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Rhode Island Energy™
a PPL company

February 9, 2024

VIA ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket No. 23-48-EL – The Narragansett Electric Company d/b/a Rhode Island Energy's Proposed FY 2025 Electric Infrastructure, Safety, and Reliability Plan
Responses to CLF Data Requests – Set 1

Dear Ms. Massaro:

On behalf of The Narragansett Electric Company d/b/a Rhode Island Energy (the "Company"), enclosed are the Company's responses to the Conservation Law Foundation's ("CLF") First Set of Data Requests in the above-referenced matter.

Thank you for your attention to this transmittal. If you have any questions or concerns, please do not hesitate to contact me at 401-784-4263.

Sincerely,

Andrew S. Marcaccio

Enclosures

cc: Docket No. 23-48-EL Service List

CLF 1-1

Request:

On pages 47-48 of the ISR plan, the Company asserts that it "…has assessed that approval of this ISR Plan promotes the Act on Climate mandates by preparing the electric distribution grid to integrate greater renewable energy generation as discussed in detail through the Grid Modernization Plan."

a. What method of assessment was used to determine that the proposed investments in this ISR plan promotes the Act on Climate mandates?

b. Does "promote," as used in this assertion, mean that it furthers the ability of the State to achieve the mandates contained in the Act on Climate?

c. If not, what does the Company mean by "promote"?

Response:

a. The Company makes this assertion based on its technical-economic assessment contained within the Grid Modernization Plan (see Docket No. 22-56-EL, both the filed Plan and the supplemental testimony) and a qualitative assessment based on our customers' growing reliance on the electric distribution system as the State decarbonizes.

The Company's analysis that is the basis of its Grid Modernization Plan comprehensively compares long-term costs of the electric distribution system under a range of plausible future states of the world in terms of electrification and penetration of distributed energy resources. The Company compares costs using a traditional investment strategy relative to a grid modernization investment strategy and finds that a grid modernization investment strategy is likely to result in lower costs for customers. The investments the Company makes in alignment with a grid modernization investment strategy include reclosers, capacitors, and advanced relays, which promote data, sensing, and control on the distribution system, as well as communication investments such as the fiber study and potential future fiber projects.

Qualitatively, general project work within the ISR strengthens the electric distribution system by maintaining and/or improving safety and reliability, both of which are needed throughout the State's decarbonization now and into the future. These investments often have related benefits that can allow for higher penetration of distributed energy resources and electrification. For example, a conversion project from a 4 kilovolt system to a 15

kilovolt system will provide additional generation hosting capacity in addition to the projects primary goals of addressing asset issues, load capacity, or reliability.

b. The Company intended the use of the word "promote" to be interpreted as "supports" or "helps". By way of example, failure to maintain the safety and reliability of the electric distribution system may discourage electrification and slow decarbonization. Similarly, if maintaining the electric distribution system is done through a more costly portfolio of investments, then electric rates will be higher and will send price signals that are contradictory to the strategy of electrifying as a way to decarbonize. The work the Company has proposed in this ISR is aligned with the objective of decarbonization because the work maintains and/or improves safety and reliability in a more affordable manner than other potential investment strategies.

c. Please see the response to part b.

CLF 1-2

Request:

Referencing the same section identified in 1-1 above, the Company appears to indicate that the only portion of the ISR that intersects with the Act on Climate is its facilitation of greater integration of renewable energy generation.

a. In the Company's opinion, is this an accurate assessment of the impact that this ISR proposal will have on the State's ability to achieve the Act on Climate mandates?

b. If not, what other provisions of the ISR are likely to impact whether the State will meet these mandates?

c. What does the Company mean by "integrate" with respect to renewable energy generation?

