Catalog of Guidelines and Standards for the Handling and Management of Sulfur Hexafluoride (SF_6)

Prepared for

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FORWARD

This catalog is provided as a service to Sulfur Hexafluoride (SF_6) Emission Reduction Partners and others interested in these topics. The list of all references on these topics is not complete and U.S. EPA does not endorse the documents included in this catalog or verify their accuracy. Some of these references may be out-of-date or no longer available. Suggestions for additional books, reports, or articles that could be added to this catalog should be forwarded to:

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A companion document, "Technical Papers, Conference Proceedings, and Books Related to Use and Emissions of Sulfur Hexafluoride (SF_6) Gas" (August 2000), provides a much broader compilation of information addressing topics such as physical/chemical properties, byproducts, greenhouse gas potential, and uses. This document is available at http://www.epa.gov/highgwp1/sf6/pdf/bibliofinal800.pdf.

INTRODUCTION

This catalog lists more than 65 references that address topics related to guidelines and standards for the handling and management of sulfur hexafluoride (SF_6). The catalog is divided into five summary tables – corresponding to four industry categories and an "other industries" category – followed by the complete and more detailed list of all references. Each table includes the organization/author, title, date, and topics addressed for each reference related to a given industry (i.e., electric utilities, magnesium processing industry, semiconductor industry, use of SF_6 as a tracer gas, or other industries).[1] The complete table provides more detailed information (e.g., description, document length, and ordering information[2]) about all of the documents included in the summary tables. Documents are listed alphabetically by organization/author and then by date (most recent documents first).

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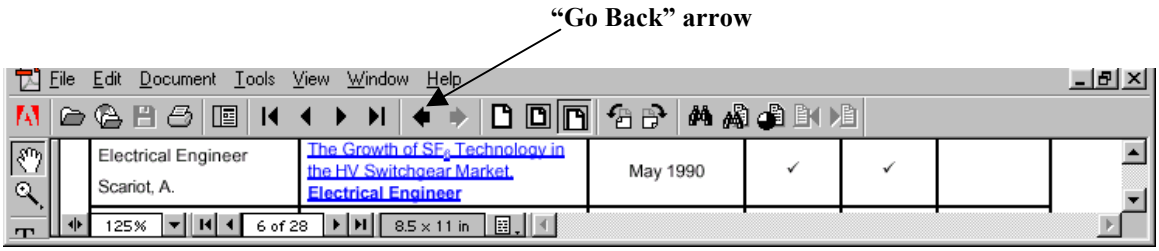
Additional information on each reference can be accessed electronically by clicking on the title (in blue underlined text) of the reference of interest. To return to the summary table, use the "Go Back" arrow (⇦) on the Acrobat Reader tool bar (see graphic below) or press "Ctrl+left arrow." (Note that if any resizing or movements are made on the detailed table, each subsequent selection of "Go Back" will trace back through each of these actions before returning to the summary table.) The last column of the complete table indicates how the document can be obtained. Website links are provided for documents that are published on the internet or can be ordered through a website. Although an abbreviated web address may be provided, in many cases clicking on it will link you to a more specific address.



[1] Some references are applicable to more than one industry and thus are included in multiple summary tables, and some references are very broad and thus are included in each summary table.

[2] As indicated in the complete table, many of these documents can be obtained through websites and/or directly from the author. In most cases, documents can also be obtained through Interlibrary Loan or through a document delivery service.

Alternatively, the catalog can be navigated using the various movement keys, commands, and buttons provided by Acrobat Reader. A particularly useful tool is Reader's Find command, which allows users to search on title words, keywords in the document descriptions (only in the complete table), date, or author.

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Summary of References for Electric Utilities Industry

Reminder: Click on a document title (in underlined blue text) to move to the top of the page containing that reference in the complete table. To move back to this table, use the "Go Back" arrow (⇦) on the Acrobat tool bar or press "Ctrl+left arrow."

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
ABB USA ABB T&D High Voltage Switchgear SF_6 Recycling Team	ABB Gas Handling Guide for Switchgear	Dec 1998		✓	✓
ABB USA Rittenhouse, T., and Dale, S.J.	SF_6 Impurities and Recycling in High Voltage Switchgear Applications	Dec 1998			✓
Air Products Air Products Gases and Equipment Group	SF_6: An Applications and Technical Manual	1997		✓	
American Conference of Government Industrial Hygienists (ACGIH)	Environmental Toxicants: Human Exposures and Their Health Effects, 2nd Ed.	2000		✓	
American Society for Testing and Materials (ASTM)	Standard Specification for Sulfur Hexafluoride	2000		✓	
American Society for Testing and Materials (ASTM)	Standard Test Method for Air and Carbon Tetrafluoride in Sulfur Hexafluoride by Gas Chromatography	1998		✓	
American Society for Testing and Materials (ASTM)	Water Vapor Content of Electrical Insulating Gases by Measurement of Dew Point	1997		✓	
American Society for Testing and Materials (ASTM)	Acidity of Sulfur Hexafluoride	1995		✓	
Cryoquip, Inc.	SF_6 Reclamation: Where Are We?	2000			✓
Cryoquip, Inc.	SF_6 Recycling Technology	1997			✓
Danish Technological Institute Pederson, P.H.	Substitutes for Potent Greenhouse Gases (HFCs, PFCs, and SF_6) – Status Report	1997	✓		
Electrical World	New Laser Camera Detects SF_6 Gas Leaks, **Electrical World**	Aug 1999		✓	
Electrical World Larsen, R.R.	Switchgear Bellows: Key to SF_6 Containment, **Electrical World**	Apr 1997		✓	
Electrical World Valin, S.	Fast SF_6 Moisture Tests: A Way to Reduce Emissions, **Electrical World**	Feb 1997		✓	
Electrical World Irwin, P.	More Bad News from EPA: SF_6 is a Greenhouse Gas, **Electrical World**	Oct 1995		✓	✓
Electrical World Marks, J.	Custom SF_6 Switchgear Replaces Oil Breakers, **Electrical World**	Aug 1995		✓	

