

## **APPENDIX G**

SCAQMD REFINERIES PROPOSED CARFG2 MODIFICATIONS  
WITH BACT DETERMINATIONS

**ARCO – CARSON  
PROPOSED CARFG2 OPERATIONAL PHASE EMISSIONS  
SOURCES WITH BACT DETERMINATIONS**

<u>App. No.</u> 274405 &	<u>Source Description</u> No.1 Crude Distillation Unit	<u>BACT</u> 1) All pumps will be equipped w/ double mechanical seals w/ barrier fluid and are vented to a vapor recovery system. Leak of VOC is considered to be in excess of 500ppm.
274406	No.2 Crude Distillation Unit	2) Valves and flanges leak is in excess of 500ppm. 3) Pump shaft seals are enclosed and vented to a vapor recovery system or a vapor disposal system.
<u>App. No.</u> 284271 &	<u>Source Description</u> Naptha Hydrodesulfurization Unit	<u>BACT</u> 1) Valves – Bellows sealed valves for sizes 2” and smaller. Valves 3” and larger will utilize API/ANSI design.
284275	Naptha HDS Unit	2) Pumps – Double mechanical seals or equivalent seals, specifically dry running tandem mechanical seals vented to a closed system for all new replacement process pumps in light service. 3) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings. 4) Pressure relief valves – PRV’s routed to a closed system. 5) Process drains – Drain lines will be provided with two normally closed block valves in series, or a single block valve in series w/ a cap or plug. Drain hubs (funnels) will be equipped w/ P-traps and/ or seal pots. 6) Combustion emission controls – SO <sub>x</sub> & PM requirements will be met by firing natural gas w/ total sulfur content of less than 100ppm. Low NO <sub>x</sub> burners have been selected for controlling NO <sub>x</sub> emissions for heaters w/ a fired duty of less than 18 MMBtu/hr. 7) Compressors – Makeup H2 Booster compressor will be equipped w/ oil film or buffer gas as barrier fluid or equivalent seals.
<u>App. No.</u> 284281	<u>Source Description</u> Light Gasoline Hydrogenation Unit	<u>BACT</u> No BACT listing in application
<u>App. No.</u> 284291	<u>Source Description</u> Hydrogen Production Heater	<u>BACT</u> 1) All pumps & compressors are equipped w/ seal venting to a closed vent system. 2) Bellow sealed valves will be employed on valves 2” and smaller, SCR w/ ammonia injections is employed for the control of NO <sub>x</sub> emissions from the heater.

<u>App. No.</u> 285601	<u>Source Description</u> Fluid Feed Hydrodesulfurization Unit	<u>BACT</u> No BACT listing in application.
<u>App. No.</u> 286485	<u>Source Description</u> C5 Alkylolation Unit	<u>BACT</u> 1) Valves – Bellows sealed valves for sizes 2” and smaller. Valves 3” and larger will utilize API/ANSI design.
286494	Butane Tank Car Loading/ Unloading System	2) Pumps – Double mechanical seals or equivalent seals, specifically dry running tandem mechanical seals vented to a closed system for all new replacement process pumps in light service.
286495	Tank-681, Light Ends	3) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings.
286496	Tank-682, Light Ends	4) Pressure relief valves – PRV’s routed to a closed system.
286497	Tank-683, Light Ends	5) Process drains – Drain lines will be provided with two normally closed block valves in series, or a single block valve in series w/ a cap or plug. Drain hubs (funnels) will be equipped w/ P-traps and/ or seal pots.
286498	Tank-684, Light Ends	
<u>App. No.</u> 286499	<u>Source Description</u> No.1 HDS Unit Naptha	<u>BACT</u> 1) Valves – Bellows sealed valves for sizes 2” and smaller. Valves 3” and larger will utilize API/ANSI design. 2) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings. 3) Pressure relief valves – PRV’s routed to a closed system. 4) Process drains – Drain lines will be provided with two normally closed block valves in series, or a single block valve in series w/ a cap or plug. Drain hubs (funnels) will be equipped w/ P-traps and/ or seal pots.
<u>App. No.</u> 305323	<u>Source Description</u> Hydrogen Production No.2 Plant	<u>BACT</u> 1) Valves – Bellows sealed valves for sizes 2” and smaller. Valves 3” and larger will utilize API/ANSI design. 2) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings.
<u>App. No.</u> 305363	<u>Source Description</u> C5 Alkylolation Pretreating System	<u>BACT</u> 1) Valves – Bellows sealed valves for sizes 2” and smaller. Valves 3” and larger will utilize API/ANSI design. 2) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings.

