**Throughout this Application, all references to Federal Power, Federal Power Avenal, LLC, and Federal Power Avenal refer to Avenal Power Center, LLC.**

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# 1.0 EXECUTIVE SUMMARY

## 1.1 PROJECT OVERVIEW

Avenal Power Center, LLC (the "Applicant"), is seeking approval from the California Energy Commission (Commission) for the construction and operation of the Avenal Energy project (the Project). The Project consists of a 600 megawatt (MW) combined-cycle electric power generating plant and ancillary facilities. The Project will be located on a portion of an approximately 148-acre site (the Site) on industrially-zoned land in the City of Avenal, Kings County, California. The Project design incorporates advanced combustion turbine technology and advanced emissions control systems to provide California electric customers with additional electric capacity in the form of an environmentally sound, efficient electric generating facility selling electricity into California's deregulated electric energy market. The Applicant's Project objectives are to:

- Provide environmentally sound, efficient and reliable power generation for California's energy market.
- Use a location that has existing nearby infrastructure (i.e., existing transmission lines, water supply and gas supply) with available capacity and supply to support the Project.
- Develop a site consistent with community planning and existing zoning, at a location that is supported by the local community.
- Minimize impacts to environmental resources.

Key Project features and benefits of the proposed Project include:

- Provides direct employment by creating an average of approximately 320 construction jobs and 25 full-time jobs for operation of the plant.
- Contributes to the local economy through the purchase of goods and services during Project construction and through increased sales and property tax revenues, as well as employment, during Project operation.
- Provides increased electrical power to the grid capable of supporting about 450,000 homes or small businesses.

The Project is consistent with City of Avenal land use plans and zoning. It will be located on industrially-zoned lands, away from developed urban areas and surrounded by agricultural lands. The Project will connect to existing nearby infrastructure, including water and natural gas supplies and electrical transmission lines. The short water and natural gas infrastructure tie-ins and the routing of the transmission line along an existing Pacific Gas & Electric (PG&E) transmission corridor will minimize environmental impacts of linear facilities. The primary

water supply for the Project will be from the City of Avenal, supplied via an existing turnout on the San Luis Canal located adjacent to the Site.

The Site and associated linear facilities occur on lands that have been extensively disturbed by agricultural activity or infrastructure improvements. No disturbance of natural vegetation or wildlife habitat will occur.

The facility will be designed to minimize water consumption through the use of dry cooling, and by recycling water to the maximum extent practical through the installation of a zero liquid discharge facility (ZLDF). The ZLDF will also eliminate wastewater discharge from the Project.

This Application for Certification (AFC) has been prepared in accordance with Commission guidelines and provides:

- A description of the Project.
- An assessment of Project impacts on the existing environment.
- Proposed design features to assure that environmental issues are properly and responsibly addressed.
- Discussion of compliance with applicable laws, ordinances, regulations and standards (LORS).

## 1.2 PROJECT NEED

By supporting local and Central San Joaquin Valley loads, the Project will improve electric supply reliability in this region. Loads in Fresno and surrounding areas will grow as well as agricultural demands in the Central San Joaquin Valley. Furthermore, the addition of generating capacity at this Site provides additional reactive power capability that will act to improve area transmission system voltage. The addition of the 600 MW combined-cycle generation plant results in more firm generation available for direct local service to the San Joaquin Valley area loads.

## 1.3 PROJECT SCHEDULE

A preliminary Project schedule is provided in Figure 1.3-1. Construction mobilization is expected to begin in April 2010 and construction is expected to be completed in approximately 27 months. Initial start-up is scheduled to occur in October 2011. Commencement of commercial operation is scheduled for June 1, 2012.

## 1.4 PROJECT OWNERSHIP

Avenal Power Center, LLC will be the owner of the generating plant and the Site. Avenal Power Center, LLC will also own the natural gas pipeline to PG&E's existing Kettleman compressor station, the water pipelines from the nearby existing agricultural wells to be used for back-up water supply, and the electrical transmission line that will connect the generating plant to the existing PG&E Gates substation.

Avenal Power Center, LLC formerly known as Federal Power Avenal, LLC, is a Delaware limited liability company licensed to do business in the State of California. It is a wholly-owned subsidiary of Macquarie Energy North America Trading, Inc, incorporated in Delaware, having Macquarie Group Limited, a publicly traded Australian corporation ("Macquarie") as its ultimate parent. Macquarie, through its subsidiaries, provides specialist investment, advisory, and financial services in select markets around the world. Macquarie and its subsidiaries are active in a broad range of financial and physical commodities markets globally, with a worldwide team of professionals who have in-depth knowledge across a range of commodity sectors including electric energy trading and electric generation. Throughout this application, all references to Federal Power, Federal Power Avenal, LLC and Federal Power Avenal refer to Avenal Power Center, LLC.

## 1.5 FACILITY LOCATION AND DESCRIPTION

### 1.5.1 FACILITY LOCATION

The Site and each of the infrastructure tie-ins are located entirely in areas that have been extensively disturbed by agriculture and infrastructure development and, consequently, no natural habitat will be impacted. The Site is located in the agricultural region of the southwestern San Joaquin Valley (Figure 1.5-1). While the Site is within the city limits of the City of Avenal, it is separated from the residential and commercial districts of the City by the intervening topography of the Kettleman Hills and by a distance of about 6 miles (Figure 1.5-2). The City of Avenal has zoned the Site area for development of an industrial park in part due to its proximity to Interstate 5 and to the natural gas supply available at the PG&E Kettleman compressor station. The location of the Site, the electrical transmission line, the gas supply pipeline, and backup water supply pipelines are shown in Figures 1.5-3A and 1.5-3B. Table 1.5-1 provides a "fact sheet" for the Project. The Site encompasses approximately 148 acres and constitutes the majority of the northeast quarter of Section 19, Township 21 South, Range 18 East, Mt. Diablo Base and Meridian (Figure 1.5-3A). Federal Power has secured a purchase

option for the Site, which is identified by Kings County Assessor's Parcel No. 36-170-035. Site facilities (including the power block, switchyard, ZLDF, air cooled condenser, storm water retention basin, and access) will occupy approximately 25 acres within the 148-acre Site. An additional approximately 1 acre of long-term disturbance will occur due to tower footings for the Project's electrical transmission line. The Site is surrounded by open farmland except for the City of Avenal potable water treatment facility located on the contiguous parcel to the northeast.

