

2 ALTERNATIVES

This chapter describes the alternatives analyzed in this EIS. They are as follows:

1. **No Action Alternative:** Deny both permit and corresponding ROW applications. This presents the environmental impacts in the United States as if the lines had never been constructed and provides a baseline against which the impacts in the United States of the action alternatives can be measured in the absence of Presidential permits and corresponding ROWs.
2. **Proposed Action:** Grant one or both permits and corresponding ROWs. This sets forth the impacts in the United States of constructing and operating the line(s) from the Mexico power plants as those plants are presently designed, and it is DOE's and BLM's preferred alternative.
3. **Alternative Technologies:** Grant one or both permits and corresponding ROWs to authorize transmission lines that connect to power plants that would employ more efficient emissions controls and alternative cooling technologies.
4. **Mitigation Measures:** Grant one or both permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigation measures to minimize environmental impacts in the United States.

DOE and BLM also consider alternative routes for the transmission lines within the United States under the action alternatives described above.

2.1 NO ACTION

Under the no action alternative, neither of the proposed transmission lines would be constructed and the environmental impacts associated with their construction and operation would not occur. In the case of Semptra, lack of the requested transmission line would preclude the Termoeléctrica de Mexicali (TDM) power plant from operating because there would be no delivery path for the electricity generated. Similarly, in the case of Intergen, the EBC export unit could not be operated because the proposed transmission line would have provided the only delivery path for the electricity generated from that unit.

However, the EAX unit at the La Rosita Power Complex (LRPC) could still operate. The existing SDG&E transmission line has sufficient capacity to transmit the electrical output of the EAX export gas turbine and one-third (90 MW) of the EAX steam turbine output to the United States. The other two EAX gas turbines and the remaining two-thirds (180 MW) of the electrical output of the EAX steam turbine are designated for the Mexico market and would operate under any and all circumstances.

Because DOE and BLM are proceeding with this EIS under the assumption that the proposed Intergen and Sempra transmission lines do not exist, this EIS does not address the removal of their lines and support structures from BLM lands. Should the Presidential permits and ROWs not be granted, the issue of whether to remove the existing lines from BLM lands would be a new Federal action subject to an appropriate separate NEPA review.

2.2 PROPOSED ACTION: GRANT ONE OR BOTH PRESIDENTIAL PERMITS AND CORRESPONDING ROWS

Under the proposed action alternative, one or both Sempra and Intergen transmission lines would be constructed and operated and all generating units at the TDM and LRPC power plants would be able to operate. DOE's and BLM's preferred alternative would be to issue both Presidential permits and ROWs to Sempra and Intergen as their projects are presently designed.

The impacts attributable to the preferred alternative would be those associated with operation of the entire TDM power plant, the EBC unit, the EAX export turbine, and the construction and operation of the proposed transmission lines. If the proposed Intergen transmission line were approved and constructed, the electrical output of the EAX export turbine at the LRPC would be exported to the United States over that line. Therefore, even though the EAX export turbine would be able to operate under the no action alternative, the impacts associated with this turbine are also included in the proposed action.

2.2.1 Descriptions of Proposed Transmission Lines

The proposed transmission lines would be located in the Yuha Basin in the Colorado Desert in the southwestern portion of Imperial County, California, about 10 to 12 mi (16 to 18 km) southwest of the town of El Centro (Figures 1.1-1, 2.2-1, and 2.2-2). Each proposed project would construct a double-circuit, 230-kV transmission line extending from the existing IV Substation south approximately 6 mi (10 km) to the U.S.-Mexico border in Utility Corridor N, where each line would connect with a corresponding transmission line in Mexico (Figures 2.2-3 through 2.2-6). The transmission line support structures would consist of steel lattice towers from the border to just south of the IV Substation, where steel A-frame structures would be used for each transmission line to allow the crossing of the Southwest Power Link (Figure 2.2-3). The Southwest Power Link is a 500-kV transmission line that enters the IV Substation from the east at the substation's southeast corner. After crossing the Southwest Power Link, the proposed transmission lines would be supported by steel monopoles along the east side of the IV Substation and would enter it from the north.

From the U.S.-Mexico border to the last tower south of the Southwest Power Link at the IV Substation, both the Intergen and Sempra ROWs would parallel the existing line. The ROW for the Intergen transmission line would be adjacent to the existing 120-ft (37-m) ROW for the existing SDG&E transmission line and would also be 120 ft (37 m) wide, so that the centerline would be 120 ft (37 m) east of the centerline of the existing transmission line ROW. The

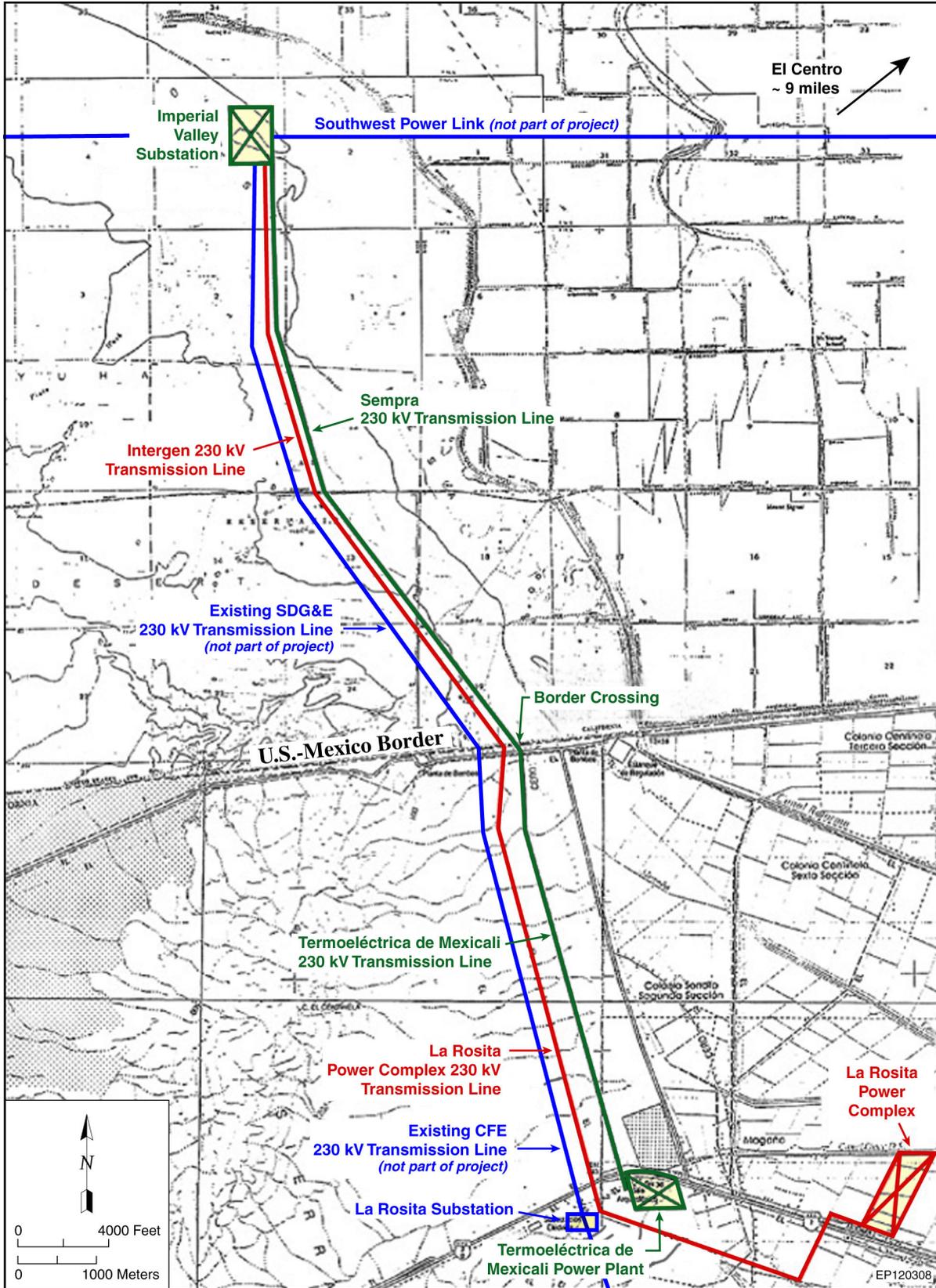


FIGURE 2.2-1 General Area Map Showing the Proposed Transmission Lines

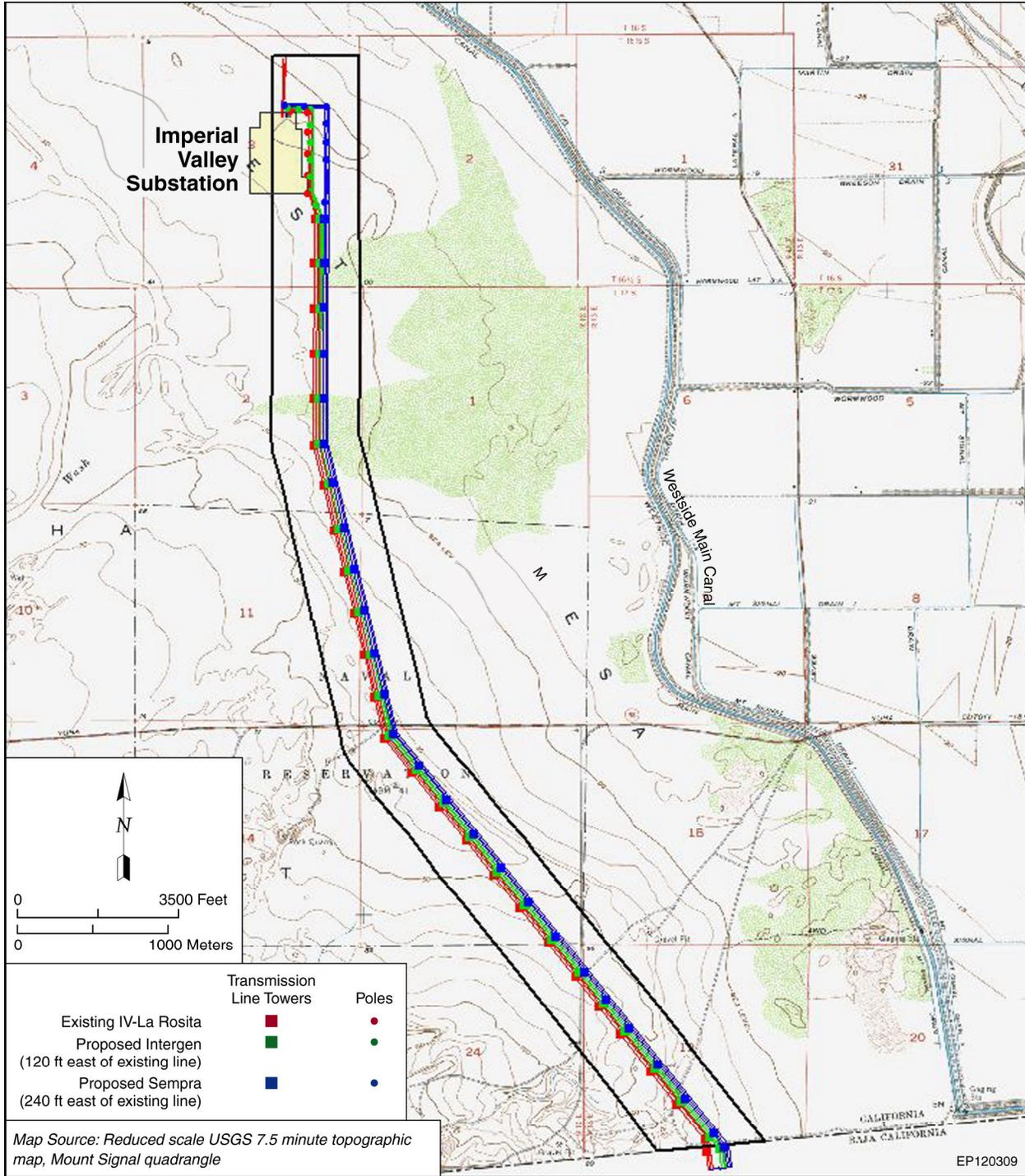


FIGURE 2.2-2 Location of Existing and Proposed Transmission Lines as Shown on USGS Topographic Map