App. No.

Source Description

BACT

2) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings.

App. No.  
305942

Source Description  
Hydrocracking Unit

BACT

1) Valves – Bellows sealed valves for sizes 2” and smaller. Valves 3” and larger will utilize API/ANSI design.  
2) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings.

App. No.  
323940

Source Description  
C4 Alkylation Unit

BACT

1) Valves – Bellows sealed valves for sizes 2” and smaller. Valves 3” and larger will utilize API/ANSI design.  
2) Flanges – Flanged connections will be designed in accordance with ANSI B16.5-1988 pipe flanges and flanged fittings.  
3) Pressure relief valves – PRV's routed to a closed system.  
4) Process drains – Drain lines will be provided with two normally closed block valves in series, or a single block valve in series w/ a cap or plug. Drain hubs (funnels) will be equipped w/ P-traps and/ or seal pots.

App. No.  
331848

Source Description  
Emergency Flare System

BACT

No BACT listing in application.

**CHEVRON – EL SEGUNDO  
PROPOSED CARFG2 OPERATIONAL PHASE EMISSIONS  
SOURCES WITH BACT DETERMINATIONS**

**BACT**

BACT is applied to all new emissions sources. The SCAQMD's Regulation XIII and RECLAIM Rule 2005 requires BACT on any new permit unit, and any modification to an existing permit unit that results in a net increase in emissions or relocation of existing units.

The equipment that would require BACT includes furnaces, pumps, flares, storage tanks, compressors, process valves, and pressure-relief devices with the potential to emit regulated air contaminants such as NO<sub>x</sub>, SO<sub>x</sub>, VOC, CO, and PM<sub>10</sub>.

Furnaces	<u>Application</u> NO <sub>x</sub>  SO <sub>x</sub>  PM <sub>10</sub>	<u>BACT</u> Low NO <sub>x</sub> burners in conjunction with Selective Catalytic Reduction, converting NO <sub>x</sub> to non-polluting agents. Controlled by maintaining sulfur content in the fuel gas below 100 ppm. Control measure is the use of refinery gas or natural gas.
Pumps	<u>Application</u> All pumps	<u>BACT</u> BACT standards include use of seal-less pumps with dual seals with barrier fluids or with dry-running dual seals, vented to a closed system.
Compressors	<u>Application</u> All compressors	<u>BACT</u> BACT for compressors is the use of a barrier-type device, such as an oil film or gas seal vented to a vapor recovery system, accompanied by proper inspection and maintenance.
Process valve	<u>Application</u> All process valves	<u>BACT</u> BACT for controlling fugitive VOC emissions from valves is to be determined by cost analysis in the SCAQMD. Process valves two inches or less in diameter are to use bellows-sealed valves for BACT. For larger valves, an inspection and maintenance program in conjunction with a performance standard for leaks (500 ppm) is BACT.
Flanges	<u>Application</u> All flanges	<u>BACT</u> BACT for controlling fugitive VOC emissions from flanges is a gasket rated at 150 percent of actual working pressure, at service temperature, and a SCAQMD approved inspection and maintenance program.
Pressure relief valves	<u>Application</u> All Pressure relief valves	<u>BACT</u> Released VOC's are vented to a vapor recovery system and then to a flare system. The vented VOC is routed to flares and burned off, yielding SO <sub>x</sub> , NO <sub>x</sub> , nonpolluting carbon dioxide and water.

