

MARCH 2009 DOCUMENT DATA ANALYSIS FOR THE SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY (STS) RESEARCH PROGRAM

Analysis of Publication Use in Rulemaking, Policy Making, and Decision-Making

I. Summary of Document Data Analysis

Background

The Document Data Analysis (DDA) is a companion to the Bibliometric Analysis for the Science and Technology for Sustainability (STS) Research Program and it is designed to determine how the Program's products are being used by the Office of Research and Development's (ORD) primary partners for EPA rulemaking and policy making. The Bibliometric Analysis focuses on the citation of the Program's publications in the peer-reviewed scientific literature; the DDA focuses on the use of the Program's publications in rule-, policy-, and decision-making. The DDA will serve as an indicator of the relative quality, relevance, and impact of the science produced by the Program.

This DDA report is presented in five sections. The first section provides a summary of the results of the analysis. The second section identifies those STS Program publications that have been cited by EPA program offices or regions in rulemaking, policy, guidelines, and other decision-making documents, as well as the risk assessments prepared by ORD. The third section presents the results of a Google search of a relatively small subset of the STS Program's publications to determine their use by federal, state, and local governments; the international community; academia; associations; and others. The fourth section of the report identifies the STS Program's publications that have been cited in the Toxicological Profiles of the Agency for Toxic Substances and Disease Registry (ATSDR).

Process

National Program Directors (NPDs) provide a list of all program journal articles and products to the National Center of Environmental Research Center (NCER). NCER utilizes a software (datamining) tool to determine which research publications are cited by EPA program offices or regions and, as appropriate, in NCEA risk assessments. To provide additional context for assessing the validity of the DDA results for demonstrating program performance, a Google search and analysis of a relatively small subset of the research products is performed to determine the extent to which other federal, state, and local agencies, as well as the international community, academia, associations, and others may be citing ORD research.

Summary of EPA Program and Regional Office Decision Documents Citing STS Program Publications (Results of Datamining Search of EPA Web Sites)

- ✧ **Total Number of STS Program Publications Searched Using Tool:** 865
 - 794 journal publications and 71 non-journal publications (books, book chapters, EPA reports)
- ✧ **Total Number and Percent of STS Program Publications Cited:** 19 (2.2%)
- ✧ **Total Number and Percent of STS Program Publications Cited Excluding Citations by ORD Documents:** 3 (0.3%)
- ✧ **Number and Percent of STS Program Publications Cited Two or More Times:** 1 (0.1%)

- ✧ **Total Number of EPA Decision Documents Citing STS Program Publications:** 10 (the 19 publications were cited 20 times in the 10 publications and 1 document cited 10 of the STS Program publications)
- ✧ **Total Number of EPA Decision Documents Citing STS Program Publications Excluding Citations by ORD Documents:** 3
- ✧ **Types of EPA Decision Documents Citing STS Program Publications:** 2 Federal Rulemaking/Regulatory Publications and 8 Technical/Guidance Documents.

Summary of Federal and Other Governmental/Organizational Resources Citing STS Program Publications (Google/Google Scholar Search of Subset of STS Program Publications)

- ✧ **Total Number of STS Program Publications Searched:** 30 (27 journal publications and 3 non-journal publications selected at random)
- ✧ **Total Number and Percent of the 30 STS Program Publications Cited:** 3 (10%) (the 3 publications were cited 5 times by 5 different decision resources)
- ✧ **Number and Percent of the 30 STS Program Publications Cited Two or More Times:** 1 (3.3%)
- ✧ **Total Number of Publications Citing the 30 STS Program Publications:** 5 (the 3 STS Program publications were cited by 5 different publications)
- ✧ **Total Number of Publications Citing the 30 STS Program Publications Excluding ORD Publications:** 3
- ✧ **Types of Publications Citing the 30 STS Program Publications:** 4 International documents (including 1 Government Policymaking Document, 2 Government Technical/Guidance documents, and 1 International World Health Organization Technical/Guidance document) and 1 U.S. Federal Government Technical/Guidance document.

