# CHAPTER 5.0 NATURAL GAS SUPPLY

## 5.1 INTRODUCTION

This section describes natural gas supply and infrastructure requirements for the Kings River Conservation District Community Power Plant (KRCD CPP). The KRCD CPP will be a nominal 565 megawatt (MW) combined-cycle generating plant configured using two natural-gas-fired turbines and one steam turbine. Based upon its size, the KRCD CPP will need up to 100 million standard cubic feet per day (MSCFD) for fuel supply. In order to receive this volume of natural gas the KRCD CPP will require the construction of a new natural gas pipeline that is approximately 26 miles long. The natural gas pipeline will run from the KRCD CPP project site near the City of Parlier and interconnect into Southern California Gas Company (SCG) system near City of Visalia.

This chapter describes the proposed pipeline route and pipeline construction methods as well as pipeline operations. This chapter also discusses federal, state and local laws, ordinances, regulations and standards (LORS) which will be applicable to the design, construction, operation and maintenance of the natural gas pipeline, as well as involved agencies and permits and approvals that may be required for construction of the natural gas pipeline.

## 5.2 PROPOSED ROUTE

Natural gas for the KRCD CPP will be provided from a new pipeline connection to the existing SCG local distribution system, Line 7000. The pipeline is proposed to be 20 inches in diameter.

The pipeline route will follow a path essentially due north of the northern most terminus of SCG Line 7000. The connection to the SCG system will be at an existing SCG pigging and regulator station near the City of Visalia in Tulare County. From the interconnection point to the SCG local transmission system, the proposed route will head directly north for several miles before jogging to the west around the Town of Goshen then due north again before turning to follow the northwesterly path of the Highway 99 and the Union Pacific Railway. After following the path of the Highway 99 for several miles, the pipeline will then cross under both Highway 99 and the Union Pacific Railway on the north side of the Town of Traver. North of Traver the route jogs east a half mile before heading north along Road 40 to Avenue 408 and then west for several miles where it crosses the Kings River. After crossing the Kings River the line then will head due north again on Road 32 where it will cross into Fresno County approximately one-quarter mile from Mountain View Avenue. Road 32 is named Smith Avenue in Fresno County. Once reaching Mountain View Avenue in Fresno County, the pipeline route turns west to South Bethel Avenue before the pipeline route heads north for approximately two and one-half miles to the KRCD CPP project site. The total distance of the proposed is estimated at 26.35 miles. The natural gas pipeline route is shown on Figure 1-3 in Chapter 1, Executive Summary. The vast

majority of the proposed gas pipeline route will be located in public road right-of-way, in Fresno and Tulare counties.

Multiple alternative natural gas pipeline routes were initially considered and are discussed in Chapter 9, Alternatives.

## 5.3 PIPELINE CONSTRUCTION AND DESIGN CRITERIA

The natural gas pipeline will be constructed of epoxy or polyethylene coated carbon steel pipe. For the cased bores the casing will be carbon steel Grade B, uncoated pipe. The fuel requirements of the KRCD CPP have also been determined as 100 MSCFD at 450 pounds per square inch gage (psig) of pressure. The pipeline at 20 inches in diameter is sized to accommodate these capacity requirements.

The natural gas pipeline will be constructed to serve the plant and either constructed and owned by SCG or by KRCD. In either case, the natural gas pipeline will be designed, constructed and operated in accordance with 49 Code of Federal Regulations (CFR 192) and the California Public Utilities Commission (CPUC) General Order (GO) No. 112. Specifically, the pipeline will be designed in accordance with the standards required for gas service under American Society for Mechanical Engineers (ASME) B31.8 – 2003: Gas Transmission and Distribution Systems, and 49CFR192: Transportation of Natural and Other Gas Pipelines.

## 5.4 GENERAL CONSTRUCTION PRACTICES

The natural gas pipeline for the KRCD CPP will be constructed below-grade along its entire route, except at line termination points at the project site and at the connection to SCG Line 7000. A drawing of the connection to the SCG Line 7000 at the existing pigging and regulator station site is shown on Figure 5-1.

The proposed gas pipeline route will include 34 crossings of either local (county) roads, highways, railroad tracks, creeks, irrigation canals and ditches. Pipeline construction will primarily be via the open trench method, however, horizontal auger boring may be used for the crossings of irrigation canals, railroad tracks, creeks, certain road and highway crossings and for certain ditches subject to encroachment permits from the various owners.

The natural gas pipeline will be constructed primarily within county road right-of-ways outside the paved highway with the pipe placed in the road shoulder. Some areas may require laying pipe into the paved roads, however, this is expected to be minimal and cause no significant interruptions in traffic flows. It is expected that the pipeline can be constructed using temporary easements along the majority of the route on private lands abutting the two-lane roadways. KRCD will negotiate and obtain any required easements prior to construction.

