

GENERAL INFORMATION

This report is one in a series of volumes published by the U.S. Environmental Protection Agency (EPA) to provide information of general interest regarding environmental issues associated with specific industrial sectors. The documents were developed under contract by GeoLogics Corporation (Alexandria, VA), Abt Associates (Cambridge, MA), Science Applications International Corporation (McLean, VA), and Booz-Allen & Hamilton, Inc. (McLean, VA). A listing of available Sector Notebooks is included on the following page.

Obtaining copies:

Electronic versions of all sector notebooks are available via Internet on the Enviro\$en\$e World Wide Web at www.epa.gov/oeca/sector. Enviro\$en\$e is a free, public, environmental exchange system operated by EPA's Office of Enforcement and Compliance Assurance and Office of Research and Development. The Network allows regulators, the regulated community, technical experts, and the general public to share information regarding: pollution prevention and innovative technologies; environmental enforcement and compliance assistance; laws, executive orders, regulations, and policies; points of contact for services and equipment; and other related topics. The Network welcomes receipt of environmental messages, information, and data from any public or private person or organization. Direct technical questions to the "Feedback" button on the bottom of the web page.

Purchase printed bound copies from the **Government Printing Office (GPO)** by consulting the order form at the back of this document or order via the Internet by visiting the on-line GPO Sales Product Catalog at http://orders.access.gpo.gov/su_docs/sale/prf/prf.html. Search using the exact title of the document "Profile of the XXXX Industry" or simply "Sector Notebook." When ordering, use the GPO document number found on the order form at the back of this document.

Complimentary volumes are available to certain groups or subscribers, including public and academic libraries; federal, state, tribal, and local governments; and the media from EPA's National Service Center for Environmental Publications at **(800) 490-9198**. When ordering, use the EPA publication number found on the following page.

The Sector Notebooks were developed by the EPA's Office of Compliance. Direct general questions about the Sector Notebook Project to:

Seth Heminway, Coordinator, Sector Notebook Project
US EPA Office of Compliance
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-7017

For further information, and for answers to questions pertaining to these documents, please refer to the contact names listed on the following page.

SECTOR NOTEBOOK CONTACTS

Questions and comments regarding the individual documents should be directed to the specialists listed below. See the Notebook web page at: www.epa.gov/oeca/sector for the most recent titles and staff contacts.

