

SECTION 4. APPENDIX G
RTO Operation And Maintenance Plan



**CATALENT PHARMA SOLUTIONS
REGENERATIVE THERMAL OXIDIZER (RTO)
OPERATION AND MAINTENANCE PLAN**

FDEP Facility Number 1030112

Date: September 6, 2007

Revision Number: 1

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Introduction

This Operation and Maintenance (O & M) plan is developed to meet the requirements of Pinellas County Code and Land Development Code, Chapter 58, Article IV, Division 2, Section 58-128, *Operation and Maintenance Plan*.¹ This manual is prepared for the Regenerative Thermal Oxidizer (RTO) manufactured by Advantage Energy Group (AEG). This RTO was installed in late CY 2005, and began initial operation on November 30, 2005.

Although this unit is a previously owned unit, it was extensively refurbished by AEG prior to delivery to Catalent Pharma Solutions (formerly Cardinal). Thus, this unit has completely upgraded controls, which utilizes a programmable logic controller (PLC) that continuously monitors a variety of operating parameters, and makes necessary adjustments or notifications, as appropriate. Therefore, this manual may be somewhat abbreviated when compared to O & M manuals for pollution control equipment that does not have the state of the art controller that is present on this equipment.

The PLC provides computer controlled monitoring of a wide variety of operating parameters on a frequent basis that is more extensive than could be performed by human operators. The PLC includes a wide variety of interlocks and logic algorithms, which are enhanced during the continued operation of the equipment. As such, the various interlocks and set points may be modified by field technicians to meet site-specific needs. Hence, it is not appropriate to include all the interlocks, algorithms, and functions in this O & M plan. Instead, the main operational parameters for the RTO are included in this O & M plan.

In addition, the PLC has a variety of algorithms that include periodic and corrective maintenance. The periodic requirements are programmed according to a pre-established schedule. The operator is reminded of these requirements by a message on the controller screen.

The corrective maintenance requirements are determined based on data collected by the PLC. In the event of corrective maintenance being required, a message is displayed on the controller screen. The overall maintenance menu of the PLC may be accessed by pressing the F7 key.

Maintenance of the RTO is tracked in the database system utilized by Catalent Pharma Solutions (Formerly Cardinal). Currently, these maintenance records are maintained in a system developed by J.D. Edwards. This system, or its successor, will be used to schedule maintenance tasks and record specific information associated with the maintenance activities.

¹ Pinellas County Code and Land Development Code, Dated April 4, 2006.

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Operating Parameters
and
Routine Periodic Observations

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Operating Parameters and Routine Periodic Observations

This section addresses the main operating parameters for the proper operation of the RTO. As discussed in the introduction, the RTO is controlled by a programmable logic controller (PLC), which performs sampling (monitoring) and adjustment of operations more frequently and precisely than would be accomplished by human intervention. Hence, this section lists the overall operational parameters for the equipment. The specific and detailed operating parameter ranges and logic are contained in the PLC, and are considerably more detailed than what is appropriate for inclusion in this operation and maintenance plan. The main operational parameters, including the routine observation schedule, for this device are listed in Table 1 following.

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Table 1: RTO Operating Parameters

Parameter	Value	Units	Routine Periodic Observation Schedule
Design Gas (inlet) Flow Rate	12,000	standard cubic feet per minute (scfm)	During Reference Test Method (RTM) as required by permit
Maximum Gas (inlet) Flow Rate	13,500	scfm	During Reference Test Method (RTM) as required by permit
Minimum Gas (inlet) Flow Rate	3,000	scfm	During Reference Test Method (RTM) as required by permit
Maximum solvent loading	223	pounds per hour (lb/hr) – based on loading with ethanol	During Reference Test Method (RTM) as required by permit
Maximum operating temperature ²	2,000	degrees Fahrenheit (°F)	Continuous during operation of equipment, use of strip chart, digital data logging, or other equivalent method.
Minimum operating temperature	1,450	°F	Continuous during operation of equipment, use of strip chart, digital data logging, or other equivalent method.

² Maximum operating temperature is provided for long term equipment protection interests. Because destruction reduction efficiency (DRE) increases with temperature, there are no concerns with meeting minimum DRE should there be a short term period of elevated temperature.

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Maintenance Schedule
and
Maintenance Records

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Maintenance Schedule and Maintenance Records

The overall periodic maintenance schedule is maintained in the PLC software and the facility's maintenance scheduling software (currently a J.D. Edwards solution). Corrective maintenance is performed as required to address a particular situation, including those that are identified by the PLC software and human operators. The maintenance records are retained using the maintenance scheduling software.

The overall periodic maintenance schedule is summarized following. These activities are grouped based on the frequency of the activities. This schedule is based on the suggested maintenance frequency recommended by the RTO equipment manufacturer, AEG. Changes to this schedule may be made by Catalent Pharma Solutions (formerly Cardinal) based on operational experience with the equipment and standardized internal practices for particular items of equipment.