**MOBIL – TORRANCE  
PROPOSED CARFG2 OPERATIONAL PHASE EMISSIONS  
SOURCES WITH BACT DETERMINATIONS**

<u>App. No.</u>	<u>Source Description</u>	<u>BACT</u>
280595	Jet Fuel Finishing System	BACT not required.
280596	Saturated Gas Plant Unit No. 7	Requirements are currently being reviewed.
280597	Unsaturated Gas Plant Unit No. 8	Requirements are currently being reviewed.
280599	LPG Merox Unit (App. Cancelled)	Requirements are currently being reviewed.
280600	Naptha Pretreater Unit Unit No. 20	Requirements are currently being reviewed.
280604	Butane Processing Unit	Requirements are currently being reviewed.
280605	Hydrogen Plant No.2 Unit No. 24	Requirements are currently being reviewed.
265076	Storage Tank w/ External Floating Roof, Gasoline	Application cancelled 2/23/96
272170	Storage Tank w/ External Floating Roof, Gasoline	No BACT listing in application.
272172	Storage Tank w/ External Floating Roof, Gasoline	Application cancelled 2/13/96 No BACT listing in application.
274395	Storage Tank w/ External Floating Roof, MTBE	No BACT listing in application.
280594	Crude Distillation Unit Unit No. 1	Application cancelled 3/3/94
281301	FCC Feed Hydrotreater Unit 25	Requirements are being determined.
281302	Selective Catalytic Reduction Unit serving 30 F-2 boiler	SCR system is BACT for new steam boilers.
281303	Selective Catalytic Reduction Unit serving steam generator 30 F-1	SCR system is BACT for new steam boilers.

<u>App. No.</u>	<u>Source Description</u>	<u>BACT</u>
281304	Steam Boiler A-Train	<p><u>Boilers</u> – SCR is most stringent for boilers, coupled with low NO<sub>x</sub> burners.</p> <p><u>Pumps (light liquid service pump)</u> – install either sealless type or double mechanical or tandem seals with barrier fluid or dry running with closed vent system.</p> <p><u>Valves (2" or smaller")</u> – install sealed bellows valves</p> <p><u>Valves (greater than 2")</u> – live loaded with dual seal system or low emission (&lt; or = 500ppm). Requirements shall apply to all valves in gas/vapor &amp; light liquid services.</p> <p><u>Flanges</u> – ANSI/ API standards</p> <p><u>Pressure Relief Valves</u> – PRV's not coupled w/ rupture disc shall vent to a vapor recovery system.</p>
<u>App. No.</u> 281307	<u>Source Description</u> Fluid Catalytic Cracking Unit	<u>BACT</u> Requirements are currently being reviewed.
281309	Hydrogen Production Plant Unit No. 4	Requirements are currently being reviewed.
288577	LPG Tank Car Loading Facility Unit No. 51/52	Requirements are currently being reviewed.
288829	Emergency Relief System Flares	No information available on this application.

**TEXACO – WILMINGTON**  
**PROPOSED CARFG2 OPERATIONAL PHASE EMISSIONS**  
**SOURCES WITH BACT DETERMINATIONS**

<u>App. No.</u>	<u>Source Description</u>	<u>BACT</u>
281001	Benzene Saturation Unit	<p><u>Pumps</u> – New light liquid pumps for RFG project will be either sealless, double mechanical or tandem mechanical type of seals.</p> <p><u>Valves</u> – Texaco will install sealed bellows valves for all 2" or smaller valves. The requirement applies to all valves in gas/vapor and light liquid service except for those specified in permit conditions.</p> <p><u>Flanges</u> – ANSI /API standard flanges will be used.</p> <p><u>Pressure Relief Valves</u> – All new PRVs will be vented to vapor recovery system except for those specified in permit conditions.</p>
281002	Catalytic Reforming Unit No. 2	<p><u>BACT</u></p> <p><u>Pumps</u> – New light liquid pumps for RFG project will be either sealless, double mechanical or tandem mechanical type of seals.</p> <p><u>Valves</u> – Texaco will install sealed bellows valves for all 2" or smaller valves. The requirement applies to all valves in gas/vapor and light liquid service except for those specified in permit conditions.</p> <p><u>Flanges</u> – ANSI /API standard flanges will be used.</p> <p><u>Pressure Relief Valves</u> – All new PRVs will be vented to vapor recovery system except for those specified in permit conditions.</p>
281003	Catalytic Reforming Unit No. 3	<p><u>BACT</u></p> <p><u>Pumps</u> – New light liquid pumps for RFG project will be either sealless, double mechanical or tandem mechanical type of seals.</p> <p><u>Valves</u> – Texaco will install sealed bellows valves for all 2" or smaller valves. The requirement applies to all valves in gas/vapor and light liquid service except for those specified in permit conditions.</p> <p><u>Flanges</u> – ANSI /API standard flanges will be used.</p> <p><u>Pressure Relief Valves</u> – All new PRVs will be vented to vapor recovery system except for those specified in permit conditions.</p>
288693	Splitter Reboiler Heater HD-204	<p><u>BACT</u></p> <p>SCR is the most stringent BACT for the new heater. Since HD-204 is an existing heater, BACT is not required. Texaco will install low NOx burners on this heater to achieve a net reduction. Two fired heaters H-101 H-102 will be scheduled for shutdown.</p>
288694	Storage Tank No. TK-0-6, Naptha	<p><u>BACT</u></p> <p>Fixed Roof storage tanks storing volatile materials will be connected to the vapor recovery system.</p>
301661	Vapor Recovery System	<p><u>BACT</u></p> <p>No BACT listing in application.</p>
301662	Storage Tank	<p><u>BACT</u></p> <p>Fixed Roof storage tanks storing volatile materials will be connected to the vapor recovery system.</p>
301663	Storage Tank	Same
301664	Storage Tank	Same
301665	Storage Tank	Same
301666	Storage Tank	Same