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## TABLE 1.5-1
## AVENAL ENERGY FACT SHEET

| SITE CHARACTERISTICS | MAJOR EQUIPMENT | SOCIOECONOMIC BENEFITS | ACREAGE | DISTANCES (APPROXIMATE) | WATER |
|---|---|---|---|---|---|
| • Site setting: Site, transmission line route and adjacent lands occupied by row crops and orchards.<br>• Site first cleared of native vegetation: 1951 (actively farmed since that time).<br>• Acreage of Project disturbance to natural vegetation or habitat: Zero (entire site and linear facility routes are 100% disturbed).<br>• Existing Site elevation: Approximately 320-360 feet.<br>• Finished power block elevation: Approximately 340 feet.<br>• Average rainfall: 6 to 7 inches per year.<br>• Temperatures: High 30s to low 100s (ºF). | • Nominal net output: 600 MW.<br>• Combustion turbines: 2 GE 7FA 180 MW each.<br>• Steam Turbine: GE 300 MW (nominal).<br>• CTG mechanical inlet air chillers.<br>• 2 Stacks: 145 feet high.<br>• Diameter of stacks: 19 feet.<br>• Approximate air cooled condenser dimensions: 139 feet high, 278 feet long, 258 feet wide.<br>• HRSG height: 80 feet.<br>• Length of Project's natural gas pipeline: 2.5 to 2.8 miles.<br>• Diameter of Project's natural gas pipeline: 20 inches.<br>• ZLDF to maximize water efficiency.<br>• 6.4 mile single-circuit transmission line. | • Capital Cost of Project: $530 million.<br>• Construction period: 27 months.<br>• Average construction work force: 320 people.<br>• Approximate peak construction work force: 550.<br>• Operation work force: 25 full time positions.<br>• Estimated property tax revenue from Project: Approximately $5.3 million per year.<br>• City of Avenal: Approximately $1.0 million per year.<br>• Kings County: Approximately $1.5 million per year.<br>• Local Schools: Approximately $1.3 million per year. | • Permanent facilities: Approximately 25 acres onsite disturbance, plus approximately 1 acre offsite (transmission line tower footings).<br>• Temporary (construction only): 59 acres.<br>• Site: Approximately 148 acres of row crops. | • Kettleman compressor station: 7,000 feet.<br>• Closest distance to existing electrical transmission lines: 3,000 feet.<br>• Closest distance to San Luis Canal: 300 feet.<br>• City of Avenal business and residential districts: 6 miles.<br>• Avenal Airport: more than 7 miles (closest airport, no others within 10 miles).<br>• City of Huron: 8 miles.<br>• City of Coalinga: 16 miles.<br>• City of Hanford: 28 miles.<br>• Interstate 5: 2 miles.<br>• Kettleman Hills: 2 miles.<br>• Kettleman City: 10 miles.<br>• City of San Francisco: 200 miles.<br>• City of Los Angeles: 200 miles.<br>• Closest farmhouse to the Northeast of Site: 1.3 miles.<br>• Closest farmhouse to the Southwest of Site: 1.8 miles.<br>• PG&E Gates substation: 4.5 air-miles from Site. | • Primary water supply: City of Avenal.<br>• Backup water supply: Limited use of wells as a backup will be offset by conservation measures. No net increase in groundwater pumping will occur.<br>• Onsite water storage: 750,000 gallons.<br>• Reserve for fire protection system: 240,000 gallons.<br>• Maximum year water use: 104 acre-feet (estimated).<br>• Average water use: 20 acre-feet per year (12.4 gallons per minute). |

Full-page color photographs of the Site prior to and after construction are shown in Figures 1.5-4 and 1.5-5. A list of current tax assessor's parcel numbers and owner's names and addresses for parcels within 500 feet of proposed linear facilities and within 1,000 feet of the Site are included in Appendix 1-1.

### 1.5.2 FACILITY DESCRIPTION

The Project will produce a nominal electrical power output of 600 MW for delivery to California's grid system using clean-burning natural gas. The Project has been located and designed to minimize environmental impacts. The Site is zoned industrial and is located close to existing gas, water and electrical transmission infrastructure facilities so that only short linear facility tie-ins are required. Natural gas for the Project will be provided via an underground pipeline interconnection to the PG&E Kettleman compressor station located approximately 7,000 feet southwest of the Site. The Project will deliver electric power to the PG&E transmission grid through a new on-site 230-kV switchyard by constructing a new single-circuit 230-kV line to the existing PG&E Gates substation located approximately 4.5 miles northwest of the Site. The Project will use dry cooling technology to minimize water consumption. The Project will include a ZLDF that will purify and recycle process water, further minimizing water consumption and eliminating process wastewater discharge.

The facility, to be known as Avenal Energy, is arranged with two trains of Combustion Turbine Generator (CTG)/Heat Recovery Steam Generator (HRSG) to one Steam Turbine Generator (STG) (two-on-one configuration). The two advanced natural gas-fired model PG7241 "7FA" class CTGs will be supplied by General Electric Power Systems and will be equipped with dry low NOx combustors designed for natural gas, as well as inlet-air mechanical chillers to enhance output at higher ambient temperatures. The HRSG raises steam at three pressures. The exhaust from the steam turbine discharges into a surface condenser operating under vacuum. The steam is condensed by circulating cooling water, which rejects the heat with an air cooled condenser. Dry low NOx combustors in the CTGs are followed by selective catalytic reduction (SCR) in the HRSGs to control NOx stack emissions. An oxidation catalyst located within each HRSG reduces the carbon monoxide (CO) and volatile organic compounds (VOCs) in the exhaust gases exiting the stack.

Each of the CTGs and the STG generate electrical energy at 18 kilovolts (kV). Each generating unit will be connected to 18/230-kV step-up transformers. The 230-kV side of these transformers will be connected to an onsite 230-kV switchyard.

### 1.5.3 TRANSMISSION INTERCONNECTION

The proposed interconnection with the existing PG&E transmission grid will be accomplished by constructing a new transmission line from the onsite switchyard to the Gates substation. This line will consist of approximately 6.4 miles of new single-circuit 230-kV line that will follow the route shown in Figures 1.5-3A and 1.5-3B. The new line will be located on a 120-foot-wide right-of-way.

### 1.5.4 FUEL SUPPLY

Natural gas is supplied to the Project through the PG&E pipeline network. Natural gas will be conveyed to the Site via a new 20-inch diameter, 2.5-mile underground pipeline interconnection from existing PG&E Lines 300 A/B at a point in the PG&E Kettleman compressor station located southwest of the Site. Figure 1.5-3A illustrates the proposed route of the new interconnecting line.

### 1.5.5 WATER SUPPLY

The Project's estimated average annual water demand is 20 acre-feet/year (AFY). The primary source of water for the Project will be from the City of Avenal via their existing turnout on the San Luis Canal located adjacent to the Site. The City has provided a will-serve letter.

A backup water supply has been secured from nearby existing groundwater wells. The backup water supply will come from agricultural wells that will be connected to the Site via approximately 1.6 miles of new water pipelines. The backup groundwater supply will be used on a limited basis and will be offset by conservation measures to achieve equivalent reductions in agricultural pumping to ensure no net increase in groundwater withdrawal.

