1. [Mr. Bell] Call to order

Chairman Bell called the meeting to order at 9:40 a.m.

Attendees:

Council Members: David Bell, Karen Guz, Emilio Escobar (via telephone), Toni Fox, Mark Froehlich, Deville Hubbard, David Kania, Nora Mullarkey, Rusty Tucker

TCEQ Staff: Richard Allen, Michael De La Cruz, Russ Gardner, Candy Garrett, Joseph Hildenbrand, Melissa Keller, Linda Saladino, Amy Settemeyer, Salal Tahiri

Visitors: Marsha Carson, Amanda Griffin, Jeffrey Knight, Jerry Lewis, Deborah Phillips, Austin Smith, Larry Spain, Charles Swanson

2. [Mr. Bell] Consider approval of minutes from the November 17, 2011 meeting.

Ms. Garrett stated that there was not an Electrical Board as noted in the draft minutes, so this sentence was removed from the draft being considered.

Ms. Guz stated that there should be a clarification of item 6c in the draft minutes. Clarifications were made to the minutes under item 6c. The wording now reflects if a master gardener, landscaper, the staff of a utility company, or the staff of a property management company helps the homeowner or property manager by programming the controller for them, is this a violation of TCEQ rules. Mr. Froehlich moved and Mr. Tucker seconded a motion that the minutes be approved with the changes noted above. The motion passed.

3. [Mr. Bell] Recognition of Mr. John A. Heidman - Landscape Irrigator License #2

Mr. Lewis and Ms. Griffin spoke on the contributions that Mr. Heidman made to the landscape industry. Ms. Mullarkey made a motion to have Mr. Heidman’s license be changed to honorary. The motion was seconded by Ms. Guz. The motion passed.

4. [Mr. Tucker] Enforcement and Legislative Committees Reports and Updates

Mr. Tucker wanted to know if a letter needed to be sent to the Justice of the Peace Association concerning enforcement against unlicensed irrigators. After
discussion, it was determined that Ms. Garrett and Mr. Bell would draft a letter to be sent to the Justice of the Peace Association.

Mr. Tucker also wanted to know where violators of the Landscape Irrigation Program were taking their Continuing Education Credit (CEU) hours. Ms. Keller stated that she had just started to track this information, but did not have a representative sample. Ms. Keller stated a representative sample would be provided at the next IAC meeting.

Office of Compliance and Enforcement

a. Outreach

There was no discussion on this item

b. Enforcement Activities

i. Tarrant County Blitz

Ms. Keller discussed the Tarrant County Blitz. Violations discovered included advertising without a license, improper irrigation head placement in parkways, backflow prevention devices under water, irrigation heads too close to hardscape and irrigation plans that did not reflect what was actually installed.

Ms. Keller stated that for Fiscal Year 2012, that Travis County had an influx of complaints.

There was a discussion concerning how cities over 20,000 could be penalized for not enforcing ordinances.

Mr. Bell stated that he wanted the IAC to be more of a resource to TCEQ concerning water conservation and that the landscape irrigation rules are followed.

ii. Enforcement Initiation Criteria

There was no discussion on this item.

5. [Mr. Hubbard] Education, Training and Licensing Committee Reports and Updates

Office of Permitting and Registration

a. Licensing, Training, Testing, and Renewals

There were no comments or discussion.

b. Discussion of CEU credits for smart controller installation and troubleshooting.

Mr. Hildenbrand spoke on a discussion that was held between TCEQ and the Texas Turf Irrigation Association (TTIA). Mr. Hildenbrand discussed what was submitted and what was approved by TCEQ concerning CEU
credits for manufacturer specific smart controllers and troubleshooting. Mr. Hildenbrand stated that the training cannot be a promotion by a manufacturer or a vendor. There was a discussion about what manufacturers could present in a training course. Ms. Griffin stated that manufacturers would present the training on new products, students would get CEU credits and TTIA would be the moderator of the training.

c. Updating of TCEQ website for courses and training providers.

There was a discussion among the IAC concerning when an irrigator receives an NOV or NOE, what types of courses are they taking to renew their license.

d. Discussion of statistics for Irrigation Technicians taking the examination in Spanish.

Mr. Hubbard recommended rescinding the Spanish language exam and was concerned that TCEQ may be doing a disservice to the industry. Mr. Hildenbrand stated that the Regional Offices had been contacted to give the English/Spanish examination when requested. The Regional Offices were giving the English/Spanish examination to both English and Spanish speakers. Mr. Hildenbrand stated that because of this, it created errors in the examination results. Mr. Hildenbrand stated that TCEQ will keep the Licensed Technician examination in Spanish. Later, the examination will be revised, and at that time, it will be determined if the examination will be printed in Spanish.

e. Discussion of modifications concerning license renewal and expiration.

There were no comments or discussion.

f. Discussion of CEU credits for water conservation.

Mr. Hubbard stated that a water conservation document listing topics for water conservation would be submitted to TCEQ. Ms. Mullarkey stated that training should be hands-on training and not on-line training. There was a discussion among the IAC that this would require a rule change. Mr. Gardner stated that rulemaking would occur after the next legislative session. Ms. Garrett explained the rule process.

Ms. Saladino suggested that it would be helpful to get IAC input on the following items:

- Can a licensed irrigation technician take the basic irrigator course in lieu of the technician’s course?
- Can a licensed irrigator attending a basic irrigator course receive eight hours CEU’s?
- Guidance to basic training providers regarding their courses.
• Applying course codes for specific courses in the design and hydraulics portion of the basic irrigator course.

