Draft Technical Support Document for HWC MACT Standards

Volume II:
HWC Data Base

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Contents

Acronyms

APCD	Air pollution control device
APCS	Air pollution control system
BH	Baghouse
BIF	Boiler and Industrial Furnace
CAA	Clean Air Act
CO	Carbon monoxide
CoC	Certification of Compliance
D/F	Polychlorinated dioxins and furans
DRE	Destruction and removal efficiency
ESP	Electrostatic precipitator
HAF	Halogen Acid Furnace
HAP	Hazardous air pollutant
HC	Hydrocarbons
HWC	Hazardous waste combustor
LVM	Low volatile metals (As, Cd, Cr)
MACT	Maximum achievable control technology
MHRA	Maximum hourly rolling average
MTEC	Maximum theoretical emissions concentration
PCDD/PCDF	Polychlorinated dioxin and furans
PIC	Products of incomplete combustion
PM	Particulate matter
POHC	Principal organic hazardous constituents
RA	Rolling average
RCRA	Resource Conservation and Recovery Act
SVM	Semivolatile metals (Pb, Cd)

Tables

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1.0 Introduction

The United States Environmental Protection Agency is proposing "Maximum Achievable Control Technology" (MACT) standards for "hazardous air pollutants" (HAPs) for hazardous waste combustors. This includes hazardous waste burning incinerators, cement kilns, lightweight aggregate kilns, boilers, and hydrochloric acid production furnaces. The MACT standards for the "Phase I" hazardous waste burning incinerators, cement kilns, and lightweight aggregate kilns will replace the interim standards promulgated for these sources on February 13 and 14, 2002 (67 FR 6792 and 67 FR 6968). The MACT standards for "Phase II" hazardous waste burning categories – boilers and hydrochloric acid production furnaces – will be proposed (and promulgated) on the same schedule as the replacement Phase I standards.

This document describes the format and content of the data base used to develop the MACT standards for hazardous waste combustors (HWCs). The data base has been compiled from information taken from trial burn, Certification of Compliance, risk burn, and other testing programs. The data base is the result of a number of data collection efforts and stakeholder data base reviews. See Appendix E for responses to comments on the most recent request for HWC data base review.

The hazardous waste combustor performance data are contained in three independent formats:

- Access data base – Information is contained in an Access format, relational data base. The data base is organized into various tables that are related through source ID and condition ID. The Access data base structure and contents are described in Chapter 2.

- Individual source data sheets – For each source ID, an Excel (and Lotus compatible) workbook file contains the detailed supporting data and calculations used to develop the data contained in the Access data base and data summary sheets. The individual source data sheets are described in Chapter 3.

- Data summary sheets – A series of Excel (and Lotus compatible) files, each containing data for a specific HAP (or HAP surrogate) and source category, as described in Chapter 4.

2.0 Access Data Base

The HWC Data Base in Access format is attached in Appendix A.

Figure 2-1 shows the general structure of the Access HWC Data Base and the relationships between the different tables. The data base has been designed to facilitate "querying" (retrieving specific types of information) for different data requirements.

The Access HWC Data Base contains the following tables:

Source Information – The table contains information that is specific to each hazardous waste combustion system. There is a single record for each combustion unit; i.e., each combustor system is assigned a unique Source ID Number. Information in this table relates to the Condition Description table (using the Record Identifier table) through the Source ID Number. The table contains data fields specific to the characteristics of each of the combustion units, such as combustor type, air pollution control system, unit name, city/state location, etc.

Condition Description – The table contains data fields specific to the characteristics of each different test condition, such as test condition date, condition description (purpose), name and date of report test condition information is taken from, etc. There is a single record for each different test condition; i.e., each test condition is assigned a unique Condition ID Number.

Record Identifier – This table functions as a link between the Source Information and Condition Description tables through the Source ID Number and Condition ID Number. There are two record identifier tables that can be used:

-- Record Identifier 1 – Used to retrieve data from sources for which testing was performed.

-- Record Identifier 2 – Used to retrieve data from "sister" or "data-in-lieu" sources which have not been tested since they are identical in design and operation to sources which were tested. Each of these sister sources are assigned a Source ID Number that is the same as the source which was tested, but with an added letter following the number – e.g., 746A, 746B, etc.

Stack Gas Emissions Tables – A series of tables, one for each different stack gas pollutant, including:

-- Particulate matter (PM), as per EPA Method 5. Also, a table for "total PM" (where stack gas measurement includes both front half filter and back half condenser solids catch)
-- PCDD/PCDF TEQ

- -- Enumerated metals of mercury (Hg), arsenic (As), chromium (Cr), beryllium (Be), lead (Pb), cadmium (Cd), cobalt (Co), nickel (Ni), semivolatile metals (SVM, the sum of cadmium and lead), low volatile metals (LVM, the sum of chromium, beryllium, and arsenic)
- -- HCl, Cl_2, and total chlorine
- -- Carbon monoxide (CO) and hydrocarbons (HC)
- -- Non-enumerated metals of antimony, cobalt, manganese, nickel, and selenium

Each table contains records for each Condition ID Number where stack gas emissions data are available. The data fields contain the data organized by individual test condition run, including the measured stack gas emissions concentration and detection status.

Separate tables are also included for emissions expressed as "hazardous waste thermal emissions" (with tables named "Thermal Emissions 1", and described in detail in Technical Support Document Volume III), and "total thermal emissions" (with tables named "Thermal Emissions 2"). These are provided only for the energy recovery units – cement kilns, lightweight aggregate kilns, and liquid fuel boilers.

Feedrate Tables – Similar to the Stack Gas Emissions tables, one for each different feedrate constituent, including ash, chlorine, metals, and heat input firing rate. Contains records, by Condition ID Number, with data for feedrate MTECs, separated for six feed classes: hazardous waste, spikes, raw materials, coal, miscellaneous fuels, and total. Information is provided by test run, with detection status.

Separate tables are also included for feedrates expressed as "hazardous waste thermal feedrates" (with tables named "Thermal Feedrates", and described in detail in Technical Support Document Volume III). These are provided only for energy recovery units – cement kilns, lightweight aggregate kilns, and liquid fuel boilers.

Stack Gas Sampling Train Tables – For each sampling train and Condition ID Number, contains stack gas sampling train information including stack gas flowrate, oxygen, moisture, and gas temperature.

Process Information – Table contains information on dry PM air pollution control device operating temperature, by Condition ID Number.

The data field dictionary, shown in Table 2-1, describes the specific fields of each of the tables, and the contents of each field. Additional descriptions of some of the fields include:

- SRE -- System removal efficiency, calculated from the feedrate MTECs and stack gas emissions. Calculated using emissions at full non detect (emissions reported to be less than the method detection limit are assumed to be present at the full detection limit) and feeds at 0 (zero) non detect (feeds reported to be less than the detection limit are assumed to not be present).

- Test type -- Various identifiers are used to classify the purpose of testing, including:

- -- Compliance testing (CT). Certification of Compliance or Trial Burn testing.
- -- Risk burn (RB). A risk burn is an emissions test used to conduct a site-specific risk assessment. Risk burns are often conducted under normal operating conditions.
- -- Normal operating conditions (N).
- -- Annual / biannual /quarterly performance testing (ann PT, biann PT, quarterly PT).
- -- Baseline no waste testing (B).
- -- Research testing (RT).
- -- Evaluation testing (Eval).
- -- Demonstration testing (Demo)
- -- Mini-burn testing (MB).

• <u>Campaign</u> -- The Phase I data base includes data from old and new emissions tests. Often, sources conducted a series of tests under the same testing "campaign". Such tests are numbered and grouped together for purposes of classifying each test as Compliance Test Vs Normal, as discussed below. Where it is determined, however, that a source conducted tests under different modes of operations but at different times, these tests are also grouped (classified) under the same campaign. This is appropriate because such tests do not supersede previous compliance test operating results, but rather provide additional operating flexibility by defining operating limits for specific, alternative operating modes (e.g., waste types).

For example, munitions furnaces often conducted a series of trial burns over a period of years to identify operating conditions specific to the types of waste munitions that were generated and needed to be incinerated. All those trial burns are classified under the same campaign, and the "compliance test" emissions data for each pollutant identified from among all of those tests. This is appropriate because the waste munitions with the "compliance test" emissions may require incineration in the future, and the emissions from those munitions are representative of emissions the source may emit.

• <u>Test condition rating (Compliance Test Vs Normal Vs In-Between Vs NA)</u> -- Various identifiers used to classify emissions for each test condition for each pollutant within a test campaign. These include:

- <u>N (normal)</u> -- Test condition is run under conditions which are most representative of normal operations for the HAP in question. For example, the HAP is not intentionally spiked in the feed, operating limits are not being determined for the HAP during the test condition, the waste feed composition and other process operating conditions reflect normal operations.

  For PCDD/PCDF, test conditions are rated as normal unless they use a dry PM APCD and the dry PM APCD was operated at maximum temperature, in which case they are rated as "compliance test" (see below).

- CT (compliance test) -- Test condition within each test campaign with the highest emissions of the pollutant and where the test condition meets any of these criteria:[1] (1) a test condition where the feedrate of the pollutant (i.e., metal, chlorine, or ash) is maximized by spiking or other means (e.g., feeding waste with atypically high concentrations of the pollutant) or where the emission control device is detuned; or (2) a test condition that a boiler or industrial furnace used to demonstrate compliance under Tier III of the BIF rule for the pollutant, or that an incinerator used to comply with Tier III of the risk assessment guidance.

  Note that within each test campaign, there may only be one condition which is identified with a "compliance test" rating.

- IB (In-between) -- The test condition would have met the definition of compliance test except that there was another condition with higher emissions. Test conditions are also classified as IB if the SVM and LVM emissions represented a mixture of "compliance test" and normal emissions.[2]

- NA (not applicable) -- It is not appropriate to classify the test condition for the pollutant as compliance test vs normal. A comment is provided for each NA classification indicating the reason for the classification. Reasons include:

  -- APCS or combustor modifications – Tests conducted prior to modifications of the combustion system and/or APCS retrofits (i.e., tests conducted with older equipment that is no longer used in current

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[1] For PM, the definition of compliance test is more inclusive. If there is only one test condition in the test campaign that the test report refers to as a trial burn or certification of compliance test, we assume that test condition represents compliance test PM emissions (unless the test report explicitly states otherwise) even if the test report does not explicitly indicate that ash was spiked or the APCS was detuned during the test. This interpretation is appropriate because a source must document compliance with the PM standard by emissions testing. Sources do not have the option of complying with an ash feedrate option (such as the Tier I feedrate limits for metals and chlorine) in lieu of emissions testing. If there is more than one test in the test campaign that the test report refers to as a trial burn or certification of compliance test, we assume that the test condition with the highest PM emissions represents compliance test (unless the test report explicitly states otherwise), even if the test report does not explicitly indicate that ash was spiked during the test.

[2] For example, in some cases lead emissions reflected non-spiked normal conditions, and cadmium emissions reflected worst case spiked emissions. Note that we classified LVM data as worst case when beryllium was the only LVM metal that reflected normal emissions (and where arsenic and chromium reflected worst case). This is because beryllium emissions are virtually always substantially lower than either arsenic or chromium emissions, and thus, do not contribute substantially to LVM emissions.

operations). Emissions data prior to these changes may not be representative of current operations.

-- <u>Miniburns, research tests, demonstration tests</u> -- These types of tests are generally used to determine emissions under modes of operation that are not representative of current operations (for example, to demonstrate the potential new operating modes, evaluating small changes in operating conditions, etc.). Thus, emissions during these tests are not likely to be worst-case or normal.

-- <u>Baseline tests</u> -- Emissions when not burning hazardous waste are not relevant to establishing a MACT standard for hazardous waste combustors.

-- <u>Tests where not all metals in the SVM or LVM group were measured, or where only Cl_2 was measured for total Cl</u> -- SVM and LVM emissions cannot be classified as compliance test or normal if emissions data are not available from the test for both lead and cadmium for SVM, and for arsenic, beryllium, and chromium for LVM. Note that, for some source categories where there are substantial emissions data for only lead or only chromium during a test condition, we classified the lead-only or chromium-only data by worst-case vs normal. Note that we did not apply the NA classification to LVM emissions data if only beryllium emissions data were missing. This is because beryllium emissions are virtually always substantially lower than either arsenic or chromium emissions, and thus, do not contribute substantially to LVM emissions.

-- <u>PM (or metals) run exceeding the RCRA emission standard</u> -- If a PM run failed the 0.08 gr/dscf RCRA standard, the test failed to demonstrate compliance with the RCRA standards. Thus, the test could not be used to establish operating limits, and the emissions are not representative of emissions when operating within allowable limits established under a successful compliance test. Also, test conditions with failure to meet BIF allowable metals emissions limits were also excluded.

-- <u>HAP is not actively controlled in the entire source category</u> – NA's are assigned to SREs for HAPs for which no currently operating source in the source category uses a dedicated, add-on APCD that controls the HAP (such as Cl for coal fired boiler, Hg and Cl for cement kilns).

-- <u>Pre-BIF rule data</u> – For cement and lightweight aggregate kilns, NA's assigned to test condition data that were taken prior to the BIF rule. The purpose/intent of these tests was not consistent and generally not used for compliance related reasons.

- Most recent data – For Phase II sources (liquid and coal boilers, HCl production furnaces), only most recent compliance testing data are being considered. Older CoC test data are given an "NA".

- Data in lieu – Test conditions which are borrowed to demonstrate compliance from testing at a different, but identical designed and operated "sister" unit (units which use "data in lieu" for compliance, do not conduct actual emissions testing) are assigned an "NA".

- QA/QC problems – NA's assigned where problems were identified in the test report with some aspect of the sampling and analysis activities that prevented the data from being used for regulatory compliance purposes. Also, NA's are assigned to data whose accuracy appeared extremely suspect – for example, outlier (very low or very high) feedrates, SREs that are not consistent with behavior of other similar units, etc.

- Spiking -- Indicates whether spiking of ash, chlorine, or metal feedstreams was used. "N" indicates no, "Y" is yes, "UL" is unlikely, and "L" is likely. Unlikely and likely are determined based on the relative HAP feedrate level and how the HAP is complied with under the RCRA BIF Rule compliance option (Tier I or Tier III).

- Tier status -- The RCRA BIF Tier compliance status (Tier I vs Tier III) is identified for the individual metals and chlorine.

Table 2-2 provides a list of acronyms that are used in the data base.

Table 2-1. Data Field Dictionary -- HWC Data Base in Access

Field	Format	Description	Examples / Comments
Table: Source Information			
Source ID No.	Text	Assigned 3 or 4 digit ID No. Specific (unique) to each combustion unit. Sister (data-in-lieu) units assigned an “A”, “B”, etc.	200, 300, 300A (sister unit to 300)
EPA ID No.	Text	9 digit EPA ID No. given to all facilities handling hazardous waste	TXD001893284
Facility Name	Text	Name of company which owns/operates the hazardous waste combustor	Safety Kleen
City	Text	City location of hazardous waste combustor	Beaumont
State	Text	State location of hazardous waste combustor	TX
Unit ID Name	Text	Name of hazardous waste combustor given to by (referred to by) the facility	Kiln No. 2, NCIN-1
Other Sister Facilities	Text	Narrative description of other sister (data-in-lieu) units represented by this unit; or other units in the database which are used to represent this unit.	Boiler No. 1
Number of Sister Units	Number	Number of additional identical, sister (data-in-lieu) units that this unit currently represents, including other units that have a Source ID No.	0
Combustor Category	Text	General category of hazardous waste combustor. 6 possible entries: Cement kiln, Lightweight aggregate kiln, liquid fuel boiler, solid fuel boiler, HCl production furnace, incinerator, sulfuric acid recovery furnace	Incinerator

Combustor Class	Text	Descriptive category of hazardous waste combustor. Key words: cement kiln (CK), lightweight aggregate kiln (LWAK), incinerator (onsite, commercial, mixed waste, government, munitions, popping, chem demil), boiler (liquid, coal), process heater, HCl production furnace, sulfuric acid recovery furnace	Onsite Incinerator, chem demil incinerator
Munitions Popping Furnace	Yes/No	Identifies munitions / popping furnace incinerators	Yes
Short Cement Kiln	Yes/No	Identifies short cement kilns	No
Chemical Weapons Demilitarization Units	Yes/No	Identifies chemical demilitarization furnaces	Yes
Mixed Radioactive Waste	Yes/No	Identifies mixed radioactive waste handling units	No
Government	Yes/No	Identifies government owned units	No
Commercial vs Onsite	Text	Identifies unit as commercial (treats offsite generated waste for a tipping fee, hazardous waste combustion is primary business at the site) vs on-site (treats onsite generated waste, and/or waste generated from same company without tipping fee)	Comm or OS
Liquid Injection Incinerator	Yes/No	Identifies liquid injection incinerators	
Combustor Type	Text	Combustor design. Key words: <u>cement kilns</u> -- wet, dry, short, long, preheater, precalciner, in-line raw mill (ILRM) <u>incinerators</u> -- rotary kiln, liquid injection, fluidized bed, controlled air, rotary hearth, fixed hearth <u>boilers</u> -- pulverized, stoker, liquid fired, liquid injection <u>HCl Production Furnace</u> <u>Sulfuric Acid Recovery Furnace</u>	Wet, long, rotary kiln

Combustor Characteristics	Text	Narrative description of combustor design, features.	
Capacity (MMBtu/hr)	Text	Total fuel heat input capacity of combustor, usually provided in MMBtu/hr	
Sootblowing	Text	Narrative discussion on sootblowing practices	
Waste Heat Boiler	Yes/No	Yes for units with waste heat boiler; no for units without waste heat boiler	Yes
APCS Detailed Acronym	Text	Acronym string used to define specific components of the air pollution control system. Acronym list is shown in attached list.	SD/FF/PBS/DM
APCS General Class / Components	Text	General components of APCS. Including: FF, HEWS, LEWS, CI, CB, WESP, ESP, RH, IWS, DS, WHB, HE, WQ. Acronym list shown in attached list.	SD, FF, LEWS
Dry vs Wet PM APCD	Text	Dry -- uses dry PM APCD, must be prior to wet scrubber if used. Wet -- uses wet PM APCD and does not use a dry PM APCD. None -- does not use active PM APCD	Dry, Wet, None
APCS Characteristics	Text	Narrative description of APCS design, features	
Hazardous Waste Type	Text	General class of hazardous waste that is combusted. Including: liquid, solid, sludge.	
Hazardous Waste Description	Text	Narrative description of hazardous waste. Such as origin, types, ID Nos., names, any other interesting characteristics of waste.	
Supplemental Fuel	Text	List of other non-hazardous waste fuels used. Including: coal, natural gas, fuel oil.	
Stack Diameter (ft)	Text	Stack diameter	
Stack Height (ft)	Number	Stack height	
Stack Gas Temperature (F)	Number	Stack gas temperature (nominal rated)	
Stack Gas Velocity (ft/s)	Number	Stack gas velocity (nominal rated)	

Permitting Status	Text	Narrative of permitting/compliance procedures, such as BIF compliance Tiers for metals and chlorine, Low Risk Waste Exemption for boilers, etc.	
Operating Status	Text	Operating status of facility. Y if still operating. N if closed (with date of closure).	
<u>Table: Condition Description</u>			
Condition ID No.	Text	ID number assigned to each unique test condition. Structured as: first (starting from the left) the 3 or 4 digit Source ID No., followed by the condition number, such as “C1”, “C2”, “A1”, “B1”, “D1”, ...	200C1, 200C2, 319D2
Report Name / Date	Text	Name and date of report that information is taken from (bibliographic reference)	
Report Preparer	Text	Name of firm which is responsible for preparing test report	
Testing Firm	Text	Name of firm which performed the testing	
Testing Dates	Text	Date(s) during which the test condition was performed	Sept 11-14, 1997
Condition Date	Date	Month during which test condition was performed	Sept 1997
Condition Description	Text	Narrative description of purpose of test condition	Trial burn, low combustion temperature DRE
Content	Text	Measurements taken during test condition	
Test Type	Text	General purpose of testing. See more detailed description in main report.	CT, TB, N, B
Soot Blowing Run No.	Text	Test condition run, if any, during which soot blowing conducted.	R3, R2, No
Soot Blow Comments	Text		
ILRM Status	Text	Operating status of cement kiln in line raw mill (on / off)	Off

Cl Campaign No.	Text	Testing campaign number assigned to each test condition. See more detailed description in the main report	1, 2, 3
Cl Spiking	Text	Status of spiking during testing (Y/N)	Y
Cl Tier	Text	RCRA Tier Compliance status (1, 2, or 3)	1
Cl Rating	Text	Rating of test condition. For example, compliance test (CT), normal (N), in-between (IB), etc. See more detailed description in main report.	CT, N, U, NA, RT
Cl Rating Comments	Text	Notes on rationale for rating	
Similar sets of fields like chlorine above, for rest of HAPs (D/F, Hg, LVM, Cr, SVM, PM)			
Tables: Stack Gas Emissions Tables (different table for each pollutant: Hg, SVM, LVM, PM, etc.)			
Condition ID No.	Text	See above	
Emission Concentration	Number	Value of stack gas emissions concentration. Individual runs and condition average provided in fields for each test condition record. Units of the emissions concentration value, corrected to 7% oxygen: PM -- gr/dscf; CO, HC, HCl, Cl2, Total Chlorine -- ppmv; metals -- ug/dscm, D/F -- ng TEQ/dscm. Non-detect measurements (measurements reported as less than a provided detection limit) are considered at the full detection limit (i.e., the Access database contains the value corresponding to 100% of the provided detection limit).	

