

O & M, The Good, The Bad and The Ugly

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It is estimated that between 23% (EPA 2002) to 33% (American Ground Water Trust 2003) of the homes in the United States are served by on-site septic systems. Yet if you were to ask residents living in these homes what O & M was, most could not tell you. Oatmeal and milk or the name of an up and coming rock group would be as good a guess as any. And why would we expect them to know when a vast majority of homeowners do not even know they are on an on-site septic system (OSS) until the first time it backs up in their home or they notice a dark and smelly liquid in their yard? According to Byers (2003) the typical septic tank in America is not managed or maintained, and the typical owner is uneducated regarding their wastewater treatment and disposal system.

In the last 20 years technology in the on-site industry has expanded immensely. Many of the new systems (i.e. aerobic treatment units, sandfilters, etc.) on the market, which will be defined as alternative (any system other than a conventional standard gravity system), have been tested, and when combined with disinfection, have been approved by the National Sanitation Foundation (NSF) to meet a higher treatment standard. As a result, state and local on-site rules governing horizontal and vertical separation setbacks have been relaxed for these systems when compared to conventional systems. Reductions in vertical separation to 12 inches, and in horizontal setbacks to wells and surface water to 50 feet, are common changes in state regulations. Although the local health jurisdictions (LHJ) can be more stringent than the state, the majority of them adopt the same setback reductions into their own local rules.

To coincide with the development and use of new alternative OSS and the “tradeoff” of reduced setbacks, it was recognized that there was a need to develop minimum operation and maintenance (O & M) standards for them. Therefore, in January of 1995 the Washington State Board of Health enacted new on-site sewage regulations with requirements for O & M. These regulations made the OSS owner responsible for inspecting their standard gravity system once every three years and complying with local health jurisdiction O & M requirements for alternative systems. The local health officer in turn was responsible for monitoring all OSS performance in areas of special concern and for initiating periodic monitoring of each OSS no later than January 1, 2000. The local health officer was additionally responsible for ensuring that O & M information, as well as educational

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material on the OSS, was distributed to the OSS owner. Three methods of management could be required by the health officer to ensure proper O & M, namely: A renewable operational permit; management by a public entity; or management by a private entity. The objective of all this was to ensure that each OSS owner properly maintained and operated their OSS in accordance with state and local O & M requirements (Washington State 1995).

Today, three and a half years after the January 1, 2000 deadline requiring the local health officer to initiate periodic O & M monitoring, there are only a handful of the 35 local health jurisdictions in the state of Washington that have implemented an O & M program that meet this criteria. For most local jurisdictions, if they have any type of O & M program at all, it consists solely of the health officer providing educational material to the OSS owner or periodic reminders that are sent to the owner to inspect their OSS. Some jurisdictions require that pump reports be submitted when the septic tank has been pumped or that the system be inspected by the health district or an authorized agent at the time of home resale. However, very few have a program that requires maintenance providers to perform inspections of OSS, especially alternative systems, on a routine schedule to ensure they are functioning properly.

There are a number of reasons why the majority of local health jurisdictions have not developed effective O & M programs that are in compliance with the 1995 state OSS regulations: Lack of funding; non-acceptance by the homeowner of the idea of having O & M; no model program or guidance document for developing an O & M program; lack of political will; no consequences for not implementing an effective O & M program; lack of trained OSS maintenance providers and few homeowners prepared to operate and maintain their system (Ohio State University Extension Fact Sheet 2000), as well as others that will be discussed later in this document. Regardless of what the reasons are for most local health jurisdictions not having an O & M program, one has to look at what the public health implications are and what the cost is to the homeowner if it is not done. Combine this with the fact that the popularity of alternative systems is increasing in many areas because good building sites are either nonexistent or are very expensive, and it makes these public health implications even more alarming.

Systems are being installed on sites where they would not have been allowed 20 years ago. Sites with marginal soils (silts and clays), high seasonal water tables (one foot from ground surface) or closer proximity to wells and surface water (50 feet) are now buildable when combined with the right alternative system. Regulators, those involved in the OSS industry, and homeowners rely on the fact that these systems meet higher treatment standards in order to compensate for their site limitations. If these systems fail to meet these standards, the health of the public is jeopardized because there is a greater risk for failing systems to impact ground and surface water, consequently affecting shellfish areas, swimming beaches, drinking water and fisheries.

Equally important is the cost involved to replace or repair an alternative system if it fails. Alternative systems are very expensive, often costing between \$10,000 to \$20,000 to install. The original idea was that these systems would last the life of the home if they were maintained on a regular basis. In reality, that probably is not going to happen. However, if they are not operated and maintained properly they will fail much sooner, as no technology can succeed without implementation of an approved management plan (David Featherstonhaugh et al 1999).

In Kitsap County, Health District staff and Certified O & M specialists are finding alternative systems that are having problems within the first year of operation (Ghylin 2003). These problems

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can be attributed to one or more of the following items (Basics of Operation, Maintenance and Monitoring 1995):

- Dirty effluent screens are frequently found causing sewage to back up around the septic tank or into the house;
- Pump and float switches aren't working properly causing overloads to the system;
- Timers are not working or are set improperly;
- Broken baffles in septic tanks;
- Alarms have been turned off by homeowners;
- Hydraulic overloading is occurring due to leaky plumbing, ground or surface water infiltration into septic tank, pump tank or proprietary treatment unit, and/or homeowner abuse;
- High strength waste due to laundry and water use practices, use of garbage disposal and medications;
- Pressure distribution pipe orifices are clogged and/or are starting to clog at the ends.

