Project 86-060-20
January 1990

Canonie Environmental

As-Built Report

North Cell Interim Stabilization

Church Rock Site
Gallup, New Mexico

Prepared for:

UNC Mining and Milling
A Division of United Nuclear Corporation
Gallup, New Mexico

As-Built Report

North Cell Interim Stabilization

Canonie Environmental

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UNITED NUCLEAR CORPORATION
CHURCH ROCK FACILITY

1.0 INTRODUCTION

This report describes construction of the second phase of interim stabilization and reclamation measures for the uranium mill and tailings disposal area at United Nuclear Corp.'s (United Nuclear) Church Rock facility. The site is located northeast of Gallup, New Mexico along State Highway 566 as shown on Sheet 1. United Nuclear is continuing interim stabilization measures as scheduled at its Church Rock, New Mexico uranium mill and tailings disposal facility in accordance with the Reclamation Plan, License Number SUA-1475, as amended, submitted to the Nuclear Regulatory Commission (NRC) (Canonie 1987, 1988a, 1989a).

The second phase of interim stabilization and reclamation consisted of regrading and placement of interim soil cover over the north cell of the tailings disposal area (north cell). Interim stabilization for the approximate 100-acre tailings disposal area will be conducted over a three-year period with work progressing from north to south. North cell interim stabilization was completed during this phase, with work in the central and south cells to be done in 1990 and 1991, respectively. The first phase of interim stabilization, completed in early 1989, consisted of construction of two synthetically lined evaporation ponds to hold and evaporate ground water extracted from beneath the site. An As-Built Report for pond construction was prepared by Canonie in March 1989 (Canonie, 1989b).

Activities for the second phase of interim stabilization included:

1. Regrading approximately 28 acres of the north cell and the northernmost portion of the central cell of the tailings disposal area;

2. Stripping windblown tailings/affected soils in Section 2, Township 16 North (T16N), Range 16 West (R16W) (Section 2), and Section 36, T17N, R16W (Section 36);

3. Placing these soils in the north cell and Borrow Pit No. 2 after the north cell had reached design grade;

4. Placing additional fill to bring the north cell surface up to design grade; and

5. Placing an interim soil cover.

Sheet 2 shows the location of these second-phase interim stabilization activities.

Construction services for the second phase were provided to United Nuclear by Nielsons General Contractors (Nielsons). Canonie Environmental Services Corp. (Canonie) provided on-site engineering oversight and construction monitoring services. Sergent, Hauskins & Beckwith (SHB) provided geotechnical sampling and testing services. Descriptions of the daily construction activities are presented in the Daily Field Activity logs included in Appendix A.

North cell interim stabilization was part of scheduled 1989 reclamation work as identified in the document entitled "Reclamation Plan, License No. SUA-1475" (Canonie, 1987) as amended in the documents entitled "Amendment I, Reclamation Plan, SUA-1475" (Canonie, 1988a) and "Amendment II, Reclamation Plan, SUA-1475" (Canonie, 1989). Interim stabilization measures were constructed in accordance with the technical specifications and construction drawings presented in the Reclamation Plan. As-built construction drawings are presented on Sheets 1 through 4 and are included following the text of this report.

Interim stabilization measures were implemented to minimize emissions to the air via windblown tailings and radon gas, as well as infiltration of precipitation into the tailings. Windblown tailings from the north cell were minimized or eliminated by covering the tailings with a compacted soil cover. Prior to placement of the soil cover, the tailings were recontoured to provide positive drainage and reduce infiltration while maintaining a gradual slope so as not to induce soil cover erosion. Recontouring was

accomplished by a combination of cutting and filling the materials located in and around the north cell, including coarse tailings and soils from the windblown area. Recontouring the tailings provided placement of low radium content soils over tailings materials having a higher radium content. This reduces the radon flux from the areas that have the highest radium content and, thus, the highest radon flux rates.

