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August 16, 2011

Mr. Greg Solomon  
Senior Air Quality Engineer  
Bay Area Air Quality Management District  
939 Ellis Street  
San Francisco, CA 94109

**Chevron Energy & Hydrogen Renewal Project  
Renewal of Authority to Construct – District Regulation 2-1-407  
Application No. 12842, Plant 10**

Dear Mr. Solomon:

Further to Chevron's September 15, 2010 request for renewal of the Authority to Construct (ATC) issued on September 19, 2008, the District recently requested additional information documenting "substantial use" for the Hydrogen Purity and Hydrogen Plant elements of Chevron's Hydrogen & Energy Renewal Project (Renewal Project). In response to this request, Chevron is submitting the following information for the Hydrogen Purity and Hydrogen Plant:

- Project Description/Overview
- Major Equipment Summary
- Hydrogen Purity Purchased Equipment Summary
- Highlighted Renewal Project Process Flow Diagrams
- Hydrogen Plant Purchased Equipment Summary

The referenced documents were reviewed with you on August 11, 2011, and establish "substantial use" for all sources associated with the Renewal Project as currently configured.

All major equipment for the project has been purchased and received. This equipment is highlighted in yellow on the attached process flow diagrams (PFDs). Equipment that is not highlighted in yellow is existing and unchanged by the project.

The attached Purchased Equipment Summary tables provide detailed information for all equipment purchased prior to the court order ceasing project construction. Equipment highlighted in the Hydrogen Purity Equipment List corresponds to the highlighted equipment on the PFDs.

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As set forth in District Regulation 2-1-407, pursuant to an environmental impact report that "explicitly covered a construction period longer than four years," the District issued the ATC on September 19, 2008. By letter dated September 15, 2010, Chevron requested that the ATC be renewed for an additional two year term. The District subsequently requested additional information by letter dated October 6, 2010. Chevron responded to that request by letter dated November 17, 2010. Chevron submitted additional information demonstrating "substantial use" on July 14, 2011.

**TRADE SECRET INFORMATION**


Please note that much of the information included with this transmittal is confidential business information/trade secret. Chevron asserts that this information is trade secret pursuant to Section 6254.7 of the Government Code and District Rule 2-1-202.7 and is not public record as follows:

- The Praxair equipment costs, descriptions, and shipment dates contain engineering and design information of commercial value that could provide competitors with a business advantage.
- The Chevron cost information and Process Flow Diagrams contain detailed engineering and design information of commercial value that could provide competitors with a business advantage.

The redacted, public version of the information is also being submitted to the District with this letter.

If you have any questions concerning the information provided in this submittal, please contact Bob Chamberlin at (510) 242-1466.

Sincerely,



Jeff W. Hartwig

Attachments

## Chevron Revised Renewal Project

### Major Equipment Substantial Use Documentation Package

- Project Description / Overview
- Major Equipment Summary
- Chevron Hydrogen Purity Improvements – Equipment List
- Process Flow Diagrams
  - No. 6 H2S Plant
  - No. 1, 2, & 3 SRU Modifications
  - Emergency Scrubber & Caustic Storage
  - FCC Feed Hydrotreater (TKC) Modifications
- Praxair Hydrogen Plant – Equipment List