The IAC will discuss these issues and follow up with Ms. Saladino.

Lunch (1 hour) Mr. Bell adjourned the meeting at 12:00p.m./called the meeting to order 1:00p.m.

6. [Mr. Bell] Hear from individuals wishing to address the Council
   a. Mr. Larry Spain—Use of Appropriate Backflow Prevention Devices
      Mr. Spain presented a presentation on the Toro’s Treflan Line (DL) 2000 drip tubing with root guard. Mr. Spain stated that the drip tubing is a low hazard product and does not induce chemicals into the water supply. Mr. Spain stated that Regulatory Guidance Documents 466 and 470 have different language and do not have a definition for hazard. He would like Texas Administrative Code §344.51(c) to include that a small amount of the chemical to be acceptable. In his presentation, Mr. Spain provided a report supporting that Treflan is a low hazard product. Ms. Keller recommended that the IAC review the report and consider if a rule interpretation of §344.51(c) is needed.

      There was a discussion concerning the hazards associated with the product Treflan. Ms. Garrett recommended that Mr. Spain send a letter to the TCEQ concerning his request. Ms. Saladino recommended that Mr. Spain present the information to the Backflow and Cross Connection subcommittee and to the Public Drinking Water section.

   b. Others
      No others wish to address the Council.

7. [Ms. Guz] Rules and Administrative Committee Reports and Updates
   a. Discussion of the legality of irrigation system owners allowing master gardeners to program their irrigation controllers.

      There was a discussion among the IAC concerning the legality of irrigation system owners allowing master gardeners to program their irrigation controllers. Ms. Garrett stated that she would check with the TCEQ legal department concerning this issue and provide a legal interpretation. The IAC will discuss this issue at the June IAC meeting.

   b. Future rule changes.

      Ms. Guz discussed the following issues concerning rule changes:
      • Individuals being allowed to take the same course during the renewal period.
The definition of water conservation.

The minimum number of CEU’s to be taken for water conservation.

Defining the education level of an individual before taking the irrigator examination.

A license being required for irrigation scheduling.

Master valve and backflow prevention device.

CEU requirements being related to a Notice of Violation.

The state enforcing against cities that are not enforcing their local ordinances.

Licensed irrigators missing their renewal date being penalized.

The IAC will send a survey to TTIA members concerning the rule changes. Ms. Keller stated that most of these rule changes were under the TCEQ licensing section. Ms. Keller stated that a field citation is not a rule change, but is an internal TCEQ policy and discussed the field citation process.

8. [Mr. Bell] Receive, Discuss and Act on Other Items of Interest to IAC
   a. Nominations for appointment to serve on the Irrigator Advisory Council
      Ms. Keller stated that she knew of two interested individuals who would like to serve on the IAC. There was a discussion of the IAC nominations process. It was encouraged that the IAC members submit nominations to the TCEQ.

   b. Future IAC Meetings
      The next IAC meeting will be June 21, 2012 in Building A 202

9. Adjournment
   The meeting adjourned at 2:30 p.m.

Attachment A-Enforcement Activities
Attachment B-Upcoming Meetings
Attachment C-Licensing, Training, Testing, and Renewals
Attachment D-Larry Spain presentation
ENFORCEMENT ACTIVITIES
Landscape Irrigation Program
September 1, 2011 – February 13, 2012

Notices of Violation – 25
Unlicensed Individuals – 14
- Advertising-14

Licensed Individuals – 11
- LI # not in advertisement – 3
- Incorrect placement of irrigation heads-7
- Plan violations-1

Notice of Enforcement – 11
Unlicensed Individuals – 5
- Installing – 3
- Continuing to advertise without a license – 2
Licensed Individuals – 6
- No permit – 4
- Irrigation system inspected not passing final inspection-2

Investigations Conducted – 28 (0 on-site)

Incidents Closed – 20 (20 Unsubstantiated)

Administrative Orders Issued and Penalties Collected-12; $8,817.00

Note: One NOV or NOE may include several violations

Attachment A
Landscape Irrigation: Upcoming Meetings - Texas Commission on Environmental Quality

Meetings for parties interested in landscape irrigation, including governments and the Irrigator Advisory Council. States whether open to public.

Please check this site periodically for additional meetings and information.

