STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT BOARD

IN THE MATTER OF THE AMENDED PETITION
TO CONSIDER PROPOSED AMENDMENTS
TO THE LIQUID WASTE DISPOSAL AND
TREATMENT REGULATIONS, 20.7.3 NMAC

EIB 12-01 (R)

NEW MEXICO ENVIRONMENT DEPARTMENT, Petitioner

INFILTRATOR SYSTEMS INC.'S NOTICE OF INTENT TO PRESENT REBUTTAL TECHNICAL TESTIMONY

Infiltrator Systems Inc. (Infiltrator), by and through its undersigned counsel Sheehan & Sheehan, P.A. (Susan C. Kery), submits to the New Mexico Environmental Improvement Board (EIB) this Notice to Present Rebuttal Technical Testimony at the hearing before the Board, to be held on October 29 and 30, 2012 and continuing thereafter as necessary, to consider proposed amendments by the New Mexico Environment Department (Department) to the Liquid Waste Disposal and Treatment Regulations, 20.7.3 NMAC. Dennis F. Hallahan will present rebuttal technical testimony on behalf of Infiltrator. Pursuant to 20.1.1.302 NMAC, the following additional information is provided to the EIB:

1. Rebuttal Technical Testimony of Mr. Hallahan.

The rebuttal technical testimony of Mr. Hallahan is attached hereto as Attachment A.

2. Rebuttal Exhibits.

ISI Rebuttal Exhibit No. 1 – Infiltrator Systems, Inc.'s Fact Sheet, Science and Statistics Supporting Chamber Technology Use in Wyoming (August 7, 2012);

ISI Rebuttal Exhibit No. 2 – Document with comment by Dr. Jörg E. Drewes, "Scientific Assumptions, Findings and Conclusions to be Addressed by Peer Reviewers" (May 1, 2012);

ISI Rebuttal Exhibit No. 3 – Ronald W. Crites, P.E.'s Comments on Peer Review of State Board Onsite Wastewater Treatment Systems Policy (May 1, 2012);

ISI Rebuttal Exhibit No. 4 – Uniform Plumbing Code, 2012 Edition, pages 316, 319; and

ISI Rebuttal Exhibit No. 5 - Excerpts from the August 6, 2012 Transcript of Proceedings (pages 8-12, 29-33, 61-63, 75-90 and 200-202) and August 13, 2012 Transcript of Proceedings (pages 251-154).

Respectfully submitted,

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing Notice was hand-delivered or mailed this 22nd day of October, 2012 to:

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S:\49300095\Hearing No. EIB 12-01(R)\Notice^Rebuttal Testimony (Oct 2012).doc

DENNIS HALLAHAN REBUTTAL TESTIMONY

Dennis F. Hallahan, P.E., on behalf of Infiltrator Systems Inc. (Infiltrator) submits the following rebuttal testimony in Hearing No. EIB 12-01 (R) (Hearing):

The purpose of my testimony is to rebut testimony presented to the New Mexico Environmental Improvement Board (EIB) at the Hearing on August 6, 2012, and August 13, 2012. I wish to rebut testimony relating to the 70% sizing (as compared to gravel and pipe systems) allowed in New Mexico for Infiltrator chambers. I also wish to clarify my testimony set forth in Infiltrator's July 17, 2012 Notice of Intent, as it relates to the Uniform Plumbing Code.

I. Sizing of Drainfields.

In his opening remarks before the EIB at the Hearing, Andrew Knight, counsel for the New Mexico Environment Department (NMED), characterized the issue relating to the sizing of drainfields as "relatively minor" and requested that the issue not "dominate" the discussion before the EIB. *See* Transcript of Proceedings (hereafter Tr.) at p. 9, lines 17-21; p. 11, lines 12-15, attached as Exhibit 5. Despite Mr. Knight's attempts to characterize the issue as minor, it is in fact an important issue which needs to be carefully considered by the EIB.

In his testimony before the EIB, NMED's technical witness, Dennis McQuillan, alluded to the fact that Infiltrator has an unfair advantage over gravel and pipe systems due to the fact that Infiltrator chambers are sized at 70% (which was authorized by NMED in both 1998 and again in 2005) as compared to gravel systems. For example, Mr. McQuillan stated at the hearing, in discussing the justification for NMED's proposal to eliminate the six inches of surge protection in sizing drainfields: "Another factor is that the industry in New Mexico, the guys who install these every day, have been telling us for now, for eight years and with seven Petitions that they filed with the EIB, that the playing field was not level between pipe and gravel and proprietary products." Tr. at p. 253, lines 8-13, attached as Exhibit 5.

Mr. McQuillan also questioned the science behind chamber sizing by testifying as follows: "And there have been a number of papers that have come out since 2005, and we - - when we codified the rule that gives up to a 30% reduction for proprietary products, that raised questions about the assumptions that went into that, and we are not - - but the bottom line is we are not proposing to change the 30 percent rule." Tr. at p. 253, lines 14-20, attached as Exhibit 5. As I will discuss below, NMED is wrong on both points. First, the playing field between proprietary products such as Infiltrator chambers and gravel systems is fair and even, since many studies show that, by design, chambers allow more infiltration of wastewater than gravel. Second, in direct contradiction to Mr. McQuillan's testimony, numerous scientific studies support chamber sizing.

Infiltrator chambers are more efficient than traditional gravel and pipe systems since they have a greater infiltrative capacity per linear foot than the traditional systems. This is based on the open-bottom design of chambers, and well as louvered sides which allows for additional infiltration of waste water into the drainfield. This efficiency is the basis for chamber sizing in many states, including New Mexico. Attached to my testimony are three exhibits which illustrate this point.

First, attached as Exhibit 1 is a Fact Sheet compiled by Infiltrator outlining the science and statistics supporting chamber technology use in Wyoming. As shown by the Fact Sheet, the use of a sizing reduction for chambers as compared to the size of a gravel and pipe drainfield is a proven method supported by independent research. The Fact Sheet lists multiple research papers and references that support the validity of the chamber sizing allowed in New Mexico. These papers are summarized in the Table 1 attached to the Fact Sheet, with a column showing the increased efficiency of a non-gravel system compared to gravel (1.33-3.2 times as efficient.)

Further support of chamber sizing is shown in California, which recently conducted a rule-making to develop a statewide policy covering onsite wastewater systems. An external peer review is required for California rule making. Two world-class experts, Ronald W. Crites, P.E, and Dr. Jörg E. Drewes, commented on the 70% multiplier in the California policy, and both found it to be justified by the science.

Attached as Exhibit 3 is a letter authored by Mr. Crites to California's State Water Resources Control Board in which he agrees with the proposed regulation which would "allow design of gravel-less dispersal systems with a reduction (adjustment multiplier of 0.7) of the minimum required dispersal area for effluent application." *See* Exhibit 3, p. 4. Exhibit 4 is an attachment to Mr. Crites' letter. Comment 17 of Exhibit 4 was drafted by Dr. Drewes (the Director of Research for the National Science Foundation), and states: "It has been shown in the laboratory and in the field that gravel-less chambers function as well as conventional dispersal systems even when the system sized is reduced by as much as fifty percent in size (King, et. al. 2002). When gravel-less chambers are sized equivalently to conventional OWTS, it has been shown that the long-term acceptance rate can be 1.5 to 2 times higher than that of conventional OWTS dispersal systems (Seigrist et. al. 2004). For this reason, SWRCB staff has included a multiplier allowing the reduction of the dispersal system when chambers are used."

As shown by the three exhibits discussed above, it is abundantly clear that the sizing of chambers is well-supported. Mr. McQuillan's testimony questioning the sizing is not supported by any evidence, and should be disregarded by the EIB. Further, any assertions that the playing field is unfair between gravel and chamber systems is also not supported by science - - the systems are different, and need to be sized differently.

II. Uniform Plumbing Code.

The testimony I submitted with the July 17, 2012 Notice of Intent referenced the 2000 edition of the Uniform Plumbing Code (UPC). A question was raised at the Hearing as to whether the 2012 edition of the UPC excludes, as did the 2000 edition, 12 inches of trench sidewall from the size calculation for gravel systems. Tr. at page 201, lines 2-10. As shown on attached Exhibit 4, the 2012 UPC continues to exclude 12 inches of sidewall for calculating the size of gravel systems, and allows a 0.7 multiplier for the sizing of chambers.

S:\49300095\Hearing No. EIB 12-01(R)\Hallahan^rebuttal (Oct 2012)

Fact Sheet
Science and Statistics Supporting Chamber Technology Use in Wyoming

INFILTRATOR Systems Inc.

The use of a sizing reduction for gravelless leaching chambers compared to the size of a stone and pipe drainfield is a proven method that is supported by independent research. Numerous statistically valid studies have been conducted on this subject, from the laboratory and full-scale test facility level at major research centers, to the world's largest onsite system field performance study conducted by the North Carolina Department of Environmental and Natural Resources. Taken as a whole, the weight of scientific evidence shows that reduced-size gravelless chamber systems perform consistent with "conventional" stone and pipe. A technical basis for reduced-size gravelless chamber products is provided below.

Ubiquity of Technology

- Reduced-size gravelless systems have replaced "conventional" stone and pipe as the standard system in many areas of North America.
- Gravelless chamber products are approved in all 50 states and 10 provinces, with over 2.5 million systems installed.
- Approximately 50% of the septic systems installed in North America each year are constructed at reduced sizing using gravelless drainfield products.
- In the US, proprietary gravelless drainfield products make up over 75% of all systems installed in 9 states. In 16 other states, proprietary products make up between 50 and 75% of all drainfields installed.
- The International Association of Plumbing and Mechanical Officials (IAPMO), allows a 30% sizing efficiency for chamber technology in its *Uniform Plumbing Code.*

Hydraulic Efficiency Multiplier

- The efficiency multiplier measures the ability of a gravelless system to process effluent as compared to a reference.
- Example 1: A 50% sizing reduction (100 ft stone and pipe divided by 50 ft of gravelless), would be a 2.0 multiplier.
- Example 2: A 35% reduction equates to an efficiency multiplier of 1.5 (100 ft of stone and pipe trench divided by 65 ft of gravelless system = 1.5 efficiency multiplier).
- Numerous studies (see Table 1) have compared gravel and gravelless infiltration characteristics.
- The gravelless system infiltration rate efficiency in these studies ranges between 1.3 and 3.2.
- The 1.5 and 2.0 multipliers provided as examples above are within the multiplier range in the available research, and are supported by current scientific evidence.
- Use of gravelless sizing shall not be combined with a reduction for advance treatment (i.e., no double dipping).

Chamber Large-Scale Field Performance Assessments

Large-scale field performance assessments have been conducted to examine the function of installed, real-life gravelless chamber systems. This method of analysis offers the advantage of a large sample population, differing physiographic and climactic conditions, and a wide spectrum of wastewater flows from the dwelling. Table 2 includes a listing of significant field performance studies conducted on chamber systems.

North Carolina: 900-System Gravelless Study at a 25% Reduction

- The North Carolina Department of Environment and Natural Resources conducted a field performance study on 900 systems in total, including chamber and expanded polystyrene drainfields.
- North Carolina is one of the largest on-site wastewater treatment system permit writing jurisdictions in the US.
- Systems ranged in age from 2 to 12 years and were installed at a 25% reduction.
- 303 stone and pipe, 303 chamber, and 306 expanded polystyrene systems were surveyed.
- Over 10,000 of both the chamber and expanded polystyrene drainfields are installed annually in the state.
- Systems were distributed uniformly within the coastal, piedmont, and mountain physiographic regions.
- At a 95% upper confidence level, no statistical difference in malfunction rates was identified between stone and pipe and gravelless systems.
- Based on the study results, the DENR granted chamber and expanded polystyrene products an approval status that, under NC law, designates both products as equal or superior to a stone and pipe system.

Fact Sheet
Science and Statistics Supporting Gravelless Technology Use in Wyoming

Oregon: 200-System Chamber Study at a 40% Reduction

- Dr. Larry King and Dr. Michael Hoover at North Carolina State University conducted a 3rd party study of the Infiltrator Equalizer 24 chamber in support of a product approval by the Oregon Department of Environmental Quality.
- A juried article summarizing the study results was published in the Fall 2002 edition of *Small Flows Quarterly.*
- Over 400 chamber and conventional stone and pipe systems were studied.
- Malfunction rates for chamber systems and stone and pipe systems were less than 1.5%.
- There was no statistical difference in surficial failure rates between these two system types.
- Chamber systems in this study were installed with basal area reductions of 40%.
- The Oregon DEQ issued an unrestricted product approval based on the results of the study.

Maine: 400-System Chamber Study at a 50% Reduction

- The University of Maine's Dr. Chet Rock conducted a study that examined the longevity of gravelless drainfields sized at 50% the length of stone and pipe systems.
- Systems were at least 20, and up to 30 years in age, with 63 chamber and 341 gravel system evaluated.
- All systems were located within a single municipality in the state of Maine.
- The source of information was municipal drainfield repair records, where malfunction was determined based on the record of repair since the time of system construction.
- Repair records showed that, at a 95% upper confidence level, gravelless systems at a 50% sizing reduction outperformed stone and pipe.

Treatment and Hydraulics Studies

Colorado: Chamber Hydraulic and Treatment Study at a 50% Reduction

- Dr. Robert Siegrist of the Colorado School of Mines conducted a 3rd party study of Infiltrator chambers in Colorado.
- 6 operating gravel and 10 operating chamber systems were studied in Colorado.
- Systems were aged up to 11 years.
- Percolate samples analyzed from 30 cm beneath infiltrative surface for treatment performance.
- Effluent ponding was monitored in the chamber and gravel trenches.
- No significant difference in hydraulic or treatment performance between the gravel and 50% reduced length chamber systems.

Other Considerations

Natural Resource Preservation

- Wyoming's natural resource reserves can benefit from the proposed addition of gravelless products. Gravelless wastewater absorption systems are installed in lieu of crushed rock aggregate. This aggregate is typically mined at a local rock quarry, processed at the quarry to achieve a specific size requirement, and delivered to a construction site for placement in a trench or bed as part of a wastewater absorption system. Gravelless chambers are frequently manufactured using recycled plastics and represent a substitute for the crushed rock aggregate, conserving a valuable, non-renewable natural resource. This product substitution allows natural aggregate reserves to be preserved for use in asphalt, concrete, road bases, etc., where the type of product substitution that is possible for gravelless products in a wastewater absorption system is technically infeasible.

- In addition to preserving aggregate reserves, by eliminating the need to mine, process, and transport aggregate, significant reductions in energy use are realized. This not only reduces the state's energy demand, it also reduces the release of carbon to the atmosphere from electricity generation and internal combustion engine operation. For perspective, one tractor trailer loaded with gravelless chambers contains over 11,000 linear feet of wastewater absorption trench. A single truckload of gravelless chambers is the approximate equivalent of 70 gravel-filled tri-axle dump trucks that would be used to transport aggregate from a quarry to the job site.