REDACTED PUBLIC VERSION

<u>Project Description</u>	<u>Hydrogen Plant Replacement</u>
<p>The Refinery processes crude oil blends, externally sourced gas oils, and natural gas into a variety of fuel and oil products. In addition to producing motor gasoline, jet fuel, diesel fuel, and lubricating oils, the Refinery produces industrial fuel oil, liquefied petroleum gas, sulfur, and other products, such as ammonia. The Refinery also produces steam, electricity, fuel gas, and hydrogen, primarily for its own use.</p> <p>The Revised Project is proposed by Chevron for several reasons. It would allow the Refinery to process crude oil blends and externally-sourced gas oils with higher sulfur content, in order to continue producing competitive transportation fuels and lubricating oils. In addition, it would replace the Refinery's existing hydrogen production facilities with a modern plant that is more energy efficient yields higher purity hydrogen, and has the capacity to produce more hydrogen.</p> <p>Each of the Revised Project components is described below.</p> <p><b><u>Hydrogen Purity Improvements (Sulfur Removal)</u></b></p> <p>The Hydrogen Purity Improvements will enable the Refinery to process crude oil blends that contain up to approximately 3% sulfur. These improvements will also provide the Refinery with the flexibility to process more externally-sourced medium-high sulfur gas oils (containing 0.5% sulfur or more). This change is likely to result in the replacement of some low-sulfur gas oils by medium-high sulfur gas oils; however, the overall amount of feedstock and petroleum product output will be consistent with the Refinery's current capacity. Chevron proposes equipment changes to recover the additional sulfur, which would then be sold as a product.</p> <p>The primary equipment changes involved in the Hydrogen Purity Improvements are to: increase the capacity of the FCCFH (from 65,000 to 80,000 barrels per day) in keeping with the potentially higher sulfur feedstock slate; enable sulfur removal from the recycle hydrogen stream of the FCCFH; add a #6 Hydrogen Sulfide Amine Regenerator; and increase the sulfur recovery capacity of the Sulfur Recovery Units (SRUs) (from 600 to 900 long tons per day).</p> <p>Under the application, there will also be related modifications and additions of ancillary process equipment such as pumps, piping, heat exchangers vessels, tanks, instrumentation, off-pilot interconnections and utilities.</p>	<p>The existing maximum production capacity of each hydrogen train is 90 million standard cubic feet per day (SCFD) for a total of 180 million SCFD for both trains. Adding 50 million SCFD from hydrogen recovery vessels brings the total hydrogen production capacity to a total of 230 million SCFD. Currently, the product hydrogen is approximately 95 percent hydrogen, with 5 percent impurities consisting primarily of methane.</p> <p>The Revised Renewal Project proposes completion of construction of the new Hydrogen Plant and hydrogen recovery vessels. Following startup of the new plant the existing Hydrogen Plant and hydrogen recovery vessels will be removed from service. The new Hydrogen Plant consists of two trains, each capable of producing a maximum of 122 million SCFD hydrogen on an annual basis, plus 50 million SCFD of hydrogen from the hydrogen recovery unit, for a total of 294 million SCFD, a net increase of 64 million SCFD hydrogen capacity. The new equipment will be more energy efficient and will produce higher purity hydrogen. The new trains will use Pressure Swing Adsorption (PSA) technology allowing the Refinery to generate hydrogen from natural gas, ammonia,<sup>[1]</sup> and Refinery process gas. The resulting hydrogen product is expected to be greater than 99 percent hydrogen, a net increase of approximately four percent in hydrogen gas purity over current operations.</p> <p>Improving hydrogen purity will reduce the density of hydrogen streams in the Refinery. This will necessitate replacement or modification of existing refinery compressors to preserve their current operation and capacities. The replacements and modifications will also reduce compressor energy consumption. The Revised Project will also include the installation of low-NOX burners on five process heaters to maintain compliance with the Refinery-wide NOX emission limit in BAAQMD Regulation 9, Rule 10.</p> <p><b><u>Associated Infrastructure Improvements</u></b></p> <p>To tie the new Hydrogen Plant and Hydrogen Purity Improvements into the existing Refinery, new pipe racks, piping, and utility infrastructure (including electricity, steam, fuel gas, process gas, water, instrumentation, process and storm sewer connections) will be installed.</p>

[1] Ammonia fed to the new Hydrogen Plant is converted to hydrogen and nitrogen gas. Converting ammonia to hydrogen in the new Hydrogen Plant reduces natural gas consumption and CO2 production and reduces the quantities of ammonia stored on site and transported outside the refinery.

