Walkerton Clean Water Centre

Distance Education Enterprise

2008 Business Plan Implementation

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The Walkerton Clean Water Centre, an Ontario crown agency, was established in October 2004 to address critical gaps identified by the O'Connor Commission as a result of the tragedy in the Town of Walkerton —its main objectives to:

- Ensure that training courses are accessible and tailored to meet the needs of drinking water operators in small and remote communities
- Ensure the availability of courses on the subjects required to train drinking water operators
- Offer training facilities and curriculum to First Nations water system operators.

As such the Centre is becoming a premiere training facilitator for Ontario's drinking water system operators. This business case proposes a distance education enterprise model that would facilitate proper training and sustained competency for operators, not only in the more densely populated areas of southern Ontario, but also in more remote locations in northern Ontario.

Issues to be reviewed include provincial agency relationships, operator training requirements, the reality of distance education within the drinking water industry, and culminating in the implementation of a proposed distance education enterprise within the Walkerton Clean Water Centre.

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Business Plan Implementation

This business plan proposes a distance education enterprise within the Walkerton Clean Water Centre (WCWC), that would facilitate proper training and sustained competency for operators, not only in the more densely populated areas of southern Ontario, but also in more remote locations in northern Ontario. A distance education enterprise manager would work to develop the necessary content for the distance education programming by building links to distance education specialists, such as website designers and application specialists. The distance education enterprise would also act as an incubator for trainers and course content specialists. It would provide an environment within which experienced and knowledgeable operations staff would work with distance education specialists to develop distance education applications. This aligns with the mission and mandate of the WCWC, to deliver and coordinate training for drinking water operators across Ontario.

A business plan has been developed that relies upon a mix of public and private sector funding as initial investment and over a five year period building to become a self-sustaining entity, relying upon student fees and courseware sales. From a marketing and sales perspective, this enterprise can build on the existing goodwill the WCWC has developed in the drinking water industry and the peer linkages with other professionals and associations.

The Need - Aging Workforce, Operator Certification and Educational Requirements

Ontario Regulation (O. Reg.) 128/04 under this Act requires that all persons operating drinking water systems have the necessary skills and knowledge to treat or supply safe drinking water to the public consumer. There are two general areas of focus—(1) training new operators who are entering the industry and (2) sustaining ongoing education of existing operators in order to maintain acceptable level of competency. It requires mandatory licensing of water works operators, with auditable requirements for operator training that include certified training programs with defined learning objectives and measurable results.

Based on inquiries to the Ministry of Environment (MOE), there are approximately 9000 drinking water operators with some License Class which includes operator-in-training (OIT) licenses, based on recent listing from the Ontario Environment Training Consortium (February 2008). Based on a recent literature review, over the next ten years approximately 30% to 40% of the existing workforce, within the municipal and utility sector will be eligible for retirement and as such there will be need to replacing the aging workforce, which equates to approximately 3200 operators.

These numbers do not include operators required for First Nation Communities (governed by federal legislation), or smaller non-municipal systems such as rural community centres on a well system, where only 'trained persons' are required. This also may not include operators that are required to operate and maintain wastewater systems, such as sanitary sewers, pumping stations, and primary, secondary and tertiary wastewater treatment plants.

For a new person in the field—an operator-in-training (OIT) — completion of a formal training course is required, along with on-the-job practical training. Having attained the appropriate class certification level for the license of facility which they are operating, the operator must maintain an acceptable level of knowledge and competency. This level is based on the operator's certification level, with an increasing number of training hours required for more complex facilities.

An operator must renew their license every three years, and demonstrate that they have successfully achieved an adequate level of approved training. Training requirements involve two types of training defined under the regulation—'on-the-job' training and 'director approved' continuing education. 'On-the-job' practical training must have documented learning objectives, be provided by a trainer with expertise in the subject matter, and be directly related to the duties typically performed by an operator; examples include on-site backhoe operations or routine pump maintenance.

The question that is important to address is whether the current approach to providing training and education is sustainable. Will the current approach to providing education in the conventional manner continue to be able to meet the future demand? It is proposed that a distance education enterprise be created within WCWC to drive development of distance education programming and act as an incubator for new distributed learning opportunities within Ontario.

