

PRODUCT INDEX

Transmission and Distribution Environmental Issues



TOPICAL INDEX

Substation Environmental Issues	2
Utility Poles: Assessment and Impact	3
Avian and Animal Interactions with Utility Infrastructure	4
Vegetation Management (VM) and Inspection Techniques	5
Remote Sensing and New Technologies	9
Transmission Siting, Construction, and Maintenance Environmental Issues.....	9
Emerging Contaminants and PCBs	10

To maintain safe and reliable grid operation, power companies must minimize environmental impacts from power delivery systems and manage the risk those systems may pose to the health of humans and other species. These challenges are magnified by an expanding and aging electric transmission and distribution (T&D) infrastructure, and new rights-of-way (ROW) standards.

The Electric Power Research Institute’s Transmission and Distribution Environmental Issues program (P51) helps power companies meet these challenges by conducting research on substation environmental issues, utility pole assessment and impact, avian and animal interactions with powerlines and substation equipment, vegetation management (VM) and inspection techniques, remote sensing and new technologies for environmental applications, transmission siting, construction, and maintenance environmental issues; and emerging contaminants and PCB mitigation and remediation.

Quick access to a library of relevant results from the program is available here. To select a specific research area, click on an entry in the topical index at right. To view the abstract of a publication, click on the publication number or go to www.epri.com and search for the number.

Product ID	Year	Product Title
SUBSTATION ENVIRONMENTAL ISSUES		
3002026826	2023	Overview of Sustainable Retrofit Options for Substations
3002026208	2023	State of the Science: Fire Characteristics of a Synthetic Ester Fluid
3002023414	2022	Spill Prevention and Containment: Deployable Equipment and Response Methods
3002024728	2022	Electric Utility Industry Common Practices for SPCC Evaluation and Compliance
3002023414	2022	Spill Prevention and Containment: Deployable Equipment and Response Methods
3002020002	2021	Environmental Impacts and Mitigation Options for Alternatives to Mineral Oil in Transformers: Assessment of Midel 7131 Synthetic Fluid
3002018891	2020	Substation Stormwater Management Practices and Spill Containment Methods: Selection and Review Guidance
3002016521	2019	Substation Industrial Stormwater Review: Regulations Water Quality and Stormwater Management Practices
3002013593	2018	Substation Environmental Assessment and Decommissioning Guidebook: Best Management Practices
3002001291	2013	Evaluation of Alternative Spill Containment Systems
★ 3002023808	2022	External Flooding Guidance for Probabilistic Risk Assessment
★ 3002015989	2019	External Flooding Probabilistic Risk Assessment Walkdown Guidance
★ 3002002345	2013	In Situ Chemical Fixation of Arsenic-Contaminated Soils and Groundwater: Pilot Study Results from an Energized Substation
★ 3002001293	2013	Substation Stormwater Management
★ 1026830	2012	Absorbents for Mineral Oil Spill Cleanup, Phase 3: Field Performance
1023750	2012	Mineral Oil Spill Evaluation System-Multi Phase (MOSES-MP), Version 4
★ 1022613	2011	Gulf Power Company and EPRI Develop New Arsenic Remediation Technologies
★ 1022150	2011	Absorbents for Mineral Oil Spill Cleanup
★ 1022524	2011	EPRI Software Tool Saves Additional Substation Containment Costs for Duke Energy
★ 1019851	2010	Bioaccessibility of Arsenic in Soil
★ 1017936	2010	Environmentally Acceptable Transformer Fluids: An Update
★ 1020814	2010	PNM Resources Avoids Substation Retrofit Costs Through Oil Spill Risk Evaluation
★ 1019476	2009	Arsenic Remediation Technologies for Groundwater and Soil
★ 1015567	2008	Disposable Absorbent Material for the Removal of Arsenic from Water
★ 1012603	2007	Hybrid Ion Exchange Material for the Removal of Arsenic from Water
★ 1014056	2007	In Situ Chemical Fixation of Arsenic-Contaminated Soil
★ 1012604	2006	Modeling Arsenic Fate and Transport in Groundwater
★ 1012601	2006	Oil Fires in Electrical Equipment
★ 1011760	2005	Phytoremediation at an Arsenic-Contaminated Site
★ 1012102	2005	Innovation in Storm Water and Oil Spill Control Techniques for Substations
★ 1005469	2004	Financial Analysis of Arsenic-Contaminated Sites
★ 1007825	2003	Prediction of the Environmental Mobility of Arsenic: Laboratory Measurement of Partitioning Coefficients
★ 1007615	2003	Characteristics of Pipe-Type Cable Fluids: Environmental Data Protocol and Comprehensive Test Matrix for Fluid Evaluation
★ 1005311	2003	Management Practices for Prevention and Retention of Oil Spills from Substation Equipment
★ 1005308	2002	Prediction of the Environmental Mobility of Arsenic: Selection and Use of Partitioning Coefficients
★ 1001932	2002	Characteristics of Pipe-Type Cable Fluids and Development of Risk-Based Cleanup Goals: Interim Report
★ 1005306	2002	Guidance for the Selection of Monitored Natural Attenuation as a Remedial Measure
★ 1007508	2002	Innovation in Storm Water and Oil Spill Control Techniques for Substations
★ 1006220	2001	Design, Construction, and Field Testing of a Prototype Mobile Vault Water Treatment System
★ 1005169	2001	In Situ Environmental Remediation of an Energized Substation
★ 1001071	2001	Substation Site Assessment
★ 1000203	2000	Electrokinetic Removal of Arsenic From Contaminated Soil: Experimental Evaluation

Download reports online at www.epri.com or call 800.313.3774 for assistance.

