QUALITY INSTALLATION ASSURANCE
A PROGRAM TO IMPROVE THE WORKING LIVES OF PRACTITIONERS, EQUIPMENT VENDORS AND BENEFIT THE SYSTEM END-USERS

Ralph Benson*

ABSTRACT

Quality installation assurance (QIA) programs for implementing decentralized wastewater treatment infrastructure will improve the working lives of the practitioners involved in its design, installation and maintenance.

A program, emphasizing the installer/inspector relationship initially, will include the following elements:

- A Standards of Practice Manual to cover general installation issues
- Installation worksheets and templates, in a convenient format, for installers' as-built documentation and job control
- Product-specific installation guidance and documentation worksheet, in a convenient format, provided by vendors to installers
- A commitment by regulators to base inspections and approvals upon the verification of the general installation worksheets and templates, and the product-specific installation guidance worksheets
- A commitment by vendors for their installers to complete the general and product-specific installation worksheets and templates, to prepare to pass inspections
- Standardized documentation of start-up parameters, if applicable, by a responsible person, designer or installer, to ensure a "clean hand-off" of the system to the entity responsible for its operation and maintenance

This paper includes a Long-Range Strategic Plan to develop a QIA Program.

A QIA Program will serve NOWRA's state affiliates, which would adapt the models, in particular, the general standards of installation practice to adjust for regional climate and soil conditions and available basic materials. A QIA Program will provide affiliates with a unifying concept for serving the current and future membership, growing the association and advancing the onsite industry.

*Ralph Benson is a former NOWRA Director, a former OOWA Director and a retired Sanitarian at Clermont (OH) Public Health.

Forward

This paper presents a working model, a first draft, for a project to develop a Quality Installation Assurance Program within a wastewater association. It is in the format of a long-range strategic plan (LRSP). Many LRSP templates are available and there is nothing magical about the one presented here. It provides structure and organization for the project that, if reasonably well executed, can in this case become the central organizing concept for the activities and mission of a wastewater association.

This model project blends elements of eight source documents into a program designed to have a positive impact on the working lives of association membership and provide a means to increase the membership and the influence of an association.
The eight are:

- The OOWA Policy and Procedures Manual
- The OOWA Standards of Installation Practice Manual
- The OOWA "Draft Training Plan Initiative for Sewage Treatment System Installation Contractors", January 10, 2018, from the strategic planning meetings with John Thomas of WOSSA.
- NOWRA's "U.S. EPA Water Quality Cooperative Agreement Pre-Proposal," titled "Development of a NOWRA "Qualified Practitioner" Program Prototype, 2002.
- The OOWA *I.Q. Installer Program, 2003 – 2008 (*Installation Qualified)
- The NOWRA Strategic Framework for Unsewered Wastewater Infrastructure
- "Seven Results/Outcomes of a Good Installation," General Standards of Installation Practice "in a nut shell." By Author
- Technical Speaking for Engineers, by Randall Reeder, P.E., Member National Speakers Association. This is an excellent review of fundamentals for developing training presentations, although done before the advent of digital technology.

This model applies five of the seven directives found in the Ohio Onsite Wastewater Association (OOWA) Policy and Procedures Manual (PPM). The directives have been modified slightly to more specifically align with the goals of the QIA Program project. Page 17, Bylaws, Article II, (a), (b), (c), (e), (f). (OOWA, 2017)

Italics indicate the additions by the author.

(a) To improve the *working* conditions of the *various practitioners in* the onsite wastewater recycling industry by working toward the establishment of uniform standards for the quality design, installation and servicing of all types of onsite wastewater treatment systems.

(b) To establish throughout Ohio *positive and more productive* relationships among all those *involved and* concerned with the onsite wastewater recycling industry, that will increase *and/or improve the quality and* flow of information, not only among members of the association, but among all organizations, agencies and individuals having complementary objectives and purposes.

(c) To compile and to disseminate statistics, experiences and other information affecting the *various practitioners in the* onsite wastewater recycling industry *for the purpose of improving job satisfaction and efficiency for all and profitability for the private sector.*

(e) To protect the environment of *Ohio* by assisting the development of sound ecological practices in the manufacture, design, siting, installation, maintenance and management of onsite wastewater treatment systems.

