

ATTACHMENT A

RANAJIT (RON) SAHU, Ph.D, QEP, CEM

CONSULTANT, ENVIRONMENTAL AND ENERGY ISSUES

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EXPERIENCE SUMMARY

Dr. Sahu has over twenty three years of experience in the fields of environmental, mechanical, and chemical engineering including: program and project management services; design and specification of pollution control equipment for a wide range of emissions sources; soils and groundwater remediation including landfills as remedy; combustion engineering evaluations; energy studies; multimedia environmental regulatory compliance (involving statutes and regulations such as the Federal CAA and its Amendments, Clean Water Act, TSCA, RCRA, CERCLA, SARA, OSHA, NEPA as well as various related state statutes); transportation air quality impact analysis; multimedia compliance audits; multimedia permitting (including air quality NSR/PSD permitting, Title V permitting, NPDES permitting for industrial and storm water discharges, RCRA permitting, etc.), multimedia/multi-pathway human health risk assessments for toxics; air dispersion modeling; and regulatory strategy development and support including negotiation of consent agreements and orders.

Specifically, over the last 20+ years, Dr. Sahu has consulted on several municipal landfill related projects addressing landfill gas generation, landfill gas collection, and the treatment/disposal/control of such gases in combustion equipment such as engines, turbines, and flares. In particular, Dr. Sahu has executed numerous projects relating to flare emissions from sources such as landfills as well as refineries and chemical plants. He has served as a peer-reviewer for EPA in relation to flare combustion efficiency, flare destruction efficiency, and flaring emissions.

He has over twenty one years of project management experience and has successfully managed and executed numerous projects in this time period. This includes basic and applied research projects, design projects, regulatory compliance projects, permitting projects, energy studies, risk assessment projects, and projects involving the communication of environmental data and information to the public. Notably, he has successfully managed a complex soils and groundwater remediation project with a value of over \$140 million involving soils characterization, development and implementation of the remediation strategy including construction of a CAMU/landfill and associated groundwater monitoring, regulatory and public interactions and other challenges.

He has provided consulting services to numerous private sector, public sector and public interest group clients. His major clients over the past twenty three years include various steel mills, petroleum refineries, cement companies, aerospace companies, power generation facilities, lawn and garden equipment manufacturers, spa manufacturers, chemical distribution facilities, and various entities in the public sector including EPA, the US Dept. of Justice, California DTSC, various municipalities, etc.). Dr. Sahu has performed projects in over 44 states, numerous local jurisdictions and internationally.

In addition to consulting, Dr. Sahu has taught numerous courses in several Southern California universities including UCLA (air pollution), UC Riverside (air pollution, process hazard analysis), and Loyola Marymount University (air pollution, risk assessment, hazardous waste management) for the past seventeen years. In this time period he has also taught at Caltech, his alma mater (various engineering courses), at the University of Southern California (air pollution controls) and at California State University, Fullerton (transportation and air quality).

Dr. Sahu has and continues to provide expert witness services in a number of environmental areas discussed above in both state and Federal courts as well as before administrative bodies (please see Annex A).

EXPERIENCE RECORD

- 2000-present **Independent Consultant.** Providing a variety of private sector (industrial companies, land development companies, law firms, etc.) public sector (such as the US Department of Justice) and public interest group clients with project management, air quality consulting, waste remediation and management consulting, as well as regulatory and engineering support consulting services.
- 1995-2000 Parsons ES, **Associate, Senior Project Manager and Department Manager for Air Quality/Geosciences/Hazardous Waste Groups**, Pasadena. Responsible for the management of a group of approximately 24 air quality and environmental professionals, 15 geoscience, and 10 hazardous waste professionals providing full-service consulting, project management, regulatory compliance and A/E design assistance in all areas.
- Parsons ES, **Manager for Air Source Testing Services.** Responsible for the management of 8 individuals in the area of air source testing and air regulatory permitting projects located in Bakersfield, California.
- 1992-1995 Engineering-Science, Inc. **Principal Engineer and Senior Project Manager** in the air quality department. Responsibilities included multimedia regulatory compliance and permitting (including hazardous and nuclear materials), air pollution engineering (emissions from stationary and mobile sources, control of criteria and air toxics, dispersion modeling, risk assessment, visibility analysis, odor analysis), supervisory functions and project management.
- 1990-1992 Engineering-Science, Inc. **Principal Engineer and Project Manager** in the air quality department. Responsibilities included permitting, tracking regulatory issues, technical analysis, and supervisory functions on numerous air, water, and hazardous waste projects. Responsibilities also include client and agency interfacing, project cost and schedule control, and reporting to internal and external upper management regarding project status.
- 1989-1990 Kinetics Technology International, Corp. **Development Engineer.** Involved in thermal engineering R&D and project work related to low-NOx ceramic radiant burners, fired heater NOx reduction, SCR design, and fired heater retrofitting.
- 1988-1989 Heat Transfer Research, Inc. **Research Engineer.** Involved in the design of fired heaters, heat exchangers, air coolers, and other non-fired equipment. Also did research in the area of heat exchanger tube vibrations.

EDUCATION

- 1984-1988 Ph.D., Mechanical Engineering, California Institute of Technology (Caltech), Pasadena, CA.
- 1984 M. S., Mechanical Engineering, Caltech, Pasadena, CA.
- 1978-1983 B. Tech (Honors), Mechanical Engineering, Indian Institute of Technology (IIT) Kharagpur, India

TEACHING EXPERIENCE

Caltech

"Thermodynamics," Teaching Assistant, California Institute of Technology, 1983, 1987.

"Air Pollution Control," Teaching Assistant, California Institute of Technology, 1985.

"Caltech Secondary and High School Saturday Program," - taught various mathematics (algebra through calculus) and science (physics and chemistry) courses to high school students, 1983-1989.

"Heat Transfer," - taught this course in the Fall and Winter terms of 1994-1995 in the Division of Engineering and Applied Science.

"Thermodynamics and Heat Transfer," Fall and Winter Terms of 1996-1997.

U.C. Riverside, Extension

"Toxic and Hazardous Air Contaminants," University of California Extension Program, Riverside, California. Various years since 1992.

"Prevention and Management of Accidental Air Emissions," University of California Extension Program, Riverside, California. Various years since 1992.

"Air Pollution Control Systems and Strategies," University of California Extension Program, Riverside, California, Summer 1992-93, Summer 1993-1994.

"Air Pollution Calculations," University of California Extension Program, Riverside, California, Fall 1993-94, Winter 1993-94, Fall 1994-95.

"Process Safety Management," University of California Extension Program, Riverside, California. Various years since 1992-2010.

"Process Safety Management," University of California Extension Program, Riverside, California, at SCAQMD, Spring 1993-94.

"Advanced Hazard Analysis - A Special Course for LEPCs," University of California Extension Program, Riverside, California, taught at San Diego, California, Spring 1993-1994.

"Advanced Hazardous Waste Management" University of California Extension Program, Riverside, California. 2005.

Loyola Marymount University

"Fundamentals of Air Pollution - Regulations, Controls and Engineering," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1993.

"Air Pollution Control," Loyola Marymount University, Dept. of Civil Engineering, Fall 1994.

"Environmental Risk Assessment," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1998.

"Hazardous Waste Remediation" Loyola Marymount University, Dept. of Civil Engineering. Various years since 2006.

University of Southern California

"Air Pollution Controls," University of Southern California, Dept. of Civil Engineering, Fall 1993, Fall 1994.

"Air Pollution Fundamentals," University of Southern California, Dept. of Civil Engineering, Winter 1994.

University of California, Los Angeles

"Air Pollution Fundamentals," University of California, Los Angeles, Dept. of Civil and Environmental Engineering, Spring 1994, Spring 1999, Spring 2000, Spring 2003, Spring 2006, Spring 2007, Spring 2008, Spring 2009.

International Programs

"Environmental Planning and Management," 5 week program for visiting Chinese delegation, 1994.

"Environmental Planning and Management," 1 day program for visiting Russian delegation, 1995.

"Air Pollution Planning and Management," IEP, UCR, Spring 1996.

"Environmental Issues and Air Pollution," IEP, UCR, October 1996.

PROFESSIONAL AFFILIATIONS AND HONORS

President of India Gold Medal, IIT Kharagpur, India, 1983.

Member of the Alternatives Assessment Committee of the Grand Canyon Visibility Transport Commission, established by the Clean Air Act Amendments of 1990, 1992-present.

American Society of Mechanical Engineers: Los Angeles Section Executive Committee, Heat Transfer Division, and Fuels and Combustion Technology Division, 1987-present.

Air and Waste Management Association, West Coast Section, 1989-present.

PROFESSIONAL CERTIFICATIONS

EIT, California (# XE088305), 1993.

REA I, California (#07438), 2000.

Certified Permitting Professional, South Coast AQMD (#C8320), since 1993.

QEP, Institute of Professional Environmental Practice, since 2000.

CEM, State of Nevada (#EM-1699). Expiration 10/07/2011.

PUBLICATIONS (PARTIAL LIST)

"Physical Properties and Oxidation Rates of Chars from Bituminous Coals," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **67**, 275-283 (1988).

"Char Combustion: Measurement and Analysis of Particle Temperature Histories," with R.C. Flagan, G.R. Gavalas and P.S. Northrop, *Comb. Sci. Tech.* **60**, 215-230 (1988).

"On the Combustion of Bituminous Coal Chars," PhD Thesis, California Institute of Technology (1988).

"Optical Pyrometry: A Powerful Tool for Coal Combustion Diagnostics," *J. Coal Quality*, **8**, 17-22 (1989).

"Post-Ignition Transients in the Combustion of Single Char Particles," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **68**, 849-855 (1989).

"A Model for Single Particle Combustion of Bituminous Coal Char." Proc. ASME National Heat Transfer Conference, Philadelphia, **HTD-Vol. 106**, 505-513 (1989).

"Discrete Simulation of Cenospheric Coal-Char Combustion," with R.C. Flagan and G.R. Gavalas, *Combust. Flame*, **77**, 337-346 (1989).

"Particle Measurements in Coal Combustion," with R.C. Flagan, in "**Combustion Measurements**" (ed. N. Chigier), Hemisphere Publishing Corp. (1991).

"Cross Linking in Pore Structures and Its Effect on Reactivity," with G.R. Gavalas in preparation.

"Natural Frequencies and Mode Shapes of Straight Tubes," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Optimal Tube Layouts for Kamui SL-Series Exchangers," with K. Ishihara, Proprietary Report for Kamui Company Limited, Tokyo, Japan (1990).

"HTRI Process Heater Conceptual Design," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Asymptotic Theory of Transonic Wind Tunnel Wall Interference," with N.D. Malmuth and others, Arnold Engineering Development Center, Air Force Systems Command, USAF (1990).

"Gas Radiation in a Fired Heater Convection Section," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1990).

"Heat Transfer and Pressure Drop in NTIW Heat Exchangers," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1991).

"NOx Control and Thermal Design," Thermal Engineering Tech Briefs, (1994).

"From Purchase of Landmark Environmental Insurance to Remediation: Case Study in Henderson, Nevada," with Robin E. Bain and Jill Quillin, presented at the AQMA Annual Meeting, Florida, 2001.

"The Jones Act Contribution to Global Warming, Acid Rain and Toxic Air Contaminants," with Charles W. Botsford, presented at the AQMA Annual Meeting, Florida, 2001.

PRESENTATIONS (PARTIAL LIST)

"Pore Structure and Combustion Kinetics - Interpretation of Single Particle Temperature-Time Histories," with P.S. Northrop, R.C. Flagan and G.R. Gavalas, presented at the AIChE Annual Meeting, New York (1987).

"Measurement of Temperature-Time Histories of Burning Single Coal Char Particles," with R.C. Flagan, presented at the American Flame Research Committee Fall International Symposium, Pittsburgh, (1988).

"Physical Characterization of a Cenospheric Coal Char Burned at High Temperatures," with R.C. Flagan and G.R. Gavalas, presented at the Fall Meeting of the Western States Section of the Combustion Institute, Laguna Beach, California (1988).

"Control of Nitrogen Oxide Emissions in Gas Fired Heaters - The Retrofit Experience," with G. P. Croce and R. Patel, presented at the International Conference on Environmental Control of Combustion Processes (Jointly sponsored by the American Flame Research Committee and the Japan Flame Research Committee), Honolulu, Hawaii (1991).

"Air Toxics - Past, Present and the Future," presented at the Joint AIChE/AAEE Breakfast Meeting at the AIChE 1991 Annual Meeting, Los Angeles, California, November 17-22 (1991).

"Air Toxics Emissions and Risk Impacts from Automobiles Using Reformulated Gasolines," presented at the Third Annual Current Issues in Air Toxics Conference, Sacramento, California, November 9-10 (1992).

"Air Toxics from Mobile Sources," presented at the Environmental Health Sciences (ESE) Seminar Series, UCLA, Los Angeles, California, November 12, (1992).

"Kilns, Ovens, and Dryers - Present and Future," presented at the Gas Company Air Quality Permit Assistance Seminar, Industry Hills Sheraton, California, November 20, (1992).

"The Design and Implementation of Vehicle Scrapping Programs," presented at the 86th Annual Meeting of the Air and Waste Management Association, Denver, Colorado, June 12, 1993.

"Air Quality Planning and Control in Beijing, China," presented at the 87th Annual Meeting of the Air and Waste Management Association, Cincinnati, Ohio, June 19-24, 1994.

Annex A

Expert Litigation Support

1. Occasions where Dr. Sahu has provided Written or Oral testimony before Congress:

- (a) In July 2012, provided expert written and oral testimony to the House Subcommittee on Energy and the Environment, Committee on Science, Space, and Technology at a Hearing entitled “Hitting the Ethanol Blend Wall – Examining the Science on E15.”

2. Matters for which Dr. Sahu has have provided affidavits and expert reports include:

- (b) Affidavit for Rocky Mountain Steel Mills, Inc. located in Pueblo Colorado – dealing with the technical uncertainties associated with night-time opacity measurements in general and at this steel mini-mill.
- (c) Expert reports and depositions (2/28/2002 and 3/1/2002; 12/2/2003 and 12/3/2003; 5/24/2004) on behalf of the United States in connection with the Ohio Edison NSR Cases. *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).
- (d) Expert reports and depositions (5/23/2002 and 5/24/2002) on behalf of the United States in connection with the Illinois Power NSR Case. *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).
- (e) Expert reports and depositions (11/25/2002 and 11/26/2002) on behalf of the United States in connection with the Duke Power NSR Case. *United States, et al. v. Duke Energy Corp.*, 1:00-CV-1262 (Middle District of North Carolina).
- (f) Expert reports and depositions (10/6/2004 and 10/7/2004; 7/10/2006) on behalf of the United States in connection with the American Electric Power NSR Cases. *United States, et al. v. American Electric Power Service Corp., et al.*, C2-99-1182, C2-99-1250 (Southern District of Ohio).
- (g) Affidavit (March 2005) on behalf of the Minnesota Center for Environmental Advocacy and others in the matter of the Application of Heron Lake BioEnergy LLC to construct and operate an ethanol production facility – submitted to the Minnesota Pollution Control Agency.
- (h) Expert Report and Deposition (10/31/2005 and 11/1/2005) on behalf of the United States in connection with the East Kentucky Power Cooperative NSR Case. *United States v. East Kentucky Power Cooperative, Inc.*, 5:04-cv-00034-KSF (Eastern District of Kentucky).
- (i) Affidavits and deposition on behalf of Basic Management Inc. (BMI) Companies in connection with the BMI vs. USA remediation cost recovery Case.
- (j) Expert Report on behalf of Penn Future and others in the Cambria Coke plant permit challenge in Pennsylvania.
- (k) Expert Report on behalf of the Appalachian Center for the Economy and the Environment and others in the Western Greenbrier permit challenge in West Virginia.
- (l) Expert Report, deposition (via telephone on January 26, 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women’s Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) in the Thompson River Cogeneration LLC Permit No. 3175-04 challenge.
- (m) Expert Report and deposition (2/2/07) on behalf of the Texas Clean Air Cities Coalition at the Texas State Office of Administrative Hearings (SOAH) in the matter of the permit challenges to TXU Project Apollo’s eight new proposed PRB-fired PC boilers located at seven TX sites.

- (n) Expert Testimony (July 2007) on behalf of the Izaak Walton League of America and others in connection with the acquisition of power by Xcel Energy from the proposed Gascoyne Power Plant – at the State of Minnesota, Office of Administrative Hearings for the Minnesota PUC (MPUC No. E002/CN-06-1518; OAH No. 12-2500-17857-2).
- (o) Affidavit (July 2007) Comments on the Big Cajun I Draft Permit on behalf of the Sierra Club – submitted to the Louisiana DEQ.
- (p) Expert Report and Deposition (12/13/2007) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case. *Plaintiffs v. Allegheny Energy Inc., et al.*, 2:05cv0885 (Western District of Pennsylvania).
- (q) Expert Reports and Pre-filed Testimony before the Utah Air Quality Board on behalf of Sierra Club in the Sevier Power Plant permit challenge.
- (r) Expert Report and Deposition (October 2007) on behalf of MTD Products Inc., in connection with General Power Products, LLC v MTD Products Inc., 1:06 CVA 0143 (Southern District of Ohio, Western Division)
- (s) Experts Report and Deposition (June 2008) on behalf of Sierra Club and others in the matter of permit challenges (Title V: 28.0801-29 and PSD: 28.0803-PSD) for the Big Stone II unit, proposed to be located near Milbank, South Dakota.
- (t) Expert Reports, Affidavit, and Deposition (August 15, 2008) on behalf of Earthjustice in the matter of air permit challenge (CT-4631) for the Basin Electric Dry Fork station, under construction near Gillette, Wyoming before the Environmental Quality Council of the State of Wyoming.
- (u) Affidavits (May 2010/June 2010 in the Office of Administrative Hearings)/Declaration and Expert Report (November 2009 in the Office of Administrative Hearings) on behalf of NRDC and the Southern Environmental Law Center in the matter of the air permit challenge for Duke Cliffside Unit 6. Office of Administrative Hearing Matters 08 EHR 0771, 0835 and 0836 and 09 HER 3102, 3174, and 3176 (consolidated).
- (v) Declaration (August 2008), Expert Report (January 2009), and Declaration (May 2009) on behalf of Southern Alliance for Clean Energy et al., v Duke Energy Carolinas, LLC. in the matter of the air permit challenge for Duke Cliffside Unit 6. *Southern Alliance for Clean Energy et al., v. Duke Energy Carolinas, LLC*, Case No. 1:08-cv-00318-LHT-DLH (Western District of North Carolina, Asheville Division).
- (w) Declaration (August 2008) on behalf of the Sierra Club in the matter of Dominion Wise County plant MACT.
- (x) Expert Report (June 2008) on behalf of Sierra Club for the Green Energy Resource Recovery Project, MACT Analysis.
- (y) Expert Report (February 2009) on behalf of Sierra Club and the Environmental Integrity Project in the matter of the air permit challenge for NRG Limestone’s proposed Unit 3 in Texas.
- (z) Expert Report (June 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*
- (aa) Expert Report (August 2009) on behalf of Sierra Club and the Southern Environmental Law Center in the matter of the air permit challenge for Santee Cooper’s proposed Pee Dee plant in South Carolina).
- (bb) Statements (May 2008 and September 2009) on behalf of the Minnesota Center for Environmental Advocacy to the Minnesota Pollution Control Agency in the matter of the Minnesota Haze State Implementation Plans.
- (cc) Expert Report (August 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
- (dd) Expert Report and Rebuttal Report (September 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.
- (ee) Expert Report (December 2009) and Rebuttal reports (May 2010 and June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).

- (ff) Pre-filed Testimony (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
- (gg) Pre-filed Testimony (July 2010) and Written Rebuttal Testimony (August 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions*, No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.
- (hh) Expert Report (August 2010) and Rebuttal Expert Report (October 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Liability Phase.
- (ii) Declaration (August 2010), Reply Declaration (November 2010), Expert Report (April 2011), Supplemental and Rebuttal Expert Report (July 2011) on behalf of the United States in the matter of DTE Energy Company and Detroit Edison Company (Monroe Unit 2). *United States of America v. DTE Energy Company and Detroit Edison Company*, Civil Action No. 2:10-cv-13101-BAF-RSW (US District Court for the Eastern District of Michigan).
- (jj) Expert Report and Deposition (August 2010) as well as Affidavit (September 2010) on behalf of Kentucky Waterways Alliance, Sierra Club, and Valley Watch in the matter of challenges to the NPDES permit issued for the Trimble County power plant by the Kentucky Energy and Environment Cabinet to Louisville Gas and Electric, File No. DOW-41106-047.
- (kk) Expert Report (August 2010), Rebuttal Expert Report (September 2010), Supplemental Expert Report (September 2011), and Declaration (November 2011) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)’s Cherokee power plant. No. 09-cv-1862 (D. Colo.).
- (ll) Written Direct Expert Testimony (August 2010) and Affidavit (February 2012) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).
- (mm) Deposition (August 2010) on behalf of Environmental Defense, in the matter of the remanded permit challenge to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
- (nn) Expert Report, Supplemental/Rebuttal Expert Report, and Declarations (October 2010, November 2010, September 2012) on behalf of New Mexico Environment Department (Plaintiff-Intervenor), Grand Canyon Trust and Sierra Club (Plaintiffs) in the matter of Plaintiffs v. Public Service Company of New Mexico (PNM), Civil No. 1:02-CV-0552 BB/ATC (ACE). (US District Court for the District of New Mexico).
- (oo) Expert Report (October 2010) and Rebuttal Expert Report (November 2010) (BART Determinations for PSCo Hayden and CSU Martin Drake units) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.
- (pp) Expert Report (November 2010) (BART Determinations for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.
- (qq) Declaration (November 2010) on behalf of the Sierra Club in connection with the Martin Lake Station Units 1, 2, and 3. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Case No. 5:10-cv-00156-DF-CMC (US District Court for the Eastern District of Texas, Texarkana Division).
- (rr) Pre-Filed Testimony (January 2011) and Declaration (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).
- (ss) Declaration (February 2011) in the matter of the Draft Title V Permit for RRI Energy MidAtlantic Power Holdings LLC Shawville Generating Station (Pennsylvania), ID No. 17-00001 on behalf of the Sierra Club.

- (tt) Expert Report (March 2011), Rebuttal Expert Report (June 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (US District Court for the District of Colorado).
- (uu) Declaration (April 2011) and Expert Report (July 16, 2012) in the matter of the Lower Colorado River Authority (LCRA)'s Fayette (Sam Seymour) Power Plant on behalf of the Texas Campaign for the Environment. *Texas Campaign for the Environment v. Lower Colorado River Authority*, Civil Action No. 4:11-cv-00791 (US District Court for the Southern District of Texas, Houston Division).
- (vv) Declaration (June 2011) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.
- (ww) Expert Report (June 2011) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).
- (xx) Declaration (August 2011) in the matter of the Sandy Creek Energy Associates L.P. Sandy Creek Power Plant on behalf of Sierra Club and Public Citizen. *Sierra Club, Inc. and Public Citizen, Inc. v. Sandy Creek Energy Associates, L.P.*, Civil Action No. A-08-CA-648-LY (US District Court for the Western District of Texas, Austin Division).
- (yy) Expert Report (October 2011) on behalf of the Defendants in the matter of *John Quiles and Jeanette Quiles et al. v. Bradford-White Corporation, MTD Products, Inc., Kohler Co., et al.*, Case No. 3:10-cv-747 (TJM/DEP) (US District Court for the Northern District of New York).
- (zz) Declaration (February 2012) and Second Declaration (February 2012) in the matter of *Washington Environmental Council and Sierra Club Washington State Chapter v. Washington State Department of Ecology and Western States Petroleum Association*, Case No. 11-417-MJP (US District Court for the Western District of Washington).
- (aaa) Expert Report (March 2012) and Supplemental Expert Report (November 2013) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.*, Civil Action No. 4:10-cv-4969 (US District Court for the Southern District of Texas, Houston Division).
- (bbb) Declaration (March 2012) in the matter of *Center for Biological Diversity, et al. v. United States Environmental Protection Agency*, Case No. 11-1101 (consolidated with 11-1285, 11-1328 and 11-1336) (US Court of Appeals for the District of Columbia Circuit).
- (ccc) Declaration (March 2012) in the matter of *Sierra Club v. The Kansas Department of Health and Environment*, Case No. 11-105,493-AS (Holcomb power plant) (Supreme Court of the State of Kansas).
- (ddd) Declaration (March 2012) in the matter of the Las Brisas Energy Center *Environmental Defense Fund et al., v. Texas Commission on Environmental Quality*, Cause No. D-1-GN-11-001364 (District Court of Travis County, Texas, 261st Judicial District).
- (eee) Expert Report (April 2012), Supplemental and Rebuttal Expert Report (July 2012), and Supplemental Rebuttal Expert Report (August 2012) on behalf of the states of New Jersey and Connecticut in the matter of the Portland Power plant *State of New Jersey and State of Connecticut (Intervenor-Plaintiff) v. RRI Energy Mid-Atlantic Power Holdings et al.*, Civil Action No. 07-CV-5298 (JKG) (US District Court for the Eastern District of Pennsylvania).
- (fff) Declaration (April 2012) in the matter of the EPA's EGU MATS Rule, on behalf of the Environmental Integrity Project
- (ggg) Expert Report (August 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Harm Phase.
- (hhh) Declaration (September 2012) in the Matter of the Application of *Energy Answers Incinerator, Inc.* for a Certificate of Public Convenience and Necessity to Construct a 120 MW Generating Facility in Baltimore City, Maryland, before the Public Service Commission of Maryland, Case No. 9199.

- (iii) Expert Report (October 2012) on behalf of the Appellants (Robert Concilus and Leah Humes) in the matter of Robert Concilus and Leah Humes v. Commonwealth of Pennsylvania Department of Environmental Protection and Crawford Renewable Energy, before the Commonwealth of Pennsylvania Environmental Hearing Board, Docket No. 2011-167-R.
- (jjj) Expert Report (October 2012), Supplemental Expert Report (January 2013), and Affidavit (June 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.
- (kkk) Pre-filed Testimony (October 2012) on behalf of No-Sag in the matter of the North Springfield Sustainable Energy Project before the State of Vermont, Public Service Board.
- (lll) Pre-filed Testimony (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.
- (mmm) Expert Report (February 2013) on behalf of Petitioners in the matter of Credence Crematory, Cause No. 12-A-J-4538 before the Indiana Office of Environmental Adjudication.
- (nnn) Expert Report (April 2013), Rebuttal report (July 2013), and Declarations (October 2013, November 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).
- (ooo) Expert Report (May 2013) and Rebuttal Expert Report (July 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).
- (ppp) Declaration (August 2013) on behalf of A. J. Acosta Company, Inc., in the matter of A. J. Acosta Company, Inc., v. County of San Bernardino, Case No. CIVSS803651.
- (qqq) Comments (October 2013) on behalf of the Washington Environmental Council and the Sierra Club in the matter of the Washington State Oil Refinery RACT (for Greenhouse Gases), submitted to the Washington State Department of Ecology, the Northwest Clean Air Agency, and the Puget Sound Clean Air Agency.
- (rrr) Statement (November 2013) on behalf of various Environmental Organizations in the matter of the Boswell Energy Center (BEC) Unit 4 Environmental Retrofit Project, to the Minnesota Public Utilities Commission, Docket No. E-015/M-12-920.
- (sss) Expert Report (December 2013) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).
- (ttt) Expert Testimony (December 2013) on behalf of the Sierra Club in the matter of Public Service Company of New Hampshire Merrimack Station Scrubber Project and Cost Recovery, Docket No. DE 11-250, to the State of New Hampshire Public Utilities Commission.
- (uuu) Expert Report (January 2014) on behalf of Baja, Inc., in *Baja, Inc., v. Automotive Testing and Development Services, Inc. et. al*, Civil Action No. 8:13-CV-02057-GRA (District of South Carolina, Anderson/Greenwood Division).
- (vvv) Declaration (March 2014) on behalf of the Center for International Environmental Law, Chesapeake Climate Action Network, Friends of the Earth, Pacific Environment, and the Sierra Club (Plaintiffs) in the matter of Plaintiffs v. the Export-Import Bank (Ex-Im Bank) of the United States, Civil Action No. 13-1820 RC (United States District Court for the District of Columbia).
- (www) Direct Prefiled Testimony (June 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17319 (Michigan Public Service Commission).

(xxx) Expert Report (June 2014) on behalf of ECM Biofilms in the matter of the US Federal Trade Commission (FTC) v. ECM Biofilms (FTC Docket #9358).

(yyy) Declaration (July 2014) on behalf of Public Health Intervenor in the matter of EME Homer City Generation v. US EPA (Case No. 11-1302 and consolidated cases) relating to the lifting of the stay entered by the Court on December 30, 2011 (US Court of Appeals for the District of Columbia).

3. Occasions where Dr. Sahu has provided oral testimony in depositions, at trial or in similar proceedings include the following:

(zzz) Deposition on behalf of Rocky Mountain Steel Mills, Inc. located in Pueblo, Colorado – dealing with the manufacture of steel in mini-mills including methods of air pollution control and BACT in steel mini-mills and opacity issues at this steel mini-mill.

(aaaa) Trial Testimony (February 2002) on behalf of Rocky Mountain Steel Mills, Inc. in Denver District Court.

(bbbb) Trial Testimony (February 2003) on behalf of the United States in the Ohio Edison NSR Cases, *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).

(cccc) Trial Testimony (June 2003) on behalf of the United States in the Illinois Power NSR Case, *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).

(dddd) Deposition (10/20/2005) on behalf of the United States in connection with the Cinergy NSR Case. *United States, et al. v. Cinergy Corp., et al.*, IP 99-1693-C-M/S (Southern District of Indiana).

(eeee) Oral Testimony (August 2006) on behalf of the Appalachian Center for the Economy and the Environment re. the Western Greenbrier plant, WV before the West Virginia ????

(ffff) Oral Testimony (May 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women's Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) re. the Thompson River Cogeneration plant before the Montana Board of Environmental Review.

(gggg) Oral Testimony (October 2007) on behalf of the Sierra Club re. the Sevier Power Plant before the Utah Air Quality Board.

(hhhh) Oral Testimony (August 2008) on behalf of the Sierra Club and Clean Water re. Big Stone Unit II before the South Dakota Board of Minerals and the Environment.

(iiii) Oral Testimony (February 2009) on behalf of the Sierra Club and the Southern Environmental Law Center re. Santee Cooper Pee Dee units before the South Carolina Board of Health and Environmental Control.

(jjjj) Oral Testimony (February 2009) on behalf of the Sierra Club and the Environmental Integrity Project re. NRG Limestone Unit 3 before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

(kkkk) Deposition (July 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*

(llll) Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Coletto Creek coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(mmmm) Deposition (October 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(nnnn) Deposition (October 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.

(oooo) Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Tenaska coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH). (April 2010).

- (pppp) Oral Testimony (November 2009) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.
- (qqqq) Deposition (December 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
- (rrrr) Oral Testimony (February 2010) on behalf of the Environmental Defense Fund re. the White Stallion Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.
- (ssss) Deposition (June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).
- (tttt) Trial Testimony (September 2010) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, State of Maryland, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case in US District Court in the Western District of Pennsylvania. *Plaintiffs v. Allegheny Energy Inc., et al.*, 2:05cv0885 (Western District of Pennsylvania).
- (uuuu) Oral Direct and Rebuttal Testimony (September 2010) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).
- (vvvv) Oral Testimony (September 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions*, No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.
- (wwwv) Oral Testimony (October 2010) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.
- (xxxx) Oral Testimony (November 2010) regarding BART for PSCo Hayden, CSU Martin Drake units before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.
- (yyyy) Oral Testimony (December 2010) regarding BART for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.
- (zzzz) Deposition (December 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).
- (aaaaa) Deposition (February 2011 and January 2012) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)’s Cherokee power plant. No. 09-cv-1862 (D. Colo.).
- (bbbbb) Oral Testimony (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).
- (ccccc) Deposition (August 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (US District Court for the District of Colorado).
- (ddddd) Deposition (July 2011) and Oral Testimony at Hearing (February 2012) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.
- (eeeeee) Oral Testimony at Hearing (March 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).
- (fffff) Oral Testimony at Hearing (April 2012) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).

- (ggggg) Oral Testimony at Hearing (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.
- (hhhhh) Deposition (March 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.
- (iiiiii) Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).
- (jjjjj) Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).
- (kkkkk) Deposition (February 2014) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).
- (lllll) Trial Testimony (February 2014) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.*, Civil Action No. 4:10-cv-4969 (US District Court for the Southern District of Texas, Houston Division).
- (mmmmm) Trial Testimony (February 2014) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).
- (nnnnn) Deposition (June 2014) and Trial (August 2014) on behalf of ECM Biofilms in the matter of the US Federal Trade Commission (FTC) v. ECM Biofilms (FTC Docket #9358).

ATTACHMENT B

United States New Source Performance Standards (NSPS) for Power Plants

Electronic Code of Federal Regulations

e-CFR data is current as of June 4, 2015

[Title 40](#) → [Chapter I](#) → [Subchapter C](#) → [Part 60](#) → Subpart Da

Title 40: Protection of Environment

[PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES](#)

Subpart Da—Standards of Performance for Electric Utility Steam Generating Units

SOURCE: 72 FR 32722, June 13, 2007, unless otherwise noted.

§60.40Da Applicability and designation of affected facility.

(a) Except as specified in paragraph (e) of this section, the affected facility to which this subpart applies is each electric utility steam generating unit:

(1) That is capable of combusting more than 73 megawatts (MW) (250 million British thermal units per hour (MMBtu/hr)) heat input of fossil fuel (either alone or in combination with any other fuel); and

(2) For which construction, modification, or reconstruction is commenced after September 18, 1978.

(b) An IGCC electric utility steam generating unit (both the stationary combustion turbine and any associated duct burners) is subject to this part and is not subject to subpart GG or KKKK of this part if both of the conditions specified in paragraphs (b)(1) and (2) of this section are met.

(1) The IGCC electric utility steam generating unit is capable of combusting more than 73 MW (250 MMBtu/h) heat input of fossil fuel (either alone or in combination with any other fuel) in the combustion turbine engine and associated heat recovery steam generator; and

(2) The IGCC electric utility steam generating unit commenced construction, modification, or reconstruction after February 28, 2005.

(c) Any change to an existing fossil-fuel-fired steam generating unit to accommodate the use of combustible materials, other than fossil fuels, shall not bring that unit under the applicability of this subpart.

(d) Any change to an existing steam generating unit originally designed to fire gaseous or liquid fossil fuels, to accommodate the use of any other fuel (fossil or nonfossil) shall not bring that unit under the applicability of this subpart.

(e) Applicability of this subpart to an electric utility combined cycle gas turbine other than an IGCC electric utility steam generating unit is as specified in paragraphs (e)(1) through (3) of this section.

(1) Affected facilities (*i.e.* heat recovery steam generators used with duct burners) associated with a stationary combustion turbine that are capable of combusting more than 73 MW (250 MMBtu/h) heat input of fossil fuel are subject to this subpart except in cases when the affected facility (*i.e.* heat recovery steam generator) meets the applicability requirements of and is subject to subpart KKKK of this part.

(2) For heat recovery steam generators use with duct burners subject to this subpart, only emissions resulting from the combustion of fuels in the steam generating unit (*i.e.* duct burners) are subject to the standards under this subpart. (The emissions resulting from the combustion of fuels in the stationary combustion turbine engine are subject to subpart GG or KKKK, as applicable, of this part.)

(3) Any affected facility that meets the applicability requirements and is subject to subpart Eb or subpart CCCC of this part is not subject to the emission standards under subpart Da.

[72 FR 32722, June 13, 2007, as amended at 74 FR 5078, Jan. 28, 2009; 77 FR 9448, Feb. 16, 2012]

§60.41Da Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in subpart A of this part.

Affirmative defense means, in the context of an enforcement proceeding, a response or defense put forward by a defendant, regarding which the defendant has the burden of proof, and the merits of which are independently and objectively evaluated in a judicial or administrative proceeding.

Anthracite means coal that is classified as anthracite according to the American Society of Testing and Materials in ASTM D388 (incorporated by reference, see §60.17).

Available system capacity means the capacity determined by subtracting the system load and the system emergency reserves from the net system capacity.

Biomass means plant materials and animal waste.

Bituminous coal means coal that is classified as bituminous according to the American Society of Testing and Materials in ASTM D388 (incorporated by reference, see §60.17).

Boiler operating day for units constructed, reconstructed, or modified before March 1, 2005, means a 24-hour period during which fossil fuel is combusted in a steam-generating unit for the entire 24 hours. For units constructed, reconstructed, or modified after February 28, 2005, *boiler operating day* means a 24-hour period between 12 midnight and the following midnight during which any fuel is combusted at any time in the steam-generating unit. It is not necessary for fuel to be combusted the entire 24-hour period.

Coal means all solid fuels classified as anthracite, bituminous, subbituminous, or lignite by the American Society of Testing and Materials in ASTM D388 (incorporated by reference, see §60.17) and coal refuse. Synthetic fuels derived from coal for the purpose of creating useful heat, including but not limited to solvent-refined coal, gasified coal, coal-oil mixtures, and coal-water mixtures are included in this definition for the purposes of this subpart.

