

## **Trial Burn Review Checklist/Tech Review**

**Company Name:** DuPont (Sabine River Works) - Orange **ISWR #:** 30019

**Air Permit Coordinator:** Edward Rapier **HW** **Permit** **#:** HW-50230-001

**Facility Description:** Five Boilers and One Rotary Kiln Incinerator

### **I. OVERVIEW**

DuPont has submitted trial and risk burn plans for their Sabine River Works. This site produces adiponitrile (ADN), hexamethylenediamine, and adipic acid. There are five boilers and one rotary kiln incinerator that burn hazardous waste at the Sabine River Works. The two boilers in the ADN section are designated ADN Boilers North and South. The utility boilers are designated Power Boilers No. 5, No. 7, and No. 8.

The ADN boilers are each Babcock & Wilcox pressure fired integral type unit, model 28-20. The North boiler was manufactured in 1977, the South boiler in 1971. Each unit consists of an integral furnace boiler with superheater, forced draft fan, and Ljunstron regenerative air heater. The maximum heat input of each boiler is 514 MMBtu/hr. Both units can fire liquid and gaseous process wastes and supplemental natural gas.

Power Boiler No. 5 is a Babcock & Wilcox front fired boiler, Model F, designed with four gas/liquid ring type burners and manufactured in 1945. The unit consists of an integral furnace boiler with superheater, forced draft/induced draft fans, and a tubular air heater. The maximum heat input is 263 MMBtu/hr. The unit is designed to fire mainly liquid process wastes with supplemental firing of natural gas and process off-gases.

Power Boiler No. 7 is a Babcock & Wilcox front fired boiler, Model FH, designed with four gas/liquid ring type burners and manufactured in 1955. The unit consists of an integral furnace boiler with superheater, forced draft/induced draft fans, and a tubular air heater. The maximum heat input is 268 MMBtu/hr. The unit is designed to fire mainly liquid process wastes with supplemental firing of natural gas and process off-gases.

Power Boiler No. 8 is a Babcock & Wilcox front fired boiler, Model FH, designed with six gas/liquid spud type burners and manufactured in 1964. The unit consists of an integral furnace boiler with superheater, forced draft/induced draft fans, and a regenerative air heater. The maximum heat input is 329 MMBtu/hr. The unit is designed to fire mainly liquid process wastes with supplemental firing of natural gas and process off-gases.

Power Boilers No. 7 and No. 8 vent through a common stack.

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The incinerator train consists of a rotary kiln, vertical afterburner, and emission control system. The kiln has a diameter of 14.44 ft and a length of 39.4 ft. The afterburner chamber has an equivalent diameter of 21.4 ft (19 ft by 19 ft) and a height of 24.1 ft. Total system design heat input is 140 MMBtu/hr. The emissions control system consists of a quench tower, baghouse, saturator, condenser, high energy scrubber, and mist separator.

DuPont's trial burn proposal calls for a mix of testing, data in lieu of testing, and Adjusted Tier I screening.

## **II. TESTING CONDITIONS**

### **A. Trial Burn**

DuPont is proposing to test only three boilers for the Trial Burn (one of the two ADN Boilers, Power Boiler No. 8, and one of the other two Power Boilers). This is based on a letter dated July 25, 1995, in which the TNRCC agreed with a DuPont request relating to a pending permit action that the ADN North Boiler and Power Boiler No. 7 were sufficiently similar to the ADN South Boiler and Power Boiler No. 5 respectively to allow the use of test data in lieu of testing. Boiler selection for testing will be based on availability at the time of trial burn plan approval.

#### **Primary Proposal:**

Perform Low Temperature Condition testing for DRE and CO on three boilers and use data in lieu of testing or Adjusted Tier I for all other standards. The ADN Boiler will be tested at maximum liquid waste feed rate, zero off-gas flow, reduced natural gas flow, and reduced steam production. Power Boiler No. 8 will be tested at maximum liquid waste feed rate, zero off-gas flow, and reduced steam production. The other tested power boiler will be tested at maximum liquid waste feed rate, zero off-gas flow, and reduced steam production.

Data in Lieu of Testing - Use DRE and CO data from the tested boilers for the designated similar units. Use 1995 Certificate of Compliance Testing data for PM. Use Adjusted Tier I for HCl/Cl. Use Adjusted Tier I for all metals except Cr at the Power Boilers. Use 1995 Certificate of Compliance data for Power Boiler Tier III Cr.

#### **Secondary Proposal:**

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If the TNRCC does not allow use of the data in lieu of testing, then DuPont plans to test three of the five boilers at the High Temperature Condition in addition to the Low Temperature Condition test. The ADN Boiler will be tested at maximum liquid waste feed rate, high off-gas flow, natural gas flow, and steam production. Power Boiler No. 8 will be tested at maximum liquid waste feed rate, and high off-gas flow and steam production. The other tested power boiler will be tested at maximum liquid waste feed rate, high off-gas or natural gas flow, and high steam production.

Data in Lieu of Testing - Use Cr, PM, and CO data from the tested boilers for the designated similar units. Use Adjusted Tier I for HCl/Cl. Use Adjusted Tier I for all metals except Cr at the Power Boilers.

