Contra Costa Pipeline Project

Project Description

Provided by:

Praxair, Inc.

November 2007

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SECTION 1.0 INTRODUCTION

Praxair Inc. (Praxair), is proposing to develop an approximately 21.5 mile hydrogen pipeline to deliver hydrogen from Praxair's proposed hydrogen production facility at the Chevron Richmond Refinery in Richmond, CA[1], to the Shell Refinery in Martinez, CA, with a lateral pipeline extension to the ConocoPhillips Refinery in Rodeo, CA. The Contra Costa Pipeline Project consists of construction of approximately 13.5 miles of new pipeline and the reuse of approximately 8.0 miles of existing pipeline. The project also includes construction of an approximately 2.0 mile natural gas pipeline. The alignment of the new natural gas pipeline will parallel a segment of the proposed route for the new hydrogen pipeline. Figure 1 shows an overview of the pipeline route (all figures are located at the back of each section). Detailed maps of the entire route are in Appendix A.

Both the new and existing elements of the pipeline route are located in Contra Costa County, primarily in the unincorporated areas of the county. The segments of the route involving construction of new pipeline are located in the cities of Richmond, Pinole, and Martinez, and unincorporated areas of Contra Costa County. A portion of the route is also located on land owned by the East Bay Regional Park District (EBRPD). The existing pipeline is located in the unincorporated areas of Contra Costa County, and the cities of Richmond, Pinole, and Hercules. For purposes of this assessment, the route has been divided into eight segments, which includes both the new and existing hydrogen pipeline and the natural gas pipeline (see Section 2.7 and the pipeline route maps in Appendix A for a description of each segment).

1.1 Project Applicant

The project is being developed by Praxair, the largest industrial gases company in North and South America, and one of the largest worldwide, with 2005 sales of $7.7 billion. The company produces, sells, and distributes atmospheric, process, and specialty gases, as well as high-performance surface coatings.

Praxair operates four major hydrogen pipeline systems totaling over 300 miles of pipelines in six states. The largest pipeline complex is in the Gulf Coast area and has been in operation for over 30 years. In addition, Praxair operates over 35 hydrogen production plants around the world that feed pipeline systems which transport hydrogen gas at high pressures to various industrial customers. The

[1] The hydrogen facility being developed at the Chevron Richmond Refinery is currently under review as part of a separate Environmental Impact Report being prepared by the City of Richmond for the Chevron Refinery Renewal Project.

U.S. Department of Transportation regulates the design, operation, and maintenance of the hydrogen pipelines. Praxair pipeline operations are audited every year by state and federal agencies.

Praxair's safety performance is substantially better than industry averages. The recordable injury rate for industry in 2005 was 5.3 injuries per 100 employees, while Praxair's was 0.91. The lost workday case rate for industry in 2005 was 1.6, while Praxair's was 0.11.

1.2 Route Selection

In an effort to minimize potential environmental, health, and safety impacts associated with the proposed Contra Costa Pipeline Project, the following objectives were identified as part of the route selection process:

- utilize existing utility corridors or disturbed areas (such as streets, fire roads, or trails) to the extent practical
- avoid or limit routing in streets/roadways heavily congested with existing subsurface utilities
- avoid or limit routing in residential areas to the extent practical
- avoid or limit routing in sensitive environmental areas, including those containing biological resources (e.g., trees and wetland areas) to the extent practical

Using these criteria as a guide, Praxair has carefully selected a proposed pipeline route that is primarily located within existing roads or railroad corridors. Where a portion of the route crosses through open grassland, a team of biologists assisted Praxair with routing the pipeline so that it parallels an existing gas pipeline or is located within an existing fire road or trail wherever possible.

To further reduce potential environmental impacts associated with construction of the pipeline, Praxair plans to utilize approximately 8.0 miles of an existing pipeline (Chevron's Line #2) to transport hydrogen. The newly constructed segments of the Praxair hydrogen pipeline will connect with this existing line, which Chevron currently uses to transport natural gas. Praxair intends to convert this section of the existing Chevron #2 line to transport hydrogen as part of the overall project. Ownership of the existing pipeline will be retained by Chevron, but Praxair will operate and maintain it.

Once Line #2 begins transporting hydrogen, Chevron will use its existing Line #4 to transport natural gas. Sections of Line #2 that will not be used to transport hydrogen will remain in place. The

exception to this is a small section of the pipeline in the City of Richmond which may either be removed, or filled with concrete and capped (see Section 2.7.2).

1.3 Environmental Considerations

As part of the route selection process, Praxair retained a team of biologists to conduct biological surveys of the proposed route alignment, including extensive tree surveys. Geologic, landslide and flood hazards, as well as known cultural resources along the route segments were also identified. The following sections contain a brief summary of each of these analyses.

1.3.1 Biological Resources

The pipeline route was surveyed for wetlands, habitats, and the presence of any threatened or endangered species. The surveys occurred along a 100-foot study corridor (50 feet on each side of centerline) for wetlands. Habitat assessments for special-status species included an area approximately 2,000-foot wide along the alignment, particularly through the EBRPD lands. For the segments of the route utilizing the existing Chevron #2 pipeline, the habitats along those segments were also identified and mapped. Wetland maps of the entire route are included in Appendix B. The Biological Resources Technical Memorandum which summarizes the results of all of the project surveys will be submitted in February 2007. Resumes of the biologists who conducted the surveys are included in Appendix I.

1.3.2 Tree Survey

An Arboricultural Study was conducted pursuant to local ordinances and regulations, including those of Contra Costa County, EBRPD, and the cities of Pinole, Martinez, and Richmond. The tree surveys were conducted within a 200-foot study corridor (100 feet on each side of centerline) along the pipeline route. The Arboricultural Study provides a list of the trees within the study corridor of the pipeline route, and identifies the number of trees that will be impacted, how the impacts will be mitigated, and a proposed tree replacement and monitoring plan. The Arboricultural Study is included in Appendix C. The resume of the arborist who prepared the Arboricultural Study is included in Appendix I.

1.3.3 Seismic and Geologic Hazards

A report was prepared to assess the seismic and geologic hazards along the route of the Contra Costa Pipeline project. Although the pipeline is located in an area with seismic activity, the project will

incorporate measures to mitigate against potential seismic and geologic hazards. The Seismic and Geologic Hazards Report is included in Appendix D.

1.3.4 Flood Hazards

An evaluation assessing landslide and creek crossing hazards along the pipeline route was conducted. The report identifies potential hazards along the pipeline route and measures to mitigate potential impacts to insignificant levels. The flood hazard report is included in Appendix E.

1.3.5 Cultural Resources

A California Historic Resources Information System (CHRIS) literature search was conducted for the proposed Contra Costa Pipeline Project. The majority of the pipeline route has been previously surveyed for cultural resources. Based on the survey results, there are 5 known cultural resource sites immediately adjacent to or within the pipeline right-of-way. Although Praxair intends to avoid the sites, the specific boundaries of each site are not known. As a result, Praxair will have a cultural resource monitor at each site during construction of the pipeline. The CHRIS survey results are included in Appendix F. The resume of the project archeologist is included in Appendix I.

1.4 Project Benefits

Construction and operation of the proposed Contra Costa Pipeline Project will bring several benefits to the County and outlying areas, including the following:

- providing or enhancing reliability of the hydrogen supply to local refineries, thereby improving the reliability and availability of cleaner fuels for the County and the State
- enabling local refineries to obtain hydrogen from multiple suppliers
- providing a dependable back-up supply of natural gas to the Chevron Richmond Refinery and the Praxair hydrogen facility within the Richmond Refinery, thus increasing reliability of both facilities
- providing a source of revenue to the County through payment of annual franchise fees
- creating up to 100 construction jobs during the nine-month construction period
- purchasing local goods and services during both pipeline construction and operation

1.5 Project Cost

The construction cost of the Contra Costa Pipeline Project is estimated to be $25 million. The investment in capital improvements is estimated to be approximately $10 million, for a total project cost of approximately $35 million.

SECTION 2.0 PROJECT DESCRIPTION

2.1 Project Objective

As part of its Chevron Refinery Renewal Project, the Chevron Richmond Refinery is seeking approval to site a new hydrogen production facility at the refinery, which would be developed by Praxair.[2] That facility, which is expected to be completed by the fourth quarter, 2008, will supply hydrogen to Chevron's Richmond Refinery. The proposed Contra Costa Pipeline Project described in this document will allow hydrogen from that facility to also be supplied to the Shell Refinery in Martinez. A lateral pipeline off the primary pipeline route will provide the ability to deliver a backup supply of hydrogen to the ConocoPhillips Refinery.

The new 16-inch natural gas pipeline will provide the Praxair hydrogen production facility and the Chevron Richmond Refinery with a back-up supply of natural gas.

The Contra Costa Pipeline Project will enable Praxair to provide or enhance reliability of the hydrogen supply to local refineries, improving reliability and the availability of clean fuels for the region and the State of California. The project will also enable local refineries to obtain hydrogen from multiple suppliers at a more competitive price.