WCWC Distance Education Enterprise – Business Process Implementation

WCWC is an Ontario crown agency and was established in October 2004 to address critical gaps identified by the O'Connor Commission (2002)—its main purpose is to lead the implementation of three specific recommendations:

- Ensure that training courses are accessible and tailored to meet the needs of operators in small and remote communities
- Ensure the availability of courses on the subjects required to train operators
- Offer training facilities and curriculum to First Nations water system operators

In addition to the training oriented objectives, WCWC focuses much effort on research and technology transfer, dealing with new drinking water technologies, including optimization approaches.

With the subsequent regulatory requirements for additional training, there has been a noticeable increase in trainers providing services. Additionally with the aging workforce in the municipal and utility sector, there are many experienced operators retiring and getting involved in the training, by sharing their wealth of experience and technical know-how. Though ready to provide this knowledge, few have direct adult education certification and even fewer have an understanding of distance education approaches that could be used to reach a broader audience, in a more economical fashion.

The enterprise would develop the necessary content for the distance education programming and build links to distance education specialists, such as website designers and application specialists. These concepts were identified in the Strategic Plan SWOT analysis are included and summarized in Table 1. It would act as a distance education incubator for drinking water trainers and course content specialists, providing an environment within which experienced and knowledgeable operations staff would develop distance education applications with the help of others.

Though WCWC will enable distance education applications and modes in order to distribute this form of education to the drinking water and wastewater utility sectors across Ontario, it will also work with others beyond Ontario's borders so as to optimize the development of online material or learning objects.

It is not likely that distance education will dominate the drinking water operator's educational landscape, as there will always be a need for hands-on training. Complimenting existing programming is very important and building linkages is critical to the ultimate success of the WCWC Distance Education Enterprise.

This enterprise model will review what other jurisdictions with similar challenges are doing; examples might include online drinking water training courses developed by the American Water Works Association (2005). The courses are computer-based, delivered over the internet, and include lessons, readings, video clips, animated illustrations, student exercises, and online exams. Due to the close affiliation of the WCWC with the American Water Works Association, the sharing of course content would be a very real opportunity and would help move the Distance Education Enterprise more quickly to implementation. Scanning other provincial jurisdictions may find other developed course content and though not specific to the Ontario's regulatory environment, basic learning objects would be shared. Development of online course materials can be constructed as learning objects, site specific learning objects could be swapped out with best practices remaining the same.

Table 1 - Multi-Year Strategic Goals

SWOT Issue/Risk	Strategic Goal	Resource Estimates
• Very few trainers have formal adult education certification and even fewer still have a distance education bias.	Align with industry organizations that have influence to change the perception with trainers.	Implement a red ribbon panel of distance education experts to raise the profile of distance education in remote areas and work with the AWWA, OWWA and WEAO to promote this.
• Only 16% of training organizations offer any form of distance education training, including correspondence, online training modules and only 8% offer asynchronous distance education.	Assess the training and education needs of drinking water operators with a specific bias towards distance education. Look for opportunities to expand this mode within the province. Make the WCWC a distance education specialist… or a change agent.	Complete research on the available training, what is needed and how it could be driven by distance education. Hire distance education specialists to assist on completing the needs assessment.
• Both large and small communities across Ontario are facing increased operator training costs, and this pressure will continue to grow.	Develop core course material around reaching out to remote communities and help support the necessary infrastructure to overcome technological barriers.	Requires a manager knowledgeable in distance education to provide necessary support for distance education applications. Utilize contracted consultants to design course material.
• Overcome perception that distance education cannot provide a collaborative learning environment like face to face education does.	Demonstrate to industry training consultants the potential of distance education modes and pedagogy.	Requires a manager knowledgeable in distance education to provide necessary support for distance education applications. Two additional staff would work with necessary contracted personnel with specific training in the design, instruction, and support of distance education programs.
• Significant bias in the drinking water industry towards face-to-face training.	Encourage training companies to develop course material that aligns with the WCWC's distance education objective. These courses would be deemed Director Approved in a similar fashion as face to face course material.	Work with OETC to evaluate distance education course to ensure that courses are Director Approved.