### 1.5.6 WASTEWATER DISPOSAL

The Project will have separate plant wastewater and sanitary wastewater collection systems. A general plant drainage system will collect storm water from the contained or curbed power block areas and process blowdown from plant equipment and general plant drains. This collection system will route the water to the ZLDF for treatment. The ZLDF will treat the water by separating the water from the dissolved solids. The treated water will be recycled back to the power production cycle. Brine slurry continuously withdrawn by the ZLDF will be reduced to dry solids (salt cake). The resultant dewatered salt cake will be disposed at a local Class III (non-hazardous) landfill. Water recycling through the ZLDF will minimize project water consumption.

The sanitary system will collect sanitary wastewater from sinks, toilets, and other sanitary facilities and discharge it to a permitted on-site septic system.

## 1.6 FACILITY OPERATION

The Project will be operated up to 7 days per week, 24 hours per day. Overall annual availability of the Project is expected to be approximately 90 percent or greater. The Project's capacity factor will depend on the demand for electricity and ancillary services. The design of the Project provides for operating flexibility (i.e., ability to start-up, shut down, turn down, and provide peaking output) so that operations may be readily adapted to changing conditions in the energy market.

## 1.7 PROJECT ALTERNATIVES

A number of alternatives to the Project were considered, including the "no project" alternative (see Section 5.0, Alternatives Analysis). The Project as planned minimizes environmental impacts. In addition, the "no project" alternative fails to provide additional tax revenue to the local area or diversify the business base of Avenal and Kings County. A change in location of this Project adds no benefit, generally requires more infrastructure, and is less efficient in the support of Californian's electric needs as compared to the proposed Project.

Several alternative site locations for the Project were analyzed but were rejected due to unavailability or due to the potential to cause greater impacts to the environment than the proposed Site. Alternative generating technologies were also considered but rejected as being

less fuel efficient, economically unfeasible, or causing greater impacts to the environment than the selected, natural gas-fired, combined-cycle technology. Alternative routes for the electrical transmission line were considered but rejected as causing greater or equal impacts to the environment.

## 1.8 ENVIRONMENTAL CONSIDERATIONS

Seventeen areas of possible environmental impact from the Project were investigated. The Project will avoid or minimize potential environmental impacts through careful Site selection, an environmentally sensitive design, and incorporation of design features. As a result, the Project will have no significant environmental impacts. Detailed descriptions and analyses of these areas are presented in Sections 6.2 through 6.18 of this AFC.

### 1.8.1 AIR QUALITY

The Project will not have a significant adverse impact on air quality. The Project will control emissions of criteria pollutants including oxides of nitrogen (NOx), CO, VOCs, sulfur dioxide (SO2), particulates less than or equal to 10 microns in diameter (PM10) and particulates less than or equal to 2.5 microns in diameter (PM2.5). The Project will create a net reduction in regional emissions by providing emission reductions from other regional emission sources that exceed the emissions from the Project. In addition, the following mitigation measures will reduce the direct impacts of these pollutants to levels that are less than significant:

- The facility will incorporate the following advanced air pollution controls that reflect Best Available Control Technology (BACT) to reduce emissions:
  - Dry low NOx combustor technology and selective catalytic reduction (SCR) to reduce NOx emissions.
  - Oxidation catalyst to limit CO emissions.
  - Dry low NOx combustor technology to limit VOC emissions.
  - Clean-burning natural gas as fuel to limit $SO_2$ and PM10 emissions.
- Short-term air quality impacts associated with construction activities will be reduced by compliance with the San Joaquin Valley Air Pollution Control District (SJVAPCD) requirements, including the following measures:
  - Water trucks and sprinklers will be used to control dust.
  - Construction surface disturbance will be minimized to the extent consistent with safe and efficient work. Agricultural practices may continue onsite outside of Project construction areas.

As demonstrated by the air quality modeling, criteria pollutant emissions from the Project will not cause violations of federal or state ambient air quality standards. Therefore, in combination with the mitigation measures described above, no significant adverse affects on air quality from criteria pollutant emissions are anticipated.

### 1.8.2 GEOLOGIC RESOURCES AND HAZARDS

No significant geologic or soil-related impacts are anticipated from the construction or operation of the Project. Implementation of the following design features will reduce the potential for any minor construction or operational impacts to a level of insignificance:

- An engineering geology report will be developed as part of Project siting design. The report will be developed in conformance with the most recent addition of the California Building Code (CBC). The report will be developed, signed and stamped by a California Certified Engineering Geologist. Final placement and design of the proposed facilities and foundations will follow the recommendations of the engineering geology.
- A detailed, site-specific seismic evaluation will be performed as part of Project siting design. This evaluation will determine the governing design ground acceleration, and will be coordinated with power plant structural design, as needed, to control any potential impacts associated with ground-shaking, in accordance with the CBC. The proposed facilities will be designed in accordance with the CBC Seismic Zone 4.

### 1.8.3 AGRICULTURE AND SOILS

The Site will occupy land that is designated and zoned industrial and located in an industrial park. Agricultural practices on lands adjacent to the Site will not be affected by the construction or operation of the Project. Water conservation measures will be implemented by the owner/farmer of the surrounding lands to offset groundwater that will be pumped from wells for the Project backup water supply.

Beneficial aspects of the Project relative to agriculture and soils are:

- The Project Site will be located in an area that is designated and zoned industrial by the City of Avenal. Where the transmission line is in the City of Avenal, it is also on land designated and zoned industrial. There will be no conversion of land that is designated or zoned for agricultural use.

- Where the transmission line is in Fresno County, the land use designation and zoning is Agriculture. The transmission line has been designed to follow an existing PG&E transmission line corridor to avoid impacting agricultural operations.
- The Project Site is not located on Williamson Act Lands.
- Where the transmission line is in Fresno County, Williamson Act Lands will stay in agricultural use.
- The Project has been designed in consultation with the owner/operator of the agricultural lands surrounding the Site.
- Project design features assure that ground-level concentrations of air pollutants will have no significant impacts on agriculture and soil resources.
- The Project will provide additional electrical power to assure a reliable supply of energy for California, including agricultural uses.
- An onsite buffer zone will remain in agricultural production around the power plant once construction is complete.

The Project will not significantly affect agriculture or soil resources.

### 1.8.4 WATER RESOURCES

The Project's estimated average water demand will be approximately 20 AFY, and the potential maximum use year is estimated at 104 acre-feet. The City of Avenal will provide the primary water supply for the Project. Use of this water will not impact other water users in the area. A backup groundwater supply from nearby agricultural wells will be used on a limited basis. The Project's use of groundwater will be offset so there will be no net increase in groundwater pumping. Achievements of groundwater conservation will be accomplished by crop rotation and irrigation conservation measures.