2.2 Hydrogen

Hydrogen (H_2) is the lightest of all gases. Commonly found in nature in compounds with other elements, it is the most abundant element in the universe. Hydrogen is a component of water, minerals and acids, as well as an essential part of all hydrocarbons and other organic substances. In fact, 98 percent of the known universe - most notably the sun and stars - consists of hydrogen.

Colorless, odorless, tasteless and nontoxic, hydrogen is a quickly dissipating gas at atmospheric temperatures and pressures. It is flammable and burns in air with a pale blue, almost invisible flame. When cooled to -423°F (-253°C), hydrogen becomes a liquid.

Today, hydrogen is a common chemical feedstock used by industry. It is handled routinely in its liquid and gaseous forms in the manufacture of chemicals, foods, and electronics. The use of hydrogen in the crude oil refining process is necessary to comply with reduced emission limits for

[2] The hydrogen facility being developed at the Chevron Richmond Refinery is currently under review as part of a separate Environmental Impact Report being prepared by the City of Richmond for the Chevron Refinery Renewal Project.

sulfur dioxide and nitrogen oxide set forth in the federal and California Clean Air Acts. These new emission limits have prompted the development of new crude oil refining processes that utilize hydrogen gas to improve the removal or prevent the formation of these sulfur and nitrogen based compounds. Use of hydrogen allows petroleum refiners to produce cleaner-burning gasoline and other transportation fuels.

More than 8.9 billion standard cubic feet (50 million pounds) of hydrogen are used daily in production plants across the United States. The most common mode of transporting hydrogen is as a compressed gas flowing through a steel pipeline. Pipeline transportation of hydrogen is very reliable and arguably the safest method of delivery.

2.3 Natural Gas

Natural gas is a gaseous fossil fuel consisting primarily of methane (CH4), the shortest and lightest hydrocarbon molecule. Natural gas also contains other gaseous hydrocarbons such as ethane (C2H6), propane (C3H8), and butane (C4H10).

The composition of processed natural gas is allowed to vary, but there is an industry standard with respect to heating value. One standard cubic foot of natural gas must produce around 1000 British Thermal Units (BTUs) of energy.

Natural gas is processed primarily from gas feedstocks found in oil fields and natural gas fields, and in coal beds. Processed natural gas is tasteless and odorless. Before gas is distributed to end-users, it is odorized by adding small amounts of thiols or mercaptans to assist in leak detection. Natural gas is flammable. It is lighter than air, and tends to dissipate quickly into the atmosphere.

Natural gas burns more cleanly than other fossil fuels, such as oil and coal, and produces lower levels of greenhouse gases per unit of energy. For an equivalent amount of heat, burning natural gas produces about 30 percent less carbon dioxide than burning petroleum, and about 45 percent less than burning coal. Natural gas is used to produce hydrogen gas and is a major fuel source for electricity generation.

Because of its low density, natural gas is most economically transported by gas pipelines. There are many existing natural gas pipelines in North America.

2.4 Project Location

The approximate 21.5 mile hydrogen pipeline will be located entirely in Contra Costa County. Approximately 13.5 miles of the project will consist of new pipeline construction. The remaining 8.0 miles will consist of existing pipeline that will be converted to hydrogen service. In addition, approximately 2.0 miles of natural gas pipeline line will be constructed. The route for the natural gas pipeline is the same as a segment of the new hydrogen pipeline.

For the new hydrogen pipeline construction, up to 0.8 miles will be located in the City of Richmond; approximately 1.6 miles will be located in the City of Pinole; and approximately 2.3 miles will be located in the City of Martinez. The remainder of the new hydrogen pipeline construction (approximately 8.9 miles) will be located in unincorporated areas of Contra Costa County.

For construction of the new natural gas pipeline, up to 0.9 miles will be located in the City of Richmond and 1.1 miles will be located in unincorporated areas.

For the existing pipeline which will be converted to hydrogen service as part of the project, 3.0 miles is located in the City of Richmond; 0.7 miles is located in the City of Pinole; 1.9 miles is located in the City of Hercules; and 2.4 miles will be located in the unincorporated areas of Contra Costa County.

2.5 Project Components

Below is a discussion of each of the components of the Contra Costa Pipeline Project.

2.5.1 New Hydrogen Pipeline Construction

The Praxair hydrogen pipeline will consist of approximately 13.5 miles of new 12-inch diameter carbon steel pipe, constructed and operated by Praxair.

2.5.2 Converted Use of Existing Pipeline for Transport of Hydrogen

Praxair has determined that it is possible to use a portion of an existing pipeline to transport hydrogen. Recent strength and metallic property tests have determined that approximately 8.0 miles of Chevron's 10-inch to 12-inch existing natural gas pipeline (Chevron Line #2) can be used for this purpose. The existing pipeline is currently being used by Chevron to transport natural gas. However, the pipeline can also accommodate hydrogen. In addition, the governing safety, operations, and maintenance regulations (Code of Federal Regulations, Title 49, Part 192 regulated by the U.S. Department of Transportation) for the existing gas pipeline are also applicable to the transportation of

hydrogen, allowing the pipeline to be used to transport hydrogen. The existing pipeline is located within a well-marked corridor. No modifications are required for Praxair's use of Chevron's Line #2 other than to connect the existing pipe to the proposed newly constructed segments of the hydrogen pipeline and to construct a valve station at Chevron's existing Hilltop valve station in the City of Richmond. Praxair will operate and maintain the existing pipeline segment, but it will be owned by Chevron.

2.5.3 New Natural Gas Pipeline Construction

As part of the project, Praxair is also seeking approval to construct a 16-inch diameter, approximate 2.0-mile long natural gas pipeline. The purpose of the natural gas pipeline is to provide a back up supply of natural gas for Praxair's hydrogen facility and the Chevron Refinery in Richmond. The majority of the new 16-inch diameter carbon steel natural gas pipeline will follow the same route as a segment of the new hydrogen pipeline and will be located in the same construction corridor. The new natural gas pipeline will be constructed by Praxair but will be owned and operated by Chevron.

The route for the proposed natural gas pipeline will extend from the Chevron Richmond Refinery to Chevron's AB station in Richmond. At this point, the pipeline will interconnect to PG&E's existing STANDPAC 3 gas transmission pipeline.

2.6 Pipeline Construction Methodology

Both the new 12-inch hydrogen and 16-inch natural gas pipelines will be constructed within a maximum 75-foot wide pipeline corridor. Praxair intends to acquire a 10-foot wide permanent easement in which to locate the pipelines. An additional 65-foot wide temporary easement will be required during construction, for a total corridor width of 75 feet. The width of the easements will be the same for the segments of the route containing both the hydrogen and the natural gas pipelines. In some areas, the construction corridor will be narrower than 75 feet, such as when the pipelines are located in streets, when there are topographic constraints, or when it is necessary to avoid environmental resources such as trees or wetlands. (See Appendix B Wetland Maps and Appendix C Arboricultural Study for information on the reduced corridor width to avoid environmental resources.)

In the segments of the route containing both the new hydrogen and natural gas pipelines, the pipelines will be placed within the same construction trench and located at least 1 foot apart, pursuant to U.S. Department of Transportation requirements. The pipelines will be buried so that the top of the pipe will be approximately 4 feet below the surface. In the Union Pacific Railroad (UPRR) and the BNSF Railway (BNSF) rights-of-way, the trench will be approximately 6 feet deep because both railroads require a minimum cover of 5 feet. In the locations where the pipeline crosses an

underground encumbrance such as a sewer pipe or drainage feature, the pipeline may be buried deeper than the minimum depth of cover of 4 feet, depending on the object to be avoided. Section 5.0 provides additional details regarding the construction methods to be used for both the proposed natural gas and hydrogen pipeline components of the project.

2.7 Proposed Pipeline Route

The route for both the hydrogen and natural gas pipelines is described below. To better describe the route, it has been divided into eight segments (see Figure 2). The route description below corresponds with the maps in Appendix A. In the description of each pipeline segment, the applicable map segment and map sheets in Appendix A are identified.

2.7.1 Segment 1

Segment 1 is the short section of the route that provides the interconnection point for the new hydrogen and gas pipelines near Gate 67 of Chevron's Richmond Refinery.[3] An aboveground valve station will be installed at this interconnection. Segment 1 is depicted on the Segment 1 Map, Sheet 1.

2.7.2 Segment 2

The route proposed for Segment 2 is depicted on the Segment 2 Maps, Sheets 1 through 6. Segment 2 consists of construction of approximately 1.8 miles of new 12-inch diameter hydrogen pipeline and approximately 2.0 miles of 16-inch natural gas pipeline. The route begins where the two pipelines exit the northeastern boundary of the Chevron Refinery at Gate 67 (refer to Sheet 1 of Segment 1 map). The route then extends east on West Gertrude Avenue for approximately 850 feet before continuing north on private property until it reaches Wildcat Creek. In order to avoid Wildcat Creek and the environmentally sensitive areas adjacent to it, the horizontal directional drill (HDD) construction method will be used to construct the pipeline in this section of Segment 2 (refer to Sheet 2 of Segment 2 maps).[4] Drill pad areas (approximately 100-foot square) will be located at each end of the drill line. The drill pad area on the south end of the drill line will be located on an existing gravel road on private property. The drill pad area on the north end of the drill line will be located at the southern end of the Garden Tract Road extension.