★ = Publicly Available Reports

Product ID	Year	Product Title
SUBSTATION ENVIRONMENTAL ISSUES <i>(continued)</i>		
★ 1000547	2000	Prediction of the Environmental Mobility of Arsenic: Evaluation of a Mechanistic Approach to Modeling Water-Rock Partitioning
★ 1000587	2000	Electrokinetic Remediation of Arsenic in Soil and Groundwater
★ 1000141	2000	Mineral Insulating Oils Used in the Power Industry: Chemical Composition and Dissolution Characteristics
★ 1000716	2000	Characteristics of High Pressure Fluid Filled Pipe-Type Cable Dielectric Fluids: Progress Report
★ 1000065	2000	Service Center Site Assessment
★ TR-113372	1999	Characterization of PCBs in Groundwater Using a Drive Point Sampler
★ TR-111317	1998	Pilot-Scale Studies of Solvent Extraction Treatment of PCB- and PAH-Contaminated Soil and Sediment
★ TR-108562	1998	Ex Situ Bioremediation of Mineral Oil in Soils: Aerated Pile Treatment
★ TR-108560	1998	In Situ Treatability of Mineral Oil in Soils
★ TR-108561	1998	Ex Situ Bioremediation of Mineral Oil in Soils: Land Treatment and Composting
★ TR-106701	1997	Innovative Technologies for Remediation of Arsenic in Soil and Groundwater: Soil Flushing, In-Situ Fixation, Iron Coprecipitation, and Ceramic Membrane Filtration
★ TR-106700	1997	In-situ Solidification/Stabilization of Arsenic-Contaminated Soils
★ TR-104168	1994	Sites A to Z: A Reference Manual for Site Risk Analysis
UTILITY POLES: ASSESSMENT AND IMPACT		
3002024730	2022	Utility-Focused Risk Evaluation of DCOI for Wood Utility Poles
3002023933	2022	Evaluation of Thermolyzer™ and CCA Removal from Biochar as a Potential End-of-Life Solution for Treated Wood Utility Poles
3002020291	2020	Field Evaluation of Airepel® HC to Reduce Woodpecker Damage to Utility Poles: Year 1
3002019782	2020	Exploring a Potential end-of-life Solution for Treated Wood Utility Poles: Thermolyzer Technology
3002018902	2020	DCOI Wood Pole Treatment: Overview of History Research and Commercialization
3002016522	2019	Utility Wood Pole Butt Decommissioning: Six Case Studies
3002017572	2019	Predictive Mapping of Pileated Woodpecker Habitat: Mitigating Wood Utility Pole Damage Through Geographic Information System and Initiating a Repellency Trial
★ 3002014984	2018	Reusing Retired Utility Wood Poles: Answers to Your Frequently Asked Questions
★ 3002013591	2018	Utility Wood Pole Preservatives: Answers to Your Frequently Asked Questions
3002010815	2017	Retired Wood Pole Disposal and Reuse Options: Guidance for Final Pole Disposition
★ 3002009467	2016	Wood Pole Species
★ 3002009463	2016	Chromated Copper Arsenate Treated Utility Poles
★ 3002009464	2016	Pentachlorophenol Treated Utility Poles
★ 3002009465	2016	Wood Pole Characteristics and Pressure Treatment
★ 3002009466	2016	Wood Pole Decayers
3002006336	2015	Creosote Treated Utility Poles
3002006337	2015	Treated Wood Poles Management: International Practices
3002006335	2015	Treated Wood Poles in Use and in the Environment, Questions and Answers About Utility Poles
3002004306	2014	Woodpecker Damage to Utility Poles
★ 3002002722	2014	Treated Wood Planted Post Study: Assessment of Leaching of Various Wood Preservatives from In-Service Wood Poles and Prevention Methods to Mitigate Leaching
★ 1019849	2010	Assessment of Treated Wood and Alternate Materials for Utility Distribution Poles
★ 1017934	2009	Treated Wood Planted Post Study
★ 1016803	2008	Demonstration of Decision Tool for Screening Eight Distribution Poles
★ 1015560	2008	Feasibility of Remanufacturing Out-of-Service Western Utility Poles
★ 1015562	2008	Treated Wood Pole Management
★ 1014777	2007	An Assessment of the Potential for Remanufacturing Out-of-Service Southern Pine Utility Poles
★ 1014096	2007	Demonstration of Decision Tool for Selection of Transmission Poles



