

Utah On-Site Newsletter

**Utah State
UNIVERSITY**

Utah On-Site Wastewater Treatment Training Center
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Establishment of the Utah On-Site Wastewater Treatment Training Center

The Utah On-Site Wastewater Treatment Training Center was established in January, 1998 at the Utah Water Research Laboratory at Utah State University (USU) in Logan, Utah. The mission of the training center is to provide classroom and field training to Utah regulators, designers, installers, pumpers, homeowners, and other stakeholders in on-site wastewater treatment systems.

About 12% of all Utah households use on-site wastewater treatment systems, and in six of the twelve local health department regions, this percentage is as high as 30 to 60%. About 3,500 new systems are added annually to the already existing 68,000 on-site systems operating in Utah. Although most systems adequately treat and dispose of wastewater, there are some failing systems. Most of the documented failures of these systems generally occur by discharge of effluent into saturated soils, leakage at the discharge pipe, backup into the house, or wastewater ponding at the soil

The activities of the training center will include conducting workshops and publishing quarterly newsletters and informational brochures.

surface. However, systems are also considered to be failing if wastewater effluents high in nitrogen, phosphates, or pathogenic microorganisms reach surface or groundwater resources.

Many of the soils in Utah are marginal or unacceptable for use of conventional soil absorption systems due to high or fluctuating water tables, slowly

permeable or highly permeable soil horizons, and extreme slopes. Experience with alternative systems that can be utilized on sites with unsuitable conditions is generally low in Utah. Combine these challenges with the accelerated population growth rate of Utah, and the need for increased understanding and training of Utah on-site practitioners and the public becomes clear. An on-site wastewater treatment training center can be instrumental in helping to address these challenges.

Training centers were first established in the early 1990's in North Carolina, Rhode Island, and Michigan. Until recently, growth of such centers proceeded rather slowly. However, since the U.S. EPA's "Response to Congress" report in April, 1997, wherein on-site systems were reported to be appropriate, cost-effective, safe, and environmentally suitable, several such training centers have been established. As recently as September, 1997, there were only about a dozen training centers operating in the country but presently there are at least 20 to 30 in various stages of development.

There is a nationwide movement to elevate the knowledge and acceptance level of on-site wastewater treatment systems as a viable long-term option as well

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as to increase the training level of practitioners in the on-site industry. The entrance of Utah into this training movement could not have come at a better time. National and regional interest is high and other training centers are willing to share their experience and materials. We are in an excellent position to contribute to the continued development of national and state research, training, and outreach activities and goals. It is an exciting time to be involved in this area of environmental protection and public health.

The activities of the training center will include conducting workshops and publishing quarterly newsletters and informational brochures. The training center conducted a workshop on "Site Evaluation Techniques" in Cedar City, Utah, in March, 1998, and will conduct this workshop at least three more times in the next two years. Also, at least four "Fundamentals of On-Site Wastewater Treatment Systems" workshops will be held in the same period. This workshop will include discussions of design, installation, operation, and maintenance of conventional septic tank systems as well as an introduction to alternative systems. We are also developing a percolation (perc) testing training workshop.

Additionally, the training center will assist in the establishment of a Utah on-site wastewater treatment professional association that will promote, facilitate, and elevate the professional development of individuals in the on-site industry and also increase public awareness and education concerning on-site wastewater treatment issues. We hope to establish a Utah internet information clearinghouse for providing technical information and exchanging experiences among Utah health departments and the Utah Department of Environmental Quality (DEQ) for addressing on-site treatment issues. As additional resources are obtained, a physical demonstration site will be developed at USU to provide hands-on training with conventional and alternative on-site treatment systems.

The training center is currently funded through a contract with the Utah DEQ in cooperation with the twelve Utah local health departments, with supplemental matching funds from USU. Tuition fees for the workshops will also provide additional funding. Other training centers receive funding from a



Soil water movement fundamentals are taught by Instructor Judy Sims at the Cedar City Workshop.



Instructor Peg Cashell gives workshop participants instruction on soil characterization in soil pits in Cedar City.

variety of sources, including septic tank permit surcharges, state legislative budgeting, certification training and testing, and research grants.

The training center staff is looking forward to a high and productive level of participation in the development of on-site systems training for all those with a stake in an environmentally responsible approach to on-site wastewater treatment in Utah.