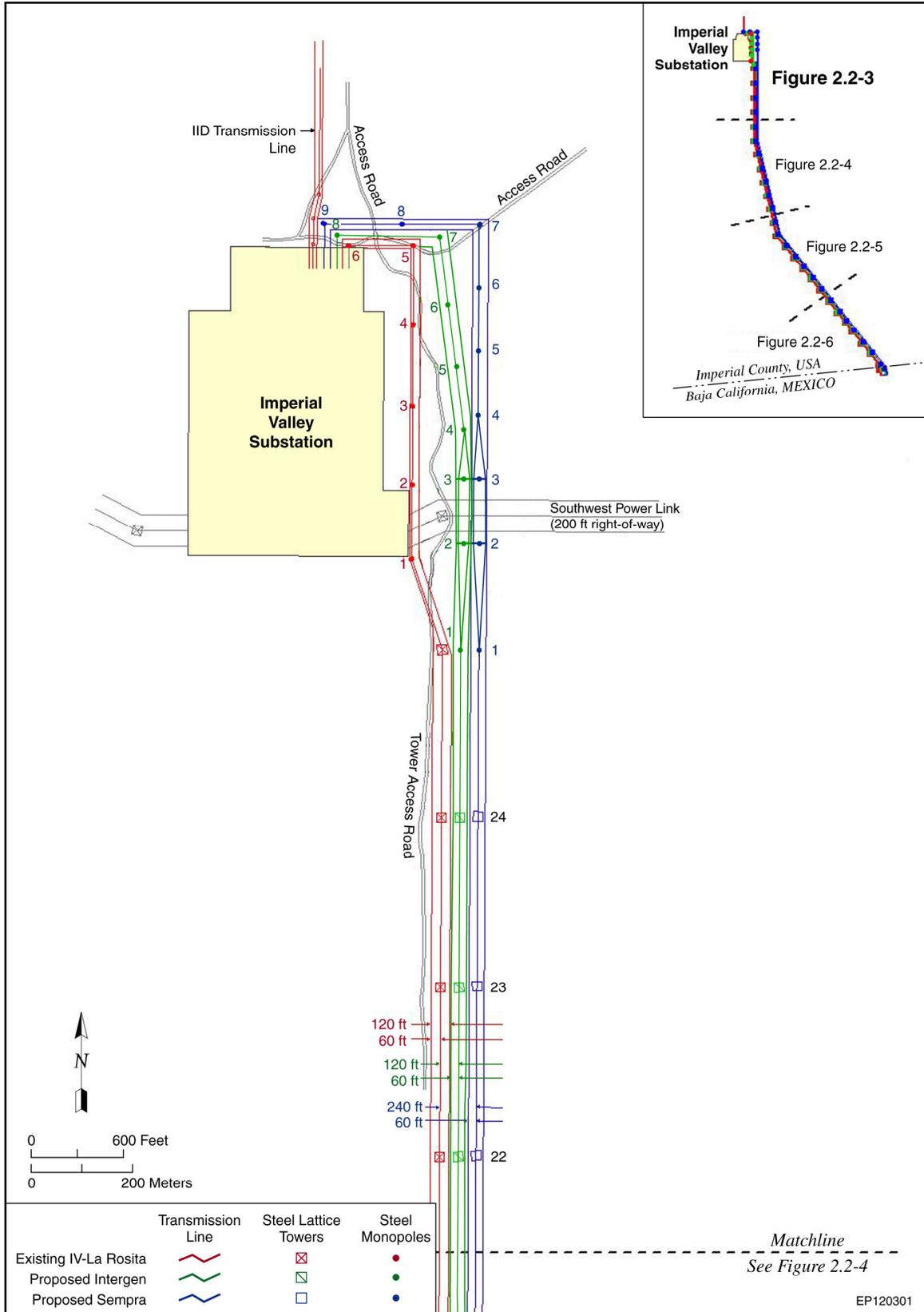


FIGURE 2.2-3 Projects Plan — Segment A

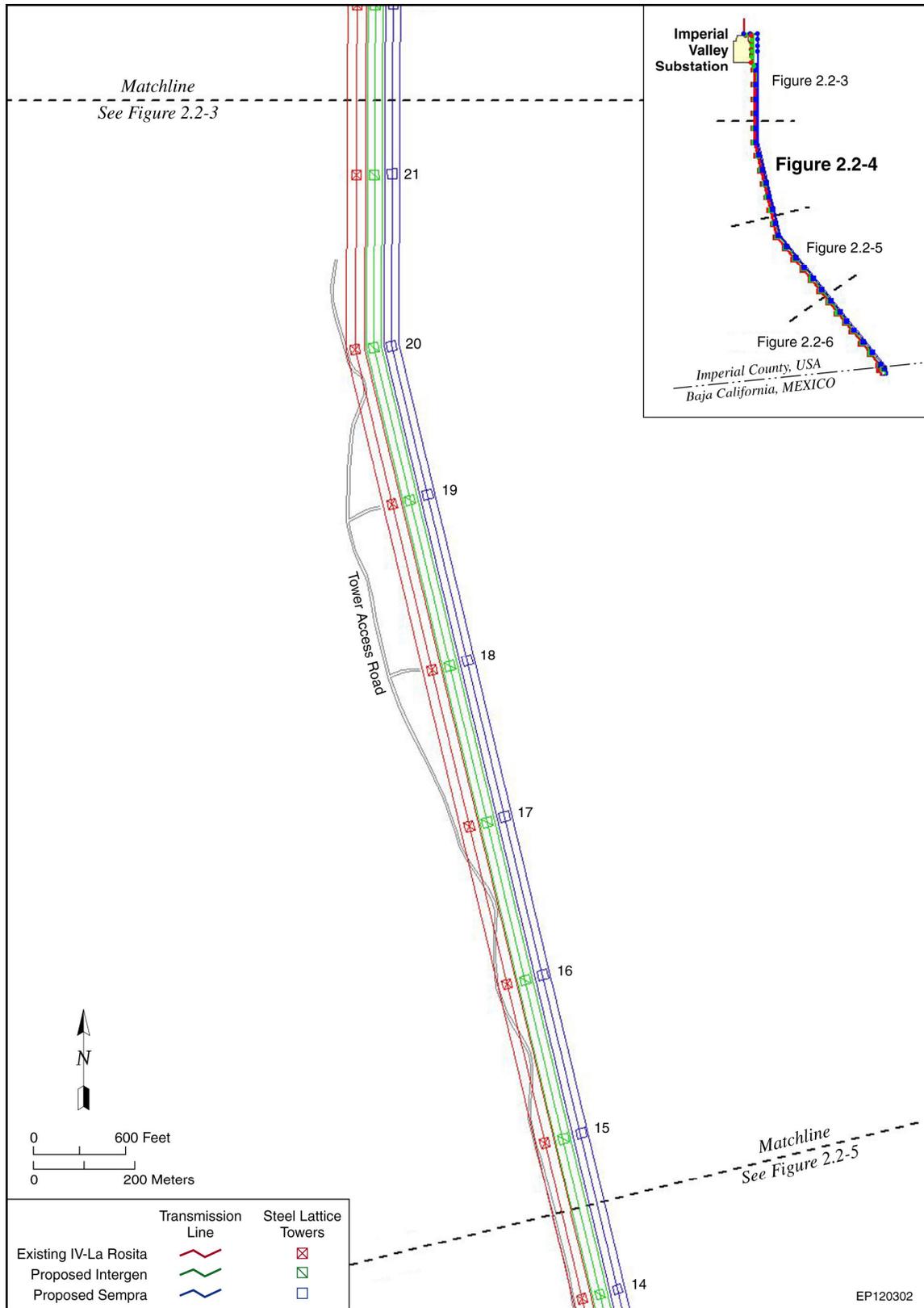


FIGURE 2.2-4 Projects Plan — Segment B

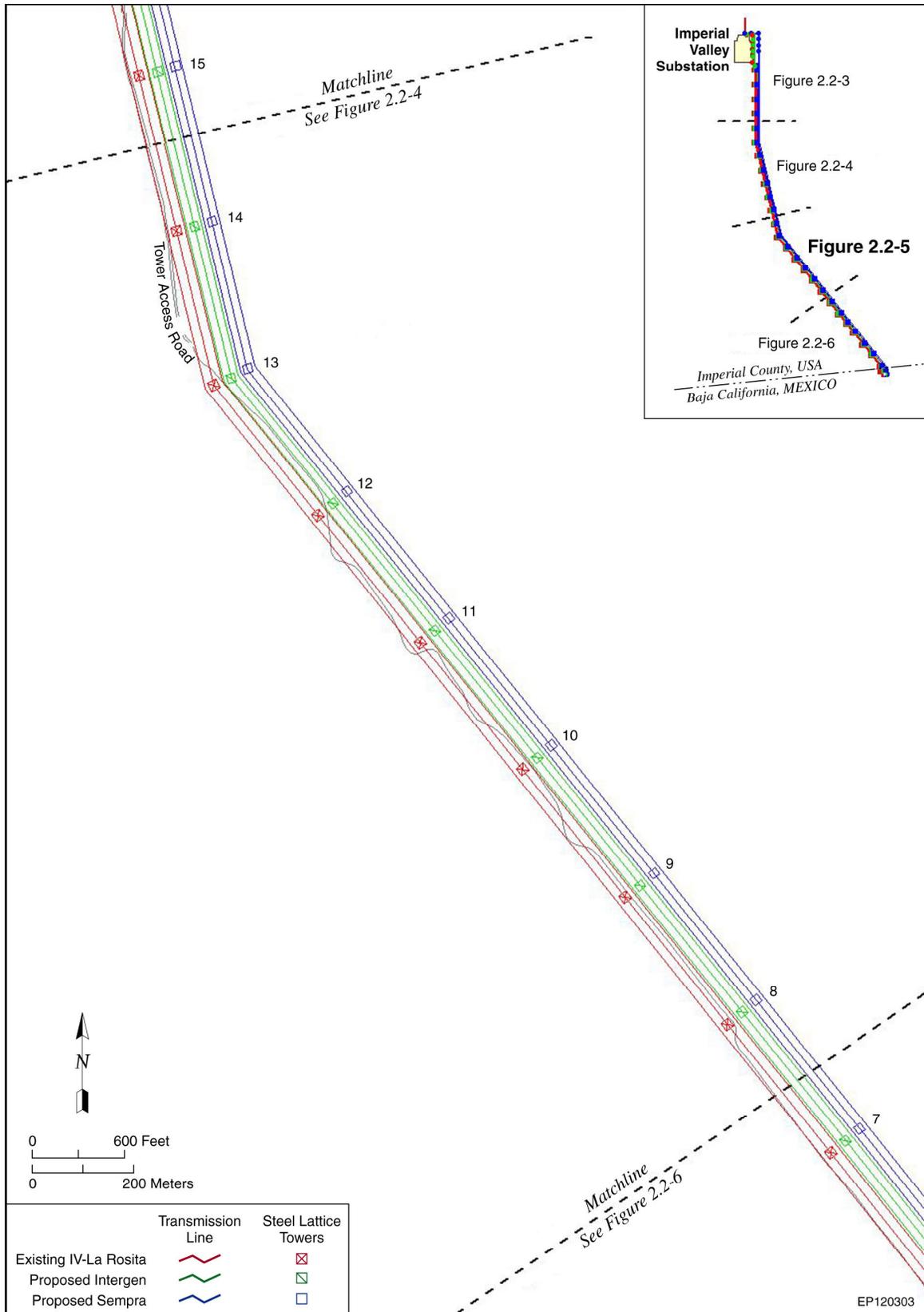


FIGURE 2.2-5 Projects Plan — Segment C

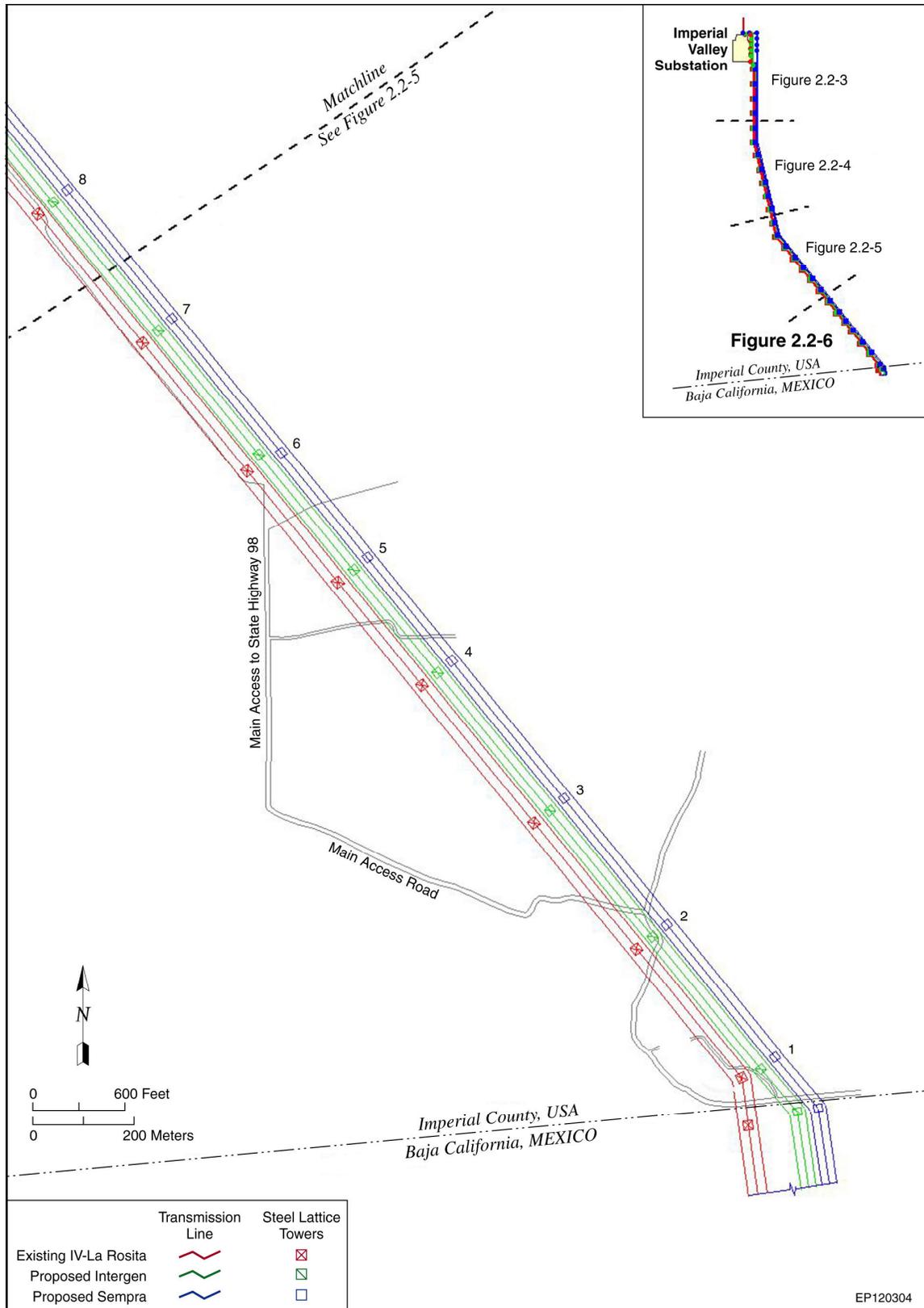


FIGURE 2.2-6 Projects Plan — Segment D

centerline of the Sempra ROW would be east of and adjacent to the proposed Intergen transmission line ROW and would be 120 ft (37 m) wide. Thus, the centerline of the Sempra ROW would be 120 ft (37 m) east of the centerline of the proposed Intergen ROW and 240 ft (73 m) east of the centerline of the existing line.

For both the Intergen and Sempra transmission lines, steel lattice towers would be erected on the centerlines of the ROWs.¹ The towers would be spaced approximately 900 to 1,150 ft (274 to 350 m) apart and would be roughly in line with the existing line's towers in an east-west direction. In this EIS, the towers, the A-frames, and steel poles for both lines are referred to by consecutive numbers from south to north; Tower No. 1 would be the first tower north of the U.S.-Mexico border, and Tower No. 24 would be just south of the IV Substation. Similarly, the steel monopoles are referred to by consecutive numbers from south to north of the substation, with the A-frame crossing structures included in the pole numbering system as No. 2 and No. 3. All proposed features of the projects are shown in Figures 2.2-3 through 2.2-6.

2.2.1.1 Transmission Line Construction

Sempra and Intergen would use the same contractor to build both transmission lines simultaneously. Construction would begin with site preparation, consisting of grading of access roads, where necessary, and drilling or excavation for support structures and footings. Support structures would be fabricated in segments by the same vendor in Mexico. Each lattice tower and A-frame structure would be carried to the construction site by helicopter, which would minimize the amount of lay-down area required in the United States. Monopoles would be brought to the site by truck in sections, assembled in lay-down areas, and lifted into place with a crane. Principal preparation at each support structure location would consist of preparing concrete foundation footings. Each tower would require four footings, one on each corner; a single footing would be needed for each monopole.

Three types of steel lattice transmission towers and two types of steel monopoles would be used, depending on function. The three types of steel lattice towers are suspension, deflection, and dead-end; the two types of steel monopoles are suspension and deflection. Suspension towers (or monopoles) are used where cables are strung in a straight line from one tower to an adjacent one (Figures 2.2-7 and 2.2-8). Deflection towers (or monopoles) are used where transmission lines turn gradual angles (Figures 2.2-9 and 2.2-10), and dead-end lattice towers are used where transmission lines turn large angles or where a transmission line is brought into an electric substation (Figure 2.2-11). Suspension, deflection, and deadend towers are about 140 ft (43 m) high, and both deflection and suspension monopoles are about 102 ft (31 m) high.

Conductors (wires) on the dead-end and deflection towers or poles would be supported by double insulators. Conductors on suspension towers or poles would be supported by single insulators. The minimum ground clearance of the conductor would be 36 ft (11 m). The average

¹ In some cases, the descriptions of tower dimensions and conductor spacing are slightly greater than the as-built dimensions. Thus, some of the estimates of land disturbance during construction are conservative.

