Vol. XXI No. 23 November 19, 1999

Reliability-centered maintenance helps increase equipment performance

(Note: This is the first of a two-part series on maintenance management. This article introduces Reliability-Centered Maintenance. How RCM is being applied at Western will be addressed in an upcoming issue.)

"If it isn't broken, don't fix it. But if it's important, don't let it break." This is the philosophy behind Reliability-Centered Maintenance, an industry approach that helps maintenance staff determine the best policy for achieving reliability at a minimal direct maintenance cost.

Designed to decrease equipment "downtime" and unnecessary maintenance, RCM will help Western to stay competitive. RCM helps maintenance staff select the best way to manage equipment and the consequences of equipment failures.

It identifies what a piece of equipment does and what might make it stop working, then outlines what will happen to the overall system if it fails.

Power customers and maintenance staff add to the process by summarizing what they expect from the equipment in terms of output, speed, range and carrying capacity. They may also identify what they want in terms of risk (regarding environmental integrity), quality, control, comfort, containment, economy and customer service.

Once this information is gathered, RCM helps maintenance staff determine the critical nature of each piece of equipment, when it can be taken out of service for maintenance and what type of service should be applied.

For example, RCM recommends preventive maintenance or predicts what failure will happen if no maintenance is done and which steps will prevent that failure. The program recognizes some failures are preventable and others are entirely random.

It targets preventable causes of failure, such as telltale signs that equipment is in the early stage of decline and what can be done about it, or recommends allowing a nonessential piece of equipment to operate until it fails. The process lets maintenance staff identify a policy to deal with each failure in

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What is RCM?

RCM was invented more than 30 years ago in the civilian aviation industry, primarily by United Airlines, the Federal Aviation Administration and Boeing, to enhance airplane safety while saving money on maintenance.

RCM is being used more frequently in the electric utility industry because it is a cost-effective approach to achieve equipment reliability. With the advent of Independent System Operators and sanctions for equipment downtime, utilities must re-evaluate routine maintenance practices and think in terms of increasing equipment performance.

The program identifies:

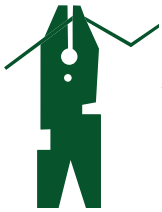
- how a piece of equipment works, its function and what makes it stop working
- all likely causes of failure
- what happens to the overall system if the equipment stops working
- overall consequences of failures

RCM is a powerful tool that focuses on 'just-in-time' maintenance. If maintenance can be scheduled just before the cause of failure instead of taking the equipment out of service periodically, utilities can increase equipment performance time.

light of its consequences and technical characteristics. Failure management policy options include:

- Predictive maintenance
- Preventive maintenance
- Failure-finding
- Changing the design or system configuration
- Changing how the system is operated
- Operating the equipment until it fails

"Performing maintenance 'just in time' increases equipment performance time,"



said **Dennis Schurman,** an electrical engineer in Golden. "RCM is favored over traditional maintenance approaches that typically rely on equipment supplier recommendations or on what has always been done. Both of these approaches have serious drawbacks."

Regarding the traditional approach, Schurman said suppliers usually write only one maintenance manual for each piece of equipment and provide it to all users. "Equipment failure can produce widely different environmental, safety, production or

maintenance consequences, depending on where and how the equipment is used, and yet, maintenance recommendations from the manual will be the same for all. The 'we have always done it this way' approach is similarly flawed for not focusing on failure mechanisms, causes and consequences."

On the other hand, RCM focuses on determining what is most critical for getting work done, ensuring that maximum benefits are realized quickly. Because it looks at likely failures and their effects, it provides precise criteria for scheduling routine maintenance tasks.

"This RCM approach boils down to keeping the system up and running—something we are committed to at Western. We need to keep finding ways to remain competitive in this industry, and RCM will help us to accomplish that goal," Schurman said.