

SECTION 42

MONITORING, MAINTENANCE, INSPECTIONS, AND EXAMINATIONS

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Surface Water, Groundwater, and Air Quality Monitoring Locations

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MONITORING, MAINTENANCE, INSPECTIONS, AND EXAMINATIONS

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REV.		DATE
NUMBER	REVISION DESCRIPTION	APPROVED

SECTION 42 MONITORING, MAINTENANCE, INSPECTIONS, AND EXAMINATIONS

This section describes the hydrologic, air quality, and fish and wildlife monitoring plans, including the objectives and rationale of the monitoring system, measurement and sampling methods and equipment, data analysis methods, quality assurance methods, and the reporting schedule. This section also describes the inspection and examination plans for impoundments and disposal facilities.

42.1 Surface Water Monitoring Plan

As described in Section 18 (Water Resources), the South Fork of the Cottonwood Arroyo and Pinabete Arroyo are the primary surface water features within the Pinabete Mine Plan permit area (permit area). Small portions of the permit area also drain into the Cottonwood Arroyo and an unnamed tributary to the Chaco River ([Exhibit 42.1-1](#)). These are ephemeral drainages and flow only in response to precipitation events or snowmelt runoff. Further information on surface water features within and adjacent to the permit area and baseline monitoring is presented in Section 18 (Water Resources). The drainage area of the South fork of the Cottonwood Arroyo is 18.3 square miles (sq mi) upstream of the permit area and 20.7 sq mi where it exits the permit area, while the drainage area of the Pinabete Arroyo is 51.8 sq mi upstream of the permit area and 55.7 sq mi where it exits the permit area (Table 18.1-1). Along the western permit boundary, approximately 0.6 sq mi of the permit area drains to an unnamed tributary to the Chaco River. Approximately 1.7 sq mi of watershed along the northern permit boundary drains to the Cottonwood Arroyo through various ephemeral tributaries. BHP Navajo Coal Company (BNCC) has historically monitored the flow and water quality of the Cottonwood Arroyo at stations CNS-1 and CS-1 (BNCC 2009). In 2012, BNCC installed automated flow samplers along the North Fork, Middle Fork, and South Fork of the Cottonwood Arroyo and downstream at station CNS-1. These surface water quantity and quality sampling stations and historic sampling are discussed further in BNCC's Navajo Mine permit application package (PAP) Chapter 7 (Office of Surface Mining Reclamation and Enforcement [OSM] Permit No. NM-0003F) (BNCC 2009).

The surface water monitoring program is established to monitor surface water quality and quantity at locations where major drainages enter and leave the permit area. The monitoring program provides the basis for assessment of the impact on mining on the surface water resource. While potential for surface water impacts resulting from mining remains nominal, the following monitoring program has been developed to collect water quality and quantity information for use in the possible identification of impacts to the prevailing hydrologic regime. The plan is structured to optimize quarterly sample collection; however, the low precipitation regime will result in no acquisition of samples during some quarters.

42.1.1 Surface Water Monitoring Locations

[Exhibit 42.1-1](#) shows the location of the current and proposed surface water monitoring stations. [Table 42.1-1](#) identifies the surface water monitoring stations. The sampling stations are sited upstream and

downstream within the South Fork of the Cottonwood Arroyo, Cottonwood Arroyo, and Pinabete Arroyo to sample and assess water entering and leaving the permit area.

42.1.2 Surface Water Monitoring Approach and Frequency

Monitoring stations will be installed at upstream and downstream locations near where the channels enter and exit the permit areas. Photos of monitoring sites may be reviewed in [Appendix 42.A](#). BNCC will use a combination of in-stream single-stage sediment samplers ([Figure 42.1-1](#)) to sample water quality and in-stream crest gages ([Figure 42.1-2](#)) or automated ultrasonic flow meters to measure water quantity. The sampling strategy for surface water stations is to acquire samples from the stations at the beginning of each quarter. Once samples are collected, the obligation is complete for that quarter. At the end of each quarter, BNCC or their contractor will prepare the automatic samplers and sediment samplers for the next quarter by emptying them. BNCC will also attempt to collect grab samples of storm runoff at each surface water monitoring location on an annual basis. Sufficient grab sample volume will be obtained to analyze for all the parameters listed in [Table 42.1-2](#). Field pH, specific conductance, and temperature will be acquired for all grab samples. Given the potential for adverse road conditions when flow is present at these stations, obtaining samples on an annual basis will be contingent upon being able to access the monitoring sites.

Samples collected at single-stage samplers will be field monitored for pH and specific conductance. Laboratory analysis of total suspended solids (TSS), major ions, and trace constituents listed in [Table 42.1-2](#) will be performed on the samples. In the event that there is inadequate volume in the single-stage samplers (e.g., due to low flow conditions), samples will be analyzed by the laboratory according to the priority categories listed in [Table 42.1-2](#). If sufficient sample is available to analyze for both major anions and major cations, total dissolved solids (TDS) will be calculated as the sum of the major ion concentrations. TDS will not be determined as the residue on evaporation of a filtered sample because it appears that for some of the single-stage samples collected during the baseline program, colloidal sediments passing through the 0.45 micron (45 μ) filter occasionally resulted in erroneous TDS values.

The Navajo Nation has adopted the Navajo Nation Surface Water Quality Standards (Navajo Nation Environmental Protection Agency [NNEPA] 2008) which established various surface water use and quality standards for the Waters of the Navajo Nation. NNEPA designated uses for the Cottonwood Arroyo and Chaco River include livestock watering (LW), aquatic & wildlife habitat (A&WHbt), fish consumption (FC), and secondary human contact (ScHC) standards (NNEPA 2008). Specific uses have not been designated for the Pinabete Arroyo; however, it is likely that it would share the same standards with the Chaco River as it is a nonperennial tributary. The NNEPA has no water quality standard for total dissolved solids (TDS), sulfate, or fluoride, but relevant livestock use criteria from Lardy, Stoltenow, and Johnson (2008) will be used to help assess the suitability of surface water for livestock use. The surface water monitoring parameter list is presented in [Table 41.1-2](#).

Surface water samples will be marked with the permit area name, sample location (i.e., sample station or coordinate location), sampling date and time, and sampler's name. All samples collected in the field are packed in ice and in coolers and delivered to the laboratory in time to meet U.S. Environmental Protection Agency (USEPA) established analytical holding times. A chain of custody (COC) will accompany all samples submitted to the laboratory. The COC lists the requested analyses and detailed sample information. Once the samples are received by the contract laboratory, the samples are prepared and analyzed in accordance to USEPA guidelines (Guidelines Establishing Test Procedures for the Analysis of Pollutants 40 CFR Part 136). The contract laboratory is required to have an acceptable Quality Assurance/Quality Control (QA/QC) program.

Occasionally the single-stage samplers or crest-stage gages may be destroyed by high flows. Channel geometry will also change due to erosion and deposition during these large flow events. BNCC will reset equipment or resurvey channel cross-sections following major flow events that destroy or damage any of the crest-stage gages or single-stage sediment samplers or significantly alter the channel cross-section.

Upon completion of the hydrologic monitoring program, BNCC will remove all monitoring equipment and appurtenances. The site of each stream monitoring station will then be reclaimed. Cost involved with the station removal and reclamation will be minor and is sufficiently covered by the contingency line item in the existing reclamation bond in Section 50 (Bonding).

Point source discharges will be monitored according to the applicable National Pollutant Discharge Elimination System (NPDES) permitting requirements. NPDES monitoring locations are presented and discussed in Section 25 (Sediment Control Plan).

42.1.3 Surface Water Data Management and Reporting

The analytical data received from the laboratory are managed electronically by BNCC. The data are used to determine and assess long-term trends for the monitored parameters and will be used to monitor and assess potential impacts to the hydrologic regime. The data collected at the downstream Cottonwood Arroyo and Pinabete Arroyo sites will be used in conjunction with computer modeling results from the probable hydrologic consequences (PHC) (Section 41) to support final reclamation for the bond release application. Bonding is discussed in Section 50 and reclamation schedule is discussed in Section 51.

Surface water monitoring results will be submitted on a quarterly basis to OSM. In addition, surface water monitoring information, including data results, summary and interpretations, will be included in a hydrology report submitted to OSM twice during a permit term. The twice a permit term hydrology report will provide a detailed analysis and interpretation of surface water data collected during the period and

include a copy of the raw analytical data in both hardcopy and electronic form. The analysis will include plotting hydrographs, parameter concentration versus time graphs, and statistical summaries. The monitoring data for the period will be compared against historical data trends and water quality standards to identify changes in surface water quality or quantity.

The surface water monitoring plan requirements (including both the monitoring parameters and frequency), except those required by the appropriate NPDES permits, may be modified during mining and reclamation pursuant to the criteria listed in 30 CFR 816.41(e)(3) and based on the surface water monitoring information submitted by BNCC.

