

## 2 Current Operations of Navajo Mine, FCPP, and Transmission Lines

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This EIS analyzes the environmental effects of both new mining and construction at the Navajo Mine and FCPP, as well as continuing operations of the Navajo Mine, FCPP, and transmission lines. Since many of the environmental effects of the Project analyzed in this EIS are attributed to the continued operation of existing facilities, this Section describes those continuing operations to a level of detail that supports the environmental analysis.

This section also describes two Federal Actions that were completed prior to the Draft EIS: OSMRE's approval of a SMCRA permit transfer associated with the sale of the Navajo Mine to NTEC, and EPA's issuance of a FIP for the installation of BART at the FCPP. OSMRE's approval of a SMCRA permit transfer has already been subject to NEPA and EPA's issuance of a FIP is exempt from NEPA; therefore, neither Federal Action is considered as part of the Proposed Action of this EIS. However, the consequences of these two decisions on the environmental effects of continuing operations are considered in this EIS. Since these two Federal Actions are considered part of continuing operations, they are described in this section. The period during which these actions will occur is called the Interim Period (2014 to 2018) in this EIS.

Section 3 describes the Proposed Action and alternatives. The description of continuing operations provided in this section is referenced in the descriptions in Section 3, where applicable.

### 2.1 Navajo Mine Operations

The Navajo Mine lease was granted in July 1957 to BNCC's predecessor, Utah Construction and Mining Company. It is subdivided into six administrative resource areas known as Areas I, II, III, IV North, IV South, and V. There is no fixed lease term applicable to the Navajo Mine lease. The duration of the lease is contingent upon the continuation of mining activity and the completion of final reclamation activities. The current operations within the Navajo Mine Lease Area are conducted within an existing SMCRA Permit Area (NM-0003F) that includes Areas I, II, III, and portions of Area IV North (Figure 2-1). This area of current operations is known as the Navajo Mine SMCRA Permit Area. The proposed Pinabete Permit Area includes portions of Area IV North and Area IV South (see Section 3). The history and current status of each resource area is summarized in Table 2-1.

**Table 2-1 Summary of Resource Areas**

Resource Area	Total Area (acres)	Disturbed / Reclaimed Area (acres) <sup>1</sup>	Mining Period	Comment
I	4,558	4,078/3,614	1960s–1970s	All pits inactive and reclaimed.
II	6,196	5,179/2,917	1970s–present	Portions of Hosteen and Yazzie pits kept as contingency reserves, will be mined prior to final reclamation in 2017.
III	5,003	3,730/1,434	1980s–present	Lowe and Dixon pits still active. Mining will continue in Dixon pit until approximately 2018 depending upon customer needs.
IV North	4,760	366/0	2012–present	Approximately 366 acres mined.
IV South	6,075			Not currently permitted, no mining has occurred.
V	7,024			Not currently permitted, no mining has occurred.

Notes:

OSMRE has approved an application to change the rate of contemporaneous reclamation under the existing Navajo Mine SMCRA Permit as a result of reduced coal demand from the shutdown of FCPP Units 1, 2, and 3.

<sup>1</sup> Acreage represent mining and disturbance land status as of July 2011.

**2.1.1 Workforce**

MMCo employs approximately 526 people at the mine site and Farmington office. The workforce is composed of the employment categories/skill levels shown in Table 2-2. About 413 of the employees, or 79 percent, are Native American.

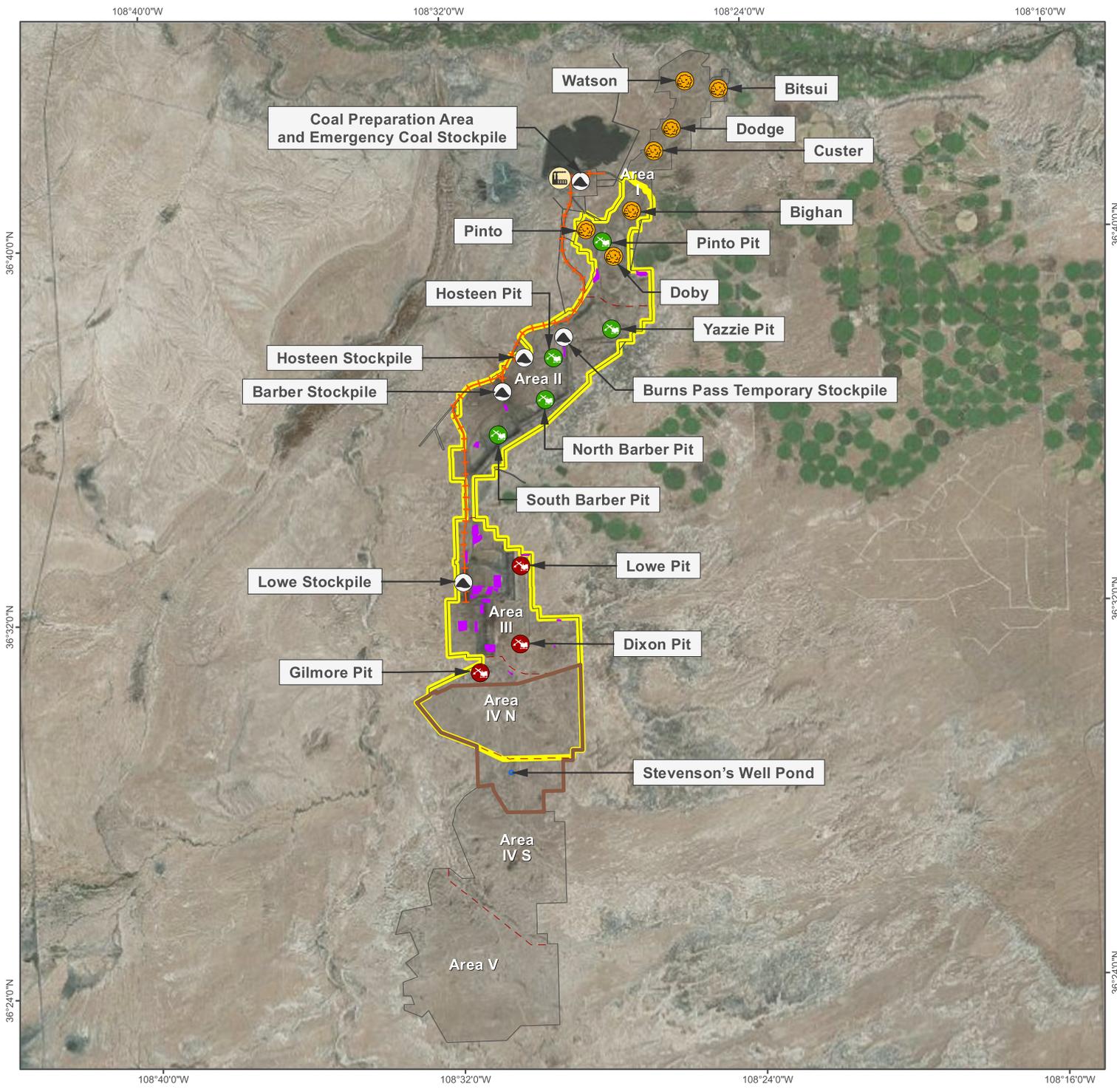
**Table 2-2 Navajo Mine Workforce by Employment Category**

Employment Category	Number of Employees	Percent of Labor Class that is American Indians
Administrative Professionals	53	38%
Administrative Support	22	95%
Apprentices	9	100%
Engineers	21	14%
Laborers	17	100%
Management	76	43%
Miners/Mining Equipment Operators	193	97%
Mining Operatives	8	75%
Semiskilled Maintenance	14	100%
Skilled Craft Workers	102	90%
Technicians	11	100%
<b>Total</b>	<b>526</b>	<b>79%</b>

# Four Corners Power Plant and Navajo Mine Energy Project

CURRENT OPERATIONS

**Figure 2-1**  
Navajo Mine Lease Area



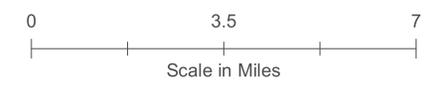
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36°32'0"N  
36°24'0"N

### PROJECT FACILITIES

- Four Corners Power Plant
- Coal Stockpile
- Historic Ash Placement Areas
- Active Mining Pits
- Inactive/Reclaimed Mining Pits
- Topdressing/Regolith Stockpile
- Navajo Mine Railroad

### PROJECT BOUNDARIES

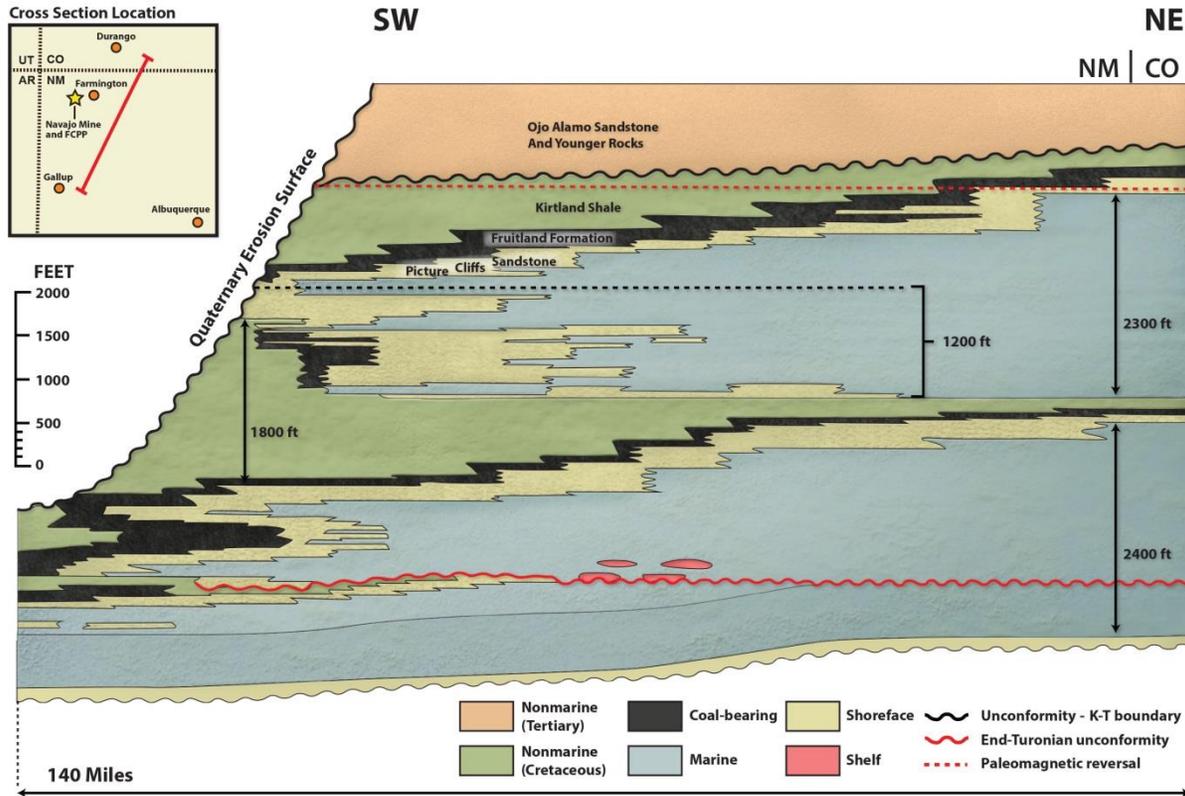
- Navajo Mine Resource Areas
- Navajo Mine Lease and ROWs
- Navajo Mine SMCRA Permit Boundary
- Proposed Pinabete SMCRA Permit Boundary



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### 2.1.2 Mining Operations

The Navajo Mine is located on the western flank of the San Juan Basin. Coal-bed methane, coal, and conventional oil and gas are all extracted from this area (Papadopoulos 2006). Figure 2-2 is a generalized geological cross-section through the San Juan Basin. Coal-bearing formations are shown in black. All coal mined at the Navajo Mine SMCRA Permit Area and Pinabete Permit Area exists within the Fruitland Formation, the shallowest coal-bearing formation. The extent of the Fruitland Formation's coal seams differs across the Navajo Mine SMCRA Permit Area. Eight primary coal seams and eight corresponding overburden or interburden horizons are present within the Navajo Mine SMCRA Permit Area (BNCC 2009). Individual coal seams are as much as 20 feet thick, and average 6 feet in thickness.



Generalized geological cross-section through the San Juan Basin  
Coal-bearing beds are shown in black. The Navajo Mine produces from the shallowest formation, the Fruitland Formation.

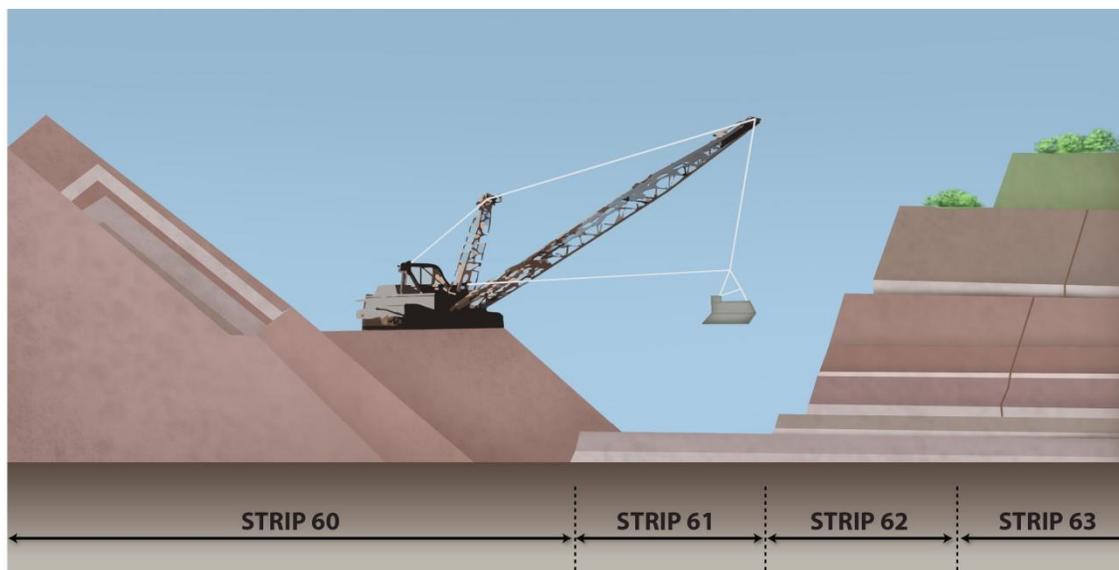
**Figure 2-2 Stratigraphic Cross-Section of San Juan Basin**

Dragline stripping is the primary mining method used for multiple seam mining operations at the Navajo Mine. The typical sequence for multiple seam mining is as follows:

1. Vegetation and topdressing removal
2. Overburden drilling and blasting
3. Overburden removal
4. Coal drilling and blasting
5. Coal removal
6. Interburden drilling and blasting

7. Interburden removal
8. Repeat steps 5 through 7 for each minable seam

As shown in the schematic illustration below, the coal seams at the Navajo Mine are exposed in pits that range in width depending on the size of the dragline equipment that is being used to expose them. Pit depths range from 5 to 240 feet, and pit lengths range from 1,000 to 15,000 feet. Each pit is stripped by slowly moving the dragline across the pit in parallel cuts called “strips.” Table 2-3 lists the equipment currently used daily at the Navajo Mine SMCRA Permit Area.



