



# The Commissioning Agent -- Keeping It All Together

*Building a water treatment plant involves many specialized trades that often work independently under separate contracts. A Commissioning Agent can be the intermediary that keeps everyone else on track.*

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**W**ater treatment plants need to meet the demands of the water supplier, the regulatory agencies and the consumer. To do so, these facilities have many primary components including water treatment systems, production, transfer and booster pumps, chemical addition, disinfection and instrumentation and control systems, including SCADA. Sub-systems include power distribution, emergency power generation, HVAC, bulk chemical and fuel storage and fire and intrusion alarms. Building these facilities requires several specialized trades that often work independently of one another under separate contracts. Without effective communication and coordination between the owner, design engineers and architects and construction contractors and their sub-contractors, these facilities could end up with installation deficiencies that may result in the facility not

performing as specified. Without a comprehensive verification of the proper interaction and operation of all systems and components, they will not operate properly at commissioning and throughout the facility's lifespan.

A systematic process can address or prevent these issues before they become problems. A Commissioning Agent (CxA) facilitates the required communication, coordination and verification of the facility's systems to ensure that they are performing properly. The CxA's responsibilities include design review, installation verification, coordinating system start-up, testing functional performance, training operation and maintenance staffs and documenting the installations. The CxA also can see that the construction schedule is maintained to smooth the progress of commissioning the facility's systems

so the project can be completed in a timelier manner. The CxA serves the owner's best interest by ensuring that the facility's systems perform as specified and as paid for.

Many owners feel that a construction inspector (CI) gives them this kind of service. But while many construction inspectors have a broad and necessary knowledge of the means and methods of a facility's construction and systems, they may lack the specific technical expertise to understand the proper operation of the water treatment plant and its systems. The CxA is not an alternative or a replacement for the CI; he/she is a team member with different responsibilities. Along with the designers and contractors, CxAs have a common objective — to get the facility into service on

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time and operating as intended.

Commissioning benefits include:

Fewer project delays— By reviewing and using the contractors' schedules, the CxA can identify potential scheduling conflicts and revise sequences so that the work can be completed more efficiently.

Value added engineering and construction – Giving a CxA the contractor submittals to review before they are approved creates another opportunity to identify potential problems that could lead to revisions to prevent the need for future change orders and claims.

Improved operation, maintenance and overall reliability—The commissioning agent ensures that the facility operators are properly trained.

Shortened facility turn-over—The facility cannot be made fully operational and

turned over to the owner until the treatment system and its ancillary systems operate as intended and the plant operators have been properly trained. The commissioning agents coordinates the O&M training and assures that the plant is operating properly, minimizing delays and keeping the project on schedule.

Start-up requirements are managed –Equipment and system start-ups involve interrelated contractor tasks. The commissioning agent's planning and coordination makes implementing these tasks more efficient.

Shorter 'punch lists' –During construction the CxA identifies incorrect or incomplete work before project acceptance so corrective work can be completed, documented, followed up and re-tested. When the CxA works along with the construction inspector, problems can be corrected before substantial completion so the facility will be fully operational at that time.

The CxA documents any deficiencies that remain at substantial

completion and determines who is responsible for the correction.

Useful O&M documentation – The CxA establishes and maintains equipment records throughout the commissioning process. This provides the owners and operators with valuable information to use in defining a practical scheduled maintenance program.

Successful commissioning requires a team approach. Team members include the owner/ plant operators, the project manager, the design engineers and architects, the construction inspector, the prime contractors and their sub-contractors. For the best possible results, it is important to get this team established before construction begins. If the owner includes the commissioning agent in the design phase, commissioning requirements can be considered and included in the contract documents before the project design has been completed and advertised. This makes it possible to organize, plan

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ahead and include and clearly define in the specifications the roles and responsibilities of the individual team members.

The water treatment plant commissioning agent's qualifications must include knowledge of water treatment and the systems that are involved with operating the facility. This includes controls, operation, installation and maintenance.

Other qualifications include:

- Experience with multi-contract / multi-discipline teams and contractors
- Practical field construction experience
- Ability to organize many activities into a working commissioning plan

The formal commissioning of a facility is not limited to large or very large capacity facilities. It is just as critical, if not more so, to a small system operator who produces less than 250,000 gallons per day. This operator may have only this one facility and just a few personnel to run the entire system. A chronically dysfunctional facility will require significant effort on that operator's part to maintain acceptable water quality, answer repeated service calls and respond to alarm conditions. The operator may be dissatisfied with his new and expensive facility.

While not always the norm, construction projects can lose the "Get 'er done" feel the project started with and take on a "let's just get done with it, so we can get to our next job" feel towards the end. The owner may feel that the contractor's interest already has moved on to the next project, leaving the most important phase—startup—to whoever is willing to do it. Whether perceived or actual,



One of two 350 GPM microfiltration systems in the plant referenced in the article.

this is unacceptable. One of the commissioning agent's responsibilities is to keep the contractors engaged and focused on a successful startup. This begins early in the project by maintaining the project schedule and focusing team commitment on keeping to that schedule.

When commissioning tasks are well defined, the contractor, will know what he has to do even though he may not be overly familiar with the operation of the equipment he is installing. The manufacturer representatives tasked with equipment startup are not always interested in how their equipment works with equipment they do not supply. The CxA is the link between all the individual participants in a project.

A recent treatment improvement at a state-run facility offers an example of a successful project utilizing commissioning services. The new 0.5 MGD water treatment facility utilized microfiltration treatment equipment to satisfy the surface water rule for 3-log removal of cryptosporidium oocysts and *Guardia lamblia* and removal of iron and manganese from the existing groundwater wells, which are under the influence of surface water.

The process included nine distinct yet interrelated systems, (systems 1 thru 9). It started with the operation of the wells.

### The Process

When the 0.2MG feed tank reaches the pump start elevation, the selected wells start. The raw water reaches the treatment building where sodium hypochlorite is added for iron oxidation and soda ash for pH control via flow paced treatment pumps. The water is stored in the 0.2MG processed/raw water storage/feed tank. (System 1)

When the distribution system calls for water based on a falling distribution tank level, the filtration system, utilizing two package microfiltration units with a maximum capacity of 350 GPM each, accepts water from the processed raw water storage feed tanks (System 2). The filtered water then passes through a UV treatment system (System 3) before iron sequestering for corrosion control and sodium hypochlorite addition to maintain the required system disinfection residual (System 4). Finished water then enters the

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