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
Electrical World	Smart Density Monitor Cuts SF_6 Breaker Maintenance, **Electrical World**	Aug 1994		✓	
Electrical World Lane, J.	'Slower-is-Better' When it Comes to SF_6 Maintenance, **Electrical World**	Sep 1993		✓	✓
Electrical World Lane, J.	The Do's and Don't's of SF_6, **Electrical World**	Oct 1992		✓	✓
Electric Power Research Institute (EPRI)	SF_6 Gas Condition Assessment and Decontamination	Jun 2000		✓	✓
Electric Power Research Institute (EPRI)	Practical Guide to SF_6 Handling Practices	Nov 1999		✓	✓
Electric Power Research Institute (EPRI)	Condenser On-Line Leak-Detection System: Technology Review	Dec 1995		✓	
Electric Power Research Institute (EPRI) Moore, T., Damsky, B., and Loynes, K.	Seeing SF_6 in a New Light, **EPRI Journal**	Jun 1999		✓	
Electric Power Research Institute (EPRI)	Preparing for the Future of SF_6 Handling, **EPRI Newsletter**	Apr 1997		✓	
Electric Power Research Institute (EPRI)	Considerations for Conversion or Replacement of Medium-Voltage Air-Magnetic Circuit Breakers Using Vacuum or SF_6 Technology	Dec 1996		✓	✓
Especial Gas, Inc.	Material Safety Data Sheet for SF_6	Feb 2000		✓	
Federation of Electric Power Companies, Japan Electrical Manufacturers' Association, Asahi Glass Co., and Kanto Denka Kogyo Co.	Partnership Activities for SF_6 Gas Emission Reduction from Gas Insulated Electrical Equipment in Japan	1999		✓	✓
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Kielmann, F., et al.	SF_6/N_2 Mixtures for Explosion-Protected Motors, **High Voltage Engineering**	1999		✓	
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Smeets, R.P.P., and van der Linden, W.A.	The Testing of SF_6 Generator Circuit Breakers , **Transactions on Power Delivery**	Oct 1998		✓	
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Christophorou, L.G., Olthoff, J.K., and Van Brunt, R.J.	Sulfur Hexafluoride and the Electric Power Industry, **Electrical Insulation Magazine**	Sep/Oct 1997	✓	✓	
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Nielson, M.L.	Disposal of SF_6 in Standards	Jan 1996			✓

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Janssen, A.L.J., Brunke, J.H., Heising, C., and Lanz, W.	Studies on the Reliability of Single Pressure SF_6 Gas High Voltage Circuit Breakers, **Transactions on Power Delivery**	Jan 1996		✓	
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Martin Marietta Energy Systems, Inc. James, D.R., et al.	Investigation of S_2F_{10} production and mitigation in compressed SF_6-insulated power systems, **Electrical Insulation Magazine**	May/Jun1993		✓	
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Yanabu, S.	SF_6 Insulation and its Application to High-Voltage Equipment, **Transactions on Electrical Insulation**	Jun 1991		✓	
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Boggs, S., and Schramm, H.H.	Current Interruption and Switching in Sulfur Hexafluoride, **Electrical Insulation Magazine**	Jan/Feb 1990		✓	
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Boggs, S.	Sulfur Hexafluoride: Introduction to the Material and Dielectric, **Electrical Insulation Magazine**	Sep/Oct 1989	✓	✓	✓
International Council on Large Electric Systems (CIGRE)	CIGRE Guide for SF_6 Gas Mixtures	Aug 2000	✓	✓	
International Council on Large Electric Systems (CIGRE)	SF_6 Recycling Guide: Reuse of SF_6 Gas in Electrical Power Equipment and Final Disposal	1997			✓
International Electrotechnical Commission (IEC)	Guide to the Checking of Sulfur Hexafluoride (SF_6), **Electrical Equipment**	1974, 1998		✓	
International Electrotechnical Commission (IEC)	High-voltage Switchgear and Control Gear - Use and Handling of Sulfur Hexafluoride (SF_6) in High-voltage Switchgear and Control Gear (Technical Report)	1995		✓	✓
National Institute for Occupational Safety and Health (NIOSH)	NIOSH Pocket Guide to Chemical Hazards	1997		✓	
National Institute for Occupational Safety and Health (NIOSH)	Guide to Measuring SF_6 by Portable GC	Aug 1994		✓	
National Institute of Standards and Technology (NIST) Christophorou, L.G., Olthoff, J.K., and Green, D.S.	Gases for Electrical Insulation and Arc Interruption: Possible Present and Future Alternatives to Pure SF_6	Nov 1997	✓		

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
National Institute of Standards and Technology (NIST) Christophorou, L.G., and Van Brunt, R.J.	SF_6 Insulation: Possible Greenhouse Gas Problems and Solutions	Jul 1995	✓	✓	✓
National Institute of Standards and Technology (NIST)	Toxic Gas Measured in Power Equipment, **Chemical & Engineering News**	1991		✓	
Ontario Hydro Technologies Morrison, H.D., et al.	A Utility Perspective on SF_6 Gas Management Issues	1998		✓	✓
Power Engineering Journal Jones, G.	The Impact of SF_6 Upon Power Switchgear Technology, Part 2: Switch System Implications, **Power Engineering Journal**	Mar 1991		✓	
PROMOSOL/Dehon Group Rollet, P., and Micozzi, J.	SF_6 Recycling	1999			✓
Public Service Company of New Mexico Ivey, A., and Baldwin, B.	Maintenance Experience with Brown Boveri 362 KV Type ELF SL5-2, Live Tank SF_6 Circuit Breakers	1999		✓	
Russian Electrical Engineering Institute Arakelyan, V.G.	Standardization of SF_6 Insulation in Electrical Equipment, Russian Electrical Engineering	1993		✓	
Solvay Fluor	Life Cycle Assessment: Electricity Supply Using SF_6 Technology	Jul 1999		✓	
Standards Association of Australia (SAA)	High-voltage Switchgear and Controlgear: Use and Handling of Sulfur Hexafluoride in High-voltage Switchgear and Controlgear	1996		✓	✓
Transmission and Distribution World Baumbach, J.I., Pilzecker, P., Trindade, E., and Meinders, J.	Diagnosing the Health of SF_6 Switchgear, **Transmission and Distribution World**	Jan 2000		✓	
U.S. EPA	Byproducts of Sulfur Hexafluoride (SF_6) Use in the Electric Power Industry	Jul 2001		✓	
U.S. EPA SF_6 Emissions Reduction Partnership for Electric Power Systems	SF_6 Handling Procedures	Dec 12, 2000		✓	✓
U.S. EPA and Australian Greenhouse Office	SF_6 and the Environment: Emission Reduction Strategies Conference Proceedings	Nov 2000	✓	✓	✓

Summary of References for Magnesium Processing Industry

Reminder: Click on a document title (in underlined blue text) to move to the top of the page containing that reference in the complete table. To move back to this table, use the "Go Back" arrow (⇦) on the Acrobat tool bar or press "Ctrl+left arrow."