*Schematic of Dragline Operation (Source: BNCC)*



*Photograph of Dragline Operation at the Navajo Mine (Source: BNCC)*

**Table 2-3 Equipment Use at the Navajo Mine SMCRA Permit Area**

Equipment	Typical Number in Operation <sup>1</sup>
Draglines	3
Overburden Drills	3
Coal Drills	1
Dozers	12
Rubber-Tire Dozers	1
Large Front-End Loaders	7
Small Front-End Loaders	3
Graders	4
Scrapers	3
Coal Haulers	5
End Dumps	8
Mix Trucks	2
Water Trucks	3
Cable Reels	2
Locomotives	5
Railroad Cars	57
Stemming Truck	1

**Notes:**

<sup>1</sup> The types and number of equipment are subject to change during the permit term due to fluctuations in production levels, equipment outages, and equipment replacement schedules.

**2.1.2.1 Exploration Drilling**

NTEC periodically conducts development drilling and sampling to delineate and characterize coal, overburden, interburden materials, and hydrologic conditions, or to perform geotechnical evaluations in both active and future mining areas. Drilling and sampling are the primary means of determining the depth, thickness, physical and chemical characteristics, and degree of hydrologic saturation of the geologic materials to be disturbed or otherwise affected by mining. A site-specific drilling plan is typically prepared for each program that specifies the number of holes, locations, drill depths, access routes, and post-drilling reclamation; however, each drilling program generally involves the following common activities:

- Establishment of staging area
- Construction of temporary roads
- Drilling, sampling, and geophysical surveying of completed drill holes
- Subsequent reclamation of all disturbances outside of the 5-year affected lands area

Exploration activities can occur at the same time and in proximity to ongoing surface mining operations. All drilling activities adhere to the following criteria:

- Drilling is conducted with air or air-water mist whenever practicable to minimize the use of drilling mud.
- Drilling sites and associated access roads are located in a manner to minimize disturbance and impacts on environmental resources (e.g., drainages).
- Minimal excavation and/or site preparation may be required at drill sites, including grading.
- In the event a mud pit is required, a maximum of 12 inches of soil material is stockpiled immediately adjacent to the mud pit, and the extent of the mud pit is kept to the minimum practicable.

All surface disturbance associated with drilling is reclaimed and exploratory boreholes are abandoned. Exploration holes, boreholes, and wells are backfilled and sealed to eliminate hazards to people, environment, and machinery using the following criteria:

- Exploration holes or wells located in areas planned for mining are backfilled and sealed using cuttings and/or bentonite “hole plug.”
- Exploration holes or wells located outside of areas planned for mining and where water is not encountered are backfilled and sealed using cuttings and/or bentonite “hole plug” to approximately 5 feet from the collar and then stemmed to the top with concrete grout.
- Exploration holes or wells located outside of areas planned for mining and where water is encountered are backfilled and sealed with concrete grout from the bottom of the hole to at least 20 feet above the top of the uppermost water-bearing stratum. The hole is then filled with cuttings and/or bentonite “hole plug” to approximately 5 feet from the collar and then stemmed to the top with concrete grout.

All drilling locations and associated access roads are reclaimed as soon as practicable upon completion of the drilling program. In the event that mud pits are excavated at the drill site, the collected wet cuttings and/or drilling mud are allowed to dry before being covered with excavated material and the replacement of any salvaged soil. Reclamation of the drilling locations and access roads consists primarily of disking, seeding, and mulching the drill sites.

#### **2.1.2.2 Vegetation and Topdressing Removal**

SMCRA defines topsoil as the A and E soil horizons. They are the uppermost soil horizons of a soil profile and are characterized by accumulations of organic matter (A horizon) or intensely weathered and leached horizons that have not accumulated organic matter (E horizon) (Brady and Weil 1996). Navajo Mine has a negligible amount of topsoil within its lease area, consistent with its regional desert location. Therefore, NTEC uses a topsoil substitute material for reclamation. Soil material used as topsoil substitute at the Navajo Mine SMCRA Permit Area are defined based on their location within the soil profile. The material within the top 60 inches of the profile is called “topdressing,” and the material found deeper than 60 inches is called “regolith.”

NTEC conducts pre-salvage soil sampling to identify soil material suitable for topsoil substitute. Soils are sampled on a grid with a density of approximately one sample per acre. Samples are analyzed at an off-site laboratory and topsoil substitute suitability is determined through a sampling program that tests for texture, saturation percentage, pH, electrical conductivity, sodium adsorption ratio, coarse fragments, erosion factor, and soluble selenium. The suitability of salvaged topdressing and regolith to be used as topsoil substitute is determined by the *Navajo Mine Topsoil and Topsoil Substitute Suitability Criteria*, Chapter 11, Table 11-2 (BNCC 2009). Soil analyses are submitted to OSMRE annually along with field descriptions and a map of the sample locations.

Topdressing is removed ahead of mining activities to prevent contamination from rocks that are dislodged by the blasting operations, as well as to accommodate mining support infrastructure such as roads. Certain soils cannot be removed without jeopardizing the safety of the operators and equipment or diminishing the quality of the topdressing salvaged. Because of these limitations, topdressing is not salvaged where:

1. Slopes are greater than 3 horizontal to 1 vertical (3h:1v or >33 percent).
2. Suitable surface deposits are less than 6 inches (this soil is too shallow to allow removal without considerable contamination from underlying unsuitable material).
3. Areas are less than 1 acre in size.
4. Areas where rock rims and/or rock outcrops exist.

Also, for environmental protection of the topdressing resource, the maximum allowable lateral limit of topdressing removal in advance of the active mining area is 1,800 feet beyond the current extent of mining, measured from the top edge of the highwall.

Topdressing removal activities are conducted in opportunistic blocks that maximize the direct haul and respread of topdressing in active reclamation plots, limiting the need for stockpiles. If stockpiling of topdressing and regolith is necessary, the two are segregated and separately stockpiled. If regolith is sampled and determined to be a suitable topsoil substitute, it can be stockpiled with topdressing material. A perimeter berm or other equivalent surface water control structure is constructed around the stockpile to minimize material loss through water erosion and to prevent sediment from entering undisturbed areas and streams. In addition, the stockpile surface is stabilized by mulching and seeding. Topdressing stockpiles that are to remain undisturbed for 6 to 12 months are mulched, while those that are to be undisturbed for a year or greater are seeded and mulched during the next appropriate seeding period. After a stockpile is depleted, the area is surfaced with suitable topdressing so that it may also be reclaimed. All topdressing stockpiles are clearly marked so that other mining activities do not inadvertently disturb or contaminate them. Berms and ditches are inspected on a routine basis and repaired as needed.

### **2.1.2.3 Overburden Drilling and Blasting**

After all suitable topdressing material is removed, rotary drills are used to drill overburden blast holes. Blast-hole diameters range from 5 to 10 5/8 inches. Blast holes typically are drilled to the top of the coal seam that is being uncovered (until coal is encountered) and then backfilled with 1 to 10 feet of drill-hole cuttings to prevent coal shattering and any accompanying coal loss during blasting. However, some holes may be drilled to a specified elevation of 3 to 7 feet above the coal seam and not backfilled to reduce coal loss due to the movement of the overburden over the coal seam.

Once a set of blast holes has been drilled, the overburden is blasted by one of two methods, cast or stand-up blasting. In both blasting methods, the blast holes are loaded with bulk explosives and the explosive column is detonated by a ½-pound to 3-pound primer initiated with either a nonelectric detonating cord, nonelectric blasting caps, or electronic/electric blasting caps. The bulk explosives typically consist of ammonium nitrate and fuel oil (ANFO), an emulsion and ANFO blend, or bagged slurry product. To ensure proper blast sequencing, the shots are controlled using in-hole delays and/or surface delays.

All blasting is conducted under the supervision of OSMRE-certified blasters. The blaster present at the firing of the blast, as well as all other personnel assisting blasting operations, are responsible for having a thorough working knowledge of the site-specific performance standards and requirements.

### **2.1.2.4 Overburden Removal**

The tops of the coal seams are exposed in parallel cuts, or “strips,” with each contiguous sequence of strips comprising a pit. Overburden and interburden materials, which are also included in the strips (commonly referred to as “spoil”), are removed primarily using electric-powered walking draglines. Strips vary in width

as a function of the size and capability of the dragline operating in each pit. Pits vary in depth from 5 to 240 feet (measured from the topographic crest to the toe of the highwall), depending on the stratigraphic location of the recoverable coal seams and individual operating constraints. In most cases, a minimum pit width of 100 feet is required to facilitate safe operation of the mobile mining equipment. Pit length varies from 1,000 to 15,000 feet, depending on pit geometry and planned mining sequence.

NTEC utilizes two methods of dragline stripping: conventional side casting and conventional spoil-side stripping. Conventional side casting is generally used on upper layers and consists of moving the material to the side as dragline stripping, or removal of the overburden and interburden, continues. Conventional spoil-side stripping is generally used on lower layers and entails excavation and removal prior to placement in the spoil area. Geologic conditions, such as depth of coal and number of coal seams, along with the size of the dragline and its basic configurations determine the methods of stripping used in any given pit.

In addition to primary dragline stripping, dozers, front-end loaders, and haul trucks are used as needed. Dozers and truck/loader stripping is used in isolated areas where dragline stripping is not practical (e.g., mesas, pits with short lengths, constrained spaces). Dozers and truck/loader stripping are also used within dragline pits on thin overburden and interburden horizons where dragline operations are not effective.

### **2.1.2.5 Coal Drilling and Blasting**

After the coal is exposed by stripping operations, the top of the coal is cleared using small front-end loaders. The resulting diluted coal is piled on the spoil side of the pit. The coal seam is then drilled in preparation for blasting. Thin coal seams are generally ripped with dozers rather than blasted. Blasting of the coal seam is similar to the blasting of overburden, as described above.

### **2.1.2.6 Coal Removal**

Once the coal is blasted or ripped, it is mined using large front-end loaders that load large-capacity haul trucks. The entire thickness of the coal seam is mined in one pass, except where a non-coal unit (parting) separates the coal beds, or where the coal quality makes a distinct division in the coal seam. In the former case, the top part of the coal seam is mined by the front-end loader, the parting is ripped by dozers and pushed into the adjoining spoil area, and the rest of the coal seam is mined with front-end loaders.

Although the operations are engineered and planned to recover the maximum amount of coal, a small percent (approximately 8 percent) is lost in “wedges,” also known as “ribs” at the top and bottom of coal seams. A coal wedge or rib is the portion of the coal seam left to serve as a safety barrier either on upper coal seams to prevent trucks and front-end loaders from accidentally going over the highwall, or on lower spoil-encroached coal seams to increase spoil stability and reduce the occurrence of loose material rolling into the active work area. In both cases, front-end loaders are used to recover as much of the coal wedge as safely as possible once the coal seam is mined out. The coal is loaded into large-capacity haul trucks that travel up the pit ramps to the primary haul roads for delivery to field coal stockpiles. Front-end loaders are used at the field stockpiles to load the coal into railcars for off-loading at FCPP. Typically, one electric locomotive pulls approximately 20 cars from the stockpiles to the FCPP. There are four permitted and active coal stockpiles at the Navajo Mine SMCRA Permit Area: Barber (Area II), Hosteen (Area II), Lowe (Area III), and an emergency stockpile (Area I) (see Figure 2-1). The stockpiles have capacities of 1,500,000, 800,000, 2,700,000, and 80,000 tons, respectively. In addition, the Burns Pass Temporary Coal Stockpile is located in Area II, which is intended to add additional storage capacity when the Hosteen and Barber field coal stockpiles near capacity. This stockpile was permitted in 2007 and has yet to be used. However, once the contingency coal reserves in the Area II Hosteen and Yazzie Pits are mined, it may be operationally beneficial to utilize this stockpile.

Except for the emergency stockpile, located near the coal preparation plant in Area I, the coal stockpiles are field stockpiles located adjacent to railroad spurs. Barber, Hosteen, and Lowe field stockpiles are divided down the center by the railroad spur to facilitate blending. This division allows coal of varying qualities to be stacked on either side of the rail. From October through March, coal for personal use by

F CPP, Navajo Mine Coal Company (NMCC) employees, and local Chapter residents is placed in the Community Coal Stockpile, located adjacent to the Navajo Mine Area III office.

### 2.1.3 Coal Production

NTEC has a contract with the F CPP's owners to supply coal through the year 2016. The tonnage per year is subject to change depending on the F CPP's demand for power and the availability of equipment. Recent production volumes and acres mined are provided in Table 2-4.