The Project is designed to minimize consumptive use of fresh water to that which is minimally essential. To this end, the Project design includes dry cooling and a ZLDF. The ZLDF is a water treatment system that will recover process purge streams and plant drain water for treatment and recycling through the system. The ZLDF is a costly plant upgrade that will reduce water consumption and eliminate the need for process water disposal.

The Project will be constructed and operated under the State General National Pollutant Discharge Elimination System (NPDES) permits for storm water discharges from construction

and industrial activities. Best Management Practices (BMPs) will be implemented to minimize storm water contact with potential pollutants and to reduce or prevent pollutants from entering storm water. The BMPs will include an erosion control plan and other measures that will be implemented in accordance with the State General NPDES permit.

The following design and operational features of the Project avoid potentially significant environmental impacts:

- Groundwater will be used only as a backup supply. Groundwater use will be entirely offset so that the Project will not increase groundwater pumping in the basin.
- The Project will incorporate a ZLDF designed to eliminate off-site disposal of wastewater.
- The Project will occur entirely within areas that have been intensively disturbed, so there will be no impact to natural surface drainages or natural watershed areas.
- The Project linear facilities will not alter existing surface drainage. The gas pipeline interconnection will be underground. The water pipelines will be underground. The electrical interconnection line towers will not affect surface drainage.

### 1.8.5 BIOLOGICAL RESOURCES

Biological impacts will be minimal due to the Site location and characteristics. Due to its continuous farming use, the Site and Project linear corridors contain no native vegetation or natural habitat and will require only minor grading. The natural gas pipeline route has been sited primarily underneath existing roads.

The following Site characteristics and Project design features limit the impacts to biological resources to a level that is less than significant:

- The Site was selected so that construction and operations will occur entirely within active agricultural land and, therefore, the Project will not result in the removal of natural vegetation or wildlife habitat. The transmission line also is located entirely on active agricultural land with no natural vegetation or wildlife habitat.
- The Project design, construction and operation includes specific features to control the generation of fugitive dust so as not to affect surrounding agricultural operations.

- The Project's landscaping will assure that weedy species are not introduced to the Site or surrounding areas.
- Project lighting will be directed downward.
- The gas pipeline interconnection and water pipelines will be underground.
- Project construction and operation will include emission control measures to comply with relevant air quality standards, which also will protect biologic resources.
- Relevant standards for noise control will be followed during construction and operations that also will protect biologic resources from indirect impacts from noise.
- While no sensitive species are known to occur on the Site or linear corridors, the Project design includes provisions for a preconstruction clearance survey and an employee education program to assure that sensitive species are not adversely affected.
- Because the San Joaquin kit fox, a California Threatened and Federally Endangered Species, may move through the Site vicinity, Federal Power will mitigate potential impacts to kit fox by conveyance of a conservation easement on suitable habitat for kit fox within the Project region or through purchase of mitigation credits from a U. S. Fish and Wildlife Service (USFWS) approved conservation bank in the region. In addition, pursuant to a request from the USFWS, Federal Power will maintain a 300-foot setback between Project facilities and the San Luis Canal. The portion of the Site that lies within 300 feet of the canal will be planted with non-irrigated grasses.
- Because Swainson's hawk, a California Threatened Species, has been documented to nest within 10 miles of the Site, Federal Power will mitigate potential impacts to Swainson's hawk in accordance with California Department of Fish and Game (DFG) policy for this species. Mitigation will be accomplished through conveyance of a conservation easement on suitable foraging habitat for the Swainson's hawk within the Project region, or through purchase of mitigation credits from a DFG approved conservation bank in the region.

### 1.8.6 CULTURAL RESOURCES

Based on literature, records searches, field surveys, and Native American consultations, there is no evidence of important cultural resources occurring in the Project vicinity. Therefore, the Project is expected to have no impact to cultural resources.

### 1.8.7 PALEONTOLOGICAL RESOURCES

Literature, archival reviews and field surveys did not provide evidence of any paleontological resources that would be impacted by the construction or operation of the Project. No impacts to paleontological resources are anticipated.

### 1.8.8 LAND USE

The Project is located in the northeast corner of the City of Avenal, on industrial zoned lands, approximately 6 miles from the closest population center. The Project is consistent with the City of Avenal General Plan and Zoning Ordinance. No zoning change is needed. The Project represents a beneficial use of Avenal's industrial zoned lands that will help the City achieve the goals of the General Plan. Recognizing the benefits of the Project, City staff have been working with Federal Power to plan the Project.

Design and operational features of the Project that help to minimize potential land use impacts are:

- The Site is located away from developed urban areas and is surrounded by agricultural lands. It is located at the outskirts of the City limits, on industrial zoned lands.
- A large parcel of land has been acquired to allow for optimal placement of the facility and a large buffer zone from the main highway near the Site.
- The Project will be located to ideally utilize existing industrial infrastructure, including water and gas supplies and electrical transmission lines. Only relatively short tie-ins to existing water and gas infrastructure systems will be required, and the transmission line will follow an existing transmission line corridor.
- The Project Site lands are zoned industrial, so there will be no loss of lands designated for agriculture, open space, wildlife, recreation or other conflicting uses. The Project is consistent with the City's plan for industrial development in the area.
- The Site and infrastructure tie-ins occur on lands that have been extensively disturbed by agricultural activity. No disturbance of natural vegetation or wildlife habitat will occur.
- To minimize the impact of tall structures on aerial spraying applications, the Project will include lighting and visibility features on higher structures, as required (e.g., stacks).

- The Site is at a lower elevation than Interstate 5 and will not penetrate the horizon for views from Interstate 5, which will limit visual impacts. In addition, the Project will not be visible from the developed area of Avenal.

Based on consistency with existing zoning and City land use goals and minimal environmental impacts, the Project will have an overall land use benefit.

### 1.8.9 SOCIOECONOMICS

The Project will employ a construction work force averaging approximately 320 persons for the 27-month construction period, and a long-term operations work force of approximately 25. Federal Power is committed to hiring from the local labor pool to the extent possible for construction and operation of the Project. The Project will result in direct and indirect beneficial socioeconomic effects. There will be an infusion of dollars from outside the local area in the form of monies spent for materials, equipment, wages and salaries. As a result, the Project will have a beneficial impact on the local economy. The City of Avenal supports development of the Project and has determined the Project is consistent with local land use plans.

Beneficial aspects of the Project related to socioeconomics are:

- Increased revenue to local vendors and suppliers from the $530-million Project.
- Improved electrical power reliability for California businesses, residents and services.
- Increased utilization of locally available skilled craft labor.
- Reduction of the area unemployment rate by Project employment opportunities.
- Increase in County and City property tax revenue with new operating assets.
- Increase in state and City sales tax revenues from purchase of equipment and supplies.
- Natural gas transportation franchise fees.
- Promotion of indirect and induced employment in the local area.

