Case Study: Hands-On Training in Wastewater Performance Evaluations

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Introduction

The Grand River Conservation Authority (GRCA) initiated a program in 2010 to optimize wastewater treatment plants (WWTPs) in the watershed as a way to improve water quality in the Grand River and its tributaries. A major component has involved demonstrating the Comprehensive Performance Evaluation (CPE) protocol to identify performance limiting factors preventing plants from achieving optimized performance. This case study describes the background, approach and “lessons learned” from conducting 8 evaluations of wastewater systems in the Grand River watershed.

Background

The Comprehensive Performance Evaluation protocol was developed by the U.S. Environmental Protection Agency to address compliance problems at plants constructed in the late 1960’s and early 1970’s. A survey of over one hundred facilities found that operations and maintenance factors were frequently the cause of poor performance. The evaluation protocol was formalized and guidance provided in a series of EPA handbooks (EPA, 1989). In the early 1990’s Environment Canada and the Ontario Ministry of Environment demonstrated the protocol at a number of facilities in Ontario (MOEE, 1994). A reference document-- “The Ontario Composite Correction Program Manual for Optimization of Sewage Treatment Plants”--was adapted from the EPA handbooks (WTC & PAI, 1996). The EPA handbooks and Ontario manual provide guidance on the evaluation of the activated sludge process.

During a Comprehensive Performance Evaluation (CPE), a team assesses a plant’s operation, design, maintenance and administration to determine the unique combination of factors limiting performance. Factors having a major effect on performance (i.e. causing effluent concentrations to exceed compliance limits) are given an “A” rating under the protocol. An example of an “A” factor might be inadequate sludge disposal resulting in high concentrations of effluent total suspended solids on a continuous basis. Factors having a major effect on performance on a periodic basis, or a minor effect on plant performance on a continuous basis are given a "B” rating. An example of a “B” factor might be high levels of infiltration/inflow creating high effluent suspended solids concentrations on a seasonal basis. Factors having a minor effect on plant performance are given a “C” rating. Factors that are noteworthy and may affect performance are assigned a “no rating” (NR).

If the CPE determines that the facility's design is "capable" or "marginal", a program of follow-up support (termed "Comprehensive Technical Assistance") may be recommended to resolve the factors. During technical assistance, facilitators support process control activities and transfer skills to operations staff and assist managers to upgrade policies. If, on the other hand, the CPE determines that the WWTP's major unit processes are "not capable", follow-up assistance is not recommended as design upgrades are required.

Eight CPEs were completed as part of the Grand River optimization program to:

- Provide hands-on training in the evaluation tools and develop CPE facilitators;
- Identify facilities which could benefit from follow-up support to demonstrate improved performance or capacity;
- Adapt the protocol to lagoons.

Approach

A nucleus of staff from GRCA, MOECC (Environmental Innovations Branch) and an external consultant provided overall leadership of the evaluation teams. Based on their availability and interest, staff from other organizations within the watershed participated as team members to obtain training. **Attachment #1** contains an equipment checklist which was developed for planning CPEs. The steps described in **Table 1** were followed during the on-site CPE activities, generally completed within a 4- to 5-day window. **Attachment #1** contains an equipment checklist which was developed for planning CPEs.

Table 1: Description of approach used for on-site CPE training in Grand River Watershed-Wide Optimization Program