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 19, 2012</td>
<td>Grapevine Convention Center</td>
<td>Lonestar Irrigation Expo</td>
</tr>
<tr>
<td></td>
<td>1209 South Main Street</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grapevine, Texas 76051</td>
<td></td>
</tr>
<tr>
<td>January 30 - February 2, 2012</td>
<td>Hilton Houston Hobby Airport</td>
<td>12th Annual Houston Building Professional Institute (HBPI)</td>
</tr>
<tr>
<td></td>
<td>8181 Airport Boulevard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Houston, Texas 77061</td>
<td></td>
</tr>
<tr>
<td>February 16, 2012</td>
<td>Texas Commission on Environmental Quality (TCEQ)</td>
<td>Irrigator Advisory Council</td>
</tr>
<tr>
<td></td>
<td>12100 Park 35 Circle Building B, Room 201A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Austin, Texas 78753</td>
<td></td>
</tr>
<tr>
<td>February 17, 2012</td>
<td>Pano Convention Centre</td>
<td>Dallas Irrigation Association Expo (DIA)</td>
</tr>
<tr>
<td></td>
<td>20000 East Spring Creek Parkway</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plano, Texas 75074</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11503 Carl Road</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Austin, Texas 78610</td>
<td></td>
</tr>
<tr>
<td>March 1-2, 2012</td>
<td>DoubleTree Hotel</td>
<td>Texas Municipal League</td>
</tr>
<tr>
<td></td>
<td>6505 Interstate Hwy 35N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Austin, Texas 78752</td>
<td></td>
</tr>
<tr>
<td>May 1-2, 2012</td>
<td>Austin Convention Center</td>
<td>TCEQ Trade Fair</td>
</tr>
<tr>
<td></td>
<td>201 East 2nd Street</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Austin, Texas 78701</td>
<td></td>
</tr>
<tr>
<td>June 10-14, 2012</td>
<td>MCM Elegante Suites Hotel</td>
<td>Texas State Association of Plumbing Inspectors, INC (TSAPI)</td>
</tr>
<tr>
<td></td>
<td>4350 Ridgemont Drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abilene, Texas 79606</td>
<td></td>
</tr>
<tr>
<td>August 17-19, 2012</td>
<td>George R. Brown Convention Center</td>
<td>Texas Nursery and Landscape Association (TNA)</td>
</tr>
<tr>
<td></td>
<td>1001 Avenida De Las Americas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Houston, Texas 77010</td>
<td></td>
</tr>
</tbody>
</table>
1. Licensing, Training, Testing, and Renewals (20 minutes)

**09/01/2011-01/31/2012**

<table>
<thead>
<tr>
<th>License Type/Level</th>
<th>New Applications Received</th>
<th>Renewal Applications Received</th>
<th>Total Applications Received</th>
<th>Tests Administered</th>
<th>Tests Passed</th>
<th>Percent Passed</th>
<th>New Licenses Issued</th>
<th>Renewal Licenses Issued</th>
<th>Tot: Curr License</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation Technician (Spanish)</td>
<td>88</td>
<td>0</td>
<td>88</td>
<td>143</td>
<td>40</td>
<td>28.0%</td>
<td>41</td>
<td>0</td>
<td>1,27</td>
</tr>
<tr>
<td>Landscape Installer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Landscape Irrigation Inspector</td>
<td>6</td>
<td>11</td>
<td>17</td>
<td>10</td>
<td>5</td>
<td>50.0%</td>
<td>6</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Landscape Irrigation Technician</td>
<td>112</td>
<td>0</td>
<td>112</td>
<td>116</td>
<td>96</td>
<td>86.0%</td>
<td>77</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>Landscape Irrigator</td>
<td>284</td>
<td>1,165</td>
<td>1,469</td>
<td>471</td>
<td>361</td>
<td>76.5%</td>
<td>223</td>
<td>1,159</td>
<td>5,44</td>
</tr>
<tr>
<td>Grand Totals</td>
<td>498</td>
<td>1,178</td>
<td>1,674</td>
<td>740</td>
<td>491</td>
<td>62.3%</td>
<td>347</td>
<td>1,119</td>
<td>7,39</td>
</tr>
</tbody>
</table>

2. Central Office Policy on Exam Day Walk-Ins

Effective January 1, 2012, the TCEQ Central Office located at 12100 Park 35 Circle in Austin, Texas, will no longer accept walk-in applicants on the day of the exam.

In August, 2011, TCEQ Central Office implemented an online exam registration process for all applicants to pre-register for the exam sessions held at the Austin location. This was done to facilitate registration on exam day and to minimize the number of applicants turned away at each session due to over-crowding in the examination rooms.

The Central Office offers exams on the second Monday of each month. There is a morning session at 8:30am and an afternoon session at 1:30pm. Along with those sessions, there is an 8:30am session for those applicants pre-approved to sit for the Water and Wastewater ‘A’ exams.

Currently, walk-in applicants are allowed, on a first come-first served basis, as room allows. Since the implementation of the online registrations, however, this has become more difficult to maintain as staff must wait to make sure all pre-registered applicants are seated before walk-in applicants.

We encourage all applicants wishing to take their exam at the Austin Central Office to register online at http://www.tceq.texas.gov/licensing under the Exam Schedules and Registration page. If you have any questions regarding this process, contact the Occupational Licensing Section at (512) 239-6133.

3. TCEQ Licensing Listserv

To be added to the email list, send an email to join-tceqlicense@listserv.tceq.texas.gov. Once an email has been received you will get a confirmation email indicating that you have been added to the distribution list.

4. Renewal Notifications by Email

As of February 2012 the Occupational Licensing section is emailing individuals to remind them that their license is about to expire. The email is generated if the licensee holds a license that is going to
OL IAC Update expire in 90 days. The licensee’s email address must be on file to be able to receive a notification email. Below is a total by month of how many email notifications were sent.

- February – 495
- March – 622
- April - 394

5. Technician Exam Pass Rates

The following email went to all exam administrators on 11/17/11:

Exam Administrators,

In an effort to accurately track the pass rates for both the English and Spanish versions of the Irrigation Technician Exam, we are asking for your assistance to ensure the correct version of the exam is being given to applicants.

If an applicant requests the exam in Spanish, they need to be given Test Set IK99903 or IK99904 (EXAMEN PARA TÉCNICO CERTIFICADO DE IRRIGACIÓN).

If an applicant requests the exam in English, they need to be given Test Set IK90004, IK90005, or IK90006 (LICENSED IRRIGATION TECHNICIAN).

Even though Test Sets IK99903 and IK99904 do have the questions in English as well, they should only be used for those requesting the Spanish exam. Otherwise, we will have applicants’ scores that are not reading/answering the Spanish version of the questions, therefore skewing the pass rate percentages.