42.2 Groundwater Monitoring Plan

As discussed in Section 18 (Water Resources) and Section 41 (Probable Hydrologic Consequences), the hydrogeologic units within the permit area that could potentially be affected by the proposed mining and reclamation activities include:

- Coal seams of the Fruitland Formation
- Pictured Cliffs Sandstone (PCS), located below the Fruitland Formation No. 2 coal seam
- Alluvium of the Chaco River, Cottonwood Arroyo, and Pinabete Arroyo

The groundwater monitoring program will emphasize collecting groundwater quality information from these hydrogeologic units as well as backfill locations. The alluvium of Cottonwood Arroyo and Pinabete Arroyo are the only hydrogeologic units that support current use for livestock watering, although the sulfate and TDS concentrations typically exceed livestock water quality guidelines (Section 18, Water Resources). The baseline monitoring information (Section 18, Water Resources) indicates that the yields in the Fruitland coal seams and PCS are generally too poor to serve as a reliable source for domestic or stock water use. Based on baseline groundwater sample collection, the No. 8 coal seam at well KF2007-01 is the only coal well that had sufficient yield for purging and sampling. Water quality within the No. 8 coal seam at this monitoring location is unsuitable for drinking water due to concentrations of TDS, chloride, fluoride, and sulfate that exceed the relevant water quality criteria for drinking water use. The water at this monitoring location is marginally suitable for livestock use. Although sulfate and TDS concentrations exceed livestock water quality guidelines, the water is of similar quality to the Cottonwood Arroyo and Pinabete Arroyo alluvial groundwater, which is currently used for stock water.

The groundwater monitoring plan presents details on the location of monitoring sites, the target hydrogeologic units, and sampling approach, including sampling parameters and monitoring frequency. The goal of the monitoring plan is to collect information on groundwater quality and quantity to provide an indication of groundwater changes that may occur as a result of mining and reclamation (Section 20, Mining Operations), including verification of the groundwater modeling projections provided in the

probable hydrologic consequences (PHC) assessment in Section 41. OSM may modify the groundwater monitoring requirements, including the parameters and monitoring frequency, based on groundwater monitoring data submitted by BNCC and the criteria described in 30 CFR 816.41(c)(3).

The PHC assessment (Section 41) indicates that after backfilling of mine pits and final reclamation, the groundwater regime will begin to move towards a final equilibrium in recharge-discharge relationships within the alluvium of the Cottonwood Arroyo and Pinabete Arroyo, the mine backfill, the underlying PCS, and the adjacent coal seams of the Fruitland Formation. The groundwater chemistry will also evolve over time as resaturation of the mine spoil backfill occurs as a result of recharge from precipitation, lateral inflow from the coal seams and interburden of the Fruitland Formation, and upward flow from the PCS. Once water levels rise sufficiently in the backfill spoil, groundwater will flow at a very slow rate from the mine spoil into the lower coal seam seams of the Fruitland Formation, into the PCS, and toward the topographic lows along the alluvial channels of Cottonwood Arroyo and Pinabete Arroyo. The rate of groundwater recovery in the mine backfill is estimated to be very slow and may take up to 1,000 years before the final steady-state potentiometric levels and groundwater flow system becomes established (Section 41, Probable Hydrologic Consequences).

As discussed in Section 41 (Probable Hydrologic Consequences), the water in the mine backfill is expected to have higher concentrations of TDS and sulfate than the pre-mine Fruitland Formation coal seams. Groundwater flow and chemical transport modeling results provided in Section 41 (Probable Hydrologic Consequences) indicate that groundwater flow from the mine backfill will be extremely slow and dispersed. A portion will flow vertically into the PCS where it will mix with the PCS groundwater, which has a higher concentration of TDS than estimates for water in the mine backfill. A portion of the backfill water will also flow laterally toward the alluvium and shallow bedrock along the topographic lows associated with the Cottonwood Arroyo and Pinabete Arroyo drainages down gradient of the mine. This water will mix with the alluvial recharge water, which will reduce TDS concentrations along this flow path. Finally, a portion of the backfill water will flow laterally along the potentiometric gradient into the Fruitland Formation coal seams and bedrock located to the north and northeast of the mine. Modeling results indicate that flow rates are extremely low along this pathway. Groundwater monitoring locations proposed in this section are based on consideration of these PHC results.

42.2.1 Groundwater Monitoring Locations

[Exhibit 42.1-1](#) shows the locations of the current and proposed groundwater and alluvial monitoring wells and vibrating wire piezometers (VWPs). [Table 42.2-1](#) identifies monitoring locations of wells and VWPs for monitoring of water levels or hydrostatic pressures. Several of these wells and VWPs are located within the area to be mined and will be removed by mining as indicated in [Exhibit 42.1-1](#).

[Table 42.2-2](#) identifies monitoring locations of wells for monitoring water quality, if sufficient water is available for sampling. Fruitland Formation coal seam water quality is monitored by No. 8 coal seam well KF2007-01. Groundwater modeling reported in Section 41 (Probable Hydrologic Consequences) indicates slow migration of groundwater from the mine spoils through the PCS and the alluvium of the Cottonwood Arroyo and Pinabete Arroyo in the general direction of the topographic lows west of the permit area. Consequently, the down gradient PCS wells KPC-98-01 and KPC2007-01 will also be sampled for water quality analysis if sufficient water is available. A future backfill well will be installed in the regraded spoil once a significant portion of the mine pit is regraded and reclaimed. The proposed backfill well will assess initial backfill water quality and rates of water recovery in the backfill.

Groundwater modeling also indicates extremely slow migration of groundwater from the mine spoils through the Fruitland coal seams toward the north. A No. 3 Coal well, KF3-12-02, and a No. 8 Coal well, KF8-12-2, will be installed in these units adjacent to the mine area as shown in [Exhibit 42.1-1](#) to confirm the groundwater modeling results or to permit modification of modeling based on observations under transient conditions during and following mining. These new down gradient coal wells will also be sampled for water quality analysis if sufficient water is available.

BNCC will ensure that the groundwater monitoring wells are properly installed and maintained for the duration of the hydrologic monitoring program. Upon completion of the hydrologic monitoring program, BNCC will remove all groundwater monitoring equipment and appurtenances. The location of each groundwater monitoring well will be reclaimed according to the applicable sections in Part 5 (Reclamation Plan) of this PAP. Cost involved with the well removal and reclamation will be minor and is sufficiently covered by the contingency line item in the existing reclamation bond in Section 50 (Bonding).

42.2.2 Groundwater Monitoring Approach and Frequency

Water level or hydrostatic pressure measurements will be taken on a quarterly basis at all of the monitoring wells and VWP locations listed in [Table 42.2-1](#) until such time as these locations are disturbed by mining operations or reclaimed. The water levels in monitoring wells will be measured using a well sounder and the depth to water from the measuring point indicated on the well casing will be recorded to the nearest 0.01 foot. The measurement will be compared with the previous readings. If the two measurement values for any single well differ by more than 0.5 foot, the water level will be remeasured.

The frequency and temperature readings at the VWP locations will be measured using the digital readout device. These readings will be compared with the previous readings. If the temperature readings differ by more than 1°C or the frequency readings differ by more than 10 HZ, the VWP color code and location will be verified to ensure that the readings are from the same VWP and then the reading from the digital readout device checked to ensure that the first readings were recorded properly.

The monitoring wells listed in [Table 42.2-2](#) will be sampled for water quality at the frequency described in the table, provided there is sufficient water present to support purging. Field readings of pH, temperature, and specific conductance will be taken at the time of sampling. Regulations require that the groundwater monitoring plan include analysis of TDS or specific conductance, pH, total iron, total manganese, water levels, and any additional constituents identified in the spoil leachates or baseline monitoring data (Section 18, Water Resources) as potentially deleterious to current and post-mining water uses. All laboratory analyses of groundwater samples will be performed for the list of parameters provided in [Table 42.2-3](#). If insufficient sample is available for laboratory analysis, only field parameters will be collected.

Prior to sampling and following measurement of the depth to water from the measuring point indicated on the well casing the wells will be purged. The well will be slowly purged so that well water level draw down is minimized. Field parameters will be measured periodically and samples collected after field parameters have stabilized within approximately 10% between at least three successive measurements during purging.

The yield of some wells may be too low to permit purging. It might be necessary to return to these low-yield wells several days following initial purging to obtain the minimum sample volume needed for analysis. If the static water column in a well is less than 2 feet, it is unlikely to yield sufficient water for laboratory analysis but should provide sufficient volume for measurement of field parameters. In cases where the static water column is less than 2 feet, no laboratory analyses will be conducted.

Groundwater samples will be marked with permit area, well number, sampling date and time, and sampler's name. Samples will be collected and preserved in the field following USEPA guidelines found in 40 CFR, Part 136 Guidelines Establishing Test Procedures for the Analysis of Pollutants. The samples will be packed in ice, placed in a cooler, and delivered to the analytical laboratory. A COC will accompany all samples submitted to the laboratory for analysis. The COC lists the requested analyses and detailed sample information. The samples submitted to the laboratory will be analyzed for the parameters on [Table 42.2-3](#) in accordance to USEPA approved analytical methodology, laboratory QA/QC procedures, and priorities based on sample volume.

