

FEDERAL ENERGY REGULATORY COMMISSION
Office of Enforcement
Washington, D.C. 20426

In Reply Refer To:
OE
Docket No. AC08-143-000
September 4, 2008

Troutman Sanders LLP
Attention: Daniel L. Larcamp
Attorney for Novinium, Inc.
401 9th Street, N.W.
Washington, DC 20004

Dear Mr. Larcamp:

This is in reply to your July 10, 2008 letter, filed on behalf of Novinium, Inc., (Novinium), requesting an accounting ruling confirming that its public utility clients may properly account of the costs of installing Novinium Brand injection rehabilitation products for underground residential distribution (URD) cable as an addition to electric utility plant, i.e., a capital expenditure, under the Commission's Uniform System of Accounts.¹

Based upon the information provided, a company may capitalize the cost of installing injection rehabilitation products provided that the product is used by the company to extend the useful life of its segments of URD cables beyond their original estimated useful lives.

Novinium claims that its Perficio and Ultrinium products extend the useful life of URD cable by at least 20 years from the date of injection and offers a full money back warranty for 20 years for the "Perficio" fluid and a 40 year full money back warranty for the "Ultrinium" fluid. Novinium states these products rehabilitate URD cable through an injection process which can be used to rehabilitate segments of URD cable or groups of contiguous segments of URD cables. Novinium also states these products increase the dielectric, or voltage, capacity of URD cable, significantly enhance the reliability of URD cable, and improve public safety. Finally, Novinium claims that these products include advancements to the silicone dielectric enhancement fluid used in CableCURE, a

¹ 18 C.F.R. Part 101 (2008).

silicone injection rehabilitation product previously approved by the Chief Accountant to be appropriately capitalized as an addition to electric utility plant on the basis that the product will be used to extend the actual useful life of significant sections of an underground distribution system beyond its initially expected estimated service life.²

Under the requirements of the Commission's Uniform System of Accounts, a company may capitalize the cost of minor items of property that did not previously exist provided that a substantial addition results. Electric Plant Instruction (EPI) 10(C)(1), states in part:

“When a minor item of property which did not previously exist is added to plant, the cost thereof shall be accounted for in the same manner as for the addition of a retirement unit, as set forth in paragraph B(1), above, if a substantial addition results, otherwise the charge shall be to the appropriate maintenance expense account.”

Further, Electric Plant Instruction 10(B)(1), states in part:

“When a retirement unit is added to electric plant, the cost thereof shall be added to the appropriate electric plant account...”

Therefore a company may capitalize the cost of installing injection rehabilitation products when the cost is incurred for the purpose of extending the useful life of segments of URD cables beyond their original estimated useful lives.

The Commission delegated authority to act on this matter to the Chief Accountant under 18 C.F.R. § 375.303 (2008). This letter order constitutes final agency action. Your company may file a request for rehearing with the Commission within 30 days of the date of this order under 18 C.F.R. § 385.713 (2008).

Sincerely,

Scott P. Molony
Chief Accountant

² *Georgia Power Company*, Docket No. AC00-7-000 (January 18, 2000) (unpublished letter order).

July 10, 2008

Hon. Scott Molony
Chief Accountant
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

RE: Novinium, Inc.
Docket No. AC08-____-000

Dear Mr. Molony:

Novinium, Inc. (“Novinium”) hereby requests the Chief Accountant of the Federal Energy Regulatory Commission (“FERC” or “Commission”), pursuant to delegated authority, 18 C.F.R. 375.303(d) (2008), to pass upon proposed accounting treatment for the costs of using Novinium products. Specifically, Novinium requests confirmation that its public utility clients and prospective clients may properly account for the cost of installing Novinium Brand injection rehabilitation products (“Perficio” fluid and “Ultrinium” fluid, collectively “Novinium products”) for underground residential distribution (“URD”) cable as an addition to electric plant (i.e., capital expenditure) under the FERC Uniform System of Accounts.¹ As explained below, such a ruling would be consistent with the Chief Accountant’s most recent ruling on a similar product called CableCURE, which the Chief Accountant ruled may be capitalized due to its ability to extend the actual useful life of significant sections of underground distribution systems.²