Component	Description
Kick-off Workshop	A half-day workshop to review the background, objectives, approach and expected results of a CPE.
Plant Tour	A plant tour of the facility to review the process and layout with the plant supervisor or chief operator, followed by an evaluation team debriefing.
Data Collection	Collection of key information in the areas of administration, operations, design, and maintenance using forms in the Appendix of the Ontario CCP Handbook*.
Loading Evaluation	In a workshop setting, the evaluation team jointly calculates and interprets per capita flows and loads (BOD_5, TSS, & NH_3) and ratios (TSS: BOD_5, TKN: BOD_5, etc.).
Process Evaluation	Estimates are prepared for key process parameters (SRT, F/M, HRT, recycle rate, etc.) and compared to typical values.
Sludge Accountability	Calculations are prepared for projected and reported sludge masses for a 12-month period as performance check.
Major Unit Evaluation	A Performance Potential Graph (PPG) is prepared with estimates of rated capacities for each major unit process; the plant is classified as “Capable”, “Marginal” or “Not Capable” at current flows.
Special Studies	Additional information on the facility is collected from on-site studies such as a spot check of the flow meter or coagulant dosing rates.
Personnel Interviews	A list of key questions is generated. Key operations, maintenance, and administrative staff are interviewed by two-member interview teams and the interviews debriefed with the rest of the evaluation team.
Limiting Factors	Evaluators identify challenges and opportunities in each of the four areas (admin, design, maintenance and administration). The CPE Facilitators identify and prioritize the limiting factors using a list in the appendix of the Ontario CCP Handbook.
Exit Briefing	A PowerPoint Exit Briefing on the CPE objectives, approach, and findings is prepared and jointly presented.

An Exit Briefing was scheduled within two weeks of the completion of the on-site activities. The evaluation team jointly presented and discussed the approach, findings and prioritized list of performance limiting factors to plant staff at the Exit Briefing. A CPE report was provided within 6 to 8 weeks of the completion of the on-site activities. The CPE report reflected in writing the results presented at the Exit Brief and did not to include supplemental information or analysis.

Those wishing to participate in an evaluation team were requested to attend the full 4 to 5 days of on-site activities and commit to presenting a portion of the Exit Briefing. Staff wishing to gain a better understanding of the evaluation protocol but unable to commit to the full 4 to 5 days of on-site activities could attend the half day Kick-off Workshop which was structured as a classroom activity and/or join the team for jointly calculating and interpreting process loading, sludge accountability and the major unit evaluation. Using results from initial data collection, these calculations were written on a flip chart one step at a time by one of the CPE facilitators with the evaluation team calculating and discussing the results.

During the initial CPEs, an external consultant knowledgeable in the protocol was responsible for facilitating training during on-site activities, as well as for preparing the Exit Briefing and CPE Report. As experience in the protocol was gained, the facilitation responsibilities were transferred in stages to GRCA and MOECC staff, with the external consultant serving in an advisory capacity. The overall goal was to transfer CPE evaluation skills over time while simultaneously conducting a high-quality evaluation to assist municipalities in improving treatment capacity and performance.

Table 2 lists the plants that were evaluated in the order in which they were evaluated, as well as the size and type of facility and team makeup. Photographs of some on-site activities are shown below the table. **Attachment #2** contains a list of the CPE reports prepared.

Table 2: List of CPEs conducted as part of the Grand River Watershed-Wide Optimization Program