This online training would incorporate threaded discussion groups for students to discuss coursework with their peers and a messaging system for asking course-related questions of an instructor or industry expert. The readings, student exercises, and video clips are contained on a companion CD that integrates with the online materials. A significant portion of OIT training and operator examinations would be

delivered through the use of the internet, or asynchronous conferences. These materials can come in the form of video-conferencing, live webcasts, computer-based learning (CD-ROM, internet and system simulation).

Currently, the Ontario Water Works Association (OWWA) and Water Environment Association of Ontario (WEAO), along with several other volunteer industry associations, are involved with development and review of Ontario water system regulations, guidelines, and procedures. This peer reviewer approach has been effective to date at ensuring that best practices drawn from other jurisdictions are successfully implemented in Ontario. This linkage will be capitalized upon, during the review and evaluation of existing course content, development of examinations, and addition of future content.

Finally, the business plan calls for the involvement of drinking water industry and wastewater industry stakeholders to be involved in the course development and the marketing of distance education enterprise products and services.

Business Organization and Governance Model

WCWC has a Board of Directors, whose members are appointed by the Province and hold office for a term of up to two years with eligibility for reappointment. WCWC is a crown corporation and is accountable to the Provincial Legislature through the Minister of the Environment. The Board of Directors is responsible for the overall supervision of the affairs of the WCWC and are involved with the development of the rolling three-year business planning process.

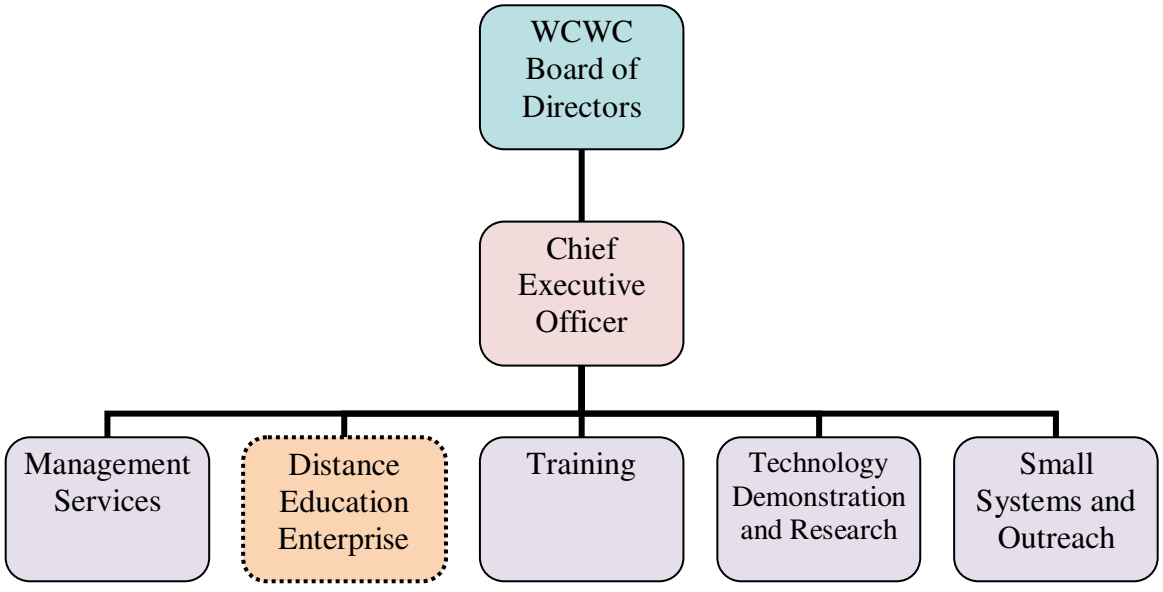

Figure 3 - Walkerton Clean Water Centre Business Structure

The Distance Education Enterprise will form a new department under the existing organizational structure and will compliment the many hands-on programming that the WCWC already provided s to both large and small municipalities. The proposed Enterprise is modeled after an approach suggested by Bates (2005). The Enterprise is made up of subject matter experts, "people who know things"; instructional design specialists, "people who know how to teach things", educational technology specialists, "people who know how to make it look interesting" and last but not least; technology infrastructure support specialists, "people who know how to make things work".