ND	Number	Percentage of the emission concentration contributed from measurements reported at the detection limit (non-detects). For an individual HAP (e.g., Cr, PM, HCl, 2,3,7,8-TCDD) and individual run, the ND % will be either 0 or 100% (0 if detected, 100 if non-detect). For test condition averages, or individual runs for a grouped HAP (SVM, LVM, PCDD/PCDF TEQ, or Total Chlorine), the ND % is anywhere between 0 and 100% (e.g., 57%). As mentioned above, the non-detect measurements are treated at the full detection limit.	
Comments	Text	Miscellaneous issues related to the measurement.	
Tables: Feedrates (different table for each pollutant: ash, Cl, Hg, SVM, LVM, Cr, Cd, Ni, etc.)			
Condition ID No.		See above	
Feedrate	Number	Value of feedrate MTEC for individual runs and condition average for 6 different feedstream categories: hazardous waste (HW), spike, coal, raw materials (RM), other nonhazardous fuels (MF), and total. MTECs shown in units of ug/dscm for metals and Cl, mg/dscm for ash. Non-detect measurements are considered at the full detection limit.	
ND	Number	Percentage of the feedrate MTEC contributed by measurements reported at the detection limit. Non-detect measurements are considered at the full detection limit.	
Tables: System Removal Efficiency (different table for each pollutant: ash, Cl, Hg, SVM, Cr, Cd, Ni, etc.)			

System Removal Efficiency (SRE)	Number	System removal efficiency, shown by run and test condition average. Calculated as the ratio of the total feedrate minus the stack gas emission rate to the total feedrate (or alternatively, 1 minus the ratio of the emissions rate to the feedrate). Expressed in %. The following procedures are used for handling of non-detects: for stack gas emissions, considered at the full detection limit; for feedrates, treated as 0 (zero) (i.e., feedrates reported as less than a detection limit are treated as 0). When all feedstreams are non-detect, SRE is not calculated.	
ND	Text	">" qualifiers are shown for SREs for which either the feedrate or emissions rate contains non-detect contributors (levels which are reported as being present at less than a detection limit). This is because the actual SRE is equal to or greater than the SRE that is shown. This is a result of handling non-detects in the stack gas emissions at the full detection limit, and non-detects in the feed as 0 (zero).	
SRE Campaign Number	Text	Testing campaign number assigned to each test condition. See more detailed description in the main report	
SRE Rating	Text	Rating of test condition. For example, compliance test (CT), normal (N), in-between (IB), etc. See more detailed description in main report.	
SRE Rating Comment	Text	Notes on rationale for rating	
Tables: Process Information (dry PM operating inlet temperature)			
Condition ID No.	Text	See above	
Operating Parameter	Text	Miscellaneous combustor and air pollution control device operating parameters, such as temperature, pressure drops, voltage, scrubber liquor feedrate, pH, etc.	
Parameter Level	Number	Value of operating parameter by run and condition average	
Units	Text	Unit of operating parameter	

Comments	Text	Miscellaneous issues relating to operating parameter	

Table 2-2. Acronym List used in HWC Data Base

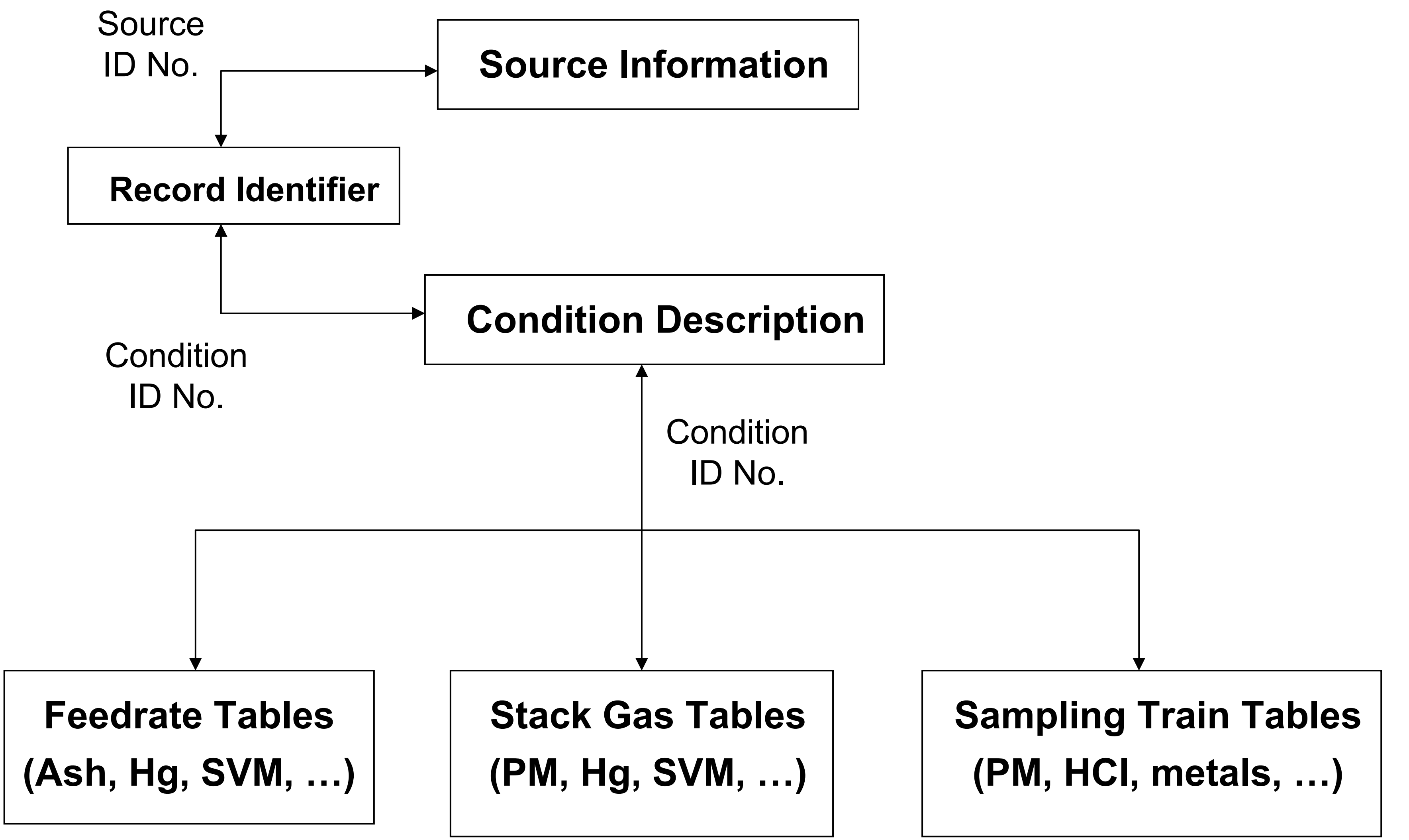
B	Baseline
Comm	Commercial incinerator
HW	Hazardous waste
IB	In-between
MB	Mini burn
MR	Most recent
N	No spiking
N	Normal
NA	Not appropriate
NE	Not evaluated
OS	Onsite incinerator
PT	Performance Test
RB	Risk Burn
RT	Research testing
SRE	System removal efficiency
TB	Trial Burn
U	Unknown
WC	Worst case
Y	Yes spiking

Air Pollution Control Device Acronyms

AA	Acid absorber
AB	Afterburner
ABS	Absorber (packed bed scrubber)
BH	Baghouse
C	Cyclone
CA	Carbon adsorber
CB	Carbon bed
CCS	Counter current scrubber
CFS	Cross flow scrubber
CHEAF	Mist eliminator filter
CI	Carbon injection
CS	Caustic scrubber
CSC	Caustic scrubber
DA	Dilution air
DI	Dry injection scrubbing
DM	Demister
DS	Dry scrubber
ES	Entrainment separator
ESP	Electrostatic precipitator
FF	Fabric filter

GC	Gas cooler
GS	Gas subcooler
HE	Heat exchanger
HES	High energy scrubber
HEPA	High efficiency particulate air filter
HEWS	High energy wet scrubber
HTHE	High temperature heat exchanger
HS	Hydrosonic scrubber
IDF	Induced draft fan
IWS	Ionizing wet scrubber
LEWS	Low energy wet scrubber
LTHE	Low temperature heat exchanger
MC	Multiple cyclones
ME	Mist eliminator
OS	Orifice scrubber
PB	Packed bed scrubber
PBS	Packed bed scrubber
PCS	Packed column scrubber
PT	Packed tower scrubber
PTWS	Packed tower wet scrubber
Q	Quench
QC	Quench column
QS	Quench separator
QS	Quench system
QT	Quench tower
RH	Reheat
RJS	Reverse jet scrubber
S	Scrubber (wet)
SC	Scrubber (wet)
SC	Spray column
SD(A)	Spray dryer adsorber
SP	Separator
SS	Spray saturator
ST	Spray tower
VS	Venturi scrubber
WCS	Packed bed water scrubber
WESP	Wet electrostatic precipitator
WHB	Waste heat boiler
WS	Wet scrubber

Figure 2-1. HWC Access Data Base Structure



3.0 Individual Source Data Sheets

Detailed data on each source are compiled in Excel (and Lotus compatible) spreadsheets. Each individual source has its own workbook file, and is assigned a unique ID number. The Excel files are named according to the source's ID number. The files are contained in Appendix B.

Each file has a series of worksheets which contain a compilation of the data corresponding to each worksheet topic. These include: (1) source description ("source"); (2) condition description ("cond"); (3) stack gas emissions ("emiss"); (4) feedstreams ("feed"); (5) process data ("process"); and (6) PCDD/PCDF ("df"). Contents of the worksheets are described below.

Multiple test conditions at the same source, either performed within the same campaign or during another test campaign, are incorporated into the same source file.

The structure of these data sheets is tailored to facilitate review and enhance the accuracy of the data. The key measure of this review-friendliness is the convention of designing the spreadsheets for data entry to be consistent with the data as found in the test report, thus allowing a direct comparison of the as-reported data with the entered data. This involved dividing the emissions and feedstream sheets into two portions. In most cases, as-reported data are entered "verbatim" in the first section. Next, calculations are made as appropriate to convert the as-reported emissions data into common units (e.g., gas concentrations corrected to 7% O_2), which are presented in the second section. Customized programming, apparent in the cell formulas, shows the calculations that are made to convert the data to common units.

For many of the combustors, data on the emissions, feed, and process information, are divided between two sheets (e.g., "feed 1" and "feed 2"). Recently collected data are included in the first sheet, which includes a "1" in the sheet title. Sheets with a "2" in the title contain previously collected testing information that has been released and used by EPA in previous activities.

For much of the previously collected data in the "2" sheets it was not feasible to present the information in a "verbatim" form. Instead, data are provided directly in standardized units (e.g., ug/dscm @ 7% oxygen). However, the stack gas sampling train flowrates and oxygen levels that were used for unit conversions are provided in the sheets in all cases, making it simple to re-convert the data to any other desired units (e.g., lb/hr, grams/min, etc.) for comparison purposes.

3.1 Source Description Sheet

The first sheet contains descriptive information on the source type, ID Nos., source design, fuel types, etc. It includes:

ID No. -- Unique ID No. that identifies each different hazardous waste burning unit (i.e., source) which has been tested; identical or sister units which have not been tested are not assigned an ID No.

EPA ID No. -- 9 digit code assigned to each facility site by EPA.

Facility Name -- Name of the company which operates the source.

Facility Location -- City and state of facility.

Facility Name or ID No. -- Name of the source as identified internally by the facility.

Sister Units -- Sources for which "data-in-lieu" of testing is used to document compliance. Sisters units have been determined by regulatory officials to be either identical or essentially similar in expected performance so that testing of both units is unnecessary.

Combustor Class and Type -- Generic class and type of combustor, for example, incinerator, boiler, cement kiln, etc.

Combustor Characteristics -- Distinguishing features of combustor and firing set-up, including design, manufacturer, model, thermal ratings, etc.

Soot Blowing -- Identifies whether soot blowing is used, as well as the duration and frequency.

APCS – Generic type of air pollution control system; for example, ESP, FF, SDA (spray dryer absorber), WS (wet scrubber), VS (venturi scrubber).

APCS Characteristics -- Distinguishing features of the APCS, including manufacturer, model, and design characteristics of performance indicators (such as pressure drop for VS, fabric type and air to cloth ratio for FF, number of fields for ESP, etc.).

Hazardous Waste -- Generic form of hazardous waste that is burned as indicated in the test report – liquid, solid, sludge.

Hazardous Waste Characteristics -- Distinguishing features of waste, including waste constituents, waste codes, waste types, waste origin, etc.

Non-Hazardous Waste (Auxiliary, Supplemental) Fuel -- Auxiliary fuel (including non-hazardous waste) co-fired with hazardous waste. Typically natural gas. May also include coal, fuel oil, process gas, or any other non-hazardous waste fuels.

Stack Characteristics -- Presented in terms of dispersion modeling at stack exit.

Diameter -- Diameter, or equivalent diameter if non-circular (ft).

Height -- Elevation above grade level (ft).

Gas Velocity -- Average gas velocity (ft/sec).

Gas Temperature -- Average gas temperature (°F).

Permitting Status -- Includes Tier I, II, or III permitting status, identification of low waste risk exemption units, etc.

3.2 Condition Description

The condition description sheet serves as a bibliographic reference to all compliance test and/or risk burn test reports from which the data are taken:

Report Name/Date -- Title and date of report.

Report Preparer -- Company responsible for writing test report.

Testing Firm -- Company responsible for performing sampling/testing.

This is followed by a description of each of the test conditions from the test reports. For each test condition, the following information is provided:

Number -- Test condition number that is assigned.

Testing Dates -- Date(s) of the test condition.

Condition Description -- Description of why the test was performed (typically a CoC, trial burn, or risk burn), and under what test conditions (for example maximum feedrates, minimum combustion chamber temperature, etc.).

Content -- Summarizes the technical scope of the test, including what emissions measurements and feedstream analyses were conducted.

3.3 Emissions Data Sheet

This sheet summarizes the stack gas emission results for the individual sources. Information for each test condition is presented in order of assigned condition number.

For each test condition, data are entered on an individual run basis, typically three runs per test condition. Data are first entered with the same units of measure as presented in the test report. This can include various different stack gas concentration units (ppmv, mg/dscm, sometimes corrected to 7% O_2), as well as mass emissions rates (lb/hr, g/hr, g/sec, etc.).

The second column of the sheet shows the units of the data. The third column specifies whether the gas concentration data are corrected to 7% O_2 (with either a “y” or “n”).

The next columns show the data by run. Non-detect measurements are indicated by an "nd" which is added to the column immediately to the left of each of the run data.

When data are presented in non-standard units (mass rates or non-standard concentrations), conversion calculations are made as necessary to transform all emissions to common units of concentrations -- PM in gr/dscf; HCl, Cl_2, and total chlorine in ppmv; CO and HC in ppmv; and metals in ug/dscm -- all corrected to 7% O_2.

Note the following issues for each of the pollutant types.

- PM -- Usually reported and entered as front-half capture data, as per EPA Method 5. Sometimes both front-half and total capture are reported. This is noted and entered. Soot blowing corrected average is entered in the average column when soot blowing is used and the soot blowing correction procedure is used by the source to calculate a corrected daily emission average. Also soot blowing corrected averages are used for metals as appropriately reported.

- HCl and Cl_2 -- HCl and Cl_2 gas concentration data are entered. Total chlorine is calculated as HCl + 2*Cl_2, where both are in ppmv.

- CO, HC – Both test run averages ("RA") and maximum hourly rolling averages ("MHRA") are entered as available. HC is reported as propane.

- Metals -- Data for CAA and BIF metals emission values are entered as available. The Cd and Pb concentrations are added together for calculating the SVM concentration and the As, Be, and Cr concentrations are summed for calculating the LVM concentration. Emissions values are considered at the full non detect level for all calculations.

- Principal Organic Hazardous Constituent (POHC) and DRE -- For each POHC type tested in trial burns, the DRE % is entered, and usually the POHC feedrate and/or POHC emission rate are entered as well.

- Sampling train information -- Stack gas flowrate (dscfm), oxygen (% dry volume), moisture (%), and gas temperature (°F) are provided for each of the different manual isokinetic sampling methods. These are used for normalization of stack gas emissions and calculation of feedrate Maximum Theoretical Emission Concentrations (MTEC), as discussed in the next section below.