Miscellaneous

- Use of an engineered product vs. gravel provides consistent and reliable dimensions for the construction of an onsite system. Gravel trenches may be dimensionally inconsistent, which may lead to system malfunction or reduced wastewater storage capacity.
- Gravelless products can typically be hand-carried, minimizing construction traffic over the area where the onsite wastewater system is to be constructed, thereby preserving and protecting the soil structure. An open soil structure is critical to the effective dispersal of wastewater in the subsurface. If the soil structure collapses from the load of construction vehicle traffic, its ability to absorb wastewater is compromised.
- The number of economical choices available to designers and installers remains high with a gravelless technologies. Maintaining a robust number of cost-effective "tools" that can be installed at reduced sizing allows more flexibility in drainfield design.

Table 1
Research Summary on Infiltration Efficiency of Gravelless Drainfields
Compared to Gravel Aggregate Drainfields

August 2012

Research Study	**Description of Study**	**Difference in Septic Tank Effluent Infiltration Rate Efficiency (Gravelless vs. Gravel Aggregate)**
Massachusetts Alternative Septic System Test Center, 2010. Performance Evaluation of the EZflow Geosynthetic Aggregate Leaching System	16-month side-by-side comparison of treatment and hydraulics	2.2
Lowe et al. 2008. Controlled Field Experiment for Performance Evaluation of Septic Tank Effluent Treatment during Soil Evaluation, Journal of Environmental Engineering	Two-year field study of 30 pilot-scale test cells.	1.4 – 1.8
Walsh, R. 2006. Infiltrative Capacity of Receiving Media as Affected by Effluent Quality, Infiltrative Surface Architecture, and Hydraulic Loading Rate, Master Thesis at Colorado School of Mines	One dimensional column study	3.2
Uebler et al. 2006. Performance of Chamber and EZ1203H Systems Compared to Conventional Gravel Septic Tank Systems in North Carolina, Proceedings of NOWRA	Field evaluation of failure rates of approximately 300 of each type system (gravel, chamber, EPS) 2-12 years old	1.4
Radcliffe et al. 2005. Gravel and Sidewall Flow Effects in On-Site System Trenches, Soil Science Society of America Journal	Two dimensional computer model (HYDRUS-2D)	1.5 – 1.93
Siegrist et al.2004. Wastewater Infiltration into Soil and the Effects of Infiltrative Surface Architecture, Small Flows Quarterly	Two one dimensional column studies and pilot-scale field study	1.5 – 2.0
White and West. 2003. In-Ground Dispersal of Wastewater Effluent: The Science of Getting Water into the Ground. Small Flows Quarterly, 2003	Literature Review and One dimensional column study measuring the impact of gravel and fines (clean water)	2.5
King et al. 2002. Surface Failure Rates of Chamber and Traditional Aggregate-Laden Trenches in Oregon, Small Flows Quarterly	Field evaluation of failure rates of 198 chamber systems and 191 gravel systems 2-5 years old	1.6
Burcham, T. 2001. A Review of Literature and Computations for Chamber-Style Onsite Wastewater Distribution Systems, Report commissioned by the Mississippi Department of Health	Literature review and computer model	1.43– 2.0
Joy, Douglas. 2001. Review of Chamber Systems and Their Sizing for Wastewater Treatment Systems, Ontario Rural Wastewater Centre Report, University of Guelph	Literature Review	1.67
Van Cuyk et al, 2001. Hydraulic and Purification Behaviors and their Interactions During Wastewater Treatment in Soil Infiltration Systems", Journal of Water Resources	Three-dimensional lysimeter study of treatment performance	1.67

Table 1
Research Summary on Infiltration Efficiency of Gravelless Drainfields
Compared to Gravel Aggregate Drainfields

August 2012

Research Study	**Description of Study**	**Difference in Septic Tank Effluent Infiltration Rate Efficiency (Gravelless vs. Gravel Aggregate)**
Casper, Jay. 1997. Final Report: Infiltrator Side-by-Side Test Site, Killarney Elementary School, Winter Park, Florida. Report to State of Florida, Department of HRS.	Pilot-scale side-by-side study of 15 trenches (gravel and chamber).	1.6 – 2.3
Amerson, RS, Tyler, EJ, Converse, JC. 1991. Infiltration as Affected by Compaction, Fines and Contact Area of Gravel, *in* On-Site Wastewater Treatment: Proceedings of 6th National Symposium On Individual and Small Community Sewage Systems, American Society of Agricultural Engineers, St. Joseph, MI, December 1991	Evaluation of 30 soil cells to assess impact of gravel compaction, contact area and fines. Ratios are the clean water infiltration rate ratios of an open soil surface (control) compared to one with gravel compaction, embedment, and fines.	2.1 – 2.6
Other References		
2006. Uniform Plumbing Code.	International Standard	1.4
Siegrist, Robert. 2006. Evolving a Rational Design Approach for Sizing Soil Treatment Units, Small Flows Quarterly. Summer 2006	Proposed design methodology that takes into account BOD loading, soil type and infiltrative surface architecture.	1.33 – 2.0
2001. U.S. EPA Decentralized Systems Technology Fact Sheet – Septic Tank Leaching Chambers.	Literature Review and Recommended Usage	1.4

Table 2
Summary of Gravelless Leaching Chamber Field Performance Studies

State	Regulatory Agency	Lead Investigator	Gravelless Sizing Reduction	System Age (years)	Total Systems Studied	Gravelless Systems Studied	Gravel Systems Studied	Study Conclusion	Resulting Regulatory Action
Chamber Technology									
North Carolina	DENR	Dr. Robert Uebler, DENR	25%	2 to 12	912	303	303	Equivalent performance at the 95% upper confidence level	Approval as gravel equivalent
Oregon	DEQ	Dr. Mike Hoover, NC State University	50%	3 to 5	389	198	191	Equivalent performance at the 95% upper confidence level	Unrestricted product approval
Maine	---	Dr. Chet Rock, University of Maine	50%	20 to 30	404	63	341	Chambers outperformed gravel at 95% upper confidence level	---
Tennessee	TDEC	Andrew England	50%	2 to 9	895	895	0	Less than 1% malfunction rate	Unrestricted product approval
Georgia	DHR	Stephen Dix, Infiltrator Systems	50%	2 to 7	232	98	134	Chamber malfunction rate equivalent to gravel	Continued unrestricted approval
Maine	DHS	Donald Hoxie, Dept. of Human Services	50%	1 to 10	7,677	779	6,898	Chamber malfunction rate lower than gravel	Continued unrestricted approval
Texas	TCEQ	Shawn Ricklefs, Amarillo County Health Dept.	40%	2	42	42	0	Acceptable product performance	Continued unrestricted approval
Washington	DOH	Stephen Dix, Infiltrator Systems	40%	7	28	28	0	No malfunctions attributable to product failure	Continued unrestricted approval
Illinois	IDPH	Stephen Dix, Infiltrator Systems	40%	4	10	10	0	No malfunctions attributable to product failure	Unrestricted product approval

Note:
1. The North Carolina field performance study was conducted on gravel, chambers, and expanded polystyrene, and results are reported in a single document.

May 1, 2012

ATTACHMENT 2: SCIENTIFIC ASSUMPTIONS, FINDINGS AND CONCLUSIONS TO BE ADDRESSED BY PEER REVIEWERS

The statute mandate for external scientific peer review (Health and Safety Code Section 57004) states that the reviewer's responsibility is to determine whether the scientific portion of the proposed rule is based upon sound scientific knowledge, methods, and practices.

We request that you make this determination for each of the following assumptions, finding and conclusions that constitute the scientific portion of the proposed regulatory action. An explanatory statement is provided for each issue in order to focus the review.

An important caveat should be noted for the reviewers. The vast majority of existing OWTS are conventional systems (septic tank and dispersal system).

1. **It is reasonable to use expected waste strength as a trigger for submitting a report of waste discharge (State permit application) and for determining the necessary approach to direct State regulation and oversight through waste discharge requirements.**
   These regulations establish an upper limit for wastewater organic and solids strength due to concern for the performance and operating longevity of the dispersal field. Sections 2.4, 2.6.6, and 6.1.2 of the Policy allow commercial facilities that have an OWTS with biochemical oxygen demands (BOD) less than 900 mg/L provided that those facilities also have a grease interceptor. Other commercial OWTS with wastewater having a BOD greater than 900 mg/L and/or not having a grease interceptor would have to file for a separate waste discharge permit or waiver thereof.

Reviewer Comment:
The proposed trigger level for waste strength discharge is reasonable. The justification provided is sound.

2. **Use of the design flow as a trigger for submitting a report of waste discharge (State permit application) and for determining the necessary approach to direct State regulation and oversight through waste discharge requirements is reasonable.**

   Experience shows that larger OWTS (greater than 3,500 gallons-per-day) are more likely to fail than smaller ones and are best limited to design flows of less than 6,000 gallons-per-day (Plews et al. 1985). The Policy Section 2.6.2 would require that OWTS owners with new or replaced OWTS notify the regional water board if the flow rate is in excess of 3,500 gallons-per-day and if the system is not specifically allowed by a local permitting agency in the local agency management plan. The Policy Sections 2.6.3, 6.1.1 and 9.4.2

would require all existing OWTS owners not covered by an existing waiver or waste discharge requirements notify the regional water board if the flow rate is in excess of 10,000 gallons-per-day. The regional water board would then determine whether it would issue specific waste discharge requirements or a waiver that may be more stringent than required by the proposed regulations to guarantee protection of water quality.

Reviewer Comment:
The proposed design flows are reasonable and representative of commonly used OWTS systems.

3. A site evaluation is required in Tier 1 (Section 7 of the proposed Policy) to determine that adequate soil depth is present in the dispersal area. Soil depth would be measured vertically to the point where bedrock, hardpan, impermeable soils, or saturated soils are encountered or an adequate depth has been determined.

Soil is the primary media that treats wastewater from OWTS. It also serves as the receiving environment and ultimate assimilation point for the wastewater volume that is passed from the structures through the OWTS. Bedrock, hardpan, impermeable soils, and saturated soils do not provide a porous media to provide adequate treatment to safely dispose wastewater with surety of proper treatment and disposal.

Reviewer Comment:
A site evaluation to determine the adequate soil depth is appropriate.

4. A site evaluation for seasonal groundwater is required in Section 7.3 using one or a combination of the following methods: direct observation of the highest extent of soil mottling observed in the examination of soil profiles, direct observation of groundwater levels during the anticipated period of high groundwater, or other methods, such as historical records, acceptable to the local agency. Where a conflict in the above methods of examination exists, the direct observation method indicating the highest level shall govern.

All the prescribed methods are valid methods to determine seasonal high groundwater, with the most valid method being direct observation during the time that groundwater is most likely to be expected at its seasonal high level. This is because direct observation conclusively indicates actual groundwater levels.

Reviewer Comment:
All proposed methods are valid methods to determine or estimate groundwater levels.

5. **Section 7.4 requires that percolation test results in the effluent disposal area shall not be faster than one minute per inch (1 MPI) or slower than ninety minutes per inch (90 MPI) because of problems associated with allowing OWTS on soils that exhibit faster percolation rates than 1 MPI and slower than 90 MPI. All percolation rates shall be based on actual or simulated wet weather conditions by performing the test during the wet weather period as determined by the local agency or by presoaking of percolation test holes and shall be a stabilized rate.**

   In OWTS, soils provide both treatment and disposal of the wastewater. If soils percolate the wastewater too quickly, insufficient treatment of the wastewater can occur before entering groundwater. However, if the soil percolates too slowly, the soil may not be able to accept all of the wastewater and the wastewater may subsequently surface and pose a condition of nuisance or pollution. A commonly allowed acceptance rate is between 1 and 120 MPI. As such, the allowable interval proposed in the Policy is conservative towards protection from surfacing. Presoaking the percolation test hole helps to stabilize the rate at which soils absorbs the water and helps to estimate the long-term acceptance rate.

Reviewer Comment:
In section 7.4 and other sections of the draft policy, percolation rates are expressed in "minute per inch" (MPI). This is not correct, since an infiltration rate should be expressed as "volume per area and time" rather than "time over volume per area or distance". Thus, percolation rates in Table 1 should be expressed in inch/minute or cm/day.

Limiting the percolation rate in OWTS by defining a minimum and maximum percolation rate is very appropriate to avoid ponding and appropriate retention time in the porous media. The range of recommended infiltration rates are appropriate (1-120 MPI), but should be expressed in units of inch/minute or cm/day.

6. **Section 7.5 stipulates minimum horizontal setbacks as follows:**

   a. **5 feet from parcel property lines.**

      This setback is designed to protect the septic tank and dispersal system. Surcharges due to soil loads associated with structures can damage an OWTS. The default assumption for surcharges in building codes usually establishes a zero surcharge load when the structure on the soil is two times the distance of the depth of the cut. Setting OWTS away from the property lines helps assure that surcharges on an OWTS will be minimal, if not zero, since OWTS are usually not very deep and structures often have their own setback from property lines.

Reviewer Comment:
The suggested set-back is appropriate and the provided justification is sound.

b. 100 feet from water wells and monitoring wells, unless regulatory or legitimate data requirements necessitate that monitoring wells be located closer.

OWTS are identified as a possible contaminating activity (PCA) for groundwater (CA DHS 1999). OWTS contamination of water supplies is known to cause diseases such as infectious hepatitis, typhoid fever, dysentery, and various gastrointestinal illnesses (US EPA 1977). It is also known that dissolved contaminant plumes from conventional OWTS can travel hundreds of feet and exceed drinking water standards (USEPA 2002). Thus, discharges from OWTS are known to impair or threaten impairment of beneficial uses of groundwater in the immediate vicinity of the discharge.

This setback is established using a common standard of practice. Many references and technical documents prescribe 100 feet for OWTS setback from a well. While well pollution is documented to have occurred on occasion, the setback has been successful.

Reviewer Comment:
The suggested set-back is appropriate and the provided justification is sound. However, in lieu of justifications provided for 6f., 6g. and 6h. it seems appropriate to specify that wells listed under 6b. are not intended to provide drinking water supplies, to clearly distinguish them from public water wells specified under 6f. and 6 g.

c. 100 feet from any unstable land mass or any areas subject to earth slides identified by a registered engineer or registered geologist; other setback distance are allowed, if recommended by a geotechnical report prepared by a qualified professional.

Unstable land masses can be further destabilized by direct addition of water to the soil column. A setback of 100 feet or greater, if prescribed by a professional geologist, will assist in minimizing any further destabilization of unstable areas.

Reviewer Comment:
The suggested set-back from any unstable land mass is appropriate and the provided justification is sound.

d. 100 feet from springs and flowing surface water bodies where the edge of that water body is the natural or levied bank for creeks and rivers, or may be less where site conditions prevent migration of wastewater to the water body.

For the same reasons described in Issue 6.b. above regarding concerns for pathogens, this setback is being established because springs and flowing surface water bodies are often areas of interflow, where groundwater exits the subsurface to become surface waters. Since the intent of subsurface disposal is to treat and dispose the wastewater in the subsurface, areas of interflow pose a design threat. A setback minimizes such design failure. The Policy prescribes 100 feet because it is a standard of practice often used in design manuals and local ordinances.