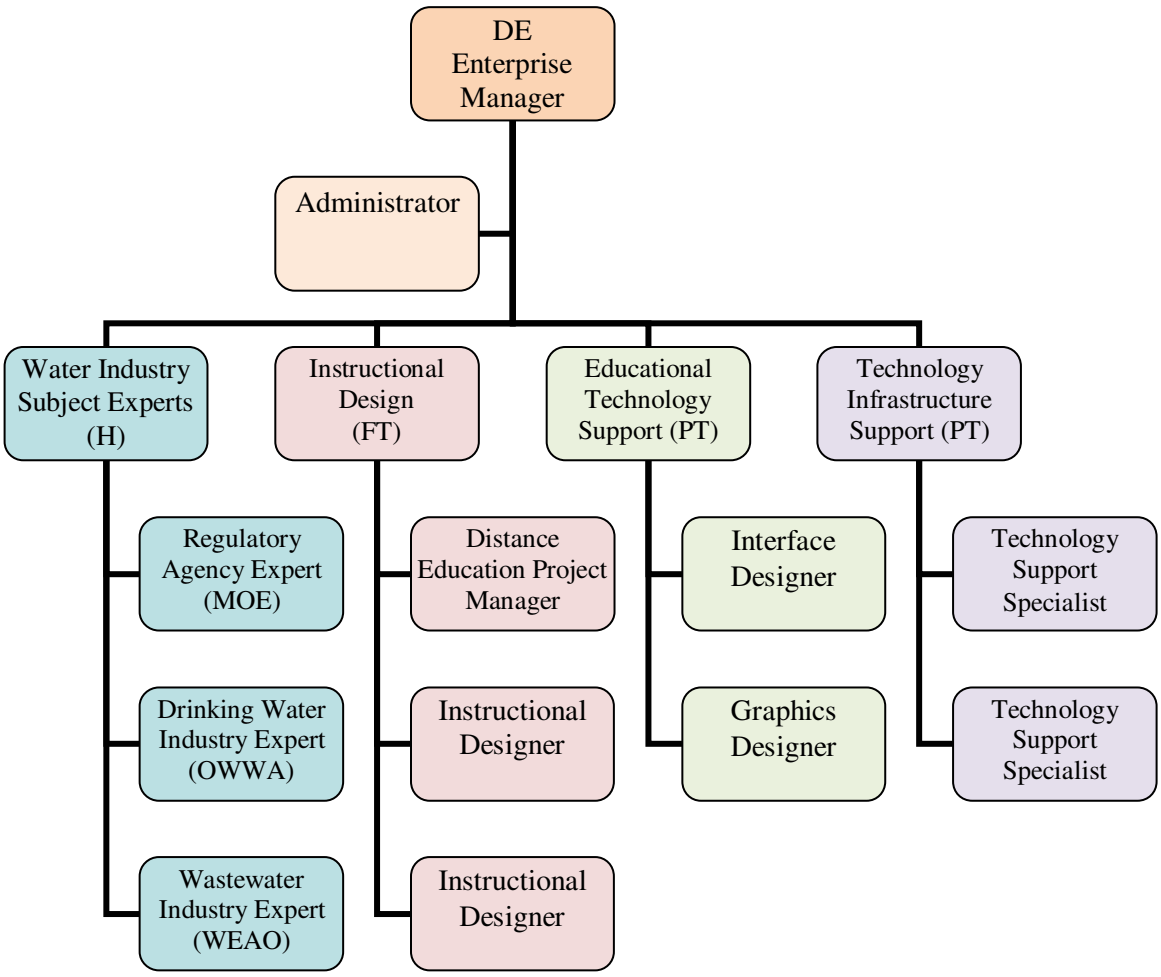

Figure 4 -Distance Education Enterprise Organizational Chart

The enterprise will be led by a full-time manager who reports to the CEO and is accountable for the day to day operation, business unit leadership, staffing and budgetary responsibilities.

The composition of staff will include full-time employees (FT), part-time contracted staff (PT), and industry experts that will be compensated for their efforts by honorarium (H). This model would provide a reasonable amount of flexibility, dependent upon the growth of the enterprise.