Response:

a. Yes, the statement that "this ISR Plan promotes[1] the Act on Climate mandates by preparing the electric distribution grid to integrate greater renewable energy generation" is an accurate assessment of an impact this ISR proposal will have on the State's ability to achieve the Act on Climate mandates, but it does not reflect all the impacts the proposed investments can have on achieving those mandates. The Company also recognizes that the linkages between the proposed investments and decarbonization is broader than renewable energy generation. In addition to the positive impacts of the proposed investments on renewable energy generation, these investments may also serve to promote electrification and other distributed energy resources. This statement is not intended to comment on the State's ability to achieve the Act on Climate mandates; achievement is dependent on a number of factors outside of the Company's control.

b. The investments within the ISR plan that have functionality that ties to the Grid Modernization Plan will also facilitate integration of electric vehicles and charging infrastructure, heating electrification, and energy storage. The general investments within the ISR plan often provide load hosting capacity in addition to generation hosting capacity. (Please see the Company's response to CLF 1-1 part a).

c. The Company intends "integrate" to mean lowered or moderated interconnection costs and an ability to establish operating parameters to maximize renewable generation in high penetration areas.

[1] Please see the Company's response to CLF 1-1 for further clarification of the term "promotes."

CLF 1-3

Request:

In its direct testimony, bates pages 17-18 of Book 1, the ISR panel indicates that "…the investments proposed are critical to enabling the Company to operate the electric distribution grid safely and reliably while also integrating the level of DER proliferation and increased electric demand necessary to meet the emissions reductions and increased renewable energy generation called for by the Climate Mandates." Additionally, in the response to Div 1-14, the Company indicates that itemized Grid Modernization proposals within the ISR are limited to $200,000 marked for Fiber projects, with an additional $1,234,000 spread across other line items in the ISR proposal.

a. Please describe how these investments will result in better integration of DER.

b. What will be the measurable impact on known or expected DER projects?

c. Besides integration of DER, are there other intended uses associated with these expenditures?

Response:

Please refer to the Company's Grid Modernization Plan (GMP), supplemental testimony, and response to PUC 1-1, which can be found here: https://ripuc.ri.gov/Docket-22-56-EL

a. This GMP describes how these investments will result in better integration of DER. Specifically, Attachments D and L and the Nasonville Story (Bates pages 46-48) show how DER can be limited by current study and operation limitations. The entirety of the report explains how the data sensing and control that results from the comprehensive solution set, which includes fiber projects, capacitors, and reclosers can remove some of these study and operational constraints. As a result, DER can be better integrated with the FY25 investments as part of a longer road to grid modernization.

b. Quantified benefits are included in the GMP with a summary shown in Figure 8.2, Bates page 173. Although these are system-wide benefits for the GMP assumptions, Attachment D can be reviewed to see specific project impacts.

c. Yes, there are other intended uses associated with these expenditures. As explained within the GMP, the expenditures form a comprehensive plan with many benefits. For example, Figure 6.20 (Bates page 147) shows projected reliability benefits mainly associated with recloser investment but also linked to the data and sensing provided by

capacitor banks both with communication paths using fiber investments. Similarly, capacitor banks integrated into a volt-var optimization system can use the sensing provided by reclosers again with fiber communication paths.

CLF 1-4

Request:

In Section 3 of the proposed ISR, the Company proposes to trial "tree growth regulators" as a tool to reduce vegetation management costs overtime. Identify the specific chemical compound(s) used along with available studies that evaluate the potential safety risks, including but not limited to potential human exposure, wildlife exposure, and/or to surrounding plant life, of the use of the chemical compound(s).

Response:

The specific product the Company's vendor Davey Resource Group will be using is Arborlock 2SC. The Environmental Protection Agency Registration Number is 80697-4-2292. The active ingredient in all tree growth regulators on the market is Paclobutrazol, CAS[1] number 76738-62-0. This specific product, Arborlock 2SC, is identified as low toxicity under normal conditions handling and use. This product's Material Safety Data Sheet (MSDS) details in-depth the precautions for use, including worker safety, public safety, avian and mammal LD_{50}s[2] and fish LD_{50}s. As the product manufacturer, Davey Tree must legally disclose all the product's attributes through the specific MSDS.

A copy of the MSDS is provided as Attachment CLF 1-4-1.

A copy of an article describing Tree Growth Retardants history and how the compound works is provided as Attachment CLF 1-4-2.

[1] CAS stands for Chemical Abstract Services.
[2] LD_{50} is the median lethal dose of a toxin.