### 1.8.10 TRAFFIC AND TRANSPORTATION

The Site is located in an agricultural area that does not normally have traffic congestion. No significant impacts to traffic and circulation are expected. The following design features will limit potential construction impacts to a level that is less than significant:

- The Site is located adjacent Avenal Cutoff Road away from developed urban areas and surrounded by agricultural lands. The Project has excellent access to Interstate 5 and other highways and arterials that allow for efficient access to the Site for construction and operations.
- Construction deliveries and worker traffic will enter the Site from the Avenal Cutoff Road entrance where improvements (e.g., turning lanes) will be provided in accordance with City of Avenal requirements.
- Parking for construction workers will be provided on-site.
- The security gate with a turnaround circle will be within the property to ensure that vehicles waiting to enter the Site are not on the Avenal Cutoff Road.
- Construction traffic control procedures will be implemented addressing timing of heavy equipment and building materials deliveries.
- Construction work will be scheduled with two work shifts to reduce peak worker traffic counts.
- Through scheduling of construction work shifts and deliveries, isolated peak-hour traffic congestion at Interstate 5 ramps west of the Site will be avoided.
- Federal Power will provide a traffic monitor at the intersection of Avenal Cutoff Road and SR 198 when construction workers leaving the Site pass through this area so that there will be no reduction in level of service for the minor street traffic on the SR 198 eastbound ramps at this location.

Project operation will require a maximum of approximately 17 employees working during the day shift at the Site. The traffic generated by Project operations will not cause a significant impact to area roads.

### 1.8.11 NOISE

An ambient noise survey was conducted to quantify existing baseline noise levels in the Project vicinity as well as late night L90 (i.e., the sound level exceeded 90 percent of the time, also known as background or residual) noise levels at the nearest residential receptors. Future Project-generated sound levels would only increase cumulative residual L90 noise levels by no more than 2 decibels (dB) above existing residual ambient noise levels, well within the Commission's allowable maximum increase of 5 dB. Further, project-generated sound levels would not exceed the noise limit criteria established by City of Avenal and Kings County noise standards. Although the Project has the potential for increased noise levels during construction

and operation, proposed Project design features will reduce noise impacts to a level that is less than significant at the nearest residential receptors.

### 1.8.12 VISUAL RESOURCES ANALYSIS

The Site is located in the San Joaquin Valley, approximately 7,000 feet from PG&E's Kettleman compressor station and 2 miles from Interstate 5. The Site is bordered by the City of Avenal's water treatment facility, the San Luis Canal and land under agricultural production. The landscape in the Project vicinity is dotted with man-made features such as electrical transmission and distribution lines, ranch structures, and water irrigation apparatus. The population density in the valley is less than 1 person per acre, with the closest residential structure located more than 1 mile from the Site. Because of the low population density in the area, most public views would be from the roadways in the Project vicinity. None of these roadways are designated as scenic roadways.

The Project has been designed and will be constructed to enhance the appearance of the City's industrial park area. Nonreflective paint will be used for Site facilities. The landscaping plan is designed to achieve the City's visual goals for the Project. The landscape plan extends existing agricultural patterns (orchards and row crops) into the Site. Other Project features that limit visual impacts include:

- A large parcel of land has been acquired to allow for optimal placement of the facility and a large buffer zone from the main highway near the Site.
- The Site is located in a rural area with few homes.
- The Site occurs near a major existing high voltage transmission corridor. The transmission line interconnection will be located to exit the power plant at the southeast corner of the Site to reduce visibility from Avenal Cutoff Road. The majority of the transmission line route will be adjacent to the existing transmission line corridor, and will have only an incremental visual effect.
- The Site is located almost 2 miles from Interstate 5, and approximately 200 feet lower in elevation than the freeway. The distance and orientation will reduce the visibility of the Project from Interstate 5.
- There will be a large setback between Avenal Cutoff Road, the closest paved road to the Site, and Site facilities.

Based on a detailed evaluation of five key observation points, the Project, including landscaping enhancements incorporated in the proposed design, will have neutral visual effects.

### 1.8.13 WASTE MANAGEMENT

Wastes generated by the Project during construction and operation will be recycled to the extent practicable. Appropriate procedures and personnel training will provide assurance that non-hazardous and hazardous wastes are properly handled and do not significantly affect the environment or health and safety. Waste will be minimized and disposal of waste from the Project will not significantly impact the capacity of the disposal facilities identified as available for use by the Project. The incremental waste disposal capacity needed by the Project is not significant.

### 1.8.14 HAZARDOUS MATERIALS HANDLING

The Project will implement accident prevention and response planning measures to reduce the risk associated with use and storage of hazardous materials. Hazardous materials used for the Project will be well below federal risk management and process safety requirement threshold quantities. Aqueous ammonia used for emissions control is the only hazardous material that will be used or stored on-site in a quantity that will exceed the threshold levels for state risk management and process safety requirements and, therefore, a Risk Management Plan will be prepared in accordance with California Code of Regulations (CCR) Title 19. Analyses presented in Section 6.15 of this AFC demonstrate that even under a highly improbable (nearly impossible) worst-case scenario for an accidental release of aqueous ammonia, the impact on offsite areas and sensitive receptors would be less than significant.

Federal Power will also prepare a Hazardous Materials Business Plan/Contingency Plan in accordance with California Code of Regulations (CCR) Titles 19 and 22, a Spill Prevention Control and Countermeasure Plan (SPCC) in accordance with Code of Federal Regulations (CFR) Title 40, and a Storm Water Pollution Prevention Plan (SWPPP) in accordance with California Regional Water Quality Control Board (RWQCB) requirements. Each of these management plans includes detailed measures designed to prevent or respond to discharges, spills, leaks or other incidents involving hazardous materials. Bulk tanks will be provided with secondary containment to contain leaks or spills. Safety showers and eyewashes will be provided in appropriate chemical storage and use areas. Personnel who may potentially handle

hazardous materials will be trained to perform their duties safely and to respond to emergency situations that may occur in the event of an accidental spill or release.

### 1.8.15 PUBLIC HEALTH

Aspects of the Project that benefit public health include the use of an optimized stack height to reduce ground-level concentrations of emissions, and the sole use of clean-burning natural gas for fuel. These design and operating aspects will keep potential public health impacts below a level of significance.

The Project will use advanced combustion turbine technology to minimize emissions of pollutants and, therefore, to minimize potential effects on public health. Potential health risks are comprehensively assessed in Section 6.16 and determined to be below their significance thresholds. Because future public health risks will be below significance criteria, no residential or sensitive receptors will be impacted. Sensitive receptors nearest the Project are located more than 6 miles from the Site. The closest residence is located more than 1 mile from the Site.