**UNOCAL – CARSON & WILMINGTON  
PROPOSED CARFG2 OPERATIONAL PHASE EMISSIONS  
SOURCES WITH BACT DETERMINATIONS**

<u>App. No.</u> 311333	<u>Source Description</u> East Flare	<u>BACT</u> 1) Surge tank emissions vented to flare w/ control efficiency of 95% 2) Flares utilized as control measures to meet BACT for surge tank.
<u>App. No.</u> 311334	<u>Source Description</u> West Flare	<u>BACT</u> 1) New pumps equipped with single seal, double seals.
<u>App. No.</u> 281356	<u>Source Description</u> Hydrotreating Unit (HDS) FCC Feed Pretreater 120	<u>BACT</u> 1) For refinery heater (rating > 18 through 86.2 MMBtu/hr) for NO <sub>x</sub> control is low NO <sub>x</sub> burner & selective non-catalytic reduction (SNCR). But with increased efficiency of low NO <sub>x</sub> burner, presently, will not install SNCR. SCR is not cost effective will not install. 2) Sulfur compounds in fuel limited to less than 100ppm. Unocal will use natural gas containing total sulfur low as 5ppm. 3) For CO, ROG, & PM, installation of oxygen analyzer is required per condition 5 to measure excess oxygen in ensuring completeness of the combustion reaction.
<u>App. No.</u> 289725	<u>Source Description</u> HDS Unit 120 Heater	<u>BACT</u> 1) For CO, ROG, & PM, installation of oxygen analyzer is required per condition 5 to measure excess oxygen in ensuring completeness of the combustion reaction.
<u>App. No.</u> <del>310596</del> (326109) sub.	<u>Source Description</u> <del>Hydrotreating Unit 59</del>	<u>BACT</u> <del>New fugitive components will meet BACT. New pumps equipped w/ seals. New valves (2" &amp; smaller) are bellows sealed.</del>
<u>App. No.</u> 298618 (326115) sub.	<u>Source Description</u> Catalytic Reforming Unit 80	<u>BACT</u> New fugitive components will meet BACT. New pump is equipped w/ single mechanical seal for heavy liquid service. New valves (2" & smaller) are bellows sealed.
<u>App. No.</u> 287971 (326116) sub.	<u>Source Description</u> Catalytic Reforming Unit 100	<u>BACT</u> New fugitive components will meet BACT. New pumps are equipped w/ tandem seals for light liquid service. New valves (2" & smaller) are bellows sealed.
<u>App. No.</u> 326117	<u>Source Description</u> Hydrogen Production Plant Unit 118	<u>BACT</u> Application incomplete no BACT listing.