If an O & M program is in place that requires routine inspections by qualified maintenance providers, these problems can be caught early and major failures, can often be prevented. What sense does it make to ignore such a critical and expensive investment? A person's daily life is greatly impacted if their septic system is problematic or failing. Most people do not give a second thought to maintaining other investments, such as cars, homes or boats.

What makes O & M even more critical is monitoring data, which indicates that many of the alternative systems are not performing in the field the same way they did during NSF testing. Alternative systems that have been designed and installed to meet treatment standard 1 or 2 (10 mg/L BOD₅, 10 mg/L TSS and 200 or 800 Fecal Coliform), are not actually performing at these levels once subjected to everyday use under a variety of conditions.

In a recent study on the effluent quality exiting residential aerobic treatment units, Maxfield (2002) found that over a third of the ATU systems in her study failed to meet NSF certification parameters for BOD₅ and TSS effluent standards of less than 30mg/L. In addition, generally over two-thirds of the systems failed to meet Washington State Board of Health Treatment Standard 2 criteria for BOD₅ and TSS of less than 10mg/L. Furthermore, an average of 59% of the systems failed to meet state standards for fecal coliform of less than 800 fecal coliform per 100 milliliters. Maxfield highlights the fact that the field results shown in her studies and others did not reflect the results obtained during the rigorous testing protocol that these aerobic treatment units had to meet during the NSF certification process. New systems were not showing any better field test results than older systems. When factored together, her findings brought into question long term performance and reliability and strengthened the rationale for O & M on ATUs.

Currently the Washington State DOH is overseeing the Rule Development Committee (RDC) in the revision of the state on-site sewage code, Chapter 246-272 Washington Administrative Code (WAC). One of the debates that the RDC has had in this process, during the past year and a half, is whether to adopt a performance or prescriptive based approach for monitoring alternative systems. Utilization of a performance based approach would set specific performance standards that alternative systems would have to meet in the field. In theory this would ensure that the site limitations (i.e., poor soils, high seasonal water tables, reduced setbacks to surface water and wells) for which the alternative system was approved, were not compromised by an improper functioning OSS.

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Although performance based standards would be the ideal approach, it would present obstacles for LHJ. This is mainly due to the fact that most health jurisdictions do not have O & M programs that are capable or set up to operate under this type of approach. They do not have the staff, funding or maintenance specialists to do the field-testing or perform the necessary enforcement if problems were found with the system. When combined with monitoring data on State Approved ATUs (Maxfield 2002 and others), which shows that 60% do not meet Treatment Standard 2, an even bigger issue is made. Does the local health officer take action against the manufacturer, the property owner or both? And, what would be done to homeowners who were found to have systems out of compliance? They have already paid a high price to have one of these systems installed, and, therefore, have an expectation that the system should function properly. Writing tickets or forcing them to take corrective action would be difficult, if not futile, and may even create a consumer and/or political backlash. This is not to say that O & M is not necessary; quite the contrary. O & M must be performed to ensure that all parts are working and that the OSS is functioning as designed and installed. At this time, however, a performance based approach may be premature, when one considers both the current state of OSS technology to consistently meet specific treatment standards in the field and the current status of effective O & M programs.

The debate goes on as to what to do regarding O & M. On-site sewage professionals; regulators, as well as authors of almost every article that is written on OSS today, indicate that O & M is essential to an OSS functioning properly. Without O & M the systems will fail. Despite what everyone in the on-site sewage profession knows, the struggle to get the message to homeowners of on-site systems goes on. The state and LHJ need to work together to develop management programs for OSS that will ensure that they are inspected on a routine basis. Education is important in this regard, but it will not perform the maintenance that is necessary for an OSS to function properly and hence, provide protection of the public's health. Several key elements are important to the development of a successful O & M program. The following section is, therefore, devoted to what these elements are and how they can be implemented by LHJ to establish an effective O & M program.

KEY ELEMENTS FOR AN EFFECTIVE O & M PROGRAM

Background: As previously stated, excluding political and funding issues, one of the main reasons local health jurisdictions in this state do not have sophisticated O & M programs are because no guidelines or good models exist that can be used by them to develop and implement one. The Kitsap County Health District (KCHD) actually began developing an O & M program back in 1993 when it saw that the number of alternative systems were increasing in popularity county-wide. Mounds, sandfilters, Glendons, as well as several other proprietary devices, were being installed in the county. The KCHD was finding that there were associated maintenance issues surrounding them.

Primarily what was done in the early stages of the program was educational in nature. The KCHD developed several brochures, offered OSS workshops and seminars and established a monthly Technical Advisory Meeting. The monthly meeting, which was designed to discuss new OSS technology, KCHD rules and policies and other OSS related issues, was open to the public, members from the on-site sewage industry, homebuilders association, realtors and other government agencies. The Health District began recommending that different components be installed on alternative systems that would provide easier access for servicing. By October of 1995 the Health District developed its first Operation and Maintenance Ordinance (Bremerton-Kitsap County Board of Health Ordinance 1995-14). The Ordinance enacted a phased implementation schedule for O & M

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beginning with all standard gravity septic systems and systems in areas of special concern on January 1, 1995 and eventually requiring all alternative systems by January 1, 2000.