Beneficial aspects of the Project regarding protection of public health include the following:

- Clean-burning natural gas as fuel.
- Advanced combustion turbine technology to minimize the amount of fuel needed to produce electricity.
- SCR to minimize NOx emissions.
- Optimized stack height to reduce ground-level concentrations of exhaust pollutants below public health-related significance thresholds.
- Selection of a Site that is in an area with low population density and located far from the nearest farmhouse or sensitive receptor.

### 1.8.16 WORKER SAFETY

Worker safety is a high priority for Avenal Power Center LLC. The Applicant has extensive experience in owning and operating complex facilities including power plants. The practices and procedures that will be used for worker safety will be designed to comply with applicable LORS.

Beneficial factors of the Project related to worker safety are:

- Use of a proven operations health and safety program.
- Ongoing worker training to assure safe work practices and coordinated emergency response.

- Development of a comprehensive site-specific construction health and safety program.

### 1.8.17 TRANSMISSION LINE SAFETY AND NUISANCE

The Project transmission line interconnection will consist of approximately 6.4 miles of new single-circuit, 230 kV transmission line. The line will extend from the southeast corner of the Site south and then westward to the nearby PG&E transmission corridor, and then northwestward to the Gates substation. Beneficial aspects of the Project include:

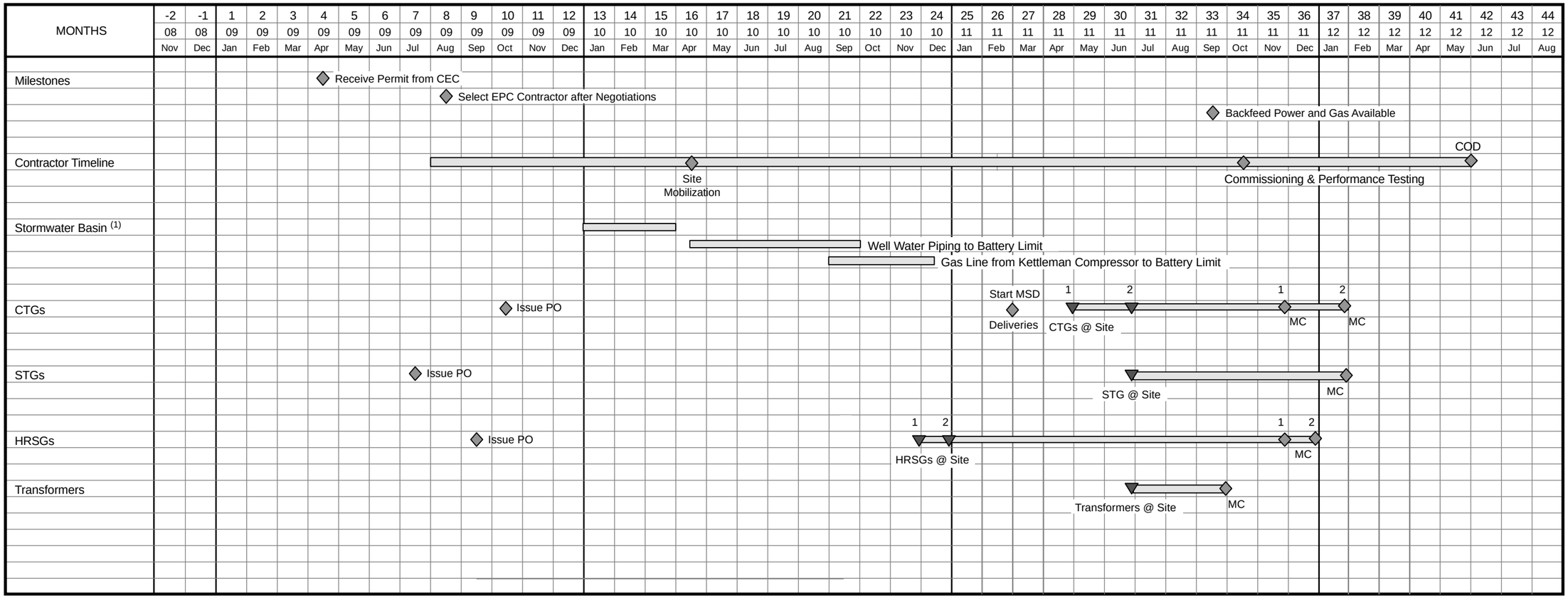
- The Project is located proximal to a major electrical transmission corridor. The majority of the new line construction will follow the existing PG&E transmission line corridor.
- New line construction will occur in an agricultural area, away from populated areas.

The Bonneville Power Administration Corona and Field Effects Program (BPA Program) model was used to calculate the electric and magnetic fields for the new 230 kV single-circuit tower line that will connect the Site switchyard to the existing PG&E 230 kV line. While California does not have regulatory levels for electric field strength, the BPA modeling shows that the electric and electromagnetic fields will be within standards set by other states that do have regulatory limits. In addition, no impact to current audible noise or radio and TV interference is expected from the Project.

## 1.9 SUMMARY

The Project will provide benefits and diversity to the local economy and will help California meet projected power generation resource needs. By employing natural gas-fired, advanced combustion turbine technology and emissions control systems, the Project will provide an efficient and environmentally sound source of electricity for California's deregulated electricity market.

Environmental impacts associated with construction and operations of the Project have been considered by Federal Power throughout the planning process. In those instances where potential impacts on the environment have been identified, design measures have been implemented to ensure that impacts are limited to a level that is less than significant.




Note: (1) Stormwater Basin to be an early construction activity if needed to avoid disturbance to Tri-Colored Blackbird as described in Section 6.6.

COD = Commercial Operation Date
MSD = Material Shipped Direct
MC = Mechanical Completion

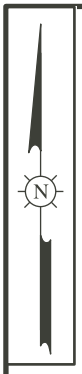
Notes: 1. Commercial operation date includes emission and performance tests.
2. Capability, Reliability & Availability Tests After COD.