On-Site Dates	Facility	NDF* (m^3/d)	Type	Receiver	Team Membership (no. of members)
Oct.17-19, 2012	Paris	7,056	Extended aeration with effluent chlorination, aerobic digestion, centrifuge dewatering and land application of cake solids.	Grand River	CPO Inc. (1) GRCA (1) Brant County (1) Haldimand County (1) Guelph (1)
Dec. 10-14, 2013	Galt	56,800	Conventional Activated Sludge with UV disinfection, tertiary filtration, WAS thickening, anaerobic digestion centrifuge dewatering and land application of cake solids.	Grand River	CPO Inc. (1) GRCA (1) Region of Waterloo (4) Brantford (1)
Jan. 6-10, 2014	Elmira	7,800	Biological Nutrient Removal (BNR) with tertiary filters, UV disinfection, centrifuge dewatering and land application of cake solids.	Canagagigue Creek	CPO Inc (1) GRCA (1) Region of Waterloo (2) MOECC (2)
Jan. 27-30, 2014	Fergus	8,000	Conventional Activated Sludge with tertiary filtration, UV disinfection, anaerobic digestion, sludge storage and land application of sludge.	Grand River	CPO Inc. (1) GRCA (1) MOECC (2)
Oct. 6-10. 2014	Arthur	1,465	Extended Aeration with effluent lagoon storage, tertiary filters, UV disinfection, aerobic sludge digestion, sludge storage and land application.	Conestogo River	GRCA (2) MOECC (2)
Dec. 16-19, 2014	Mapleton	750	Seasonal discharge lagoon with one aerated cell, one facultative cell, 3 storage cells, alum addition, tertiary filters and UV disinfection.	Conestogo River	CPO Inc. (1) GRCA (2) MOECC (2)
Apr. 13-16, 2015	Plattsville	800	Seasonal discharge lagoon (1 aerated cell and 2 facultative cells), alum addition, and tertiary intermittent sand filters.	Nith River	CPO Inc. (1) GRCA (2) Oxford County (1)
Oct. 26-30, 2015	Dundalk	1,832	Continuous discharge lagoon (4 facultative cells, 1 post aeration cell), alum addition, and tertiary filtration.	Foley Drain	GRCA (2) MOECC (3)

Figure 1: Photo (top) shows clarifier solids sampling at the Galt WWTP; photo (bottom) shows spot checking of the Parshall flume at the Paris WWTP

Figure 2: Photo (left) shows plant tour of the Mapleton WWTP; photo (right) shows preparation of a plant flow schematic on a flip chart at the Fergus WWTP

Lessons Learned

The "lessons learned" from these 8 CPEs were as follows:

Optimization Training

- Overall, the CPE was a very effective tool for hands-on training in the evaluation of the performance and capacity of existing treatment systems. The personnel interviews were particularly instructive of the impact of non-technical issues on plant performance and capacity.
- Four MOECC water inspectors were included in the CPE training at 5 facilities. The feedback from the inspectors (**Attachment #3**) was consistently positive with regards to the CPE enhancing their understanding of facilities. With respect to the involvement of MOECC water inspectors in the evaluations, some host facilities welcomed their inclusion, viewing the CPE training event as an opportunity to enhance the levels of communication and understanding.
- The identification, rating and prioritization of the performance limiting factors were the most challenging components of the CPE to teach. Judgment in this area benefits from experience gained over a number of evaluations. It is valuable for an experienced evaluator to provide telephone consultation and to schedule a review component after the completion of on-site activities, prior to the presentation of the CPE Exit Briefing. A helpful exercise was to request that each team member individually write down challenges or opportunities in the four areas of operations, administrations, design and

administration and then review and then discuss jointly as a team. Based on this feedback the CPE facilitators then made the final decision on the performance limiting factors.

- It is desirable to limit the size of an evaluation team to a maximum of approximately 6 members for effective training. Large teams are difficult to manage and coordinate on-site. More time is spent debriefing activities and team members do not gain experience in all elements of the CPE. The evaluation team should also be external and independent in composition. Therefore, it is preferable to respectfully exclude staff that have direct responsibility for the facility such as the plant supervisor or the supervisor's manager.
- Staff participating in a CPE should be encouraged to block off the 4 to 5 days for on-site activities. Team members who come in and out of an evaluation in order to manage other commitments disrupt team activities and reduce the effectiveness of the evaluation.
- Some host organizations for the initial CPEs arranged for lunch to be served on-site during. This was very helpful maximizing the use of the time on-site.

Optimization Program Development

- Facilities hosting the CPEs did so voluntarily following discussions with the GRCA staff. At a number of them, the evaluation team judged that the facilities did not have significant issues with either capacity or performance. Consequently, the factors lists consisted of "NR" (or not rated) factors. While all of the CPEs provided valuable training experience, it is likely that some watershed plants have capacity or performance issues but did not volunteer to host a CPE. Therefore, a challenge for the Grand River optimization program, which is voluntary, is how to identify plants in need of support and persuade their staff to conduct an evaluation which potentially uncovers unexpected or unwelcome issues.
- The complexity of the issues at a treatment plant was not found to be a function of the size of the facility. That is, the CPEs at some of the smaller facilities were found to be as technically challenging as those at larger facilities.