3.4 Feedstream Data Sheet

This sheet summarizes the characteristics of all feedstreams to the system during each test condition. As available, contributions from all the different feedstreams are shown, including different hazardous waste streams, spiking streams, non-hazardous waste streams, and any other auxiliary fuel or feedstreams such as process gases, natural gas, fuel oil, or coal.

The characteristics of each different feedstream are shown in separate columns. Information for each test condition is presented in order of assigned condition number.

Characteristics include total feedstream feedrate, as well as ash, chlorine, and metals content, and feedstream thermal and physical properties -- such as heating value, viscosity, and density -- as available.

Firing rates (in million Btu/hr) are calculated based on feedrates and heating value. Total firing rates are also estimated using a conventional "F-factor" approach (as commonly done for conversation of stack gas concentration measurements to emissions factors for compliance purposes for fuel fired boilers). An F-factor of 9,000 dscf (at 0% O_2) / MMBtu heat input is used. Estimated firing rates are compared with firing rates based on reported feedstreams. Heat input from non-waste feedstreams that are not accounted for in the test report are determined based on the difference between estimated and reported firing rate levels.

Maximum theoretical emissions concentrations (MTECs) are calculated for ash, chlorine, and metals for each different feedstream. As the name implies, MTECs represent emission levels on the assumption that feed constituents are completely discharged in the stack exhaust without any loss or partitioning within the combustor system. MTECs are calculated by dividing the constituent mass feed rate by the stack gas flowrate, as measured by a manual method sampling system, to produce normal units of concentration, corrected to 7% O_2. In cases where multiple stack gas flowrates are simultaneously measured during the same condition from more than one stack gas sampling train, the flow rate from the sampling train that is conducted during the longest time duration is used to calculate the MTECs. This convention has little impact on the value of the MTECs because the stack gas flowrates from different trains over the same test condition are very similar.

Non detects are used at the full reported detection limit.

Tier I feedrates limits (for metals and chlorine as appropriate) are also tabulated at the bottom of the feedstream sheet where found in the test reports.

3.5 Process Data Sheet

This sheet includes a listing of all the reported non-feedrate related process operating data for each test condition. The process data normally include permit operating parameters, such as combustion temperature, steam production rates, production rates, and APCS operating data -- such as for baghouses: inlet temperature and pressure drop; for ESPs: inlet temperature and power input; and for scrubbers: pressure drop, pH, L/G ratio, and some measure of blowdown. Individual run and/or condition averages are presented, and sometimes maximum (or minimum) hourly rolling averages are shown.

3.6 PCDD/PCDF Sheets

A separate sheet is used to present the PCDD/PCDF emission data due to the relative complexity involved in processing data on 25 individual congeners/isomers and calculating the normal units in toxic equivalents (TEQs) and total PCDD/PCDF. The TEQ and total PCDD/PCDF values are calculated from raw test report data from the analytical and sampling results by individual run, as available. TEQ values are calculated by run using the International

(I-TEQ) risk-weighting system for each congener and isomer. Total PCDD/PCDF values are also determined without the TEQ risk-weighting factors as available. Separate sheets are used for each different test condition for which PCDD/PCDF data are available.

Non detects are considered at the full detection limit.

3.7 Sources That Did Not Make It Into the Access Data Base

Data from compliance test reports from four combustion systems are included in the individual Excel files, but are not included in the Access data base or in the MACT floor analyses. These test reports were received after the Access data base cutoff date. The four sources include:

- ID No. 3034, Shell, Deer Park, TX (Liquid Fuel Boiler)
- ID No. 3034, Bostik, Middleton, MA (Liquid Fuel Boiler)
- ID No. 3036, Burroughs Wellcome, Greenville, SC (Incinerator)
- ID No. 3037, Burroughs Wellcome, Greenville, SC (Incinerator)

Preliminary investigation indicates that the use of data from these sources will not impact the MACT floor analyses.

4.0 Data Summary Sheets

The data summary sheets comprise a set of 36 Excel (and Lotus compatible) spreadsheets. Each spreadsheet contains a summary of data for each different HAP (or HAP surrogate) and source category. There are individual data sheets, grouped separately, for 6 HAPs (PM, PCDD/PCDF, Hg, SVM, LVM, and HCl/Cl_2), and for each of the 6 source categories (incinerators, cement kilns, lightweight aggregate kilns, solid fuel boilers, liquid fuel boilers, and HCl production furnaces). See Table 4-1 for a list of the file names and contents. For example, the summary data sheet named "inc-svm.xls" contains all semi-volatile metals data from incinerators; sheet "lwak-hg.xls" contains all mercury data from lightweight aggregate kilns; etc. Although MACT standards are being established for CO/HC and DRE, data summary sheets are not provided. The files are contained in Appendix C.

The spreadsheets all have the same general arrangement and format. Each row contains information related to a specific test condition. Test conditions are grouped together for each source, and within each source are ordered by date, starting at the top with the most recent.

For each test condition, information includes, moving across columns from left to right:

Column Number	Information
1	Source ID Number
2	Condition ID Number
3	Facility Name
4	City

Combustor Information

5	Combustor Category
6	Combustor Class
7	Combustor Type
8	APCS Detailed Acronym
9	Dry vs Wet APCS
10	Waste Heat Boiler
11	Short Kiln
12	ILRM Status
13	Hazardous Wastes
14	Liquid Hazardous Wastes
15	Munitions Popping Furnace
16	Chemical Weapons Demil
17	Mixed Radioactive Waste
18	Commercial vs Onsite
19	Government

Condition Information

20	Condition Date
21	Condition Description
22-24	Feedrate Spiking
25-27	BIF Tier Status
28	Dry APCD Temperature
29	Sootblow Run Number

Stack Gas Concentration

30	Stack Gas Emission Campaign Number
31	Stack Gas Emission Rating
32	Stack Gas Emission Rating Comments
	Stack Gas Levels
33-54	By Runs (Run 1 through Run 11, non-detect %, value)
55-56	Sootblowing Run
57-58	Condition Average
59-60	Condition Average of Runs Without Sootblowing Run

SRE

61	SRE Campaign Number
62	SRE Rating
63	SRE Rating Comments
	SRE Results
64-79	By Runs (Run 1 through Run 8)
80-81	Sootblowing Run
82-83	Condition Average
84-85	Condition Average of Runs Without Sootblowing Run
	SRE Results Adjusted for Ranking Purposes
86-101	By Runs (Run1 through Run 8)
102-103	Sootblowing Run
104-105	Condition Average
106-107	Condition Average of Runs Without Sootblowing Run

Feedrate MTECs

	By Feedstream, Condition Averages
108	Hazardous Waste
109	Spike
110	Raw Material
111	Coal
112	Miscellaneous
113	Total

Total Feedrate

114-135	By Runs (Run 1 through Run 11)
136-137	Sootblowing Run
138-139	Condition Average

Waste + Spike

140-145	By Runs (Run 1 through Run 3)
146-147	Sootblowing Run
148-149	Condition Average

Total Thermal Feedrate, Condition Average

150	Hazardous Waste
151	Coal
152	Miscellaneous
153	Total
154	Estimated Total

HAP Thermal Emissions

155	Thermal Emission Campaign Number
156	Thermal Emission Rating
157	Thermal Emission Rating Comments

Thermal Emissions from Hazardous Waste

158-179	By Runs (Run 1 through Run 6)
180-181	Sootblowing Run
182-183	Condition Average

HAP in Hazardous Waste, Thermal Feedrates

184-205	By Runs (Run 1 through Run 6)
206-207	Sootblowing Run
208-209	Condition Average

Table 4-1. Data Summary Sheet File Name Listing

HWC Category	D/F	PM	Hg	SVM	LVM	Chlorine
Incinerator	inc-d&f.xls	inc-pm.xls	inc-hg.xls	inc-svm.xls	inc-lvm.xls	inc-cl.xls
Cement Kiln	ck-d&f.xls	ck-pm.xls	ck-hg.xls	ck-svm.xls	ck-lvm.xls	ck-cl.xls
Lightweight Aggregate Kiln	lwak-d&f.xls	lwak-pm.xls	lwak-hg.xls	lwak-svm.xls	lwak-lvm.xls	lwak-cl.xls
Liquid Fuel Boiler	lfb-d&f.xls	lfb-pm.xls	lfb-hg.xls	lfb-svm.xls	lfb-lvm.xls	lfb-cl.xls
Solid Fuel Boiler	sfb-d&f.xls	sfb-pm.xls	sfb-hg.xls	sfb-svm.xls	sfb-lvm.xls	sfb-cl.xls
HCl Production Furnace	hcl-d&f.xls	hcl-pm.xls	hcl-hg.xls	hcl-svm.xls	hcl-lvm.xls	hcl-cl.xls

Appendix A – Access Data Base

Appendix B – Individual Source Data Files

Appendix C – Data Summary Sheets

Find on the EPA/OSW hazardous waste combustion web site and other parts of the proposed replacement rule docket

Appendix D. Data Base Quality Assurance and Quality Control Plan

Quality assurance is an integrated system of management activities which involves planning, standard operating procedures, training, work performance, quality assessment, and quality improvement to ensure that the end product meets all stated levels of confidence. Quality assurance encompasses the organization within which quality control activities are performed. Such is the philosophy and practice involved in developing the Phase I and Phase II data bases.

From experience in developing the previous Phase I and Phase II data bases, we recognize that processing mistakes and inaccuracies can and do occur. To create safeguards against missed data, incorrect data interpretation, and data entry errors, we recognize the need to be *proactive and reactive* in building collective, comprehensive QA measures: proactive in the sense of establishing concrete planning procedures and performance guidelines prior to work initiation; reactive in the sense of being sensitive and responsive to inadvertent and systematic shortcomings. An important key step is to build in quality review measures and to identify and implement improvements to the systematic processing of the reported data.

To enhance quality assurance in developing the data bases, we followed the following philosophy and procedures:

Quality Assurance Philosophy

Quality work is produced from personnel with:

- Clear understanding of the purpose of the work and overall project objectives.
- Clear understanding of the data base contents and requirements.
- Background in HWC design and operation, APCS operations, environmental testing programs, measurement methods, and MACT rulemaking.
- Sense of pride/purpose in work.
- Organization and attention to detail.

Data Base Design

- Simplify data base design to the degree possible.
- Make data base fields and structure self-explanatory to the degree possible.
- Minimize/eliminate redundant data entry requirements.

1. Capitalize on opportunity for data base design evolution; after initial utilization, perform

critical review and evaluation of the design limitations, then identify and implement improvements.

Data Entry Personnel Training

- Understand purpose of the data base.

- Review results of previously processed test reports.

- Review contents and fields of the data base.

- Process a report. Have work reviewed by experienced personnel to provide feedback on quality. Continue this feedback process sequence until report processing is of highest quality.

Test Report Review Procedures

- Before data entry, review report to identify:

  -- Number of different sources for which stack gas testing is performed.

  -- Unit design and operation, including combustor type, APCS, waste types, and operating characteristics.

  -- Number of different test conditions tested, and purposes of each test condition.

  -- Measurements taken -- stack gas measurements, feedstream and other process operating measurements.

  -- Report organization -- extent and location of key data tables and corresponding descriptions of test conduct and any technical problems with process operations, sampling, or sample analysis.

- Assign unit ID No. to each different combustor.

Data Entry Procedures / Guideline

- Philosophy

  -- Emphasize prevention of data errors by entering correctly the first time.
  -- Minimize/eliminate redundant data entry requirements by maximizing cell linkages

- Enter all pertinent data regardless if incomplete at the time to avoid possible data bias.

Make a note of incomplete data, and attempt to request what is missing. Fill in later as additional data is received. Omit incomplete data in analysis as necessary.

- Enter data exactly as reported in test report to ensure data traceability / data origin and to facilitate review.

- Enter data in preferred final units -- stack gas concentrations corrected to 7% O_2 -- when available in the test report as a first choice. Enter data in other units (e.g., mass emissions rates (lb/hr)) when it is only available in these units.

- Enter data on a run-by-run basis for each test condition.

- Enter all available non-feedrate related process information that can be used to characterize the tested operating conditions.

Data Evaluation

- Identify and double check apparent outliers through evaluation of data:

  -- Compare three runs at the same test condition.

  -- Compare data within similar type of units.

  -- Compare data with that expected from engineering judgement.

- Second party review of selected test report and data base entries to identify missed data, incorrect data interpretation, and data entry errors.

- Random or systematic spot checks.

Data Changes

- Document all changes (dates and person making change) to data base.

Appendix E

Response to Comments Document for

Data Base for Hazardous Waste Combustors (Final Replacement Standards and Phase II)

Notice of Data Availability (67 FR 44452)

Released on July 2, 2002

U.S. Environmental Protection Agency
Office of Solid Waste
1200 Pennsylvania Avenue, NW
Washington, DC 20460

March 2004

Acknowledgment

This document was prepared by EPA's Office of Solid Waste, Hazardous Waste Minimization and Management Division. EERGC Corporation provided technical support under EPA Contract No. 68-W-01-024.

Contents

Introduction

The United States Environmental Protection Agency (EPA) has assembled a data base for developing "Maximum Achievable Control Technology" (MACT) standards for hazardous waste combustors: hazardous waste burning incinerators, cement kilns, lightweight aggregate kilns, boilers, and hydrochloric acid production furnaces.

The MACT standards for the "Phase I" hazardous waste combustors -- incinerators, cement kilns, and lightweight aggregate kilns -- will replace the interim standards promulgated for these sources on February 13 and 14, 2002 (67 FR 6792 and 67 FR 6968). The MACT standards for the "Phase II" hazardous waste combustors -- boilers and hydrochloric acid production furnaces -- are being proposed (and promulgated) on the same schedule as the replacement Phase I standards.

The hazardous waste combustor (HWC) data base was released for comment in a "Notice of Data Availability" on July 2, 2002 (67 FR 44452). Comments on the NODA data base were received from 52 stakeholders:

ID No.	Commenter Name
4 - 13	Reilly Industries
14	Mallinckrodt Inc.
15 - 18	Eli Lilly and Comp
19	DSM Pharmaceuticals, Inc.
20	Glaxo Smith Kline
21	ATOFina Petrochemicals, Inc.
22	Bostik Findley, Inc.
23 - 24	BASF Corp
25	Nutra Sweet Comp
26	Environmental Technology Council
27	Eastman Chemical Comp
28	Celanese Chemicals
29	Rubicon, INc.
30	General Electric Comp
31	GE Plastics Mt Vernon, Inc.
32	CIBA Specialty Chemicals Corp
33	OXY Vinyls, Inc.
34	Rhodia, Inc.
35	Eli Lilly and Company
36	Coalition for Responsible Waste Incineration (CRWI)
37	American Chemistry Council (ACC)
38	Eastman Kodak Company
39	Rhom and Haas Texas Inc.
40	Continental Cement Comp
41	Occidental Chemical Corp

42 United States Department of Energy
43 Lafarge North America
44 United States Department of the Army
45 Sunoco, Inc.
46 Rohm and Haas Company
47 Solite Corp
48 Merck and Company, Inc.
49 Dow Chemical Comp
50 Washington Demilitarization Comp
51 Chemical Waste Management, Inc.
52 Cement Kiln Recycling Coalition (CKRC)

This document contains responses to the comments that were received. It is organized by commenter ID No., as shown above.

Each comment response section is divided into the same format. First, the general contents of the comments are summarized. Next, general responses by EPA are included. This is followed by the actual commenter comments, provided to the degree reasonably possible. Many of the comments were provided in Excel spreadsheet format and handwritten notes on Excel spreadsheets. These comments are not provided in this document, but can be obtained directly from the EPA NODA docket. EPA responses to specific issues are added within the actual comments where appropriate, and specifically where EPA did not agree with the comments, or felt a response was necessary. EPA responses are highlighted in blue underlined text.

Comments from the 52 stakeholders were focused primarily on the accuracy and content of the data base. Many comments were minor changes – where a change in the value was less than 10%, and usually less than 5%. In these cases, EPA simply made the change as requested.

In cases where the requested change was more significant, EPA confirmed that the change was appropriate based on supporting information provided by the commenter, and/or test report information in the EPA files.

For the majority of the changes where EPA agreed with the commenters requested change, no response is provided by the EPA -- other than the general comment initial response that "most changes are made as requested".

All changes that were made in the data base are documented in the revised HWC Data Base, which is contained in: (1) an "Access" platform data base format, (2) individual Excel spreadsheet format, and (3) "data summary sheet" format. The revised data bases are provided as part of the background supporting information of the proposed Replacement HWC MACT Rule.

Comment ID No. 5 – Reilly Industries

Comment Summary – Comments provided on the data for Reilly boiler ID Nos. 735, 737, and 738 (also contained in the following comment ID Nos. 4, and 6-13). Commenter suggests that SREs should not be included in the database from units without air pollution control devices. Also commenter does not understand the boiler class acronyms "OIB" and "OSIB" used in the data summary sheets.

Comment Response – SREs continue to be calculated and shown in the data base for all units regardless of the use of air pollution control device. SREs can be used as an indicator of the accuracy of feedrate and emissions measurements. For example, negative SREs indicate inaccuracies in the feedrate and/or emissions measurements, or may be a result of non-detect measurements. Likewise, very high SREs for systems without air pollution control devices likely indicate similar inaccuracies. The subsequent use of SREs will consider these concerns – for example, setting negative SREs to zero; setting all SREs from units without air pollution control devices to zero; etc. See the proposed Replacement HWC MACT Rule background documents and preamble for a more detailed discussion on the use and treatment of SREs when evaluating the HWC MACT standards.

The boiler class acronyms of "OIB" and "OSIB" are used to identify "on-site" boilers – those that treat hazardous waste that was generated at the same site which the boiler hazardous waste combustion takes place (or from the same company) – and specifically excluding "commercial" units which charge a tipping fee for waste treatment and/or burn wastes that were not generated at the site of the combustor or by the company that operates the combustor. The explanation of these acronyms was inadvertently not included in the NODA data base background support document. There will be further opportunity to comment on the data base contents and its use in the upcoming proposed Replacement HWC MACT Rule, which will be based on the revised HWC data base.

Comment ID No. 5 – Reilly Industries

Docket ID No. RCRA-2002-0019
Environmental Protection Agency
Notice of Data Availability Comments
NESHAP: Standards for Hazardous Air Pollutants for Hazardous Waste Combustors
(Final Replacement Standards and Phase II)

Reilly Industries, Inc.
1500 South Tibbs Avenue
Indianapolis, Indiana 46241
EPA ID No. IND 000 807 107

Facility Contact: John Jones, P.E.
Telephone: (317) 248-6427

Reilly Industries, Inc. (hereafter, Reilly) hereby submits comments on the HWC MACT Phase II Database for the three (3) hazardous waste combustion devices located at the Indianapolis, Indiana facility. The three (3) devices have assigned source identification numbers in the database of 735 (Boiler 70K), 737 (Boiler 30K), and 738 (Boiler 28K). Reilly is submitting comments on the Individual Source Summary Sheets for sources 735, 737, and 738. Reilly is also submitting comments on each of the six Pollutant Summary Sheets (i.e., chlorine, particulate matter, dioxins/furans, mercury, semivolatile metals, and low volatile metals).