Coal-fired electric utility steam generating unit means an electric utility steam generating unit that burns coal, coal refuse, or a synthetic gas derived from coal either exclusively, in any combination together, or in any combination with other fuels in any amount.

Coal refuse means waste products of coal mining, physical coal cleaning, and coal preparation operations (e.g. culm, gob, etc.) containing coal, matrix material, clay, and other organic and inorganic material.

Combined cycle gas turbine means a stationary turbine combustion system where heat from the turbine exhaust gases is recovered by a steam generating unit.

Combined heat and power, also known as “cogeneration,” means a steam-generating unit that simultaneously produces both electric (and mechanical) and useful thermal energy from the same primary energy source.

Duct burner means a device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary gas turbine, internal combustion engine, kiln, etc., to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a heat recovery steam generating unit.

Electric utility combined cycle gas turbine means any combined cycle gas turbine used for electric generation that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW net-electrical output to any utility power distribution system for sale. Any steam distribution system that is constructed for the purpose of providing steam to a steam electric generator that would produce electrical power for sale is also considered in determining the electrical energy output capacity of the affected facility.

Electric utility steam-generating unit means any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW net-electrical output to any utility power distribution system for sale. Also, any steam supplied to a steam distribution system for the purpose of providing steam to a steam-electric generator that would produce electrical energy for sale is considered in determining the electrical energy output capacity of the affected facility.

Electrostatic precipitator or *ESP* means an add-on air pollution control device used to capture particulate matter (PM) by charging the particles using an electrostatic field, collecting the particles using a grounded collecting surface, and transporting the particles into a hopper.

Emission limitation means any emissions limit or operating limit.

Federally enforceable means all limitations and conditions that are enforceable by the Administrator, including the requirements of 40 CFR parts 60 and 61, requirements within any applicable State implementation plan, and any permit requirements established under 40 CFR 52.21 or under 40 CFR 51.18 and 51.24.

Fossil fuel means natural gas, petroleum, coal, and any form of solid, liquid, or gaseous fuel derived from such material for the purpose of creating useful heat.

Gaseous fuel means any fuel that is present as a gas at standard conditions and includes, but is not limited to, natural gas, refinery fuel gas, process gas, coke-oven gas, synthetic gas, and gasified coal.

Gross energy output means:

- (1) For facilities constructed, reconstructed, or modified before May 4, 2011, the gross electrical or mechanical output from the affected facility plus 75 percent of the useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (*i.e.*, steam delivered to an industrial process);
- (2) For facilities constructed, reconstructed, or modified after May 3, 2011, the gross electrical or mechanical output from the affected facility minus any electricity used to power the feedwater pumps and any associated gas compressors (air separation unit main compressor, oxygen compressor, and nitrogen compressor) plus 75 percent of the useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (*i.e.*, steam delivered to an industrial process);
- (3) For combined heat and power facilities constructed, reconstructed, or modified after May 3, 2011, the gross electrical or mechanical output from the affected facility divided by 0.95 minus any electricity used to power the feedwater pumps and any associated gas compressors (air separation unit main compressor, oxygen compressor, and nitrogen compressor) plus 75 percent of the useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (*i.e.*, steam delivered to an industrial process);
- (4) For a IGCC electric utility generating unit that coproduces chemicals constructed, reconstructed, or modified after May 3, 2011, the gross useful work performed is the gross electrical or mechanical output from the unit minus electricity used to power the feedwater pumps and any associated gas compressors (air separation unit main compressor, oxygen compressor, and nitrogen compressor) that are associated with power production plus 75 percent of the useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (*i.e.*, steam delivered to an industrial process). Auxiliary loads that are associated with power production are determined based on the energy in the coproduced chemicals compared to the energy of the syngas combusted in combustion turbine engine and associated duct burners.

24-hour period means the period of time between 12:01 a.m. and 12:00 midnight.

Integrated gasification combined cycle electric utility steam generating unit or *IGCC electric utility steam generating unit* means an electric utility combined cycle gas turbine that is designed to burn fuels containing 50 percent (by heat input) or more solid-derived fuel not meeting the definition of natural gas. The Administrator may waive the 50 percent solid-derived fuel requirement during periods of the gasification system construction, startup and commissioning, shutdown, or repair. No solid fuel is directly burned in the unit during operation.

ISO conditions means a temperature of 288 Kelvin, a relative humidity of 60 percent, and a pressure of 101.3 kilopascals.

Lignite means coal that is classified as lignite A or B according to the American Society of Testing and Materials in ASTM D388 (incorporated by reference, see §60.17).

Natural gas means a fluid mixture of hydrocarbons (e.g., methane, ethane, or propane), composed of at least 70 percent methane by volume or that has a gross calorific value between 35 and 41 megajoules (MJ) per dry standard cubic meter (950 and 1,100 Btu per dry standard cubic foot), that maintains a gaseous state under ISO conditions. In addition, *natural gas* contains 20.0 grains or less of total sulfur per 100 standard cubic feet. Finally, natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.

Neighboring company means any one of those electric utility companies with one or more electric power interconnections to the principal company and which have geographically adjoining service areas.

Net-electric output means the gross electric sales to the utility power distribution system minus purchased power on a calendar year basis.

Net energy output means the gross energy output minus the parasitic load associated with power production. Parasitic load includes, but is not limited to, the power required to operate the equipment used for fuel delivery systems, air pollution control systems, wastewater treatment systems, ash handling and disposal systems, and other controls (*i.e.*, pumps, fans, compressors, motors, instrumentation, and other ancillary equipment required to operate the affected facility).

Noncontinental area means the State of Hawaii, the Virgin Islands, Guam, American Samoa, the Commonwealth of Puerto Rico, or the Northern Mariana Islands.

Out-of-control period means any period beginning with the quadrant corresponding to the completion of a daily calibration error, linearity check, or quality assurance audit that indicates that the instrument is not measuring and recording within the applicable performance specifications and ending with the quadrant corresponding to the completion of an additional calibration error, linearity check, or quality assurance audit following corrective action that demonstrates that the instrument is measuring and recording within the applicable performance specifications.

Petroleum for facilities constructed, reconstructed, or modified before May 4, 2011, means crude oil or a fuel derived from crude oil, including, but not limited to, distillate oil, and residual oil. For units constructed, reconstructed, or modified after May 3, 2011, *petroleum* means crude oil or a fuel derived from crude oil, including, but not limited to, distillate oil, residual oil, and petroleum coke.

Petroleum coke, also known as “petcoke,” means a carbonization product of high-boiling hydrocarbon fractions obtained in petroleum processing (heavy residues). *Petroleum coke* is typically derived from oil refinery coker units or other cracking processes.

Potential combustion concentration means the theoretical emissions (nanograms per joule (ng/J), lb/MMBtu heat input) that would result from combustion of a fuel in an uncleaned state without emission control systems. For sulfur dioxide (SO₂) the potential combustion concentration is determined under §60.50Da(c).

Potential electrical output capacity means 33 percent of the maximum design heat input capacity of the steam generating unit, divided by 3,413 Btu/KWh, divided by 1,000 kWh/MWh, and multiplied by 8,760 hr/yr (e.g., a steam generating unit with a 100 MW (340 MMBtu/hr) fossil-fuel heat input capacity would have a 289,080 MWh 12 month potential electrical output capacity). For electric utility combined cycle gas turbines the potential electrical output capacity is determined on the basis of the fossil-fuel firing capacity of the steam generator exclusive of the heat input and electrical power contribution by the gas turbine.

Resource recovery unit means a facility that combusts more than 75 percent non-fossil fuel on a quarterly (calendar) heat input basis.

Solid-derived fuel means any solid, liquid, or gaseous fuel derived from solid fuel for the purpose of creating useful heat and includes, but is not limited to, solvent refined coal, liquified coal, synthetic gas, gasified coal, gasified petroleum coke, gasified biomass, and gasified tire derived fuel.

Steam generating unit for facilities constructed, reconstructed, or modified before May 4, 2011, means any furnace, boiler, or other device used for combusting fuel for the purpose of producing steam (including fossil-fuel-fired steam generators associated with combined cycle gas turbines; nuclear steam generators are not included). For units constructed, reconstructed, or modified after May 3, 2011, *steam generating unit* means any furnace, boiler, or other device used for combusting fuel for the purpose of producing steam (including fossil-fuel-fired steam generators associated with combined cycle gas turbines; nuclear steam generators are not included) plus any integrated combustion turbines and fuel cells.

Subbituminous coal means coal that is classified as subbituminous A, B, or C according to the American Society of Testing and Materials in ASTM D388 (incorporated by reference, see §60.17).

Wet flue gas desulfurization technology or *wet FGD* means a SO₂ control system that is located downstream of the steam generating unit and removes sulfur oxides from the combustion gases of the steam generating unit by contacting the combustion gases with an alkaline slurry or solution and forming a liquid material. This definition applies to devices where the aqueous liquid material product of this contact is subsequently converted to other forms. Alkaline reagents used in wet FGD technology include, but are not limited to, lime, limestone, and sodium.

[72 FR 32722, June 13, 2007, as amended at 74 FR 5079, Jan. 28, 2009; 77 FR 9448, Feb. 16, 2012; 77 FR 23402, Apr. 19, 2012; 78 FR 24082, Apr. 24, 2013]

§60.42Da Standards for particulate matter (PM).

(a) Except as provided in paragraph (f) of this section, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, an owner or operator of an affected facility shall not cause to be discharged into the atmosphere from any affected facility for which construction, reconstruction, or modification commenced before March 1, 2005, any gases that contain PM in excess of 13 ng/J (0.03 lb/MMBtu) heat input.

(b) Except as provided in paragraphs (b)(1) and (b)(2) of this section, on and after the date the initial PM performance test is completed or required to be completed under §60.8, whichever date comes first, an owner or operator of an affected facility shall not cause to be discharged into the atmosphere any gases which exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity.

(1) An owner or operator of an affected facility that elects to install, calibrate, maintain, and operate a continuous emissions monitoring system (CEMS) for measuring PM emissions according to the requirements of this subpart is exempt from the opacity standard specified in this paragraph (b) of this section.

(2) An owner or operator of an affected facility that combusts only natural gas and/or synthetic natural gas that chemically meets the definition of natural gas is exempt from the opacity standard specified in paragraph (b) of this section.

(c) Except as provided in paragraphs (d) and (f) of this section, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commenced construction, reconstruction, or modification after February 28, 2005, but before May 4, 2011, shall cause to be discharged into the atmosphere from that affected facility any gases that contain PM in excess of either:

(1) 18 ng/J (0.14 lb/MWh) gross energy output; or

(2) 6.4 ng/J (0.015 lb/MMBtu) heat input derived from the combustion of solid, liquid, or gaseous fuel.

(d) As an alternative to meeting the requirements of paragraph (c) of this section, the owner or operator of an affected facility for which construction, reconstruction, or modification commenced after February 28, 2005, but before May 4, 2011, may elect to meet the requirements of this paragraph. On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility shall cause to be discharged into the atmosphere from that affected facility any gases that contain PM in excess of:

(1) 13 ng/J (0.030 lb/MMBtu) heat input derived from the combustion of solid, liquid, or gaseous fuel, and

(2) For an affected facility that commenced construction or reconstruction, 0.1 percent of the combustion concentration determined according to the procedure in §60.48Da(o)(5) (99.9 percent reduction) when combusting solid, liquid, or gaseous fuel, or

(3) For an affected facility that commenced modification, 0.2 percent of the combustion concentration determined according to the procedure in §60.48Da(o)(5) (99.8 percent reduction) when combusting solid, liquid, or gaseous fuel.

(e) Except as provided in paragraph (f) of this section, the owner or operator of an affected facility that commenced construction, reconstruction, or modification commenced after May 3, 2011, shall meet the requirements specified in paragraphs (e)(1) and (2) of this section.

(1) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, the owner or operator shall not cause to be discharged into the atmosphere from that affected facility any gases that contain PM in excess of the applicable emissions limit specified in paragraphs (e)(1)(i) or (ii) of this section.

(i) For an affected facility which commenced construction or reconstruction:

(A) 11 ng/J (0.090 lb/MWh) gross energy output; or

(B) 12 ng/J (0.097 lb/MWh) net energy output.

(ii) For an affected facility which commenced modification, the emission limits specified in paragraphs (c) or (d) of this section.

(2) During startup periods and shutdown periods, owners or operators of facilities subject to subpart UUUUU of part 63 of this chapter shall meet the work practice standards specified in Table 3 to subpart UUUUU of part 63 and use the relevant definitions in §63.10042, and owners or operators of facilities subject to subpart DDDDD of part 63 shall meet the work practice standards specified in Table 3 to subpart DDDDD of part 63 and use the relevant definition used in §63.7575.

(f) An owner or operator of an affected facility that meets the conditions in either paragraphs (f)(1) or (2) of this section is exempt from the PM emissions limits in this section.

(1) The affected facility combusts only gaseous or liquid fuels (excluding residual oil) with potential SO₂ emissions rates of 26 ng/J (0.060 lb/MMBtu) or less, and that does not use a post-combustion technology to reduce emissions of SO₂ or PM.

(2) The affected facility is operated under a PM commercial demonstration permit issued by the Administrator according to the provisions of §60.47Da.

[77 FR 9450, Feb. 16, 2012, as amended at 78 FR 24083, Apr. 24, 2013; 79 FR 68788, Nov. 19, 2014]

§60.43Da Standards for sulfur dioxide (SO₂).

(a) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any affected facility which combusts solid fuel or solid-derived fuel and for which construction, reconstruction, or modification commenced before or on February 28, 2005, except as provided under paragraphs (c), (d), (f) or (h) of this section, any gases that contain SO₂ in excess of:

(1) 520 ng/J (1.20 lb/MMBtu) heat input and 10 percent of the potential combustion concentration (90 percent reduction);

(2) 30 percent of the potential combustion concentration (70 percent reduction), when emissions are less than 260 ng/J (0.60 lb/MMBtu) heat input;

(3) 180 ng/J (1.4 lb/MWh) gross energy output; or

(4) 65 ng/J (0.15 lb/MMBtu) heat input.

(b) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any affected facility which combusts liquid or gaseous fuels (except for liquid or gaseous fuels derived from solid fuels and as provided under paragraphs (e) or (h) of this section) and for which construction, reconstruction, or modification commenced before or on February 28, 2005, any gases that contain SO₂ in excess of:

(1) 340 ng/J (0.80 lb/MMBtu) heat input and 10 percent of the potential combustion concentration (90 percent reduction); or

(2) 100 percent of the potential combustion concentration (zero percent reduction) when emissions are less than 86 ng/J (0.20 lb/MMBtu) heat input.

(c) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any affected facility which combusts solid solvent refined coal (SRC-I) any gases that contain SO₂ in excess of 520 ng/J (1.20 lb/MMBtu) heat input and 15 percent of the potential combustion concentration (85 percent reduction) except as provided under paragraph (f) of this section; compliance with the emission limitation is determined on a 30-day rolling average basis and compliance with the percent reduction requirement is determined on a 24-hour basis.

(d) Sulfur dioxide emissions are limited to 520 ng/J (1.20 lb/MMBtu) heat input from any affected facility which:

(1) Combusts 100 percent anthracite;

(2) Is classified as a resource recovery unit; or

(3) Is located in a noncontinental area and combusts solid fuel or solid-derived fuel.

(e) Sulfur dioxide emissions are limited to 340 ng/J (0.80 lb/MMBtu) heat input from any affected facility which is located in a noncontinental area and combusts liquid or gaseous fuels (excluding solid-derived fuels).

(f) The SO₂ standards under this section do not apply to an owner or operator of an affected facility that is operated under an SO₂ commercial demonstration permit issued by the Administrator in accordance with the provisions of §60.47Da.

(g) Compliance with the emission limitation and percent reduction requirements under this section are both determined on a 30-day rolling average basis except as provided under paragraph (c) of this section.

(h) When different fuels are combusted simultaneously, the applicable standard is determined by proration using the following formula:

(1) If emissions of SO₂ to the atmosphere are greater than 260 ng/J (0.60 lb/MMBtu) heat input

$$E_s = \frac{(340x + 520y)}{100} \quad \text{and} \quad \%P_s = 10$$

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(2) If emissions of SO₂ to the atmosphere are equal to or less than 260 ng/J (0.60 lb/MMBtu) heat input:

$$E_s = \frac{(340x + 520y)}{100} \quad \text{and} \quad \%P_s = \frac{(10x + 30y)}{100}$$

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Where:

E_s = Prorated SO₂ emission limit (ng/J heat input);

%P_s = Percentage of potential SO₂ emission allowed;

x = Percentage of total heat input derived from the combustion of liquid or gaseous fuels (excluding solid-derived fuels); and

y = Percentage of total heat input derived from the combustion of solid fuel (including solid-derived fuels).

(i) Except as provided in paragraphs (j) and (k) of this section, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility for which construction, reconstruction, or modification commenced after February 28, 2005, but before May 4, 2011, shall cause to be discharged into the atmosphere from that affected facility, any gases that contain SO₂ in excess of the applicable emissions limit specified in paragraphs (i)(1) through (3) of this section.

(1) For an affected facility which commenced construction, any gases that contain SO₂ in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output; or

(ii) 5 percent of the potential combustion concentration (95 percent reduction).

(2) For an affected facility which commenced reconstruction, any gases that contain SO₂ in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output;

(ii) 65 ng/J (0.15 lb/MMBtu) heat input; or

(iii) 5 percent of the potential combustion concentration (95 percent reduction).

(3) For an affected facility which commenced modification, any gases that contain SO₂ in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output;

(ii) 65 ng/J (0.15 lb/MMBtu) heat input; or

(iii) 10 percent of the potential combustion concentration (90 percent reduction).

(j) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commenced construction, reconstruction, or modification commenced after February 28, 2005, and that burns 75 percent or more (by heat input) coal refuse on a 12-month rolling average basis, shall cause to be discharged into the atmosphere from that affected facility any gases that contain SO₂ in excess of the applicable emission limitation specified in paragraphs (j)(1) through (3) of this section.

(1) For an affected facility for which construction commenced after February 28, 2005, any gases that contain SO₂ in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output on a 30-day rolling average basis; or

(ii) 6 percent of the potential combustion concentration (94 percent reduction) on a 30-day rolling average basis.

(2) For an affected facility for which reconstruction commenced after February 28, 2005, any gases that contain SO₂ in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output on a 30-day rolling average basis;

(ii) 65 ng/J (0.15 lb/MMBtu) heat input on a 30-day rolling average basis; or

(iii) 6 percent of the potential combustion concentration (94 percent reduction) on a 30-day rolling average basis.

(3) For an affected facility for which modification commenced after February 28, 2005, any gases that contain SO₂ in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output on a 30-day rolling average basis;

(ii) 65 ng/J (0.15 lb/MMBtu) heat input on a 30-day rolling average basis; or

(iii) 10 percent of the potential combustion concentration (90 percent reduction) on a 30-day rolling average basis.

(k) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility located in a noncontinental area for which construction, reconstruction, or modification commenced after February 28, 2005, but before May 4, 2011, shall cause to be discharged into the atmosphere from that affected facility any gases that contain SO₂ in excess of the applicable emissions limit specified in paragraphs (k)(1) and (2) of this section.

(1) For an affected facility that burns solid or solid-derived fuel, the owner or operator shall not cause to be discharged into the atmosphere any gases that contain SO₂ in excess of 520 ng/J (1.2 lb/MMBtu) heat input.

(2) For an affected facility that burns other than solid or solid-derived fuel, the owner or operator shall not cause to be discharged into the atmosphere any gases that contain SO₂ in excess of 230 ng/J (0.54 lb/MMBtu) heat input.

(l) Except as provided in paragraphs (j) and (m) of this section, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility for which construction, reconstruction, or modification commenced after May 3, 2011, shall cause to be discharged into the atmosphere from that affected facility, any gases that contain SO₂ in excess of the applicable emissions limit specified in paragraphs (l)(1) and (2) of this section.

(1) For an affected facility which commenced construction or reconstruction, any gases that contain SO₂ in excess of either:

(i) 130 ng/J (1.0 lb/MWh) gross energy output; or

(ii) 140 ng/J (1.2 lb/MWh) net energy output; or

(iii) 3 percent of the potential combustion concentration (97 percent reduction).

(2) For an affected facility which commenced modification, any gases that contain SO₂ in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output; or

(ii) 10 percent of the potential combustion concentration (90 percent reduction).

(m) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility located in a noncontinental area for which construction, reconstruction, or modification commenced after May 3, 2011, shall cause to be discharged into the atmosphere from that affected facility any gases that contain SO₂ in excess of the applicable emissions limit specified in paragraphs (m)(1) and (2) of this section.

(1) For an affected facility that burns solid or solid-derived fuel, the owner or operator shall not cause to be discharged into the atmosphere any gases that contain SO₂ in excess of 520 ng/J (1.2 lb/MMBtu) heat input.

(2) For an affected facility that burns other than solid or solid-derived fuel, the owner or operator shall not cause to be discharged into the atmosphere any gases that contain SO₂ in excess of 230 ng/J (0.54 lb/MMBtu) heat input.

[72 FR 32722, June 13, 2007, as amended at 77 FR 9450, Feb. 16, 2012]

§60.44Da Standards for nitrogen oxides (NO_x).

(a) Except as provided in paragraph (h) of this section, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any affected facility for which construction, reconstruction, or modification commenced before July 10, 1997 any gases that contain NO_x (expressed as NO₂) in excess of the applicable emissions limit in paragraphs (a)(1) and (2) of this section.

(1) The owner or operator shall not cause to be discharged into the atmosphere any gases that contain NO_x in excess of the emissions limit listed in the following table as applicable to the fuel type combusted and as determined on a 30-boiler operating day rolling average basis.

Fuel type	Emission limit for heat input	
	ng/J	lb/MMBtu
Gaseous fuels:		
Coal-derived fuels	210	0.50
All other fuels	86	0.20
Liquid fuels:		
Coal-derived fuels	210	0.50
Shale oil	210	0.50

All other fuels	130	0.30
Solid fuels:		
Coal-derived fuels	210	0.50
Any fuel containing more than 25%, by weight, coal refuse	(¹)	(¹)
Any fuel containing more than 25%, by weight, lignite if the lignite is mined in North Dakota, South Dakota, or Montana, and is combusted in a slag tap furnace ²	340	0.80
Any fuel containing more than 25%, by weight, lignite not subject to the 340 ng/J heat input emission limit ²	260	0.60
Subbituminous coal	210	0.50
Bituminous coal	260	0.60
Anthracite coal	260	0.60
All other fuels	260	0.60

¹Exempt from NO_x standards and NO_x monitoring requirements.

²Any fuel containing less than 25%, by weight, lignite is not prorated but its percentage is added to the percentage of the predominant fuel.

(2) When two or more fuels are combusted simultaneously in an affected facility, the applicable emissions limit (E_n) is determined by proration using the following formula:

$$E_n = \frac{(86w + 130x + 210y + 260z + 340v)}{100}$$

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Where:

E_n = Applicable NO_x emissions limit when multiple fuels are combusted simultaneously (ng/J heat input);

w = Percentage of total heat input derived from the combustion of fuels subject to the 86 ng/J heat input standard;

x = Percentage of total heat input derived from the combustion of fuels subject to the 130 ng/J heat input standard;

y = Percentage of total heat input derived from the combustion of fuels subject to the 210 ng/J heat input standard;

z = Percentage of total heat input derived from the combustion of fuels subject to the 260 ng/J heat input standard;
and

v = Percentage of total heat input delivered from the combustion of fuels subject to the 340 ng/J heat input standard.

(b)-(c) [Reserved]

(d) Except as provided in paragraph (h) of this section, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commenced construction, reconstruction, or modification after July 9, 1997, but before March 1, 2005, shall cause to be discharged into the atmosphere from that affected facility any gases that contain NO_x (expressed as NO₂) in excess of the applicable emissions limit specified in paragraphs (d)(1) and (2) of this section as determined on a 30-boiler operating day rolling average basis.

(1) For an affected facility which commenced construction, any gases that contain NO_x in excess of 200 ng/J (1.6 lb/MWh) gross energy output.

(2) For an affected facility which commenced reconstruction, any gases that contain NO_x in excess of 65 ng/J (0.15 lb/MMBtu) heat input.

(e) Except as provided in paragraphs (f) and (h) of this section, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commenced construction, reconstruction, or modification after February 28, 2005 but before May 4, 2011, shall cause to be discharged into the atmosphere from that affected facility any gases that contain NO_x (expressed as NO₂) in excess of the applicable emissions limit specified in paragraphs (e)(1) through (3) of this section as determined on a 30-boiler operating day rolling average basis.

(1) For an affected facility which commenced construction, any gases that contain NO_x in excess of 130 ng/J (1.0 lb/MWh) gross energy output.

(2) For an affected facility which commenced reconstruction, any gases that contain NO_x in excess of either:

(i) 130 ng/J (1.0 lb/MWh) gross energy output; or

(ii) 47 ng/J (0.11 lb/MMBtu) heat input.

(3) For an affected facility which commenced modification, any gases that contain NO_x in excess of either:

(i) 180 ng/J (1.4 lb/MWh) gross energy output; or

(ii) 65 ng/J (0.15 lb/MMBtu) heat input.

(f) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, the owner or operator of an IGCC electric utility steam generating unit subject to the provisions of this subpart and for which construction, reconstruction, or modification commenced after February 28, 2005 but before May 4, 2011, shall meet the requirements specified in paragraphs (f)(1) through (3) of this section.

(1) Except as provided for in paragraphs (f)(2) and (3) of this section, the owner or operator shall not cause to be discharged into the atmosphere any gases that contain NO_x (expressed as NO₂) in excess of 130 ng/J (1.0 lb/MWh) gross energy output.

(2) When burning liquid fuel exclusively or in combination with solid-derived fuel such that the liquid fuel contributes 50 percent or more of the total heat input to the combined cycle combustion turbine, the owner or operator shall not cause to be discharged into the atmosphere any gases that contain NO_x (expressed as NO₂) in excess of 190 ng/J (1.5 lb/MWh) gross energy output.

(3) In cases when during a 30-boiler operating day rolling average compliance period liquid fuel is burned in such a manner to meet the conditions in paragraph (f)(2) of this section for only a portion of the clock hours in the 30-day compliance period, the owner or operator shall not cause to be discharged into the atmosphere any gases that contain NO_x (expressed as NO₂) in excess of the computed weighted-average emissions limit based on the proportion of gross energy output (in MWh) generated during the compliance period for each of emissions limits in paragraphs (f)(1) and (2) of this section.

(g) Except as provided in paragraphs (h) of this section and §60.45Da, on and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commenced construction, reconstruction, or modification after May 3, 2011,

shall cause to be discharged into the atmosphere from that affected facility any gases that contain NO_x (expressed as NO₂) in excess of the applicable emissions limit specified in paragraphs (g)(1) through (3) of this section.

(1) For an affected facility which commenced construction or reconstruction, any gases that contain NO_x in excess of either:

(i) 88 ng/J (0.70 lb/MWh) gross energy output; or

(ii) 95 ng/J (0.76 lb/MWh) net energy output.

(2) For an affected facility which commenced construction or reconstruction and that burns 75 percent or more coal refuse (by heat input) on a 12-month rolling average basis, any gases that contain NO_x in excess of either:

(i) 110 ng/J (0.85 lb/MWh) gross energy output; or

(ii) 120 ng/J (0.92 lb/MWh) net energy output.

(3) For an affected facility which commenced modification, any gases that contain NO_x in excess of 140 ng/J (1.1 lb/MWh) gross energy output.

(h) The NO_x emissions limits under this section do not apply to an owner or operator of an affected facility which is operating under a commercial demonstration permit issued by the Administrator in accordance with the provisions of §60.47Da.

[77 FR 9451, Feb. 16, 2012]

ATTACHMENT C

European Union Standards

DIRECTIVES

DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**of 24 November 2010****on industrial emissions (integrated pollution prevention and control)
(Recast)****(Text with EEA relevance)**

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 192(1) thereof,

Having regard to the proposal from the European Commission,

Having regard to the opinion of the European Economic and Social Committee ⁽¹⁾,

Having regard to the opinion of the Committee of the Regions ⁽²⁾,

Acting in accordance with the ordinary legislative procedure ⁽³⁾,

Whereas:

- (1) A number of substantial changes are to be made to Council Directive 78/176/EEC of 20 February 1978 on waste from the titanium dioxide industry ⁽⁴⁾, Council Directive 82/883/EEC of 3 December 1982 on procedures for the surveillance and monitoring of environments concerned by waste from the titanium dioxide industry ⁽⁵⁾, Council Directive 92/112/EEC of 15 December 1992 on procedures for harmonising the programmes for the reduction and eventual elimination of pollution caused by waste from the titanium dioxide industry ⁽⁶⁾, Council Directive 1999/13/EC of 11 March 1999 on the limitation of

emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations ⁽⁷⁾, Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste ⁽⁸⁾, Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants ⁽⁹⁾ and Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control ⁽¹⁰⁾. In the interests of clarity, those Directives should be recast.

- (2) In order to prevent, reduce and as far as possible eliminate pollution arising from industrial activities in compliance with the 'polluter pays' principle and the principle of pollution prevention, it is necessary to establish a general framework for the control of the main industrial activities, giving priority to intervention at source, ensuring prudent management of natural resources and taking into account, when necessary, the economic situation and specific local characteristics of the place in which the industrial activity is taking place.
- (3) Different approaches to controlling emissions into air, water or soil separately may encourage the shifting of pollution from one environmental medium to another rather than protecting the environment as a whole. It is, therefore, appropriate to provide for an integrated approach to prevention and control of emissions into air, water and soil, to waste management, to energy efficiency and to accident prevention. Such an approach will also contribute to the achievement of a level playing field in the Union by aligning environmental performance requirements for industrial installations.

⁽¹⁾ OJ C 182, 4.8.2009, p. 46.

⁽²⁾ OJ C 325, 19.12.2008, p. 60.

⁽³⁾ Position of the European Parliament of 10 March 2009 (OJ C 87 E, 1.4.2010, p. 191) and position of the Council at first reading of 15 February 2010 (OJ C 107 E, 27.4.2010, p. 1). Position of the European Parliament of 7 July 2010 (not yet published in the Official Journal) and decision of the Council of 8 November 2010.

⁽⁴⁾ OJ L 54, 25.2.1978, p. 19.

⁽⁵⁾ OJ L 378, 31.12.1982, p. 1.

⁽⁶⁾ OJ L 409, 31.12.1992, p. 11.

⁽⁷⁾ OJ L 85, 29.3.1999, p. 1.

⁽⁸⁾ OJ L 332, 28.12.2000, p. 91.

⁽⁹⁾ OJ L 309, 27.11.2001, p. 1.

⁽¹⁰⁾ OJ L 24, 29.1.2008, p. 8.

- (4) It is appropriate to revise the legislation relating to industrial installations in order to simplify and clarify the existing provisions, reduce unnecessary administrative burden and implement the conclusions of the Commission Communications of 21 September 2005 on the Thematic Strategy on Air Pollution (hereinafter the Thematic Strategy on Air Pollution), of 22 September 2006 on the Thematic Strategy for Soil Protection and of 21 December 2005 on the Thematic Strategy on the Prevention and Recycling of Waste adopted as a follow-up to Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme ⁽¹⁾. Those Communications set objectives to protect human health and the environment which cannot be met without further reductions in emissions arising from industrial activities.
- (5) In order to ensure the prevention and control of pollution, each installation should operate only if it holds a permit or, in the case of certain installations and activities using organic solvents, only if it holds a permit or is registered.
- (6) It is for Member States to determine the approach for assigning responsibilities to operators of installations provided that compliance with this Directive is ensured. Member States may choose to grant a permit to one responsible operator for each installation or to specify the responsibility amongst several operators of different parts of an installation. Where its current legal system provides for only one responsible operator for each installation, a Member State may decide to retain this system.
- (7) In order to facilitate the granting of permits, Member States should be able to set requirements for certain categories of installations in general binding rules.
- (8) It is important to prevent accidents and incidents and limit their consequences. Liability regarding the environmental consequences of accidents and incidents is a matter for relevant national law and, where applicable, other relevant Union law.
- (9) In order to avoid duplication of regulation, the permit for an installation covered by Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community ⁽²⁾ should not include an emission limit value for direct emissions of the greenhouse gases specified in Annex I to that Directive except where it is necessary to ensure that no significant local pollution is caused or where an installation is excluded from that scheme.
- (10) In accordance with Article 193 of the Treaty on the Functioning of the European Union (TFEU), this Directive does not prevent Member States from maintaining or introducing more stringent protective measures, for example greenhouse gas emission requirements, provided that such measures are compatible with the Treaties and the Commission has been notified.
- (11) Operators should submit permit applications containing the information necessary for the competent authority to set permit conditions. Operators should be able to use information resulting from the application of Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment ⁽³⁾ and of Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances ⁽⁴⁾ when submitting permit applications.
- (12) The permit should include all the measures necessary to achieve a high level of protection of the environment as a whole and to ensure that the installation is operated in accordance with the general principles governing the basic obligations of the operator. The permit should also include emission limit values for polluting substances, or equivalent parameters or technical measures, appropriate requirements to protect the soil and groundwater and monitoring requirements. Permit conditions should be set on the basis of best available techniques.
- (13) In order to determine best available techniques and to limit imbalances in the Union as regards the level of emissions from industrial activities, reference documents for best available techniques (hereinafter BAT reference documents) should be drawn up, reviewed and, where necessary, updated through an exchange of information with stakeholders and the key elements of BAT reference documents (hereinafter BAT conclusions) adopted through committee procedure. In this respect, the Commission should, through committee procedure, establish guidance on the collection of data, on the elaboration of BAT reference documents and on their quality assurance. BAT conclusions should be the reference for setting permit conditions. They can be supplemented by other sources. The Commission should aim to update BAT reference documents not later than 8 years after the publication of the previous version.

⁽¹⁾ OJ L 242, 10.9.2002, p. 1.

⁽²⁾ OJ L 275, 25.10.2003, p. 32.

⁽³⁾ OJ L 175, 5.7.1985, p. 40.

⁽⁴⁾ OJ L 10, 14.1.1997, p. 13.

- (14) In order to ensure an effective and active exchange of information resulting in high-quality BAT reference documents, the Commission should establish a forum that functions in a transparent manner. Practical arrangements for the exchange of information and the accessibility of BAT reference documents should be laid down, in particular to ensure that Member States and stakeholders provide data of sufficient quality and quantity based on established guidance to enable the determination of best available techniques and emerging techniques.
- (15) It is important to provide sufficient flexibility to competent authorities to set emission limit values that ensure that, under normal operating conditions, emissions do not exceed the emission levels associated with the best available techniques. To this end, the competent authority may set emission limits that differ from the emission levels associated with the best available techniques in terms of the values, periods of time and reference conditions applied, so long as it can be demonstrated, through the results of emission monitoring, that emissions have not exceeded the emission levels associated with the best available techniques. Compliance with the emission limit values that are set in permits results in emissions below those emission limit values.
- (16) In order to take into account certain specific circumstances where the application of emission levels associated with the best available techniques would lead to disproportionately high costs compared to the environmental benefits, competent authorities should be able to set emission limit values deviating from those levels. Such deviations should be based on an assessment taking into account well-defined criteria. The emission limit values set out in this Directive should not be exceeded. In any event, no significant pollution should be caused and a high level of protection of the environment taken as a whole should be achieved.
- (17) In order to enable operators to test emerging techniques which could provide for a higher general level of environmental protection, or at least the same level of environmental protection and higher cost savings than existing best available techniques, the competent authority should be able to grant temporary derogations from emission levels associated with the best available techniques.
- (18) Changes to an installation may give rise to higher levels of pollution. Operators should notify the competent authority of any planned change which might affect the environment. Substantial changes to installations which may have significant negative effects on human health or the environment should not be made without a permit granted in accordance with this Directive.
- (19) The spreading of manure contributes significantly to emissions of pollutants into air and water. With a view to meeting the objectives set out in the Thematic Strategy on Air Pollution and Union law on water protection, it is necessary for the Commission to review the need to establish the most suitable controls of these emissions through the application of best available techniques.
- (20) The intensive rearing of poultry and cattle contributes significantly to emissions of pollutants into air and water. With a view to meeting the objectives set out in the Thematic Strategy on Air Pollution and in Union law on water protection, it is necessary for the Commission to review the need to establish differentiated capacity thresholds for different poultry species in order to define the scope of this Directive and to review the need to establish the most suitable controls on emissions from cattle rearing installations.
- (21) In order to take account of developments in best available techniques or other changes to an installation, permit conditions should be reconsidered regularly and, where necessary, updated, in particular where new or updated BAT conclusions are adopted.
- (22) In specific cases where permit reconsideration and updating identifies that a longer period than 4 years after the publication of a decision on BAT conclusions might be needed to introduce new best available techniques, competent authorities may set a longer time period in permit conditions where this is justified on the basis of the criteria laid down in this Directive.
- (23) It is necessary to ensure that the operation of an installation does not lead to a deterioration of the quality of soil and groundwater. Permit conditions should, therefore, include appropriate measures to prevent emissions to soil and groundwater and regular surveillance of those measures to avoid leaks, spills, incidents or accidents occurring during the use of equipment and during storage. In order to detect possible soil and groundwater pollution at an early stage and, therefore, to take appropriate corrective measures before the pollution spreads, the monitoring of soil and groundwater for relevant hazardous substances is also necessary. When determining the frequency of monitoring, the type of prevention measures and the extent and occurrence of their surveillance may be considered.