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
Air Liquide Li, Y.E.D., et al.	Capture and Recycle: A New Option for Emission Reduction of SF_6 in Magnesium Melting	Jun 1999			✓
Air Products Air Products Gases and Equipment Group	SF_6: An Applications and Technical Manual	1997		✓	
American Conference of Government Industrial Hygienists (ACGIH)	Environmental Toxicants: Human Exposures and Their Health Effects, 2nd Ed.	2000		✓	
Danish Technological Institute Pederson, P.H.	Substitutes for Potent Greenhouse Gases (HFCs, PFCs, and SF_6) – Status Report	1997	✓		
Especial Gas, Inc.	Material Safety Data Sheet for SF_6	Feb 2000		✓	
Foundry Management and Technology	Conserving SF_6 in Magnesium Melting Operations, **Foundry Management and Technology**	Dec 1999		✓	✓
Gjestland, H., and Magers, D.	Progress to Eliminate SF_6 as a Protective Gas in Magnesium Die Casting	Sept/Oct 1998	✓		
International Magnesium Assocation (IMA)	Recommended Practice for the Conservation of Sulfur Hexafluoride in Magnesium Melting Operations	1998	✓	✓	✓
National Institute for Occupational Safety and Health (NIOSH)	NIOSH Pocket Guide to Chemical Hazards	1997		✓	
National Institute for Occupational Safety and Health (NIOSH)	Guide to Measuring SF_6 by Portable GC	Aug 1994		✓	
North American Die Casting Association	Pollution Prevention Practices	1996	✓	✓	✓
PROMOSOL/Dehon Group Rollet, P., and Micozzi, J.	SF_6 Recycling	1999			✓
U.S. EPA and Australian Greenhouse Office	SF_6 and the Environment: Emission Reduction Strategies Conference Proceedings	Nov 2000	✓	✓	✓

Summary of References for the Semiconductor Industry

Reminder: Click on a document title (in underlined blue text) to move to the top of the page containing that reference in the complete table. To move back to this table, use the "Go Back" arrow (⇦) on the Acrobat tool bar or press "Ctrl+left arrow."

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
Air Products Air Products Gases and Equipment Group	SF_6: An Applications and Technical Manual	1997		✓	
American Conference of Government Industrial Hygienists (ACGIH)	Environmental Toxicants: Human Exposures and Their Health Effects, 2nd Ed.	2000		✓	
Danish Technological Institute Pederson, P.H.	Substitutes for Potent Greenhouse Gases (HFCs, PFCs, and SF_6) – Status Report	1997	✓		
Especial Gas, Inc.	Material Safety Data Sheet for SF_6	Feb 2000		✓	
Motorola Bea, L., Brown, P.T., and Hart, M.	Use and Emissions Mitigation of PFC, HFC, and SF_6 in the Semiconductor Industry	1999	✓	✓	✓
National Institute for Occupational Safety and Health (NIOSH)	NIOSH Pocket Guide to Chemical Hazards	1997		✓	
National Institute for Occupational Safety and Health (NIOSH)	Guide to Measuring SF_6 by Portable GC	Aug 1994		✓	
PROMOSOL/Dehon Group Rollet, P., and Micozzi, J.	SF_6 Recycling	1999			✓
Semiconductor Equipment and Materials International (SEMI)	Specification for Sulfur Hexafluoride (SF_6) in Cylinders, 99.97% Quality	Mar 2001		✓	

Summary of References for Use of SF_6 as a Tracer Gas

Reminder: Click on a document title (in underlined blue text) to move to the top of the page containing that reference in the complete table. To move back to this table, use the "Go Back" arrow (⇦) on the Acrobat tool bar or press "Ctrl+left arrow."

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
Air Products Air Products Gases and Equipment Group	SF_6: An Applications and Technical Manual	1997		✓	
American Conference of Government Industrial Hygienists (ACGIH)	Environmental Toxicants: Human Exposures and Their Health Effects, 2nd Ed.	2000		✓	
Danish Technological Institute Pederson, P.H.	Substitutes for Potent Greenhouse Gases (HFCs, PFCs, and SF_6) – Status Report	1997	✓		
Electric Power Research Institute (EPRI)	Condenser On-Line Leak-Detection System: Technology Review	Dec 1995		✓	
Especial Gas, Inc.	Material Safety Data Sheet for SF_6	Feb 2000		✓	
National Institute for Occupational Safety and Health (NIOSH)	NIOSH Pocket Guide to Chemical Hazards	1997		✓	
National Institute for Occupational Safety and Health (NIOSH)	Guide to Measuring SF_6 by Portable GC	Aug 1994		✓	
PROMOSOL/Dehon Group Rollet, P., and Micozzi, J.	SF_6 Recycling	1999			✓

Summary of References for Other Industries

Reminder: Click on a document title (in underlined blue text) to move to the top of the page containing that reference in the complete table. To move back to this table, use the "Go Back" arrow (⇦) on the Acrobat tool bar or press "Ctrl+left arrow."