Regulatory Spotlight

R317. Environmental Quality, Water Quality

R317-507. Absorption Systems

R317-507-1. General Requirements

1.6. Absorption system excavations may be made by machinery provided that the soil in the bottom and sides of the excavation is not compacted. Strict attention shall be given to the protection of the natural absorption properties of the soil. Absorption systems shall not be excavated when the soil is wet enough to smear or compact easily. Open absorption system excavations shall be protected from surface runoff to prevent the entrance of silt and debris. If it is necessary to walk in the excavation, a temporary board laid on the bottom will prevent damage from excessive compaction. Some smearing damage is likely to occur. All smeared or compacted surfaces should be raked to a depth of 1-inch, and loose material removed before the filter material is placed in the absorption system excavation.

A frequent cause of early failure of soil absorption systems is poor construction techniques. Absorption of wastewater by soil requires that soil pores are open at the infiltrative surface of the natural soil. If these pores are sealed during construction by compacting, smearing, or puddling of the soil, the system may experience early failure.

Not all soils are equally susceptible to structural damage during construction. Degree of compaction, smearing and puddling depends on soil type, moisture content, and applied force.

Soils with greater than 25 percent (by weight) of clay (which includes all soils types except sands and loamy sands) are susceptible to structural damage. When clay particles are wet, the clay plates separate when force is applied. Water acts as a lubricant as clay plates move relative to one another. This movement results in closing off of soil pores and channels, thereby reducing the permeability of the soil to very low levels; this process is referred to as puddling. However, soils with significant amounts of clay will not puddle if they are only slightly moist. Flat clay particles adhere to one another in dry soils, making

the soil hard and very stable under compacting forces. Under these forces, a dry soil will break into small fragments along the boundaries of soil structural units, keeping the soil pores open.

Careful construction techniques during system excavation and backfilling must be used to minimize soil structural damage, including:

◆ Evaluation of soil moisture

Excavation should proceed in loamy or finer textured soils only when the soil moisture content is below the plastic limit of the soil. If a sample of the soil taken at the depth of the proposed bottom of the system forms a "wire" (about 1/8 inch in diameter) instead of crumbling or breaking when rolled between the hands, the soil moisture is higher than the plastic limit and is too wet for construction.

◆ Use of appropriate equipment

Front end loaders or bulldozer blades should not be used because the scraping action of the bucket or blade can smear the soil, while the wheels or tracks compact the exposed soil surface. The use of backhoes or other similar equipment is preferred. Backhoes with side-mounted "raker teeth" can also be used to minimize sidewall compaction.

◆ Scheduling

Construction should only proceed when the infiltrative surface can be covered in one day because wind-blown silt or the impact of raindrops can clog the soil.

◆ Removal of compacted surfaces

If compaction, smearing, or puddling does occur, the damaged soil should be removed to expose an undamaged surface. The Utah regulation requires that smeared or compacted surfaces be raked to a depth of 1 inch. However, researchers at the University of Wisconsin recommended that at least 4 to 6 inches should be removed to restore infiltrative capacity.

◆ Backfilling

The gravel used as the porous media should be laid in from the sides (avoid driving on the infiltrative surface) by a backhoe or front-end loader rather than dumped by truck.

We must realize that construction of septic tank systems cannot be done “anytime,” even if there is pressure by the owner or developer to complete the system. In some areas, soils may be wet for long periods of time, but we should not permit the use of poor practices that will result in eventual system failure.

Wright and Hill Honored

The Water Quality Board of the Utah Department of Environmental Quality recently presented Dwight Hill, Environmental Health Director of the Utah County Health Department and Phil Wright, Environmental Health Director of the Wasatch County Health Department, with the 1998 Calvin K. Sudweeks Award. The Sudweeks Award is given to an individual or individuals who have shown leadership and achievement in the field of water pollution control or water quality improvement and who have shown qualities of professionalism, personal integrity, and dedication to the goals of improving water quality in the State of Utah. The award is named for Calvin Sudweeks, who exemplified these qualities. Mr. Sudweeks was employed by the Division of Water Quality for over 35 years and served as Executive Secretary to the Water Quality Board for 17 years before retiring in 1987.