From looking at the exam inventories you all sent in to us, it appears that all regions have ample copies of both types of the exam (except for R10 who does not have any copies of the Spanish version). If you feel you need more copies, please let me know and we will send them out to you.

We appreciate your assistance.

Attachment C
Presentation and Supporting Documents

Application of:
Title 30, Part 1, Chapter 344, Subchapter E,
Rule §344.51, Section C

"Specific Conditions and Cross-Connection Control"

Toro® DL2000™ Inline Drip Tubing with Rootguard®

TCEQ/IAC
February 16, 2012

Attachment D
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation Handout Pages</td>
<td>1-7</td>
</tr>
<tr>
<td>The Rootguard Process</td>
<td>8</td>
</tr>
<tr>
<td>DL2000 Product Brochure</td>
<td>9-10</td>
</tr>
<tr>
<td>Battelle Bio-Barrier Information</td>
<td>11-12</td>
</tr>
<tr>
<td>Golder Associates Study-Executive Summary</td>
<td>13-14</td>
</tr>
<tr>
<td>EPA Registration Exemption</td>
<td>15</td>
</tr>
<tr>
<td>TCEQ 344.1 C Statute</td>
<td>16</td>
</tr>
<tr>
<td>TCEQ R-466 Page Excerpt, January 2009</td>
<td>17</td>
</tr>
<tr>
<td>TCEQ R-470 Page Excerpt, August 2009</td>
<td>18</td>
</tr>
</tbody>
</table>
Slide 1

TCEQ/IAC Meeting Presentation

The focus of this presentation is on:

1. Provide the "body of evidence," technical information about three DLCDs related to background.

2. Describe the TCEQ's efforts to establish control criteria for the area and why it was not recommended for a strict control in 1998.

3. Provide information related to the name of the site in order to clarify the TCEQ's strictest criteria for the area based on data from monitoring in 2014-2020 for regulatory control of a selected pressure principle location that is used for subsurface purposes in the state of Texas.

Slide 2

TCEQ/IAC Meeting Presentation

1. The 394-5420, Chapter 362, Act 60, 1993, Data (TCEQ) of the VOA landscape includes Performance and Exemptions Table where data is collected on a regular basis. The maximum level of data collected in an area is determined by the TCEQ's regulatory framework.

2. Provide an overview of the process for establishing a standard for the area.

Slide 3

TCEQ/IAC Meeting Presentation

- So if it does not fall into those three categories, why are we here?

- The current language in three different TCEQ statements can be interpreted differently by local inspectors and agencies.

- To eliminate this unintended ambiguity, a ruling from the TCEQ that clarifies the language and brings coherency to the statutes would be most helpful.
Slide 4

Use a reduced pressure schedule backflow prevention device if:

- a chemical is added to the irrigation system by aspiration or injection or is introduced in an irrigation system component; or

Slide 5

Specific: Crystalizer and Cross-Connection Control, §44.21, requires a reduced pressure schedule backflow prevention assembly or act.

- a chemical is added to an irrigation system that is connected to a public water supply;

- the irrigation system is connected to a chemical pipeline and is connected to a public water supply.

Slide 6

TCEQ/IAC Meeting Presentation

Imported Interaction Software from http://www.interaction.com with Thanks!
Slide 8

TCEQ/IAC Meeting Presentation

Trelfan® Released as a Vapor:
Trelfan is released in the vapor phase whether or not irrigation is running. It is not carried by the water to its destination.

Trelfan - Essentially Not Water Soluble:
Trelfan is essentially not water soluble. So if there’s any water that remains in 300 feet of DI2000, it will not have any measurable concentration of Trelfan.

Slide 9

TCEQ/IAC Meeting Presentation

No Water in Drip Line Tubing:
There is no water residual in the DI2000 drip line because there are no check valves in the emitters and because there are dual opposing emitter outlets to assure that the DI2000 drip line is emptied of water after each irrigation cycle.
Slide 10

TCEQ/IAC Meeting Presentation

Guidelines for High Incorporation

- The Teflon® film will not be compromised by water in the system, due to its low solubility in water.

- Teflon® solubility in water:
  - 0.0001% at 70°F (21°C)

Conservation of Water in a System with a Cross-Connection

- Max. Acreage of Treatment = 100% of Acreage in 50% of Feeding (Irrigation) Sets
- 1.5 acre-ft with Teflon up weight = 1.5 gallon
- 1.5 gallon = 600,000 cc
- 600,000 cc = 600 liters
- The product Teflon Concentrate @ 0.0001% in 1 liter = 1 cc
- 1 cc = 0.064 fluid oz (1.7 ml)

Slide 11

TCEQ/IAC Meeting Presentation

- The Teflon® film is fixed in the soil immediately adjacent to the emitter outlet; cannot be absorbed by the moisture in the kit due to the solubility of Teflon.
- The Teflon® film is molecularly suspended within the polypropylene matrix of the emitter. The Teflon® film is 5% of the weight of the 5 gram emitter; which means the amount of Teflon® in the emitter is 0.61 oz.
- Over a 40 year life span, the consistent discharge of Teflon® film = 0.00036 oz per year or 0.0000009 oz/day or 7.8 x 10^-7 per day per emitter.
- This should not be considered a "high hazard."
**Slide 13**

TCEQ RG-470 Page 40
344.1 Definitions

- **(34) Health hazard**—A cross-connection or potential cross-connection with an injection system that involves any substance that may, if introduced into the potable water supply, cause death or disease, spread disease, or have a high probability of causing such effects.