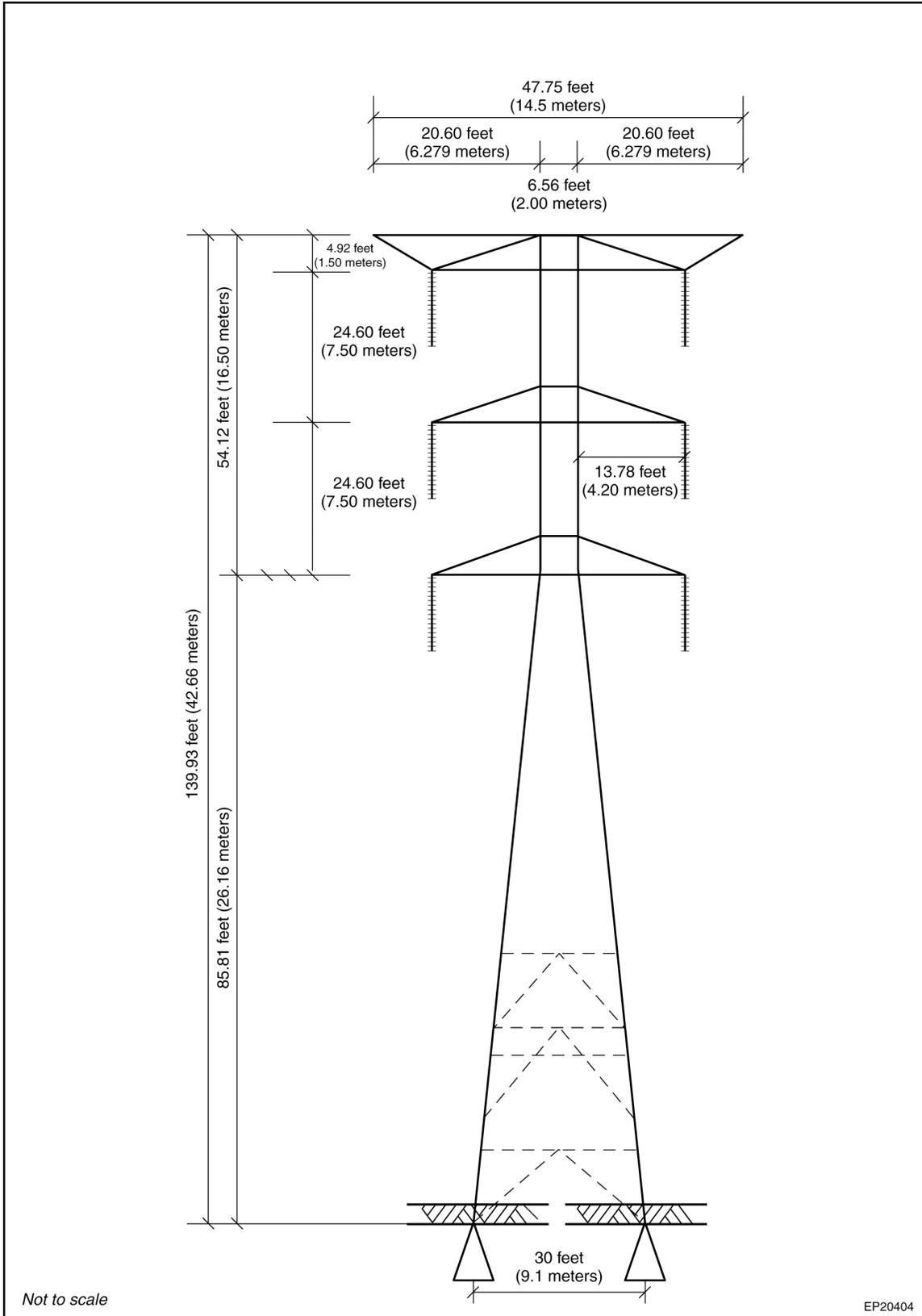


FIGURE 2.2-7 Suspension Tower

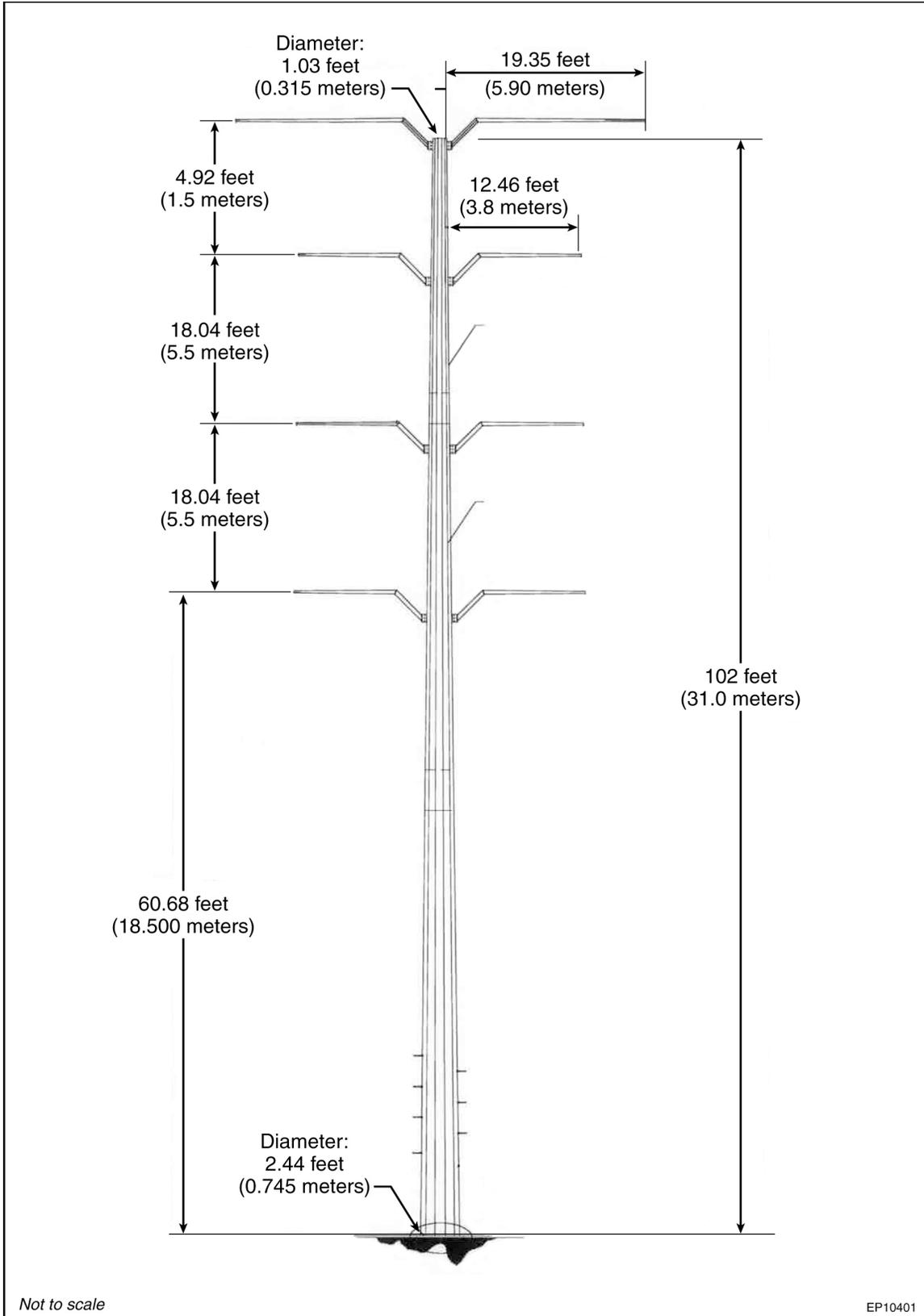


FIGURE 2.2-8 Suspension Monopole

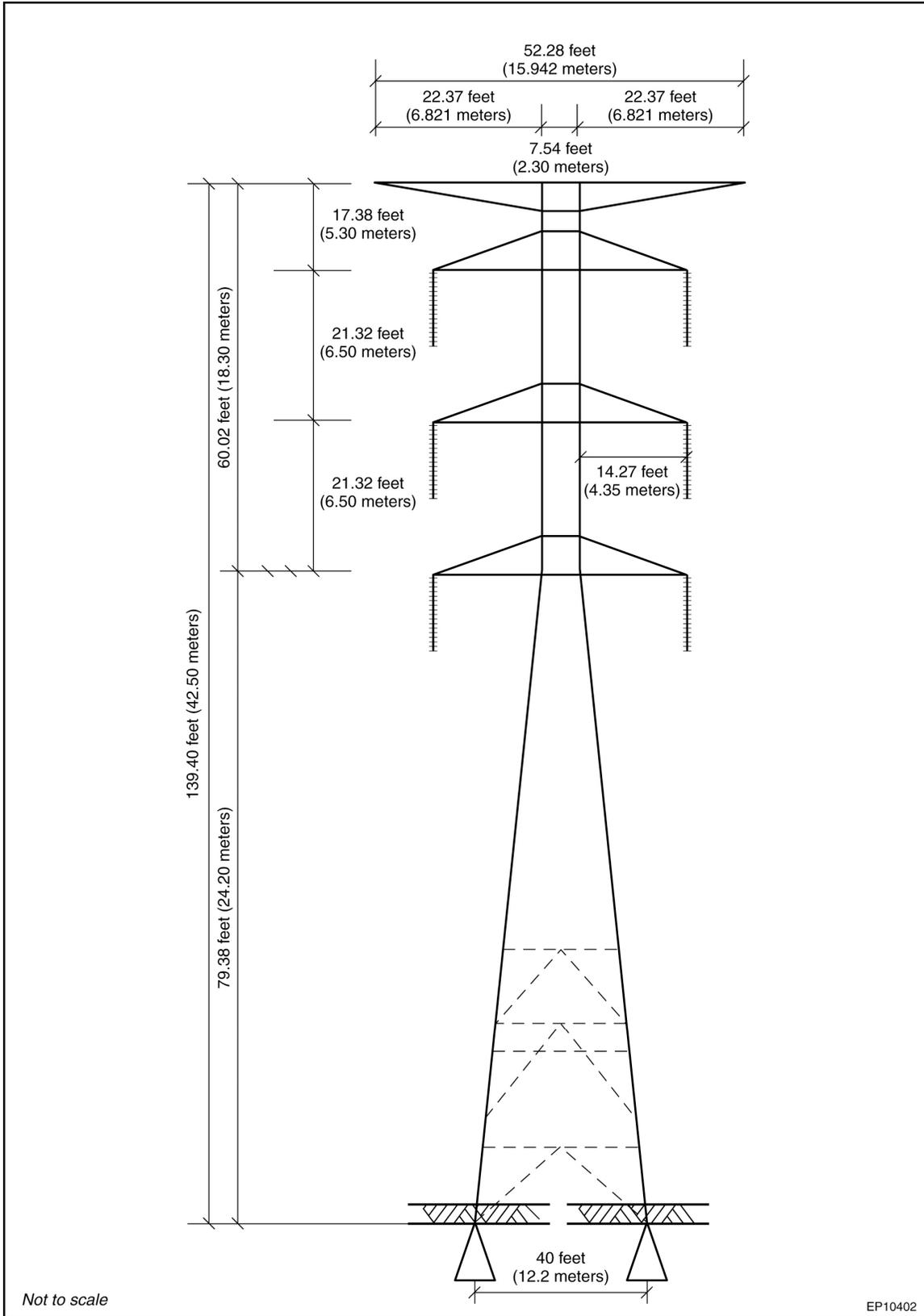


FIGURE 2.2-9 Deflection Tower

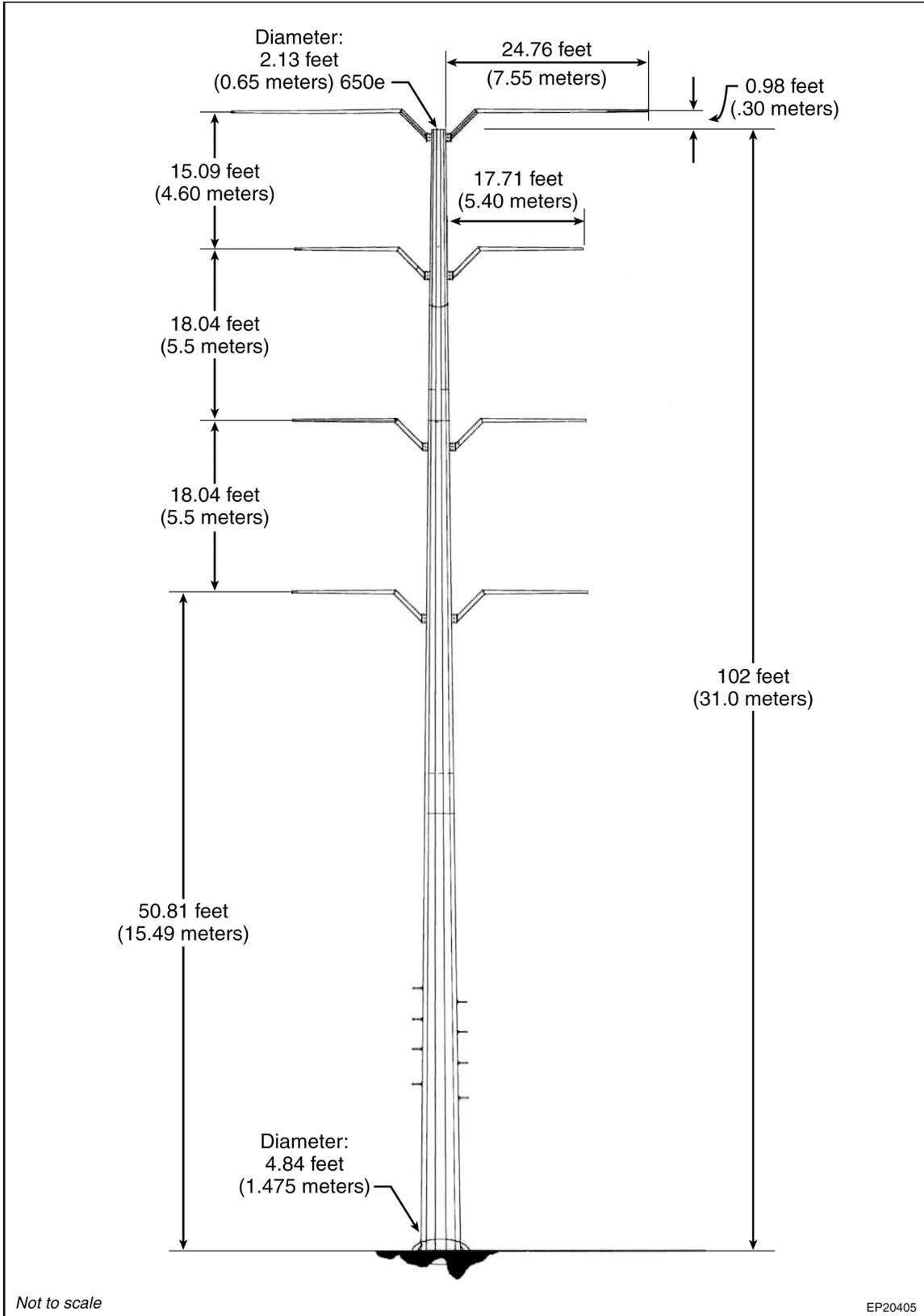


FIGURE 2.2-10 Deflection Monopole

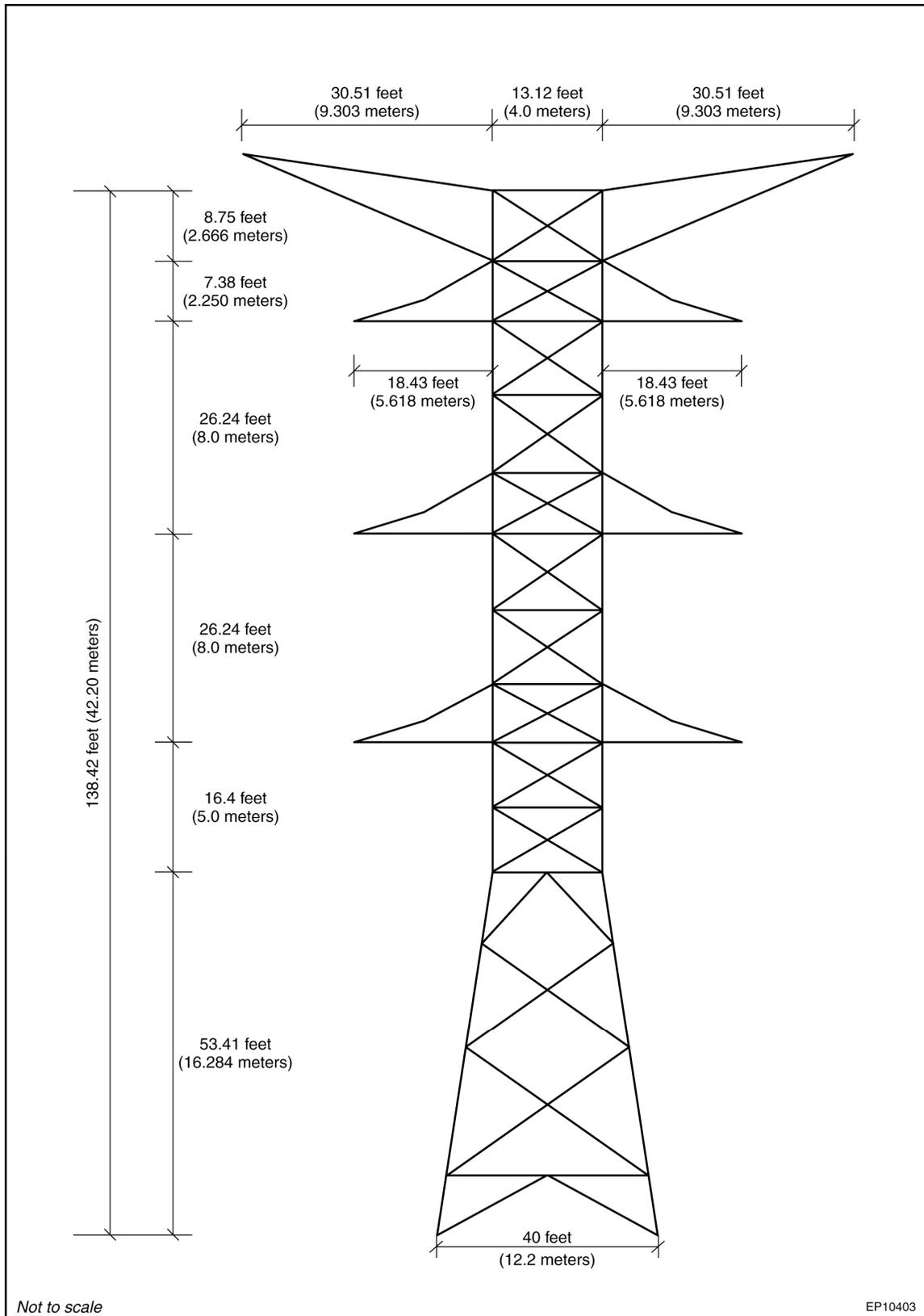


FIGURE 2.2-11 Dead-end Tower

horizontal distance between circuits for phase conductor spacing on steel lattice suspension and deflection towers would be approximately 35 ft (10.7 m). For dead-end steel lattice towers, the distance would be about 50 ft (15.2 m). The horizontal distance between phases on the steel monopoles would be about 26 ft (8.0 m) for the suspension monopole and 37.6 ft (11.5 m) for the deflection monopole. Vertical spacing between phases on a steel lattice tower would be between 21.3 ft (6.5 m) and 26.4 ft (8.0 m), depending upon the tower type. Vertical spacing between phases on steel monopoles would be 18.0 ft (5.5 m) for both monopole types.