[3] The hydrogen pipeline within the Chevron Refinery is being evaluated as part of the Environmental Impact Report for the Chevron Refinery Renewal Project, which is being prepared by the City of Richmond.

[4] Refer to Section 5.0 of the original application for a description of the construction methods to be used for the project.

On the north side of Wildcat Creek, the pipeline will extend north on Garden Tract Road until it reaches Pittsburg Avenue. At Pittsburg Avenue, the pipeline will head east on the south side of the road until it reaches 3rd Street (refer to Sheets 3 and 4 of Segment 2 maps).

The jack and bore construction method will be used to cross under 3rd Street (Sheet 4 of Segment 2 maps). The pipeline route will then head north on 3rd Street until it reaches Brookside Drive (Sheet 5 of Segment 2 maps). The pipeline route will then head east on the south side of Brookside Drive for approximately 2,780 feet until it reaches the Union Pacific Railroad (UPRR) tracks. The pipeline will cross the UPRR track using the jack and bore construction method. The pipeline will continue another 560 feet using the conventional open cut construction method until it reaches the Burlington Northern Santa Fe (BNSF) railroad tracks. At this location, the jack and bore method will be utilized to cross under the tracks. The hydrogen pipeline will terminate on the east side of the BNSF tracks where the hydrogen pipeline will interconnect with the existing Chevron Line #2 pipeline. The natural gas pipeline will continue south for 1,200 feet until it reaches the existing Chevron AB Station, where it will interconnect with the existing PG&E STANDPAC 3 pipeline.

Approximately 1,200 feet of the existing Chevron Line #2 pipeline, from the interconnection point with the new 12-inch hydrogen pipeline south to the Chevron AB station, may either be idled, physically removed, or filled with concrete and capped since once Line #2 is used to transport hydrogen, this 1,200-foot section will no longer be used.

With the exception of Wildcat Creek, the areas along Segment 2 are industrial and commercial.

2.7.3 Segment 3

The route for Segment 3 is depicted on the Segment 3 Maps, Sheets 1 through 13. Segment 3 is approximately 4.5 miles in length and consists of the existing Chevron #2 pipeline. With the exception of the installation of a new valve at Chevron's existing Hilltop valve station and interconnecting to the new pipeline, no modifications to the existing pipeline will be necessary along this segment of the route.

The route begins at the interconnection point of the new hydrogen pipeline to the existing Chevron #2 pipeline and extends to the intersection of Walter Avenue and San Pablo Avenue in the City of Pinole. Specifically, the route extends north along the BNSF right-of-way (refer to Sheets 1 through 6 of Segment 3 maps). Just south of the Richmond Country Club, the pipeline route extends east for 0.6 miles until it reaches the intersection of Park Ridge Drive and Hilltop Drive (refer to Sheets 7 and 8 of Segment 3 maps). The pipeline route then parallels Hilltop Drive until it reaches San Pablo Avenue. At San Pablo Avenue, the pipeline route heads north and parallels San Pablo Avenue for

0.7 miles, until it reaches Chevron's existing Hilltop valve station. A new valve station will be constructed for the Chevron #2 line at the Hilltop station. The pipeline then parallels San Pablo Avenue for 1.6 miles until it reaches Walter Avenue (refer to Sheet 13 of Segment 3 maps).

The areas along Segment 3 consist of light industrial, residential, open space, and park land.

2.7.4 Segment 4

The route for Segment 4 is depicted on the Segment 4 Maps, Sheets 1 through 3. Segment 4 consists of the construction of approximately 1.6 miles of new 12-inch diameter hydrogen pipeline. A new pipeline is being constructed in this segment, rather than using the existing Chevron Line #2, in order to use the railroad right-of-way, where there is less congestion and less potential for third party damage.

The new pipeline will interconnect with the existing Chevron #2 line at the intersection of Walter Avenue and San Pablo Avenue in Pinole (refer to Sheet 1 of Segment 4 maps). The pipeline route will head north along the west side of Walter Avenue until it reaches the BNSF tracks. The HDD construction method will then be used for approximately 2,800 feet paralleling the BNSF tracks. The HDD will be located on either the north or south side of the tracks depending on approval from BNSF. As a result, Praxair is seeking approval to locate the pipeline on either side of the tracks. However, the south side is preferred. If the HDD is on the north side of the tracks, a jack and bore of approximately 100 feet in length will be used to cross to the north side of the railroad tracks. Pipeline laydown areas for the HDD have been identified (refer to Sheet 1A of Segment 4 maps). The HDD will end (regardless of what side of the track it is on) at the west end of the East Bay Regional Park District (EBRPD) trail (refer to Sheet 2 of Segment 4 maps). HDD equipment will utilize a newly identified access route to get equipment and personnel to the proposed HDD pad located within East Bay Regional Parks (refer to Sheet 2A of Segment 4 maps). Vehicles will reach the access road from Pinole Shores Drive. The newly identified access road will utilize the existing East Bay Regional Parks hiking trail, and will also contain a truck turnaround area. It is important to note that construction equipment will remain on the construction corridor during construction. In addition, in order to minimize traffic, construction workers will park at a centralized staging area and then be shuttled to the construction corridor.

At the end of the HDD, the conventional trenching construction method will be used for approximately 170 feet. A second HDD approximately 2,230 feet in length, will then be installed at the west end of the EBRPD trail, ending approximately 700 feet west of Tennent Avenue (refer to Sheet 3 of Segment 4 maps). The drill pads for this HDD will be located on the BNSF right-of-way. After the HDD, the conventional trenching construction method will be used and the route will

parallel the railroad tracks until it reaches Tennent Avenue. It will then cross Tennent Avenue moving east, under the BNSF bridge, until reaching Fernandez Park. From there, the pipeline route will parallel the BNSF tracks until it reaches Pinole Creek. The jack and bore construction method will be used to cross under Pinole Creek. After the creek crossing, the pipeline route will extend approximately 700 feet until it reconnects with the existing Chevron #2 line at Charles Street, west of San Pablo Avenue. A new valve station will be installed where the new 12-inch hydrogen pipeline interconnects to the existing Chevron #2 pipeline.

Segment 4 is located in the City of Pinole and on BNSF right-of-way. The areas along the route consist primarily of residential (adjacent to the BNSF tracks), commercial, recreational, and light industrial properties.

2.7.5 Segment 5

The route for Segment 5 is depicted on the Segment 5 Maps, Sheets 1 through 6. Segment 5 consists of the use of the existing Chevron #2 pipeline for 3.5 miles. No modifications to the pipeline will be necessary along this segment of the route except where the new pipeline interconnects with Chevron Line #2. The pipeline route extends from Charles Street west of San Pablo Avenue to the ConocoPhillips Collier Meter Station, adjacent to the ConocoPhillips Carbon Plant. Specifically, the pipeline heads in a northeast direction primarily paralleling the BNSF tracks (refer to Sheets 1 through 4 of Segment 5 maps). The pipeline then heads in a northeast direction cross-country on private property until it reaches Franklin Canyon Road (refer to Sheet 5 of Segment 5 maps). It then parallels Franklin Canyon Road, crossing Highway 4, until it reaches the Collier Meter Station (refer to Sheet 6 of Segment 5 maps).

The areas along Segment 5 consist of residential and open space.

2.7.6 Segment 6

The route for Segment 6 is depicted on the Segment 6 Maps, Sheets 1 through 17. Segment 6 is 8.6 miles long. The pipeline route begins at the ConocoPhillips Collier Meter Station and extends north until it reaches the BNSF railroad tracks. The HDD construction method will be used to cross under both the BNSF tracks and a natural drainage located just east of the BNSF tracks (refer to Sheets 1 and 2 of Segment 6 maps). After the HDD crossing, the pipeline route continues north, paralleling an existing PG&E overhead electric transmission line, until it reaches an existing dirt road (refer to Sheet 3 of Segment 6 maps). Two valve stations will be constructed at this location: one will be installed to isolate flow to ConocoPhillips. The second valve will isolate the flow for maintenance,

operation, or safety purposes. (The valve station to ConocoPhillips marks the beginning of Segment 7, the lateral pipeline to the ConocoPhillips Refinery. See Section 2.7).

At the location of the new valve stations, the pipeline route will head east through open grassland until it reaches Cummings Skyway. The majority of the route will be located within an existing dirt road. The jack and bore construction method will be used to cross under Cummings Skyway (refer to Sheets 3 through 5 of Segment 6 maps).