DAVEY
Proven Solutions for a Growing World

The Davey Tree Expert Company
1500 North Mantua Street
Kent, OH 44240

Created Date: 03/21/2014 SN: DAV-PGR8069742293

MATERIAL SAFETY DATA SHEET

Section 1: Chemical Product and Company Identification:

Product:	**ARBORLOCK™ 2SC**
Product Use:	A triazole Plant Growth Regulator for trees
EPA Reg.No.:	80697-4-2293
Company;	The Davey Tree Expert Company
	1500 North Mantua Street, Kent, OH 44240
Emergency phone:	Chemtrec: 1-800-424-9300
	The Davey Tree Expert Company, 1-952-217-3375

Section 2: Composition/Information on Ingredients:

Active Ingredient;	CAS number	w/w (%)
PACLOBUTRAZOL	76738-62-0	22.3%
Inert Ingredients, total including:		77.7%
PROPYLENE GLYCOL	57-55-6	
CLAY AND PROPRIETARY INGREDIENTS		

Section 3: Hazards Identification:

Low toxicity under normal conditions of handling and use.

Section 4: First Aid Measures:

If in Eyes: Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 15 minutes. Obtain immediate medical attention.
If on Skin: Take off immediately all contaminated clothing. Wash skin immediately with water followed by soap and water. Such action is essential to minimize contact with skin. Contaminated clothing should be laundered before re-use.
If Swallowed: If swallowed seek medical advice immediately and show the container, label or this data sheet, if possible. Do not induce vomiting.
If Inhaled: Remove patient from exposure, keep warm and at rest. Obtain medical attention as a precaution.

Section 5: Fire Fighting Measures:

Extinguishing media: For small fires, use foam, carbon dioxide, halon or dry powder extinguishant. For large fires, use foam or water-fog. Avoid use of water jet. Contain run-off

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water with, for example, temporary earth barriers.
Protective equipment: A self-contained breathing apparatus and suitable protective clothing must be worn in fire conditions.

Section 6: Accidental Release Measures:

Wear suitable personal protection during removal of spillages. This means eye protection, chemically resistant gloves, boots and coveralls. Absorb spillage onto sand, soil, or any other suitable absorbent material. Transfer to a container for disposal. Wash spillage area with water. Washings must be prevented from entering surface water drains. Large spills should be handled according to a spill plan. Otherwise, in case of emergency call day or night, Chemtrec, 1-800-424-9300.

Section 7: Handling and Storage:

Safe Handling Advice: Avoid contact with skin and eyes. When using, do not eat, drink or smoke. Wash face and hands before eating, drinking or smoking.
Requirements for Storage Rooms: Keep in original containers, tightly closed, out of reach of children. Keep away from food, drink and animal feeding stuffs. Protect from frost. Do not store near food or within the reach of children.
Additional Information: Read the label before use.

Section 8: Exposure Controls/Personal Protections:

Ingestion: Prevent eating, drinking, tobacco usage and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.
Eye Contact: Where eye contact is likely, use chemical splash goggles.
Skin Contact: Where contact is likely, wear chemical resistant gloves (such as nitrile or butyl) coveralls, socks and chemical resistant footwear. For overhead exposure, wear chemical-resistant headgear.
Inhalation: A respirator is not normally required when handling this product. In case of emergency spills, use a NIOSH approved respirator with any N, R, P or HE filter.

Section 9: Physical and Chemical Properties:

Form:	Opaque Liquid
Color:	Beige to off-white
Boiling Point:	Approx. 212° F
Density:	1.08 ±0.02 grams/cubic cm at 20°C
Solubility:	Miscible

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Flash Point (0°C): Does not flash
Explosive Properties (0°C): Not Applicable
Oxidizing Properties (0°C): Not Applicable

Section 10: Stability and Reactivity:

Stability: Stable for more than 2 years under normal use and storage conditions. Stable to hydrolysis (pH 4-9) and not degraded by UV light.
Incompatibility: Oxidizing agents.
Hazardous Polymerization: Will not occur.
Hazardous Decomposition Products: Combustion or thermal decomposition will evolve toxic and irritant vapors.