### *5.4.1 Pipeline Crossings*

While most of the pipeline length will be constructed using an open trench method of construction, there are three right-of-way crossings that have been identified for special construction treatment, these includes the crossings of Highway 99, the Union Pacific Railway and the Kings River. For both the railroad and highway crossing, the pipeline will be installed using road bores to minimize the affects upon traffic, and to comply with applicable permits. Boring across other more minor roadways may also be required depending upon possible changes to traffic flow patterns on the roads. The road bore is accomplished with a horizontal drill rig, or boring machine. The boring machine will drill a hole under the road to allow insertion of the pipe. The crossing may also entail the use of a casing which is first installed in the hole, and then the gas pipeline is inserted inside the casing. A depiction of various pipeline boring techniques are shown on Figure 5-2.

In order to cross the Kings River, the Avenue 408 crossing location has been chosen as a particularly advantageous crossing location due to its open and flat areas on both sides of the Kings River (see Figure 5-3). In order to cross the river, the project is planning on using a horizontal directional drill (HDD) or a trenchless pipeline construction technique that uses guided drilling in order to create an arc profile under the river. The HDD technique is commonly used for long distance underground boring such as under rivers, lagoons, or highly urbanized areas. Utilizing the HDD methods will avoid any disturbances to the bed and bank of the Kings River (see Section 8.16, Biological Resources). In addition, HDD offers several advantages compared to other trenchless techniques including:

- Complicated crossings can be quickly accomplished with a great degree of accuracy since it is possible to monitor and control the drilling process;
- Sufficient depth can be attained to avoid other utilities;
- Danger of river bed erosion is eliminated; and
- Only a small construction footprint is required.

As stated below, one of the identified natural gas pipeline construction staging areas is on the west side of the river, near to Kamm Avenue (see Figure 5-3 and Figure 1-3 in Chapter 1, Executive Summary). This construction staging area is intended to be a temporary location set aside for construction equipment to be used during the HDD operation at the Kings River crossing. It is expected that the temporary construction staging area will serve as the site for trucks, drilling equipment, possible welding equipment and possibly as an area to hold pipeline sections to be eventually placed in the horizontal hole drilled under the river. KRCD will negotiate and obtain any required easements prior to construction.

### *5.4.2 Construction Staging*

In order to facilitate the construction of the balance of the pipeline, four other temporary construction staging areas have been identified along the pipeline route as shown on Figure 1-3 in Chapter 1, Executive Summary. Approximately 15-acres of a 40-acre parcel to the immediate south of the project site will be used for temporary staging and parking during construction of the KRCD CPP. This 15-acre area will also be used as one of the gas pipeline staging areas and will also serve as the main parking area for workers and the location for storing pipe and other pipeline construction materials. The other staging areas are to be set up to serve as locations to be used for field offices, materials storage, dirt stockpile if required, and worker parking.

The pipe materials will be transported directly to the work site and will be strung along the ditch line on a daily basis, as needed. The balance of the pipe will be stored at the main pipe yard and loaded out on a daily basis.

The five construction staging areas which have been identified for use during construction of the gas pipeline, each have an approximate size of 200 feet by 200 feet. Staging areas have been planned for:

- West side of the Kings River, near Kamm Avenue (for installation of the HDD under the Kings River);
- West of Road 40 just south of Avenue 404;
- East side of Road 36; north of Avenue 368;
- West side of Road 60 and Highway 99, approximately 2.5 miles south of Avenue 352; and
- East side of Road 64 between Avenue 304 and 308 in the vicinity of the SCG Line 7000 interconnection.

KRCD will negotiate and obtain any required easements prior to construction.

### *5.4.3 Gas Pipeline Construction*

The construction of the main sections of the natural gas pipeline itself will consist of the following construction processes:

- **Clearing and Grading** – The survey crew will carefully survey and stake the construction right-of-way to ensure that only the pre-approved construction workspace is cleared. The clearing and construction crew will be responsible for removing trees, boulders and debris from the construction right-of-way and preparing a level workspace for the heavy construction equipment that will follow.