Each support structure would contain two electrical circuits. Each electrical circuit consists of three phases with two unbundled conductors making up each phase. Two static ground wires would be located at the top of each support structure. These static ground wires would provide communications, system protection, and monitoring. The two ground static wires would include the installation of communications fiber for system protection and monitoring, with additional black fiber for future communications use. Therefore, each proposed transmission line would consist of 14 wires; that is, 12 conductors and the two static ground wires.

The conductors would be composed of strands of aluminum wire wrapped around a stranded steel cable. The aluminum conducts electricity and the steel supports the conductor. This type of construction is known as aluminum conductor steel-supported. Each conductor wire has a core of 7 steel wires surrounded by 54 aluminum wires.

The towers would be anchored to concrete foundations at each of the four corners at the base of the tower. The tower base dimensions would range from approximately 30 ft by 30 ft (9.1 m by 9.1 m) for suspension towers to 40 ft by 40 ft (12.2 m by 12.2 m) for the deflection and dead-end towers. At the top, the suspension towers would be approximately 6.6 ft (2.0 m) square, the deflection towers would be approximately 7.5 ft (2.3 m) square, and the dead-end towers would be approximately 13 ft (4 m) square.

Steel suspension monopoles would be approximately 2.5 ft (0.8 m) in diameter at the base, tapering to approximately 1 ft (0.3 m) in diameter at the top. Steel deflection monopoles would be approximately 4.8 ft (1.5 m) in diameter at the base, tapering to approximately 2.1 ft (0.6 m) at the top. Steel monopoles would be anchored to a concrete foundation.

Each of the four legs of the A-frame structures used to cross the Southwest Power Link (Figure 2.2-12) would be bolted to a cylindrical concrete footing. A total of 32 footings would be needed for the four A-frames, with two A-frame structures on each side of the Southwest Power Link.

Once support structures are in place, conductors would be strung for the entire length of the transmission lines, from the northernmost support structure at the substation. Truck-mounted cable-pulling equipment would be used to string the conductors on the support structures. Cables would be pulled through one segment of a transmission line, with each segment containing several towers or poles. To pull cables, truck-mounted cable-pulling equipment would be placed alongside the tower or monopole, directly beneath the crossarm insulators (the “pull site”) at the

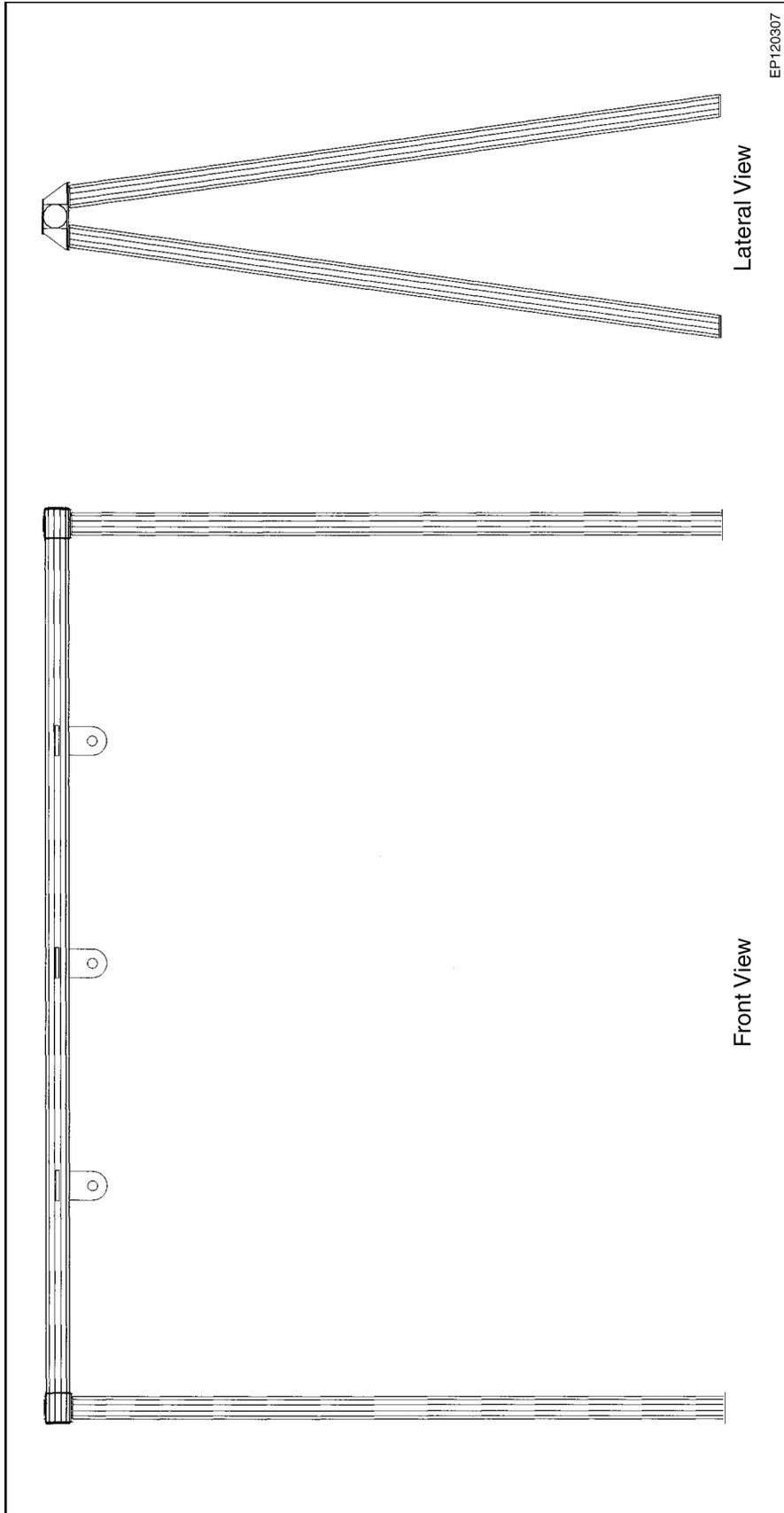


FIGURE 2.2-12 Crossing Structure

first and last towers or poles in the segment of the transmission line. The conductors would be pulled through the segment of line and attached to the insulators. Then the equipment would be moved to the next segment, with the “front-end” pull site just used becoming the “back-end” pull site for the next segment.

At the crossing structure south of the Southwest Power Link, the static wires would be brought down the structure, placed in a trench to pass to the other side of the Southwest Power Link, and brought back up the crossing structure on the other side. The trench would be backfilled.

Construction would be completed by restoring disturbed ground surfaces to original contours. Spoil dirt excavated for the footings would be spread on the ground, on access roads, or taken off site for disposal in a permitted disposal site.

2.2.1.2 Areas of Construction Impact

Areas of permanent impact would be those areas where the surface of the ground would be permanently disturbed. Specifically, permanent impacts would occur where new access roads and footings or anchors for tower, monopole, or crossing structures are constructed. Temporary impacts would occur in areas where construction activity takes place but where restoration of the surface is possible. These areas would include the work areas used to erect the towers, monopoles, or crossing structures; pull sites; lay-down areas for the monopoles; and the trenches for the optical cables under the Southwest Power Link at the substation. In some places, areas of temporary disturbance would overlap.

Many areas of temporary disturbance, such as work areas around towers or poles and pull sites, would overlap at least partially; consequently, the total estimate for the temporary impact areas is overestimated and therefore conservative.

The areas of impact, permanent and temporary, from construction of the proposed project are presented in Table 2.2-1.

2.2.1.3 Operations and Maintenance

Operations and maintenance requirements would include, but not necessarily be limited to, the following: (1) yearly maintenance grading of access roads; (2) insulator washing; (3) monthly on-ground inspection of towers, poles, and access roads by vehicle; (4) air or ground inspection as needed; (5) repair of tower or pole components as needed; (6) repair or replacement of lines as needed; (7) replacement of insulators as needed; (8) painting pole or tower identification markings or corroded areas on towers or poles; and (9) response to emergency situations (e.g., outages) as needed to restore power.

TABLE 2.2-1 Area of Construction Impacts

Impact Location	Size of Impact (acres) ^a	
	Temporary	Permanent
Lattice tower footing	NA ^b	0.23
Lattice tower access roads	NA	1.72
Lattice suspension tower work areas	2.46	NA
Lattice deflection tower work areas	0.88	NA
Lattice tower pull sites	0.83	NA
Area of substation impact ^c	9.5	NA
Monopole pull sites and work areas	0.48	NA
Monopole lay-down areas	1.21	NA
Optical line trenches	0.06	NA
Crossing structures footing	NA	<0.05
Monopole footings	NA	<0.04
Monopole access roads	NA	1.56
Total	15.42	<3.60

^a Based on a total of 25 towers (the actual number built is 24); thus the actual disturbance would be less than that shown here. To convert acres to hectares multiply by 0.4047.

^b NA = not applicable.

^c The work area near the IV Substation would be subject to intensive disturbance. It is likely, however, that not all of this area would be disturbed.

For most of these operations, equipment could use the access roads and no significant additional disturbance would occur. Transmission line conductors may occasionally need to be upgraded or replaced over the life of the line. Old cables would be taken down and new cables would be strung on the insulators in an operation similar to the cable-pulling operation used to initially install the conductors. While the project access roads can be used for access, pull sites would also be required. The size and location of these pull sites may vary, depending on the cable and equipment used, the methods used by the contractor, and the technology available at the time. For these reasons, the size and location of future temporary disturbance areas because of pull sites cannot be accurately estimated. In any event, such conductor replacement is infrequent.

2.2.1.4 Applicants’ Proposed Environmental Protection Measures

Several features of the projects’ design and construction methods are intended to reduce the amount of surface disturbance and therefore the potential impacts on environmental resources. These include locating the support structures (steel lattice towers, crossing structures,

and steel monopoles) so that new access roads can be kept as short as possible, using existing access roads to the maximum extent possible, and using a helicopter to place lattice tower assemblies onto footings to reduce the amount of ground disturbance that would otherwise be caused by the use of lay-down areas and operation of cranes. In addition, the applicants would hire the same construction contractor to build both lines, further minimizing impacts by combining and coordinating construction activity, eliminating potential repeated impacts to the same area, and minimizing traffic flows.

The applicants would commit to stringent monitoring and mitigation requirements to protect biological, cultural, and paleontological resources. These measures are discussed in the following subsections.

2.2.1.4.1 Biological Resources. To protect BLM sensitive species, including the flat-tailed horned lizard and the western burrowing owl, the applicants would agree to accept the following conditions for the proposed projects:

1. Construction would be scheduled to occur as much as possible during the flat-tailed horned lizard's dormant period — November 15 to February 15; BLM would approve the construction schedule before the start of construction.
2. A preconstruction worker education program would be developed and implemented. In addition, wallet-cards would be provided to all construction and maintenance personnel and would include information regarding the biology and status of the lizard; the protection measures that are being implemented; the function of the flagging around sensitive resources; reporting procedures if a lizard is found within the construction area; and methods of reducing impacts during commuting to and from construction areas.
3. A field contact representative (FCR) would be designated prior to the start of construction and approved by BLM. The FCR would be responsible for ensuring compliance with protective measures for the flat-tailed horned lizard and other sensitive biological resources and would act as the primary resource agency contact. The FCR would have the authority to halt construction activities if the project is not in compliance with mitigation required by BLM.
4. The FCR would coordinate with the construction manager to assure that all surface-disturbing activities are located as much as possible in areas that have been previously disturbed or where habitat quality is lower, and where disturbance to biological resources can be minimized.
5. All work areas would be clearly flagged or otherwise marked, and all work would be restricted to these areas. All construction workers would restrict

their activities and vehicles to areas that have been flagged or to clearly recognizable areas, such as access roads, that have been identified as “safe” areas by the FCR.

6. A Biological Monitor, hired by the applicants but authorized by BLM, would be present in each area of active construction throughout the workday, from initial clearing through habitat restoration, except where the project is completely fenced and cleared of flat-tailed horned lizards by a biologist (measure 12 below). The biologist must have sufficient education and field training with the flat-tailed horned lizard. This biologist would ensure that the project complies with these mitigation measures and would have the authority to halt activities if they are not in compliance. The biologist would inspect the construction areas periodically for the presence of flat-tailed horned lizards and would inspect any open trenches or pits prior to backfilling. The biologist would also work with the construction supervisor to take steps to avoid disturbing the lizards and their habitat. If a lizard is discovered within an affected area, the lizard would be captured and relocated. The Biological Monitor would also excavate all potential flat-tailed horned lizard burrows within the construction areas and relocate any flat-tailed horned lizards encountered.
7. Only biologists authorized by BLM may handle flat-tailed horned lizards. Any workers who discover flat-tailed horned lizards would avoid disturbing the animals and would immediately notify their construction supervisor and the Biological Monitor.
8. If a flat-tailed horned lizard is detected within an affected area, it should be relocated according to the measures detailed in Measure No. 9 of the Mitigation Measures section (Appendix 3) of the *Flat-tailed Horned Lizard Rangelwide Management Strategy* (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). Any relocation must be conducted by a biologist authorized by BLM to handle the lizards.
9. The area of vegetation and soil disturbance would be minimized to the greatest extent possible. When possible, the equipment and vehicles should use existing surfaces or previously disturbed areas. When excavation or grading is necessary, the topsoil should be stockpiled and restored following completion of the work.
10. Existing roads would be used to the greatest extent possible for travel and staging areas.
11. If BLM desires, newly created access roads would be restricted by constructing barriers, erecting fences with locked gates, and/or by posting signs. Maintenance access control facilities would be the responsibility of the applicants for the life of the project (construction and operation).

12. Sites where prolonged construction activity, lasting 6 hours or more, would occur, and in which lizard mortality could occur, may be enclosed with 0.5-in. (1.3-cm) wire mesh fencing to exclude the lizards from the site. This barrier fencing must be at least 12 in. (30.4 cm) above and below the ground surface, and all entry gates should be constructed to prevent lizard entry. Once a fenced site has been cleared of flat-tailed horned lizards and fenced in this manner, an on-site monitor would no longer be required. Fencing would not be required if a Biological Monitor is present.
13. For all areas disturbed by construction, a habitat restoration plan would be developed by a qualified biologist, approved by BLM, and implemented by the applicants. The restoration plan would address all of the items included in Measure No. 14 in Appendix 3 and in the Overview for Techniques for Rehabilitation of Lands in Appendix 8 of the Rangewide Management Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). The restoration plan would include a schedule for monitoring and assuring the success of restoration, including the removal of invasive species, acceptable to BLM. The restoration plan would also include a minimum of 3 years of tamarisk and other exotics control following construction.
14. The FCR would keep a record of the extent of all areas permanently and temporarily disturbed by construction. This record would be the basis for determining a monetary compensation to be paid by the applicants to BLM upon the completion of construction as required by Appendix 4 (Compensation Formula) of the Rangewide Management Strategy. BLM may require, prior to the beginning of construction, a reasonable deposit, on the basis of the extent of anticipated disturbance, with the final compensation to be determined according to the FCR's final record and the Compensation Formula in the Rangewide Management Strategy.

For any construction occurring during the flat-tailed horned lizard's active period, before November 15 or after February 15, all of the measures listed above that are applicable would be implemented. In addition, the following measures would be required:

1. The FCR would coordinate with the construction manager for the applicants to assure that vehicular traffic is kept to a minimum, consistent with the practical requirements of construction.
2. Work crews would not drive to the work site in the management area in individual vehicles. The applicant would arrange for workers to park outside the management area and be driven together to the work site in single collection vehicles. This limitation would apply to the members of a work crew (two or more persons) who would be working together throughout the shift, except for emergencies.

3. The FCR and Biological Monitors would keep a record of all sightings of flat-tailed horned lizards and fresh flat-tailed horned lizard scat. Sightings would be reported in writing to BLM on a schedule established by BLM.