Section 11: Toxicological Information:

(Based on Paclobutrazol Technical Data)

Acute Toxicity:
Acute oral (rats) LD_{50}: >5,000 mg/Kg
Acute dermal (rabbits) LD_{50}: > 5,050 mg/Kg
Acute inhalation (Rats): LC_{50}: >2.40 mg/L
Acute eye irritation (rabbits): Non-Irritant
Acute dermal irritation (rabbits): Non-Irritant
Skin sensitization (mice): Is not considered a sensitizer, with an index of < 3 in all groups of test animals

Section 12: Ecological Information:

(Based on Paclobutrazol Technical Data)

Ecotoxicity;
Toxicity to fish: LC_{50} Rainbow trout: 27.8 mg/L
Bluegill sunfish**:** 23.6 mg/L
Daphnia magna: 33.2 mg/L
Unlikely to be hazardous to aquatic life
Avian dietary toxicity: LC_{50} Mallard duck: >20,000 ppm
Quail: > 5,000 ppm

Section 13: Disposal Considerations:

Discarded product is not considered as a hazardous waste under RCRA, 40 CFR 261.

Disposal: Do not reuse product containers. Dispose of product containers, waste containers, and residues according to local, state, and federal health and environmental regulations.

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Kent, OH 44240

Characteristic Waste: Not Applicable
Listed Waste: Not Applicable

Section 14: Transport Information:

DOT status: Not classified
UN number: Not classified
NMFC number: 101685
Class: 065
Proper shipping name: Plant Growth Inhibitor, Modifier or Regulator
Packaging group: Not classified
Marine Pollutant: Not classified
Other applicable information: Not classified

Section 15: Regulatory Information:

Not classified as hazardous to users.
TSCA (Toxic substances control act) regulations, 40 CFR 710:
This product is a pesticide and is exempt from TSCA regulation.
CERCLA and SARA regulations (40CFR 355,370 and 372): This product does not contain any chemicals subject to the reporting requirements of SARA section 313.

Section 16: Other Information:

The information and recommendations contained herein are based upon data believed to be correct. However, ***no guarantee or warranty of any kind, expressed or implied, is made*** *with respect to the information contained herein.* The Davey Tree Expert Company *assumes no responsibility for results obtained or for incidental or consequential damages arising from the use of these data.*

PURDUE UNIVERSITY

PURDUE EXTENSION

FNR-252-W

EXPERT REVIEWED

Growth Retardants: A Promising Tool for Managing Urban Trees

William R. Chaney, Professor of Tree Physiology
Department of Forestry and Natural Resources
Purdue University, West Lafayette, IN 47907

Trees and shrubs often grow too large for the available space in urban areas. In the past, costly mechanical trimming was the sole method available to arborists and utility foresters to reduce tree and shrub size. Consequently, chemical growth retardants were developed as an inexpensive approach to limit size and the growth rate of trees and, at the same time, to enhance their tolerance to the harsh environmental conditions of urban areas.

History of Tree Growth Retardants (TGRs)

Utility arborists were the first among those caring for trees to peer over the fence at agricultural and horticultural fields and ponder the potential of growth regulators used in those cropping systems as a tool for tree maintenance. Mechanical trimming, which was the sole means to combat the unrelenting growth of trees into overhead electrical wires, was a costly operation and a chemical alternative was very attractive. Hence, the electric utility industry provided funding in the late 1950s for research on chemical control of tree growth following trimming for electric line clearance. Results of that early research led to the use of napthaleneacetic acid (NAA), a synthetic auxin, painted onto the surface of pruning wounds. Although effective in reducing the regrowth of branches, coating each cut surface high in the crown of trees took a lot of time and was not cost effective. Hence, in the 1970s new TGRs and more economical application techniques were sought.

The first major breakthrough in the commercial feasibility of TGRs on a large scale was the formulation in the late 1970s of the cell elongation inhibitors, paclobutrazol, uniconazole, and flurprimidol for trunk injection. Due to their low water solubility, it was considered necessary to dissolve the new generation of growth retardants in either methyl or isopropyl alcohol. The active ingredients of these formulations were unquestionably effective in reducing tree growth. After several years of use throughout the United States in the 1980s, problems associated with trunk injection begin to appear. Cracks in the bark and cambium, weeping from injection holes, and internal wood discoloration due to the alcohol carriers led to disenchanted utility arborists and their customers. A decline in use of TGRs followed. Uniconazole was even removed from the tree care market. However, in spite of these problems, interest among utility arborists continued in a chemical tool to reduce trimming frequency and the amount of wood waste removed from trees.