REVISED RENEWAL PROJECT - MAJOR EQUIPMENT SUMMARY

8/15/2011

COMPONENT AREA	TOTAL NUMBER OF MAJOR EQUIPMENT PIECES FOR PROJECT	Estimated Cost of Major Pieces of Equipment for Project	NUMBER OF MAJOR EQUIPMENT PIECES PURCHASED TO DATE	Estimated Cost of Major Pieces of Equipment Purchased (Note 1)	PERCENT OF EQUIPMENT PURCHASED	TOTAL NUMBER OF MAJOR EQUIPMENT PIECES INSTALLED FOR PROJECT
No. 6 H2S Plant (New)	42		42		100%	8
Emergency Scrubber & Caustic Storage	5	REDACTED - CONFIDENTIAL & TRADE SECRET	5	REDACTED - CONFIDENTIAL & TRADE SECRET	100%	0
No. 1, 2, 3 SRU Modifications	101		101		100%	2
FCC Feed Hydrotreater (TKC) Modifications	31		31		100%	17
Praxair Hydrogen Plant	165	Note 2	165	Note 2	100%	41
Total:	344	\$ -	344	\$ -	Note 3	68

Notes:

1. All major pieces of equipment for construction of the Revised Renewal Project component have been purchased and/or installed. Various bulk piping, electrical and instrumentation materials remain to be procured.
2. Cost data is not available from Praxair.
3. All major equipment purchased and/or received by Chevron or Praxair prior to 9/17/10.

# CHEVRON HYDROGEN PURITY IMPROVEMENTS

- Equipment List and Details







Chevron Energy Hydrogen Renewal Project - Hydrogen Purity Element Equipment Status List - August 16, 2011  
 Note: **YELLOW** highlighted cells indicate equipment shown on PFDs

Project Component	Associated Sources	Equipment Tag #	Equipment Name	Status	Sketch Order #	Purchase Order	Purchase Date	Delivery Date	Cost	Location
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002	V-2102	Steam Separator	Received - Not Installed	15026527	11031000-0816	7/23/2007	7/26/2008	REACTIVE EQUIPMENT & MATERIALS	Yrd 4-11
SRU Modifications	S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3100	HP Boiler Feedwater Pumps	Received - Not Installed	15026943	11031000-0072	1/29/2009	7/26/2009	REACTIVE EQUIPMENT & MATERIALS	Yrd 4-11
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3100A	HP Boiler Feedwater Pumps	Received - Not Installed	15026943	11031000-0072	1/26/2009	6/12/2009	REACTIVE EQUIPMENT & MATERIALS	Yrd 4-11
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3101	LP Boiler Feedwater Pumps	Received - Not Installed	15026943	11031000-0072	1/26/2009	6/12/2009	REACTIVE EQUIPMENT & MATERIALS	Yrd 4-11
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3101A	LP Boiler Feedwater Pumps	Received - Not Installed	15026943	11031000-0072	4/6/2009	7/20/2009	REACTIVE EQUIPMENT & MATERIALS	Yrd 4-11
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3102	Condensate Pumps	Received - Not Installed	15026943	11031000-0072	4/6/2009	7/20/2009	REACTIVE EQUIPMENT & MATERIALS	Yrd 4-11
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3102A	Condensate Pumps	Received - Not Installed	15026943	11031000-0072	9/2/2007	9/19/2008	REACTIVE EQUIPMENT & MATERIALS	Bedford Field
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3102C	Economic Reaction Pump	Received - Not Installed	15027255	11031000-0073	10/2/2007	9/26/2008	REACTIVE EQUIPMENT & MATERIALS	Yrd 4 of 1st
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3110C	TP - Hydrogen Pump	Received - Not Installed	15027285	11031000-0073	9/21/2009	9/19/2008	REACTIVE EQUIPMENT & MATERIALS	Yrd 4 of 1st
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	P-3120C	Amine Injection Pump	Received - Not Installed	15027285	11031000-0073	3/21/2009	9/19/2008	REACTIVE EQUIPMENT & MATERIALS	Yrd 4 of 1st
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	TP-3100A	HP Boiler Feedwater Pump Turbine	Received - Not Installed	15026943	11031000-0072	2/11/2009	9/19/2008	REACTIVE EQUIPMENT & MATERIALS	Yrd 4 of 1st
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	TP-3101A	LP Boiler Feedwater Pump Turbine	Received - Not Installed	15026943	11031000-0072	9/17/2009	9/19/2008	REACTIVE EQUIPMENT & MATERIALS	Yrd 4 of 1st
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	TP-3102A	LP Boiler Feedwater Pump Turbine	Received - Not Installed	15026943	11031000-0072	4/6/2009	7/20/2009	REACTIVE EQUIPMENT & MATERIALS	Yrd 4 of 1st
SRU Modifications	S-4436 F-2170 Stack Gas Heater No. 1 SRU S-4437 SRU # W/TOU A-0002 S-4438 F-2170 Stack Gas Heater No. 2 SRU S-4439 SRU # W/TOU A-0001 S-4440 SRU # W/TOU A-0002	V-3101	LP Boiler Feed Water Discharge Sump Drum	Received - Not Installed	15026947	11031000-0956	4/6/2009	7/20/2009	REACTIVE EQUIPMENT & MATERIALS	Yrd 4 of 1st