Organization/ Author	Title	Document Date	Topics Addressed		
			Altern-atives	Storage/ Handling	Recycling/ Disposal
American Conference of Government Industrial Hygienists (ACGIH)	Environmental Toxicants: Human Exposures and Their Health Effects, 2nd Ed.	2000		✓	
Association of American Railroads, Bureau of Explosives	Emergency Handling of Hazardous Materials in Surface Transportation	2000		✓	
Danish Technological Institute Pederson, P.H.	Substitutes for Potent Greenhouse Gases (HFCs, PFCs, and SF_6) – Status Report	1997	✓		
Especial Gas, Inc.	Material Safety Data Sheet for SF_6	Feb 2000		✓	
International Air Transport Association (IATA)	Dangerous Goods Regulations	2000		✓	
International Maritime Organization (IMO)	International Maritime Dangerous Goods Code	2000		✓	
National Institute for Occupational Safety and Health (NIOSH)	NIOSH Pocket Guide to Chemical Hazards	1997		✓	
National Institute for Occupational Safety and Health (NIOSH)	Guide to Measuring SF_6 by Portable GC	Aug 1994		✓	
Ophthalmic Surgery Friedrichsen, E.J., McMullen, W.W., and Garcia, C.A.	Storage of Sulfur Hexafluoride Gas, **Ophthalmic Surgery**	Jan 1993		✓	
PROMOSOL/Dehon Group Rollet, P., and Micozzi, J.	SF_6 Recycling	1999			✓

Complete Table of References

Note: Many of these documents can be obtained through websites. The websites where these documents can be obtained are indicated in underlined blue text. Click on the underlined blue text (weblink) to move to a more specific address.

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
ABB USA ABB T&D High Voltage Switchgear SF_6 Recycling Team	ABB Gas Handling Guide for Switchgear	Dec 1998	6 pp.	This document provides information and recommendations on SF_6 recycling methods and procedures. In addition, gas handling and test equipment are discussed. Finally, current storage and transportation guidelines are reviewed.	Free	Web access: http://www.abb.com/.us
ABB USA Rittenhouse, T., and Dale, S.J.	SF_6 Impurities and Recycling in High Voltage Switchgear Applications	Dec 1998	11 pp.	This paper discusses the economic and environmental issues surrounding SF_6 gas recycling. It identifies sources of SF_6 contaminants, the possible effects of these contaminants on equipment performance, and the acceptable contamination levels for reuse in various electrical power equipment applications. Also, general SF_6 recycling practices (such as gas quality analysis, necessary gas handling equipment components, and labeling practices for categorizing new and recycled SF_6) are reviewed.	Free	Web access: http://www.abb.com/.us
Air Liquide Li, Y.E.D., Kapusta, J., Meimari, M., and Barney, J.	Capture and Recycle: A New Option for Emission Reduction of SF_6 in Magnesium Melting	Jun 1999	9 pp.	This paper reviews emission reduction options and discusses the technology behind Air Liquide's on-site sulfur hexafluoride recycle system.	NA	Contact: http://www.airliquide.com
Air Products Air Products Gases and Equipment Group	SF_6: An Applications and Technical Manual	1997	11 pp.	This manual includes electrical and other applications of SF_6 safety and handling procedures. In addition, it includes a section describing the chemical, physical, and electrical properties of SF_6.	NA	Contact: http://www.airproducts.com
American Conference of Government Industrial Hygienists (ACGIH), Cincinnati, OH	Environmental Toxicants: Human Exposures and Their Health Effects, 2nd Ed. Publication 9256	2000	987 pp.	This is a reference text on risk assessment and management. Supplemented with historical background material, chapters address a number of toxicants, including sulfur oxides.	$184	Order online: http://www.acgih.org/store/
American Society for Testing and Materials (ASTM)	Standard Specification for Sulfur Hexafluoride ASTM D 2472 – 00	2000	2 pp.	This standard places limits on the quality of SF_6 used in gas-insulated electrical equipment. Quantitative limits are placed on several parameters, including water content, hydrolyzable fluorides expressed as HF acidity, air, carbon tetrafluoride, and the minimum weight percent of SF_6. ASTM methods for measuring these parameters are documented in standards D 2029, D 2284, and D 2685.	$25	Order online: http://www.astm.org (610) 832-9585 (customer service)