There is a potential that the proposed projects could impact active burrows of the western burrowing owl; the breeding season for burrowing owls is between February 1 and August 31. Burrows can be occupied and active during both the breeding and nonbreeding seasons. To avoid impacts to the burrowing owl, the following measures would be required:

1. Disturbance by construction of any occupied burrowing owl burrows should be avoided. A nondisturbance buffer of 160 ft (49 m) during the nonbreeding season and 250 ft (76 m) during the breeding season should be maintained around each occupied burrow when possible. It is preferable that construction take place between September 1 and January 31, to avoid impacts to breeding burrowing owls.
2. If construction is to begin during the nonbreeding season, a preconstruction clearance survey should be conducted within the 30 days prior to construction to identify whether any burrowing owl territories are present within the project footprint. The proposed construction areas would need to be identified in the field by the project engineers prior to the commencement of the preconstruction clearance survey. The survey should follow the protocols provided in the Burrowing Owl Survey Protocol and Mitigation Guidelines (California Burrowing Owl Consortium 2001).
3. Passive relocation of burrowing owls from occupied burrows that would be otherwise impacted by construction would be required. Passive relocation should only be implemented in the nonbreeding season. This includes covering or excavating all burrows and installing one-way doors into occupied burrows. This would allow any animals inside to leave the burrow but would prevent any animals from reentering the burrow. A period of at least 1 week is required after the relocation effort to allow the birds to leave the impacted area before construction of the area can begin. The burrows should then be excavated and filled in to prevent their reuse. An artificial burrow should be created beyond 160 ft (49 m) from the impact area but contiguous with or adjacent to the occupied habitat.
4. The destruction of the active burrows on site would require construction of new burrows at a mitigation ratio of 1:1, at least 164 ft (50 m) from the impacted area. New burrows would be constructed as part of the above-described relocation efforts.
5. If construction is to begin during the breeding season, the above-described measures should be implemented prior to February 1 to discourage the nesting of the burrowing owls within the area of impact. As construction continues, any area where owls are sighted should be subject to frequent

surveys for burrows before the breeding season begins, so that the owls can be relocated before nesting occurs.

6. It is possible that these protocols would need to be repeated throughout the length of construction to ensure that additional burrowing owls have not moved within the areas of impact subsequent to the initial preconstruction clearance survey and relocation efforts. As the construction schedule and details are finalized, a qualified biologist should prepare a monitoring plan to detail the methodology proposed to minimize and mitigate impacts to this species.

The construction of the steel lattice tower portions of both the Intergen and Sempra transmission lines could impact nonwetland jurisdictional waters of the United States. To mitigate impacts to nonwetland jurisdictional waters, the following measures would be required:

1. Any areas of nonwetland jurisdictional waters temporarily impacted would be returned to preconstruction contours and condition.
2. Permanent impacts of 0.08 acre (0.03 ha) would be mitigated at a ratio consistent with Federal regulatory agencies, which is typically 1:1. A restoration plan would be prepared detailing the proposed mitigation for impacts to jurisdictional waters. It is recommended that enhancement of the survey corridor through removal of the nonnative invasive tamarisk be conducted. This should be conducted along the eastern edge of the IV Substation, which would account for an area of at least 0.10 acre (0.04 ha) in size. Additional tamarisk could be removed from the southern edge of the wetland area, if necessary. The restoration plan should require a minimum of 3 years of control for tamarisk and other exotics following construction to ensure that these species are not allowed to establish within the impacted areas.
3. In addition, impacts to these waters would require a Section 404 Permit from the U.S. Army Corps of Engineers and a 401 Certificate from the Regional Water Quality Control Board in accordance with the Clean Water Act (CWA). This project would be covered by Nationwide Permit No. 12, which regulates all activities required for the construction of utility lines and associated facilities within waters of the United States. This Nationwide Permit covers all projects that do not exceed 0.50 acre (0.20 ha) of impact resulting from construction of the utility lines and associated access roads. This project meets that threshold by impacting a maximum of 0.21 acre (0.08 ha) of jurisdictional waters.

2.2.1.4.2 Cultural Resources. To protect cultural resources, the applicants would agree to accept the following conditions to the grants of ROW with BLM:

1. Identification and evaluation of historic properties and resolution of adverse effects would be determined through consultation with BLM, California State Historic Preservation Officer (SHPO), and consulting parties pursuant to Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations at 36 CFR Part 800.
2. The applicants would assist BLM in consulting (pursuant to the NHPA) with Indian tribes to determine whether there are properties of religious and cultural significance to the tribes within the Area of Potential Effect. The applicants would document their consultation efforts and would provide this in writing to BLM. This documentation may be submitted as part of the cultural resource survey report or as an addendum to that report.
3. The applicants would implement the treatment plan for resolving adverse effects on historic properties, if any, that would be affected by the undertaking.
4. BLM would ensure that all historic preservation work is carried out by or under the direct supervision of a person or persons (the Principal Investigator) meeting, at a minimum, the standards set forth in the Secretary of the Interior's Professional Qualifications (48 FR 44738–44739).
5. Archaeological monitoring would be conducted for any subsurface construction or ground-disturbing activity in areas determined by the Principal Investigator and BLM to be archaeologically sensitive in accordance with a monitoring and discovery plan approved by BLM and SHPO.
6. The Principal Investigator and Biological Monitors would attend a preconstruction meeting. The construction contract would state the need for the meeting, and project construction plans would be marked with requirements for monitoring. The meeting would allow the archaeological monitors to establish their roles and responsibilities, and protocol and point of contact information with the construction contractors.
7. Cultural properties discovered during construction would be reported and treated in accordance with a monitoring and discovery plan approved by BLM and SHPO.
8. If human remains or funerary objects are discovered during construction, construction would cease immediately in the area of discovery, and BLM would be notified by telephone followed by written confirmation. In accordance with the monitoring and discovery plan and Native American

Graves Protection and Repatriation Act, BLM would notify and consult with Indian tribes to determine treatment and disposition measures.

9. BLM would ensure that all materials and records resulting from the treatment program are curated in accordance with 36 CFR Part 79.

2.2.1.4.3 Paleontological Resources. To protect paleontological resources, the applicants would agree to accept the following conditions to the grants of ROW agreements with BLM:

1. A paleontologist, approved by BLM, would be retained prior to the beginning of construction and would be responsible for carrying out the mitigation program.
2. The consulting paleontologist would review project plans and site information and determine those areas of the site where excavations may have the potential to encounter significant fossils (areas of paleontological sensitivity).
3. Areas of paleontological sensitivity would be monitored when excavations or any other activities that could expose subsurface formations are occurring. Paleontological Monitors, approved by the consulting paleontologist, would monitor such activities. Areas of paleontological sensitivity would be marked on project plans used by the construction contractor.
4. The consulting paleontologist would attend at least one preconstruction meeting with the construction contractor to explain the monitoring requirements and procedures to be followed if fossils are discovered.
5. The construction contractor would keep the consulting paleontologist informed of the construction schedule and would perform periodic inspections of construction.
6. In the event that fossils are discovered, the Paleontological Monitor would immediately inform the consulting paleontologist. The monitor would have the authority to temporarily halt, redirect, or divert construction activities to allow the recovery of fossil material.
7. Any fossil materials collected would be cleaned, sorted, and cataloged and then donated to an institution approved by BLM with a research interest in the materials.
8. Within 6 weeks of the completion of construction, the consulting paleontologist would prepare a report on the results of the monitoring effort

and would submit the report to BLM, and, if fossils have been recovered, to the institution to which the fossils have been donated.

2.2.1.5 Alternative Transmission Line Routes

The identification of potential transmission line routes includes routes on Federal and private lands that would connect the IV Substation with lines from Mexico at the U.S.-Mexico border. BLM lands extend more than 20 mi (32 km) to the west of the existing 230-kV IV-La Rosita transmission line (hereafter, existing line) route, and private lands are within 1 or 2 mi (2 or 3 km) of the route to the east. Utility Corridor N, designated in the BLM Desert Plan (BLM 1999), is identified as an appropriate location for utility lines. This corridor also allows a more direct route between the IV Substation in the United States and the La Rosita Substation in Mexico. Two alternative transmission routes to the applicants' proposed routes are evaluated in this EIS (Figure 2.2-13). A third alternative route located mostly on private land east of the existing line was considered but not evaluated for the reasons given below.

The end point and start point of each alternative route is at a fixed geographical location, namely the IV Substation to the north and the U.S.-Mexico border immediately east of where the existing line crosses the U.S.-Mexico border. The applicants' proposed routes represent a relatively direct path between these points.

2.2.1.5.1 West of the Existing 230-kV Transmission Line. An alternative route west of the existing 230-kV IV-La Rosita transmission line (Figure 2.2-13) is evaluated. The location of the western route was selected to minimize the amount of land with sensitive cultural resources that would have to be crossed by the transmission lines. This route would require 7.4 mi (11.9 km) of ROW entirely on BLM land. The southern portion of this route would extend to the west, outside of the BLM-designated Utility Corridor N. Any alternative route outside the corridor could require a BLM Plan Amendment. Under this alternative, the Intergen and Sempra transmission lines would make a 90-degree turn to the west, then turn northeast to connect to the IV Substation. If the Intergen and Sempra lines were routed west of the existing line, these two new lines would have to cross over or under the existing line. The crossing of the existing transmission line would add considerable expense to construction and maintenance costs, as well as likely result in an increase in the number of towers required to be constructed on the U.S. side, and thus in the area temporarily and permanently impacted by construction.

2.2.1.5.2 East of the Existing 230-kV Transmission Line. An alternative route east of the existing line on the eastern boundary of BLM-managed land is also analyzed (Figure 2.2-13). The rationale for selecting the location of this route was to avoid concentrations of archaeological resources along the former shoreline of Lake Cahuilla and also to attempt to reduce biological effects by constructing the lines on the border of the Yuha Basin ACEC rather than through it. The eastern alternative route would require 5.8 mi (9.3 km) of ROW. This location, like the applicants' proposed routes, would remain entirely on BLM land within Utility Corridor N.

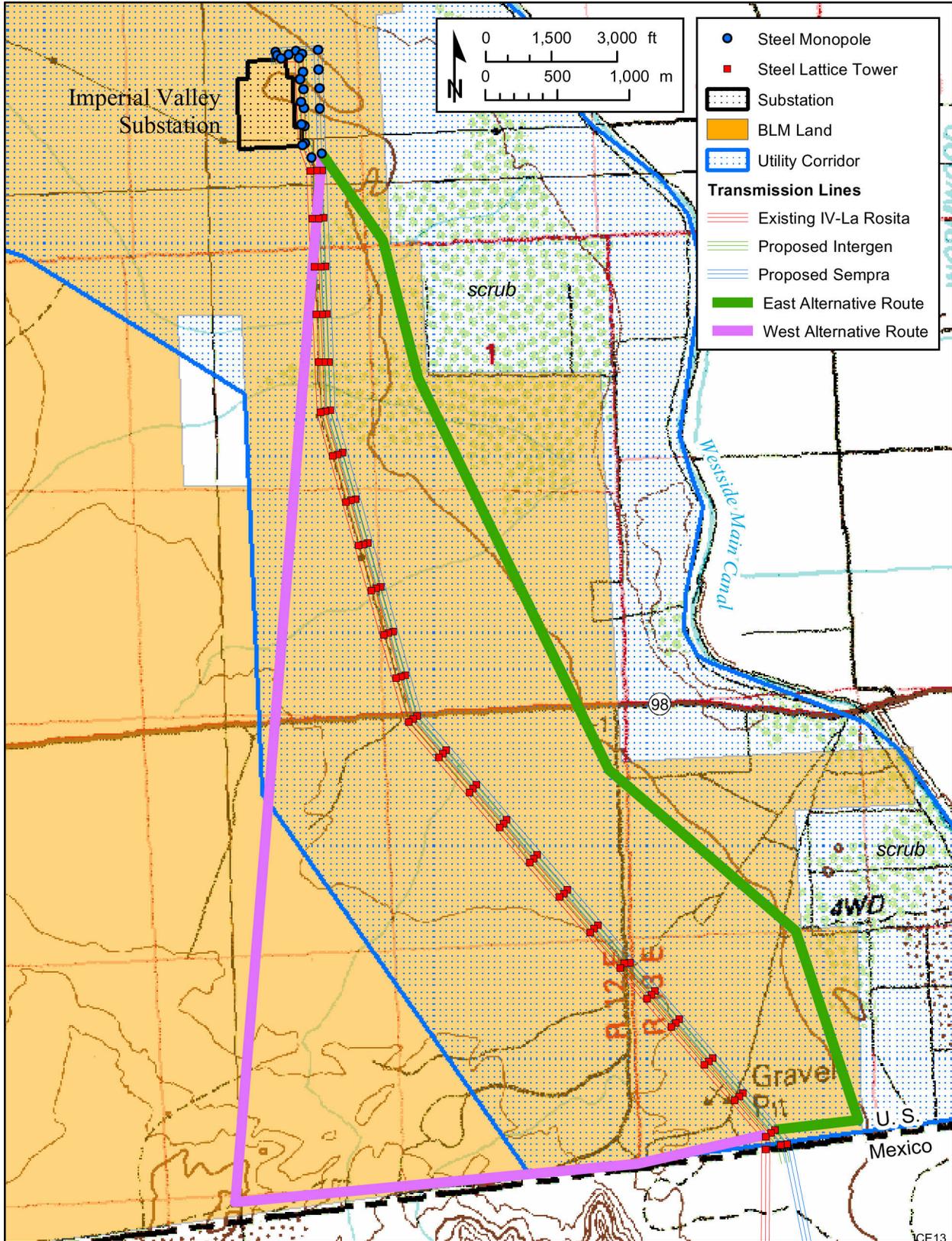


FIGURE 2.2-13 Alternative Transmission Line Routes

The Intergen and Sempra lines would make a 90-degree turn to the east along the border to the eastern boundary of BLM lands, then turn northwest along the eastern property boundary of BLM lands to the IV Substation.

2.2.1.5.3 Outside Federal Lands. An additional alternative route was considered in which the transmission lines would be located primarily on private lands located east of Utility Corridor N. To reach the IV Substation, this alternative route would traverse a little more than a mile in Federal lands.

Routing the transmission lines through private land to the east would require a considerably longer route than the more direct eastern, western, and applicants' proposed routes. Such a route would be more costly to construct and would result in a greater amount of ground disturbance than the other proposed routes. A larger number of towers would be required to be constructed, expanding any area temporarily or permanently impacted by construction; also, more materials, fuels, and expendables would be consumed.

Most important, private lands to the east are being used for agriculture. Any such alternative route would displace some agricultural land under towers and/or around poles and create conflicts with aerial crop dusting and other agriculture practices. Further, the acquisition of ROWs on private land would prove difficult to justify with regard to a variety of issues, including economic, environmental, and resource consumption, and it would be regarded as an unnecessary impingement on valued land when less expensive, shorter, and less intrusive routes are available on Federal lands through an existing, predesignated utility corridor.

This alternative route was not considered to be reasonable; no substantive advantage could be discerned to weigh against its considerable disadvantages; therefore, it was not analyzed further.

2.2.2 Project-Related Power Plants

Figure 2.2-14 is a schematic showing the generalized engineering features of the TDM and LRPC power plants as described in Chapter 1. The following sections further describe specific characteristics of each power plant.