Summary of ATSDR Toxicological Profile Search

- ✧ **Total Number of STS Program Publications Searched:** 865 (794 journal and 71 non-journal publications)
- ✧ **Total Number and Percent of the STS Program Publications Cited in ATSDR Toxicological Profiles:** 1 (0.1%)
- ✧ **Number and Percent of the STS Program Publications Cited Two or More Times in ATSDR Toxicological Profiles:** 0 (0%)
- ✧ **Total Number of ATSDR Toxicological Profiles Citing the STS Program Publications:** 1

II. EPA Program and Regional Office Decision Documents Citing STS Program Publications—Results of the Datamining Search of EPA Web Sites

This section identifies those STS Research Program publications that have been cited by EPA program offices or regions in rulemaking, policy, guidelines, and other decision-making documents, as well as the risk assessments prepared by ORD’s National Center for Environmental Assessment (NCEA). Nineteen of the STS Program publications were cited by 10 different decision documents. The results are tallied and summarized in Table 1. The citing publications are listed in Table 2 and the publication numbers in the first column of Table 2 are hyperlinked to the citations of the STS Program publications being cited, which provided in Appendix A.

Table 1. Tally Summary of STS Program Publications Cited by EPA Program Offices and Regions in Decision Documents

<i>Data on STS Program Publications</i>	
Total Number of STS Program Publications Searched Using Tool	865 (794 journal publications and 71 non-journal publications)
Total Number and Percent of STS Program Publications Cited in EPA Decision Documents	19 (2.2%)
Total Number and Percent of STS Program Publications Cited in EPA Decision Documents Excluding Citations by ORD Documents	3 (0.3%)
Number and Percent of STS Program Publications Cited Two or More Times in Decision Documents	1 (0.1%)
<i>Data on EPA Decision Documents Citing STS Program Publications</i>	
Total Number of EPA Decision Documents Citing STS Program Publications	10 (the 19 publications were cited 20 times in the 10 publications and 1 document cited 10 of the STS publications)
Total Number of EPA Decision Documents (Excluding the ORD Documents) Citing STS Program Publications	3
Types of EPA Decision Documents Citing STS Program Publications	2 Federal Rulemaking/Regulatory Publications and 8 Technical and Guidance Documents

Table 2. EPA Program Office and Regional Office Decision Documents Citing STS Program Publications

<i>Pub #</i>	<i>Cited in</i>	<i>Type of Citing Pub</i>	<i>Office</i>
1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10	Alternative Synthesis and Pathways Green Chemistry & Engineering Clean Processes Sustainable Technology Risk Management Research Research and Development US EPA “Alternative Chemical Synthetic Pathways” Dr. Rajender Varma, US Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, (Online Publication)	Technical/ Guidance	NRMRL
11 , 12	Pervaporation-based Separation Processes Clean Processes Sustainable Technology Risk Management Research Research and Development US EPA – US EPA/ ORD – Pervaporation-based Separation Processes for Pollution Prevention and Waste Treatment (Online Publication)	Technical/ Guidance	NRMRL
13	CAPE-OPEN Pollution Prevention (P2) Research Tools Industrial Multimedia Sustainable Technology Risk Management Research Research and Development US EPA . US EPA/ORD. Computer Aided Process Engineering – Online Pollution Prevention Research Tool	Technical/ Guidance	OIAA
14	EPA: Federal Register: National Primary Drinking Water Regulations: Long Term 2 Enhanced Surface Water Treatment Rule - Federal Register: Volume 68, Number 154, Page 47739-47788, August 11, 2003. [Proposed Rules]	Federal Rulemaking/ Regulatory	OIAA
14	EPA: Federal Register: National Primary Drinking Water Regulations: Long Term 2 Enhanced Surface Water Treatment Rule - Federal Register: January 5, 2006 (Volume 71, Number 3) – Rules and Regulations	Federal Rulemaking/ Regulatory	OIAA
15	QSAR Sustainable Technology US EPA – US EPA/ORD – NRMRL – (online publication) - QSAR models are useful for estimating toxicities needed for green process design algorithms such as the Waste Reduction Algorithm	Technical/ Guidance	NRMRL