Flurprimidol, sold as Cutless Tree Implants®, was pressed into tablets for insertion into shallow holes drilled in tree trunks. Concern about drilling holes into trees and the apparent compartmentalization around the tablets that prevented continued slow release of flurprimidol into the transpiration stream resulted in limited use of the implants. Hence, flurprimidol was removed from the tool kit of arborists about two years ago.

Today, only one growth retardant for use on trees remains, paclobutrazol. Satisfactory performance of paclobutrazol as a growth retardant, as well as several benefits to tree health, revealed through recent research that resulted in a rebound in use of this TGR today by some electric utilities and spurred an active expansion of the market to commercial landscapes and general arboricultural tree care.

Purdue Extension
Knowledge to Go
1-888-EXT-INFO

This publication has been reviewed by:
Dr. Jeff Stringer, Un. of Kentucky; Dr. George Parker, Purdue University; Dr. Burnell Fischer, IDNR Division of Forestry; Dr. John Kershaw, Un. of New Brunswick; Mr. Ron Rathfon, Purdue University

Treatment is Easy

Paclobutrazol, formulated as Cambistat 2SC® or Profile 2SC®, is applied as a water suspension. Both formulations are approved by the EPA for soil injection or application as a basal drench. The dose rate, which is species specific, is determined by measuring trunk diameter. The water suspension of paclobutrazol can either be injected at about 150 psi into the soil to a depth of approximately 6 inches as close to the tree trunk as possible (Fig. 1) or simply poured into a shallow trench around the base of each tree (Fig. 2). The product label provides detailed information for proper application. Treatments can be made anytime the soil is not frozen or saturated with water.

Figure 1. *Soil injection method for applying paclobutrazol.*

Figure 2. *Basal or soil drench method of applying paclobutrazol.*

Actually paclobutrazol and other growth retardants with the same mode of action are currently used in the nursery industry for production of compact and hardy bedding plants and on golf courses to reduce growth of turf and the frequency of mowing fairways. The dose rate for turf is lower than that applied to trees. Consequently, the grass in a narrow ring around the base of paclobutrazol-treated trees may be notably shorter. However, this could be a benefit because the serious problem of mower and string trimmer damage to tree trucks is less likely without the need to mow close to trees. Since paclobutrazol in very immobile in soils, there is no need for concern about over-regulation of turf more than a few inches away from the treatment zone.

Mode of Action

Suppression of growth by paclobutrazol occurs because the compound blocks three steps in the terpenoid pathway for the production of the hormone gibberellin by binding with and inhibiting the enzymes that catalyze the metabolic reactions (Fig. 3). One of the main roles of gibberellins in trees is the stimulation of cell elongation. When gibberellin production is inhibited, cell division still occurs, but the new cells do not elongate. The result is shoots with the same numbers of leaves and internodes compressed into a shorter length. For many years this was considered to be the sole response of trees to treatment with paclobutrazol.

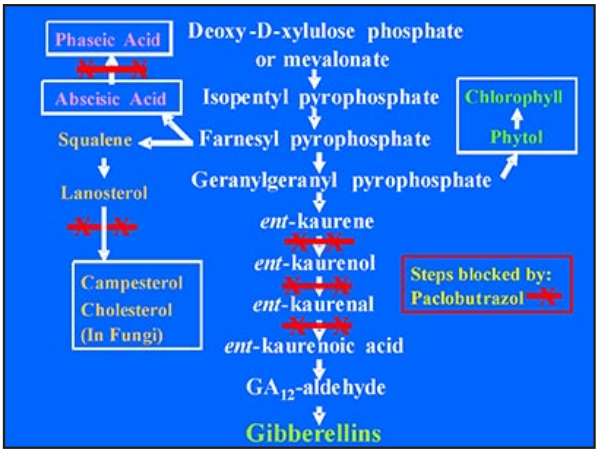

Figure 3. *Terpenoid pathway for biosynthesis of gibberellins, abscisic acid, phytol, and steroids, and path for degradation of abscisic acid. Steps blocked by paclobutrazol indicated with ~~X—X~~.*

However, recent research has demonstrated that blocking a portion of the so-called terpenoid pathway causes shunting of the accumulated intermediary compounds above the blockage. The consequence is increased production of the hormone abscisic acid and the chlorophyll component phytol, both beneficial to tree growth and health (Fig. 3).