- (24) In order to ensure that the operation of an installation does not deteriorate the quality of soil and groundwater, it is necessary to establish, through a baseline report, the state of soil and groundwater contamination. The baseline report should be a practical tool that permits, as far as possible, a quantified comparison between the state of the site described in that report and the state of the site upon definitive cessation of activities, in order to ascertain whether a significant increase in pollution of soil or groundwater has taken place. The baseline report should, therefore, contain information making use of existing data on soil and groundwater measurements and historical data related to past uses of the site.
- (25) In accordance with the polluter pays principle, when assessing the level of significance of the pollution of soil and groundwater caused by the operator which would trigger the obligation to return the site to the state described in the baseline report, Member States should take into account the permit conditions that have applied over the lifetime of the activity concerned, the pollution prevention measures adopted for the installation, and the relative increase in pollution compared to the contamination load identified in the baseline report. Liability regarding pollution not caused by the operator is a matter for relevant national law and, where applicable, other relevant Union law.
- (26) In order to ensure the effective implementation and enforcement of this Directive, operators should regularly report to the competent authority on compliance with permit conditions. Member States should ensure that the operator and the competent authority each take necessary measures in the event of non-compliance with this Directive and provide for a system of environmental inspections. Member States should ensure that sufficient staff are available with the skills and qualifications needed to carry out those inspections effectively.
- (27) In accordance with the Århus Convention on access to information, public participation in decision-making and access to justice in environmental matters ⁽¹⁾, effective public participation in decision-making is necessary to enable the public to express, and the decision-maker to take account of, opinions and concerns which may be relevant to those decisions, thereby increasing the accountability and transparency of the decision-making process and contributing to public awareness of environmental issues and support for the decisions taken. Members of the public concerned should have access to justice in order to contribute to the protection of the right to live in an environment which is adequate for personal health and well-being.
- (28) The combustion of fuel in installations with a total rated thermal input below 50 MW contributes significantly to emissions of pollutants into the air. With a view to meeting the objectives set out in the Thematic Strategy on Air Pollution, it is necessary for the Commission to review the need to establish the most suitable controls on emissions from such installations. That review should take into account the specificities of combustion plants used in healthcare facilities, in particular with regard to their exceptional use in the case of emergencies.
- (29) Large combustion plants contribute greatly to emissions of polluting substances into the air resulting in a significant impact on human health and the environment. In order to reduce that impact and to work towards meeting the requirements of Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants ⁽²⁾ and the objectives set out in the Thematic Strategy on Air Pollution, it is necessary to set more stringent emission limit values at Union level for certain categories of combustion plants and pollutants.
- (30) The Commission should review the need to establish Union-wide emission limit values and to amend the emission limit values set out in Annex V for certain large combustion plants, taking into account the review and update of the relevant BAT reference documents. In this context, the Commission should consider the specificity of the energy systems of refineries.
- (31) Due to the characteristics of certain indigenous solid fuels, it is appropriate to apply minimum desulphurisation rates rather than emission limit values for sulphur dioxide for combustion plants firing such fuels. Moreover, as the specific characteristics of oil shale may not allow the application of the same sulphur abatement techniques or the achievement of the same desulphurisation efficiency as for other fuels, a slightly lower minimum desulphurisation rate for plants using this fuel is appropriate.
- (32) In the case of a sudden interruption in the supply of low-sulphur fuel or gas resulting from a serious shortage, the competent authority should be able to grant temporary derogations to allow emissions of the combustion plants concerned to exceed the emission limit values set out in this Directive.

⁽¹⁾ OJ L 124, 17.5.2005, p. 4.

⁽²⁾ OJ L 309, 27.11.2001, p. 22.

- (33) The operator concerned should not operate a combustion plant for more than 24 hours after malfunctioning or breakdown of abatement equipment and unabated operation should not exceed 120 hours in a 12-month period in order to limit the negative effects of pollution on the environment. However, where there is an overriding need for energy supplies or it is necessary to avoid an overall increase of emissions resulting from the operation of another combustion plant, competent authorities should be able to grant a derogation from those time limits.
- (34) In order to ensure a high level of environmental and human health protection and to avoid transboundary movements of waste to plants operating at lower environmental standards, it is necessary to set and maintain stringent operating conditions, technical requirements and emission limit values for plants incinerating or co-incinerating waste within the Union.
- (35) The use of organic solvents in certain activities and installations gives rise to emissions of organic compounds into the air which contribute to the local and transboundary formation of photochemical oxidants which causes damage to natural resources and has harmful effects on human health. It is, therefore, necessary to take preventive action against the use of organic solvents and to establish a requirement to comply with emission limit values for organic compounds and appropriate operating conditions. Operators should be allowed to comply with the requirements of a reduction scheme instead of complying with the emission limit values set out in this Directive where other measures, such as the use of low-solvent or solvent-free products or techniques, provide alternative means of achieving equivalent emission reduction.
- (36) Installations producing titanium dioxide can give rise to significant pollution into air and water. In order to reduce these impacts, it is necessary to set at Union level more stringent emission limit values for certain polluting substances.
- (37) With regard to the inclusion in the scope of national laws, regulations and administrative provisions brought into force in order to comply with this Directive of installations for the manufacturing of ceramic products by firings, on the basis of the characteristics of the national industrial sector, and in order to grant clear interpretation of the scope, Member States should decide whether to apply both the criteria, production capacity and kiln capacity, or just one of the two criteria.
- (38) In order to simplify reporting and reduce unnecessary administrative burden, the Commission should identify methods to streamline the way in which data are made available pursuant to this Directive with the other requirements of Union law, and in particular Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register ⁽¹⁾.
- (39) In order to ensure uniform conditions for implementation, implementing powers should be conferred on the Commission to adopt guidance on the collection of data, on the drawing up of BAT reference documents and on their quality assurance, including the suitability of their content and format, to adopt decisions on BAT conclusions, to establish detailed rules on the determination of start-up and shut-down periods and for transitional national plans for large combustion plants, and to establish the type, format and frequency of information that Member States are to make available to the Commission. In accordance with Article 291 TFEU, rules and general principles concerning mechanisms for the control by Member States of the Commission's exercise of implementing powers are to be laid down in advance by a regulation adopted in accordance with the ordinary legislative procedure. Pending the adoption of that new regulation, Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission ⁽²⁾ continues to apply, with the exception of the regulatory procedure with scrutiny, which is not applicable.
- (40) The Commission should be empowered to adopt delegated acts in accordance with Article 290 TFEU in respect of the setting of the date from which continuous measurements of emissions into the air of heavy metals and dioxins and furans are to be carried out, and the adaptation of certain parts of Annexes V, VI and VII to scientific and technical progress. In the case of waste incineration plants and waste co-incineration plants, this may include, inter alia, the establishment of criteria to allow derogations from continuous monitoring of total dust emissions. It is of particular importance that the Commission carry out appropriate consultations during its preparatory work, including at expert level.
- (41) In order to address significant environmental pollution, for example from heavy metals and dioxins and furans, the Commission should, based on an assessment of the implementation of the best available techniques by certain activities or of the impact of those activities on the environment as a whole, present proposals for Union-wide minimum requirements for emission limit values and for rules on monitoring and compliance.
- (42) Member States should lay down rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive and ensure that they are implemented. Those penalties should be effective, proportionate and dissuasive.

⁽¹⁾ OJ L 33, 4.2.2006, p. 1.

⁽²⁾ OJ L 184, 17.7.1999, p. 23.

(43) In order to provide existing installations with sufficient time to adapt technically to the new requirements of this Directive, some of the new requirements should apply to those installations after a fixed period from the date of application of this Directive. Combustion plants need sufficient time to install the necessary abatement measures to meet the emission limit values set out in Annex V.

(44) Since the objectives of this Directive, namely to ensure a high level of environmental protection and the improvement of environmental quality, cannot be sufficiently achieved by Member States and can, therefore, by reason of the transboundary nature of pollution from industrial activities, be better achieved at Union level, the Union may adopt measures in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.

(45) This Directive respects the fundamental rights and observes the principles recognised in particular by the Charter of Fundamental Rights of the European Union. In particular, this Directive seeks to promote the application of Article 37 of that Charter.

(46) The obligation to transpose this Directive into national law should be confined to those provisions which represent a substantive change as compared with the earlier Directives. The obligation to transpose the provisions which are unchanged arises under the earlier Directives.

(47) In accordance with paragraph 34 of the Interinstitutional agreement on better law-making ⁽¹⁾, Member States are encouraged to draw up, for themselves and in the interests of the Union, their own tables, which will as far as possible, illustrate the correlation between this Directive and the transposition measures, and to make those tables public.

(48) This Directive should be without prejudice to the obligations of the Member States relating to the time-limits for transposition into national law and application of the Directives set out in Annex IX, Part B,

HAVE ADOPTED THIS DIRECTIVE:

CHAPTER I

COMMON PROVISIONS

Article 1

Subject matter

This Directive lays down rules on integrated prevention and control of pollution arising from industrial activities.

⁽¹⁾ OJ C 321, 31.12.2003, p. 1.

It also lays down rules designed to prevent or, where that is not practicable, to reduce emissions into air, water and land and to prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole.

Article 2

Scope

1. This Directive shall apply to the industrial activities giving rise to pollution referred to in Chapters II to VI.

2. This Directive shall not apply to research activities, development activities or the testing of new products and processes.

Article 3

Definitions

For the purposes of this Directive the following definitions shall apply:

(1) 'substance' means any chemical element and its compounds, with the exception of the following substances:

(a) radioactive substances as defined in Article 1 of Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation ⁽²⁾;

(b) genetically modified micro-organisms as defined in Article 2(b) of Directive 2009/41/EC of the European Parliament and the Council of 6 May 2009 on the contained use of genetically modified micro-organisms ⁽³⁾;

(c) genetically modified organisms as defined in point 2 of Article 2 of Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms ⁽⁴⁾;

(2) 'pollution' means the direct or indirect introduction, as a result of human activity, of substances, vibrations, heat or noise into air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment;

⁽²⁾ OJ L 159, 29.6.1996, p. 1.

⁽³⁾ OJ L 125, 21.5.2009, p. 75.

⁽⁴⁾ OJ L 106, 17.4.2001, p. 1.

- (3) 'installation' means a stationary technical unit within which one or more activities listed in Annex I or in Part 1 of Annex VII are carried out, and any other directly associated activities on the same site which have a technical connection with the activities listed in those Annexes and which could have an effect on emissions and pollution;
- (4) 'emission' means the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into air, water or land;
- (5) 'emission limit value' means the mass, expressed in terms of certain specific parameters, concentration and/or level of an emission, which may not be exceeded during one or more periods of time;
- (6) 'environmental quality standard' means the set of requirements which must be fulfilled at a given time by a given environment or particular part thereof, as set out in Union law;
- (7) 'permit' means a written authorisation to operate all or part of an installation or combustion plant, waste incineration plant or waste co-incineration plant;
- (8) 'general binding rules' means emission limit values or other conditions, at least at sector level, that are adopted with the intention of being used directly to set permit conditions;
- (9) 'substantial change' means a change in the nature or functioning, or an extension, of an installation or combustion plant, waste incineration plant or waste co-incineration plant which may have significant negative effects on human health or the environment;
- (10) 'best available techniques' means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole:
 - (a) 'techniques' includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned;
 - (b) 'available techniques' means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator;
 - (c) 'best' means most effective in achieving a high general level of protection of the environment as a whole;
- (11) 'BAT reference document' means a document, resulting from the exchange of information organised pursuant to Article 13, drawn up for defined activities and describing, in particular, applied techniques, present emissions and consumption levels, techniques considered for the determination of best available techniques as well as BAT conclusions and any emerging techniques, giving special consideration to the criteria listed in Annex III;
- (12) 'BAT conclusions' means a document containing the parts of a BAT reference document laying down the conclusions on best available techniques, their description, information to assess their applicability, the emission levels associated with the best available techniques, associated monitoring, associated consumption levels and, where appropriate, relevant site remediation measures;
- (13) 'emission levels associated with the best available techniques' means the range of emission levels obtained under normal operating conditions using a best available technique or a combination of best available techniques, as described in BAT conclusions, expressed as an average over a given period of time, under specified reference conditions;
- (14) 'emerging technique' means a novel technique for an industrial activity that, if commercially developed, could provide either a higher general level of protection of the environment or at least the same level of protection of the environment and higher cost savings than existing best available techniques;
- (15) 'operator' means any natural or legal person who operates or controls in whole or in part the installation or combustion plant, waste incineration plant or waste co-incineration plant or, where this is provided for in national law, to whom decisive economic power over the technical functioning of the installation or plant has been delegated;
- (16) 'the public' means one or more natural or legal persons and, in accordance with national law or practice, their associations, organisations or groups;
- (17) 'the public concerned' means the public affected or likely to be affected by, or having an interest in, the taking of a decision on the granting or the updating of a permit or of permit conditions; for the purposes of this definition, non-governmental organisations promoting environmental protection and meeting any requirements under national law shall be deemed to have an interest;

- (18) 'hazardous substances' means substances or mixtures as defined in Article 3 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures ⁽¹⁾;
- (19) 'baseline report' means information on the state of soil and groundwater contamination by relevant hazardous substances;
- (20) 'groundwater' means groundwater as defined in point 2 of Article 2 of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy ⁽²⁾;
- (21) 'soil' means the top layer of the Earth's crust situated between the bedrock and the surface. The soil is composed of mineral particles, organic matter, water, air and living organisms;
- (22) 'environmental inspection' means all actions, including site visits, monitoring of emissions and checks of internal reports and follow-up documents, verification of self-monitoring, checking of the techniques used and adequacy of the environment management of the installation, undertaken by or on behalf of the competent authority to check and promote compliance of installations with their permit conditions and, where necessary, to monitor their environmental impact;
- (23) 'poultry' means poultry as defined in point 1 of Article 2 of Council Directive 90/539/EEC of 15 October 1990 on animal health conditions governing intra-Community trade in, and imports from third countries of, poultry and hatching eggs ⁽³⁾;
- (24) 'fuel' means any solid, liquid or gaseous combustible material;
- (25) 'combustion plant' means any technical apparatus in which fuels are oxidised in order to use the heat thus generated;
- (26) 'stack' means a structure containing one or more flues providing a passage for waste gases in order to discharge them into the air;
- (27) 'operating hours' means the time, expressed in hours, during which a combustion plant, in whole or in part, is operating and discharging emissions into the air, excluding start-up and shut-down periods;
- (28) 'rate of desulphurisation' means the ratio over a given period of time of the quantity of sulphur which is not emitted into air by a combustion plant to the quantity of sulphur contained in the solid fuel which is introduced into the combustion plant facilities and which is used in the plant over the same period of time;
- (29) 'indigenous solid fuel' means a naturally occurring solid fuel fired in a combustion plant specifically designed for that fuel and extracted locally;
- (30) 'determinative fuel' means the fuel which, amongst all fuels used in a multi-fuel firing combustion plant using the distillation and conversion residues from the refining of crude-oil for own consumption, alone or with other fuels, has the highest emission limit value as set out in Part 1 of Annex V, or, in the case of several fuels having the same emission limit value, the fuel having the highest thermal input amongst those fuels;
- (31) 'biomass' means any of the following:
- (a) products consisting of any vegetable matter from agriculture or forestry which can be used as a fuel for the purpose of recovering its energy content;
 - (b) the following waste:
 - (i) vegetable waste from agriculture and forestry;
 - (ii) vegetable waste from the food processing industry, if the heat generated is recovered;
 - (iii) fibrous vegetable waste from virgin pulp production and from production of paper from pulp, if it is co-incinerated at the place of production and the heat generated is recovered;
 - (iv) cork waste;
 - (v) wood waste with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coating and which includes, in particular, such wood waste originating from construction and demolition waste;
- (32) 'multi-fuel firing combustion plant' means any combustion plant which may be fired simultaneously or alternately by two or more types of fuel;
- (33) 'gas turbine' means any rotating machine which converts thermal energy into mechanical work, consisting mainly of a compressor, a thermal device in which fuel is oxidised in order to heat the working fluid, and a turbine;
- (34) 'gas engine' means an internal combustion engine which operates according to the Otto cycle and uses spark ignition or, in case of dual fuel engines, compression ignition to burn fuel;

⁽¹⁾ OJ L 353, 31.12.2008, p. 1.

⁽²⁾ OJ L 327, 22.12.2000, p. 1.

⁽³⁾ OJ L 303, 31.10.1990, p. 6.

- (35) 'diesel engine' means an internal combustion engine which operates according to the diesel cycle and uses compression ignition to burn fuel;
- (36) 'small isolated system' means a small isolated system as defined in point 26 of Article 2 of Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity ⁽¹⁾;
- (37) 'waste' means waste as defined in point 1 of Article 3 of Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste ⁽²⁾;
- (38) 'hazardous waste' means hazardous waste as defined in point 2 of Article 3 of Directive 2008/98/EC;
- (39) 'mixed municipal waste' means waste from households as well as commercial, industrial and institutional waste which, because of its nature and composition, is similar to waste from households, but excluding fractions indicated under heading 20 01 of the Annex to Decision 2000/532/EC ⁽³⁾ that are collected separately at source and excluding the other waste indicated under heading 20 02 of that Annex;
- (40) 'waste incineration plant' means any stationary or mobile technical unit and equipment dedicated to the thermal treatment of waste, with or without recovery of the combustion heat generated, through the incineration by oxidation of waste as well as other thermal treatment processes, such as pyrolysis, gasification or plasma process, if the substances resulting from the treatment are subsequently incinerated;
- (41) 'waste co-incineration plant' means any stationary or mobile technical unit whose main purpose is the generation of energy or production of material products and which uses waste as a regular or additional fuel or in which waste is thermally treated for the purpose of disposal through the incineration by oxidation of waste as well as other thermal treatment processes, such as pyrolysis, gasification or plasma process, if the substances resulting from the treatment are subsequently incinerated;
- (42) 'nominal capacity' means the sum of the incineration capacities of the furnaces of which a waste incineration plant or a waste co-incineration plant is composed, as specified by the constructor and confirmed by the operator, with due account being taken of the calorific value of the waste, expressed as the quantity of waste incinerated per hour;
- (43) 'dioxins and furans' means all polychlorinated dibenzo-p-dioxins and dibenzofurans listed in Part 2 of Annex VI;
- (44) 'organic compound' means any compound containing at least the element carbon and one or more of hydrogen, halogens, oxygen, sulphur, phosphorus, silicon or nitrogen, with the exception of carbon oxides and inorganic carbonates and bicarbonates;
- (45) 'volatile organic compound' means any organic compound as well as the fraction of creosote, having at 293,15 K a vapour pressure of 0,01 kPa or more, or having a corresponding volatility under the particular conditions of use;
- (46) 'organic solvent' means any volatile organic compound which is used for any of the following:
- (a) alone or in combination with other agents, and without undergoing a chemical change, to dissolve raw materials, products or waste materials;
 - (b) as a cleaning agent to dissolve contaminants;
 - (c) as a dissolver;
 - (d) as a dispersion medium;
 - (e) as a viscosity adjuster;
 - (f) as a surface tension adjuster;
 - (g) as a plasticiser;
 - (h) as a preservative;
- (47) 'coating' means coating as defined in point 8 of Article 2 of Directive 2004/42/EC of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products ⁽⁴⁾.

Article 4

Obligation to hold a permit

1. Member States shall take the necessary measures to ensure that no installation or combustion plant, waste incineration plant or waste co-incineration plant is operated without a permit.

By way of derogation from the first subparagraph, Member States may set a procedure for the registration of installations covered only by Chapter V.

The procedure for registration shall be specified in a binding act and include at least a notification to the competent authority by the operator of the intention to operate an installation.

⁽¹⁾ OJ L 176, 15.7.2003, p. 37.

⁽²⁾ OJ L 312, 22.11.2008, p. 3.

⁽³⁾ Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (OJ L 226, 6.9.2000, p. 3).

⁽⁴⁾ OJ L 143, 30.4.2004, p. 87.

2. Member States may opt to provide that a permit cover two or more installations or parts of installations operated by the same operator on the same site.

Where a permit covers two or more installations, it shall contain conditions to ensure that each installation complies with the requirements of this Directive.

3. Member States may opt to provide that a permit cover several parts of an installation operated by different operators. In such cases, the permit shall specify the responsibilities of each operator.

Article 5

Granting of a permit

1. Without prejudice to other requirements laid down in national or Union law, the competent authority shall grant a permit if the installation complies with the requirements of this Directive.

2. Member States shall take the measures necessary to ensure that the conditions of, and the procedures for the granting of, the permit are fully coordinated where more than one competent authority or more than one operator is involved or more than one permit is granted, in order to guarantee an effective integrated approach by all authorities competent for this procedure.

3. In the case of a new installation or a substantial change where Article 4 of Directive 85/337/EEC applies, any relevant information obtained or conclusion arrived at pursuant to Articles 5, 6, 7 and 9 of that Directive shall be examined and used for the purposes of granting the permit.

Article 6

General binding rules

Without prejudice to the obligation to hold a permit, Member States may include requirements for certain categories of installations, combustion plants, waste incineration plants or waste co-incineration plants in general binding rules.

Where general binding rules are adopted, the permit may simply include a reference to such rules.

Article 7

Incidents and accidents

Without prejudice to Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage ⁽¹⁾, in the event of any incident or accident significantly affecting the environment, Member States shall take the necessary measures to ensure that:

- (a) the operator informs the competent authority immediately;
- (b) the operator immediately takes the measures to limit the environmental consequences and to prevent further possible incidents or accidents;
- (c) the competent authority requires the operator to take any appropriate complementary measures that the competent authority considers necessary to limit the environmental consequences and to prevent further possible incidents or accidents.

Article 8

Non-compliance

1. Member States shall take the necessary measures to ensure that the permit conditions are complied with.

2. In the event of a breach of the permit conditions, Member States shall ensure that:

- (a) the operator immediately informs the competent authority;
- (b) the operator immediately takes the measures necessary to ensure that compliance is restored within the shortest possible time;
- (c) the competent authority requires the operator to take any appropriate complementary measures that the competent authority considers necessary to restore compliance.

Where the breach of the permit conditions poses an immediate danger to human health or threatens to cause an immediate significant adverse effect upon the environment, and until compliance is restored in accordance with points (b) and (c) of the first subparagraph, the operation of the installation, combustion plant, waste incineration plant, waste co-incineration plant or relevant part thereof shall be suspended.

Article 9

Emission of greenhouse gases

1. Where emissions of a greenhouse gas from an installation are specified in Annex I to Directive 2003/87/EC in relation to an activity carried out in that installation, the permit shall not include an emission limit value for direct emissions of that gas, unless necessary to ensure that no significant local pollution is caused.

2. For activities listed in Annex I to Directive 2003/87/EC, Member States may choose not to impose requirements relating to energy efficiency in respect of combustion units or other units emitting carbon dioxide on the site.

⁽¹⁾ OJ L 143, 30.4.2004, p. 56.

3. Where necessary, the competent authorities shall amend the permit as appropriate.

4. Paragraphs 1 to 3 shall not apply to installations which are temporarily excluded from the scheme for greenhouse gas emission allowance trading within the Union in accordance with Article 27 of Directive 2003/87/EC.

CHAPTER II

PROVISIONS FOR ACTIVITIES LISTED IN ANNEX I

Article 10

Scope

This Chapter shall apply to the activities set out in Annex I and, where applicable, reaching the capacity thresholds set out in that Annex.

Article 11

General principles governing the basic obligations of the operator

Member States shall take the necessary measures to provide that installations are operated in accordance with the following principles:

- (a) all the appropriate preventive measures are taken against pollution;
- (b) the best available techniques are applied;
- (c) no significant pollution is caused;
- (d) the generation of waste is prevented in accordance with Directive 2008/98/EC;
- (e) where waste is generated, it is, in order of priority and in accordance with Directive 2008/98/EC, prepared for re-use, recycled, recovered or, where that is technically and economically impossible, it is disposed of while avoiding or reducing any impact on the environment;
- (f) energy is used efficiently;
- (g) the necessary measures are taken to prevent accidents and limit their consequences;
- (h) the necessary measures are taken upon definitive cessation of activities to avoid any risk of pollution and return the site of operation to the satisfactory state defined in accordance with Article 22.

Article 12

Applications for permits

1. Member States shall take the necessary measures to ensure that an application for a permit includes a description of the following:

- (a) the installation and its activities;
- (b) the raw and auxiliary materials, other substances and the energy used in or generated by the installation;
- (c) the sources of emissions from the installation;
- (d) the conditions of the site of the installation;
- (e) where applicable, a baseline report in accordance with Article 22(2);
- (f) the nature and quantities of foreseeable emissions from the installation into each medium as well as identification of significant effects of the emissions on the environment;
- (g) the proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the installation;
- (h) measures for the prevention, preparation for re-use, recycling and recovery of waste generated by the installation;
- (i) further measures planned to comply with the general principles of the basic obligations of the operator as provided for in Article 11;
- (j) measures planned to monitor emissions into the environment;
- (k) the main alternatives to the proposed technology, techniques and measures studied by the applicant in outline.

An application for a permit shall also include a non-technical summary of the details referred to in the first subparagraph.

2. Where information supplied in accordance with the requirements provided for in Directive 85/337/EEC or a safety report prepared in accordance with Directive 96/82/EC or other information produced in response to other legislation fulfils any of the requirements of paragraph 1, that information may be included in, or attached to, the application.

Article 13

BAT reference documents and exchange of information

1. In order to draw up, review and, where necessary, update BAT reference documents, the Commission shall organise an exchange of information between Member States, the industries concerned, non-governmental organisations promoting environmental protection and the Commission.

2. The exchange of information shall, in particular, address the following:

- (a) the performance of installations and techniques in terms of emissions, expressed as short- and long-term averages, where appropriate, and the associated reference conditions, consumption and nature of raw materials, water consumption, use of energy and generation of waste;
- (b) the techniques used, associated monitoring, cross-media effects, economic and technical viability and developments therein;
- (c) best available techniques and emerging techniques identified after considering the issues mentioned in points (a) and (b).

3. The Commission shall establish and regularly convene a forum composed of representatives of Member States, the industries concerned and non-governmental organisations promoting environmental protection.

The Commission shall obtain the opinion of the forum on the practical arrangements for the exchange of information and, in particular, on the following:

- (a) the rules of procedure of the forum;
- (b) the work programme for the exchange of information;
- (c) guidance on the collection of data;
- (d) guidance on the drawing up of BAT reference documents and on their quality assurance including the suitability of their content and format.

The guidance referred to in points (c) and (d) of the second subparagraph shall take account of the opinion of the forum and shall be adopted in accordance with the regulatory procedure referred to in Article 75(2).

4. The Commission shall obtain and make publicly available the opinion of the forum on the proposed content of the BAT reference documents and shall take into account this opinion for the procedures laid down in paragraph 5.

5. Decisions on the BAT conclusions shall be adopted in accordance with the regulatory procedure referred to in Article 75(2).

6. After the adoption of a decision in accordance with paragraph 5, the Commission shall without delay make the BAT reference document publicly available and ensure that BAT conclusions are made available in all the official languages of the Union.

7. Pending the adoption of a relevant decision in accordance with paragraph 5, the conclusions on best available techniques from BAT reference documents adopted by the Commission prior to the date referred to in Article 83 shall apply as BAT conclusions for the purposes of this Chapter except for Article 15(3) and (4).

Article 14

Permit conditions

1. Member States shall ensure that the permit includes all measures necessary for compliance with the requirements of Articles 11 and 18.

Those measures shall include at least the following:

- (a) emission limit values for polluting substances listed in Annex II, and for other polluting substances, which are likely to be emitted from the installation concerned in significant quantities, having regard to their nature and their potential to transfer pollution from one medium to another;
- (b) appropriate requirements ensuring protection of the soil and groundwater and measures concerning the monitoring and management of waste generated by the installation;
- (c) suitable emission monitoring requirements specifying:
 - (i) measurement methodology, frequency and evaluation procedure; and
 - (ii) where Article 15(3)(b) is applied, that results of emission monitoring are available for the same periods of time and reference conditions as for the emission levels associated with the best available techniques;
- (d) an obligation to supply the competent authority regularly, and at least annually, with:
 - (i) information on the basis of results of emission monitoring referred to in point (c) and other required data that enables the competent authority to verify compliance with the permit conditions; and
 - (ii) where Article 15(3)(b) is applied, a summary of the results of emission monitoring which allows a comparison with the emission levels associated with the best available techniques;
- (e) appropriate requirements for the regular maintenance and surveillance of measures taken to prevent emissions to soil and groundwater pursuant to point (b) and appropriate requirements concerning the periodic monitoring of soil and groundwater in relation to relevant hazardous substances likely to be found on site and having regard to the possibility of soil and groundwater contamination at the site of the installation;
- (f) measures relating to conditions other than normal operating conditions such as start-up and shut-down operations, leaks, malfunctions, momentary stoppages and definitive cessation of operations;

- (g) provisions on the minimisation of long-distance or trans-boundary pollution;
- (h) conditions for assessing compliance with the emission limit values or a reference to the applicable requirements specified elsewhere.

2. For the purpose of paragraph 1(a), emission limit values may be supplemented or replaced by equivalent parameters or technical measures ensuring an equivalent level of environmental protection.

3. BAT conclusions shall be the reference for setting the permit conditions.

4. Without prejudice to Article 18, the competent authority may set stricter permit conditions than those achievable by the use of the best available techniques as described in the BAT conclusions. Member States may establish rules under which the competent authority may set such stricter conditions.

5. Where the competent authority sets permit conditions on the basis of a best available technique not described in any of the relevant BAT conclusions, it shall ensure that:

- (a) that technique is determined by giving special consideration to the criteria listed in Annex III; and
- (b) the requirements of Article 15 are complied with.

Where the BAT conclusions referred to in the first subparagraph do not contain emission levels associated with the best available techniques, the competent authority shall ensure that the technique referred to in the first subparagraph ensures a level of environmental protection equivalent to the best available techniques described in the BAT conclusions.

6. Where an activity or a type of production process carried out within an installation is not covered by any of the BAT conclusions or where those conclusions do not address all the potential environmental effects of the activity or process, the competent authority shall, after prior consultations with the operator, set the permit conditions on the basis of the best available techniques that it has determined for the activities or processes concerned, by giving special consideration to the criteria listed in Annex III.

7. For installations referred to in point 6.6 of Annex I, paragraphs 1 to 6 of this Article shall apply without prejudice to the legislation relating to animal welfare.

Article 15

Emission limit values, equivalent parameters and technical measures

1. The emission limit values for polluting substances shall apply at the point where the emissions leave the installation, and any dilution prior to that point shall be disregarded when determining those values.

With regard to indirect releases of polluting substances into water, the effect of a water treatment plant may be taken into account when determining the emission limit values of the installation concerned, provided that an equivalent level of protection of the environment as a whole is guaranteed and provided this does not lead to higher levels of pollution in the environment.

2. Without prejudice to Article 18, the emission limit values and the equivalent parameters and technical measures referred to in Article 14(1) and (2) shall be based on the best available techniques, without prescribing the use of any technique or specific technology.

3. The competent authority shall set emission limit values that ensure that, under normal operating conditions, emissions do not exceed the emission levels associated with the best available techniques as laid down in the decisions on BAT conclusions referred to in Article 13(5) through either of the following:

- (a) setting emission limit values that do not exceed the emission levels associated with the best available techniques. Those emission limit values shall be expressed for the same or shorter periods of time and under the same reference conditions as those emission levels associated with the best available techniques; or
- (b) setting different emission limit values than those referred to under point (a) in terms of values, periods of time and reference conditions.

Where point (b) is applied, the competent authority shall, at least annually, assess the results of emission monitoring in order to ensure that emissions under normal operating conditions have not exceeded the emission levels associated with the best available techniques.

4. By way of derogation from paragraph 3, and without prejudice to Article 18, the competent authority may, in specific cases, set less strict emission limit values. Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits due to:

- (a) the geographical location or the local environmental conditions of the installation concerned; or
- (b) the technical characteristics of the installation concerned.

The competent authority shall document in an annex to the permit conditions the reasons for the application of the first subparagraph including the result of the assessment and the justification for the conditions imposed.

The emission limit values set in accordance with the first subparagraph shall, however, not exceed the emission limit values set out in the Annexes to this Directive, where applicable.

The competent authority shall in any case ensure that no significant pollution is caused and that a high level of protection of the environment as a whole is achieved.

On the basis of information provided by Member States in accordance with Article 72(1), in particular concerning the application of this paragraph, the Commission may, where necessary, assess and further clarify, through guidance, the criteria to be taken into account for the application of this paragraph.

The competent authority shall re-assess the application of the first subparagraph as part of each reconsideration of the permit conditions pursuant to Article 21.

5. The competent authority may grant temporary derogations from the requirements of paragraphs 2 and 3 of this Article and from Article 11(a) and (b) for the testing and use of emerging techniques for a total period of time not exceeding 9 months, provided that after the period specified, either the technique is stopped or the activity achieves at least the emission levels associated with the best available techniques.

Article 16

Monitoring requirements

1. The monitoring requirements referred to in Article 14(1)(c) shall, where applicable, be based on the conclusions on monitoring as described in the BAT conclusions.

2. The frequency of the periodic monitoring referred to in Article 14(1)(e) shall be determined by the competent authority in a permit for each individual installation or in general binding rules.

Without prejudice to the first subparagraph, periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

Article 17

General binding rules for activities listed in Annex I

1. When adopting general binding rules, Member States shall ensure an integrated approach and a high level of environmental protection equivalent to that achievable with individual permit conditions.

2. General binding rules shall be based on the best available techniques, without prescribing the use of any technique or specific technology in order to ensure compliance with Articles 14 and 15.

3. Member States shall ensure that general binding rules are updated to take into account developments in best available techniques and in order to ensure compliance with Article 21.

4. General binding rules adopted in accordance with paragraphs 1 to 3 shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication.

Article 18

Environmental quality standards

Where an environmental quality standard requires stricter conditions than those achievable by the use of the best available techniques, additional measures shall be included in the permit, without prejudice to other measures which may be taken to comply with environmental quality standards.

Article 19

Developments in best available techniques

Member States shall ensure that the competent authority follows or is informed of developments in best available techniques and of the publication of any new or updated BAT conclusions and shall make that information available to the public concerned.

Article 20

Changes by operators to installations

1. Member States shall take the necessary measures to ensure that the operator informs the competent authority of any planned change in the nature or functioning, or an extension of the installation which may have consequences for the environment. Where appropriate, the competent authority shall update the permit.

2. Member States shall take the necessary measures to ensure that no substantial change planned by the operator is made without a permit granted in accordance with this Directive.

The application for a permit and the decision by the competent authority shall cover those parts of the installation and those details listed in Article 12 which may be affected by the substantial change.

3. Any change in the nature or functioning or an extension of an installation shall be deemed to be substantial if the change or extension in itself reaches the capacity thresholds set out in Annex I.

Article 21

Reconsideration and updating of permit conditions by the competent authority

1. Member States shall take the necessary measures to ensure that the competent authority periodically reconsiders in accordance with paragraphs 2 to 5 all permit conditions and, where necessary to ensure compliance with this Directive, updates those conditions.

2. At the request of the competent authority, the operator shall submit all the information necessary for the purpose of reconsidering the permit conditions, including, in particular, results of emission monitoring and other data, that enables a comparison of the operation of the installation with the best available techniques described in the applicable BAT conclusions and with the emission levels associated with the best available techniques.

When reconsidering permit conditions, the competent authority shall use any information resulting from monitoring or inspections.

3. Within 4 years of publication of decisions on BAT conclusions in accordance with Article 13(5) relating to the main activity of an installation, the competent authority shall ensure that:

- (a) all the permit conditions for the installation concerned are reconsidered and, if necessary, updated to ensure compliance with this Directive, in particular, with Article 15(3) and (4), where applicable;
- (b) the installation complies with those permit conditions.

The reconsideration shall take into account all the new or updated BAT conclusions applicable to the installation and adopted in accordance with Article 13(5) since the permit was granted or last reconsidered.

4. Where an installation is not covered by any of the BAT conclusions, the permit conditions shall be reconsidered and, if necessary, updated where developments in the best available techniques allow for the significant reduction of emissions.

5. The permit conditions shall be reconsidered and, where necessary, updated at least in the following cases:

- (a) the pollution caused by the installation is of such significance that the existing emission limit values of the permit need to be revised or new such values need to be included in the permit;
- (b) the operational safety requires other techniques to be used;
- (c) where it is necessary to comply with a new or revised environmental quality standard in accordance with Article 18.

Article 22

Site closure

1. Without prejudice to Directive 2000/60/EC, Directive 2004/35/EC, Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration⁽¹⁾ and to relevant Union law on soil protection, the competent authority shall set permit conditions to ensure compliance with paragraphs 3 and 4 of this Article upon definitive cessation of activities.

2. Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time after 7 January 2013.

The baseline report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for under paragraph 3.

The baseline report shall contain at least the following information:

- (a) information on the present use and, where available, on past uses of the site;
- (b) where available, existing information on soil and groundwater measurements that reflect the state at the time the report is drawn up or, alternatively, new soil and groundwater measurements having regard to the possibility of soil and groundwater contamination by those hazardous substances to be used, produced or released by the installation concerned.