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
American Society for Testing and Materials (ASTM)	Standard Test Method for Air and Carbon Tetrafluoride in Sulfur Hexafluoride by Gas Chromatography ASTM D 2685-95	1998	3 pp.	This document specifies measurement methods for nitrogen and carbon tetrafluoride (impurities) in SF_6.	$25	Order online: http://www.astm.org (610) 832-9585 (customer service)
American Society for Testing and Materials (ASTM)	Water Vapor Content of Electrical Insulating Gases by Measurement of Dew Point ASTM D 2029-97	1997	6 pp.	This document provides test methods to describe the determination of the water vapor content of electrical insulating gases such as SF_6 by direct or indirect measurement of the dew point and the calculation of the water vapor content.	$30	Order online: http://www.astm.org (610) 832-9585 (customer service)
American Society for Testing and Materials (ASTM)	Acidity of Sulfur Hexafluoride ASTM D 2284-95	1995	2 pp.	This document specifies measurement methods for acidity of SF_6.	$25	Order online: http://www.astm.org (610) 832-9585 (customer service)
Association of American Railroads, Bureau of Explosives Washington, DC	Emergency Handling of Hazardous Materials in Surface Transportation	2000		This publication provides commodity-specific descriptions and response information for all the US Department of Transportation-listed hazardous materials and many specifically named chemicals transported under a generic DOT description. In addition, materials regulated only by Canada and the International Maritime Organization (IMO) are included. Provides: basic properties of the chemicals; recommended methods of dealing with hazardous materials in the early stages of an emergency; listing of emergency environmental mitigation procedure; first-aid information; and suggested chemical compatible protective equipment for some of the commodities.	$71	Order online: http://www.aar.com/boe/index_boe.htm (412) 741-1096 Also available through Interlibrary Loan or a document delivery service.
Cryoquip, Inc.	SF_6 Reclamation: Where Are We? **NWPPA Conference** 2000	2000	6 pp.	This article discusses how gas cart manufacturers are responding to EPA's goal of having complete recycling of all SF_6 gas currently being used.	Free	Web access: http://www.cryoquip.com
Cryoquip, Inc.	SF_6 Recycling Technology	1997	10 pp.	This paper discusses the technologies involved in the recycling of SF_6 gas in the electrical utility industry.	Free	Web access: http://www.cryoquip.com
Danish Technological Institute Pederson, P.H.	Substitutes for Potent Greenhouse Gases (HFCs, PFCs, and SF_6) Final Report	1998	~50 pp.	This paper contains a section on the consumption of SF_6 and substitution possibilities for SF_6 in all its uses (noise-reducing windows, light-metal foundries, electric power switches, tracer gas, car tires, and others).	Free	Web access: http://www.mst.dk/homepage/
Electrical World	New Laser Camera Detects SF_6 Gas Leaks **Electrical World**	Aug 1999	1 pg.	This article discusses the new GasVue laser camera, developed by Electric Power Research Institute (EPRI), Palo Alto, California, and Laser Imaging Systems, Punta Gorda, Florida, and designed to detect leaks quicker and with the equipment still in-service.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
Electrical World Larsen, R.R.	Switchgear Bellows: Key to SF_6 Containment **Electrical World**, Vol. 211 (4), pp. 31-35	Apr 1, 1997	4 pp.	This article contains a technical description of switchgear mechanisms and how various bellows behave using SF_6.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.
Electrical World Valin, S.	Fast SF_6 Moisture Tests: A Way to Reduce Emissions **Electrical World**, Vol. 211 (2), pp. 31-33	Feb 1, 1997	3 pp.	This article discusses the vitality of moisture testing in circuit breakers and switchgear and how more rapid testing of moisture will reduce SF_6 leaks to the atmosphere.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.
Electrical World Irwin, P.	More Bad News from EPA: SF_6 is a Greenhouse Gas **Electrical World**, Vol. 209, pp. 47-48	Oct 1995	2 pp.	This article briefly describes methods for improved handling, recycling, and careful design and maintenance of SF_6 equipment to reduce emissions.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.
Electrical World Marks, J.	Custom SF_6 Switchgear Replaces Oil Breakers **Electrical World**, Vol. 209 (8), pp. 47-49	Aug 1, 1995	2 pp.	This brief article mentions that Public Service Electric & Gas Co replaced oil-filled circuit breakers with modern SF_6-filled breakers that include a visual alarm monitoring low gas pressure.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.
Electrical World	Smart Density Monitor Cuts SF_6 Breaker Maintenance **Electrical World**, Vol. 208 (8), pp. 46-47	Aug 1, 1994	2 pp.	This articles discusses how utilities are using a microprocessor-based density monitor which reads SF_6 gas pressure, measures temperature, and is insulated from the ambient air. This monitor benefits the maintenance of SF_6 gas leaks in SF_6 breakers.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.
Electrical World Lane, J.	"Slower-is-Better" When it Comes to SF_6 Maintenance **Electrical World**, Vol. 207 (9), pp. 50-52	Sept 1, 1993	3 pp.	This article discusses SF_6 breaker maintenance and stresses the importance of allowing adequate time for cleansing of the SF_6 gas to ensure maintenance is effective and that the gas is pure when complete.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
Electrical World Lane, J.	The Do's and Don't's of SF_6 **Electrical World**, Vol. 206 (10), pp. 60-62	Oct 1, 1992	3 pp.	This article discusses the basic qualities of SF_6 and presents various scenarios for how to keep SF_6 pure against other elements and contaminants.	$12	Order online: http://www.electricalworld.com/ Also available through Interlibrary Loan or a document delivery service.
Electric Power Research Institute (EPRI)	SF_6 Gas Condition Assessment and Decontamination 1000131	Jun 2000		This report contains details of investigations into the best methods for assessing the quality of SF_6 gas and a cost-effective method to purify gas that has become contaminated with air.	NA	Contact information: http://www.epri.com (800) 313-3774
Electric Power Research Institute (EPRI)	Practical Guide to SF_6 Handling Practices TR-113933	Nov 1999	74 pp.	This guide suggests procedures and policies related to the handling of SF_6 gas. While the document does not constitute a standard, it provides suggestions that could save utilities time and effort in developing their own guides for this sensitive area.	NA	Contact information: http://www.epri.com (800) 313-3774
Electric Power Research Institute (EPRI) Moore, T., Damsky, B., and Loynes, K.	Seeing SF_6 in a New Light **EPRI Journal**, June 1999, pp. 26-31	Jun 1999	6 pp.	This article describes a new, high-tech laser-based camera system, developed with EPRI support for utility application, which can detect and display on video even pinhole leaks of SF_6. This field-tested version of the GasVue laser camera for detecting leaks of sulfur hexafluoride (SF_6) gas at utility facilities was developed and tested at Consolidated Edison.	NA	Contact information: http://www.epri.com (800) 313-3774
Electric Power Research Institute (EPRI)	Preparing for the Future of SF_6 Handling (Newsletter)	Apr 1997	2 pp.	This article addresses the concerns of accumulation of SF_6 decomposition products in the equipment and discusses a new Laser Imaging System that can detect SF_6 leaks easily.	Free	Web access: http://www.epri.com
Electric Power Research Institute (EPRI)	Considerations for Conversion or Replacement of Medium-Voltage Air-Magnetic Circuit Breakers Using Vacuum or SF_6 Technology TR-106761	Dec 1996	40 pp.	This document provides guidance to nuclear power plant engineers to assist them in deciding whether to maintain existing obsolete circuit breakers or to replace them with new technology.	NA	Contact information: http://www.epri.com (800) 313-3774
Electric Power Research Institute (EPRI)	Condenser On-Line Leak-Detection System: Technology Review AP-101840	Dec 1995		This article reviews an EPRI-developed condenser on-line leak detection system (COLDS) that uses targeted injection of sulfur hexafluoride to detect and locate condenser tube leaks while the condenser is in full operation. With COLDS, utilities can avoid prolonged shutdowns to locate leaks and realize quick payback on investment in the system.	NA	Contact information: http://www.epri.com (800) 313-3774 Also available through Interlibrary Loan or a document delivery service.