Reviewer Comment:
The suggested set-back from any spring and flowing surface water is appropriate and the provided justification is sound.

e. 200 feet from vernal pools, wetlands, lakes, ponds, or other surface water bodies where the edge of that water body is the high water mark for lakes and reservoirs, and the mean high tide line for tidally influenced water bodies.

For the same reasons described in Issue 6.b. above regarding concerns for pathogens, this setback is being established because lakes, wetlands and other placid surface water bodies are often areas of interflow, where groundwater exits the subsurface to become surface waters. Since the intent of subsurface disposal is to treat and dispose the wastewater in the subsurface, areas of interflow pose a design threat. Unlike flowing waters, these water bodies with a relatively low level of mixing, due the lack of flow, will collect interflow and retain it, creating nuisance conditions. A setback minimizes such design failure. The Policy prescribes 200 feet because it is a standard of practice often used in design manuals and local ordinances.

Reviewer Comment:
The suggested set-back from any stagnant or low-flowing surface water bodies is appropriate and the provided justification is sound.

f. 150 feet from a public water well where the depth of the effluent dispersal system does not exceed 10 feet;

For the same reasons described in Issue 6.b. above regarding concerns for pathogens, public water wells may have a have a greater zone of influence on the surrounding groundwater than monitoring wells, private domestic wells. Also, if the OWTS design fails, these public water wells also can affect more people and pose a risk to public health. For this reason, the Policy requires increased separation from the OWTS and public well, which is determined by multiplying the standard well separation by a factor of safety of 1.5.

Reviewer Comment:
The suggested set-back from any public water well is appropriate and the provided justification is sound providing that there is sufficient depth between the bottom of the system and groundwater. Under 6h., this depth is specified to be at least 5 feet. For consistency and to provide the same design standards throughout, the following statement should be added: "...the depth of the effluent dispersal system does not exceed 10 feet **and the separation from the bottom of the system and groundwater is more than five feet."** As an alternative, specify depth by making reference to Table 1.

g. **200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet in depth.**

For the same reasons described in Issue 6.b. above regarding concerns for pathogens, deeper disposal systems have the potential to contaminate groundwater because there is potentially less unsaturated soil below the leachfield. For this reason, the Policy requires increased separation from the OWTS and the public well which is determined by multiplying the standard well separation by a factor of safety of 2.0.

Reviewer Comment:
The suggested set-back from any public water well is appropriate and the provided justification is sound providing that there is sufficient depth. Similar to the suggestion provided under 6f., the following statement should be added: "...the depth of the effluent dispersal system exceeds 10 feet **and the separation from the bottom of the system and groundwater is more than five feet."** As an alternative, specify depth by making reference to Table 1.

h. **Where the effluent dispersal system is within 600 feet of a public water well and exceeds 20 feet in depth and the separation from the bottom of the system and ground water is less than five feet, the horizontal setback required to achieve a two-year travel time for microbiological contaminants shall be evaluated. A qualified professional shall conduct this evaluation. However in no case shall the setback be less than 200 feet.**

For the same reasons described in Issue 6.b. above regarding concerns for pathogens, deeper disposal systems have the potential to contaminate groundwater because there is potentially less unsaturated soil below the leachfield. Where the OWTS exceeds 20 feet in depth and the separation from the bottom of the system and ground water is less than five feet, the OWTS begins to look more like a design for groundwater reinjection rather than an OWTS for wastewater treatment and dispersal. For this reason, simple factors of safety will not address the overall potential water quality problems and the Policy requires an evaluation by a qualified profession to ensure adequate destruction of pathogenic materials travelling in an aqueous environment.

Reviewer Comment:
The suggested site-specific evaluation is appropriate and the provided justification is sound.

i. **Where the effluent dispersal system is within 1,200 feet from a public water systems' surface water intake and within the catchment of the drainage, the dispersal system shall be no less than 400 feet from the high water mark of the reservoir, lake or flowing water body.**

For the same reasons described in Issue 6.b. above regarding concerns for pathogens, this requirement is directly related to the California Department of Public Health's Drinking Water Source Assessment Program (DWSAP). This requirement effectively requires that all OWTS must be outside the Protection Zones of surface waters used for consumption (CA DPH 1999).

Reviewer Comment:
The suggested set-back from any public water well is appropriate and the provided justification is sound.

j. **Where the effluent dispersal system is located more than 1,200 but less than 2,500 feet from a public water systems' surface water intake and within the catchment of the drainage, the dispersal system shall be no less than 200 feet from the high water mark of the reservoir, lake or flowing water body.**

For the same reasons described in Issue 6.b. above regarding concerns for pathogens, this requirement is directly related to the California Department of Public Health's Drinking Water Source Assessment Program (DWSAP). This requirement effectively requires that all OWTS must be outside the Protection Zones of surface waters used for consumption (CA DPH 1999).

Reviewer Comment:
The suggested set-back from any public water well is appropriate and the provided justification is sound.

7. **Natural ground slope in all areas used for effluent disposal shall not be greater than 25 percent for Tier 1 and 30 percent for Tier 2.**

   Slopes can cause problems for the use of OWTS. If not constructed properly, dispersal systems constructed on sloping land can lead to surfacing of the water down gradient. Slopes in excess of 25% may limit the use of machinery (USEPA 1980; Crites 1998) in addition to problems related to surfacing wastewater. Tier 1 (Section 7.7) is subject to 25 percent due to less oversight in the OWTS management system. For Tier 2, where management is done under a local agency management plan, slopes are allowed (Section 9.4.4) up to 30 percent.

Reviewer Comment:
The suggested maximum slope factors are appropriate and the provided justification is sound.

8. **The average density for any subdivision of property occurring after the effective date of this Policy and implemented under Tier 1 shall not exceed one single-family dwelling unit, or its equivalent, per 2.5 acres for those units that rely on OWTS (Section 7.8).**

   Accumulations of pollutants, particularly nitrogen compounds, in the groundwater are a major concern for the use of OWTS. It is OWTS density that leads to pollution due to the fact that the amount of wastewater exceeds the assimilative capacity of the groundwater (Canter and Knox 1986). Furthermore, Canter and Knox note: "Areas with more than 40 [OWTS] per square mile can be considered to have potential contamination problems." However, other researchers (Brown and Bicki 1997) have found that most of the studies that they reviewed "estimated that the minimum lot size necessary to ensure against contamination is roughly one-half to one acre." As such, an average density of one OWTS per 2.5 acres is a good step forward and between two estimations.

Reviewer Comment:
The proposed average density of one OWTS per 2.5 acres is not well justified. The reviewer notes that considering only the number of OWTS per area is a simplification that neglects subsurface conditions that are key to achieve nitrogen attenuation. The most important threat to contamination is likely downstream impact on any shallow wells

used for drinking water supply. Thus, it would be more appropriate to couple a maximum number of OWTS per area with a specification of subsurface conditions as described in 6f. and 6g. When conditions as specified in 6f. and 6g. are met, one OWTS per one acre (based on Brown and Bicki, 1997) seems an appropriate load.

9. **All dispersal systems shall have at least twelve (12) inches of soil cover (Section 8.1.4).**

   Twelve inches of backfill over the dispersal system is common practice (U.S. Public Health Service 1967).

Reviewer Comment:
The suggested soil cover is appropriate and the provided justification is sound.

10. **The minimum depth to the anticipated highest level of groundwater below the bottom of the leaching trench, and the native soil depth immediately below the leaching trench, shall not be less than prescribed in Table 1.**

Reviewer Comment:
As mentioned above, the percolation rate should be expressed in units of "distance per time" or "volume per area and time" instead of "time per distance". It is understood that determining the percolation rate through observation in the field might be determined as monitoring the percolation of an inch of water over time, nevertheless rates listed in Table 1 should be computed as inch/min or cm/day. The same comments applies to section 7.4 of the draft policy.

Table 1: Tier 1 Minimum Depths to Groundwater and Minimum Soil Depth from the Bottom of the Dispersal System

Percolation Rate	**Depth to groundwater**
Percolation Rate ≤1 MPI	Only as authorized in a Tier 2 Local Management Program
1 MPI< Percolation Rate ≤ 5 MPI	Twenty (20) feet
5 MPI< Percolation Rate ≤ 30 MPI	Eight (8) feet
30 MPI< Percolation Rate ≤ 90 MPI	Five (5) feet
Percolation Rate > 90 MPI	Only as authorized in a Tier 2 Local Management Program

MPI = minutes per inch

The requirements for this portion of the Policy are established to ensure that wastewater discharged from OWTS has sufficient time to receive treatment prior to entering groundwater. The separation for groundwater requirements listed in Table 1 are taken from the Basin Plan from the Central Coast Regional Water Quality Control Board (Central Coast RWQCB

11. **Dispersal systems shall be a leachfield, designed using not more than 4 square-feet of infiltrative area per linear foot of trench as the infiltrative surface, and with trench width no wider than 3 feet. Seepage pits and other dispersal systems may only be authorized for repairs where siting limitations require a variance. Maximum application rates shall be determined from stabilized percolation rate as provided in Table 2, or from soil texture and structure determination as provided in Table 3.**

Reviewer Comment:
The specified rates in Table 2 and soil properties in Table 3 are appropriate. As mentioned earlier, percolation rates in Table 2 should be reported as inch/minute or cm/day. The justification provided for the values listed in sound.

ATTACHMENT 2

May 1, 2012

Table 2: Application rates as determined from stabilized percolation rate

Percolation Rate (minutes per inch)	Application Rate (gallons per day per square foot)		Percolation Rate (minutes per inch)	Application Rate (gallons per day per square foot)		Percolation Rate (minutes per inch)	Application Rate (gallons per day per square foot)
<1	Requires Local Manage-ment Program		31	0.522		61	0.197
1	0.8		32	0.511		62	0.194
2	0.8		33	0.5		63	0.19
3	0.8		34	0.489		64	0.187
4	0.8		35	0.478		65	0.184
5	0.8		36	0.467		66	0.18
6	0.8		37	0.456		67	0.177
7	0.8		38	0.445		68	0.174
8	0.8		39	0.434		69	0.17
9	0.8		40	0.422		70	0.167
10	0.8		41	0.411		71	0.164
11	0.786		42	0.4		72	0.16
12	0.771		43	0.389		73	0.157
13	0.757		44	0.378		74	0.154
14	0.743		45	0.367		75	0.15
15	0.729		46	0.356		76	0.147
16	0.714		47	0.345		77	0.144
17	0.7		48	0.334		78	0.14
18	0.686		49	0.323		79	0.137
19	0.671		50	0.311		80	0.133
20	0.657		51	0.3		81	0.13
21	0.643		52	0.289		82	0.127
22	0.629		53	0.278		83	0.123
23	0.614		54	0.267		84	0.12
24	0.6		55	0.256		85	0.117
25	0.589		56	0.245		86	0.113
26	0.578		57	0.234		87	0.11
27	0.567		58	0.223		88	0.107
28	0.556		59	0.212		89	0.103
29	0.545		60	0.2		90	0.1
30	0.533					>90	Requires Local Management Program

Table 3: Design Soil Application Rates

(Source: USEPA Onsite Wastewater Treatment Systems Manual, February 2002)

Soil Texture (per the USDA soil classification system)	**Soil Structure Shape**	**Grade**	**Maximum Soil Application Rate(gallons per day per square foot)** [1]
Coarse Sand, Sand, Loamy Coarse Sand, Loamy Sand	Single grain	Structureless	0.8
Fine Sand, Very Fine Sand, Loamy Fine Sand, Loamy Very Fine Sand	Single grain	Structureless	0.4
Coarse Sandy Loam, Sandy Loam	Massive	Structureless	0.2
	Platy	Weak	0.2
		Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.4
		Moderate, Strong	0.6
Fine Sandy Loam, very fine Sandy Loam	Massive	Structureless	0.2
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.2
		Moderate, Strong	0.4
Loam	Massive	Structureless	0.2
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.4
		Moderate, Strong	0.6
Silt Loam	Massive	Structureless	Prohibited
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.4
		Moderate, Strong	0.6
Sandy Clay Loam, Clay Loam, Silty Clay Loam	Massive	Structureless	Prohibited
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.2
		Moderate, Strong	0.4
Sandy Clay, Clay, or Silty Clay	Massive	Structureless	Prohibited
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	Prohibited
		Moderate, Strong	0.2

Wastewater application rates are established for pathogen reduction, long-term unsaturated soil treatment of the wastewater, and to prevent surfacing of OWTS effluent in the dispersal system. The wastewater application rates contained in Tables 2 and 3 are developed from application rates specified in the Central Coast Regional Water Board's Water Quality Control Plan (Central Coast Regional Water Board 2011) and the 2002 USEPA Design Manual. The application rate associated with percolation testing has been broken down across the acceptable percolation rates by staff. However, these application rates are within the range of recommended/suggested values contained in both USEPA design manuals (USEPA 1980, USEPA 2002).

12. Dispersal systems shall not exceed a maximum depth of 10 feet as measured from the ground surface to the bottom of the trench.

This requirement is established to allow dispersal systems to target the preferential portion of the soil column, maximizing the amount of atmospheric oxygen for wastewater treatment.

Reviewer Comment:
The design feature is appropriate and well justified.

13. No dispersal systems or replacement areas shall be covered by an impermeable surface, such as paving, building foundation slabs, plastic sheeting, or any other material that prevents oxygen transfer to the soil.

This requirement is established to maximize the amount of atmospheric oxygen for wastewater treatment.

Reviewer Comment:
The design feature is appropriate and well justified.

14. Rock fragment content of native soil surrounding the dispersal system shall not exceed 50 percent by volume for rock fragments sized as cobbles or larger and shall be estimated using either the point-count or line-intercept methods.

Soils with a high fraction of coarse fragments (gravel, cobbles and rock) pose a problem for the treatment of the wastewater because the volume occupied by the coarse fragments is not available for providing the treatment of the wastewater (Woessner et. al. 1987, Ver Hey et. al. 1987).

Reviewer Comment:
The specified subsurface conditions are appropriate and well justified.

15. Septic Tank Construction and Installation: All new or replaced septic tanks and new or replaced grease interceptor tanks shall comply with the standards contained in Sections K5(b), K5(c), K5(d), K5(e), K5(k),

K5(m)(1), and K5(m)(3)(ii) of Appendix K, of Part 5, Title 24 of the 2007 California Code of Regulations.

These standards are industry standards found in the California Plumbing Code (CA Building Standards Commission 2011)

Reviewer Comment:
The specified design features are appropriate and well justified.

16. **New and replaced OWTS septic tanks shall be designed to prevent solids in excess of three-sixteenths (3/16) of an inch in diameter from passing to the dispersal system. Septic tanks that use a National Sanitation Foundation/American National Standard Institute (NSF/ANSI) Standard 46 certified septic tank filter at the final point of effluent discharge from the OWTS and prior to the dispersal system shall be deemed in compliance with this requirement.**

The draft regulations require all new septic tanks to restrict solids particles in excess of 3/16 inch in diameter from passing through to the dispersal field, thereby prolonging the life of the dispersal system. This value was selected from the body of knowledge surrounding septic tank effluent filters (1/8 effluent screens).