  It was evident that some of the smaller municipalities within the watershed had limited resources and expertise for managing and operating wastewater treatment plants. A number of the watershed communities will benefit from a sustainable optimization program which can provide some on-going technical support. The extent of such technical support and how to fund it will be a key challenge for future development of the Grand River optimization program.

- Three of the facilities which were evaluated were judged to benefit from follow-up technical support to resolve the factors identified. Technical support is now being provided at two of the three facilities.
- One component of a CPE is the process loading evaluation which calculates a number of metrics related to plant loading and compares the results to typical values. As a result of collecting these metrics as part of annual voluntary report in the watershed, the typical values (Table 3) for watershed plants can be used in the CPEs.

Table 3: Summary of 2012-2015 Metrics for Plant Loading (after Hagan and Anderson, 2016)

Metric*	**2012**	**2013**	**2014**	**2015**
Per capita flow (L/person.d)	310	351	344	294
Flows: Peak day: annual average	2.25	2.53	2.44	2.31
Per capita $TBOD_5$** Loading (g/person.d)	63	72	74	77
Per capita TSS Loading (g/person.d)	76	84	93	73
Per capita TKN Loading (g/person.d)	14	14	14	13
Per capita TP Loading (g/person.d)	1.8	1.9	2.0	1.8
Raw: TSS:$TBOD_5$ ratio	1.11	1.17	1.12	1.01
Raw:TKN: $TBOD_5$ ratio	0.22	0.20	0.18	0.17

* Median values for approximately 30 WWTPs reported in the Grand River watershed

** Most WWTPs in the Grand River measure $cBOD_5$, not $TBOD_5$; $TBOD_5$ values were calculated based on 1.2 x $cBOD_5$ concentration

In addition to the metrics for process loading evaluation, it would be worthwhile to continue to collect and collate the results from the application of CPE tools such as sludge accountability, and a plant's Performance Potential Graph (PPG).

- Applying the CPE protocol to lagoons was successful. In place of sludge accountability, the evaluation team developed a water balance to relate changes in volume to the flows into and out of a seasonal discharge lagoon. Information on conducting lagoon evaluations should be incorporated into existing guidance on the CPE protocol.

- The three lagoons which were evaluated had effluent compliance limits for ammonia. However, the evaluation teams could not identify design criteria which would enable ammonia removal to be rated as a unit process on a lagoon Performance Potential Graph. Further work in this regard is warranted.

Acknowledgements

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References

Hagan, Kelly, and Mark Anderson, “2015 Watershed Overview of Wastewater Treatment Plant Performance”, Grand River Conservation Authority, 2016.

MOEE, Assessment of the Comprehensive Performance Evaluation Technique for Ontario Sewage Treatment Plants, Queen's Printer for Ontario, ISBN 0-7778-1293-2, 1994.

MOEE and WTC, **Assessment of the Comprehensive Technical Assistance Techniques for Ontario Sewage Treatment Plants**, report prepared for Ontario Ministry of Environment and Energy, Environment Canada and the Municipal Engineers Association, Queen’s Printer for Ontario, ISBN 0-7778-3833-8., 1995.

Wastewater Technology Centre and Process Applications Inc., “The Ontario Composite Correction Program Manual for Optimization of Sewage Treatment Plants” prepare for Ontario Ministry of Environment and Energy, Environment Canada, and The Municipal Engineers Association, Oct. 1996.

US EPA, **Handbook: Retrofitting POTWs**, Center for Environmental Research Information, EPA/625/6-89/020, July 1989.

