175 psi, it indicates that the hydraulic system can sustain adequate performance while reducing the risks associated with lower pressures that can lead to equipment damage or operational failure. This threshold serves as a critical safety mechanism, providing functionality and security for the HP header system, ensuring it maintains the necessary pressure needed for optimal performance of the boiler system. Other pressure levels listed do not trigger the same level of reliability in terms of backup for HP header pressure. Therefore, understanding the specific pressure threshold, such as the significance of 175 psi for the lube oil in relation to equipment functionality, is essential for the safe and efficient operation of water auxiliary equipment in power generation systems.**

## 4. Which factor is essential to check during MFP pre-start procedures?

**A. Temperature of the environment**

**B. Seal water lineup**

**C. Load demand**

**D. Electrical supply voltage**

**During the pre-start procedures for a Main Feedwater Pump (MFP), one of the most critical factors to check is the seal water lineup. The seal water system is vital for maintaining the integrity of the pump's mechanical seals, which prevent leaks and protect the pump from damage. Proper seal water lineup ensures that there is an adequate supply of water to cool and lubricate the seals, thereby preventing overheating and wear. If the seal water system is not correctly aligned or functioning, it could lead to seal failure, which may result in pump damage and operational issues. Although other factors like environmental temperature, load demand, and electrical supply voltage are important in general operations, they do not have the direct and immediate implication for the safe and effective startup of the pump as the seal water lineup does. Ensuring that the mechanical seals operate properly by verifying the seal water lineup is essential for the successful and safe operation of the MFP.**

## 5. Which of the following can prevent scale formation in a boiler?

**A. Regular blowdown**

**B. Increasing water pH**

**C. Lowering water temperature**

**D. Adding more make-up water**

**Regular blowdown is instrumental in preventing scale formation in a boiler because it helps to remove concentrated impurities and dissolved solids from the water. As water is heated in a boiler, minerals and other contaminants can precipitate and accumulate in the system, leading to scale buildup on heat transfer surfaces. By performing regular blowdowns, operators can maintain appropriate water chemistry, keeping the concentrations of these impurities in check. This process not only helps prevent scale but also enhances boiler efficiency and reliability. In contrast, increasing water pH may not specifically address the control of scale, as scale formation can be influenced by multiple factors, including the concentration of hardness salts. Lowering water temperature can reduce the tendency of certain solids to precipitate, but it does not directly target the removal of existing impurities that can result in scale. Similarly, adding more make-up water can dilute certain concentrations but does not actively prevent or remove the scale-forming materials already present in the boiler system. Hence, regular blowdown stands out as the most effective measure for managing and preventing scale buildup within the boiler.**

## 6. What is a benefit of effective condensate polishing?

**A. Increased water usage**

**B. Reduced scale formation potential**

**C. Higher operational costs**

**D. Increased waste production**

**Effective condensate polishing plays a critical role in maintaining the quality of feedwater in steam generation systems. The primary benefit of this process is reduced scale formation potential within boiler systems. Scale formation can significantly decrease the efficiency of heat exchange surfaces, leading to overheating and potential damage to the equipment. Condensate polishing removes impurities and contaminants from the condensate water, such as dissolved salts and other solids, which would otherwise contribute to scale buildup. By ensuring that the water returned to the boiler is of high purity, the likelihood of scale formation is greatly diminished. This not only helps in protecting the boiler and associated piping from damage but also enhances overall system efficiency and longevity. The focus on this benefit emphasizes the importance of maintaining high-quality water treatment processes to ensure optimal performance within industrial systems relying on steam generation.**

## 7. MFP long cycle cleanup continues from which previous cleanup process?

**A. MFP recirc cleanup**

**B. MFP short cycle cleanup**

**C. Initial system flush**

**D. Condensate flow adjustment**

**The correct answer, which indicates that MFP long cycle cleanup continues from the MFP recirc cleanup, is based on the sequence and methodology of maintenance in water treatment systems. The MFP (Main Feed Pump) long cycle cleanup is designed to ensure that any lingering contaminants from previous operations are thoroughly removed. The recirculation cleanup process serves as a preliminary step to the long cycle cleanup, effectively flushing the system to remove residual impurities before the extended cleaning operation takes place. This connection highlights the importance of the recirc cleanup as it establishes a clean baseline, allowing for more effective results during the long cycle cleanup. The long cycle cleanup typically involves a more extended timeframe and more aggressive cleaning methods, which build on the foundation set by the recirc process. In this context, other options do not lead directly into the long cycle cleanup as they either represent different maintenance processes or pertain to varying operational adjustments that do not specifically serve as the predecessor to the long cycle cleanup. For example, the short cycle cleanup and the initial system flush involve different cleaning methodologies catered to different operational scenarios, while condensate flow adjustments are more about optimizing system performance rather than directly relating to internal cleaning processes.**

## 8. What type of monitoring system is essential for ensuring proper feedwater parameters?

**A. Periodic monitoring systems**

**B. Continuous monitoring systems**

**C. Manual inspection systems**

**D. Visual observation methods**

**A continuous monitoring system is essential for ensuring proper feedwater parameters because it allows for real-time data collection and assessment of various critical parameters such as temperature, pressure, pH, conductivity, and dissolved oxygen levels. This type of system enables operators to detect fluctuations or deviations from the desired set points immediately, facilitating prompt corrective actions to maintain optimal feedwater quality. Given the dynamic nature of feedwater systems, continuous monitoring is crucial in preventing issues such as scaling, corrosion, or system failures, which can arise from improper feedwater conditions if not addressed swiftly. Unlike periodic monitoring, which may miss transient changes, or manual inspection and visual observation methods that rely on human judgment and can introduce delays or errors, continuous monitoring provides a reliable and consistent means of safeguarding the feedwater quality. This approach enhances operational efficiency and safety in water treatment and boiler systems.**

## 9. In a continuous monitoring system, what action could be taken when an alarm is triggered?

A. Increase the feedwater flow

B. Investigate the cause of deviation

C. Ignore the alarm

D. Switch off the system

**When an alarm is triggered in a continuous monitoring system, the appropriate action is to investigate the cause of the deviation. This is essential for ensuring the safety and efficiency of the system. Investigating the cause allows operators to identify the underlying issue, assess the severity of the alarm, and determine the necessary steps to rectify the problem. Responding to an alarm without understanding the root cause can lead to inadequate solutions or even exacerbate the situation. For instance, simply increasing the feedwater flow might not address whatever triggered the alarm, and could lead to further complications if the issue lies elsewhere. Furthermore, ignoring the alarm or switching off the system could result in unsafe conditions and potential damage to equipment, compromising overall system reliability and safety. Therefore, it's crucial to prioritize investigations when alarms are activated to maintain operational integrity and safety in the context of auxiliary equipment management.**

## 10. What is the main function of a level control system in a feedwater system?

A. To purify the feedwater

B. To maintain water levels

C. To regulate temperature

D. To control steam pressure

**A level control system in a feedwater system primarily serves to maintain the appropriate water levels within various components, such as the boiler or feedwater tank. This is crucial for efficient operation and safety in steam generation processes. Maintaining optimal water levels helps prevent situations that could lead to boiler damage, such as low water levels, which can result in overheating and structural failures, or high water levels that may cause carryover of water into the steam system. The importance of maintaining water levels can't be overstated, as it directly impacts the efficiency and reliability of the entire system. By ensuring that the water levels are maintained within predetermined limits, the level control system contributes to overall system stability and performance.**