Distance Education Course Offering

The main focus of the WCWC Distance Education Enterprise will be on re-inventing the existing programming and re-tooling it. Currently the WCWC offers face to face learning related to the following:

- Entry-Level Drinking Water Operator Course (OIT)
  - An operator candidate must successfully complete the Operator-in-Training (OIT) examination, after which they can take an OIT course developed by WCWC.
  - This two week course is divided in two parts— a self-study component, estimated to take 40 hours to complete, followed by five days of classroom training.
  - The prospective OIT completes the initial self-study component at home; following this they register for, and write (in a classroom setting), the test related to the self-study. Once the OIT has passed the self-study test, they register for a classroom training session that also ends with a test.
  - ***This course has a very good potential for distance education learning as it could be the beginning of developing a community of learners focusing specifically on the water and wastewater industries.***
  - ***The intent is to support the existing function of the WCWC Training Department, be augmenting the existing psychomotor skills portion still required for this type of occupation (i.e. face to face educational experience).***
- Preventing Water Borne Illnesses
  - The course "Preventing Water Borne Illnesses" is required to be taken by the operator every three years as a condition of licensing; and deals with the importance of applying regulations, standards, and policies dealing with water quality, and discusses the emerging issues facing the water industry.
  - ***This course has a very good potential to be adapted to a distributed learning model, where cognitive skills beginning developed and where attitudinal or values are being presented and shaped.***
- Other 'Director approved' continuing education programs

- ‘Director approved’ continuing education programs are structured courses that involve two-way communication between the learner and the trainer. These types of courses have documented learning objectives and specified evaluation techniques.
- The course material is related to quality management systems, assessing pathogen risk, and optimizing water treatment processes, chemical feed dosing and proper traffic control techniques.
- ***Some of these courses may have a good potential to be adapted to a distributed learning model, where cognitive skills beginning developed and where attitudinal or values are being presented and shaped.***
- ***The intent is to support the existing function of the WCWC Training Department, be augmenting the existing psychomotor skills portion*** *still required for this type of occupation (i.e. face to face educational experience).*

- Partnership with the American Water Works Association (AWWA) to “Canadianize” their existing on-line learning programs.
  - The partnership with AWWA would be a good first step towards providing on-line versions of products that are closely aligned with the Ontario’s drinking water industry.
  - These on-line products would be converted to metric system, adjusted to reflect current Ontario regulations, generalized for the Canadian regulatory framework.
  - An example would be AWWA’s Water 101which introduces students to the principles of water treatment and distribution, plant operations and management and provides awareness-level information on drinking water regulations and security.
  - ***These courses have a good potential to be adapted to a distributed learning model, where cognitive skills beginning developed and where attitudinal or values are being presented and shaped.***
  - ***These course learning objects do need to be integrated into a more pedagogically sound educational experience for the learner.***

Projected Revenue Streams

There are four projected revenue streams for the business plan, course sales, provincial funding, private sector funding and course sales. As detailed in Table 2, the intent would be to price these courses at about what they are being offered, currently. Though a more detailed cost analysis needs to be completed in order to set the final price point at which these courses will come into the market. The selling feature to municipalities and utilities would the reduction in overall costs to train and certify operators, as travel costs, losses in unproductive time and paying overtime costs to cover shifts. Further, in the case of small utilities it may be impossible for the operator to away from the local municipality for an extended period of time.

For the purposes of the cost analysis, a revenue of $600 annually per student was included with a total of 3000 students taking courses from WCWC over the 5 years, for a projected revenue of $1.5M.

Table 2 - Course Offerings and Fees

Course	CEU	Course Cost	Notes
Entry-Level Drinking Water Operator Course (OIT)	7.0	$1190	Not all course cost are related to DE, as 50% of the CEU's will be face to face learning.
Preventing Water Borne Illnesses	0.7	$500	
'Director approved' continuing education programs	0.7	$600	Various topics to be considered as part of the development of the DE Enterprise
American Water Works Association (AWWA) "Canadianized" on-line earning programs	0.2	$200	The learning objects would be updated and re-tooled.