Mr. Hill and Mr. Wright received the Sudweeks Award for their leadership and initiative in the on-site wastewater treatment and disposal area, both in their local programs and on a statewide basis. They are members of the Wastewater Disposal Technical Review Committee, an advisory committee on on-site wastewater issues to the Utah Department of Environmental Quality, with Mr. Hill serving as committee chairman.

Satellite Broadcast on Alternative Sewage Treatment

On March 30, 1998, the University of Minnesota Extension Service broadcast a satellite conference, “Alternative Sewage Treatment” that was downlinked to six sites in Utah. Nationally, the conference was viewed by an estimated 6,500 people at 630 sites in 25 states. The conference included:

- A 23-minute video, *Septic Systems Revealed: Guide to Operation, Care, and Maintenance*. This video demonstrated how a septic system works and proper septic tank pumping methods. Also included were hints on household water conservation and use of septic tank additives.
- Introduction of the *Septic Systems Owner's Guide*, a record-keeping folder and guidance booklet for homeowner use.
- Description of service districts for the management of individual on-site wastewater treatment systems.
- Discussion of alternative wastewater treatment systems, including aerobic treatment units (ATUs) and treatment filters, advantages of ATUs, and operation and maintenance requirements.

Both the video *Septic Systems Revealed* and the *Septic System Owner's Guide* can be ordered from the Minnesota Extension Service by calling (800) 876-8636. The video costs \$13 and the guide costs \$4; both the video and the guide can be purchased for \$16. A copy of the video can be checked out from the Utah On-Site Wastewater Treatment Training Center at no cost. Contact Ivonne Harris by telephone (435) 797-3693 or by e-mail at <iharr@pub3.uwrl.usu.edu>.

Training Needs for On-Site Wastewater Treatment Identified

A graduate student team from the College of Business at Utah State University conducted a survey to identify and assess training needs regarding on-site wastewater treatment in Utah. The team conducted a focus group survey of local health department and state Department of Environmental Quality personnel at the Utah Environmental Health Association (UEHA) Spring Conference at Bryce Canyon, Utah, in March, 1998.

Key findings from the survey included:

- ◆ The training center should teach soil characterization, site evaluation, and the basic operation of on-site treatment systems. Additional topics requested include selection and use of alternative systems, trouble-shooting system failures, and understanding of on-site rules and regulations.
- ◆ Other groups were identified who could benefit from on-site training, including designers, developers, real estate professionals, installers, contractors, homeowners, and government planning and zoning officials.
- ◆ The preferred method of training was hands-on, with supplemental reference and lecture materials provided.
- ◆ There was an even split in preference for holding workshops in spring or in fall/winter, with summer being clearly undesirable.
- ◆ Certification of all groups involved in on-site wastewater treatment management (except homeowners) was viewed as both essential and beneficial to environmental health professionals to aid in the performance of their role to protect the public from health hazards. Certification of groups such as site evaluators, contractors, and installers would also provide those groups with additional credibility and advertising advantages.

From the results of the study, the student team recommended that the training center should strive to: 1) provide a standardized educational curriculum for on-site wastewater treatment processes and regulations; 2) provide hands-on training for practitioners; 3) serve as a central clearinghouse of information on conventional and alternative systems; and 4) provide training to all the audiences in Utah with a stake in on-site systems.

The findings of the survey provided the training center staff and advisory board with a foundation for planning future training activities. Similar surveys will be conducted in the future to identify training needs of different groups as well as to determine if training center activities are meeting the needs of targeted audiences.

The members of the MBA Student Consulting Project included:

Dave Rasmussen, Brian Staheli, Kip Kobayashi, Lee Brilliant, and Doug Cooley. Their advisor was Dr. David Baucus. A copy of their report can be obtained from Ms. Ivonne Harris, at the Utah Water Research Laboratory, Telephone (435) 797-3693, Fax (435) 797-3663, e-mail iharr@pub.uwrl.usu.edu, or by visiting our website at <http://engineering.usu.edu/uwrl/uwj/training>.



MBA students conducted a group survey of focus training needs at the UEHA Conference in March, 1998.