On the east side of Cummings Skyway, the pipeline corridor continues through open grassland (refer to Sheets 6 through 8 of Segment 6 maps). The jack and bore construction method will be used to construct the pipeline under McEwen Road (refer to Sheet 9 of Segment 6 maps). A valve station will be constructed on the west side of McEwen Road. On the east side of McEwen Road, the pipeline will follow an existing dirt road for approximately 1.4 miles (refer to Sheets 10 through 12 of Segment 6 maps). The HDD construction method will then be used along Franklin Hill to avoid the numerous trees on the hill. The HDD will be approximately 2,470 feet long and will end within an EBRPD parking area (refer to Sheet 13 of Segment 6 maps). The conventional trenching construction method will then be used, following an existing EBRPD trail. At the base of the hill, the jack and bore construction method will be used to cross under the UPRR tracks (refer to Sheet 14 of Segment 6 maps).

The pipeline route will then follow Embarcadero Street until it reaches Alhambra Creek (refer to Sheet 15 of Segment 6 maps). The jack and bore construction method will be used to avoid Alhambra Creek. The conventional trenching construction method will then be used heading north on private property. At the existing bike path, the pipeline route will head east. The jack and bore construction method will be used to cross under a creek immediately east of the bike path. The pipeline route will then continue south along North Court Street within Waterfront Park. It will then follow Joe DiMaggio Drive heading west for the length of the road. Where the pavement ends, the pipeline will continue along a dirt road until it reaches the end of the Waterfront Park property (refer to Sheets 15 and 16 of Segment 6 maps).

After exiting Waterfront Park, the pipeline alignment will be located within the Shell Refinery for approximately 1,720 feet (refer to Sheet 16 of Segment 6 maps). The jack and bore construction method will be used to cross under the UPRR tracks (refer to Sheet 17 of Segment 6). A valve station will be installed on the north side of the tracks prior to the jack and bore. The pipeline route corridor will then head east paralleling Monte Vista Avenue. The conventional trenching construction method will be used in this area. The jack and bore construction method will then be used to cross under Monte Vista Avenue. The pipeline route corridor will be located within Shell Refinery until it terminates at Shell Avenue. Two valve stations will be installed here. A valve station will be installed

which will isolate the flow for maintenance, operation, or safety purposes. Another valve station will be installed to isolate flow to the Shell Refinery. (The valve station to isolate the flow to the Shell Refinery marks the beginning of Segment 8. See Section 2.8).

Segment 6 crosses a variety of land uses, including open grassland, EBRPD parkland, railroads, commercial, and industrial properties.

2.7.7 Segment 7

The route for Segment 7 is depicted on the Segment 7 Maps, Sheets 1 and 2. Segment 7 consists of a new 12-inch lateral hydrogen pipeline to serve the ConocoPhillips Refinery. The pipeline route begins at the new valve station adjacent to an existing dirt road approximately 3,700 feet north of the Collier Meter Station. The purpose of this valve is to isolate flow to ConocoPhillips. The pipeline route then heads in a northwest direction paralleling an existing pipeline right-of-way until it reaches the ConocoPhillips tank farm (refer to Sheets 1 and 2 of Segment 7 maps). Within the tank farm, the pipeline will be terminated inside the refinery fence.

Most of the area through which the pipeline route crosses in Segment 7 consists of open grassland. However, the majority of the route follows an existing dirt road.

2.7.8 Segment 8

The route for Segment 8 is depicted on the Segment 8 Maps, Sheets 1 through 3. An 8- to 12-inch hydrogen pipeline will be installed in this Segment. Segment 8 begins inside of the Shell Refinery at Shell Avenue, where Segment 6 terminates. The pipeline route corridor extends approximately 2,400 feet along Shell Avenue until it reaches an existing pipe rack. A valve station will be installed at this point. Segment 8 terminates at the valve station.

The area along Segment 8 is industrial.

2.8 Pipeline Route By Jurisdiction

The proposed hydrogen and natural gas pipeline routes and the existing Chevron #2 pipeline are located in Contra Costa County. However, the routes are located in several cities and in unincorporated areas of Contra Costa County. The routes of the pipelines through each of these jurisdictions are described below.

2.8.1 City of Richmond

Segment 2

Portions of the pipeline route in Segment 2 for the new hydrogen pipeline and the new natural gas pipeline are located in the City of Richmond. Specifically, the areas within the City of Richmond are where:

- the route exits the Chevron Refinery extends east on Gertrude Avenue (refer to Sheet 1 of Segment 2 maps)
- the route crosses Wildcat Creek and runs along Garden Tract Road (refer to Sheets 2 and 3 of Segment 2 maps)
- the route crosses the UPRR tracks and the BNSF tracks (refer to Sheet 5 of Segment 2 maps)
- the natural gas pipeline extends to where it interconnects to the AB station (refer to Sheet 6 of Segment 2 maps)

The total distance for the hydrogen and natural gas pipelines within the City of Richmond is approximately 0.8 miles.

Segment 3

Segment 3 consists of using the existing Chevron #2 pipeline to transport hydrogen. Segment 3 is approximately 4.5 miles long, of which 3.0 miles are located in the City of Richmond. The remainder is located in unincorporated Contra Costa County and the City of Pinole. The sections of Segment 3 located in the City of Richmond are depicted on the Segment 3 Maps, Sheets 1 through 10.

2.8.2 City of Pinole

The pipeline route in the City of Pinole consists of both the existing Chevron Line #2 and the construction of the new hydrogen pipeline. Portions of Segments 3 and 5 and the entire length of Segment 4 are located in the City of Pinole. This is described in more detail in the sections below.

Segment 3

Approximately 0.4 miles of Segment 3 are located in the City of Pinole. The section within the City's jurisdiction in Segment 3 begins approximately 850 feet west of the intersection of San Pablo Avenue and Del Monte Drive, and ends at the beginning of Segment 4. This is depicted on the Segment 3 Maps, Sheet 13.

Segment 4

Segment 4 consists of construction of new hydrogen pipeline. The entire approximately 1.6 miles of Segment 4 are located in the City of Pinole. This is depicted on the Segment 4 Maps, Sheets 1 through 3.

Segment 5

Segment 5 consists using the existing Chevron #2 pipeline. Segment 5 is approximately 3.5 miles long, of which approximately 0.3 miles are located in the City of Pinole. This is depicted on the Segment 5 Maps, Sheet 1.

2.8.3 City of Hercules

Portions of Segment 5 which consists of the existing Chevron Line #2 are located in the City of Hercules. Segment 5 is 3.5 miles long, of which 1.9 miles are located in the City of Hercules. The portions of Segment 5 in the City of Hercules are depicted on the Segment 5 Maps, Sheets 1 through 4.

2.8.4 City of Martinez

Sections of Segment 6 and Segment 8 are located in the City of Martinez. Approximately 2.2 miles of Segment 6 and 0.1 miles of Segment 8 are located within the City limits. This is depicted on the Segment 6 Maps, Sheets 14 through 17, and Segment 8 Maps, Sheets 1 and 2.

2.8.5 Unincorporated Contra Costa County

Approximately 9.0 miles of the new hydrogen and 1.5 miles of natural gas pipeline route extend through the unincorporated area of Contra Costa County as depicted on the Segment 2 Maps, Sheets 1 through 5; Segment 6 Maps, Sheets 1 through 13; Segment 7 Maps, Sheets 1 and 2; Segment 8 Maps, Sheets 2 and 3.

A section of the existing Chevron Line #2 is located in unincorporated Contra Costa County. Specifically, approximately 1.0 mile of Segment 3 is in the unincorporated area. This is depicted on the Segment 3 Maps, Sheets 10 through 13. A portion of Segment 5 depicted on the Segment 5 Maps, Sheets 5 and 6 is also located in unincorporated Contra Costa County. However, it is within the City of Hercules' sphere of influence.

SECTION 3.0 PIPELINE ENGINEERING

The proposed Contra Costa Pipeline Project will be designed per American Society of Mechanical Engineers (ASME) B31.8 for the maximum operating pressures of 815 pounds per square inch gauge (psig) and 1440 psig for the hydrogen and natural gas pipelines, respectively. However the new hydrogen pipeline will be operated at 350 psig and the natural gas pipeline will be operated at 800 psig. The Chevron Line #2 will be operated at 350 psig.

The pipeline wall thickness and material for the new hydrogen and natural gas pipelines will be calculated for CLASS 4 installation per ASME B31.8, and United States Code of Federal Regulations, Title 49, Part 192. The new pipelines will be made of carbon steel and coated with fusion bond epoxy or equivalent and will be designed to include an appropriate cathodic protection system.

SECTION 4.0 CONSTRUCTION METHODS BY SEGMENT

The proposed Contra Costa Pipeline Project route has been divided into eight segments. This Section summarizes the construction methods to be used along each segment of the pipeline. It also describes the valve stations that will be constructed as part of the project, the designated laydown areas, and right-of-way access for pipeline construction.