The specified design features are appropriate and well justified.

17.

The reviewer has a repeat number at this point. For easy of the reader we will provide the actual number next to each issue.

16. **The proposed regulations (Section 9.4.5) would allow design of gravel-less dispersal systems with a reduction (adjustment multiplier of 0.7) of the minimum required dispersal system area for effluent application.**

It has been shown in the laboratory and in the field that gravel-less chambers function as well as conventional dispersal systems even when the system sized is reduced by as much as fifty percent in size (King, et. al. 2002). When gravel-less chambers are sized equivalently to conventional OWTS, it has been shown that the long-term acceptance rate can be 1.5 to 2 times higher than that of conventional OWTS dispersal systems (Seigrist et. al. 2004). For this reason, SWRCB staff has included a multiplier allowing the reduction of the dispersal system when chambers are used.

Reviewer Comment:
The specified design features are appropriate and well justified.

18. **17. The proposed Policy identifies OWTS within 600 lateral feet of an impaired water body listed for nitrogen or for pathogens pursuant to §303(d) of the Federal Clean Water Act as contributing to the impairment of the water body when further designated by the Regional Water Board. For purposes of this Section, impairment is limited to nitrate or bacterial contamination.**

The Policy establishes a capture distance (600 feet) in lieu of requiring a case-by-case determination regarding each OWTS contribution. This approach is preferred because of cost concerns regarding actual groundwater transport studies. The 600 feet distance is based on: California Department of Health Services (DHS), ***Drinking Water Source Assessment and Protection Program***. As detailed in the document (page 54), a radial distance established a microbial/direct chemical contamination zone to protect public drinking water supply wells from possible contaminating activities associated with viral, microbial and direct chemical contamination. OWTS are identified as possible contaminating activities posing "very high potential risks" (CA DHS 1999, pg 54, 92). To our knowledge the guidance was not peer reviewed.

As detailed in the document (page 54), a radial distance established a microbial/direct chemical contamination zone to protect water supply from viral, microbial and direct chemical contamination. For porous media aquifers, 600 feet was the recommended minimum distance to be sufficiently conservative for protection from microbial contaminants as well as chemical contaminants such as nitrate.

Reviewer Comment:
A 600 feet distance is conservative for protection from microbial contaminants as well as nitrate. The justification provided is sufficient and sound.

19. **18. Effluent from the supplemental treatment components designed to reduce nitrogen shall be certified by NSF, or other approved third party tester, to meet a 50 percent reduction in total nitrogen when comparing the 30-day average influent to the 30-day average effluent (Section 10.9).**

This standard was chosen because it provides a level of assurance to the consumer that the supplemental treatment system will meet the standards. Third party certification is designed to screen out unreliable supplemental treatment technologies. The independent third party certification protocol used by the National Sanitation Foundation (NSF) International takes components through a series of operational evaluations and stress tests using wastewater at their own NSF controlled facilities. NSF International is widely recognized (Pearson 1977), has over 30 years of experience, and has certified over 315 different OWTS products from more than 35 manufacturers.

Reviewer Comment:
The specified design features are appropriate and well justified.

20. **19. Where a drip-line dispersal system is used to enhance vegetative nitrogen uptake, the dispersal system shall have at least six (6) inches of soil cover.**

This is prescribed as part of the nitrogen removal design in Section 10.9, where such a system is used. Drip dispersal and pressure dispersal systems distribute wastewater across the dispersal field in a manner that is more uniform than conventional gravity dispersal systems (USEPA 2002). With relatively uniform distribution of the wastewater, there is a tendency to raise these systems closer to the land surface (Beggs, et. al. 2004). Drip dispersal systems are the best method to distribute the wastewater uniformly and pose less of a threat to the environment than a conventional dispersal field, due to the fact that it optimizes the retention of pollutants and allows the dispersal of the wastewater into the root dispersal field (Watson 2004). Accordingly, the Policy allows these systems to be placed less than six (6) inches from the ground surface. This is supported in literature (Crites 1998).

Reviewer Comment:
The specified design features are appropriate and well justified.

21. **20. Supplemental treatment components designed to perform disinfection shall provide sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters (Section 10.10).**

This standard was chosen because a it provides a level of assurance to the consumer that the supplemental treatment system will meet the standards. NSF Standard 46 certified products for disinfection meet this standard. The independent third party certification protocol used by the National Sanitation Foundation (NSF) International takes components through a series of operational evaluations and stress tests using wastewater at their own NSF controlled facilities. Third party certification is designed to screen out unreliable supplemental treatment technologies. NSF International is widely recognized (Pearson 1977.

Reviewer Comment:
The specified design features are appropriate and well justified.

22. **21. The minimum soil depth and the minimum depth to the anticipated highest level of groundwater below the bottom of the dispersal system**

shall not be less than three (3) feet. All dispersal systems shall have at least twelve (12) inches of soil cover.

This standard is required to work in conjuction to the supplemental treatment requirements specified in Section 10.10. The groundwater separation is discussed in this request above under Issue No. 10. The 12 inches of cover is discussed above in Issue No. 9.

Reviewer Comment:
There should be consistency across the draft policy and a justification for a minimum depth of 3 feet is not provided either here or under issue No. 10. The minimum depth specified under 10. is 5 feet. The minimum depth should be adjusted to 5 feet if no further specifications are given. The proposed soil cover is appropriate and had been justified before.

The Big Picture

Reviewers are not limited to addressing only the specific issues presented above, and are asked to contemplate the following "big picture" questions:

1. **Are there any additional issues that are part of the scientific basis of the proposed regulations that are not described above?**

Reviewer Comments:
The draft policy is very comprehensive and covers the key aspects of design, operation and oversight of OWTS.

2. **Taken as a whole, is the scientific portion of the proposed regulations based upon sound scientific knowledge, methods, and practices?**

Reviewer Comments:
I'd like to congratulate the State Board for developing a comprehensive, science-based regulatory framework for Onsite Wastewater Treatment Systems. The policy did consider best available science and is based on sound assessments.
This policy is very unique across the country as well as from an international perspective and provides excellent guidance to the industry. The tiered approach to classify different systems is very appropriate.

Reviewers should also note that some portions of the proposed regulations may rely significantly on professional judgment where available scientific data are not as extensive as desired to support the statue requirement for absolute scientific rigor. In these situations, the proposed course of action is favored over no action.

The preceding guidance will ensure that reviewer have an opportunity to comment on all aspects of the scientific basis of the proposed State Water Board action. At the same time, reviewers also should recognize that the State Water Board has a legal obligation to consider and respond to all feedback on the scientific portions of the proposed regulations. Because of this obligation, reviewers are encouraged to focus feedback on the scientific issues that are relevant to the central regulatory elements being proposed.

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May 1, 2012

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1017-142613

Subject: Peer Review of State Board Onsite Wastewater Treatment Systems Policy

Dear Mr. Thompson:

As requested by Dr David Jenkins, I have prepared comments on the 22 questions posed to the peer reviewers of the new onsite wastewater treatment systems policy.

Background

The State Water Resources Control Board is issuing policy for Onsite Wastewater Treatment Systems (OWTS). The Final Draft of "Water Quality Control Policy for Siting. Design. Operation, and Maintenance of Onsite Wastewater Treatment Systems" dated March 20, 2012 was reviewed.

Focused Review Comments

The following are my review comments for each of the assumptions, findings and conclusions that constitute the scientific portion of the proposed regulatory action.

1. It is reasonable to use expected waste strength as a trigger for submitting a report of waste discharge (State permit application) and for determining the necessary approach to direct State regulation and oversight through waste discharge requirements.

   Comment: Yes. This is a reasonable assumption.

2. Use of the design flow as a trigger for submitting a report of waste discharge (State permit application) and for determining the necessary approach to direct State regulation and oversight through waste discharge requirements is reasonable.

   Comment: Yes it is.

ISI REBUTTAL EXHIBIT NO. 3

3. A site evaluation is required in Tier 1 (Section 7 of the proposed Policy) to determine that adequate soil depth is present in the dispersal area. Soil depth would be measured vertically to the point where bedrock, hardpan, impermeable soils, or saturated soils are encountered or an adequate depth has been determined.

   Comment: A site evaluation of the depth of soil into which effluent is to be discharged is essential to the proper siting of soil treatment units.

4. A site evaluation for seasonal groundwater is required in Section 7.3 using one or a combination of the following methods: direct observation of the highest extent of soil mottling observed in the examination of soil profiles, direct observation of groundwater levels during the anticipated period of high groundwater, or other methods, such as historical records, acceptable to the local agency. Where a conflict in the above methods of examination exists, the direct observation method indicating the highest level shall govern.

   Comment: It is appropriate to require direct observation of the highest extent of groundwater rise to avoid direct contact between the applied effluent and the groundwater. The other methods are also appropriate where direct observation is not reasonably attained.

5. Section 7.4 requires that percolation test results in the effluent disposal area shall not be faster than one minute per inch (1 MPI) or slower than ninety minutes per inch (90 MPI) because of problems associated with allowing OWTS on soils that exhibit faster percolation rates than 1 MPI and slower than 90 MPI. All percolation rates shall be based on actual or simulated wet weather conditions by performing the test during the wet weather period as determined by the local agency or by presoaking of percolation test holes and shall be a stabilized rate.

   Comment: The performance of a soil treatment system depends on sufficient detention time of the wastewater within the soil matrix. At the 1 MPI (60 in/hr) end of the range, the fear is that too rapid of movement of wastewater through soil will result in insufficient treatment. At the 90 MPI (0.67 in/hr) end, the detention time is sufficient and there is adequate ability to move the water through the top layers of the soil matrix. In land treatment systems that rely on percolation, 0.2 in/hr (300 MPI) would be judged to be acceptable. In my opinion, the lower end of the range should be extended from 90 MPI to 120 MPI.

6. Setbacks

   Comment: All of the setbacks in this section of the policy appear reasonable.

7. Natural ground slope in all areas used for effluent disposal shall not be greater than 25 percent for Tier 1 and 30 percent for Tier 2.

   Comment: Steep slopes can be detrimental to the successful operation and performance of onsite systems. These restrictions are reasonable.

8. The average density for any subdivision of property occurring after the effective date of this Policy and implemented under Tier 1 shall not exceed one single-family dwelling unit, or its equivalent, per 2.5 acres for those units that rely on OWTS (Section 7.8).

   Comment: An average density of one equivalent single-family dwelling unit per 2.5 acres is too restrictive. Based on Assumption No. 1 that wastewater strength is important and that loading rates should be proportional to the ability of the soil treatment system to treat the applied effluent, a more scientific approach to determining the appropriate average density of individual home treatment units should be taken.

   One approach would be to use the average loading rate per acre of nitrogen from a conventional onsite system. For example, one County has set a loading rate of 45 grams/acre-day of nitrogen as the basis for a housing density. This loading rate would result in a housing density of one dwelling per 0.88 acres.

   Several other counties have a minimum size of 1 acre per dwelling unit, which seems to be an appropriate minimum size for this policy.

9. All dispersal systems shall have at least twelve (12) inches of soil cover (Section 8.1.4).

   Comment: This minimum cover should only be applied to conventional gravity distribution systems. Pressure dosed systems and drip emitters should be allowed as shallow as 6 inches.

10. The minimum depth to the anticipated highest level of groundwater below the bottom of the leaching trench, and the native soil depth immediately below the leaching trench, shall not be less than prescribed in Table 1.

    Comment: These minimum depths are appropriate.

11. Dispersal systems shall be a leachfield, designed using not more than 4 square-feet of infiltrative area per linear foot of trench as the infiltrative surface, and with trench width no wider than 3 feet. Seepage pits and other dispersal systems may only be authorized for repairs where siting limitations require a variance. Maximum application rates shall be determined from stabilized percolation rates as provided in Table 2, or from soil texture and structure determination as provided in Table 3.

    Comment: This is a reasonable approach.

12. Dispersal systems shall not exceed a maximum depth of 10 feet as measured from the ground surface to the bottom of the trench.

    Comment: This is a reasonable limit.

13. No dispersal systems or replacement areas shall be covered by an impermeable surface, such as paving, building foundation slabs, plastic sheeting, or any other material that prevents oxygen transfer to the soil.

    Comment: Under Tier 1 conditions, this is a reasonable restriction.

14. Rock fragment content of native soil surrounding the dispersal system shall not exceed 50 percent by volume for rock fragments sized as cobbles or larger and shall be estimated using either the point-count or line-intercept methods.

    Comment: This is a reasonable assumption.

15. Septic Tank Construction and Installation: All new or replaced septic tanks and new or replaced grease interceptor tanks shall comply with the standards contained in Sections K5(b), K5(c), K5(d), K5(e), K5(k), K5(m)(1), and K5(m)(3)(ii) of Appendix K, of Part 5, Title 24 of the 2007 California Code of Regulations.

    Comment: This is appropriate.

16. New and replaced OWTS septic tanks shall be designed to prevent solids in excess of three-sixteenths (3/16) of an inch in diameter from passing to the dispersal system. Septic tanks that use a National Sanitation Foundation/American National Standard Institute (NSF/ANSI) Standard 46 certified septic tank filter at the final point of effluent discharge from the OWTS and prior to the dispersal system shall be deemed in compliance with this requirement.

    Comment: Containment of suspended solids within the septic tank is an important step in the sustainable performance of OWTS. This is a reasonable assumption.

17. The proposed regulations (Section 9.4.5) would allow design of gravel-less dispersal systems with a reduction (adjustment multiplier of 0.7) of the minimum required dispersal system area for effluent application.

    Comment: This is appropriate.

18. The proposed Policy identifies OWTS within 600 lateral feet of an impaired water body listed for nitrogen or for pathogens pursuant to §303(d) of the Federal Clean Water Act as contributing to the impairment of the water body when further designated by the Regional Water Board. For purposes of this Section, impairment is limited to nitrate or bacterial contamination.

    Comment: This is appropriate.

19. Effluent from the supplemental treatment components designed to reduce nitrogen shall be certified by NSF, or other approved third party tester, to meet a 50 percent reduction in total nitrogen when comparing the 30-day average influent to the 30-day average effluent (Section 10.9).

    Comment: Fifty percent is a conservative value for nitrogen reduction treatment. I would favor a higher bar of 80 percent reduction. In actual practice many nitrogen reduction technologies can meet 50 percent under controlled conditions, but under actual conditions their performance will vary significantly.

20. Where a drip-line dispersal system is used to enhance vegetative nitrogen uptake, the dispersal system shall have at least six (6) inches of soil cover.

    Comment: Drip dispersal should be encouraged in this policy. This is an appropriate condition.

21. Supplemental treatment components designed to perform disinfection shall provide sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters (Section 10.10).

    Comment: This is appropriate.