EPA Publication

Number	Industry	Contact	Phone
EPA/310-R-95-001.	Profile of the Dry Cleaning Industry	Joyce Chandler	202-564-7073
EPA/310-R-95-002.	Profile of the Electronics and Computer Industry*	Steve Hoover	202-564-7007
EPA/310-R-95-003.	Profile of the Wood Furniture and Fixtures Industry	Bob Marshall	202-564-7021
EPA/310-R-95-004.	Profile of the Inorganic Chemical Industry*	Walter DeRieux	202-564-7067
EPA/310-R-95-005.	Profile of the Iron and Steel Industry	Maria Malave	202-564-7027
EPA/310-R-95-006.	Profile of the Lumber and Wood Products Industry	Seth Heminway	202-564-7017
EPA/310-R-95-007.	Profile of the Fabricated Metal Products Industry*	Scott Throwe	202-564-7013
EPA/310-R-95-008.	Profile of the Metal Mining Industry	Maria Malave	202-564-5027
EPA/310-R-95-009.	Profile of the Motor Vehicle Assembly Industry	Anthony Raia	202-564-6045
EPA/310-R-95-010.	Profile of the Nonferrous Metals Industry	Debbie Thomas	202-564-5041
EPA/310-R-95-011.	Profile of the Non-Fuel, Non-Metal Mining Industry	Rob Lischinsky	202-564-2628
EPA/310-R-95-012.	Profile of the Organic Chemical Industry *	Walter DeRieux	202-564-7067
EPA/310-R-95-013.	Profile of the Petroleum Refining Industry	Tom Ripp	202-564-7003
EPA/310-R-95-014.	Profile of the Printing Industry	Ginger Gotliffe	202-564-7072
EPA/310-R-95-015.	Profile of the Pulp and Paper Industry	Seth Heminway	202-564-7017
EPA/310-R-95-016.	Profile of the Rubber and Plastic Industry		202-564-2310
EPA/310-R-95-017.	Profile of the Stone, Clay, Glass, and Concrete Ind.	Scott Throwe	202-564-7013
EPA/310-R-95-018.	Profile of the Transportation Equipment Cleaning Ind.	Virginia Lathrop	202-564-7057
EPA/310-R-97-001.	Profile of the Air Transportation Industry	Virginia Lathrop	202-564-7057
EPA/310-R-97-002.	Profile of the Ground Transportation Industry	Virginia Lathrop	202-564-7057
EPA/310-R-97-003.	Profile of the Water Transportation Industry	Virginia Lathrop	202-564-7057
EPA/310-R-97-004.	Profile of the Metal Casting Industry	Steve Hoover	202-564-7007
EPA/310-R-97-005.	Profile of the Pharmaceuticals Industry	Emily Chow	202-564-7071
EPA/310-R-97-006.	Profile of the Plastic Resin and Man-made Fiber Ind.	Sally Sasnett	202-564-7074
EPA/310-R-97-007.	Profile of the Fossil Fuel Electric Power Generation Industry	Rafael Sanchez	202-564-7028
EPA/310-R-97-008.	Profile of the Shipbuilding and Repair Industry	Anthony Raia	202-564-6045
EPA/310-R-97-009.	Profile of the Textile Industry		202-564-2310
EPA/310-R-97-010.	Sector Notebook Data Refresh-1997 **	Seth Heminway	202-564-7017
EPA/310-R-98-001.	Profile of the Aerospace Industry	Anthony Raia	202-564-6045
EPA/310-R-99-006.	Profile of the Oil and Gas Extraction Industry	Dan Chadwick	202-564-7054
EPA/310-R-00-001.	Profile of the Agricultural Crop Production Industry	Ginah Mortensen	913-551-5211
EPA/310-R-00-002.	Profile of the Agricultural Livestock Production Industry	Ginah Mortensen	913-551-5211
EPA/310-R-00-003.	Profile of the Agricultural Chemical, Pesticide and Fertilizer Industry	Michelle Yaras	202-564-4153

Government Series

EPA/310-R-99-001.	Profile of Local Government Operations		202-564-2310
-------------------	--	--	--------------

* Spanish translations available.

** This document revises compliance, enforcement, and toxic release inventory data for all profiles published in 1995.

Table of Contents

LIST OF EXHIBITS	v
LIST OF ACRONYMS	vi
I. INTRODUCTION TO THE SECTOR NOTEBOOK PROJECT	1
I.A. Summary of the Sector Notebook Project	1
I.B. Additional Information	2
II. INTRODUCTION TO THE AGRICULTURAL PRODUCTION INDUSTRIES: CROPS, GREENHOUSES/NURSERIES, AND FORESTRY	3
II.A. General Overview of Agricultural Establishments	4
II.B. Characterization of the Crop Production Industry	8
II.B.1. Oilseed and Grain	10
II.B.2. Vegetables and Melons	11
II.B.3. Fruit and Tree Nuts	11
II.B.4. Other Crops	12
II.C. Characterization of the Greenhouse, Nursery, and Floriculture Production Industry	13
II.D. Characterization of the Forestry Production Industry	15
II.D.1. Definition of Forest Land	15
II.D.2. Consumption and Regeneration of Forest Products	18
II.E. Geographic Distribution and Economic Trends	19
III. SUMMARY OF OPERATIONS, IMPACTS, AND POLLUTION PREVENTION OPPORTUNITIES FOR THE AGRICULTURAL PRODUCTION INDUSTRIES: CROPS, GREENHOUSES/NURSERIES, AND FORESTRY	21
III.A. Crop Production: Operations, Impacts, and Pollution Prevention Opportunities	25
III.A.1. Preparing the Site/Soil for Crops	27
III.A.2. Planting/Tending Crops	32
III.A.3. Applying Nutrients to Crops	33
III.A.4. Applying Pesticides and Pest Control	36
III.A.5. Irrigating Crops	43
III.A.6. Harvesting Crops and Post-Harvesting Activities	47
III.A.7. Maintaining and Repairing Agricultural Machinery and Vehicles	49
III.A.8. Fuel Use and Fueling Activities	52
III.A.9. Maintaining the Facility	53
III.B. Greenhouses and Nurseries: Operations, Impacts, and Pollution Prevention Opportunities	56
III.B.1. Preparing the Soil/Growing Media for Horticulture Crops	58
III.B.2. Planting Horticulture Crops	60
III.B.3. Applying Nutrients to Horticulture Crops	60
III.B.4. Applying Pesticides and Pest Control for Horticulture Crops	62
III.B.5. Irrigating Horticulture Crops	63
III.B.6. Tending and Harvesting Horticulture Crops	65