4.1 Construction Methods by Segment

4.1.1 Segment 1

Segment 1 is the short segment of the pipeline route that consists of the interconnection of the new hydrogen and gas pipelines near Gate 67 of Chevron's Richmond Refinery. To make these interconnections, the new hydrogen and natural gas pipelines will be welded, per American Petroleum Institute (API) 1104 welding code, to the existing hydrogen and natural gas pipelines within the Chevron Refinery. The weld joints will be coated with fusion bonded epoxy and sleeves and will be installed at the weld joints to match the new pipes.

4.1.2 Segment 2

Segment 2 includes both the hydrogen and natural gas pipelines. The route in Segment 2 will consist of construction activities within public roads, on private property, and within railroad rights-of-way. The conventional pipeline trenching construction method will be used in all of these areas. Both the hydrogen and natural gas pipelines will be installed in the same trench with a minimum one foot separation.

The HDD construction method will be used to cross Wildcat Creek. The jack and bore construction method will be used to cross under:

- Richmond Parkway
- 3rd Street
- UPRR and BNSF tracks

To interconnect the new hydrogen pipeline to Chevron's existing Line #2 and the gas pipeline to the Chevron AB Station, the hydrogen pipeline will be tied into the #2 pipeline by cutting into the existing pipeline and making weld connections. To connect the new gas pipeline to the existing PG&E gas pipeline at the Chevron AB station, a 90-degree elbow joint will be installed to connect the two

pipelines. The joint will be coated with fusion bonded epoxy, and sleeves will be installed to match the new 16-inch pipe.

4.1.3 Segment 3

Since Segment 3 consists of using the existing Chevron #2 pipeline, there will be no modifications to the pipeline within this segment except where the new hydrogen pipeline interconnects with the Chevron #2 pipeline and where a new valve station at Chevron's Hilltop Station will be installed.

4.1.4 Segment 4

The construction along Segment 4 consists of road construction, construction along the BNSF right-of-way, up to 2 jack and bores, and 2 HDDs. Road construction will occur within or along the following roads:

- San Pablo Avenue (at the intersection with Walter Avenue)
- Walter Avenue
- Tennant Avenue

Conventional open cut (trenching) construction will occur along the streets and areas where the HDD construction method is not used along the BNSF right-of-way. The jack and bore construction method will be used to cross under the BNSF tracks at Walter Avenue, if construction is located on the north side of the BNSF tracks, and to avoid Pinole Creek. The HDD construction method will be used in a residential area and in areas with topographic constraints along the BNSF right-of-way.

To interconnect the new hydrogen pipeline to the existing pipeline at Walter Avenue and Charles Street, the existing #2 pipeline will first be excavated and exposed. A new 90-degree elbow joint will be installed to connect the new hydrogen pipeline with the existing #2 pipeline. The pipe joint will be coated with fusion bonded epoxy and sleeves will be installed to match the new pipe coating.

4.1.5 Segment 5

Since Segment 5 consists of using the existing Chevron #2 pipeline, there will be no modifications to the pipeline within this segment except where the new hydrogen pipeline interconnects with the Chevron #2 pipeline.

4.1.6 Segment 6

Construction along this segment will primarily be in open grassland where the conventional open cut (trenching) construction method will be used. In addition, there will be 7 jack and bores, and 2 HDDs. The jack and bore construction method will be used in the following locations:

- Cummings Skyway
- McEwen Road
- UPRR tracks near Embarcadero Road
- Alhambra Creek
- A creek in Waterfront Park, east of Alhambra Creek
- UPRR Tracks at the Shell Refinery
- Marina Vista Avenue

The HDD construction method will be used to cross under the BNSF tracks and a natural drainage near the Collier Meter Station and on Franklin Hill, west of the City of Martinez.

4.1.7 Segment 7

Conventional pipeline trenching construction will be used to construct the pipeline in this segment.

4.1.8 Segment 8

Conventional pipeline trenching construction will be used to construct the pipeline in this segment.

4.2 Valve Station Construction

Isolation valve stations (8 manual and 4 automated) will be installed along the pipeline route (see Figure 3 in Section 4.2 – Valve Station Construction, of the original application which depicts a typical manual valve assembly). The purpose of a valve station is to enable isolation of pipeline segments and for normal maintenance, operations, and safety. They will be installed at the following locations:

- Interconnection of natural gas and hydrogen pipelines at the Chevron Richmond Refinery (refer to Sheet 1 of Segments 1 and 2 maps). This will be a manual valve.

- Chevron's existing Hilltop Station (refer to Sheet 9 of Segment 3 maps). This will be an automatic valve.

- At the interconnection point of the new hydrogen pipeline and the existing Chevron #2 at the end of Segment 4 (refer to Sheet 3 of the Segment 3 maps). A manual valve will be installed at this location.

- At the Collier Station, near the Conoco Carbon Plant, an automatic valve will be installed in the station.

- North of the Collier Meter Station, where the lateral pipeline to the ConocoPhillips Refinery (Segment 7) begins. There will be two valves in this location. A manual valve will be installed to isolate flow into Segment 7. The second manual valve will be installed which will isolate the flow into Segment 6.(refer to Sheet 3 of Segment 6 maps as well as Sheet 1 of the Segment 7 maps).

- An automatic valve will be installed at the terminus of Segment 7 in a future delivery station.

- On the west side of McEwen Road (refer to Sheet 9 of the Segment 6 maps). This will be a manual valve.

- Prior to crossing to the south side of the UPRR tracks at the Shell Refinery. This will be a manual valve. (Refer to Sheet 16 and 17 of the Segment 6 maps. It is also depicted on Sheet 1 of the Segment 8 maps.)

- At the termination point of Segment 6 and the beginning of Segment 8 within the Shell Refinery, two valves will be located. A manual valve to isolate flow to the Shell Refinery and a second manual valve to be used to provide future connections. (Refer to Sheet 17 of the Segment 6 maps and Sheet 1 of Segment 8 maps.)

- At the termination point of Segment 8 within the Shell Refinery. An automatic valve will be installed in the meter station at this location. (Refer to Sheet 3 of Segment 8 maps.). The automatic valve station will enable isolation of the use points within the Shell refinery and will be the DOT demarcation valve.

The manual valve stations will be located within an approximate 10' x 10' graveled surface area which will be surrounded by chain-link fence. The automatic valve stations will be located within an approximate 10' x 20' graveled surface area which will be surrounded by chain-link fence.

SECTION 5.0 CONSTRUCTION METHOD DESCRIPTIONS

The construction of the Praxair hydrogen and natural gas pipelines involves the use of 3 different construction methods: conventional pipeline trenching construction, jack and bore, and HDD. Each construction method is described below.

5.1 Conventional Pipeline Trenching Construction

Conventional pipeline trenching construction will be used within roads, along the railroad rights-of-way, and on public and private property. The construction activities associated with trenching include staking, fencing and gates, clearing, grading, trenching, stringing, bending, line-up, welding, radiographic inspection, coatings, pipeline lowering, trench backfilling, hydrostatic testing, and clean-up. Each of these activities is discussed in more detail below.

5.1.1 Staking

The pipeline alignment will be staked with reference to the trench centerline. Station numbers will be marked on one set of stakes. Foreign pipelines or buried cables will be located and staked to avoid damage during the trenching.

All survey monuments, witness corners, reference monuments, and bearing trees within the right-of-way will be protected against disturbance during construction, operation, maintenance and rehabilitation. If any monuments, corners or accessories are destroyed or damaged during construction, operation or maintenance, registered land survey services will be secured to restore the disturbed monuments, corners or accessories, at the same location, using surveying procedures found in the *Manual of Surveying Instruction for the Survey of the Public Lands of the United States, latest edition*.

5.1.2 Fencing and Gates

Temporary gaps will be installed in all fences crossed by the right-of-way. Gaps will not exceed 100 feet in length. Pressure treated fence posts will be used for brace posts when installing the temporary gaps and for line posts when installing permanent fence. If metal "T" posts are in the original fence, then metal "T" posts will be used to rebuild the fence. Before cutting ordinary fence wires, sturdy H-type braces will be placed on each side of the gap and fence wires secured to them to prevent slack occurring in the fence.

Gates and gaps will be kept securely closed at all times except during passage of construction workers and equipment. Necessary precautions will be taken to prevent livestock escaping from pastures, corrals, or pens while fences are lowered or gates and gaps opened. After completion of other work, permanent gates may be installed in fences where gaps have been cut. These gates will be approved by the landowners. Materials used for repairs will match the original fence as nearly as practicable in gauge, mesh, style and appearance and will equal or exceed the original size and strength.

5.1.3 Clearing

Construction of the pipeline will occur within a 75-foot construction corridor. A narrower corridor will be used in streets, where there are topographic constraints, and to avoid environmental resources such as trees and wetlands (see Appendix B Wetland Maps and Appendix C Arboricultural Study) for information on the reduced corridor width to avoid environmental resources. The upper approximate 6" topsoil and vegetation will be stripped on the working side of the right-of-way. The topsoil will be separated from the subsoil removed from the trench, so the topsoil can be used for restoration of the pipeline right-of-way after construction is completed. Figure 4 depicts a typical 75-foot wide construction corridor configuration with the topsoil and vegetation or brush set to the side. The vegetation removed from the pipeline right-of-way will be stockpiled along the edge of the working side of the right-of-way and disposed of off-site as determined by the applicable regulatory agencies, landowners, and in accordance with applicable regulations.

