

Control Technology Center **NEWS**

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THE TTN GOES FTP AND WORLDWIDE WEB

By Hersch Rorex
ITG, OAQPS

The Technology Transfer Network (TTN) is now a File Transfer Protocol (FTP*) site. This service was made available to the TTN user community on Monday, May 6th. This site allows users of FTP clients, as well as web browsers, to transfer TTN files quickly and easily over the Internet. This much-requested service is now a reality.

The TTN is also a World Wide Web (WWW**) site. This service provides WWW access to the TTN from home pages developed from the familiar menus of the TTN. Some of the TTN boards have data base applications that are not included in the present Web site but will be included at a later time when the technology has matured.

The TTN now offers a wide range of access methods that include bulletin board system (BBS) dial-up service

(modems), Local Area Networks (LANs), and for the Internet user, Telnet, FTP and WWW.

For those who use FTP clients***, you can reach the TTN FTP site at: "ttnftp.rtpnc.epa.gov". Type in "ftp://ttnftp.rtpnc.epa.gov" as your universal resource locator (URL) if you use a web browser. Once logged in, you will see a series of directories and files. Read the README.TXT file to determine what the directories represent. You will also see a file named "00MASTER.TXT". This file contains descriptions of every file available in the TTN system as seen by TTN BBS users. Because of its size, it is recommended that you FTP this file and use a text editor in order to locate the files you wish to transfer via FTP. File identification and description is not a part of basic FTP, so a special effort was made in order to provide this master index to help the FTP user identify files.

If you are using an FTP client program, you will be required to enter the

following information:

Site ID: ttnftp.rtpnc.epa.gov

User ID: anonymous

Password: (your E-mail address).

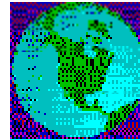
If you have a web browser such as Netscape, use the following URL:

ftp://ttnftp.rtpnc.epa.gov

In order to access the TTN via the WWW, use the following URL for your Web browser:

http://ttnwww.rtpnc.epa.gov

and then point and click.



TTN 2000
The future of information
transfer has arrived . . .

*FTP - File Transfer Protocol, a protocol that allows a user on one host to transfer files to and from another host over the Internet.

**WWW - World Wide Web point and click access to the TTN over the Internet.

***FTP Client - Software used to transfer files over the Internet from an FTP server.

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AIR WAVES

By Charlotte Bercegeay
CTC/APPCD, Co-Chair

Since I am the new CTC/Air Pollution Prevention and Control Division (APPCD) Co-Chair, I want to introduce myself. I have been with the Agency and the Office of Research and Development (ORD) since 1972. The majority of my years with EPA have been with APPCD and its predecessor(s), most recently known as the Air and Energy Engineering Research Laboratory (AEERL). From 1989 to 1994, I also had the opportunity to work in EPA Headquarters in ORD's former Office of Environmental Engineering and Technology Demonstration (OEETD).

More to the point, ORD and the Agency have undergone several reorganizations in the past 24 years. ORD's new organizational umbrella emphasizes a risk-based program utilizing a nationwide system of research laboratories and centers. The National Risk Management Research Laboratory (NRMRL) is one of these major ORD components and is located in Cincinnati, OH. NRMRL consists of six Divisions and one Office: four Divisions in Cincinnati; one Division in Ada, OK; one Division in Research Triangle Park, NC--APPCD; and one Office in Washington, DC.

With all these changes, APPCD's support and work for the CTC has not changed. A brief synopsis of CTC's FY96 current events is provided for your information in the following paragraphs.

Of CTC's nine current projects, four will be funded in FY96 so work can be completed. The CTC Steering Committee (SC) also made decisions at its June SC meeting

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AIR WAVES

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for funding one additional project this fiscal year. New project proposals are welcome! Just call the HOTLINE for information (919-541-0800).

CTC Bulletin Board System (BBS) --

As many of you may know, the CTC has a World Wide Web HOME PAGE. However, in July there will be improved access to the CTC BBS through the TTN-2000, a new, common server for the OAQPS Technology Transfer Network (TTN). Look for the article in this issue for updates of the CTC HOME PAGE and TTN-2000.

HAP-PRO upgraded--This popular software program is available to you through the CTC BBS. HAP-PRO implements the equations in the EPA Control Cost Manual and allows state and local agencies to have a uniform basis for cost. Now inflation indices are available to bring the cost estimates up to current-year dollars. An article on the recent upgrades to HAP-PRO is included in this July issue of the newsletter.