Lab quality control (QC) samples will be collected to support laboratory QC analysis, when possible. For QA/QC requirements, the analytical laboratory will routinely split 10% of the samples to perform matrix spike and lab duplicate analyses. To support this QA/QC requirement, one sample split will be obtained per sampling event and designated as a "Lab QC Sample Split" for the QC analyses. This split sample will be collected at one of the sample locations and might not always be obtained if well yields are insufficient. BNCC or its sampling contractor will attempt to acquire a QC blind duplicate sample for one in ten

samples collected. If there are insufficient sample volumes for QC analysis, the laboratory may provide the required information from other samples analyzed during the same run or day as the samples.

42.2.3 Groundwater Data Management and Reporting

The analytical data received from the laboratory will be managed electronically by BNCC. Groundwater level monitoring and quality sampling results will be submitted quarterly to OSM. In addition, groundwater monitoring information, including data results and summary of the data collected and identification of anomalies or inconsistencies, will be included in a hydrology report submitted to OSM twice during the permit term. The twice a permit term hydrology report will provide a detailed analysis and interpretation of groundwater data collected during the period and include a copy of the raw data and analytical results in both hardcopy and electronic form and analysis and interpretation of groundwater data collected during the period. The analysis will include plotting hydrographs, parameter concentration vs. time graphs, and statistical summaries. The period monitoring data will be compared against historical data trends to identify potential changes in groundwater quality or quantity.

42.3 Air Quality Monitoring Plan

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) states that the PAP shall contain an air pollution control plan which includes an air quality monitoring program to provide sufficient data to evaluate the effectiveness of the fugitive dust control practices proposed by the applicant to comply with federal and state air quality standards. The air quality monitoring plan described herein is designed to support and meet the requirements of the federal regulations, 30 CFR Part 780.15.

42.3.1 Objectives and Rationale

Particulate data monitoring objectives for the permit area are to monitor ambient air particulate concentrations to determine the effectiveness of fugitive dust control practices utilized by the mine as described in the fugitive dust control plan (Section 40, Environmental Protection). BNCC will monitor particulate concentrations near representative mining activities as described in Section 40 (Environmental Protection) of this PAP.

Meteorological data collected by the Meteorological Station III (NM Met III) will be used to support the Pinabete air quality monitoring program. As mentioned in Section 12 (Climate), information from the NM Met III station was used in combination with other BNCC Navajo Mine meteorological stations to describe the baseline climate of the permit area ([Exhibit 42.1-1](#)). BNCC will assess whether additional meteorological stations are necessary to facilitate the monitoring program as mining progresses in Area 4 South.

42.3.2 Measurement and Sampling Methods and Equipment

42.3.2.1 Particulate Matter Sampling

BNCC conducts ambient particulate matter air monitoring. The proposed monitoring is based on low volume (16.67 L/min) filter-based samplers manufactured by BGI, Inc., or equivalent sampling equipment. These samplers can be remotely located, requiring a single solar panel and external battery for operation. The method is filter based, using a 47-mm Teflon filter. The filters are processed under climate controlled conditions for pre- and post-sampling periods. The sampler operating procedures, filter specifications, handling, and data reporting or interpretation will follow industry standard methods.

42.3.2.2 Meteorological Monitoring

The NM Met III station includes a 10-m tower instrumented at three different levels: 10 m, 2 m, and ground level. A Campbell Scientific CR 10x datalogger collects data on 1-second scan intervals and outputs data averaged over a period of 1 hour. The description of the operation and maintenance of this station is described in the BNCC Navajo Mine PAP NM-0003F (BNCC 2009).

The meteorological monitoring station will monitor the parameters as outlined in [Table 42.3-1](#).

42.3.3 Data Analysis Methods

42.3.3.1 Particulate Matter

Particulate matter samples will be taken as described in the fugitive dust control plan (Section 40, Environmental Protection). The following information will be collected for each sampling event:

- Determination of sampler flow rate.
- Determination of fluctuation of air flow during each sample run.
- Inspection of filters for problems encountered through filter handling and exposure to the environment.
- Calculation of the net filter weight change from pre- to post-sampling.
- Calculation of the measured concentration.

42.3.3.2 Meteorological Monitoring

The data from the 10-m tower at NM Met III will be analyzed on an as-needed basis. Data will be reviewed per the following outline:

- Compare the data to the particulate matter data collected to understand the meteorological influences in the particulate matter sampling.
- Compare conditions to parameters from nearby towers as available.

42.3.4 Quality Assurance Methods

42.3.4.1 Particulate Matter

Flow-rate calibration checks and sampler maintenance will be performed according to industry standard methods. Quality control for the particulate sampling program will be performed in accordance with manufacturer's instruction manuals.

The physical integrity of each particulate sampler will be visually checked at the time of filter installation for a given sampling interval. A multipoint calibration will be performed on each sampler on a quarterly basis and following any major repair work. An independent field audit will be conducted each quarter for each sampler. Routine preventative maintenance will be scheduled in accordance with the manufacturer's guidelines and on an as-needed basis as determined during the routine inspections.

Results from the quality assurance methods will be documented at the time of service on multiple-copy field log forms and calibration log forms. The information on the log forms includes date, time of day, and serial numbers of all critical equipment in use.

42.3.4.2 Meteorological Monitoring

General station checks, calibration, and maintenance will be performed according to the manufacturer's instruction manuals.

42.3.5 Reporting Schedule

42.3.5.1 Particulate Matter

BNCC will submit air quality monitoring information quarterly to OSM. This information will be included in an annual report submitted on or before August 31. The air quality monitoring results presented in this report will be from the period of July 1 through June 30.

42.3.5.2 Meteorological Monitoring

BNCC will maintain meteorological monitoring data on site for purposes of data analysis.

42.3.6 Probable Changes to Air Quality and Measures to Comply With Prevention of Significant Deterioration (PSD) Limitations

Mining operations under the new permit will generate fugitive emissions of particulate matter. Such emissions are characterized by non-buoyant plumes released at or near ground level. Consequently, dispersion of those emissions into the ambient air is very limited.

Mining operations under the Pinabete mine plan will essentially consist of the same mining operations currently ongoing at Navajo Mine (OSM Permit No. NM-0003F) (BNCC 2009) which are moved to new

locations within BNCC's mining lease. That is, emissions associated with mining under the Pinabete mine plan will be offset by emissions that are discontinued under the Navajo Mine mine plan. As a result, any increase in particulate matter emissions under the new Pinabete permit will be minimal, if any. Because overall emissions are not projected to increase significantly under the Pinabete permit, existing levels of ambient air quality are not expected to change. Existing levels of ambient air quality surrounding the mine comply with applicable national ambient air quality standards (NAAQS), and mining operations under the Pinabete mine plan will not change that compliance status.

The Navajo Nation does not currently have a tribal implementation plan (TIP) that has been approved by the U. S. Environmental Protection Agency (USEPA). Therefore, federal Clean Air Act (CAA) programs that apply to stationary sources located within the exterior boundaries of the Navajo Nation are administered and enforced by USEPA.

The existing Navajo Mine is not currently classified as a major stationary source under USEPA's regulations for prevention of significant deterioration (PSD) of air quality. Moreover, the change in mining operations with the Pinabete permit will not be classified as a new major stationary source. Therefore, mining operations under the Pinabete permit will not be subject to preconstruction permitting requirements under the PSD program.

The existing Navajo Mine is currently classified as a minor stationary source under USEPA's regulations for minor new source review (NSR) in Indian country. Minor NSR applicability is triggered by an increase in allowable emissions at an existing minor source although coal mining is one of the source categories for which the calculation of any emissions increase does not include fugitive emissions. Thus, even if there were a modest increase in fugitive emissions with the Pinabete permit, mining operations under the Pinabete permit would not be subject to preconstruction minor NSR.

Because mining operations under the Pinabete permit will not have to undergo permitting under the PSD or the minor NSR regulations, no new air pollution control measures will need to be implemented prior to commencement of mining under the new permit. Given the negligible changes in emissions and air quality that result from mining operations under the new permit, the mine will continue to rely on its fugitive dust control plan (Section 40.8) to assure continued compliance with applicable requirements under the CAA.

42.4 Fish and Wildlife Monitoring Plan

Based on the outcomes of consultation and coordination with the Navajo Nation Department of Fish and Wildlife (NNDFW) and OSM, BNCC has developed an adaptive approach to wildlife monitoring and mitigation. An adaptive monitoring and mitigation approach assists NNDFW to gather the information needed to effectively manage the wildlife resources of the Navajo Nation, while allowing BNCC the

flexibility to apply the most appropriate wildlife mitigation measures in accordance with standard scientific protocols. Monitoring and mitigation measures described in the plan are intended to address all mining and reclamation activities associated with the permit area.