All generating units at both power plants would operate in a combined-cycle mode and would be fueled by natural gas supplied by a cross-border pipeline previously permitted by FERC. Electricity would be produced by both

La Rosita Power Complex	
EAX:	<ul style="list-style-type: none"> • 3 Siemens-Westinghouse Model W501F combustion turbines • Alsthom steam turbine • Doosan heat recovery steam generator
EBC:	<ul style="list-style-type: none"> • 1 Siemens-Westinghouse Model W501F combustion turbine • Alsthom steam turbine • Foster Wheeler heat recovery steam generator

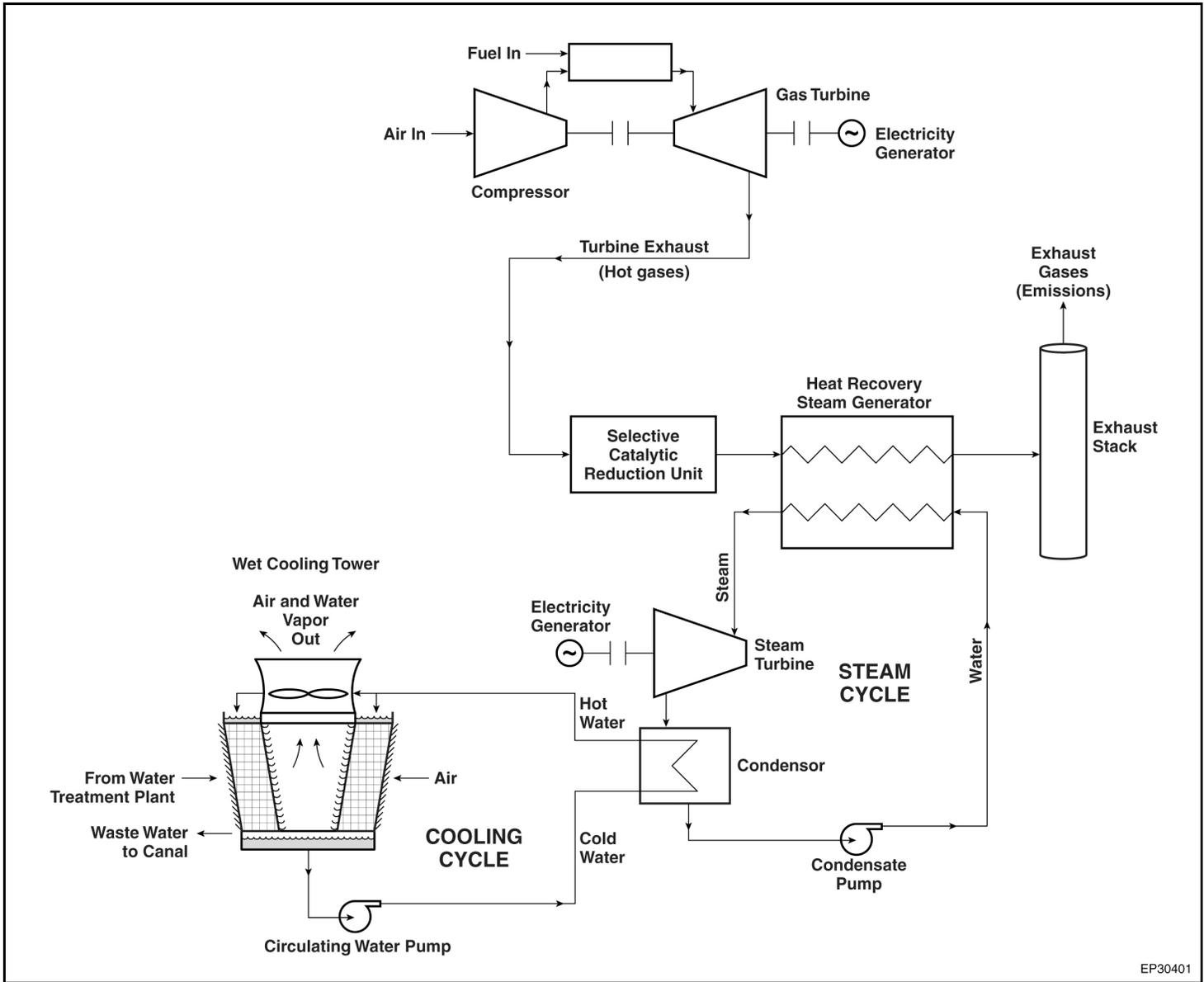


FIGURE 2.2-14 General Engineering Features at the LRPC and TDM Power Plants

the gas turbines and the steam turbine generators. Exhaust gases from the gas turbine are cleaned up during their travel through the heat recovery steam generator. Heat from the gas turbine exhaust, which would otherwise be released to the atmosphere with exhaust gases, would be recovered by the heat recovery steam generator to produce steam, which in turn would be used by the steam turbine to generate additional electricity.

- Termoeléctrica de Mexicali Power Plant**

 - 2 General Electric Model 7FA combustion turbines
 - Alstom steam turbine
 - Cerrey heat recovery steam generator

All turbines at both power plants would be equipped with dry low-NO_x burners that control emissions of NO_x during combustion. All turbines at both power plants would also eventually utilize an SCR system to further control NO_x emissions. SCR (Figure 2.2-15) is a postcombustion cleaning technology that chemically reduces NO_x (nitrogen [NO] and nitrogen oxide [NO₂]) into molecular nitrogen and water vapor. A nitrogen-based reagent, such as NH₃, is injected either as a gas or liquid into the ductwork, downstream of the combustion turbine. The waste gas from the combustion turbine mixes with the reagent and enters a reactor module containing a catalyst. The hot flue gas and reagent diffuse through the catalyst, and the reagent reacts selectively with the NO_x. Unreacted NH₃ in the flue gas downstream of the SCR reactor is referred to as NH₃ slip. As the catalyst activity decreases, NO_x removal decreases and NH₃ slip increases. When NH₃ slip reaches the maximum design or permitted level, new catalyst must be installed. The NO_x removal efficiency of SCR ranges between 85 and 90%.

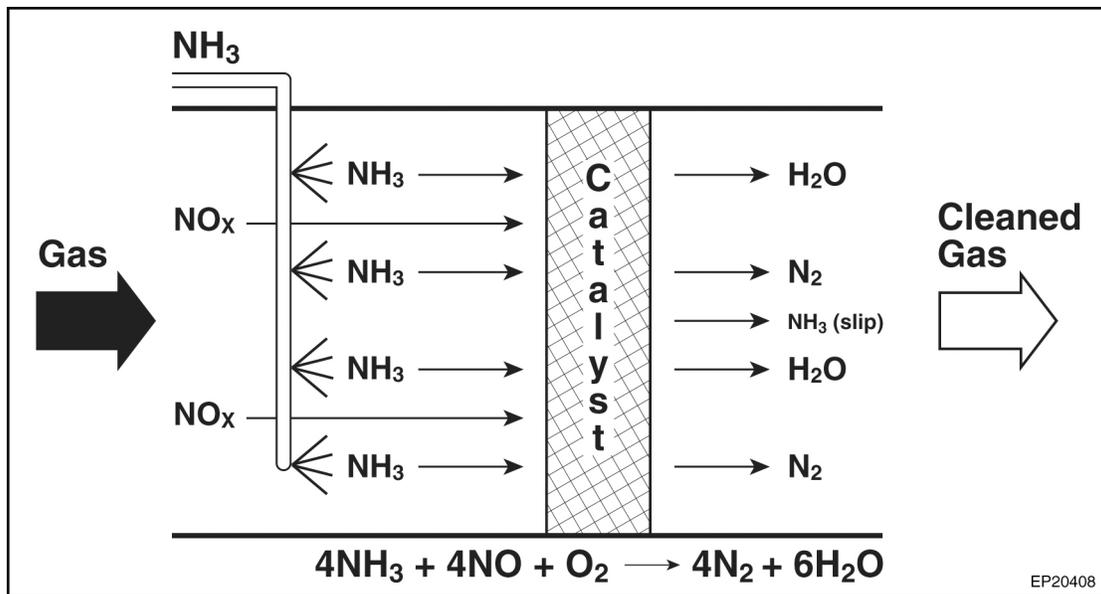


FIGURE 2.2-15 Schematic of Typical SCR System

Both the LRPC and TDM power plants would use wet cooling systems. The wet cooling system would consist of a surface condenser and a cooling tower. Figure 2.2-16 is a schematic of a wet cooling system. Because water used to produce steam in the steam turbine is demineralized and free of scale-forming material, it is in an open circulating system and reused in the steam turbine. Exhaust steam from the steam turbine is condensed by water circulating in the surface condenser. Demineralized makeup water is introduced to the steam cycle to replenish water lost as heat recovery steam generator blowdown and miscellaneous water and steam losses. The water in the surface condenser is then cooled by air flowing through the cooling tower(s) and the water is recirculated. Water is lost by evaporation in the cooling tower and must be replenished with “makeup water.” Cooling towers are characterized by the means by which air is moved. Mechanical-draft cooling towers rely on power-driven fans to draw or force the air through the tower. Natural-draft cooling towers proposed for the Sempra and Intergen plants use the buoyancy of the exhaust air rising in a tall chimney to provide the draft. A fan-assisted natural-draft cooling tower employs mechanical draft to augment the buoyancy effect. To reduce the demand for cooling water, power plants could be equipped with either a dry cooling system or a wet-dry cooling system; these are described in Section 2.3.1.

Water (both cooling and steam cycle) for both power plants would come from the Zaragoza Oxidation Lagoons located west of Mexicali (Figure 2.2-17). The primary source of water entering the lagoons is municipal sewage. Minor sources include storm water runoff and industrial discharge water (both process and sewage). The Zaragoza facility receives and treats approximately 33,200 acre-ft/yr of sewage water (an acre-foot [ac-ft] of water is the volume of

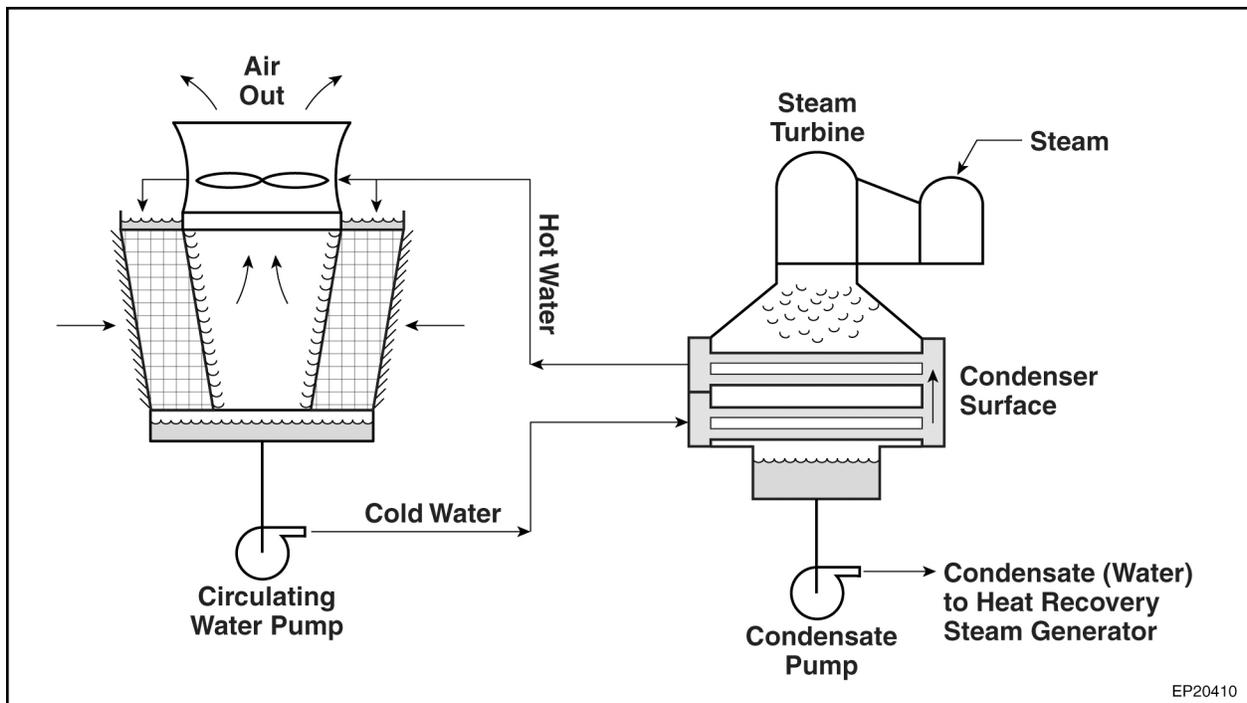


FIGURE 2.2-16 Wet Cooling Technology (Source: adapted from CEC 2001)

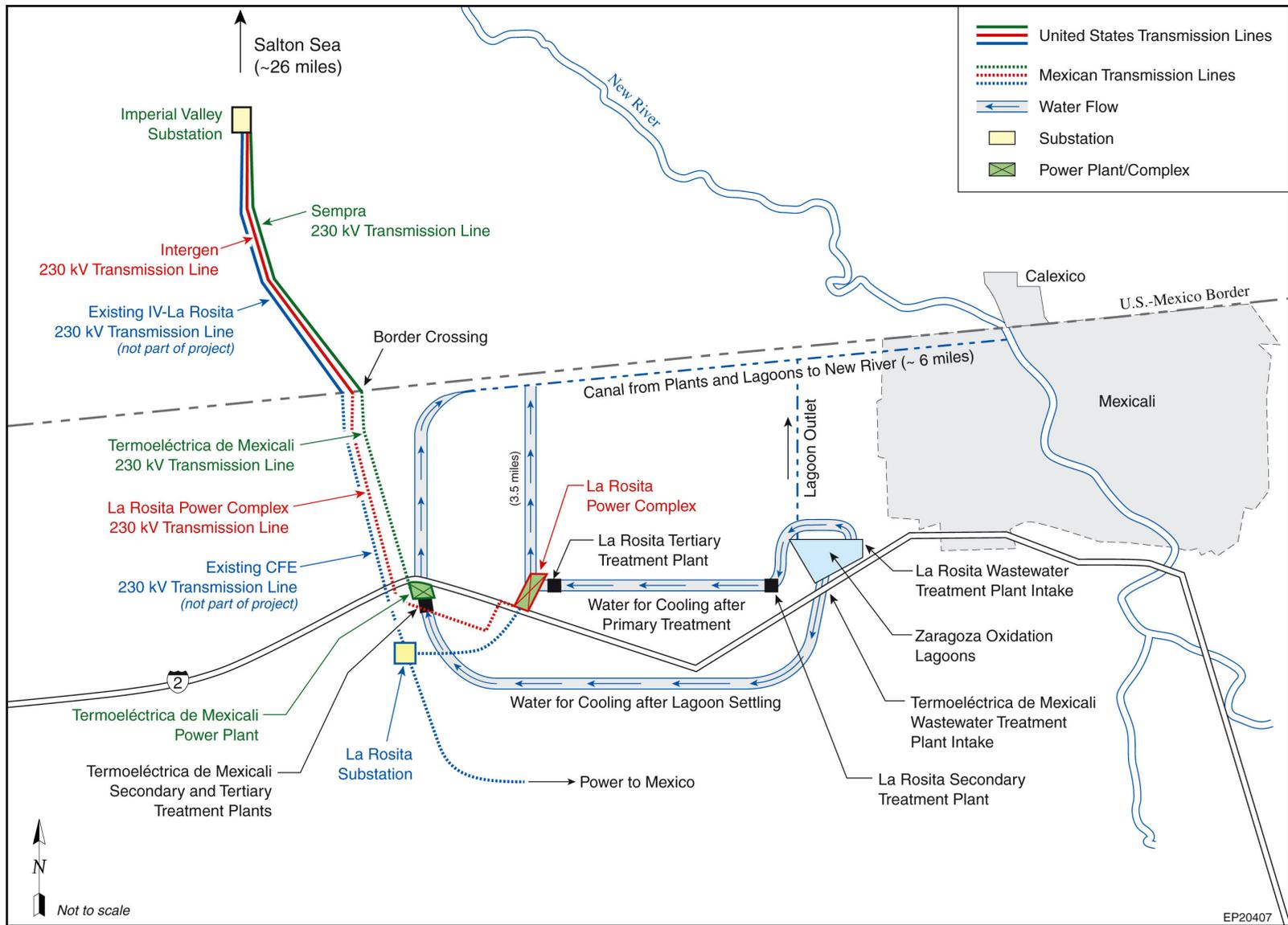


FIGURE 2.2-17 Water Supply Cycle for LRPC and TDM Power Plants

water that covers 1 acre [43,560 ft] to a depth of 1 ft [0.30 m]). The sewage water is processed at the Zaragoza facility in up to 13 lagoons or settling ponds. It is a primary treatment process, in which solids are settled out before the water is discharged into the New River through drainage channels managed by the Comisión Nacional del Agua.

Water Treatment for LRPC. The LRPC would contract with the local Mexican municipal water authority, Comisión Estatal de Servicios Públicos de Mexicali (CESPM), to provide untreated, municipal wastewater. Raw sewage water would be obtained at the inlet of the Zaragoza lagoons and piped to a sewage treatment plant adjacent to the lagoons that would treat the water for use at the LRPC. Consequently, the water input to the sewage treatment plant would have undergone little, if any, settling action from the lagoons. The adjacent sewage treatment plant would treat the raw sewage via screening, degritting, degreasing, biological treatment via an extended aeration-activated sludge process (known as Orbal aeration, a process developed by U.S. Filter), nitrification-denitrification, final clarification, and chlorine disinfection. The sludge would be dewatered and disposed of as nonhazardous waste. The treated water would be pumped and piped approximately 5.2 mi (8.3 km) to the LRPC. Because it is critical to meet the water demands of the LRPC, the sewage treatment plant is expected to operate at flow rates somewhat higher than the demands of the power plants. Excess treated water (up to 1 ft³/s) would be discharged to a channel adjacent to the sewage treatment plant. This stream eventually combines with the Zaragoza lagoon effluent.

Next to the LRPC, a tertiary water treatment system would be constructed to further treat the water to reduce phosphates, dissolved organic matter, and heavy metals. The water would also be lime-softened and then stored in tanks for use at the power plant. Sludge from lime softening would be dewatered and disposed of in an off-site landfill as nonhazardous waste.

Treated and untreated wastewater streams collected from power plant operations would be collected in a sump and would then be discharged to the drainage channel. In the LRPC cooling towers, water is used up to five cooling cycles before it is discharged.

