

Sewage Strategies

Critical Point Monitoring provides framework for on-site systems

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Many on-site wastewater management programs fail to ensure that systems are properly operated and maintained on a continuous basis.

Traditional programs rely on inspection to identify and correct system performance problems. These approaches include sporadic operating system inspections focused on sanitary surveys, consumer complaints, property transfers and construction or building use changes. These inspections help identify and eliminate failing systems. However, they are reactive instead of preventive so they do not ensure continuous system performance.

In 1995, revisions to the Washington State Board of Health's on-site sewage rules began requiring local health agencies to develop and implement plans to periodically monitor all wastewater systems within their jurisdictions. The goal was to ensure that owners properly operate and maintain their systems.

Since then, the state's wastewater management paradigm has been changing to provide continuous oversight or monitoring of on-site system performance. To help meet this mandate, the Critical Point Monitoring (CPM) program is being developed to provide a control approach for operation, monitoring and maintenance activities. CPM can help ensure that on-site wastewater technologies consistently meet performance requirements.

The CPM approach adapts the Hazard Analysis Critical Control Point (HACCP) system to identify, monitor and control hazards associated with on-site operations. The HACCP system was developed in the 1960s to ensure food safety for astronauts traveling in space. It has since been applied to many food protection systems by identifying potential hazards in production and preparation, and developing mechanisms to eliminate or control those hazards.

The CPM process includes prevention and documentation to monitor and reduce risks in the wastewater flow path. CPM identifies critical points within a system where problems are likely to occur so that control measures can be taken to prevent them. Documentation verifies that hazards and risks have been controlled.

Steps in a CPM plan

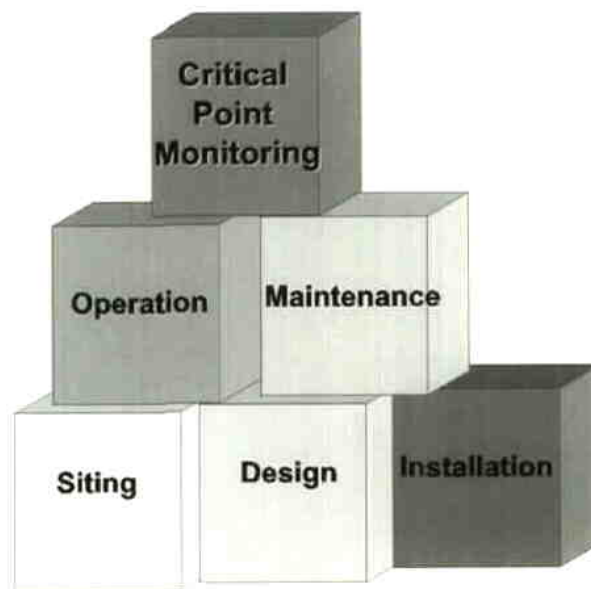
Using HACCP principles, the CPM process outlines steps to evaluate hazard risks and determine where control procedures are needed most for safe operation. On-site industry monitoring and maintenance practitioners can use the following steps to develop and implement plans:

- Perform a system hazard analysis — Identify hazards including biological, chemical and physical problems in the wastewater flow path and establish controls to address these hazards. Hazard types and risks depend on the on-site system's complexity, size, environmental sensitivity and wastewater characteristics. A wastewater flow diagram can document the wastewater flow path and help identify potential hazards at each point.

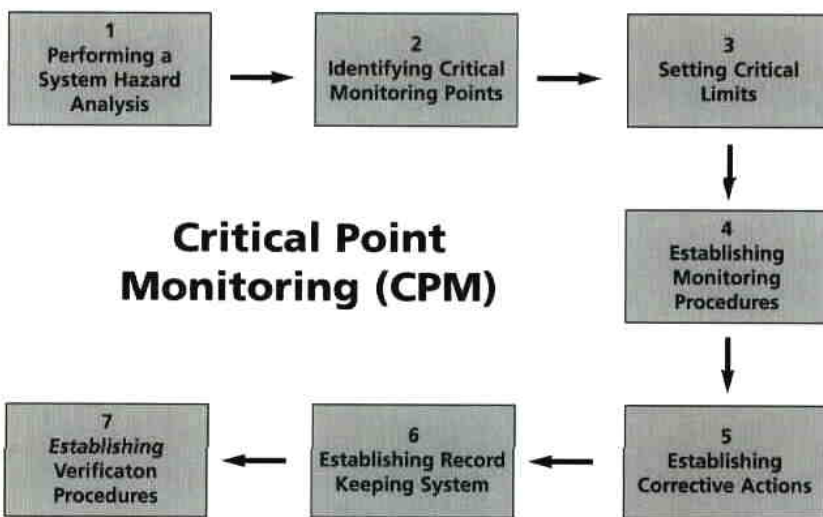
Whether an identified hazard must be addressed in the monitoring plan will depend on the hazard's actual risk and severity. For example, due to differences in treatment process effectiveness and/or site condition sensitivity, a chemical hazard may be harmful in one system but not another.