As discussed in Section 16 (Fish and Wildlife), there are no permanent water bodies present within the permit area. Therefore, BNCC has not developed mitigation plans for water habitats. BNCC's plans to reclaim and restore the hydrologic features of the permit area are described in Section 35 (Hydrologic Reclamation Plan). Compliance with the Clean Water Act for the protection and mitigation of jurisdictional waters of the United States is discussed Section 8 (Compliance with Air and Water Quality Laws and Regulations).

The wildlife monitoring plan is intended to complement the wildlife enhancement measures and protection measures presented in Sections 39 (Fish and Wildlife Enhancement) and 40 (Environmental Protection), respectively. The wildlife enhancement measures, discussed in Section 39 (Fish and Wildlife Enhancement), are long-term mitigation measures accomplished by incorporating lasting habitat features and components into the post-reclamation surface. The protection measures discussed in Section 40 (Environmental Protection) include the operational and design features BNCC will implement to minimize impact to wildlife resources within and adjacent to the permit area. The monitoring and mitigation measures discussed in this section and [Appendix 42.B](#) describe the timing and procedures used to monitor the wildlife resources and provide mitigation measures.

BNCC will periodically conduct wildlife resource monitoring surveys to determine the need for wildlife buffer areas or to identify wildlife features that require mitigation measures. The objectives of these surveys are:

- to assure that mitigation measures are limiting the impacts of mining on wildlife species;
- to identify the presence of additional important wildlife habitats that may occur (e.g., new raptor nests);
- to identify additional unanticipated impacts that require development of specific mitigation measures;
- to describe and characterize the wildlife use of reclaimed areas; and
- to generally track important wildlife activities within the permit area.

Prior to any new land-disturbing activities, annual mine operation plans are reviewed to identify potential conflicts with important wildlife habitats (e.g., rimrocks, raptor nests, and water sources) so that consideration can be made for mitigation. Early identification of these features is desirable to allow flexibility in resolving conflicts with the least possible impact to wildlife species. As part of the annual mine operation plan review, surveys are conducted around existing mining activities to determine if there

have been any changes to existing wildlife habitats. The results of these monitoring surveys determine whether buffer areas are needed for certain areas or whether wildlife habitats require mitigation.

As species are either listed or de-listed on the Navajo Natural Heritage Program (NNHP) Navajo Endangered Species List (NESL) (NNHP 2008) or the USFWS Southwest Region Endangered Species List (USFWS 2011), their change in status will be reflected within the Pinabete Permit monitoring and mitigation plan.

The permit monitoring and mitigation plan describes the monitoring and mitigation of raptors and general wildlife documented or having potential to occur in the permit area ([Appendix 42.B](#)).

BNCC will prepare an annual raptor and general wildlife monitoring report for submission to NNDFW and OSM by August 31 each year. These reports will document and evaluate the effectiveness of the mitigation measures and provide recommendations for improvements.

42.5 Impoundments, Inspections, and Examinations

BNCC will inspect sediment/drainage control ponds and impoundments during and after construction to verify the pond or impoundment has been built in accordance with the approved design. BNCC will provide a report, certified by a professional engineer, to OSM documenting that the construction has occurred according to the approved design or BNCC will develop an as-built design of the structure. The as-built design will be kept on file at the mine site and will be made available upon request. Once constructed, these structures will be inspected in compliance with 30 CFR 816.49(a)(11) to ensure they have the proper capacity and are maintained in accordance with the approved design. A qualified specialist, under the direction of a professional engineer, shall conduct the inspections at least yearly. Inspections shall continue until the structure is removed or OSM approves that inspections are no longer needed. A certified professional engineer shall review the inspections and prepare a report certifying that the ponds and impoundments are being maintained in accordance with the approved design and shall identify any corrective actions. An example of the impoundment inspection report form is provided as [Appendix 42.C](#). The certified impoundment inspection report will be included in the annual reclamation report, submitted to OSM on or before August 31 each year. The locations of the impoundments are presented on Exhibit 26.1-1.

Required maintenance will be noted on the inspection report and communicated internally for action. Gage posts will be maintained in each pond or impoundment. The maximum permissible gage reading for each pond or impoundment is provided on Table 26.2-1. When the water and/or sediment rises up to the permissible gage reading, the pond or impoundment will be pumped or sediment removed to reestablish the required capacity.

BNCC does not plan to construct any ponds or impoundments that meet criteria defined in 30 CFR 77.216-3 or OSM Directive TSR-2. BNCC does not plan to construct any coal mine waste dams or impoundments.

42.6 Excess Spoil Disposal Sites Inspections

As discussed in Section 21 (Waste Disposal Structure and Facilities), BNCC intends to utilize all spoil material to achieve approximate original contours (AOC) and does not plan to construct any excess spoil disposal facilities. Therefore, this section is not applicable.

42.7 Waste Banks and Refuse Piles Inspections

As discussed in Section 21 (Waste Disposal Structure and Facilities), BNCC does not plan to dispose of coal mine waste in banks or refuse piles. Therefore, this section is not applicable.

42.8 Alluvial Valley Floor Monitoring Plan

There are no alluvial valley floors (AVF) or waters supplying AVF present within or adjacent to the permit area. Therefore, this section is not applicable. The negative determination for AVF is presented in Section 19 (Alluvial Valley Floors).

Personnel

Persons or organizations responsible for data collection, analysis, and preparation of this permit application package section:

Kent Applegate	Norwest Applied Hydrology
Ron Van Valkenburg	Denver, Colorado
Vivie Melendez	
Matt Owens	
BHP Navajo Coal Company	

References

BHP Navajo Coal Company (BNCC). 2009. Navajo Mine Permit Application Package. OSM Permit No. NM-0003F. On file at Office of Surface Mining Reclamation and Enforcement- Western Region Technical Office. Denver, Colorado.

Navajo Natural Heritage Program (NNHP). 2008. Navajo Endangered Species List. http://nnhp.nndfw.org/nnhp_nesl.pdf (Verified March 29, 2012).

U.S. Fish and Wildlife Service (USFWS). 2011. Endangered species lists. U.S. Fish and Wildlife Service, Southwest Region Ecological Services.

http://www.fws.gov/southwest/es/EndangeredSpecies/EndangeredSpecies_Lists/EndangeredSpecies_ListSpecies.cfm (Verified March 29, 2012).

Table 42.1-1 Quarterly Surface Water Monitoring Locations

Proposed monitoring locations ¹		
Site name	Northing (ft)	Easting (ft)
CNS-1 ²	2,008,565	298,361
CS-2 ²	1,998,100	309,106
CS-3 ²	2,000,525	308,666
Upper Pinabete	1,979,840	309,269
Lower Pinabete	1,996,028	296,061

¹ Locations presented in State Plane New Mexico West, North American Datum 1927 coordinates.

² Approximate locations. Scheduled for installation in 2012. Location will be surveyed upon installation of surface water

Pinabete Permit Application Package

Table 42.1-2 Surface Water Monitoring Parameter List

Parameter	Unit	Priority class ¹	Method
Flow	cfs or gpm	1	
pH	SU	1	SM4500-H B
Specific conductance	µmhos/cm	1	SM2510 B
Hardness	mg/L	3	SM2340 B
Total dissolved solids (TDS)	mg/L	3	calculation method ²
Total suspended solids (TSS)	mg/L	2	SM2540 D
Aluminum, total	mg/L	4	EPA 200.7 or EPA200.8
Arsenic, total	mg/L	4	EPA 200.7 or EPA200.8
Boron, total	mg/L	4	EPA 200.7 or EPA200.8
Calcium, dissolved	mg/L	3	EPA 200.7
Iron, total	mg/L	4	EPA 200.7 or EPA200.8
Magnesium, dissolved	mg/L	3	EPA 200.7 or EPA200.8
Manganese, total	mg/L	4	EPA 200.7 or EPA200.8
Mercury, total	mg/L	5	EPA 245.1
Potassium, dissolved	mg/L	3	EPA 200.7 or EPA200.8
Selenium, total	mg/L	4	EPA 200.7 or EPA200.8
Sodium, dissolved	mg/L	3	EPA 200.7 or EPA200.8
Bicarbonate	mg/L	3	A2320 B
Carbonate	mg/L	3	A2320 B
Chloride	mg/L	3	EPA 300.0
Fluoride	mg/L	3	EPA 300.0
Nitrate-N	mg/L	3	EPA 353.2
Sulfate	mg/L	3	EPA 300.0
Temperature ³	°C	1	SM 2550 B

¹analysis priority class ranging from highest (1) to lowest (6). Analysis will be conducted on highest priority parameters first, before conducting analysis on lower priority parameters.

²calculated from the sum of constituents. See "Techniques of Water Resources Investigations of the United States Geological Survey-Methods for Collection and Analysis of Water Samples for Dissolved Minerals and Gases"

³parameters acquired only from grab samples. BNCC will attempt to collect a annual grab sample at each surface water sampling location.