5.1.4 Grading

Grading of the pipeline right-of-way is necessary to provide a level area on which the equipment can operate. In areas where the pipeline must traverse steep side slopes (generally greater than 10 percent), benching or "two-toning" may be required. Benching will consist of grading a level path for the pipeline and for equipment to operate. A bank will be leveled on the higher side and material deposited on the lower side in a terrace type manner. After installation of the pipe, the graded areas will be returned as nearly as possible to their original contours. Netting fabric will be placed to stabilize the slope prior to replanting or seeding for the entire width and length of the sloped construction area. No areas will be routinely graded where only vehicular construction traffic will occur and can occur without grade.

5.1.5 Trenching

The pipeline trench will be excavated according to the approved plans. The trench will typically be approximately 4 to 5 feet deep and approximately 3 feet wide. The depth of cover for the pipeline will

be a minimum of four feet. In the UPRR and BNSF rights-of-way, the trench will be approximately 6 feet deep because both railroads require a minimum cover of five feet. Where there is a pipeline trench crossing a drainage, the pipeline will be buried at a minimum depth of approximately 5 feet at the low spot, resulting in approximately 4 feet of cover.

In Segment 2 where both a natural gas pipeline and hydrogen pipeline will be constructed, the trench will be approximately 5 feet wide to accommodate both pipelines. The pipelines will be located approximately 1 foot apart from one another.

Prior to trenching, known pipelines, telephone cables, and other underground structures will be located. All necessary precautions will be taken to protect the structures from damage as a result of the construction work. Praxair will use the DigAlert System to identify the foreign underground structures. The owners of all foreign underground structures will be notified in writing and will be telephoned again prior to excavating near their facilities. The underground structures will normally be crossed by ditching under them unless the owner of the pipeline(s) allows the natural gas and/or hydrogen pipeline to be installed over them. The trench will be hand dug in areas in close proximity to existing pipelines. A minimum clearance of 1 foot will be maintained where feasible between such lines or structures and the line being laid unless otherwise specified. Where this clearance is not feasible, special procedures will be followed to protect existing structures. Pipe and/or pipe coating damaged by the construction work will be repaired. Special care will be taken to protect other pipelines and coatings in the vicinity of the new pipeline construction.

For high priority subsurface installations[5], Praxair will follow the requirements of SB 1359 (Chapter 651, Statutes of 2006). This law provides a process for identifying and delineated high priority subsurface installations, prior to construction activities occurring near these installations.

The contractor will excavate the trench along staked lines established by Praxair. The end of the trench will be sloped to enable animals which inadvertently enter the trench to escape. The finished trench will be free of rocks, hard clods, stumps, roots or other debris which may injure the coating when the pipe is lowered into the ditch. All tree roots will be cut flush with the side wall and bottom of the ditch to prevent contact with the pipe. The bottom of the trench will be graded and dressed so that the pipe will have substantially continuous and uniform bearing or supports such as sand bags (or equivalent) that may be used. In open grassland areas a trenching machine may be utilized. In areas near creeks and on roads a backhoe will generally be used.

[5] High priority subsurface installations are defined by Government Code §4216(d) as high-pressure natural gas pipelines with normal operating pressures greater than 60 psig or greater than 6 inches nominal pipe diameter, petroleum pipelines, pressurized sewage pipelines, high-voltage transmission lines, conductors, or cables equal to or greater than 60kV, or hazardous materials pipelines that are potentially hazardous to workers or the public if damaged.

The Contractor will dig the trench in such a manner to minimize the number of bends required to lay the pipe. This will be accomplished by cutting the trench slightly deeper at the crest of ridges and gradually cutting the trench deeper in approaches to road crossings, terraces, water courses, etc. At such locations the trenching machine will be operated at various depths rather than grading the ditch by other means. Where over-bends or side-bends are required, the trench will be excavated to provide proper clearance between the inside bend of the pipe and the bottom or side of the trench. Soil removed from the trench will be used to backfill the trench once the pipeline has been installed.

Any water that requires removal and disposal during trenching will be tested to determine if it is contaminated. If it is non-hazardous, it will be used for dust suppression along the right-of-way and/or irrigation once land owner and any appropriate regulatory approvals have been obtained.

5.1.6 Stringing, Bending, Line-Up, Welding and Radiographic Inspection

The pipe will be transported to the rights-of-way by truck and laid on wooden skids and strung along side the trench. A portable bending machine will be used to bend the pipe to fit the contours of the trench. For sharper angles, the pipe bends will be prefabricated. Following bending and lineup, the pipe will be welded in accordance with approved specifications and procedures for the particular material and service involved. The welding procedure will meet applicable API Standards. All welders will be qualified and welds inspected in accordance with API 1104. A radiographic inspection of one hundred (100) percent of all pipeline butt welds, tie-ins, and isolation block valves will be performed. All radiographic inspections will be performed by an independent qualified radiographic contractor.

5.1.7 External Coating

Pipe will be delivered to project staging areas with the external coating applied. Field application of external coatings will only be required on those pipes improperly coated, damaged during transportation or construction, or left bare for welding. Field applied coating materials will match or equal the original coating. All coatings will be checked for defects prior to lowering the pipe into the trench.

5.1.8 Lowering of the Pipe

No pipe will be lowered into the trench until it is free from loose rocks, hard clods, roots or debris, which could damage the coating. Necessary slack in the pipeline is obtained by lowering sections into the trench while alternate sections are held above the ditch on skids.

5.1.9 Backfilling

After properly positioning the pipe within the trench, excavated material will be placed into the trench. Only materials which were excavated in the trenching operation will be used for fill material. The subsoil will be backfilled first. The subsoil will be compacted by rolling with one tread of a tractor or by other suitable means. Colored pipeline warning tape will then be placed in the trench. After all subsoil is placed and compacted and the pipeline warning tape installed, the remainder of the ditch will be filled with topsoil. All topsoil will be spread in an even layer over areas where topsoil was removed. The right-of-way disturbance shall be left rough where practical to assist rehabilitation.

Backfill operations will be performed within a reasonable time and distance of the lowering-in operation to ensure the trench is not left open for more than 24 hours or 36 hours in special cases. For roadway and railroad construction and construction on EBRPD property, the trench will be covered with metal plate(s) at the end of construction each day. In all construction areas, the end of the strung pipe will be capped to prevent animals from crawling in. The end of the trench will also be sloped to enable animals which inadvertently entered the trench to escape.

5.1.10 Hydrostatic Testing

After the pipeline has been backfilled, the line will be tested in accordance with the American Standard "Code for Gas Transmission and Distribution Piping Systems", ASME B31.8, Chapter IV, Design, Installation and Testing. Hydrostatic testing will be performed to comply with ASME B31.8 regulations and to establish the integrity and strength of the pipeline. In hydrostatic testing, the pipeline will be filled with water, sealed and pressurized. The hydrostatic test will be at a minimum pressure of 150 percent of the maximum allowable operating pressure.

Testing may be done through one-half open mainline valves and tests will be made against weld caps or blind flanges. The pipeline will be divided into sections, as feasible, for hydrostatic testing. The test sections will be arranged in such a manner to allow the minimum test pressure of 150 percent of the maximum allowable operating pressure and the maximum test pressure not to exceed 100 percent of the specified minimum yield of the line pipe.

Water from city and/or county fire hydrants or other supply points may be used for hydrostatic testing. After testing, the water will be tested for contaminants and if clean, discharged into a dewatering structure consisting of hay bales, geotextile fabric, and silt fencing. The discharge rate shall be moderate and directed onto a splash board. The discharge water will be allowed to filter through the hay bales and silt fence onto a jute matting before it is discharged. Temporary approval for test water use and permits for discharge will be obtained as required. If the water is contaminated, it will be pumped into a tank and transported to a licensed disposal facility.

5.1.11 Cleanup

After construction of the pipelines is completed, the right-of-way will be restored by removing any construction debris, grading to the original grade and contour, and revegetating and repairing where required.

5.2 Jack and Bore

The jack and bore construction method will be used to make moderately short crossings under roads, railroad tracks, and drainages. Bore pits will be dug on each side of the crossing. The dimensions of the bore pits will be approximately 25 to 40 feet long by 10 feet wide. They will be approximately 5 to 8 feet deep. On one side, a boring machine with an auger will be used to dig under the crossing and install the pipe (see Figure 5). Once the pipe is installed, the pits will be backfilled with the soil that was removed. Any soil unsuitable for use will be disposed of pursuant to applicable laws and regulations. The areas where the jack and bore construction method will be used will be cleaned and restored as specified in Section 5.1.11.