The development of the O & M program in Kitsap County has been a work in progress as it continues to be changed and added to as time befits. However, being flexible by utilizing a trial and error approach in planning and developing the program has been a key to its success. It may have made the development stage more costly, but at the same time, the KCHD staff has learned what works and what doesn't as they have progressed in this endeavor.

Early on in the process, the formulation of the key elements for an O & M program were established. This was done out of necessity for organizing, developing and implementing the program. The "Key Elements of an Effective O & M Program" (Deeter, et al. 1997) that were established by the KCHD staff, were presented at the University of Washington, *9th Northwest On-Site Wastewater Treatment Short Course and Equipment Exhibition* in September 1997. The paper listed in the proceedings consisted of a two-page outline, which documented the following five key elements:

1. Funding
2. Establishment of Effective Rules and Regulations Governing O & M
 - Maintenance and Monitoring Requirements
 - Clear Enforcement Procedures
 - Certification Program for Maintenance Specialists
3. Education Program on O & M
4. Effective Data Collection Program
 - Ensure Data Collected is Meaningful and of Future Beneficial Use
 - Ability to Track:
 - Performance Trends;
 - Maintenance Frequencies;
 - & M Contracts and Monitoring
5. Flexibility Within O & M Program For Change

The outline will be used as the basis for a discussion on how the KCHD O & M program was developed and how it is currently functioning. It is interesting to note that a comparison of the key elements developed by the KCHD in 1995, coincide with the critical elements listed in the EPA Design Manual (2002):

1. Clear and specific program goals
2. Public education and Outreach
3. Technical guidelines for site evaluations, design, construction, and operation/maintenance
4. Regular system inspections, maintenance, and monitoring
5. Licensing or certification of all service providers
6. Adequate legal authority, effective enforcement mechanisms, and compliance incentives
7. Funding mechanisms
8. Adequate record management
9. Periodic program evaluations and revisions

This comparison is somewhat significant, as it indicates that early organization and development of the O & M program in Kitsap County was "right on target" with what is now recognized as being the critical elements to an effective O & M program on a national level.

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Element #1: Funding:

Not surprisingly, the most important element needed for an effective O & M program, is funding. If funding is not available, a LHJ will not have the staff or resources necessary to do the planning, education, inspection and enforcement activities that are essential to make an O & M program effective. Despite the essentialness of funding, the majority of LHJ have had difficulty or failed altogether to convince their local governing bodies on the need for O & M, which consequently affects the funding for such a program. Reasons for this failure will be discussed later. At this time the focus will be spent on several LHJ that have been successful in gaining the support of their governing bodies and have developed both a successful management method for O & M, along with the funding necessary to run the program. Generally the method for funding is based on the type of management entity providing oversight. One has to take into account when looking at the various options, that the success of one method over another will be dependent on both the community acceptance and political support, for not only the funding, but the program itself.

Kitsap County Health District

The KCHD is responsible for administering the O & M program within its jurisdictional boundaries. As part of this responsibility it oversees that private industry, which consists of certified O & M specialists, performs the required operation, monitoring and maintenance of all alternative systems in the county.

The KCHD funds its O & M program from a number of sources. The largest funding source comes from the Kitsap County Surface and Storm Water Management Program (SSWM). The Kitsap County Board of Commissioners established the program within the County to provide a comprehensive approach to surface and storm water management. The Director of the Kitsap County Public Works Department is responsible for coordinating SSWM programs and services by forming interlocal or operating agreements with other departments or special governmental entities (Conservation District, Kitsap County Natural Resources, Health and Public Works) to coordinate and administer identified areas of responsibility, program elements and budgets (MOU 1995).

Funding for services provided are obtained from revenues derived from authorized (Ordinance No 165-1994) service charges that are assessed annually on parcels of real property in unincorporated Kitsap County. Currently, a service charge of \$45.00 per equivalent residential unit (ERU), approximately 14,000 square feet, is levied on parcels of land in the County. In 2003, the Health District received \$800,000 for operating its portion of the overall SSWM program. The O & M program billed approximately \$80,000 during the year to the SSWM program for time spent performing specific O & M tasks.

Revenue for funding the O & M program is also derived from several other sources that are completely separate from SSWM. Bremerton-Kitsap County Board of Health Ordinance 1996-8, requires that an annual maintenance report be submitted to the KCHD. The report contains all maintenance performed on the system during the year and any problems found with the system. Currently the KCHD charges the Maintenance Specialist a fee of \$25.00 for submittal of each report. The cost of the Annual Report is figured into the O & M contract that is written up between the property owner and the O & M Maintenance Specialist. The fee is paid to the Health District at the time the report is submitted. The Kitsap County Health District, as of June 30, 2003, has 3098 O & M contracts on file. Assuming 100% reporting, the District will receive \$77,450.00 in 2003 from this revenue source for operation of the O & M program. This source of funding pays for report review

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time, data entry of the report into the O & M database, development and maintenance of the O & M database, enforcement and other miscellaneous expenses.