Water Treatment for TDM. The TDM power plant would obtain water from the Zaragoza lagoons after the water was treated in the primary settling ponds. The TDM sewage treatment plant would use a biological treatment process to first oxidize organic matter and NH₃ in an aerobic step (in the presence of air following aeration), and then remove nitrates formed by NH₃ oxidation by bacterial action under anaerobic conditions (in the absence of air) in a second step, incorporating an activated sludge process with nitrification-denitrification. This treatment process eliminates biological contaminants and reduces other contaminants in the water. After biological treatment, water would be clarified by the addition of lime to raise the pH to cause the precipitation of dissolved minerals such as calcium and magnesium. The clarified water would then be adjusted to neutral pH with the addition of sulfuric acid and disinfected through the addition of chlorine. The precipitated sludge settles out, thickens, and finally dehydrates on a belt press to produce a solid, nonhazardous waste, which would be hauled to a landfill in Mexico. The water so treated would be suitable for use as cooling water, the major use of water at the power plant. It would replace water lost to evaporation from the cooling towers.

A portion of this water would be further treated to high purity for use in the closed steam cycle portion of the plant. This treatment would be accomplished through coagulation of suspended solids using ferric chloride, filtering through sand and cartridge filters, and passage through a reverse osmosis system, which employs a semipermeable membrane to remove the smallest particles and much of the remaining dissolved matter. The water would be finally treated in a demineralizer to remove the remaining dissolved matter. This water would provide makeup water in the steam cycle as well as potable water for the plant.

Three main waste streams would be piped into the waste sump during normal power plant operation. Waste streams would mix before being discharged untreated into a drainage channel that would eventually lead to the New River. The first stream would be the wastewater from the cooling tower. The cooling tower bank would consist of 12 units, and the water would be used for up to six cycles before it was discharged. The second stream would be wastewater from the demineralization process. The third stream would be water discharged from the steam cycle.

At times when the TDM power plant is not producing energy under normal conditions, the sewage treatment plant would operate in the bypass mode; that is, water from the Zaragoza Oxidation Lagoons would be treated in the biological treatment portion of the sewage treatment plant and then be discharged into the drainage channels. This would be necessary because the biological treatment part of the sewage treatment plant must operate at all times to maintain the microorganisms in the biological reactor. If the microorganisms would die, the sewage treatment plant would require 4 to 6 weeks to restart operations.

2.3 ALTERNATIVE TECHNOLOGIES

Under this alternative, DOE and BLM would grant one or both Presidential permits and corresponding ROWs to applicants who would build transmission lines that connect to power plants that would employ more efficient emissions controls and alternative cooling technologies.

The alternative cooling technologies considered under this alternative are dry cooling and wet-dry cooling. Under the proposed action alternative, both power plants would use SCR technology to reduce NO_x emissions. Only one power plant would use oxidizing catalysts to reduce CO emissions. Thus, this alternative includes operation of two power plants utilizing SCR and oxidizing catalyst technologies on all turbines.

2.3.1 Cooling Technologies

This section provides a general description of the dry and wet-dry cooling technologies that will be analyzed in this EIS as alternative technologies.

2.3.1.1 Dry Cooling

There are two types of dry cooling systems: direct dry cooling and the lesser-used indirect dry cooling. In both systems, fans blow air over a radiator system to remove heat from the system via convective heat transfer (rather than using water for cooling or evaporative heat transfer). In the direct dry cooling system, also known as an air-cooled condenser system, steam from the steam turbine exhausts directly to a manifold radiator system that releases heat to the atmosphere, condensing the steam inside the radiator. Figure 2.3-1 is a schematic of a direct dry cooling system.

Indirect dry cooling uses a secondary working fluid (in a closed cycle with no fluid loss) to help remove the heat from the steam. The secondary working fluid extracts heat from the surface condenser and flows to a radiator system that is dry cooled (fans blow air through the radiator to remove heat from the working fluid). An indirect dry cooling system is more complex and less efficient than a direct dry cooling system; for this reason it is also less common. An indirect dry cooling system also produces no environmental advantages over a direct dry cooling system. For these reasons, this EIS only considers a direct dry-cooling system.

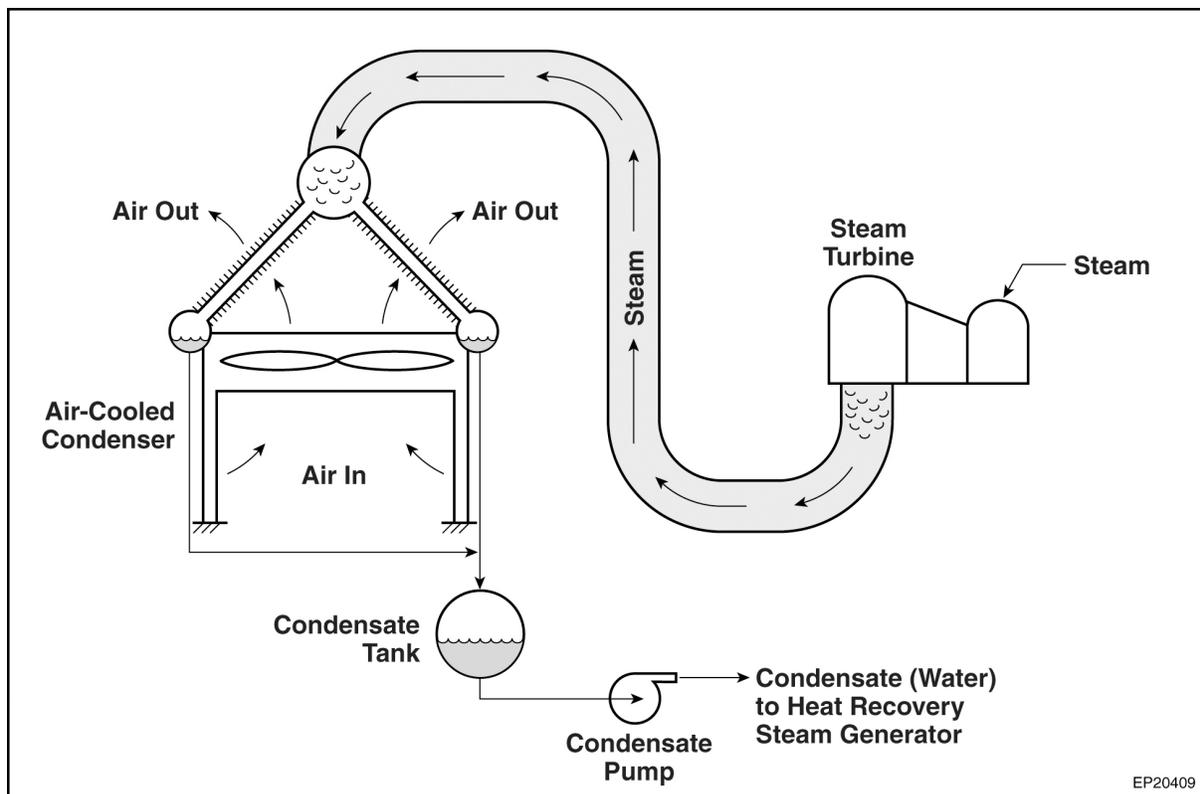


FIGURE 2.3-1 Dry Cooling Technology (Source: adapted from CEC 2001)

Advantages of dry cooling, relative to wet cooling, may include the following:

- Significant decrease in water required for dry cooling compared with wet cooling. Typically, dry cooling systems use 90 to 95% less water than power plants with wet cooling systems.
- Minimal use of water treatment chemicals, since air is used in the air-cooled condenser and not water like in the wet cooling tower.
- Minimal generation of liquid and solid wastes, since water impurities requiring disposal are not generated in the air-cooled condenser as they are in a wet evaporative cooling tower.
- No visible water vapor plume, which is present with wet cooling technology during certain meteorological conditions.
- Lower water consumption, that is, 90 to 95% less water would be purchased and treated.

The following disadvantages may be associated with dry cooling:

- Air-cooled condensers can have a negative visual effect because they are often taller than wet cooling towers.
- Decreased efficiency in hot weather compared with wet evaporative cooling.
- Disturbance of a larger land area for the air-cooled condensers than is required for wet cooling towers.
- Greater noise impacts than wet cooling systems because of the greater number of fans and the considerably greater total airflow rate. However, new quieter fans and other mitigation measures are available to reduce these impacts.
- A 10 to 15% reduction in power plant steam-cycle efficiency and output, depending on site conditions and seasonal variations in ambient conditions. Also, extra power is needed to operate the cooling fans.
- Increased capital and operating and maintenance costs for building a dry cooling system compared with a wet cooling system.

2.3.1.2 Wet-Dry Cooling

Wet-dry cooling systems combine wet and dry cooling technologies (Figure 2.3-2). A wide range of system designs is possible, covering the entire spectrum of wet versus dry cooling

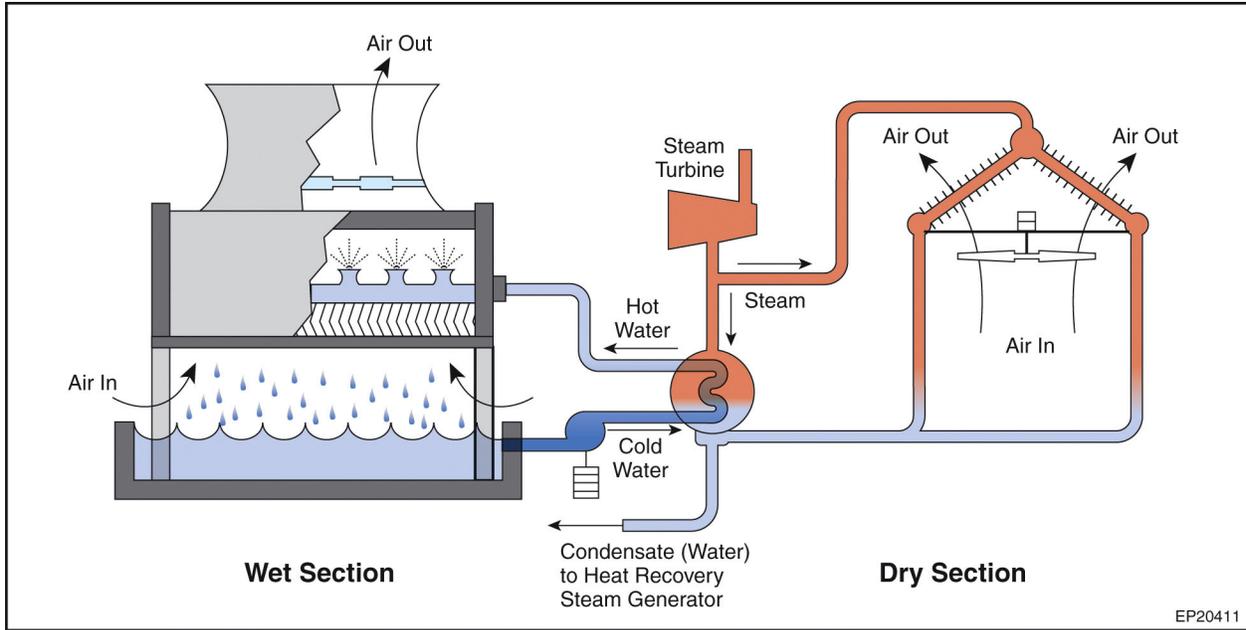


FIGURE 2.3-2 Wet-Dry Cooling Technology (Source: adapted from Institute of Clean Air Companies 1997)

components depending on plant needs. A typical wet-dry cooling system would utilize both an air-cooled condenser and a wet evaporative cooling tower within the same cooling system. A typical wet-dry cooling system would achieve a ratio of wet-to-dry cooling on the order of 50%. Ratios can vary, however, on the basis of ambient air temperatures and humidity. A wet-dry system is sometimes called a “water conservation design,” or a “parallel condensing cooling system.” Wet cooling would be used during hot weather, while dry cooling would be used most other times.

Application of a wet-dry cooling system allows tailoring the use of either the wet or dry system on the basis of climatic conditions. However, use of such a system entails increased capital and maintenance costs compared with either wet or dry cooling systems, since two systems are needed.

2.3.2 Air Emissions Control Technologies

This alternative includes operation of two power plants equipped with SCR and the use of oxidizing catalyts on all gas turbines.

The following is a description of a generic CO control system. CO is emitted when natural gas is not combusted completely. CO emissions in power plants are often controlled with an oxidizing catalyst. A honeycomb-like structure containing the catalyst is placed in the flue gas ductwork. The catalyst is made of precious metals, such as platinum and palladium, which act to promote a chemical reaction to transform CO to carbon dioxide (CO₂). This system can also

reduce other hydrocarbons caused by incomplete combustion. These hydrocarbons combine with oxygen to form water and CO₂. For effective reduction of CO and hydrocarbons, the flue gas must be lean (i.e., have excess oxygen) to promote the reactions.

2.4 MITIGATION MEASURES

Under this alternative, DOE and BLM grant one or both Presidential permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigative measures to minimize environmental impacts in the United States. The mitigation measures addressed under this alternative pertain only to offsets of air emissions from power plant operation. DOE contacted the Imperial County Air Pollution Control Office and the Border Power Plant Working Group to obtain suggestions for off-site mitigation measures that could be evaluated under this alternative (Russell 2004; Pioriez 2004a,b,c; Pentecost and Picel 2004; Powers 2004). Additional mitigation measures to replace water reductions were not analyzed because all available water in California is committed to other uses (Colorado River Board of California 2000). Also, the Imperial Irrigation District (IID), the state agency that is presently addressing water use issues in the Salton Sea Watershed, currently has a monitoring and mitigation program to respond to such issues.

For air quality, the mitigation measures can be evaluated on a per-unit or individual project basis. The evaluation of impacts includes examples of reductions in PM₁₀ and NO_x emissions that could occur as a result of updating engines in agricultural and transportation equipment and use of more efficient, newer automobiles. These examples could be assembled into a program that would mitigate impacts from emissions from the developers' power plants. The EIS evaluates possible elements of such a program, but does not specify combinations of elements.

The following mitigation measures identified by the Imperial County Air Pollution Control Office are also considered under this alternative. None of the measures, individually or collectively, would be able to offset the total quantities of PM₁₀ or gaseous emissions produced by the power plants. However, implementation of one or more of these measures would serve to improve air quality in Imperial County. Later sections describe potential offsets in the Mexicali region.

- **Paving of Roads:** The Imperial County Public Works Director provided the Imperial County Air Pollution Control Office with a list of about 50 road segments totaling 22 mi (37 km) that could be paved to reduce fugitive dust emissions.
- **Retrofitting of Emission Controls on IID Power Plants:** The Imperial County Air Pollution Control Office suggested that SCR installation on IID steam plant Unit 3 and the peaker plants would reduce NO_x emissions in the project area.

- **Enhance the Use of Compressed Natural Gas in Motorized Vehicles:** Four projects were identified as follows: (1) provide funding to maintain the El Centro Compressed Natural Gas refueling facility located at Commercial and Fairfield Streets; (2) provide funding for a compressed natural gas fast-fill facility to be constructed at the Calexico Unified School District; (3) acquire land in Brawley, California, for construction of a compressed natural gas facility; and (4) replace or update engines for the current fleet of ten 40-ft-long (12-m-long) Imperial Valley transit buses and 5 smaller buses.
- **Controlling Imperial Airport Dust:** Fugitive dust from natural windstorms and from aircraft (particularly from helicopter landings) occurs frequently at the airport.
- **Retrofitting of Diesel Engines for Off-Road Heavy-Duty Vehicles:** Diesel engines of off-road vehicle equipment used in agriculture, earthmoving, or construction would be updated to reduce particulate and gaseous emissions.

Several other mitigation measures could be implemented in the Mexicali region that could serve to improve regional air quality. These include a program to replace older automobiles and buses in the Mexicali area with a newer, less polluting, fleet; reduction of fugitive dust through road paving; and reduction of emissions from brick kilns by converting the fuel used in firing the kilns to natural gas.

2.5 COMPARISON OF ALTERNATIVES

A comparison of the impacts resulting from each of the four alternatives is provided in Table 2.5-1. The impacts are summarized by resource area (e.g., water resources) and its corresponding section number in this report.