A key revenue source for the first three years of the business plan is the Ministry of Environment (MOE) which totals $350,000. The results of the business plan would be presented to the MOE Education and Outreach Section for their consideration and approval. It should be noted that the initial start-up of the WCWC was funded by the Province in 2004. Partnership funding from the Water Environment Association of Ontario (WEAO) and the Ontario Waterworks Association (OWWA) would total $100,000 over the life of the business plan. In addition it is expected that a modest revenue opportunity of $25,000 could be achieved by re-selling portions of the course material to other provincial or federal jurisdictions. This last item was a conservative estimate modest and low expectations were set for the potential of this revenue stream. As the business plan matures, the opportunity may be better developed and provide higher returns then originally expected.

Cost Analysis

In the first and second year of the business plan, significant effort is placed on developing the programming, with the following years placing more emphasis on sales, promotion, marketing, building industry interest and engagement with respect to selling the programming. Table 3 provides an overview of the five (5) year plan based on 3000 students participating in the courses, while Table 4 provides a detailed analysis.

Table 3 - Annual Cash Flow Summary (Year 1 to 5)

Scenario - 3000 Students	Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Costs	$ 107,160	$ 242,290	$ 255,940	$ 103,400	$ 120,300
Variable Costs	$ -	$ 217,500	$ 217,500	$ 217,500	$ 217,500
Total Costs	$ 107,160	$ 459,790	$ 473,440	$ 320,900	$ 337,800
Revenue	$ 170,000	$ 495,000	$ 495,000	$ 395,000	$ 420,000
Surplus (deficit)	*$ 62,840*	*$ 35,210*	*$ 21,560*	*$ 74,100*	*$ 82,200*