An additional source of funding for O & M comes from Sewage Tipping Fees. Currently the Health District receives \$.02/gallon of sewage that is hauled to the Kitsap County Sewage Treatment Facility in Brownsville. In 2003, the portion budgeted to SSWM from the total amount received from the County is \$25,000. The O & M program generally utilizes about one-fifth of this amount, or \$5,000. Most of these funds are spent on O & M Technical Advisory Meetings, other O & M related meetings, O & M education and other O & M tasks that can not be billed to SSWM or annual reporting.

The total KCHD O & M budget in 2003, based on these three funding sources, is approximately \$162,000. In regard to personnel, this funds 1FTE (Full Time Employee) O & M Coordinator, 0.25FTE EHS II, 0.1 FTE EH Management, 0.25FTE clerical support and 0.05FTE Information Services. The rest of the budget is allocated to other non personnel items, such as equipment, professional services, supplies, travel etc.

The KCHD is the only one of thirty-five LHJ in the state that has a program like SSWM to fund their O & M program, which means there has to be other viable methods for meeting this element.

Jefferson County Health Department

The Jefferson County Health Department (JCHD) has formed an Interlocal Agreement between it and the Public Utility District #1 (PUD) in Jefferson County. This method provides both management oversight for O & M and ensures adequate funding for accomplishing the task. A written agreement is signed between the local health jurisdiction and the PUD or Special Use District to perform the monitoring of on-site sewage systems in its jurisdictional boundary. Local health is responsible for issuing the Sewage Permit and inspecting the installation of the OSS. Once the permit is signed off as approved the PUD takes over and provides periodic monitoring of the system. If problems are found they are reported to the local health jurisdiction. The PUD and local health work with the property owner to resolve the problem. The PUD charges an hourly rate to monitor and provide assistance when problems are found with the OSS. Funding for O & M becomes the responsibility of the PUD and is a good alternative for local health jurisdictions with small budgets. This arrangement between JCHD and its PUD to provide this type of O & M oversight has worked particularly well for them and is another method for O & M management of OSS (PUD #1 of Jefferson County).

Tacoma-Pierce County Health Department

The Tacoma-Pierce County Health Department (TPCHD) O & M program is based on the resale of property. When a home is placed on the market for sale, the Health Department makes an inspection, which determines the level of O & M. There are variations on how this method of O & M management, including funding, has been implemented by LHJ, but the approach used by the TPCHD appears to be working well (Dennis Tone, 2003). Initially, the Tacoma-Pierce County Board of Health passed a Resolution which stated that all transactions involving the sale of property with an OSS in Pierce County were required to have a "Report of System Status" before closing. When a property with an OSS is to be sold, the Realtor, Escrow Company, Title Company or other closing agent notifies the seller of the need to obtain a Report of System Status. This requires inspection of the system by a certified individual who issues an "Operational Evaluation" (inspection report). It also requires an Application for Report of System Status along with a fee. If the subject property is

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not already in the TPCHD O & M program, there is an additional O & M Application plus an accompanying fee. This is a one-time only fee per parcel.

With the inspection report, as-built drawing of the system, and Application for Report of System Status in hand, TPCHD staff visit the site to verify the system's function, proper use and protection of the system area, and that no alterations to the site have been made that are incompatible with the OSS. From this site visit and supporting documentation, TPCHD issues a Report of System Status. The purpose of the O & M Application is to document the system type and intended use and to classify the relative risk to public health should the system malfunction. This risk level (low, medium or high) determines the level of ongoing inspection and O & M permitting the system requires. Resale of homes that fall through the cracks are picked up later by the Health Department by reviewing the Auditor's records on warranty deeds on sales of property during the month. These are matched up with the Reports of System Status" that the Health Department has in its records. Each sale without a report is reviewed to determine whether it is on sewer, or an on-site sewage system. New owners on OSS are contacted to determine the reason for not filing a Report of System Status". Those found in violation must go through the entire process previously mentioned.

An applicant of a Sewage Permit for new construction and repairs to existing OSS only are required to fill out the O & M application as part of the permit process. The risk level is determined at this stage, which sets into motion the frequency of future inspections. The risk level is based on the type of OSS. Gravity and simple pressure OSS are assigned low risk; systems that are undersized or that may have other site constraints are considered moderate risk; and alternative OSS are considered to be high risk. Frequency of inspection is determined by risk level. High risk must be monitored by an O & M contractor annually; moderate risk are monitored every three years and; low risk are not inspected again until the next transfer of property. The TPCHD charges an O & M renewal fee based on frequency of inspections.

The main focus of the TPCHD O & M program is to ensure that the OSS is functioning properly and the public's health is protected. Maximum effort is applied to inspecting and permitting the systems that have the greatest potential for harm to health if they malfunction. The various permits that are required are a convenient vehicle for registering systems and conducting ongoing education and customer assistance.

These are a few of the more successful methods that are currently being used by LHJ to provide management and funding for O & M programs. Several other methods include Operational Permits and Homeowner Associations.

Operational Permits require that the owner of an on-site septic system have a renewable permit, generally with the LHJ, that specifies monitoring inspections at varying frequencies. The inspections are dependent on system complexity and the risk level the system poses to public health. Fees are collected at the time of renewal. The TPCHD and the KCHD both use variations of the operational permit.