**Table 2-4 Recent Coal Production Volumes at the Navajo Mine SMCRA Permit Area**

Year	Volume (tons)	Acres Mined
2009	8,967,000	246
2010	8,629,000	154
2011	8,825,000	152
2012	8,571,000	203

Source: BNCC 2012a

### 2.1.4 Coal Handling, Quality, and Delivery

NTEC operates a 15-mile private railroad within its lease area and associated ROWs for hauling coal from field stockpiles to the coal preparation plant, which is owned by NTEC and located within the Navajo Mine SMCRA Permit Area in Area I, adjacent to the F CPP (as depicted on Figure 2-1). Coal from the stockpiles is loaded into 100- to 125-ton-capacity railcars using large front-end loaders. Each train typically consists of approximately 20 railcars and is powered by one electric locomotive. NTEC is capable of running three trains along the rail line, but historically has run only two trains at a time. Typical railroad operations include loading one train at the field coal stockpile while the other train is in transit to or from delivering coal at the coal preparation plant. The trains historically have averaged 12 trips a day over three 8-hour shifts and have run 20 shifts per week. Operation of the railroad and delivery of coal to the coal preparation plant is dependent on coal preparation plant inventory and fuel sales to F CPP. In the rare instances where the railroad is unavailable to deliver coal to the preparation plant, NTEC may haul coal using haul trucks from one of the three field stockpiles (shown on Figure 2-1) directly to the coal preparation plant.

The coal preparation plant is a stacking and reclaiming facility and not a coal cleaning operation. A small amount of water is used for dust suppression and housekeeping purposes to remove coal fine accumulations from the equipment (historically, approximately 300-600 acre-feet water per year has been used for these purposes). The dust suppression wash down water and any surface water drainage is directed to a sedimentation pond that is designed to handle the runoff from a 100-year/6-hour precipitation event. Ponds that are designed for such precipitation events are known as total containment ponds and are designed for no discharge. If this sedimentation pond nears capacity, the contents are pumped to Pond 1 Cell A2, another 100-year/6-hour (total containment) pond and allowed to evaporate. The coal fines and sediment retained in the total containment ponds are excavated and placed in the bottom of the mining pits. Therefore, no water or coal plant wastes are discharged from the facility area.



Coal delivered by railcar (or occasionally by haul trucks) to the preparation plant located in Area I is unloaded into one of two stations into underground hoppers. Fully enclosed feeder systems transfer the coal from the hoppers via electric conveyors into redundant systems consisting of enclosed single-roll crushers, coal quality samplers and scales. The coal is crushed to a ¾-inch to 1-inch diameter suitable for the FCPP pulverizing mills. Hoppers and feeders are equipped with water spray systems, and a mixture of foam and binder is added at the crushers for dust suppression.

Once the coal has been crushed and passed through the sampling towers, it is delivered to the coal stackers via an interconnected electric

conveyor and flop gate system. The coal stackers place the coal into one of 10 stacker piles. The coal is stacked in layers for blending purposes to achieve overall product specifications. A “reclaimer” then collects the coal from the stacker piles with bucketwheels that cut through the entire depth of the pile to create the required blend of coal for the final product and loads the blended coal onto two electric conveyors for delivery to FCPP.

FCPP was designed and constructed specifically to burn low-rank, low-sulfur, bituminous coal. Therefore, NTEC must meet coal specifications for heating value, sulfur, and ash content for efficient FCPP operation. The quality of the coal that NTEC delivers to FCPP cannot deviate from the narrow range of contractual specifications even though the quality of the coal found in situ within the mine pits can vary substantially. The heating value of the coal found within Navajo Mine typically ranges from 7,800 to 9,500 British thermal units (BTU) per pound. The target heating value of coal delivered to FCPP under the coal supply agreement is 8,700 to 8,750 BTU per pound with a contractual minimum of 8,500 BTU per pound. To meet the target heating value and contractual specifications, NTEC blends coal mined from multiple locations and seams within the lease. NTEC maintains approximately 1 million tons of coal as minimum working inventory available for coal blending. This amount represents about a 1.5-month reserve supply of coal. Each of the 10 stacker piles can contain approximately 28,000 tons of coal.

### **2.1.5 Surface Water Management**

In accordance with the requirements of SMCRA and the CWA, the discharge of runoff from disturbed areas is controlled and treated in a manner that protects receiving streams from excessive sediment and other pollutants.

During mining operations, diversion structures such as berms or ditches are used to convey surface water runoff from active mining and reclamation areas to containment or treatment facilities such as the mining pit, sump, or sediment pond. The retained water is evaporated, used to suppress dust on haul roads, or discharged in accordance with the NPDES permit conditions.

NTEC uses engineered structures (e.g., diversions, sediment ponds, detention ponds, impoundments) and other best management practices (BMPs) to comply with the NPDES effluent limitations for point-source and stormwater discharges. BMPs include, but are not limited to: minimizing disturbed areas; surface stabilization, such as mulching and temporary seeding; and check dams and sediment traps. All NTEC operations are conducted in accordance with an individual NPDES permit to cover possible discharges from the Navajo Mine SMCRA Permit Area. In addition, MMCo is required to obtain the Multi-Sector General Permit (MSGP) under Sector H for coal mines and coal mining-related facilities (e.g., haul roads and access roads). Runoff from disturbed mining and reclamation areas is managed by retaining the effluent or surface runoff from the disturbed areas in sedimentation ponds for evaporation. Professional engineers design and certify these ponds to contain runoff from a 100-year/6-hour or 10-year/24-hour storm event. Should discharges, via point sources, occur from these ponds, they are subject to the applicable NPDES discharge effluent limitations of the individual NPDES permit.



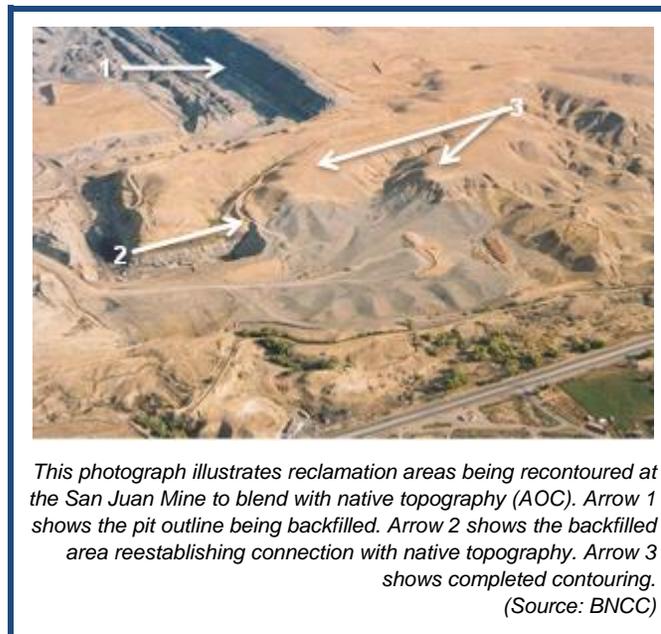
#### **2.1.6 Reclamation**

As mining progresses, disturbed areas are reclaimed. As part of reclamation, NTEC removes all temporary structures. After installing erosion control measures sufficient to minimize the erosion rate to less than or equal to pre-mine levels, the reclamation areas are contoured to blend with the native drainages that surround the permit area, achieving approximate original contour (AOC) in accordance with SMCRA regulations. If the surface runoff from an active mining area has the potential to leave the permit area, or enter a reclaimed area downstream, a sediment pond is constructed to retain the surface runoff and sediment, and berms are utilized to route the runoff from active mining areas to the sediment control structure. Water supply for irrigation is provided from the San Juan River in accordance with BNCC's water right permit.

The sequence in which sediment controls are put into place during reclamation is important to the functioning of the controls. The sequence is as follows:

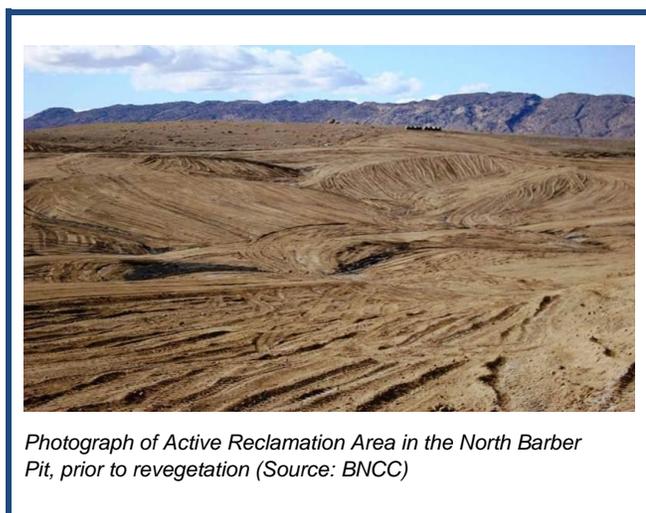
- Berms, ditches, and other drainage control structures are constructed to prevent surface runoff and sediment associated with active mining and spoil storage areas from entering reclaimed areas, undisturbed lands, or leaving the permit area.
- Spoils are regraded to AOC with dozers and motor graders. During this phase, additional berms and ditches may be constructed as needed to control runoff and sediment migration.
- Temporary berms and ditches that are no longer needed are removed. Berms and ditches remain in place as long as practicably possible during topdressing placement. Generally, berms and ditches are removed by blending the cut-fill material into the adjacent regraded spoils.

- Topdressing, or topsoil substitute material, is placed and spread onto the regraded spoils. The soil types found in the Navajo Mine Lease Area generally lack these soil horizons, or they are a small portion of the soil profile. Therefore, NTEC must use a topsoil substitute material that is suitable for plant growth for reclamation.
- The seedbed is prepared, and the area is seeded using a native seed mix suitable for livestock grazing and wildlife.
- Mulch is applied to the seeded area and crimped, and the remaining steps of the revegetation plan are carried out to establish a diverse, effective vegetation cover.
- Irrigation is applied as needed from May to mid-October for the first 2 years after revegetation. The irrigation system utilizes various sizes of aluminum pipe to cover the reclaim plot. Irrigation is applied for 5 hours at 55 pounds per square inch (within the lateral pipes) which is equivalent to 0.10 acre-foot or 1.15 inch application. This 5-hour application rate is repeated every fourth day for 13 days, supplying a total germination application of 4.6 inches.



Through the mining process, the original or pre-mine surface configuration and contour are altered. The post-reclamation topography is designed to approximate the pre-mine relief and contour, stabilize the surface and prevent excessive erosion, and introduce topographic diversity that enhances vegetation re-establishment and provides a condition capable of supporting the designated post mining land use as rangeland for domestic livestock grazing and wildlife habitat to support the post-mining land use.

OSMRE's reclamation requirements are specified in 30 USC 1265 Section 515. BNCC's past reclamation efforts have been successful based on OSMRE review; however, in 2009, OSMRE found that BNCC's rate of reclamation was inadequate. BNCC developed a plan to improve the rate of contemporaneous reclamation in response, and the plan was subsequently approved by OSMRE. Since then, the prescribed rate of contemporaneous reclamation has been met. In 2008, in accordance with OSMRE recommendations, BNCC expanded the use of geomorphic reclamation approaches. This design principle uses fewer hard engineered structures for erosion control, and instead uses design measures that better mimics natural erosion and deposition process.



## 2.1.7 Waste Disposal

### 2.1.7.1 **Coal Mine Waste and Disposal**

NTEC does not generate coal mine waste or coal processing waste (as defined by 30 CFR 701.5) or accept it from outside the permit area. Small quantities of coal spilled around the mine operation are routinely picked up and placed in mined-out areas. Because of the small volume of coal spilled, NTEC has not designated a disposal location for this material. Instead, this material is hauled to a mined-out area and free-dumped along the bottom of the pit or in an alternate location (e.g., low-lying areas within the spoil piles where the coal will be buried). The buried coal is not expected to impact surface drainages or the final surface configuration or adversely affect reclamation operations. No coal is placed in banks, refuse piles, waste dams, or impoundments.

### 2.1.7.2 **Coal Combustion Residuals**

Under NTEC's lease agreement with the Navajo Nation and NTEC's OSMRE SMCRA permit, the Navajo Mine historically accepted Coal Combustion Residuals (CCRs) or "ash," from FCPP Units 4 and 5 for reclamation and placement in mined-out areas and ramps. CCR is referred to as Coal Combustion Byproducts in the mining industry. CCR placement in the Navajo Mine Lease Area between 1971 and 2008 included fly ash, scrubber sludge, and bottom ash from FCPP.



*Photograph of Active Reclamation in Area II following revegetation (Source: BNCC)*

CCR materials were utilized as mine backfill material and managed in accordance with NTEC's approved SMCRA permit requirements. Historic CCR placement locations in the Navajo Mine Lease Area are shown on Figure 2-1, and include Watson, Bitsui, Dodge, Custer, Bighan, Doby, and Pinto pits in Areas I and at Yazzie pit in Area II. CCR's were placed in Yazzie pit prior to SMCRA regulations (Pre-1977), when the resource area was classified as Pre-Law jurisdiction. Yazzie pit was inactive for several years, when mining recommenced the pit and ramps were changed to permanent program land jurisdiction. CCR was hauled in trucks and placed in the pits. A dozer was used to push the CCR into the backfilled pit. The last CCR material was placed in Pinto pit in January 2008; there has been no CCR material placed at the Navajo Mine since that time. For a description of current CCR placement practices, see Section 2.2.6.

The major chemical constituents of CCR include silicon dioxide (SiO<sub>2</sub>), aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), and calcium sulfate (CaSO<sub>4</sub>). Coal also contains trace levels of arsenic, barium, beryllium, boron, chromium, copper, lead, mercury, selenium, zinc, and other metals at the part per million levels. BNCC reported release of these constituents from the placement of CCR and other mining operations to EPA in accordance with Toxic Release Inventory (TRI) Program requirements. The TRI program requires certain manufacturing and industrial facilities in specified Standard Industrial Classification codes to complete toxic chemical release forms for listed chemicals. In 1997, EPA added several new industrial groups to the reporting requirements including coal mines.

Table 2-5 summarizes the TRI constituents reported by BNCC from 2002 to 2008. BNCC used a mass balance approach to calculate the volumes of constituents of all mine operations.