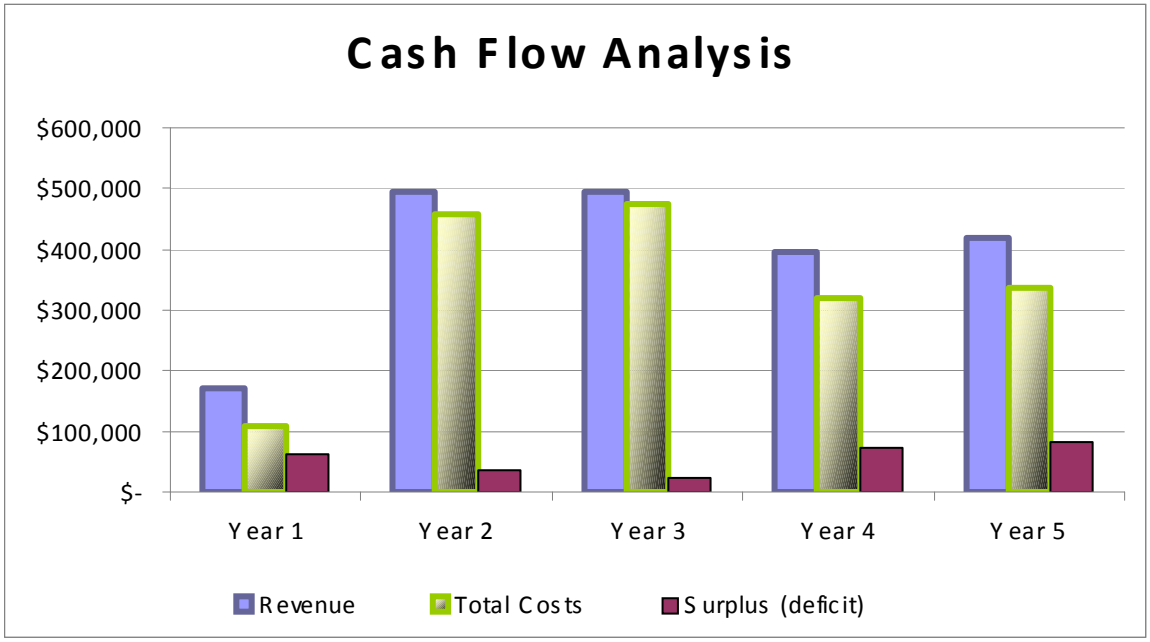

Figure 5 - Annual Cash Flow Summary

Table 4 - Detailed Annual Cash Flow Analysis

Scenario - 3000 Students	Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Costs					
Red Ribbon Panel					
Water Industry Stakeholders (3)	$ 6,000	$ -	$ -	$ -	$ -
DE Subject Matter Experts (2)	$ 3,200	$ -	$ -	$ -	$ -
Travel Expenses	$ 10,000	$ -	$ -	$ -	$ -
Sub-total 1	*$ 19,200*	*$ -*	*$ -*	*$ -*	*$ -*
R&D of D.E. Applications					
Water Industry Stakeholders (3)	$ 3,000	$ -	$ -	$ -	$ 4,000
DE Subject Matter Experts (2)	$ 16,000	$ -	$ -	$ -	$ 4,000
Travel Expenses	$ 20,000	$ -	$ -	$ -	$ 5,000
Sub-total 2	*$ 39,000*	*$ -*	*$ -*	*$ -*	*$ 13,000*
Develop D.E. Core Course Material					
Water Industry Stakeholders (3)	$ 1,500	$ 8,000	$ 8,000	$ -	$ -
DE Subject Matter Experts (2)	$ 32,000	$ 96,000	$ 96,000	$ -	$ -
Internet Specialist	$ 3,000	$ 7,200	$ 7,200	$ -	$ -
Graphics and Interface Design	$ 1,500	$ 3,600	$ 3,600	$ -	$ -
Copyright clearance	$ 1,000	$ 1,000	$ 1,000	$ -	$ -
Sub-total 3	*$ 39,000*	*$ 115,800*	*$ 115,800*	*$ -*	*$ -*
Demo & Market D.E. Courses					
Mailing, Internet Advertisements	$ -	$ 5,000	$ 8,000	$ 8,000	$ 8,000
Conferences and Workshops	$ -	$ 10,000	$ 15,000	$ 15,000	$ 15,000
Travel Expenses	$ -	$ 7,500	$ 10,000	$ 10,000	$ 10,000
Sub-total 4	*$ -*	*$ 22,500*	*$ 33,000*	*$ 33,000*	*$ 33,000*
Student Administration & Support					
Internet Specialist	$ -	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Technical Support	$ -	$ 15,000	$ 15,000	$ 15,000	$ 15,000
Sub-total 5	*$ -*	*$ 35,000*	*$ 35,000*	*$ 35,000*	*$ 35,000*
Direct Costs - 30% Overhead	$ 29,160	$ 51,990	$ 55,140	$ 20,400	$ 24,300
Total Direct Costs	*$ 107,160*	*$ 225,290*	*$ 238,940*	*$ 88,400*	*$ 105,300*
Course Administration and Support					
AWWA On-line Library Annual Fee	$ -	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Server costs	$ -	$ 5,000	$ 5,000	$ 5,000	$ 5,000
Course Approvals	$ -	$ 2,000	$ 2,000	$ -	$ -
	$ -	*$ 17,000*	*$ 17,000*	*$ 15,000*	*$ 15,000*
Total Fixed Costs	***$ 107,160***	***$ 242,290***	***$ 255,940***	***$ 103,400***	***$ 120,300***

Variable Costs					
On-Line Tutoring	$ -	$ 150,000	$ 150,000	$ 150,000	$ 150,000
Student Administration	$ -	$ 30,000	$ 30,000	$ 30,000	$ 30,000
Printed material including postage	$ -	$ 37,500	$ 37,500	$ 37,500	$ 37,500
Total Variable Costs	***$ -***	***$ 217,500***	***$ 217,500***	***$ 217,500***	***$ 217,500***
Total Costs (fixed and variable)	***$ 107,160***	***$ 459,790***	***$ 473,440***	***$ 320,900***	***$ 337,800***
Revenues					
Registered Students	$ -	$ 375,000	$ 375,000	$ 375,000	$ 375,000
Courseware sales to other Provinces	$ -	$ -	$ -	$ -	$ 25,000
Public Funding (Ministry of Environment)	$ 150,000	$ 100,000	$ 100,000	$ -	$ -
Private Sector Funding	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Total Revenues	***$ 170,000***	***$ 495,000***	***$ 495,000***	***$ 395,000***	***$ 420,000***
Annual Surplus (Deficit)	$ 62,840	$ 35,210	$ 21,560	$ 74,100	$ 82,200

Break-Even Analysis

Several scenarios were calculated based on different annual enrollments and the total expected enrollment figure over the five (5) years of the business plan (an assumption was made that the enrollment figures did not vary from one year to another). The results of the break-even analysis is shown in Table 5 and Figure 5 and indicates that a total enrollment of approximately 1700 students during the five (5) year period. The scenario that was selected for the development of the business case is shown in Table cc and is a reasonable and prudent approach. Refer to Appendix 'A' for an overview of the various scenarios that were completed.