Homeowner Associations are usually associated with subdivisions or areas of special concern that have Large On-Site Sewage Systems (LOSS), community on-site sewage systems and/or individual on-site sewage systems. Homeowners contract with an O & M provider or public entity, as part of a Homeowners Association agreement, to perform the required monitoring and maintenance of the system. Property owners pay a fee, on a scheduled frequency, into a fund for the required

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maintenance items specified in the Homeowner Association Agreement. The LHJ may set the basic requirements for operation and maintenance of the system, but are removed from the funding.

Element #2: Establishment of effective rules and regulations for governing O & M:

The backbone of a successful O & M program is having effective rules and regulations. If an O & M program doesn't have specific maintenance and monitoring requirements, clear enforcement procedures to ensure compliance and some type of certification program that provides reliable, responsive and skilled O & M providers, the program will eventually fail or be ineffective.

The KCHD established its initial O & M Ordinance (Ordinance 1995-14) in 1995, in order to have the legal authority to implement and enforce its O & M program. In 1996 additional O & M requirements were incorporated into Bremerton-Kitsap County Board of Health Ordinance 1996-8, Rules and Regulations Governing On-Site Sewage Systems. These two Ordinances contain the three components referenced above for ensuring an effective O & M program.

Maintenance and Monitoring:

The maintenance and monitoring is divided into requirements for standard gravity systems and alternative systems. In Kitsap County, anything other than a standard gravity system is considered to be an alternative system. Therefore, a pressure distribution system, by definition, is considered to be an alternative system. The main difference between the two groups is that standard gravity systems can be operated and maintained by the homeowner, whereas alternative systems must have a certified O & M contractor provide the maintenance and the system must comply with all maintenance and monitoring requirements specified in the Ordinance. At this time the Health District has not assumed an active O & M oversight role for standard gravity systems, other than providing education to the homeowner. The Health District may eventually send out reminders to owners of these systems, which would inform them that they must have their system inspected once every three years.

An O & M contract between the homeowner and a certified maintenance specialist is required at the time of final sewage permit approval or within 30 days of occupancy of the home. Contracts specify the responsibilities of the homeowner and the maintenance specialist and give the time the contract shall remain in effect (generally one (1) year). An O & M manual is provided to the homeowner at the time the contract is signed. The regulations are clear in notifying homeowners that they are to either renew their contract within thirty days (30) of expiration or provide notification to the O & M specialist that they will not be renewing their contract. If they do not renew the owner is responsible for obtaining a new contract with another certified O & M specialist prior to the end of the contract period.

Owners of alternative on-site systems are responsible for complying with the instructions in the O & M manual and the contract, as well as notifying the O & M specialist if they are having any problems with the OSS. They are required to provide right of entry to the O & M specialist and the Health District representative upon proper notification and identification, to inspect or service the OSS. They are also responsible for notifying the Health District when the residence is to be sold or rented to new tenants.

Requirements for monitoring the performance of alternative OSS are delegated by authority of the health officer. The health officer requires the monitoring of any alternative system installed for which guidelines have been developed. The frequency of O & M inspections for alternative systems is based on the type of system installed on the property. This varies from once every three (3) months for aerobic treatment units (based on manufacturer warranty stipulations) to annually for

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sandfilters and Glendons. The O & M performed on the system has to be done by a Kitsap County Certified O & M contractor and it must be in conformance with maintenance, monitoring and reporting requirements described in the DOH Recommended Standards and Guidance document for the system in question.

Equally important to a successful monitoring program is accessibility to system components. The KCHD realized early on that if ongoing inspections were going to be required for alternative systems, it had to address accessibility. This aspect was key to ensuring that O & M providers could get to the parts of the system that needed to be observed or serviced without difficulty. As a result, minimum construction and component requirements for accessibility were established in the local rules for alternative systems. Specific requirements include, but are not limited to the following items:

- All septic tanks must have watertight manhole risers over the first compartment extending to ground surface or above;
- Sealed and water tight riser on the septic tank and pump tank (if applicable) with secured lid, i.e. hex bolts or locking device;
- Septic tank must have a removable cartridge filter installed in the second compartment on the outlet “T” filter with riser installed above it, unless followed by a pump tank which is required to have a screened vault filter surrounding the pump;
- Pump floats are required to be fastened to a float tree independent of the transport line;
- A union, check valve, gate valve and pump line exiting the pump tank must be twelve (12) inches to twenty-four (24) inches from finished grade;
- Control panel with programmable timer, counter and alarm that is in an accessible location;
- Screw caps at end of pressure distribution lines;
- Clean outs brought up to finished grade or enclosed within riser;
- Check valves on manifold between laterals if installed on a slope, valves must be accessible within riser;
- Observation ports installed within ten (10) feet the of the end and within ten (10) feet the beginning on all drain field laterals;
- Observation ports installed in sandfilter at gravel and sand interface;
- All proprietary treatment units must have accessible manhole risers to ground surface;
- Disinfection units must have risers to surface.
- A detailed as-built drawing of the installation with O & M details and required components must be provided and signed by the installer at the time of Health District inspection of the OSS installation.

In addition to performing all tests and inspections as required by the Owner/Operator Manual and the Health District, the maintenance specialist is responsible for submittal of an annual maintenance report to the Health District within thirty (30) days following completion of all servicing for the previous year. He must also respond to complaints and problems in a timely and reasonable manner.