- **(35) Non-health hazard**—A cross-connection or potential cross-connection from a landscape irrigation system that involves any substance that generally would not be a health hazard but would constitute a nuisance or be aesthetically objectionable if introduced into the potable water supply.

---

**Slide 14**

What Is meant by "Degree of Hazard"?

The degree of hazard is a commonly used phrase utilized in cross connection programs and is simply a determination on whether the substance in the non-potable system is:

- Toxic (health hazard)
- Non-toxic (non-health hazard).

---

**Slide 15**

What Is meant by "Degree of Hazard"?

What is the difference between a toxic and a non-toxic substance?

A **toxic substance** is any liquid, solid or gas, which when introduced into the water supply creates, or may create a danger to health and well-being of the consumer.

A **non-toxic substance** is any substance that, in any amount, cannot create a health hazard, is a nuisance or is aesthetically objectionable.
Slide 16

Backflow Device Selection

RPZ Devices are normally used where a high-hazard (toxic) condition exists.

Double Check Valve Assemblies are normally allowed in a low-hazard (non-toxic) situation.

Slide 17

Slide 18

Rootguard™
ROOTGUARD® Technology

The supplied root-growth inhibiting water-soluble technology is based on a formulation that is present in attachable root growth inhibit and reduces root penetration into drainage pipes. The technology is effective in reducing root growth and penetration into pipes, but does not eliminate the need for regular maintenance and inspection. RootGuard is designed to be used in conjunction with regular maintenance and inspection protocols to ensure continued effectiveness. The technology is available in various forms, including pellets, powders, and liquids, and can be applied to drainage pipes, manholes, and other underground infrastructure to prevent root growth and penetration.
**ROOTGUARD** protection consists of a continuous slow release of Treflan™ from the specially formulated plastic polymer, into the soil whether the irrigation water is running or not. The Treflan is released extremely slowly in the vapor phase and fixes in the soil immediately adjacent to the emitter. This zone of Treflan treated soil creates a vapor back-pressure preventing the further release from the emitter, thereby reducing the amount of Treflan in the soil, restricting the volume of Treflan-treated soil, and increasing the life of the ROOTGUARD protection. Empirical evidence from the field provides Toro with the technical information needed to confidently offer a 7-year, written warranty against root intrusion on its DL2000® Series PC Dripline (5/8” diameter) and DL2000 Series Microline (1/4” diameter) products.

**TREFLAN (trade name)** is part of the family of chemicals known as dinitroanilines. Trifluralin, which is the generic form of Treflan, is the most widely used of the dinitroanilines. It inhibits the division of cells by inhibiting spindle formation at the end of the root tip in such a way that the root is unable to grow. It is effective - through direct contact and in vapor phase within soils - on the roots of both grasses and broadleaf plants. It is not known to bio-accumulate in plants (i.e., it is not systemic); thus it will not be transported through the food chain to wildlife, domestic animals, or humans.

**ROOTGUARD technology** is based on the principle of long-term controlled-release by means of a polymeric delivery system. This polymeric delivery system is manufactured by a highly proprietary process. This process combines Treflan with the polymeric base which is then used to mold the pressure compensating emitters. These specially molded emitters are then inserted into the DL2000 tubing during the extrusion process.

**The MOLDED emitter** itself now becomes a reservoir for the herbicide and a controlled delivery system for the herbicide. This reservoir/delivery system is by its nature, protected from photochemical, chemical, and biological degradation, while providing a method for controlled release. Thus the bioactive chemical is released slowly, in a controlled manner, to the soil adjacent to the device to prevent root intrusion in an environmentally safe way.
Toro® DL2000 Dripline is the most technologically advanced subsurface irrigation system available. Through its non-toxic ROOTGUARD® technology, only DL2000 delivers optimal water application directly to the root zone while safely inhibiting root intrusion. Unlike other subsurface systems, DL2000 requires virtually no maintenance. There are no filters to change or chemically treated disks to handle. Ideal for shrub areas, median strips, public recreation areas and parking islands, DL2000 eliminates overspray and run-off since water is applied only at the root zone.

Features & Benefits

US Government-approved
ROOTGUARD Protection
The pre-emergent, TREFLAN®, is impregnated into the emitter during the molding process and creates a "force field" effect around the emitter outlet, diverting root growth and assuring long term reliability.

At Grade Or Buried Options
Can be installed at grade or buried 4" - 8" underground, delivering irrigation directly to the plant's root zone.

Pressure Compensating PC Self-cleaning Emitters
Provide precise, trouble-free water application. TREFLAN® impregnated emitters are inseparably welded to the inside wall of durable polyethylene dripline tubing during manufacturing.

Environmentally Friendly
Irrigation takes place at or below grade so there is minimal water loss due to mist, evaporation, run-off or wind. Fertigation needs are reduced because water is applied only at the root zone. Safety is assured because the treated emitters are inside the DL2000 tubing.