### **B. Risk Burn**

#### **Primary Proposal:**

Surrogate Data - DuPont is proposing to use data from boiler testing at a similar plant in Victoria and data from the 1990 Rotary Kiln Incinerator Trial Burn for the Risk Burn.

#### **Secondary Proposal:**

If the TNRCC does not allow the use of surrogate data, then DuPont plans to test up to three of the boilers as needed to obtain the data. The incinerator was not included in the risk burn proposal. The boilers are proposed to be tested at "normal" operating conditions. No indication is given as to what firing rates constitute normal operation. DuPont proposes that the permit limits be based on the maximum feedrates accomplished during the Trial Burn and not the reduced feed rates of the Risk Burn.

## **III. REGULATORY REQUIREMENTS**

### **A. Standards Checklist Table**

A copy of the 1990 trial burn test report for the incinerator was included in the DuPont submittal. No proposal was made to conduct new testing or use the existing data in lieu of testing.

The liquid waste streams were analyzed for metals, ash, chlorine, Appendix VIII

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compounds, heating value, and viscosity. The gaseous streams were analyzed for heating value.

Primary Proposal:

Combustion Unit	DRE Std		PM Std		HCl/Cl <sub>2</sub>		CO/THC		Metals	
	Test	Data	Test	Data	Test	Data	Test	Data	Test	Data
ADN N or S	*			*		ATI	*			ATI
ADN N or S		*		*		ATI		*		ATI
Pw Blr 5 or 7	*			*		ATI	*			**
Pw Blr 5 or 7		*		*		ATI		*		**
Pw Boiler 8	*			*		ATI	*			**
Incinerator	?	?	?	?	?	?	?	?	?	?

Notes:

- ATI Adjusted Tier I. Operating limits are based on feed screening, not emissions testing.
- \* For chromium Tier III only, all other metals covered under Adjusted Tier I.
- ? Not addressed in Trial Burn Plan.

Secondary Proposal:

Combustion Unit	DRE Std		PM Std		HCl/Cl <sub>2</sub>		CO/THC		Metals	
	Test	Data	Test	Data	Test	Data	Test	Data	Test	Data
ADN N or S	*		*			ATI	*			ATI
ADN N or S		*		*		ATI		*		ATI
Pw Blr 5 or 7	*		*			ATI	*		**	ATI
Pw Blr 5 or 7		*		*		ATI		*		**
Pw Boiler 8	*		*			ATI	*		**	ATI
Incinerator	?	?	?	?	?	?	?	?	?	?

Notes:

- ATI Adjusted Tier I. Operating limits are based on feed screening, not emissions testing.
- \* For chromium Tier III only, all other metals covered under Adjusted Tier I.
- ? Not addressed in Trial Burn Plan.

### B. Data in Lieu of Testing

DRE - Trial burn data from the tested boilers will be used for the designated similar units.

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PM - Under DuPont's primary proposal, data from the 1995 Certificate of Compliance testing will be used. This data passed the Engineering Services QA/QC. Two test conditions were run. Test Condition 1 was run at the permitted maximum hazardous feed and ash feed rates. The secondary proposal will use trial burn data from the tested boilers for the designated similar units.

CO - Trial burn data from the tested boilers will be used for the designated similar units.

Cr - Under DuPont's primary proposal, data from the 1995 Certificate of Compliance testing will be used. This data passed the Engineering Services QA/QC. The secondary proposal will use trial burn data from the tested power boiler (No. 5 or No. 7) for the designated similar unit.

### C. POHC Selection per § 264.342 and § 270.62

Two Class 1 compounds can be present in DuPont's waste - hydrogen cyanide (HCN) and benzene. Neither compound was chosen as a POHC. HCN has unacceptable risks in handling and benzene can be a PIC. DuPont proposes to spike the waste with another Class 1 compound, chlorobenzene, as the POHC. The POHC will be tested for using EPA Volatile Organic Sampling Train Method 0030. No information was given on how much chlorobenzene will be spiked or on how the chlorobenzene will be introduced into the waste. Chlorobenzene is a PIC. DuPont should address this in their discussion of the POHC selection and choose another POHC if necessary.

### D. Emissions Monitoring/Testing per § 264.347 and § 266.102(e)(8)

Samples of the liquid waste streams will be taken every 15 minutes during the trial burn test runs. These samples will be analyzed for the POHC (chlorobenzene), metals, and PM. Each boiler is equipped with CO and O2 CEMS.