Product ID	Year	Product Title
UTILITY POLES: ASSESSMENT AND IMPACT (continued)		
★ 1010146	2006	Retreatment of In-service Wood Poles
★ 1013104	2006	Options for Prevention, Mitigation, and Remediation at Wood Poles Storage Sites
★ 1013631	2006	Program on Technology Innovation: Feasibility of Using In-Situ Chemical Oxidation for Wood Pole Storage Yard Remediation
★ 1012597	2006	Cedar and Douglas Fir Treated Wood Poles
★ 1012598	2006	Demonstration of Decision Tool for Selection of Distribution Poles
★ 1010143	2005	Environmental Profile of Utility Distribution Poles
★ 1000747	2000	Bioremediation of Pentachlorophenol and Creosote-Contaminated Soil and Groundwater
★ TR-108598	1997	Pole Preservatives in Soils Adjacent to In-Service Utility Poles in the United States
★ TR-104893	1995	Pentachlorophenol (PCP) in Soils Adjacent to In-Service Utility Poles in New York State
★ TR-102172	1993	Biodegradability of Pentachlorophenol in the Environment: A Literature Review
★ TR-100870	1992	Creosote-Treated Wood Poles and Crossarms: Toxicity Characteristic Leaching Procedure (TCLP) Results
AVIAN AND ANIMAL INTERACTIONS WITH UTILITY INFRASTRUCTURE		
3002027806	2023	Evaluating the TransGard Laser Bird Defense Programmable Mounted Laser System (LBDS), Year 2
3002026830	2023	Successful Nest Management Techniques: State of the Art in the Electric Utility Industry
3002026613	2023	Interim Report Field Evaluation of Airepel® HC to Reduce Woodpecker Damage to Utility Poles – Year 2
3002024724	2022	Best Management Practices for Line Marking: Reducing Avian Collisions with Power Lines
3002022500	2021	Evaluating a Second-Generation Avian Collision Avoidance System (ACAS): Reducing Sandhill Crane Collisions with a 69-kV Transmission Line
3002021639	2021	Survey of Wildlife Protection Products
3002020008	2020	Bald Eagles and Electric Infrastructure: A Case Study in Risk Assessment and Reduction Lincoln Electric System
3002018893	2020	Animal-Caused Outage Prevention Products: Effectiveness and Durability — A Framework for Product Testing
3002020097	2020	Testing Efficacy of the Sonic Net to Deter Rock Pigeons from Substations: Hazing Trials
3002018892	2020	UAS Line Marker Installation Demonstration; Clinton Mississippi
3002016588	2019	Guidelines for Unmanned Aircraft System Wildlife Surveys on Rights-of-Way
3002017572	2019	Predictive Mapping of Pileated Woodpecker Habitat: Mitigating Wood Utility Pole Damage Through Geographic Information System and Initiating a Repellancy Trial
3002016589	2019	Experimental Small Unmanned Aircraft System (sUAS) Field Installation of Line Markers
3002016586	2019	Compendium of Animal Caused Outage Prevention Products: 2019 Update
3002017492	2019	Program on Technology Innovation: Reducing Data Demands of Fatality Predictions for Birds and Bats at Wind Energy Facilities: A Case Study of Golden Eagles
3002015179	2019	Results at a Glance: Ultraviolet Light Reduces Sandhill Crane Collisions with a Power Line from 48 to 1
3002013607	2018	Automated Collision Marking System Demonstration
3002014763	2018	The Avian Collision Avoidance System — Phase 2
3002014001	2018	Bird Nesting Deterrents: Best Management Practices for Managing Nests on Transmission and Distribution Lines
3002014780	2018	Hazing Wildlife: Best Management Practices
3002013604	2018	Animal Activity Monitor (AAM) Prototype Development
★ 3002010814	2017	Animal Activity Monitor (AAM) Prototype Development
★ 3002010812	2017	Vegetation Best Management Practices to Protect Birds and Bats Along Electric Transmission Rights-of-Way
★ 3002010813	2017	Avian Collision Avoidance System: Testing Nocturnal Illumination of Power Lines to Reduce Avian Collision Risks
★ 3002009038	2017	Bat Detection and Shutdown System for Utility-Scale Wind Turbines
3002008529	2017	Power Line Collision Mitigation and Avian Vision
★ 3002008528	2016	Animal-Caused Outages in Substations: Problems and Solutions
★ 3002006333	2016	Conductor Cover Selection: An Animal Outage Device Selection Process to Maximize Installation Ease, System Compatibility, and Overall Performance
★ 3002008530	2016	Animal Activity Monitor (AAM) Prototype Development

Download reports online at www.epri.com or call 800.313.3774 for assistance. ★ = Publicly Available Reports