I. Background

Novinium has developed an underground cable rehabilitation technology that extends the service life of URD cable through a cable injection process. The Novinium technology can be used to rehabilitate segments of URD cable, or groups of contiguous segments of URD cables. Laboratory data, field data and modeling demonstrate that Novinium rehabilitation technology will extend the service life of URD cables by at least 20 years. Consistent with these facts, for the Perficio product, Novinium provides a full money back warranty for 20 years from the date the cable is injected. For the Ultrinium product, a full money back warranty is provided for 40 years from the date the cable is injected. The differences in these products, and the data supporting their extension of the service lives of URD cables, is described in the attached Affidavit of Mr. Glen Bertini. Mr. Bertini is a world recognized expert in URD rehabilitation technologies, including the Novinium products.

¹ See 18 C.F.R. Part 101 (2008).

² See Docket No. AC00-7-000, Letter Order, January 18, 2000 (“January 2000 Letter Order”).

This Novinium technology is similar to an older CableCURE technology, which also uses a cable injection process to extend the life of underground distribution cable beyond its expected service life. Novinium technology has improved upon the CableCURE process, as described in detail below.

II. Reason for Filing

Novinium seeks the instant accounting ruling to confirm that the Novinium products may properly be accounted for as an addition to electric plant (i.e., capitalized) under the FERC Uniform System of Accounts, consistent with the Chief Accountant's 2000 Letter Order ruling regarding CableCURE. Out of an abundance of caution,³ Novinium seeks to confirm this interpretation because the Commission in 1992 indicated the cost of installing CableCURE at that time should be expensed and charged to Account No. 594, Maintenance of Underground Lines.⁴

In contrast to the Commission's earlier ruling, the 2000 Letter Order by the Chief Accountant found that because the CableCURE product would extend the actual useful life of significant sections of underground distribution system, it was proper to capitalize the costs of the product. The 2002 ruling of the Chief Accountant is consistent with Commission precedent permitting the capitalization of natural gas rehabilitation products.⁵ In a number of cases, the Commission found that the pipeline rehabilitation products extended the useful life of the gas pipelines beyond their estimated service life, the products added value by significantly enhancing reliability, improving public safety and the condition of the property, and costs associated with pipeline rehabilitation products are "non-recurring" costs as opposed to routine maintenance expenses.⁶

Novinium asserts similar circumstances are present with the use of the Novinium products and that the costs of using the products also should be capitalized under FERC's Uniform System of Accounts.

³ EPCRA 2005 provided the Commission with increased civil penalty authority. See FPA § 316A, 16 U.S.C.S. § 825o-1(b). In addition, the Commission has in place various mechanisms under which industry participants may seek guidance from FERC Staff on regulatory issues. See *Obtaining Guidance on Regulatory Requirements*, 123 FERC ¶ 61,157 (2008).

⁴ See *Dow Corning Corp.*, 59 FERC ¶ 61,181 (1992) ("Dow").

⁵ See *Natural Gas Pipeline Co. of America*, 115 FERC ¶ 61,294 (2006); See *Transwestern Pipeline Company*, Letter Order, Docket No. AC02-39-000 (Nov. 8, 2006); *Florida Gas Transmission Company*, Letter Order, Docket No. AC97-110-000 (June 30, 1997); *Kaneb Pipe Line Operating Partnership*, Letter Order, Docket No. AC95-213-000 (Aug. 15, 1996); *Northwest Pipeline Corporation*, Letter Order, Docket No. AC94-149-000 (Nov. 1, 1994); *South Georgia Natural Gas Company*, letter Order, Docket No. AC95-18-000 (Dec. 5, 1996); and *Colonial Pipeline Company*, Letter Order, Docket No. AC97-163-000 (Aug. 14, 1997).