Where information produced pursuant to other national or Union law fulfils the requirements of this paragraph that information may be included in, or attached to, the submitted baseline report.

The Commission shall establish guidance on the content of the baseline report.

3. Upon definitive cessation of the activities, the operator shall assess the state of soil and groundwater contamination by relevant hazardous substances used, produced or released by the installation. Where the installation has caused significant pollution of soil or groundwater by relevant hazardous substances compared to the state established in the baseline report referred to in paragraph 2, the operator shall take the necessary measures to address that pollution so as to return the site to that state. For that purpose, the technical feasibility of such measures may be taken into account.

Without prejudice to the first subparagraph, upon definitive cessation of the activities, and where the contamination of soil and groundwater at the site poses a significant risk to human health or the environment as a result of the permitted activities carried out by the operator before the permit for the installation is updated for the first time after 7 January 2013 and taking into account the conditions of the site of the installation established in accordance with Article 12(1)(d), the operator shall take the necessary actions aimed at the removal, control, containment or reduction of relevant hazardous substances, so that the site, taking into account its current or approved future use, ceases to pose such a risk.

⁽¹⁾ OJ L 372, 27.12.2006, p. 19.

4. Where the operator is not required to prepare a baseline report referred to in paragraph 2, the operator shall, upon definitive cessation of the activities, take the necessary actions aimed at the removal, control, containment or reduction of relevant hazardous substances, so that the site, taking into account its current or approved future use, ceases to pose any significant risk to human health or the environment due to the contamination of soil and groundwater as a result of the permitted activities and taking into account the conditions of the site of the installation established in accordance with Article 12(1)(d).

Article 23

Environmental inspections

1. Member States shall set up a system of environmental inspections of installations addressing the examination of the full range of relevant environmental effects from the installations concerned.

Member States shall ensure that operators afford the competent authorities all necessary assistance to enable those authorities to carry out any site visits, to take samples and to gather any information necessary for the performance of their duties for the purposes of this Directive.

2. Member States shall ensure that all installations are covered by an environmental inspection plan at national, regional or local level and shall ensure that this plan is regularly reviewed and, where appropriate, updated.

3. Each environmental inspection plan shall include the following:

- (a) a general assessment of relevant significant environmental issues;
- (b) the geographical area covered by the inspection plan;
- (c) a register of the installations covered by the plan;
- (d) procedures for drawing up programmes for routine environmental inspections pursuant to paragraph 4;
- (e) procedures for non-routine environmental inspections pursuant to paragraph 5;
- (f) where necessary, provisions on the cooperation between different inspection authorities.

4. Based on the inspection plans, the competent authority shall regularly draw up programmes for routine environmental inspections, including the frequency of site visits for different types of installations.

The period between two site visits shall be based on a systematic appraisal of the environmental risks of the installations concerned and shall not exceed 1 year for installations posing the highest risks and 3 years for installations posing the lowest risks.

If an inspection has identified an important case of non-compliance with the permit conditions, an additional site visit shall be carried out within 6 months of that inspection.

The systematic appraisal of the environmental risks shall be based on at least the following criteria:

- (a) the potential and actual impacts of the installations concerned on human health and the environment taking into account the levels and types of emissions, the sensitivity of the local environment and the risk of accidents;
- (b) the record of compliance with permit conditions;
- (c) the participation of the operator in the Union eco-management and audit scheme (EMAS), pursuant to Regulation (EC) No 1221/2009 ⁽¹⁾.

The Commission may adopt guidance on the criteria for the appraisal of environmental risks.

5. Non-routine environmental inspections shall be carried out to investigate serious environmental complaints, serious environmental accidents, incidents and occurrences of non-compliance as soon as possible and, where appropriate, before the granting, reconsideration or update of a permit.

6. Following each site visit, the competent authority shall prepare a report describing the relevant findings regarding compliance of the installation with the permit conditions and conclusions on whether any further action is necessary.

The report shall be notified to the operator concerned within 2 months of the site visit taking place. The report shall be made publicly available by the competent authority in accordance with Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information ⁽²⁾ within 4 months of the site visit taking place.

Without prejudice to Article 8(2), the competent authority shall ensure that the operator takes all the necessary actions identified in the report within a reasonable period.

⁽¹⁾ Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) (OJ L 342, 22.12.2009, p. 1).

⁽²⁾ OJ L 41, 14.2.2003, p. 26.

*Article 24***Access to information and public participation in the permit procedure**

1. Member States shall ensure that the public concerned are given early and effective opportunities to participate in the following procedures:

- (a) the granting of a permit for new installations;
- (b) the granting of a permit for any substantial change;
- (c) the granting or updating of a permit for an installation where the application of Article 15(4) is proposed;
- (d) the updating of a permit or permit conditions for an installation in accordance with Article 21(5)(a).

The procedure set out in Annex IV shall apply to such participation.

2. When a decision on granting, reconsideration or updating of a permit has been taken, the competent authority shall make available to the public, including via the Internet in relation to points (a), (b) and (f), the following information:

- (a) the content of the decision, including a copy of the permit and any subsequent updates;
- (b) the reasons on which the decision is based;
- (c) the results of the consultations held before the decision was taken and an explanation of how they were taken into account in that decision;
- (d) the title of the BAT reference documents relevant to the installation or activity concerned;
- (e) how the permit conditions referred to in Article 14, including the emission limit values, have been determined in relation to the best available techniques and emission levels associated with the best available techniques;
- (f) where a derogation is granted in accordance with Article 15(4), the specific reasons for that derogation based on the criteria laid down in that paragraph and the conditions imposed.

3. The competent authority shall also make available to the public, including via the Internet at least in relation to point (a):

- (a) relevant information on the measures taken by the operator upon definitive cessation of activities in accordance with Article 22;

- (b) the results of emission monitoring as required under the permit conditions and held by the competent authority.

4. Paragraphs 1, 2 and 3 of this Article shall apply subject to the restrictions laid down in Article 4(1) and (2) of Directive 2003/4/EC.

*Article 25***Access to justice**

1. Member States shall ensure that, in accordance with the relevant national legal system, members of the public concerned have access to a review procedure before a court of law or another independent and impartial body established by law to challenge the substantive or procedural legality of decisions, acts or omissions subject to Article 24 when one of the following conditions is met:

- (a) they have a sufficient interest;
- (b) they maintain the impairment of a right, where administrative procedural law of a Member State requires this as a precondition.

2. Member States shall determine at what stage the decisions, acts or omissions may be challenged.

3. What constitutes a sufficient interest and impairment of a right shall be determined by Member States, consistently with the objective of giving the public concerned wide access to justice.

To this end, the interest of any non-governmental organisation promoting environmental protection and meeting any requirements under national law shall be deemed sufficient for the purpose of paragraph 1(a).

Such organisations shall also be deemed to have rights capable of being impaired for the purpose of paragraph 1(b).

4. Paragraphs 1, 2 and 3 shall not exclude the possibility of a preliminary review procedure before an administrative authority and shall not affect the requirement of exhaustion of administrative review procedures prior to recourse to judicial review procedures, where such a requirement exists under national law.

Any such procedure shall be fair, equitable, timely and not prohibitively expensive.

5. Member States shall ensure that practical information is made available to the public on access to administrative and judicial review procedures.

*Article 26***Transboundary effects**

1. Where a Member State is aware that the operation of an installation is likely to have significant negative effects on the environment of another Member State, or where a Member State which is likely to be significantly affected so requests, the Member State in whose territory the application for a permit pursuant to Article 4 or Article 20(2) was submitted shall forward to the other Member State any information required to be given or made available pursuant to Annex IV at the same time as it makes it available to the public.

Such information shall serve as a basis for any consultations necessary in the framework of the bilateral relations between the two Member States on a reciprocal and equivalent basis.

2. Within the framework of their bilateral relations, Member States shall ensure that in the cases referred to in paragraph 1, the applications are also made available for an appropriate period of time to the public of the Member State likely to be affected so that it will have the right to comment on them before the competent authority reaches its decision.

3. The results of any consultations pursuant to paragraphs 1 and 2 shall be taken into consideration when the competent authority reaches a decision on the application.

4. The competent authority shall inform any Member State which has been consulted pursuant to paragraph 1 of the decision reached on the application and shall forward to it the information referred to in Article 24(2). That Member State shall take the measures necessary to ensure that that information is made available in an appropriate manner to the public concerned in its own territory.

*Article 27***Emerging techniques**

1. Member States shall, where appropriate, encourage the development and application of emerging techniques, in particular for those emerging techniques identified in BAT reference documents.

2. The Commission shall establish guidance to assist Member States in encouraging the development and application of emerging techniques as referred to in paragraph 1.

CHAPTER III

SPECIAL PROVISIONS FOR COMBUSTION PLANTS*Article 28***Scope**

This Chapter shall apply to combustion plants, the total rated thermal input of which is equal to or greater than 50 MW, irrespective of the type of fuel used.

This Chapter shall not apply to the following combustion plants:

- (a) plants in which the products of combustion are used for the direct heating, drying, or any other treatment of objects or materials;
- (b) post-combustion plants designed to purify the waste gases by combustion which are not operated as independent combustion plants;
- (c) facilities for the regeneration of catalytic cracking catalysts;
- (d) facilities for the conversion of hydrogen sulphide into sulphur;
- (e) reactors used in the chemical industry;
- (f) coke battery furnaces;
- (g) cowpers;
- (h) any technical apparatus used in the propulsion of a vehicle, ship or aircraft;
- (i) gas turbines and gas engines used on offshore platforms;
- (j) plants which use any solid or liquid waste as a fuel other than waste referred to in point (b) of point 31 of Article 3.

*Article 29***Aggregation rules**

1. Where the waste gases of two or more separate combustion plants are discharged through a common stack, the combination formed by such plants shall be considered as a single combustion plant and their capacities added for the purpose of calculating the total rated thermal input.

2. Where two or more separate combustion plants which have been granted a permit for the first time on or after 1 July 1987, or the operators of which have submitted a complete application for a permit on or after that date, are installed in such a way that, taking technical and economic factors into account, their waste gases could in the judgement of the competent authority, be discharged through a common stack, the combination formed by such plants shall be considered as a single combustion plant and their capacities added for the purpose of calculating the total rated thermal input.

3. For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15 MW shall not be considered.

*Article 30***Emission limit values**

1. Waste gases from combustion plants shall be discharged in a controlled way by means of a stack, containing one or more flues, the height of which is calculated in such a way as to safeguard human health and the environment.

2. All permits for installations containing combustion plants which have been granted a permit before 7 January 2013, or the operators of which have submitted a complete application for a permit before that date, provided that such plants are put into operation no later than 7 January 2014, shall include conditions ensuring that emissions into air from these plants do not exceed the emission limit values set out in Part 1 of Annex V.

All permits for installations containing combustion plants which had been granted an exemption as referred to in Article 4(4) of Directive 2001/80/EC and which are in operation after 1 January 2016, shall include conditions ensuring that emissions into the air from these plants do not exceed the emission limit values set out in Part 2 of Annex V.

3. All permits for installations containing combustion plants not covered by paragraph 2 shall include conditions ensuring that emissions into the air from these plants do not exceed the emission limit values set out in Part 2 of Annex V.

4. The emission limit values set out in Parts 1 and 2 of Annex V as well as the minimum rates of desulphurisation set out in Part 5 of that Annex shall apply to the emissions of each common stack in relation to the total rated thermal input of the entire combustion plant. Where Annex V provides that emission limit values may be applied for a part of a combustion plant with a limited number of operating hours, those limit values shall apply to the emissions of that part of the plant, but shall be set in relation to the total rated thermal input of the entire combustion plant.

5. The competent authority may grant a derogation for a maximum of 6 months from the obligation to comply with the emission limit values provided for in paragraphs 2 and 3 for sulphur dioxide in respect of a combustion plant which to this end normally uses low-sulphur fuel, in cases where the operator is unable to comply with those limit values because of an interruption in the supply of low-sulphur fuel resulting from a serious shortage.

Member States shall immediately inform the Commission of any derogation granted under the first subparagraph.

6. The competent authority may grant a derogation from the obligation to comply with the emission limit values provided for in paragraphs 2 and 3 in cases where a combustion plant using only gaseous fuel has to resort exceptionally to the use of other fuels because of a sudden interruption in the supply of gas and for this reason would need to be equipped with a waste gas purification facility. The period for which such a derogation is granted shall not exceed 10 days except where there is an overriding need to maintain energy supplies.

The operator shall immediately inform the competent authority of each specific case referred to in the first subparagraph.

Member States shall inform the Commission immediately of any derogation granted under the first subparagraph.

7. Where a combustion plant is extended, the emission limit values set out in Part 2 of Annex V shall apply to the extended part of the plant affected by the change and shall be set in relation to the total rated thermal input of the entire combustion plant. In the case of a change to a combustion plant, which may have consequences for the environment and which affects a part of the plant with a rated thermal input of 50 MW or more, the emission limit values as set out in Part 2 of Annex V shall apply to the part of the plant which has changed in relation to the total rated thermal input of the entire combustion plant.

8. The emission limit values set out in Parts 1 and 2 of Annex V shall not apply to the following combustion plants:

- (a) diesel engines;
- (b) recovery boilers within installations for the production of pulp.

9. For the following combustion plants, on the basis of the best available techniques, the Commission shall review the need to establish Union-wide emission limit values and to amend the emission limit values set out in Annex V:

- (a) the combustion plants referred to in paragraph 8;
- (b) combustion plants within refineries firing the distillation and conversion residues from the refining of crude-oil for own consumption, alone or with other fuels, taking into account the specificity of the energy systems of refineries;
- (c) combustion plants firing gases other than natural gas;
- (d) combustion plants in chemical installations using liquid production residues as non-commercial fuel for own consumption.

The Commission shall, by 31 December 2013, report the results of this review to the European Parliament and to the Council accompanied, if appropriate, by a legislative proposal.

*Article 31***Desulphurisation rate**

1. For combustion plants firing indigenous solid fuel, which cannot comply with the emission limit values for sulphur dioxide referred to in Article 30(2) and (3) due to the characteristics of this fuel, Member States may apply instead the minimum rates of desulphurisation set out in Part 5 of Annex V, in accordance with the compliance rules set out in Part 6 of that Annex and with prior validation by the competent authority of the technical report referred to in Article 72(4)(a).

2. For combustion plants firing indigenous solid fuel, which co-incinerate waste, and which cannot comply with the C_{proc} values for sulphur dioxide set out in points 3.1 or 3.2 of Part 4 of Annex VI due to the characteristics of the indigenous solid fuel, Member States may apply instead the minimum rates of desulphurisation set out in Part 5 of Annex V, in accordance with the compliance rules set out in Part 6 of that Annex. If Member States choose to apply this paragraph, C_{waste} as referred to in point 1 of Part 4 of Annex VI shall be equal to 0 mg/Nm³.

3. The Commission shall, by 31 December 2019, review the possibility of applying minimum rates of desulphurisation set out in Part 5 of Annex V, taking into account, in particular, the best available techniques and benefits obtained from reduced sulphur dioxide emissions.

Article 32

Transitional National Plan

1. During the period from 1 January 2016 to 30 June 2020, Member States may draw up and implement a transitional national plan covering combustion plants which were granted the first permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003. For each of the combustion plants covered by the plan, the plan shall cover emissions of one or more of the following pollutants: nitrogen oxides, sulphur dioxide and dust. For gas turbines, only nitrogen oxides emissions shall be covered by the plan.

The transitional national plan shall not include any of the following combustion plants:

- (a) those to which Article 33(1) applies;
- (b) those within refineries firing low calorific gases from the gasification of refinery residues or the distillation and conversion residues from the refining of crude oil for own consumption, alone or with other fuels;
- (c) those to which Article 35 applies;
- (d) those which are granted an exemption as referred to in Article 4(4) of Directive 2001/80/EC.

2. Combustion plants covered by the plan may be exempted from compliance with the emission limit values referred to in Article 30(2) for the pollutants which are subject to the plan or, where applicable, with the rates of desulphurisation referred to in Article 31.

The emission limit values for sulphur dioxide, nitrogen oxides and dust set out in the permit for the combustion plant applicable on 31 December 2015, pursuant in particular to the requirements of Directives 2001/80/EC and 2008/1/EC, shall at least be maintained.

Combustion plants with a total rated thermal input of more than 500 MW firing solid fuels, which were granted the first permit after 1 July 1987, shall comply with the emission limit values for nitrogen oxides set out in Part 1 of Annex V.

3. For each of the pollutants it covers, the transitional national plan shall set a ceiling defining the maximum total annual emissions for all of the plants covered by the plan on the basis of each plant's total rated thermal input on 31 December 2010, its actual annual operating hours and its fuel use, averaged over the last 10 years of operation up to and including 2010.

The ceiling for the year 2016 shall be calculated on the basis of the relevant emission limit values set out in Annexes III to VII to Directive 2001/80/EC or, where applicable, on the basis of the rates of desulphurisation set out in Annex III to Directive 2001/80/EC. In the case of gas turbines, the emission limit values for nitrogen oxides set out for such plants in Part B of Annex VI to Directive 2001/80/EC shall be used. The ceilings for the years 2019 and 2020 shall be calculated on the basis of the relevant emission limit values set out in Part 1 of Annex V to this Directive or, where applicable, the relevant rates of desulphurisation set out in Part 5 of Annex V to this Directive. The ceilings for the years 2017 and 2018 shall be set providing a linear decrease of the ceilings between 2016 and 2019.

Where a plant included in the transitional national plan is closed or no longer falls within the scope of Chapter III, this shall not result in an increase in total annual emissions from the remaining plants covered by the plan.

4. The transitional national plan shall also contain provisions on monitoring and reporting that comply with the implementing rules established in accordance with Article 41(b), as well as the measures foreseen for each of the plants in order to ensure timely compliance with the emission limit values that will apply from 1 July 2020.

5. Not later than 1 January 2013, Member States shall communicate their transitional national plans to the Commission.

The Commission shall evaluate the plans and, where the Commission has raised no objections within 12 months of receipt of a plan, the Member State concerned shall consider its plan to be accepted.

When the Commission considers a plan not to be in accordance with the implementing rules established in accordance with Article 41(b), it shall inform the Member State concerned that its plan cannot be accepted. In relation to the evaluation of a new version of a plan which a Member State communicates to the Commission, the time period referred to in the second subparagraph shall be 6 months.

6. Member States shall inform the Commission of any subsequent changes to the plan.

*Article 33***Limited life time derogation**

1. During the period from 1 January 2016 to 31 December 2023, combustion plants may be exempted from compliance with the emission limit values referred to in Article 30(2) and with the rates of desulphurisation referred to in Article 31, where applicable, and from their inclusion in the transitional national plan referred to in Article 32 provided that the following conditions are fulfilled:

- (a) the operator of the combustion plant undertakes, in a written declaration submitted by 1 January 2014 at the latest to the competent authority, not to operate the plant for more than 17 500 operating hours, starting from 1 January 2016 and ending no later than 31 December 2023;
- (b) the operator is required to submit each year to the competent authority a record of the number of operating hours since 1 January 2016;
- (c) the emission limit values for sulphur dioxides, nitrogen oxides and dust set out in the permit for the combustion plant applicable on 31 December 2015, pursuant in particular to the requirements of Directives 2001/80/EC and 2008/1/EC, shall at least be maintained during the remaining operational life of the combustion plant. Combustion plants with a total rated thermal input of more than 500 MW firing solid fuels, which were granted the first permit after 1 July 1987, shall comply with the emission limit values for nitrogen oxides set out in Part 1 of Annex V; and
- (d) the combustion plant has not been granted an exemption as referred to in Article 4(4) of Directive 2001/80/EC.

2. At the latest on 1 January 2016, each Member State shall communicate to the Commission a list of any combustion plants to which paragraph 1 applies, including their total rated thermal input, the fuel types used and the applicable emission limit values for sulphur dioxide, nitrogen oxides and dust. For plants subject to paragraph 1, Member States shall communicate annually to the Commission a record of the number of operating hours since 1 January 2016.

3. In case of a combustion plant being, on 6 January 2011, part of a small isolated system and accounting at that date for at least 35 % of the electricity supply within that system, which is unable, due to its technical characteristics, to comply with the emission limit values referred to in Article 30(2), the number of operating hours referred to in paragraph 1(a) of this Article shall be 18 000, starting from 1 January 2020 and ending no later than 31 December 2023, and the date referred to in paragraph 1(b) and paragraph 2 of this Article shall be 1 January 2020.

4. In case of a combustion plant with a total rated thermal input of more than 1 500 MW which started operating before 31 December 1986 and fires indigenous solid fuel with a net calorific value of less than 5 800 kJ/kg, a moisture content greater than 45 % by weight, a combined moisture and ash content

greater than 60 % by weight and a calcium oxide content in ash greater than 10 %, the number of operating hours referred to in paragraph 1(a) shall be 32 000.

*Article 34***Small isolated systems**

1. Until 31 December 2019, combustion plants being, on 6 January 2011, part of a small isolated system may be exempted from compliance with the emission limit values referred to in Article 30(2) and the rates of desulphurisation referred to in Article 31, where applicable. Until 31 December 2019, the emission limit values set out in the permits of these combustion plants, pursuant in particular to the requirements of Directives 2001/80/EC and 2008/1/EC, shall at least be maintained.

2. Combustion plants with a total rated thermal input of more than 500 MW firing solid fuels, which were granted the first permit after 1 July 1987, shall comply with the emission limit values for nitrogen oxides set out in Part 1 of Annex V.

3. Where there are, on the territory of a Member State combustion plants covered by this Chapter that are part of a small isolated system, that Member State shall report to the Commission before 7 January 2013 a list of those combustion plants, the total annual energy consumption of the small isolated system and the amount of energy obtained through interconnection with other systems.

*Article 35***District heating plants**

1. Until 31 December 2022, a combustion plant may be exempted from compliance with the emission limit values referred to in Article 30(2) and the rates of desulphurisation referred to in Article 31 provided that the following conditions are fulfilled:

- (a) the total rated thermal input of the combustion plant does not exceed 200 MW;
- (b) the plant was granted a first permit before 27 November 2002 or the operator of that plant had submitted a complete application for a permit before that date, provided that it was put into operation no later than 27 November 2003;
- (c) at least 50 % of the useful heat production of the plant, as a rolling average over a period of 5 years, is delivered in the form of steam or hot water to a public network for district heating; and
- (d) the emission limit values for sulphur dioxide, nitrogen oxides and dust set out in its permit applicable on 31 December 2015, pursuant in particular to the requirements of Directives 2001/80/EC and 2008/1/EC, are at least maintained until 31 December 2022.

2. At the latest on 1 January 2016, each Member State shall communicate to the Commission a list of any combustion plants to which paragraph 1 applies, including their total rated thermal input, the fuel types used and the applicable emission limit values for sulphur dioxide, nitrogen oxides and dust. In addition, Member States shall, for any combustion plants to which paragraph 1 applies and during the period mentioned in that paragraph, inform the Commission annually of the proportion of useful heat production of each plant which was delivered in the form of steam or hot water to a public network for district heating, expressed as a rolling average over the preceding 5 years.

Article 36

Geological storage of carbon dioxide

1. Member States shall ensure that operators of all combustion plants with a rated electrical output of 300 megawatts or more for which the original construction licence or, in the absence of such a procedure, the original operating licence is granted after the entry into force of Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide⁽¹⁾, have assessed whether the following conditions are met:

- (a) suitable storage sites are available,
- (b) transport facilities are technically and economically feasible,
- (c) it is technically and economically feasible to retrofit for carbon dioxide capture.

2. If the conditions laid down in paragraph 1 are met, the competent authority shall ensure that suitable space on the installation site for the equipment necessary to capture and compress carbon dioxide is set aside. The competent authority shall determine whether the conditions are met on the basis of the assessment referred to in paragraph 1 and other available information, particularly concerning the protection of the environment and human health.

Article 37

Malfunction or breakdown of the abatement equipment

1. Member States shall ensure that provision is made in the permits for procedures relating to malfunction or breakdown of the abatement equipment.

2. In the case of a breakdown, the competent authority shall require the operator to reduce or close down operations if a return to normal operation is not achieved within 24 hours, or to operate the plant using low polluting fuels.

The operator shall notify the competent authority within 48 hours after the malfunction or breakdown of the abatement equipment.

⁽¹⁾ OJ L 140, 5.6.2009, p. 114.

The cumulative duration of unabated operation shall not exceed 120 hours in any 12-month period.

The competent authority may grant a derogation from the time limits set out in the first and third subparagraphs in one of the following cases:

- (a) there is an overriding need to maintain energy supplies;
- (b) the combustion plant with the breakdown would be replaced for a limited period by another plant which would cause an overall increase in emissions.

Article 38

Monitoring of emissions into air

1. Member States shall ensure that the monitoring of air polluting substances is carried out in accordance with Part 3 of Annex V.

2. The installation and functioning of the automated monitoring equipment shall be subject to control and to annual surveillance tests as set out in Part 3 of Annex V.

3. The competent authority shall determine the location of the sampling or measurement points to be used for the monitoring of emissions.

4. All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.

Article 39

Compliance with emission limit values

The emission limit values for air shall be regarded as being complied with if the conditions set out in Part 4 of Annex V are fulfilled.

Article 40

Multi-fuel firing combustion plants

1. In the case of a multi-fuel firing combustion plant involving the simultaneous use of two or more fuels, the competent authority shall set the emission limit values in accordance with the following steps:

- (a) taking the emission limit value relevant for each individual fuel and pollutant corresponding to the total rated thermal input of the entire combustion plant as set out in Parts 1 and 2 of Annex V;
- (b) determining fuel-weighted emission limit values, which are obtained by multiplying the individual emission limit value referred to in point (a) by the thermal input delivered by each fuel, and dividing the product of multiplication by the sum of the thermal inputs delivered by all fuels,
- (c) aggregating the fuel-weighted emission limit values.

2. In the case of multi-fuel firing combustion plants covered by Article 30(2), which use the distillation and conversion residues from the refining of crude-oil for own consumption, alone or with other fuels, the following emission limit values may be applied instead of the emission limit values set according to paragraph 1:

- (a) where, during the operation of the combustion plant, the proportion contributed by the determinative fuel to the sum of the thermal inputs delivered by all fuels is 50 % or more, the emission limit value set in Part 1 of Annex V for the determinative fuel;
- (b) where the proportion contributed by the determinative fuel to the sum of the thermal inputs delivered by all fuels is less than 50 %, the emission limit value determined in accordance with the following steps:
 - (i) taking the emission limit values set out in Part 1 of Annex V for each of the fuels used, corresponding to the total rated thermal input of the combustion plant;
 - (ii) calculating the emission limit value of the determinative fuel by multiplying the emission limit value, determined for that fuel according to point (i), by a factor of two, and subtracting from this product the emission limit value of the fuel used with the lowest emission limit value as set out in Part 1 of Annex V, corresponding to the total rated thermal input of the combustion plant;
 - (iii) determining the fuel-weighted emission limit value for each fuel used by multiplying the emission limit value determined under points (i) and (ii) by the thermal input of the fuel concerned and by dividing the product of this multiplication by the sum of the thermal inputs delivered by all fuels;
 - (iv) aggregating the fuel-weighted emission limit values determined under point (iii).

3. In the case of multi-fuel firing combustion plants covered by Article 30(2), which use the distillation and conversion residues from the refining of crude-oil for own consumption, alone or with other fuels, the average emission limit values for sulphur dioxide set out in Part 7 of Annex V may be applied instead of the emission limit values set according to paragraphs 1 or 2 of this Article.

Article 41

Implementing rules

Implementing rules shall be established concerning:

- (a) the determination of the start-up and shut-down periods referred to in point 27 of Article 3 and in point 1 of Part 4 of Annex V; and
- (b) the transitional national plans referred to in Article 32 and, in particular, the setting of emission ceilings and related monitoring and reporting.

Those implementing rules shall be adopted in accordance with the regulatory procedure referred to in Article 75(2). The Commission shall make appropriate proposals not later than 7 July 2011.

CHAPTER IV

SPECIAL PROVISIONS FOR WASTE INCINERATION PLANTS AND WASTE CO-INCINERATION PLANTS

Article 42

Scope

1. This Chapter shall apply to waste incineration plants and waste co-incineration plants which incinerate or co-incinerate solid or liquid waste.

This Chapter shall not apply to gasification or pyrolysis plants, if the gases resulting from this thermal treatment of waste are purified to such an extent that they are no longer a waste prior to their incineration and they can cause emissions no higher than those resulting from the burning of natural gas.

For the purposes of this Chapter, waste incineration plants and waste co-incineration plants shall include all incineration lines or co-incineration lines, waste reception, storage, on site pretreatment facilities, waste-, fuel- and air-supply systems, boilers, facilities for the treatment of waste gases, on-site facilities for treatment or storage of residues and waste water, stacks, devices and systems for controlling incineration or co-incineration operations, recording and monitoring incineration or co-incineration conditions.

If processes other than oxidation, such as pyrolysis, gasification or plasma process, are applied for the thermal treatment of waste, the waste incineration plant or waste co-incineration plant shall include both the thermal treatment process and the subsequent incineration process.

If waste co-incineration takes place in such a way that the main purpose of the plant is not the generation of energy or production of material products but rather the thermal treatment of waste, the plant shall be regarded as a waste incineration plant.

2. This Chapter shall not apply to the following plants:

- (a) plants treating only the following wastes:
 - (i) waste listed in point (b) of point 31 of Article 3;
 - (ii) radioactive waste;
 - (iii) animal carcasses as regulated by Regulation (EC) No 1774/2002 of the European Parliament and of the Council of 3 October 2002 laying down health rules concerning animal by-products not intended for human consumption ⁽¹⁾;

⁽¹⁾ OJ L 273, 10.10.2002, p. 1.

- (iv) waste resulting from the exploration for, and the exploitation of, oil and gas resources from off-shore installations and incinerated on board the installations;
- (b) experimental plants used for research, development and testing in order to improve the incineration process and which treat less than 50 tonnes of waste per year.
- (e) the sampling and measurement procedures and frequencies to be used to comply with the conditions set for emission monitoring;
- (f) the maximum permissible period of any technically unavoidable stoppages, disturbances, or failures of the purification devices or the measurement devices, during which the emissions into the air and the discharges of waste water may exceed the prescribed emission limit values.

Article 43

Definition of residue

For the purposes of this Chapter, 'residue' shall mean any liquid or solid waste which is generated by a waste incineration plant or waste co-incineration plant.

Article 44

Applications for permits

An application for a permit for a waste incineration plant or waste co-incineration plant shall include a description of the measures which are envisaged to guarantee that the following requirements are met:

- (a) the plant is designed, equipped and will be maintained and operated in such a manner that the requirements of this Chapter are met taking into account the categories of waste to be incinerated or co-incinerated;
- (b) the heat generated during the incineration and co-incineration process is recovered as far as practicable through the generation of heat, steam or power;
- (c) the residues will be minimised in their amount and harmfulness and recycled where appropriate;
- (d) the disposal of the residues which cannot be prevented, reduced or recycled will be carried out in conformity with national and Union law.

Article 45

Permit conditions

1. The permit shall include the following:
 - (a) a list of all types of waste which may be treated using at least the types of waste set out in the European Waste List established by Decision 2000/532/EC, if possible, and containing information on the quantity of each type of waste, where appropriate;
 - (b) the total waste incinerating or co-incinerating capacity of the plant;
 - (c) the limit values for emissions into air and water;
 - (d) the requirements for the pH, temperature and flow of waste water discharges;

2. In addition to the requirements set out in paragraph 1, the permit granted to a waste incineration plant or waste co-incineration plant using hazardous waste shall include the following:

- (a) a list of the quantities of the different categories of hazardous waste which may be treated;
 - (b) the minimum and maximum mass flows of those hazardous wastes, their lowest and maximum calorific values and their maximum contents of polychlorinated biphenyls, pentachlorophenol, chlorine, fluorine, sulphur, heavy metals and other polluting substances.
3. Member States may list the categories of waste to be included in the permit which can be co-incinerated in certain categories of waste co-incineration plants.
 4. The competent authority shall periodically reconsider and, where necessary, update permit conditions.

Article 46

Control of emissions

1. Waste gases from waste incineration plants and waste co-incineration plants shall be discharged in a controlled way by means of a stack the height of which is calculated in such a way as to safeguard human health and the environment.

2. Emissions into air from waste incineration plants and waste co-incineration plants shall not exceed the emission limit values set out in parts 3 and 4 of Annex VI or determined in accordance with Part 4 of that Annex.

If in a waste co-incineration plant more than 40 % of the resulting heat release comes from hazardous waste, or the plant co-incinerates untreated mixed municipal waste, the emission limit values set out in Part 3 of Annex VI shall apply.

3. Discharges to the aquatic environment of waste water resulting from the cleaning of waste gases shall be limited as far as practicable and the concentrations of polluting substances shall not exceed the emission limit values set out in Part 5 of Annex VI.

4. The emission limit values shall apply at the point where waste waters from the cleaning of waste gases are discharged from the waste incineration plant or waste co-incineration plant.

When waste waters from the cleaning of waste gases are treated outside the waste incineration plant or waste co-incineration plant at a treatment plant intended only for the treatment of this sort of waste water, the emission limit values set out in Part 5 of Annex VI shall be applied at the point where the waste waters leave the treatment plant. Where the waste water from the cleaning of waste gases is treated collectively with other sources of waste water, either on site or off site, the operator shall make the appropriate mass balance calculations, using the results of the measurements set out in point 2 of Part 6 of Annex VI in order to determine the emission levels in the final waste water discharge that can be attributed to the waste water arising from the cleaning of waste gases.

Under no circumstances shall dilution of waste water take place for the purpose of complying with the emission limit values set out in Part 5 of Annex VI.

5. Waste incineration plant sites and waste co-incineration plant sites, including associated storage areas for waste, shall be designed and operated in such a way as to prevent the unauthorised and accidental release of any polluting substances into soil, surface water and groundwater.

Storage capacity shall be provided for contaminated rainwater run-off from the waste incineration plant site or waste co-incineration plant site or for contaminated water arising from spillage or fire-fighting operations. The storage capacity shall be adequate to ensure that such waters can be tested and treated before discharge where necessary.

6. Without prejudice to Article 50(4)(c), the waste incineration plant or waste co-incineration plant or individual furnaces being part of a waste incineration plant or waste co-incineration plant shall under no circumstances continue to incinerate waste for a period of more than 4 hours uninterrupted where emission limit values are exceeded.

The cumulative duration of operation in such conditions over 1 year shall not exceed 60 hours.

The time limit set out in the second subparagraph shall apply to those furnaces which are linked to one single waste gas cleaning device.

Article 47

Breakdown

In the case of a breakdown, the operator shall reduce or close down operations as soon as practicable until normal operations can be restored.

Article 48

Monitoring of emissions

1. Member States shall ensure that the monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI.

2. The installation and functioning of the automated measuring systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.

3. The competent authority shall determine the location of the sampling or measurement points to be used for monitoring of emissions.

4. All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.

5. As soon as appropriate measurement techniques are available within the Union, the Commission shall, by means of delegated acts in accordance with Article 76 and subject to the conditions laid down in Articles 77 and 78, set the date from which continuous measurements of emissions into the air of heavy metals and dioxins and furans are to be carried out.

Article 49

Compliance with emission limit values

The emission limit values for air and water shall be regarded as being complied with if the conditions described in Part 8 of Annex VI are fulfilled.

Article 50

Operating conditions

1. Waste incineration plants shall be operated in such a way as to achieve a level of incineration such that the total organic carbon content of slag and bottom ashes is less than 3 % or their loss on ignition is less than 5 % of the dry weight of the material. If necessary, waste pre-treatment techniques shall be used.

2. Waste incineration plants shall be designed, equipped, built and operated in such a way that the gas resulting from the incineration of waste is raised, after the last injection of combustion air, in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850 °C for at least two seconds.

Waste co-incineration plants shall be designed, equipped, built and operated in such a way that the gas resulting from the co-incineration of waste is raised in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850 °C for at least two seconds.

If hazardous waste with a content of more than 1 % of halogenated organic substances, expressed as chlorine, is incinerated or co-incinerated, the temperature required to comply with the first and second subparagraphs shall be at least 1 100 °C.

In waste incineration plants, the temperatures set out in the first and third subparagraphs shall be measured near the inner wall of the combustion chamber. The competent authority may authorise the measurements at another representative point of the combustion chamber.

3. Each combustion chamber of a waste incineration plant shall be equipped with at least one auxiliary burner. This burner shall be switched on automatically when the temperature of the combustion gases after the last injection of combustion air falls below the temperatures set out in paragraph 2. It shall also be used during plant start-up and shut-down operations in order to ensure that those temperatures are maintained at all times during these operations and as long as unburned waste is in the combustion chamber.

The auxiliary burner shall not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil as defined in Article 2(2) of Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels ⁽¹⁾, liquefied gas or natural gas.

4. Waste incineration plants and waste co-incineration plants shall operate an automatic system to prevent waste feed in the following situations:

- (a) at start-up, until the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) has been reached;
- (b) whenever the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) is not maintained;
- (c) whenever the continuous measurements show that any emission limit value is exceeded due to disturbances or failures of the waste gas cleaning devices.