In addition to the attached comments, Reilly has two general comments related to the accuracy of the database. These two comments relate to the system removal efficiency (SRE) calculations for chlorine and particulate matter (PM) and the "Boiler Class" designations.

Reilly noted during the review of the chlorine and PM Pollutant Summary Sheets that a SRE was calculated for our sources. Reilly's sources do not have any type of air pollution control device installed. SRE's for chlorine and PM are typically calculated for units that have air pollution control devices installed for the express purpose of removing these types of pollutants. Therefore, Reilly believes that the inclusion of SRE's for sources that do not have control devices results in the incorporation of inaccurate data into the database. A review of the database reveals that some of the calculated SRE's for units without control devices provide negative results. Such results may be due to the differences between sampling and analysis methods used to determine feed rates and emission rates. As such, calculating SRE's for uncontrolled units may not be an accurate use of the database. Using SRE's as a comparison tool between controlled and uncontrolled units would not be an accurate use of the database. Therefore, Reilly recommends the removal of SRE information for all units that do not have control devices.

The EPA has also included a "Boiler Class" designation in the Pollutant Summary Sheets. Reilly's sources have been assigned a classification of either OIB or OSIB depending on the particular summary sheet. These designations have not been defined by the EPA and, therefore, cannot be reviewed for accuracy by Reilly. Reilly surmises that the "Boiler Class" designations are an attempt by EPA to subcategorize sources in anticipation of doing such in the finalized standards. Without defining the classification methodology, Reilly cannot confirm or deny the designation and, therefore, inaccuracies can be introduced into the database. Perhaps the EPA is attempting to classify boilers by the type of fuel that is burned (e.g., top ends, bottom residues, etc.), the type and number of other feed streams to the unit (e.g., non-hazardous wastes, high viscosity, etc.), or the applicability of other exemptions (e.g., low risk waste, comparable fuels, etc.). Therefore, due to an inability to review the classifications for our sources, Reilly is requesting that the EPA provide another NODA to allow Reilly the opportunity to verify that the assigned classifications are accurate.

Reilly appreciates the opportunity to provide comments to the EPA on this very important basis for future regulations. If you have any questions related to our comments, please contact Mr. John Jones, P.E. at (317) 248-6427.

Comment ID No. 4 – Reilly Industries

Comment Summary – Provided comments on the data for Reilly boiler ID No. 735.

Comment Response – Made most of the requested changes to the data base. See added blue underlined text for cases where changes were not made.

Comment ID No. 4 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Boiler 70K
ID No. 735

Comment 1
Conditions Spreadsheet, 735C7 Testing Dates – This test date should be May 22, 2000 instead of May 23, 2000.

Comment 2
Emissions Spreadsheet, Condition 1 – The Chromium (+6) values for Run 1, Run 2, and Run 3 should be 0.4536 g/hr, 0.4536 g/hr, and 0.4536 g/hr, respectively. The HCl and Cl_2 Condition Average values should be 3265 g/hr and 0.454 g/hr, respectively. NOTE: The Chromium (+6) (g/hr), HCl (g/hr), and Cl_2 (g/hr) Condition Average values are sootblow corrected values and are not a straight average of the values for the three test runs. Therefore, the Condition Average Chromium (+6) (ug/dscm), HCl (ppmv), and Cl_2 (ppmv) values should be calculated using the sootblow corrected values instead of averaging the three run values. In addition, the Total Chlorine Condition Average value (ppmv) should be calculated using the HCl (ppmv) and Cl_2 (ppmv) Condition Average values instead of averaging the three run values.

Comment 3
Emissions Spreadsheet, Condition 3 – The Run 2 HC (RA) value with units of ppmv, corrected to 7% O_2, should be a non-detect (i.e., nd) value.

> EPA appreciates noting that the HC reading was apparently reported as “non-detect”, but will continue to consider it as detected. HC measurements using the standard CEMS Flame Ionization Detection method are not conventionally reported as “non-detect”. CEMS sensitivity is adjusted (full scale span range is reduced) so that real quantitative measurements can be made. Also CEMS readings over a 3 hour period are very unlikely to be “non-detect”. Because non-detects are considered in the revised data base at full detection limit, this issue is not important. EPA does acknowledge that this measurement (and likely other HC CEMS measurements at similar levels) are potentially at the lower end of the sensitivity of typical HC FIDs used in practice.

Comment 4

Emissions Spreadsheet, Condition 6 – Run 2 of this test was aborted due to a failed leak check. Therefore, the second set of data was actually collected during Run 3. Also, a sootblow event occurred during Run 3 of the test. The Chromium (+6) (ug/dscm) Condition Average value is a sootblow corrected value and should be input as 87.61 ug/dscm based on the test report value of 2.30 g/hr. Therefore, the Condition Average value corrected to 7% O_2 should use the sootblow corrected value instead of the average of the two run values. The revised Condition Average Chromium (+6) (ug/dscm at 7% O_2) value should be 66.30 instead of 77.7.

<u>Comment 5</u>

Feedstream Spreadsheet, Condition 735C1, Feed Rates – For the Spike Streams, the average chromium value is not calculated but is input at 2.500. The calculated and correct value is 2.425.

<u>Comment 6</u>

Feedstream Spreadsheet, Condition 735C1, Feedrate MTEC Calculations – The Waste Fuel Condition Average value for mercury is not calculated correctly using one-half the detection limit and should be 1.07 instead of 1.5. Due to this calculation error, the Mercury Run 1 Total and Total Condition Average values are calculated incorrectly and should be 0.75 and 1.01, respectively, instead of 1.4 and 1.3. The Waste Fuel Condition Average values for SVM and LVM are not calculated correctly using one-half the detection limit and should be 4.0 and 20.7, respectively, instead of 3.5 and 23.4.

<u>Comment 7</u>

Feedstream Spreadsheet, Condition 735C3, Feed Rates – The Waste Fuel Condition Average values are either input values and not calculated values or have been rounded prior to averaging resulting in errors. Also, the Waste Fuel Condition Average value for Mercury (g/hr) is not calculated correctly using one-half the detection limit resulting in the MTEC value being calculated incorrectly. The City Gas Heat Content value is entered as 23,350 and should be 21,214. In addition, the Spike Streams Condition Average values are input values and not calculated values resulting in errors for Antimony, Beryllium, Cadmium, and Mercury.

> <u>No changes were made to the waste and spike feedrates in the data base. The NODA data base values appear consistent with those reported in the CoC forms. It is not clear what changes the commenter was requesting.</u>

<u>Comment 8</u>

Feedstream Spreadsheet, Condition 735C3, Feedrate MTEC Calculations – All the LVM values for the Spike Streams were not calculated correctly using one-half the detection limit. Therefore, the Total LVM (ug/dscm) values for each run and the Test Condition Average (ug/dscm) value are not correct. In addition, the Run 1 Total Mercury (ug/dscm) value is not calculated correctly using one-half the detection limit. Therefore, the Run 1 Total (ug/dscm) value should be 2.7 instead of 1.4 and the Test Condition Average (ug/dscm) value should be 1.63 instead of 1.2.

Comment 9

Feedstream Spreadsheet, Condition 735C4, Feed Rates – The Waste Fuel Condition Average values are input values and not calculated values resulting in errors to the Feed Rate, Density, and Heat Content values. The Natural Gas Heat Content value should be 21,214 instead of 23,350.

Comment 10

The "BIF Feedrate Limits" should be changed to "BIF Adjusted Tier I Feedrate Limits".

Comment 11

PCDDF Spreadsheet, Test Dates October 21-23, 1999 – The Run 1 TEQ (ng/dscm) value for 1,2,3,7,8,9-HxCDD should be 2.70E-04 instead of 2.70E-03. The corresponding value at ½ ND should be 1.35E-04 instead of 1.35E-03. The Total TEQ value for Run 1 should be 0.0032 instead of 0.0044. Also, the Condition Average value should be 0.0031 instead of 0.0035.

> The "Summary2" sheets in the individual source spreadsheets are not being updated because they will not be used in the future, as noted in the Data Base NODA background document. In the data base released in the NODA there was no attempt to update and standardize the Summary2 sheets, and the Data Base NODA specifically asked not to comment on or review the Summary2 sheets. Nonetheless, specific errors in the data that are noted from review of the Summary2 sheets by commenters will be made to the data base as required.

Comment 12

Summary2 Spreadsheet, Heat Input Rate – The "Other" Heat Input Rate for 735C1 is not linked to the correct cell and should be 28.5. The "Other" Heat Input Rate for 735C3 and 735C4 should be automatically corrected based on previous comments.

Comment 13

Summary2 Spreadsheet, HCl, Cl_2, and TCl Stack Gas Emissions – The HCl (ppmv), Cl_2 (ppmv), and TCl (ppmv) values for 735C1 were not included and should be 77.0, 0.02, and 77.1, respectively. The Baseline values should be changed accordingly because chlorine spiking occurred during 735C1 and did not occur during any of the subsequent tests.

Comment 14

Summary2 Spreadsheet, D/F TEQ Stack Gas Emissions – The value for 735C3 should be automatically corrected based on previous comments.

Comment 15

Summary2 Spreadsheet, Feedrate Characteristics – This section contained many errors. In general, there are many errors associated with using one-half the detection limit for non-detectable quantities. There were numerous errors with the % Spike and % ND calculations. The Baseline values for SVM, LVM, and TCl did not use the worst case result. This is of particular importance for TCl where spiking of chlorine occurred during 735C1 and not during other testing. Also, the TCl section does not have a column for % ND.

Comment 16

Summary2 Spreadsheet, Stack Gas Conditions – The Stack Gas Flowrate for 735C1 was not linked correctly and should be 12,874. The Stack Gas Temperature for 735C6 and 735C7 were also not linked correctly and should be 613.5 and 514.3, respectively.

Comment 17

Summary2 Spreadsheet, Individual Metal Feedrates – It appears that this entire section is not being used because the ug/dscm links go to cells that contain no data. It is suggested that this section be deleted from the spreadsheet.

Comment ID No. 6 – Reilly Industries

Comment Summary – Provided comments on the data for Reilly boiler ID No. 737, as shown below.

Comment Response – Made changes as requested to most of the comments. See added blue underlined text for cases where changes were not made.

Comment ID No. 6 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Boiler 30K
ID No. 737

Comment 1
Emissions Spreadsheet, Condition 1 – The Condition Average Chromium (+6) (g/hr), HCl (g/hr), and Cl_2 (g/hr) values are sootblow corrected values and are not a straight average of the values for the three test runs. Therefore, the Condition Average Chromium (+6) (ug/dscm), HCl (ppmv), and Cl_2 (ppmv) values should be calculated using the sootblow corrected values instead of averaging the three run values. In addition, the Total Chlorine Condition Average value (ppmv) should be calculated using the HCl (ppmv) and Cl_2 (ppmv) Condition Average values instead of averaging the three run values.

Comment 2
Emissions Spreadsheet, Condition 3 – The Condition Average O_2 value is not calculated correctly and should be 4.6 instead of 3.97. Also, the Run 3 Stack Gas Temperature value should be 676 instead of 674.

Comment 3
Emissions Spreadsheet, Condition 4 – The Condition Average O_2 value is not calculated correctly and should be 6.87 instead of 6.95.

Comment 4
Emissions Spreadsheet, Condition 5 – The Run 2 POHC Feedrate value should be 9496 instead of 9456.

Comment 5
Feedstream Spreadsheet, Condition 737C1, Feedrate MTEC Calculations – The Waste Fuel Run 1 SVM and LVM values are not calculated correctly using one-half the detection limit. Also, the Run 1 City Gas SVM value is not calculated correctly using one-half the detection limit. Due to these errors, the Waste Fuel Condition Average, City Gas Condition Average, Run 1 Total, and Condition Average Total values are calculated incorrectly.

Comment 6

Feedstream Spreadsheet, Condition 737C4 – The waste fuel feed rate for Run 1 should be 272.6 instead of 372.6.

Comment 7
Feedstream Spreadsheet – The "BIF Tier I Feedrate Limit" should be changed to the "BIF Adjusted Tier I Feedrate Limits".

Comment 8
Summary2 Spreadsheet, Heat Input Rate – The "Other" Heat Input Rates for 737C3 and 737C4 are incorrect and should be 4.7 and 6.6, respectively.

Comment 9
Summary2 Spreadsheet, D/F TEQ – The value for 737C3 is linked to the wrong cell of the PCDDF worksheet and needs to be corrected.

Comment 10
Summary2 Spreadsheet, CO Values – The CO MHRA value for 737C2 is actually a CO RA value and should be moved to the appropriate column. The CO MHRA and RA values for 737C3 are linked to the wrong cells and should be 1.29 and 0.81, respectively, instead of 0.8 and 0.03.

Comment 11
Summary2 Spreadsheet, DRE Values – The maximum and minimum DRE values for 737C4 are reversed.

Comment 12
Summary2 Spreadsheet, Feedrate Characteristics – The errors with the SVM and LVM values for 737C1 should automatically be corrected based on previous comments. There are errors with the % Spike and % ND calculations. The Baseline values for SVM and TCl did not use the worst case result. This is of particular importance for TCl where spiking of chlorine occurred for 737C1 and not during other testing. Also, the TCl and Ash sections do not have columns for % ND.

Comment 13
Summary2 Spreadsheet, Stack Gas Conditions – The errors with the O_2 values for 737C3 and 737C4 should automatically be corrected based on previous comments. The stack gas temperatures for 737C3, 737C4, and 737C5 should be 664, 422, and 467, respectively.

Comment 14
Summary2 Spreadsheet, Individual Metal Feedrates – It appears that this entire section is not being used because the ug/dscm links go to cells that contain no data. It is suggested that this section be deleted from the spreadsheet.

Comment ID No. 7 – Reilly Industries

Comment Summary – Provided comments on accuracy of the data for Reilly boiler ID No. 738, as shown below.

Comment Response – Made most of the changes as requested. See added blue underlined text for cases where changes were not made.

Comment ID No. 7 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Boiler 28K
ID No. 738

Comment 1
Emissions Spreadsheet, Condition 1 – The CO (RA) values are incorrect and should be 16.31, 10.47, 9.50, and 12.09 for Run 1, Run 2, Run 3, and Condition Average, respectively.

No change made; NODA data base is consistent with CoC forms.

The Chromium (+6) Condition Average value should be 0.1654 g/hr. The HCl Condition Average value should be 0.719 g/hr. The Cl_2 Condition Average value should be 0.830 g/hr. NOTE: The Chromium (+6) (g/hr), HCl (g/hr), and Cl_2 (g/hr) Condition Average values are sootblow corrected values and are not a straight average of the values for the three test runs. Therefore, the Condition Average Chromium (+6) (ug/dscm), HCl (ppmv), and Cl_2 (ppmv) values should be calculated using the sootblow corrected values instead of averaging the three run values. In addition, the Total Chlorine Condition Average value (ppmv) should be calculated using the HCl (ppmv) and Cl_2 (ppmv) Condition Average values instead of averaging the three run values. Furthermore, the HCl (g/hr) value for Run 2 and the Cl_2 (g/hr) value for Run 3 are non-detect (i.e., nd) data points, and should be indicated as such.

The Stack Gas Flowrate values are incorrect and should be 8039, 8034, 8188, and 8087 for Run 1, Run 2, Run 3, and Condition Average, respectively. The O_2 values should be 5.4, 5.4, 5.7, and 5.5 for Run 1, Run 2, Run 3, and Condition Average, respectively. The temperature values should be 541, 434, 441, and 472 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 2
Feedstream Spreadsheet, Condition 738C1, Feedstream Description – The Waste Fuel Condition Average values for Ash and Chlorine are input values and should be 1168.3 g/hr and 307.6 g/hr, respectively, instead of 1201.3 g/hr and 238.7 g/hr. The City Gas Heat Content is 21,214 and should be used to calculate the Thermal Feedrate contribution from the City Gas. The Cadmium value for the Spike on Run 2 was a detectable quantity. Therefore, the “nd” needs to be deleted. The Spike Condition Average values for Ash and Chlorine are

input values and should be 1246.0 g/hr and 372.74 g/hr, respectively, instead of 1244.0 g/hr and 364.0 g/hr.

Comment 3
Feedstream Spreadsheet, Condition 738C1, Stack Gas Flow and Thermal Feedrates – The Stack Gas Flowrate and O_2 values should be automatically corrected based on previous discussions. The Total Thermal Feedrate values should be automatically corrected for Run 1, Run 2, Run 3, and Condition Average based on the revised City Gas Heat Content value.

Comment 4
Feedstream Spreadsheet, Condition 738C1, MTEC Calculations – As noted above, the Cadmium value for the Spike on Run 2 was a detectable quantity. Therefore, the "nd" needs to be deleted and the SVM calculations for the Spike Run 2, Condition Average, Total Run 2, and Total Condition Average need to be corrected.

Comment 5
Feedstream Spreadsheet – The BIF Adjusted Tier I Feedrate Limits were not included. The Adjusted Tier I Feedrate Limits for Boiler 28K are as follows:

Antimony – 334 g/hr
Arsenic – 2.56 g/hr
Barium – 55,577 g/hr
Beryllium – 4.67 g/hr
Cadmium – 6.23 g/hr
Chromium – 3.68 g/hr
Lead – 100 g/hr
Mercury – 334 g/hr
Silver – 3335 g/hr
Thallium – 556 g/hr
Total Chlorine – 4850 g/hr

Comment 6
Process Spreadsheet, Condition 738C1 – The Combustion Temperature and Steam Production Rate values presented are the maximum values for the test. The average values for Combustion Temperature and Steam Production Rate are 1620.0°F and 30,010 lb/hr, respectively.

Comment 7
Process Spreadsheet, Condition 738C2 – The Combustion Temperature and Steam Production Rate values presented are the minimum values for the test. The average values for Combustion Temperature and Steam Production Rate are 1151.1°F and 6700 lb/hr, respectively.

Comment 8

Summary 2 Spreadsheet – The incorporation of the above comments will automatically correct the values contained in the Summary 2 Spreadsheet with the exception of the following items. For TCl Feedrate, the data points for "Other" are non-detect quantities and, therefore, should be incorporated as one-half the detection limit. For Ash Feedrate in the "HW" column, the spike values are non-detect quantities and, therefore, should be incorporated as one-half the detection limit. Also, the TCl and Ash sections do not have columns for % ND.

Comment 9

Summary 2 Spreadsheet, Individual Metal Feedrates – It appears that this entire section is not being used because the ug/dscm links go to cells that contain no data. It is suggested that this section be deleted from the spreadsheet.

Comment ID No. 8– Reilly Industries

Comment Summary – Provided comments on the Chlorine Data Summary Sheet data for Reilly boilers.

Comment Response – Made most of the changes as requested. See added blue underlined text for cases where changes were not made.