⁶ *Id.*

III. Proper FERC Accounting Treatment

Based on the Commission's most recent ruling regarding CableCURE, and the Commission's prior precedent with regard to natural gas rehabilitation products, Novinium asserts that the Perficio and Ultrinium products should likewise be capitalized for FERC accounting purposes. Specifically, Novinium's products extend the useful life of URD cable well beyond its estimated service life; depending on the product, the service life of the URD is extended from 20 to 40 years beyond the service life remaining at the time of injection. The Novinium products also: (1) add value to URD systems by substantially increasing URD cable's dielectric capacity;⁷ (2) significantly enhance reliability and improve public safety; and (3) provide direct economic and environmental benefits to public utilities and their ratepayers. These public benefits will be furthered if utilities have assurance that the cost of the Novinium products can be capitalized, consistent with the Chief Accountant's earlier ruling. Since the costs of installing Novinium products to URD cable only affect future periods, these costs should be capitalized and allocated to the future periods benefiting from them.⁸

Moreover, under FERC's Uniform System Accounts, the costs of Novinium products are appropriately capitalized. Under Electric Plant Instruction No. 10(C)(1), "When a minor item of property which did not previously exist is added to plant, the cost thereof shall be accounted for in the same manner as the addition of a retirement unit, as set forth in paragraph B(1) . . . if a substantial addition results . . ."⁹ Electric Plant Instruction No. 10(B)(1) states, "When a retirement unit is added to electric plant, the cost thereof shall be added to the appropriate electric plant account."¹⁰ The Novinium products result in a substantial addition, as they significantly extend the useful life of service of the URD cable, and should therefore be added to the appropriate 300-series electric plant account and capitalized accordingly.

A. Novinium is a Life Extension Product

Novinium products are underground distribution cable rehabilitation products used primarily to extend the useful life of URD cable beyond its estimated service life.¹¹ Data and field experiences have been collected that conclusively establish that Novinium's products

⁷ Dielectric capacity, or voltage capacity, is one of the two factors that determine the total power which can be transmitted or distributed on a cable.

⁸ See ELDON S. HENDRICKSEN, ACCOUNTING THEORY, (Richard D. Irwin, Inc. 1970).

⁹ 18 C.F.R. Part 101, Electric Plant Instruction No. 10(C)(1). The definition of "minor item of property" means the associated part or items of which retirement units are composed. 18 C.F.R. Part 101, Definition No. 18. "Retirement units" means those items of electric plant which, when retired, with or without replacement, are accounted for by crediting the book cost thereof to the electric plant account in which included. 18 C.F.R. Part 101, Definition No. 34.

¹⁰ 18 C.F.R. Part 101, Electric Plant Instruction No. 10(B)(1).

¹¹ The product has limited application to transmission facilities; it is used approximately 99% of the time to rehabilitate distribution facilities. There are over 1,000,000 miles of URD cable in the United States.

extend the service life of URD cable by at least 20 years.¹² As a result of these data, Novinium guarantees the life extension of its products from the date that the cable is injected with this URD cable rehabilitation product. For the Perficio product, a 20-year full money-back warranty is issued and for the Ultrinium product, a 40-year full money-back warranty is issued.

Novinium products include two levels of advancement built upon the proven performance of CableCURE technology. The first advancement is represented by Novinium's Perficio product. Perficio fluid uses the same silicone dielectric enhancement fluid which makes up 95% of the CableCURE formulation, namely phenylmethyldimethoxysilane. Improving upon the catalyst and the method of delivery stretches the anticipated post-injection life by about 35% or more. The second advancement is embodied within Novinium Ultrinium. Ultrinium includes all of the functionality found in CableCURE and Perficio, and also includes entirely new functionality. The new functionality of Ultrinium addresses electrical trees and other voids in the cable insulation.¹³ This functionality broadens the applicability of the technology from the pre-failure treatment, where the older technology is typically applied, to include post-failure cables. While CableCURE technology has a failure rate of about 4% one year after treatment and 16% after 15 years when applied in post-failure circumstances, laboratory testing on the Novinium technology demonstrates 87-fold superior short-term performance, which is a key to addressing post-failure cables.¹⁴ The laboratory results are backed up by over two years of field proven performance, in all cases the failure rates are less than half those experienced by CableCURE.¹⁵