The unique structure of paclobutrazol that allows it to bind to an iron atom in the enzymes essential for the production of gibberellins also has the capacity to bind to enzymes necessary for the production of steroids in fungi as well as those that promote destruction of abscisic acid (Fig. 3). The consequence is that paclobutrazol treated trees have greater tolerance to environmental stresses and resistance to fungal diseases. Morphological modifications of leaves induced by treatment with paclobutrazol such as smaller stomatal pores, thicker leaves, and increased number and size of surface appendages on leaves may provide physical barriers to some fungal, bacterial, and insect infestations.

Growth Reduction

Shoot Growth

Although growth reduction is dose sensitive and varies widely among species, all evergreen and hardwood species, and even palms, respond in some degree to treatment with paclobutrazol. Treated trees have more compact crowns and somewhat smaller and darker green leaves, but otherwise look normal. The amount of shoot growth reduction ranges from a low of 10 percent to a high of 90 percent, with average growth reduction being 40 to 60 percent when recommended dose rates are applied. As a consequence of the reduced growth in height, there is a parallel reduction in biomass removed when trees eventually require trimming.

Cambial Growth

Although the principal focus of research with paclobutrazol has been on growth in length of shoots, reduced growth in diameter of the trunk and branches of woody plants also has been found. Expansion of cells produced by the vascular cambium also depends on gibberellins just like cells in stems and leaves. This could have significance in urban areas for trees planted in wells, above ground containers, and in the parkway between sidewalk and curb. Up to 30 percent of trees planted in the city cause sidewalk and curb damage due to expansion in girth of the trunk and roots, requiring significant portions of annual tree budgets for costly repairs. Suppression of diameter growth of tree trunks and roots at least forestalls costly damage and the creation of hazards.

Root Growth

Effects of paclobutrazol on root growth vary from enhancement to inhibition and are far from being clearly defined and understood. In almost all cases, however, the response in paclobutrazol-treated trees is an increase in root to shoot ratio. Gary Watson at the Morton Arboretum conducted one of the few studies on large mature trees exposed to paclobutrazol. Soil injection at the base of white and pin oaks caused fine root densities to be 60 or 80 percent higher, respectively, near the trunk base. It is unclear whether the responses observed in roots of treated trees are a direct effect of paclobutrazol on root growth or an indirect effect resulting from shoot growth modification and a shift in carbohydrate allocation to the roots. Root response to paclobutrazol is an important question because root growth and vigor influence not only water uptake but many other aspects of tree health.

Greener Leaves

Trees treated with paclobutrazol generally have leaves with a rich green color suggesting higher chlorophyll content (Fig. 4). There are two possible explanations for this response. One is that the leaves of both treated and untreated trees contain the same number of cells, but because the cells in leaves of treated trees are smaller, the chlorophyll is more concentrated in the reduced cell volume. In addition, however, there is evidence that the amount of chlorophyll is actually increased too because

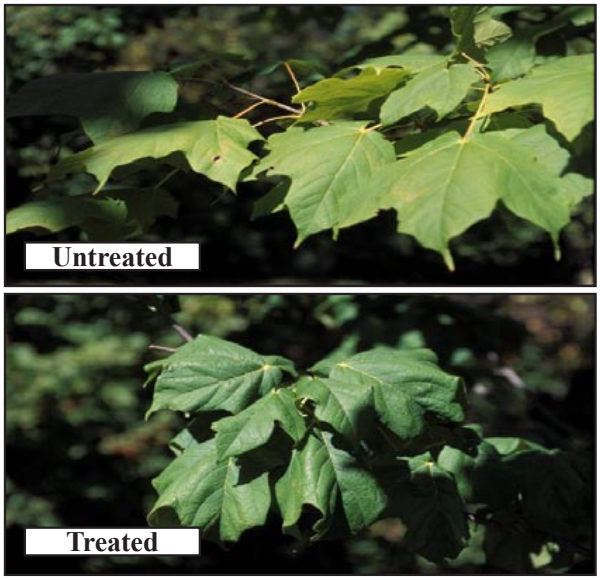

Figure 4. *Sugar maple leaves from trees untreated or treated with paclobutrazol showing higher chlorophyll content (From Gary Watson).*

phytol, an essential part of the chlorophyll molecule is produced via the same terpenoid pathway as gibberellins. Paclobutrazol treatment, which blocks the production of gibberellins, results in a shunting of the intermediate compounds from gibberellin synthesis to the production of even more phytol (Fig. 3). An analogy might be an accident blocking the flow of traffic on a major highway causing more drivers to divert to alternate routes.