Placement of the interim soil cover further reduces radon flux rates from the tailings impoundment and provides a low permeability cap to reduce precipitation infiltration. As discussed within this report, the in-situ geotechnical properties of the interim soil cover (regraded tailings and soil cap) are more favorable for attenuating radon than those used in the Reclamation Plan model [Radon Attenuation Effectiveness and Cover Optimization with Moisture Effects (RAECOM)]. Reevaluation of the soil cover thickness, based on as-built conditions, indicates that the soil cover thickness can be reduced from 4.0 feet, as presented in the Reclamation Plan (Canonie, 1987), to 2.0 feet. Therefore, one foot of additional soil cover over the north cell is required to limit radon emissions to the National Emission Standards for Hazardous Air Pollutants (NESHAPs) requirement of 20 picoCuries per square meter per second. In addition, interim stabilization allows for monitoring the success of the reclamation program prior to final reclamation. Results of the monitoring will be used to confirm final design parameters and allow for adjustments in the final design, if needed.

The following sections of this document describe the interim stabilization construction activities, provide quality control procedures and documentation, describe as-built details, and present post-construction monitoring procedures.

2.0 EARTHWORK CONSTRUCTION

2.1 Haul Road Construction

As part of interim stabilization activities, a 75-foot-wide haul road was constructed along the tailings retention embankment to the west of the north cell (west embankment) at the location shown on Sheet 3. The haul road was constructed to provide access to the tailings disposal area during interim stabilization and final reclamation construction activities.

The west embankment was excavated to the elevation of the regraded north cell and widened to its final configuration. The haul road was constructed in accordance with the specifications contained in the Reclamation Plan, which requires that fill be placed in lifts no greater than one foot thick and compacted to a minimum of 95 percent of the Standard Proctor maximum attainable dry density as determined by American Society for Testing and Materials (ASTM) test method D-698. SHB provided in-place and laboratory soil density testing services for the haul road construction. In-place moisture-density tests were performed by both nuclear densometer (ASTM D-698) and sand cone (ASTM D-1556) methods. A total of 50 in-place moisture-density tests were conducted to verify that compaction criteria were being met. At least one test per lift was taken. Test results are presented in Appendix B. Areas that did not meet the required minimum density criteria were reworked until testing confirmed that the required minimum density standards were met.

2.2 Recontouring the North Cell

Approximately 28 acres (the north cell) of the tailing disposal area were recontoured as part of second-phase interim stabilization measures. Recontouring was performed to prevent ponding and infiltration of precipitation while encouraging positive drainage without excessive erosion. The recontouring also places low radium content soils (coarse tailings, windblown tailings, affected soils, and alluvial soils) over higher radium content soils (slimes), which reduces radon flux from the tailings disposal area.

The following sections describe the methods and procedures used to recontour the north cell.

2.2.1 Regrading Coarse Tailings

Coarse tailings were excavated from areas of the north cell and northernmost portion of the central cell where the original ground elevation was above the regraded design contours. These coarse tailings were placed as fill in the lowest portion of the north cell (ie, over slimes) to aid in attenuation of radon emissions from the slimes and to raise the elevation of the north cell to design grade. The original design called for placement of approximately 7 feet of coarse tailings as fill. Since an insufficient quantity of coarse tailings was available in the work area, other materials, including windblown tailings, affected soils, and clean soil, were used as fill. These imported fill materials have much lower radium contents and lower diffusion coefficients than those modeled in the Reclamation Plan (the 7-foot-thick layer of coarse tailings) and will provide a soil cover with greater radon attenuating properties than those used for design purposes in the Reclamation Plan.

2.2.2 Excavation and Placement of Windblown Tailings and Affected Soils

Subsequent to excavation and placement of the coarse tailings over the slimes, windblown tailings and affected soils were excavated from Section 2 and Section 36, at the locations shown on Sheets 3 and 4, and placed in the north cell. The Reclamation Plan identified these areas as influenced by windblown tailings and specified that the areas be cleared and stripped by removing the upper 6 inches of soil and placing the soil in the north cell. Following excavation of the top six inches of soil from the designated areas, radiologic monitoring was conducted by United Nuclear to determine areas that required further excavation. Final radiological monitoring was performed by United Nuclear to verify that all windblown tailings and affected soils were removed from areas outside the limits of the tailings disposal facility and placed in the north cell. The windblown tailings cleanup verification report was submitted by United Nuclear to the NRC in November 1989.