(f) To *foster positive relationships of mutual respect and* unite in common organization those professionally engaged in the onsite wastewater recycling industry.

Preface/Introduction

Onsite wastewater treatments system (OWTS) projects involve six roles: site evaluator, plan designer, plan reviewer, installer, inspector, and operation and maintenance service provider. (Sometimes these roles are combined, as regulations permit.) A person can, in many states, begin to practice in any one of those roles without any awareness of the fundamental knowledge required for the other roles. This lack of a shared knowledge base is a deficiency that needs to be acknowledged as a source of problems. Those problems often result in negative outcomes for association members and participants the onsite wastewater industry, at large. These outcomes include unnecessary job stress, lost time and, for practitioners working in the private sector, unnecessary expense and lost opportunity costs. The labor market is tight. A looming shortage, in many areas, of installers entering the onsite industry is serious concern. Many health districts have difficulty finding, training and then retaining qualified staff.

An association's mission is improving the working conditions of practitioners represented by its membership. One important goal of this QIA Program is to provide the necessary shared knowledge, through training and tools, so that the work can flow from practitioner to practitioner as efficiently as possible, and deliver a quality product to the system owner, as a result.

Practitioners who are competent and consistent in their practice are better able to communicate with other practitioners, resulting in improved work flow and the best possible end product for the paying customer. A QIA project will provide the educational resources (utilizing existing and future NOWRA, CIDWT and association-developed resources), the training and the tools to reinforce the best practices critical to successful projects and build the foundation of shared knowledge among practitioners. These are necessary to **promote a culture of respect and trust based upon competence, consistency, and productive communication**.

The project will organize training programs with the goal of providing to all practitioners a shared knowledge and understanding of the fundamental principles which apply to the planning, design, installation and maintenance of onsite wastewater treatment systems.

A short-term goal is a pilot project for the benefit of installers and inspectors. The pilot will provide and field-test construction worksheets (models are developed) and generic templates (to be developed) in convenient formats to installers for job planning and as-built documentation. These tools will provide structure for planning and documenting completed work. The same tools will serve as training aides and guidance for inspectors to verify that the work meets the

generally-accepted best practices for installations, compliance with designs and state rules. * See Endnote regarding worksheets.

A critical emphasis of the pilot project is the working relationship between the installer and the inspector. Fostering relationships of mutual respect is the goal. In the world of work, respect grows out of a recognition and appreciation of knowledge and competence. Inspectors and installers need to be trained on the same basic construction principles and generally-accepted installation practices.

A goal of the project is to provide for sanitarians/inspectors a foundation of shared knowledge of the fundamentals for the construction of permanent wastewater treatment infrastructure. This is important for several reasons. There is high job turnover among inspectors, due to retirements, promotions within agencies or to on-the-job stress. It has become difficult, in many cases, to find people who take to this job and are willing to stick with it. Providing a means to train and retain inspectors and foster less stressful working conditions will be a service to inspectors and to public health districts.

On the private sector side, there are capable contractors who are wary of taking onsite jobs because of stories about "inspection-related difficulties" that they would rather avoid. A critical goal of this project is to make a transition of contractors to onsite installations as worry and problem-free as possible. Training combined with clear guidance documents (see above, tools) and the cooperation of public health jurisdictions are keys to engaging and retaining capable contractors for the onsite business.

An Example of a QIA Program Project Long-Range Strategic Plan

Section 1: Executive Summary
The Executive Summary of an association's LRSP should be completed last. This section merely summarizes each of the other sections of an association's plan. The Executive Summary is important since it will aid key participants and beneficiaries to quickly understand and support an association's plan.

Section 2: Vision and Mission Statement
The vision and mission of a QIA Program are to promote and facilitate conditions that will have positive effects on the working lives of practitioners, specifically by minimizing time-wasting conflicts and errors, minimizing job stress and improving the profitability of those working in the private sector.