Reduced Water Stress

In addition to interfering with gibberellin production, paclobutrazol is known to affect the synthesis of the hormone abscisic acid. Abscisic acid also is made via the terpenoid pathway (Fig. 3). Unlike the inhibiting effect on gibberellin synthesis, treatment with paclobutrazol promotes the production of abscisic acid much like it promotes the production of phytol. When gibberellin synthesis is inhibited, more precursors in the terpenoid pathway accumulate and are shunted to the production of abscisic acid.

Paclobutrazol also interferes with the normal breakdown of abscisic acid. The mode of action involves another iron containing enzyme to which the paclobutrazol will attach, preventing its activity. The combined effect on both the production and breakdown processes results in enhanced concentrations of abscisic acid in leaves. One of the functions of abscisic acid is to cause stomates to close, reducing water loss from leaves through transpiration.

Improved water relations in trees could arise from a combination of increased abscisic acid contents that physiologically reduce stomatal opening, reduced shoot growth resulting in less leaf and stem surface area for transpiration, more fine roots to absorb water, and structural changes in leaves that provide physical barriers to moisture loss. Fig. 5 shows dramatic scanning electron microscope images of thicker leaves and masses of hairs on leaf surfaces of cherrybark oaks in response to treatment with paclobutrazol.

The improvement of water relations in paclobutrazol-treated trees is an important secondary benefit of using a TGR.

Effects on Fungal Diseases

Protection from fungal diseases that attack urban trees is now recognized as another secondary benefit of using paclobutrazol. There are numerous observations of reduced incidence of common fungal diseases such as anthracnose following treatment with paclobutrazol. Karel Jacobs at the Morton Arboretum has shown

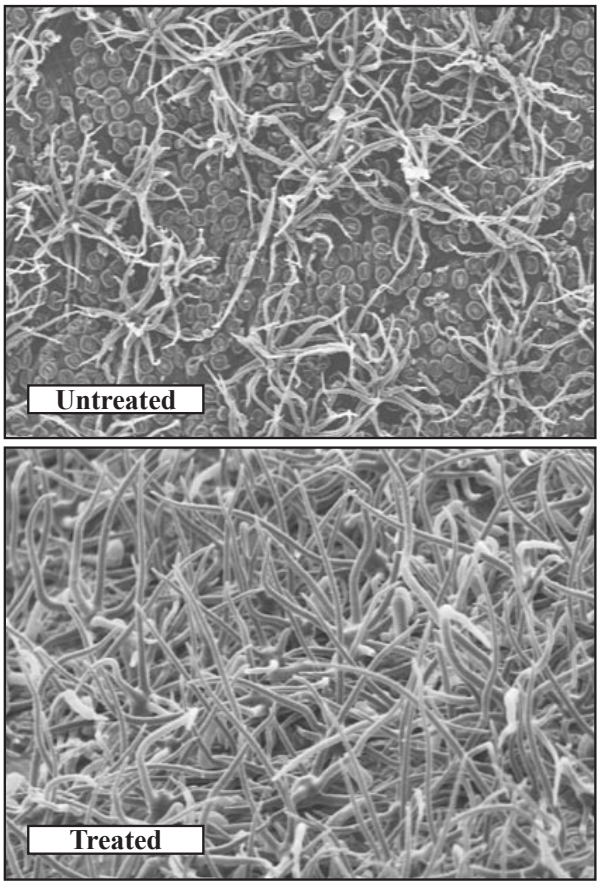

Figure 5. *Scanning electron micrographs of the lower surface of leaves of cherrybark oak untreated or treated by the soil injection method with paclobutrazol. (From Yadong Qi and William Chaney)*

paclobutrazol to significantly reduce the growth of eight fungal pathogens in laboratory cultures. More and more data from field trials is being published to substantiate the fungistatic benefit of using paclobutrazol. Bruce Fraedrich with Bartlett Tree Expert Company has recently demonstrated that even bacterial leaf scorch is markedly reduced in red oaks following a soil drench application of paclobutrazol.