B. Public Benefits Resulting From Novinium Products Being Capitalized

(1) Novinium Adds Value to URD Systems by Increasing the Dielectric Strength of Power Cable.

Novinium increases the dielectric strength, or "voltage capacity," of URD cable by preventing water-related deterioration resulting from oxidation within the cable's polyethylene insulation.¹⁶ Specifically, as URD cable ages and oxidizes, swiss cheese-like micro-voids, called "water trees," develop in the insulation.¹⁷ The constant passage of current through the cable, combined with specific electrical and environmental events, ultimately reduces the voltage capacity of the URD cable.¹⁸ Once injected, the Novinium products ameliorate the effects of

12 See Bertini Affidavit at 2.

13 See Bertini & Vincent, *Cable Rejuvenation Mechanisms*, presented at the IEEE/ICC semi-annual meeting (March 14, 2006).

14 See Bertini, *Underground Distribution Reliability: The 5•Ps*, presented at the Western Underground (September 15, 2006).

15 See Bertini Affidavit at 3-4.

16 See *id.* at 4.

17 *Id.*

18 *Id.* at 3.

water-related deterioration and increases dielectric strength of URD cable by up to 350 percent.¹⁹

(2) Novinium Products Add Value to URD Systems by Significantly Enhancing Reliability of URD Cable.

In addition to extending the service life and substantially increasing the dielectric properties of URD cable, Novinium products add value to URD systems by significantly enhancing URD cable reliability, thereby improving public safety. The reliability role played by Novinium products is significant. Over the past 2 years, Novinium has injected over 700,000 feet of URD cable with a 99.5 percent success rate. Accelerated laboratory results demonstrate an 87-fold faster increase in dielectric performance and a greater than 3.5-times improvement in life extension than the legacy CableCURE technology.²⁰

(3) Capitalizing Novinium Products Will Provide Direct Economic and Environmental Benefits.

Treating the cost of installing Novinium as a capitalized expenditure will encourage investment in new, cost-efficient technologies that provide significant functional and economic benefits to public utilities and their ratepayers. The cost of installing Novinium is estimated to be approximately 10 percent to 50 percent of the cost of replacing the URD cable. By granting the requested accounting treatment, utilities will have a clear economic incentive to undertake cost-efficient URD system rehabilitations, without sacrificing system reliability or public safety. In fact, since FERC approved capital treatment for the CableCURE product in 2000 an estimated \$1 billion of capital has been saved by utilities purchasing URD rehabilitation products. Similar amounts of savings can be expected as more URD cable reaches the end of its useful service life.

In addition, using the Novinium Products provides environmental benefits compared to the alternative of replacing the URD cable. Approving this request would minimize the intrusive construction that utilities must undertake when they install new URD cable, generally abandoning the old cable in place. The use of the Novinium products involves no retrenching, eliminates the negative impacts of operating construction machinery, and recycles aging cables *in situ* creating a significant environmental benefit given the approximately one-million miles of distribution facilities that may be affected.

C. Improvements to Novinium Since CableCURE

The Novinium technology has also improved upon the CableCURE technology in several respects. Data supports improved safety and functionality since the development of the CableCURE product.²¹ While the older technology applied in a pre-failure mode has a failure

¹⁹ *Id.*

²⁰ *See Bertini Affidavit at 4.*

²¹ *See Glen J. Bertini, New Developments in Solid Dielectric Life Extension Technology*, presented at the IEEE International Symposium on Electrical Insulation (09/2004). *See also Bertini, Accelerated Aging of Rejuvenated Cables – Part I*, presented at the IEEE/ICC semi-annual meeting (April 19, 2005) and Bertini,

rate of less than 1%, laboratory testing on the Novinium products demonstrate an 87-fold superior short-term performance.²² The laboratory results are backed up by over two years of field proven performance.²³ Further, the Novinium products have been proven to extend the service life of URD cable for longer than the 20 year period guaranteed by CableCURE.