Some portions of areas previously identified as being influenced by windblown tailings were stripped of more than 6 inches of soil to provide additional cleanup of windblown tailings and affected soils prior to radiologic verification and to provide additional fill needed to raise the north cell to design grade. Vegetation and major root systems were cleared and burned within the north cell prior to excavation of windblown tailings and affected soils.

Windblown tailings located in Section 1, T16N, R16W, which is land held in trust for the Navaho Indians and administered by the Bureau of Indian Affairs, were not accessible during second-phase construction activities. Access to this area was granted too late in the Phase 2 construction period. The area will be cleared of vegetation and the windblown tailings will be similarly excavated and placed as fill in either the central or south cell of the tailings disposal area or in Borrow Pit No. 2 in 1990 per a recent NRC license modification.

2.2.3 Construction Methods and Equipment

North cell recontouring was completed with conventional earthmoving equipment. A listing of the types of construction equipment used to perform earthmoving operations is provided in Table 1 and included scrapers, bulldozers, graders, a sheepsfoot compactor, and a smooth drum vibratory roller. The bulldozers were equipped with rippers for rock excavation.

2.2.4 Compaction Criteria and Testing

The Reclamation Plan specifications require that the top 12 inches of the recontoured surface be compacted to a minimum 90 percent of the maximum dry density attainable by the Standard Proctor method of compaction as determined by ASTM D-698. This test method identifies the maximum attainable dry density of a soil under a specified level of compactive effort, as well as the optimal soil moisture content at which that density is obtained. This criterion was specified for the recontoured surface in order to increase the radon attenuating characteristics (decreased porosity) of the

fill material and to provide a firm base for subsequent placement and compaction of the interim soil cover.

SHB performed specified geotechnical testing and sampling related to field quality control in accordance with design specifications. Results of SHB's tests are presented in Appendix B. Field in-place density tests on representative samples of fill material indicated an average dry density of 108.4 pounds per cubic foot (pcf) and an average moisture content of 13.6 percent. This average dry density and in-situ moisture content are significantly higher than the values used in the Reclamation Plan model (98 pcf and 10.1 percent, respectively). These values correspond to an in-situ porosity of 0.36 and a saturation of 67 percent, as compared to the model values of 0.44 and 36 percent for porosity and saturation, respectively. The lower in-situ porosity and higher in-situ saturation of the regraded tailings surface compared to design values will, thus, provide improved radon attentuating capabilities as compared to the layer modeled in the Reclamation Plan.

In-place field moisture-density testing was performed by both nuclear densometer (ASTM D-2922) and sand cone (ASTM D-1556) methods. Although a specified frequency for density tests was not established in the Reclamation Plan, the Response to Comments letter dated June 29, 1988 (Canonie, 1988c) specified one in-place density test per 5,000 cubic yards (cy) of soil placed. Therefore, the upper one foot of the recontoured surface, which is equivalent to approximately 45,000 cy of material, would require that at least nine in-place density tests be taken. A total of 40 in-place moisture-density tests were conducted on the recontoured surface to verify compaction criteria were being met. Of this total, 19 in-place density tests met required density specifications. Thus, sufficient in-place density tests were taken to verify compaction. Areas that did not meet the required minimum density criteria upon initial testing were reworked until additional testing confirmed that required minimum density standards were met. Adequate density of the fill material will provide a stable base for placement of the soil cover and verify that field properties of the regraded tailings meet or exceed those modeled in the Reclamation Plan.