Product ID	Year	Product Title
AVIAN AND ANIMAL INTERACTIONS WITH UTILITY INFRASTRUCTURE (continued)		
3002007005	2015	Avian Species and the Electric Power Sector: Potential Research and Technology Gaps Related to Proposed Migratory Bird Treaty Act Permitting
3002006334	2015	Animal Activity Monitor Development
3002003574	2014	Animal Bushing Cover Testing: Current Practices and Opportunities to Improve Comparability and Transparency
3002003575	2014	Avian Interactions with Distribution Lines – DVD
3002001185	2013	Effectiveness and Durability of Products to Prevent Animal-Caused Outages: A Framework for Product Testing
★ 1023755	2012	Avian Vision Perception
★ 1019882	2010	Selection and Testing of an Internet Protocol Video Camera for the Bird Activity Monitor
★ 1021375	2010	Pileated Woodpecker Damage to Electric Utility Poles: Evaluation of the Sonic Dissuader
★ 1022303	2010	Program on Technology Innovation: Bat Detection and Shutdown System for Utility-Scale Wind Turbines
★ 1019017	2009	Bird Activity Monitor
★ 1015599	2008	Bird Activity Monitoring (BAM)
★ 1010130	2006	Use of the Bird Strike Indicator to Monitor Avian Collisions with Guy Wires on a U.S. Coast Guard Differential GPS Tower
★ 1009360	2004	Attracting and Managing the Peregrine Falcon at Electricity Generating Facilities
★ 1005551	2004	Bird Strike Indicator/Bird Activity Monitor and Field Assessment of Avian Fatalities: Project Update – March 2004
★ 1009178	2003	Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota Wind Resource Area: An Assessment of Bat Activity, Species Composition and Collision Mortality
★ 1005385	2003	Bird Strike Indicator / Bird Activity Monitor and Field Assessment of Avian Fatalities
★ 1005384	2003	Avian Interactions with Wind Power Structures
★ 1005180	2001	Avian Interactions with Utility and Communication Structures: Proceedings of a Workshop Held in Charleston, South Carolina, December 2–3, 1999
★ 1000736	2000	Avian Interactions with Utility Structures: Proceedings of the December 1999 Workshop
★ EA-4120	1985	Radar Electro-optical and Visual Methods of Studying Bird Flight Near Transmission Lines
VEGETATION MANAGEMENT (VM) AND INSPECTION TECHNIQUES		
3002028685	2024	Effects of Vegetation Management in Southeastern United States Electric Utility Rights-of-Way on Pollinating Insects: Rights-of-Ways and Pollinators
3002028677	2024	Using Remotely Sensed Data to Evaluate Pollinator Habitat Establishment
3002028639	2024	Influence of Vegetation Management Practices on Native Habitat Establishment and Pollinator Communities on Utility Lands in Illinois – Year 2
3002027692	2023	The Contribution of Electric Utility Transmission Line Rights-of-Way to Pollinator Biodiversity in Arizona, Year 2: Annual Report
3002027588	2023	The Biodiversity Value of Rights-of-Way in the Southeast United States
3002027532	2023	Evaluating the Establishment, Pollinator Value, and Bat Forage Provision of a Native Seed Mix in West Virginia: Year 1
3002027531	2023	The Effect of Construction Mats on Right-of-Way Vegetation and Pollinators in New York State: Year 1
3002026829	2023	Evaluating Detection of Pollinators with Environmental DNA on Right-of-Way Vegetation in New York State
3002025967	2023	American Electric Power Prairie Research at The Dawes Arboretum: Right-of-Way Prairies
3002024725	2022	ESG Biodiversity Handbook
3002025052	2022	Vegetation Monitoring of Regional Native Seed Mixes: Right-of-Way Site Assessment
3002025040	2022	The Contribution of Electric Utility Transmission Line Rights-of-Way to Pollinator Biodiversity in Arizona
3002023791	2022	The Value of Native Vegetation on Utility Lands
3002023193	2021	IVM Zone Management Quick Guide
3002023180	2021	Zone Management: Concepts and Practices
3002023179	2021	Implementing IVM: Concepts and Practices
3002023178	2021	Introduction to IVM: Public Audience

Download reports online at www.epri.com or call 800.313.3774 for assistance.