<u>App. No.</u> 290738 (326118) sub.	<u>Source Description</u> Hydrogen Production Plant Unit 118 Heaters	<u>BACT</u> 1) BACT for refinery heater (rating > 86.2 MMBtu/hr) for NO <sub>x</sub> control is low- NO <sub>x</sub> burner & SCR. 2) Sulfur compounds in fuel gas limited to less than 100ppm. Unocal will use refinery gas that contains total sulfur less than 100ppm. 3) For CO, ROG, & PM: Install O <sub>2</sub> analyzer to ensure completeness of combustion reaction.
<u>App. No.</u> 311655 (326121) sub.	<u>Source Description</u> Gas Oil Hydrocracker Unit 120	<u>BACT</u> New Valves (2" & smaller) are not bellows sealed since they are instrumental valves.
<u>App. No.</u> 310339	<u>Source Description</u> Gasoline Blending Unit	<u>BACT</u> New pumps are equipped w/ BACT (sealless).
<u>App. No.</u> 323067 (326128) sub.	<u>Source Description</u> Petroleum Middle Distillate Blending	<u>BACT</u> New pump is equipped w/ BACT (tandem seal).
<u>App. No.</u> 292245 (326130) sub.	<u>Source Description</u> Vapor Control System Carbon Adsorber	<u>BACT</u> Carbon adsorber has 98% control efficiency.
<u>App. No.</u> 326164	<u>Source Description</u> South Flare	<u>BACT</u> No BACT listing (note: large emission benefit cited for this application).
<u>App. No.</u> 317755 (326166) sub.	<u>Source Description</u> Isomerization Unit 60	<u>BACT</u> 1) New pumps equipped w/ BACT (single seal type). 2) New valves (2" & smaller) are bellows sealed.
<u>App. No.</u> 327229	<u>Source Description</u> Hydrotreating Unit 90	<u>BACT</u> 1) New fugitive components will meet BACT. New pumps are equipped w/ tandem seals. 2) New valves (2" & smaller) are bellows sealed.
<u>App. No.</u> 295332 (326343) sub.	<u>Source Description</u> Storage Tank No. 2 Light Catalytically Cracked Gasoline	<u>BACT</u> The tank will be equipped w/ double seals.
<u>App. No.</u> 295334 (326345) sub.	<u>Source Description</u> Storage Tank No. 3 Naptha	<u>BACT</u> The tank will be equipped w/ double seals.
<u>App. No.</u> 299240 (327360) sub.	<u>Source Description</u> Hydrotreating Unit 89	<u>BACT</u> New fugitive components will meet BACT. New pumps are equipped w/ mechanical seals for light liquid service. New valves (2" & smaller) will be bellows sealed.

<u>App. No.</u> 334038	<u>Source Description</u> Butamer Unit 60	<u>BACT</u> 1) Pumps – Tandem sealed type pumps will be used for Perc and VOC services. 2) Valves – Bellow seals valves will be used for all 2" valves or smaller. The rest of the new valves will be live-loaded or low emission valves. 3) Flanges – BACT is using ANSI/ ASTM standards and I & M program.
<u>App. No.</u> 334429	<u>Source Description</u> North Flare	<u>BACT</u> All fugitive components associated with piping of this flare will be equipped w/ BACT. Application does not list what BACT is, however. Previous app. 294014 states that new pump is sealless BACT.
<u>App. No.</u> 337587	<u>Source Description</u> Storage Tank 466 Fixed roof	<u>BACT</u> Emissions from the low pressure tank is controlled by a vapor recovery system.
<u>App. No.</u> 338490	<u>Source Description</u> Tail Gas Incinerator	<u>BACT</u> Application incomplete. No BACT listing.