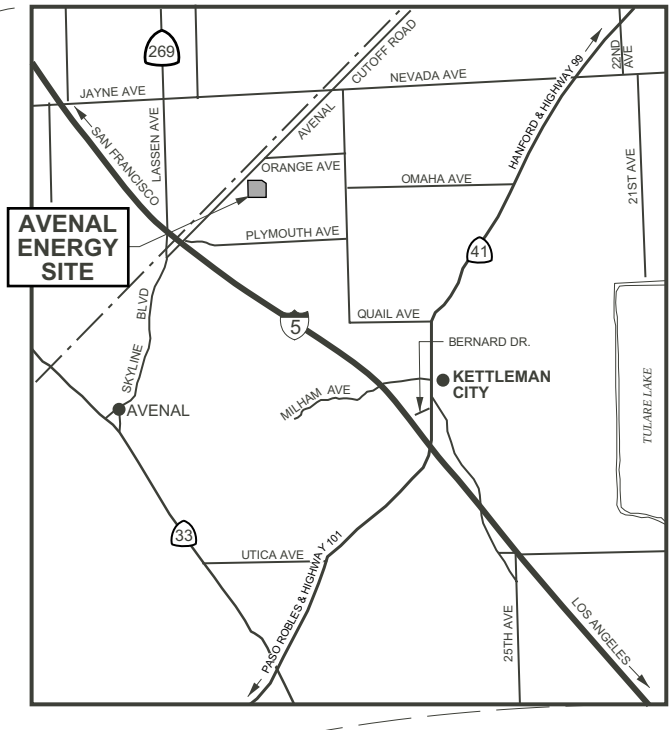
PRELIMINARY PROJECT SCHEDULE

AVENAL POWER CENTER, LLC

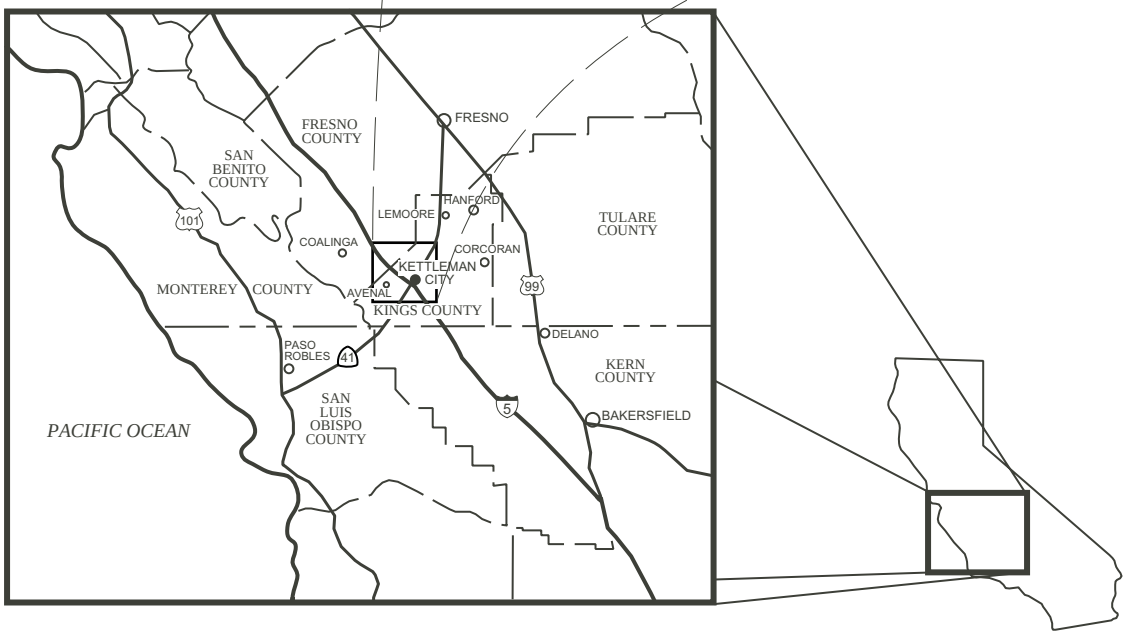
AVENAL ENERGY | FIGURE 1.3-1

125155-AFC-1.5-1.CNV REV 11/14/07




**VICINITY MAP**
NOT TO SCALE




**REGIONAL MAP**

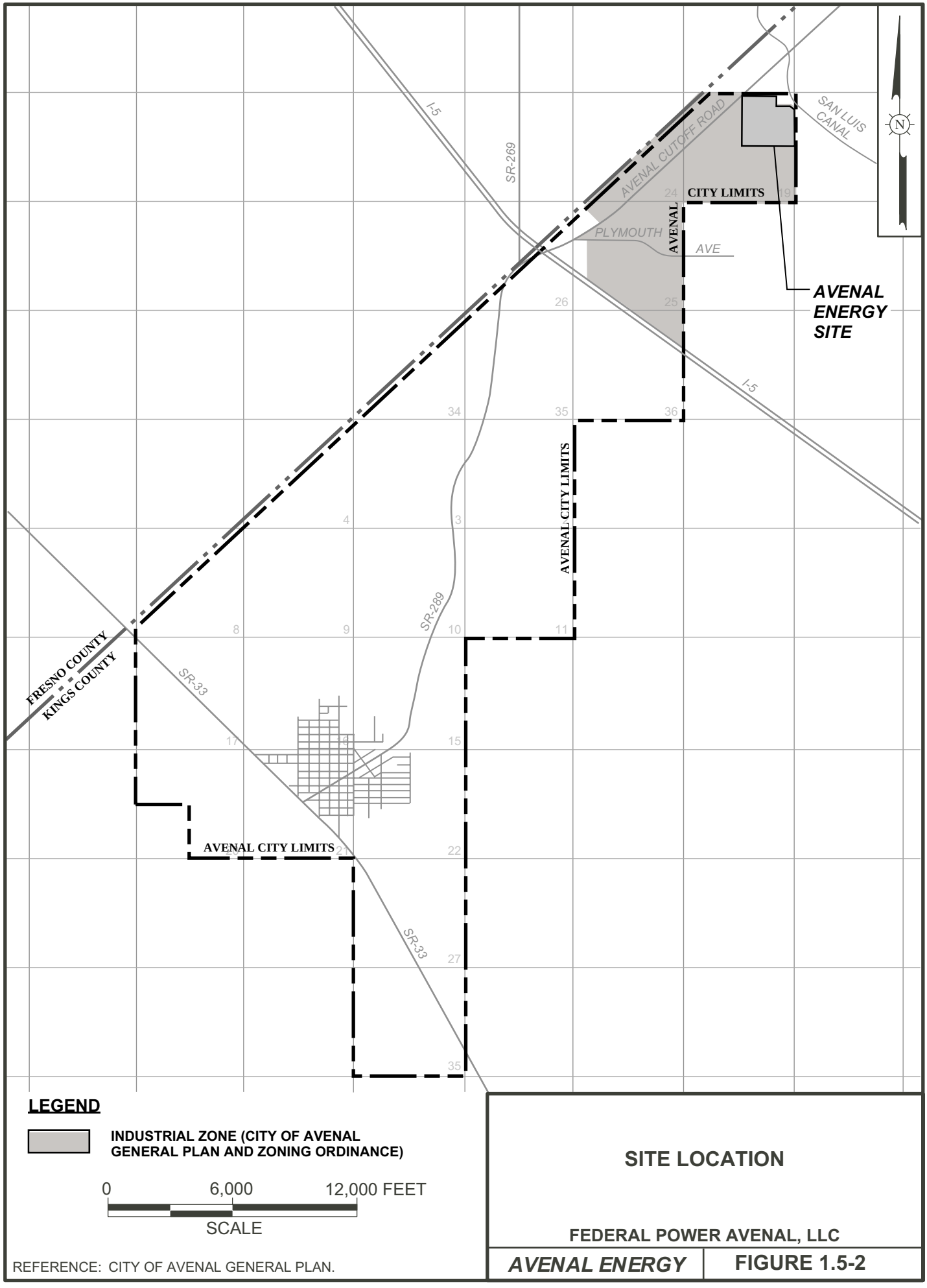
0 60 120 MILES

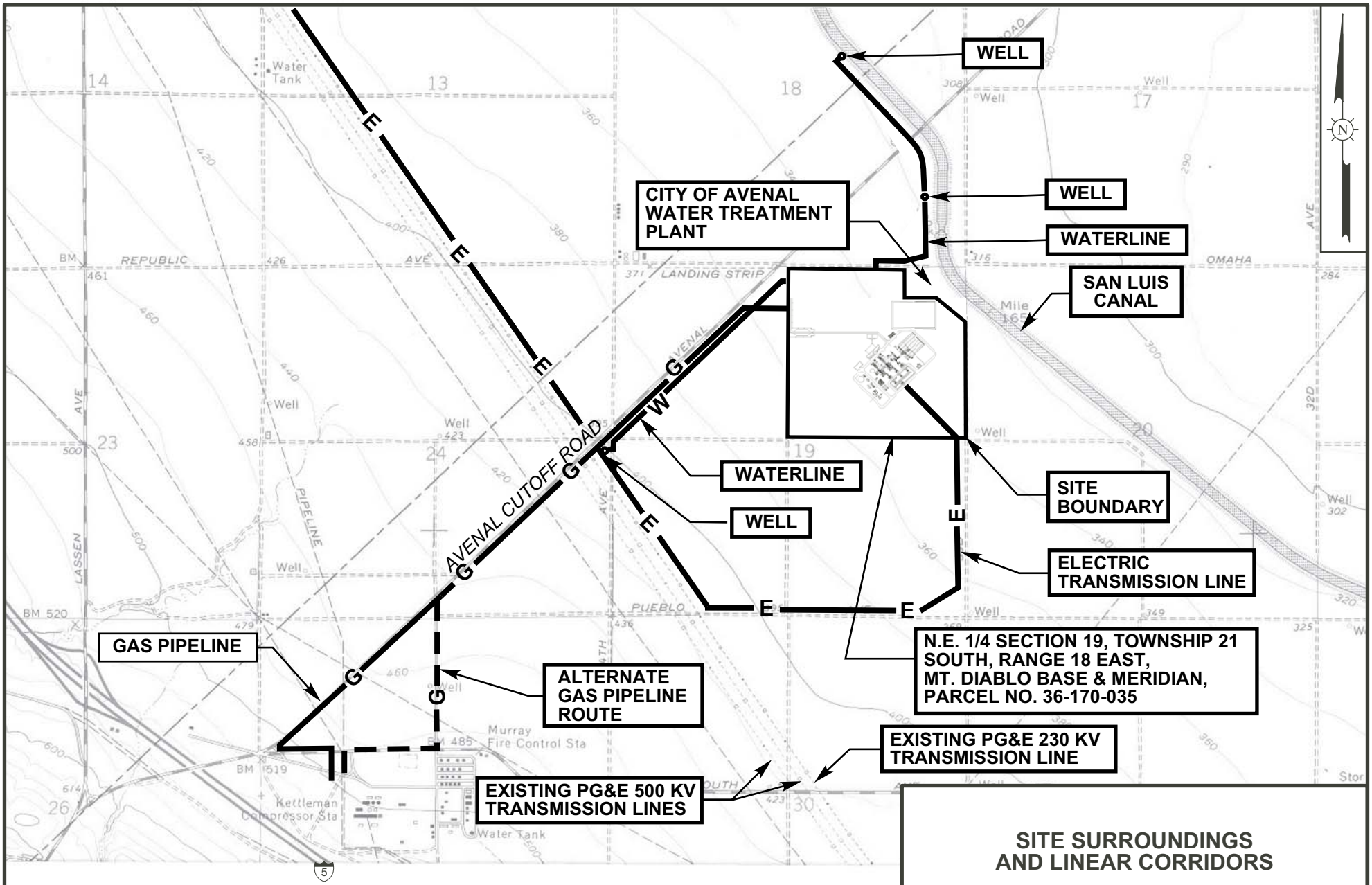
APPROXIMATE SCALE

## REGIONAL LOCATION MAP

**FEDERAL POWER AVENAL, LLC**

| *AVENAL ENERGY* | **FIGURE 1.5-1** |
|---|---|


125155-AFC-1.5-2.CNV REV.11/14/07
I-5
SR-269
AVENAL CUTOFF ROAD
SAN LUIS CANAL
CITY LIMITS
AVENAL
PLYMOUTH
AVE
AVENAL ENERGY SITE
I-5
AVENAL CITY LIMITS
SR-289
FRESNO COUNTY
KINGS COUNTY
SR-33
AVENAL CITY LIMITS
SR-33
N
LEGEND
INDUSTRIAL ZONE (CITY OF AVENAL GENERAL PLAN AND ZONING ORDINANCE)
0
6,000
12,000 FEET
SCALE
REFERENCE: CITY OF AVENAL GENERAL PLAN.
SITE LOCATION
FEDERAL POWER AVENAL, LLC
AVENAL ENERGY