Integrated Air Pollution Control System (IAPCS)--Version 5 of this software program has just been issued and has been added to the CTC BBS. It estimates capital and annual costs for sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter controls for coal-fired utility boilers. An article on this program is also in this July issue of the newsletter.

Seven project summaries have been added to the CTC BBS on APPCD's Florida Radon Research program. There have been 50 published reports in this research area to date. The complete listing of report titles and EPA and National Technical Information Service (NTIS) numbers is available on the CTC BBS, as well. For further information on radon research, please contact David Sanchez at 919-541-2979.

Through the CTC BBS and the HOTLINE, we are here to provide continued technical assistance to you, our clients. We look forward to hearing from you!

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CHARACTERIZATION OF MUD/DIRT CARRY OUT ONTO PAVED ROADS FROM CONSTRUCTION AND DEMOLITION ACTIVITIES

By Lyndon S. Cox
Senior Environmental Employee,
APPCD/NRMRL

The Air Pollution Prevention and Control Division (APPCD) of EPA's National Risk Management Research Laboratory (NRMRL) recently published a report entitled "Characterization of Mud/Dirt Carryout Onto Paved Roads from Construction and Demolition Activities." This report detailed the procedure used by Midwest Research Institute in measuring the amount of mud/dirt carried onto pavement in Kansas City, MO.

Several areas of the country are in violation of the National Ambient Air Quality Standards for particulate matter equal to or less than 10 µm in diameter (PM10). A primary source of PM10 is the fugitive dust generated by traffic over paved roads.

Road dust emissions occur as a vehicle moves on pavement. The surface loading of mud/dirt is one factor in determining the quantity of such emissions. Surface loading is important enough that control techniques have been developed to reduce it. This test program evaluated the effectiveness of three techniques to control the mud/dirt carryout.

The first control technique used a street sweeper to mechanically sweep the dirt and debris from the paved roadway. The second control technique used a 6- to 12-inch (15- to 30-cm) layer of wood chips or mulch on the access area of the construction site to a distance of 100 feet (32 m) from the paved road. The third control technique used a 6-inch layer of gravel over the same area.

From "Compilation of Air Pollutant Emission Factors (AP-42)," there is an empirical expression for PM10 emissions:

$$E = 4.6 \left(\frac{sL}{2} \right)^{0.65} \left(\frac{W}{3} \right)^{1.5}$$

where:

E = PM10 emission factor - grams per vehicle kilometer traveled

s = surface silt - the fraction of mud/dirt that exists as particles smaller than 75 µm

L = total road surface dust loading - grams per square meter

W = average weight of the vehicle traveling - tons

Prior to the uncontrolled and the three control technique test periods, the baseline or "clean road" silt loading values were measured after broom sweeping and water flushing. During each test period, s and L were measured and a vehicle activity log was kept. Street sweeping was found to be only marginally effective (approximately 20%) in reducing average silt loading on the paved road surface. Treatment of the access area with a layer of wood chips or mulch was moderately effective, reducing average silt loading by 38-46%. The gravel showed the greatest effectiveness, reducing the average silt loading by 57-68%. These silt loading reductions resulted in the following calculated PM10 reductions: street sweeping, 14%; wood chips, 27-33%; and gravel, 42-52%.

The collection and reporting of such data are only one function of the APPCD. The work was performed for EPA's Office of Air Quality Planning and Standards (OAQPS) as part of the cooperative effort of the Joint Emissions Inventory Oversight Group. The report number is EPA-600/R-95-171 (NTIS PB96-129028) and may be obtained by calling the National Technical Information Service (NTIS) at 703-487-4650. For additional information, you may also call the EPA Project Officer, Charles C. Masser, at 919-541-7586.