Chevron Energy Hydrogen Renewal Project - Hydrogen Purity Element Equipment Status List - August 16, 2011  
 Note: Yellow highlighted cells indicate equipment shown on PFDs

Project Component	Associated Sources	Equipment TAG #	Equipment Name	Status	Service Order #	Process Order	Purchase Date	Delivery Date	COI	Location
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 SRU2, W/FGU A-0202	V4104A	UP Jumper Feed Water Disposal	Received - Not Installed	15200347	11031020-0006	4/8/2009	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 SRU2, W/FGU A-0202	V4102	Condensate Pump	Received - Not Installed	15017550 / 15017961	11031020-0005	Document not ready available	Document not ready available	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	C-2250	Quench Column	Received - Not Installed	15030665	11031020-1005	Document not ready available	Document not ready available	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	E-2201	Strip Condenser No. 1 (Train 2)	Received - Not Installed	15030705	11031020-0004	6/2/2007	7/16/2008	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	E-2250	Strip Condenser No. 2 (Train 2)	Received - Not Installed	Document not ready available	Document not ready available	4/8/2005	6/15/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	E-2283	Heater - Purge Air	Received - Not Installed	15031738	11021460-0591	4/8/2005	6/15/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	E-2284	Heater - Purge Air	Received - Not Installed	15031738	11021460-0591	4/8/2005	6/15/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	FB-2201	Feed Gas Burner Train 2	Received - Not Installed	15013994	11031020-0006	4/8/2005	6/15/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2202	Vent Eductor	Received - Not Installed	15020346	11031020-0007	1/21/6/2008	3/29/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2240	Stripper - Main Weak Acid Circ Pump Station	Received - Not Installed	Document not ready available	11031020-0007	11/16/2008	3/27/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2250A	Stripper - Silyl Vinyl Acid Circ Pump Station	Received - Not Installed	No related service order	11022451	11/20/2009	11/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2251A	Stripper - Flogging Water - Duplex	Received - Not Installed	No related service order	11022451	Document not ready available	Document not ready available	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2252A	Stripper - WESP Wash Water - Duplex	Received - Not Installed	No related service order	11022451	Document not ready available	Document not ready available	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2253	Purge Air - WESP	Received - Not Installed	15031738	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2254	Purge Air - WESP	Received - Not Installed	15031738	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2255	Water Eductor Stage Preserver	Received - Not Installed	15031738	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2257	Stripper - Therm. Oxidizer Recirculation	Received - Not Installed	Document not ready available	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	K-2258	Stripper - Strip Heater Recirculation	Received - Not Installed	Document not ready available	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	P-2111	Sublet Dispensing Pump	Received - Not Installed	15016620	11031420-0026	10/27/2007	1/16/2008	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	P-2129	Quench Water Circulation	Received - Not Installed	No related service order	11032325	3/31/2009	8/19/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	P-2204A	Quench Water Circulation - Strip by	Received - Not Installed	No related service order	11032325	3/31/2009	8/19/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	P-2280 B	Aspirator Circulation Pump - Strip by	Received - Not Installed	No related service order	11032325	3/31/2009	8/19/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	P-2281	Aspirator Circulation Pump - Strip by	Received - Not Installed	No related service order	11032325	3/31/2009	8/19/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	V-2201	Steam Drum	Received - Not Installed	15030795	11031020-0204	7/11/2008	2/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 1 SRU S-4437 SRU2, W/FGU A-0202	V-2202	Steam Separator	Received - Not Installed	15035607	11031020-0816	7/21/2008	2/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 3 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202	C-2260	Quench Column	Installed	15029925	11021460-1005	7/21/2008	10/20/2008	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 3 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202	E-2260	Stripper - Oxidizer Water	Received - Not Installed	Document not ready available	Document not ready available	7/21/2008	10/20/2008	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 3 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202	E-2260A	Stripper - Oxidizer Water - Standby	Received - Not Installed	Document not ready available	Document not ready available	7/21/2008	10/20/2008	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 3 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202	E-2283	Heater - Purge Air	Received - Not Installed	15031738	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 3 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202	E-2804A	Heater - Purge Air - Standby	Received - Not Installed	15031738	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor
SRU Modifications	S-4437 F-2270 Stack Gas Header No. 3 SRU S-4437 SRU2, W/FGU A-0202 S-4437 F-2270 Stack Gas Header No. 2 SRU S-4437 SRU2, W/FGU A-0202	E-2284	Heater - Purge Air	Received - Not Installed	15031738	11021460-0591	4/8/2005	7/20/2009	HEATING EQUIPMENT & INSTRUMENTATION	3rd Floor