★ = Publicly Available Reports



Product ID	Year	Product Title
VEGETATION MANAGEMENT (VM) AND INSPECTION TECHNIQUES (continued)		
3002023177	2021	Introduction to IVM: Utility Audience
3002023176	2021	IVM: Clearing the Way for Biodiversity
3002023175	2021	Row Zone Management: History and Strategies
3002023148	2021	Native Habitat – Short and Long-term Management
3002023147	2021	Native Habitat – Site Preparation and Seeding
3002023146	2021	Native Habitat – Seed Mix Design
3002022728	2021	Effects of Vegetation Management in Southeastern United States Electric Utility Right-of-Ways on Pollinating Insects
3002022101	2021	Vegetation Monitoring of Regional Seed Mixes: Right-of-Way Site Assessments in Ohio, West Virginia, and Oklahoma
3002021641	2021	Environmental Fate of Herbicides Used in Vegetation Maintenance of Transmission Rights-of-Way: An Assessment Based on Contemporary Integrated Vegetation Management Practices
3002021640	2021	Implementing Integrated Vegetation Management (IVM): Components of an IVM Program
3002021637	2021	Can Spatial Arrangement of Prairie Vegetation Suppress the Invasion of Undesirable Species on Utility Rights-of-Way?
3002020096	2021	Pollinator Habitat Model: Detection of Key Pollinator Species using Unmanned Aerial Vehicles
3002020204	2020	Solar Grazing: Viability of Grazing Sheep for Vegetation Management
3002020202	2020	American Electric Power Prairie Research at The Dawes Arboretum: Right-of-Way Prairies
3002020203	2020	Evaluating the Establishment and Pollinator Value of a Native Seed Mix at a Solar Array: Georgia Power a Southern Company Subsidiary LaGrange Solar Array
3002019050	2020	Identification of At-Risk Trees Using Satellite Imagery
3002018894	2020	Cost of Deferring Vegetation Maintenance on Transmission Rights-of-Way: Direct and Indirect Cost Considerations in Determining Optimal Preventive Maintenance Intervals
3002018895	2020	Environmental Fate of Herbicides Used in Vegetation Maintenance on Transmission Rights-of-Way: An Assessment Based on Contemporary Integrated Vegetation Management Practices
3002020213	2020	Louisville Gas & Electric and Kentucky Utilities — Demonstrating the Use of Pollinator Habitat at Solar Sites
3002016585	2020	The Response of Insect Pollinators (Bees: Hymenoptera) to Vegetation Management on Powerline Corridors in New York
3002016590	2020	Vegetation Management using Satellite Imaging Augmented Reality Artificial Intelligence and Image Analysis
3002019649	2020	Geospatial Analysis of Utility ROW Along Agricultural Fields for Selection of Research Sites
3002019574	2020	Results at a Glance: Vegetation Indexes for Hazard Tree Management
3002017448	2020	Vegetation Indexes for Hazard Tree Management
3002017810	2019	Vegetation Management Inspection Technologies Applications and Research Needs
3002017684	2019	American Electric Power Prairie Research Project at The Dawes Arboretum: Right-of-Way Prairies
3002017685	2019	Effects of Vegetation Management in Southeastern United States Electric Transmission Line Rights-of-Way on Pollinating Insects: Rights-of Way and Pollinators
3002016591	2019	Unmanned Aircraft System-Based LiDAR versus Photogrammetry: A Critical Comparison for Vegetation Management
3002013597	2018	Pollinator Assemblages on Powerline Corridors Treated with Different Vegetation Control Methods in New York
3002013599	2018	Integrated Vegetation Management (IVM) Training Manual: Update
3002013596	2018	Pollinator Assemblages on Powerline Corridors Treated to Control Invasive Exotic Woody Plants in Northeastern Ohio
3002013753	2018	Protected Species and Electric Transmission Line Rights-of-Way: An Annotated Bibliography and Literature Review of Benefits, Cautions, and Recommendations
3002013600	2018	Defining and Controlling the Risks of Glyphosate Herbicide to Honey Bees During Vegetation Management on Powerline Corridors
3002013999	2018	American Electric Power Prairie Research Project at the Dawes Arboretum: Right-of-way Prairies

Download reports online at www.epri.com or call 800.313.3774 for assistance.  = Publicly Available Reports

Product ID	Year	Product Title
VEGETATION MANAGEMENT (VM) AND INSPECTION TECHNIQUES (continued)		
3002014000	2018	Effects of Vegetation Management on Pollinating Insects in Southern United States Electric Transmission Line Rights-of-Way
3002014765	2018	Assessing Effects of Powerline Corridor Vegetation Management Treatments on Insect Pollinators: Field Research Protocols for Design, Installation, Implementation, and Monitoring
3002013594	2018	Plant Community Development on Electric Transmission Line Rights-of-Way With/Without Attention to Controlling Invasive, Exotic Plants: A Long-Term Collaborative Research Project with FirstEnergy – Final Report
★ 3002013609	2018	American Electric Power Prairie Research Project at the Dawes Arboretum: Right-of-way Prairies
★ 3002010812	2017	Vegetation Best Management Practices to Protect Birds and Bats Along Electric Transmission Rights-of-Way
★ 3002010809	2017	Pollinator Diversity on Power Line Corridors in New York
★ 3002010805	2017	Conducting Field Studies of Pollinators: Preliminary Field Research Protocols for Design, Installation, Implementation, and Monitoring
★ 3002011898	2017	Insights from the Literature and Stepwise Guidance for Vegetation Managers Interested in Promoting Pollinators on Electric Transmission Line Rights-of-Way
★ 3002010811	2017	Direct Effects of Glyphosate on Honey Bees: A Brief Literature Review with Implications for Vegetation Management of Electric Transmission Line Rights-of-way
3002010806	2017	Pollinator Diversity on Powerline Corridors in Ohio
3002008533	2017	Pollinator Research by Electric Power Companies: Results of an EPRI Member Survey
★ 3002011466	2017	2017 Pollinator Workshop Meeting Summary
★ 3002009474	2016	Plant Community Development on Electric Transmission Line Rights-of-Way With/Without Attention to Controlling Invasive Exotic Plants: A Long-term Collaborative Research Project with FirstEnergy: Year 4
★ 3002008534	2016	Pollinator Habitat Patterns Across a Powerline Corridor in Upstate New York Associated with Different Herbicide Treatment Schemes: Project Initiation
★ 3002008535	2016	Pollinator Diversity on Powerline Corridors in New York and Ohio: Study Initiation
★ 3002007045	2015	Plant Community Development on Electric Transmission Line Rights-of-Way With/Without Attention to Controlling Invasive, Exotic Plants: A Long-Term Collaborative Research Project with FirstEnergy: Year 3
3002006332	2015	Photogrammetry for Vegetation Inspection on Transmission Lines: Technology, Process, and Deliverables
3002007046	2015	Literature Syntheses of Select Invasive Exotic Plants Common on Electric Transmission Line Rights-of-Way: Biology and Ecology
3002006331	2015	Understanding Human-Based Transport of Invasive Exotic Plants on Electric Transmission Line Rights-of-Way: Developing an Empirical Basis for Deciding When to Clean Personnel and Vehicles to Minimize Inadvertent Transport of Invasive Exotic Plants from Power Line Corridors
★ 3002002750	2014	Plant Community Development on Electric Transmission Line Rights-of-Way With and Without Attention to Controlling Invasive Exotic Plants: A Long-term Collaborative Research Project with FirstEnergy—Year 2
★ 3002004307	2014	Plant Community Development on Electric Transmission Line Rights-of-Way with/without Attention to Controlling Invasive Exotic Plants: A Long-Term Collaborative Research Project with FirstEnergy on the Cuyahoga Valley National Park
3002004308	2014	Transmission Right-of-Way Steward Pilot Audit Report—New York Power Authority
★ 3002003573	2014	Inspection Technology for Vegetation Management: Overview of GeoDigital International LiDAR Inspection Approach
★ 3002003572	2014	Cost Effectiveness of Cleaning Techniques for Controlling Human-Based Transport of Invasive Exotic Plants on Electric Transmission Line Rights-of-Way
★ 3002002272	2013	Transmission Right-of-Way Steward Accreditation Pilot Audit Report: Arizona Public Service
★ 3002001178	2013	New and Emerging Inspection Technologies for Vegetation Management
★ 3002001287	2013	Best Management Practices for Vegetation Management at Electric Utility Facilities
★ 3002001189	2013	Cost Effectiveness of Cleaning Techniques for Controlling Human-based Transport of Invasive Exotic Plants on Electric Transmission Line Rights-of-Way
★ 1023753	2012	Inspection Technologies for Vegetation Management
★ 1025379	2012	Cost-effectiveness of Different Herbicide and Non-herbicide Alternatives for Treating Transmission Rights of Way Vegetation