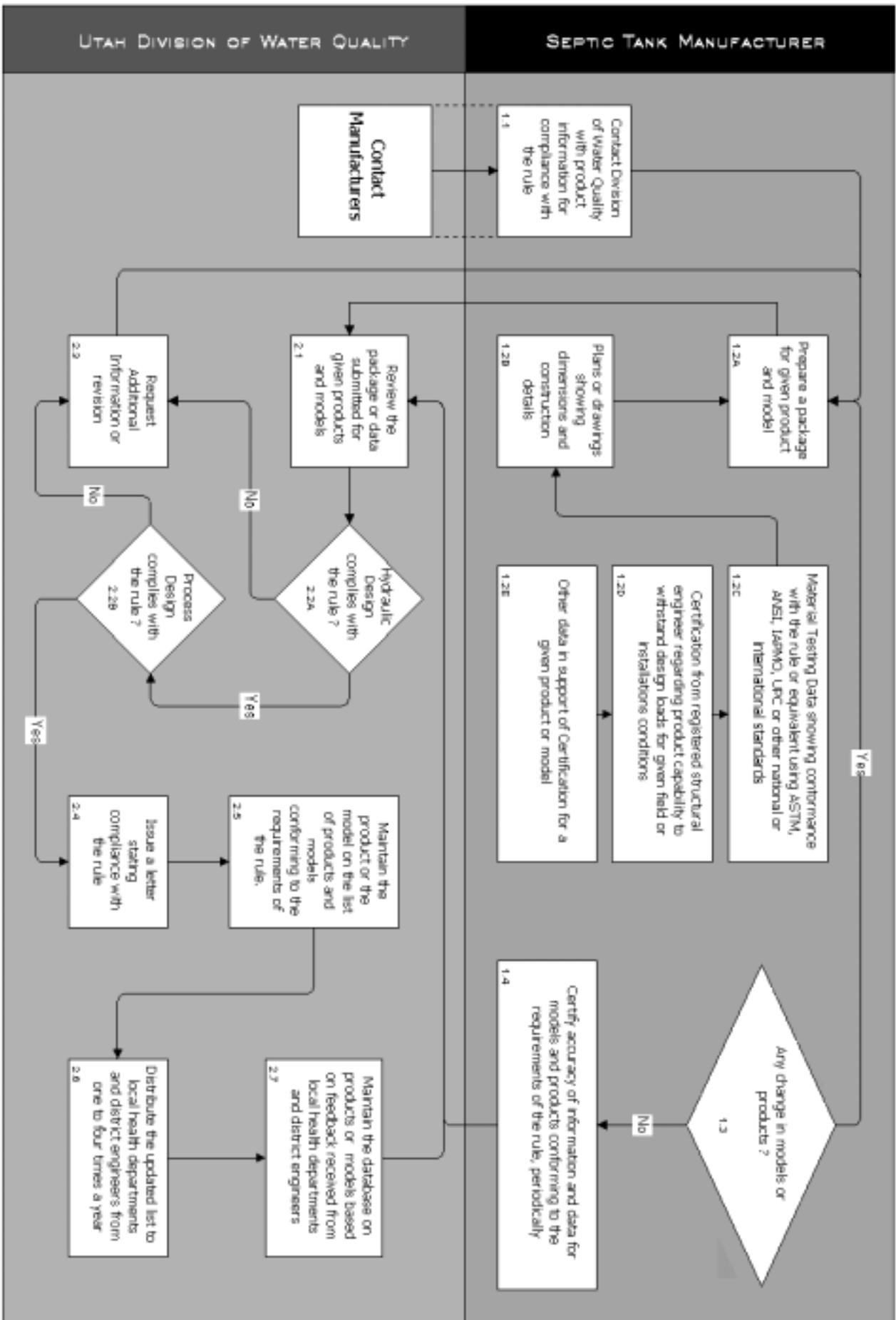
Development of Policy on Approved Septic Tanks

The Division of Water Quality of the Utah Department of Environmental Quality is considering new guidelines for approval of the construction and design of septic tanks. §R317-505 of *Individual Wastewater Disposal Systems of the Utah Administrative Code* requires that plans for all septic tanks be submitted to regulatory authorities for approval. To accomplish this approval process, the Division of Water Quality is considering adopting the following procedures:

1. The Division will contact all septic tanks manufacturers within the state.
2. Plans and design details for all models of septic tanks will be submitted to the Division including:
 - a. Material testing data from an independent testing laboratory indicating conformance with the standards or specifications adopted by the American Society of Testing Materials (ASTM), the American National Standards Institute, and other national and international standards-setting organizations.
 - b. Certification from a registered professional engineer, preferably a registered structural engineer, that the design of the specific model will withstand specified loads (e.g., surcharge, impact, live load, etc.). Limitations for installation should also be specified.