Here, again, Ohio will serve as an illustrative example. On Page 26 of the OOWA Policies and Procedures Manual the list of statements under the heading of "Purpose" provides specific and useful guidance for the vision and the mission of a QIA Program project. Each statement is examined in light of the QIA Program vision and mission with this author's comments in *italics*.

- "To improve the conditions of the onsite wastewater industry by working toward the establishment of uniform design, installation and servicing standards of all types of onsite wastewater treatment systems."

The Project will require an objective evaluation of the conditions and any problems that currently exist.

- "To establish throughout Ohio a relationship among all those concerned with the onsite wastewater industry. Increase the flow of information within OOWA and among all organizations, agencies and individuals having complementary objectives and purposes."

The nature of relationships among the practitioners involved in bringing an OWTS project to completion is a critical factor affecting the efficiency of the process. A QIA Program will focus on improving and maximizing the quality and efficiency of these relationships. The Program will also develop or improve relationships with other organizations, agencies and individuals to attain the goals of the Program and benefits for Association membership.

- "To compile and disseminate statistics, experiences and other information affecting the onsite wastewater industry."

Data will be collected to support the mission and goals of a QIA Program and to evaluate performance and achievement.

- "To inform and educate the general public concerning the value of onsite wastewater treatment as a viable option (alternative) to central sewerage systems and of the need for properly designed and maintained onsite wastewater treatment systems." (Page 26)

The ultimate goal of a QIA Program is to assure the continued development of an affordable permanent decentralized infrastructure for the public that can be maintained at a reasonable cost, while at the same time ensuring the well-being of an association's membership.

- "To protect Ohio's environment by assisting the development of sound ecological practices in the manufacture, design, siting, installation, maintenance and management of onsite wastewater treatment systems."

One of the goals of a QIA Program is promotion of best practices throughout the project development process.

- "To formulate and maintain ethical standards for the guidance of OOWA members in their relations with each other and the public."

An association's Code of Ethics will be a component of training.

Section 3: The Elevator Pitch, i.e. the vision and mission of a QIA Program "in a nut shell."
The Elevator Pitch is a brief description of an association's vision and mission. It is important because if the members can't clearly and concisely communicate an association's vision and mission to others, an association will miss opportunities for membership growth, support and other vision/mission-related opportunities. * See Endnote.

Section 4: Strengths, Weaknesses, Opportunities, and Threats
This is an examination of the condition of an association and the existing conditions in the industry that present opportunities for, or present obstacles to, the goals of a QIA Program.
*See Endnote

Section 5: Goals
Setting and achieving goals is the hallmark of successful associations and is a critical element of an Association's LRSP. First, identify 5 year, or longer-term goals. Next, identify 1 year goals, that is, what must be achieved within the next year for the project to be successful and to put the Association on a trajectory to achieve its 5 year or longer-term goals. *See Endnote.

Section 6: Key Performance Indicators (KPIs)
Great associations and businesses understand their metrics and KPIs. By tracking KPIs, an association will know how it is performing and can adjust, as needed. It's critical to identify KPIs and list them in this section. * See Endnote.

Section 7: Wants and Needs of Current and Potential Association Members
Advancements in rules, knowledge and technology are one side of the onsite coin. The human element is the other side of that coin. A QIA Program is intended to facilitate processes and procedures to improve the flow of work in the development, installation and maintenance of onsite system projects.

Section 8: Industry Survey and Analysis
An association will conduct an analysis to ensure that the current and developing onsite wastewater market is understood, in order to help identify new opportunities.

Section 9: Competitive Analysis
An association, with its available resources, has the potential to be the principle training body for the practitioners in the development, installation and maintenance of OWTS. Identify the competition, list their strengths and weaknesses, and determine an association's advantages and ways to develop additional advantages.

Section 10: Marketing Plan
The Association will develop a comprehensive marketing plan which describes how an association will attract new prospects, convert them to paying members and maximize the value of their membership, thereby retaining them as members.

Section 11: Project Development Team
An association will ensure that it has the human resources to execute the opportunities identified and achieve the established goals in Section 5. List the current team members and the qualifications and background of the people who will be needed to achieve the goals in the next year.