5. Any heat generated by waste incineration plants or waste co-incineration plants shall be recovered as far as practicable.

6. Infectious clinical waste shall be placed straight in the furnace, without first being mixed with other categories of waste and without direct handling.

7. Member States shall ensure that the waste incineration plant or waste co-incineration plant is operated and controlled by a natural person who is competent to manage the plant.

Article 51

Authorisation to change operating conditions

1. Conditions different from those laid down in Article 50(1), (2) and (3) and, as regards the temperature, paragraph 4 of that Article and specified in the permit for certain categories of waste or for certain thermal processes, may be authorised by the competent authority provided the other requirements of this Chapter are met. Member States may lay down rules governing these authorisations.

2. For waste incineration plants, the change of the operating conditions shall not cause more residues or residues with a higher content of organic polluting substances compared to those residues which could be expected under the conditions laid down in Article 50(1), (2) and (3).

3. Emissions of total organic carbon and carbon monoxide from waste co-incineration plants, authorised to change operating conditions according to paragraph 1 shall also comply with the emission limit values set out in Part 3 of Annex VI.

Emissions of total organic carbon from bark boilers within the pulp and paper industry co-incinerating waste at the place of its production which were in operation and had a permit before 28 December 2002 and which are authorised to change operating conditions according to paragraph 1 shall also comply with the emission limit values set out in Part 3 of Annex VI.

4. Member States shall communicate to the Commission all operating conditions authorised under paragraphs 1, 2 and 3 and the results of verifications made as part of the information provided in accordance with the reporting requirements under Article 72.

Article 52

Delivery and reception of waste

1. The operator of the waste incineration plant or waste co-incineration plant shall take all necessary precautions concerning the delivery and reception of waste in order to prevent or to limit as far as practicable the pollution of air, soil, surface water and groundwater as well as other negative effects on the environment, odours and noise, and direct risks to human health.

2. The operator shall determine the mass of each type of waste, if possible according to the European Waste List established by Decision 2000/532/EC, prior to accepting the waste at the waste incineration plant or waste co-incineration plant.

3. Prior to accepting hazardous waste at the waste incineration plant or waste co-incineration plant, the operator shall collect available information about the waste for the purpose of verifying compliance with the permit requirements specified in Article 45(2).

⁽¹⁾ OJ L 121, 11.5.1999, p. 13.

That information shall cover the following:

- (a) all the administrative information on the generating process contained in the documents mentioned in paragraph 4(a);
- (b) the physical, and as far as practicable, chemical composition of the waste and all other information necessary to evaluate its suitability for the intended incineration process;
- (c) the hazardous characteristics of the waste, the substances with which it cannot be mixed, and the precautions to be taken in handling the waste.

4. Prior to accepting hazardous waste at the waste incineration plant or waste co-incineration plant, at least the following procedures shall be carried out by the operator:

- (a) the checking of the documents required by Directive 2008/98/EC and, where applicable, those required by Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste ⁽¹⁾ and by legislation on transport of dangerous goods;
- (b) the taking of representative samples, unless inappropriate as far as possible before unloading, to verify conformity with the information provided for in paragraph 3 by carrying out controls and to enable the competent authorities to identify the nature of the wastes treated.

The samples referred to in point (b) shall be kept for at least 1 month after the incineration or co-incineration of the waste concerned.

5. The competent authority may grant exemptions from paragraphs 2, 3 and 4 to waste incineration plants or waste co-incineration plants which are a part of an installation covered by Chapter II and only incinerate or co-incinerate waste generated within that installation.

Article 53

Residues

- 1. Residues shall be minimised in their amount and harmfulness. Residues shall be recycled, where appropriate, directly in the plant or outside.
- 2. Transport and intermediate storage of dry residues in the form of dust shall take place in such a way as to prevent dispersal of those residues in the environment.
- 3. Prior to determining the routes for the disposal or recycling of the residues, appropriate tests shall be carried out to establish

the physical and chemical characteristics and the polluting potential of the residues. Those tests shall concern the total soluble fraction and heavy metals soluble fraction.

Article 54

Substantial change

A change of operation of a waste incineration plant or a waste co-incineration plant treating only non-hazardous waste in an installation covered by Chapter II which involves the incineration or co-incineration of hazardous waste shall be regarded as a substantial change.

Article 55

Reporting and public information on waste incineration plants and waste co-incineration plants

- 1. Applications for new permits for waste incineration plants and waste co-incineration plants shall be made available to the public at one or more locations for an appropriate period to enable the public to comment on the applications before the competent authority reaches a decision. That decision, including at least a copy of the permit, and any subsequent updates, shall also be made available to the public.
- 2. For waste incineration plants or waste co-incineration plants with a nominal capacity of 2 tonnes or more per hour, the report referred to in Article 72 shall include information on the functioning and monitoring of the plant and give account of the running of the incineration or co-incineration process and the level of emissions into air and water in comparison with the emission limit values. That information shall be made available to the public.
- 3. A list of waste incineration plants or waste co-incineration plants with a nominal capacity of less than 2 tonnes per hour shall be drawn up by the competent authority and shall be made available to the public.

CHAPTER V

SPECIAL PROVISIONS FOR INSTALLATIONS AND ACTIVITIES USING ORGANIC SOLVENTS

Article 56

Scope

This chapter shall apply to activities listed in Part 1 of Annex VII and, where applicable, reaching the consumption thresholds set out in Part 2 of that Annex.

⁽¹⁾ OJ L 190, 12.7.2006, p. 1.

*Article 57***Definitions**

For the purposes of this Chapter, the following definitions shall apply:

- (1) 'existing installation' means an installation in operation on 29 March 1999 or which was granted a permit or registered before 1 April 2001 or the operator of which submitted a complete application for a permit before 1 April 2001, provided that that installation was put in operation no later than 1 April 2002;
- (2) 'waste gases' means the final gaseous discharge containing volatile organic compounds or other pollutants from a stack or abatement equipment into air;
- (3) 'fugitive emissions' means any emissions not in waste gases of volatile organic compounds into air, soil and water as well as solvents contained in any products, unless otherwise stated in Part 2 of Annex VII;
- (4) 'total emissions' means the sum of fugitive emissions and emissions in waste gases;
- (5) 'mixture' means mixture as defined in Article 3(2) of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency ⁽¹⁾,
- (6) 'adhesive' means any mixture, including all the organic solvents or mixtures containing organic solvents necessary for its proper application, which is used to adhere separate parts of a product;
- (7) 'ink' means a mixture, including all the organic solvents or mixtures containing organic solvents necessary for its proper application, which is used in a printing activity to impress text or images on to a surface;
- (8) 'varnish' means a transparent coating;
- (9) 'consumption' means the total input of organic solvents into an installation per calendar year, or any other 12-month period, less any volatile organic compounds that are recovered for re-use;
- (10) 'input' means the quantity of organic solvents and their quantity in mixtures used when carrying out an activity, including the solvents recycled inside and outside the installation, and which are counted every time they are used to carry out the activity;

- (11) 're-use' means the use of organic solvents recovered from an installation for any technical or commercial purpose and including use as a fuel but excluding the final disposal of such recovered organic solvent as waste;
- (12) 'contained conditions' means conditions under which an installation is operated so that the volatile organic compounds released from the activity are collected and discharged in a controlled way either via a stack or abatement equipment and are, therefore, not entirely fugitive;
- (13) 'start-up and shut-down operations' means operations excluding regularly oscillating activity phases whilst bringing an activity, an equipment item or a tank into or out of service or into or out of an idling state.

*Article 58***Substitution of hazardous substances**

Substances or mixtures which, because of their content of volatile organic compounds classified as carcinogens, mutagens, or toxic to reproduction under Regulation (EC) No 1272/2008, are assigned or need to carry the hazard statements H340, H350, H350i, H360D or H360F, shall be replaced, as far as possible by less harmful substances or mixtures within the shortest possible time.

*Article 59***Control of emissions**

1. Member States shall take the necessary measures to ensure that each installation complies with either of the following:
 - (a) the emission of volatile organic compounds from installations shall not exceed the emission limit values in waste gases and the fugitive emission limit values, or the total emission limit values, and other requirements laid down in Parts 2 and 3 of Annex VII are complied with;
 - (b) the requirements of the reduction scheme set out in Part 5 of Annex VII provided that an equivalent emission reduction is achieved compared to that achieved through the application of the emission limit values referred to in point (a).

Member States shall report to the Commission in accordance with Article 72(1) on the progress in achieving the equivalent emission reduction referred to in point (b).

2. By way of derogation from paragraph 1(a), where the operator demonstrates to the competent authority that for an individual installation the emission limit value for fugitive emissions is not technically and economically feasible, the competent authority may allow emissions to exceed that emission limit value provided that significant risks to human health or the environment are not to be expected and that the operator demonstrates to the competent authority that the best available techniques are being used.

⁽¹⁾ OJ L 396, 30.12.2006, p. 1.

3. By way of derogation from paragraph 1, for coating activities covered by item 8 of the table in Part 2 of Annex VII which cannot be carried out under contained conditions, the competent authority may allow the emissions of the installation not to comply with the requirements set out in that paragraph if the operator demonstrates to the competent authority that such compliance is not technically and economically feasible and that the best available techniques are being used.

4. Member States shall report to the Commission on the derogations referred to in paragraphs 2 and 3 of this Article in accordance with Article 72(2).

5. The emissions of either volatile organic compounds which are assigned or need to carry the hazard statements H340, H350, H350i, H360D or H360F or halogenated volatile organic compounds which are assigned or need to carry the hazard statements H341 or H351, shall be controlled under contained conditions as far as technically and economically feasible to safeguard public health and the environment and shall not exceed the relevant emission limit values set out in Part 4 of Annex VII.

6. Installations where two or more activities are carried out, each of which exceeds the thresholds in Part 2 of Annex VII shall:

- (a) as regards the substances specified in paragraph 5, meet the requirements of that paragraph for each activity individually;
- (b) as regards all other substances, either:
 - (i) meet the requirements of paragraph 1 for each activity individually; or
 - (ii) have total emissions of volatile organic compounds not exceeding those which would have resulted had point (i) been applied.

7. All appropriate precautions shall be taken to minimise emissions of volatile organic compounds during start-up and shut-down operations.

Article 60

Monitoring of emissions

Member States shall, either by specification in the permit conditions or by general binding rules, ensure that measurements of emissions are carried out in accordance with Part 6 of Annex VII.

Article 61

Compliance with emission limit values

The emission limit values in waste gases shall be regarded as being complied with if the conditions set out in Part 8 of Annex VII are fulfilled.

Article 62

Reporting on compliance

The operator shall supply the competent authority, on request, with data enabling the competent authority to verify compliance with either of the following:

- (a) emission limit values in waste gases, fugitive emission limit values and total emission limit values;
- (b) the requirements of the reduction scheme under Part 5 of Annex VII;
- (c) the derogations granted in accordance with Article 59(2) and (3).

This may include a solvent management plan prepared in accordance with Part 7 of Annex VII.

Article 63

Substantial change to existing installations

1. A change of the maximum mass input of organic solvents by an existing installation averaged over 1 day, where the installation is operated at its design output under conditions other than start-up and shut-down operations and maintenance of equipment, shall be considered as substantial if it leads to an increase of emissions of volatile organic compounds of more than:

- (a) 25 % for an installation carrying out either activities which fall within the lower threshold band of items 1, 3, 4, 5, 8, 10, 13, 16 or 17 of the table in Part 2 of Annex VII or, activities which fall under one of the other items of Part 2 of Annex VII, and with a solvent consumption of less than 10 tonnes per year;
- (b) 10 % for all other installations.

2. Where an existing installation undergoes a substantial change, or falls within the scope of this Directive for the first time following a substantial change, that part of the installation which undergoes the substantial change shall be treated either as a new installation or as an existing installation, provided that the total emissions of the whole installation do not exceed those that would have resulted had the substantially changed part been treated as a new installation.

3. In case of a substantial change, the competent authority shall check compliance of the installation with the requirements of this Directive.

Article 64

Exchange of information on substitution of organic solvents

The Commission shall organise an exchange of information with the Member States, the industry concerned and non-governmental organisations promoting environmental protection on the use of organic solvents and their potential substitutes and techniques which have the least potential effects on air, water, soil, ecosystems and human health.

The exchange of information shall be organised on all of the following:

- (a) fitness for use;
- (b) potential effects on human health and occupational exposure in particular;
- (c) potential effects on the environment;
- (d) the economic consequences, in particular the costs and benefits of the options available.

Article 65

Access to information

1. The decision of the competent authority, including at least a copy of the permit, and any subsequent updates, shall be made available to the public.

The general binding rules applicable for installations and the list of installations subject to permitting and registration shall be made available to the public.

2. The results of the monitoring of emissions as required under Article 60 and held by the competent authority shall be made available to the public.

3. Paragraphs 1 and 2 of this Article shall apply, subject to the restrictions laid down in Article 4(1) and (2) of Directive 2003/4/EC.

CHAPTER VI

SPECIAL PROVISIONS FOR INSTALLATIONS PRODUCING TITANIUM DIOXIDE

Article 66

Scope

This Chapter shall apply to installations producing titanium dioxide.

Article 67

Prohibition of the disposal of waste

Member States shall prohibit the disposal of the following waste into any water body, sea or ocean:

- (a) solid waste;
- (b) the mother liquors arising from the filtration phase following hydrolysis of the titanyl sulphate solution from installations applying the sulphate process; including the acid waste associated with such liquors, containing overall more than 0,5 % free sulphuric acid and various heavy metals and including such mother liquors which have been diluted until they contain 0,5 % or less free sulphuric acid;

(c) waste from installations applying the chloride process containing more than 0,5 % free hydrochloric acid and various heavy metals, including such waste which has been diluted until it contains 0,5 % or less free hydrochloric acid;

(d) filtration salts, sludges and liquid waste arising from the treatment (concentration or neutralisation) of the waste mentioned under points (b) and (c) and containing various heavy metals, but not including neutralised and filtered or decanted waste containing only traces of heavy metals and which, before any dilution, has a pH value above 5,5.

Article 68

Control of emissions into water

Emissions from installations into water shall not exceed the emission limit values set out in Part 1 of Annex VIII.

Article 69

Prevention and control of emissions into air

1. The emission of acid droplets from installations shall be prevented.

2. Emissions into air from installations shall not exceed the emission limit values set out in Part 2 of Annex VIII.

Article 70

Monitoring of emissions

1. Member States shall ensure the monitoring of emissions into water in order to enable the competent authority to verify compliance with the permit conditions and Article 68.

2. Member States shall ensure the monitoring of emissions into air in order to enable the competent authority to verify compliance with the permit conditions and Article 69. Such monitoring shall include at least monitoring of emissions as set out in Part 3 of Annex VIII.

3. Monitoring shall be carried out in accordance with CEN standards or, if CEN standards are not available, ISO, national or other international standards which ensure the provision of data of an equivalent scientific quality.

CHAPTER VII

COMMITTEE, TRANSITIONAL AND FINAL PROVISIONS

Article 71

Competent authorities

Member States shall designate the competent authorities responsible for carrying out the obligations arising from this Directive.

Article 72

Reporting by Member States

1. Member States shall ensure that information is made available to the Commission on the implementation of this Directive, on representative data on emissions and other forms of pollution, on emission limit values, on the application of best available techniques in accordance with Articles 14 and 15, in particular on the granting of exemptions in accordance with Article 15(4), and on progress made concerning the development and application of emerging techniques in accordance with Article 27. Member States shall make the information available in an electronic format.

2. The type, format and frequency of information to be made available pursuant to paragraph 1 shall be established in accordance with the regulatory procedure referred to in Article 75(2). This shall include the determination of the specific activities and pollutants for which data referred to in paragraph 1 shall be made available.

3. For all combustion plants covered by Chapter III of this Directive, Member States shall, from 1 January 2016, establish an annual inventory of the sulphur dioxide, nitrogen oxides and dust emissions and energy input.

Taking into account the aggregation rules set out in Article 29, the competent authority shall obtain the following data for each combustion plant:

- (a) the total rated thermal input (MW) of the combustion plant;
- (b) the type of combustion plant: boiler, gas turbine, gas engine, diesel engine, other (specifying the type);
- (c) the date of the start of operation of the combustion plant;
- (d) the total annual emissions (tonnes per year) of sulphur dioxide, nitrogen oxides and dust (as total suspended particles);
- (e) the number of operating hours of the combustion plant;
- (f) the total annual amount of energy input, related to the net calorific value (TJ per year), broken down in terms of the following categories of fuel: coal, lignite, biomass, peat, other solid fuels (specifying the type), liquid fuels, natural gas, other gases (specifying the type).

The annual plant-by-plant data contained in these inventories shall be made available to the Commission upon request.

A summary of the inventories shall be made available to the Commission every 3 years within 12 months from the end of the three-year period considered. This summary shall show separately the data for combustion plants within refineries.

The Commission shall make available to the Member States and to the public a summary of the comparison and evaluation of those inventories in accordance with Directive 2003/4/EC within 24 months from the end of the three-year period considered.

4. Member States shall, from 1 January 2016, report the following data annually to the Commission:

- (a) for combustion plants to which Article 31 applies, the sulphur content of the indigenous solid fuel used and the rate of desulphurisation achieved, averaged over each month. For the first year where Article 31 is applied, the technical justification of the non-feasibility of complying with the emission limit values referred to in Article 30(2) and (3) shall also be reported; and
- (b) for combustion plants which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, the number of operating hours per year.

Article 73

Review

1. By 7 January 2016, and every 3 years thereafter, the Commission shall submit to the European Parliament and to the Council a report reviewing the implementation of this Directive on the basis of the information referred to in Article 72.

That report shall include an assessment of the need for Union action through the establishment or updating of Union-wide minimum requirements for emission limit values and for rules on monitoring and compliance for activities within the scope of the BAT conclusions adopted during the previous three-year period, on the basis of the following criteria:

- (a) the impact of the activities concerned on the environment as a whole; and
- (b) the state of implementation of best available techniques for the activities concerned.

That assessment shall consider the opinion of the forum referred to in Article 13(4).

Chapter III and Annex V of this Directive shall be considered to represent the Union-wide minimum requirements in the case of large combustion plants.

The report shall be accompanied by a legislative proposal where appropriate. Where the assessment referred to in the second subparagraph identifies such a need, the legislative proposal shall include provisions establishing or updating Union-wide minimum requirements for emission limit values and for rules on monitoring and compliance assessment for the activities concerned.

2. The Commission shall, by 31 December 2012, review the need to control emissions from:

- (a) the combustion of fuels in installations with a total rated thermal input below 50 MW;
- (b) the intensive rearing of cattle; and
- (c) the spreading of manure.

The Commission shall report the results of that review to the European Parliament and to the Council accompanied by a legislative proposal where appropriate.

3. The Commission shall report to the European Parliament and the Council, by 31 December 2011, on the establishment in Annex I of:

- (a) differentiated capacity thresholds for the rearing of different poultry species, including the specific case of quail;
- (b) capacity thresholds for the simultaneous rearing of different types of animals within the same installation.

The Commission shall report the results of that review to the European Parliament and to the Council accompanied by a legislative proposal where appropriate.

Article 74

Amendments of Annexes

In order to allow the provisions of this Directive to be adapted to scientific and technical progress on the basis of best available techniques, the Commission shall adopt delegated acts in accordance with Article 76 and subject to the conditions laid down in Articles 77 and 78 as regards the adaptation of Parts 3 and 4 of Annex V, Parts 2, 6, 7 and 8 of Annex VI and Parts 5, 6, 7 and 8 of Annex VII to such scientific and technical progress.

Article 75

Committee procedure

1. The Commission shall be assisted by a committee.
2. Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

The period laid down in Article 5(6) of Decision 1999/468/EC shall be set at 3 months.

Article 76

Exercise of the delegation

1. The power to adopt the delegated acts referred to in Article 48(5) and Article 74 shall be conferred on the Commission for a period of 5 years from 6 January 2011. The Commission shall draw up a report in respect of the delegated power at the latest 6 months before the end of the five-year period. The delegation of power shall be automatically extended for periods of an identical duration, unless the European Parliament or the Council revokes it in accordance with Article 77.

2. As soon as it adopts a delegated act, the Commission shall notify it simultaneously to the European Parliament and to the Council.

3. The power to adopt delegated acts is conferred on the Commission subject to the conditions laid down in Articles 77 and 78.

Article 77

Revocation of the delegation

1. The delegation of power referred to in Article 48(5) and Article 74 may be revoked at any time by the European Parliament or by the Council.

2. The institution which has commenced an internal procedure for deciding whether to revoke a delegation of power shall endeavour to inform the other institution and the Commission within a reasonable time before the final decision is taken, indicating the delegated power which could be subject to revocation and possible reasons for a revocation.

3. The decision of revocation shall put an end to the delegation of the power specified in that decision. It shall take effect immediately or on a later date specified therein. It shall not affect the validity of the delegated acts already in force. It shall be published in the *Official Journal of the European Union*.

Article 78

Objections to delegated acts

1. The European Parliament or the Council may object to a delegated act within a period of 2 months from the date of notification.

At the initiative of the European Parliament or the Council that period shall be extended by 2 months.

2. If, on expiry of the period referred to in paragraph 1, neither the European Parliament nor the Council has objected to the delegated act, it shall be published in the *Official Journal of the European Union* and shall enter into force on the date stated therein.

The delegated act may be published in the *Official Journal of the European Union* and enter into force before the expiry of that period if the European Parliament and the Council have both informed the Commission of their intention not to raise objections.

3. If either the European Parliament or the Council objects to the delegated act within the period referred to in paragraph 1, it shall not enter into force. The institution which objects shall state the reasons for objecting to the delegated act.

Article 79

Penalties

Member States shall determine penalties applicable to infringements of the national provisions adopted pursuant to this Directive. The penalties thus provided for shall be effective, proportionate and dissuasive. Member States shall notify those provisions to the Commission by 7 January 2013 and shall notify it without delay of any subsequent amendment affecting them.

Article 80

Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with Article 2, points (8), (11) to (15), (18) to (23), (26) to (30), (34) to (38) and (41) of Article 3, Article 4(2) and (3), Article 7, Articles 8 and 10, Article 11(e) and (h), Article 12(1)(e) and (h), Article 13(7), point (ii) of Article 14(1)(c), points (d), (e), (f) and (h) of Article 14(1), Article 14(2) to (7), Article 15(2) to (5), Articles 16, 17 and 19, Article 21(2) to (5), Articles 22, 23, 24, 27, 28 and 29, Article 30(1), (2), (3), (4), (7) and (8), Articles 31, 32, 33, 34, 35, 36, 38 and 39, Article 40(2) and (3), Articles 42 and 43, Article 45(1), Article 58, Article 59(5), Article 63, Article 65(3), Articles 69, 70, 71, 72 and 79, and with the first subparagraph and points 1.1, 1.4, 2.5(b), 3.1, 4, 5, 6.1(c), 6.4(b), 6.10 and 6.11 of Annex I, Annex II, point 12 of Annex III, Annex V, point (b) of Part 1, points 2.2, 2.4, 3.1 and 3.2 of Part 4, points 2.5 and 2.6 of Part 6 and point 1.1(d) of Part 8 of Annex VI, point 2 of Part 4, point 1 of Part 5, point 3 of Part 7 of Annex VII, points 1 and 2(c) of Part 1, points 2 and 3 of Part 2 and Part 3 of Annex VIII by 7 January 2013.

They shall apply those measures from that same date.

When Member States adopt those measures, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 81

Repeal

1. Directives 78/176/EEC, 82/883/EEC, 92/112/EEC, 1999/13/EC, 2000/76/EC and 2008/1/EC, as amended by the acts listed in Annex IX, Part A are repealed with effect from 7 January 2014, without prejudice to the obligations of the Member States relating to the time limits for transposition into national law and application of the Directives set out in Annex IX, Part B.

2. Directive 2001/80/EC as amended by the acts listed in Annex IX, Part A is repealed with effect from 1 January 2016, without prejudice to the obligations of the Member States relating to the time limits for transposition into national law and application of the Directives set out in Annex IX, Part B.

3. References to the repealed Directives shall be construed as references to this Directive and shall be read in accordance with the correlation table set out in Annex X.

Article 82

Transitional provisions

1. In relation to installations carrying out activities referred to in Annex I, point 1.1 for activities with a total rated thermal input exceeding 50 MW, points 1.2 and 1.3, point 1.4(a), points 2.1 to 2.6, points 3.1 to 3.5, points 4.1 to 4.6 for activities concerning production by chemical processing, points 5.1 and 5.2 for activities covered by Directive 2008/1/EC, point 5.3 (a)(i) and (ii), point 5.4, point 6.1(a) and (b), points 6.2 and 6.3, point 6.4(a), point 6.4(b) for activities covered by Directive 2008/1/EC, point 6.4(c) and points 6.5 to 6.9 which are in operation and hold a permit before 7 January 2013 or the operators of which have submitted a complete application for a permit before that date, provided that those installations are put into operation no later than 7 January 2014, Member States shall apply the laws, regulations and administrative provisions adopted in accordance with Article 80(1) from 7 January 2014 with the exception of Chapter III and Annex V.

2. In relation to installations carrying out activities referred to in Annex I, point 1.1 for activities with a total rated thermal input of 50 MW, point 1.4(b), points 4.1 to 4.6 for activities concerning production by biological processing, points 5.1 and 5.2 for activities not covered by Directive 2008/1/EC, point 5.3(a)(iii) to (v), point 5.3(b), points 5.5 and 5.6, point 6.1(c), point 6.4(b) for activities not covered by Directive 2008/1/EC and points 6.10 and 6.11 which are in operation before 7 January 2013, Member States shall apply the laws, regulations and administrative provisions adopted in accordance with this Directive from 7 July 2015 with the exception of Chapters III and IV and Annexes V and VI.

3. In relation to combustion plants referred to in Article 30(2), Member States shall, from 1 January 2016, apply the laws, regulations and administrative provisions adopted in accordance with Article 80(1) to comply with Chapter III and Annex V.

4. In relation to combustion plants referred to in Article 30(3), Member States shall no longer apply Directive 2001/80/EC from 7 January 2013.

5. In relation to combustion plants which co-incinerate waste, point 3.1 of Part 4 of Annex VI shall apply until:

(a) 31 December 2015, for combustion plants referred to in Article 30(2);

(b) 7 January 2013, for combustion plants referred to in Article 30(3).

6. Point 3.2 of Part 4 of Annex VI shall apply in relation to combustion plants which co-incinerate waste, as from:

(a) 1 January 2016, for combustion plants referred to in Article 30(2)

(b) 7 January 2013, for combustion plants referred to in Article 30(3).

7. Article 58 shall apply from 1 June 2015. Until that date, substances or mixtures which, because of their content of volatile organic compounds classified as carcinogens, mutagens, or toxic to reproduction under Regulation (EC) No 1272/2008, are assigned or need to carry the hazard statements H340, H350, H350i, H360D or H360F or the risk phrases R45, R46, R49, R60 or R61, shall be replaced, as far as possible, by less harmful substances or mixtures within the shortest possible time.

8. Article 59(5) shall apply from 1 June 2015. Until that date, the emissions of either volatile organic compounds which are

assigned or need to carry the hazard statements H340, H350, H350i, H360D or H360F or the risk phrases R45, R46, R49, R60 or R61 or halogenated volatile organic compounds which are assigned or need to carry the hazard statements H341 or H351 or the risk phrases R40 or R68, shall be controlled under contained conditions, as far as technically and economically feasible, to safeguard public health and the environment and shall not exceed the relevant emission limit values set out in Part 4 of Annex VII.

9. Point 2 of Part 4 of Annex VII shall apply from 1 June 2015. Until that date, for emissions of halogenated volatile organic compounds which are assigned or need to carry the hazard statements H341 or H351 or the risk phrases R40 or R68, where the mass flow of the sum of the compounds causing the hazard statements H341 or H351 or the labelling R40 or R68 is greater than, or equal to, 100 g/h, an emission limit value of 20 mg/Nm³ shall be complied with. The emission limit value refers to the mass sum of the individual compounds.

Article 83

Entry into force

This Directive shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*.

Article 84

Addressees

This Directive is addressed to the Member States.

Done at Strasbourg, 24 November 2010.

For the European Parliament
The President
J. BUZEK

For the Council
The President
O. CHASTEL

ANNEX I

Categories of activities referred to in Article 10

The threshold values given below generally refer to production capacities or outputs. Where several activities falling under the same activity description containing a threshold are operated in the same installation, the capacities of such activities are added together. For waste management activities, this calculation shall apply at the level of activities 5.1, 5.3(a) and 5.3(b).

The Commission shall establish guidance on:

- (a) the relationship between waste management activities described in this Annex and those described in Annexes I and II to Directive 2008/98/EC; and
- (b) the interpretation of the term 'industrial scale' regarding the description of chemical industry activities described in this Annex.

1. Energy industries

1.1. Combustion of fuels in installations with a total rated thermal input of 50 MW or more

1.2. Refining of mineral oil and gas

1.3. Production of coke

1.4. Gasification or liquefaction of:

- (a) coal;
- (b) other fuels in installations with a total rated thermal input of 20 MW or more.

2. Production and processing of metals

2.1. Metal ore (including sulphide ore) roasting or sintering

2.2. Production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2,5 tonnes per hour

2.3. Processing of ferrous metals:

- (a) operation of hot-rolling mills with a capacity exceeding 20 tonnes of crude steel per hour;
- (b) operation of smitheries with hammers the energy of which exceeds 50 kilojoule per hammer, where the calorific power used exceeds 20 MW;
- (c) application of protective fused metal coats with an input exceeding 2 tonnes of crude steel per hour.

2.4. Operation of ferrous metal foundries with a production capacity exceeding 20 tonnes per day

2.5. Processing of non-ferrous metals:

- (a) production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes;
- (b) melting, including the alloyage, of non-ferrous metals, including recovered products and operation of non-ferrous metal foundries, with a melting capacity exceeding 4 tonnes per day for lead and cadmium or 20 tonnes per day for all other metals.

2.6. Surface treatment of metals or plastic materials using an electrolytic or chemical process where the volume of the treatment vats exceeds 30 m³

3. Mineral industry
 - 3.1. Production of cement, lime and magnesium oxide:
 - (a) production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other kilns with a production capacity exceeding 50 tonnes per day;
 - (b) production of lime in kilns with a production capacity exceeding 50 tonnes per day;
 - (c) production of magnesium oxide in kilns with a production capacity exceeding 50 tonnes per day.
 - 3.2. Production of asbestos or the manufacture of asbestos-based products
 - 3.3. Manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day
 - 3.4. Melting mineral substances including the production of mineral fibres with a melting capacity exceeding 20 tonnes per day
 - 3.5. Manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain with a production capacity exceeding 75 tonnes per day and/or with a kiln capacity exceeding 4 m³ and with a setting density per kiln exceeding 300 kg/m³

4. Chemical industry

For the purpose of this section, production within the meaning of the categories of activities contained in this section means the production on an industrial scale by chemical or biological processing of substances or groups of substances listed in points 4.1 to 4.6

- 4.1. Production of organic chemicals, such as:
 - (a) simple hydrocarbons (linear or cyclic, saturated or unsaturated, aliphatic or aromatic);
 - (b) oxygen-containing hydrocarbons such as alcohols, aldehydes, ketones, carboxylic acids, esters and mixtures of esters, acetates, ethers, peroxides and epoxy resins;
 - (c) sulphurous hydrocarbons;
 - (d) nitrogenous hydrocarbons such as amines, amides, nitrous compounds, nitro compounds or nitrate compounds, nitriles, cyanates, isocyanates;
 - (e) phosphorus-containing hydrocarbons;
 - (f) halogenic hydrocarbons;
 - (g) organometallic compounds;
 - (h) plastic materials (polymers, synthetic fibres and cellulose-based fibres);
 - (i) synthetic rubbers;
 - (j) dyes and pigments;
 - (k) surface-active agents and surfactants.
- 4.2. Production of inorganic chemicals, such as:
 - (a) gases, such as ammonia, chlorine or hydrogen chloride, fluorine or hydrogen fluoride, carbon oxides, sulphur compounds, nitrogen oxides, hydrogen, sulphur dioxide, carbonyl chloride;
 - (b) acids, such as chromic acid, hydrofluoric acid, phosphoric acid, nitric acid, hydrochloric acid, sulphuric acid, oleum, sulphurous acids;

- (c) bases, such as ammonium hydroxide, potassium hydroxide, sodium hydroxide;
 - (d) salts, such as ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate;
 - (e) non-metals, metal oxides or other inorganic compounds such as calcium carbide, silicon, silicon carbide.
- 4.3. Production of phosphorous-, nitrogen- or potassium-based fertilisers (simple or compound fertilisers)
- 4.4. Production of plant protection products or of biocides
- 4.5. Production of pharmaceutical products including intermediates
- 4.6. Production of explosives
5. Waste management
- 5.1. Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving one or more of the following activities:
- (a) biological treatment;
 - (b) physico-chemical treatment;
 - (c) blending or mixing prior to submission to any of the other activities listed in points 5.1 and 5.2;
 - (d) repackaging prior to submission to any of the other activities listed in points 5.1 and 5.2;
 - (e) solvent reclamation/regeneration;
 - (f) recycling/reclamation of inorganic materials other than metals or metal compounds;
 - (g) regeneration of acids or bases;
 - (h) recovery of components used for pollution abatement;
 - (i) recovery of components from catalysts;
 - (j) oil re-refining or other reuses of oil;
 - (k) surface impoundment.
- 5.2. Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants:
- (a) for non-hazardous waste with a capacity exceeding 3 tonnes per hour;
 - (b) for hazardous waste with a capacity exceeding 10 tonnes per day.
- 5.3. (a) Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment ⁽¹⁾:
- (i) biological treatment;
 - (ii) physico-chemical treatment;
 - (iii) pre-treatment of waste for incineration or co-incineration;
 - (iv) treatment of slags and ashes;
 - (v) treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.

⁽¹⁾ OJ L 135, 30.5.1991, p. 40.

- (b) Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, and excluding activities covered by Directive 91/271/EEC:

- (i) biological treatment;
- (ii) pre-treatment of waste for incineration or co-incineration;
- (iii) treatment of slags and ashes;
- (iv) treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.

When the only waste treatment activity carried out is anaerobic digestion, the capacity threshold for this activity shall be 100 tonnes per day.

- 5.4. Landfills, as defined in Article 2(g) of Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste ⁽¹⁾, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25 000 tonnes, excluding landfills of inert waste

- 5.5. Temporary storage of hazardous waste not covered under point 5.4 pending any of the activities listed in points 5.1, 5.2, 5.4 and 5.6 with a total capacity exceeding 50 tonnes, excluding temporary storage, pending collection, on the site where the waste is generated

- 5.6. Underground storage of hazardous waste with a total capacity exceeding 50 tonnes

6. Other activities

- 6.1. Production in industrial installations of:

- (a) pulp from timber or other fibrous materials;
- (b) paper or card board with a production capacity exceeding 20 tonnes per day;
- (c) one or more of the following wood-based panels: oriented strand board, particleboard or fibreboard with a production capacity exceeding 600 m³ per day.

- 6.2. Pre-treatment (operations such as washing, bleaching, mercerisation) or dyeing of textile fibres or textiles where the treatment capacity exceeds 10 tonnes per day

- 6.3. Tanning of hides and skins where the treatment capacity exceeds 12 tonnes of finished products per day

- 6.4. (a) Operating slaughterhouses with a carcass production capacity greater than 50 tonnes per day

- (b) Treatment and processing, other than exclusively packaging, of the following raw materials, whether previously processed or unprocessed, intended for the production of food or feed from:

- (i) only animal raw materials (other than exclusively milk) with a finished product production capacity greater than 75 tonnes per day;
- (ii) only vegetable raw materials with a finished product production capacity greater than 300 tonnes per day or 600 tonnes per day where the installation operates for a period of no more than 90 consecutive days in any year;
- (iii) animal and vegetable raw materials, both in combined and separate products, with a finished product production capacity in tonnes per day greater than:

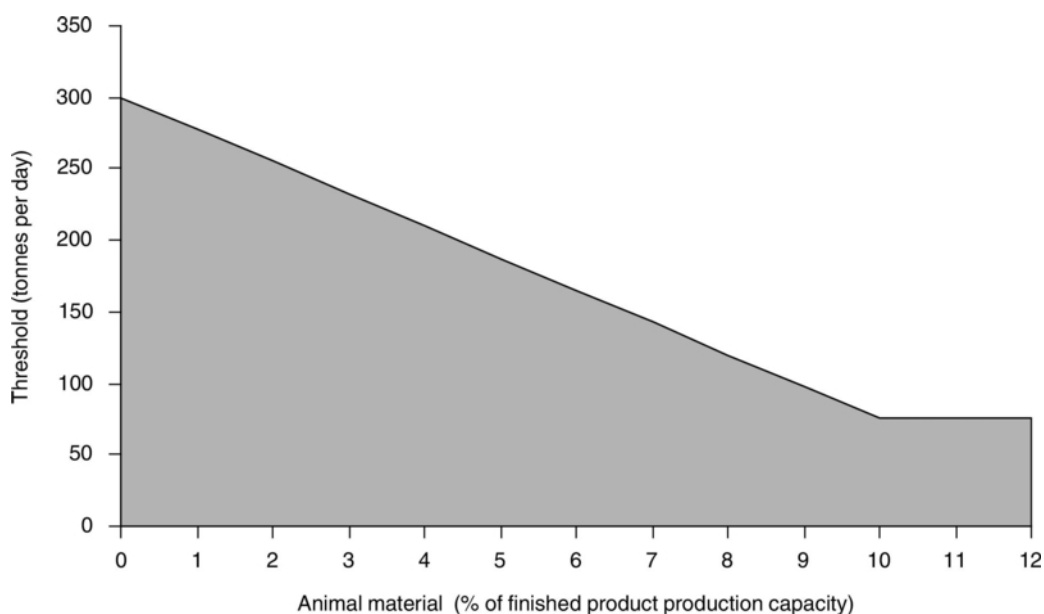
- 75 if A is equal to 10 or more; or,
- $[300 - (22,5 \times A)]$ in any other case,

where 'A' is the portion of animal material (in percent of weight) of the finished product production capacity.