**Table 2-5 Navajo Mine Disposal of Minor Toxic Release Inventory (TRI) Constituents  
 (Measured in Pounds per Year)**

Compound	2008	2007	2006	2005	2004	2003	2002
Arsenic	NR	NR	NR	NR	NR	8500	7100
Barium	9,197	937,940	1,012,638	1,078,881	975,787	1,300,000	1,100,000
Beryllium	NR	10,006	10,791	11,478	10,340	14,000	12,000
Chromium	NR	43,240	45,792	47,874	44,936	57,000	49,000
Cobalt	NR	12,312	13,237	13,728	12,877	18,000	15,000
Copper	NR	82,861	89,481	95,102	79,771	108,000	89,000
Lead	670	70,337	75,811	80,667	73,560	100,000	83,000
Manganese	NR	142,311	153,095	162,054	152,551	206,000	170,000
Mercury	NR	257	265	309	315	490	410
Nickel	NR	36,791	38,216	39,630	37,627	45,000	40,000
Selenium	NR	7,953	8,820	11,757	10,553	15,000	12,000
Vanadium	NR	123,697	133,601	142,214	135,142	180,000	150,000
Zinc	NR	59,332	63,859	68,161	61,143	84,000	69,000
Thallium	NR	5,835	10,189	10,428	9,344	12,000	9,500
<b>Totals</b>	<b>9,867</b>	<b>1,532,872</b>	<b>1,655,795</b>	<b>1,762,283</b>	<b>1,603,946</b>	<b>2,147,990</b>	<b>1,806,010</b>

Source: EPA 2012a

Notes:

BNCC has filed TRI reports between 1998 and 2008. Reports filed between 2002 and 2008 are available online and reported in this table.

NR = Not Reported

**2.1.7.3 Other Waste**

In compliance with Navajo Nation Environmental Protection Agency (NNEPA), Navajo Nation Solid Waste Regulations Part II, Section 202, all non-coal mine waste, including solid waste and hazardous waste, is removed from the mine site for disposal at an appropriate facility licensed to accept these wastes. Non-hazardous, non-coal solid waste is stored in dumpsters located at various designated areas around the mine site and transported by a third-party contractor to San Juan County Regional Landfill or another permitted solid waste landfill on a regular schedule.

Special wastes, such as used sorbents and oily rags and hazardous materials are accumulated, managed, and disposed of in accordance with applicable EPA, NNEPA, and U.S. Department of Transportation regulations. Special wastes are transported by a third-party contractor to San Juan County Regional Landfill for appropriate handling and disposal. NTEC is currently a conditionally exempt small quantity generator of hazardous waste and has obtained an EPA Identification number from EPA. The Resource Conservation and Recovery Act (RCRA) number is used on all hazardous waste, universal wastes, and used oil manifests and any other RCRA documentation as required.

### **2.1.8 Buildings and Support Facilities**

Existing buildings and support facilities associated with Navajo Mine operations are concentrated in two areas within the existing mine lease:

1. The North Area support facilities, covering approximately 70 acres and located adjacent to the FCPP about 4 miles south of the northern end of the Navajo Mine Lease Area.
2. The Area III support facilities, covering approximately 30 acres and located about 11 miles south of the northern end of the Navajo Mine Lease Area.

The Navajo Mine North Area includes a heavy equipment repair shop, carpentry and plumbing shop, fuel and lube tanks, storage yards, tire installation and repair shop, change rooms, heavy equipment ready line, wash bay, sewage facility, coal plant, weld shop, irrigation system pump house, reclamation seed building, reclamation yard, coal lab, railroad yard, warehouse with associated storage yard, communication tower, and offices, field maintenance, and security offices. South of the North Area support facilities is a potable water tank that is used for these facilities.

Area III includes an engineering and production office building, equipment maintenance shop, auto repair shop, weld shop, equipment loading dock, vehicle fueling area, propane tank, warehouse with associated storage yard, change rooms, wash bay, potable water tank, heavy equipment ready line, employee coal stockpile, sewage facility, waste management building, and a safety building and security offices. South of Area III is a second communication tower for the mine radio system transmitter/repeater.

All of these facilities are currently in use and maintained in good condition. The Navajo Mine North Area support facilities and associated parking lots are designed to comply with 30 CFR 816.181.

## **2.2 Four Corners Power Plant Operations**

Prior to January 1, 2014, when compliance with BART requirements (BART, see Section 2.4) commenced, the FCPP consisted of five pulverized coal-burning steam electric generating units with a total generating capability of 2,100 MW:

- Unit 1, 170 net MW, in service from 1962 to December 2013
- Unit 2, 170 net MW, in service from 1962 to December 2013
- Unit 3, 220 net MW, in service from 1963 to December 2013
- Unit 4, 770 net MW, in service since 1969
- Unit 5, 770 net MW, in service since 1970

In addition to the plant's generating units, the plant site contains other ancillary facilities (Figure 2-3) including:

- Morgan Lake and Morgan Lake Dam, located immediately north of the generating units. Morgan Lake is an approximately 1,200-acre human-made reservoir that provides water for industrial and domestic use at the plant, including cooling water. A 155-foot high earthen fill dam contains the reservoir. All of Morgan Lake is within the FCPP lease area and is maintained by the Navajo Nation for recreational uses, including angling, windsurfing, and boating. At maximum capacity, the lake contains 39,000 acre-feet of water. Associated structures include the water intake and discharge structures to and from the lake, intake structure, and a pump house on the San Juan River, a 2.5-mile-long pipeline to bring San Juan River water to Morgan Lake, and a 69-kV transmission line from FCPP to the pump house.
- Fly ash storage silos and bottom ash dewatering bins located south of Unit 5. Lined dry ash disposal areas and lined ash impoundments are located west of FCPP's generating units.

- Three FCPP switchyards that connect the FCPP to the following eight high-voltage transmission lines: (1) APS FCPP to the Moenkopi Substation, (2) PNM FCPP to San Juan Switchyard, (3) PNM FCPP to West Mesa Switchyard, (4) APS FCPP to Cholla Substation (two lines), (5) PNM FCPP to Pillar/Ambrosia, (6) PacifiCorp FCPP to Pinto, and (7) Western Area Power Administration FCPP to Shiprock.
- Condenser cooling water intake canal located adjacent to the switchyard at FCPP and the condenser cooling water intake structures for Units 1, 2, and 3, and Units 4 and 5.
- A main access road, which runs north-south directly to the west of Units 1 through 5 turbine enclosures. A second main access road runs east-west from the generating units to the Ash Disposal Area. Secondary roads provide access to and around area structures, yards, and other ancillary facilities. An employee access road from the bridge crossing the San Juan River to FCPP.

### 2.2.1 Workforce

The FCPP workforce currently consists of 473 full-time employees and 1 part-time employee. The workforce is composed of the employment categories/skill level shown in Table 2-6. About 380, or 80 percent, of the employees are Native American.

**Table 2-6 FCPP Workforce by Employment Category**

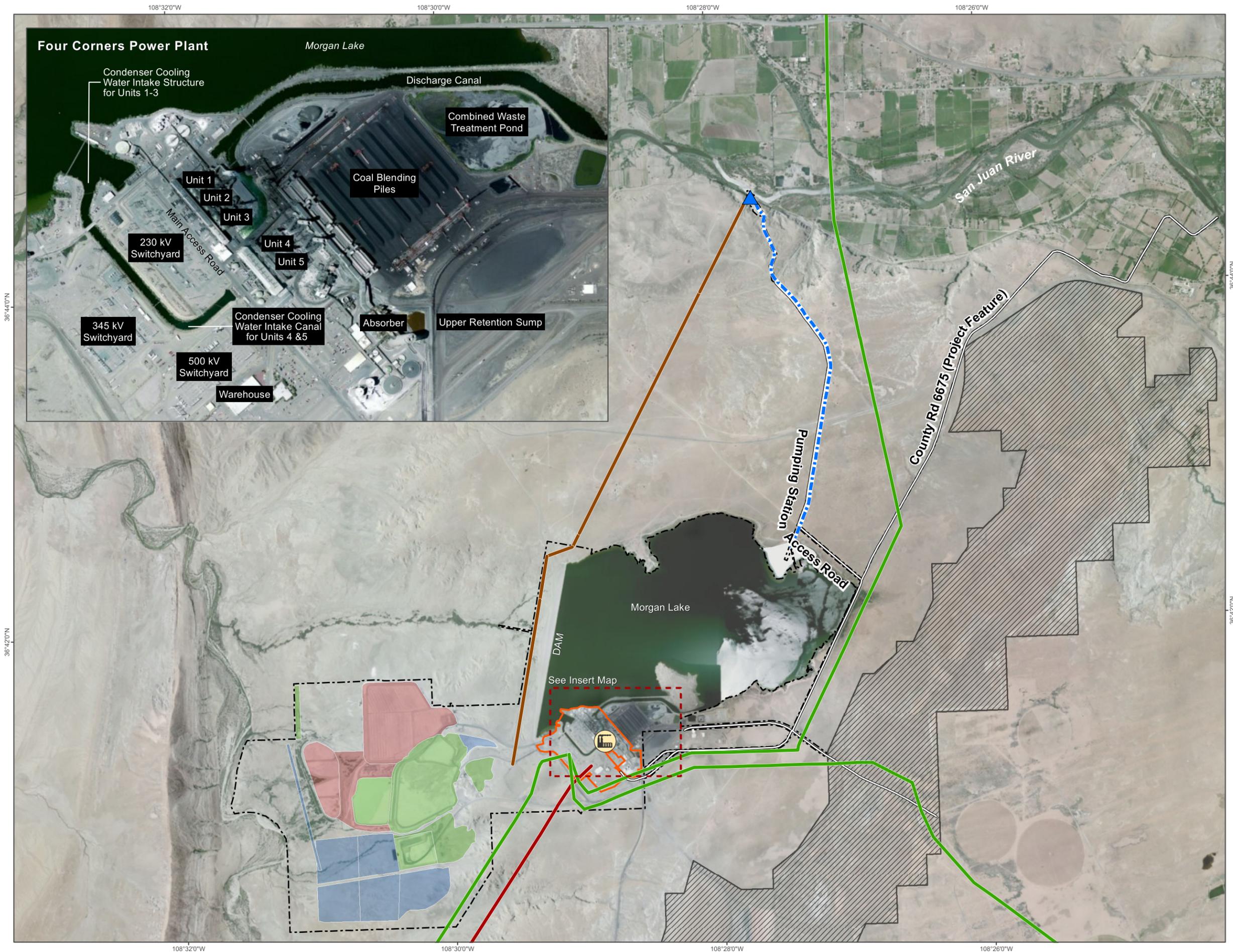
<b>Employment Category</b>	<b>Number of Employees</b>	<b>Percent of Labor Class that is American Indian</b>
Professionals	73	66%
Technicians	102	73%
Office and Clerical	22	95%
Executive/Senior Level Officials	3	67%
Craft Workers (Skilled)	224	89%
First/Mid-Level Officials	43	67%
Laborers (Unskilled)	6	100%
Service Workers	1	100%
<b>Total</b>	<b>474</b>	<b>80%</b>

**Four Corners Power Plant and Navajo Mine Energy Project**

CURRENT OPERATIONS

**Figure 2-3**

Four Corners Power Plant and Ancillary Facilities



**PROJECT FACILITIES**

- Four Corners Power Plant 
- Pumping Station 
- Pumping Station Pipeline 

**PROJECT BOUNDARIES**

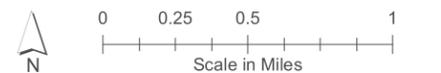
- Four Corners Lease Boundary 
- Navajo Mine Lease Area 
- Power Plant Fence Line 

**TRANSMISSION LINES**

- 345kV 
- 500kV 
- 69kV - Pumping Station to Power Plant 

**ASH FACILITIES**

- Existing Active Facility 
- Existing Inactive Facility 
- Future Facility 



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## 2.2.2 Coal Handling and Processing System

Coal for the units is supplied from the adjacent Navajo Mine, using a dedicated electric rail line between the mine and the plant. The train carrying the coal travels uncovered to the plant where it is off-loaded. The coal is delivered from NTEC's Navajo Mine coal preparation plant by electric conveyor belts to the FCPP surge bins. These conveyor belts are covered with a sheet metal enclosure to prevent blowing dust and for personnel protection. A surfactant spray manifold discharges foam onto the open conveyor feed belts below the surge bins to mitigate fugitive dust emissions. From the two 1,500-ton surge bins, the coal is then transported via open conveyor belts to any of eight coal storage silos that support Units 4 and 5. The storage silos are equipped with a baghouse/cyclone type dust collector system. Each dust collector has been sized and manifolded to enable adequate dust removal from both surge bins. Once the coal reaches the storage silos, all additional coal transfer operations occur via closed piping. From the storage silos, the coal is transferred to feeders and then to the ball mills, which pulverize the coal.



## 2.2.3 Power Plant Operations

### 2.2.3.1 *Historic Operation with Units 1 through 5 and Current Operation of Units 4 and 5*

The pulverized coal is dried by and mixed with preheated air and injected into the boilers through low nitrogen oxide (NO<sub>x</sub>) burners where it is ignited. Low NO<sub>x</sub> burners reduce NO<sub>x</sub> formation by reducing the flame temperature. Natural gas igniters are used during startup and shutdown for flame stabilization. Prior to their shutdown in December 2013, at full load, Units 1, 2, and 3 burned approximately 9,000 tons of coal per day<sup>1</sup>. Units 4 and 5 burn approximately 19,000 tons of coal per day. These are maximum potential rates; the actual rates would be less based on the capacity factor (approximately 80 percent operation).

Heat energy given off during the combustion process is transferred through the furnace walls to convert water to steam. The steam is passed through primary and secondary super heaters and is heated to a final temperature of 1,000 degrees Fahrenheit (°F). This steam is piped to the turbine where its energy is used to rotate the shaft of an electric generator. The resulting electrical output is transformed to a higher voltage, delivered to the adjacent switchyard, and ultimately to the electric transmission system emanating from the plant.