Product ID	Year	Product Title
VEGETATION MANAGEMENT (VM) AND INSPECTION TECHNIQUES <i>(continued)</i>		
★ 1025380	2012	Cost Effectiveness of Cleaning Techniques for Controlling Human-based Transport of Invasive Exotic Plants on Electric Transmission Line Rights-of-Way
★ 1023752	2012	Herbicide Use Safety for Vegetation Management on Powerline Corridors
★ 1025030	2012	NYPA Uses EPRI Workshop to Develop Integrated Vegetation Management Strategy for Invasive Plant Species on Rights-of-Way
★ 1021826	2011	Management of Riparian Areas on Electric Transmission Line Rights-of-Way
★ 1019878	2010	Evolving Rights-of-Way Vegetation Management Standards and Practices: Update 2010
★ 1019879	2010	Importance, Identification, and Assessment of Danger and Hazard Trees Located Outside Electric Transmission Line Rights-of-Way
★ 1019877	2010	Invasive Plant Species Workshop
★ 1020949	2010	Hawaiian Electric Company Herbicide Efficacy Study
★ 1020323	2010	Vegetation Management in Electric Transmission Rights-of-Way and Potential Impacts on Groundwater
★ 1017963	2009	Sustainability: A Central Principle for the Electric Utility Industry Available Through Vegetation Management on Transmission Rights-of-Way
★ 1019417	2009	Utility Vegetation Management: Use of Reliability-Centered Maintenance Concepts to Improve Performance
★ 1014032	2008	Corridors and Connectivity of Rights-of-Way: State of the Science
★ 1014030	2008	Transmission Rights-of-Way Vegetation Management Plan Framework
★ 1015595	2008	Electric Transmission Line Right-of-Way Post-Blackout Vegetation Management Strategies: 2008 Update
★ 1012551	2007	Electric Transmission Right-of-Way Post-Blackout Vegetation Management Strategies
★ 1010127	2006	Electric Transmission Right-of-Way Invasive Non-Native Woody Plant Species Control
★ 1010126	2005	New Equipment for Electric Utility Vegetation Management
★ 1010125	2005	Product Options for Herbicide Application
★ 1010124	2005	Automatic Vehicle Locating and Its Use for Electric Utility Vegetation Management
★ 1008480	2004	Electric Distribution Hazard Tree Risk Reduction Strategies
★ 1008859	2004	Utility Vegetation Management: Use of Reliability Centered Maintenance Concepts to Improve Performance
★ 1005368	2004	Transferring Knowledge of Shrub Ecology and Management to Promote Integrated Vegetation Management on Power Line Corridors
★ 1009445	2004	Ecological and Wildlife Risk Assessment of Chemicals Encountered in Vegetation Management on Electric Utility Rights-of-Way
★ 1005367	2003	Human Health Risk Assessment of Chemicals Encountered in Vegetation Management on Electric Utility Rights-of-Way
★ 1005366	2002	Wildlife and Integrated Vegetation Management on Electric Transmission Line Rights-of-Way
★ 1005186	2001	Rights-of-Way Mechanical Cutting and Disposal Costs – Update 2001
★ 1005187	2001	Vascular Species Richness and Rarity in Wetlands on Electric Power Rights-of-Way in New York State
★ 1000270	2000	Cost Comparison of Rights-of-Way Treatment Methods: Update 2000
★ 1000525	2000	Right-of-Way Treatment Cycles: Update 2000
★ 1000271	2000	Long-Term Right-of-Way Effectiveness: Update 2000
★ 1000317	2000	Tree Growth Regulators for Management of Trees in Electric Utility Rights-of-Way: A Literature and Current Application Status Review
★ 1000272	2000	Use of the Registered Tree Growth Regulators Paclobutrazol (Profile (R) 2SC) and Flurprimidol (Cutless (R)) in the State of New York
★ 1000268	2000	Natural Growth Inhibitors (Allelopathy): Literature Review
★ TR-113160	1999	Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality
★ TR-113191	1999	Rights-of-Way Stability: A 15-year Appraisal of Plant Dynamics on Electric Power Rights-of-Way in New York State
★ TR-113377	1999	Vegetation Dynamics Along Utility Rights-of-Way Factors Affecting the Ability of Shrub and Herbaceous Communities to Resist Invasion by Trees