IV. Communications

Novinium requests that all notices and correspondence regarding this filing be sent to the following:

Glen Bertini
Novinium
22019 70th Avenue South
Kent, WA 98032
Tel: 206-529-4828
Fax: 206-774-9754
Email: glen.bertini@novinium.com

Daniel L. Larcamp
Bonnie A. Suchman
Troutman Sanders LLP
401 9th Street, N.W.
Washington, DC 20004
Tel: 202-274-2950
Fax: 202-274-2995
Email: Daniel.Larcamp@troutmansanders.com

Accelerated Aging of Rejuvenated Cables – Part II, presented at the IEEE/ICC semi-annual meeting (November 1, 2005), and Bertini & Vincent, *Cable Rejuvenation Mechanisms*, presented at the IEEE/ICC semi-annual meeting (March 14, 2006).

²² See Bertini, *Underground Distribution Reliability: The 5•Ps*, presented at the Western Underground (September 15, 2006).

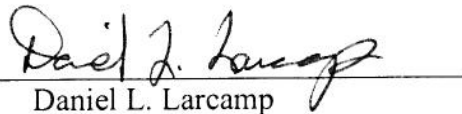
²³ See Bertini Affidavit at 4.

V. Conclusion

Given the significant pressure that public utilities are under in today's environment of rapidly increasing costs and to avoid unnecessary increases in rates, the Chief Accountant, by granting this request, would remove disincentives to utilities selecting cost effective ways to add to the service life of the delivery infrastructure. Approving the instant request to capitalize the costs of installing Novinium products would remove a possible disincentive to such utilities; the alternative accounting treatment of expensing the cost of the product would require shareholders to assume these costs until they could be reflected in rates and would, in any event, raise the costs of electricity service to current ratepayers if the full costs were immediately reflected in rates, as opposed to a more gradual return of capital through depreciation over the new service life of the URD.²⁴ Moreover, granting Novinium's request would be consistent with the prior ruling of the Chief Account with respect to CableCURE, as well as the decisions addressing rehabilitation products' use in gas pipelines.

Wherefore, Novinium respectfully requests that the Chief Accountant confirm that accounting for the cost of installing Novinium products as a capital expenditure is appropriate under the FERC Uniform System of Accounts. Novinium requests such action by the Chief Accountant as soon as possible and consistent with staff's normal practice to act on such requests within 60 days.

Respectfully Submitted,



Daniel L. Larcamp
Bonnie A. Suchman

Attorneys for Novinium, Inc.

²⁴ Novinium understands that accounting treatment of costs does not mandate any particular ratemaking treatment of such costs. However, the accounting treatment may nevertheless bear on the ratemaking treatment of such costs.

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

Novinium, Inc.

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Docket No. AC08-____-000

**AFFIDAVIT OF
GLEN J. BERTINI
ON BEHALF OF
NOVINIUM, INC.**

1. Please state your name, title and business address.

My name is Glen J. Bertini. I am the President, CEO, and Chairman of Novinium, Inc. Novinium's principal place of business is 22019 70th Avenue South, Kent, Washington, 98032.

2. Please state your qualifications and experience.

I am a licensed Professional Engineer. I graduated from Michigan Technological University with a degree in Chemical Engineering in 1980. I hold 17 patents in cable rehabilitation technologies. I am a Senior Member of the Institute of Electrical and Electronic Engineers and the Power and Energy Society, and a voting member of the Insulated Conductors Committee. In September 1992, I, along with several other co-developers, received the R&D 100 award for one of the 100 most technologically significant innovations in the world, for the development of underground cable rehabilitation technology.