Enforcement:

If the O & M program is to work, the homeowner, installer, O & M contractor and manufacturer (proprietary treatment unit) of any alternative OSS that is required to be under an O & M contract, must be held accountable for ensuring that they have complied with all operation, monitoring and maintenance requirements that are specified in the rules and regulations, maintenance contract, and manufacturer’s specifications for that OSS system.

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In the event the homeowner or O & M specialist fails to comply with any of the requirements in the regulations, the KCHD has a prescribed set of enforcement procedures that are implemented. A Notice and Order to Correct Violation (NOCV) is sent out to the violator, giving them 30 days to correct the violation. If substantial progress has not been made to correct the problem the KCHD has the ability to issue a Notice of Civil Infraction to the individual. The Notice of Civil Infraction is similar to a traffic ticket. It gives the violator 15 days to either submit the appropriate payment indicated in the Notice or contest it. If the Notice is contested, a court date is scheduled. The maximum penalty for a civil infraction is \$513/day/violation.

Certification:

The last component in establishing effective rules and regulations governing O & M is the development of a certification program for individuals who will be performing the monitoring and maintenance of the OSS. It is essential that the people who are in the public sector writing contracts with homeowners have the skills and technical knowledge to do the job. The goal is to ensure that the OSS performs the way it was designed, which translates into providing adequate public health protection and system longevity. Based on this goal the KCHD viewed the following criteria as being necessary to have an effective O &M certification program:

- (1) A written /oral examination is required as part of the application process. The examination is comprehensive, incorporating state and local requirements on design, installation, as well as knowledge of maintenance and monitoring criteria. A score of 70% or more is required in order to pass. As part of the application the applicant pays an initial certification fee and a testing service charge fee.
- (2) Contractors License: A current Washington State contractors license is required prior to certification
- (3) Bonding and insurance: A performance bond for an amount that is set by the Department of Labor and Industry for the state contractor license. A contractor's insurance policy must be attached to the bond and name the Health District as a certificate holder.
- (4) Continuing Education: One CEU or six contact hours of instruction or training at a class that has been pre approved by the Health Officer must be submitted as one (1) of the annual certification renewal requirements.
- (5) Annual certification renewal: A maintenance certification is valid for the year in which it is issued and expires on June 30th of each year. Renewal requires: Payment of the Health District renewal; proof of bonding and insurance; a copy of the individuals current contractors license; proof of obtaining one (1) CEU during the previous calendar year (July 1- June 30); be in good standing with the Health District.
- (6) Operator warranty: the maintenance specialist warrants that they have performed the minimum maintenance and monitoring required for the OSS by visiting the site and submitting all required documents to the owner and the Health District. The warranty provision is enforceable by the owner of the property on which a violation occurs.
- (7) Notification and record keeping: An annual maintenance report for each OSS that the maintenance specialist has under contract must be submitted with the Health District. The maintenance specialist must notify the Health District of the following events: Failure of the OSS within 7 days; Expiration of O & M contract with 30 days; change of owner within 30 days.

Currently the Health District has eighteen certified maintenance contractors who perform maintenance on 3098 OSS. One of the things that KCHD is doing to determine the quality of the work being performed by the maintenance specialist is to do performance evaluations both in the

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field and office. The KCHD has developed a draft procedure on performance indicators, which will assist staff in doing evaluations. In addition, a position description is being developed for an O & M maintenance specialist. This will describe the various responsibilities of the maintenance specialist that are required to meet job expectations. .

Element #3: Education

The third key element in an effective O & M program is education. Education of not only the homeowner, but education of the OSS industry, Health District staff, as well as state and local politicians. Despite a greater effort put forth in providing education by LHJ, the state DOH and members of the OSS industry, much more still needs to be done. Too many homeowners on OSS either do not know they are on one, or if they do, that it requires regular maintenance. Most OSS receive maintenance only after they have problems or when they fail, and then owners complain because of the high cost to repair or replace it (Byers 2003).

Most education programs currently consist of developing some type of O & M manual that provides the “do and don’ts” of using an OSS and maintaining the septic tank (Homeowners Manual 1999). Additional information may provide criteria on maintaining specific types of OSS (Aerobic Treatment Units, Sandfilters, etc.). The KCHD has also developed a manual for pumpers, which: Provides regulatory information; guidance in pumping procedures; establishes standards and expectations and; provides information and accountability for all pumper employees (Pumper Specialist Manual 2002). The state and LHJs have also developed and distributed brochures on maintenance of septic systems that are easier to mail and display at public and private facilities.

Providing educational talks on O & M to community groups, service clubs, and other organizations is also utilized by most LHJS as a way to get information out. As previously mentioned, the KCHD established an OSS Technical Advisory Meeting (TAM) in 1991 for members of the OSS industry, Homebuilders Association, Realtors, lenders and the public. An O & M Technical Advisory Meeting was established in 1995 at a time when O & M was becoming an important issue due to the number of alternative systems that were being installed in Kitsap County and O & M was part of the 1995 State On-Site Sewage Regulations. These meetings are held every two months and focus on new technology, procedures for maintaining new and existing alternative OSS, and problems that O & M maintenance specialists may have with specific systems. Frequent presentations are provided to the group by manufacturers, suppliers or sales representatives on improved techniques for ensuring proper maintenance or explaining how the system functions. The KCHD also puts on annual seminars and workshops that are specifically related to topics on O & M. Ultraviolet Disinfection, Maintenance of Aerobic Treatment Units, and Troubleshooting Problems with Alternative OSS are just a few of the topics that have been presented more recently. Other training opportunities for staff and members of the OSS industry are provided at the Northwest On-Site Training Center in Puyallup that is sponsored by the Washington On-Site Sewage Association (WOSSA).