III.B.7.	Constructing and Maintaining Greenhouses	66
III.B.8.	Packaging, Loading, and Transporting Products	67
III.B.9.	Maintaining and Repairing Machinery and Vehicles at Greenhouses/Nurseries	67
III.B.10.	Fuel Use and Fueling Activities at Greenhouses/Nurseries	68
III.C.	Forestry Production Industry: Operations, Impacts, and Pollution Prevention Opportunities	69
III.C.1.	Road Construction and Use	71
III.C.2.	Timber Harvesting	75
III.C.3.	Site Preparation	80
III.C.4.	Forest Regeneration	82
III.C.5.	Prescribed Burning	83
III.C.6.	Application of Chemicals	86
IV.	SUMMARY OF APPLICABLE FEDERAL STATUTES AND REGULATIONS	89
IV.A.	General Description of Major Statutes	89
IV.B.	Industry-Specific Requirements for the Agricultural Production Industries: Crops, Greenhouses/Nurseries, and Forestry	107
IV.C.	Proposed and Pending Regulations	136
V.	COMPLIANCE AND ENFORCEMENT HISTORY	139
V.A.	Background	139
V.B.	Compliance and Enforcement Profile Description	139
V.C.	Compliance History for the Agricultural Production Industries: Crops, Greenhouses/Nurseries, and Forestry	143
VI.	REVIEW OF MAJOR LEGAL ACTIONS	153
VII.	COMPLIANCE ASSURANCE ACTIVITIES AND INITIATIVES	155
VII.A.	Sector-Related Environmental Programs and Activities	155
VII.B.	EPA Programs and Activities	156
VII.C.	USDA Programs and Activities	160
VII.D.	Other Voluntary Initiatives	164
VII.E.	Summary of Trade Associations	165
VIII.	CONTACTS/RESOURCE MATERIALS/BIBLIOGRAPHY	169

LIST OF EXHIBITS

1.	Agricultural Land Use in the U.S.	4
2.	Types of Cropland	5
3.	Acreage of Agricultural Establishments in the U.S.	6
4.	Agricultural Establishments by Value of Sales	6
5.	Ownership Status of Agricultural Establishments in the U.S.	7
6.	1997 NAICS Descriptions for Crop Production (NAICS 111)	8
7.	Number of Farms	9
8.	Land in Acres vs. Acres of Harvested Cropland (in millions of acres)	9
9.	Percent of Sales by Type of Establishment	10
10.	Types of Grain Farms	10
11.	Noncitrus Fruit and Tree Nut Farms	11
12.	Total Acres vs. Acres Harvested of Other Crops (in thousands of acres)	12
13.	Value of Greenhouse, Nursery, and Floriculture Production Compared to Total Crop Production	14
14.	Values of Greenhouse, Nursery, and Floriculture Production Sales	14
15.	Distribution of U.S. Forested Land Area	16
16.	Federal vs. Nonfederal Forest Lands	16
17.	Timberland Ownership	17
18.	NFS Timber Sales, FY 1993-1998	18
19.	Acres Seeded and Acres of Tree Planting (FY 1996)	19
20.	Crop Production Activities, Raw Material Inputs, and Pollution Outputs	26
21.	Greenhouse and Nursery Production Activities, Raw Material Inputs, and Pollution Outputs	57
22.	Forestry Production Activities, Raw Material Inputs, and Pollution Outputs	71
23.	Five-Year Enforcement and Compliance Summary for the Agricultural Crop Production Industry	145
24.	Five-Year Enforcement and Compliance Summary for the Forestry Production Industry	146
25.	Five-Year Enforcement and Compliance Summary for Selected Industries	149
26.	One-Year Enforcement and Compliance Summary for Selected Industries	150
27.	Five-Year Inspection and Enforcement Summary by Statute for Selected Industries	151
28.	One-Year Inspection and Enforcement Summary by Statute for Selected Industries	152