Chevron Energy Hydrogen Renewal Project - Hydrogen Purity Element Equipment Status List - August 16, 2011  
 Note: **YELLOW** highlighted cells indicate equipment shown on PFDs

Equipment	Associated Source	Equipment Tag #	Equipment Name	Status	Serial Order #	Purchase Order #	Purchase Date	Delivery Date	Cost	Location
TRC Modifications	S-4250 TRC/FCC Feed Hydrogenator	V-2042	Rever. Catalytic Tank	Received - Not Installed	15021461	11031000-0030	7/27/2007	1/9/2008	1502508	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	C-400	HDS Absorber	Received - Not Installed	15018248	11031000-0014	6/14/2007	7/26/2008	1760208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-400A	HDS Absorber Feed Cooler	Installed	15018488	11031000-0003	5/29/2007	12/17/2007	12117007	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-400B	HDS Absorber Feed Cooler	Installed	15018488	11031000-0003	5/29/2007	12/17/2007	12117007	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-400	Dist. HP Separator Vapor Air Cooler	Installed	15018488	11031000-0003	5/29/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-207	Distilled Sulfur Water Cooler	Installed	15018488	11031000-0002	5/29/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4250 TRC/FCC Feed Hydrogenator	E-711A	Fractionator Reheat Drum Vapor Air Cooler	Installed	15018488	11031000-0003	6/14/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-711B	Fractionator Reheat Drum Vapor Air Cooler	Installed	15018488	11031000-0003	6/14/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-711C	Fractionator Reheat Drum Vapor Air Cooler	Installed	15018488	11031000-0003	6/14/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-711D	Fractionator Reheat Drum Vapor Air Cooler	Installed	15018488	11031000-0003	6/14/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-711E	Fractionator Reheat Drum Vapor Air Cooler	Installed	15018488	11031000-0003	6/14/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	E-714	Dist. HP Separator Vapor Air Cooler	Installed	15018488	11031000-0003	6/14/2007	6/16/2008	6166208	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	K-400	Refrigeration Power Recovery Turbine	Received - Not Installed	15013318	11031000-0037	5/16/2008	9/17/2009	91712009	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	K-412	Diester Strainer	Installed	15033504	11031000-0037	5/16/2008	10/29/2009	1029209	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	K-413A	Diester Strainer	Installed	15033504	11031000-0037	5/16/2008	10/29/2009	1029209	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	P-400	HP Seal Pump Pumps	Received - Not Installed	15013318	11031000-0013	5/16/2008	10/29/2009	1029209	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	P-207	Seal Water Discharge Pumps	Installed	15013318	11031000-0013	5/16/2008	10/29/2009	1029209	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	P-207A	Seal Water Discharge Pumps	Installed	15013318	11031000-0013	5/16/2008	10/29/2009	1029209	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	P-212	V-111 Reboiler Water Pumps	Installed	15013318	11031000-0013	5/16/2008	10/29/2009	1029209	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	P-212A	V-111 Reboiler Water Pumps	Installed	15013318	11031000-0013	5/16/2008	10/29/2009	1029209	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	V-400	ORP Centrifuge Separator	Received - Not Installed	15018258	11031000-0014	5/29/2008	12/17/2009	12172009	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	V-401	Recycle Gas Compressor KO Drum	Received - Not Installed	15015843	11031000-0100	6/14/2008	9/6/2009	962009	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	V-402	Non-Azeotropic Distiller	Received - Not Installed	15015535	11031000-0017	6/14/2008	9/6/2009	962009	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	V-207	TRC Seal Water Distiller	Installed	15015535	11031000-0017	6/14/2008	9/6/2009	962009	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	V-711	Fractionator Product Drum	Installed	15015845	11031000-0093	6/14/2008	9/6/2009	962009	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	F-510	TRC Reactor Furnace Burners	Received - Not Installed	15008328	11031000-0002	6/14/2008	11/17/2008	11172008	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	F-503	TRC Reactor Furnace Burners	Received - Not Installed	15008328	11031000-0002	6/14/2008	11/17/2008	11172008	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	F-501	TRC Reactor Furnace Burners	Received - Not Installed	15008328	11031000-0002	6/14/2008	11/17/2008	11172008	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	K-619	TRC Condensate Flow	Received - Not Installed	15005505	11031000-0118	6/14/2008	8/9/2009	892009	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	P-2425	ORH Pump	Received - Not Installed	15013318	11031000-0013	5/16/2008	11/17/2008	11172008	Hydrogen Gasification & Feed Effluent
TRC Modifications	S-4251 TRC/FCC Feed Hydrogenator	P-2425A	ORH Pump	Received - Not Installed	15013318	11031000-0013	5/16/2008	11/17/2008	11172008	Hydrogen Gasification & Feed Effluent