Prior to the shutdown of Units 1, 2, and 3, hot flue gases resulting from the combustion process passed through the furnace, super heaters, economizer, and air heater into the Venturi scrubbers on the three units before discharging out of the stacks, which are 249 feet high for Units 1 and 2 (two flues in one stack) and 250 feet high for Unit 3. Venturi scrubbers remove 99.8 percent of entrained fly ash (particulate matter or PM) in the flue gas and more than 90 percent of the sulfur dioxide (SO<sub>2</sub>) from Units 1, 2, and 3. Quicklime (lime or calcium oxide) is used for the removal of SO<sub>2</sub>. Bulk lime is delivered to the lime handling areas at all units, where the lime unloading systems transfer the lime from the vehicle hoppers to storage silos. Lime unloading blowers generate air pressure to transfer the lime from the truck to the

<sup>1</sup> A brief description of the operation of Units 1 through 3 is provided since the operation of all five units is considered the historic (pre-2014) baseline from which impacts of the alternatives are evaluated.

storage silos. The transfer air exits through a vent, which is equipped to remove lime dust from the transfer air. The lime is transferred from the lime silo via conveyor belts to attrition slakers, where water mixes with the lime to form lime slurry that is pumped into storage tanks. Pumps deliver the lime slurry from the storage tanks to the scrubbers for SO<sub>2</sub> removal, as needed. The attrition slakers have dust scrubbers to remove fugitive lime dust resulting from the mixing process.

On Units 1, 2, and 3, lime slurry was injected into the Venturi scrubbers, and chemical reactions of the lime with SO<sub>2</sub> produce calcium sulfite and calcium sulfate solids. The resulting slurry, a mixture of fly ash and flue gas desulfurization solids, is sent from the Venturi scrubbers to a thickener. The thickener underflow was pumped to the Lined Ash Impoundment where the solids settled and the liquid was decanted to the Lined Water Impoundment. That liquid was then pumped back to the scrubbers for reuse.

Units 4 and 5, which are larger and more modern, operate slightly differently than Units 1, 2, and 3. In 2012, APS installed an auxiliary boiler to provide steam for Units 4 and 5 in anticipation of the shutdown of Units 1, 2, and 3. The hot flue gases pass from the air heater into baghouses and a flue gas desulfurization system before discharging out of the flues, which are 380 feet high (flues for both Units 4 and 5 are contained in one stack). The baghouses (fabric filters) remove 99.9 percent of entrained fly ash (particulate matter) in the flue gas, and the flue gas desulfurization (FGD) system removes 88 to 91 percent of the SO<sub>2</sub>. In the FGD system, lime slurry is injected into absorber towers, and similar to the operations of Units 1, 2, and 3, the chemical reactions of lime with SO<sub>2</sub> produce calcium sulfite and calcium sulfate solids, which precipitate and create FGD slurry.

The FGD slurry is pumped to thickeners, where solids are concentrated in the bottom, as thickener underflow. The thickener underflow is pumped to the Lined Ash Impoundment (see Section 2.2.6.2 for additional information). The thickener overflow is returned to the scrubbers.

#### **2.2.4 Plant Water Supply**

All of the water supply for the plant is obtained from the San Juan River. Water is pumped from the river to Morgan Lake, and then pumped from the lake into the plant for use. An average of 27,682 acre-feet of water is pumped from the San Juan River to Morgan Lake annually. BBNMC holds the water rights for this water use (New Mexico Office of State Engineer Permit No. 2838). FCPP uses water for a variety of purposes, including SO<sub>2</sub> scrubbing, steam condenser cooling water, and air compressor and other equipment cooling water, dust control, washwater for vehicles and facilities, and domestic purposes. Units 4 and 5 together use approximately 5,000 acre-feet per year for operation of the SO<sub>2</sub> scrubbers. Units 4 and 5 evaporate approximately 13,000 acre-feet per year of cooling water. The average annual water consumption between 2000 and 2011 was 22,856 acre-feet per year. FCPP also has an agreement with Jicarilla Apache Water Authority for supplemental water, if required.

Discharge from the power plant to Morgan Lake from the condenser cooling water discharge canal is approximately 105°F. Cooling water from the main condensers and other equipment condensers is discharged to the condenser cooling water discharge canal that flows into Morgan Lake. The lake's water temperature ranges from 65 to 90°F depending on the time of the year. Between 2000 and 2011, approximately 4,826 acre-feet per year were discharged from Morgan Lake to No Name Wash, which flows to Chaco Wash, an intermittent wash that terminates at the San Juan River, approximately 5 miles northwest of the plant. Approximate natural evaporation from Morgan Lake is about 7,432 acre-feet per year and gains from precipitation are about 472 acre-feet per year. No groundwater is used at FCPP.

The intake structure on the river consists of two 10-foot by 10-foot intake bays, placed perpendicularly to the flow of the river. These intake bays are located just upstream of the APS weir. The weir includes a control gate that provides the ability to control water depths at the intake location. The intakes are screened to reduce fish intake, with screen opening of approximately 1 inch by 3 inches. Approach velocities toward the screens are 0.38 feet per second. There are no fish collection or return facilities associated with the intake (R. Grimes pers. comm. October 2014).

The intakes are operated in two modes, pumping either 17,000 gallons per minute (gpm), or 32,000 gpm (approximately 37 and 71 cubic feet per second, respectively) from the San Juan River. The intake is operated at any time of day, as needed. The 17,000 gpm mode is generally used during the October to May timeframe, and the 32,000 gpm mode is generally used during the May through October timeframe. This is driven primarily by the evaporation rate of Morgan Lake. These pumps run approximately 80 percent of the time.

### **2.2.5 Capacity Factor**

Capacity factor is defined as actual utilization of the power-producing units, divided by their full load capacity. For generating units, this factor is typically expressed as actual megawatt-hours (MW-hrs) generated in a year versus design rating in megawatts times 8,760 hours per year (maximum theoretical MW-hrs). Since generating units must be periodically shut down for routine maintenance, repair, and replacement, capacity factor is always less than 100 percent, typically in the range of 80 to 95 percent for base load generating units, depending on overall reliability. Historic annual average capacity factor at FCPP is 86 percent.

### **2.2.6 Ash Production**

Ash produced in the combustion process consists of bottom ash and fly ash (also known as coal combustion residuals or CCRs). Bottom ash accumulates along the inside walls and floors of the boiler units. The bottom ash inside the boiler is directed to the bottom ash hopper. The total production rate of furnace bottom ash for Unit 4 and Unit 5 is approximately 40 tons per hour during full load conditions. The total bottom ash production rate for Units 1, 2, and 3 was 20 tons/hour. The furnace bottom ash is collected and removed by means of a hydraulic-vacuum system and delivered via sluice water pipelines to dewatering bins. In the bins, the sluice water is decanted and the bottom ash is unloaded to trucks for disposal. Two dewatering bins are each 35 feet in diameter with a storage capacity of approximately 21,600 cubic feet, or 400 tons, with a bottom ash density of 37 pounds per cubic foot. Each bin is elevated for 20-foot truck clearance, with trucks periodically hauling the ash from the dewatering bins to the Dry Fly Ash Disposal Area (DFADA) or to construction sites for the buttresses of the dams and access roads.

Fly ash constitutes approximately 80 percent of the FCPP's total ash output. Units 1, 2, and 3 produced fly ash at a total rate of approximately 70 tons/hour. Fly ash is produced by Units 4 and 5 at a total rate of approximately 150 tons per hour during full load conditions. The fly ash from the boiler passes through the flue gas draft system to the fabric filter dust collectors ("baghouses"), which remove fly ash from the flue gas. A fly ash handling system then removes the fly ash from the baghouse hoppers and conveys it to silos for storage. The ash is mixed with scrubber process water for dust control and to aid in compaction. Trucks then transport the dry fly ash (no free liquid) to a lined DFADA on site for disposal. The baghouse system for Units 4 and 5 is designed to remove not less than 99.87 percent of fly ash from the flue gas.

#### **2.2.6.1 On-site Ash/Flue Gas Desulfurization Disposal System**

The FCPP has disposed of fly ash and bottom ash since 1962 and FGD waste since 1979, when the Venturi particulate scrubbers on Units 1, 2, and 3 were retrofitted to remove SO<sub>2</sub>.

Units 1, 2, and 3 ash/FGD waste slurry historically was sluiced to impoundments in the Ash Disposal Area located approximately 1 mile west of the power plant. Prior to 2008, ash and FGD wastes generated by Units 4 and 5 were hauled to the adjacent mine for placement in mined-out areas regulated by the OSMRE. Since 2008, fly ash generated by Units 4 and 5 has been trucked to a lined DFADA located within the on-site Ash Disposal Area. A portion of the fly ash is also sold for beneficial reuse. FDG slurry from Units 4 and 5 scrubbers is pumped to thickeners. The thickeners underflow is pumped to the Lined Ash Impoundment in the Ash Disposal Area where the solids settle and the liquid is decanted to the Lined Water Impoundment. The liquid is pumped back to the scrubbers for reuse, and the bottom ash is trucked to the DFADA. From

1962 to the present, approximately 33.5 million tons, or 20,800 acre-feet, of fly ash, bottom ash, and FGD solids have been placed into the Ash Disposal Area.

### **2.2.6.2 Description of Ash Disposal Facilities**

The Ash Disposal Area currently consists of the following facilities, each of which is described in detail below:

- Ash Ponds 1 and 2/Evaporation Ponds 1 through 4
- Ash Pond 3/Lined Decant Water Pond
- Ash Ponds 4 and 5/Lined Ash Impoundment
- Ash Pond 6
- DFADA Sites 1 and 2
- Gridded Disposal Area

#### **Ash Ponds 1 and 2 and Evaporation Ponds 1 Through 4**

Ash Ponds 1 and 2 were constructed in the 1960s by erecting a dike on existing ground downstream from the power plant. Ash slurry was allowed to flow through existing washes until it was captured by the dike. The ash ponds were not lined and contain an average depth of approximately 24 feet of ash. Ash Ponds 1 and 2 were taken out of service when Ash Pond 3 was constructed in 1976.

In the late 1970s, Evaporation Ponds 1 through 4 were constructed on top of Ash Ponds 1 and 2. The evaporation ponds were constructed with a single liner of 20 milliliter (mL) high-density polyethylene (HDPE) and a 1-foot layer of earth and gravel fill placed over the liner on the sides of the ponds. The evaporation ponds were used for storage of seepage intercept water, runoff, and other industrial water from the FCPP. FCPP began phasing out the use of the evaporation ponds in 2001. The evaporation ponds have not been in use since October 2011 and have since been reclaimed.

#### **Ash Pond 3 and Lined Decant Water Pond**

Ash Pond 3 is currently inactive and was used as an impoundment for the fly ash and FGD solids from Units 1, 2, and 3. The west embankment of Ash Pond 3 is the tallest of all embankments surrounding the pond, approximately 80 feet higher than natural grade.

The Lined Decant Water Pond was constructed on top of the western and southern embankments of Ash Pond 3 and is intended to collect and retain liquid decanted from the Lined Ash Impoundment (described below). The Lined Decant Water Pond is lined with two layers of HDPE Geosynthetic liner, each 60 mL thick. The liquid collected in the Lined Decant Water Pond is then pumped back to the plant for reuse in the scrubbers.

#### **Ash Ponds 4 and 5 and Lined Ash Impoundment**

Ash Pond 4 was constructed adjacent to and shares its western embankment with Ash Pond 3. The western embankment of Ash Pond 4 is the tallest of all embankments surrounding Ash Pond 4, approximately 40 feet higher than natural grade. Ash Pond 5 was constructed adjacent to and shares its southwestern embankment with Ash Pond 4. The northwestern embankment of Ash Pond 5 is the tallest of all embankments surrounding Ash Pond 5, approximately 70 feet higher than the natural grade. Ash Ponds 4 and 5 are inactive and were used as impoundments for the fly ash and FGD solids from Units 1, 2, and 3.

Construction of the Lined Ash Impoundment began in 2003. It was built in five lifts over the top of Ash Ponds 4 and 5 and is lined with a single 60 mL HDPE liner. The Lined Ash Impoundment is used to impound FGD solids from Units 4 and 5 and was previously used to impound the fly ash and FGD solids from Units 1 through 3 until they were shut down on December 30, 2013. Once the solids settle in the

Lined Ash Impoundment, the liquids decant into the Lined Decant Water Pond through either an outfall structure located on the downstream end of the Lined Ash Impoundment or are pumped through an 8-inch diameter HDPE drain pipe located in the southwestern corner of the Lined Ash Impoundment. Once the liquid has been pumped or gravity fed into the Lined Decant Water Pond, it is then pumped back into the plant for reuse in the scrubbers.

### **Ash Pond 6**

Ash Pond 6, which is located on the northwestern side of the Ash Disposal Area, is currently inactive, but was used to impound the fly ash and FGD solids from Units 1, 2, and 3. Ash Pond 6 was designed in 1984 and constructed shortly thereafter. Ash Pond 6 borders Ash Pond 3 to the south and Ash Pond 5 to the southeast. The northern embankment of Ash Pond 6 is adjacent and parallel to the northern lease boundary of the site. Ash Pond 6 is constructed with a clay core embankment that has been keyed into the unweathered shale bedrock. The final lift of Ash Pond 6 is approximately 80 feet higher than natural grade on the western embankment.

### **DFADA Sites 1 and 2**

The DFADA is currently an active, lined landfill facility originally constructed in 2007 and is used for disposal of dry fly ash from Units 4 and 5, as well as small amounts of construction debris from the FCPP. DFADA Site 1 is tallest on its western berm at approximately 110 feet above natural grade. Both DFADA Sites 1 and 2 have composite liner systems consisting of compacted clay liner and a 60 mL HDPE liner. Both sites are projected to reach capacity by 2016.