Attachment #1:

CPE Equipment Checklist

Item	Rationale
Overhead project	To facilitate joint team review of performance graphs and PPG
Files	Excel files for data, PPG, and O2 Availability calculations
Camera	Photos of plant equipment, special study, team activities, and flip chart notes (backup)
Flip Chart stand & paper	For joint team calculations for load evaluation, process evaluations, sludge accountability, PPG calculations & special study calculations
Extension cord (in reel)	For laptop computers & overhead projector
Calculator (one per team member)	For CPE calculations & data summaries;
Binder with tabs & forms: (i.e. sign-up sheets, data collection forms etc.	CPE binder to collate team notes and other documents (such as plant CofA) obtained during CPE
Tape measure	For checking unit process dimensions (if necessary)
Office equipment: - Hole punch - Masking tape - Scissors - Flash drive	For collating team notes in CPE binder & backup flash drive.
Reference material: - Cheat Sheets - Ontario CPE Manual - EPA Phosphorous Manual - Metcalf & Eddy	 - To facilitate CPE calculations - Reference for CPE - Reference for coagulant addition - Reference for process evaluation & PPG calculations

Attachment #2:

List of CPE Reports for Grand River CPEs

Comprehensive Process Optimization (CPO) Inc. and Grand River Conservation Authority, “Results of the Comprehensive Performance Evaluation of the Paris Water Pollution Control Plant”, December 2012.

Grand River Conservation Authority and Comprehensive Process Optimization Inc., “Results of the Comprehensive Performance Evaluation of the Galt Wastewater Treatment Plant”, January 2013.

Grand River Conservation Authority and Comprehensive Process Optimization Inc., “Results of the Comprehensive Performance Evaluation of the Elmira Wastewater Treatment Plant”, March 2014.

Grand River Conservation Authority, “Results of the Comprehensive Evaluation of the Fergus Wastewater Treatment Plant”, March 2014.

Grand River Conservation Authority, “Results of the Comprehensive Evaluation of the Arthur Wastewater Treatment Plant”, December 2014.

Grand River Conservation Authority, Ontario Ministry of the Environment and Climate Change and Comprehensive Process Optimization Inc., “Results of the Comprehensive Evaluation of the Mapleton Water Pollution Control Plant”, March 2015.

Grand River Conservation Authority, “Results of the Comprehensive Evaluation of the Plattsville Wastewater Treatment Plant”, June 2015.

Grand River Conservation Authority and Ministry of the Environment and Climate Change, “Results of the Comprehensive Evaluation of the Dundalk Wastewater Treatment Plant”, January 2016.

Attachment #3: Water Inspector CPE Feedback

Revision date: June 15, 2015

Inspectors:

Manpreet Dhesi

Carola Serwotka

Martha Weber

Questions to Water Inspectors for feedback from CPE experiences:

- How did participating in the CPEs compare to other training you've received? Did you feel the effort was worth what you got out of it? (Recall that these CPEs were used as training in addition to getting the evaluation done. The training objective was to teach the CPE process, but do you have any high-level comments comparing it to other training approaches you've experienced?)
- What did you learn from the CPE that you found noteworthy? Comments could be about the facility, the CPE process, wastewater treatment, or anything else.
- From an inspection perspective, what CPE information would help you determine how well a facility is doing/performing?
- Is there any other information that you think should be included in a CPE to help determine how well a facility is doing/performing?
- If opportunities come up in the future for Water Inspectors to participate in CPEs, is there any advice you have to improve the experience?

Inspector A:

Participation in CPE compared to other trainings we received.

- Since I was new to the waste water inspections and had not conducted any inspection on waste water plant when I participated in CPE, it was awesome training opportunity for me.
- I would not say that the participation in CPE should replace any other form of internal training, we have been provided till now, but should be in addition to the other trainings provided. The other internal trainings we have got till now cover the topics such as basic science behind waste water treatment plant operation, the waste water treatment techniques and the inspection techniques; these trainings prepared us for the baseline work we are required to do during the inspection. Having already taken those internal trainings helped me to understand the process of CPE effectively.