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Especial Gas, Inc.	Material Safety Data Sheet for SF_6		4 pp.	This document contains SF_6 product information, physical data, exposure limits, reactivity data, toxicological properties, and preventative measures for gas handling.	Free	Web access: http://www.c-f-c.com
Federation of Electric Power Companies, Japan Electrical Manufacturers' Association, Asahi Glass Co., and Kanto Denka Kogyo Co.	Partnership Activities for SF_6 Gas Emission Reduction from Gas Insulated Electrical Equipment in Japan	1999	9 pp.	This document was prepared by Japanese industry representatives to describe the outlook for SF_6 use and emissions in Japan. In particular, the document describes the: current use and emissions of SF_6 gas in the electrical industry; sources and handling of emissions from gas insulted equipment; recovery targets for SF_6 based on voluntary programs; estimates of future SF_6 emissions; and SF_6 gas quality control criteria and recycling flow.	Free	Web access: http://www.ecn.nl
Foundry Management and Technology	Conserving SF_6 in Magnesium Melting Operations **Foundry Management and Technology**, Vol. 33 (23): 489A	Dec 1, 1999		This document summaries best practices in the magnesium processing industry for using SF_6 as a protective atmosphere and ideas for reducing consumption and emissions.	NA	Available through Interlibrary Loan or a document delivery service.
Gjestland, H., and Magers, D.	Progress to Eliminate SF_6 as a Protective Gas in Magnesium Die Casting	Sep 30 - Oct 1, 1998		This article, presented at the Europaische Forschungsgemeinschaft Magensiumguss e. V. Session 6, focuses on the different alternative cover gas options that do not use SF_6.	NA	Available through Interlibrary Loan or a document delivery service.
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Kielmann, F., et al.	SF_6/N_2 Mixtures for Explosion-Protected Motors **High Voltage Engineering**, Vol. 3 (467), pg. 252	1999	1 pg.	This paper focuses on the use of SF_6-N_2 mixtures as purging and protective gases for explosion-protected machines and the electrical safety margin that could be reached with small SF_6 admixtures.	Free	Web access: http://ieeexplore.ieee.org/ Also available through Interlibrary Loan or a document delivery service.
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Smeets, R.P.P., and van der Linden, W.A.	The Testing of SF_6 Generator Circuit Breakers **Transactions on Power Delivery**, Vol. 13 (4), pp. 1188-1193	Oct 1,1998	6 pp.	This article discusses the ANSI standard C37.013 that defines test circuits and parameters for a 100 kA and 120 kA SF_6 generator circuit-breaker. Capacitors at both sides of the extinction chamber reduce the TRV severity. The importance of arc voltage in reducing the longer arcing time is illustrated in this paper.	Free	Web access: http://ieeexplore.ieee.org/ Also available through Interlibrary Loan or a document delivery service.
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Christophorou, L.G., Olthoff, J.K., and Van Brunt, R.J.	Sulfur Hexafluoride and the Electric Power Industry **Electrical Insulation Magazine**, Vol. 13 (5), pp. 20-24	Sept/Oct 1997	5 pp.	This article discusses the use of SF_6 in electrical equipment and the search for substitutions for SF_6.	NA	Available through Interlibrary Loan or a document delivery service.

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Institute of Electrical and Electronics Engineers, Inc. (IEEE) Nielson, M.L.	Disposal of SF_6 in Standards	Jan 1996	1 pg.	This document briefly describes the problems associated with SF_6 in the atmosphere and IEEE's standards that address its release.	Free	Web access: http://standards.ieee.org
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Janssen, A.L.J., Brunke, J.H., Heising, C., and Lanz, W.	Studies on the Reliability of Single Pressure SF_6 Gas High Voltage Circuit Breakers **Transactions on Power Delivery**, Vol. 11 (1), pp. 274-282	Jan 1996	9 pp.	This article covers some findings of a 15-year study conducted as the first worldwide inquiry on circuit-breaker failures and defects in service. The main conclusion is that the reliability concerning major failures has increased considerably and that the maintainability of modern SF_6 circuit-breakers is better than the older technology.	NA	Available through Interlibrary Loan or a document delivery service.
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Martin Marietta Energy Systems, Inc. James, D.R., Sauers, I., Griffin, G.D., Van Brunt, R.J., Olthoff, J.K., Stricklett, K.L., Chu, F.Y., Robins, J.R., and Morrison, H.D.	Investigation of S_2F_{10} production and mitigation in compressed SF_6-insulated power systems **Electrical Insulation Magazine**, Workshop Proceedings (June 9, 1994), Vol. 9 (3), pp. 29-51	May/Jun 1993	23 pp.	This paper discusses information on S_2F_{10} production as a by-product of SF_6 and how this information can be used to assess potential hazards and define safe gas handling and operating procedures.	NA	Available through Interlibrary Loan or a document delivery service.
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Yanabu, S.	SF_6 Insulation and its Application to High-Voltage Equipment **Transactions on Electrical Insulation**, Vol. 26 (3), pp. 358-366	Jun 1, 1991	9 pp.	This article discusses SF_6 insulation in high voltage electrical equipment, in particular transformers and outlines the trends in gas-insulated equipment design. Also, complete gas-insulated substations are likely to be promoted at all voltage levels.	Free	Web access: http://ieeexplore.ieee.org/ Also available through Interlibrary Loan or a document delivery service.
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Boggs, S., and Schramm, H.H.	Current Interruption and Switching in Sulfur Hexafluoride **Electrical Insulation Magazine**, Vol. 6 (1), pp. 12-17	Jan/Feb 1990	6 pp.	This paper concentrates on SF_6 as a switching and arc-interrupting medium and how this compound is ideal for high voltage substations.	NA	Available through Interlibrary Loan or a document delivery service.
Institute of Electrical and Electronics Engineers, Inc. (IEEE) Boggs, S.	Sulfur Hexafluoride: Introduction to the Material and Dielectric **Electrical Insulation Magazine**, Vol. 5 (5), pp. 18-21	Sept/Oct 1989	4 pp.	This article reviews the basic properties that make SF_6 an important engineering dielectric.	NA	Available through Interlibrary Loan or a document delivery service.