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### IV. RISK BURN REQUIREMENTS

#### A. Risk Assessment Data Table

Primary Proposal:

Combustion Units	Volatiles		Semi-Vols		D/Fs		Ttl Organics		Part. Size	
	Test	Data	Test	Data	Test	Data	Test	Data	Test	Data
ADN North		*		*		*		*		*
ADN South		*		*		*		*		*
Pw Boiler 5		*		*		*		*		*
Pw Boiler 7		*		*		*		*		*
Pw Boiler 8		*		*		*		*		*
Incinerator		*		*		*		*		*

Secondary Proposal:

Combustion Units	Volatiles		Semi-Vols		D/Fs		Ttl Organics		Part. Size	
	Test	Data	Test	Data	Test	Data	Test	Data	Test	Data
ADN North	*		*		*		*		*	
ADN South		*		*		*		*		*
Pw Boiler 7	*		*		*		*		*	
Pw Boiler 5		*		*		*		*		*
Pw Boiler 8	*		*		*		*		*	
Incinerator		*		*		*		*		*

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### **B. Surrogate Risk Data**

#### **Primary Proposal:**

DuPont is proposing to use data from boiler testing at a similar plant in Victoria and data from the 1990 Rotary Kiln Incinerator Trial Burn for the Risk Burn. The testing from the Victoria Plant did not pass the Engineering Services QA/QC. The Sabine River Works produces similar chemicals to the Victoria Plant. To determine if the Victoria Plant and Sabine River Works facilities are similar enough to use surrogate data, more information is needed on the composition of the reactor feeds, analyses of the waste streams, and a technical comparison of the boilers at the two facilities. The incinerator was tested for a Trial Burn in 1990. This test did not gather the type of emissions data needed for a Risk Analysis.

#### **Secondary Proposal:**

Perform testing for the pollutants that do not have acceptable surrogate data on the ADN North Boiler, Power Boiler No. 7, and/or Power Boiler No. 8 (as required by TNRCC) and use the data for the designated similar units. No additional testing was proposed for the incinerator. The existing incinerator test does not contain the type of emissions data needed for a Risk Analysis.

### **C. Stack Parameters**

EPA Reference Methods 1 and 3 are proposed for determination of stack gas flow, O<sub>2</sub> and CO<sub>2</sub> concentration, and molecular weight.

### **D. Waste Feed Testing**

Under the secondary proposal samples of the hazardous waste will be tested for chlorine (ASTM D808 or EPA 5050/EPA9056), ash (ASTM D482), heating value (ASTM D240 or D1989), ultimate analysis (ASTM D3176), proximate analysis (ASTM D3172), and BIF metals (ICAP (SW-846 6010) & GFAA or CVAA (SW-846 7000 series))

### **E. Residuals Testing**

No residuals testing was proposed.

## **V. DISCUSSION**

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### A. Trial Burn

The trial burn proposal did not address the incinerator. If the incinerator does not need to be tested, then DuPont should state why. If they plan on using the 1990 data in lieu of testing, then they should make such a request and justify that the incinerator operates in the same manner that it did in 1990. If a new trial burn is required, then DuPont will need to propose a trial burn plan for the incinerator.

Based on the hazardous rate feedrate on the CC-4 forms of the 1995 Certificate of Compliance test, it appears that Test Condition 1 of the 1995 test corresponds to the High Temperature Condition test required to demonstrate compliance with the PM limit.

Chlorobenzene is to be spiked into the waste as a POHC to demonstrate compliance with the DRE requirement. DuPont should describe how the chlorobenzene will be added to the waste to ensure proper mixing. The spiked concentration should be shown to be enough for the test method to easily measure the POHC after 99.99 % destruction.

Chlorobenzene is a PIC. DuPont should address this in their discussion of the POHC selection and choose another POHC if necessary.

No residuals testing is proposed. It is not clear from the submittal if residuals are expected. If they are, then testing should be performed on the residuals.

Power Boilers No. 7 and No. 8 vent through a common stack. DuPont should address how sampling is to be performed to determine emissions from the individual boilers.

### B. Risk Burn

DuPont proposes to use test data from their Victoria Plant as surrogate data for the Sabine River Works risk analysis. To determine if the Victoria Plant and Sabine River Works facilities are similar enough to use surrogate data, more information is needed on the composition of the reactor feeds, a description of the reactor trains, analyses of the waste streams, and a technical comparison of the boilers at the two facilities.

The risk burn plan proposes to use the 1990 incinerator trial burn data for the risk analysis. This data addresses compliance with regulatory standards and does not contain data appropriate to a risk analysis, such as volatiles, semi-volatiles, dioxins/furans, total organics, and particle size distribution.



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If testing is required, then DuPont proposes to conduct the test at normal operating rates and conditions. However the Risk Burn plan states "Consistent with routine variations in normal operations, actual levels may vary from target levels." They do not indicate what the normal levels are, what a typical variation might be, how often these variations may occur, their duration, and their effect on emissions.

In a related issue, DuPont proposes that the permit limits be based on the maximum feed rates accomplished during the Trial Burn and not the reduced feed rates of the Risk Burn and proposes that there be no additional permit conditions for operating parameters and constituent feed rates based on Risk Burn results. However, there is no guarantee that a successful Risk Analysis at normal operating conditions would be successful at maximum operating conditions. DuPont should expect additional permit limitations, such as an annual cap on the amount of waste burned.

Power Boilers No. 7 and No. 8 vent through a common stack. DuPont should address how sampling is to be performed to determine emissions from the individual boilers.

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Permit Engineer

Date

Team Leader

Date