Section 12: Operations Plan
An operations plan helps to transform the opportunities and goals into reality. The team will identify the individual projects that comprise the larger goals and how these projects will be completed. Map out the projects on Gantt charts, with starting date, completion date, and name of project leader.

Section 13: Financial Projections - Sources of Present and Future Funding
This section will require an assessment of an association's current finances and estimates of the costs of short-term projects and long-range projects. It also will project future revenue streams resulting from the success of the QIA Program. The goal is to develop a self-sustaining and on-going program to meet the goals of an association and the wants and needs of current and future membership.

Section 14: Gantt Chart Inputs
A Gantt chart provides a visual representation of the component projects of a larger project, to display them as the various phases of the component projects progress over time. These charts will help the project team keep track of all phases of the project through its development and make adjustments, as necessary. Gantt templates are widely available. *See Endnote.

Section 15: Guidance for Developing Worksheets, Templates, and Training Materials
This section is vitally important. Rules for developing training materials for adult learners are generally recognized. Sentence structure, mood, voice, and verb tense are all important. Simply and consistently formed sentences will also be easier to translate into another language. The workflow detailed in worksheets and job templates must follow a logical progression, typically from the house wall out to the end of the system. This is for the convenience of inspectors, but would not restrict an experienced installer with good job control skills from doing the installation in steps best suited to the jobsite. *See Endnote.

Section 16: Pilot Projects
Pilot projects serve several purposes. Gaining experience by field-testing worksheets and templates is necessary for refining these tools. The data and opinions acquired are to be presented at local and annual conferences and to health districts to promote the QIA Program. This information could also be made available to other associations. *See Endnote.

Section 17: Reviews and Revisions
Review progress as frequently as necessary. Adjustments and improvements will be made as experience is gained and results are seen.

Note: The installer/inspector relationship is emphasized in the above examples. The relationships between all of the other practitioners involved in an OWTS project are also critical to the ultimate success of a QIA Program and the future of an association. Examples of how all practitioners are to be involved in a QIA Project are included in the Gantt Chart Inputs and available upon request. *See Endnote.

Summary

A structured program to guide the design, installation, inspection, approval, operation, and maintenance of OWTS, to optimize cooperation among onsite practitioners, to minimize time-wasting errors and omissions throughout the OWTS development process, to ensure serviceability of systems to minimize long-term O&M expenses, will serve the system end-users, NOWRA’s partners and affiliate groups and benefit current and future association members.

The vast training resources of NOWRA, the CIDWT, affiliate associations, and the talents and abilities of individual members focused in a QIA Program, will provide positive results and make a difference in the lives of those who labor to provide an effective and sustainable onsite wastewater treatment infrastructure.

Endnote: Content is available upon request from the author by email to ocas.rab@gmail.com, Subject line: QIA

REFERENCES

1. The OOWA Policy and Procedures Manual, Ohio Onsite Wastewater Association, 2017, used with permission

2. The OOWA Standards of Installation Practice Manual, © 2006 OOWA, used with permission

3. The OOWA "Draft Training Plan Initiative for Sewage Treatment System Installation Contractors", January 10, 2018, from the strategic planning meetings with John Thomas of WOSSA.

4. NOWRA's "U.S. EPA Water Quality Cooperative Agreement Pre-Proposal," titled "Development of a NOWRA "Qualified Practitioner" Program Prototype, 2002.

5. The OOWA *I.Q. Installer Program, 2003 – 2008 (*Installation Qualified)
   This programs was developed by the author with the cooperation of a committee which included an installation contractor, an equipment vendor, and another health district regulator.

6. The NOWRA Strategic Framework for Unsewered Wastewater Infrastructure, National Onsite Wastewater Recycling Association

7. "Seven Results/Outcomes of a Good Installation," General Standards of Installation Practice "in a nut shell." 2006, by Author

8. Technical Speaking for Engineers, Randall Reeder, P.E., Prepared for presentation to the ASAE 1998 Annual International Meeting, Orlando, Florida, July 14, 1998
   Note: This is an excellent review of fundamentals for developing training presentations.

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