Packaging shall not be included in the final weight of the product.

⁽¹⁾ OJ L 182, 16.7.1999, p. 1.

This subsection shall not apply where the raw material is milk only.



- (c) Treatment and processing of milk only, the quantity of milk received being greater than 200 tonnes per day (average value on an annual basis).
- 6.5. Disposal or recycling of animal carcasses or animal waste with a treatment capacity exceeding 10 tonnes per day
 - 6.6. Intensive rearing of poultry or pigs:
 - (a) with more than 40 000 places for poultry;
 - (b) with more than 2 000 places for production pigs (over 30 kg), or
 - (c) with more than 750 places for sows.
 - 6.7. Surface treatment of substances, objects or products using organic solvents, in particular for dressing, printing, coating, degreasing, waterproofing, sizing, painting, cleaning or impregnating, with an organic solvent consumption capacity of more than 150 kg per hour or more than 200 tonnes per year
 - 6.8. Production of carbon (hard-burnt coal) or electrographite by means of incineration or graphitisation
 - 6.9. Capture of CO₂ streams from installations covered by this Directive for the purposes of geological storage pursuant to Directive 2009/31/EC
 - 6.10. Preservation of wood and wood products with chemicals with a production capacity exceeding 75 m³ per day other than exclusively treating against sapstain
 - 6.11. Independently operated treatment of waste water not covered by Directive 91/271/EEC and discharged by an installation covered by Chapter II

ANNEX II

List of polluting substances

AIR

1. Sulphur dioxide and other sulphur compounds
2. Oxides of nitrogen and other nitrogen compounds
3. Carbon monoxide
4. Volatile organic compounds
5. Metals and their compounds
6. Dust including fine particulate matter
7. Asbestos (suspended particulates, fibres)
8. Chlorine and its compounds
9. Fluorine and its compounds
10. Arsenic and its compounds
11. Cyanides
12. Substances and mixtures which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction via the air
13. Polychlorinated dibenzodioxins and polychlorinated dibenzofurans

WATER

1. Organohalogen compounds and substances which may form such compounds in the aquatic environment
 2. Organophosphorus compounds
 3. Organotin compounds
 4. Substances and mixtures which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction in or via the aquatic environment
 5. Persistent hydrocarbons and persistent and bioaccumulable organic toxic substances
 6. Cyanides
 7. Metals and their compounds
 8. Arsenic and its compounds
 9. Biocides and plant protection products
 10. Materials in suspension
 11. Substances which contribute to eutrophication (in particular, nitrates and phosphates)
 12. Substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.)
 13. Substances listed in Annex X to Directive 2000/60/EC
-

ANNEX III

Criteria for determining best available techniques

1. the use of low-waste technology;
 2. the use of less hazardous substances;
 3. the furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate;
 4. comparable processes, facilities or methods of operation which have been tried with success on an industrial scale;
 5. technological advances and changes in scientific knowledge and understanding;
 6. the nature, effects and volume of the emissions concerned;
 7. the commissioning dates for new or existing installations;
 8. the length of time needed to introduce the best available technique;
 9. the consumption and nature of raw materials (including water) used in the process and energy efficiency;
 10. the need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it;
 11. the need to prevent accidents and to minimise the consequences for the environment;
 12. information published by public international organisations.
-

ANNEX IV

Public participation in decision-making

1. The public shall be informed (by public notices or other appropriate means such as electronic media where available) of the following matters early in the procedure for the taking of a decision or, at the latest, as soon as the information can reasonably be provided:
 - (a) the application for a permit or, as the case may be, the proposal for the updating of a permit or of permit conditions in accordance with Article 21, including the description of the elements listed in Article 12(1);
 - (b) where applicable, the fact that a decision is subject to a national or transboundary environmental impact assessment or to consultations between Member States in accordance with Article 26;
 - (c) details of the competent authorities responsible for taking the decision, those from which relevant information can be obtained, those to which comments or questions can be submitted, and details of the time schedule for transmitting comments or questions;
 - (d) the nature of possible decisions or, where there is one, the draft decision;
 - (e) where applicable, the details relating to a proposal for the updating of a permit or of permit conditions;
 - (f) an indication of the times and places where, or means by which, the relevant information will be made available;
 - (g) details of the arrangements for public participation and consultation made pursuant to point 5.
 2. Member States shall ensure that, within appropriate time-frames, the following is made available to the public concerned:
 - (a) in accordance with national law, the main reports and advice issued to the competent authority or authorities at the time when the public concerned were informed in accordance with point 1;
 - (b) in accordance with Directive 2003/4/EC, information other than that referred to in point 1 which is relevant for the decision in accordance with Article 5 of this Directive and which only becomes available after the time the public concerned was informed in accordance with point 1.
 3. The public concerned shall be entitled to express comments and opinions to the competent authority before a decision is taken.
 4. The results of the consultations held pursuant to this Annex must be taken into due account in the taking of a decision.
 5. The detailed arrangements for informing the public (for example by bill posting within a certain radius or publication in local newspapers) and consulting the public concerned (for example by written submissions or by way of a public inquiry) shall be determined by the Member States. Reasonable time-frames for the different phases shall be provided, allowing sufficient time to inform the public and for the public concerned to prepare and participate effectively in environmental decision-making subject to this Annex.
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ANNEX V

Technical provisions relating to combustion plants

PART 1

Emission limit values for combustion plants referred to in Article 30(2)

1. All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O₂ content of 6 % for solid fuels, 3 % for combustion plants, other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.
2. Emission limit values (mg/Nm³) for SO₂ for combustion plants using solid or liquid fuels with the exception of gas turbines and gas engines

Total rated thermal input (MW)	Coal and lignite and other solid fuels	Biomass	Peat	Liquid fuels
50-100	400	200	300	350
100-300	250	200	300	250
> 300	200	200	200	200

Combustion plants, using solid fuels which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, shall be subject to an emission limit value for SO₂ of 800 mg/Nm³.

Combustion plants using liquid fuels, which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, shall be subject to an emission limit value for SO₂ of 850 mg/Nm³ in case of plants with a total rated thermal input not exceeding 300 MW and of 400 mg/Nm³ in case of plants with a total rated thermal input greater than 300 MW.

A part of a combustion plant discharging its waste gases through one or more separate flues within a common stack, and which does not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, may be subject to the emission limit values set out in the preceding two paragraphs in relation to the total rated thermal input of the entire combustion plant. In such cases the emissions through each of those flues shall be monitored separately.

3. Emission limit values (mg/Nm³) for SO₂ for combustion plants using gaseous fuels with the exception of gas turbines and gas engines

In general	35
Liquefied gas	5
Low calorific gases from coke oven	400
Low calorific gases from blast furnace	200

Combustion plants, firing low calorific gases from gasification of refinery residues, which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, shall be subject to an emission limit value for SO₂ of 800 mg/Nm³.

4. Emission limit values (mg/Nm^3) for NO_x for combustion plants using solid or liquid fuels with the exception of gas turbines and gas engines

Total rated thermal input (MW)	Coal and lignite and other solid fuels	Biomass and peat	Liquid fuels
50-100	300 450 in case of pulverised lignite combustion	300	450
100-300	200	250	200 ⁽¹⁾
> 300	200	200	150 ⁽¹⁾

Note:

⁽¹⁾ The emission limit value is $450 \text{ mg}/\text{Nm}^3$ for the firing of distillation and conversion residues from the refining of crude-oil for own consumption in combustion plants with a total rated thermal input not exceeding 500 MW which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003.

Combustion plants in chemical installations using liquid production residues as non-commercial fuel for own consumption with a total rated thermal input not exceeding 500 MW which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, shall be subject to an emission limit value for NO_x of $450 \text{ mg}/\text{Nm}^3$.

Combustion plants using solid or liquid fuels with a total rated thermal input not exceeding 500 MW which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, shall be subject to an emission limit value for NO_x of $450 \text{ mg}/\text{Nm}^3$.

Combustion plants using solid fuels with a total rated thermal input greater than 500 MW, which were granted a permit before 1 July 1987 and which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, shall be subject to an emission limit value for NO_x of $450 \text{ mg}/\text{Nm}^3$.

Combustion plants using liquid fuels, with a total rated thermal input greater than 500 MW which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, shall be subject to an emission limit value for NO_x of $400 \text{ mg}/\text{Nm}^3$.

A part of a combustion plant discharging its waste gases through one or more separate flues within a common stack, and which does not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, may be subject to the emission limit values set out in the preceding three paragraphs in relation to the total rated thermal input of the entire combustion plant. In such cases the emissions through each of those flues shall be monitored separately.

5. Gas turbines (including combined cycle gas turbines (CCGT)) using light and middle distillates as liquid fuels shall be subject to an emission limit value for NO_x of $90 \text{ mg}/\text{Nm}^3$ and for CO of $100 \text{ mg}/\text{Nm}^3$.

Gas turbines for emergency use that operate less than 500 operating hours per year are not covered by the emission limit values set out in this point. The operator of such plants shall record the used operating hours.

6. Emission limit values (mg/Nm³) for NO_x and CO for gas fired combustion plants

	NO _x	CO
Combustion plants firing natural gas with the exception of gas turbines and gas engines	100	100
Combustion plants firing blast furnace gas, coke oven gas or low calorific gases from gasification of refinery residues, with the exception of gas turbines and gas engines	200 ⁽⁴⁾	—
Combustion plants firing other gases, with the exception of gas turbines and gas engines	200 ⁽⁴⁾	—
Gas turbines (including CCGT), using natural gas ⁽¹⁾ as fuel	50 ⁽²⁾ ⁽³⁾	100
Gas turbines (including CCGT), using other gases as fuel	120	—
Gas engines	100	100

Notes:

⁽¹⁾ Natural gas is naturally occurring methane with not more than 20 % (by volume) of inerts and other constituents.

⁽²⁾ 75 mg/Nm³ in the following cases, where the efficiency of the gas turbine is determined at ISO base load conditions:

- (i) gas turbines, used in combined heat and power systems having an overall efficiency greater than 75 %;
- (ii) gas turbines used in combined cycle plants having an annual average overall electrical efficiency greater than 55 %;
- (iii) gas turbines for mechanical drives.

⁽³⁾ For single cycle gas turbines not falling into any of the categories mentioned under note (2), but having an efficiency greater than 35 % – determined at ISO base load conditions – the emission limit value for NO_x shall be 50η/35 where η is the gas turbine efficiency at ISO base load conditions expressed as a percentage.

⁽⁴⁾ 300 mg/Nm³ for such combustion plants with a total rated thermal input not exceeding 500 MW which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003.

For gas turbines (including CCGT), the NO_x and CO emission limit values set out in the table contained in this point apply only above 70 % load.

For gas turbines (including CCGT) which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, the emission limit value for NO_x is 150 mg/Nm³ when firing natural gas and 200 mg/Nm³ when firing other gases or liquid fuels.

A part of a combustion plant discharging its waste gases through one or more separate flues within a common stack, and which does not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, may be subject to the emission limit values set out in the preceding paragraph in relation to the total rated thermal input of the entire combustion plant. In such cases the emissions through each of those flues shall be monitored separately.

Gas turbines and gas engines for emergency use that operate less than 500 operating hours per year are not covered by the emission limit values set out in this point. The operator of such plants shall record the used operating hours.

7. Emission limit values (mg/Nm³) for dust for combustion plants using solid or liquid fuels with the exception of gas turbines and gas engines

Total rated thermal input (MW)	Coal and lignite and other solid fuels	Biomass and peat	Liquid fuels ⁽¹⁾
50-100	30	30	30
100-300	25	20	25
> 300	20	20	20

Note:

⁽¹⁾ The emission limit value is 50 mg/Nm³ for the firing of distillation and conversion residues from the refining of crude oil for own consumption in combustion plants which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003.

8. Emission limit values (mg/Nm³) for dust for combustion plants using gaseous fuels with the exception of gas turbines and gas engines

In general	5
Blast furnace gas	10
Gases produced by the steel industry which can be used elsewhere	30

PART 2

Emission limit values for combustion plants referred to in Article 30(3)

1. All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O₂ content of 6 % for solid fuels, 3 % for combustion plants other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.

In case of combined cycle gas turbines with supplementary firing, the standardised O₂ content may be defined by the competent authority, taking into account the specific characteristics of the installation concerned.

2. Emission limit values (mg/Nm³) for SO₂ for combustion plants using solid or liquid fuels with the exception of gas turbines and gas engines

Total rated thermal input (MW)	Coal and lignite and other solid fuels	Biomass	Peat	Liquid fuels
50-100	400	200	300	350
100-300	200	200	300 250 in case of fluidised bed combustion	200
> 300	150 200 in case of circulating or pressurised fluidised bed combustion	150	150 200 in case of fluidised bed combustion	150

3. Emission limit values (mg/Nm³) for SO₂ for combustion plants using gaseous fuels with the exception of gas turbines and gas engines

In general	35
Liquefied gas	5
Low calorific gases from coke oven	400
Low calorific gases from blast furnace	200

4. Emission limit values (mg/Nm³) for NO_x for combustion plants using solid or liquid fuels with the exception of gas turbines and gas engines

Total rated thermal input (MW)	Coal and lignite and other solid fuels	Biomass and peat	Liquid fuels
50-100	300 400 in case of pulverised lignite combustion	250	300
100-300	200	200	150
> 300	150 200 in case of pulverised lignite combustion	150	100

5. Gas turbines (including CCGT) using light and middle distillates as liquid fuels shall be subject to an emission limit value for NO_x of 50 mg/Nm^3 and for CO of 100 mg/Nm^3

Gas turbines for emergency use that operate less than 500 operating hours per year are not covered by the emission limit values set out in this point. The operator of such plants shall record the used operating hours.

6. Emission limit values (mg/Nm^3) for NO_x and CO for gas fired combustion plants

	NO_x	CO
Combustion plants other than gas turbines and gas engines	100	100
Gas turbines (including CCGT)	50 ⁽¹⁾	100
Gas engines	75	100

Note:

⁽¹⁾ For single cycle gas turbines having an efficiency greater than 35 % – determined at ISO base load conditions – the emission limit value for NO_x shall be $50\eta/35$ where η is the gas turbine efficiency at ISO base load conditions expressed as a percentage.

For gas turbines (including CCGT), the NO_x and CO emission limit values set out in this point apply only above 70 % load.

Gas turbines and gas engines for emergency use that operate less than 500 operating hours per year are not covered by the emission limit values set out in this point. The operator of such plants shall record the used operating hours.

7. Emission limit values (mg/Nm^3) for dust for combustion plants using solid or liquid fuels with the exception of gas turbines and gas engines

Total rated thermal input (MW)	
50-300	20
> 300	10
	20 for biomass and peat

8. Emission limit values (mg/Nm^3) for dust for combustion plants using gaseous fuels with the exception of gas turbines and gas engines

In general	5
Blast furnace gas	10
Gases produced by the steel industry which can be used elsewhere	30

PART 3

Emission monitoring

1. The concentrations of SO_2 , NO_x and dust in waste gases from each combustion plant with a total rated thermal input of 100 MW or more shall be measured continuously.

The concentration of CO in waste gases from each combustion plant firing gaseous fuels with a total rated thermal input of 100 MW or more shall be measured continuously.

2. The competent authority may decide not to require the continuous measurements referred to in point 1 in the following cases:

- (a) for combustion plants with a life span of less than 10 000 operational hours;
- (b) for SO_2 and dust from combustion plants firing natural gas;

- (c) for SO₂ from combustion plants firing oil with known sulphur content in cases where there is no waste gas desulphurisation equipment;
 - (d) for SO₂ from combustion plants firing biomass if the operator can prove that the SO₂ emissions can under no circumstances be higher than the prescribed emission limit values.
3. Where continuous measurements are not required, measurements of SO₂, NO_x, dust and, for gas fired plants, also of CO shall be required at least once every 6 months.
 4. For combustion plants firing coal or lignite, the emissions of total mercury shall be measured at least once per year.
 5. As an alternative to the measurements of SO₂ and NO_x referred to in point 3, other procedures, verified and approved by the competent authority, may be used to determine the SO₂ and NO_x emissions. Such procedures shall use relevant CEN standards or, if CEN standards are not available, ISO, national or other international standards which ensure the provision of data of an equivalent scientific quality.
 6. The competent authority shall be informed of significant changes in the type of fuel used or in the mode of operation of the plant. The competent authority shall decide whether the monitoring requirements laid down in points 1 to 4 are still adequate or require adaptation.
 7. The continuous measurements carried out in accordance with point 1 shall include the measurement of the oxygen content, temperature, pressure and water vapour content of the waste gases. The continuous measurement of the water vapour content of the waste gases shall not be necessary, provided that the sampled waste gas is dried before the emissions are analysed.
 8. Sampling and analysis of relevant polluting substances and measurements of process parameters as well as the quality assurance of automated measuring systems and the reference measurement methods to calibrate those systems shall be carried out in accordance with CEN standards. If CEN standards are not available, ISO, national or other international standards which ensure the provision of data of an equivalent scientific quality shall apply.

The automated measuring systems shall be subject to control by means of parallel measurements with the reference methods at least once per year.

The operator shall inform the competent authority about the results of the checking of the automated measuring systems.

9. At the emission limit value level, the values of the 95 % confidence intervals of a single measured result shall not exceed the following percentages of the emission limit values:

Carbon monoxide	10 %
Sulphur dioxide	20 %
Nitrogen oxides	20 %
Dust	30 %

10. The validated hourly and daily average values shall be determined from the measured valid hourly average values after having subtracted the value of the confidence interval specified in point 9.

Any day in which more than three hourly average values are invalid due to malfunction or maintenance of the automated measuring system shall be invalidated. If more than 10 days over a year are invalidated for such situations the competent authority shall require the operator to take adequate measures to improve the reliability of the automated measuring system.

11. In the case of plants which must comply with the rates of desulphurisation referred to in Article 31, the sulphur content of the fuel which is fired in the combustion plant shall also be regularly monitored. The competent authorities shall be informed of substantial changes in the type of fuel used.

PART 4

Assessment of compliance with emission limit values

1. In the case of continuous measurements, the emission limit values set out in Parts 1 and 2 shall be regarded as having been complied with if the evaluation of the measurement results indicates, for operating hours within a calendar year, that all of the following conditions have been met:
 - (a) no validated monthly average value exceeds the relevant emission limit values set out in Parts 1 and 2;
 - (b) no validated daily average value exceeds 110 % of the relevant emission limit values set out in Parts 1 and 2;
 - (c) in cases of combustion plants composed only of boilers using coal with a total rated thermal input below 50 MW, no validated daily average value exceeds 150 % of the relevant emission limit values set out in Parts 1 and 2,
 - (d) 95 % of all the validated hourly average values over the year do not exceed 200 % of the relevant emission limit values set out in Parts 1 and 2.

The validated average values are determined as set out in point 10 of Part 3.

For the purpose of the calculation of the average emission values, the values measured during the periods referred to in Article 30(5) and (6) and Article 37 as well as during the start-up and shut-down periods shall be disregarded.

2. Where continuous measurements are not required, the emission limit values set out in Parts 1 and 2 shall be regarded as having been complied with if the results of each of the series of measurements or of the other procedures defined and determined according to the rules laid down by the competent authorities do not exceed the emission limit values.

PART 5

Minimum rate of desulphurisation

1. Minimum rate of desulphurisation for combustion plants referred to in Article 30(2)

Total rated thermal input (MW)	Minimum rate of desulphurisation	
	Plants which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003	Other plants
50-100	80 %	92 %
100-300	90 %	92 %
> 300	96 % ⁽¹⁾	96 %

Note:

⁽¹⁾ For combustion plants firing oil shale, the minimum rate of desulphurisation is 95 %.

2. Minimum rate of desulphurisation for combustion plants referred to in Article 30(3)

Total rated thermal input (MW)	Minimum rate of desulphurisation
50-100	93 %
100-300	93 %
> 300	97 %

PART 6

Compliance with rate of desulphurisation

The minimum rates of desulphurisation set out in Part 5 of this Annex shall apply as a monthly average limit value.

PART 7

Average emission limit values for multi-fuel firing combustion plants within a refinery

Average emission limit values (mg/Nm³) for SO₂ for multi-fuel firing combustion plants within a refinery, with the exception of gas turbines and gas engines, which use the distillation and conversion residues from the refining of crude-oil for own consumption, alone or with other fuels:

- (a) for combustion plants which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003: 1 000 mg/Nm³;
- (b) for other combustion plants: 600 mg/Nm³.

These emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O₂ content of 6 % for solid fuels and 3 % for liquid and gaseous fuels.

ANNEX VI

Technical provisions relating to waste incineration plants and waste co-incineration plants

PART 1

Definitions

For the purpose of this Annex the following definitions shall apply:

- (a) 'existing waste incineration plant' means one of the following waste incineration plants:
- (i) which was in operation and had a permit in accordance with applicable Union law before 28 December 2002,
 - (ii) which was authorised or registered for waste incineration and had a permit granted before 28 December 2002 in accordance with applicable Union law, provided that the plant was put into operation no later than 28 December 2003,
 - (iii) which, in the view of the competent authority, was the subject of a full request for authorisation before 28 December 2002, provided that the plant was put into operation not later than 28 December 2004;
- (b) 'new waste incineration plant' means any waste incineration plant not covered by point (a).

PART 2

Equivalence factors for dibenzo-p-dioxins and dibenzofurans

For the determination of the total concentration of dioxins and furans, the mass concentrations of the following dibenzo-p-dioxins and dibenzofurans shall be multiplied by the following equivalence factors before summing:

	Toxic equivalence factor
2,3,7,8 — Tetrachlorodibenzodioxin (TCDD)	1
1,2,3,7,8 — Pentachlorodibenzodioxin (PeCDD)	0,5
1,2,3,4,7,8 — Hexachlorodibenzodioxin (HxCDD)	0,1
1,2,3,6,7,8 — Hexachlorodibenzodioxin (HxCDD)	0,1
1,2,3,7,8,9 — Hexachlorodibenzodioxin (HxCDD)	0,1
1,2,3,4,6,7,8 — Heptachlorodibenzodioxin (HpCDD)	0,01
Octachlorodibenzodioxin (OCDD)	0,001
2,3,7,8 — Tetrachlorodibenzofuran (TCDF)	0,1
2,3,4,7,8 — Pentachlorodibenzofuran (PeCDF)	0,5
1,2,3,7,8 — Pentachlorodibenzofuran (PeCDF)	0,05
1,2,3,4,7,8 — Hexachlorodibenzofuran (HxCDF)	0,1
1,2,3,6,7,8 — Hexachlorodibenzofuran (HxCDF)	0,1
1,2,3,7,8,9 — Hexachlorodibenzofuran (HxCDF)	0,1
2,3,4,6,7,8 — Hexachlorodibenzofuran (HxCDF)	0,1
1,2,3,4,6,7,8 — Heptachlorodibenzofuran (HpCDF)	0,01
1,2,3,4,7,8,9 — Heptachlorodibenzofuran (HpCDF)	0,01
Octachlorodibenzofuran (OCDF)	0,001

PART 3

Air emission limit values for waste incineration plants

1. All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correcting for the water vapour content of the waste gases.

They are standardised at 11 % oxygen in waste gas except in case of incineration of mineral waste oil as defined in point 3 of Article 3 of Directive 2008/98/EC, when they are standardised at 3 % oxygen, and in the cases referred to in Point 2.7 of Part 6.

- 1.1. Daily average emission limit values for the following polluting substances (mg/Nm³)

Total dust	10
Gaseous and vaporous organic substances, expressed as total organic carbon (TOC)	10
Hydrogen chloride (HCl)	10
Hydrogen fluoride (HF)	1
Sulphur dioxide (SO ₂)	50
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as NO ₂ for existing waste incineration plants with a nominal capacity exceeding 6 tonnes per hour or new waste incineration plants	200
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as NO ₂ for existing waste incineration plants with a nominal capacity of 6 tonnes per hour or less	400

- 1.2. Half-hourly average emission limit values for the following polluting substances (mg/Nm³)

	(100 %) A	(97 %) B
Total dust	30	10
Gaseous and vaporous organic substances, expressed as total organic carbon (TOC)	20	10
Hydrogen chloride (HCl)	60	10
Hydrogen fluoride (HF)	4	2
Sulphur dioxide (SO ₂)	200	50
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as NO ₂ for existing waste incineration plants with a nominal capacity exceeding 6 tonnes per hour or new waste incineration plants	400	200

- 1.3. Average emission limit values (mg/Nm³) for the following heavy metals over a sampling period of a minimum of 30 minutes and a maximum of 8 hours

Cadmium and its compounds, expressed as cadmium (Cd)	Total: 0,05
Thallium and its compounds, expressed as thallium (Tl)	
Mercury and its compounds, expressed as mercury (Hg)	0,05
Antimony and its compounds, expressed as antimony (Sb)	Total: 0,5
Arsenic and its compounds, expressed as arsenic (As)	
Lead and its compounds, expressed as lead (Pb)	
Chromium and its compounds, expressed as chromium (Cr)	
Cobalt and its compounds, expressed as cobalt (Co)	
Copper and its compounds, expressed as copper (Cu)	
Manganese and its compounds, expressed as manganese (Mn)	
Nickel and its compounds, expressed as nickel (Ni)	
Vanadium and its compounds, expressed as vanadium (V)	

These average values cover also the gaseous and the vapour forms of the relevant heavy metal emissions as well as their compounds.

- 1.4. Average emission limit value (ng/Nm³) for dioxins and furans over a sampling period of a minimum of 6 hours and a maximum of 8 hours. The emission limit value refers to the total concentration of dioxins and furans calculated in accordance with Part 2.

Dioxins and furans	0,1
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- 1.5. Emission limit values (mg/Nm³) for carbon monoxide (CO) in the waste gases:

- (a) 50 as daily average value;
- (b) 100 as half-hourly average value;
- (c) 150 as 10-minute average value.

The competent authority may authorise exemptions from the emission limit values set out in this point for waste incineration plants using fluidised bed technology, provided that the permit sets an emission limit value for carbon monoxide (CO) of not more than 100 mg/Nm³ as an hourly average value.

2. Emission limit values applicable in the circumstances described in Article 46(6) and Article 47.

The total dust concentration in the emissions into the air of a waste incineration plant shall under no circumstances exceed 150 mg/Nm³ expressed as a half-hourly average. The air emission limit values for TOC and CO set out in points 1.2 and 1.5(b) shall not be exceeded.

3. Member States may lay down rules governing the exemptions provided for in this Part.

PART 4

Determination of air emission limit values for the co-incineration of waste

1. The following formula (mixing rule) shall be applied whenever a specific total emission limit value 'C' has not been set out in a table in this Part.

The emission limit value for each relevant polluting substance and CO in the waste gas resulting from the co-incineration of waste shall be calculated as follows:

$$\frac{V_{\text{waste}} \times C_{\text{waste}} + V_{\text{proc}} \times C_{\text{proc}}}{V_{\text{waste}} + C_{\text{proc}}} = C$$

V_{waste} : waste gas volume resulting from the incineration of waste only determined from the waste with the lowest calorific value specified in the permit and standardised at the conditions given by this Directive.

If the resulting heat release from the incineration of hazardous waste amounts to less than 10 % of the total heat released in the plant, V_{waste} must be calculated from a (notional) quantity of waste that, being incinerated, would equal 10 % heat release, the total heat release being fixed.

C_{waste} : emission limit values for waste incineration plants set out in Part 3

V_{proc} : waste gas volume resulting from the plant process including the combustion of the authorised fuels normally used in the plant (wastes excluded) determined on the basis of oxygen contents at which the emissions must be standardised as set out in Union or national law. In the absence of legislation for this kind of plant, the real oxygen content in the waste gas without being thinned by addition of air unnecessary for the process must be used.

C_{proc} : emission limit values as set out in this Part for certain industrial activities or in case of the absence of such values, emission limit values of plants which comply with the national laws, regulations and administrative provisions for such plants while burning the normally authorised fuels (wastes excluded). In the absence of these measures the emission limit values set out in the permit are used. In the absence of such permit values the real mass concentrations are used.

C: total emission limit values at an oxygen content as set out in this Part for certain industrial activities and certain polluting substances or, in case of the absence of such values, total emission limit values replacing the emission limit values as set out in specific Annexes of this Directive. The total oxygen content to replace the oxygen content for the standardisation is calculated on the basis of the content above respecting the partial volumes.

All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correcting for the water vapour content of the waste gases.

Member States may lay down rules governing the exemptions provided for in this Part.

2. Special provisions for cement kilns co-incinerating waste

- 2.1. The emission limit values set out in points 2.2 and 2.3 apply as daily average values for total dust, HCl, HF, NO_x, SO₂ and TOC (for continuous measurements), as average values over the sampling period of a minimum of 30 minutes and a maximum of 8 hours for heavy metals and as average values over the sampling period of a minimum of 6 hours and a maximum of 8 hours for dioxins and furans.

All values are standardised at 10 % oxygen.

Half-hourly average values shall only be needed in view of calculating the daily average values.

- 2.2. C – total emission limit values (mg/Nm³ except for dioxins and furans) for the following –polluting substances

Polluting substance	C
Total dust	30
HCl	10
HF	1
NO _x	500 ⁽¹⁾
Cd + Tl	0,05
Hg	0,05
Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V	0,5
Dioxins and furans (ng/Nm ³)	0,1

⁽¹⁾ Until 1 January 2016, the competent authority may authorise exemptions from the limit value for NO_x for Lepol kilns and long rotary kilns provided that the permit sets a total emission limit value for NO_x of not more than 800 mg/Nm³.

- 2.3. C – total emission limit values (mg/Nm³) for SO₂ and TOC

Pollutant	C
SO ₂	50
TOC	10

The competent authority may grant derogations for emission limit values set out in this point in cases where TOC and SO₂ do not result from the co-incineration of waste.

- 2.4. C- total emission limit values for CO

The competent authority may set emission limit values for CO.

3. Special provisions for combustion plants co-incinerating waste

- 3.1. C_{proc} expressed as daily average values (mg/Nm³) valid until the date set out in Article 82(5)

For determining the total rated thermal input of the combustion plants, the aggregation rules as defined in Article 29 shall apply. Half-hourly average values shall only be needed in view of calculating the daily average values.

C_{proc} for solid fuels with the exception of biomass (O_2 content 6 %):

Polluting substances	< 50 MWth	50-100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	850	200	200
NO _x	—	400	200	200
Dust	50	50	30	30

C_{proc} for biomass (O_2 content 6 %):

Polluting substances	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	200	200	200
NO _x	—	350	300	200
Dust	50	50	30	30

C_{proc} for liquid fuels (O_2 content 3 %):

Polluting substances	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	850	400 to 200 (linear decrease from 100 to 300 MWth)	200
NO _x	—	400	200	200
Dust	50	50	30	30

3.2. C_{proc} expressed as daily average values (mg/Nm³) valid from the date set out in Article 82(6)

For determining the total rated thermal input of the combustion plants, the aggregation rules as defined in Article 29 shall apply. Half-hourly average values shall only be needed in view of calculating the daily average values.

3.2.1. C_{proc} for combustion plants referred to in Article 30(2), with the exception of gas turbines and gas engines

C_{proc} for solid fuels with the exception of biomass (O_2 content 6 %):

Polluting substance	< 50 MWth	50-100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	400 for peat: 300	200	200
NO _x	—	300 for pulverised lignite: 400	200	200
Dust	50	30	25 for peat: 20	20

C_{proc} for biomass (O_2 content 6 %):

Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	200	200	200
NO _x	—	300	250	200
Dust	50	30	20	20

C_{proc} for liquid fuels (O_2 content 3 %):

Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	350	250	200
NO _x	—	400	200	150
Dust	50	30	25	20

3.2.2. C_{proc} for combustion plants referred to in Article 30(3), with the exception of gas turbines and gas engines

C_{proc} for solid fuels with the exception of biomass (O_2 content 6 %):

Polluting substance	< 50 MWth	50-100 MWth	100 to 300 MWth	> 300 MWth
SO_2	—	400 for peat: 300	200 for peat: 300, except in the case of fluidised bed combustion: 250	150 for circulating or pressurised fluidised bed combustion or, in case of peat firing, for all fluidised bed combustion: 200
NO_x	—	300 for peat: 250	200	150 for pulverised lignite combustion: 200
Dust	50	20	20	10 for peat: 20

C_{proc} for biomass (O_2 content 6 %):

Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO_2	—	200	200	150
NO_x	—	250	200	150
Dust	50	20	20	20

C_{proc} for liquid fuels (O_2 content 3 %):

Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO_2	—	350	200	150
NO_x	—	300	150	100
Dust	50	20	20	10

3.3. C — total emission limit values for heavy metals (mg/Nm^3) expressed as average values over the sampling period of a minimum of 30 minutes and a maximum of 8 hours (O_2 content 6 % for solid fuels and 3 % for liquid fuels)

Polluting substances	C
Cd + Tl	0,05
Hg	0,05
Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V	0,5

3.4. C — total emission limit value (ng/Nm^3) for dioxins and furans expressed as average value measured over the sampling period of a minimum of 6 hours and a maximum of 8 hours (O_2 content 6 % for solid fuels and 3 % for liquid fuels)

Polluting substance	C
Dioxins and furans	0,1

4. Special provisions for waste co-incineration plants in industrial sectors not covered under Points 2 and 3 of this Part

- 4.1. C — total emission limit value (ng/Nm^3) for dioxins and furans expressed as average value measured over the sampling period of a minimum of 6 hours and a maximum of 8 hours:

Polluting substance	C
Dioxins and furans	0,1

- 4.2. C – total emission limit values (mg/Nm^3) for heavy metals expressed as average values over the sampling period of a minimum of 30 minutes and a maximum of 8 hours:

Polluting substances	C
Cd + Tl	0,05
Hg	0,05

PART 5

Emission limit values for discharges of waste water from the cleaning of waste gases

Polluting substances	Emission limit values for unfiltered samples (mg/l except for dioxins and furans)	
	(95 %)	(100 %)
1. Total suspended solids as defined in Annex I of Directive 91/271/EEC	30	45
2. Mercury and its compounds, expressed as mercury (Hg)		0,03
3. Cadmium and its compounds, expressed as cadmium (Cd)		0,05
4. Thallium and its compounds, expressed as thallium (Tl)		0,05
5. Arsenic and its compounds, expressed as arsenic (As)		0,15
6. Lead and its compounds, expressed as lead (Pb)		0,2
7. Chromium and its compounds, expressed as chromium (Cr)		0,5
8. Copper and its compounds, expressed as copper (Cu)		0,5
9. Nickel and its compounds, expressed as nickel (Ni)		0,5
10. Zinc and its compounds, expressed as zinc (Zn)		1,5
11. Dioxins and furans		0,3 ng/l

PART 6

Monitoring of emissions

1. Measurement techniques

- 1.1. Measurements for the determination of concentrations of air and water polluting substances shall be carried out representatively.

- 1.2. Sampling and analysis of all polluting substances including dioxins and furans as well as the quality assurance of automated measuring systems and the reference measurement methods to calibrate them shall be carried out according to CEN-standards. If CEN standards are not available, ISO, national or other international standards which ensure the provision of data of an equivalent scientific quality shall apply. Automated measuring systems shall be subject to control by means of parallel measurements with the reference methods at least once per year.

- 1.3. At the daily emission limit value level, the values of the 95 % confidence intervals of a single measured result shall not exceed the following percentages of the emission limit values:

Carbon monoxide:	10 %
Sulphur dioxide:	20 %
Nitrogen dioxide:	20 %
Total dust:	30 %
Total organic carbon:	30 %
Hydrogen chloride:	40 %
Hydrogen fluoride:	40 %.

Periodic measurements of the emissions into air and water shall be carried out in accordance with points 1.1 and 1.2.

2. Measurements relating to air polluting substances

2.1. The following measurements relating to air polluting substances shall be carried out:

- (a) continuous measurements of the following substances: NO_x, provided that emission limit values are set, CO, total dust, TOC, HCl, HF, SO₂;
- (b) continuous measurements of the following process operation parameters: temperature near the inner wall or at another representative point of the combustion chamber as authorised by the competent authority, concentration of oxygen, pressure, temperature and water vapour content of the waste gas;
- (c) at least two measurements per year of heavy metals and dioxins and furans; one measurement at least every 3 months shall, however, be carried out for the first 12 months of operation.

2.2. The residence time as well as the minimum temperature and the oxygen content of the waste gases shall be subject to appropriate verification, at least once when the waste incineration plant or waste co-incineration plant is brought into service and under the most unfavourable operating conditions anticipated.