For over two decades, I have focused my career exclusively on the research, development, and commercialization of cable rehabilitation technology. I have contributed to the development and commercialization of CableCURE[®] injection technology, Perficio[™] fluid injection technology, and Ultrinium[™] injection technology. CableCURE is registered trademark of my former employer UTILX. Perficio and Ultrinium belong to the family of Novinium[®] brand injection technologies, which are trademarks of my current employer.

From 1980 to 1986, I was employed by Dow Corning in various technical and financial roles. In 1986, I was assigned by Dow Corning as one of the original team members responsible for research, development, and commercialization of Dow Corning's CableCURE product. In 1991, Dow Corning sold the CableCURE business to UTILX Corporation and I joined UTILX for the next 11 years as the individual responsible for the CableCURE business.

In 1999, I provided an affidavit in support of Georgia Power's petition to the Chief Accountant of FERC for confirmation that capital treatment of the costs of using the CableCURE product was appropriate under the Uniform System of Accounts. In 2002, I left UTILX and founded Novinium which has researched, developed and commercialized the Novinium family of next generation cable life extension technologies.

3. What is the purpose of your affidavit?

I have prepared this affidavit in order to provide my expert opinion supporting the petition filed by Novinium in the above-referenced docket seeking an accounting ruling from the Chief Accountant to confirm that existing public utility customers of Novinium and future customers, can account for the costs of installing Novinium products as a capital expenditure under the FERC Uniform System of Accounts. I am personally familiar with the facts set forth herein. The injection of Novinium products into in-service underground residential distribution ("URD") cable extends the useful service life of such facilities for at least 20 years from the date of injection. Use of the products also increases the dielectric strength, or "voltage capacity," of the URD cable, and significantly enhances the reliability and safety of URD systems.

4. What evidence exists that the injection of Novinium products into URD cable extends the useful service life of URD cable, and enhances the reliability and safety of URD systems?

CableCURE technology, which was conceived and commercialized by me and my colleagues, who are now employed by Novinium, has been in commercial use for over two decades. The technology provider, UTILX, reports that over 75 million feet of URD cable have been treated over those two decades and that less than 1% of treated cables have failed in service. This is an impressive real-world result. Laboratory results and case study results were cited in my 1999 affidavit to the Chief Accountant in support of the Georgia Power petition where I wrote:

"I have personally conducted, co-authored, and published two case studies that specifically address the future benefits associated with using CableCURE on in service and field-aged URD cable.¹ These studies conclusively establish that CableCURE substantially increases the dielectric capacity of URD cable, thereby extending the service life of the cable by a minimum of twenty years and significantly enhancing reliability of URD systems, thereby improving public safety.

Each of these case studies discussed above evaluated in-service, 16-22 year field-aged polyethylene power cables with conductor sizes varying from

¹ See S.W. Mokry, et al., *Cable Fault prevention using Dielectric Enhancement Technology*, REVUE DE ELECTRICITE ET DE L'ELECTRONIQUE (Aug. 1996); K.A. Jenkins and G.J. Bertini, *Fourth Generation Dielectric Enhancement Technology*, JICABLE (June 1999).

54mm² (small cable) to 507 mm² (large cable) and insulation thickness varying from 4.4 mm to 22.9 mm that were injected with CableCURE under both laboratory and field conditions to determine the effectiveness of the CableCURE treatment process at varying times after injection. The case studies examine several distinct cable circuits with voltages varying from 15 kV to 115 kV to assure a broad representation of service history and underground power cable type. In order to provide standardized results, each study performs an AC breakdown analysis, microscopic examination for water trees and infra-red micro-spectroscopic examination in order to determine the efficacy of the treatment process for the underground cables tested. After injection with CableCURE, the studies reveal that the dielectric capacity of URD cable improves by one-half percent every day, or about 30 percent in 60 days, and continues to increase until it reaches its maximum at 350 percent dielectric improvement (which is comparable to new URD cable), thereby functionally extending the service life of URD cable by a minimum of 20 years.²