Safety and Liability
When DL2000 is installed below ground, the landscape surface is free from irrigation equipment that may disrupt activities or cause injury. Sub-surface performance also avoids slippery walkways and roadways as well as wet walls, fences and windows.
**DL2000® Series PC Dripline**

![Graph showing flow rate and pressure relationship](image)

### Performance Table

<table>
<thead>
<tr>
<th>Flow Rate</th>
<th>0.53/1.06 GPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of Variation (CV)</td>
<td>≤ 5.96</td>
</tr>
<tr>
<td>Flow Exponent (x)</td>
<td>0.03</td>
</tr>
<tr>
<td>Inside Diameter</td>
<td>0.629</td>
</tr>
<tr>
<td>Outside Diameter</td>
<td>0.715</td>
</tr>
<tr>
<td>Wall</td>
<td>0.045</td>
</tr>
<tr>
<td>Operating pressure (P)</td>
<td>15-50 psi</td>
</tr>
<tr>
<td>Minimum filtration requirement</td>
<td>120 Mesh</td>
</tr>
<tr>
<td>Hazen-Williams C factor</td>
<td>140</td>
</tr>
<tr>
<td>Barl loss factor (Kb)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

### Specifications

**5/8” DL 2000 PC DRIPLINE with ROOTGUARD**

**Model**

- **RGP-212-01**: 0.50 GPH, 12” emitter spacing, 100 ft. col
- **RGP-412-01**: 1.00 GPH, 12” emitter spacing, 100 ft. col
- **RGP-218-01**: 0.50 GPH, 18” emitter spacing, 100 ft. col
- **RGP-418-01**: 1.00 GPH, 18” emitter spacing, 100 ft. col
- **RGP-212-05**: 0.50 GPH, 12” emitter spacing, 500 ft. col
- **RGP-412-05**: 1.00 GPH, 12” emitter spacing, 500 ft. col
- **RGP-218-05**: 0.50 GPH, 18” emitter spacing, 500 ft. col
- **RGP-418-05**: 1.00 GPH, 18” emitter spacing, 500 ft. col
- **RGP-212-10**: 0.50 GPH, 12” emitter spacing, 1000 ft. col
- **RGP-412-10**: 1.00 GPH, 12” emitter spacing, 1000 ft. col
- **RGP-218-10**: 0.50 GPH, 18” emitter spacing, 1000 ft. col
- **RGP-418-10**: 1.00 GPH, 18” emitter spacing, 1000 ft. col

**5/8” DL2000 PC PURPLE DRIPLINE with ROOTGUARD**

**Model**

- **RGP-212-05-E**: 0.50 GPH, 12” emitter spacing, 500 ft. col
- **RGP-412-05-E**: 1.00 GPH, 12” emitter spacing, 500 ft. col
- **RGP-218-05-E**: 0.50 GPH, 18” emitter spacing, 500 ft. col
- **RGP-418-05-E**: 1.00 GPH, 18” emitter spacing, 500 ft. col

### Other Features

- Design flexibility for narrow, odd-shaped landscape areas
- Precise watering puts water where it’s needed; avoids water marks on expensive hardwoods, glass or signage
- Distinctive red strip on tubing signifies DL2000 w/ROOTGUARD®

### Warranty

Seven years

---

www.toro.com • The Toro Company • Irrigation Division • 5825 Jasmine St. • Riverside, CA • 92504 • 877-345-8676
Specifications subject to change without notice. For more information, contact your local Toro distributor, PN 09-1061-IRC
©2009 The Toro Company. All rights reserved.
Buried drip irrigation systems offer an efficient and cost-effective way to irrigate crops. They use less water than above-ground systems because they deliver water directly to the plant roots, so excess evaporation and agricultural diseases associated with moist leaves are avoided. Additionally, the drip irrigation systems can bring systemic insecticides to roots in slow, controlled doses.

Unfortunately, roots often clog drip emitters in buried drip irrigation systems, and this tendency severely limits the service life of a valuable irrigation technology.

Now, through a unique marriage of polymer and root-growth inhibitor, researchers at Battelle's Pacific Northwest Laboratories have created long-term, controlled-release devices that establish a barrier zone where plant roots cannot grow. Called "BioBarrier," the devices exclude plant roots for up to 100 years.

The BioBarrier for drip irrigation applications is engineered to exclude plant roots from drip emitters for up to 20 years. Buried drip irrigation systems protected with the BioBarrier offer all the benefits of the buried drip irrigation technology without the problem of root intrusions.

Battelle-Northwest's BioBarrier technology excludes plant roots from drip emitters for up to 20 years.

Combining Chemical and Carrier

The BioBarrier technology combines polymers or other synthetic rubbers with herbicides that inhibit root growth. The technology, originally developed for buried waste sites, releases the herbicide at a uniform rate, maintaining sufficient soil concentration to prevent root growth in the barrier zone. The BioBarrier herbicide was selected for its effectiveness and minimal impact on the environment.
It is harmless to birds, mammals, and insects. It does not kill plant roots but does prevent longitudinal root growth. Also, the herbicide is not significantly water soluble and is not actively translocated into the aerial tissues of the plant. Furthermore, concentrations needed to inhibit root-growth are low, making the biobarrier herbicide an economical and ecologically sound choice.

Battelle-Northwest researchers have identified several polymers and synthetic rubbers as candidate carriers for the Biobarrier herbicide. These materials have proven effective as chemical carriers for controlled-release devices. They act as reservoirs for the chemical and provide a sustained and prescribed chemical release while protecting the herbicide from degradation. Stable and strong, these carriers are also relatively inexpensive to process.

**Promising Applications**

Battelle-Northwest researchers can tailor the Biobarrier technology to meet many needs. Varying the chemical concentration, polymer thickness, or polymer type creates an engineered obsolescence in the various devices of 2 to 100 years. Integrating the chemical with different polymers or synthetic rubbers, or changing the construction method allows the Biobarrier to assume many shapes and sizes. For example, Battelle-Northwest researchers designed and constructed a sewer gasket that prevents roots from growing through the barrier zone for up to 50 years.