Comment ID No. 8 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Chlorine Summary Spreadsheet

General Comments

Comment 1
Reilly has provided detailed comments for each of the boilers in a separate submittal. The following comments assume that database changes based on those comments will be incorporated into the Chlorine Summary Spreadsheet. Therefore, comments have not been included in this document related to items that Reilly has already provided comment (e.g., emission rates, feed rates, etc.).

Comment 2
The Chlorine Pollutant Summary Sheet includes a calculation of the System Removal Efficiency (SRE) based on MTEC feed rates and emissions. SRE's for chlorine are typically calculated for units that have air pollution control devices installed for the express purpose of removing this pollutant. Therefore, Reilly believes that the inclusion of SRE's for sources that do not have control devices results in the incorporation of inaccurate data into the database. Therefore, Reilly recommends the removal of SRE information for all units that do not have control devices.

Comment 3
The Chlorine Summary Spreadsheet contains a column titled "Boiler Class". For Reilly's Test Conditions, the "Boiler Class" column indicates "OSIB". A description of "Boiler Class" is not included in the HWC Data Base Report associated with the NODA. The acronym lists associated with the NODA do not contain a listing for "OSIB". Therefore, Reilly is not able to confirm or deny the information presented in this column. Perhaps the EPA is attempting to classify boilers by the type of fuel that is burned (e.g., top ends, bottom residues, etc.), the type and number of other feed streams to the unit (e.g., non-hazardous wastes, high viscosity, etc.), or the applicability of other exemptions (e.g., low risk waste, comparable fuels, etc.). Due to an inability to review this information, Reilly requests that the EPA provide another NODA to allow Reilly the opportunity to verify that the assigned classification is correct.

ID No. 735, Boiler 70K, Comments

Comment 1
Reilly agrees that Test Condition 735C1 should be classified as worst case due to the spiking of chlorine during the testing. Reilly also agrees with the classification of Test Condition 735C3 as normal because the feed rate of chlorine during this test was not maximized.

Comment 2
The Sootblow Status for Test Condition 735C1 should be Run 1.

Comment 3
The emission rates for the Condition Averages represented Sootblow Corrected results. The emission rates for the individual test runs were not corrected for the sootblow event. Therefore, the Sootblow Corrected Average for 735C1 should be marked "Yes".

Comment 4
The Tier Chlorine for 735C3 should be Adjusted Tier I.

ID No. 737, Boiler 30K, Comments

Comment 1
Reilly agrees that Test Condition 737C1 should be classified as worst case due to the spiking of chlorine during the testing. Reilly also agrees with the classification of Test Condition 735C3 as normal because the feed rate of chlorine during this test was not maximized.

Comment 2
The "Other" Heat Input Rate for Test Condition 737C3 should have a value of 4.7 MM Btu/hr.

Comment 3
The Sootblow Status for Test Condition 737C1 should be Run 2 and Run 4.

Comment 4
The emission rates for the Condition Averages represented Sootblow Corrected results. The emission rates for the individual test runs were not corrected for the sootblow event. Therefore, the Sootblow Corrected Average for 737C1 should be marked "Yes".

Comment 5
The Tier Chlorine for 737C3 should be Adjusted Tier I.

Comment 6
Test Condition 737C2 is listed in the "chlorine feed rate only, no stack gas emissions" section. During this test condition, neither feed stream nor stack gas measurements were taken for chlorine. Therefore, this Test Condition should not be included in the database.

Chlorine feedrate measurements are available from the CoC test report, and continue to be used as reported.

ID No. 738, Boiler 28K, Comments

Comment 1

Reilly agrees that Test Condition 738C1 should be classified as worst case due to the spiking of chlorine during the testing.

Comment 2

The "Other" Heat Input Rate for TC 738C1 should have a value of 7.7 MM Btu/hr.

Comment 3

The emission rates for the Condition Averages represented Sootblow Corrected results. The emission rates for the individual test runs were not corrected for the sootblow event. Therefore, the Sootblow Corrected Average for 738C1 should be marked "Yes".

Comment ID No. 9– Reilly Industries

Comment Summary – Provided comments on the PM Data Summary Sheet data for Reilly boilers.

Comment Response – Made most of the changes as requested. See added blue underlined text for cases where changes were not made.

Comment ID No. 9 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Particulate Matter Summary Spreadsheet

General Comments

Comment 1

Reilly has provided detailed comments for each of the boilers in a separate submittal. The following comments assume that database changes based on those comments will be incorporated into the Particulate Matter Summary Spreadsheet. Therefore, comments have not been included in this document related to items that Reilly has already provided comment (e.g., emission rates, feed rates, etc.).

Comment 2

The PM Pollutant Summary Sheet includes a calculation of the System Removal Efficiency (SRE) based on MTEC feed rates and emissions. SRE's for PM are typically calculated for units that have air pollution control devices installed for the express purpose of removing this pollutant. Therefore, Reilly believes that the inclusion of SRE's for sources that do not have control devices results in the incorporation of inaccurate data into the database. Therefore, Reilly recommends the removal of SRE information for all units that do not have control devices.

Comment 3

The Particulate Matter Summary Spreadsheet contains a column titled "Boiler Class". For Reilly's Test Conditions, the "Boiler Class" column indicates "OIB". A description of "Boiler Class" is not included in the HWC Data Base Report associated with the NODA. The acronym lists associated with the NODA do not contain a listing for "OIB". Therefore, Reilly is not able to confirm or deny the information presented in this column. Perhaps the EPA is attempting to classify boilers by the type of fuel that is burned (e.g., top ends, bottom residues, etc.), the type and number of other feed streams to the unit (e.g., non-hazardous wastes, high viscosity, etc.), or the applicability of other exemptions (e.g., low risk waste, comparable fuels, etc.). Due to an inability to review this information, Reilly requests that the EPA provide another NODA to allow Reilly the opportunity to verify that the assigned classification is correct.

ID No. 735, Boiler 70K, Comments

Comment 1

Reilly agrees that Test Condition 735C3 should be classified as worst case due to the spiking of ash to establish the feed rate limit.

ID No. 737, Boiler 30K, Comments

Comment 1

Reilly agrees that Test Condition 737C3 should be classified as worst case due to the spiking of ash to establish the feed rate limit.

Comment 2

Test Condition 737C2 is listed in the "Ash Feedrates Only, No Stack Gas PM Emissions" section. Test Condition 737C2 was a low temperature Certification of Compliance test. A minimum temperature limit was established during this test based on demonstrating compliance with the CO emissions limit. Samples of the waste feed stream and stack gas were not obtained or analyzed for ash/PM. Therefore, Test Condition 737C2 should be removed from the Particulate Matter Summary Spreadsheet.

> Ash feedrate measurements were reported in the CoC, and continue to be used as reported.

ID No. 738, Boiler 28K, Comments

Comment 1

Reilly agrees that Test Condition 738C1 should be classified as worst case due to the spiking of ash to establish the feed rate limit.

Comment 2

For the Ash Feedrate MTEC Condition Average, the hazardous waste value should be 76.5 instead of 58 and the Spike value should be 40.8 instead of 60.

<u>Comment ID No. 10– Reilly Industries</u>

<u>Comment Summary</u> – Provided comments on the PCDD/PCDF Metal Data Summary Sheet data for Reilly boilers.

<u>Comment Response</u> – Made most of the changes as requested. See added blue underlined text for cases where changes were not made.

<u>Comment ID No. 10 – Reilly Industries</u>

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Dioxin/Furan Summary Spreadsheet

<u>General Comments</u>

<u>Comment 1</u>

Reilly has provided detailed comments for each of the boilers in a separate submittal. The following comments assume that database changes based on those comments will be incorporated into the Dioxin/Furan Summary Spreadsheet. Therefore, comments have not been included in this document related to items that Reilly has already provided comment (e.g., emission rates, feed rates, etc.).

<u>Comment 2</u>

The Dioxin/Furan Summary Spreadsheet contains a column titled "Boiler Class". For Reilly's Test Conditions, the "Boiler Class" column indicates "OIB". A description of "Boiler Class" is not included in the HWC Data Base Report associated with the NODA. The acronym lists associated with the NODA do not contain a listing for "OIB". Therefore, Reilly is not able to confirm or deny the information presented in this column. Perhaps the EPA is attempting to classify boilers by the type of fuel that is burned (e.g., top ends, bottom residues, etc.), the type and number of other feed streams to the unit (e.g., non-hazardous wastes, high viscosity, etc.), or the applicability of other exemptions (e.g., low risk waste, comparable fuels, etc.). Due to an inability to review this information, Reilly requests that the EPA provide another NODA to allow Reilly the opportunity to verify that the assigned classification is correct.

<u>ID No. 735, Boiler 70K, Comments</u>

<u>Comment 1</u>

Reilly agrees that Test Conditions 735C3 and 735C4 should be classified as "NA", not applicable, for Dioxin/Furans due to the unit being a liquid fired boiler with no APCDs.

> <u>PCDD/PCDF data from CoC testing from boilers without air pollution control devices has been determined be closer to "normal", as opposed to worst case or unknown. Although CoC testing was conducted under worst case combustion conditions (low temperature, low residence time), other factors, such as boiler temperature profile, may have a more dominant influence on PCDD/PCDF emissions. See the proposed Replacement HWC</u>

MACT Rule background documents and preamble for more detailed discussion of the rationale of characterizing PCDD/PCDF CoC test conditions for boilers without air pollution control devices.

Comment 2
The Boiler Type is specified as WT for Test Conditions 735C3 and 735C4. It is assumed that "WT" is an acronym for "watertube" since the Acronym Lists associated with this NODA does not contain this designation. If this assumption is correct, Reilly agrees with this designation.

Commenter is correct that "WT" is used to identify watertube boilers.

Comment 3
The Sootblow Status for Test Condition 737C4 is designated as "U", unknown. There was no sootblow event during this Test Condition. Since there is no acronym in the Data Summary Sheet Acronym List addressing this situation, it is not known if a more appropriate designation is warranted.

ID No. 737, Boiler 30K, Comments

Comment 1
Reilly agrees that Test Conditions 737C3 and 737C4 should be classified as "NA", not applicable, for Dioxin/Furans due to the unit being a liquid fired boiler with no APCDs.

Comment 2
The Boiler Type is specified as WT for Test Conditions 737C3 and 737C4. It is assumed that "WT" is an acronym for "watertube" since the Data Summary Sheet Acronym List does not contain this designation. If this assumption is correct, Reilly agrees with this designation.

Comment 3
The Sootblow Status for Test Condition 737C4 is designated as "U", unknown. There was no sootblow event during this Test Condition. Since there is no acronym in the Data Summary Sheet Acronym List addressing this situation, it is not known if a more appropriate designation is warranted.

A blank or "N" is used to identify that no sootblowing was used during the test condition.

Comment ID No. 11– Reilly Industries

Comment Summary – Provided comments on the Low Volatile Metal Data Summary Sheet data for Reilly boilers.

Comment Response – Made most of the changes as requested. See added blue underlined text for cases where changes were not made.

Comment ID No. 11 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Low Volatile Metal Summary Spreadsheet

General Comments

Comment 1

Reilly has provided detailed comments for each of the boilers in a separate submittal. The following comments assume that database changes based on those comments will be incorporated into the Low Volatile Metal Summary Spreadsheet. Therefore, comments have not been included in this document related to items that Reilly has already provided comment (e.g., emission rates, feed rates, etc.).

Comment 2

The LVM Feedrate MTEC Condition Average calculations sometimes showed all of the LVM originating from the hazardous waste when significant portions came from a spiking stream. Other times, amounts from the spiking stream were differentiated from the hazardous waste. If information on the differentiation between the HW, Spike, and Other streams is important, then it is suggested that this section be corrected. Otherwise, only the total amounts need to be provided. In addition, the ND % column has sometimes been calculated and at other times not. Once again, if this information is important, this column needs to be corrected.

> As possible based on available information, metal and chlorine feed contributions were attributed to the following feed categories: actual hazardous waste, "spiked" feedstreams, raw materials, coal, and "other" feeds (such as tires, natural gas, fuel oil, etc.).

Comment 3

The information presented in the Individual Metal Feedrates columns must match the information contained in the Individual Source Data Sheets. The Individual Source Data Sheets did not contain calculations for the individual metal feedrates and, therefore, could not be compared to the information presented in the Low Volatile Metal Summary Sheet. The absence of this information does not allow Reilly the opportunity to verify its accuracy. Therefore, Reilly requests that the EPA provide another NODA to allow Reilly the opportunity to verify that the Individual Metal Feedrate information is correct.

All data contained in the Data Summary Sheets was documented in the individual source data sheets. There are no additional feedrate data in the Data Summary Sheets that are not contained in the individual source data sheets.

Comment 4
The Low Volatile Metals Summary Spreadsheet contains a column titled "Boiler Class". For Reilly's Test Conditions, the "Boiler Class" column indicates "OSIB". A description of "Boiler Class" is not included in the HWC Data Base Report associated with the NODA. The acronym lists associated with the NODA do not contain a listing for "OSIB". Therefore, Reilly is not able to confirm or deny the information presented in this column. Perhaps the EPA is attempting to classify boilers by the type of fuel that is burned (e.g., top ends, bottom residues, etc.), the type and number of other feed streams to the unit (e.g., non-hazardous wastes, high viscosity, etc.), or the applicability of other exemptions (e.g., low risk waste, comparable fuels, etc.). Due to an inability to review this information, Reilly requests that the EPA provide another NODA to allow Reilly the opportunity to verify that the assigned classification is correct.

ID No. 735, Boiler 70K, Comments
Comment 1
The Tier column should indicate I, I, and III for Arsenic, Beryllium, and Chromium for Test Condition 735C1. The Tier column should indicate I, I, and I for Arsenic, Beryllium, and Chromium for Test Condition 735C3. Also, the Tier column should indicate I, I, and I for Arsenic, Beryllium, and Chromium for Test Condition 735C6.

Comment 2
Spiking of ash, chlorine, and hexavalent chromium occurred during Test Condition 735C1. Spiking of ash occurred during Test Condition 735C3. Spiking of hexavalent chromium occurred during Test Condition 735C6. Therefore, the Spiking column should indicate Yes, No, and Yes for Test Conditions 735C1, 735C3, and 735C6, respectively.

Comment 3
The Worst Case versus Normal column should identify Test Condition 735C1 as WC due to spiking of hexavalent chromium to establish a Tier III limit. Test Condition 735C6 should be identified as IB (i.e., in between) because spiking of hexavalent chromium occurred but only for the purpose of determining a conversion ratio to trivalent chromium in the combustion system.

ID No. 737, Boiler 30K, Comments
Comment 1
Test Condition 737C2 was a low temperature Certification of Compliance test. A minimum temperature limit was established during this test based on demonstrating compliance with the CO emissions limit. Samples of the waste feed stream and stack gas were not obtained or analyzed for metals. Therefore, Test Condition 737C2 should be removed from the Low Volatile Metal Summary Spreadsheet.

Feedrate data for 737C2 were taken from the CoC test report, and continue to be used as reported.

Comment 2
Spiking of ash, chlorine, and hexavalent chromium occurred during Test Condition 737C1. Spiking of ash occurred during Test Condition 737C3. Therefore, the Spiking column should indicate Yes and No for Test Conditions 737C1 and 737C3, respectively.

Comment 3
The Tier column should indicate I, I, and III for Arsenic, Beryllium, and Chromium for Test Condition 737C1. The Tier column should indicate I, I, and I for Arsenic, Beryllium, and Chromium for Test Condition 737C3.

Comment 4
The Worst Case versus Normal column should identify Test Condition 737C1 as WC due to spiking of hexavalent chromium to establish a Tier III limit.

ID No. 738, Boiler 28K, Comments

Comment 1
Spiking of ash, chlorine, and hexavalent chromium occurred during Test Condition 738C1. Therefore, the Spiking column should indicate Yes for Test Condition 738C1.

Comment 2
The Tier column should indicate I, I, and III for Arsenic, Beryllium, and Chromium for Test Condition 738C1.

Comment 3
The Worst Case versus Normal column should identify Test Condition 738C1 as WC due to spiking of hexavalent chromium to establish a Tier III limit.

Comment ID No. 12– Reilly Industries

Comment Summary – Provided comments on the Semivolatile Metal Data Summary Sheet data for Reilly boilers.

Comment Response – Made most of the changes as requested. See added blue underlined text for cases where changes were not made.

Comment ID No. 12 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Semivolatile Metal Summary Spreadsheet

General Comments

Comment 1

Reilly has provided detailed comments for each of the boilers in a separate submittal. The following comments assume that database changes based on those comments will be incorporated into the Semivolatile Metal Summary Spreadsheet. Therefore, comments have not been included in this document related to items that Reilly has already provided comment (e.g., emission rates, feed rates, etc.).

Comment 2

The SVM Feedrate MTEC Condition Average calculations show all of the SVM originating from the hazardous waste. Some portion of the SVM originated from the natural gas and spike streams. If information on the differentiation between the HW, Spike, and Other streams is important, then it is suggested that this section be corrected. Otherwise, only the total amounts need to be provided. In addition, the ND % column has sometimes been calculated and at other times not. Once again, if this information is important, this column needs to be corrected.

Comment 3

The information presented in the Individual Metal Feedrates columns must match the information contained in the Individual Source Data Sheets. The Individual Source Data Sheets did not contain calculations for the individual metal feedrates and, therefore, could not be compared to the information presented in the Low Volatile Metal Summary Sheet. The absence of this information does not allow Reilly the opportunity to verify its accuracy. Therefore, Reilly requests that the EPA provide another NODA to allow Reilly the opportunity to verify that the Individual Metal Feedrate information is correct.

Comment 4

The Semivolatile Metals Summary Spreadsheet contains a column titled "Boiler Class". For Reilly's Test Conditions, the "Boiler Class" column indicates "OSIB". A description of "Boiler Class" is not included in the HWC Data Base Report associated with the NODA. The acronym lists associated with the NODA do not contain a listing for "OSIB". Therefore, Reilly is not able to confirm or deny the information presented in this column. Perhaps the EPA is attempting to classify boilers by the type of fuel that is burned (e.g., top ends, bottom residues, etc.), the type and number of other feed streams to the unit (e.g., non-hazardous wastes, high viscosity, etc.), or the applicability of other exemptions (e.g., low risk waste, comparable fuels, etc.). Due to an inability to review this information, Reilly requests that the EPA provide another NODA to allow Reilly the opportunity to verify that the assigned classification is correct.

ID No. 735, Boiler 70K, Comments

Comment 1

The Tier column should indicate I and I for Lead and Cadmium, respectively, for Test Conditions 735C1 and 735C3.

ID No. 737, Boiler 30K, Comments

Comment 1

Test Condition 737C2 was a low temperature Certification of Compliance test. A minimum temperature limit was established during this test based on demonstrating compliance with the CO emissions limit. Samples of the waste feed stream and stack gas were not obtained or analyzed for metals. Therefore, Test Condition 737C2 should be removed from the Semivolatile Metal Summary Spreadsheet.

Comment 2

The Tier column should indicate I and I for Lead and Cadmium, respectively, for Test Conditions 737C1 and 737C3.