- In short, I would say that the participation in CPE enhanced my overall knowledge related to the waste water plants; it taught me to trouble shoot the cause of any exceedance the waste water plant may be having and enhanced my skills in the preparation or recommendation of the abatement techniques to bring the facility into compliance.

A few of many noteworthy things I learnt during CPE and how they may help us during our inspections-

A) How having a knowledge of an average per capita flow, influent BOD, COD, TSS and TP for the waste water plants in the Region or watershed can provide a quick idea of the challenges the particular plant may be facing such as industrial waste influence on loadings (variability in chemical composition from industrial waste), infiltration problems (waste water too diluted) etc. This may answer some of the problems we see for the plant during the inspection such as the effluent limit exceedance or exceedance in rated capacity due to infiltration, may help us in abatement steps such as recommending PPCP/characterization study.
B) How a quick check of sludge accountability test indicates overall healthy process of waste water treatment, in any plant.
C) How each treatment unit can be separated and checked for its efficiency.
D) During CPE, I learnt the average expected quality of waste water after each treatment unit. This can help an inspector to estimate the quality of waste water bypassing any unit during the bypass events reported to us.
E) During CPE, I learnt to think beyond the idea of a process upset, if I see any effluent exceedance. The cause of any effluent exceedance could be a matter of level of staffing; due to low staffing, operator not being able to perform enough process control testing. E.g. high effluent BOD/COD because operator not being able to check sludge blanket as often as required. Definitely will help me in preparing/recommending abatement plan for the facilities.
F) Getting an idea from the CPE, how the process control is crucial to maximize outcome of each unit, along with looking at the effluent quality during my inspection, I paid attention to the data collected by the operators during day to day process control such as measurement of MLSS, MLVS, dissolved oxygen, WAS, RAS and supernatant returning back to the head works. I felt not many operators perform/record all the checks often enough. Some older operators having great long experience can run the plant with the visual check of the plants and do not believe in recording on daily/weekly basis, so lack of historical data may hinder performance of newer/ future operators. Again, CPE experience helped me to encourage the operators in my reports to perform and record process control data to enhance plant's performance.

Suggestions, which I think may make CPE learning experience more enjoyable

A) It would be a help if the participating inspectors will know that their lack of knowledge in any aspect would not affect the CPE results.
B) If inspectors will be well informed regarding the type of treatment provided at the plant selected for CPE beforehand, so that they can familiarize themselves with the techniques being used, such as for me I was learning about Plant XXX waste water plant's unique biological nutrient removal process along with the CPE techniques used on it.
C) Also, not all inspectors have engineering background or will like participating in calculations required in the CPE. Personally having engineering background, I enjoyed these calculations, but other may not. It will be great if steps can be taken to develop programs to use inputs in the formulas and receive required outputs. Or, team can be divided to get involved in the work, they enjoy more.
D) Also, the experience of participation in CPE with a team of well experienced people performing different roles in waste water industry in various capacities, can be enhanced by providing some extra time for story telling of problems they encountered and how they trouble shooted it.

At last, I would say, having knowledge of CPE, will equip the inspectors to acknowledge if any of their wastewater plants will benefit from CPE and can recommend the names of those plants to the CPE team.

Also, during my inspections of the wastewater plants, I felt that presently the wastewater plant operators are overwhelmed with the new/detailed protocol of the inspections and are facing noncompliance in the areas where noncompliance were not identified ever earlier due to short inspection protocol; thus recommending them best management practices through our inspections based on our increased knowledge from CPE, may not be received positively.

But, after a couple of cycles of inspections, and better inspector/client relationship, it will be easier for the inspectors to start including best management practices based on CPE knowledge in their inspections.