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MACT, CTG, NSPS, ACT AND TITLE I RULE SCHEDULES**

<u>MACT STANDARD</u>	<u>Proposal</u>	<u>Final</u>	<u>ACT</u>	<u>Final</u>
Asbestos MACT/GACT	*1/24/95***	11/95***	Plywood/Particle Board (PM10)	Schedule Under Dev.
Asbestos Litigation	*1/1/93	***		
Ferroalloys	7/96	7/97	<u>NSPS</u>	<u>Proposal</u>
Flexible Polyurethane Foam	8/96	7/97	Cold Cleaning	*9/9/94
Gasoline Distribution	*12/8/95	12/96	Degreaser NSPS	*8/31/94
Haz. Waste Inc.	*4/19/96	4/97	Elec. Utility Gen. Rev. (NOx)	*5/30/94
Mineral Wool	9/96	10/97	Landfill NSPS & 111(d)	*5/30/91
Off-site Waste & Recovery	*10/13/94	7/96	Med. Waste Inc. NSPS & III(d)	*2/27/95
Oil & Gas Production	1/97	9/98	Mun. Waste Combustors II & III	*9/20/94
Pharmaceutical Production	8/96	1/98	NOx NSPS Revision (407(c))	*11/31/95
Polymers & Resins I	*6/12/95	7/96	SOCMI Sec. Sources Suppl.	7/96
Polymers & Resins III	Schedule under revision		Starch Mfg. Industry NSPS	*8/31/94
Polymers & Resins IV	*3/29/95	7/96		
Portland Cement	9/96	11/97	<u>Other Rules</u>	<u>Proposal</u>
Primary Aluminum Prod.	8/96	9/97	Arch./Ind. Coatings (§183e)	*6/25/96
Primary Copper Smelting	7/96	8/97	Auto Refinishing (§183e)	*4/30/96
Printing/Publishing	*3/1/95	7/96	Consumer Products List (§183e)	*8/31/95
Pulp & Paper (combustion)	*2/27/95	8/96	Household Consumer Products	*3/26/96
Pulp & Paper (non-comb.)	*10/29/95	8/96	Haz. Waste TSDF, Phase II	
Secondary Aluminum Prod.	8/96	10/97	(RCRA)	*7/22/91
Shipbuilding (coatings)	*11/22/94	*12/15/95	Haz. Waste TSDF Phase III	*12/6/94
Steel Pickling-HC1 Process	*5/31/96	5/97	(RCRA)	Schedule under revision
Wood Furniture Coating	*11/21/94	*12/7/95		
Wood Treatment	Proposal to be delisted			
Wool Fiberglass Mfg.	11/96	10/97		

<u>CTG ****</u>	<u>Proposal</u>	<u>Final</u>
Aerospace Coatings	9/96	4/97
Industrial Wastewater	*12/29/93	*****
Shipbuilding (coating)	*12/6/94(BACM)	8/96
Offset Lithography	*11/93	*****
Plastic Parts Coating	*****	*****
VOL Storage	*12/93	*****
Wood Furniture Coating	*8/7/95	*5/20/96

NOTE:

- * Indicates date completed.
- ** All schedules are tentative and subject to change without notice. Only those rules with proposal or promulgation dates within one year are included. Completed rules are removed from list after six months.
- *** Schedule to be determined by litigation/negotiation.
- **** ACT's were issued for most CTG categories in April 1995.
- ***** Final CTG cancelled or no plans to finalize.

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HAP-PRO 2.2 NOW AVAILABLE!

By Joe Steigerwald
CTC, OAQPS

The new version of the HAP-PRO model (version 2.2) is now available on the CTC BBS. All of the modules included in the new version have been reviewed and any problems found were corrected. Release 2.2 of the HAP-PRO model corrects various problems and deficiencies. The fixes include correcting errors in calculations, updating chemical properties and other technical data constants, and implementing several enhancements to the program. The

addendum to the user's manual (which is also available in the CTC Downloading Area) has more information on the updates in this release.

The file available on the CTC BBS, HAPPRO22.EXE, contains the actual model and the installation program. Just download this file (please be aware that it is very large and may take a while) and put it into an empty directory on your hard drive. Go into that directory and type HAPPRO22 and press the ENTER key to expand the files. Then type INSTALL and press the ENTER key to install the model. The model will check your hard drive to see if an old version of the HAP-PRO model is already installed. If it finds an older version, it will query you as to how you want to pro-

ceed. (As a precaution, back-up any old data files you created using an older version (2.0 or lower) of HAP-PRO if you are worried about losing existing data created using an older version of HAP-PRO.) When HAP-PRO is correctly installed on your PC, you can delete the files HAPPRO22.EXE and INSTALL.EXE.

The User's Manuals are also available on the CTC BBS in ASCII text, WordPerfect, and Envoy (a portable document format - all you need is a PC running Windows!) format. As stated above, this update to HAP-PRO corrects several problems and discrepancies found; however, the overall operation of the model remains the same.

