



IoT-Mfg

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White Paper

What is a Mill wide audit and why is it important?

Historically, mill strategies are to try and solve problems one section at a time: the pulp mill sewer, the paper mill sewer, the clarifier, the pond, etc. Focus on fiber and liquor loss in the pulp mill sewer, ash and complex chemical carryover in the paper mill sewer, throughput settling efficiency at the clarifier, COD/BOD, turbidity, toxicity, and any other permit requirements at the pond outfall, etc.

The challenge to this approach is that there is no clear overview of all the conditions, suspended solids, metals, chemicals, and microbiology that eventually affect the sewers, clarifiers, pond, and outfall. In addition, the data required for such an overview is not centralized. Some of this data resides in individual localized distributed control systems (DCS). Some of this data is only local measurements on gauges and/or local measurement devices. Some of the data resides in the manufacturing execution system (MES). Some of the data is not continuously measured.

Purpose of the Mill Effluent Study

The Mill Effluent Study focuses on the environmental concern of wastewater handling and treatment. It is important to recognize that this includes all the mill sewers and the wastewater treatment plant (WWTP) proper, all working together as a wastewater biological ecosystem (WBE).

The study lays out a map to achieve a step change in through:

- the integration of manufacturing and treatment process expertise
- the implementation of an Environmental Server supporting IIoT mesh technology
- the collection of disparate data from existing control and MES systems
- the addition of non-integrated measurements
- the use of multivariate analytical tools
- the integration of new age graphical displays

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What is required from the Mill

The following is needed from the mill

- Mill or Corporate NDA (if required) to allow us to collect data and pictures of the areas we inspected.
- Google earth map of the complete Mill
 - This may be several blow-up maps showing major co-joined sumps and lift stations.
 - If so-joined sumps are inside buildings, mark approximate location on the building.
- Any Influent source contributors into each co-joined sump
- A copy of the mill EPA permit
- All organic, inorganic data, including external lab data
- As Built and updated P&ID files
- Chemical feed rates
- Potential chemical addition from the mill process
- A spreadsheet is attached for all the following, Operational data for 4 weeks minimum up to 1 year

Mill Effluent Walk Through

After the mill information is reviewed, the study team will come onsite for a one-week survey.

The goals of the survey are:

- Review historical data, Permits, Bottlenecks, Upsets, Systems/Controls
- Understand the impact of mill upsets and productions changes on WBE
- Review any mill expansion plans and/or water reduction projects
- Map/Quantify Sources of Waste to WWTP
- Upstream Source & Treatment Equipment Operating Envelopes
- Select a single qualitative variable of interest or a problem (examples: COD, BOD, soda loss, etc.) in the WWTP and work with the mill lab to collect data to develop a reliable measurement that can be implemented to provide real time measurements and potentially control.
- Perform a microbial evaluation of the wastewater system, review system performance.
- Any potential “quick fixes” identified during the survey will be immediately related to mill personnel.

Mill Effluent Study Deliverables

All the data and information gathered will be correlated as follows:

- **Goals/Objectives** – Permits, Targets, Corporate Goals/Objectives
- **Strategy** – Identify low hanging fruit and overall approach
- **Process Modeling** – model cause/effect, process response, upsets
- **Roadmap** – Select technologies, architect solution
- **Sequencing** – Prioritize projects, addressing interdependencies
- **Implementation Plan** – Phased approach to overall project delivery
- **Qualitative Variable Proposal** – A proposal for the analyzer required to implement the studied qualitative variable for real-time measurement/control

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