- **Stringing** – Pipeline representatives will carefully inspect new pipe to assure that it meets industry standards and federal and state safety standards. For corrosion control, the outside of the surface will be treated with a protective coating. The pipeline will be transported from the pipe mill to the pipe storage yard. The pipe lengths will be 40 to 80 feet long. A stringing crew using specialize trailers will move the pipe from the storage yard to the pipeline right-of-way. The crew will be careful to distribute the various pipe joints according to the design plan since the type of coating and wall thickness can vary based upon soil conditions and location.
- **Trenching** – The trenching crew will use a wheel trencher or backhoe to dig the pipe trench. The top of the pipeline will be buried to a minimum of 36 inches below ground as per the requirements of governing agencies. The optimal dimensions of the trench will be about 24 inches wide and 48 inches deep. The pipe will be buried even deeper at stream and road crossings. In cultivated areas the topsoil over the trench will be removed first and kept separate from the excavated subsoil, a process called topsoiling. As backfilling operations begin, the soil will be returned to the trench in reverse order with the subsoil put back first, followed by the topsoil. This process ensures the topsoil is returned to its original position.
- **Pipe Bending** – The pipe bending crew will use a bending machine to make slight bends in the pipe to account for changes in the pipeline route and to conform to topography. The bending machine uses a series of clamps and hydraulic pressure to make a very smooth, controlled bend in the pipe.
- **Welding** – The pipe crew will be responsible for welding, the process that joins the various sections of pipe together into one continuous length. The pipe gang uses special pipeline equipment called side booms to pick up each joint of pipe, align it with the previous joint and make the first part (pass) of the weld. The pipe gang then moves down the line to the next section repeating the process. The welding crew follows the pipe gang to complete each weld.
- **Coating** – Line pipe is externally coated to inhibit corrosion by preventing moisture from coming into direct contact with the steel. Normally this is done at the mill where the pipe is manufactured or at another coating facility location before it is delivered to the construction site. All coated pipe, however, has uncoated areas three to six inches from each end to prevent the coating from interfering with the welding process. Once the welds are made, a coating crew coats the field joint, the area around the weld, before the pipeline is lowered into the ditch. Pipeline companies use several types of coating for field joints, the most common being fusion bond epoxy or polyethylene heat-shrink sleeves.

- **Lowering In –** Lowering the welded pipe into the trench demands close coordination and skilled operators. Using a series of side-booms, which are tracked construction equipment with a boom on the side, operators simultaneously lift the pipe and carefully lower the welded sections into the trench. Non-metallic slings protect the pipe and coating as it is lifted and moved into position.
- **Backfilling –** Once the pipe is placed in the trench, the trench can be backfilled. This is accomplished with either a backhoe or padding machine depending on the soil makeup. As with previous construction crews, the backfilling crew takes care to protect the pipe and coating as the soil is returned to the trench. As operations begin, the soil is returned to the trench in reverse order, with the subsoil put back in first, followed by the topsoil.
- **Hydrostatic Test –** Before the pipeline is put into actual natural gas service, the entire length of the pipeline is pressure tested using water. The hydrostatic test is the final construction quality assurance test. Each section of the pipeline is filled with water and pressured up to a level higher than the maximum operating pressure. The test pressure is held for a specific period of time to determine if it meets the design strength requirements and if any leaks are present. Once a test section successfully passes the hydrostatic test, water is emptied from the pipeline in accordance with state and federal requirements. The pipeline is then dried before put in service.
- **Restoration –** The final step in the construction process is restoring the land as closely as possible to its original condition. Depending upon the projects requirements, this process typically involves decompacting the construction work areas, replacing topsoil, removing large rocks that may have been brought to the service, completing any final repairs to irrigation systems or drain tiles, applying lime or fertilizer, restoring fences, etc.

### *5.4.4 Metering Station*

If the pipeline is owned by the KRCD, a metering station will be located at the interconnection point between the pipeline and SCG's Line 7000 and near SCG existing pigging and regulator station. In the event the pipeline is owned by SCG, the meter will be moved to the KRCD CPP project site location, where the pipeline enters the project site.

### *5.4.5 Compressor Station*

The KRCD CPP will include a compressor station located at the proposed project site. Compression is necessary due to the minimum natural gas pressure requirements of the turbine of 450 psig and the minimum operating pressures of SCG's Line 7000 of 350 psig as well as hydraulic considerations along the pipeline. Initial analysis of gas and electric compressors indicates that an electric compressor will likely provide the lowest compressor cost option for the project.

## 5.5 OPERATIONS

The natural gas pipeline will be constructed to serve the plant and either constructed and owned by SCG or by KRCD. In order to operate the pipeline, a standard operating and maintenance plan will be developed and implemented, to address both normal procedures and conditions and any upset or abnormal conditions that could occur. Per the requirements of Paragraph 840.2, ASME B31.8, and Paragraph 192.5, 49CFR192, the majority of each identified pipeline can be considered a Location Class 2 (rural roadways with work area greater than 20 feet), with minor portions of each pipeline considered as Location Class 3 (light residential or light industrial). Per the requirements of Paragraph 846.1, ASME B31.8, and Paragraph 192.179, 49CFR192, the spacing between valves for a new pipeline in Location Class 2 must not exceed 15 miles (each point on the pipeline must be within 7.5 miles of a valve). In order to comply with applicable natural gas pipeline design standards, the proposed natural gas pipeline will include a minimum of three block valves. These valves will be manually controlled, lockable ball valves and will be located approximately two feet above the ground. These block valves will be located directly over the pipeline line and in the public right-of-way and do not present a significant feature visible to the public.