LIST OF ACRONYMS

ACM	Asbestos-Containing Materials
AFO	Animal Feeding Operations
AFPA	American Forest Paper Association
AFS	AIRS Facility Subsystem (CAA database)
ANSI	American National Standards Institute
BIF	Boiler and Industrial Furnace
BLM	Bureau of Land Management
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
Bt	Bacillus thuringiensis
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CCAP	Climate Change Action Plan
CDA	Controlled Droplet Application
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	CERCLA Information System (CERCLA database)
CESQG	Conditionally Exempt Small Quantity Generator
CFC	Chlorofluorocarbon
CFO	Conservation Farm Option
CFR	Code of Federal Regulations
CNMP	Comprehensive Nutrient Management Plan
CPA	Conservation Priority Area
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWA	Clean Water Act
CWAP	Clean Water Action Plan
CZARA	Coastal Zone Act Reauthorization Amendments
DOT	United States Department of Transportation
DOJ	United States Department of Justice
DUN	Dun and Bradstreet
EMS	Environmental Management Systems
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EQIP	Environmental Quality Incentives Program
ESPP	Endangered Species Protection Program
FDA	United States Food and Drug Administration
FFDCA	Federal Food, Drug and Cosmetic Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FINDS	Facility Indexing System
FQPA	Food Quality Protection Act
FR	Federal Register

LIST OF ACRONYMS (CONTINUED)

FS	Forest Service
FSA	Farm Service Agency
FWS	Fish and Wildlife Service
FY	Fiscal Year
GPS	Global Positioning System
HAP	Hazardous Air Pollutant (CAA)
HSWA	Hazardous and Solid Waste Amendments
HUD	United States Department of Housing and Urban Development
IDEA	Integrated Data for Enforcement Analysis
IPM	Integrated Pest Management
ISO	International Organization for Standardization
LDR	Land Disposal Restrictions (RCRA)
LEPC	Local Emergency Planning Committee
LQG	Large Quantity Generator
MACT	Maximum Achievable Control Technology (CAA)
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards (CAA)
NAICS	North American Industrial Classification System
NASS	National Agricultural Statistics Service
NCBD	National Compliance Database, Office of Prevention, Pesticides and Toxic Substances
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NICE ³	National Industrial Competitiveness Through Energy, Environment, and Economics
NOA	Notice of Arrival
NPS	Nonpoint Source Management Program
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFS	National Forest System
NOAA	National Oceanic and Atmospheric Agency
NPDES	National Pollutant Discharge Elimination System (CWA)
NPL	National Priorities List
NRC	National Response Center
NRCS	Natural Resources Conservation Service
NSPS	New Source Performance Standards (CAA)
OECA	Office of Enforcement and Compliance Assurance
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PCS	Permit Compliance System

LIST OF ACRONYMS (CONTINUED)

PESP	Pesticide Environmental Stewardship Program
PMN	Premanufacture Notice
POTW	Publicly Owned Treatment Works
PWS	Public Water Systems
RCRA	Resource Conservation and Recovery Act
RCRIS	RCRA Information System (RCRA database)
RMP	Risk Management Plan
RQ	Reportable Quantities
RUP	Restricted Use Pesticides
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEP	Supplemental Environmental Project
SERC	State Emergency Response Commission
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SPCC	Spill Prevention, Control, and Countermeasure
SQG	Small Quantity Generator
TMDL	Total Maximum Daily Load
TRI	Toxic Release Inventory
TRIS	Toxics Release Inventory System
TSCA	Toxic Substances Control Act
TSS	Total Suspended Solids
UIC	Underground Injection Control (SDWA)
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank (RCRA)
WHIP	Wildlife Habitat Incentives Program
WPS	Worker Protection Standard Requirements for Users
WRP	Wetlands Reserve Program