SU- standard units

Pinabete Permit Application Package

Table 42.2-1 Quarterly Groundwater Level Monitoring Locations

Well/VWP name	Hydrogeologic unit	Northing ¹	Easting ¹
VWP2007-03 (#2)	No. 2 coal seam	1,975,118	303,891
VWP2007-05 S2 (blue)	No. 2 coal seam	1,963,803	300,994
VWP2007-01 (yellow)	No. 2a/2b coal seams	1,995,125	320,544
KF3-12-2 ²	No. 3 coal seam	2,005,479	292,718
KF-98-02	No. 3 coal seam	1,974,602	303,882
KF-98-03	No. 3 coal seam	1,984,268	304,595
KF-98-04	No. 3 coal seam	1,990,165	300,367
VWP2007-01 (yellow)	No. 3 coal seam	1,995,125	320,544
VWP2007-02 (#3)	No. 3 coal seam	1,984,390	307,994
VWP2007-03 (#3)	No. 3 coal seam	1,975,118	303,891
VWP2007-01 S6 (white)	No. 6 coal seam	1,995,125	320,544
VWP2007-02 (#2)	No. 6 coal seam	1,984,390	307,994
VWP2007-02 S7 (#4)	No. 7 coal seam	1,984,390	307,994
KF2007-01	No. 8 coal seam	1,984,390	307,994
VWP2007-02 S8 (#5)	No. 8 coal seam	1,984,390	307,994
KF8-12-2 ²	No. 8 coal seam	2,005,558	292,911
KPC-98-01	Pictured Cliffs Sandstone (PCS)	1,993,800	290,789
KPC2007-01	PCS	1,995,125	302,544
KPC2007-02	PCS	1,975,118	303,891
KPC2007-03	PCS	1,982,903	295,089
VWP2007-01 Kpc (blue)	PCS	1,995,125	320,544
VWP2007-02 Kpc (#1)	PCS	1,984,390	307,994
VWP2007-04 Kpc	PCS	1,971,752	293,812
VWP2007-05 Kpc (red)	PCS	1,963,803	300,994
PA-1	Pinabete Alluvium, down gradient	1,990,310	300,421
PA-2	Pinabete Alluvium, up gradient	1,980,957	306,703
QACW-2	Cottonwood Alluvium, down gradient	2,009,620	287,240
CWA-4	Cottonwood Alluvium, down gradient	2,008,383	298,166
CWA-3	Cottonwood Alluvium, up gradient	2,000,512	310,584
BF20XX-1 ³	Backfill well	Future	Future

¹ Locations presented in State Plane New Mexico West, North American Datum 1927 coordinates.

² Approximate locations. Wells scheduled for installation in 2012. Location will be surveyed upon installation of well.

³ Backfill well to be installed at a future date in the regraded Area 4 North mining area.

Pinabete Permit Application Package

Table 42.2-2 Quarterly Groundwater Quality Monitoring Locations

Existing Monitoring Locations				
Well Name	Hydrogeologic Unit	Sampling frequency	Northing (ft) ¹	Easting (ft) ¹
KF2007-01	No. 8 coal seam	quarterly	1,984,390	307,994
KF-98-02	No. 3 coal seam	quarterly	1,974,602	303,882
KPC2007-02	Pictured Cliffs Sandstone	quarterly	1,975,118	303,891
KPC-98-01	Pictured Cliffs Sandstone	quarterly	1,993,800	290,789
KPC2007-01	Pictured Cliffs Sandstone	quarterly	1,995,125	302,544
KF3-12-2 ²	No. 3 coal seam	quarterly	2,005,479	292,718
KF8-12-2 ²	No. 8 Coal Seam	quarterly	2,005,558	292,911
PA-1	Pinabete Alluvium, down gradient	quarterly	1,990,310	300,421
PA-2	Pinabete Alluvium, up gradient	quarterly	1,980,957	306,703
QACW-2	Cottonwood Alluvium, down gradient	quarterly	2,009,620	287,240
CWA-4 ²	Cottonwood Alluvium, down gradient	quarterly	2,008,383	298,166
CWA-3 ²	Cottonwood Alluvium, up gradient	quarterly	2,000,512	310,584
Future Monitoring Locations ³				
Well Name	Hydrogeologic Unit	Sampling frequency	Northing (ft) ¹	Easting (ft) ¹
BF20XX-1 ³	Backfill	quarterly	Future	Future

¹ Locations presented in State Plane New Mexico West, North American Datum 1983 coordinates

² Approximate locations. Wells scheduled for installation in 2012. Location will be surveyed upon installation of well.

³ These are proposed future monitoring locations. This table will be updated, as the proposed monitoring wells are installed.

Table 42.2-3 Groundwater Monitoring Parameter List

Parameter	Unit	Method
Location	feet	
Groundwater elevation	feet	
pH	SU	SM4500-H B
Conductivity	µmhos/cm	SM2510 B
Temperature	°C	SM 2550 B
Total dissolved solids (TDS)	mg/L	A2540 C
Calcium, dissolved	mg/L	EPA 200.7
Chloride	mg/L	EPA 300.0
Fluoride	mg/L	EPA 300.0
Iron, total	mg/L	EPA 200.7 or EPA200.8
Magnesium, dissolved	mg/L	EPA 200.7 or EPA200.8
Manganese, total	mg/L	EPA 200.7 or EPA200.8
Potassium, dissolved	mg/L	EPA 200.7 or EPA200.8
Selenium, dissolved	mg/L	EPA 200.7 or EPA200.8
Sodium, dissolved	mg/L	EPA 200.7 or EPA200.8
Alkalinity, total as CaCO ₃	mg/L	A3114 B
Bicarbonate, as HCO ₃	mg/L	A2320 B
Carbonate, as CO ₃	mg/L	A2320 B
Hydroxide, as OH	mg/L	A3114B
Sulfate	mg/L	EPA 300.0
Cation/Anion balance	%	A1030 E

MP- measuring point

Table 42.3-1 NM Met Station III Parameter List

Parameter	Height
Wind speed	10 m
Wind direction	10 m
Sigma Theta of horizontal wind direction	10 m
Temperature	10 m
Temperature	2 m
Delta temperature	10 to 2 m
Relative humidity	2 m
Net radiation	2 m
Solar radiation	2 m
Precipitation	Ground level