5.3 Horizontal Directional Drilling (HDD)

The HDD construction method will be used for large crossings and where the jack and bore construction method is not appropriate. HDD involves the drilling of a pilot hole beneath the area to be crossed, followed by a pilot hole drill string. A reaming device is attached to the drill string and pulled through the pilot hole. The reaming device enlarges the diameter of the pilot hole. In order to lubricate and cool the drill, "drilling mud" consisting of bentonite will be used. Bentonite is an inert, non-toxic, natural material. The pipe is then welded, radiographed, and hydrotested and pulled through the enlarged hole (see Figure 6).

To conduct the HDD, an approximate 100-foot square drill pad is needed on each end of the crossing. A drilling mud collection pit will be dug within the 100-foot square area. Upon completion of the HDD, the drilling mud will be removed and the drill pad area will be cleaned and restored pursuant to Section 5.1.11.

As part of the HDD activities, a contingency plan will be developed to address the inadvertent return of drilling mud (most often referred to as a "frac-out") through fissures in the soil structure. The plan will outline how an inadvertent return of drilling mud will be minimized, contained, and cleaned up. The plan will provide emergency contact numbers for a spill response team in case of excessive spills of drilling mud. In addition, it will describe the role of the biological monitor who will be present during drilling operations.

SECTION 6.0 CONSTRUCTION WORKFORCE AND SCHEDULE

The proposed Contra Costa Pipeline Project will be constructed with approximately five continuous operations or "spreads" working concurrently. A spread will consist of equipment adequately staffed to handle various types of construction activities for a given pipeline segment. The construction contractor will employ approximately 10-20 individuals per spread for conventional construction, 5 workers for jack and bores, and 10 workers for HDDs. The project will employ a total peak work force of up to 100 workers. Construction is expected to begin in Spring 2008 and be completed in Fall 2008.

SECTION 7.0 CONSTRUCTION SAFETY

The proposed Contra Costa Pipeline Project will utilize safety principles and practices that are documented in Praxair's internal standards in addition to federal and California OSHA regulations. Praxair's construction work process could include the formulation of a construction safety plan and a site specific safety plan. Praxair will also implement a Health and Safety Plan. Regular safety meetings will be held between Praxair's construction managers and the contractors.

Public safety will be very important to Praxiar's project construction team and contractors. Construction plans will include all practical measures to ensure public safety. This includes for example, signage, use of flagman, and fencing.

SECTION 8.0 CONSTRUCTION ACTIVITIES

8.1 Staging Areas

Staging area(s) will be established prior to the start of construction. The staging area is where the construction trailer offices and equipment and materials will be stored and construction workers park their personal vehicles. Field crews will dispatch to construction locations from the staging area. Temporary office trailers may be placed in Richmond and Pinole in locations which are already paved or disturbed. These could include abandoned service stations or fenced gravel or paved lots, for example. Temporary power will also be made available to serve the trailers either through existing or new electrical connections.

8.2 Laydown Areas

Eight laydown areas have been identified along the pipeline route. They are depicted in Figure 1. The laydown areas will be sited in various locations along the pipeline and will be used to store materials primarily for HDDs. The locations of the laydown areas are:

- South of Wildcat Creek (Sheet 1 of Segment 2 maps)
- North of Wildcat Creek (Sheet 2 of Segment 2 maps)
- Along the BNSF tracks west of Walter Ave. (Sheet 1A of Segment 4 maps)
- Along the EBRPD trail in Pinole (Sheet 2A of Segment 4 maps)
- BNSF rail road tracks west of Tennant Ave (Sheet 3 of Segment 4 maps)
- UPRR property off Charles Street in Pinole (Sheet 3 of Segment 4 maps)
- North of Collier Meter Station (Sheets 2 and 3 of Segment 6 maps)
- At the top of Franklin Hill above the City of Martinez (Sheet 12 of Segment 6 maps)

The laydown areas vary in size depending primarily on the length of the pipeline construction for the area. The areas will be kept clean and restored to their original condition after the construction is complete.

8.3 Right-of-Way Access

Access along the construction corridor will be provided by existing public and dirt roads. For construction along segments of the route on private property, including railroad tracks, and on public property (such as property owned by the EBRPD), specific routes for accessing the pipeline right-of-way have been determined. The right-of-way access locations for these areas are identified below. The access locations for Segment 6 are also depicted in Figure 2. The locations for right-of-way access along the pipeline route include:

- EBRPD trail in Pinole (Sheet 2A of Segment 4 maps) accessed via Pinole Shores Drive
- Charles Street off San Pablo Avenue (UPRR Property) (Sheet 3 of Segment 4 maps)
- Collier Meter Station along private ranch road (Sheet 1 of Segment 6 maps)
- EBRPD Gate 15 off Cummings Skyway (Sheet 5 of Segment 6 maps)
- East side of Cummings Skyway (Sheet 6 of Segment 6 maps)
- West side of McEwen Road at ranch gate (Sheet 7 of Segment 6 maps)
- West side of McEwen Road near valve station location (Sheet 9 of Segment 6 maps)
- East side of McEwen Road at ranch gate (Sheet 9 of Segment 6 maps)
- Carquinez Scenic Drive (Sheet 14 of Segment 6 maps)

8.4 Traffic Control Plan

For construction within or crossing roads, traffic control will be implemented pursuant to the *Work Area Traffic Control Handbook*, *Manual of Uniform Traffic Control Devices*, the *California Supplement*, and any other applicable local government requirements. Controls will include temporary signage and/or flagmen where necessary. Affected businesses, property owners, etc., will be contacted prior to construction. Emergency response providers will also be informed of the pipeline construction schedule and will be notified prior to construction on the roads.

8.5 Erosion and Sedimentation Control

Praxair will file with the San Francisco Bay Regional Water Quality Control Board a Notice of Intent for a General Construction National Pollution Discharge Permit Elimination System (NPDES) permit

for the project. As a requirement of this permit, a Storm Water Pollution Prevention Plan (SWPPP) for construction activities will be prepared. The plan will utilize the Best Management Practices (BMPs) for erosion and sedimentation control. BMPs include, for example, the use of straw bales, straw waddles, and silt fences. The plan will show the location of these structures on pipeline construction drawings. The SWPPP will also address protective measures for refueling equipment along the pipeline right-of-way, response procedures for spills, and fugitive dust control measures.

Erosion control on steep slopes will be conducted by installing diversion berms within the pipeline right-of-way. The berms will be designed and constructed to limit erosion from surface run off. The berms will be placed every 30 feet along the pipeline right-of-way. The berms will be as wide as the pipeline. The berms will be constructed of mineral soil, avoiding organics. The berms will be compacted with 6-inch lift placements. The herringbone pattern is used to divert water away from the pipeline ditch to prevent erosion.

8.6 Waste Management

During construction of the Contra Costa Pipeline Project, contractors will implement "good housekeeping practices" along the pipeline route. This includes providing the appropriate type, size, and numbers of containers to store all wastes generated, and to keep it from scattering due to animals and wind. Construction waste could include domestic garbage; boxes and other containers used to ship materials; wastes from welding and pipe coating; and vegetation removed from the construction corridor.

Non-hazardous wastes will be transported to a licensed Class III landfill. Waste such as welding rods or any metallic wastes will be segregated and recycled. Any hazardous waste will be properly labeled, manifested, and disposed of at a licensed disposal facility. Removed vegetation will be disposed of at a local landfill or along the right-of-way if approved by the property owner and allowed by local policies.

Excavated soil, if thought to be contaminated due to color or odor, will be tested and, if hazardous, disposed of at a licensed waste facility. Any water requiring removal and disposal will be tested. If it is hazardous, it will be pumped into a tank(s) and transported to a licensed disposal facility.

8.7 Noise

Construction will occur during the hours specified by each local jurisdiction through which the pipeline route crosses. These hours are generally 7:00 a.m. – 5:00 p.m. Monday through Friday. However, the HDD construction method may require 24-hour operations depending on the soil

conditions in the area where the drilling will be conducted. Noise will be attenuated in the area around the drilling operation through the use of sound walls and silencers on equipment. In addition, Praxair will notify residents and business owners in the affected area prior to the activity. Praxiar will also monitor the noise levels if drilling occurs at night.

8.8 Fugitive Dust

Praxair commits to using dust control measures during construction to minimize fugitive dust. These include:

- using water suppression on unpaved construction areas, including stockpiles, to control dust emission
- requiring trucks used to transport solid bulk material on public roadways to be covered or maintain at least two feet of freeboard
- limiting traffic speeds on unpaved areas to 5 mph
- sweeping roadways near construction access points to remove silt
- using sandbags or other erosion control measures to prevent silt runoff on to roadways

SECTION 9.0 KNOWN EASEMENTS, FRANCHISES, AND HAZMAT PIPELINES

The table below provides a list of known easements, franchises, and hazardous materials pipelines along the proposed pipeline route as of January 2007.