3. The Division will review hydraulic process related aspects, according to the requirements presented in §R317-505-13 through 20 concerning liquid depth in tanks, tanks with compartments, the use of tanks in series, inlets and outlets, scum storage volumes, accessibility of tanks, access to tank interiors, and tank covers.
4. The Division will issue an approval stating compliance with the rules based on the review and certification from a registered professional engineer and will maintain a list of the approved models or types of septic tanks.
5. A manufacturer may be required annually, or at another time interval to be determined, to recertify the accuracy of the information and the data on which the approval was issued.
6. Approvals issued prior to this policy will be subjected to recertification, since the Division does not have records or details of such approvals issued before the Division took over the program administration. Data submitted for earlier approvals will be reevaluated for certification if the data are still accurate, current, and applicable.

A summary of the proposed septic tank certification process is presented in Figure 1. All septic tank manufacturers are encouraged to contact the Division of Water Quality immediately (801) 538-6146. If you have questions on the new policy, please contact Kiran Bhayani of the Division at (801) 538-6146.



Process for Septic Tank Certification

prepared by: Steven L. Bryant

March 8, 2008

Figure 1. Proposed Process for Septic Tank Certification.

Calendar of Events

July 30-August 1, 1998

Florida Septic Tank Association (FSTA) 25th Annual Conference and Trade Show. Haines City, FL, Bob Lynch (904) 454-4030.

August 11-13, 1998

Utah Department of Environmental Quality, "Non-Point Source Pollution 7th Annual Conference," Animal feeding issues with field trips to the Beaver River and Otter Creek watersheds. Richfield, UT, Jack Wilbur (801) 538-7098.

September 15-18, 1998

Utah On-Site Wastewater Treatment Training Center classes in "Basic Site Evaluation Techniques for On-Site Wastewater Treatment," Sept. 15; "Fundamentals of On-Site Wastewater Treatment and Disposal Systems," Sept. 16; and "Advanced Site Evaluation Techniques for On-Site Wastewater Treatment," Sept. 17-18. Charleston, UT, Steve Iverson (435) 797-3159; e-mail: <sverson@cc.usu.edu>.

September 24-26, 1998

Pumper and Cleaner Environmental Expo West. Workshops and vendor displays regarding wastewater pumpers and cleaning of sewage pipe systems. Long Beach, CA, Cole, Inc. (800) 257-7222.

September 30-October 2, 1998

Utah Environmental Health Association Fall Conference, "Food Protection and Safety." Provo, UT, Bruce Costa (435) 896-5451, Ext. 16, e-mail: <hrichfield.costa@state.ut.us>.

October 3-7, 1998

Water Environment Federation (WEF) Technical Expo and Conference '98. Orlando, FL, (800) 666-0206.

October 19-20, 1998

British Columbia Onsite Sewage Association. "New Thinking-The Technology Revolution in Wastewater Treatment, Disposal, and Reuse." Royal Roads University, Victoria, B.C., Lyn Bailey (250) 748-8500, e-mail: <osieagle@cow.net.com>.

October 22-25, 1998

National On-Site Wastewater Recycling Association (NOWRA) Annual Conference and Exhibition. Cincinnati, OH, Pam Franzen (800) 966-2942.

October 25-28, 1998

Annual Biological Safety Conference. Includes topics on lab safety in handling various wastewater materials. Orlando, FL, John Stygar (847) 949-1517.

October 27-29, 1998

14th Annual On-Site Wastewater Treatment Conference. "Securing the Future of On-Site Wastewater Systems." Sessions to include conventional and alternative technologies. Directed toward health department personnel, on-site system designers and installers, and others. Raleigh, NC, Joni Tanner (919) 513-1678.

November 4-6, 1998

The Environmental Technology Expo (general wastewater issues). Atlanta, GA, e-mail: <info@aeeecenter.org> for attendance questions and (770) 447-5083, ext. 210 or the website at [<http://aeeecenter.org>] for exhibits information.

November 15-18, 1998

American Public Health Association Expo. Topics include public health and the environment, children's health, public health infrastructure, and managed care. Washington, D.C., Carol Lewis (202) 789-5620.