Part of the education process is ensuring that homeowners know that they are on an OSS that requires ongoing O & M. Based on this, the KCHD established several notification procedures. All notification is done as part of the issuance and approval process of a Sewage Permit. The applicant proposing the OSS installation of an alternative system for new construction, repair or modification of an existing OSS, or connection to an alternative OSS, must submit a valid O & M contract or notification agreement and a recorded “Notice to Title” as part of the sewage permit. A “Notice to Title” form must be completed and recorded with the Kitsap County Auditor’s office prior to the issuance of a Sewage Permit, or in the case of a home resale, prior to the Health District’s issuance of

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a loan status report to the lender that indicates the OSS is in compliance with Health District requirements. The statement recorded on the "Notice to Title" indicates to the homeowner or prospective buyer of the home that the residence or facility on the property utilizes an alternative OSS, which requires regularly scheduled maintenance and monitoring performed by a certified O & M Specialist or an individual approved by the Health Officer.

Element #4: Data Collection

One of the main steps in planning and organizing an O & M program is to determine what, if anything, is going to be done with the data that is collected. The data collected needs to be meaningful and need to provide a future beneficial use. Collecting data for the sake of doing it is a waste of an agency's resources. One has to determine if there are statistics that will show trends, if numbers will be needed for reports and /or budgets, if the information is important data that will be useful if shared with other agencies or specific individuals, as well as other considerations.

An inventory of all OSS is essential for management of system information. The KCHD recently completed a three (3) year project to scan all existing OSS records into its logger database. This will provide the Health District the ability to transfer information electronically to other agencies involved in the permitting of OSS, provide eventual access of O & M information by O & M maintenance specialists, as well as allow them to enter data into the database.

The current O & M method for entering and retrieving data in the logger database is very inefficient and time consuming and as it is set up, allows program staff the ability to retrieve limited information. Because of these inefficiencies a new logger database is being developed and will be operational sometime in the fall of 2003. The new logger system will allow for much more detailed and flexible data entering and tracking. All contractors will be able to access the system from any computer through the internet. Contractor pages will all be securely accessed with user names, and passwords. Only information related to their clients will be viewable for them. The system itself will allow for the following features upon initial startup:

1. Entering new information on O & M contracts, renewals and cancellations will automatically provide notification to Health District staff of important status changes, such as a cancellation of a contract.
2. Annual O & M reports will be custom generated based upon system type. This new function will allow for a detailed "check list" type of inspection report to be generated so that the contractor can easily identify what information pertains to the site that they are visiting. They will be able to generate reports based upon their inspections.
3. The O & M maintenance specialist will be able to submit an annual report from their office and ALL of the information that has been gathered from the inspection will be entered into the system. This will allow for detailed review of all inspection items, and trend tracking. A billing system will be implemented for online entries. The Health District will bill the contractor monthly with an itemized bill.
4. Online entry of certification setups for new OSS installations will automatically notify logger that the certification setup is entered and completed. The inspector of record will receive an email notifying them that a certification setup has been received and they can complete the final approval of the permit.
5. All annual reports will be viewable for contractors and the public. A simple search program will be developed so that they can search by address, Tax ID, etc.
6. Homeowners will be able to review annual reports.

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7. All septic tank pump contractors will be able to enter and submit pump reports via the system
8. All O & M maintenance specialists will be able to generate ticklers of inspections due for given date ranges. The Health District will be able to track this information as well.
9. Automated notifications for renewals and enforcement actions.

One of the most important aspects of this is that all items will be fully automated, and functional for use at any location that web access is available. All of the information will be automatically transferred into logger. It will have the ability to generate a variety of different reports based on program needs. The new logger database system will increase the efficiency and ease of collecting, storing, retrieving, using and integrating O & M data. This will allow better tracking of all O & M information, including O & M contracts and monitoring, and it will assist staff in looking at performance trends of different OSS, such as failure rates, system life spans, and maintenance frequencies.

Element #5: Flexibility

Operation and maintenance is such a new industry that the influx of information regarding new technologies, and new ways of doing things is constantly changing. Add this to changes in people's attitudes, in regulations and a changing political scene and one hopefully realizes that a narrow minded approach to O & M is not going to work. To succeed in this new endeavor will require the ability to adapt to the changes and ability to move in different directions. Several LHJs have already gone through some of these changes and have had to come up with different approaches in their O & M programs. Most of this has been the result of funding issues, but currently this is a key issue. Budgets are tight; people want less government and; the politicians react to this. However, in another five to ten years all of these things may change, and approaches that previously failed may be successful. The KCHD has made numerous changes in its O & M program over the past eight years and are about to make another one with the database system currently in use. The existing one is outdated and needs to be updated to provide a system that will meet the need of the O & M program today and into the near future. Many people do not like change but today changes continually happen. Therefore, being flexible is the best way to stay afloat and meet the challenges ahead in O & M.