Pub #	Cited in	Type of Citing Pub	Office
<u>16</u>	<u>Information Sources CADDIS US EPA</u> – The publication below (#16) is listed as a reference used in the development of the Stressor Identification Guidance Document and the CADDIS Web site. CADDIS is an online application that helps scientists and engineers in the regions, states and tribes find, access, organize, use, and share information to conduct causal evaluations in aquatic systems. It is based on the U.S. Environmental Protection Agency <u>Stressor Identification</u> process. US EPA/NCEA (online Publication)	Technical/ Guidance	NCEA
<u>17</u>	<u>WAR Algorithm Sustainable Technology US EPA</u> US. EPA/ORD. Chemical Process Simulation for Waste Reduction (online publication)	Technical/ Guidance	NRMRL
<u>18</u>	<u>Metal Finishing Industrial Multimedia Sustainable Technologies Risk Management Research Research and Development US EPA</u> US EPA/ORD. Guide to Pollution Prevention in Metal Finishing (online publication)	Technical/ Guidance	NRMRL
<u>19</u>	<u>Program for Assisting the Replacement of Industrial Solvents PARIS II Industrial Multimedia Sustainable Technologies Risk Management Research Research and Development US EPA</u> US EPA/ORD. PARIS II - Computer Aided Solvent Design For Pollution Prevention (online publication)	Technical/ Guidance	NRMRL

III. Federal and Other Governmental/Organizational Resources Citing STS Program Publications — Results of Google/Google Scholar Searches of 30 STS Program Publications

This section presents the results of a Google search of 30 of the STS Program’s publications to determine their use by federal, state, and local governments; the international community; academia; associations; and others. Three of the 30 STS Program publications searched were cited and the results are tallied and summarized in Table 3 below. The citing resources are listed in Table 4 and the publication numbers in the first column of Table 4 are hyperlinked to the citations of the STS Program publications being cited provided in Appendix B.

Table 3. Tally Summary of STS Program Publications Cited in Federal and Other Governmental/Organizational Decision Resources

<i>Data on STS Program Publications Searched</i>	
Total Number of STS Program Publications Searched Using Google/Google Scholar	30 (includes 27 journal publications and 3 non-journal publications selected at random)
Total Number and Percent of the 30 STS Program Publications Cited in Decision Resources	3 (10.0%)—the 3 publications were cited 5 times by 5 different decision resources
Number and Percent of the 30 STS Program Publications Cited Two or More Times	1 (33.3%)
<i>Data on Federal and Other Governmental/Organizational Decision Resources Citing STS Program Publications</i>	
Total Number of Federal and Other Governmental/Organizational Decision Resources Citing the 30 STS Program Publications	5 (3 of the 30 STS Program publications were cited 5 times by 5 different decision resources; none of the citing publications were ORD documents)
Types of Publications Citing the 30 STS Publications	1 U.S. Federal Resource —National Institute for Occupational Safety and Health Technical/Guidance Document 4 International Resources —1 Government Policymaking Document, 2 Government Technical Guidance Documents, and 1 World Health Organization Technical/Guidance Document

Table 4. Federal and Other Governmental/Organizational Decision Resources Citing STS Program Publications