2.3. The continuous measurement of HF may be omitted if treatment stages for HCl are used which ensure that the emission limit value for HCl is not being exceeded. In that case the emissions of HF shall be subject to periodic measurements as laid down in point 2.1(c).

2.4. The continuous measurement of the water vapour content shall not be required if the sampled waste gas is dried before the emissions are analysed.

2.5. The competent authority may decide not to require continuous measurements for HCl, HF and SO₂ in waste incineration plants or waste co-incineration plants and require periodic measurements as set out in point 2.1(c) or no measurements if the operator can prove that the emissions of those pollutants can under no circumstances be higher than the prescribed emission limit values.

The competent authority may decide not to require continuous measurements for NO_x and require periodic measurements as set out in point 2.1(c) in existing waste incineration plants with a nominal capacity of less than 6 tonnes per hour or in existing waste co-incineration plants with a nominal capacity of less than 6 tonnes per hour if the operator can prove on the basis of information on the quality of the waste concerned, the technologies used and the results of the monitoring of emissions, that the emissions of NO_x can under no circumstances be higher than the prescribed emission limit value.

2.6. The competent authority may decide to require one measurement every 2 years for heavy metals and one measurement per year for dioxins and furans in the following cases:

- (a) the emissions resulting from co-incineration or incineration of waste are under all circumstances below 50 % of the emission limit values;
- (b) the waste to be co-incinerated or incinerated consists only of certain sorted combustible fractions of non-hazardous waste not suitable for recycling and presenting certain characteristics, and which is further specified on the basis of the assessment referred to in point (c);

- (c) the operator can prove on the basis of information on the quality of the waste concerned and the monitoring of the emissions that the emissions are under all circumstances significantly below the emission limit values for heavy metals and dioxins and furans.

- 2.7. The results of the measurements shall be standardised using the standard oxygen concentrations mentioned in Part 3 or calculated according to Part 4 and by applying the formula given in Part 7.

When waste is incinerated or co-incinerated in an oxygen-enriched atmosphere, the results of the measurements can be standardised at an oxygen content laid down by the competent authority reflecting the special circumstances of the individual case.

When the emissions of polluting substances are reduced by waste gas treatment in a waste incineration plant or waste co-incineration plant treating hazardous waste, the standardisation with respect to the oxygen contents provided for in the first subparagraph shall be done only if the oxygen content measured over the same period as for the polluting substance concerned exceeds the relevant standard oxygen content.

3. Measurements relating to water polluting substances

- 3.1. The following measurements shall be carried out at the point of waste water discharge:

- (a) continuous measurements of pH, temperature and flow;
- (b) spot sample daily measurements of total suspended solids or measurements of a flow proportional representative sample over a period of 24 hours;
- (c) at least monthly measurements of a flow proportional representative sample of the discharge over a period of 24 hours of Hg, Cd, Tl, As, Pb, Cr, Cu, Ni and Zn;
- (d) at least every 6 months measurements of dioxins and furans; however, one measurement at least every 3 months shall be carried out for the first 12 months of operation.

- 3.2. Where the waste water from the cleaning of waste gases is treated on site collectively with other on-site sources of waste water, the operator shall take the measurements:

- (a) on the waste water stream from the waste gas cleaning processes prior to its input into the collective waste water treatment plant;
- (b) on the other waste water stream or streams prior to its or their input into the collective waste water treatment plant;
- (c) at the point of final waste water discharge, after the treatment, from the waste incineration plant or waste co-incineration plant.

PART 7

Formula to calculate the emission concentration at the standard percentage oxygen concentration

$$E_S = \frac{21 - O_S}{21 - O_M} \times E_M$$

E_S = calculated emission concentration at the standard percentage oxygen concentration

E_M = measured emission concentration

O_S = standard oxygen concentration

O_M = measured oxygen concentration

PART 8

Assessment of compliance with emission limit values

1. Air emission limit values

- 1.1. The emission limit values for air shall be regarded as being complied with if:

- (a) none of the daily average values exceeds any of the emission limit values set out in point 1.1 of Part 3 or in Part 4 or calculated in accordance with Part 4;

- (b) either none of the half-hourly average values exceeds any of the emission limit values set out in column A of the table under point 1.2 of Part 3 or, where relevant, 97 % of the half-hourly average values over the year do not exceed any of the emission limit values set out in column B of the table under point 1.2 of Part 3;
 - (c) none of the average values over the sampling period set out for heavy metals and dioxins and furans exceeds the emission limit values set out in points 1.3 and 1.4 of Part 3 or in Part 4 or calculated in accordance with Part 4;
 - (d) for carbon monoxide (CO):
 - (i) in case of waste incineration plants:
 - at least 97 % of the daily average values over the year do not exceed the emission limit value set out in point 1.5(a) of Part 3; and,
 - at least 95 % of all 10-minute average values taken in any 24-hour period or all of the half-hourly average values taken in the same period do not exceed the emission limit values set out in points 1.5(b) and (c) of Part 3; in case of waste incineration plants in which the gas resulting from the incineration process is raised to a temperature of at least 1 100 °C for at least two seconds, Member States may apply an evaluation period of 7 days for the 10-minute average values;
 - (ii) in case of waste co-incineration plants: the provisions of Part 4 are met.
- 1.2. The half-hourly average values and the 10-minute averages shall be determined within the effective operating time (excluding the start-up and shut-down periods if no waste is being incinerated) from the measured values after having subtracted the value of the confidence interval specified in point 1.3 of Part 6. The daily average values shall be determined from those validated average values.

To obtain a valid daily average value no more than five half-hourly average values in any day shall be discarded due to malfunction or maintenance of the continuous measurement system. No more than ten daily average values per year shall be discarded due to malfunction or maintenance of the continuous measurement system.

- 1.3. The average values over the sampling period and the average values in the case of periodical measurements of HF, HCl and SO₂ shall be determined in accordance with the requirements of Articles 45(1)(e), 48(3) and point 1 of Part 6.
2. Water emission limit values

The emission limit values for water shall be regarded as being complied with if:

- (a) for total suspended solids 95 % and 100 % of the measured values do not exceed the respective emission limit values as set out in Part 5;
 - (b) for heavy metals (Hg, Cd, Tl, As, Pb, Cr, Cu, Ni and Zn) no more than one measurement per year exceeds the emission limit values set out in Part 5; or, if the Member State provides for more than 20 samples per year, no more than 5 % of these samples exceed the emission limit values set out in Part 5;
 - (c) for dioxins and furans, the measurement results do not exceed the emission limit value set out in Part 5.
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ANNEX VII

Technical provisions relating to installations and activities using organic solvents

PART 1

Activities

1. In each of the following points, the activity includes the cleaning of the equipment but not the cleaning of products unless specified otherwise.

2. Adhesive coating

Any activity in which an adhesive is applied to a surface, with the exception of adhesive coating and laminating associated with printing activities.

3. Coating activity

Any activity in which a single or multiple application of a continuous film of a coating is applied to:

- (a) either of the following vehicles:
 - (i) new cars, defined as vehicles of category M1 in Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles ⁽¹⁾ and of category N1 in so far as they are coated at the same installation as M1 vehicles;
 - (ii) truck cabins, defined as the housing for the driver, and all integrated housing for the technical equipment, of vehicles of categories N2 and N3 in Directive 2007/46/EC;
 - (iii) vans and trucks, defined as vehicles of categories N1, N2 and N3 in Directive 2007/46/EC, but not including truck cabins;
 - (iv) buses, defined as vehicles of categories M2 and M3 in Directive 2007/46/EC;
 - (v) trailers, defined in categories O1, O2, O3 and O4 in Directive 2007/46/EC;
- (b) metallic and plastic surfaces including surfaces of airplanes, ships, trains, etc.;
- (c) wooden surfaces;
- (d) textile, fabric, film and paper surfaces;
- (e) leather.

Coating activities do not include the coating of substrate with metals by electrophoretic and chemical spraying techniques. If the coating activity includes a step in which the same article is printed by whatever technique used, that printing step is considered part of the coating activity. However, printing activities operated as a separate activity are not included, but may be covered by Chapter V of this Directive if the printing activity falls within the scope thereof.

4. Coil coating

Any activity where coiled steel, stainless steel, coated steel, copper alloys or aluminium strip is coated with either a film forming or laminate coating in a continuous process.

⁽¹⁾ OJ L 263, 9.10.2007, p. 1.

5. Dry cleaning

Any industrial or commercial activity using volatile organic compounds in an installation to clean garments, furnishing and similar consumer goods with the exception of the manual removal of stains and spots in the textile and clothing industry.

6. Footwear manufacture

Any activity of producing complete footwear or parts thereof.

7. Manufacturing of coating mixtures, varnishes, inks and adhesives

The manufacture of the above final products, and of intermediates where carried out at the same site, by mixing of pigments, resins and adhesive materials with organic solvent or other carrier, including dispersion and predispersion activities, viscosity and tint adjustments and operations for filling the final product into its container.

8. Manufacturing of pharmaceutical products

The chemical synthesis, fermentation, extraction, formulation and finishing of pharmaceutical products and, where carried out at the same site, the manufacture of intermediate products.

9. Printing

Any reproduction activity of text and/or images in which, with the use of an image carrier, ink is transferred onto whatever type of surface. It includes associated varnishing, coating and laminating techniques. However, only the following sub-processes are subject to Chapter V:

- (a) flexography – a printing activity using an image carrier of rubber or elastic photopolymers on which the printing areas are above the non-printing areas, using liquid inks which dry through evaporation;
- (b) heatset web offset – a web-fed printing activity using an image carrier in which the printing and non-printing area are in the same plane, where web-fed means that the material to be printed is fed to the machine from a reel as distinct from separate sheets. The non-printing area is treated to attract water and thus reject ink. The printing area is treated to receive and transmit ink to the surface to be printed. Evaporation takes place in an oven where hot air is used to heat the printed material;
- (c) laminating associated to a printing activity – the adhering together of two or more flexible materials to produce laminates;
- (d) publication rotogravure – a rotogravure printing activity used for printing paper for magazines, brochures, catalogues or similar products, using toluene-based inks;
- (e) rotogravure – a printing activity using a cylindrical image carrier in which the printing area is below the non-printing area, using liquid inks which dry through evaporation. The recesses are filled with ink and the surplus is cleaned off the non-printing area before the surface to be printed contacts the cylinder and lifts the ink from the recesses;
- (f) rotary screen printing – a web-fed printing activity in which the ink is passed onto the surface to be printed by forcing it through a porous image carrier, in which the printing area is open and the non-printing area is sealed off, using liquid inks which dry only through evaporation. Web-fed means that the material to be printed is fed into the machine from a reel as distinct from separate sheets;
- (g) varnishing – an activity by which a varnish or an adhesive coating for the purpose of later sealing the packaging material is applied to a flexible material.

10. Rubber conversion

Any activity of mixing, milling, blending, calendering, extrusion and vulcanisation of natural or synthetic rubber and any ancillary operations for converting natural or synthetic rubber into a finished product.

11. Surface cleaning

Any activity except dry cleaning using organic solvents to remove contamination from the surface of material including degreasing. A cleaning activity consisting of more than one step before or after any other activity shall be considered as one surface cleaning activity. This activity does not refer to the cleaning of the equipment but to the cleaning of the surface of products.

12. Vegetable oil and animal fat extraction and vegetable oil refining activities

Any activity to extract vegetable oil from seeds and other vegetable matter, the processing of dry residues to produce animal feed, the purification of fats and vegetable oils derived from seeds, vegetable matter and/or animal matter.

13. Vehicle refinishing

Any industrial or commercial coating activity and associated degreasing activities performing either of the following:

- (a) the original coating of road vehicles as defined in Directive 2007/46/EC or part of them with refinishing-type materials, where this is carried out away from the original manufacturing line;
- (b) the coating of trailers (including semi-trailers) (category O in Directive 2007/46/EC).

14. Winding wire coating

Any coating activity of metallic conductors used for winding the coils in transformers and motors, etc.

15. Wood impregnation

Any activity giving a loading of preservative in timber.

16. Wood and plastic lamination

Any activity to adhere together wood and/or plastic to produce laminated products.

PART 2

Thresholds and emission limit values

The emission limit values in waste gases shall be calculated at a temperature of 273,15 K, and a pressure of 101,3 kPa.

	Activity (solvent consumption threshold in tonnes/year)	Threshold (solvent consumption threshold in tonnes/year)	Emission limit values in waste gases (mg C/Nm ³)	Fugitive emission limit values (percentage of solvent input)		Total emission limit values		Special provisions
				New installations	Existing installations	New installations	Existing installations	
1	Heatset web offset printing (> 15)	15—25 > 25	100 20	30 ⁽¹⁾ 30 ⁽¹⁾				⁽¹⁾ Solvent residue in finished product is not to be considered as part of fugitive emissions.
2	Publication rotogravure (> 25)		75	10	15			
3	Other rotogravure, flexography, rotary screen printing, laminating or varnishing units (> 15) rotary screen printing on textile/cardboard (> 30)	15—25 > 25 > 30 ⁽¹⁾	100 100 100	25 20 20				⁽¹⁾ Threshold for rotary screen printing on textile and on cardboard.
4	Surface cleaning using compounds specified in Article 59(5). (> 1)	1—5 > 5	20 ⁽¹⁾ 20 ⁽¹⁾	15 10				⁽¹⁾ Limit value refers to mass of compounds in mg/Nm ³ , and not to total carbon.
5	Other surface cleaning (> 2)	2—10 > 10	75 ⁽¹⁾ 75 ⁽¹⁾	20 ⁽¹⁾ 15 ⁽¹⁾				⁽¹⁾ Installations which demonstrate to the competent authority that the average organic solvent content of all cleaning material used does not exceed 30 % by weight are exempt from application of these values.
6	Vehicle coating (< 15) and vehicle refinishing	> 0,5	50 ⁽¹⁾	25				⁽¹⁾ Compliance in accordance with point 2 of Part 8 shall be demonstrated based on 15 minute average measurements.
7	Coil coating (> 25)		50 ⁽¹⁾	5	10			⁽¹⁾ For installations which use techniques which allow reuse of recovered solvents, the emission limit value shall be 150.

	Activity (solvent consumption threshold in tonnes/year)	Threshold (solvent consumption threshold in tonnes/year)	Emission limit values in waste gases (mg C/Nm ³)	Fugitive emission limit values (percentage of solvent input)		Total emission limit values		Special provisions
				New installations	Existing installations	New installations	Existing installations	
8	Other coating, including metal, plastic, textile ⁽⁵⁾ , fabric, film and paper coating (> 5)	5—15 > 15	100 ⁽¹⁾ ⁽⁴⁾ 50/75 ⁽²⁾ ⁽³⁾ ⁽⁴⁾		25 ⁽⁴⁾ 20 ⁽⁴⁾			<p>⁽¹⁾ Emission limit value applies to coating application and drying processes operated under contained conditions.</p> <p>⁽²⁾ The first emission limit value applies to drying processes, the second to coating application processes.</p> <p>⁽³⁾ For textile coating installations which use techniques which allow reuse of recovered solvents, the emission limit value applied to coating application and drying processes taken together shall be 150.</p> <p>⁽⁴⁾ Coating activities which cannot be carried out under contained conditions (such as shipbuilding, aircraft painting) may be exempted from these values, in accordance with Article 59(3).</p> <p>⁽⁵⁾ Rotary screen printing on textile is covered by activity No 3.</p>
9	Winding wire coating (> 5)					10 g/kg ⁽¹⁾ 5 g/kg ⁽²⁾		<p>⁽¹⁾ Applies for installations where average diameter of wire ≤ 0,1 mm.</p> <p>⁽²⁾ Applies for all other installations.</p>
10	Coating of wooden surfaces (> 15)	15—25 > 25	100 ⁽¹⁾ 50/75 ⁽²⁾		25 20			<p>⁽¹⁾ Emission limit value applies to coating application and drying processes operated under contained conditions.</p> <p>⁽²⁾ The first value applies to drying processes, the second to coating application processes.</p>
11	Dry cleaning					20 g/kg ⁽¹⁾ ⁽²⁾		<p>⁽¹⁾ Expressed in mass of solvent emitted per kilogram of product cleaned and dried.</p> <p>⁽²⁾ The emission limit value in point 2 of Part 4 does not apply for this activity.</p>

	Activity (solvent consumption threshold in tonnes/year)	Threshold (solvent consumption threshold in tonnes/year)	Emission limit values in waste gases (mg C/Nm ³)	Fugitive emission limit values (percentage of solvent input)		Total emission limit values		Special provisions
				New installations	Existing installations	New installations	Existing installations	
12	Wood impregnation (> 25)		100 ⁽¹⁾	45		11 kg/m ³		⁽¹⁾ Emission limit value does not apply for impregnation with creosote.
13	Coating of leather (> 10)	10—25 > 25 > 10 ⁽¹⁾				85 g/m ² 75 g/m ² 150 g/m ²		Emission limit values are expressed in grams of solvent emitted per m ² of product produced. ⁽¹⁾ For leather coating activities in furnishing and particular leather goods used as small consumer goods like bags, belts, wallets, etc.
14	Footwear manufacture (> 5)					25 g per pair		Total emission limit value is expressed in grams of solvent emitted per pair of complete footwear produced.
15	Wood and plastic lamination (> 5)					30 g/m ²		
16	Adhesive coating (> 5)	5—15 > 15	50 ⁽¹⁾ 50 ⁽¹⁾	25 20				⁽¹⁾ If techniques are used which allow reuse of recovered solvent, the emission limit value in waste gases shall be 150.
17	Manufacture of coating mixture, varnishes, inks and adhesives (> 100)	100—1 000 > 1 000	150 150	5 3		5 % of solvent input 3 % of solvent input		The fugitive emission limit value does not include solvent sold as part of a coatings mixture in a sealed container.
18	Rubber conversion (> 15)		20 ⁽¹⁾	25 ⁽²⁾		25 % of solvent input		⁽¹⁾ If techniques are used which allow reuse of recovered solvent, the emission limit value in waste gases shall be 150. ⁽²⁾ The fugitive emission limit value does not include solvent sold as part of products or mixtures in a sealed container.

	Activity (solvent consumption threshold in tonnes/year)	Threshold (solvent consumption threshold in tonnes/year)	Emission limit values in waste gases (mg C/Nm ³)	Fugitive emission limit values (percentage of solvent input)		Total emission limit values		Special provisions
				New installations	Existing installations	New installations	Existing installations	
19	Vegetable oil and animal fat extraction and vegetable oil refining activities (> 10)					Animal fat: 1,5 kg/tonne Castor: 3 kg/tonne Rape seed: 1 kg/tonne Sunflower seed: 1 kg/tonne Soya beans (normal crush): 0,8 kg/tonne Soya beans (white flakes): 1,2 kg/tonne Other seeds and other vegetable matter: 3 kg/tonne ⁽¹⁾ 1,5 kg/tonne ⁽²⁾ 4 kg/tonne ⁽³⁾		⁽¹⁾ Total emission limit values for installations processing individual batches of seeds and other vegetable matter should be set by the competent authority on a case-by-case basis, applying the best available techniques. ⁽²⁾ Applies to all fractionation processes excluding de-gumming (the removal of gums from the oil). ⁽³⁾ Applies to de-gumming.
20	Manufacturing of pharmaceutical products (> 50)		20 ⁽¹⁾	5 ⁽²⁾	15 ⁽²⁾	5 % of solvent input	15 % of solvent input	⁽¹⁾ If techniques are used which allow reuse of recovered solvent, the emission limit value in waste gases shall be 150. ⁽²⁾ The fugitive emission limit value does not include solvent sold as part of products or mixtures in a sealed container.

PART 3

Emission limit values for installations of the vehicle coating industry

1. The total emission limit values are expressed in terms of grams of organic solvent emitted in relation to the surface area of product in square metres and in kilograms of organic solvent emitted in relation to the car body.
2. The surface area of any product dealt with in the table under point 3 is defined as the surface area calculated from the total electrophoretic coating area, and the surface area of any parts that might be added in successive phases of the coating process which are coated with the same coatings as those used for the product in question, or the total surface area of the product coated in the installation.

The surface of the electrophoretic coating area is calculated using the following formula:

$$\frac{2 \times \text{total weight of product shell}}{\text{average thickness of metal sheet} \times \text{density of metal sheet}}$$

This method shall also be applied for other coated parts made out of sheets.

Computer aided design or other equivalent methods shall be used to calculate the surface area of the other parts added, or the total surface area coated in the installation.

3. The total emission limit values in the table below refer to all process stages carried out at the same installation from electrophoretic coating, or any other kind of coating process, through to the final wax and polish of topcoating inclusive, as well as solvent used in cleaning of process equipment, including spray booths and other fixed equipment, both during and outside of production time.

Activity (solvent consumption threshold in tonnes/year)	Production threshold (refers to annual production of coated item)	Total emission limit value	
		New installations	Existing installations
Coating of new cars (> 15)	> 5 000	45 g/m ² or 1,3 kg/body + 33 g/m ²	60 g/m ² or 1,9 kg/body + 41 g/m ²
	≤ 5 000 monocoque or > 3 500 chassis- built	90 g/m ² or 1,5 kg/body + 70 g/m ²	90 g/m ² or 1,5 kg/body + 70 g/m ²
Total emission limit value (g/m ²)			
Coating of new truck cabins (> 15)	≤ 5 000	65	85
	> 5 000	55	75
Coating of new vans and trucks (> 15)	≤ 2 500	90	120
	> 2 500	70	90
Coating of new buses (> 15)	≤ 2 000	210	290
	> 2 000	150	225

4. Vehicle coating installations below the solvent consumption thresholds mentioned in the table under point 3 shall meet the requirements for the vehicle refinishing sector set out in Part 2.

PART 4

Emission limit values relating to volatile organic compounds with specific risk phrases

1. For emissions of the volatile organic compounds referred to in Article 58 where the mass flow of the sum of the compounds causing the labelling referred to in that Article is greater than, or equal to, 10 g/h, an emission limit value of 2 mg/Nm³ shall be complied with. The emission limit value refers to the mass sum of the individual compounds.

2. For emissions of halogenated volatile organic compounds which are assigned or need to carry the hazard statements H341 or H351, where the mass flow of the sum of the compounds causing the hazard statements H341 or H351 is greater than, or equal to, 100 g/h, an emission limit value of 20 mg/Nm³ shall be complied with. The emission limit value refers to the mass sum of the individual compounds.

PART 5

Reduction scheme

1. The operator may use any reduction scheme, specially designed for his installation.
2. In the case of applying coatings, varnishes, adhesives or inks, the following scheme can be used. Where the following method is inappropriate, the competent authority may allow an operator to apply any alternative scheme achieving equivalent emission reductions to those achieved if the emission limit values of Parts 2 and 3 were to be applied. The design of the scheme shall take into account the following facts:
 - (a) where substitutes containing little or no solvent are still under development, a time extension shall be given to the operator to implement his emission reduction plans;
 - (b) the reference point for emission reductions should correspond as closely as possible to the emissions which would have resulted had no reduction action been taken.
3. The following scheme shall operate for installations for which a constant solid content of product can be assumed:
 - (a) The annual reference emission is calculated as follows:
 - (i) The total mass of solids in the quantity of coating and/or ink, varnish or adhesive consumed in a year is determined. Solids are all materials in coatings, inks, varnishes and adhesives that become solid once the water or the volatile organic compounds are evaporated.
 - (ii) The annual reference emissions are calculated by multiplying the mass determined in (i) by the appropriate factor listed in the table below. Competent authorities may adjust these factors for individual installations to reflect documented increased efficiency in the use of solids.

Activity	Multiplication factor for use in item (a)(ii)
Rotogravure printing; flexography printing; laminating as part of a printing activity; varnishing as part of a printing activity; wood coating; coating of textiles, fabric film or paper; adhesive coating	4
Coil coating, vehicle refinishing	3
Food contact coating, aerospace coatings	2,33
Other coatings and rotary screen printing	1,5

- (b) The target emission is equal to the annual reference emission multiplied by a percentage equal to:
 - (i) (the fugitive emission limit value + 15), for installations falling within item 6 and the lower threshold band of items 8 and 10 of Part 2,
 - (ii) (the fugitive emission limit value + 5) for all other installations.
- (c) Compliance is achieved if the actual solvent emission determined from the solvent management plan is less than or equal to the target emission.

PART 6

Emission monitoring

1. Channels to which abatement equipment is connected, and which at the final point of discharge emit more than an average of 10 kg/h of total organic carbon, shall be monitored continuously for compliance.
2. In the other cases, Member States shall ensure that either continuous or periodic measurements are carried out. For periodic measurements at least three measurement values shall be obtained during each measurement exercise.
3. Measurements are not required in the case where end-of-pipe abatement equipment is not needed to comply with this Directive.

PART 7

Solvent management plan

1. Principles

The solvent management plan shall be used to:

- (a) verify compliance as specified in Article 62;
- (b) identify future reduction options;
- (c) enable provision of information on solvent consumption, solvent emissions and compliance with the requirements of Chapter V to the public.

2. Definitions

The following definitions provide a framework for the mass balance exercise.

Inputs of organic solvents (I):

- I1 The quantity of organic solvents or their quantity in mixtures purchased which are used as input into the process in the time frame over which the mass balance is being calculated.
- I2 The quantity of organic solvents or their quantity in mixtures recovered and reused as solvent input into the process. The recycled solvent is counted every time it is used to carry out the activity.

Outputs of organic solvents (O):

- O1 Emissions in waste gases.
- O2 Organic solvents lost in water, taking into account waste water treatment when calculating O5.
- O3 The quantity of organic solvents which remains as contamination or residue in products output from the process.
- O4 Uncaptured emissions of organic solvents into air. This includes the general ventilation of rooms, where air is released to the outside environment via windows, doors, vents and similar openings.
- O5 Organic solvents and/or organic compounds lost due to chemical or physical reactions (including those which are destroyed, by incineration or other waste gas or waste water treatments, or captured, as long as they are not counted under O6, O7 or O8).

- O6 Organic solvents contained in collected waste.
- O7 Organic solvents, or organic solvents contained in mixtures, which are sold or are intended to be sold as a commercially valuable product.
- O8 Organic solvents contained in mixtures recovered for reuse but not as input into the process, as long as not counted under O7.
- O9 Organic solvents released in other ways.

3. Use of the solvent management plan for verification of compliance.

The use made of the solvent management plan shall be determined by the particular requirement which is to be verified, as follows:

- (a) verification of compliance with the reduction scheme as set out in Part 5, with a total emission limit value expressed in solvent emissions per unit product, or otherwise stated in Parts 2 and 3.

- (i) for all activities using the reduction scheme as set out in Part 5, the solvent management plan shall be drawn up annually to determine the consumption (C). The consumption shall be calculated according to the following equation:

$$C = I1 - O8$$

A parallel exercise shall also be undertaken to determine solids used in coating in order to derive the annual reference emission and the target emission each year.

- (ii) for assessing compliance with a total emission limit value expressed in solvent emissions per unit product or otherwise stated in Parts 2 and 3, the solvent management plan shall be drawn up annually to determine the emissions (E). The emissions shall be calculated according to the following equation:

$$E = F + O1$$

Where F is the fugitive emission as defined in point (b)(i). The emission figure shall then be divided by the relevant product parameter.

- (iii) for assessing compliance with the requirements of point (b)(ii) of Article 59(6), the solvent management plan shall be drawn up annually to determine total emissions from all activities concerned, and that figure shall then be compared with the total emissions that would have resulted had the requirements of Parts 2, 3 and 5 been met for each activity separately.

- (b) Determination of fugitive emissions for comparison with the fugitive emission limit values in Part 2:

- (i) The fugitive emission shall be calculated according to one of the following equations;

$$F = I1 - O1 - O5 - O6 - O7 - O8$$

or

$$F = O2 + O3 + O4 + O9$$

F shall be determined either by direct measurement of the quantities or by an equivalent method or calculation, for instance by using the capture efficiency of the process.

The fugitive emission limit value is expressed as a proportion of the input, which shall be calculated according to the following equation:

$$I = I1 + I2$$

- (ii) Determination of fugitive emissions shall be done by a short but comprehensive set of measurements and needs not be done again until the equipment is modified.

PART 8

Assessment of compliance with emission limit values in waste gases

1. In the case of continuous measurements the emission limit values shall be considered to be complied with if:
 - (a) none of the arithmetic averages of all valid readings taken during any 24-hour period of operation of an installation or activity except start-up and shut-down operations and maintenance of equipment exceeds the emission limit values,
 - (b) none of the hourly averages exceeds the emission limit values by more than a factor of 1,5.
 2. In the case of periodic measurements the emission limit values shall be considered to be complied with if, in one monitoring exercise:
 - (a) the average of all the measurement values does not exceed the emission limit values,
 - (b) none of the hourly averages exceeds the emission limit value by more than a factor of 1,5.
 3. Compliance with Part 4 shall be verified on the basis of the sum of the mass concentrations of the individual volatile organic compounds concerned. For all other cases, compliance shall be verified on the basis of the total mass of organic carbon emitted unless otherwise specified in Part 2.
 4. Gas volumes may be added to the waste gas for cooling or dilution purposes where technically justified but shall not be considered when determining the mass concentration of the pollutant in the waste gas.
-

ANNEX VIII

Technical provisions relating to installations producing titanium dioxide

PART 1

Emission limit values for emissions into water

1. In case of installations using the sulphate process (as an annual average):
550 kg of sulphate per tonne of titanium dioxide produced.
2. In case of installations using the chloride process (as an annual average):
 - (a) 130 kg chloride per tonne of titanium dioxide produced using neutral rutile,
 - (b) 228 kg chloride per tonne of titanium dioxide produced using synthetic rutile,
 - (c) 330 kg chloride per tonne of titanium dioxide produced using slag. Installations discharging into salt water (estuarine, coastal, open sea) may be subject to an emission limit value of 450 kg chloride per tonne of titanium dioxide produced using slag.
3. For installations using the chloride process and using more than one type of ore, the emission limit values in point 2 shall apply in proportion to the quantity of the ores used.

PART 2

Emission limit values into air

1. The emission limit values which are expressed as concentrations in mass per cubic meter (Nm^3) shall be calculated at a temperature of 273,15 K, and a pressure of 101,3 kPa.
2. For dust: 50 mg/Nm^3 as an hourly average from major sources and 150 mg/Nm^3 as an hourly average from any other source.
3. For gaseous sulphur dioxide and trioxide discharged from digestion and calcination, including acid droplets calculated as SO_2 equivalent:
 - (a) 6 kg per tonne of titanium dioxide produced as an annual average;
 - (b) 500 mg/Nm^3 as an hourly average for plants for the concentration of waste acid.
4. For chlorine in the case of installations using the chloride process:
 - (a) 5 mg/Nm^3 as a daily average;
 - (b) 40 mg/Nm^3 at any time.

PART 3

Emission monitoring

The monitoring of emissions into air shall include at least the continuous monitoring of:

- (a) gaseous sulphur dioxide and trioxide discharged from digestion and calcination from plants for the concentration of waste acid in installations using the sulphate process;
 - (b) chlorine from major sources within installations using the chloride process;
 - (c) dust from major sources.
-

ANNEX IX

PART A

Repealed Directives with their successive amendments
(referred to in Article 81)

Council Directive 78/176/EEC (OJ L 54, 25.2.1978, p. 19).	
Council Directive 83/29/EEC (OJ L 32, 3.2.1983, p. 28).	
Council Directive 91/692/EEC (OJ L 377, 31.12.1991, p. 48).	only Annex I, point (b)
Council Directive 82/883/EEC (OJ L 378, 31.12.1982, p. 1).	
Act of Accession of 1985	only Annex I, point X.1(o)
Act of Accession of 1994	only Annex I, point VIII.A.6
Council Regulation (EC) No 807/2003 (OJ L 122, 16.5.2003, p. 36).	only Annex III, point 34
Regulation (EC) No 219/2009 of the European Parliament and of the Council (OJ L 87, 31.3.2009, p. 109).	only Annex, point 3.1
Council Directive 92/112/EEC (OJ L 409, 31.12.1992, p. 11).	
Council Directive 1999/13/EC (OJ L 85, 29.3.1999, p. 1).	
Regulation (EC) No 1882/2003 of the European Parliament and of the Council (OJ L 284, 31.10.2003, p. 1).	only Annex I, point 17
Directive 2004/42/EC of the European Parliament and of the Council (OJ L 143, 30.4.2004, p. 87).	only Article 13(1)
Directive 2008/112/EC of the European Parliament and of the Council (OJ L 345, 23.12.2008, p. 68).	only Article 3
Directive 2000/76/EC of the European Parliament and of the Council (OJ L 332, 28.12.2000, p. 91).	
Regulation (EC) No 1137/2008 of the European Parliament and of the Council (OJ L 311, 21.11.2008, p. 1).	only Annex, point 4.8
Directive 2001/80/EC of the European Parliament and of the Council (OJ L 309, 27.11.2001, p. 1).	
Council Directive 2006/105/EC (OJ L 363, 20.12.2006, p. 368).	only Annex, part B, point 2
Directive 2009/31/EC of the European Parliament and of the Council (OJ L 140, 5.6.2009, p. 114).	only Article 33
Directive 2008/1/EC of the European Parliament and of the Council (OJ L 24, 29.1.2008, p. 8).	
Directive 2009/31/EC of the European Parliament and of the Council (OJ L 140, 5.6.2009, p. 114).	only Article 37

PART B

List of time-limits for transposition into national law and application
(referred to in Article 81)

Directive	Time-limit for transposition	Time-limit for application
78/176/EEC	25 February 1979	
82/883/EEC	31 December 1984	
92/112/EEC	15 June 1993	
1999/13/EC	1 April 2001	
2000/76/EC	28 December 2000	28 December 2002
		28 December 2005
2001/80/EC	27 November 2002	27 November 2004
2003/35/EC	25 June 2005	
2003/87/EC	31 December 2003	
2008/1/EC	30 October 1999 ⁽¹⁾	30 October 1999
		30 October 2007

⁽¹⁾ Directive 2008/1/EC is a codified version of Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (OJ L 257, 10.10.1996, p. 26) and the time-limits for transposition and application remain in force.