FIGURE 1.5-2




REFERENCE:
U.S.G.S 7.5 MINUTE TOPOGRAPHIC SERIES MAP OF LA CIMA, CALIFORNIA, DATED 1978.

0 2,000 4,000 FEET
SCALE

## SITE SURROUNDINGS AND LINEAR CORRIDORS

**FEDERAL POWER AVENAL, LLC**

*AVENAL ENERGY* | **FIGURE 1.5-3A**

GATES SUBSTATION

ELECTRIC TRANSMISSION LINE

SAN LUIS CANAL

SITE BOUNDARY

FRESNO COUNTY
KINGS COUNTY

JAYNE AVENUE

0 1/4 1/2 3/4 1 MILE

SCALE 1:24,000

SOURCE: United States Geological Survey 7.5 Minute Topographic Map: Huron, California and La Cima, California Quadrangle

# TRANSMISSION LINE SURROUNDINGS

FEDERAL POWER AVENAL, LLC

TRC

FIGURE 1.5-3B

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**AVENAL SITE**
**BEFORE CONSTRUCTION**

**FEDERAL POWER AVENAL, LLC**

| *AVENAL ENERGY* | **FIGURE 1.5-4** |
|---|---|

**AVENAL SITE**
**AFTER CONSTRUCTION**

**FEDERAL POWER AVENAL, LLC**

| *AVENAL ENERGY* | **FIGURE 1.5-5** |
|---|---|