Product ID	Year	Product Title
REMOTE SENSING AND NEW TECHNOLOGIES		
3002024726	2022	Using UAV Technology to Identify Pollinator Plant Species in the Midwestern U.S.
3002023194	2021	Stress Tree Detection using Hyperspectral and Multispectral Imagery Collected from Unmanned Aerial Vehicles
3002022770	2021	Program on Technology Innovation: Using Hyperspectral Imagery and Artificial Intelligence (AI) to Detect Stressed and Dead Trees
3002022029	2021	Identification of At-Risk Trees Using Satellite Imagery in the Western U.S.
3002021525	2021	Program on Technology Innovation: Environmental Data Science Use Cases – Quick Summaries and Select Deep Dives
3002020681	2021	Utilization of Emerging Data Science Technologies to Electric Power Sector Environmental Challenges: Index of Research
3002020098	2021	Comparison of UAS-Collected Point Clouds for Vegetation Threat Analysis: An Evaluation of LiDAR and Photogrammetry for Right-of-Way Monitoring
3002020096	2020	Pollinator Habitat Model: Detection of Key Pollinator Species using Unmanned Aerial Vehicles
3002018898	2020	Maximizing the Value of Right-of-Way (ROW) Unmanned Aircraft Systems (UAS) Collected Data: Four Applications for Remotely Sensed Data
3002016588	2019	Guidelines for Unmanned Aircraft System Wildlife Surveys on Rights-of-Way
3002016589	2019	Experimental Small Unmanned Aircraft System (sUAS) Field Installation of Line Markers
3002016591	2019	Unmanned Aircraft System-Based LiDAR versus Photogrammetry: A Critical Comparison for Vegetation Management
3002015063	2019	Unmanned Aircraft Systems (UAS): Advanced Payloads
3002013607	2018	Automated Collision Marking System Demonstration
★ 3002010873	2017	Small Unmanned Aircraft Systems Environmental Applications and Best Management Practices
TRANSMISSION SITING, CONSTRUCTION, AND MAINTENANCE ENVIRONMENTAL ISSUES		
3002028706	2024	Hydroseeding Native Seed Mixes: Evaluating Germination Success and Establishment
3002026833	2023	Evaluating Seed Mats for Postconstruction Revegetation
3002026828	2023	Equity and Environmental Justice Considerations for Electric Power Delivery Infrastructure Siting
3002025946	2022	Hydroseeding Native Seed Mixes: Evaluating Germination Success and Establishment – Year 1
3002024721	2022	Can Spatial Arrangement of Prairie Vegetation Suppress the Invasion of Undesirable Species on Utility Rights-of-Way?
3002021638	2021	Access Road Design and Stormwater Management Considerations
3002018903	2020	Practitioner's Guide to Federal State and Provincial Protected Species Regulations for Electric Transmission Utilities
3002018908	2020	A Guide to Establishing Native Habitat: Principles Practices and Plants
3002018905	2020	Can Plant Selection and Spatial Arrangement of Prairie Vegetation Suppress Invasion of Undesirable Species on Utility Rights-of-Way?
3002017450	2019	Environmental Aspects of Transmission & Distribution: 2019 International Workshop Summary
★ 3002017601	2019	EPRI-GTC Overhead Electric Transmission Line Siting Methodology 2019 Update
3002017682	2019	Native Seed Installation Guidance Document
3002017686	2019	Can Plant Selection and Design Reduce Invasion by Woody and Herbaceous Species?
3002017032	2019	Best Management Practices Manual for Access Road Crossings of Wetlands and Waterbodies
★ 3002002280	2014	Social Media in Support of Outage Management: Workshop Summary
★ 3002001188	2013	Guide for Successful Transmission Line Siting
1022151	2011	Stormwater Management Options for Linear Projects
★ 1022164	2011	Economic and Environmental Challenges of Transmission Lines - An Engineering Perspective
★ 1021825	2011	Storm Water Best Management Practices Manual for Transmission Line Rights-of-Way
★ 1019881	2010	Transmission Siting Integrating National Corridor and North American Electric Reliability Corporation (NERC) Compliance Requirements

Download reports online at www.epri.com or call 800.313.3774 for assistance.