**ULTRAMAR – CARSON & WILMINGTON  
PROPOSED CARFG2 OPERATIONAL PHASE EMISSIONS  
SOURCES WITH BACT DETERMINATIONS**

<u>App. No.</u>	<u>Source Description</u>	<u>BACT</u>
277667	Hot Oil Heaters	1) Sulfur content of gaseous fuel 100ppm 2) NO <sub>x</sub> emissions – SCR 3) SO <sub>x</sub> emissions – 100 ppm total sulfur fuel gas
App. No. 309044 (277668) prev.	Storage Tank w/ Ext. Floating Roof	External floating roof & seals for control system.
App. No. 277670	Storage Tank, Naptha	Fixed roof w/ vapor recovery system w/ overall system efficiency of 95% or greater, employing carbon adsorption or refrigerated condenser.
App. No. 309043 (277672)	Storage Tank	Tank is equipped with dual seals in accordance w/ District BACT guidelines.
App. No. 281825	Storage Tank 33-V-1 Aqueous Ammonia	No BACT listing in this application.
App. No. 281826	SCR Unit	Is the controlling unit for BACT.
App. No. 281828 281829 281830	Storage Tank 82-TK-3 Storage Tank 82-TK-1 Storage Tank 82-TK-2	No BACT listing in these applications.
App. No. 282620	Naptha Hydrotreater Charge Heater 56-H-1	1) NO <sub>x</sub> emissions – SCR 2) SO <sub>x</sub> emissions – 100ppm total sulfur fuel gas.
App. No. 271654	Storage Tank 82-T-91	Floating roof & seals for control system.
App. No. 291899 291900	Heater, Gas Oil Hydrotreater SCR	1) All pumps & compressors are equipped w/ seal venting to closed vent system. 2) Bellows sealed valves for valves 2” or smaller. 3) SCR w/ ammonia injection for control of NO <sub>x</sub> .
App. No. 291944	Amine Treating Unit	1) All pumps & compressors are equipped w/ seal venting to closed vent system. 2) Bellows sealed valves for valves 2” or smaller. 3) SCR w/ ammonia injection for control of NO <sub>x</sub> .

<u>App. No.</u> 257793	<u>Source Description</u> Amine Treating Unit	<u>BACT</u> 1) Bellows sealed valves. 2) Tandem mechanical seals on the amine pump. 3) Sealless gas scrubber pumps.
<u>App. No.</u> 296076	<u>Source Description</u> Amine Regeneration Unit	<u>BACT</u> 1) Pumps & compressors equipped w/ seal venting to closed vent system. 2) Bellows sealed valves on valves 2" & smaller. 3) SCR w/ ammonia injection for control of NO <sub>x</sub> emissions.
<u>App. No.</u> 256041	<u>Source Description</u> Amine Treating Unit No. 45	<u>BACT</u> Bellows sealed valves & sealless pumps.
<u>App. No.</u> 301268	<u>Source Description</u> Gas Oil Unibon	<u>BACT</u> 1) Use bellows sealed valves for ROG emissions of valves 2" or less.
270955	Hydrotreating Unit No. 80	2) Compressor seal is vented to vapor recovery system.
309049	Benzene Reduction Unit No. 51 Flare Gas Treating Unit 97	
<u>App. No.</u> 306175	<u>Source Description</u> Storage Tank w/ Fixed Roof	<u>BACT</u> ROG vapor vented from this storage tank to an air pollution control system.
<u>App. No.</u> 306177	<u>Source Description</u> Boiler	<u>BACT</u> Use treated fuel gas for PM10 emissions.
<u>App. No.</u> 306179	<u>Source Description</u> SCR	<u>BACT</u> For NH <sub>3</sub> emissions by limiting stack concentration to less than 20 ppmv @ 3% O <sub>2</sub> dry basis.
<u>App. No.</u> 307086	<u>Source Description</u> Fluid Catalytic Cracking Unit	<u>BACT</u> 1) Use bellows sealed valves for ROG emissions of valves 2" or less. 2) Compressor seal is vented to vapor recovery system.
<u>App. No.</u> 307083	<u>Source Description</u> Alkylation Unit 68	<u>BACT</u> 1) Use bellows sealed valves for valves 2" or less.
<u>App. No.</u> 308206	<u>Source Description</u> Isomerization Unit	<u>BACT</u> 1) Use bellows sealed valves for ROG emissions of valves 2" or less. 2) Compressor seal is vented to vapor recovery system.
<u>App. No.</u> 307081	<u>Source Description</u> Tail Gas Unit 38	<u>BACT</u> 1) Use bellows sealed valves for valves 2" or less.
<u>App. No.</u> 309050	<u>Source Description</u> MTBE/TAME Production Unit 67	<u>BACT</u> 1) Use bellows sealed valves for ROG emissions of valves 2" or less. 2) Compressor seal is vented to vapor recovery system.