



The Chemical Company

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**DATE:** May 29, 2009 **NO. PAGES** 3

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**TO:** URS Corp  
ATTN: Mark Strehlow  
  
BASF Catalysts LLC  
ATTN: Nancy Ellison

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**FROM:** Fred Booth **Ph 410-569-0297 // FAX 410-569-1841**

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**RE:** Siemens Flex Plant 10 Project  
CO Catalyst - BASF Catalysts LLC Budgetary Proposal EPB00870

We provide BASF Catalysts LLC Budgetary Proposal EPB00870 for BASF Catalysts LLC **Camet**<sup>®</sup> CO Catalyst systems per requirements of your e-mail request on May 29, 2009.

We offer CO oxidation catalyst design and pricing based on:

- Three (3) year Performance guarantee;
- BASF Catalysts LLC Scope: CO catalyst modules and catalyst internal frame and gas seals, and interface engineering.
- By others: Duct / catalyst housing (including any transitions), internal insulation, grooved internal liner sheets, frame supports and pedestals, catalyst loading door, personnel manway and sample ports.

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<b>CO SYSTEM DESIGN BASIS:</b>	Data assumed and given as noted in performance Data
Dimensions:	Assumed HRSG inside Liner dimensions of 66 ft High x 24 ft Wide
Gas Flow from:	Combustion Turbine
Gas Flow:	Horizontal
Fuel:	Natural Gas
Gas Flow Rate (At catalyst face):	Designed for Gas Velocities within $\pm 15\%$ of the mean velocity at the catalyst face
Temperature (At catalyst face):	Designed for Gas Temperatures within range $\pm 25^{\circ}\text{F}$ of noted temperatures
CO Concentration (At catalyst face):	Given 10 ppmvd @ 15% O <sub>2</sub> - See Table A - Performance data
CO Reduction:	<b>Case 1</b> -To Max. 2 ppmvd @ 15% O <sub>2</sub> <b>Case 2</b> -To Max. 0.9 ppmvd @ 15% O <sub>2</sub>

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Sincerely yours,

**BASF Catalysts LLC**

Frederick A. Booth  
Senior Sales Engineer



**BASF Catalysts LLC CORPORATION**  
**CAMET® CATALYTIC OXIDATION SYSTEM**

**DELIVERABLES:** Equipment and services consisting of:

1. CO Catalyst modules: The CO Catalyst is manufactured with a special stainless steel foil substrate which is corrugated and coated with an alumina washcoat. The washcoat is impregnated with platinum group metals. The catalyzed foil is folded and encased in welded steel frames, approximately 2 ft. square, to form individual modules. Two (2) of the total modules are provided with four (4) replaceable catalyst test buttons in each module (eight total buttons provided).
2. Catalyst internal support frame and internal gas seals: The internal support frame and internal seals are fabricated from standard structural **Carbon Steel** members and shapes. Mechanical expansion seals around the perimeter of the frame and inside the liner sheet prevent bypass around the catalyst. Design accommodates movement of the frame due to thermal expansion while maintaining a continuous seal. The internal frame system interfaces with two types of customer provided connections; ductplate mounted slide plates and liner sheet grooves, both designed by BASF Catalysts LLC.
3. Drawings showing installation details, loadings, and support requirements;

The equipment is supplied by BASF Catalysts LLC and installed by others in accordance with the BASF Catalysts LLC design and installation instructions. CO Catalyst modules should be installed after initial turbine firing.

<b><u>BUDGET PRICE:</u> Per Unit</b>	<b>Delivery: FOB, plant gate, job site.</b>		
	<b>CASE</b>	<b>1</b>	<b>2</b>
	<b>CO MODULES</b>	<b>\$396,000</b>	<b>\$500,000</b>
	<b>INTERNAL FRAME</b>	<b>\$82,000</b>	<b>\$82,000</b>
	<b>WEIGHT - FRAME + CATALYST</b>	<b>34,000</b>	<b>38,000</b>

**WARRANTY AND GUARANTEE:**

Mechanical Warranty:	Twelve (12) months from date of start up or eighteen (18) months from date of delivery, whichever is earlier.
Performance Guarantee:	Thirty-Six (36) months of operation from date of start up provided start up is no later than ninety (90) days from date of delivery. Catalyst warranty is prorated over the guaranteed life.
Expected Life:	Five (5) to Seven (7) Years

**DOCUMENT / MATERIAL DELIVERY SCHEDULE**

Drawings for Approval	Three weeks after notice to proceed
Material Delivery	fob, plant gate, Jobsite
Frame and Seals	12 – 14 weeks after release for fabrication
Catalyst Modules	14 – 16 weeks after release for fabrication

**SPENT CATALYST**

BASF Catalysts LLC agrees to support buyer's efforts in the disposal of spent catalyst and potential metal reclaim from spent catalyst. The catalyst proposed contains platinum group metals, and unless contaminated in operation by others, is **not a hazardous material**. Buyer may receive credit for recovered platinum metals based upon the quantity of platinum group metals recovered and the world price of platinum group metals then in effect, net of recovery cost and disposal costs.

**Table A - Performance Data**

CASE	Case 1	Case 2
FUEL	Nat Gas	Nat Gas
GIVEN EXHAUST FLOW, lb/hr	4,000,000	4,000,000
ASSUMED EXHAUST GAS ANALYSIS, % VOL. - N <sub>2</sub>	73.70	73.70
O <sub>2</sub>	12.18	12.18
CO <sub>2</sub>	3.81	3.81
H <sub>2</sub> O	9.43	9.43
Ar	0.88	0.88
CALC. GAS MOL. WT.	28.28	28.28
GIVEN INLET CO, ppmvd @ 15% O <sub>2</sub>	10.00	10.00
CALC. INLET CO, lb/hr	45.3	45.3
ASSUMED GAS TEMP. @ CO CATALYST, °F (+/-25)	650	650
DESIGN REQUIREMENTS CO OUT, ppmvd @ 15% O <sub>2</sub>	2.0	0.9
<b>GUARANTEED PERFORMANCE DATA</b>		
CO CONVERSION, % - Min.	80.0%	91.0%
CO OUT, lb/hr - Max.	9.1	4.1
CO OUT, ppmvd @ 15% O <sub>2</sub>	2.0	0.9
CO PRESSURE DROP, inH <sub>2</sub> O - Max.	1.0	1.4
<b>EXPECTED PERFORMANCE DATA</b>		
SO <sub>2</sub> -> SO <sub>3</sub> CONVERSION, % - Max.	6%	8%