22. The minimum soil depth and the minimum depth to the anticipated highest level of groundwater below the bottom of the dispersal system shall not be less than three (3) feet. All dispersal systems shall have at least twelve (12) inches of soil cover.

    Comment: This is appropriate.

23. BIG PICTURE

    Comment: The policy contains sufficient minimum standards for the range of conditions found in California. The use of tiers and risk categories is appropriate.

Please call Ron Crites at 530.204.5204 if you have questions.

Very truly yours,

Brown and Caldwell,

Ronald W. Crites

Ronald W. Crites, P.E.
Natural Systems Service Leader

REGISTERED PROFESSIONAL ENGINEER
RONALD W. CRITES
Ronald W. Crites
No. C21532
Exp. 09-30-13
CIVIL
STATE OF CALIFORNIA

cc: Dr. David Jenkins

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WORLD PLUMBING COUNCIL

TABLE H 1.7
LOCATION OF SEWAGE DISPOSAL SYSTEM

MINIMUM HORIZONTAL DISTANCE IN CLEAR REQUIRED FROM	BUILDING SEWER	SEPTIC TANK	DISPOSAL FIELD	SEEPAGE PIT OR CESSPOOL
Building or structures[1]	2 feet	5 feet	8 feet	8 feet
Property line adjoining private property	Clear[2]	5 feet	5 feet	8 feet
Water supply wells	50 feet[3]	50 feet	100 feet	150 feet
Streams and other bodies of water	50 feet	50 feet	100 feet[7]	150 feet[7]
Trees	–	10 feet	–	10 feet
Seepage pits or cesspools[8]	–	5 feet	5 feet	12 feet
Disposal field[8]	–	5 feet	4 feet[4]	5 feet
On-site domestic water service line	1 foot[5]	5 feet	5 feet	5 feet
Distribution box	–	–	5 feet	5 feet
Pressure public water main	10 feet[6]	10 feet	10 feet	10 feet

For SI units: 1 foot = 304.8 mm

Notes:

1 Including porches and steps, whether covered or uncovered, breezeways, roofed porte cocheres, roofed patios, carports, covered walks, covered driveways, and similar structures or appurtenances.

2 See Section 312.3.

3 Drainage piping shall clear domestic water supply wells by not less than 50 feet (15 240 mm). This distance shall be permitted to be reduced to not less than 25 feet (7620 mm) where the drainage piping is constructed of materials approved for use within a building.

4 Plus 2 feet (610 mm) for each additional 1 foot (305 mm) of depth in excess of 1 foot (305 mm) below the bottom of the drain line. (See Section H 6.0)

5 See Section 720.0.

6 For parallel construction – For crossings, approval by the Health Department shall be required.

7 These minimum clear horizontal distances shall also apply between disposal fields, seepage pits, and the mean high-tide line.

8 Where disposal fields, seepage pits, or both are installed in sloping ground, the minimum horizontal distance between any part of the leaching system and ground surface shall be 15 feet (4572 mm).

from conditions similar to those at the proposed site, or require such additional data as necessary to provide assurance that the alternate system will produce continuous and long-range results at the proposed site, not less than equivalent to systems which are specifically authorized.

Where demonstration systems are to be considered for installation, conditions for installation, maintenance, and monitoring at each such site shall first be established by the Authority Having Jurisdiction.

Approved aerobic systems shall be permitted to be substituted for conventional septic tanks provided the Authority Having Jurisdiction is satisfied that such systems will produce results not less than equivalent to septic tanks, whether their aeration systems are operating or not.

H 2.0 Capacity of Septic Tanks.

H 2.1 General. The liquid capacity of septic tanks shall comply with Table H 2.1 and Table H 2.1(1) as determined by the number of bedrooms or apartment units in dwelling occupancies and the estimated waste/sewage design flow rate or the number of plumbing fixture units as determined from Table 702.1 of this code, whichever is greater in other building occupancies. The capacity of any one septic tank and its drainage system shall be limited by the soil structure classification in Table H 2.1(2), and as specified in Table H 2.1(3).

H 3.0 Area of Disposal Fields and Seepage Pits.

H 3.1 General. The minimum effective absorption area in disposal fields in square feet (m^2), and in seepage pits in square feet (m^2) of sidewall, shall be predicated on the required septic tank capacity in gallons (liters), estimated waste/sewage flow rate, or whichever is greater, and shall be in accordance with Table H 2.1(2) as determined for the type of soil found in the excavation, and shall be as follows:

(1) Where disposal fields are installed, not less than 150 square feet (13.9 m^2) of trench bottom shall be provided for each system exclusive of any hard pan, rock, clay, or other impervious formations. Sidewall area in excess of the required 12 inches (305 mm) and not exceeding 36 inches (914 mm) below the leach line shall be permitted to be added to the trench bottom area where computing absorption areas.

(2) Where leaching beds are permitted in lieu of trenches, the area of each such bed shall be not less than 50 percent greater than the tabular requirements for trenches. Perimeter sidewall area in excess of the required 12 inches (305 mm) and not exceeding 36 inches (914 mm) below the leach line shall be permitted to be added to the trench bottom area where computing absorption areas.

(3) No excavation for a leach line or leach bed shall be located within 5 feet (1524 mm) of the water table nor to a depth where sewage is capable of contaminating

ISI REBUTTAL EXHIBIT NO. 4

TABLE H 2.1(3)
LEACHING AREA SIZE BASED ON SEPTIC TANK CAPACITY

REQUIRED SQUARE FEET OF LEACHING AREA PER 100 GALLONS SEPTIC TANK CAPACITY (square feet per 100 gallons)	MAXIMUM SEPTIC TANK SIZE ALLOWABLE (gallons)
20–25	7500
40	5000
90	3500
120	3000

For SI units: 1 square foot per 100 gallons = 0.000245 m^2/L, 1 gallon = 3.785 L

the underground water stratum that is usable for domestic purposes.

Exception: In areas where the records or data indicate that the groundwaters are grossly degraded, the 5 foot (1524 mm) separation requirement shall be permitted to be reduced by the Authority Having Jurisdiction. The applicant shall supply evidence of groundwater depth to the satisfaction of the Authority Having Jurisdiction.

(4) The minimum effective absorption area in any seepage pit shall be calculated as the excavated sidewall area below the inlet exclusive of any hardpan, rock, clay, or other impervious formations. The minimum required area of porous formation shall be provided in one or more seepage pits. No excavation shall extend within 10 feet (3048 mm) of the water table nor to a depth where sewage is capable of contaminating underground water stratum that is usable for domestic purposes.

Exception: In areas where the records or data indicate that the groundwaters are grossly degraded, the 10 foot (3048 mm) separation requirement shall be permitted to be reduced by the Authority Having Jurisdiction.

The applicant shall supply evidence of groundwater depth to the satisfaction of the Authority Having Jurisdiction.

(5) Leaching chambers shall be sized on the bottom absorption area (nominal unit width) in square feet. The required area shall be calculated using Table H 2.1(2) with a 0.70 multiplier.

H 4.0 Percolation Test.

H 4.1 Pit Sizes. Where practicable, disposal field and seepage pit sizes shall be computed from Table H 2.1(2). Seepage pit sizes shall be computed by percolation tests, unless use of Table H 2.1(2) is approved by the Authority Having Jurisdiction.

H 4.2 Absorption Qualities. In order to determine the absorption qualities of seepage pits and of questionable soils other than those listed in Table H 2.1(2), the proposed site shall be subjected to percolation tests acceptable to the Authority Having Jurisdiction.

H 4.3 Absorption Rates. Where a percolation test is required, no private disposal system shall be permitted to serve a building where that test shows the absorption capacity of the soil is less than 0.83 gallons per square foot (gal/ft^2) (33.8 L/m^2) or more than 5.12 gal/ft^2 (208.6 L/m^2) of leaching area per 24 hours. Where the percolation test shows an absorption rate greater than 5.12 gal/ft^2 (208.6 L/m^2) per 24 hours, a private disposal system shall be permitted where the site does not overlie groundwaters protected for drinking water supplies, a minimum thickness of 2 feet (610 mm) of the native soil below the entire proposed system is replaced by loamy sand, and the system design is based on percolation tests made in the loamy sand.

H 5.0 Septic Tank Construction.

H 5.1 Plans. Plans for septic tanks shall be submitted to the Authority Having Jurisdiction for approval. Such plans shall show dimensions, reinforcing, structural calculations, and such other pertinent data as required.

H 5.2 Design. Septic tank design shall be such as to produce a clarified effluent consistent with accepted standards and shall provide adequate space for sludge and scum accumulations.

H 5.3 Construction. Septic tanks shall be constructed of solid durable materials not subject to excessive corrosion or decay and shall be watertight.

H 5.4 Compartments. Septic tanks shall have not less than two compartments unless otherwise approved by the Authority Having Jurisdiction. The inlet compartment of any septic tank shall be not less than two-thirds of the total capacity of the tank, nor less than 500 gallons (1892 L) liquid capacity, and shall be not less than 3 feet (914 mm) in width and 5 feet (1524 mm) in length. Liquid depth shall be not less than 2½ feet (762 mm) nor more than 6 feet (1829 mm). The secondary compartment of a septic tank shall have a capacity of not less than 250 gallons (946 L) and a capacity not exceeding one-third of the total capacity of such tank. In septic tanks having a 1500 gallon (5678 L) capacity, the secondary compartment shall be not less than 5 feet (1524 mm) in length.

H 5.5 Access. Access to each septic tank shall be provided by not less than two manholes 20 inches (508 mm) in minimum dimension or by an equivalent removable cover

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT BOARD

No. EIB 12-01(R)

IN THE MATTER OF PROPOSED AMENDMENTS,
20.7.3 - Liquid Waste Disposal and Treatment

TRANSCRIPT OF PROCEEDINGS

BE IT REMEMBERED that on the 6th day of August, 2012, the above-entitled matter came on for hearing before the New Mexico Environmental Improvement Board, taken at the State Capitol Building, Room 307, Santa Fe, New Mexico, at the hour of 9:21 a.m.

VOLUME 1

ISI REBUTTAL EXHIBIT NO. 5

MS. PEACOCK: Okay. And we're skipping number 8 and moving on to number 9. This is the hearing in EIB 12-01(R) to consider proposed amendments to the liquid waste disposal and treatment regulations, 20.7.3 NMAC.

MS. ORTH: Good morning.

My name is Felicia Orth. I'm the Hearing Officer appointed by the Board to conduct the hearing in EIB 12-01(R). These are proposed amendments to the liquid waste disposal and treatment regulations found in 20.7.3 of the New Mexico Administrative Code.

The hearing will be conducted in accordance with the Board's rulemaking rules, which are found at 20.1.1 of the New Mexico Administrative Code.

We expect this hearing to take up the rest of the day, essentially, and probably to continue on to another day as -- as needed. The Board will not make a decision today, but will make a decision at a subsequent meeting.

And if you go to the Board's web site or make contact with me or with Sally, we will let you know what agenda that is on.

There are two parties who entered notices of intent to present technical testimony. That, obviously, is the petitioner, the Department, and also Infiltrator, Inc., represented by Susan Kery.

Everyone else who either entered an appearance or has offered written public comment or intends to offer verbal public comment will be asked to keep their testimony to nontechnical observations. The Board's rules require an NOI before you can offer technical testimony.

Testimony is taken under oath and is subject to cross-examination.

The hearing is being recorded and transcribed in its entirety by Cheryl Arreguin of Kathy Townsend Court Reporters. Please contact Cheryl directly if you'd like to purchase a copy of the transcript. It also eventually becomes a public record that can be viewed in our office during working hours.

The file is here. You're certainly welcome to look at it on a break. It contains the NOIs, some procedural orders and entries of appearance.

If you have a cell phone, please reach for it and turn it off.

We will take a break for lunch, and, as the Board knows, we will have to vacate the room by about 5:30 today. So we won't go very far into the evening hours.

One thing we know is that the cross-examination of the Department by the Board and

potentially by other folks will be extensive. We know some of you have come from out of town, and we would like to take your testimony without requiring you to travel back on a subsequent day.

So we're going to allow the petitioners, obviously, to present their petition, and we'll take some cross-examination, say, until lunch or close to lunch, but we will break into their cross-examination in order to hear from Infiltrator and in order to accept public comment from anyone who would like to offer it.

So just be thinking about that either just before lunch or just after lunch, which presents a natural break for us.

We'll then resume with cross-examination of the Department and continue until we're done.

Are there any process questions, process or procedure?

No?

All right, then.

Mr. Knight, if you would introduce yourself and your witness.

MR. KNIGHT: Madam Chair, members of the Board, good morning.

My name is Andrew Knight. I'm with the Office of General Counsel of the Environment Department.

With me is Mr. Dennis McQuillan.

The petition before the Board today is the culmination of many hours of meeting and discussion over a period of years between the Department, stakeholders and interested citizens. We worked hard with stakeholders to resolve complicated issues, and we were able to reach consensus on the vast majority of these proposed changes.

While there is a good reason for making each one of these changes as explained in our written testimony, there are a lot of them. So our testimony today will focus on the most important changes, and we will also talk about areas where we were unable to reach agreement with all of the stakeholders.

There are three areas where we were unable to reach consensus. While one of them I think is fairly important, the other two, in the Department's opinion, are relatively minor changes to the rules, and it is my hope that we can avoid having these two areas dominate our discussion today at the expense of some of the more important changes that we have proposed.

The first area of controversy concerns the scope of the liquid waste program.

Currently we only regulate onsite systems that discharge less than 2,000 gallons per day and larger systems require a more complicated groundwater discharge permit.

For some time, the Department has been considering the merits of raising that limit to 5,000 gallons per day, and this topic was much discussed at the public meetings held throughout the state.

But there are a number of very real difficulties that would result from such a change, as Mr. McQuillan will explain in more detail, and there are many good arguments and strong points on both sides of this issue.

In the final analysis, the Department has elected not to propose this change at this time and has instead proposed other changes that may allow businesses that are right around that 2,000-gallon-per-day limit stay with a simpler permit.

However, we included a discussion of this change in today's testimony, number one, because we know it will come up, and, second, because it is an important issue that could affect a number of businesses and residential properties in our state, and we wanted to provide the Board with the Department's perspective on this subject.

The second area of controversy is a new rule we have proposed prohibiting construction of drain

fields in areas subject to flood irrigation.

While I think most professional designers and installers would agree that siting a drain field in such a location is not a good practice, the reality is that there are a small number of sites where it may be unavoidable, and so the question becomes should it be outright prohibited in our rules.

We think it should, and so the Department has proposed a general ban on the practice while allowing land owners to apply for a variance in those few situations where there is truly no alternative.

The third area of dispute, and, again, we believe this is a fairly minor one, has to do with the way the Department calculates the minimum required size of the drain field.

The changes we have proposed will affect the overall -- will have the overall effect of making new drain fields slightly smaller and thus more affordable for homeowners.

After much discussion with industry folks throughout the state and with our experienced staff, the Department now believes that this proposed change can be made without significantly affecting the performance or reliability of onsite waste systems, and, as far as we know, we have reached consensus on this issue with all

New Mexico stakeholders.