Equipment marked on associated Process Flow Diagrams

# NO. 6 H2S PLANT

Drawing:

D-349291-2

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

Drawing D-349310

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

Drawing D-349291-2

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

# No. 1, 2, & 3 SRU MODIFICATIONS

(includes Oxygen Storage & Sulfur Loading Rack)

Drawings:

D-349319-0

D-366320-F

D-366120-B

D-350570-1

D-352734-1

D-349386-1

D-366220-0

D-349320-0

THESE PROCESS FLOW DIAGRAMS HAVE BEEN REDACTED SINCE THEY CONTAIN CONFIDENTIAL  
AND TRADE SECRET INFORMATION



Drawing D-349319-0

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

Drawing D-366320-F

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

# EMERGENCY SCRUBBER & CAUSTIC STORAGE

Drawing:

D-349310

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

Drawing D-366120-B

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

Drawing D-350570-1

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION

Drawing D-352734-1

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION

Drawing D-349386-1

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TRADE SECRET INFORMATION

D-366220-0

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION



D-349320-0

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

# CHEVRON HYDROGEN PURITY IMPROVEMENTS

- Equipment List and Details

Drawing D-349331-2

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

Drawing D-349330-2

THIS PROCESS FLOW DIAGRAM HAS BEEN REDACTED SINCE IT CONTAINS CONFIDENTIAL AND  
TRADE SECRET INFORMATION

# FCC FEED HYDROTREATER (TKC) MODIFICATIONS

Drawings:

D-349330-2

D-349331-2

THESE PROCESS FLOW DIAGRAMS HAVE BEEN REDACTED SINCE THEY CONTAIN CONFIDENTIAL  
AND TRADE SECRET INFORMATION

Praxair Richmond H2 Plant - Praxair Supplied Equipment - 12/31/09						
Item #	Equipment Tag No.	Description	Purchase Status	Installation Status - % complete	Purchase Order #	Shipment Date
1	CP-3305	EQUIPMENT DESCRIPTIONS HAVE BEEN REDACTED SINCE THEY ARE CONFIDENTIAL & TRADE SECRET	Received	Not Installed	30207961OS	SHIPMENT DATES OF EQUIPMENT HAVE BEEN REDACTED SINCE THEY ARE CONFIDENTIAL & TRADE SECRET
2	CP-3315		Received	Not Installed	30207961OS	
3	CP-3310		Received	Not Installed	30207961OS	
4	CP-3905		Received	Not Installed	30212903OS	
5	ST-3640		Received	Not Installed	30209538OS	
6	SK-3645		Received	Not Installed		
7	G-3660		Received	Not Installed	30209538OS	
8	SK-3450		Received	Not Installed	30211817OS	
9	SK-3460		Received	Not Installed	30211817OS	
10	SK-3470		Received	Not Installed	30211817OS	
11	HX-3650		Received	Not Installed	30211085OS	
12	PU-1500		Received	Not Installed	30245293OS	
13	PU-2500		Received	Not Installed	30245293OS	
14	PU-3502		Received	Not Installed	30245293OS	
15	T-3921 & T-3922		Received	Not Installed	30237663UP	
16	SK-1000		Received	Not Installed	30240462OS	
17	SK-3490		Received	Not Installed	30307305	
18	D-3491		Received	Not Installed	30307305	
19	D-3486		Received	Not Installed	30305850	
20	D-3481		Received	Not Installed	30305891	
21	EB-8311, EB-8312, & EB-8313		Received	Not Installed	30247597OS	
22	EB-8314		Received	Not Installed	30247599OS	
23	ES-8311		Received	Not Installed	30213674OS	
24	ES-8312		Received	Not Installed	30213675OS	
25	ES-8313		Received	Not Installed	30217705OS	
26	ES-8307		Received	Not Installed	30219353OS	
27	ES-8317		Received	Not Installed	30219018OS	
28	ES-8327		Received	Not Installed	30219019OS	
29	ET-8325		Received	Not Installed	30193556OS	
30	ET-8326		Received	Not Installed	30193453OS	
31	EN-8304		Received	Not Installed	30268079OS	
32	EN-8304		Received	Not Installed	30268079OS	
33	EN-8304		Received	Not Installed	30268079OS	
34	EN-8304		Received	Not Installed	30268079OS	
35	ED-8305		Received	Not Installed	30277457OS	
36	ED-8305		Received	Not Installed	30277457OS	
37	ED-8305		Received	Not Installed	30277457OS	
38	ED-8308		Received	Not Installed	30272938OS	
39	ED-8308		Received	Not Installed	30272938OS	
40	ED-8308		Received	Not Installed	30272938OS	

41	EM8310	Received	Not Installed	
42	EM8311	Received	Not Installed	30242974OS
43	EM8312	Received	Not Installed	30242984OS
44	EL-8305	Received	Not Installed	30242985OS
45	EL-8306	Received	Not Installed	30246331OS
46	EL-8307	Received	Not Installed	30246332OS
47	EL-8308	Received	Not Installed	30246333OS
48		Received	Not Installed	30246334OS
49	BG-8401-1	Received	Not Installed	
50	BG-8401-2	Received	Not Installed	30235468OS
51	BG-8401-3	Received	Not Installed	30235466OS
52	BG-8401-4	Received	Not Installed	30235434OS
53	AE-17001, AE-17001A, AE-27001, AE-27001B, AE-12402, AE-12403	Received	Not Installed	30235435OS
54	AE-37004, AE-17004, AE-27004	Received	Not Installed	30253203OS
55	AE-12108, AE-22108	Received	Not Installed	30252681OS
56	AE-39908	Received	Not Installed	30260061OS
57	AE-37005, AE-17005, AE-27005	Received	Not Installed	30260061OS
58	AE-37205	Received	Not Installed	30263739OS
59	AE-12402, AE-12403	Received	Not Installed	30263739OS
60	AE-39820, AE29810	Received	Not Installed	30253203OS
61	AE39810	Received	Not Installed	30254005OS
62	AE-11000, AE-21000	Received	Not Installed	30254005OS
63	AE-11450, AE-21450	Received	Not Installed	30254264OS
64	AEPUR1, AEPUR2	Received	Not Installed	30263994OS
65	TBD	Received	Not Installed	30274257
66	AE-39700	Received	Not Installed	30954274
67	RM9201	Received	Not Installed	30220838OS
68	RM9221	Received	Not Installed	30207851 OS
69	RM9211	Received	Not Installed	30207851 OS