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
<p>Water Resources (4.2)</p>	<p><i>Transmission Lines</i> Under the no action alternative no transmission lines would be built and thus there would be no impacts.</p> <p><i>Water Consumption</i> The LRPC unit would consume up to 4,940 ac-ft/yr of water taken from the Zaragoza Oxidation Lagoons in Mexicali.</p> <p><i>Flow Reduction</i> The flow of the New River would be reduced by less than 4% (15.7% of the standard deviation for the flow at the Calexico gage).</p> <p><i>New River</i> The TDS concentration would be increased by less than 3.7% (31% of the standard deviation). TSS, BOD, COD, and phosphorus loads in the New River would be reduced.</p>	<p><i>Transmission Lines</i> Construction of two transmission lines along the proposed routes or alternative routes would have minimal impacts on surface waters. A maximum of two lattice towers for each line would be placed on the 100-yr floodplain for the Pinto Wash. This placement would have minimal impacts on floodplain function or values. Impacts to groundwater would be prevented during construction.</p> <p><i>Water Consumption</i> The LRPC and TDM power plants would consume 10,667 ac-ft/yr of water for cooling purposes. The water would be taken from the Zaragoza Oxidation Lagoons in Mexicali. (The LRPC power plant alone would consume 7,170 ac-ft/yr. The TDM power plant alone would consume 3,497 ac-ft/yr.)</p> <p><i>New River</i> Power plant operations would directly impact the New River by reducing the flow of water received from the Zaragoza Oxidation Lagoons and by modifying its quality. As a result, the average annual flow of the New River would be decreased by about 5.9% at the U.S.-Mexico border (Calexico gage). Decreases in flow would result in a decrease in average annual water depth of about 0.13 ft (3.9 cm) at the Calexico gage and 0.7 ft (2.1 cm) at the Westmorland gage near the Salton Sea. TDS concentrations would increase by 5.6%, or about 46% of its variability in the river at the Calexico gage, TDS, TSS, BOD, COD, phosphorus, and selenium loads would be reduced as a result of water treatment at the plants.</p>	<p><i>Dry Cooling</i> The plants would use about 5% of the water needed for wet cooling under the proposed action. BOD, TSS, and phosphorus and selenium concentrations in the New River would be essentially unchanged. COD would slightly decrease. Indirect impacts to the Salton Sea would be minimal.</p> <p><i>Wet-Dry Cooling</i> Impacts would be greater than those for dry cooling but less than those for wet cooling only, as described for the proposed action.</p> <p>Impacts to the New River, Salton Sea, Brawley Wetlands, and groundwater would be less than those for the no action and proposed action alternatives and would be proportional to the amount of wet-cooling used.</p>	<p>Impacts would be the same as for the proposed action. Measures to reduce air quality impacts could result in beneficial impacts to water resources over the long term, since surface runoff from unpaved surfaces would be reduced.</p>

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
<p>Water Resources (4.2) (Cont.)</p>	<p><i>Salton Sea</i> The Salton Sea inflow would be reduced by 0.4%, or 6.3% of the standard deviation of total inflow. Salinity would increase by less than 0.17 mg/L/yr.</p> <p><i>Brawley Wetland</i> New River flow reductions would not interfere with withdrawal of water for wetland. Increases in TDS would not cause adverse impacts to the system.</p> <p><i>Groundwater</i> The flow reduction of 4% at the Calexico gage would have minimal effect on groundwater recharge to the Imperial Valley Groundwater Basin, from the New River.</p>	<p><i>Salton Sea</i> New River inflow to the Salton Sea would decrease, thus reducing its volume, lowering its elevation, and decreasing its surface area. The decrease in inflow of 10,667 ac-ft/yr would result in a elevation decrease of about 0.05 ft (0.6 cm), about 10% of the Sea's natural variability. Surface area would decrease by about 97 acres (39 ha), which is about 0.04% of its initial surface area and about 9% of its natural variability. Decreased water inflow would increase the TDS concentration (salinity) by 0.19 mg/L/yr. This rate of increase would cause the Salton Sea to reach a threshold of 60,000 mg/L only about 4 days earlier out of 36 years than it would with no plants operating. Phosphorus loads would be reduced by about 5.3%. Selenium loads would be reduced by about 38 lb/yr, or about 0.2% of the dissolved mass in the sea.</p> <p><i>Brawley Wetland</i> New River flow reductions would not interfere with withdrawal of water for wetland. Increases in TDS would not cause adverse impacts to the system. Changes in other parameters (i.e., BOD, COD, and pathogens) could have beneficial impacts. All changes would fall within the range of the parameter's variability.</p> <p><i>Groundwater</i> Indirect impacts to groundwater would occur as a result of decreasing flow in the New River since it is a recharge source for groundwater in the Imperial Valley Groundwater Basin. Impacts to the basin would be minimal because the New River is only one of many recharge sources, and the reduction in its flow is expected to be low.</p>		

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Air Quality (4.3)	<p><i>Primary Emissions</i> Plant emissions would be somewhat greater for no action than for the proposed action for CO and NO_x because of the inclusion of the Mexico units at LRPC. However, emissions would still result in impacts in the United States below EPA SLs for all pollutants. Carbon dioxide (CO₂) emissions would be about 3.9 million tons/yr, or about 0.066% of total U.S. CO₂ emissions.</p> <p><i>Secondary Air Pollutants</i> Increases or decreases of ambient ozone concentrations resulting from plant emissions of NO_x and volatile organic compounds (VOC) would be minor. Secondary PM₁₀ (particulate matter with a mean aerodynamic diameter of 10 μm or less) production from plant emissions would also be minor and be similar to that under the proposed action.</p> <p><i>Fugitive Dust</i> There would be no fugitive dust emissions from construction as transmission lines would not be built.</p>	<p><i>Primary Emissions</i> The impacts from operation of export turbines at the TDM and LRPC power plants are considered as effects of the transmission line projects. Plant emissions of PM₁₀, nitrogen oxides (NO_x), carbon monoxide (CO), and ammonia (NH₃) all would result in increases in air concentrations that are below EPA SLs used here as thresholds of significant deterioration of air quality. CO₂ emissions would be about 5.1 million tons/yr, or about 0.088% of total U.S. CO₂ emissions.</p> <p><i>Secondary Air Pollutants</i> Characterization of the air chemistry in the region suggests that plant emissions of NO_x and VOC could result in slight (less than 3 ppb) increases or decreases in the concentration of ambient ozone levels. Secondary production of PM₁₀ in the atmosphere resulting from plant emissions of NH₃ and NO_x is expected to be no more than 1 μg/m³. The SL for PM₁₀ is not expected to be exceeded with the addition of secondary PM₁₀.</p> <p><i>Fugitive Dust Emissions</i> Temporary emissions from transmission line construction would include those from fugitive dust, PM₁₀ (construction, vehicular traffic, and helicopter operations), and fuel combustion. Construction-related PM₁₀ emissions over the construction period would be about 11.4 tons (10.3 t) for the proposed routes, 14.4 tons (13.1 t) for the western alternative routes, and 12.3 tons (11.2 t) for the eastern alternative routes.</p> <p>The emission rate of fugitive dust (PM₁₀) from exposed shoreline resulting from the reduction in the surface area of the Salton Sea would be at most 100 tons/yr (91 t/yr).</p>	<p><i>Emission Controls</i> CO emissions would be up to 80% less than those under the proposed action. HAPs emissions are assumed to be reduced by 50%. Emissions of other pollutants would be as for the proposed action.</p> <p>Secondary O₃ and PM₁₀ impacts would be the same as those for the proposed action.</p> <p><i>Dry cooling or wet-dry cooling</i> Plant emissions of PM₁₀ would be reduced without wet-cooling tower use. Other emissions would increase 10–15% as a result of reductions in plant efficiency.</p> <p><i>Fugitive Dust Emissions</i> Emissions from transmission line construction would be the same as for the proposed action.</p>	<p><i>Primary Emissions</i> Plant emissions would be the same as for the proposed action. Impacts of plant emissions on air quality would be offset by reductions in emissions of the same pollutants from other sources in the air basin.</p> <p><i>Secondary Air Pollutants</i> Secondary O₃ and PM₁₀ impacts from plant emissions could be reduced as compared to those for the proposed action with the use of emission offsets.</p> <p><i>Fugitive Dust Emissions</i> In addition to emissions from transmission line construction, mitigation activities such as road paving could produce temporary fugitive dust emissions but long term improvement.</p>

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
<p>Biological Resources (4.4)</p>	<p><i>Transmission Lines</i> No additional impacts to desert habitat or wildlife are expected since no transmission lines would be built.</p> <p><i>New River</i> Impacts to biological resources would occur from changes in water quality and volume in the New River, due to power plant operation.</p> <p>Impacts to aquatic organisms would be in proportion to the water resource impacts under the proposed alternative in accordance with relative water consumption.</p> <p><i>Wetlands</i> No impacts would occur to wetlands because the transmission lines would not be built. The Brawley Wetland would not be adversely impacted by a decrease in New River water depth or an increase in salinity.</p>	<p><i>Transmission Lines</i> Permanent impacts to Sonoran creosote bush scrub and desert wash habitat would occur during construction of the transmission lines. Construction may adversely impact small mammals and reptiles with low mobility during construction. No Federal-listed threatened or endangered species would be impacted by the proposed action; however, some sensitive plant species could be disturbed. Protective measures would be taken to minimize impacts to the flat-tailed horned lizard, the western burrowing owl, and other sensitive species.</p> <p><i>New River</i> Water quality changes would have a minor adverse impact on fish and aquatic invertebrates. Riparian vegetation would not be impacted by a decrease in water depth or an increase in salinity.</p> <p><i>Wetlands</i> No wetlands would be impacted by transmission line construction and operation. Desert wash areas [about 0.2 ac (0.08 ha)] could be adversely impacted. Brawley Wetland would not be adversely impacted by a decrease in New River water depth or an increase in salinity.</p>	<p><i>Transmission Lines</i> The effects on desert habitat would be the same as those for the proposed action.</p> <p><i>New River</i> The use of alternative cooling technologies at the power plants would reduce the adverse impacts associated with slight water depth and water quality changes to the New River and Salton Sea (though all these impacts would be small).</p> <p><i>Wetlands</i> Impacts would be less to the Brawley wetland than under the proposed action for dry cooling or wet-dry cooling systems.</p>	<p><i>Transmission Lines</i> Impacts would be the same as under proposed action.</p> <p><i>New River</i> Impacts would be the same as for proposed action.</p> <p><i>Wetlands</i> Impacts would be the same as for proposed action.</p> <p><i>Salton Sea</i> Impacts would be the same as for proposed action.</p> <p><i>Mitigation Measures</i> <i>Impacts</i> Prior to implementation an evaluation of potential impacts to special status species would be conducted.</p>

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
<p>Biological Resources (4.4) (Cont.)</p> <p><i>Applicants' Proposed Routes:</i></p> <p><i>Western Alternative Routes:</i></p> <p><i>Eastern Alternative Routes:</i></p>	<p><i>Salton Sea</i> No additional impacts to aquatic invertebrates and fish.</p>	<p><i>Salton Sea</i> Reduction in New River inflow would increase salinity (e.g., increase of 0.19 mg/L/yr) and could cause small adverse impacts to biological resources. A decrease in phosphorus load could reduce eutrophication, resulting in fewer episodic fish kills and improving the food base for some bird species. Impacts to habitat for waterfowl and wading birds would be small.</p> <p>Permanent impact to 3.1 acre (1.3 ha) of Sonoran creosote bush scrub and 0.3 acre (0.1 ha) of desert wash habitat.</p> <p>Permanent impacts would be about 30% greater due to greater length relative to the proposed routes.</p> <p>Permanent impacts would be about 8% greater due to greater length relative to the proposed routes.</p>	<p><i>Salton Sea</i> The use of alternative cooling technologies at the power plants would reduce the adverse impacts associated with slight water depth and water quality changes to the New River and Salton Sea (though all these impacts would be small).</p>	
<p>Cultural Resources (4.5)</p> <p><i>Applicants' Proposed Routes:</i></p>	No additional impacts expected.	<p>Cultural resources would be impacted by the construction and operation of the transmissions lines. Impacts to cultural resources would be mitigated.</p> <p>Construction of the transmission lines in the proposed routes would impact four archaeological sites. Adverse impacts from transmission line construction to these archaeological sites would be mitigated in consultation with the California SHPO.</p>	Impacts would be the same as those identified for the proposed action.	Any measures involving road paving or construction may require evaluation for NRHP eligibility status and protection in consultation with California SHPO to mitigate impacts.

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Transportation (4.7)	No additional impacts expected.	Traffic in the projects area would increase during the transmission line construction period. Given the current levels of service on State Route 98 and low traffic volumes associated with projects, no impacts on existing levels of service are expected for the proposed or alternative routes.	Impacts would be same as those under the proposed action.	Impacts would depend on mitigation measures. In the short-term, adverse impacts could result from increased local traffic.
Visual Resources (4.8)	No additional impacts expected.	Construction and operation of the transmission lines would not alter the Class III Visual Resource Management rating for the project area. Transmission lines would not be a prominent addition to the existing landscape. Location of the lines in the Eastern routes would be closer to the nearest residence and a larger aspect of the landscape than in the other routes.	Impacts would be the same as those under the proposed action.	Impacts would depend on mitigation measure used (e.g., a compressed natural gas station would not cause a visual contrast, since its height would be similar to that of a gasoline service station).
Noise Impacts (4.9)	No additional impacts expected.	No adverse impacts are expected during transmission line construction or operation. Noise levels would be below EPA guideline values for the proposed and western alternative routes. For the eastern alternative routes, construction noise would be above EPA guidelines, but only for a short period of time (8-hr daytime shift, less than 1 week).	Impacts would be the same as those under the proposed action.	Impacts would depend on mitigation measures (e.g., paving roads would cause short-term adverse noise impacts due to equipment use near residential areas, but retiring old automobiles would have a beneficial impact).
Socioeconomics (4.10)	No additional impacts expected.	Temporary, small beneficial impacts on the local economy would occur during construction of the transmission lines as a result of wage expenditures and material procurement. Local tax revenues and lease payments to the Federal government from the proposed action are expected be minimal.	Impacts would be the same as those under the proposed action.	Impacts would depend on the mitigation measure (e.g., wage and salary spending and material procurement to implement a measure would have a beneficial impact to the local economy).

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Human Health Impacts (4.11)	No additional impacts from EMF would occur since the transmission lines would not be constructed. Impacts due to plant emissions would be minimal since they would be below EPA SLs. Secondary production of ozone and PM ₁₀ from plant emissions of precursors (NO _x , NH ₃ , and VOCs) would pose minimal health impacts.	<p>No health impacts to residents, workers, or recreationalists due to EMF exposure would be expected from the proposed action. Emissions of NO_x, CO, and PM₁₀ would result in air concentration increases to levels that would be below EPA SLs and therefore unlikely to adversely impact the health of residents in the air basin. Secondary production of ozone and PM₁₀ from plant emissions of precursors (NO_x, NH₃, and VOCs) would pose minimal health impacts.</p> <p>Estimated incremental (above no action) cancer risks from exposure to HAPs are below the one per million significance threshold. Noncancer risks for HAPs and NH₃ are below the significance threshold for both acute and chronic exposure.</p>	<p>EMF impacts would be as for the proposed action. Emission controls (oxidizing catalysts) would reduce CO and HAPs emissions relative to the proposed action. Only minimal benefits to residents of the air basin would be expected.</p> <p>The use of alternative cooling technologies at the power plants would increase air emissions up to 15%, but health impacts would be minimal.</p>	<p>EMF impacts would be as for the proposed action. Mitigation measures would result in beneficial impacts by improving the air quality in the region.</p> <p>Road paving would produce long-term reductions in PM₁₀ emissions. Fuel conversions would produce short- and long-term reductions in NO_x, CO, and VOC emissions.</p>

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Environmental Justice	No additional impacts expected.	<p>Temporary impacts from noise and dust emissions and the more long-term impacts from noise and EMF in the vicinity of the transmission lines would not contribute to high and adverse impacts on the general population or to disproportionately high and adverse impacts on minority and low-income populations in any block group.</p> <p>Increases in air pollution due to emissions of PM_{2.5} and PM₁₀ were found to be below new source significance levels used as a benchmark for negligible impacts; therefore, these emissions would not contribute to high and adverse impacts on the general population or to disproportionately high and adverse impacts on minority and low-income populations in any block group.</p> <p>Adverse impacts to biological resources as a result of increases in Salton Sea salinity could result in minor impacts on the general population that fishes recreationally at the Sea. These impacts attributable to the proposed action would not be disproportionately high and adverse for any populations that might rely on the Sea for subsistence fishing, because the same minor effects on biological resources are estimated as under no action.</p>	Installation of dry cooling or wet-dry cooling systems at the power plants would not contribute to impacts.	Mitigation measures to compensate for power plant emissions would have a beneficial impact on low-income and minority populations by improving air quality in the region. (Because of uncertainties related to the location of mitigation measures, an impact assessment at the census-block level was not conducted.)

a Abbreviations: BOD = biochemical oxygen demand; CO = carbon monoxide; COD = chemical oxygen demand; EMF = electric and magnetic fields; EPA = U.S. Environmental Protection Agency; HAPs = hazardous air pollutants; LRPC = La Rosita Power Complex; metric ton = 2,206 lb; NH₃ = ammonia; NO_x = nitrogen oxides; NRHP = National Register of Historic Places; O₃ = ozone; PM_{2.5} = particulate matter less than 2.5 micrometers in diameter; PM₁₀ = particulate matter less than 10 micrometers in diameter; ROW = right-of-way; SHPO = State Historic Preservation Office; SL = significance level; TDS = total dissolved solids; TSS = total suspended solids; VOC = volatile organic compound(s).