Infiltrator, an out-of-state company that makes itself proprietary drain field products used in many of the systems in the state, is, as far as we know, the only party opposing this change. And while we certainly respect their opinion on this matter, there are several statements in their written testimony that we believe are inaccurate or taken out of context.

So again, we would like to offer the Department's perspective on this without taking up too much of the Board's time with this one issue.

Lastly, I think it's important to point out that in preparing for this hearing the Department and stakeholders have continued to work together and have together scrutinized our proposed amendments, and in the course of this back and forth, we have determined that there are a few of our proposed changes that needed further clarification or correction.

These are listed in Exhibit 14 of our notice of intent, and I would urge the Board to include these changes in its deliberations. In most cases, these minor corrections and clarifications are necessary for the regulations to make sense or to be self-consistent or to reflect the actual consensus reached with the stakeholders.

And with that, I would like to introduce my witness, Mr. Dennis McQuillan. He is the liquid waste program manager for the Department, and he submitted a written testimony in this matter, and I would like for him to be be sworn in and provide a summary of his written testimony and then stand for any questions.

DENNIS MC QUILLAN

having been first duly sworn or affirmed, was examined and testified as follows:

DIRECT TESTIMONY

MR. MC QUILLAN: Good morning, Madam Chair, members of the Board, ladies and gentlemen from the audience.

I am the program manager of the liquid waste program for the -- for the whole state. I am a geologist by training. I have 33 years of experience, heavily in water quality, and I currently manage the liquid waste program.

I am going to -- there's 31 pages of written testimony, and as far as we know, there are only three areas of dispute. So I am going to not specifically address each change with the understanding that there's going to be plenty of cross-examination, and that's great.

I will talk about the disputed issues, and going to amend our design flow requirements for a three-bedroom home. You still have to build a system that's capable of handling that type of flow.

But for the purposes of whether or not you can have a liquid waste permit, we're going to take eight-tenths of a design flow and use that. So that will bring dischargers who have a design flow of 2,500 gallons per day into the liquid waste program.

This will provide some relief, and we're looking at what we can do short of raising it to -- the scope to 5,000, which we are not comfortable doing that at this time.

I talked about the hydrogeologic mapping. There's a new section in 301F where we propose doing that. And we have criteria, where we might use those criteria for determining that.

If the rule goes through, I have made a personal commitment to the Village of Angel Fire and to the people in Rio Rancho that they would be first on the list, and to Alamogordo.

On the west side of Alamogordo, the groundwater becomes very salty. I think that Angel Fire and Alamogordo are going to be low-hanging fruit for this type of hydrogeologic mapping. Rio Rancho will take a little bit longer.

I understand there will probably be testimony today by Valencia County.

So we will map these areas on a priority basis, based on where the half-acre lots are or where people want to develop.

With Angel Fire and Ruidoso -- I'm sorry -- Alamogordo and Rio Rancho being first, we think this is a very good rule. There's no purpose in making people put in expensive technology if there's no benefit to the environment.

The second disputed issue, as Mr. Knight mentioned, is the -- is dispose of putting drain fields into your flood irrigation areas.

I think everybody agrees this is not a good idea. But if you want to put a one-seat toilet in alfalfa fields on a farm, the whole area is irrigated. And it just -- there are some lots where there's no options. And you don't want to put an elevated system there, because that will take out area that you can farm.

So what the installers have done typically is to oversize the system, and they put clay liner layered with some type of impermeable barrier on top to prevent the irrigation water from interfering with the dispersal system. Purposely the dispersal system is to disperse

water. So if you put irrigation water on there, that's not a good thing.

It doesn't happen very often, and our position is we would just like to do this by variance only. It's not a big deal to us, though.

The next -- let me talk about the gravel issue. That's in 703F.

Similar to the -- to the lot size issue, what our existing rule right now says is you can't have more than 30 percent gravel. And certainly if you're in a shallow water table environment, that's not a good thing, because the gravel affords less natural attenuation than, say, does a sandy loam.

But if the groundwater is really deep -- and you can see I have -- introduced an Exhibit 26 that shows some pictures of the high and dry gravels we have in the state. There is one in Placitas and one in San Juan County. You can see the Figure 1 in NMED Exhibit 26 shows some of this gravel in Placitas. The depth to groundwater at this particular location is about 200, 250 feet.

So keep in mind that the standard we have for suitable soil below the trench is four feet. You have to have four feet of suitable soil. These gravel layers are underlain by 100 or more feet of material that will

provide more than the equivalent of four feet of suitable soil.

So here the challenge again is to keep the effluent underground. There is no benefit, in our opinion, by making people put in advanced treatment systems where these gravels are high and dry.

The other figures on Farmington -- Figure 4 actually shows the gravel layer underlaying -- this is in San Juan County -- on finer-grained sediment.

So this is a big issue in our river valleys, where we also have gravels with shallow groundwater. We would not allow that here.

But there are a lot of geologic maps prepared by the state Bureau of Geology, and this is some low-hanging fruit. We can just exempt these areas of gravel and then be extra careful to make sure they design a system where we won't have surfacing effluent, where the effluent runs along the bottom of the gravel and comes out the side of the hill.

That hasn't happened very often. It has not happened in Placitas at all.

So that brings us to the third disputed issue, and this is with regard to the six inches of aggregate below the drain field.

I think that our written testimony and the written testimony of Infiltrator describe pretty well the history of how we got here today, but one thing that's not included in neither of our testimony is nature of the standards. We have some regulatory standards that are just pretty much based on pure science and others where there -- where public policy has been applied as a safety factor.

And let me give an example. I was heavily involved in the development of groundwater standards initially. And the experts would come in and tell us at what concentration the contaminant would cause no adverse health effect.

We'd take a carcinogen, what that level first would be, and then a safety factor would be applied to that number. The calculation -- the science is in the realm of the technical experts. The determination of risk and cost in setting of safety factors is largely within the realm of the EIB, or the Water Quality Control Commission.

And the six-inch -- the serge capacity is more heavily rooted in public policy than it is in science. It's got -- it's got both.

If you look at the -- the testimony that was submitted, there wasn't even consensus among the experts we brought in in 2005. They gave us a range from 12 to

18 inches. We ended up with six.

At that time, we required twelve, and because of socioeconomic reasons and the cost of drain fields and the perception by the industry, which I'm sure you'll hear about today, that the playing field is not level between conventional pipe and gravel and proprietary products, because of the sizing reductions that were granted to proprietary systems, the decision was made in 2005 to lower that safety factor from twelve to six inches.

There's not rigorous science behind that. It's not mathematically precise. The experts say twelve to eighteen inches. The Board decided -- well, and we're proposing six.

Now, why are we proposing to eliminate that today?

We think, as I stated in my testimony, the -- well, clearly the sizing requirements became much larger in 2005. We knew that, and we knew there were going to be expenses to that, and everybody agreed at the time that this was worth it, that the longevity of the drain fields, the extra expense would be paid off in the long term by having drain fields that last longer and having fewer drain fields that fail and creating public health and safety hazards.

I think perhaps the pendulum swung too far in the direction of larger and more expensive drain fields in '05.

We also had the Governor's -- and since '05, the economy crash in '08, and the Governor issued Executive Order 2011-001, which directed all the executive agencies to look at making their rules more friendly to small businesses, which -- and we include homes as small businesses. Arguably households are small businesses, they have income and expenses and so on, and they are a major stakeholder.

So we propose this to provide some economic relief to the people who use pipe and gravel drain fields. I don't think it's an issue that we should be falling on our sword on.

If you keep it where it's at, it will -- you know, there will be no relief provided. But we think -- especially in light of -- even though the Board reduced the safety factor from twelve inches to six inches in '05, our drain field still became larger in '05 because of the soil application rates.

And I'll come back to that analogy I used setting drinking water standards. We did bring in two national experts, and they told us in very elegant detail with soil physics how soils perform, how biomat

performs and what the long-term infiltration rates were.

And that good scientific information was used to develop the application rates -- the modified application rates that were adopted in 2005. That's the good science.

What we're talking about here is a safety factor, that -- that is one of several within the liquid waste regulations. The other big one is design flow. The design flows are typically much larger than the actual flows, especially in a state like New Mexico, where we have low-flush toilets and water conservation.

So there are safety factors built into the rules, and we think that we can eliminate the six inches of sidewall to give relief without unduly compromising both health and safety.

Will some drain fields become smaller? Yes.

But will we require less square feet of absorption area? No. That's not being changed. It's how they get that square footage in a geometry of whatever trench they put in that's being changed.

And I know this is a really complicated issue, we're going to hear a lot of cross-examination and testimony about it, but that's -- that's why we're doing what we're doing.

Some of the other changes, very quickly.

MR. MC QUILLAN: It does say that.
MR. CASCIANO: In B.(4), it says "given at least 2 days, calculated to the hour, prior to the time of the requested inspection. If the department inspector does not arrive at the site within one hour of the notified time of completion."
MR. MC QUILLAN: That's correct. Madam Chair, Board Member Casciano, the -- the difference here is if you're not an installer specialist, and you want to have your system inspected at 11 o'clock on Wednesday, you have to call the Department and schedule an inspection and -- and see if we can have that as the appointed time.
B.(1) is not real clear about that, but that's in practice what we do. And if we agree on that time and we're not there at that scheduled time, then this installer, whether they use a specialist or not, can take pictures and cover it up.
The way the installer specialist would work is they would just notify us and say Wednesday at 11:00, that's it. They don't have to check with us. They don't have to schedule around our schedule. They just say Wednesday at 11:00. And we're either there or we're not.
MR. CASCIANO: Okay. I think I understand

now.
So for B.(1), that's a negotiated time. For B.(4), it's preapproved or prenegotiated -- there is no negotiation. They just notify.
MR. MC QUILLAN: That's correct.
MR. CASCIANO: And you can show up to do spot checks based upon that.
MR. MC QUILLAN: That's correct.
MR. CASCIANO: Okay. I see.
MR. MC QUILLAN: Member Casciano, they would just tell us where and when, without having to negotiate around our schedule.
MR. CASCIANO: Okay. Thank you for clarifying that.
MR. MC QUILLAN: And I think, you know, B.(1) probably is not real clear. It just says "appointed time of inspection." We have -- that has evolved into them negotiating with us the inspection, and that causes them downtime in some cases.
MS. PEACOCK: So who is doing the appointing?
MR. MC QUILLAN: The appointing is done mutually by our inspectors and by the installer.
MS. PEACOCK: Okay.
So it's really a scheduled time more than a time that you determine?

MR. MC QUILLAN: Yes, Madam Chair. I mean, most of our inspectors have pretty good working relationships with the installers, and there's some that only work in Clayton on a certain day of the week, and then we adjust our schedule to be in Clayton. So that's how it works.
MS. PEACOCK: Okay.
Since Infiltrator is here for testimony today, why don't we talk about that section, which is -- do you know?
MR. MC QUILLAN: That's on the size of the drain field, Madam Chair.
MS. PEACOCK: 703 -- 703J.
MS. RYAN: 703J.
MS. PEACOCK: And in the written testimony, Infiltrator cited that EPA article.
It's Exhibit -- their Exhibit -- I have it as the fourth exhibit.
And on page 4-10 -- this is Onsite Wastewater Treatment Systems Manual, Office of Water, Office of Research and Development, USEPA, February, 2002 publication.
And that article states, "Both the bottom and sidewall areas of the SWIS excavation can be infiltration services -- surfaces; however, if the

sidewall is to be an active infiltration surface, the bottom surface must pond. If continuous ponding of the infiltration surface persists, the infiltration zone will become anaerobic, resulting in loss of hydraulic capacity. Loss of the bottom surface for infiltration will cause the ponding depth to increase over time as the sidewall also clogs. If allowed to continue, hydraulic failure of the system is probable. Therefore, including sidewall areas as an active infiltration surface in design should be avoided."
So I'm wondering what is your response to this article?
MR. MC QUILLAN: Our response to this article is that we have three decades of experience where we have granted sidewall, and it works really well in some situations.
The -- there is an article I downloaded from Infiltrator's web site yesterday. And I don't know if I can introduce new exhibits, but it's something I downloaded where it talks about how sidewall infiltration can be an important factor in maintaining the long-term infiltration of a drain field.
I think that the statements that EPA made in this manual are largely, in many cases, best management practices.

If you look, Madam Chair, at the next section on that same page, 4-10, under Design flow, it talks about getting accurate estimations of the design flow is critical to the infiltration surface sizing. And it says in the first paragraph, "It is best to obtain several weeks of metered daily flows to estimate daily average and peak flows."

That's a great idea, but what would happen if we told all the homeowners in New Mexico that they had to measure flow if they weren't put on in addition?

Is it a good idea? Absolutely.

Should it be written into our code? No.

Let me -- but with regard to this EPA manual, there is a statement that they make in the introduction that I'd like to read.

And this is the manual that the -- that we're talking about. It's also called the green book, published by EPA. It's about an inch thick. In 2002.

It states on page viii -- or -- no -- xiii, X-I-I-I, of the introduction.

"This manual contains overview information on treatment technologies, installation practices, and past performance. It does not, however, provide detailed design information and is not intended as a substitute for region- and site-specific program

criteria and standards that address conditions, technologies, and practices appropriate to each individual management jurisdiction."

I mean, there are differences in New Mexico, with our dry climate and our high evaporation rates, and some of the design criteria and statements they make are not as applicable here as they are in, say, other climates in the country.

And there's socioeconomic conditions, with example being given that we -- I just can't see us requiring metered flows in homes even though it's a good idea.

The ponding issue, there may well be ponding in some of these thousands of systems that we've permitted that -- where we've allowed sidewall. We've been doing this for many, many years. But if the system works for 30, 40 years, even though it's ponding, if the sewage doesn't surface and the toilets don't back up and the groundwater and well water doesn't get contaminated, then I guess my response is so what.

And I do have this article that -- from Infiltrator's web site.

MS. KERY: Madam Chair, I would ask if they're submitting this as a rebuttal exhibit, and if so -- or Madam Hearing Examiner -- I apologize for that -- and if

so, if we have an opportunity to look at it before Mr. McQuillan testifies to it.

MS. ORTH: Yes. Thank you, Ms. Kery.

Actually, the Chair invited him to sort of make their response, and I certainly notice that essentially she's inviting rebuttal before having heard what he's rebutting. That's always the danger of having prefiled testimony.

So we will have to mark anything that's going to be submitted, and it will have to be shared with you, to see if you have an objection to it, before it's admitted.

I trust, though, that you would prefer to continue this line of questioning before we break to hear from Infiltrator.

MS. PEACOCK: Yes.

MS. ORTH: Okay.

We'll proceed.

Let's mark it, though, so we know what we're talking about, as Department Rebuttal 1.

MR. KNIGHT: Rebuttal 1.

MS. ORTH: And you said it's called the green book?

MR. KNIGHT: Oh. Madam Hearing Officer, this is a -- actually, this is an article that was found on

Infiltrator's web site. This is not the -- we're not submitting the green book as an exhibit. This is just a single article that was retrieved from the web.