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DESKTOP RBLC AVAILABLE THIS SUMMER

By JoAnn Kerrick
INDUS Corporation

How would you like to have the RACT/BACT/LAER Clearinghouse (RBLC) on your PC? No BBS or Internet connection! Just you and your PC. The Desktop RBLC is a standalone version of the RBLC Query module that you can install on your PC and use to view RBLC control technology determinations locally. The system works in much the same way as the on-line RBLC search module available to users of the RBLC BBS on the Office of Air Quality Planning and Standards (OAQPS) Technology Transfer Network (TTN). You can download a copy of the Desktop RBLC from the RBLC BBS on the OAQPS TTN. As needed, you can also download updated copies of RBLC data files to keep your version of the Desktop RBLC current with the on-line RBLC database.

The Desktop RBLC is an independently executable program. No special software licenses are required. To run the Desktop RBLC, you need an IBM-compatible PC with a hard drive (at least 5 Mbyte free disk space). The remainder of this article describes how to install and use the system on your PC. For details on how to search for determinations with the Desktop RBLC, refer to the RBLC User's Manual. The system works much like the on-line search modules.

Downloading the Desktop RBLC from the RBLC BBS

The system is available, in compressed form, on the RBLC BBS from the Downloading option of the DOCUMENTS / SOFTWARE section. To install the system, follow these steps.

1. Download the file RBLCVW10.EXE from the RBLC BBS.
2. On your hard drive, create a directory named RBLCVIEW.
3. Change your working directory to RBLCVIEW and run the self-extracting file RBLCVW10.EXE. (You can delete

this file when you are finished.)

4. Copy the file RBLCVIEW.BAT to your root directory. This batch file lets you run the Desktop RBLC without modifying your path.

5. To run the Desktop RBLC, type RBLCVIEW at the DOS prompt.

Getting Updated Determinations from RBLC BBS

The Desktop RBLC works with copies of the control technology determinations entered in the on-line RBLC database. Because new determinations are added to the on-line system on a regular basis, the files used by the Desktop RBLC on your hard drive can become out-of-date. You can download updated copies of the control technology determinations from the RBLC BBS and then decompress them to incorporate the latest files into your local version of the RBLC. Refer to the list of available files in the Downloading option of the DOCUMENTS / SOFTWARE section of the RBLC BBS for the exact file names. Separate files exist for the transient, current, and historical data bases. You only need to download the files you want. Be sure to exit from the Desktop RBLC before you download one or more of these data files. After you have successfully downloaded the files, execute the self-extracting files and then restart the Desktop RBLC. Refer to the on-line help system if you have any questions.

For more information, contact Joe Steigerwald, the RBLC SYSOP, at 919-541-2736.

ctc

INTERNET AND THE RBLC: DOWNLOADING SIMPLIFIED

By JoAnn Kerrick
INDUS Corporation

Attention Internet Users! It just became a lot easier to use the RACT/BACT/LAER Clearinghouse (RBLC) on the Internet. The staff of the Technology Transfer Network (TTN), host for the RBLC, have been working diligently

to streamline access to the TTN for Internet users, and the RBLC is following in their footsteps. The RBLC is now available on two complementary Internet sites, TELNET and FTP (File Transfer Protocol).

The TELNET site provides RBLC users with traditional BBS functions, except for downloading. You can search, browse and create files from the RBLC databases at the TELNET site. The FTP site allows users of FTP client software and most web browsers to transfer TTN files (including search results from RBLC query and browse functions) easily over the Internet. The addresses for these sites are:

TELNET: ttnbbs.rtpnc.epa.gov

FTP: ttnftp.rtpnc.epa.gov

A separate download option for Internet users has been added to both the RBLC Query and Browse modules. Users choose "I" from the appropriate menu to select the Internet download option. (For BBS users, the BBS download option is still available; just type "D".) When you use the Internet download option, the system saves your download report in a file on the FTP server. The system simply tells you when it has successfully created the file, instead of automatically invoking the BBS download function. The BBS download function doesn't work for most users accessing the RBLC via TELNET. You can perform as many searches as you like and select one or more download report formats for each set of search results. All of your download reports will be stored on the FTP server in file names that you select. After you have finished searching the RBLC, simply access the FTP server to transfer the files to your local PC. Just be sure to get your files fairly soon after you create them, because all RBLC user-generated download files will be erased when the TTN is down for weekly maintenance on Monday mornings (8:00 a.m. to noon eastern time).