Once hazards are identified, control measures are established to minimize or prevent the hazards. More than one control may be needed for a hazard or more than one hazard may be addressed with one control measure.

- Determine critical monitoring points within the system — Critical monitoring points can be at any wastewater



Critical Point Monitoring is one part of a larger comprehensive management program that includes properly siting, designing, installing, operating, monitoring and maintaining systems.



Critical Point Monitoring (CPM)

Using Hazard Analysis Critical Control Point principles, the CPM process outlines steps to systematically identify, monitor and control hazards associated with operating on-site systems to ensure safe system performance.

flow point in an on-site system where control measures can be effectively applied. The points become the focus for intense monitoring. The most common critical monitoring points in a conventional gravity flow on-site system are the wastewater source, septic tank and drain field.

- Establishing critical limits — Critical limits are tolerance limits, or pass/fail performance standards, in the CPM process to be met for a control measure at each critical monitoring point. Each limit, such as dissolved oxygen (DO), pH, solid and liquid levels, available chlorine, odor and visual appearance should allow for immediate monitoring using measurements or observation. These limits may come from current industry standards, guidelines, scientific literature, research or industry experts.

- Establish monitoring procedures — Monitoring detects adverse trends that if left uncorrected could lead to control loss. Monitoring practitioners can adjust a system before a problem occurs. The information is used for written documentation to verify the CPM plan. Examples include visual observations, pump discharge rate, residual pressure and measurements of DO, pH, temperature, wastewater flow, solids and liquid levels.

Monitoring may be continuous or set to specific time intervals. However, a continuous system is best for prevention. Microcomputers and remote monitoring technologies allow continuous monitoring for many physical and chemical measurements.

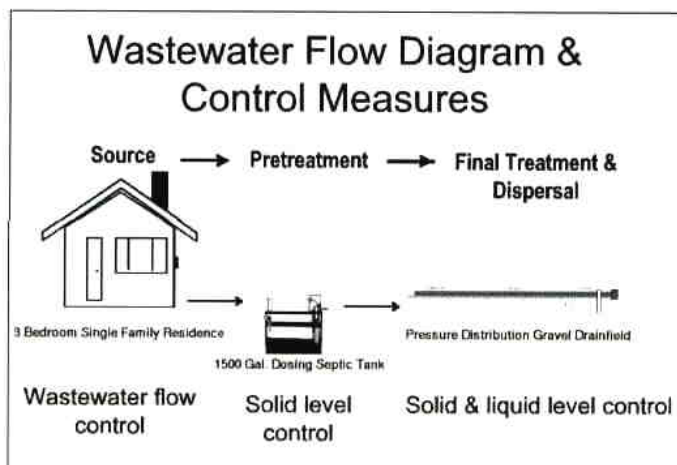
- Establishing corrective actions — Procedures, called corrective actions, must be planned for action when a critical limit is unmet. The CPM plan should record actions taken when a problem occurs and who is responsible for implementing the actions. For example, if monitoring a septic tank reveals that the sludge or scum level is above its critical limit, the tank must be pumped by an approved contractor as soon as possible and records must log this corrective action.

- Establish a record keeping system — A record keeping system's detail can vary according to complexity. Records must be accurate and complete to document that the plan is being implemented properly.
- Establish verification procedures — Verify that the monitoring plan is in place and functioning, and that the system is being monitored. Verification should occur on an ongoing basis to ensure that the CPM plan is reviewed and revised as needed.

CPM offers these advantages over traditional system inspection approaches:

- effective, efficient oversight of on-site operations by directing resources to monitor the most critical points within the system,
- identifying when problems might occur in a system and initiating actions to solve them in the early stages —before they become serious and expensive to correct,

- providing a basis for meeting performance standards at critical monitoring points,



This diagram shows control measures at various points in a pressure distribution system flow path beginning at the source and continuing through treatment and dispersal into the environment. This tool helps determine where control measures are needed most.

- providing a mechanism to verify compliance with established operation, monitoring and maintenance.

Within CPM's framework, operation and maintenance activities can be controlled on a continuous basis to improve performance and confidence in on-site wastewater systems. R

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