2.3 Interim Soil Cover Placement

A one-foot-thick interim soil cover was placed over the north cell following recontouring and compaction of the regraded surface. The interim soil cover eliminates the occurrence of windblown tailings from the north cell, substantially reduces precipitation infiltration into the tailings that could impact ground water, and serves to reduce radon flux from the tailings.

2.3.1 Interim Soil Cover Borrow Areas

The tailings retention embankment located north of the north cell (north embankment) and the area north of the north cell in Section 36, in and around the partially completed north diversion ditch, consisted of the borrow sources for constructing the soil cover. These materials were not excavated for use in the soil cover until they were verified to be free of windblown tailings by United Nuclear. The windblown tailings cleanup verification report was submitted by United Nuclear to the NRC in November 1989.

Sufficient clean borrow soil for use in construction of the soil cover was not available in close proximity to the north cell. Therefore, the north diversion ditch, which was originally scheduled to be constructed during final reclamation activities, was partially completed during this phase of reclamation due to its close proximity to the north cell and source of suitable soil cover material. Additionally, construction of this section of the north diversion ditch will serve to intercept floodwaters from the arroyo north of the site and route the water around the tailings disposal area.

The interim cover soils consisted mainly of clayey sands and low plasticity clays and silts with varying amounts of sand. Interim cover soils were placed and compacted in accordance with the specifications in the Reclamation Plan, as described in the following sections.

2.3.2 Construction Methods and Equipment

The north cell interim cover was completed with conventional earthmoving equipment. A listing of the types of construction equipment used to perform the earth-moving operation is presented in Table 1 and included scrapers, dozers, graders, and a sheepsfoot compactor.

2.3.3 Compaction Criteria and Testing

The Reclamation Plan specifies that the radon barrier over the recontoured tailings be compacted to a minimum of 95 percent of the maximum Standard Proctor dry density at a moisture content between optimum and optimum plus two percent, as determined by ASTM D-698. This density criteria was specified to provide increased soil density, decreased porosity, and higher long-term moisture content, allowing the soil cover to be an effective radon barrier.

As with field quality control for the recontoured surface, SHB was contracted to test and inspect the interim cover placement and compaction. Results of SHB's tests are presented in Appendix B. Field in-place density tests on representative cover soil samples indicate an average dry density for the cover soils of approximately 113.6 pcf, with an average moisture content of approximately 15.0 percent. The average dry density and in-situ moisture content are higher than the values used in the Reclamation Plan soil cover model (RAECOM). The model values were 99.0 pcf and 13.4 percent for the dry density and moisture content, respectively. These values correspond to an in-situ porosity of approximately 0.33 and a saturation of 82 percent, as compared to the model values of 0.39 and 54 percent for porosity and saturation, respectively. The lower porosity and higher degree of saturation of the interim soil cover will provide a radon barrier with improved radon attenuating properties, as compared to the cover modeled in the Reclamation Plan.

In-place field moisture-density testing of the interim cover was initially performed by both nuclear densometer (ASTM D-2922) and sand cone (ASTM D-1556) methods. However, because of equipment malfunction in the nuclear

densometer, the sand cone method was used exclusively. A total of 59 in-place moisture-density tests were conducted on the interim cover to verify that compaction criteria were being met. The testing frequency for passing tests was almost three times the frequency stipulated in the Response to Comments letter dated June 29, 1988 submitted to the NRC (Canonie, 1988c). The Response to Comments required one field moisture-density test for every 5,000 cy of fill placed. Approximately 45,000 cy of cover material was placed. Therefore, nine in-place moisture-density tests were actually required. Areas that did not meet the required minimum moisture-density criteria upon initial testing were reworked until additional testing confirmed that required minimum moisture-density standards were met.

Three in-situ samples of the soil cover were obtained, remolded, and tested by SHB to determine the soil cover's permeability. This testing was performed in accordance with the Response to Comments submitted to the NRC (Canonie, 1988b). The results of the testing indicate that the soil cover has a permeability ranging from 1.38×10^{-6} to 3.48×10^{-8} centimeters per second. These results are indicative of a material with a low permeability and, therefore, a low precipitation infiltration capacity.