Maintenance records are stored in a central location at the facility. These records are maintained in files organized individual equipment, and are also retained in the database system utilized by Catalent Pharma Solutions (formerly Cardinal).

Weekly (at a minimum)

1. Check instrument air filters
2. Check instrument air moisture traps
3. Human sensory checks (i.e., visual, audible, and olfactory) for leaks in natural gas and compressed air lines
4. Visual inspection of RTO for warpage or discoloration of the paint
5. Check temperature readings of unit thermocouples
6. Take bed differential and static pressure readings
7. Check natural gas pressure
8. Check process fan amperage loads
9. Visual check of process fan belts

Quarterly (at a minimum)

1. Process fan visual inspection – check for proper operation (e.g., no loose belts)

Semi-annually (at a minimum)

1. Check the tightness of the incoming and outgoing wiring terminations of the motor starters, contacts, and fuse blocks
2. Testing and recalibration of the low bed differential pressure switches (DPSL-201 and DPSL-202)

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Spare Parts List

Equipment list of Material - (List of Material Information)

File Edit View Options Help Links Print... Internal

Branch/Plant: 411

Parent Item: DET-BOM-RT001 REGENERATIVE THERMAL OXIDIZER

As of Date: Type of Bill: SEB Oper Resp

Drawing #: Item Rev Level: Ship to Line No.

Item Number	Description	Quantity	UOM	S	V	In Cd	Ship Typ	Ln Ty	Line No.	Oper Resp	Effective From	Effective Thru	Drawing Number	Rev
DET-VI-94854	ALLEN BRADLEY PLC BAY	1.00000	EA	V		1	B		7.0	10.00	11/21/2008	12/31/2020		
DET-VI-94855	SPARK IGNITOR	1.00000	EA	V		1	B		8.0	10.00	11/21/2008	12/31/2020		
DET-VI-94859	COMBUSTION ZONE TIC	1.00000	EA	V		1	B		9.0	10.00	11/21/2008	12/31/2020		
DET-VI-94870	COMBUSTION ZONE TIC (RED)	2.00000	EA	V		1	B		10.0	10.00	11/21/2008	12/31/2020		
DET-VI-94872	COMBUSTION CHAMBER	1.00000	EA	V		1	B		11.0	10.00	11/21/2008	12/31/2020		
DET-VI-94873	PANEL FUSE REPLACEMENT SET	1.00000	EA	V		1	B		12.0	10.00	11/21/2008	12/31/2020		
DET-VI-94874	CYLINDER REGULATOR	2.00000	EA	V		1	B		13.0	10.00	11/21/2008	12/31/2020		
DET-VI-94875	DIRECTIONAL VALVE SOLENOID	1.00000	EA	V		1	B		14.0	10.00	11/21/2008	12/31/2020		
DET-VI-94877	DIRECTIONAL VALVE DIOC	1.00000	EA	V		1	B		15.0	10.00	11/21/2008	12/31/2020		
DET-VI-94878	GAS SHUT DOWN VALVE ACTUATOR	1.00000	EA	V		1	B		16.0	10.00	11/21/2008	12/31/2020		
DET-VI-94879	GAS SHUT DOWN VALVE	1.00000	EA	V		1	B		17.0	10.00	11/21/2008	12/31/2020		
DET-VI-94880	MODULATING GAS ACTUATOR	1.00000	EA	V		1	B		18.0	10.00	11/21/2008	12/31/2020		
DET-VI-94881	HI-GAS PRESSURE SWITCH	1.00000	EA	V		1	B		19.0	10.00	11/21/2008	12/31/2020		
DET-VI-94882	LOW-GAS PRESSURE SWITCH	1.00000	EA	V		1	B		20.0	10.00	11/21/2008	12/31/2020		
DET-VI-94883	120V SOLENOID	1.00000	EA	V		1	B		21.0	10.00	11/21/2008	12/31/2020		
DET-VI-94885	UV SCANNER	1.00000	EA	V		1	B		22.0	10.00	11/21/2008	12/31/2020		
DET-VI-94888	FLAME SAFEGUARD MAIN RELAY	1.00000	EA	V		1	B		23.0	10.00	11/21/2008	12/31/2020		
DET-VI-94887	SCANNER BOLS	1.00000	EA	V		1	B		24.0	10.00	11/21/2008	12/31/2020		
DET-VI-95010	PM BELT	4.00000	EA	V		1	B		25.0	10.00	11/21/2008	12/31/2020		
		30000												

Equipment list of Material - (List of Material Information)

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Branch/Plant: 411

Parent Item: DET-BOM-RT001 REGENERATIVE THERMAL OXIDIZER

As of Date: Type of Bill: SEB Oper Resp

Drawing #: Item Rev Level: Ship to Line No.

