



Audit - Wastewater Treatment Plant Scenarios

Objective. Recognize and document compliance with, and demonstrated competency in, regulatory, market-based, and voluntary wastewater treatment plant management systems, through an interview-based audit.

Implementation. We have two municipal wastewater treatment plants to interview with two groups of interviews and reporters. We call one plant group “Wastewater As Usual” of **WaU**, and the other “Modern Wastewater Treatment” or **MoWt**. To play out these two scenarios, we need two teams. The **WAU** plant team and the **MoWt** plant team. Each plant team is to be interviewed by a different interviewer or by a team of interviewers with a moderator.

Queries. The interviewer (or interviewer teams) will ask these and related questions of the **WaU** and **MoWt** plant teams.

1. What is the labor situation?
2. What about sanitation? Safety? Environmental impacts? Chlorine residues?
3. What about training? Technical support? Documentation. Record keeping? Audits?
4. How are plant management decisions made? Especially for managing incoming wastewater (influent), wastewater treatment, wastewater discharges (effluent), treatment byproducts, and plant noise and odor control?
5. Is there a nature set-aside area? An environmental program? Quality assurance/control?

Interview Team Presentation to the Class

1. What are your key findings or facts?
2. What are your conclusions on compliance with best management practices?
3. What recommendations would you make to the plant managers to improve wastewater treatment management at this plant?
4. Relate your observations, conclusions, and recommendations to the three-sided USAID process of Design-Procure-Implement.

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Wastewater as Usual (WaU)

WaU is a small-scale, municipal wastewater treatment plant, receiving wastewater from several rapidly developing communities and older, stable communities. It was built on readily available land in a floodplain without an environmental assessment. It is owned and operated by a municipality, with seasonal and casual labor. Labor agreements and contracts do not conform to the International Labor Organization (ILO) or best management practices (BMP); there are no worker medical benefits, no restrictions on child labor, no restrictions on daily and weekly labor hours, no minimal wage requirements, no provisions of drinking water or food or sanitation or safety and security and training for workers, and no working-condition requirements. There are no requirements for equipment safety, noise and odor control, security, signage, and hazardous materials and solid waste management. Field, office, and laboratories have no operating fire extinguishers, noise suppressors, heating or air conditioning, circulating air, clean wash stations or toilets. Laborers and workers are not consulted in plant-related operations, and have no input to improve plant management, productivity, worker and public safety, effluent quality, or byproduct use. Staff turn-over is very high. Staff rarely recommend family and friends for work. Staff satisfaction is low.

WaU management, laborers, and workers do not understand the design-procure-implementation process, from influent to effluent. Management is concerned with satisfying randomly government inspections. Laborers and workers do only what they are told to do. Few aspects of the plant are monitored and documented, and those are available to only to management to review; there is no ongoing auditing or ongoing training.

Plant management decisions are based on availability of resources, design plans, and vender-supplied information. There is little planning for unanticipated larger influent loads, extraordinary high organic and sediment and turbidity loads, backflows and overflows, laboratory and processing equipment failures, and other issues which lead to frequent releases of untreated wastewater to the environment and receiving waters. The facility has antiquated laboratories and no onsite consultants. There are no onsite and offsite set asides for natural or recreational areas. There is no environmental education program or signage. There are no programs to reduce greenhouse gas emissions; to reduce, reuse, or recycle solid waste or hazardous waste; or to use eco-friendly products and processes. Biosolids (wastewater sludge) are poorly pressed and air dried, then dumped in the nearby river channel for further degradation or collection by unauthorized persons, and become odorous habitats for dogs, rodents, and flies which are disease vectors.

Chlorine gas, which is acutely hazardous, is used for disinfection of treated effluent, but there is no de-chlorination prior to discharge to receiving waters, which adversely impacts aquatic life. Sometimes, the chlorinators fail and wastewater is discharged without disinfection. Workers are frequently ill and miss work. There are routine noise and odor problems, and frequent complaints from nearby neighbors.

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Modern Wastewater Treatment (MoWt)

MoWt is a small-scale, municipal wastewater treatment plant, receiving wastewater from several rapidly developing communities and older, stable communities. It was built on readily available land in a floodplain with an environmental assessment which required flood mitigation designs and flood management. It is owned and operated by a municipality, with seasonal and casual labor. Labor agreements and contracts conform to the International Labor Organization (ILO) or best management practices (BMP); there are worker medical benefits, restrictions on child labor, restrictions on daily and weekly labor hours, minimal wage requirements, provisions of drinking water or food or sanitation or safety and security and training for workers, and specific working-condition requirements. There are requirements for equipment safety, noise and odor control, security, signage, and hazardous materials and solid waste management. Field, office, and laboratories have operating fire extinguishers, noise suppressors, heating or air conditioning, circulating air, clean wash stations and toilets. Laborers and workers are consulted in plant-related operations, and have input to improve plant management, productivity, worker and public safety, effluent quality, or byproduct use. Staff retention and satisfaction are very high. Staff often recommend family and friends for work.

MoWt management, laborers, and workers all understand the design-procure-implementation process, from influent to effluent. Laborers and workers are encouraged to take initiative and improve the process. Management, laborers, and workers are constantly concerned with identifying opportunities for improvements in management, productivity, effluent quality, byproduct use, worker and public health and safety, and satisfying randomly government inspections. All aspects of the plant are monitored, documented, reviewed, audited, and available to management and laborers to review; there is ongoing auditing and ongoing training and re-training.

Plant management decisions are based on real-time measurements, projections, as-built designs, and correlations with historical data. There is extensive planning for unanticipated larger influent loads, extraordinary high organic and sediment and turbidity loads, backflows and overflows, laboratory and processing equipment failures, and other issues which otherwise lead to releases of untreated wastewater to the environment and receiving waters. The facility has modern laboratories and onsite consultants. There are onsite and offsite set asides for natural or recreational areas. There is an environmental education program and signage. There are programs to reduce greenhouse gas emissions; to reduce, reuse, or recycle solid waste or hazardous waste; and to use eco-friendly products and processes. Biosolids (wastewater sludge) are pressed and air dried, then sold to farmers for soil amendments or to solid waste landfills for alternative daily cover to discourage odors, dogs, rodents, and flies which are disease vectors.

Chlorine slurry is used for disinfection of treated effluent, followed by de-chlorination prior to discharge to receiving waters, which otherwise adversely impacts aquatic life. Chlorinators and de-chlorinators rarely fail, and there is overflow storage to prevent wastewater discharge with disinfection. Workers are rarely ill. There are no routine noise and odor problems, and very rare complaints from nearby neighbors.

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