## A Survey of Operators' Concerns and Challenges in the Water/Wastewater Treatment Industry PART ONE – CERTIFICATION EXAMS William Edgar

Over the past forty years, I have been involved in some local and national surveys, gauging the responses of many individuals, including my company staff and workforce in utility operations and in maintenance. Recently, I have used my experience to investigate the issues facing operators in the water and wastewater treatment field. In this study, I hope to provide some insights from operators voicing their opinions on significant issues facing them today. You may have heard some of their views expressed, or maybe there is something new on the horizon. Around the first of the year, 21,407 e-mail solicitations were sent to operators across the country. These surveys were accepted by 20,550 recipients and viewed by 4,405 of those, from which the responses were collected and sorted into these categories: Certification Exams, Benefits and Pay, Morale, and Suggestions by Operators to improve their systems. While the main focus of this study is upon the issues around certification exams, other workplace concerns were addressed by the respondents. Among those, the biggest issues noted were manpower shortages, increased water usage and availability of chemicals and supplies, some of which topics will be covered in future briefs.



The polling of this survey was conducted during the first and second quarters of 2022, historically noting that we are now in our third year of the COVID pandemic; thus, the feedback and opinions are based in the years when isolation in training and operational activities curtailed many learning opportunities. In the survey, we posed a question concerning the effect of COVID on operators and their operations. While only a small percentage indicated any COVID symptoms, possibly due to their high natural immunities, the quarantines may have brought on the frequent use of online programs for "self-studying and manual reading", to quote one operator's words in a common response. These difficult times might also account for supply chain problems, as mentioned above. All-in-all, though, the operator community has responded well and done an excellent job in maintaining operations through the pandemic.

Here's a copy of our original survey:

## The following are short essay topics, we do not care about typos, misspelled words, etc., but rather what you are thinking:

- 1. Describe what water/wastewater treatment means to you.
- 2. If you had one wish for the water/wastewater industry, what would it be?
- 3. Describe how you prepared for your certification exam:
- 4. What was the best means to study for your exam (individually, group, tutoring, other ways)?
- 5. Which format did you feel comfortable with, to study and learn terms, methods, and rules (correspondence, classroom, webinar, online, Zoom, plant manager tutoring, or others)?
- 6. How has the COVID epidemic affected you and your operation?

## After a couple of weeks, we followed up on the responders, with a few related questions, as listed below:

- 1. Explain your opinion of the certification exam(s) taken. (What was your experience like taking the exam?)
- 2. Should you have failed an exam attempt, describe what you felt was the cause?
- 3. What is your opinion of the training you received? Was the instructor helpful?
- 4. Did you use study guides and memorize answers to pass? Did it work?
- 5. During the COVID epidemic, what is your opinion of the webinars and Zoom sessions used in training? Were they helpful?
- 6. Open Mic should you have concerns or wish to sound-off on issues facing you and your work in the water/wastewater field.

Our results were determined by the responses of utility operators across the USA, as well as from conducting follow-up interviews with various operators, trainers, and state OCP administrators. As you can see, we did not utilize a bingo card approach, nor rating of leading questions from 1 to 10, but rather, asking for the respondent to state in their own words, in a short essay, what their opinion was, in regard to enjoyment of their work, preparing for exams, compensation and even what really "ticks them off".

We were very interested in the techniques and mechanisms used to prep for the exams, what they liked and did not like. We also received comments regarding current events of pay and workforce issues, and offered operators a general opportunity for free expression, with the promise to protect their privacy and not to give out their identities except in statistical form; an honest approach for feedback.

When asked about their means of exam preparation and study guides, the overwhelming number of respondents said they made use of the California State University (CSU) – Dr. Kerri – Sacramento Manuals. The candidates prepared individually, and with some use of state training guides. States having specific requirements and exams specific to their regulations received a more positive response, versus some generic exams, which asked questions that did not apply to their regional area. The State Training Guides were reinforcement to the Sacramento Manuals, allowing candidates a more relevant approach to study. Some responses indicated use of other exam prep guides, practice tests and other training manuals. The formats of choice for operators were short schools and tutoring, along with classroom training, when it was available, while several echoed the opinion that "A great mentor is the best way", many more did not seem to have this option.

Some stated that generic practice tests were confusing and led them to provide incorrect responses on the exams. As one operator responded, "You cannot really feel comfortable with any of them because what you study and what's on the test seems to be very different." As the COVID issues resolve themselves, hopefully, the classroom format will return, to minimize some of the difficulty in retaining the Need-to-Know criteria. Finally, the students' motivation and commitment to the field are sure to affect their outcome on exam day. A successful candidate stated, "When going for the exam, I studied for it, thought about what I studied constantly, and then got a good night's sleep the night before. One time, I went with two other people to the test. They spent the night out partying. Neither passed. Go figure."

To summarize some of the various barriers to successful testing, we have seen:

- Testing on non-relevant matter, treatment processes, management styles
- Too much cellphone in the classroom/conference
- Unprepared trainers –not communicating the exam basics
- Lack of adequate prepping for the exam
- Partying the night before
- Lack of retaining content from Zoom/webinar presentations
- Repeating the exam multiple time to learn what is on the exam "repeat exam offenders"

I am sure you have seen some or all of these before. In research of training, there are two types of training: certification and continuing education. As a disclaimer, I have not been involved in certification training, only in providing continuing education; thus, I have no conflict of interest in this study. After 40+ years, I am more interested in increasing the Operators' Knowledge Base and providing guidance in the critical topics of today. With this being said, we are all aware of seeing advertisements "guaranteeing passage of the exams" by some training providers, which made me curious to research some of these facilities. The majority of the certification trainers have received high marks in this study; however, others have not lived up to their guarantees. Some candidates have indicated a lack of instruction in key test subject matter: "Not covered in my class ...," etc. In contrast, we have seen comments stating that specific programs, i.e. Rural Water, Fleming, OTCO and others have been very helpful in preparing for the exam. But not all training is equal.