In the coming months, EPA staff will continue their efforts to reinvent the role of the TTN in response to the growth of the Internet. We here at the RBLC expect that the BBS will change as well. Watch for TTN and RBLC alerts for more information.

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Technology Notebook

**DEFINING THE
PACKING CONSTANTS
IN HAP-PRO**

by Lyndon S. Cox
Senior Environmental Employee
NRMRL/APPCD

Packed tower scrubbers have been around a long time--such a long time that EPA has retired many of the people who were experts in scrubbers. We found references from 1973, 1943, and even 1935 when we traced the calculations. We did this because one of our CTC callers was concerned about packing constants α , β , Y , ϕ , ϵ , a , j , m , and n in the Control Cost Manual, versus a , b , c , d , e , Y , s , g , and r in the HAP-PRO program. Maybe you are too. Are they in different units? (These constants are dimensionless.) So how can you convert from one set of constants to the other?

I looked up the calculations in the Second Edition of the Air Pollution Engineering Manual, compiled by the Air Pollution Control District, County of Los Angeles, and published by EPA in May 1973. The section on packed tower scrubbers (pages 207-229) mentions that usually the scrubbers are counterflow, with liquid coming down while gas is going up. The liquid needs to be properly distributed, because it tends to channel in the packing. As the gas flow increases, or the diameter decreases for the same air flow, the liquid flow per unit area is diminished until flooding occurs. The air flow should be limited to 40% to 70% of the flood point.

In the Air Pollution Engineering Manual, the calculation begins with a factor which has been correlated to flooding:

$$\text{Factor} = \frac{L^1(\rho_g)^{0.5}}{V^1(\rho_l)}$$

where:

L^1 = liquid flow rate in lb/hr
 V^1 = gas flow rate in lb/hr

ρ_g = gas density in lb/ft³
 ρ_l = liquid density in lb/ft³

As this factor goes from 0.01 to 10, it is related to the following parameter which goes from 0.15 to 0.001 over the same range:

$$(G^1)^2 \left(\frac{a}{\epsilon^3} \right) \frac{\mu_L^{0.2}}{g_c \rho_g \rho_L}$$

where:

G^1 = the gas flow rate in lb/sec-ft² of tower cross-section
 a/ϵ^3 = a ratio of packing factors
 μ_L = the liquid viscosity in centipoise
 g_c = gravitational constant, 32.2 ft/sec²

The purpose of solving for this parameter is to solve for tank diameter, as a function of a/ϵ^3 . Selecting the proper packing, the equation can be solved for G^1 , the gas flow per unit area at the flood point. HAP-PRO uses 50% of the flooding flow to define the flow area, and hence the diameter of the tower.

The equation for the tower cross-sectional area is:

$$S = \frac{V^1}{3,600fG^1}$$

where:

f = the fraction of flooding chosen for the design

And finally the tower's inside diameter is calculated as:

$$D = \left(\frac{4S}{\pi} \right)^{0.5}$$

The conditions are calculated for the top and bottom of the tower, and the larger diameter is used.

This then leads to calculation of the height of the tower, which is based on transfer units. Gas transfer units are used where the solubility of the solute (pollutant) is high. Liquid transfer units are used where the solubility is low. One will dominate the transfer and therefore should be used.

The number of transfer units was determined graphically in the Air Pollution Engineering Manual. First, take conditions at the top of the tower and plot them on a graph having Y = moles of solute per mole of gas and X = moles of solute per mole of solvent. Then plot

the condition at the bottom of the tower. These two points define the "operating line." Then a second line should be plotted showing the equilibrium conditions taken from the International Critical Tables. Then a third line should be plotted, midway between the operating line and the equilibrium line. The third line should be midway in the Y direction if absorption is gas limited, and midway in the X direction if liquid limited. Using this plot, draw a horizontal line from the conditions at the top of the tower (the end of the operating line having the lower concentration of HAP). Extend the line to a point as far beyond the middle line as the conditions at the top of the tower are from the middle line. Then draw a vertical line back to the operating line. This is one transfer unit. Repeat as needed to reach the other end of the operating line. The number of times this must be done gives the height of the tower in transfer units.

Going then to the source code for the HAP-PRO program, we found that HAP-PRO calculates the number of transfer units by taking the log of the ratio of solute exiting to solute entering and multiplies this by a function of the absorption factor.