ID No. 738, Boiler 28K, Comments

Comment 1

The Tier column should indicate I and I for Lead and Cadmium, respectively, for Test Condition 738C1.

Comment ID No. 13– Reilly Industries

Comment Summary – Provided comments on the Mercury Data Summary Sheet data for Reilly boilers.

Comment Response – Made most of the changes as requested. See added blue underlined text for cases where changes were not made.

Comment ID No. 13 – Reilly Industries

Reilly Industries, Inc.
HWC MACT Phase II NODA Comments
Mercury Summary Spreadsheet

General Comment

Comment 1

Reilly has provided detailed comments for each of the boilers in a separate submittal. The following comments assume that database changes based on those comments will be incorporated into the Mercury Summary Spreadsheet. Therefore, comments have not been included in this document related to items that Reilly has already provided comment (e.g., emission rates, feed rates, etc.).

ID No. 735, Boiler 70K, Comments

Comment 1

Reilly agrees that Test Conditions 735C1 and 735C3 should be classified as normal because the feed rate of mercury during these tests was not maximized.

ID No. 737, Boiler 30K, Comments

Comment 1

Reilly agrees that Test Conditions 737C1 and 737C3 should be classified as normal because the feed rate of mercury during these tests was not maximized.

Comment 2

Test Condition 737C2 was a low temperature Certification of Compliance test. A minimum temperature limit was established during this test based on demonstrating compliance with the CO emissions limit. Samples of the waste feed stream and stack gas were not obtained or analyzed for metals. Therefore, Test Condition 737C2 should be removed from the Mercury Summary Spreadsheet.

ID No. 738, Boiler 28K, Comments

Comment 1

Reilly agrees that Test Condition 738C1 should be classified as normal because the feed rate of mercury during this test was not maximized.

Comment ID No. 14 – Mallinckrodt Inc.

Comment Summary – Provided comments on the data for the Mallinckrodt boilers (ID Nos. 778 and 1000).

Comment Response – Made changes as requested.

Comment ID No. 14 – Mallinckrodt Inc.

Mallinckrodt Inc.
Phase II HWC MACT
NODA Comments

ID No. 778, Boiler No. 1, Individual Source Comments

Comment 1
Source Spreadsheet, Source Location – 8801 Capital Boulevard.

Comment 2
Source Spreadsheet, Combustor Characteristics – John Zinc should be spelled John Zink.

Comment 3
Source Spreadsheet, Capacity – The capacity should read 18.6 instead of 19.

Comment 4
Source Spreadsheet, Sootblowing – Yes. Once per day for approximately 5 minutes.

Comment 5
Source Spreadsheet, Stack Characteristics, Stack Height – 50 Feet.

Comment 6
Source Spreadsheet, Stack Characteristics, Gas Temperature – Should be 636 instead of 0.

Comment 7
Condition Spreadsheet, Test Condition 778C10, Report Name/Date – Change the date of the report to read 8/27/98.

Comment 8
Condition Spreadsheet, Test Condition 778C11 Report Name/Date – Change the date of the report to read 8/27/98.

Comment 9
Feed Spreadsheet, Feedrate MTEC Calculations – The Chlorine Condition Average value for the Waste Feed is not calculated correctly. This needs to either be corrected to 7% oxygen or an average of the three run values.

Comment 10
Feed Spreadsheet, Feed Description, Spiking Material – For Run 2, the Lead Feedrate should be a detectable quantity at 0.001 g/hr. Also for Run 2, the Cadmium Feedrate should be a non-detectable quantity at 0.002 g/hr.

Comment 11
Summary2 Spreadsheet, Feedrate Characteristics – The Mercury HW contribution has the value divided in half due to the non-detectable quantities. However, the referenced cell in the Feed Spreadsheet has already performed this operation. Also, the Ash HW contribution is a sum of the HW and Spike material. However, the summation uses the Condition Average for the HW and the Run 1 value for the Spike. The Spike should use the Condition Average value for this summation. This error also extends to the Spike % calculation.

Comment 12
Summary2 Spreadsheet, Individual Metal Feedrates – The Pb, Cd, As, Be and Sb values are being divided in half due to being non-detectable quantities. However, the referenced cells have already performed this operation.

ID No. 1000, Boiler No. 2, Individual Source Comments

Comment 1
Source Spreadsheet, Sootblowing – Yes. Once per day for approximately 5 minutes.

Comment 2
Source Spreadsheet, Stack Characteristics – Diameter is 2.75 feet. Height is 50 feet. Gas velocity is approximately 31 ft/sec. Stack temperature is approximately 616°F.

Comment 3
Feed Spreadsheet, Feedrate Description – The K083 Barium values for Run 2 and Run 3 are both non-detectable quantities.

Comment 4
Summary2 Spreadsheet, Feedrate Characteristics – For Hg in the HW, the reference is to an incorrect location. Also, the value is being divided in half due to the non-detectable quantity. However, this operating is already being performed in the Feed Spreadsheet.

Comment 5
Summary2 Spreadsheet, Feedrate Characteristics - The Ash HW contribution is a sum of the HW and Spike material. However, the summation uses the Condition Average for the HW and the Run 1 value for the Spike. The Spike should use the Condition Average value for this summation. This error also extends to the Spike % calculation.

Comment 6
Summary2 Spreadsheet, Stack Gas Conditions – The stack gas flow rate should be 4233 instead of 4133.

Comment 7

Summary2 Spreadsheet, Individual Metal Feedrates – The Pb, Cd, As, Be and Sb values all are referencing the wrong cell in the Feed Spreadsheet. Also, each of these values is being divided in half due to being non-detectable quantities. However, the referenced cells have already performed this operation.

ID No. 778, Boiler No. 1, Pollutant Summary Sheet Comments

Comment 1

LVM Summary Sheet, Spiking – Ash was spiked during the testing. LVM was not spiked during the testing.

Comment 2

SVM Summary Sheet – Cadmium is Tier 1.

ID No. 1000, Boiler No. 2, Pollutant Summary Sheet Comments

Comment 1

LVM Summary Sheet - Ash was spiked during the testing. LVM was not spiked during the testing.

Comment 2

SVM Summary Sheet – Cadmium is Tier 1.

Comment ID No. 15 and 16 (identical) – Eli Lilly and Company

Comment Summary – Provided comments on general issues of handling detection limits in stack gas emissions and feeds, method detection limits, and classifying test conditions. Provided couple comments on Unit ID No. 728 data. Also provided comment ID Nos. 17 and 18 (containing new test reports and Excel data files for new test reports).

Comment Response – Individual responses to each general issue are included in blue underline after each of the issues. Specific database changes were made as requested.

Comment ID No. 15 and 16 (identical) – Eli Lilly and Company

August 16, 2002

RCRA Information Center (RIC)
Office of Solid Waste (5305G)
U. S. Environmental Protection Agency Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue NW
Washington, DC 20460-0002

Re: Docket number RCRA-2002-0019

Eli Lilly and Company (Lilly) is pleased to submit comments on NESHAP Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (Final Replacement Standards and Phase II) – Notice of Data Availability (67 FR 44452). Lilly operates several hazardous waste incinerators that safely and effectively treat many Lilly waste streams.

Lilly has reviewed the database in general, and specifically checked the information included for our incinerators. In general, Lilly is concerned about the quality, completeness and transparency of the database. Examples of evidence related to our concerns are as follows:

1. The combustor type for source # 728, Lilly Mayaguez, is listed in the individual source data sheet as a “Hearth”, but in the PM data summary sheet it is listed as a “Fixed hearth” combusting both liquid and solid waste while in the chlorine (Cl) data summary sheet it is listed as “Liq inj” combusting liquid waste. The Cl data summary sheet is accurate, but the inconsistencies are disturbing because the summary sheets were supposedly developed from the detailed sheets.

    In the NODA, as the comment mentions, for source ID No. 728, the combustor type in the PM data summary sheet and individual source data sheet were incorrectly identified as a hearth incinerator, and will be changed to liquid injection.

2. Lilly facility # 701, present in the original database used to develop the 1999 standards, was inappropriately removed from the current version of the database. It is a RCRA-permitted, rotary kiln incinerator that is currently combusting hazardous waste. According to the criteria given on page 44456, section VI. A. of the Federal Register notice, this source clearly should not have been removed. Its removal is evidence of inconsistent criteria being applied regarding the inclusion or exclusion of data.

Unit ID No. 701 was removed from the NODA database because the source indicated in its Notice of Intent to Comply (that was provided to the EPA) that it was not intending to comply with the 1999 HWC MACT rule (and likely not with the Interim Standards HWC MACT rule). At the request of the commenter, EPA has been put the source back into the revised HWC data base. EPA has used consistent procedures for including or excluding units and data from the HWC data base. Specifically, units that are currently operating and burning hazardous wastes, and those which are expected to be operating at the time of the proposed Replacement HWC MACT Rule, have been included in the data base. Units which are currently not operating, or those which are expected to shutdown prior to the Replacement HWC MACT Rule, have not been included in the data base.

3. There is evidence that additional information that is not in the current individual source data is being incorporated into the summary sheets. An example is the chlorine summary sheet references to “NE-Cl2 not measured” in the comment field. First of all there is no definition of the abbreviation “NE.” Second, no documentation for this determination is presented in the individual source data. Third, there are inconsistencies as to whether Cl2 was measured or speciated. See tests number 463C10 and 470C12, for example, which both indicate that Cl2 was measured, yet notes in the summary sheets indicate “NE.” This situation is evidence of the difficulty outside reviewers are experiencing in trying to verify EPA’s decisions and determinations in the database.

As discussed in the NODA Background Document, in the NODA data base release, the condition description flags are not contained in the individual source data files, only in the Data Summary Sheets. In the revised Database, all information will be contained in a single Access platform database.

The “NE” indicates “not evaluated” as described in the NODA Data Base Background Document. Total chlorine data were rated as “NE” if Cl2 was not considered to be included as part of the stack gas sampling train catch (for example, if Method 26 was used for HCl, but Cl2 was not analyzed or reported). Alternatively, if an older test method was used for HCl, but also caught Cl2 because of the use of caustic liquid impinger solution, the data were considered to include both HCl and Cl2 (total chlorine), and was not rated as NE. This is identical to how the chlorine data were handled in the

1999 HWC MACT Rule. Also, see the proposed Replacement HWC MACT Rule background document for more detailed information on the handling and classification rating for chlorine.

The individual data source sheets and Access data base clearly identify if Cl2 was measured. Cl2 was not measured during 463C10 and thus is given an NE rating. Cl2 was measured during 470C12 and was incorrectly assigned an NE rating. This has been corrected.

Because of the issues with the current version of the database, Lilly encourages the agency to accept corrections and additions to the information in the database even after the close of this comment period. This is particularly important for data that is modified, added or restored as a result of comments received by the Agency during this relatively short comment period. The Agency should strive for a complete, transparent and quality database to support this rulemaking.

Corrections to the database will continue to be made as they are identified. There will be further opportunity to comment on the data base as part of the proposed Replacement HWC MACT Rule.

SPECIFIC COMMENTS:

1. Corrections to Source ID #728

Eli Lilly and Company (Lilly) has reviewed the information in the database related to Source ID 728, Lilly Mayaguez facility. Lilly requests that the following corrections be made:

Detailed Data File, Source Description: Change "sister facilities" from 4 to 0; Change "combustor type" from Hearth to Liquid Injection; Capacity is 12 MM Btu/hr; Soot Blowing should be "no;" Supplemental Fuel is Kerosene; Change "stack height" from 39 feet to 57 feet; Change "gas velocity" from 13.5 ft/sec to 44 ft/sec.

Detailed Data File, Cond. Description: Change "cond descr" from "?" to "Trial Burn."

Detailed Data File, Stack Gas Emissions 2, Change carbon tetrachloride DRE% in run 1 from 99.9987 to 99.9998; change methylene chloride DRE% in run 1 from 99.9987 to 99.998; change methylene chloride DRE% in run 3 from 99.994 to 99.993.

Detailed Data File, Feedstream 2, Chlorine: It is unclear how the wt% values for chlorine concentration in waste streams in the test report (reported to 3 significant figures) are converted into ppmw with 6+ significant figures. For example, the main liquid waste for run #1 was reported as 27.0 wt. percent chlorine, but is shown in the data file as 277095.28 ppmw. Lilly suggests that this calculation be given a quality check.

No change is made. This conversion is accurate. The data base value is sufficiently accurate.

PM Summary Table: Change "System Design" from "fixed hearth" to liquid injection; change "HW type" from "liquid, solid" to "liquid."

2. Deletion of Source ID #701

Lilly Source ID # 701, Clinton Bartlett Snow Incinerator, was present in the 1996 database, but was inappropriately deleted from the current database. Reportedly, the Agency removed this source because it believes that Source 701 will close in the future. However, this rationale directly conflicts with the criteria stated in the July 2, 2002 Federal Register notice. Section VI. A. of the federal register notice states that "the data bases do not include information from sources no longer burning hazardous waste" and "….we conclude that data from currently operating combustors are adequate." Therefore, as long a source is currently burning hazardous waste, it should be included in the database.

The federal register criteria are distinctly different than what EPA apparently practiced in developing the database. The potential for future operation of a source is irrelevant when compiling a database of "currently operating" combustors. In order to assure that its database is complete and does not have the appearance of bias, the Agency should verify the operational status of sources with the owner/operators.

Source ID # 701 is currently operating, burning hazardous waste, and should be restored to the database. Once restored, Lilly reserves the right to review and correct the data in a future version of the database.

As discussed above, Source ID No. 701 has been added back into the database.

3. Data on Other Currently Operating Lilly Sources

Lilly operates three liquid waste incinerators that are not represented in the current database. They are designated by Lilly as T49, (Lafayette, IN), and TO3 and TO4 (Clinton, IN). These are RCRA "similar" units that were permitted through a single trial burn test conducted on TO3 in 1986. For EPA's convenience, Lilly has created detailed data files following the pattern in the current database for these three sources. Condition 1 in the data files established permit limits for HCl emissions; condition 2 established permit limits related to particulate matter (PM) emissions.

Lilly requests that data for T49, TO3, and TO4 be added to the database as three distinct sources in order to provide proper weighting in relation to the universe of operating incinerators. Once added, Lilly reserves the right to review and correct the data in a future version of the database. Lilly will forward a copy of the test report with its paper submittal of these comments.

The supplied test report data for units T49 in Lafayette, IN, and TO3 and TO4 in Clinton, IN have been added to the revised data base as requested.

4. Test Condition Descriptions

EPA has requested comment on its classification of test conditions as normal (N), worst case (WC), worst case-high emissions (WC-HE), in-between (IB), or not applicable (NA). Lilly believes that the classification scheme is overly complex and potentially prejudicial with regards to future data manipulation. Lilly suggests that the classifications be reduced to two.

The first category would be assigned to test conditions that were used to establish permit limits for a particular pollutant. For example, if an ash limit was established during a test where PM was measured, then that condition could be designated as "permit setting" or "PS." The use of the classification "worst case" in this instance seems prejudicial; especially when it is obvious that "worst case" is not always worst case as evidenced by the Agency's use of the classification "worst-case, high emission."

The second category Lilly suggests for all other test conditions is "normal." Remaining test conditions could be considered to represent normal operation within the operating envelope established by PS test conditions. To the extent that emission measurements differ, this could be considered to represent the normal variation in source operation or measurement accuracy.

No general changes are made to the test condition description scheme as used in the NODA. EPA does not understand what the commenters suggested classification scheme would add; it appears the commenters suggested scheme is similar to that being used by the EPA. See the proposed Replacement HWC MACT Rule background documents and preamble for a detailed discussion of the condition classification scheme. Generally, conditions determined to be under "normal" operations are identified as such. Conditions under "worst-case" operations are identified. In some cases, conditions have been determined to be "in-between" worst case operations and normal operations. Other conditions are identified as "not evaluated" due to reasons including baseline, no waste burning operations, research and demonstration testing, etc.

5. EPA's Response to ACC/Eastman Comments Regarding Interpretation of Less Than Values.

Appended to the HWC Data Base Report is the "Response to Comments on the June 2000 Phase II Hazardous Waste Combustor MACT Data Base Notice of Data Availability", October 2000. Under Section 4.7, EPA responded to comments by ACC and Eastman regarding an EPA's inaccurate interpretation of less than values in Eastman's test reports. EPA states that Eastman's reporting did not follow the "standard" convention. EPA did not cite a reference for its assertion that there is a "standard" convention. In contrast, it is our experience that the reporting convention used by Eastman is the norm! Therefore, it is incumbent upon the Agency, in the interest of producing a quality database, to identify and correct any data that is affected by the Agency's misinterpretation of reported "less than" values that appear in test reports. EPA's statement that "we did not (and will not) go back to the raw data" is inappropriate and not in accord with the espoused principles of using best science in rulemaking.

Stack gas emissions measurements at non-detect levels are being considered at the full detection limit in the revised database. Thus, this issue is not longer of concern.

Nonetheless, EPA believes that for the vast majority of cases in the data base, when at least one fraction of the sampling train was detected, the result was reported as fully detected, whether or not another fraction of the train was non-detect; and that the total reported value was the sum of the detected and non-detected sampling train fractions. Alternately, the value was reported as non-detect only when all fractions of the train were non-detect. Thus, it was appropriate to divide reported non-detects by one-half (if desiring to treat non-detects at one-half). When this convention was not followed (i.e., when any fraction of the train was non-detect the result was reported as non-detect even if another fraction was detected), such as the situation with the Eastman Arkansas boiler, EPA agrees it was inappropriate to divide the reported non-detect value by one-half since detected values would be incorrectly reduced by one-half. EPA was not prepared or likely able to identify the detection status of the back half and front half of the sampling trains due to lack of detailed supporting information in the CoC and trial burn reports. Additionally EPA suggested that it was not necessary because the Eastman Arkansas reporting convention appeared to be rarely if ever used, as evidenced by the very few other situations where this was reported to occur (Department of Army chemical weapons facilities were the only other group to identify this problem).

6. Interpretation of Reported Data That May Be Unachievable When Following Current Methods and Quality Practices.

Over the course of the time spanned by test reports used in the database (i.e. approximately 1985 to present), EPA has promulgated many new sampling and analytical (S&A) procedures, and changed and improved many others. Quality requirements and practices have also been implemented, changed and improved. Presumably, the Agency will require current state-of-the-art sampling and analysis, of defensible quality, to demonstrate compliance with the HWC MACT standards. However, some of the results in the database appear to be below values that are obtained through typical application of current S&A procedures, and application of current standard quality practices.

As an example of the concern, Lilly Mayaguez, (source # 728) reported an HCl emissions value of <0.03 ppm in its 1987 test report. When Lilly queried a reputable laboratory about the current expected Method 26A detection limit, assuming typical sample volumes and quality practices, the answer was approximately 0.6 ppm. This is over 20 times higher than that reported in 1987. This is likely because of the application of improved quality practices in sampling and analytical methods that lead to more defensible results.