MS. ORTH: Would you give us the title?

MR. KNIGHT: The title is Wastewater Infiltration into Soil and the Effects of Infiltrative Surface Architecture.

MS. ORTH: All right.

MR. MC QUILLAN: Madam Hearing Officer, I guess the question, though, is do we -- should we include a copy of the introduction to the green book as an exhibit?

Because I read -- I read from it.

MS. ORTH: All right.

MR. KNIGHT: And I guess I would say that, you know, we could do that, but I don't know that it's necessary if -- we're not submitting the green book itself as an exhibit, and Infiltrator has submitted relevant sections from it, but it's become part of the record through Mr. McQuillan's testimony, and it is in the -- in the recorded record. So --

MS. ORTH: Is it part of the Federal Register?

MR. MC QUILLAN: Madam Chair, it's not -- I mean Madam Hearing Officer, it's not. This -- what I read was the introduction from the document that

field.
MS. RYAN: The trench is the drain field.
MR. MC QUILLAN: Yes.
MS. RYAN: And that's 750 square feet?
MR. MC QUILLAN: No.
MS. RYAN: No.
MR. MC QUILLAN: This is just a cross-section of a trench that would have 700 --
MS. RYAN: That would have.
MR. MC QUILLAN: Yeah.
MS. RYAN: Right. Okay.
MR. MC QUILLAN: Let me -- let me add a third dimension here.
So let's just take this cross-section, gravel, and then just envision a three-dimensional body of gravel. Okay. So we have the X dimension, we have Y, which is the vertical, and we have Z.
MS. RYAN: Got it.
MR. MC QUILLAN: So X in this example is two horizontal, vertical is four.
So this configuration, you would -- you would have excluded six inches below the invert of the pipe. So that would leave three-and-a-half feet on each side and two feet on the bottom.
But that -- so that would be nine square feet

per linear foot. You'd only get credit for seven-and-a-half of this. That would be -- that would be a pretty -- pretty nice drain field, but it's oversized. We -- the regulations allow seven square feet of absorption area per linear foot of -- per Z of drain field.
If this were -- if this were one foot and this were three feet, you would get two-and-a-half feet of Y and one foot of X for absorption area. In this case, it would be two-and-a-half feet on each side, would be five feet, plus the bottom. In that configuration, you'd get six feet per linear foot. So every linear foot of drain field you'd get credit of six feet -- square feet of absorption area, pipe and gravel.
MS. PEACOCK: So you're reading number (2), "A minimum of six inches of aggregate shall be placed below the invert" -- that's the six inches you're talking about, but it's the same aggregate that's below -- that six inches is the same as the remaining three-and-a-half feet?
MR. KNIGHT: It's the same gravel. Yeah.
MR. MC QUILLAN: Same gravel. Yes.
MS. PEACOCK: Same gravel. Okay.
"To provide surge storage."
What does that mean?

MR. MC QUILLAN: The surge storage is to -- so that the drain field won't fail when you have an unusually heavy flow.
Let's say you have a wedding, and you have 30 people at your house, and they use the bathroom a lot, and you cook a lot, and you have an unusually heavy wastewater flow that day from the bathroom and kitchen. You want some protection in this drain field so that the sewage doesn't back up into your house.
MS. RYAN: And that's what the six inches is for?
MR. MC QUILLAN: Correct. That's the safety factor that was originally used. It used to be 12.
MS. RYAN: Twelve. Okay.
MR. MC QUILLAN: And in '0 -- 2005, the Board cut it in half, to six.
And I'll be straight up. You know, the experts said we should have 12, 18 inches. That's what the two experts we brought in said. And the -- what happened is it got cut down to six.
MS. RYAN: And what are you proposing now?
MR. MC QUILLAN: We are proposing to eliminate that six inches of surge altogether.
MS. RYAN: Why?
MR. MC QUILLAN: Because we think that we

oversized our drain fields. We went too far in the direction of larger and more expensive drain fields in 2005, because the soil application rate that we multiply design flow to come up with this increased.
The experts came in, and they told us in very elegant manner how soils perform, sand does this, clay does that, gravel does something different, and then the biomat actually controls the long-term application rate after it develops, as opposed to the soil in many cases. And that is going to determine long-term infiltration rate.
So in 2005, we adjusted the soil application rates in such a manner that it had a much greater influence than cutting the surge from twelve to six. Most of our drain fields in the State of New Mexico became larger in 2005, and we got a lot of complaints, went all the way to the legislature.
We had to account, why did we do this? Was there a problem with drain field failure? Was there an epidemic of drain field failures?
There wasn't. So --
MR. CASCIANO: When you say larger, you mean the bottom surface area, so you had larger trenches because they were not as deep, because you reduced the surge under the pipe?

MR. MC QUILLAN: When I say larger, the required square feet of absorption area became larger, which necessitated that they either be deeper or longer or wider or some combination, because the -- the square feet of the surface of --

MR. CASCIANO: That was because of the application rate change?

MR. MC QUILLAN: Yes.

MS. RYAN: So there's no need for the safety net anymore, because we have big enough trenches.

Is that what --

MR. MC QUILLAN: That's our position.

MS. RYAN: Okay.

MR. MC QUILLAN: I mean, if -- and like I said in my written testimony -- and we do respect Infiltrator's opinion on this, we just happen to disagree -- that because we made the drain field so much larger in 2005, and we're still hearing about that today from people, the homeowners who have to put these in and people who have to build homes -- that greatly substantially increased the costs of a septic system in 2005.

I think we allowed the pendulum to swing too far in the direction of larger and more expensive drain fields in 2005.

Now that the economy has crashed, we have the executive order from the Governor, we identified this six inches as a change we could make that would make drain fields a little bit less expensive to homeowners, gravel, pipe and gravel, without unduly compromising public health and safety.

Are there going to be drain fields that last a little bit longer -- a little bit less longer? Probably.

Will there be more that fail during peak flow because of this change? Probably.

So this is now in the realm of public policy. I can't tell you exactly how -- what's going to happen. I don't know -- I mean, these installers will tell you that as a routine matter they recommend that people oversize drain fields, because that's always a good thing. These guys don't want to ever have to come back and see this again.

If you're a homeowner, you can afford it, you want to put in an oversize drain field. In fact, it's better to have two fully sized drain fields parallel with a distribution box, and you flow to one for two to three years, then you switch and flow to the other. And as the other drain field is resting, the bacteria cannibalize each other, and the drain field

rehabilitates.

You put in one of those, you'll probably never have to work on that drain field again, but that's more expensive.

MR. CASCIANO: So what parameter of your requirements are you changing to get the overall effect you want, which is reducing the required size of the drain fields?

MR. MC QUILLAN: Madam Chair, Member Casciano, we would be -- we propose to eliminate the exclusion of six inches of sidewall below the invert. We cut it from twelve to six inches in '05, our drain fields still became larger in most cases.

MR. CASCIANO: So how does that change affect the depth of the trench or the amount of gravel that's required?

I'm just not following how --

MR. MC QUILLAN: If -- excellent question.

If the installers get full credit for the sidewall below the invert to the bottom of the trench, that potentially could be a deeper trench, it could be a shorter trench, and certainly would be less gravel in most configurations.

But it all depends on whether they make it one feet wide or three feet wide, and the depth is

another issue. You could -- you could do the math and put together all different types of X, Ys and Zs on a drain field and calculate how many square feet you get or what linear footage that you would need to come up to 750.

So it really depends, the specifics on what the installer puts in. If they have a limited layer, they're not going to be able to put in a three-foot trench. They may only be able to put in one foot.

MR. CASCIANO: So you're reducing the size by giving them credit for the first six inches below the pipe instead of excluding that in the calculation.

Am I understanding that correctly?

MR. MC QUILLAN: I think so. As long as you understand that we're not -- we're not -- we're not adjusting our soil application rates. So we're not -- this change we're proposing would not change the absorption area you would need.

The change we're proposing would give more credit to the sidewall in pipe and gravel trenches. They'd still have to come up with 750 square feet, but they would have an easier time doing it -- slightly easier time if they get that six inches.

MS. RYAN: So you're just offering more flexibility.

MR. MC QUILLAN: I think so. We're letting our installers do their job, for one thing, not really micromanaging. I mean, again, not everybody goes for the smallest drain field in the state.

And these guys will tell you, the elite installers, the ones that are going to become installer specialists, that they recommend the people who make it a little bit larger. I know there's guys that will put in one tank size larger, and if you don't want his business, you go somewhere else.

MR. FULFER: Can you describe the sidewall a little bit more? Is that -- that you're talking about? Is that the six inches below the pipe or to the side of that, or what do you call the sidewall?

MR. MC QUILLAN: This is -- the sidewall is in the -- is the sidewall of the trench. They come in with a backhoe --

(Discussion off the record.)

MR. FULFER: The first -- what is the sidewall?

I thought maybe it was the sidewall from the pipe to the sides of the ditch or the depth underneath it. I was trying to clarify what the sidewall was.

THE REPORTER: And your answer?

MR. MC QUILLAN: The answer is, I think, yes.

It is the -- when they come in, they -- with a backhoe, bucket of 12 inches or 36 inches or whatever, they dig a trench, and so the sidewall is the vertical wall of that backhoe trench. And the six inches we're talking about is the six inches below the invert.

MR. FULFER: Okay.

MR. MC QUILLAN: So --

MS. PEACOCK: So the answer is the sidewall is the three feet, correct?

MR. MC QUILLAN: In this example, yes.

MS. PEACOCK: Yes.

And the six inches is just not to be used for the calculations under the rule.

MR. MC QUILLAN: Correct. The six inches today, with the unamended rule -- this six inches on each side, which would be one foot per linear foot, would be excluded from being credited towards your 750 square feet of absorption surface.

MS. PEACOCK: I think it would help the Board if we walked through the entire three-bedroom, 750-feet example. You also mentioned the 80 percent calculation -- or the 80 percent factor, and then we get to this. So maybe we could start back from the beginning in these regulations and go through --

MR. MC QUILLAN: Sure.

MS. PEACOCK: -- using that three-bedroom, 750-square-foot example.

MR. MC QUILLAN: Okay.

MS. PEACOCK: How do you get there?

MR. MC QUILLAN: Let me refer you to the soil application rates.

The soil application rates are in Section 703 of the existing regulations, and there's a table that shows different soil types. It's Table 703.1. And it shows the soil type, the soil texture and the application rate.

So these application rates are multiplied by your design flow, which is --

MS. PEACOCK: So --

MR. MC QUILLAN: -- which is based on the number of bedrooms.

MS. PEACOCK: There is no definition for application rate.

So could you describe what that is?

MR. MC QUILLAN: The application rate is in Table 703.1, square feet per gallon per day of -- in this -- and this pertains to square feet of absorption surface.

And this is -- and this is related to -- and these numbers in 703.1, by the way, have really good

science behind them. We adjusted 703.1 in 2005, and most of these changes we made, we basically increased most of these application rates, and to the extent that we take the soil application rate and multiply it times the design flow, and that's what you have to have for absorption area in your drain field.

By increasing the application rates, we make larger drain fields.

MS. PEACOCK: So if you have a clay, it doesn't absorb very much water, so that's why you have a factor of 5, versus the sand which is 1.25.

MR. MC QUILLAN: Exactly. Clay has a lower hydraulic conductivity. In fact, the hydraulic conductivity of clay is even higher than the biomat that develops on the bottom of the trench.

So these numbers, we believe, in 703.1 were based on really good science. We're not proposing to change that.

What we're discussing here is the safety factor, which is largely a matter of public policy, in adjusting the requirements for drain field sizing.

Another big safety factor in this discussion, since the -- that 750 square feet is based on design flow, is the fact that our design flows are typically larger than the average actual tank flows. That's a huge safety factor.

MS. PEACOCK: So what are you referring to? Which section?

MR. MC QUILLAN: Oh. The design flow is in its own section. The design flows are given in Section 201. We have a table of design flow from -- 201.1 shows design flows from -- from various types of facilities based on occupancy or business design. And we also -- most of the time if it -- if it's a house, we will base design flow on the number of bedrooms in the house.

MS. PEACOCK: So you're referring to P, section P, above that, where you have three bedrooms is 375 gallons per day?

MR. MC QUILLAN: Yes.

MS. PEACOCK: Is that -- okay.

So how did you get from the 375 to the 750 feet requirement?

MR. MC QUILLAN: We took three -- the design flow for a three-bedroom house, which in 201P is 375, and we multiplied that by the soil application rate of 2 for sandy loam.

MS. PEACOCK: For this example, you were assuming a factor of 2?

MR. MC QUILLAN: Correct. I used the

three-bedroom home, sandy loam, and so we come up with, by today's standards, a requirement of 700 square feet of absorption surface area. And three bedrooms is typically what we see, and sandy loam is not an uncommon thing.

So that's how we got to the 750. And here again, how you get to 750 is a matter of design, which these guys do -- you know, our installers in New Mexico do on a daily basis.

If you have a high groundwater or, say, you had bedrock, you may not be able to put in a three-foot trench. You may only be able to go down one foot, in which case you're going to have a very shallow trench.

MS. RYAN: But you could just make that longer or wider or --

MR. KNIGHT: Or more of them.

MS. RYAN: Or more of them.

MR. MC QUILLAN: Exactly.

MS. PEACOCK: So back to 703J.(2), you just -- okay. It reads, "A minimum of six inches of aggregate shall be placed below the invert of the distribution pipe to provide surge storage. This area" -- meaning the six inches -- of trench sidewall shall not be used in calculating the absorption area."

So instead of your example of one foot by

three foot being used, you have one foot by two-and-a-half feet that's used to apply to the 750 square feet.

MR. MC QUILLAN: Correct, except the trench -- by today's rule, the trench would still be just as deep as it is, but you would only get to count two-and-a-half feet of that sidewall.

MS. PEACOCK: Right. So you need a less trench -- shorter trenches or just less -- less gravel area.

MR. MC QUILLAN: Exactly. And it's up to the -- to the system installers as to how they design that.

MS. RYAN: You're just giving them credit for what's already in place.

MR. MC QUILLAN: Yes.

And I don't want to make light of this, and I -- you know, Infiltrator has submitted testimony in opposition to this, and, you know, it is a safety factor, and we didn't -- we didn't make this proposal without thinking about it, and it's not lightly taken. We don't want to unduly put people at risk or have -- have drain fields fail, you know, extremely prematurely. I mean, that would be a bad thing.

But given the drastic change that was made in

'05, mainly due to the change in application rate, we feel that we're not going to be -- that this is not unduly risky to do this.

MR. CASCIANO: Why aren't you proposing changing the application rate, if they drove the oversizing of systems, versus messing with the height dynamic that really is meant to catch the additional flow initially?

It just seems if you're using the top part of your trench all the time, you're -- you're getting a lot of flow into your system that's not long enough if you're -- on top.

MR. MC QUILLAN: Madam Chair, Member Casciano, we could do that, or we could change design flow to provide some relief. There are three ways that we can get to that 750, or to the required surface area.