The Air Pollution Engineering Manual finds the height of a gas transfer unit by:

$$H = \alpha \frac{G^E}{L^Y} \left(\frac{\mu_G}{\rho_G D_G} \right)^{0.5}$$

where:

H = height of gas transfer unit in ft
 G = superficial gas flow rate in lb/hr-ft²
 L = superficial liquid flow rate in lb/hr-ft²
 D_G = gas diffusivity in ft²/hr
 μ_G = gas viscosity in lb/hr-ft
 α, β, Y = packing constants (see below)

The group of terms (viscosity, density, and diffusivity) in the parentheses on the right is known as the "Schmidt Number" for the gas.

HAP-PRO computes the height of a gas transfer unit as:

$$H_g = b^* \left(\frac{3600G_{\text{area}} * A_{\text{col}}}{M_{\text{sol}} * L_{\text{mol}}} \right)^c * S_{\text{cg}}^{0.5}$$

(continued page 7)

HAP-PRO

(continued from page 6)

It is obvious that the programmer for HAP-PRO used "c" instead of "β", and "d" instead of "Y".

The height of the liquid transfer unit is found as:

$$H = \phi \left(\frac{L}{\mu_L} \right)^n \left(\frac{\mu_L}{P_L D_L} \right)^{0.5}$$

where:

ϕ, n = packing constants (see below)

The group of terms in the parentheses on the right is the "Schmidt Number" for the liquid.

In HAP-PRO, the liquid transfer unit is:

$$H_l = Y * \left(\frac{MW_{sol} * \frac{L_{mol}}{A_{col}}}{2.42\mu} \right)^{0.5} S_{cl}^{0.5}$$

The pressure drop is calculated by the empirical relation:

$$\frac{\Delta P}{Z} = m (10^{-8}) (10^{nL}/\rho_L) \frac{G^2}{\mu_G}$$

where:

m, n = packing factors

The Control Cost Manual, which is supposed to be the source of HAP-PRO, computes pressure drop as:

$$\Delta P = C * 10 \left(\frac{L_{sfr,i}}{3600} \right)^{fG} \left(\frac{fG}{p_g} \right)$$

But, in HAP-PRO, the pressure drop is computed as:

$$\Delta P_g = g * 10^{-8} * 10 \left(\frac{r_{sol}^{MW}}{D_1} \right)^{fG} (3600 * G_{area}) \left(\frac{2}{D_g} \right)$$

This gives the pressure drop per gas or liquid transfer height.

The packing constants are empirical numbers without units. You will need some of the packing constants, but not all of them. Constants c and j are extraneous because they are for a different formulation. It becomes obvious that the correspondence between the standard packing constants and those in HAP-PRO is given in Table 1.

This is a simple substitution, which cryptographers consider an easy code to break. The key to the substitution is the source code and that is not distributed to users because they normally do

not need it. The programmer who wrote the source code is no longer available, so we could not find out why he changed the notation. Just be advised that Table 1 should be kept and posted.

Good luck, and happy HAP-PRO computing!

Standard Notation	HAP-PRO Notation
a	a
α	b
β	c
Y	d
e	e
φ	Y
η	s
m	g
n	r

Table 1: Correspondence of Symbols in HAP-PRO

ctc

THE INTEGRATED AIR POLLUTION CONTROL SYSTEM (IAPCS) FOR COAL FIRED UTILITY BOILERS

by Lyndon S. Cox
Senior Environmental Engineer,
APPCD

The Air Pollution Prevention and Control Division of EPA's National Risk Management Research Laboratory has recently published Version 5 of the IAPCS.

IAPCS is a computer program that estimates capital and annual costs for sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter controls for coal fired utility boilers. It addresses boiler characteristics, coal analyses, pollution controls, and economics. Outputs include material balances, emission summaries, capital costs, and annual costs. The program addresses

16 control technologies applicable to power plants ranging in size from 100 to 1300 MWe of generating capacity.

IAPCS can estimate costs for each of these control technologies, or logical combinations of them:

SO₂ control technologies: wet flue gas desulfurization, lime spray drying, advanced silicate process, coal supply option, lime injection, and dry sorbent injection.

NO_x control technologies: low NO_x combustion, natural gas reburning, selective catalytic reduction, and selective non-catalytic reduction.

Particulate matter control technologies: electrostatic precipitators, fabric filters, and gas conditioning.

Integrated combustion technologies: fluidized bed combustion and integrated gasification combined cycle.