Pub #	Cited in	Type of Citing Pub
<u>1</u>	Science and Technology Foresight Center. The 8 th Science and Technology Foresight Survey. Study on Rapidly-developing Research Area. National Institute of Science & Technology Policy (NISTEP), Ministry of Education, Culture, Sports, Science & Technology (MEXT), June 2005. (http://www.nistep.go.jp/achiev/ftx/jpn/rep082j/pdf/rep082j.pdf)	International Policymaking
<u>2</u>	Health Canada. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. Protozoa: <i>Giardia</i> and <i>Cryptosporidium</i> . Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment, Ottawa, Ontario, April 2004. (http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/protozoa/protozoa.pdf)	International Technical/Guidance
<u>2</u>	New Zealand Ministry of Health. The Guidelines for Drinking-water Quality Management for New Zealand, October 2005.	International Technical/Guidance
<u>2</u>	Aertgeerts R, Angelakis A, eds. State of the Art Report: Health Risks in Aquifer Recharge Using Reclaimed Water. World Health Organization, SDE/WSH/03.08, 2003 (http://www.who.int/water_sanitation_health/wastewater/wsh0308/en/index.html)	International Technical/Guidance
<u>3</u>	National Institute for Occupational Safety and Health. Emerging Technologies and the Safety and Health of Working People: Knowledge Gaps and Research Directions. Centers for Disease Control and Prevention, NIOSH Publication No. 2006-136, August 2006. (http://www.cdc.gov/niosh/docs/2006-136/pdfs/2006-136.pdf)	Federal Technical/Guidance

IV. ATSDR Toxicological Profiles Citing STS Program Publications

This section identifies those STS Program publications that have been cited in Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles.

One of the STS Program publications was cited by one ATSDR Toxicological Profile. The results are presented in Table 5. The citing ATSDR Toxicological Profile is listed in Table 6.

Table 5. Tally Summary of STS Program Publications Cited in ATSDR Toxicological Profiles

Data on STS Program Publications	
Total Number of STS Program Publications Searched Using Tool	865 (794 journal publications and 71 non-journal publications)
Total Number and Percent of STS Program Publications Cited in ATSDR Profiles	1 (0.1%)
Number and Percent of STS Publications Cited Two or More Times in ATSDR Toxicological Profiles	0 (0%)
Data on ATSDR Toxicological Profiles Citing STS Program Publications	
Total Number of ATSDR Toxicological Profiles Citing STS Program Publications	1

Table 6. ATSDR Toxicological Profiles Citing STS Publications

STS Program Publication Cited	ATSDR Profile Citing the STS Publication
Kominsky JR, Freyberg RW, Clark PJ, Edwards A, Wilmoth RC, Brackett KA. Asbestos exposures during routine floor tile maintenance. Part I: Spray-buffing and wet-stripping. <i>Applied Occupational and Environmental Hygiene</i> 1998;13(2):101-106.	Toxicological Profile for Asbestos. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, September 2001. http://www.atsdr.cdc.gov/toxprofiles/tp61.pdf

Appendix A: STS Research Program Publications Cited by EPA Decision Documents

- 1) Yang XF, Wang MW, Varma RS, Li CJ. Aldol- and Mannich-type reactions via in situ olefin migration in ionic liquid. *Organic Letters* 2003;5(5):657-660.
[\[Return to Table\]](#)
- 2) Keh CCK, Namboodiri VV, Varma RS, Li CJ. Direct Formation of tetrahydropyrans via catalysis in ionic liquid. *Tetrahedron Letters* 2002;43(28):4993-4996.
[\[Return to Table\]](#)
- 3) Patonay T, Varma RS, Vass A, Levai A, Dudas J. Highly diastereoselective Michael reaction under solvent-free conditions using microwaves: conjugate addition of flavanone to its chalcone precursor. *Tetrahedron Letters* 2001;42(8):1403-1406.
[\[Return to Table\]](#)
- 4) Loupy A, Varma RS. Microwave effects in organic synthesis - Mechanistic and reaction medium considerations. *Chimica Oggi-Chemistry Today* 2006;24(3):36+.
[\[Return to Table\]](#)
- 5) Ju Y, Varma RS. Aqueous N-heterocyclization of primary amines and hydrazines with dihalides: microwave-assisted syntheses of N-azacycloalkanes, isoindole, pyrazole, pyrazolidine, and phthalazine derivatives. *Journal of Organic Chemistry* 2006;71(1):135-141.
[\[Return to Table\]](#)
- 6) Smuleac V, Butterfield DA, Sikdar SK, Varma RS, Bhattacharyya D. Polythiol-functionalized alumina membranes for mercury capture. *Journal of Membrane Science* 2005;251(1-2):169-178.
[\[Return to Table\]](#)
- 7) Varma RS. Solvent-free accelerated organic syntheses using microwaves. *Pure and Applied Chemistry* 2001;73(1):193-198.
[\[Return to Table\]](#)
- 8) Varma RS. Greener organic syntheses under non-traditional conditions. *Indian Journal of Chemistry Section B-Organic Chemistry Including Medicinal Chemistry* 2006;45(10):2305-2312.
[\[Return to Table\]](#)
- 9) Varma RS. Clay and clay-supported reagents in organic synthesis. *Tetrahedron* 2002;58(7):1235-1255.
[\[Return to Table\]](#)
- 10) Vass A, Dudas J, Toth J, Varma RS. Solvent-free reduction of aromatic nitro compounds with alumina-supported hydrazine under microwave irradiation. *Tetrahedron Letters* 2001;32(42):5347-5349.
[\[Return to Table\]](#)