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
International Air Transport Association (IATA)	Dangerous Goods Regulations 41st edition, pg. 217	2000	1 pg.	This document describes industry carrier regulations for transporting hazardous materials.	$99 plus $14 s/h	Order online: http://www.iataonline.com/shop/welcome.asp (800) 716-6326
International Council on Large Electric Systems (CIGRE), France	Guide for SF_6 Gas Mixtures CE/SC 23 02.01	Aug 2000	50 pp.	This guide discusses applications of SF_6 mixtures in electrical power equipment as well as technical driving forces and issues of using SF_6 mixtures.	135.00 F ($17.50 US, 20.58 Euros)	Order online: http://www.cigre.org/
International Council on Large Electric Systems (CIGRE), France	SF_6 Recycling Guide: Reuse of SF_6 Gas in Electrical Power Equipment and Final Disposal CE/SC 23 GA.TF 01	1997	46 pp.	This document reviews significant aspects of the recycling of SF_6 gas used in electric power equipment.	135.00 F ($17.50 US, 20.58 Euros)	Order online: http://www.cigre.org/
International Electrotechnical Commission (IEC), Geneva, Switzerland	Guide to the Checking of Sulfur Hexafluoride (SF_6) **Electrical Equipment** IEC 60480 Revision to IEC 480 IEC 60480 edition 2	1974, 1998	41 pp.	This standard provides guidance for operating and maintenance personnel to enable unified methods of analysis for the assessment of SF_6 conditions when used in gas-insulated equipment.	CHF 86 (approx. $84 US)	Order online: http://www.iec.ch/
International Electrotechnical Commission (IEC), Geneva, Switzerland	High-voltage Switchgear and Control Gear - Use and Handling of Sulfur Hexafluoride (SF_6) in High-voltage Switchgear and Control Gear (Technical Report) IEC/TR2 6634	1995	80 pp.	This publication addresses SF_6 gas and its chemical derivatives generated in gas-insulated electrical equipment during normal service, and under certain abnormal conditions. It addresses the human health and environmental effects associated with exposure to these chemicals. The associated risks and suitable precautions are discussed for each stage of the normal life cycle of GIS equipment.	CHF 210 (approx. $204 US)	Order online: http://www.iec.ch/
International Magnesium Association (IMA)	Recommended Practice for the Conservation of Sulfur Hexafluoride in Magnesium Melting Operations	1998	10 pp.	The ten-page brochure gives a brief history on the use of SF_6 by the magnesium industry, recommended gas mixtures and controls, conservation measures in the foundry and safety and health information.	$10	Contact: ima@bellatlantic.net (703) 442-8888

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
International Maritime Organization (IMO)	International Maritime Dangerous Goods Code	2000		This document lays down basic principles for transporting hazardous chemicals and includes detailed recommendations for individual substances.	95 British Pounds (approx. $134 US) CD-ROM: 295 British Pounds (approx. $416 US)	Order online: http://www.imo.org
Motorola Beu, L., Brown, P.T., and Hart, M.	Use and Emissions Mitigation of PFC, HFC, and SF_6 in the Semiconductor Industry	1999	6 pp.	This paper describes the efforts by the semiconductor industry to reduce emissions of PFC, HFC, and SF_6 gases while having lower costs and, potentially, positive manufacturing benefits. The paper describes the background of fluorinated compound use in the semiconductor industry, describes several efforts to mitigate emissions, and compares the costs to the benefits for each option.	Free	Web access: http://www.ecn.nl
National Institute for Occupational Safety and Health (NIOSH), Washington, DC	NIOSH Pocket Guide to Chemical Hazards NIOSH Publication No. 97-140, pg. 289 CD-ROM: 017-033-00491-9 Book: 017-033-00483-8	1997	1 pg.	The NIOSH Pocket Guide to Chemical Hazards is intended as a source of general industrial hygiene information for workers, employers, and occupational health professionals. The Pocket Guide presents key information and data in abbreviated tabular form for 677 chemicals or substance groupings found in the work environment. The industrial hygiene information found in the Pocket Guide should help users recognize and control occupational chemical hazards.	CD-ROM: $15 Book: $21 Online: Free	Web access: http://www.cdc.gov/niosh/npg/npg.html Government Printing Office (202) 512-1800
National Institute for Occupational Safety and Health (NIOSH), Washington, DC	Guide to Measuring SF_6 by Portable GC	Aug 15, 1994	5 pp.	This guide provides a detailed description of the NIOSH-approved method for measuring SF_6 using a portable gas chromatograph.	Free	Web access: http://www.cdc.gov/niosh/
National Institute of Standards and Technology (NIST) Christophorou, L.G., Olthoff, J.K., and Green, D.S.	Gases for Electrical Insulation and Arc Interruption: Possible Present and Future Alternatives to Pure SF_6 Technical Note 1425	Nov 1997	48 pp.	This report provides information that identifies possible replacement gases for SF_6, in the event that replacement gases are deemed a reasonable approach to reducing the use of SF_6 in high voltage electrical equipment. The report focuses on the properties of SF_6 as a dielectric gas and on the data available for possible alternatives to pure SF_6 (i.e., SF_6 alone).	Free	Web access: http://www.epa.gov/highgwp1/sf6/partner_resources/index.html. Also at NIST for a fee: http://www.nist.gov
National Institute of Standards and Technology (NIST) Christophorou, L.G., and Van Brunt, R.J.	SF_6 Insulation: Possible Greenhouse Gas Problems and Solutions NISTIR 5685	Jul 1995	27 pp.	This report outlines the potential problems and current efforts in the search for short- and long-term solutions to SF_6 leakage. Some suggested solutions are SF_6 recycling and searching for alternative high-voltage insulants.	NA	Order online; http://www.nist.gov Also available through Interlibrary Loan or a document delivery service.

