

SERVICE WATER AND CLOSED COOLING WATER SYSTEMS IN NUCLEAR POWER PLANTS



- **System Condition**
- **Treatment Programs**
- **Guideline Alignment**
- **Corrosion Control**
- **Fouling and Deposition**
- **Microbiologically Influenced Corrosion (MIC) Prevention and Control**
- **Monitoring**

Most service water systems in nuclear power plants fall into the category of “raw water” systems. They include safety-related and non-safety-related systems (essential and non-essential).

Failures in safety-related service water systems can challenge the safe shutdown of a plant.

The Nuclear Regulatory Commission (NRC) pays close attention to the integrity of safety-related service water systems via Generic Letter 89-13.

Failures in a non-safety-related service water system may not challenge a safe shutdown, but they can prevent the plant from generating electricity. Failures in components such as turbine lubricating oil coolers, hydrogen coolers, etc., can prevent the plant from operating.

Closed cooling water (CCW) systems in nuclear plants are operated with very conservative approaches to treatment programs and control. These are closely scrutinized to confirm careful control and alignment with EPRI guidelines.

Service Water and CCW System Problems

Nuclear service water systems suffer from the same problems that other raw water cooling systems experience. These include :

- Microbiological growth
- General corrosion
- Localized corrosion (numerous mechanisms)
- Microbiologically Influenced Corrosion (MIC)
- Suspended solids fouling (siltation)
- Mineral scale formation

These are common problems in other raw water systems and most other industrial cooling systems, but they are often exacerbated by nuclear power plant designs which require redundant systems and conservative thermal specifications. These two unique characteristics of nuclear power plants often create low flow and stagnant areas that defy effective corrosion control and anti-foulant treatment.

Problems in CCW systems relate primarily to corrosion control and microbiological control. Often these problems go hand-in-hand. Some of the most effective chemical additives for corrosion control (e.g., nitrites) can act as a nutrient and fuel microbiological growth.

M&M Engineering Services

Mechanical & Materials (M&M) Engineering's engineers and scientists are experienced in working with nuclear plant personnel to evaluate the condition of their service water and CCW systems and to recommend solutions to existing or latent problems. We can operate as part of a self-assessment team or provide completely independent review services.

M&M Engineering personnel have been active in the development of current EPRI guidelines on service water and CCW systems.

Training

M&M Engineering water treatment specialists can develop and present training programs targeted to the needs of your technical or operating personnel

M&M Engineering Laboratory

M&M Engineering's Laboratory in Austin, Texas, is designed specifically for trouble-shooting and problem-solving. We combine the best in instrumentation and procedures with experienced engineers and scientists. We get the analytical data, photographs and information to you promptly when you need it most.

Professional Staff

M&M Engineering's engineers and scientists have provided services to many nuclear power plants. Individual M&M engineers, scientists, and technicians can provide the expertise needed to solve a problem. M&M Engineering can match your need with the appropriate staff/personnel.

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