At a minimum, Lilly suggests that the Agency review the database for unachievable low values and raise these values to those currently achievable and defensible. For the Agency's convenience, Lilly is providing values below that it understands represent quality results for typical application of the current S&A procedures. Lilly believes that the Agency should not be using unachievable and/or indefensible results (compared to current field and laboratory practices) in the computations for developing the replacement HWC MACT standards.

Parameter	Method	Reliable	Reporting

	DL ug/dscm	DL ug/dscm	Limit ug/dscm
HCl (Method 26A)	300	800	800
Cl2 (Method 26A)	100	400	400
Mercury (Method 29)	0.8	2	3
SVM (Method 29)	0.3	0.7	2
LVM (Method 29)	0.7	2	3

Regarding PM results in the database, Lilly questions whether some of the very low results are accurate and defensible, because they were obtained using standard Method 5. The Agency developed Method 5i to improve the accuracy and precision of results for sources with low (below 0.02gr/dscf) PM concentrations. Some values in the database that were generated years before the availability of Method 5i are an order of magnitude or more below 0.02 gr/dscf.

As the Agency is aware, Lilly has extensive experience in the application of Method 5 and Method 5i as a consequence of our extensive PM CEMS work. The Agency presumably has access to relevant information on the accuracy and precision of both methods from its Method 5i development program. In Section 2.3 of Method 5i, EPA states that the practical quantitation limit is 3 mg of PM. This equates to approximately 0.002 grains/dscf for a typical sample volume. In our experience, it takes extraordinary attention to the details of performing the method and analyzing the sample to obtain accurate results at this emission level. Lilly suggests that 0.005 grains/dscf is a more reasonable level to expect accurate results during routine field compliance testing. Presumably, the emission level at which Method 5 could be considered accurate is even higher.

At a minimum, Lilly suggests that reported PM data in the database in the range of 0.01 grains/dscf and below be viewed as suspect with probable large error bars around the result. Again, Lilly believes that the Agency should not be using unachievable and/or indefensible results (compared to current field and laboratory practices) in the computations for developing the replacement HWC MACT standards.

Method precision will be considered when MACT standards are developed. MACT standards will not be set below levels which are not consistently or accurately achievable using established (and required) sampling methods.

Specifically regarding Method 5 PM levels, values as reported in the CoC and trial burn reports will continue to be shown in the HWC database. EPA agrees that very low PM levels from Method 5 need to be viewed with caution due to acknowledged sampling issues at low PM levels. However, reported Method 5 PM emissions levels will be not capped (adjusted up) to a minimum level as recommended. Instead, as mentioned above, MACT PM standards will be set consistent with the accuracy and precision of Method 5i.

7. Use of One-half the Method Detection Limit in Feed Samples for

Estimating Concentrations

Lilly believes that the Agency's assumption of one-half of a non-detect value in a feed stream is inappropriate for the computations being performed. A Method Detection Limit (MDL) is a statistically derived value that is matrix independent. It only infers an assurance that the analyte will be detected. It does not imply any knowledge of the accuracy of the quantitation at the MDL level. Therefore, it seems illogical to take a value of indeterminate accuracy and divide it by two and then use it to calculate an SRE to several significant figures.

The database summaries do not include designators identifying which feed stream values are based on non-detect levels. While the purpose of the SRE computation in the data summaries is unclear, Lilly suggests that SREs only be calculated where both the feedstream data and stack emission data are above the reporting limits, and are therefore of definable quality.

> <u>Individual data source sheets show in specific detail the detection status of all individual feedstreams. In the revised HWC data base, non-detects in feedstreams are handled at the full detection limit; with the exception of the calculation of SREs, where non-detect feedrates are considered as zero (0), as discussed in detail in the proposed Replacement HWC MACT Rule background documents and preamble.</u>

8. The Computation for Condition Average ND Percent Should Be Corrected

In the data summary tables, the computations for ND percent next to the condition average result are incorrect. See for example the SVM data summary, condition 327C2, which should be 10 percent instead of 18 percent.

> <u>In some cases, as identified by the commenter, non-detect percentages for metals group test condition averages were incorrectly calculated in the data summary sheets. These have been corrected in the revised HWC data base.</u>

Lilly appreciates the opportunity to comment on this NODA. Please feel free to contact me at (317)-277-1094 if there are any questions.

Sincerely,

For Eli Lilly and Company

Michael L. Foster
Associate Engineering Consultant
Environmental Affairs
Eli Lilly and Company.

Attachments:

- TO3.xls
- TO4.xls
- T49.xls
- TO3 Trial Burn Report

bcc: Ron Pitzer
Betsy Dusold

Comment ID No. 17 and 18– Lilly and Company

Comment Summary – Contained a new test report, and Excel files with the new test report data.

Comment Response – Added test report as requested to the data base.

Comment ID No. 17 and 18 – Eli Lilly and Company

New test report and Excel files with new test report data. Not included here.

Comment ID No. 19 – DSM Pharmaceutical, Inc.

Comment Summary – Provided comments on the data for Unit ID No. 708. Also concerned that the HWC database does not include data from incinerators without air pollution control devices, for example three (3) incinerators at the DSM Greenville NC site for which no test report data has been included.

Comment Response – Most of the changes to the database were made as requested. EPA did not intentionally exclude any currently operating hazardous waste combustors from the data base, regardless of whether they are equipped with air pollution control devices. In fact, EPA spent a great deal of effort to collect the most recent available information from all currently operating hazardous waste incinerators. EPA was not able to obtain copies of the trial burn reports for the three DSM incinerators that do not have air pollution control devices from the State of NC or EPA Region 4 offices in sufficient time before the NODA release; thus they were not included. EPA is surprised that the test reports were not included as part of the commenters submission, as this data gathering was part of the intention of the NODA (i.e., to get a complete and accurate database of HWC operations). EPA was able to obtain copies of the test reports from the three DSM Greenville NC units, and has incorporated them into the HWC MACT data base.

Comment ID No. 19 – DSM Pharmaceuticals Inc.

DSM Pharmaceuticals, Inc.
Phase I HWC MACT
NODA Comments

General Comment

Comment 1

DSM Pharmaceuticals, Inc. (hereafter, DSM) owns and operates four (4) RCRA permitted hazardous waste incinerators at its facility in Greenville, North Carolina. These four (4) incinerators are referred to as the McGill I, McGill II, NAO, and Prenco incinerators. Trial Burns were conducted on each of these incinerators with the McGill I being tested in 1987, the McGill II in 1992, and the NAO and Prenco in 1989. The McGill II incinerator is the only unit that has any type of air pollution control device installed. The McGill II incinerator also happens to be the only device that the EPA has included in the Phase I HWC MACT Database. It is DSM's understanding that feed rate controls are acknowledged to be a type of MACT "technology" and can be used to comply with the MACT standards. Therefore, there is no requirement for the Maximum Available Control Technology to be based only on equipment. Incinerators that do not have air pollution control devices are required to comply with the MACT standards just as units that do have control devices. A review of the Pollutant Data Summary sheets reveals that there are only two incinerators included in the entire database that do not have air pollution control devices, and both of these units are only listed in the PM Summary Spreadsheet. Because DSM's three (3) uncontrolled incinerators have not been included in the database, it is suspected that there are other uncontrolled incinerators that have also been excluded from the database. Therefore, in addition to requesting that the

Trial Burn data for the McGill I, NAO, and Prenco incinerators be added to the database, DSM requests that the EPA incorporate any other uncontrolled incinerators into the Phase I HWC MACT Database.

ID No. 708, McGill II Incinerator, Individual Source Comments

Comment 1

Source Spreadsheet, Facility Name - The Facility Name was Burroughs Wellcome at the time of the testing. The facility was subsequently owned by Catalytica Pharmaceuticals, Inc., and is currently owned by DSM Pharmaceuticals, Inc.

Comment 2

Source Spreadsheet, Facility Location - 5900 NW Greenville Boulevard.

Comment 3

Source Spreadsheet, Combustor Characteristics - McGill Americans, Inc., Custom Designed, Horizontal, Forced Draft Incinerator.

Comment 4

Source Spreadsheet, Soot Blowing - There is no sootblow device installed in the McGill II incinerator. Therefore, NA should be inserted for Soot Blowing.

Comment 5

Source Spreadsheet, APCS Characteristics - Calvert Collision Scrubber with a maximum design pressure drop of 90 inches WC, vertical Packed Column Scrubber, followed by a Beltran Model 4 x 4 wet tubular electrostatic precipitator.

Comment 6

Source Spreadsheet, Hazardous Waste Description - Aqueous flammable waste (AFW) and special flammable waste (SFW) generated during the manufacturing of pharmaceuticals and other health products.

Comment 7

Source Spreadsheet, Supplemental Fuel - Natural gas.

Comment 8

Source Spreadsheet, Stack Height - The stack height for McGill II is 50 feet instead of 15.0 feet.

Comment 9

Source Spreadsheet, Gas Velocity - Approximately 40 ft/sec.

Comment 10

Condition Spreadsheet, Test Condition 708C1, Condition Description – Trial Burn, minimum temperature, maximum feed rate.

Comment 11

Condition Spreadsheet, Test Condition 708C2, Condition Description – Trial Burn, minimum temperature, maximum feed rate.

Comment 12

Condition Spreadsheet, Test Condition 708C3, Condition Description – Trial Burn, minimum temperature, maximum feed rate.

Comment 13

Condition Spreadsheet, Test Condition 708C3, Test Dates – Should be 11/20/92 instead of 11/19/92.

Comment 14

Emissions2 Spreadsheet, Test Condition 708C1, PM Emissions – The PM emissions should be 0.0258, 0.0225, 0.0287, and 0.0257 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 15

Emissions2 Spreadsheet, Test Condition 708C1, CO Emissions – The CO emissions should be <1.49, <1.51, <1.53, and <1.51 ppmv at 7% O_2 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 16

Emissions2 Spreadsheet, Test Condition 708C2, PM Emissions – The PM emissions should be 0.0823, 0.0535, 0.0332, and 0.0563 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 17

Emissions2 Spreadsheet, Test Condition 708C2, CO Emissions – The CO emissions should be 5.38, 3.90, <1.58, and 3.62 ppmv at 7% O_2 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 18

Emissions2 Spreadsheet, Test Condition 708C3, PM Emissions – The PM emissions should be 0.0177, 0.0127, 0.0121, and 0.0142 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 19

Emissions2 Spreadsheet, Test Condition 708C3, CO Emissions – The CO emissions should be 4.01, 21.7, 20.0, and 15.24 ppmv at 7% O_2 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 20

Feed2 Spreadsheet, Test Condition 708C1, Feedrates – The Waste Feed A feedrates were approximately 595, 596, and 603 lb/hr for Run 1, Run 2, and Run 3, respectively. The Waste

Feed B feedrates were approximately 204, 205, and 206 lb/hr for Run 1, Run 2, and Run 3, respectively. The Total Waste Feedrates for Run 1, Run 2, and Run 3 were approximately 799, 801, and 809 lb/hr, respectively.

Comment 21
Feed2 Spreadsheet, Test Condition 708C1, MTEC Feedrates – The MTEC Feedrates for Ash and Mercury were not calculated. The Chlorine MTEC Feedrates for Organic Liquid A should have been calculated using one-half the detection limit.

Comment 22
Feed2 Spreadsheet, Test Condition 708C2, Feedrates – The Waste Feed A feedrates were approximately 608, 603, and 608 lb/hr for Run 1, Run 2, and Run 3, respectively. The Waste Feed B feedrates were approximately 203, 204, and 205 lb/hr for Run 1, Run 2, and Run 3, respectively. The Total Waste Feedrates for Run 1, Run 2, and Run 3 were approximately 811, 807, and 813 lb/hr, respectively.

Comment 23
Feed2 Spreadsheet, Test Condition 708C2, Mercury – The Mercury feed stream concentrations (ppmw) are all non-detectable quantities.

Comment 24
Feed2 Spreadsheet, Test Condition 708C2, Metal Concentrations – The total metal concentrations in the waste feed are presented as follows:

Metal	Run 1	Run 2	Run 3
Antimony (ug/g)	< 0.100	< 0.100	< 0.100
Arsenic (ug/g)	< 0.100	< 0.100	< 0.100
Barium (ug/g)	< 0.100	< 0.100	< 0.100
Beryllium (ug/g)	< 0.050	< 0.050	< 0.050
Cadmium (ug/g)	< 0.100	< 0.100	< 0.100
Chromium (ug/g)	0.434	0.513	0.543
Lead (ug/g)	< 0.100	< 0.100	< 0.100
Silver (ug/g)	< 0.100	< 0.100	< 0.100
Thallium (ug/g)	< 0.100	< 0.100	< 0.100

Comment 25
Feed2 Spreadsheet, Test Condition 708C2, MTEC Feedrates – The MTEC Feedrates for Ash and Mercury were not calculated. The Chlorine MTEC Feedrates for Organic Liquid A should have been calculated using one-half the detection limit.

Comment 26
Feed2 Spreadsheet, Test Condition 708C3, Feedrates – The Waste Feed A feedrates were approximately 650, 636, and 637 lb/hr for Run 1, Run 2, and Run 3, respectively. The Waste Feed B feedrates were approximately 203, 204, and 206 lb/hr for Run 1, Run 2, and Run 3,

respectively. The Total Waste Feedrates for Run 1, Run 2, and Run 3 were approximately 853, 840, and 843 lb/hr, respectively.

Comment 27
Feed2 Spreadsheet, Test Condition 708C3, Mercury – The Mercury feed stream concentrations (ppmw) are all non-detectable quantities.

Comment 28
Feed2 Spreadsheet, Test Condition 708C3, Metal Concentrations – The total metal concentrations in the waste feed are presented as follows:

Metal	**Run 1**	**Run 2**	**Run 3**
Antimony (ug/g)	0.200	0.226	0.213
Arsenic (ug/g)	< 0.100	< 0.100	< 0.100
Barium (ug/g)	< 0.100	< 0.100	< 0.100
Beryllium (ug/g)	< 0.050	< 0.050	< 0.050
Cadmium (ug/g)	< 0.100	< 0.100	< 0.100
Chromium (ug/g)	0.335	0.332	0.319
Lead (ug/g)	< 0.100	< 0.100	< 0.100
Silver (ug/g)	< 0.100	< 0.100	< 0.100
Thallium (ug/g)	< 0.100	< 0.100	< 0.100

Comment 29
Feed2 Spreadsheet, Test Condition 708C3, MTEC Feedrates – The MTEC Feedrates for Ash and Mercury were not calculated. The Chlorine MTEC Feedrates for Organic Liquid A should have been calculated using one-half the detection limit.

ID No. 708, McGill II Incinerator, Pollutant Data Summary Comments

Comment 1
Chlorine Summary Spreadsheet - The Chlorine Feedrate Condition Average values were calculated using the full detection limit for Waste Feed A (Organic Liquid A) and should have been calculated using one-half the detection limit for Test Conditions 708C1, 708C2, and 708C3.

Comment 2
Chlorine Summary Spreadsheet - The Chlorine Feedrate MTEC Total By Run values were calculated using the full detection limit for Waste Feed A (Organic Liquid A) and should have been calculated using one-half the detection limit for Test Conditions 708C1, 708C2, and 708C3.

Comment 3
PM Summary Spreadsheet – The PM Stack Gas Emission values are incorrect. For Test Condition 708C1, the PM emissions should be 0.0258, 0.0225, 0.0287, and 0.0257 for Run 1, Run 2, Run 3, and Condition Average, respectively. For Test Condition 708C2, the PM

emissions should be 0.0823, 0.0535, 0.0332, and 0.0563 for Run 1, Run 2, Run 3, and Condition Average, respectively. For Test Condition 708C3, the PM emissions should be 0.0177, 0.0127, 0.0121, and 0.0142 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 4

LVM, SVM, and Mercury Summary Sheets – It was noted that Test Conditions 708C1, 708C2, and 708C3 were not included on the LVM, SVM, and Mercury Summary Sheets. Data is available to determine the feed rate of these metals for each Test Condition. However, emission rate data was not obtained for these metals, because the Adjusted Tier I methodology was used to demonstrate compliance and establish the metal feed rate limits. Although this incinerator has an air pollution control train, the Adjusted Tier I methodology conservatively assumes that the metal feed rates equate to the emission rates. It is recommended that the EPA add the metal feed rate information into the Phase I database for use in establishing the MACT standards.

> Metals feedrate data are included in the database. Test conditions are not included in the Data Summary Sheets if stack gas emissions measurements were not taken. The Tier I status for metals is included in the information. Tier I federate levels are not used to determine MACT standards, as discussed below and in much greater detail in the proposed Replacement HWC MACT Rule background documents and preamble.

Comment ID No. 20 – Glaxo Smith Kline

Comment Summary – Provided comments on data for Glaxo Smith Kline incinerator ID No. 341.

Comment Response – Made changes as requested.

Comment ID No. 20 – Glaxo Smith Kline

GlaxoSmithKline
Phase I HWC MACT
NODA Comments

ID No. 341, ESF Incinerator, Individual Source Comments

Comment 1
Source Spreadsheet, Facility Name – The Facility Name is now GlaxoSmithKline.

Comment 2
Source Spreadsheet, Facility Location – The Facility Location is 5 Moore Drive.

Comment 3
Source Spreadsheet, Unit ID Name/No. – The unit is more accurately referred to as the Environmental Safety Facility (ESF) Incinerator.

Comment 4
Source Spreadsheet, Other Sister Facilities – None.

Comment 5
Source Spreadsheet, Combustor Characteristics – The unit has a solid waste "ram" feeder. The primary chamber has dimensions of 6'5" diameter by 16'5" length. The secondary chamber has dimensions of 6'5" diameter by 14'3.5" length.

Comment 6
Source Spreadsheet, Soot Blowing – NA.

Comment 7
Source Spreadsheet, APCS – The APCS is more accurately described as dry lime injection (dry scrubber) followed by a heat exchanger followed by a fabric filter. Therefore, the APCS should be described as DS/HE/FF.

Comment 8
Source Spreadsheet, APCS Characterization – The APCS Characterization should be reordered to reflect the arrangement of the system as DS/HE/FF.

Comment 9

Source Spreadsheet, Stack Characteristics, Height – The stated value, 439 feet, is the top of stack elevation above mean sea level (MSL). The actual height of the stack is 99 feet.

Comment 10
Source Spreadsheet, Permitting Status – The facility is Tier III for arsenic, cadmium, and chromium. The facility is not Tier III for CO.

Comment 11
Emissions1 Spreadsheet, Test Condition 341C10 – The Hexavalent Chromium emission rate for Run 3 should be 0.0025 g/hr instead of 0.0028 g/hr.

Comment 12
Emissions1 Spreadsheet, Test Condition 341C11 – The CO (RA) values should be 6.4, 6.6, 4.7, and 5.9 for Run 1, Run 2, Run 3, and Condition Average, respectively.

Comment 13
Emissions1 Spreadsheet, Test Condition 341C11 – The Carbon Tetrachloride DRE for Run 3 should be 99.99895 instead of 99.99869.