The fungistatic property of paclobutrazol is due to the inhibition of steroid production in fungi, also via the terpenoid pathway (Fig. 3). This is the same mode of action that accounts for the fungistatic property of the class of fungicides known as SBIs or steroid biosynthesis inhibitors. Steroids are essential constituents of membranes.

The increased resistance of paclobutrazol-treated trees to bacteria is not thought to be a direct effect on the pathogen, but rather due to alteration in leaf surface

structure (Fig. 5) or even the size of stomatal pores that make infection more difficult.

Conclusions

The many benefits of paclobutrazol can be explained based on an understanding of its ability to combine with iron containing enzymes and to inhibit, as well as foster, production via the terpenoid pathway of several important compounds for tree growth and development. Because of its many positive effects on trees, paclobutrazol is quickly evolving from use solely on trees under electric distribution lines to an important tool for commercial landscape and arboricultural practices where both growth suppression and improved tree health are desired.

Recommendation for Homeowners and Disclaimer

Commercial formulations of paclobutrazol have been registered with the EPA and are rated as General Use Pesticides. They carry a Caution Toxicity label, the lowest assigned by the EPA. Although these products may be obtained form the manufacturers for use by do-it-yourselfers, it is highly recommended and advisable that they be applied by an experienced and certified pesticide applicator who is familiar with the technology and the identification of woody plants. Any person using products mentioned in this publication assumes full responsibility for their use in accordance with current directions of the manufactures. This publication is for information only and not a promotion for any particular commercial product.

Sources of Additional and More Detailed Information.

Bai, S., W.R. Chaney and Y. Qi. 2004. Response of cambial and shoot growth in trees treated with paclobutrazol. Journal of Arboriculture 30:137-145.

Bai, S. and W. R. Chaney. 2002. Tree growth regulators affect electron transport in plant mitochondria. *Plant Growth Regulation* 35:257-262.

Bai, S. and W.R. Chaney. 2002. Treatment of mature trees and seedlings with gibberellin synthesis inhibitors affects electron transport in leaf mitochondria of parents and progeny. *Plant Growth Regulation Society of America Quarterly* 30:86-97.

Fletcher, R.A., A. Gilley, N. Sankhla, and T.D. Davis. 2000. Triazoles as plant growth regulators and stress protectants. Horticulture. Review 24:55-138.

Rademacher, W. 2000. Growth retardants: Effects on gibberellin biosynthesis and other metabolic pathways. Annual Review Plant Physiology Plant Molecular Biology 51:501-531.

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CLF 1-5

Request:

On bates page 79 of Book 1, Attachment 1, entitled "Capital Spending by Key Driver Category and Budget Classification," line 4 indicates $2,533,000 budgeted for meters in FY 2025, while in Attachment PUC 2-2-2, under "meters sub-total" $28,655,473 is budgeted for AMF meters.

Please explain the significance of the differences between these two line items.

Response:

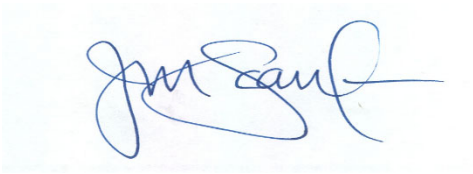
The $2,533,000 budget for Meters shown on line 4 of Attachment 1 is the budget for AMR meter purchases during FY 2025. An inventory of AMR meters will be maintained to replace failed or end of life meters throughout FY 2025 and into FY 2026.

The $28,655,473 budget for AMF Meter Costs in Attachment PUC 2-2-2 includes the purchase and installation of hardware (i.e., meters), ancillary devices, pre-sweep verifications, and project management costs. This amount is included in line 18 of Attachment 1 on bates page 79 of Book 1.

Certificate of Service

I hereby certify that a copy of the cover letter and any materials accompanying this certificate was electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.



Joanne M. Scanlon

February 9, 2023
Date

Docket No. 23-48-EL – RI Energy's Electric ISR Plan FY 2025
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