Inspector B:

For me, the greatest benefit from participating in the CPEs at Plants XXX and YYY was an increased knowledge of wastewater plants and their operation in general, as this was quite new to me. It was VERY helpful to be at the XXX plant right before I was inspecting that facility, as I really felt like I knew the system well before even starting the inspection there. I also appreciated learning about the CCP and found some aspects very interesting, such as comparing the results of certain ratios to "typical" and the potential reason for any variation from the typical value. I enjoyed the portion with the plant staff interviews, with respect to seeing which common issues were identified and where there might be

conflicting perspectives. Although it is valuable to understand some of the background to the calculations used in the assessment, at times I found myself wishing we could plug the numbers into the spreadsheet to automatically calculate, and spend more time on discussing what the results mean and how they can be impacted. Plants XXX and YYY were great facility-wise for having a space to sit and going through the process, however I believe this was an issue previously (Plant ZZZ!) that really impacted the ability to concentrate on and enjoy the time there.

From an inspection viewpoint, any information that would help to assess compliance with ECA requirements would be useful information (i.e. flow data, sampling results, etc.) Inspectors are currently using a review period up to a maximum of 4 years, so the 12 month review period of the CPE would only show a portion of the data needed for an inspection. The PPG is helpful to quickly identify potential areas where the plant is possibly hindered from performing more efficiently.

For future CPEs to benefit Water Inspectors, I suppose I would stress the importance of a file review prior to showing up at the plant. There is so much information available here (i.e. previous inspection reports, incidents, some EA info), and if we're able to take the time to access it, the background knowledge would go a long way. Also, the time commitment is significant, with a week at the site, a ½ day for a dry run, and a ½ day for an exit briefing. Perhaps plugging in some numbers into the spreadsheet rather than starting them all from scratch would save some time to make a difference on this front?

Inspector C:

I enjoyed the training. I think it helped me understand the plant better and refreshed knowledge I used to use a long time ago during my consulting years. The more we know about the plant design and processes, the better able we are at performing our inspections, understanding incidents, writing up inspection reports and the challenges operators face day to day.

I wish all inspectors could have this training. I don't know that it will help all inspectors, because some inspectors only want training that directly impacts the inspection program (i.e. Are they meeting the limits or not and what are they doing to fix the non-compliance). This is more like advanced training for people who have already done an inspection or two and want to know more on how plants are designed and what limitations of the plant can do to its operations.

Wastewater treatment is complicated because, the plants cannot always control what enters a plant, and have to change operations to meet influent changes. Some plants are designed better to buffer some of the influent changes, others not so much. All plants are different in their own way, which is

what is challenging for operators and inspectors. Are they trying their best or are they defeated due to their design?

I think this is a good opportunity for municipalities and the ministry (and conservation authorities) to work together, share/update information and work towards a common goal of protecting the environment.

Follow-up to above…

FYI…The comment about the inspectors and training…I have been in this program for almost 14 years and taken a lot of training. I also have been involved in many of the training programs and this is the comment that comes up again and again (when the training survey comes out). I myself, like to take training to expand my knowledge, even if it goes beyond the inspection program requirements while others feel the opposite. I have found these water inspectors can be very particular.

Sorry, I was not that specific on what parts of the CPE I liked best (I liked all of it). I liked to be able to help generate a process drawing (which did not exist before) for the plant.

Also, at this point, I have done about 6 wastewater inspections, only 2 of those systems had a CPE done (Plants AAA and BBB).

I did not see the Plant AAA CPE report, because I did not know about it while doing the inspection in June, 2013, I only found out later that the reason for the re-rating was because of the CPE study. So, I did mention in the inspection report that an optimization program for possible re-rating was in progress under the capacity assessment inspection question. For Plant BBB, I got the CPE report from Mark Anderson, and since the CPE report did not have any major changes, it did not impact the performance of the plant or the capacity assessment of the plant which was done in the inspection report, so I did not mention any recommendations from the CPE in the inspection report.