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National Institute of Standards and Technology (NIST)	Toxic Gas Measured in Power Equipment **Chemical & Engineering News**, Vol. 69 (25), pg. 20	1991	1 pg.	This one paragraph article explains how NIST developed a new method for measuring S2F10 when produced from SF_6.	NA	Available through Interlibrary Loan or a document delivery service.
North American Die Casting Association	Pollution Prevention Practices	1996		The guide provides up-to-date, practical, die-casting specific guidelines for waste treatment and disposal.	NA	Order online: http://www.diecasting.org Item #680
Occupational Safety and Health Agency (OSHA)	Chemical Sampling Information: Sulfur Hexafluoride	Jan 15, 1993	1 pg.	This website contains occupational exposure limits, health factors, and monitoring information for SF_6.	Free	Web access: http://www.osha.gov
Ontario Hydro Technologies Morrison, H.D., Chu, F.Y., Braun, J.M., and Ford, G.L.	A Utility Perspective on SF_6 Gas Management Issues **Gaseous Dielectrics VIII**, pg. 557-564	1998	4 pp.	This article discusses how a utility's managing investment in SF_6 provides direct economic and environmental benefits. Management of SF_6 includes proper handling at the equipment, reclaiming and recycling, and inventory control.	NA	Available through Interlibrary Loan or a document delivery service.
Ophthalmic Surgery Friedrichsen, E.J., McMullen, W.W., and Garcia, C.A.	Storage of Sulfur Hexafluoride Gas **Ophthalmic Surgery**, Vol. 24 (1), pg. 62	Jan 1993	1 pg.	This article discusses the performance of Vacutainer tubes for the short-term storage and preparation of SF_6 for use in ocular surgery.	NA	Available through Interlibrary Loan or a document delivery service.
Power Engineering Journal Jones, G.	The Impact of SF_6 upon Power Switchgear Technology, Part 2: Switch System Implications **Power Engineering Journal**, March 1991, pp. 95-100	Mar 1991	4 pp.	This article focuses on the implications of SF_6 on the configuration, design, and operation of various power subsystems.	NA	Available through Interlibrary Loan or a document delivery service.
PROMOSOL/Dehon Group Rollet, P., and Micozzi, J.	SF_6 Recycling	1999	4 pp.	This document describes a special collection system and pilot developed by PROMOSOL, a subsidiary of the Dehon Group, to recycle used SF_6.	Free	Web access: http://www.ecn.nl

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
Public Service Company of New Mexico Ivey, A., and Baldwin, B.	Maintenance Experience with Brown Boveri 362 Kf Type ELF SL5-2, Live Tank SF_6 Circuit Breakers **Proceedings of the Sixty-sixth Annual International Conference of Doble Clients** (April 12-16, 1999), Boston, MA	1999	9 pp.	This paper describes maintenance of the Brown Boveri 362 Kv Type ELF SL5-2, SF_6 circuit breakers and encourages periodic checking of coupling pins to ensure tightness, thus preventing leakage of SF_6.	NA	Contact publisher at: http://www.doble.com/services/services/htm
Russian Electrical Engineering Institute Arakelyan, V.G.	Standardization of SF_6 Insulation in Electrical Equipment **Russian Electrical Engineering**, Vol. 64 (12), pp. 26-34	1993	11 pp.	This paper describes the importance of SF_6 quality in the operation of electrical equipment. Quality standards are presented for the use of SF_6 in high-voltage electrical engineering equipment which identify maximum levels of SF_6 impurities in systems.	NA	Available through Interlibrary Loan or a document delivery service.
Semiconductor Equipment and Materials International (SEMI)	Specification for Sulfur Hexafluoride (SF_6) in Cylinders, 99.97% Quality No. C3.24-0301	Mar 2001	3 pp.	This standard is intended to establish the definitions, general procedures, specifications, and analytical procedures for sulfur hexafluoride (SF_6) in cylinders, 99.97% quality.	$50	Order online: http://dom.semi.org/web/wstandards.nsf (408) 943-6901
Solvay Fluor	Life Cycle Assessment: Electricity Supply Using SF_6 Technology	Jul 1999	6 pp.	This article discusses the increase in demand for electrical power and use of SF_6, environmental aspects and protection measures for using SF_6 switchgear, and design and results of a life cycle assessment.	Free	Web access: http://www.solvay-fluor.com/
Standards Association of Australia (SAA)	High-voltage Switchgear and Controlgear: Use and Handling of Sulfur Hexafluoride in High-voltage Switchgear and Controlgear No. SAA AS 2791	1996	80 pp.	This standard is identical to International Electrotechnical Commission (IEC) publication IEC/TR2 6634 listed above.	See Description	See Description
Transmission and Distribution World Baumbach, J.I., Pilzecker, P., Trindade, E., and Meinders, J.	Diagnosing the Health of SF_6 Switchgear **Transmission and Distribution World**, Vol. 52 (1)	Jan 2000	3 pp.	This article discusses the Ion Mobility Spectrometer (IMS) that provides utilities with a diagnostic tool able to undertake on-site monitoring of SF_6 gas used in their switchgear equipment.	NA	Available through Interlibrary Loan or a document delivery service.
U.S. EPA	Byproducts of Sulfur Hexafluoride (SF_6) Use in the Electric Power Industry	Jul 2001	12 pp.	This document provides summary information on toxic byproducts that can be formed when electric discharges occur within SF_6-filled equipment. This paper discusses the byproducts, how they are formed, health concerns, and safe handling procedures.	Free	Web access: http://www.epa.gov/highgwp1/sf6/pdf/sf6_byproducts.pdf

Organization/ Author	Title/Citation Information	Document Date	Length	Description	Cost [a,b]	How to Obtain
U.S. EPA SF_6 Emissions Reduction Partnership for Electric Power Systems	SF_6 Handling Procedures	Dec 2000		This website provides SF_6 handling procedures for seven electric utility companies that are participating in U.S. EPA's *SF_6 Emissions Reduction Partnership for Electric Utilities*.	Free	Web access to these documents: http://www.epa.gov/highgwp1/sf6/partner_resources/index.html
U.S. EPA and Australian Greenhouse Office	SF_6 and the Environment: Emission Reduction Strategies Conference Proceedings	Nov 2000		This website contains papers and presentations from a conference that addressed a wide array of issues relating to the use, handling, and management of SF_6, including international perspectives, leak detection, emission reduction, alternatives, recycling, and case studies.	Free	Web access: http://www.epa.gov/highgwp1/sf6/partner_resources/proceedings.html

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