Comment 14
Emissions1 Spreadsheet, Test Condition 341C12 – The Metals Sampling Train Moisture for Run 3 should be 10.4 instead of 10.5.

Comment 15
Emissions1 Spreadsheet, Test Condition 341C12 – The Metal Emission Rates (except hexavalent chromium) with units of ug/dscm were calculated using the stack gas flow rate and oxygen content from the PM/HCl/Cl_2 sample train. These emission rates should be calculated using the metals sampling train stack gas flow rate and oxygen content values.

Comment 16
Emissions1 Spreadsheet, Test Condition 341C12 – The LVM values with units of ug/dscm for Run 1, Run 2, and Run 3 are not calculated correctly using one-half the detection limit.

Comment 17
Feed1 Spreadsheet, Test Condition 341C10 – The Waste Feed LVM value for Run 1 is not calculated correctly using one-half the detection limit.

Comment 18
Feed1 Spreadsheet, Test Condition 341C12 – The Feedstream Description Feedrate Totals for Run 1, Run 2, Run 3, and Condition Average are not calculated correctly. For Run 1, column L is referenced in the summation equation when column N should be referenced. This error is carried through to the Run 2, Run 3, and Condition Average equations. This same error is carried through to the Ash and Chlorine totals. This error is also carried through to the MTEC LVM and SVM totals.

Comment 19
Feed1 Spreadsheet, Test Condition 341C12 – The Lead Feedrate value in lb/hr for the Bedding during Run 1, Run 2, and Run 3 should be 2.48E-04, 2.74E-04, 2.57E-04, respectively.

Comment 20
Process1 Spreadsheet, Test Condition 341C10 – The SCC Temperature for Run 1 should be 2028.5 instead of 2027.5. The Lime Injection Rate values for Run 2 and Run 3 should be 80.2 and 79.1, respectively. The Combustion Gas Velocity values for Run 1, Run 2, and Run 3 should be 40.52, 39.93, and 42.02, respectively.

Comment 21
Process1 Spreadsheet, Test Condition 341C11 – The Combustion Gas Velocity values for Run 1, Run 2, and Run 3 should be 34.85, 35.54, and 37.93, respectively.

Comment 22
Process1 Spreadsheet, Test Condition 341C12 – The Combustion Gas Velocity values for Run 1, Run 2, and Run 3 should be 36.97, 34.53, and 34.64, respectively.

Comment 23
Process1 Spreadsheet, Test Condition 341C13 – The Combustion Gas Velocity values for Run 1, Run 2, and Run 3 should be 28.65, 27.43, and 24.70, respectively.

Comment 24
Summary2 Spreadsheet – The Condition ID numbers are incorrect and should be 341C10, 341C11, 341C12, and 341C13.

ID No. 341, ESF Incinerator, Pollutant Summary Sheet Comments

Comment 1
GlaxoSmithKline has provided detailed comments for each Test Condition, above. The following comments assume that database changes based on those comments will be incorporated into the Pollutant Summary Spreadsheets. Therefore, comments have not been included in this document related to items that GlaxoSmithKline has already provided comment (e.g., emission rates, feed rates, etc.).

Comment 2
The ESF Incinerator air pollution control system has been characterized as consisting of dry lime injection followed by a heat exchanger followed by a fabric filter. The APCS description in each of the Pollutant Summary Sheets should reflect this characterization as DS/HE/FF.

Comment ID No. 21 – ATO Fina Petrochemicals

Comment Summary – Commenter notes that ATO Fina boiler ID No. 811 is currently operated under the Comparable Fuels rule for its main waste feed, and is under the Low Risk Waste Exemption for the other hazardous waste it burns. Recommends that this unit should not be included when determining the HWC MACT standards.

Comment Response – This information will be taken into consideration when determining what data to use when determining HWC MACT standards.

Comment ID No. 21 – ATO Fina Petrochemicals

RCRA Information Center (RIC)
Office of Solid Waste (5305G)
U.S. Environmental Protection Agency Headquarters (EPA HQ)
Ariel Rios Building
1200 Pennsylvania Avenue, NW.
Washington, DC 20460-0002

Re: Docket Number RCRA-2002-0019
NODA – NESHAP: Standards for Hazardous Air
Pollutants for Hazardous Waste Combustors (Final
Replacement Standards and Phase II)

Comments
ATOFINA Petrochemicals, Inc. – La Porte Plant
EPA ID: TXD086981172
EPA Database No. 811
(formerly Fina Oil and Chemical Company – La Porte Plant)

ATOFINA Petrochemicals, Inc. appreciates the opportunity to make the following comments.

A review of the EPA database indicates that the information contained for the 1998 RCOC testing is basically correct. However, there is some important information to consider that has occurred since 1998 affecting the La Porte Plant combustion units listed in the EPA database.

ATOFINA's La Porte Plant manufactures only polypropylene plastic and a by-product called Amorphous Polymer Solution (APS) which is burned, as the main liquid fuel, in the listed units. On September 27, 2001, the APS qualified as a Comparable Fuel prusuant to 40 CFR Section 261.38 and this was confirmed by the Texas Natural Resource Conservation Commission (TNRCC) on March 5, 2002. On April 8, 2002, the TNRCC confirmed that APS is a "primary fuel" as defined in 40 CFR Section 266.109. Under the Boiler and Industrial Furnace (BIF) rules, the one hazardous stream burned (<20% of the time)at these listed units qualifies for the Low Risk Waste Exemption (LRWE).

The 1998 RCOC test was conducted at worst case conditions to prove and establish Automatic Waste Feed Cutoff (AWFCO)limits. During the 1998 RCOC test, spiking of chlorine and particulate matter was conducted.

There is no information contained in the EPA database reflecting routine operation of the listed units. ATOFINA agrees that knowing what to expect during a worst case situation is valuable information but the daily operation norm is important missing information that would be useful for the "More Likely Case" emissions evaluation. Virtually all RCRA stack tests are conducted at maximum rates or worst case situations leaving what ATOFINA considers an important gap in data for normal daily operational emissions.

Considering that the main liquid stream burned by ATOFINA – La Porte Plant is a Comparable Fuel. And the one hazardous waste stream burned qualifies for the BIF Low Risk Waste Exemption, it is believed that EPA should consider excluding the La Porte Plant data before establishing Final Replacement Standards and Phase II.

Thank you for considering our comments.

Sincerely,

Ron Copeland
Environmental Coordinator
281 476 3762

<u>Comment ID No. 22 – Bostick Findley, Inc.</u>

<u>Comment Summary</u> – The commenter wonders why the HWC boiler operated by Bostick Findley in Middleton MA is not included in the data base.

<u>Comment Response</u> – EPA was not able to obtain a copy of the Bostick Findley test report in sufficient time to add it to the NODA database. EPA is surprised that a copy of the test report was not included in the commenters submission. EPA OSW has obtained a copy of the test report from EPA Region 1, and has added it to the HWC database.

<u>Comment ID No. 22 – Bostick Findley, Inc.</u>

USEPA

Subject: Docket ID RCRA-2002-0019

The NODA that you are requesting comments does not include BostikFindleys HWC unit that is Located in Middleton Massachusetts. BostikFindleys HWC unit is and industrial boiler that is operating under interim status since the implementation of the BIF regulation to the present. We have conducted several recertification tests and submitted them to USEPA region 1. Our EPA ID # is MAD00103767.

I would like to have our facility included in the NODA to ensure that it is considering all parties affected by the database.

James Harlow
EHS Specialist
BostikFindley Inc.
211 Boston Street
Middleton Ma, 01949
978-750-7466
jim.harlow@bostikfindley-us.com

Comment ID No. 23 and 24 – BASF Coporation

Comment Summary – The commenter is concerned about the data base inaccuracies, but has not yet been able to provide any specific problems.

Comment Response – Data base changes will be made as requested. However, no specific issues or comments have been received. Note that the commenter will have a further opportunity to comment on the accuracy of the data base as part of the proposed Replacement HWC MACT Rule.

Comment ID No. 23 and 24 (identical) – BASF Corporation

Sent By Electronic Mail Only

August 16, 2002

RCRA Docket Information Center
U.S. Environmental Protection Agency Headquarters (EPA HQ)
Office of Solid Waste
Ariel Rios Building (5305G)
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0002

Re: RCRA Docket Number RCRA-2002-0019
"NESHAP Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (Final Replacement Standards and Phase II) – Notice of Data Availability (NODA)"

Dear Sir or Madam:

BASF Corporation is submitting these comments on NESHAP Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (Final Replacement Standards and Phase II) – Notice of Data Availability (NODA) noticed in the July 2, 2002 Federal Register (67 FR 44452). These comments apply to Docket Number RCRA-2002-0019.

At this point BASF Corporation has not completely reviewed the data that pertains to us within this NODA. We are currently in the process of reviewing data recorded for ten of the combustion units in the database. These ten units and their test reports are located at four separate sites in three different states. An initial cursory review of the data has indicated some inaccuracies for at least one unit's emissions. The 45 days EPA has allowed for comment on this data was not sufficient to complete our review. We intend to continue our review efforts and submit any corrections by October 1st, 2002.

If you have any questions about our comments, please contact Mark Allen at (979) 415-8387.

Sincerely,

Mark S. Allen
BASF Corporate Air Team Member

<u>Comment ID No. 25 – NutraSweet Company</u>

<u>Comment Summary</u> – Provided brief comments on accuracy of the data for boiler ID Nos. 776 and 777. Also, requests an extension to review further.

<u>Comment Response</u> – Changes made as requested. No further changes have been received. Note that, as mentioned above, the commenter will have a further opportunity to comment on the accuracy of the data base as part of the proposed Replacement HWC MACT Rule.

<u>Comment ID No. 25 – NutraSweet Company</u>

August 15, 2002

RCRA Information Center
Office of Solid Waste (5305G)
U. S. Environmental Protection
Agency Headquarters (EPA HQ)
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0002

Re: Docket # RCRA-2002-0019
Phase II ID Nos. 776 and 777
EPA ID No.: GAD981237118
Facility Name: The NutraSweet Company

Dear Sir or Madam:

The NutraSweet Company of Augusta, Georgia (formerly Monsanto) is submitting the following revisions to 1997 database report the data previously submitted.

1. The facility has change owners/operator so please update the database for Phase II ID Numbers 776 and 777 to **The NutraSweet Company, 1762 Lovers Lane, Augusta, GA 30901.**
2. Heat input rate for the IDs # 776 and 777 is 66 MMBTU/hr and 26 MMBTU/hr respectively.

Based on a review of the June 1997 Certification of Compliance test report there are minor transcription discrepancies in the tables and spreadsheets as compared to test report data. I would like to request a 30-day extension for the opportunity to review in further details and provide the necessary corrections. Thank you for opportunity to comment on the above NODA.

Respectfully submitted,

Irma C. Riddick
Director, ES&H

Comment ID No. 26 – Environmental Technology Countil

Comment Summary – Provided comments on the contents of the data base for the ETC member HWCs. Many of these comments were included in revised Excel data files; these are not included in this document. Commenter agreed with decision to not include MACT standards for HW burning sulfur recovery furnaces. Commenter also provided various comments on the general database and data handling issues.

Comment Response – Made most of the specific database changes as requested. Responses to general issues are included below in blue underline text after each specific issue.

Comment ID No. 26 – Environmental Technology Council

Environmental Technology Council
734 15th Street, N.W. • Suite 720 • Washington, DC 20005 • (202) 783-0870

Filed electronically: www.epa.gov/edocket
Hard copy filed by U.S. mail

August 21, 2002

RCRA Information Center
Office of Solid Waste (5305G)
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Docket No. RCRA-2002-0019

To the Docket:

The Environmental Technology Council (ETC) submits these comments on the Notice of Data Availability (NODA) for the NESHAP Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (Final Replacement Standards and Phase II) published in the Federal Register on July 2, 2002. 67 Fed. Reg. 44452.

STATEMENT OF INTEREST

The ETC is a national trade association of companies engaged in the treatment, recycling, and disposal of industrial and hazardous wastes, the cleanup of contaminated properties, and related equipment manufacturing. ETC firms operate permitted facilities for commercial waste management and provide technologies and services to customers throughout the U.S. and Canada. A number of ETC member companies own and operate hazardous waste incinerators and lightweight aggregate kilns, and other ETC members collect and provide hazardous waste fuels to cement kilns, and these firms will be directly affected by this rulemaking.

The ETC has reviewed the databases for incinerators, cement kilns, and lightweight aggregate kilns for accuracy and completeness, and we have provided corrections and additions where appropriate in these comments. 67 FR 44,456 col. 1. When the NODA was published, EPA provided us with the spreadsheet versions of the individual source data in Microsoft Excel format on a CD-ROM, and we appreciate this courtesy. We were able to conduct a more complete and useful review as a result.

These comments are divided into two parts. Part I sets forth comments on ETC member facilities. For each source, we refer in these comments to the identification number for the spreadsheet data file and have included a CD-ROM with corrected and updated spreadsheets as appropriate. Part II presents our concerns and suggestions on the databases in general.

PART I – COMMENTS ON ETC MEMBER FACILITIES

327 Safety-Kleen (Aptus), Aragonite, Utah

EPA did not use the correct report for the 1992 trial burn for the Safety-Kleen (formerly Aptus) incinerator in Aragonite, Utah. A trial burn report was issued in 1992, but it was then revised and reissued in March 1993. EPA mistakenly used the 1992 report, rather than the revised 1993 report. As a result, the dioxin/furan test report data for the Aragonite incinerator are different from the data in EPA's database.

Copies of the correct tables for the PCDD/PCDF Stack Concentrations from the revised March 1993 trial burn report are attached to these comments, and are included on the ETC's CD-ROM as "327 SK Aragonite DF Tables.doc." We did not attempt to change the EPA spreadsheet to replace the incorrect dioxin data with the emissions data from these tables.

A revised spreadsheet labeled "327 SK Aragonite Corrected.xls" with comments that correct other errors and provide missing information is also included on the CD-ROM. The "Track Changes" feature in Microsoft Excel was used to put a red mark in the upper right corner of cells that were changed, so that the corrected or additional information can be easily identified on the revised spreadsheet.

201, 488, 489, and 609 Safety-Kleen (Rollins) Deer Park, Texas

The followed revised spreadsheets are included on the CD-ROM enclosed with these comments:

201 SK Deer Park Corrected.xls
488 SK Deer Park Corrected.xls
489 SK Deer Park Corrected.xls
609 SK Deer Park Corrected.xls

These spreadsheets correct errors and provide missing information regarding the Safety-Kleen (formerly Rollins) incinerator in Deer Park, Texas. The corrected or additional data are highlighted in red on the revised spreadsheets.

331 Ross Incineration Services, Grafton, Ohio

A revised spreadsheet labeled "331 Ross Corrected.xls" with minor corrections to the EPA spreadsheet is included on the ETC CD-ROM. The changes are highlighted in yellow.

3000 Reynolds Aluminum, Gum Springs, Arkansas

The EPA spreadsheet for the Gum Springs incinerator did not provide classifications for the data. Therefore, we provide the following commentary on the worksheets in the Excel database spreadsheet for this facility.

General

The data should be classified as follows:

1. 3000C1 should be considered 'worst case' for metals emissions due to metals spiking and elevated kiln temperatures.

2. 300C2 should be considered 'worst case' for organics removal and destruction due to minimization of kiln and afterburner temperatures. It should also be considered 'worst case' for PM and HCL due to the 2 kiln operation.

3. Due to problems with the baghouse inlet temperature measurements, and the different kiln operating conditions during the test, it is difficult to quantify either test condition as 'worst case' for D/F.

Source Worksheet

Cell C16 and C17 - This facility is somewhat unique in that its APC train includes an afterburner system in addition to the units listed. In effect, the kilns serve to 'desorb' the hazardous constituents from the waste rather than totally destroy them, with actual destruction taking place in the afterburners. Therefore, please include the afterburner system in the APC train descriptions. It is downstream of the fabric filters, is fueled by natural gas, and operates in the range of 1750-1800 degrees F with an approximate 2 second gas residence time.

Condition Worksheet

No comments

· *Cells F28, H28, and J28* – 'nd' is needed in these cells to reflect non-detect concentrations of nickel in test condition #1.

· *Cells F29, H29, and J29* – 'nd' is needed in these cells to reflect non-detect concentrations of selenium in test condition #1.

· *Cells F32, H32, and J32* – 'nd' is needed in these cells to reflect non-detect concentrations of zinc in test condition #1.

· *Cell I70* – For HCL emissions in run #2 of test condition #2, the value should be 0.0364 lb/hr, current value reflects 0.0346 lb/hr.

· *Cells F78, H78, and J78* – 'nd' is needed in these cells to reflect non-detect concentrations of antimony in test condition #2.

· *Cell J79* – 'nd' is needed in these cells to reflect non-detect concentrations of aluminum in test condition #2.

· *Cells F81, H81, and J81* – 'nd' is needed in these cells to reflect non-detect concentrations of barium in test condition #2.

· *Cells F84, H84, and J84* – 'nd' is needed in these cells to reflect non-detect concentrations of copper in test condition #2.

· *Cells F87 and H87* – 'nd' needed in these cells to reflect non-detect concentrations of mercury in test condition #2, runs #1 and #2.

· *Cells F88, H88, and J88* – 'nd' needed in these cells to reflect non-detect concentrations of nickel in test condition #2.

· *Cells F89, H89, and J89* – 'nd' needed in these cells to reflect non-detect concentrations of selenium in test condition #2.

· *Cells F92, H92, and J92* – 'nd' needed in these cells to reflect non-detect concentrations of zinc in test condition #2

· *Rows 95, 96, 97, and 98* – data on stack gas flow, oxygen, moisture, and temperature were all selected from sampling train #2 information. It is unclear why sampling train #2 was selected as it is not worst, best, or average in any or all cases.

Feed Worksheet

· *Cell F9* – fluoride feed value for test condition #1, run #1 should be 2160 lb/hour, not 21600 as currently exists in cell F9.

· *Cell J53* – ash feed rate value for test condition #2, run #3 should be 96,000 lb/hour, not 9600 as currently exists in cell J53.

· *Cell I66* – this cell should have the 'nd' removed as there was a recorded value for the silver concentration in the potliner feed for test condition #2, run#3.

Process Worksheet

Rows 8 and 18 – As noted above, the baghouse inlet temperature values recorded during the trial burn should be considered extremely suspect and not relied on as representative of an operating condition of the unit(s), as difficulties with the temperature sensing equipment at this location were encountered during the trial burn test.

Dioxin/Furan Condition #1 Worksheet

No comments.

Dioxin Furan Condition #2 Worksheet

No comments.

Source Description Summary (summ 1)Worksheet

No comments.

Emissions and Feedrate Data Summary (summ 2)
Worksheet

No comments.

Copies of the relevant pages from the trial burn reports for the Gum Springs incinerator that support this information are provided on the CD-ROM in the following PDF documents:

M035043602223787 1700.pdf
M03504390222378886 00.pdf
M05404230222379190 00.pdf
M05404440222379024 00.pdf