# **PRAXAIR HYDROGEN PLANT**

- Praxair Supplied Equipment List
- Lurgi Supplied Equipment List



Praxair Richmond H2 Plant - Lurgi Supplied Equipment - 12/31/09						
Item #	Equipment Tag No.	Description	Purchase Status	Installation Status - % complete	Purchase Order # 30212121OS (9/25/06), 30233208OS (2/9/07)	Purchase Order Date
1	A-1700	EQUIPMENT DESCRIPTIONS HAVE BEEN REDACTED SINCE THEY ARE CONFIDENTIAL AND TRADE SECRET	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
2	A-2700		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
3	A-3710		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
4	T-3850		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
5	D-3860		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
6	R-1100		Received	70%	30212121OS, 30233208OS	9/25/06, 2/9/07
7	R-2100		Received	60%	30212121OS, 30233208OS	9/25/06, 2/9/07
8	CP-1100AB		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
9	CP-2100AB		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
10	PU-1180 (incl. AD-1180, AD-1181)		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
11	PU-2180 (incl. AD-2180, AD-2181)		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
12	HE-1105		Received	90%	30212121OS, 30233208OS	9/25/06, 2/9/07
13	HE-2105		Received	90%	30212121OS, 30233208OS	9/25/06, 2/9/07
14	HE-1105		Received	90%	30212121OS, 30233208OS	9/25/06, 2/9/07
15	HE-2106		Received	90%	30212121OS, 30233208OS	9/25/06, 2/9/07
16	HE-1125		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
17	HE-2125		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
18	HE-1125		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
19	HE-2126		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
20	HE-1110		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
21	HE-2110		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
22	HE-1130		Received	70%	30212121OS, 30233208OS	9/25/06, 2/9/07
23	HE-2130		Received	70%	30212121OS, 30233208OS	9/25/06, 2/9/07
24	HE-1155		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
25	HE-2155		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
26	HE-1160		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
27	HE-2160		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
28	HE-1161		Received	70%	30212121OS, 30233208OS	9/25/06, 2/9/07
29	HE-2161		Received	70%	30212121OS, 30233208OS	9/25/06, 2/9/07
30	D-1135		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
31	D-2135		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
32	D-1137		Received	70%	30212121OS, 30233208OS	9/25/06, 2/9/07
33	D-2137		Received	70%	30212121OS, 30233208OS	9/25/06, 2/9/07
34	D-1155		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
35	D-2155		Received	80%	30212121OS, 30233208OS	9/25/06, 2/9/07
36	D-1170		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
37	D-2170		Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
38	D-1175		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
39	D-2175		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
40	SK-1145		Received	50%	30212121OS, 30233208OS	9/25/06, 2/9/07
41	SK-2145		Received	50%	30212121OS, 30233208OS	9/25/06, 2/9/07
42	PU-3400		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
43	CP-1120		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
44	CP-2120		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
45	CP-1140		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
46	CP-2140		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
47	P-1810A/B		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
48	P-2810A/B		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
49	P-3835A/B		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
50	P-3870A/B		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
51	P-3890		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
52	P-3895		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
53	P-3190A/B		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
54	P-3340A/B		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
55	X-3950		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
56	D-1225		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
57	D-2225		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
58	D-1240		Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07

Praxair Richmond H2 Plant - Lurgi Supplied Equipment - 12/31/09

58	D-2240	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
60	D-1800	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
61	D-2800	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
62	D-3200	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
63	D-3325	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
64	D-3330	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
65	D-3825	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
66	D-3940	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
67	D-3195	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
68	HE-1200	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
69	HE-2200	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
70	HE-1215	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
71	HE-2215	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
72	HE-1217	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
73	HE-2217	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
74	HE-1220	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
75	HE-2220	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
76	HE-1230	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
77	HE-2230	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
78	HE-1235	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
79	HE-2235	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
80	HE-3193	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
81	HE-3196	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
82	R-1205	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
83	R-2205	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
84	R-1210AB	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
85	R-2210AB	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
86	R-1260	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
87	R2260	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
88	R-3198	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
89	S-1150	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
90	S-2150	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
91	S-1190	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
92	S-2190	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
93	S-1800	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
94	S-2800	Received	Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
95	X-1103	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07
96	X-2103	Received	Not Installed	30212121OS, 30233208OS	9/25/06, 2/9/07