Training Courses Scheduled for September

The Utah On-Site Wastewater Treatment Training Center will conduct three courses in Charleston, UT, from September 15-18, 1998.

Basic Site Evaluation Techniques for On-Site Wastewater Treatment will be held on Tuesday, September 15, 1998. This one-day classroom course will emphasize assessment of soil characteristics and application of those characteristics to the ability of a soil to treat and dispose of wastewater. This course is designed for those who are interested in learning the fundamentals of soil science as related to on-site wastewater treatment.

Those participants who are interested in field application of the site evaluation techniques presented in the basic course are encouraged to attend the

Advanced Site Evaluation Techniques for On-Site Wastewater Treatment on Thursday, September 17, 1998. This course will be field-oriented and will provide participants with hands-on experience in soil and site evaluation at several sites in the Heber City area that represent different challenges to the siting of on-site systems. This advanced course will also include a half-day classroom session on Friday, September 18, 1998, on "Water in Soils Under Saturated and Unsaturated Conditions and Effects on Wastewater Treatment and Disposal." Additional information on water movement in unsaturated soils will be presented as well as methods for the evaluation of groundwater levels in soils. As a prerequisite for this advanced course, participants must have attended either the basic site evaluation course on September 15 or the course *Site Evaluation Techniques for On-Site Wastewater Treatment* held in Cedar City in March, 1998.

A classroom course on the *Fundamentals of On-Site Wastewater Treatment Systems* will be held on Wednesday, September 16, 1998. This course will provide classroom discussions and demonstrations on composition of wastewater (including grey and black water), septic tank construction and maintenance, wastewater distribution and treatment in conventional soil absorption systems, design of trenches and beds, use of alternative systems in Utah, and water conservation techniques.

Further information on these courses can be obtained from Steve Iverson, Center Director at (435) 797-3159 (e-mail: siverson@cc.usu.edu). Course description brochures containing registration forms were sent to all local health departments and other interested participants in July 1998.

If you would like to be added to our mailing list please contact:

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8200 Old Main Hill
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(435) 797-3693, (435) 797-3663 (Fax)
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Training Center Newsletter Name Contest!

Would you like to win a Soil Evaluator's Tool Kit for Site Characterization? We need your help to create a name for this newsletter that captures the spirit and mission of our training center. As a training center, we want to do our part to help protect the public health and our natural resources by:

1. Providing training, technology transfer and information dissemination in on-site wastewater treatment and disposal to Utah and the surrounding area.
2. Developing and promoting high performance standards in on-site wastewater treatment and disposal among practitioners.
3. Raising the level of public awareness and education in on-site wastewater treatment and disposal issues.

If you wish to participate, please submit a name that is simple, yet symbolizes what we stand for. If your entry is selected, you will win a Soil Evaluator's Tool Kit for Site Characterization. If the winning entry is duplicated, the award will go to the entry received first. The winning entry will become the property of the training center.

Please fill out the entry form and send to:

Attention: Ivonne Harris
(e-mail: iharr@pub3.uwrl.usu.edu)
Utah State University
Utah On-Site Wastewater Treatment Training Center
8200 Old Main Hill
Logan, UT 84322-8200

Newsletter Name Contest Entry Form

Name _____
Address _____

Telephone _____

E-mail Address _____

Newsletter name(s): _____

Director's Corner

Welcome to the first issue of the Utah On-Site Newsletter! We hope that it will become valuable to you as you continue your involvement in on-site wastewater treatment issues. We, as training center staff, are committed to offering you accurate and up-to-date information, knowledge, and news. We will also be actively soliciting you as experienced practitioners in your specialties to share your on-site knowledge, skills, and insights with all of us.

There is a tremendous amount of enthusiasm nationally for the establishment of training centers, and the level of cooperation among them is exceptional. We are gratified to be able to participate. We have staff members with considerable experience in on-site systems and wastewater treatment, and we look forward to working with you to increase understanding of Utah and Rocky Mountain region-specific issues.

One of the first areas of help we would like from you is your help with creating an innovative and descriptive name for this newsletter that reflects the spirit and mission of our training center.

We have already met many of you, and we are looking forward to getting to know and working with others of you as well. Please feel free to contact me or other training center staff with your suggestions as to how we can serve you better.

Steve Iverson, Director
(435) 797-3159

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