The long-term, controlled-release technology could be used to prevent unwanted plant, animal or insect intrusions in many applications: driveway and highway expansion joints building and house foundations sidewalks, tennis courts, and swimming pools commercial and residential landscaping.

Battelle-Northwest researchers have identified other promising applications for the long-term, controlled-release technology. By incorporating chemicals into controlled-release carriers, researchers may solve problems such as biodegradation of telephone poles, fire ant and termite infestation, rodent and insect attack on buried wires, and tree growth under power lines.

**Assistance from Battelle-Northwest**

Each application of the Biobarrier concept requires individual study for design and engineering of a long-term, controlled-release device. Companies interested in more information about the Biobarrier technology are invited to contact Battelle-Northwest. The research staff will be pleased to discuss arrangements for feasibility analyses and technical assistance for this or other long-term, controlled-release technology.

For more information, contact:
Peter Van Voris
Battelle/Pacific Northwest Division
P.O. Box 999
Richland, Washington 99352
(509) 375-2486

Battelle
Pacific Northwest Division
The corporate mark and name as it appears above is a registered service mark or trademark of Battelle Memorial Institute
Printed in U.S.A.
C42-65-1 0-10-345
May 2008

REPORT ON

Health Risk Assessment for Trifluralin (Rootguard®)

Submitted to:
Toro Australia
63 Howards Road
BEVERLEY SA 6009

Project Number: 087643171 001 R Rev0
Distribution:
1 Copy - Toro Australia (+ 1 electronic)
1 Copy - Golder Associates Pty Ltd
EXECUTIVE SUMMARY

This report presents our review of the available literature for the toxicity of trifluralin and a screening level Health Risk Assessment (HRA) for the Rootguard®, a subsurface irrigation system impregnated with trifluralin to prevent blockage by root growth.

Trifluralin exhibits low acute toxicity via the oral, dermal, inhalation routes. Neat trifluralin causes slight eye irritation, however once diluted with water (as would be the case for the Rootguard®, product) it is not expected to present any irritant characteristics.

Trifluralin can induce skin sensitisation in animal models, and potentially in susceptible people, a characteristic that may still be present when the trifluralin is diluted in the discharge water. However, considering that exposure to the discharge water is likely to be limited to one time exposure at very low trifluralin concentrations, skin sensitisation presents only a minor health hazard.

In rats and dogs, blood toxicity (increased methaemoglobin); changes in urinary parameters and liver toxicity (increased liver weights in the absence of any histopathological changes) are the most sensitive toxicity endpoints after repeated exposure to trifluralin (3-months to 2 years) via the oral route. Liver toxicity was also noted in Wistar rats treated topically (at doses of 200 mg/kg bw/d and above) with trifluralin. Repeated exposure to trifluralin contaminated discharge water released from unearthed damaged subsurface Rootguard® irrigation system is unlikely, therefore chronic toxic effects do not pose an undue health hazard to the public.

The intrinsic toxicological profile of trifluralin suggests that trifluralin is of low acute hazard when impregnated in the polymer matrix of Rootguard® emitter. On this basis, the Rootguard® emitter represents a Low Hazard — "any condition, device or practice that, in connection with the water supply system, constitutes a nuisance but does not endanger health or cause injury" as specified by Section 4 of the Australian Standard 3500.1.2003.

The Acceptable Daily Intake (ADI) for trifluralin is 0.02 mg/kg bw/d derived from 3-month rat study using the NOAEL of 2.5 mg/kg bw/d for increased liver weights and adverse urinary parameters and 100-fold safety factor. The Australian Drinking Water Guideline (ADWG) value is 0.05 mg/L and is derived from the ADI.

The trifluralin exposure level in the discharge water associated with the use of Rootguard® emitter is estimated to be less than 0.16 – 0.19 mg/L. Factoring in the type and length of exposure to the discharge water, the daily intake is 0.0005 mg/kg bw/d for an adult, or 0.0015 mg/kg bw/d for a child, significantly less than the ADI.
Rodney Ruskin  
GeoFlow, Inc.  
506 Taman Plaza  
Corte Madera, CA  94925  

Dear Mr. Ruskin:

Subject: Treated Article Exemption Status of RootGuard  
Drip Irrigation Products  
Your Letter Dated January 14, 2004

We completed our review of the information provided in your most recent letter, referenced above, concerning RootGuard Drip Irrigation Products. It is our opinion that the trifluralin-impregnated drip emitters of RootGuard qualifies for the treated article exemption in Title 40 Code of Federal Regulations (CFR), section 152.25(a). This exemption remains valid as long as that the two conditions specified under the treated article exemption section of the CFR continue to be met. These conditions are; (1) that the article is treated with or contains a pesticide to protect the article itself and (2) the pesticide is registered for such use. The information you have previously provided us indicates that the impregnated emitters are part of the irrigation system which is permanently installed underground (and the emitters are not marketed separately from the irrigation system) and the trifluralin pesticide product used in impregnating the emitters is registered and labeled for this use. If at any time these two conditions are no longer met, then the treated article exemption for the RootGuard drip emitters is invalid. If you have any questions, please contact me at (703) 365-6224 or via email at; miller.joanne@epa.gov.

Sincerely yours,

Joanne J. Miller  
Product Manager 23  
Herbicide Branch  
Registration Division (7505C)
(E) a separate atmospheric vacuum breaker is installed on the discharge side of each irrigation control valve, between the valve and all the emission devices that the valve controls.