★ = Publicly Available Reports

Product ID	Year	Product Title
TRANSMISSION SITING, CONSTRUCTION, AND MAINTENANCE ENVIRONMENTAL ISSUES <i>(continued)</i>		
★ 1017964	2009	Primer on Cumulative Impacts
★ 1015597	2008	Assessment of Environment Effects of Current Underground and Overhead Transmission Line Construction and Maintenance in the United States
★ 1015598	2008	Wetland and Conservation Banking in Transmission Corridor Rights-of-Way: Feasibility Assessment
★ 1014033	2008	Wetland and Conservation Banking in Transmission Corridor Rights-of-Way: Policy and Opportunities
★ 1016434	2008	8th International Symposium, Environmental Concerns in Rights-of-Way Management
★ 1016198	2007	Kentucky Transmission Line Siting Methodology
★ 1012555	2007	ROW 2.0 – Right-of-Way Environmental Stewardship Bibliographic Database, Version 2.0
★ 1013080	2006	EPRI-GTC Overhead Electric Transmission Line Siting Methodology
★ 1014474	2006	An Introduction to Electricity and the Power Delivery System
★ 1012554	2006	Electricity Needs: A Guide for Local Planners
★ 1010128	2005	Aesthetics and Public Perception of Transmission Structures
★ 1008479	2004	Electric Transmission Rights-of-Way Uses and Risks
★ 1005371	2003	Landscape Fragmentation and Electric Transmission Corridor Siting and Management
★ 1005546	2003	Transmission Lines and Property Values: State of the Science
★ 1005310	2002	Management Practices for Vegetation and Dust Control
★ 1005188	2002	Best Management Practices (BMPs) Manual for Access Road Crossings of Wetlands and Waterbodies
★ 1005189	2001	Communicating with the Public About Rights-of-Way: A Practitioner's Guide
★ TR-113159	1999	Soil and Crop Response to Power Line Construction Traffic and Shallow and Deep Tillage in New York State
★ TR-113158	1999	Soil Compaction: A Comprehensive Literature Review: State-of-the-Art Review and Bibliography with Interpretations for Transmission Rights-of-Way
EMERGING CONTAMINANTS AND PCBs		
3002021724	2021	Efficacy and Potential Environmental Impact of Fluorine-Free Firefighting Foams: Review of Status and Research in Progress
3002018700	2020	2020 Technology Innovation Program: Tracking PFAS Developments
3002015812	2019	The PCB Information Manual Second Edition Volume III: Introduction to PCB Regulations
3002010360	2017	Oil-Filled Equipment PCB Contamination Database (PCBDB), version 2.0
★ 3002007353	2016	Methodology for Predicting PCB Concentrations Helps Prioritize Decisions About Early Removal of Transformers
★ 3002007128	2015	Polychlorinated Biphenyls (PCBs) in Electrical Equipment
★ 3002008307	2016	Polychlorinated Biphenyls (PCBs) in Electrical Wiring
★ 3002008537	2016	The PCB Information Manual, Volume I: Production, Uses, Characteristics, and Toxicity of PCBs, Second Edition
★ 3002006327	2015	The PCB Information Manual, Volume II: PCB Characterization, Sources and Releases, Second Edition
★ 3002000988	2013	Polychlorinated Biphenyl Compounds in Used Transformer Fluids
★ 1023751	2012	Relative Risk Model for Transmission and Distribution Electric Infrastructure (General RRM) Version 1.0
★ 1023748	2012	Predicting the Potential Polychlorinated Biphenyl (PCB) Concentration in Electrical Equipment
★ 1025094	2012	Current and Potential Future Risk-Based Standards for Total Polychlorinated Biphenyls (PCBs) and Dioxin-Like PCBs
★ 1017937	2010	Program on Technology Innovation: In Situ Bioremediation of Polychlorinated Biphenyls (PCBs) Using Dehalococcoides Bacteria
★ 1014091	2009	Changes to Polychlorinated Biphenyl Congeners in Dielectric Fluids in Use
★ 1014772	2007	Issues and Trends for Polychlorinated Biphenyl Congener Analysis at Utility Sites
★ 1012600	2006	Review of Polychlorinated Biphenyl Congener Monitoring Methods
★ 1001333	2003	PCB Contaminated Soils Treatability Study
★ 1005309	2002	Congener-Specific Measurement and Leaching of PCBs
★ 1006553	2001	Biotransformation of PCBs in Substation Soils: A Review of Laboratory and Pilot-Scale Testing for the Development of an In Situ Process for PCB Biotransformation in Soils

Download reports online at www.epri.com or call 800.313.3774 for assistance.

★ = Publicly Available Reports

About EPRI

Founded in 1972, EPRI is the world's preeminent independent, non-profit energy research and development organization, with offices around the world. EPRI's trusted experts collaborate with more than 450 companies in 45 countries, driving innovation to ensure the public has clean, safe, reliable, affordable, and equitable access to electricity across the globe. Together, we are shaping the future of energy.

EPRI CONTACT

YAMILLE DEL VALLE, PH.D., *Program Manager,
Transmission & Distribution: Environmental Issues (P51)*
704.595.2053, ydelvalle@epri.com

For more information, contact:

EPRI Customer Assistance Center
800.313.3774 • askepri@epri.com



3002028967

February 2024

EPRI

3420 Hillview Avenue, Palo Alto, California 94304-1338 USA • 650.855.2121 • www.epri.com

© 2024 Electric Power Research Institute (EPRI), Inc. All rights reserved. Electric Power Research Institute, EPRI, and TOGETHER...SHAPING THE FUTURE OF ENERGY are registered marks of the Electric Power Research Institute, Inc. in the U.S. and worldwide.