Table 5 - Break-Even Analysis Summary

Total Students over 5 years	500	1000	1700	2000	3000
Fixed costs	$ 829,090	$ 829,090	$ 829,090	$ 829,090	$ 829,090
Variable Costs	$ 145,000	$ 290,000	$ 493,000	$ 580,000	$ 870,000
Total Costs	$ 974,090	$ 1,119,090	$ 1,322,090	$ 1,409,090	$ 1,699,090
Revenue	$ 725,000	$ 975,000	$ 1,325,000	$ 1,475,000	$ 1,975,000
Surplus (deficit)	$ (249,090)	$ (144,090)	$ 2,910	$ 65,910	$ 275,910

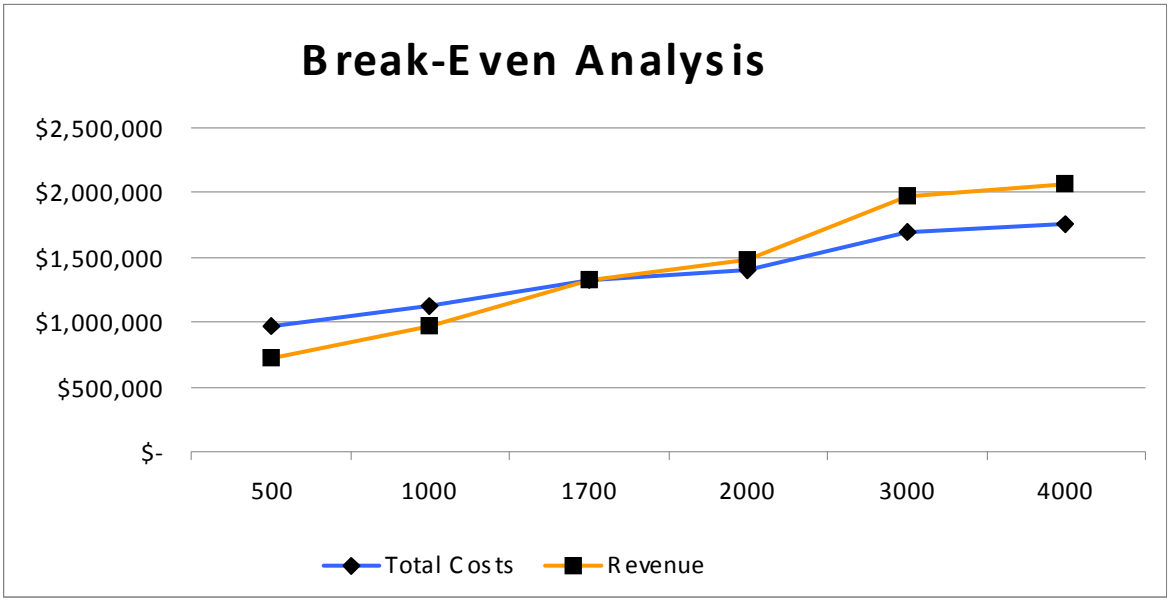

Figure 6- Break-Even Analysis

Concluding Remarks

An opportunity exists to develop a distance education enterprise within the newly emerging WCWC to change the manner in which drinking water operator training is delivered in Ontario. With a focus on developing partnerships and sharing ideas with agencies with previous distance education experience, there is the opportunity to make distance education the norm and not the exception in the drinking water industry.

In conclusion, the WCWC needs to continue as a catalyst for change within the drinking water industry, but with a specific focus on the utilization of distance education as the primary mode for delivery of drinking water education and training within the province of Ontario.

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Appendix 'A' - Cash Flow Analysis Scenarios

(Refer to the attached spreadsheet)