(c) Backflow prevention devices used in applications designated as health hazards must be tested upon installation and annually thereafter.

(d) If there are no conditions that present a health hazard double check valve backflow prevention assemblies may be used to prevent backflow if the device is tested upon installation and:

1. a local regulatory authority does not prohibit the use of a double check valve;
2. backpressure caused by an elevation of pressure in the discharge piping by pump or elevation of piping above the supply pressure which could cause a reversal of the normal flow of water or back-siphonage conditions caused by a reduced or negative pressure in the irrigation system exist; and
3. test cocks are used for testing only.

(e) If a double check valve is installed below ground:

1. test cocks must be plugged, except when the double check valve is being tested;
2. test cock plugs must be threaded, water-tight, and made of non-ferrous material;
3. a y-type strainer is installed on the inlet side of the double check valve;
4. there must be a clearance between any fill material and the bottom of the double check valve to allow space for testing and repair; and
5. there must be space on the side of the double check valve to test and repair the double check valve.

§344.51. Specific Conditions and Cross-Connection Control.

(a) Before any chemical is added to an irrigation system connected to any potable water supply, the irrigation system must be connected through a reduced pressure principle backflow prevention assembly or air gap.

(b) Connection of more than one water source to an irrigation system presents the potential for contamination of the potable water supply if backflow occurs. Therefore, connection of any additional water source to an irrigation system that is connected to the potable water supply can only be done if the irrigation system is connected to the potable water supply through a reduced-pressure principle backflow prevention assembly or an air gap.

(c) Irrigation system components with chemical additives induced by aspiration, injection, or emission system connected to any potable water supply must be connected through a reduced pressure principle backflow device.

(d) If an irrigation system is designed or installed on a property that is served by an on-site sewage facility, as defined in Chapter 285 of this title (relating to On-Site Sewage Facilities), then:
• the distance from the lowest point of the water supply outlet to the flood rim of the assembly into which the outlet discharges is one inch or larger, or is at least twice the diameter of the water supply outlet;
• a chemical is added to the irrigation system; or
• more than one water source is used.

Use a reduced pressure principle backflow prevention device if:
• the device is installed at least 12 inches above ground;
• the device will not be submerged;
• drainage is included for any discharge from the relief valve;
• a chemical is added to the irrigation system by aspiration or injection or is embedded in an emission system component; or
• the irrigation system is installed on a property served by an on-site sewage facility (such as a septic tank) and is connected to a supply of potable water.

Use a pressure vacuum breaker if:
• there is no back pressure and
• the installation is at least 12 inches above any downstream piping and the highest downstream opening—measuring from the top of the sprinkler, with pop-up sprinklers retracted.

Use an atmospheric vacuum breaker if:
• there is no back pressure,
• there are no isolation valves downstream from the device,
• the installation is six inches or more above both the downstream piping and the highest downstream opening,
• there is no continuous pressure on the supply side of the device for more than 12 hours in any 24-hour period, and
• a separate atmospheric vacuum breaker is installed on the discharge side of each control valve.

A double check valve backflow prevention device can be used if:
• the local water purveyor does not prohibit it,
• back pressure could reverse the normal flow of water or cause back siphonage from reduced pressure in the system, and
• test cocks are used for testing only.

A double check valve backflow prevention device can be installed belowground when:
• test cocks are plugged (except during testing), threaded, watertight, and made of non-ferrous materials;
Specific Conditions and Cross-Connection Control, §344.51, requires a reduced pressure principle backflow prevention assembly or air gap if:

- a chemical is added to an irrigation system that is connected to a potable water supply;
- the irrigation system has more than one water source and is connected to any potable water supply; or
- the irrigation system has components with chemical additives and is connected to a potable water supply.

If an irrigation system is on a property served by an on-site sewage facility, then:

- piping and valves must meet separation distances required for private water lines (see § 285.91(10) for requirements);
- connections to a private or public potable water source must be through a reduced pressure principle backflow prevention assembly; and
- water from the irrigation system that is applied to the surface of the area utilized by the on-site sewage facility must be controlled on separate irrigation zone or zones.

Section 344.52, Installation of Backflow Prevention Device, requires an approved, properly installed backflow prevention method if an irrigation system is connected to a potable water supply and if any maintenance, alteration, repair, or service of the system requires opening to the atmosphere of the main line at any point prior to the discharge side of any zone control valve. If an automatic master valve is used, it should be on the discharge side of a double check valve, pressure vacuum breaker, or reduced pressure principle backflow assembly. Irrigators must ensure the backflow prevention device is tested prior to the irrigation system being placed in service and that test results are provided to the water purveyor and the irrigation system owner within 10 business days of testing the device.

Section 344.60, Water Conservation, requires that irrigation systems be designed, installed, maintained, altered, repaired, serviced, and operated in a manner that promotes water conservation.

Section 344.61, Minimum Standards for the Design of the Irrigation Plan, requires that irrigators prepare an irrigation plan for all irrigation systems. A paper or electronic copy of the plan must be on the job site at all times during the installation of the irrigation system. A drawing showing the actual installation of the irrigation system must be given to the irrigation system owner. Variances may be made from the original plan if the irrigator authorizes changes that do not diminish the operation integrity of the irrigation system, do not violate any state or local requirements, and are noted in red on the irrigation plan. The irrigation plan must include complete coverage of the area or clearly identify areas that are not covered.