With regards to reliability, empirical data collected since 1986 shows that approximately 15 million feet of URD cable has been injected with CableCURE with a 99.5 percent success rate. Specifically, 17,812 sections of small URD cable have been injected with CableCURE, with only 102 reported cases in which CableCURE failed to increase the dielectric strength of the URD cable within the first six months after injection (“Dielectric Strength Failures”). In addition, approximately 1,440 sections of large URD cable have been injected with CableCURE, with only 40 reported Dielectric Strength Failures. Thus over the past thirteen years, a total of 19,252 sections of URD cable have been treated with CableCURE, with only 142 reported Dielectric Strength Failures.”

Novinium products include two levels of advancement built upon the proven performance of CableCURE technology. The first advancement is represented by Novinium’s Perficio product. Perficio fluid uses the same silicone dielectric enhancement fluid which makes up 95% of the CableCURE formulation, namely phenylmethyldimethoxysilane. Improving upon the catalyst and the method of delivery stretches the anticipated post-injection life by about 35% or more as compared to use of the CableCURE product. The second advancement is embodied within Novinium’s Ultrinium product. Ultrinium includes all of the functionality found in CableCURE and Perficio, and also includes entirely new functionality. The new functionality of Ultrinium technology addresses electrical trees and other voids in the cable insulation.³ This functionality broadens the applicability of the technology from the pre-failure treatment, where the older

² J. Pilling and G.J. Bertini, *Incorporating CableCURE Injection Program into a Cost-effective Reliability Program*, presented at the IEEE Rural Electric Power Conference, St. Louis, Missouri, (April 26-28, 1998).

³ See Bertini & Vincent, *Cable Rejuvenation Mechanisms*, presented at the IEEE/ICC semi-annual meeting (March 14, 2006).

technology is typically applied, to include post-failure cables. While CableCURE technology has a failure rate of about 4% one year after treatment and 16% after 15 years when applied in post-failure circumstances, laboratory testing on the Novinium technology demonstrate 87-fold superior short-term performance, which is a key to addressing post-failure cables.⁴ The laboratory results are verified by over two years of field proven performance; in all cases the failure rates are less than half those experienced by CableCURE.

5. How do the Novinium products affect URD cable's dielectric strength?

There are at least three ways that Novinium products improve the electrical performance of a treated cable. First, Novinium products dry and effectively exclude future water intrusion from the cable insulation. Water is a principal cause for the most prevalent cable degradation mechanism, namely "water trees." Water trees are so named, because upon staining and when viewed under a microscope, they have a dendritic or tree-like structure. Water trees are a collection of micro-voids or Swiss-cheese-like imperfections in the cable's polymeric insulation. Removing and excluding water provides an immediate increase in dielectric strength or voltage carrying capacity of the cable. Novinium products cure the micro-voids to permanently exclude water. Second, Novinium technology also adds new functionality not found in vintage cables. Self-regenerative anti-oxidants, ultraviolet absorbers (UVA) and hindered amine light stabilizers (HALS) present in Novinium products all interfere with the process where water trees convert to electrical trees just before failure. These functions are absent from the earlier CableCURE generation of technology. Finally, Novinium technology includes partial discharge suppression technology, which is not found even in modern cables. Partial discharges occur in all cables before they fail catastrophically.

6. Please state your conclusions.

Based upon the empirical data set forth above, I conclude that by increasing the dielectric strength of URD cable and preventing failures due to voltage capacity loss from water-related deterioration, Novinium products extend the actual service life of URD cable at least twenty years beyond its estimated service life, and significantly enhance the reliability and safety of URD systems.

⁴ See Bertini, *Underground Distribution Reliability: The 5•Ps*, presented at the Western Underground (September 15, 2006).