### *5.5.1 Schools Risk Analysis*

There are four existing school sites located within approximately 1500 feet of the KRCD CPP proposed natural gas pipeline. These school sites include:

- Indianola Elementary School located at 11524 East Dinuba Avenue in the City of Selma, in Fresno County;
- Kings River Elementary School located in the City of Kingsburg on the southwest corner of intersection of Road 40 and Avenue 400, in Tulare County;
- Traver Joint Elementary School located in the City of Traver and southeast of intersection of Road 40 and Avenue 368, in Tulare County; and
- Goshen Elementary School located in the City of Goshen on Avenue 304 east of Road 68, in Tulare County.

The California Department of Education (CDE) regulations (Title 5, California Code of Regulations, Division 1, Chapter 13, Subchapter 1, School Facilities Construction, Article 2-School Sites, § 14010, Standards for School Site Selection) that took affect in late 2000 require that:

> "h. The site shall not be located near an above-ground fuel or water storage tank or within 1500 feet of the easement of an above-ground or underground pipeline that can pose a safety hazard as determined by a risk analysis study,

conducted by a competent professional, which may include certification from a local public utility commission."

Recognizing the proximity of the proposed pipeline to several existing schools along the preferred pipeline route, a study to analyze the gas pipeline in accordance with CDE Pipeline Risk analysis protocol (CDE, 2007) was conducted. While the analysis would not be required to comply with applicable CDE regulations since they school sites are existing, the analysis was completed in support of the KRCD CPP as a determination of the potential for health and safety risk at the existing school sites located within 1500 feet of the proposed natural gas pipeline route.

The analysis used a multi-stage approach to determine whether in certain situations the combination of the gas pipe size, pressure, product and distance from the school sites has the potential to result in an individual risk value above levels set by the CDE. Based on the results of the analysis, the estimated risk level at each of the four school sites was lower than the threshold of significance established by the CDE protocol (Wilson GeoSciences, 2007). A copy of the Gas Pipeline Risk Analysis is included as Appendix 5-1.

## 5.6 APPLICABLE LAWS, ORDINANCES, REGULATIONS AND STANDARDS

This section provides a list of applicable LORS that apply to the design, construction, operation and maintenance of the proposed natural gas pipeline. The LORS are summarized in Table 5-1.

**Table 5-1**
**Natural Gas Pipeline LORS**
**KRCD CPP**

| LORS | Applicability |
|---|---|
| 49 United States Code (USC) 60101 et seq. | Provides various pipeline safety laws that are applicable to design, construction and operation of natural gas pipelines. |
| 49 CFR 192 – Transportation of Natural and Other Gas by Pipeline. | Provides the minimum federal safety standards and various design, construction and operational standards for gas pipelines. |
| CPUC GO No. 112. | Provides various design, construction and operational standards for gas pipelines. |
| ASME B31.8 – 2003: Gas Transmission and Distribution Systems, and 49CFR192: Transportation of Natural and Other Gas Pipelines. | Provides various design, construction and operational standards for gas pipelines. |

## 5.7 REQUIRED PERMITS AND SCHEDULES

Various approvals will need to be obtained prior to construction of the natural gas pipeline. These approvals may include Tulare and Fresno county encroachment permits, and encroachment permits from the California Department of Transportation and the Union Pacific

Railroad. These permits and applicable schedules and agency contacts are discussed further in other sections of this AFC, including Section 8.4, Land Use and Agriculture.

## 5.8 REFERENCES

California Department of Education. 2007. Regulations under Title 5, California Code of Regulations, Division 1, Chapter 13, Subchapter 1, School Facilities Construction, Article 2-School Sites, § 14010, Standards for School Site Selection, as amended.

SPEC Services, Inc. 2006. Kings River Conservation District, Natural Gas Pipeline Evaluation, SPEC Job 3828. October 20, 2006.

Wilson GeoSciences, 2007. Stage 2 Analysis: 2007 CDE Protocol Natural Gas Pipeline Risk Assessment – Four School Sites Near the Proposed Kings River Conservation District Community Power Plant 20-inch Diameter High Pressure Pipeline. April 2007.