- 11) Abou-Nemeh I, Majumdar S, Saraf A, Sirkar KK, Vane LM, Alvarez FR, Hitchens L. Demonstration of pilot-scale pervaporation systems for volatile organic compound removal from a surfactant enhanced aquifer remediation fluid. II: Hollow fiber membrane modules. *Environmental Progress* 2001;20(1):64-73.
[\[Return to Table\]](#)
- 12) Alvarez FR, Vane LM, Hitchens L. Demonstration of pilot-scale pervaporation systems for volatile organic compound removal from a surfactant enhanced aquifer remediation fluid. I: Spiral wound membrane modules. *Environmental Progress* 2001;20(1):53-63.
[\[Return to Table\]](#)
- 13) Barrett WM, Harten P. Development of the Metal Finishing Facility Risk Screening Tool (MFFRST). *Plating and Surface Finishing* 2002;89(9):77-84.
[\[Return to Table\]](#)
- 14) Bukhari Z, Hargy TM, Bolton JR, Dussert B, Clancy JL. Medium-pressure UV for oocyst inactivation. *Journal of the American Water Works Association* 1999;91(3):86-94.
[\[Return to Table\]](#)
- 15) Martin TM, Harten P, Venkatapathy R, Das S, Young DM. A hierarchical clustering methodology for the estimation of toxicity. *Toxicology Mechanisms and Methods* 2008;18(2-3):251-266.
[\[Return to Table\]](#)
- 16) Walsh CJ, Roy AH, Feminella JW, Cottingham PD, Groffman PM, Morgan RP. The urban stream syndrome: current knowledge and the search for a cure. *Journal of the North American Benthological Society* 2005;24(3):706-723.
[\[Return to Table\]](#)
- 17) Young DM, Cabezas H. Designing sustainable processes with simulation: the waste reduction (WAR) algorithm. *Computers & Chemical Engineering* 1999;23(10):1477-1491.
[\[Return to Table\]](#)
- 18) Chen AS, Stencil N, Ferguson D. Using ceramic membranes to recycle two nonionic alkaline metal-cleaning solutions. *Journal of Membrane Science* 1999;162(1-2):219-234.
[\[Return to Table\]](#)
- 19) Cabezas H, Harten PF, Green MR. Designing greener solvents. *Chemical Engineering* 2000;107(3):107-109.
[\[Return to Table\]](#)

Appendix B: STS Program Publications Cited by Federal and Other Governmental/Organizational Decision Resources

- 1) Huddleston JG, Visser AE, Reichert WM, Wilauer HD, Broker GA, Rogers RD. Characterization and comparison of hydrophilic and hydrophobic room temperature ionic liquids incorporating the imidazolium cation. *Green Chemistry* 2001;3(4):156-164.

[\[Return to Table\]](#)

- 2) Bukhari Z, Hargy TM, Bolton JR, Dussert B, Clancy JL. Medium-pressure UV for oocyst inactivation. *Journal of the American Water Works Association* 1999;91(3):86-94.

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- 3) Anastas PT, Williamson TC, eds. *Green Chemistry: Frontiers in Benign Chemical Syntheses and Processes*. Oxford: Oxford University Press, 1998.

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