ANNEX X

Correlation Table

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
Article 1(1)	Article 1	Article 1					Article 66
—	—	—	—	—	—	—	Article 2
Article 1(2), point (a)			Article 2(2)				Article 3(2)
Article 1(2), point (b)					Article 3(1)		Article 3(37)
Article 1(2), points (c), (d) and (e)							—
—	—	—	—	—	—	—	Article 66
Article 2							Article 67
Article 3							Article 11, points (d) and (e)
Article 4			Article 4	Article 3, introductory wording and (1)	Article 4(1)		Article 4(1), first subparagraph
Article 5							Article 11, points (d) and (e)
Article 6							Article 11, points (d) and (e)
Article 7(1)		Article 10					Article 70(1) and 70(2), first sentence
Article 7(2) and (3)							—
—	—	—	—	—	—	—	Article 70(2), second sentence and 70(3)
Article 8(1)							—
Article 8(2)							Article 26(1), second subparagraph
Article 9							—
Article 10							—
Article 11							Article 12
Article 12							—

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
Article 13(1)			Article 17(1), first subparagraph and 17(3), first subparagraph, first sentence	Article 11(1), first sentence and 11(2)			Article 72(1), first sentence
—	—	—	—	—	—	—	Article 72(1), second sentence
Article 13(2), (3) and (4)							—
Article 14							—
Article 15	Article 14	Article 12	Article 21	Article 15	Article 21	Article 18(1) and (3)	Article 80
Article 16	Article 15	Article 13	Article 23	Article 17	Article 23	Article 20	Article 84
Annex I							—
Annex II section A introductory wording and point 1							—
Annex II section A point 2							—
Annex II section B							—
	Article 2						—
	Article 3						—
	Article 4(1) and 4(2), first subparagraph						—
	Article 4(2), second subparagraph						—
	Article 4(3) and (4)						—
	Article 5						—
	Article 6						—
	Article 7						—
	Article 8						—
	Article 9						—
	Article 10						—

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
	Article 11(1)			Article 13(1)	Article 17(1)		Article 75(1)
—	—	—	—	—	—	—	Article 75(2)
	Article 11(2)				Article 17(2)		—
	Article 11(3)						—
	Article 12						—
	Article 13						—
	Annex I						—
	Annex II						—
	Annex III						—
	Annex IV						—
	Annex V						—
		Article 2(1), introductory wording					—
		Article 2(1)(a), introductory wording					—
		Article 2(1)(a), first indent					Article 67, point (a)
		Article 2(1)(a), second indent					Article 67, point (b)
		Article 2(1)(a), third indent and 2(1)(b), third indent					Article 67, point (d)
		Article 2(1)(a), fourth, fifth, sixth and seventh indent					—

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
		Article 2(1)(b), introductory wording and first, fourth, fifth, sixth and seventh indent					—
		Article 2(1)(b), second indent					Article 67, point (c)
		Article 2(1)(c)					—
		Article 2(2)					—
		Article 3					Article 67
		Article 4					Article 67
		Article 5					—
		Article 6, first paragraph, introductory wording					Article 68
		Article 6, first paragraph, point (a)					Annex VIII, Part 1, point 1
		Article 6, first paragraph, point (b)					Annex VIII, Part 1, point 2
		Article 6, second paragraph					Annex VIII, Part 1, point 3
		Article 7					—
		Article 8					—
		Article 9(1) introductory wording					Article 69(2)
		Article 9(1)(a), introductory wording					—
		Article 9(1)(a)(i)					Annex VIII, Part 2, point 2
		Article 9(1)(a)(ii)					Annex VIII, Part 2, point 3, introductory wording, and point 3(a)

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
		Article 9(1)(a)(iii)					Article 69(1)
		Article 9(1)(a)(iv)					Annex VIII, Part 2, point 3(b)
		Article 9(1)(a)(v)					—
		Article 9(1)(b)					Annex VIII, Part 2, point 4
		Article 9(2) and (3)					—
		Article 11					Article 11, points (d) and (e)
		Annex					—
			Article 1				Article 1
			Article 2, introductory wording				Article 3, introductory wording
			Article 2(1)	Article 2(14)			Article 3(1)
			Article 2(3)	Article 2(1)			Article 3(3)
			Article 2(4)				—
			Article 2(5)	Article 2(9)	Article 3(8)	Article 2(1)	Article 3(4)
			Article 2(6), first sentence	Article 2(13)	Article 3(9)	Article 2(3), first part	Article 3(5)
			Article 2(6), second sentence				Article 15(1)
			Article 2(7)				Article 3(6)
			Article 2(8)	Article 2(5)			Article 71
			Article 2(9), first sentence	Article 2(7)	Article 3(12)		Article 3(7)
			Article 2(9), second sentence				Article 4(2), first subparagraph
—	—	—	—	—	—	—	Article 4(2), second subparagraph
—	—	—	—	—	—	—	Article 4(3)

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
			Article 2(10)				—
—	—	—	—	—	—	—	Article 3(8)
			Article 2(11), first sentence				Article 3(9)
			Article 2(11), second sentence				Article 20(3)
			Article 2(12), first subparagraph and Annex IV, introductory wording				Article 3(10)
			Article 2(12), second subparagraph				Articles 14(5), point (a) and 14(6)
			Article 2(13)	Article 2(6)	Article 3(11)	Article 2(5)	Article 3(15)
			Article 2(14)				Article 3(16)
			Article 2(15)				Article 3(17)
—	—	—	—	—	—	—	Article 3(11) to (14), (18) to (23), (26) to (30) and (34) to (36)
			Article 3(1), introductory wording				Article 11, introductory wording
			Article 3(1), point (a)				Article 11, points (a) and (b)
			Article 3(1), point (b)				Article 11, point (c)
			Article 3(1), point (c)				Article 11, points (d) and (e)
			Article 3(1), point (d)				Article 11, point (f)
			Article 3(1), point (e)				Article 11, point (g)
			Article 3(1), point (f)				Article 11, point (h)
			Article 3(2)				—
			Article 5(1)				—

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			Article 5(2)				Article 80(1), second subparagraph
			Article 6(1), introductory wording				Article 12(1), first subparagraph, introductory wording
			Article 6(1), first subparagraph, points (a) to (d)				Article 12(1), first subparagraph, points (a) to (d)
—	—	—	—	—	—	—	Article 12(1), first subparagraph, point (e)
			Article 6(1), first subparagraph, point (e)				Article 12(1), first subparagraph, point (f)
			Article 6(1), first subparagraph, point (f)				Article 12(1), first subparagraph, point (g)
			Article 6(1), first subparagraph, point (g)				Article 12(1), first subparagraph, point (h)
			Article 6(1), first subparagraph, point (h)				Article 12(1), first subparagraph, point (i)
			Article 6(1), first subparagraph, point (i)				Article 12(1), first subparagraph, point (j)
			Article 6(1), first subparagraph, point (j)				Article 12(1), first subparagraph, point (k)
			Article 6(1), second subparagraph				Article 12(1), second subparagraph
			Article 6(2)				Article 12(2)
			Article 7				Article 5(2)
			Article 8, first paragraph		Article 4(3)		Article 5(1)
			Article 8, second paragraph				—
			Article 9(1), first part of sentence				Article 14(1), first subparagraph

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			Article 9(1), second part of sentence				—
			Article 9(2)				Article 5(3)
			Article 9(3), first subparagraph, first and second sentence				Article 14(1), second subparagraph, introductory wording and points (a) and (b)
			Article 9(3), first subparagraph, third sentence				Article 14(2)
—	—	—	—	—	—	—	Article 14(3), (4), and (7)
—	—	—	—	—	—	—	Article 14(5), introductory wording and point (b) of first subparagraph and Article 14(5), second subparagraph
			Article 9(3), second subparagraph				—
			Article 9(3), third subparagraph				Article 9(1)
			Article 9(3), fourth subparagraph				Article 9(2)
			Article 9(3), fifth subparagraph				Article 9(3)
			Article 9(3), sixth subparagraph				Article 9(4)
—	—	—	—	—	—	—	Article 10
			Article 9(4), first part of first sentence				Article 15(2)
			Article 9(4), second part of first sentence				Article 15(4), first subparagraph
—	—	—	—	—	—	—	Article 15(4), second to fifth subparagraphs and Article 15(5)

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			Article 9(4), second sentence				Article 14(1), second subparagraph, point (g)
—	—	—	—	—	—	—	Article 14(1), second subparagraph, point (h)
—	—	—	—	—	—	—	Article 15(3)
—	—	—	—	—	—	—	Article 16
			Article 9(5), first subparagraph				Article 14(1), second subparagraph, point (c)(i)
—	—	—	—	—	—	—	Article 14(1), second subparagraph, point (c)(ii)
—	—	—	—	—	—	—	Article 14(1), second subparagraph, point (d)
			Article 9(5), second subparagraph				—
—	—	—	—	—	—	—	Article 14(1), second subparagraph, point (e)
			Article 9(6), first subparagraph				Article 14(1), second subparagraph, point (f)
			Article 9(6), second subparagraph				—
			Article 9(7)				—
			Article 9(8)				Article 6 and Article 17(1)
—	—	—	—	—	—	—	Article 17(2), (3) and (4)
			Article 10				Article 18
			Article 11				Article 19
			Article 12(1)				Article 20(1)
			Article 12(2), first sentence				Article 20(2), first subparagraph
			Article 12(2), second sentence				Article 20(2), second subparagraph
			Article 12(2), third sentence				—

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			Article 13(1)				Article 21(1)
—	—	—	—	—	—	—	Article 21(2), (3) and (4)
			Article 13(2), introductory wording				Article 21(5), introductory wording
			Article 13(2)(a)				Article 21(5), point (a)
			Article 13(2)(b)				—
			Article 13(2)(c)				Article 21(5), point (b)
			Article 13(2)(d)				—
—	—	—	—	—	—	—	Article 21(5), point (c)
—	—	—	—	—	—	—	Article 22
—	—	—	—	—	—	—	Article 23(1), first subparagraph
			Article 14, introductory wording and point (a)				Article 8(1)
			Article 14, point (b)				Article 7, point (a) and Article 14(1), point (d)(i)
—	—	—	—	—	—	—	Article 7, introductory wording and points (b) and (c)
—	—	—	—	—	—	—	Article 14(1), point (d)(ii)
			Article 14, point (c)				Article 23(1), second subparagraph
—	—	—	—	—	—	—	Article 23(2) to (6)
			Article 15(1), first subparagraph, introductory wording and points (a) and (b)	Article 12(1), first subparagraph			Article 24(1), first subparagraph, introductory wording and points (a) and (b)
			Article 15(1), first subparagraph, point (c)				Article 24(1), first subparagraph, point (c)

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			Article 15(1), second subparagraph				Article 24(1), second subparagraph
			Article 15(2)				Article 24(3)(b)
			Article 15(3)				Article 24(4)
			Article 15(4)				Article 24(2), introductory wording and points (a) and (b)
—	—	—	—	—	—	—	Article 24(2), points (c) to (f) and Article 24(3), introductory wording and point (a)
			Article 16				Article 25
			Article 17(1), second subparagraph				—
			Article 17(2), first subparagraph				Article 13(1)
—	—	—	—	—	—	—	Article 13(2) to (7)
			Article 17(2), second subparagraph				—
			Article 17(3), first subparagraph, second and third sentence	Article 11(1), second sentence			Article 72(2)
			Article 17(3), first subparagraph, fourth sentence				—
—	—	—	—	—	—	—	Article 72(3) and (4)
			Article 17(3), second subparagraph				—
			Article 17(3), third subparagraph	Article 11(3)			Article 73(1)
—	—	—	—	—	—	—	Article 73(2)
			Article 17(4)				—
—	—	—	—	—	—	—	Article 74
—	—	—	—	—	—	—	Article 27
			Article 18			Article 11	Article 26
			Article 19				—

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			Article 20				—
			Article 21				Article 80(2)
			Article 22		Article 18	Article 17	Article 81
—	—	—	—	—	—	—	Article 82
			Article 23	Article 16	Article 22	Article 19	Article 83
—	—	—	—	—	—	—	Article 2(1)
			Annex I, paragraph 1 of introductory wording				Article 2(2)
			Annex I, paragraph 2 of introductory wording				Annex I, first subparagraph of introductory wording, first sentence
—	—	—	—	—	—	—	Annex I, first subparagraph of introductory wording, second sentence
—	—	—	—	—	—	—	Annex I, second subparagraph of introductory wording
			Annex I, points 1.1 to 1.3				Annex I, points 1.1 to 1.3
			Annex I, point 1.4				Annex I, point 1.4(a)
—	—	—	—	—	—	—	Annex I, point 1.4(b)
			Annex I, point 2				Annex I, point 2
			Annex I, point 3.1				Annex I, point 3.1(a) and (b)
—	—	—	—	—	—	—	Annex I, point 3.1(c)
			Annex I, points 3.2 to 3.5				Annex I, points 3.2 to 3.5
			Annex I, point 4				Annex I, point 4
			Annex I, point 5, introductory wording				—
			Annex I, point 5.1				Annex I, points 5.1(b), (f), (g), (i), (j) and 5.2(b)
—	—	—	—	—	—	—	Annex I, points 5.1(a), (c), (d), (e), (h), (k)

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			Annex I, point 5.2				Annex I, point 5.2(a)
			Annex I, point 5.3				Annex I, point 5.3(a)(i) and (ii)
—	—	—	—	—	—	—	Annex I, point 5.3(a)(iii) to (v) and 5.3(b)
			Annex I, point 5.4				Annex I, point 5.4
—	—	—	—	—	—	—	Annex I, points 5.5 and 5.6
			Annex I, points 6.1(a) and (b)				Annex I, points 6.1(a) and (b)
—	—	—	—	—	—	—	Annex I, point 6.1(c)
			Annex I, points 6.2 – 6.4(b)				Annex I, points 6.2 – 6.4(b)(ii)
—	—	—	—	—	—	—	Annex I, point 6.4 (b)(iii)
			Annex I, points 6.4(c) – 6.9				Annex I, points 6.4(c) – 6.9
—	—	—	—	—	—	—	Annex I, points 6.10 and 6.11
			Annex II				—
			Annex III				Annex II, 'Air', and 'Water', points 1 to 12
—	—	—	—	—	—	—	Annex II, 'Water', point 13
			Annex IV				Annex III
			Annex V				Annex IV
				Article 1			Article 56
				Article 2(2)			Article 57(1)

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				Article 2(3)			—
				Article 2(4)			Article 63(1)
				Article 2(8)			Article 4(1), third subparagraph
				Article 2(10)			Article 57(3)
				Article 2(11)			Article 57(2)
				Article 2(12)			Article 57(4)
				Article 2(15)			Article 57(5)
				Article 2(16)			Article 3(44)
				Article 2(17)			Article 3(45)
				Article 2(18)			Article 3(46)
				Article 2(19)			—
				Article 2(20)			Article 3(47)
				Article 2(21)			Article 57(6)
				Article 2(22)			Article 57(7)
				Article 2(23)			Article 57(8)
				Article 2(24)			Article 57(9)
				Article 2(25)			Article 57(10)
				Article 2(26)			Article 57(11)
				Article 2(27)			—
				Article 2(28)			Article 63(1)
				Article 2(29)			—
				Article 2(30)			Article 57(12)
				Article 2(31)			Annex VII, Part 2, first sentence Annex VIII, Part 2, point 1
				Article 2(32)			—
				Article 2(33)			Article 57(13)
				Article 3(2)			Article 4(1), second subparagraph

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				Article 4(1), (2) and(3)			Article 4(1), first and second subparagraph
				Article 4(4)			Article 63(2)
				Article 5(1)			Article 59(1), first subparagraph, introductory wording
				Article 5(2)			Article 59(1) first subparagraph, points (a) and (b)
				Article 5(3), first subparagraph, point (a)			Article 59(2)
				Article 5(3), first subparagraph, point (b)			Article 59(3)
				Article 5(3), second subparagraph			Article 59(4)
—	—	—	—	—	—	—	Article 59(5)
				Article 5(4)			—
				Article 5(5)			Article 59(6)
				Article 5(6)			Article 58
				Article 5(7)			Annex VII, Part 4, point 1
				Article 5(8) first subparagraph			Annex VII, Part 4, point 2
				Article 5(8) second subparagraph			—
				Article 5(9)			—
				Article 5(10)			Article 59(7)
				Article 5(11), (12) and (13)			—
				Article 6			—
				Article 7(1), introductory wording and first, second, third and fourth indent			Article 64

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				Article 7(1), closing wording			—
				Article 7(2)			—
				Article 8(1)			Article 14(1), point (d), Article 60
—	—	—	—	—	—	—	Article 61
				Article 8(2)			Annex VII, Part 6, point 1
				Article 8(3)			Annex VII, Part 6, point 2
				Article 8(4)			Annex VII Part 6, point 3
				Article 8(5)			—
				Article 9(1), first subparagraph, introductory wording			Article 62, first subparagraph, introductory wording
				Article 9(1), first subparagraph, first, second and third indent			Article 62, first subparagraph, points (a), (b) and (c)
				Article 9(1), second subparagraph			Article 62, second subparagraph
				Article 9(1), third subparagraph			Annex VII, Part 8, point 4
				Article 9(2)			Article 63(3)
				Article 9(3)			Annex VII, Part 8, point 1
				Article 9(4)			Annex VII, Part 8, point 2
				Article 9(5)			Annex VII, Part 8, point 3
				Article 10	Article 4(9)		Article 8(2)
				Article 11(1), third to sixth sentences			—
				Article 12(1), second subparagraph			Article 65(1), first subparagraph
				Article 12(1), third subparagraph			Article 65(1), second subparagraph
				Article 12(2)			Article 65(2)

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				Article 12(3)			Article 65(3)
				Article 13(2) and (3)			—
				Article 14	Article 19	Article 16	Article 79
				Annex I, first and second sentence of introductory wording			Article 56
				Annex I, third sentence of introductory wording and list of activities			Annex VII, Part 1
				Annex IIA			Annex VII, Parts 2 and 3
				Annex IIA, Part II, last sentence of paragraph 6			—
				Annex IIB, point 1, first and second sentences			Article 59(1), first subparagraph, point (b)
				Annex IIB, point 1, third sentence			Article 59(1), second subparagraph
				Annex IIB, point 2			Annex VII, Part 5
				Annex IIB, point 2, second subparagraph (i) and table			—
				Annex III, point 1			—
				Annex III, point 2			Annex VII, Part 7, point 1
				Annex III, point 3			Annex VII, Part 7, point 2
				Annex III, point 4			Annex VII, Part 7, point 3
					Article 1, first paragraph		Article 42
					Article 1, second paragraph		—
					Article 2(1)		Article 42(1), first subparagraph

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—	—	—	—	—	—	—	Article 42(1), second to fifth subparagraphs
					Article 2(2), introductory wording		Article 42(2), introductory wording
					Article 2(2)(a), introductory wording		Article 42(2)(a), introductory wording
					Article 2(2)(a), points (i) to (v)		Article 42(2)(a), point (i)
					Article 2(2)(a), point (vi)		Article 42(2)(a), point (ii)
					Article 2(2)(a), point (vii)		Article 42(2)(a), point (iii)
					Article 2(2)(a), point (viii)		Article 42(2)(a), point (iv)
					Article 2(2)(b)		Article 42(2)(b)
					Article 3(2), first subparagraph		Article 3(38)
					Article 3(2), second subparagraph		—
					Article 3(3)		Article 3(39)
					Article 3(4), first subparagraph		Article 3(40)
					Article 3(4), second subparagraph		Article 42(1), third subparagraph
—	—	—	—	—	—	—	Article 42(1), fourth subparagraph
					Article 3(5), first subparagraph		Article 3(41)
					Article 3(5), second subparagraph		Article 42(1), fifth subparagraph
					Article 3(5), third subparagraph		Article 42(1), third subparagraph

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					Article 3(6)		Annex VI, Part 1, point (a)
					Article 3(7)		Article 3(42)
—	—	—	—	—	—	—	Annex VI, Part 1, point (b)
					Article 3(10)		Article 3(43)
					Article 3(13)		Article 43
					Article 4(2)		Article 44
					Article 4(4), introductory wording and points (a) and (b)		Article 45(1), introductory wording and points (a) and (b)
					Article 4(4), point (c)		Article 45(1), point (e)
					Article 4(5)		Article 45(2)
					Article 4(6)		Article 45(3)
					Article 4(7)		Article 45(4)
					Article 4(8)		Article 54
					Article 5		Article 52
					Article 6(1), first subparagraph		Article 50(1)
					Article 6(1), second subparagraph and 6(2)		Article 50(2)
					Article 6(1), third subparagraph		Article 50(3), first subparagraph
					Article 6(1), first part of fourth subparagraph		—
					Article 6(1), second part of fourth subparagraph		Article 50(3), second subparagraph
					Article 6(3)		Article 50(4)
					Article 6(4), first and second sentences of first subparagraph and Article 6(4), first and second sentences of second subparagraph		Article 51(1)

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					Article 6(4), third sentence of first subparagraph		Article 51(2)
—	—	—	—	—	Article 6(4), third sentence of second subparagraph	—	Article 51(3), first subparagraph
					Article 6(4), third subparagraph		Article 51(3), second subparagraph
					Article 6(4), fourth subparagraph		Article 51(4)
					Article 6(5), first part of sentence		—
					Article 6(5), second part of the sentence		Article 46(1)
					Article 6(6)		Article 50(5)
					Article 6(7)		Article 50(6)
					Article 6(8)		Article 50(7)
					Article 7(1) and Article 7(2), first subparagraph		Article 46(2), first subparagraph
					Article 7(2), second subparagraph		Article 46(2), second subparagraph
					Article 7(3) and Article 11(8), first subparagraph, introductory wording		Annex VI, Part 6, first part of point 2.7
					Article 7(4)		Article 46(2), second subparagraph
					Article 7(5)		—
					Article 8(1)		Article 45(1), point (c)
					Article 8(2)		Article 46(3)
					Article 8(3)		—
					Article 8(4), first subparagraph		Article 46(4), first subparagraph

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					Article 8(4), second subparagraph		Annex VI, Part 6, point 3.2
					Article 8(4), third subparagraph		—
					Article 8(4), fourth subparagraph		—
					Article 8(5)		Article 46(4), second and third subparagraph
					Article 8(6)		Article 45(1), points (c) and (d)
					Article 8(7)		Article 46(5)
					Article 8(8)		—
					Article 9, first subparagraph		Article 53(1)
					Article 9, second subparagraph		Article 53(2)
					Article 9, third subparagraph		Article 53(3)
					Article 10(1) and (2)		—
					Article 10(3), first sentence		Article 48(2)
					Article 10(3), second sentence		—
					Article 10(4)		Article 48(3)
					Article 10(5)		Annex VI, Part 6, second part of point 1.3
					Article 11(1)		Article 48(1)
					Article 11(2)		Annex VI, Part 6, point 2.1
					Article 11(3)		Annex VI, Part 6, point 2.2
					Article 11(4)		Annex VI, Part 6, point 2.3
					Article 11(5)		Annex VI, Part 6, point 2.4

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					Article 11(6)		Annex VI, Part 6, point 2.5, first subparagraph
—	—	—	—	—	—	—	Annex VI, Part 6, point 2.5, second subparagraph
					Article 11(7), first part of first sentence of first subparagraph		Annex VI, Part 6, point 2.6, introductory wording
					Article 11(7), second part of first sentence of first subparagraph		Annex VI, Part 6, point 2.6(a)
					Article 11(7), second sentence of first subparagraph		—
					Article 11(7), second subparagraph		—
					Article 11(7), point (a)		Annex VI, Part 6, point 2.6(b)
					Article 11(7), points (b) and (c)		—
					Article 11(7), point (d)		Annex VI, Part 6, point 2.6(c)
					Article 11(7), points (e) and (f)		—
					Article 11(8), first subparagraph, points (a) and (b)		Annex VI, Part 3, point 1
					Article 11(8), first subparagraph, point (c) and second subparagraph		Annex VI, Part 6, second subparagraph of point 2.7
					Article 11(8), first subparagraph, point (d)		Annex VI, Part 4, point 2.1, second subparagraph
					Article 11(9)		Article 48(4)
					Article 11(10)		Annex VI, Part 8, point 1.1
					Article 11(11)		Annex VI, Part 8, point 1.2
					Article 11(12)		Annex VI, Part 8, point 1.3

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					Article 11(13)		Article 48(5)
—	—	—	—	—	—	—	Article 49
					Article 11(14)		Annex VI, Part 6, point 3.1
					Article 11(15)		Article 45(1), point (e)
					Article 11(16)		Annex VI, Part 8, point 2
					Article 11(17)		Article 8(2), point (a)
					Article 12(1)		Article 55(1)
					Article 12(2), first and second sentence		Article 55(2)
					Article 12(2), third sentence		Article 55(3)
					Article 13(1)		Article 45(1), point (f)
					Article 13(2)		Article 47
					Article 13(3)		Article 46(6)
					Article 13(4)		Annex VI, Part 3, point 2
					Article 14		—
					Article 15		—
					Article 16		—
					Article 20		—
					Annex I		Annex VI, Part 2
					Annex II, first part (without numbering)		Annex VI, Part 4, point 1
					Annex II, point 1, introductory wording		Annex VI, Part 4, point 2.1
					Annex II, points 1.1 and 1.2		Annex VI, Part 4, points 2.2 and 2.3
—	—	—	—	—	—	—	Annex VI, Part 4, point 2.4
					Annex II, point 1.3		—
					Annex II, point 2.1		Annex VI, Part 4, point 3.1

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—	—	—	—	—	—	—	Annex VI, Part 4, point 3.2
					Annex II, point 2.2		Annex VI, Part 4, point 3.3 and 3.4
					Annex II, point 3		Annex VI, Part 4, point 4
					Annex III		Annex VI, Part 6, point 1
					Annex IV, table		Annex VI, Part 5
					Annex IV, final sentence		—
					Annex V, point (a), table		Annex VI, Part 3, point 1.1
					Annex V, point (a), final sentences		—
					Annex V, point (b), table		Annex VI, Part 3, point 1.2
					Annex V, point (b), final sentence		—
					Annex V, point (c)		Annex VI, Part 3, point 1.3
					Annex V, point (d)		Annex VI, Part 3, point 1.4
					Annex V, point (e)		Annex VI, Part 3, point 1.5
					Annex V, point (f)		Annex VI, Part 3, point 3
					Annex VI		Annex VI, Part 7
						Article 1	Article 28, first subparagraph
						Article 2(2)	Annex V, Part 1, point 1 and Part 2, point 1, first subparagraph
—	—	—	—	—	—	—	Annex V, Part 1, point 1 and Part 2, point 1, second subparagraph
						Article 2(3) second part	Annex V, Part 1, point 1 and Part 2, point 1, first subparagraph

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
—	—	—	—	—	—	—	Annex V, Part 1, point 1 and Part 2, point 1, second subparagraph
						Article 2(4)	—
						Article 2(6), first part	Article 3(24)
						Article 2(6), second part	Article 28, second subparagraph, point (j)
						Article 2(7), first subparagraph	Article 3(25)
						Article 2(7), second subparagraph, first sentence	—
						Article 2(7), second subparagraph, second sentence and points (a) to (i)	Article 28, second subparagraph and points (a) to (i)
						Article 2(7), second subparagraph, point (j)	—
						Article 2(7), third subparagraph	—
—	—	—	—	—	—	—	Article 29(1)
						Article 2(7), fourth subparagraph	Article 29(2)
—	—	—	—	—	—	—	Article 29(3)
						Article 2(8)	Article 3(32)
						Article 2(9)	—
						Article 2(10)	—
						Article 2(11)	Article 3(31)
						Article 2(12)	Article 3(33)
						Article 2(13)	—
						Article 3	—
						Article 4(1)	—
						Article 4(2)	—

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
						Article 4(3)to 4(8)	
						Article 5(1)	Annex V, Part 1, point 2, second subparagraph
							Annex V, Part 1, point 2, first, third and fourth subparagraphs
						Article 5(2)	—
						Article 6	—
						Article 7(1)	Article 37
						Article 7(2)	Article 30(5)
						Article 7(3)	Article 30(6)
						Article 8(1)	Article 40(1)
						Article 8(2), first part of first subparagraph	Article 40(2), first part of first subparagraph
						Article 8(2), second part of first subparagraph	—
—	—	—	—	—	—	—	Article 40(2), second part of first subparagraph
—	—	—	—	—	—	—	Article 40(2), second subparagraph
—	—	—	—	—	—	—	Article 40(3)
—	—	—	—	—	—	—	Article 41
						Article 8(2), second subparagraph	—
						Article 8(3) and (4)	—
						Article 9	Article 30(1)
—	—	—	—	—	—	—	Article 30(2), (3) and (4)
						Article 9a	Article 36
						Article 10, first paragraph, first sentence	Article 30(7), first sentence

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
—	—	—	—	—	—	—	Article 30(7), second sentence
—	—	—	—	—	—	—	Article 30(8) and (9)
—	—	—	—	—	—	—	Article 31 to 35
						Article 10, first paragraph, second sentence	—
						Article 10, second paragraph	—
						Article 12, first sentence	Article 38(1)
						Article 12, second sentence	—
—	—	—	—	—	—	—	Article 38(2), (3) and (4)
—	—	—	—	—	—	—	Article 39
						Article 13	Annex V, Part 3, third part of point 8
						Article 14	Annex V, Part 4
—	—	—	—	—	—	—	Annex V, Part 5, 6 and 7
						Article 15	—
						Article 18(2)	—
						Annex I	—
						Annex II	—
						Annex III and IV	Annex V, point 2 of Part 1 and Part 2
						Annex V A	Annex V, Part 1, point 3
						Annex V B	Annex V, Part 2, point 3
						Annex VI A	Annex V, Part 1, points 4 and 6
—	—	—	—	—	—	—	Annex V, Part 1, point 5
						Annex VI B	Annex V, Part 2, points 4 and 6
—	—	—	—	—	—	—	Annex V, Part 2, point 5

Directive 78/176/EEC	Directive 82/883/EEC	Directive 92/112/EEC	Directive 2008/1/EC	Directive 1999/13/EC	Directive 2000/76/EC	Directive 2001/80/EC	This Directive
						Annex VII A	Annex V, Part 1, points 7 and 8
						Annex VII B	Annex V, Part 2, points 7 and 8
						Annex VIII A point 1	—
						Annex VIII A point 2	Annex V, Part 3, first part of point 1 and points 2, 3 and 5
—	—	—	—	—	—	—	Annex V, Part 3, second part of point 1
—	—	—	—	—	—	—	Annex V, Part 3, point 4
						Annex VIII A point 3	—
						Annex VIII A point 4	Annex V, Part 3, point 6
						Annex VIII A point 5	Annex V, Part 3, points 7 and 8
						Annex VIII A point 6	Annex V, Part 3, points 9 and 10
—	—	—	—	—	—	—	Annex V, Part 3, point 11
—	—	—	—	—	—	—	Annex V, Part 4
						Annex VIII B	—
						Annex VIII C	—
			Annex VI			Annex IX	Annex IX
			Annex VII			Annex X	Annex X

ATTACHMENT D

CHINA Power Plant Standards (from NRDC)

Summary of the Air Emission Standards on Thermal Power Plants Unofficial Translation

The *Emission Standard of Air Pollutants for Thermal Power Plants* (GB 13223-2011) (The Standard) was adopted by China's Ministry of Environmental Protection (MEP) on July 18, 2011, and will be effective starting January 1, 2012. The Standard stipulates limitations on concentrations of air pollutants in emissions from thermal power plants, including soot, SO₂, NO_x, mercury and mercury compounds. The Standard **does not** apply to thermal power plants using domestic waste or hazardous waste as fuels. The full text of the Standard is available

below: http://www.zhb.gov.cn/gkml/hbb/qt/201109/t20110921_217526.htm

KEY IMPROVEMENTS:

Compared to the earlier version, which was established in 2003, the Standard makes the following major improvements:

- The standards for soot, SO₂, and NO_x have been tightened considerably.
- The Standard distinguishes existing and new sources for SO₂ and NO_x emissions; it provides a 2.5-year grace period for existing sources.
- Hg emissions will be controlled for the first time, starting January 1, 2015.
- The Standard stipulates special limitations which are more stringent over air emissions for key regions, where development is concentrated and environmental capacity is low. These areas are defined by their weak atmospheric environmental capacity, vulnerable ecological environment and major air pollution problems. However, the specific geographic scope and timeline of these special limitations is subject to MEP's further regulation.

EMISSION STANDARDS OF AIR POLLUTANTS FOR THERMAL POWER PLANTS

I. Pollutant emission control requirements

- (Existing sources) From July 1, 2014, existing thermal power boilers and gas turbines must be controlled under the limits of soot, sulfur dioxide, nitrogen oxides emissions and blackness of smoke set forth in Table 1 below.

- (New sources) From January 1, 2012, new thermal power boilers and gas turbines must be controlled under the limits of soot, sulfur dioxide, nitrogen oxides emissions and blackness of smoke set forth in Table 1.
- (Mercury and mercury compound emissions) From January 1, 2015, coal-fired boilers must be controlled under the limits of mercury and mercury compound emissions as shown in Table 1.

Table 1: Thermal Power Boiler and Gas Turbine Air Pollutant Emission Concentration Limits

Unit : mg/m³ (not for smoke blackness level)

No.	Type of Energy Conversion Facility and Fuel	Pollutant	Conditions	Limits	Location of Emission Control
1	Coal-fired boilers	Soot	All	30	Stack or flue
		Sulfur Dioxide	New Boiler	100	
			Existing Boiler	200 400 ⁽¹⁾	
		Nitrogen Oxides (NO ₂)	All	100 200 ⁽²⁾	
		Mercury and mercury compounds	All	0.03	
2	Oil-fired boilers or gas turbines	Soot	All	30	
		Sulfur Dioxide	New boilers and gas turbines	100	
			Existing boilers and gas turbines	200	
		Nitrogen Oxides (NO ₂)	New oil-fired boiler	100	
			Existing oil-fired boiler	200	
			Gas turbine	120	
3	Gas-fired boilers or gas turbines	Soot	Natural gas boilers and gas turbines	5	
			Other gas-fired boilers and gas turbines	10	
		Sulfur Dioxide	Natural gas boilers and gas turbines	35	
			Other gas fired	100	

			boilers and gas turbines		
		Nitrogen Oxides (NO ₂)	Natural gas boiler	100	
			Other gas-fired boiler	200	
			Natural gas turbine	50	
			Other gas-fired gas turbine	120	
4	Coal-fired, oil-fired, gas-fired boilers or gas turbines	Smoke Degree (Ringelmann Smoke Chart)	All	1	Stack Vent

Notes:

(1) to be located in Guangxi Zhuang Autonomous Region, Chongqing Municipality, Sichuan Province and Guizhou Province, where the limits will be implemented with coal-fired boilers.

(2) Implementing limits on W-type thermal power generation boilers or furnace chamber flame boilers, circulating fluidized bed (CFB) boilers, and boilers put into operation as of December 31, 2003 or through the construction project's environmental impact report's approval of coal-fired power boilers.

II. Special Pollutant emission control requirements for key regions

Thermal power boilers and gas turbines located in key regions shall implement special air pollutant emission limits set forth in Table 2. The geographic scope of key regions, timeline of the special limits are subject to MEP's further regulation.

Table 2: Special Limits of Air Pollutant Emission Concentration for Key Regions

Unit : mg/m³ (not for smoke blackness level)

No.	Type of Energy Conversion Facility and Fuel	Pollutant	Conditions	Limits	Location of Emission Control
1	Coal-fired boilers	Soot	All	20	Stack or Flue
		Sulfur Dioxide	All	50	
		Nitrogen Oxides (NO ₂)	All	100	
		Mercury and mercury compounds	All	0.03	
2	Oil-fired boilers or gas turbines	Soot	All	20	
		Sulfur Dioxide	All	50	
		Nitrogen Oxides	Oil-fired	100	

		(NO ₂)	boiler		
			Gas turbine	120	
3	Gas-fired boilers or gas turbines	Soot	All	5	
		Sulfur Dioxide	All	35	
		Nitrogen Oxides (NO ₂)	Gas boiler	100	
			Gas turbine	50	
4	Coal-fired, oil-fired, gas-fired boilers or gas turbines	Smoke Degree (Ringelmann Smoke Chart)	All	1	Stack Vent

III. Environmental departments' responsibilities over sensitive zones

The environmental departments are responsible for environmental quality monitoring in surrounding residences, educational institutions, hospitals and other sensitive areas during the operation of an existing thermal power boiler or gas turbine, and during environmental review upon the completion of a construction project and its subsequent operation.

- The range of the monitoring should be the surrounding sensitive zones defined in the EIA of the construction project;
- If there has not been an EIA conducted on an existing thermal power plant, the environmental department should act in accordance with the characteristics and nature of the discharge company and the local natural weather conditions and factors, with reference to the environmental impact assessment guidelines.

The local government should be responsible for the environmental quality of its jurisdiction and should take measures to ensure meeting the ambient environmental quality standards.

- ### IV.
- The most stringent emission limits should be implemented over emission sources with boilers established at different times, using a hybrid approach for smoke discharge and choosing a monitoring location so that one can only monitor the mixture of air pollutants in the stack emissions.

ATTACHMENT E

The following draft notification, which the Central Government proposes to issue under the Environment (Protection) Act, 1986 (29 of 1986), is hereby published for the information of public likely to be affected thereby; and the notice is hereby given that the said draft notification shall be taken into consideration on or after the expiry of a period of thirty days from the date on which this draft has been made available to public through this website. The comments may be sent to the mail id of Advisor (CP) :hasan-mef@nic.in

[To be published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i)]

GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, -----April, 2015

G.S.R. _____ (E).— In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:-

1. (1) These rules may be called the Environment (Protection) Amendment Rules, 2015.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in Schedule – I

(i) in existing serial number 5, thermal power plants (water consumption limit) , for the existing entries and entries relating thereto , the following serial number and entries shall be added, namely:-

5(a) Water consumption limit

S.NO.	Industry	Parameter	Standards
1	2	3	4
5(a)	Thermal Power Plant	Water consumption	1. All plants with once through cooling (OTC) shall install cooling tower(CT) and achieve specific water consumption max. 4 m ³ / MWh within 2 years period

			<p>from the date of notification.</p> <p>2. All existing CT- based plants shall reduce specific water consumption upto maximum of 3.5 m³/ MWh within 2 years period from the date of notification.</p> <p>3. New plants to be installed after January 01, 2017 shall meet specific water consumption maximum of 2.5 m³/ MWh and achieve zero liquid discharge</p>
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(ii) in existing serial number 25, thermal power plants (emission standards) , for the existing entries and entries relating thereto , the following serial number and entries shall be substituted, namely:-

25. EMISSION LIMIT

S.NO.	Industry		Parameter	Standards
1	2		3	4
25	Thermal Power Plant	TPPs (units) installed before December 31 , 2003 (i)	Particulate Matter	100 mg/Nm ³
			Sulphur dioxide (SO₂)	600 mg/Nm ³ (units smaller than 500 MW capacity units) 200 mg/Nm ³ (units having capacity of 500 MW and above)
			Oxides of nitrogen (NOx)	600 mg/Nm ³
			Mercury (Hg)	- (units smaller than 500 MW capacity units) 0.03 mg/Nm ³ (units having capacity of 500 MW and above)
		TPPs (units) installed after	Particulate Matter	50 mg/Nm ³

		2003 to December 31,2006(i)	Sulphur dioxide (SO₂)	200 mg/Nm ³ (for units having capacity of 500 MW and above)
			Oxides of nitrogen (NO_x)	300 mg/Nm ³
			Mercury (Hg)	0.03 mg/Nm ³
		TPPs (units) to be installed from January 1,2017 (ii)	Particulate Matter	30 mg/Nm ³
			Sulphur dioxide (SO₂)	100 mg/Nm ³
			Oxides of nitrogen (NO_x)	100 mg/Nm ³
			Mercury (Hg)	0.03 mg/Nm ³

- (i) TPPs (units) shall meet the limits within two years from date of the notification.
(ii) Includes all the TPPs (units) which have been accorded environmental clearance and are under construction.

[F.NO. Q-15017/40/2007-CPW]

(Dr. Rashid Hasan)
Advisor

Note: - The principal rules were published in the Gazette of India, Extraordinary, Part II, section 3, sub-section (i) vide notification number S.O. 844 (E), 19th November, 1986 and lastly amended vide notification number S.O. 8(E) dated 3rd January, 1989.