Design flow, which we know in most cases is too large -- or larger than actual.

I would prefer not to mess with the soil application rates, because we spent -- we flew in two experts, and we spent a whole day -- it was a special TAC meeting, Technical Advisory Committee meeting, and I think that the numbers in 70 -- in the 703.1 are good, solid numbers based on soil physics, and we prefer not to mess with them.

But we could.

MS. PEACOCK: Just so I understand the rest of J, the first section that you're proposing to be deleted is actually in another section, but why -- a trench width shall be no less than one foot or no more than three feet. So why is that?

MR. MC QUILLAN: Well, the -- most of the -- I think most of the backhoe buckets that are used are about 12 inches, and the proprietary products and technical difficulties of getting something in less than 12 inches are a challenge.

And as far as it being wider than three feet, then you're going to be getting into another disposal technology called beds, and then if you make it deeper than it is wide, then you get into yet another one called seepage pits.

MS. PEACOCK: Seepage pits. Okay.

MR. MC QUILLAN: So we have these -- we have sizing criteria and design criteria for seepage pits, and we have criteria for beds, and we have criteria for trenches.

MS. PEACOCK: So the depth can be any number? Is there any limitation on that? It's just the width that's -- that's limited?

MR. MC QUILLAN: Madam Chair, that's another

change we're proposing right now. We are proposing to eliminate the -- what was put in in '05, the maximum trench depth of six feet. And we feel that this is just not protecting much in most cases.

If there is a shallow groundwater issue, by golly, we'll do what we need to do in permitting. You know, we can impose more stringent requirements. And we certainly don't want people putting disposal trenches into the groundwater.

But here again, the clearance standard that we have is four feet from the trench bottom to groundwater. So if the groundwater is at 200 feet, and you have to put in a trench that goes down to eight feet, what's -- there's no harm in it.

And the six foot rule has caused a lot of problems for installers and for the homeowners who have to pay for these systems. One thing that these guys have no control over sometimes is where they put the stub-out where the sewer pipe comes out of the house. Sometimes the plumbers put these too deep, and they have to go deeper than six feet just so they have a gravity system.

Another example would be let's say you have unsuitable soil clay that goes down to six feet and below that you have really good sandy loam. Very

common --

MR. CASCIANO: Excuse me.

The -- where is the six foot requirement? Is that in 703J?

I don't see it.

MR. MC QUILLAN: The six foot that we're proposing to delete is -- is in 701J. It's in the table. It's the -- it's currently H, and it's proposed to be J.

MR. CASCIANO: In 701?

MR. MC QUILLAN: Yes, sir.

You can see that the depth of trench six feet is -- that's strike-through in our petition.

MR. CASCIANO: And how about the three other components that are struck through in J for trench?

It seems like you're getting rid of three basic requirements for -- that's pretty standard for trench construction, trench width, minimum aggregate underneath and then how much aggregate additional under -- below the distribution.

MR. MC QUILLAN: Are you looking at --

MR. CASCIANO: J, 703J.

MR. MC QUILLAN: Well the --

MR. CASCIANO: The strike-through version, (1) through (3).

MR. MC QUILLAN: The length of each line is proposed to be increased from 155 to 160, and this is to accommodate some proprietary drain field products, so they can actually have an even number of units to put in.

MR. CASCIANO: So those basic requirements aren't needed anymore, the specifying the width or the depth of the --

MS. PEACOCK: Let -- let --

MR. CASCIANO: Sorry to interrupt.

MS. PEACOCK: They've been moved.

MR. MC QUILLAN: They've been --

MR. CASCIANO: They've been moved?

MS. PEACOCK: They've been moved to 701A.

MR. CASCIANO: Okay. Thank you, Madam Chair.

MR. MC QUILLAN: And that's explained in our written testimony. We've done some cutting and pasting to put certain rules in the place where they seem to be more logical. 701A is a good example.

MS. PEACOCK: So if you can have a trench that's six feet, you now have 701A.(3) says, "Up to maximum of 3 foot of aggregate may be placed below the distribution pipe."

So how would you accommodate a six foot --

MR. MC QUILLAN: Madam Chair, we have backfill and teach a class, or if POWRA has CIDWT come and teach a class, or NMOWA has NAWT come in and teach a class, they're going to require them to recertify every two years.

So even if I except three, I don't know that I could meet my criteria for most of the wastewater folks that are teaching that. NOWRA is also every two years, the A to Z. So a lot of them are that.

If there's a way to work around it, sure. I guess that would be fine.

MS. ORTH: Thank you.

Madam Chair.

MS. PEACOCK: Thank you for your statement. We were all expecting fireworks today, and so thanks for explaining the behind the scenes, and we have great appreciation for industry and the Department working together to come up with this single draft.

MR. BAKER DOTSON: Thank you. We appreciate that.

MS. PEACOCK: We really appreciate that you've done this work.

MR. BAKER DOTSON: They get a lot of the credit. They did a really good job this time.

MS. ORTH: Board questions, any other Board questions before we excuse Mr. Bassett and Mr. Dotson --

I'm sorry. Wait.

Does anyone else have a question of Mr. --

MS. KERY: I do.

MS. ORTH: Ms. Kery.

MS. KERY: Thank you.

Just one question.

MS. ORTH: All right.

MS. KERY: And I won't even sit down, because that will take more time.

CROSS EXAMINATION

BY MS. KERY:

MS. KERY: So, Mr. Dotson, you testified that installers follow UPC; is that correct?

MR. BAKER DOTSON: No. It's referenced in our -- in our liquid waste regulations. There is a -- there's several references to the uniform plumbing code.

MS. KERY: Okay.

But I thought your testimony was that installers follow the UPC.

Is that -- did I hear that wrong?

MR. BAKER DOTSON: I don't believe so. I believe I -- I believe I was referring to the fact that we -- when Mr. Bassett asked about this being submitted, we follow that, and if -- maybe if memory serves me correct, that I said that the UPC does allow for

sidewall absorption area.

MS. KERY: Right.

MR. BAKER DOTSON: I believe I did state that, as well.

MS. KERY: And do you agree that the UPC calls for 12 inches of sidewall credit?

MR. BAKER DOTSON: Having not -- our regulations don't follow the UPC exactly, which is why we have some issues with Mr. Becker's working on this, but why Construction Industries can't really take my license, because they don't recognize our regulations at this point. So the Department writes me a violation, means nothing to CID.

So that being said, we reference it in some of our guides that we use some of their -- some of their statements. When Mr. Tom Brandt, myself and another gentleman wrote the MS-3 license, which is the septic license -- we wrote that -- we reference most our regulations, but some of those are based on UPC.

So they're not based on the sizing criteria for UPC. I just wanted to reference that they definitely recognize sidewall absorption area.

MS. KERY: Okay.

And I just want to show you -- this is the UPC. It's Infiltrator's Exhibit Number 6, and this is

section K 3.

And would you agree that the UPC calls for -- indicates that 12 inches of sidewall should not be credited in the calculation of an absorption area?

MR. BAKER DOTSON: I am -- the only thing I would note is that you have the 2000 edition, and I believe there's a 2012 edition. So I'm not sure that it's any different, and it may be. So I don't want to state that this is the fact if there's a change in Appendix K.

MS. KERY: But that's what it does say in the 2000.

MR. BAKER DOTSON: In 2000, yeah, it does say that 12 inches and not to exceed 36 inches below the line may be added to the bottom area when computing absorption area.

But they do allow for sidewall absorption area in the UPC.

MS. KERY: But not -- but they disallow 12 inches of sidewall credit; is that -- I'm asking you, Mr. Dotson.

MR. BAKER DOTSON: Okay. Yeah. They do. You're correct.

MS. KERY: Okay. Thank you.

MR. BAKER DOTSON: In the 2000 edition, yes.

MS. KERY: Thank you.
MS. ORTH: Other questions of Mr. Dotson and Mr. Bassett?
No?
Thank you very much, gentlemen.
MR. BAKER DOTSON: Thank you.
MS. ORTH: And do I hear any objections to admitting Mr. Bassett's letter as Bassett 1 and the glossary as 2, Bassett 2?
Hearing none, they're admitted.
(Exhibits Basset 1 and 2 admitted into evidence.)
MS. ORTH: Now Mr. Stubbs.
And come up with Mr. Ensor, as well, too.
And be sworn in first.

CARL STUBBS and JACE ENSOR
having been first duly sworn or affirmed, were examined and testified as follows:
DIRECT TESTIMONY
THE REPORTER: Would you both please state your full names.
MR. STUBBS: Carl Stubbs.
MR. ENSOR: And Jace Ensor.
THE REPORTER: Thank you.
MS. ORTH: We'll start with Mr. Stubbs.
MR. STUBBS: Thank you.
We asked to be together because we represent the same organization.
I'd like to start.
I'm very thankful that the Department has gone through and cleaned up a lot of these regulations. The 2005 revision was extensive, complicated, drawn out, and it needed a little tweaking, and we're very thankful that they have taken care of that and done some rearranging that made good sense.
Specifically in the regulation, I like the change in the definition of bedroom. It's been done a little differently across the state, and this makes it much more consistent, and this would -- this will help.
There were some changes in lot size. And I

like that the -- the smaller lots were -- remained very close to the same, larger lots were a little smaller. And I really don't have a problem with that.
Census data shows that the average number of persons per household in New Mexico and the nation is 2.6, which is very close to a one-bedroom house. Most bedroom -- or houses are larger than that. And having lot sizes a little bit smaller for larger houses would not be a problem.
In Section 302C, where we're -- large lot size, where they're using a radius to help provide setbacks between water sources and contamination, generating size is a very good idea. That will really work well for a large lots -- lot size.
401P, it restricts the opportunity to cancel a permit to the owner, and over the past, there have been problems for the Department when either the owner or the contractor could cancel a permit, and this allows just the owner, and that will make things a little easier on the Department to deal with those kinds of changes.
601 -- 603G talks -- includes sand trenches as a technology or method. Any of those additional methods is very much appreciated. It makes trying to get a liquid waste system on a difficult site a little easier. So that -- that's excellent.

703I, the 30 percent rock in soil and having alternative to that is a good idea. I know my lot that I'm developing now -- I have a rock concentration problem, but I have 250 feet of this soil/rock mixture, and that will adequately filter bacteria out that shouldn't pose a risk to public health. Having alternative is different.
MS. RYAN: And what -- I'm sorry.
What section were you referencing just now?
MR. STUBBS: 703I.
MS. RYAN: Thank you.
You can continue. I just want to make sure I'm following you.
MR. STUBBS: Oh, okay.
Changing the advanced treatment unit monitoring from testing the -- making sure they get the right result to testing the functional parameters of the unit, I think, will be a benefit. The Department has struggled with trying to monitor all of these different things going on, and it's been made much worse with the recent manpower issues that they have.
Changing this to the parameters that are actually onsite should make it a little better. When you go to work on the unit, those -- what you look at, you don't look at the end product, you look at all those

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT BOARD
No. EIB 12-01(R)

IN THE MATTER OF PROPOSED AMENDMENTS,
20.7.3 - Liquid Disposal and Treatment

TRANSCRIPT OF PROCEEDINGS

BE IT REMEMBERED that on the 13th day of August, 2012, the above-entitled matter came on for hearing before the Environmental Improvement Board, taken at the State Capitol Building, 490 Old Santa Fe Trail, Room 307, Santa Fe, New Mexico, at the hour of 2:10 p.m.

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MS. PEACOCK: Okay. I can read the sentence. "NMED opposes the POWRA proposal," which is the six-inch -- not having the six-inch rule -- "on the basis that it offers no protection for surge capacity and is contrary to the advice of the national experts who were consulted on this issue." There is no name on this testimony. It just says, "Testimony of Environmental Health Division."

Who gave this testimony?

MR. McQUILLAN: As I recall from that January 2007 hearing, I think we were testifying as a panel. There were a number of us that participated in writing the testimony: Myself, Dennis McQuillan, Ana Marie Ortiz, Brian Schall, Tom Brandt, I believe, was involved in that, and maybe Carlos Romero. But that was the Department's testimony.

MS. PEACOCK: Okay. And that would fit in with the Statement of Reasons given in EIB 06-06(R), 06-07(R), and 06-13(R), paragraph 21, it says, "Mr. Schall, Mr. McQuillan, and Mr. Hallahan's testimony established grounds for NMED's position regarding the issue of 'Surge Storage Capacity.'"

And what's stated there is, "The six-inch measurement is an important safety factor for the whole equation; the six-inch measurement is on par and

comparable with other states; a zero-inch measurement appears to be too low of a figure; the lack of health problems refutes the argument that the current measurement lacks merit."

Would that have been your testimony, as well, or is that the Board?

MR. McQUILLAN: That was our testimony in January of '07.

MS. PEACOCK: Okay. And so can you explain, since you gave that testimony and now you are giving a change of position, I would like to hear from you about that change of position.

MR. McQUILLAN: Sure. Madam Chair, the Department has changed its position on that issue since January of 2007 for the following reasons: First of all, we have more experience now with the drain field sizing requirements that became effective in September of '05.

In January '07, we were just kind of still in the early stages of gaining experience on that. And we have come to the belief that we probably erred too far on the side of larger and more expensive drain fields in the changes of 2005. We didn't have all that experience and history in January of '07 that we do today.

Another reason is that the economy crashed in 2008, both in New Mexico and around the world, and so the increased costs that we imposed on homeowners in 2005, the effects of that were amplified by the crash. You know, the drain fields became more expensive, by and large, in 2005; the economy crashed, that made it worse.

Another factor is that the industry in New Mexico, the guys who install these every day, have been telling us for now, for eight years and with seven Petitions that they filed with the EIB, that the playing field was not level between pipe and gravel and proprietary products.

And there have been a number of papers that have come out since 2005, and we -- when we codified the rule that gives up to 30 percent reduction for proprietary products, that raised questions about the assumptions that went into that, and we are not -- but the bottom line is we are not proposing to change the 30 percent rule.

We are just -- that's not part of our Petition, but the local expertise and the homegrown expertise we have with our industry, evidenced anecdotally, some of it carries a lot of weight, and in the Governor's Executive Order, which is related to the

first two reasons, the cost of systems in '05, the economy crashing, we were ordered by the Governor to look at ways to make our program more business friendly. So we felt that we could eliminate the six inches of surge, which, again, is a safety factor, without unduly compromising safety -- public health and safety.

MS. PEACOCK: Okay. Thank you. Did anyone else have follow-up questions on that six-inch rule? We spent a lot of this hearing on that and there are a lot of other questions we are going to get to.

I wrote down -- well, first of all, I want to congratulate the Department and the industry together, and I also like seeing that you are trying to have all of these different variations that are available to people, but because of all these variations, I would like just a general conversation or talk about what are all these systems, what instances are they used for.

I think we have all gotten confused by the radius equation, when you get to that, but I don't even know when that comes into play. So I wrote down all of the different sections and I just wanted to ask, in general, and I think it would help our board, when would you use, for instance, a conventional treatment system versus -- and is that also primary treatment?