Item Number	Description	Quantity	UOM	S	V	In Cd	Ship Typ	Ln Ty	Line No.	Oper Resp	Effective From	Effective Thru	Drawing Number	Rev
DET-VI-94850	DIFFERENTIAL PRESSURE TRANSMIT	1.00000	EA	V		1	B		1.0	10.00	11/21/2008	12/31/2020		
DET-VI-94856	COMBUSTION AIR	1.00000	EA	V		1	B		2.0	10.00	11/21/2008	12/31/2020		
DET-VI-94860	INDICATING DAMPER ACTUATOR	1.00000	EA	V		1	B		3.0	10.00	11/21/2008	12/31/2020		
DET-VI-94881	FRESH AIR ACTUATOR	1.00000	EA	V		1	B		4.0	10.00	11/21/2008	12/31/2020		
DET-VI-94882	INLET VALVE THERMOCOUPLE	4.00000	EA	V		1	B		5.0	10.00	11/21/2008	12/31/2020		
DET-VI-94883	PI-PNEUMATIC TRANSDUCER	1.00000	EA	V		1	B		6.0	10.00	11/21/2008	12/31/2020		
DET-VI-94884	ALLEN BRADLEY PLC BAY	1.00000	EA	V		1	B		7.0	10.00	11/21/2008	12/31/2020		
DET-VI-94855	SPARK IGNITOR	1.00000	EA	V		1	B		8.0	10.00	11/21/2008	12/31/2020		
DET-VI-94859	COMBUSTION ZONE TIC	1.00000	EA	V		1	B		9.0	10.00	11/21/2008	12/31/2020		
DET-VI-94870	COMBUSTION ZONE TIC (RED)	2.00000	EA	V		1	B		10.0	10.00	11/21/2008	12/31/2020		
DET-VI-94872	COMBUSTION CHAMBER	1.00000	EA	V		1	B		11.0	10.00	11/21/2008	12/31/2020		
DET-VI-94873	PANEL FUSE REPLACEMENT SET	1.00000	EA	V		1	B		12.0	10.00	11/21/2008	12/31/2020		
DET-VI-94874	CYLINDER REGULATOR	2.00000	EA	V		1	B		13.0	10.00	11/21/2008	12/31/2020		
DET-VI-94875	DIRECTIONAL VALVE SOLENOID	1.00000	EA	V		1	B		14.0	10.00	11/21/2008	12/31/2020		
DET-VI-94877	DIRECTIONAL VALVE DIOC	1.00000	EA	V		1	B		15.0	10.00	11/21/2008	12/31/2020		
DET-VI-94878	GAS SHUT DOWN VALVE ACTUATOR	1.00000	EA	V		1	B		16.0	10.00	11/21/2008	12/31/2020		
DET-VI-94879	GAS SHUT DOWN VALVE	1.00000	EA	V		1	B		17.0	10.00	11/21/2008	12/31/2020		
DET-VI-94880	MODULATING GAS ACTUATOR	1.00000	EA	V		1	B		18.0	10.00	11/21/2008	12/31/2020		
DET-VI-94881	HI-GAS PRESSURE SWITCH	1.00000	EA	V		1	B		19.0	10.00	11/21/2008	12/31/2020		
DET-VI-94882	LOW-GAS PRESSURE SWITCH	1.00000	EA	V		1	B		20.0	10.00	11/21/2008	12/31/2020		
DET-VI-94883	120V SOLENOID	1.00000	EA	V		1	B		21.0	10.00	11/21/2008	12/31/2020		

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Spare Parts List

The spare parts list is maintained using the maintenance scheduling software. This integration with the maintenance software allows for the re-ordering of replacement equipment, and allows Catalent Pharma Solutions (formerly Cardinal) to coordinate the spares storage with other equipment at the facility. This spare parts list is based on the RTO manufacturer's recommendations, and may be modified by Catalent Pharma Solutions (formerly Cardinal) based on operational experience with the particular equipment.

The spare parts list is included as an attachment to this section, as printed from the J.D. Edwards maintenance software program. Some of these parts may be shared with spare parts for other systems at the facility in the interest of minimizing the costs associated with stocking spare parts. In addition, Catalent Pharma Solutions (formerly Cardinal) maintains an in house inventory of many commonly used parts such as valves and fittings, which can be on the RTO. These items that are commonly stocked at the site, or readily available from Catalent Pharma Solutions (formerly Cardinal) suppliers are not included on the attached spare parts list. In addition, Catalent Pharma Solutions (formerly Cardinal) can supplement the spare parts stored on site through expedited delivery services, such as same or next day delivery, if needed.

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Internal Review Schedule

Catalent Pharma Solutions (formerly Cardinal) will periodically review, evaluate, and as appropriate, revise this Operation and Maintenance Plan. Reviews will likely be event driven, e.g., resulting from substantial changes to equipment operation, company policies, or changes in maintenance schedule resulting from operational experience.