WHY THE STRUGGLE CONTINUES WITH O & M

Public health protection, increased OSS longevity and increased property values are just a few of the reasons why O & M is so important. Yet this is not reflected in the way people react to it. The question is why, when there are so many benefits to doing O & M, does it appear to be struggling? There is not just one reason for this, but a combination of things that are all interrelated.

- (1) Homeowners have not accepted the idea that they need to maintain their OSS. They are often uneducated about the issue of maintenance and they don't understand what the consequences are when they do not do it. Rural homeowners often have an attitude explained, in part, when they make a conscientious decision to live in a rural setting so they do not have to pay for water and sewer. They often view having to pay for O & M as just another attempt by government to intrude into their privacy and charge a fee for something that is not seen as necessary and they do not want.
- (2) LHJ can not properly oversee an O & M program without the staff and the funding to go along with it. Most attempts at operational permits have not been successful and charging fees for O

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O & M has not been popular among OSS owners, the OSS industry or politicians. Most LHJ are always looking at budget deficits and are struggling just to maintain. Many other funding issues, such as compliance with mandated programs, have a higher priority than O & M.

- (3) No state guidelines on how to set up a model O & M program have been developed. The state put O & M into the regulations but the local jurisdictions do not know how to set up a program that will work. Because O & M is necessary for all systems, including alternative systems, Recommended Standards and Guidance documents should have been developed by the state DOH as a first step. Local health jurisdictions should then have been required to develop and implement an O & M program prior to allowing the use of alternative systems.
- (4) The political will to implement an O & M program has to exist before it will work. If local Boards of Health or county commissioners are skeptical of the need for O & M, and they do not approve the necessary funding mechanism, it won't happen.
- (5) The OSS industry has changed. The industry has gone from one that specialized in designing and installing OSS to an entirely new one that requires the ability to analyze and troubleshoot problems, as well as deal with clients. Few individuals are well educated enough who can provide the knowledge and training to others, either entering the field or who are already in it but struggling. Even with the certification of O & M maintenance specialists in some LHJ, there are still numerous problems that are difficult to solve. Testing individuals by means of a written examination does not mean that passing will make a good O & M specialist. Most can solve the simple things like a broken baffle in a tank, a clogged filter or drainline, or improperly set floats or timers, but they do not have the ability to solve issues that are related to waste strength, hydraulic overloading or other issues related to the chemical and biologic action going on in the septic tank or treatment unit. In addition, most Maintenance specialists don't have a complete understanding of what they are supposed to be doing when they go to a site to perform O & M. A few think that their job is to just observe and look for problems instead of actually doing the maintenance, i.e. pulling effluent filters, flushing lines or fixing floats.
- (6) The interaction between the O & M specialist and the customer has changed, requiring more interpersonal skills by the contractor. Designers and installers are used to working on lots that are in the process of being developed. The O & M specialist is working on parcels of land that have been developed and they come in constant contact with the owner who is now their client. According to Snowden (2003), most contractors are ill equipped to deal with the relationship problems of having homeowners as continuing customers. Customer service training and the ability to work with others, generally isn't something that these individuals learned before getting into this field. Some of the most frequent complaints that the KCHD gets concern run-ins between the customer and the O & M specialist. Most O & M specialists are not very tactful or diplomatic. If the homeowner questions what they are doing during a site visit or the fees they charge, they are likely to get an earful from them. This doesn't help them in their business or with building support for a new and struggling industry.
- (7) There are no consequences for not doing O & M. Local health jurisdictions in Washington State were required to have O & M programs in place by January 1, 2000. However, many do not, yet nothing has happened to them. They still can approve alternative systems on limited sites or in areas of special concern without having routine maintenance inspections.

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Homeowners do not have O & M contracts for alternative systems in many LHJ and there is no active enforcement against them. That being the case, why worry about it?

These are only a few of the reasons why O & M continues to struggle. Jeff Snowden (2003) has looked at similar struggles with O & M programs in Texas and has come up with many additional reasons. Most of these center around the attitude of the maintenance provider, their inability to interact with customers and homeowners perception of what O & M is and how it relieves them of any responsibility in operating their OSS.

It is difficult to determine what exactly needs to be done in regard to O & M. If one does too much too fast it will definitely have homeowners, politicians, builders and realtors up in arms. Doing nothing is not the answer as the consequences are not acceptable. So where do we go from here? One approach might be to require LHJ to have their O & M program approved by the state. It would have to meet specific minimum standards, including some type of routine inspection program by a qualified individual, or it would not be approved. If the LHJ did not have an approved program there would be no permitting of alternative systems in areas of special concern or on sites that required vertical separation reductions or setback reductions to surface water or wells. Not being able to build on these lots because of the public health implications would get the attention of the politicians. Builders, realtors and homeowners would be on their doorsteps telling them that something needed to be done because expensive pieces of property were unbuildable. This sounds somewhat drastic, but allowing property owners to build on substandard or marginal lots with systems that will not perform unless maintained can not be allowed to continue. The politicians will have to listen because property values will be affected, as will the economy of the building industry. Once you get their attention it is easier to educate them on the need for O & M and the funding to ensure that it occurs. This approach may present some challenges, because of the costs involved, but the costs involved if nothing is done could be even far greater.

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