### **Gridded Disposal Area**

The gridded disposal area, located east of and adjacent to the Lined Ash Impoundment, received coal dust and ash from plant cleanup, lime grit, and construction and other industrial debris until 2010. Asbestos-containing materials were formerly disposed in trenches dug in that waste. Asbestos disposal in the gridded disposal area was discontinued in 1997. In 1984, a portion of the gridded disposal area was used to land farm oil/solvent-contaminated soil (known as the former chlorinated hydrocarbon disposal area). This area is located immediately north of the asbestos disposal area. A thin layer of the contaminated soil was applied to the area to allow air contact, volatilizing the solvents from the soil. The soil was sampled and tested to ensure that residual solvent concentrations were at acceptable levels and then stabilized by applying a covering of ash. This remediation plan was approved by the New Mexico Environmental Improvement Division, who inspected the site, took samples, and approved closure of the remedial activity.

#### **2.2.6.3 Beneficial Reuse of Fly Ash**

In 1997, a vendor established a fly ash beneficiation facility at the FCPP, which allows APS to sell fly ash to other companies to be reused in other materials, such as concrete. Fly ash collected from the baghouses of Units 4 and 5 is tested hourly by the vendor. Fly ash that does not meet the vendor's quality targets is conveyed to the ash silos for disposal. Fly ash that meets the vendor's quality targets is conveyed to the vendor's fly ash beneficiation facility where separation of coarse and fine particles takes place via a centrifugal air classifier. The coarse fly ash drops out and is returned to the power plant for disposal. The fine fraction becomes product, which is sold to other companies for reuse. An average of 240,000 tons per year of the fly ash is beneficially used, which represents approximately 20 percent of the total fly ash generated. The FCPP has beneficially used (recycled) more than 3.5 million tons (7 billion pounds) of fly ash since 1997, thereby reducing (i) the amount of fly ash that must be disposed at the site,

(ii) the reusers' need for virgin materials and the energy required to acquire them, and (iii) the amount of GHG emissions associated with developing new sources of virgin materials. Fly ash from the FCPP is used as an ingredient in concrete for the construction of dams, streets, freeways, bridges, buildings, sidewalks, driveways, parking structures, concrete blocks, and roof tiles. The EPA is currently considering whether to regulate the beneficial reuse of fly ash, and, if so, the most appropriate regulatory approach to be taken. While EPA states that they do not want to negatively impact the legitimate beneficial use of fly ash unnecessarily, they are also aware of the need to fully consider the risks, management practices, and other pertinent information related to fly ash.

### **2.2.7 Natural Gas Supply**

Natural gas for boiler ignition and domestic service is supplied to Units 4 and 5 by El Paso Natural Gas Company. El Paso Natural Gas meters the gas flow at its 24-inch main, approximately 1.3 miles from the plant. A 6-inch diameter steel pipe supplies the units with natural gas. Natural gas is used in start-up for all five units and other minor uses at the FCPP. Gas leaves El Paso Natural Gas's meter at approximately 400 pounds per square inch gage (psig). A pressure reducing and metering station within the plant delivers gas to Units 4 and 5 at approximately 50 psig at full flow. The maximum capability of this gas system supplying Units 4 and 5 is approximately 800,000 standard cubic feet per hour.

### **2.2.8 Chemical Storage**

The chemicals stored and used at the FCPP that are classified by EPA as Extremely Hazardous Substances are hydrazine and sulfuric acid (H<sub>2</sub>SO<sub>4</sub>). Hydrazine was only used in Units 1, 2, and 3 prior to their shutdown and was discontinued and no longer stored on site after January 2014. Other chemicals are used and stored in much smaller volumes throughout the facility in the form of spray cans and other small containers.

### **2.2.9 Plant Maintenance**

Preventive maintenance is scheduled daily, weekly, monthly, quarterly, and annually, as appropriate for various components. Planned maintenance outages occur periodically for minor and major maintenance and are typically scheduled in the spring and fall in accordance with regional power demand. These outages rotate between short (2- to 3-week) and long (1- to 3-month) durations annually. The need for unscheduled outages occasionally arises during which time the necessary maintenance is performed.

### **2.2.10 Ancillary Facilities**

Ancillary facilities at the FCPP are used to transport the produced power. The following sections describe the switchyards and transmission lines associated with the FCPP.

#### **2.2.10.1 Switchyards**

A switchyard is a system of breakers, disconnects, and transformers, with voltage reactors and capacitor banks. The switchyards take the power generated by the FCPP and distribute the power through the equipment in the switchyard and the high-voltage transmission lines to load centers. Power from other generating sources, such as San Juan Generating Station and other power plants, is also wheeled through the switchyards (i.e., passed through and not related to FCPP operations). The FCPP has three switchyards, all of which are contained within the plant site lease area. All switchyards are secured with a 7-foot-high chain-link fence with three strands of barbed wire surrounding its perimeter. Entrance gates are locked at all times when unattended.

The operational performance of all three switchyards' oil-filled electrical equipment primarily is monitored remotely by APS in Phoenix. The power plant's control room monitors specific electrical equipment designated for the units. Substantial changes in the equipment's operating condition trigger an alarm

indicating an adverse condition. This alarm prompts on-site investigation by APS personnel. Oil-filled equipment is monitored by APS and designed with several fail-safe engineering controls to prevent faulting.

**500-kV Switchyard.** This switchyard is located west of the warehouse and is directly connected to Unit 5 through three single-phase step-up transformers. Power in the switchyard may flow to and from Moenkopi Substation or the Four Corners 345-kV switchyard. Electrical equipment in the switchyard includes seven transformers, three shunt reactors, and three stationary storage tanks. The maximum amount of oil contained in all of this equipment is 190,966 gallons; the largest piece of oil-containing equipment is a transformer with a 34,690-gallon capacity. Discharge prevention measures to mitigate the off-site release of oil include secondary containment and 4 to 6 inches of gravel placed throughout the switchyard.

**345-kV Switchyard.** This switchyard is located northwest of the 500-kV switchyard and is directly connected to Unit 4 through three single-phase step-up transformers. Power in the switchyard may flow to and from the PNM San Juan (FC) line, PNM West Mesa (FW) line; the PacifiCorp line to Pinto, Utah; the Western Area Power Administration line to Shiprock, New Mexico; two APS 345-kV lines to Cholla Substation; and a line to the Four Corners 230-kV switchyard. Electrical equipment in the switchyard includes six transformers and four shunt reactors. The maximum amount of oil contained in all of this equipment is 22,628 gallons; the largest piece of oil-containing equipment is a shunt reactor with a 7,540-gallon capacity. Discharge prevention measures to mitigate the off-site release of oil include secondary containment and 4 to 6 inches of gravel placed throughout the switchyard.

**230-kV Switchyard.** The 230-kV switchyard is located north of the 500-kV switchyard and is directly connected to Units 1, 2, and 3 through single-phase step-up transformers. Following shutdown of Units 1, 2, and 3 on December 30, 2013, power in the switchyard continued to flow to and from the PNM Pillar (AF-BI-BP) line; Navajo Mine; two plant emission abatement lines; the 69-kV substation; San Juan Pumping Plant line; and the Four Corners 345-kV switchyard. Electrical equipment in the switchyard includes 16 transformers, 1 shunt reactor, and 2 oil breakers. The maximum amount of oil contained in all of this equipment is 132,493 gallons; the largest piece of oil-containing equipment is a transformer with a 27,710-gallon capacity. Discharge prevention measures to mitigate the off-site release of oil include secondary containment and 4 to 6 inches of gravel placed throughout the switchyard.

## **2.3 Associated Transmission Lines Operations**

### **2.3.1 APS Transmission Lines**

The transmission line ROW grants issued to APS by the BIA and associated with the FCPP apply to the following:

- 179 miles of 500-kV transmission line from the FCPP Switchyard to Moenkopi Substation (ROW encompasses approximately 4,339 acres) over both Navajo Nation and Hopi tribal trust lands and Navajo Nation allotted trust lands (El Dorado line)
- 14 miles of 500-kV transmission line from Moenkopi Substation to the Navajo Nation boundary (ROW encompasses approximately 338 acres)
- Moenkopi Substation (20-acre switchyard footprint within a 212-acre ROW boundary)
- Moenkopi Substation 12-kV line and Access Road (ROW encompasses approximately 0.992 acre)
- 179 miles of 345-kV transmission lines from the FCPP Switchyard to the boundary of the Navajo Nation (two adjacent circuits with a ROW encompassing approximately 5,633 acres)

APS owns and operates the FCPP to El Dorado 500-kV line, which includes the Moenkopi substation, and the 345-kV transmission lines. The 345-kV transmission lines were constructed in 1961, and the 500-kV line was constructed in 1966. Both the 500-kV and 345-kV transmission line towers are typically steel

lattice towers that range in height from between 80 to 150 feet, with cross arm widths ranging from approximately 40 to 110 feet (Figure 2-4).

Southern California Edison previously used 100 percent of the capacity on the 500-kV lines from FCPP to El Dorado Substation; however, Southern California Edison's divestiture of ownership in FCPP eliminated its need to transmit power on the FCPP to El Dorado 500-kV lines. APS currently plans to use part of this capacity along the FCPP to Moenkopi segment to deliver newly acquired FCPP generation (Southern California Edison's portion of Units 4 and 5) south to its system load in the Phoenix area. Thus, APS would not use the Moenkopi to El Dorado 500-kV transmission line to transmit FCPP power to serve its load. All of the capacity on the Moenkopi to El Dorado 500-kV line would be made available to other power generators, as would any remaining capacity on the FCPP to Moenkopi line.

The 345-kV lines are used by APS to transmit power to the Phoenix area. The lines are also used by APS to provide transmission service to PNM for delivery of a portion of PNM's share of Palo Verde Generation to New Mexico and for delivery of PNM power to the Show Low area in Arizona (from either Palo Verde or the FCPP). PacifiCorp also uses these lines to wheel power to Utah.

### **2.3.1.1 ROW Access**

Access to the transmission line ROW is achieved exclusively through the use of open access roads; APS does not hold easements or access rights outside the transmission line ROW but the right of ingress and egress is generally granted as a part of applicable ROW documents. Access to the transmission line ROW is generally open to the community unless access is restricted by the landowner; APS does not restrict access to the transmission line ROWs. In the ROW, access to the lines and towers is generally achieved through the use of unpaved community access roads. APS does not perform regularly scheduled maintenance on roads within the ROWs. If access roads do not exist due to terrain constraints, maintenance crews generally use foot access or helicopters to access the transmission lines.

### **Moenkopi Substation**

The 500-kV Moenkopi Substation and associated 12-kV line and access road are located at 457 N. Highway 89 in Coconino County, Arizona. APS is the owner/operator of Moenkopi Substation with several other entities having transmission rights through the switchyard.

The ROW for the switchyard is 212 acres; the fenced switchyard occupies only 20 acres of the ROW area. The switchyard has a 7-foot-high chain-link fence with 3 strands of barbed wire surrounding its perimeter. Entrance gates are locked at all times when unattended.

The switchyard provides an electricity grid interconnection point between four 500-kV transmission lines, including the Four Corners to Moenkopi line, the Navajo Generating Station to Moenkopi line, the Moenkopi to El Dorado Substation line, and the Moenkopi to Yavapai Substation line. The interconnection at Moenkopi Substation permits APS to transfer FCPP power south to the Phoenix load center. A 12-kV line provides station power to Moenkopi Substation; if this line fails, APS has an on-site generator for backup power. Moenkopi Substation contains capacitor banks and reactors to balance the transmission lines.

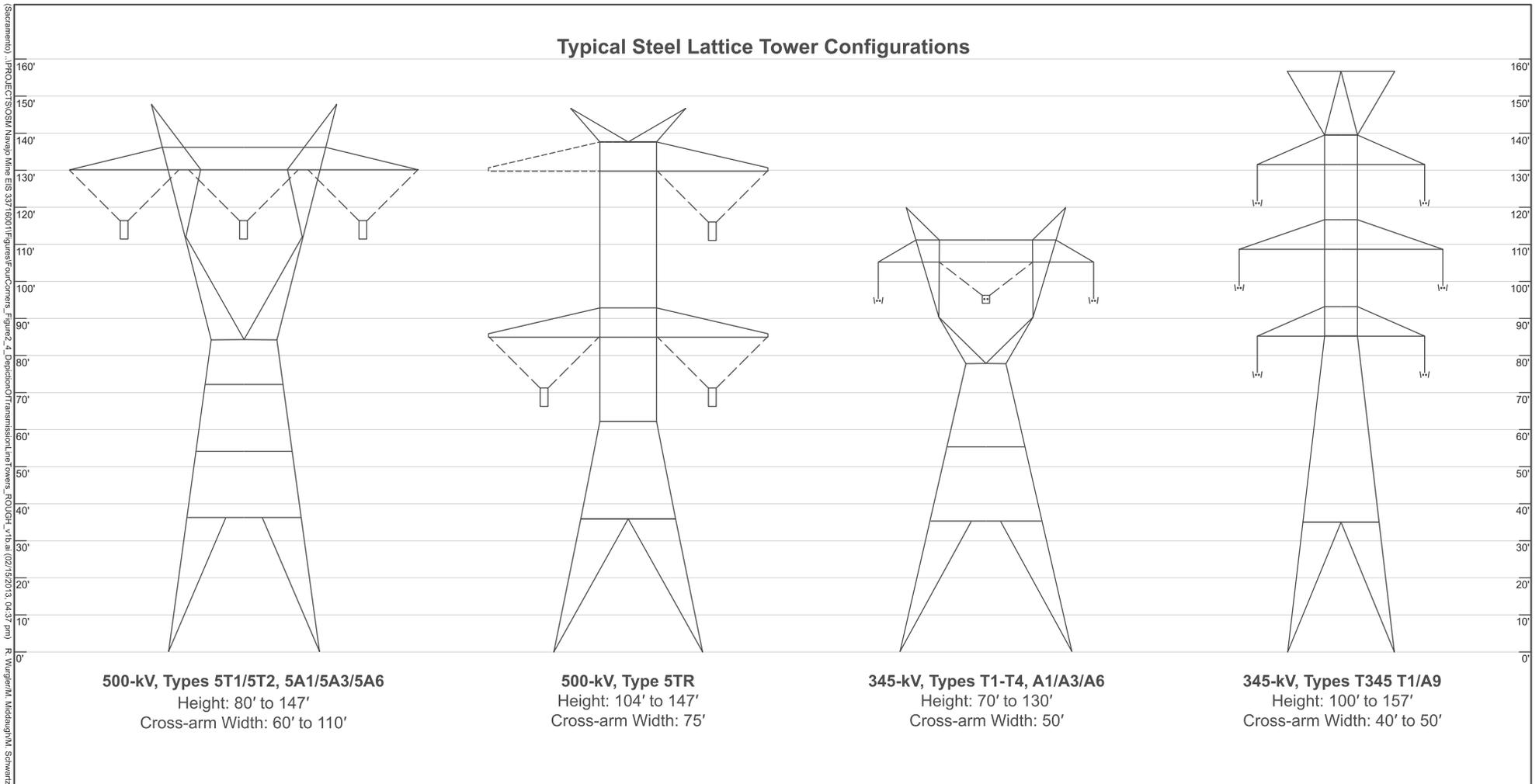
The operational performance of the switchyard's oil-filled electrical equipment is monitored remotely by APS in Phoenix. Any substantial change in the equipment's operating condition can trigger an alarm indicating an adverse condition. This alarm will prompt an on-site investigation by APS personnel. Oil-filled equipment that is monitored by APS is designed with several fail-safe engineering controls to prevent faulting.