Potential users may include pollution regulators, architects, engineers, utility companies, public utility commissions, and legislators. Look for the IAPCS on the CTC Bulletin Board of EPA's Office of Air Quality Planning and Standards' Technology Transfer Network (TTN). If you want more information, call Norm Kaplan at 919-541-2556 or send an e-mail message to him at nkaplan@engineer.aeerl.epa.gov.

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The CTC NEWS is a quarterly publication of the U.S. EPA's Control Technology Center (CTC). The CTC is an informal, easy-to-use, no cost, technical assistance service for all State and local (S/L) air pollution control agencies and EPA Regional Office staffs. For others, some services may be on a cost reimbursable basis. The CTC offers quick access to EPA experts and expertise via the CTC HOTLINE and the CTC Bulletin Board, and in-depth technical support through source specific Engineering Assistance Projects or more generic Technical Guidance Projects. The CTC is operated by the Air Pollution Prevention and Control Division, National Risk Management Research Laboratory and the Information Transfer and Program Integration Division, Office of Air Quality Planning and Standards in Research Triangle Park, North Carolina.

If you have any air pollution emission or control questions, or would like more information about the CTC and the types of technical assistance available, CALL THE CTC HOTLINE!

(919) 541-0800

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CTC ASSISTANCE

No cost assistance to staff of State and Local agencies, EPA Regional Offices, and others on air pollution control technology issues.

CTC HOTLINE: CALL (919) 541-0800 to access EPA expert staff for consultations, references to pertinent literature, or access to EPA technical data and analyses. No question is too simple!

CTC FAX: You can send a request for any CTC service listed here by FAX. Our Fax numbers are: (919) 541-0242 or (919) 541-0361.

CTC BBS: Call (919) 541-5742 for up to 14400 baud modem to access the CTC Bulletin Board. Set communications parameters to 8 data bits, N parity, and 1 stop bit, and use a terminal emulation of VT100 or VT/ANSI. You may leave HOTLINE requests, order documents, suggest projects, and download documents and software. The BBS is part of the OAQPS Technology Transfer Network (TTN). In addition, the TTN may be accessed via the Internet at 'TELNET ttnbbs.rtpnc.epa.gov' or through the EPA Home Page on the World Wide Web. The TTN also has an FTP site for downloading files at 'ttnftp.rtpnc.epa.gov'.

FEDERAL SMALL BUSINESS ASSISTANCE PROGRAM (FSBAP) The FSBAP is available through the SBAP BBS on the TTN (see CTC BBS for connection information), or the CTC HOTLINE or FAX. The FSBAP provides support to State Small Business Assistance Programs.

US-MEXICO INFORMATION CENTER ON AIR POLLUTION (CICA - *Centro de Información sobre Contaminación de Aire*): Call the CICA Information line (919) 541-1800 (Spanish) or the CTC HOTLINE (English) to access technical support and assistance in evaluating air pollution problems along the Mexico-US Border.

INTERNET/WORLD-WIDEWEB ACCESS: Send E-Mail to 'blaszczak.bob@epamail.epa.gov'. In addition, you may access our services through the following sites:

For CTC - '<http://www.epa.gov/oar/oaqps/ctc.html>'

For FSBAP - '<http://www.epa.gov/oar/oaqps/sbap.html>'

For CICA - '<http://www.epa.gov/oar/oaqps/cica.html>'

RACT/BACT/LAERCLEARINGHOUSE (RBLC): The RBLC data base is available on the OAQPS TTN BBS (see CTC BBS for connection information). The Clearinghouse provides summary information on control technology and pollution prevention (P2) determinations made by permitting agencies, and on EPA emission standards and control techniques guidelines.

ENGINEERING ASSISTANCE PROJECTS: If you need in-depth assistance concerning a specific control technology or pollution prevention problem, contact the CTC. EPA staff and contractors are available for short-term projects such as review of proposed or existing control or prevention measures. Projects are subject to CTC Steering Committee approval.

TECHNICAL GUIDANCE PROJECTS: The CTC may also respond to a number of similar requests on issues of national or regional interest by undertaking broad, long-term projects. The result may be a control technology document, PC software, seminar, or workshop.

INTERNATIONAL TECHNOLOGY TRANSFER CENTER FOR GLOBAL GREENHOUSE GASES (ITTCGGG): Call the CTC HOTLINE to access ITTCGGG information on greenhouse gas emissions, prevention, mitigation, and control strategies.

MAIL: Address conventional mail inquiries to: CTC (MD-12), U.S. EPA, RTP, NC 27711.



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