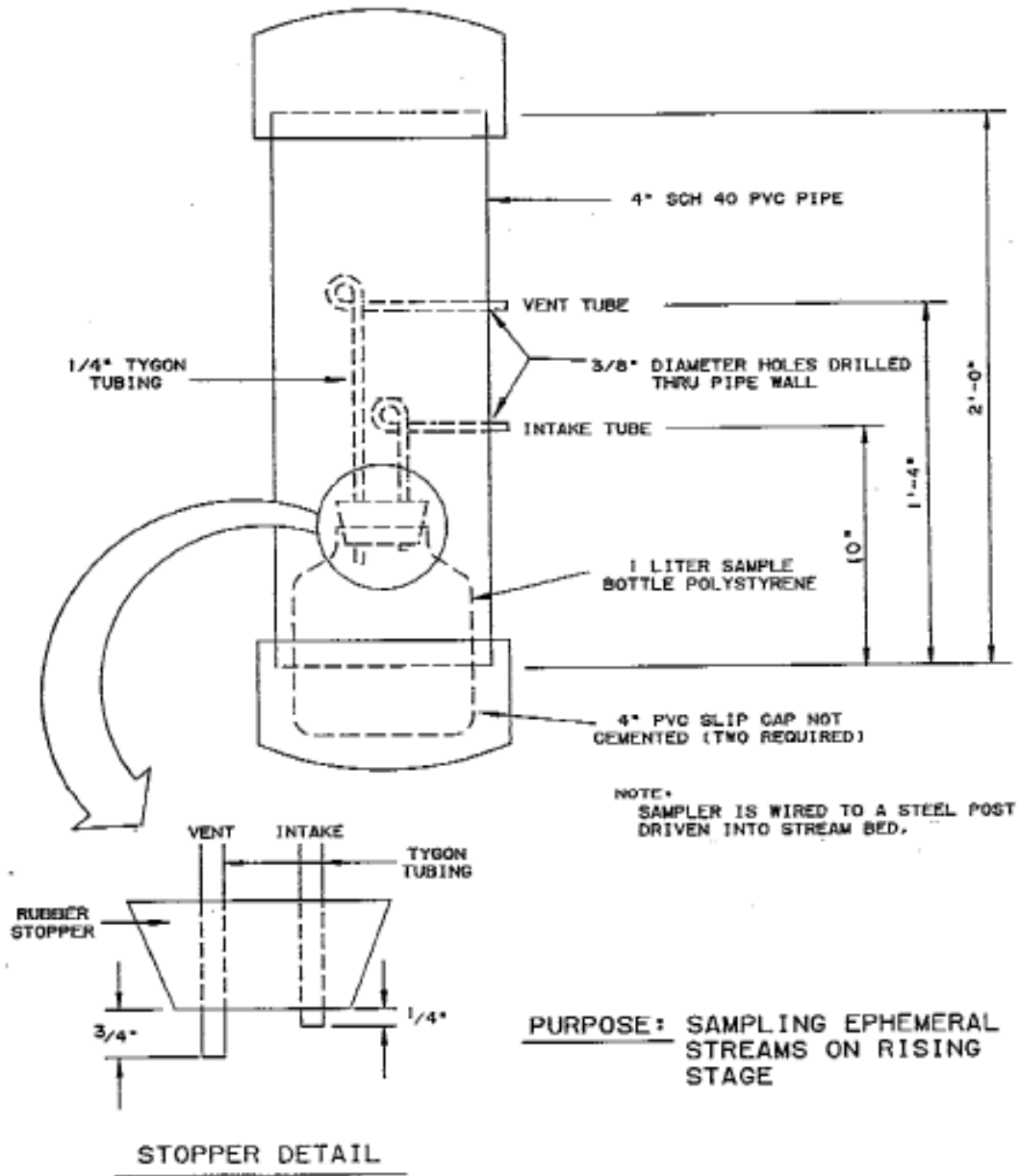


Figure 42.1-1 Schematic of Single-Stage Sediment Sampler

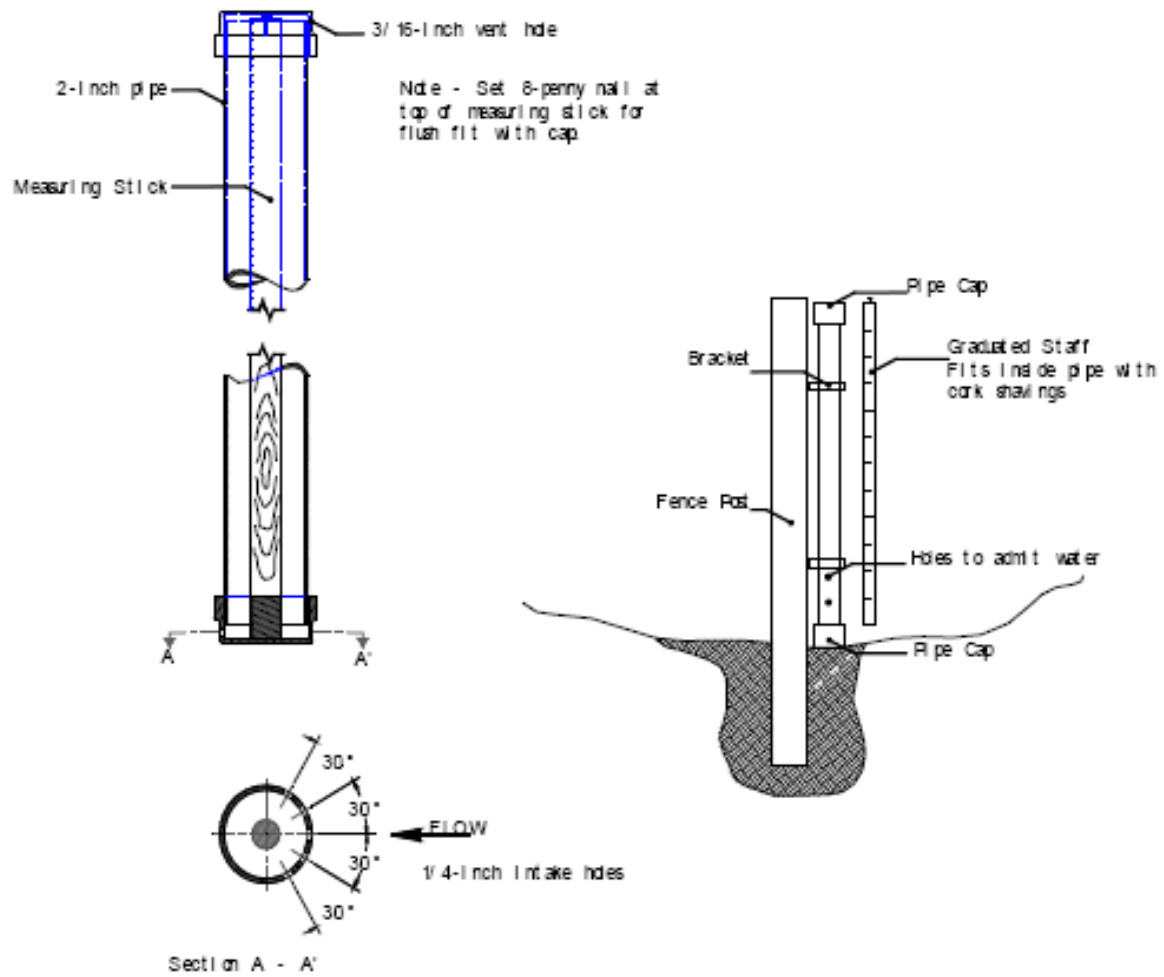
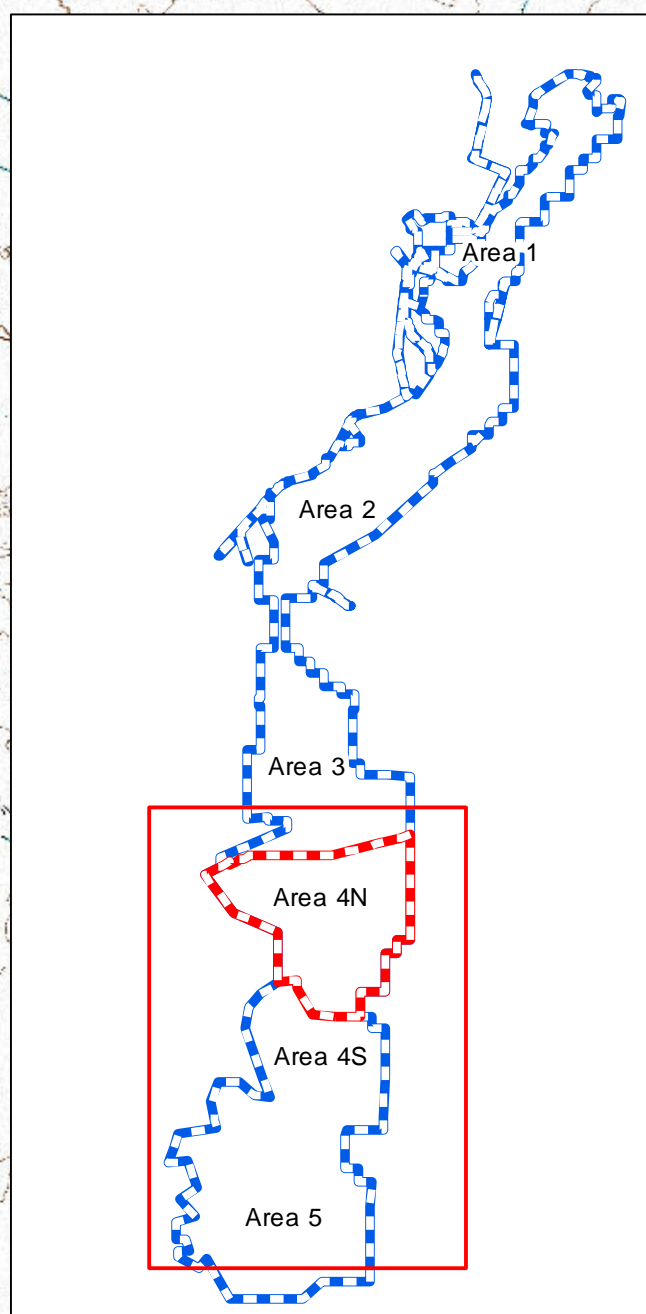
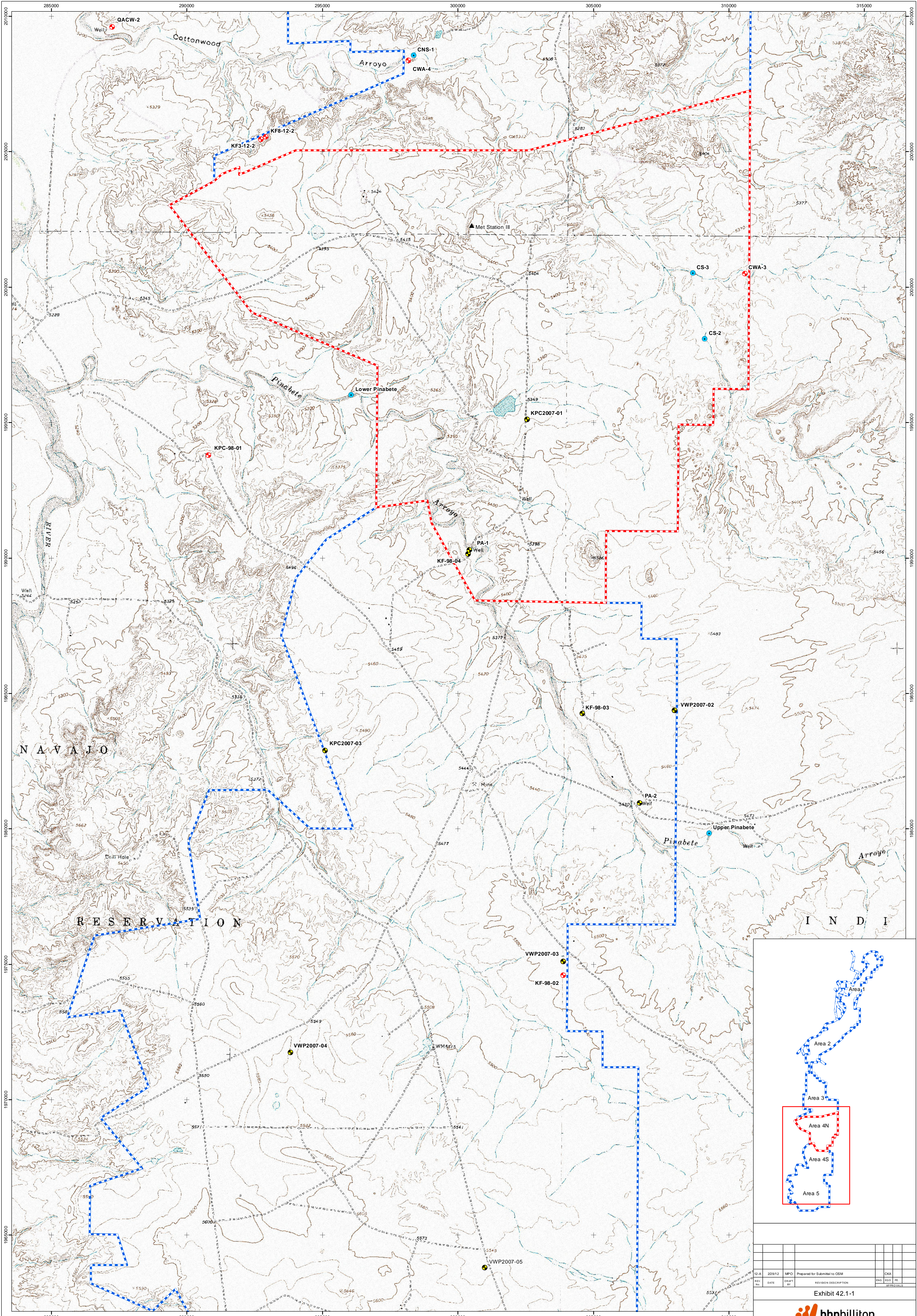
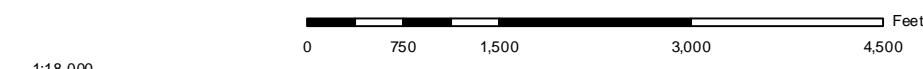