Moenkopi Substation contains a control house with remote monitoring equipment, a storage building for spare parts and equipment, and a 1,000-gallon aboveground concrete tank to store diesel fuel. Mineral oil-filled electrical equipment includes 6 current transformers and 15 shunt reactors. The maximum amount of oil contained in all of this equipment is 126,871 gallons; the largest piece of oil-containing equipment is a shunt reactor with a 15,189-gallon capacity.

Moenkopi Substation uses either secondary containment (concrete berms) or 4 to 6 inches of gravel fill to prevent any discharge of oil beyond property boundaries.

**Figure 2-4**  
Depiction of APS Transmission Line Towers

**Typical Steel Lattice Tower Configurations**



(Sacramento) \PROJECTS\OSM Navajo Mine EIS 337 16001\Figures\FourCorners\_Figures\Figure2\_4\DepictionOfTransmissionLineTowers\_ROUGH\_v1b.rvt at 02/15/2013, 04:57 (pm) R. Wurgler\ML\Midnight\ML\_Schwartz

Source(s): Adapted from drawings by Arizona Public Service Company, 1965.

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### 2.3.1.2 **Ongoing Maintenance Activities**

The transmission lines are constructed and maintained to comply with Federal Aviation Administration (FAA) rules and regulations. No lighted towers are present on the transmission line segments requiring ROW renewal.

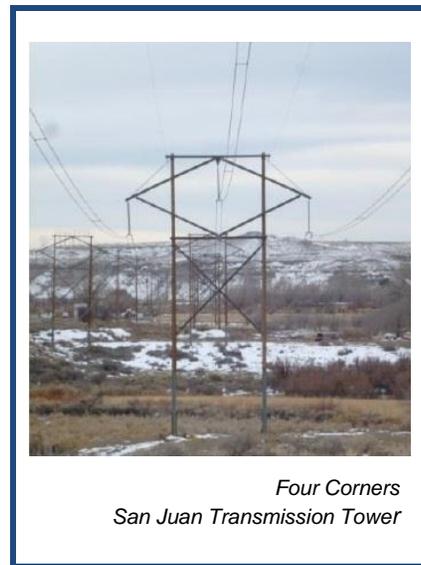
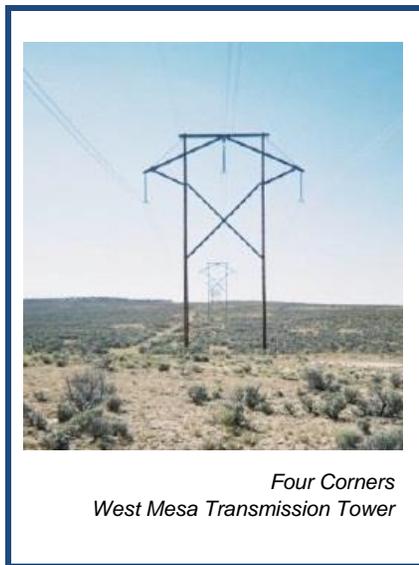
All transmission lines are maintained by APS to ensure safety and reliability. Two types of inspections, aerial and climbing, are performed on the 500-kV and 345-kV transmission lines at different intervals. Aerial inspections are performed annually by helicopter to identify any immediate public safety issues. Climbing inspections are carried out every 7 years and involve a close visual inspection of each of APS's transmission lines.

### 2.3.2 **PNM Transmission Lines**

PNM owns and operates the Four Corners-San Juan and Four Corners-West Mesa transmission lines. The transmission lines enable PNM to deliver output from the FCPP and other electrical generating sources in several western states. The lines are essential elements of the Bulk Electric system reliability for both PNM and network customers. Both are 345-kV transmission lines with 100-foot-wide ROWs. The Four Corners-West Mesa transmission line extends approximately 156 miles, and the Four Corners San Juan transmission line is approximately 10 miles.

Power can flow in either direction on the Four Corners-San Juan transmission line depending on the demand and the generation availability. Power flows on the Four Corners-West Mesa transmission line from north to south. Any rights to transact in or out of Four Corners Switchyard on these transmission lines are governed by existing open access transmission tariff or bilateral transmission service agreements. Because of the convergence of a substantial high-voltage transmission network at Four Corners Switchyard, the various parties who do business there are able to enter into both sale and purchase transactions, enabling efficient use of generation for both conventional and renewable resources.

The Transmission Line towers are wooden K-Frames. Photos of the types of structures are provided below.



### **2.3.2.1 ROW Access**

The transmission lines traverse multiple land jurisdictions and each has multiple grants of ROW agreements and easements. The Four Corners-San Juan line traverses Navajo Nation, BLM, State Land Office, and private land. The Four Corners-West Mesa transmission line crosses noncontiguous BLM land, Petroglyph National Monument (the transmission line predates the creation of the national monument), private land, State Land Office, and Navajo Nation and Zia Pueblo land. In October 2010, the 21<sup>st</sup> Navajo Nation Council approved the ROW Extension/Renewal Agreement between the Navajo Nation and PNM, which provides for the continued operation and maintenance of these transmission lines, among other PNM transmission lines and facilities.

Access to the transmission line ROW is achieved exclusively through the use of open access roads; PNM does not hold easements or access rights outside the transmission line ROW, but the right of ingress and egress is generally granted as a part of applicable ROW documents. Access to the transmission line ROW is generally open to the community unless access is restricted by the landowner; PNM does not restrict access to the transmission line ROWs. In the ROW, access to the lines and towers is generally achieved through the use of unpaved community access roads. PNM does not perform regularly scheduled maintenance on roads within the ROWs.

### **2.3.2.2 Ongoing Maintenance Activities**

PNM conducts yearly inspections of each structure on each transmission line and conducts maintenance as needed. Visual and physical inspections include vehicle (passenger and all-terrain vehicle [ATV]), pedestrian, and aerial surveys. Vegetation management is conducted in accordance with the PNM Transmission Vegetation Management Plan and includes hand-cutting, mechanical clearing, and use of herbicides. Vegetation maintenance is performed, in part, to help reduce fire hazard along the transmission line corridors, as well as to help prevent noxious weeds. Vegetation maintenance usually occurs every 4 to 5 years in pinon-juniper and forested areas, and every 2 to 3 years in riparian areas. Access roads are primarily unimproved two-track dirt roads. Access roads are repaired when roads and trails become impassable for maintenance activities. Access roads are also managed to control erosion and reduce conditions that will cause excessive rutting. Maintenance for the transmission line structures may include releveling pads in areas of uneven terrain to permit safe equipment setup, repair, replacement, or addition of structures or any of the associated equipment and wires, and treating the structures to prevent rot and extend their life span.

PNM also has an environmental screening program that requires screening all transmission maintenance work for compliance-related environmental issues. The environmental review relies on end-to-end biological and cultural surveys of the ROW corridors. Ground-disturbing work in the vicinity of a known cultural or biological resource requires specific monitoring or avoidance stipulations, and land managing agencies are consulted to determine the best course of action to protect the integrity of the resource while conducting the necessary maintenance. Emergency conditions (e.g., weather, system outages, and structure damage) are addressed immediately.

## **2.4 Administrative Changes Post-2014**

### **2.4.1 SMCRA Permit Transfer to NTEC**

On April 29, 2013, the Navajo Nation Council enacted legislation to form NTEC, Limited Liability Company (LLC) (Navajo Codified Legislation No. 0116-13). This legislation was signed into law by President Ben Shelly on April 30, 2013. As stated in the resolution, NTEC seeks to purchase the Navajo Mine and control the lease, mineral rights, and operations of Navajo Mine in order to:

*“promote and develop the Navajo Nation’s resources and new sources of energy, power, transmission, and attendant resources to develop the economic, financial, social and cultural well-being of the Navajo People and the Navajo Nation; and to promote the*

*economic vitality of the Navajo Nation through the production of goods and services, to facilitate management of the Navajo Nation's interest in the development of its energy portfolio and market, to steer the Navajo Nation into a more efficient, productive, vital, and sustainable energy portfolio and market in the best interests of the future generations of the Navajo Nation.*" (Navajo Nation Council Resolution CAP-20-13 as amended May 23, 2013).

Further, the legislation authorizing the formation of NTEC states that "The Navajo Nation's approval of the creation, formation, organization establishment and operation is for the protection and promotion of the Navajo People's and the Navajo Nation's economic and financial best interests, which are tied and related to mining operations and the energy industry within the Navajo Nation, as a means to ameliorate the economic financial and social conditions of the Navajo People and the Navajo Nation." EPA has suggested that NTEC consider development of renewable energy on reclaimed lands of the Navajo Mine Lease Area. This use would require a change to the existing land use designation, which supports livestock grazing.

On May 3, 2013, BNCC and NTEC notified OSMRE of a proposed restructuring of BNCC and ultimate transfer of BNCC's SMCRA permit to NTEC. No operational changes would result from the change of ownership or the transfer of the permit, and no revision to the mine permit or approved mine plan is proposed other than changes to the ownership information. The following is a summary of the steps of restructuring:

1. BNCC changed its name to NMCC. This name change is purely administrative and does not require OSMRE approval under the SMCRA transfer, assignment, and sale regulations.
2. NMCC converted from a Delaware corporation to a Delaware limited liability company, NMCC, LLC. The conversion required only administrative filings in the State of Delaware, and only involved a change of entity-type transaction. It did not result in any changes to the officers, ownership, or operations of the company. However, this change in entity-type triggered the transfer, assignment, and sale provisions of the regulations implementing SMCRA. See 30 CFR 774.17.
3. Immediately following the conversion, NTEC purchased 100 percent of NMCC, LLC's membership interest. The change in ownership and control of NMCC, LLC's membership interest did not require OSMRE approval under the SMCRA transfer, assignment, and sale regulations.
4. Following NTEC's purchase of NMCC, LLC's membership interests, NTEC merged with NMCC, LLC, and NTEC will be the surviving entity. The merger resulted in a permit transfer, triggering the SMCRA transfer, assignment, and sale regulations. BBNMC created a new subsidiary company, MMCo, for the purpose of managing the operation of Navajo Mine for NTEC.

In May 2013, OSMRE prepared a draft Environmental Assessment (EA) in compliance with NEPA regulations for the Navajo Mine SMCRA Permit Transfer review. OSMRE provided the Draft EA and Navajo Mine SMCRA Permit Transfer Application for public review and comment for 30 days, beginning May 18, 2013, and ending June 17, 2013. OSMRE extended the deadline for receiving public comments on the Draft EA and Navajo Mine SMCRA Permit Transfer Application from June 17, 2013 to September 27, 2013. OSMRE announced conditioned approval of the permit transfer, with a finding of no significant impact (FONSI), on November 1, 2013.

BIA served as a cooperating agency in the preparation of the EA for the permit transfer and concluded that the agency did not have an action.

Navajo Nation has been and will continue to be the owner and the lessor of the land and minerals. NTEC, the new SMCRA permit holder, will continue the surface mining and reclamation activities at the Navajo Mine SMCRA Permit Area. NTEC will acquire certain mineral and property rights from NMCC, LLC. In January 2014, BIA received a request for Secretarial approval on a mortgage between BBNMC and NMCC for the Navajo Mine Lease Area. BIA is reviewing this business transaction for compliance with Federal trust policies. The action will undergo NEPA review, as appropriate, per the requirements

provided in the BIA NEPA Guidebook as a Categorical Exclusion for the approval of a mineral lease adjustment or transfer (516 DM 10.5 G[3]). MMCo will be the mine manager on behalf of NTEC from the time of the lease transfer through December 31, 2016. MMCo will be staffed by many of the same employees, management, and executives that currently work for BNCC. Following 2016, MMCo would be replaced by a different mine manager, selected by NTEC and approved by OSMRE. The approved mine manager must meet minimum competency requirements, as defined by OSMRE.

The mine has always been supplied with water from Permit 2838, previously held by BNCC, with the right to divert surface water from the San Juan River in the amount of 39,000 acre-feet per year (consumptive use); 51,600 acre-feet per year (diversion). The Navajo Mine SMCRA Permit Area's usage is approximately 1,000 acre-feet per year. FCPP usage is approximately 25,000 acre-feet per year. The mine and FCPP will continue to be supplied with water from Permit 2838. The sale of NMCC, LLC's equity to NTEC will not change the source or amount of water available to the mine and FCPP. Prior to sale of NMCC, LLC's equity to NTEC, BNCC, the previous owner of Permit 2838, transferred its ownership interest in Permit 2838 to BBNMC. BBNMC will honor all existing contractual commitments for water deliveries (BNCC/NTEC/APS 2013).