Segment	Type of Pipeline	Owner	Location	Street	Size
2	Gas	Chevron	Richmond	Gertrude	12”
2	Gas	PG&E		Garden Tract	Various
2	Gas	Unknown		Pittsburg Ave	Small
2	Gas	Chevron		BNSF RR	10”
3	Gas & Liquid	Unknown		San Pablo	10 & 12”
5	Gas & Liquid	Unknown	Pinole	San Pablo	10” and 12”
6	Gas	PG&E	Contra Costs County		24”
6	Gas	Unknown	Contra Costa County		12”

SECTION 10.0 PIPELINE OPERATIONS

The Contra Costa Pipeline Project will be operated from Praxair's hydrogen plant control room at the Chevron Richmond refinery and will be monitored 24 hours per day, 365 days per year by trained Praxair operators. Data will be transmitted to and from remote locations on the pipeline, to a SCADA system (Supervisory Control and Data Acquisition) located at the Praxair control room. The hydrogen pressure and flow rate into the pipeline will be monitored in addition to the flow and pressures at customer locations, which will be telemetered to the SCADA system in the control room. The SCADA system continuously monitors pipeline data and automatically alerts operators to AOC's (Abnormal Operating Conditions) using alarms which are recorded and logged. Automatic alarms will be utilized to warn operators of any discrepancies and appropriate actions will be taken to address any abnormal operating condition.

Maintenance of the pipeline will be performed according to the United States, Code of Federal Regulations, Title 49, Part 192 which mandates Operator Qualification, Integrity Management and specific requirements for operating and maintaining covered pipelines.

SECTION 11.0 ALTERNATIVE ROUTES

Numerous factors were considered in selecting the preferred route for both the natural gas and hydrogen pipeline components of the proposed project. To the extent practical, priority was given to routes that utilized existing utility corridors or disturbed areas, limited use of streets and roadways heavily congested with existing subsurface utilities, and avoided or limited routing in residential areas. Engineering feasibility and ease of construction were also key criteria in Praxair's evaluation. During the route evaluation process for each segment, the following alternate routes were analyzed and ultimately discarded in favor of the preferred or alternative routes previously discussed in Section 2.7.

11.1 Segment 1

No alternate routes were examined for this interconnection point.

11.2 Segment 2

Praxair first evaluated the possibility of paralleling the existing Chevron Pipeline and working within the established corridor. However, upon closer examination, this route proved impractical due to the existence of several wetland areas (including the Rheem Creek drainage) and sensitive species habitat (i.e., pickleweed habitat for salt marsh harvest mouse) in the area between the Chevron Richmond Refinery and Parchester Village. Availability of the Chevron #2 Line gave rise to an easterly route that enabled the project to bypass these environmentally sensitive areas. This selection also proved to be a shorter distance.

Routes through the neighborhoods of north Richmond were also evaluated but eliminated due to anticipated construction difficulties associated with the narrow width of the streets and the heavily congested nature of the subsurface utilities, and the proximity of the pipeline to the residential homes.

11.3 Segment 3

No alternate routes were examined for this segment since it utilizes an existing pipeline.

11.4 Segment 4

This segment lies completely within the City of Pinole. Due to the intensively developed nature of the city environment (densely constructed on the surface), feasible routes were limited to use of an

existing pipeline or placement of the new pipeline within an existing and established utility corridor, such as the BNSF rail corridor or San Pablo Avenue. Praxair decided to build a new section of pipeline in an area that will enable easier maintenance and lower the chances of third party damage (the single biggest cause of pipeline damage). Constructing this new section along a high traffic volume road, such as San Pablo Avenue (a major thoroughfare through Pinole), would have involved significant construction constraints, including traffic control issues. Therefore, the railroad corridor was selected as the most feasible location for this new section of pipeline. No alternates to the preferred route were identified.

11.5 Segment 5

No alternate routes were examined for this segment since it utilizes an existing pipeline.

11.6 Segment 6

This segment, which begins at Collier Meter Station at the ConocoPhillips Carbon Plant and continues east to Martinez, California, is the longest segment of the pipeline route. A cross-country alignment was selected because the alternate solution would have been to place the new pipeline in the railroad corridor that runs along the shoreline from Pt. Wilson to Martinez. Key issues, such as lack of space for permanent placement of the line, limited construction access, and potential impacts to shoreline resources, including sensitive tidally influenced wetlands, clearly ruled out this option.

Instead, Praxair devoted its resources to determining the most feasible and least impacting cross-country route for this segment. Efforts included surveying the general area to identify sensitive biological resources, discussing possible alignments with representatives of the EBRPD, and discussing routing options with other potentially affected landowners. The evaluation also analyzed the feasibility of paralleling existing utility corridors while at the same time avoiding ravines, canyons, sensitive wetland areas, trees, and the habitat of special status species. In particular, the Praxair team evaluated the alignment of the existing PG&E STANDPAC 3 natural gas line (built in the 1950s) to determine if all or part of that corridor could be a feasible route for the new pipeline. After careful review, portions of the PG&E STANDPAC 3 corridor were identified as feasible but others were not, either due to the potential for significant environmental impacts or the need to select a more constant elevation for the route, or due to EBRPD's mandate that no aboveground pipeline facilities be located on park property. Ultimately, an alignment was selected that parallels portions of the existing PG&E STANDPAC 3 and PG&E electric transmission line corridors, as well as existing dirt roads through the cross country area, until the alignment reaches a hill located on the west end of the City of Martinez.

This hillside posed some challenges, due to the steep contours and forested nature of the terrain. Other constraints to descending the hill involved the Nejedly staging area which provides access to the EBRPD trailhead. Although the use of the conventional trenching construction method in this area is proposed, Praxair Inc. is evaluating the feasibility of using the HDD construction method.

The waterfront area of Martinez also required careful evaluation to select a low impact route. The preferred alignment follows the alignment of the railroad corridor. The route also follows a similar alignment evaluated by the California Public Utilities Commission for the PG&E divestiture of its Richmond-to-Pittsburg pipeline[6]. The selected route avoids the sensitive tidal wetlands as well as the streets of downtown Martinez.

11.7 Segment 7

No alternate routes were analyzed for this segment.

11.8 Segment 8

No alternate routes were analyzed for this segment.

[6] Mitigated Negative Declaration PG&E Richmond-to-Pittsburg Pipeline Divestiture SCH No. 2001102139.

SECTION 12.0 PERMITS REQUIRED BY OTHER JURISDICTIONS/AGENCIES

The table below identifies the permits for the Contra Costa Pipeline Project required by other jurisdictions or agencies.

Contra Costa Pipeline Project
Permit Summary

Agency	Permit or Authorization	Purpose/Comment
Contra Costa County	Conditional Use Permit	Comply with County zoning ordinance and General Plan requirements
City of Martinez	Conditional Use Permit	Comply with City zoning ordinance and General Plan requirements
City of Pinole	Encroachment Permit or Franchise Agreement	Based on the route of the pipeline, the City does not believe a CUP is required
City of Richmond	Conditional Use Permit	Comply with City zoning ordinance and General Plan requirements
Bay Area Air Quality Management District	Responsible Agency review under CEQA	PM10 Fugitive Dust Mitigation Requirements
East Bay Regional Park District	Easement or Encroachment Permit	Potential impacts to public land
San Francisco Bay Trail	Easement or Encroachment Permit	Potential impacts to public services
Regional Water Quality Control Board	National Pollution Elimination Discharge System (NPDES) Construction Activity Permit	Control of stormwater pollution during construction, apply Best Management Practices
State Historic Preservation Office (SHPO)	Section 106 Review	Consultation will be necessary as part of the USACOE permit process
West County Wastewater District (WCWD)	Easement or Encroachment Permit	A permit will be required if the pipeline is on WCWD property
Contra Costa Co. Flood Control & Water Conservation District	Easement or Encroachment Permit	A permit or easement will be required where the pipeline crosses the District's property in Richmond and elsewhere in the County.
San Francisco Bay Area Conservation and Development Commission	Administrative Permit	Permit may be required for the Alhambra Creek Area
Calif. Dept. of Fish and Game	Streambed Alteration Agreement Incidental take permit under the California Endangered Species Act.	

Contra Costa Pipeline Project
Permit Summary (continued)

Agency	Permit or Authorization	Purpose/Comment
U.S. Army Corp of Engineers (USACOE)	Nationwide permit(s)	Impacts to wetlands and waters of the US will be less than .5 acres
U.S. Fish and Wildlife Service	Section 7 consultation under the US Endangered Species Act required as a result of USACE permits.	USFWS to evaluate potential impacts to special status plant and animal species.
National Marine Fisheries Service (NMFS)	Section 7 consultation under the US Endangered Species Act required as a result of USACOE permitting.	NMFS to evaluate potential impacts to fish species.
Advisory Council on Historic Preservation	Section 106 National Historic Preservation Act Review required as a result of USACOE permitting.	ACHP may evaluate whether project will impact any registered eligible historic or prehistoric resources