Figure 42.1-2 Schematic of Crest Gage



Coordinate System:
 NAD 1927 State Plane New Mexico West FIPS 3003
 Projection: Transverse Mercator
 Datum: North American 1927
 Units: Foot US



- Legend**
- ▲ Meteorological Station Sites
 - Water Level Sampling
 - Surface Water Monitoring Locations
 - Quality and Water Level Sampling
 - Pinabete SMCRA Permit Area
 - Mining Lease Area

12-A	2/29/12	MPO	Prepared for Submittal to O&M	CKA
REV	DATE	DRAWN BY	REVISION DESCRIPTION	DATE

Exhibit 42.1-1

bhpbilliton
 resourcing the future

BHP NAVAJO COAL COMPANY
 Surface Water, Groundwater,
 and Air Quality Monitoring
 Locations

PREPARED BY: MPO	DRAWN BY: MPO	PAPER SIZE: ARCH D
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Appendix 42.A

Surface Water Monitoring Sites



Photo 1 Surface water samplers located along Pinabete Arroyo, referred to as “Upper Pinabete”



Photo 2 Surface water samplers located along Pinabete Arroyo, referred to as “Lower Pinabete”

Sampler not yet installed.

Sampler to be installed in 2012.

Appendix will be updated when sampler is installed.

Photo 3 Surface water samplers located along South Fork of the Cottonwood Arroyo, referred to as “CS-2”

Sampler not yet installed.

Sampler to be installed in 2012.

Appendix will be updated when sampler is installed.

Photo 4 Surface water samplers located along South Fork of the Cottonwood Arroyo, referred to as “CS-3”

Sampler not yet installed.

Sampler to be installed in 2012.

Appendix will be updated when sampler is installed.

Photo 5 Surface water samplers located along the Cottonwood Arroyo, referred to as “CNS-1”

Appendix 42.B

Pinabete Permit

Wildlife Monitoring and Mitigation Plan

PINABETE PERMIT

WILDLIFE MONITORING and MITIGATION PLAN

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2.0 MONITORING AND MITIGATION RECOMMENDATIONS..... 1

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 3.1 Long-Term Mitigation..... 4

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1.0 INTRODUCTION

The purpose of this document is to describe the monitoring and mitigation for wildlife species listed by the U.S. Fish and Wildlife Service (USFWS) or Navajo Natural Heritage Program (NNHP) of the Navajo Nation Department of Fish and Wildlife (NNDFW), and documented or having potential to occur in the Pinabete Permit area (permit area) of BHP Navajo Coal Company's (BNCC) mining lease. The measures described herein are intended to monitor and mitigate potential impacts to wildlife within the permit area boundaries by the continuation of coal extraction and associated activities, as well as address annual wildlife monitoring required by 30 CFR 780.16 and 816.97 administered by the Office of Surface Mining Reclamation and Enforcement (OSM).

2.0 MONITORING AND MITIGATION RECOMMENDATIONS

BNCC has implemented and maintains a wildlife monitoring program for the BNCC mining lease area that extends from Area 4 North northward through Area 1, hereafter referred to as Navajo Mine. The monitoring and mitigation plan for the permit area, combined with the current Navajo Mine (OSM Permit No. NM-0003F) wildlife monitoring plan, has the following objectives:

- to assure that mitigation measures are limiting the impact of mining as intended;
- to identify the presence of additional important wildlife habitats that may occur (e.g., new raptor nests);
- to identify additional unanticipated impacts that require development of specific mitigation measures;
- to describe and characterize the wildlife use of reclaimed areas; and
- to generally track important wildlife activities in the mine lease area.

The following current USFWS or NNHP listed wildlife species have been documented during previous surveys or have potential to occur in the permit area: kit fox (*Vulpes macrotis*), mountain plover (*Charadrius montanus*), ferruginous hawk, golden eagle (*Aquila chrysaetos*), burrowing owl (*Athene cunicularia hypogaea*), and pronghorn antelope (*Antilocapra americana*) (USFWS 2011; Mikesic and Roth 2008). Sufficient suitable habitat to support black-footed ferret (*Mustela nigripes*) was also mapped in Areas 4 South and 5 (Ecosphere 2008). A prairie dog town was located in Area 4 North but further investigation determined it was too small to support black-footed ferret (Ecosphere 2004). To facilitate monitoring efforts, the wildlife species documented or having potential to occur in the permit area are categorized into two subgroups – Raptors and General Wildlife. Detailed information about the occurrence of wildlife species within the permit area can be found in Section 16 (Fish and Wildlife) of the Pinabete Permit Application Package.

2.1 Raptor Monitoring

The raptor monitoring program involves a three year recurrent cycle. In the first year of the cycle, all raptor nesting habitat within the permit area and a one mile buffer zone are surveyed aerially. In years two and three of the cycle, all raptor habitat within a one mile buffer zone of the most active mining areas (active pits, coal stockpiles, shop and office areas, major top dressing stockpiles, and future mining pits) is surveyed on the ground by a combination of walking and vehicles. The active areas included in the survey are those areas where the majority of the noise and disturbance by mining or mine personnel activity will take place and would be of most concern. Agricultural fields disturbed and operated by NAPI which are within either the aerial or ground survey buffer zones will not be surveyed at any time since the fields are not managed or controlled by BNCC. The surveys will be conducted during the breeding season (April through June) to document the status of known and unknown nests (e.g., active, inactive). Potential raptor nesting habitat that does not currently support nesting raptors will also be examined to determine if and where new nests are established relative to mining activities. Monitoring and surveying for raptors during the aerial survey will be conducted between April 1 and 15 (or closest date a suitable aircraft is available) as part of the initial survey for that year. A second follow-up survey will be done on the ground between May 15 and June 15 of those areas determined as active territories during the aerial survey. The initial surveys conducted during years two and three will be conducted on all raptor habitat areas, as described above, between March 15 and April 15 and a follow-up survey of the active territories identified during the initial survey will be conducted between May 15 and June 15.