The SMCRA permit transfer EA considered the environmental consequences of the permit transfer through the end of the current coal supply agreement in July 2016. Proposed Navajo Mine operations beyond the life of the coal supply agreement (both within the Navajo Mine SMCRA Permit Area and the proposed Pinabete SMCRA Permit Area) are analyzed in this EIS. The Proposed Action evaluated in the permit transfer EA is independent and not connected to the proposed outcomes being evaluated in this EIS. This finding is supported by at least three factors: (1) the Navajo Nation resolution authorizing the formation of NTEC did not identify supporting continued operation of FCPP as a purpose of the action; (2) BNCC's most recent permit transfer application dated September 3, 2013, initiated the process regardless of the outcome of this action; and (3) the October 16, 2013, decision by the Navajo Nation Council allocated \$4.1 million from the Navajo Nation's Unreserved, Undesignated Fund Balance to fund initial and immediate costs and obligations associated with the completion of negotiations and transactions for the acquisition of Navajo Mine from BHP Billiton (Legislation 0305-13), regardless of the outcome of this action. Therefore, the permit transfer is not dependent on and is not a connected action to the Proposed Action because it would proceed regardless of the outcomes being evaluated in this EIS.

#### **2.4.2 EPA FIP for BART (Post-2014)**

In August 2012, the EPA published its source-specific FIP for BART to achieve emissions reductions required by the CAA at FCPP (40 CFR 49.5512).<sup>2</sup> EPA has required FCPP to reduce emissions of NO<sub>x</sub>. EPA has also set emission limits for PM, based on emission rates already achieved at FCPP, which contributes to visibility impairment in 16 mandatory Class I Federal areas around FCPP.

The final FIP allows APS to choose between two BART options:

1. Shut down Units 1, 2, and 3 by January 1, 2014 and install and operate SCR devices on Units 4 and 5 to comply with a BART emission limit of 0.098 pounds of NO<sub>x</sub> per million British Thermal Units of heat input (lb/MMBTU) on Units 4 and 5 by July 31, 2018; or
2. Retrofit all five units to comply with a plant-wide BART emission limit of 0.11 lb/MMBTU of NO<sub>x</sub> by installing and operating an SCR device on one 750 MW unit by October 23, 2016 and installing and operating SCR control technology on the remaining four units by October 23, 2017.

The final BART FIP rule also stipulates that Units 4 and 5 must meet a PM emission limit of 0.015 lb/MMBTU within 60 days after the restart of the units following the major scheduled outages in 2013 and 2014. These emission limits will be attainable through proper operation of the existing baghouses. EPA determined that it is not necessary or appropriate to require similar PM limitations on Units 1-3 because

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<sup>2</sup> [Link to 40 CFR 49.5512](#)

EPA's final Mercury and Air Toxics Standards rule, which set a filterable PM limit of 0.03 lb/MMBTU, applies to these units. FCPP must continue to meet the 20 percent opacity limit on Units 1-5 as well as on its materials and coal handling operations.

The FIP for BART at FCPP required APS to notify EPA of its choice of BART compliance option by July 1, 2013. EPA subsequently extended the date by which APS must notify EPA of its BART compliance strategy, from July 1, 2013 to December 31, 2013. APS notified EPA of its selection of the first option, and shut-down Units 1, 2, and 3 on December 30, 2013.

#### **2.4.2.1 Changes to Plant Ownership**

As described in Section 1.1.2, Southern California Edison previously owned 48 percent of the capacity of Units 4 and 5. In September 2006, California enacted Senate Bill (SB) 1368, which requires power plants to reduce emissions of GHGs. SB 1368 prohibits long-term investments in baseload generation by California investor-owned utilities that fail to meet a carbon dioxide (CO<sub>2</sub>) Energy Performance Standard jointly established by the California Energy Commission and the California Public Utilities Commission. This Energy Performance Standard is 1,100 pounds of CO<sub>2</sub> per MW-hour (California Public Utilities Commission Decision No. 07-01-039). The law prohibits Southern California Edison from making new long-term ownership investments in any baseload plant that does not meet this Energy Performance Standard, including FCPP.

Southern California Edison, therefore, terminated its participation in FCPP, and on December 30, 2013, APS acquired Southern California Edison's ownership shares of Units 4 and 5. The California Public Utilities Commission approved this agreement in 2011 (Decision No 07-09-040), and the Arizona Corporation Commission authorized APS to purchase Southern California Edison's interests in Units 4 and 5. Following the shutdown of APS-owned Units 1, 2, and 3, APS required Southern California Edison's shares of Units 4 and 5 to continue to provide the same baseload generation to its customers. Following transfer of ownership, APS owns 63 percent of the electricity generated by Units 4 and 5, totaling 970 MW.

As described above in Section 2.4.1, the Navajo Nation Council created NTEC with the purpose of assuming ownership and operation of the Navajo Mine, as well as developing other energy projects. The FCPP co-owners executed a long-term agreement with NTEC for the supply of coal to FCPP from July 2016, when the current coal supply agreement expires, through 2031 (the "2016 Coal Supply Agreement"). EPE, a 7-percent owner in FCPP Units 4 and 5, did not sign the 2016 Coal Supply Agreement. Under the 2016 Coal Supply Agreement, APS agreed to assume EPE's obligation to purchase 7 percent of the coal supply for FCPP at some point in the future. When APS ultimately acquires a right to EPE's interest in FCPP by agreement or operation of law, NTEC will have the opportunity to purchase that 7 percent ownership share within a certain time frame pursuant to an option agreement entered into among NTEC and APS concurrent with the closing of the Southern California Edison transaction. APS expects that no transaction would occur before the RODs are issued on the FCPP lease renewals and Pinabete Mine. For purposes of analysis, the possibility that NTEC assumes an ownership stake in FCPP is assessed under cumulative effects (Section 4.18).

#### **2.4.2.2 Actions to Comply with BART Ruling**

On December 30, 2103, APS notified EPA that it would implement BART Option 1.

To comply with BART Option 1, APS indicated that it would take the following actions:

1. Shut down Units 1, 2, and 3; and,
2. Install SCR equipment on Units 4 and 5.

Each of these is described in more detail as follows.

### **Shut Down of Units 1 Through 3**

APS shut down Units 1, 2 and 3 on December 30, 2013, after the sale agreement between APS and Southern California Edison was finalized, as required by FIP. Following shutdown, the units will be decommissioned as described in Section 3.2.5.2. Between February 2014 and February 2015, high value equipment including pumps, motors, and transformers, will be removed and marketed for sale. Smaller equipment will also be removed and demolished. Demolition of larger components such as tanks, heaters, and scrubbers will begin in February 2015 and is projected to take approximately 1 year. Demolition of structures, such as the buildings and the units, will begin in February 2016. Structures supporting Units 4 and 5 will remain, as well as other structures required by the Lease. Decommissioning and dismantling activities will be coordinated with the Navajo Nation, in accordance with lease requirements, so that the area meets the specific needs of any planned reuse. APS has not yet prepared a final decommissioning plan, but any demolition activities would comply with all environmental laws and regulations applicable at the time of decommissioning.

Decommissioning would require environmental abatement activities in the power block, including removal of environmental and safety hazards (e.g., asbestos, lead paint), and chemicals and oils. All chemicals and hydrocarbons will be managed by employees or contractors with the appropriate skill and training to deal with the specific associated hazard and removed and disposed of according to environmental regulations. Used oil will be recycled and hazardous waste will be disposed of by Clean Harbors in their approved facilities. Universal waste will also be recycled by Clean Harbors. Lead paint on metal will either be recycled or removed and disposed as hazardous waste. Asbestos will be removed by certified asbestos workers and sent to a Waste Management-approved facility by Joseph City, Arizona. Chemicals, oils, and hazardous materials will be removed shortly after Unit shutdown. Asbestos will be removed over time to maintain safety or when equipment and structures are removed or demolished. All waste generated during this phase would be managed and disposed of in accordance with applicable Federal environmental regulations. Dismantling and demolition would commence following the removal of asbestos, polychlorinated biphenyls (PCBs), lead paint, and any other hazardous chemicals. Upon removal of structures and facilities, the structural foundations would be removed to 24 inches below grade, the site profiled to allow for proper drainage, and native vegetation planted. The timeline for this process is at the discretion of APS.

### **Installation of SCR Equipment on Units 4 and 5**

APS will install SCR air emission control devices on Units 4 and 5. SCR systems can be installed at any of three locations in a power plant: (1) upstream of both the air preheater (APH) and electrostatic precipitator (ESP) (hot-side, high-dust); (2) upstream of the APH and downstream of the ESP (hot-side, low-dust); and (3) downstream of the APH and ESP (cold-side, low-dust). APS has elected to install hot-side, high-dust SCRs between the boiler economizer and secondary APH on Units 4 and 5. This location is preferred because it eliminates the need to reheat the flue gas to reaction temperature, thereby minimizing loss of thermal efficiency. Each SCR would have two reactors, and each reactor would contain three layers of catalyst and a cavity for a future catalyst layer. After the first 3 years, the top degraded layer would be replaced with the next lower layer. A contract would be set up with the catalyst supplier to handle the spent catalyst.

Ammonia, a required component in the operation of SCR controls, would be transported to the FCPP and stored on site. Ammonia would be supplied to the FCPP by a reagent processing plant, which has yet to be identified. Ammonia would be transported by truck from the nearest large metropolitan area that has the capability to manufacture the required form of ammonia. The three types of ammonia source considered by APS included anhydrous ammonia, aqueous ammonia (29 percent by weight), and solid urea-derived. Based on the risk analysis and recommendation included in the Draft EIS, APS selected the solid urea-derived ammonia option. The approximate number and size of tanks, footprint area, and an estimate of the number of truck shipments per year are shown for the three ammonia options in Table 2-7.

**Table 2-7 Ammonia Reagent Details**

Option	Number of Tanks <sup>1</sup>	Footprint Area (square feet)	Product Amount per Year (tons)	Number of Shipment Trucks per Year
Anhydrous Ammonia	2 rows of 4 (8 total)	39,000 (tanks, unloading and pumping equipment)	9,966	643 (12 per week)
29.4% Aqueous Ammonia	3 rows of 6 (18 total)	57,000 (tanks, unloading and pumping equipment)	33,797	1,504 (29 per week)
56.7% Dry Urea Pellets	3 rows of 6 (18 total)	67,000 (tanks, unloading, pumping, and hydrolyzing equipment, )	17,534	874 (17 per week)

Notes:

<sup>1</sup> Tanks would be horizontal 10-foot diameter X 40-foot length, 20,000-gallon (useable volume)

The use of SCR tends to oxidize some SO<sub>2</sub> to sulfur trioxide (SO<sub>3</sub>), which results in increased H<sub>2</sub>SO<sub>4</sub> mist above the Prevention of Significant Deterioration (PSD) significant emission threshold. Therefore, APS has applied for a PSD permit from EPA. In order to minimize H<sub>2</sub>SO<sub>4</sub> emission increases, APS proposes to install a dry sorbent injection system, using hydrated lime as the sorbent. A pneumatic dry sorbent truck unloading system and silo would be installed. Hydrated lime would be received by truck and pneumatically conveyed to a storage silo and equipment with a baghouse and vent. The lime silo would be approximately 14 feet in diameter and 80 feet tall, including lime transport equipment beneath the silo. Power plant operations currently use lime, but the use of dry sorbent injection is expected to require approximately 900 trucks per year, delivering 10,800 tons per year of hydrated lime. All construction would occur within the existing plant site in areas of previous disturbance.

The environmental issues associated with the different alternatives for transporting, storing, and using ammonia and lime are analyzed in detail in Section 4.15.2.1.

Contract labor and equipment would be mobilized for pre-outage and tie-in outage construction activities. Pre-outage construction is expected to last for approximately 19 months and would require approximately 300 workers. Final tie-in outage construction is expected to last for approximately 105 days and would require approximately 450 workers. Equipment used during construction would include one tower crane, two 250-300 ton cranes, and four 60-90 ton cranes.

Although the BART rules specifically address NO<sub>x</sub> and PM, the BART option chosen by APS would result in a decrease of all air pollutants emitted as shown in Table 2-8.

**Table 2-8 Summary Comparison of Historic and Future Emission Rates**

<b>Criteria Pollutants, Greenhouse Gases and Target Metals</b>	<b>Historic Baseline Emissions (Pre-2014) Units 1, 2, 3, 4, 5 tons/yr</b>	<b>Estimated Future Emissions (Post-2018) Units 4 and 5 tons/yr</b>	<b>Future (Post-2018) versus Historic Baseline (Pre-2014) Reduction percent</b>
Sulfur Dioxide (SO <sub>2</sub> )	11,971	9,800	18%
Nitrogen Oxides (NO <sub>x</sub> )	41,121	5,420	87%
Carbon Monoxide (CO)	2,096	1,580	25%
Filterable Particulate (PM)	1,976	830	58%
CO <sub>2</sub> Equivalents (CO <sub>2</sub> e)	15,439,236	11,396,710	26%
Arsenic (As)	1.78	0.06	96%
Lead (Pb)	1.82	0.07	96%
Mercury (Hg)	0.36	0.07	81%
Selenium (Se)	5.63	0.28	95%

Sources: EPA 2011a, 2012b, 2012c, 2012d, 2012e; AECOM 2013a; 40 CFR 63 Subpart UUUUU Table 2

Notes:

Baseline period is 2005-11 (flue gas desulfurization [FGD] installed on Units 4 and 5).

Estimated future Units 4 and 5 emissions for 2019 and beyond (SCR operated pursuant to 40 CFR 49.5512 BART rule).

Future maximum annual capacity factor = 92 percent based on historic operations (average historic annual capacity factor = 84 percent, generation basis).

Modeled emission rates based on 7,411 mmBTU/hr heat input each unit and selected emission factors (AECOM).

Estimated future SO<sub>2</sub> emissions based on Part 75 annual data; Modeled SO<sub>2</sub> based on Part 75 1-hour average value (AECOM).

Estimated future NO<sub>x</sub> emissions based on Part 75 annual data and BART Rule; Modeled NO<sub>x</sub> based on BART Rule 30-day rolling average (AECOM).

Reduction with respect to historic plant-wide baseline for all 5 units operating.

Historic baseline & estimated future PM emissions calculated pursuant to AP-42 Chapter 1.1 support document Tables 4-7 & A-3; Title V permit condition (Units 1, 2, 3); 40 CFR 49.5512 (Units 4 and 5); CO calculated per AP-42 Chapter 1.1 Table 1.1-3.