Some of today's certification trainers are lost in the basic and fundamental training aspects, due to their own lack of experience and training. In a recent interview with an environmental training center instructor who conducts training for all levels and types, they admittedly did not have any program in place to gauge the student/candidates cognitive understanding of the basic and fundamentals aspects of the grade level exam, and did NO follow-up to gauge whether the training had assisted students in passing the exam, nor implemented any assessment or techniques to evaluate the training provided. Where is the "Train-the-Trainer" in this case? In further observations, this appears to be a pattern. It is a little upsetting to see no assessment, no follow-up, and no means of improving outcomes for future classes in the water/wastewater field. In comparison, other disciplines, where certification trainers incorporate pre – post evaluations, have been shown to have higher passing rates. This aspect of our investigation is very important, as we look for the reasons for the 30% to 50% failure rates in certification exams commonly cited.

Some of the case studies in various other public health fields and services arenas indicate similar results as water and wastewater in their study issues and exam results -- a few of them are presented in the following paragraphs. Some of the important outcomes from this research were the differences found among the training assessments, as related to their pass/fail results. Others pointed to issues that are also common to our field.

Why Are So Many Younger Doctors Failing Their Boards? Study includes: Are the study habits of millennials not up to the level of Baby Boomers and Gen X'ers? Reply: One concern that has a ring of truth to it is that <u>young doctors have become great "looker-uppers," and have lost the sense of what it's like to actually read and study medicine.</u>

**Higher Pass Rates on DoDD 8570 for 200+ Soldiers in the US Army** study includes: The Army needed a new training approach that would generate high engagement and accountability, coupled with the flexibility and efficiency demanded as a result of COVID-19. To preserve the health and well-being of the soldiers, leadership shifted their search from in-person providers to those that could deliver 100% online training.

**First-Time Failure Rates of Candidates for Board Certification – An Educational Outcome Measure** study includes: The educational performance of training programs for ophthalmology remains largely unexamined. It is generally conceded that since most candidates eventually achieve certification, measuring rates of certification does not distinguish among programs and is thus not a discriminating educational outcome measure. ... Lacking information on residents' aptitude at the time of entry to programs, we are unable to estimate its effect. However, a study designed to separate the effect of resident training from other factors in cognitive examinations similar to the WQE (written qualifying examination) showed that although achievements before residency are important predictors of the outcome of the examinations, <u>candidates perform better or worse than expected</u>, depending on the quality of the training program.

Unfortunately, the water and wastewater treatment industry lacks quality studies to evaluate the increasing changes required in certification training. In this current age, drinking water and wastewater treatment are under many challenges. The key element to these challenges lies with the need for training and experience on the jobsite. The lack of proper orientation and training for new recruits and new managers is becoming a major workforce issue. Within the next decade, should the current downward trend continue in training – education – experience, the only operators manning the plant will be licensed SCADA systems -- no human personnel, only robotics and SCADA.

Another important finding suggests that some trade associations have lost their mission and statement, transforming into a fun n' games approach, conferencing together and endorsing sub-standard engineering methods, resulting in the loss of operational know-how and performance. For example, "Let the SCADA run and operate my design, we do not require operators...." This line of thought is very alarming and dangerous for the local community. City leaders should be prepared for: "where's my safe drinking water?" queries when the hackers take over.

In summarizing our study in some of the ideas and suggestions to consider for a 2022 update to your training programs, may we suggest:

- Evaluate your program for updates to certification trainers
  - Allow for development of pre post assessments
  - Identify content areas of concern from students pre-testing
  - Provide study guides for students exam candidates to enhance their skill sets
  - Compare pre to post testing for candidates' evaluations, with possible comparison to their exam attempts in the identified content areas
- Evaluate Need-to-Know, making sure the criteria meet State Requirements process, procedures, rules, and permitting
- Return to "thinking out" the solutions, instead of memorizing answers.... a proactive change of mind set in exam prep
- Expand and enhance "mentoring" and plant operations training sessions, one on one
- Create incentive programs, such as increased pay for passing the exam
- Evaluate exam questions items for distractor adjustments (not to dilute the content item)
- Establish time limitations for exam taking -- possibly 3 attempts per year. If candidates learn what is on the exam, hoping to return to hit the lotto and pass, they are not absorbing or retaining important skills.
- Create a study guide relative to your state treatment processes and state regulations.
- Assessments are the key to effective training (both Pre and Post). It is a shame to see the majority of certification training conducted without any assessment, such as classroom, conferences or other venues; similar to the above referenced environmental training centers' lack of assessing knowledge transfer. Yes, it is a failure, not to be aware of the students' progress or lack of progress. Today is the day to start evaluating your in-state training program and finding the pitfalls in your current program. How effective is your training as compared to your pass/fail ratio?

## **Conclusion:**

Currently, the heritage and experience levels of the water - wastewater certification and operation are disappearing, as the previous generation reaches retirement. Now is the time to embrace the basic fundamental aspects of operations and instill these outcomes in our educational models for the incoming workforce. The workforce is hungry to learn and improve with the technologies of today, however without the **Tools** and **Support**; these outcomes are difficult to achieve. And lastly, in our next element of this Operators' Assessment series, we hope to summarize some results on the morale, pay, and future considerations portions of the survey. These will be submitted in a separate study on Engagement and should be released in a few months. God Bless our country. God Bless, the men and women involved in our daily needs of water and wastewater. Now is the time to begin the journey to inform and improve the quality of operator competence.