All ground surveys in years two and three and the follow-up for the aerial survey will be conducted by driving through existing and accessible roads. Wherever possible, vistas and high ground will be used to view larger areas with binoculars so that views overlap among observation points and comprehensive coverage of the survey area is achieved. In areas inaccessible by vehicle, a walking transect and inspection of higher grounds, mesa cliffs and steep arroyo embankments will be conducted during this survey. Historic and current active prairie dog towns will also be checked for possible burrowing owl occupation.

Raptor survey results will be compiled into an annual report. The report will outline the methods and results of the surveys and will summarize historical and new active breeding areas. Mapping of nesting site locations is maintained by the NNDFW. Permits required to conduct off-lease monitoring activities under this plan will be obtained from the NNDFW. Results of each year's raptor survey will be submitted to NNDFW and OSM by August 31 of each year.

Annual mine operation plans are reviewed to identify potential conflicts with raptor nesting so that consideration can be made for mitigation. Early identification of conflicts is desirable to allow flexibility in resolving potential conflicts with the least possible impact to the birds or mine activities. For example, it is

much easier and less costly to move a raptor nest before or after the nesting season than when it contains young. Any moving of raptors or their nests will require special purpose permits and will be closely coordinated with the NNDFW and USFWS as necessary. The raptor nest monitoring program gathers data on the species using each nest, activity status, and number of young produced. If any golden or bald eagle nests are found on the mine permit area, its discovery and location will be reported to OSM.

When surface disturbance activities such as topdressing stripping are scheduled, the area to be disturbed will be examined prior to disturbance during the breeding season to determine if burrowing owls are nesting in the area. If burrowing owls are nesting, activities that would disturb the site will be managed to mitigate impacts to an active nest or other appropriate measures will be employed after consultation with the regulatory authorities.

2.2 General Wildlife Monitoring

General wildlife monitoring activities are conducted constantly by the BNCC environmental staff as they travel around the mine during their daily activities and note wildlife in the area. Particular attention is paid to documenting any use of the permit area by threatened or endangered species or other species of high interest. When threatened or endangered species are observed on the mine lease, OSM and the Navajo Nation will be notified immediately. The Annual Raptor and Wildlife Monitoring report will document any findings or sightings of general wildlife, threatened or endangered, or other high interest species. This report will be submitted to OSM and NNDFW by August 31 of each year.

Specific surveys to monitor wildlife use of reclaimed areas are conducted annually during the summer and winter. The procedure involves vehicle or foot surveys during which the species and numbers of wildlife observed on the reclaimed area are recorded. Results of these monitoring activities will be submitted to OSM and NNDFW in the Annual Raptor and Wildlife Monitoring Report. These studies will be periodically evaluated relative to their utility in monitoring wildlife use of reclaimed areas.

It is generally accepted that if native vegetation can be established and suitable cover similar to undisturbed areas is provided, then the presence of small and medium-sized mammals, predators, and birds will be restored in reclaimed areas. A study by Westinghouse (1975) indicates that many of the small and medium-sized mammal species had returned to reclaimed areas within two years after seeding. Primary importance will be placed on the revegetation monitoring program to identify and correct any problems in establishing vegetation on the reclaimed area. These data and results of the periodic wildlife surveys on the reclaimed area will be used as the basis for discussion regarding reestablishment of wildlife habitat and wildlife populations for bond release.

Prairie dog colonies will be surveyed for the black-footed ferret, as determined necessary after consultation with the NNDFW. Reporting of survey results will be submitted to OSM and NNDFW by August 31 of each year.

3.0 MITIGATION

Mitigation to prevent or substantially reduce significant impacts to wildlife resources is discussed in the following material. Some of the mitigation measures will be employed to prevent or lessen potential impacts to wildlife as a general group, and other measures will be directed at specific species. Certain mitigation measures will be necessary only while the mine is operating, and the effects of other mitigation measures will persist long after the mine ceases operation. BNCC will follow the short-term and long-term wildlife mitigation measures to address and mitigate the impacts of mining, discussed in Section 39 (Fish and Wildlife Enhancement).

3.1 Long-Term Mitigation

The primary long-term mitigation measure is the reclamation of disturbed sites to provide the habitat components necessary to support wildlife species that inhabited the site prior to mining. The effectiveness of this mitigation measure is a function of the success achieved in reclamation. From a wildlife standpoint, the primary factors to be reestablished are topography, vegetation, and water resources. These long-term mitigation measures are discussed in further detail in Section 39 (Fish and Wildlife Enhancement).

3.1.1 Topography

BNCC will utilize the geomorphic reclamation approach to create post-mine topography in the permit area to benefit both livestock and wildlife. Post-mine topography is discussed further in Section 34 (Post-Reclamation Topography) and Section 38 (Post-Reclamation Surface Stabilization and Sediment Control).

3.1.2 Revegetation

Vegetation is a primary habitat component that influences the suitability of an area for wildlife. The primary use of the area after mining will be for livestock grazing; however, provision for wildlife habitats is also incorporated in the mine's revegetation plan. A detailed description of the revegetation program is presented in detail in Section 37 (Post-Reclamation Vegetation)

3.1.3 Water Resources

There are few water features (mainly man-made livestock impoundments) that exist within the permit area as discussed in Section 16 (Fish and Wildlife) and Section 18 (Water Resources). Further discussion on BNCC's replacement of pre-mine water features and use is in Section 35 (Hydrologic Reclamation Plan).

3.2 Short-term Mitigation

Procedures employed to minimize or prevent impacts to wildlife during the operation of the mine will include (1) limiting the amount of vegetation and topography disturbed to only that necessary to conduct mining; (2) designing facilities, such as transmission lines, to prevent mortality of raptors; and (3) monitoring important wildlife habitat, such as raptor nests, so appropriate plans to avoid significant undesirable impacts can be developed and implemented.

Minimizing the area disturbed to only that necessary to safely conduct mining is an effective mitigation measure that will avoid unnecessary disturbance of wildlife habitat. Limiting the extent of the disturbed area is not only a conservation measure for wildlife habitat that currently exists, it is also economically advantageous since areas that are not disturbed do not require reclamation. Location of important wildlife habitats (such as rimrocks, raptor nests, and water sources) will be considered when planning the location of haul roads and ancillary facilities so that they can be avoided as much as practicable.

To protect raptors from direct mortality due to electrocution, the design and construction of electric powerlines and other transmission facilities on the permit area will meet the guidelines set forth in "Suggested Practices for Raptor Protection on Powerlines - the State of the Art in 1996" (Avian Power Line Interaction Committee (APLIC), 1996).

Buffer zones will be established around active raptor nests located on and adjacent to the permit area. The buffer zones will be established through consultation with the BIA and NNDFW on a site and species specific basis as necessary. Raptor nests will be monitored to identify potential problem areas relative to the mining operations on the permit area. If raptor nesting success is affected by mining activity, BNCC will consult with the NNDFW, BIA, and USFWS to develop plans to limit impacts. Such plans will be developed on a site by site basis and could include rescheduling of mining activities and moving or taking of nests as necessary. Any work involving the handling of raptors or their nests will require special permits and would be closely coordinated with the NNDFW and USFWS to ensure the safety of the birds and promote the use of the breeding territory in the future.

Unless authorized by NNDFW, prairie dog colonies with active nesting burrowing owls will not be disturbed during the nesting season (late March through July) (Marks and Ball, 1983) to avoid impacts to active nests. Reoccupation of the reclaimed area by prairie dogs and other burrowing mammals will be monitored to determine if burrows will be available for use by burrowing owls. If no burrows are present on reclaimed areas, BNCC will consult with the NNDFW and BIA to determine if artificial burrows are necessary on the reclaimed area to promote use by burrowing owls. Burrowing owls have readily accepted artificial burrows (Collins and Landry, 1977; Henry and Blus, 1981), but the acceptance of artificial burrows on reclaimed areas has not been proven (Marks and Ball, 1983).

4.0 REFERENCES

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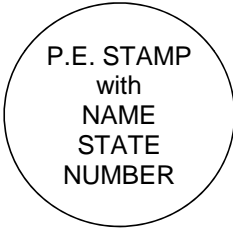
Appendix 42.C

Example Form for Annual Pond and Impoundment Inspection Report

**BHP NAVAJO COAL COMPANY
 NAVAJO MINE PINABETE PERMIT
 [YEAR] ANNUAL IMPOUNDMENT INSPECTION REPORT**

Impoundment Id.	Type	Structural Weaknesses or Instability	Monitoring Devices	Water/Sediment Level		Maximum Permissible Depth or Gauge Reading	Existing Storage Capacity (ac-ft)	Req,d Capacity (ac-ft)	As-built Capacity (ac-ft)	Deficiencies noted or comments:
				Elevation	Depth or Gauge Reading (ft)					

I, [NAME OF LICENSED PROFESSIONAL ENGINEER], certify that the impoundments listed in the above table were inspected by myself or under my direction in accordance with 30 CFR Part 816.49(a)(11) and were found to be maintained in accordance with the approved design plans, except as noted below.



Notes:

1. (Notes will identify deficiencies items, corrective measures to be taken and the timing to correct the deficiency.)
- 2.