Subsequent to completion of placement and compaction of the interim soil cover, the top three inches of soil cover was scarified to provide a suitable medium for revegetation. The compacted soil was scarified with rippers of a bulldozer or grader creating furrows running perpendicular to the slope of the recontoured north cell. Placement of furrows in this manner reduces the erosion potential of surface water runoff and degradation of the interim soil cover.

3.0 REVEGETATION

Following placement of the interim soil cover, the north cell and disturbed areas proximate to the tailings disposal area were revegetated. A total of approximately 85 acres were revegetated with a native species grass mixture as part of interim stabilization measures. The disturbed areas were revegetated in order to reduce wind-induced and surface-water-related erosion. The revegetation was performed in accordance with the Reclamation Plan specifications.

Revegetation was conducted in October 1989. The seed mixture and application rates used are presented in Table 2. The area for revegetation was divided into two subareas:

1. The north cell and the alluvial soils in the arroyo floodplain north of the north cell; and

2. The sandstone outcroppings east and northeast of the north cell.

The north cell and arroyo floodplain are relatively flat with good soil conditions for planting. Soil nutrient and fertilizer requirement analyses on representative soil samples (see Table 3) taken by United Nuclear showed that no fertilizer was required for this area. The seed mixture was distributed by drill method, and straw mulch was crimped into the soil to provide protection for the seed.

The sandstone outcroppings contain little soil and are not a prime planting medium. Soil nutrient and fertilizer requirement analyses on representative soil samples (see Table 3) taken by United Nuclear showed soil nutrient deficiency in nitrogen content. Urea 46-0-0 at 44 pounds per acre will be applied to the sandstone outcrop area in the spring of 1990. This area will also be mulched with straw.

4.0 SETTLEMENT MONITORING

The Reclamation Plan and subsequent Responses to NRC Geotechnical Comments detailed a settlement monitoring plan for reclamation activities. The monitoring plan calls for installation of eight settlement monuments throughout the reclaimed tailings disposal area, placed in the areas of greatest fill and softest foundation soil conditions. This plan was designed to verify that settlement of the tailings would not adversely affect the radon barrier.

One of the settlement monuments, Settlement Monument No. 8 (SM-8) as described in the settlement monitoring plan, is located in the north cell. As a part of this phase of interim stabilization activities, SM-8 was installed in the north cell prior to fill placement as specified in the settlement plan. An additional two settlement monuments, SM-9 and SM-10, were also installed in the north cell to provide additional data for evaluating the nature of settlement of the north cell for use in predicting potential settlement during future reclamation activities. Settlement monument locations are shown on Sheet 3. A construction detail of the settlement monuments is shown on Sheet 4.

Settlement monument elevations were surveyed weekly during construction to monitor the rate of settlement and total settlement of the tailings. Plots of magnitude of settlement versus logarithm of time are presented in Appendix C. These plots indicate a maximum settlement of approximately 0.80 feet at PSM-9. These plots indicate that 90 percent of primary consolidation has occurred. Therefore, continued monitoring is not required per the Response to Comments (Canonie, 1988b) previously submitted to the NRC.

5.0 CLOSING REMARKS

Interim stabilization of the north cell, with the exception of revegetation, was certified complete on August 25, 1989. The north cell of the tailings disposal facility has been regraded and stabilized with an interim soil cover in accordance with the specifications and construction drawings contained in the Reclamation Plan, as amended and submitted to the NRC.

The final soil cover thickness for the north cell area was reevaluated based on as-built conditions using the RADON computer code (NRC, Regulatory Guide 3.64). The geotechnical properties (density, percent saturation, and porosity) of the interim soil cover of the north cell exceed the properties used in the Reclamation Plan to model the radon attenuating properties of the soil cover. Results of the analysis indicate that soil cover over the north cell area can be reduced from 4.0 feet to 2.0 feet.

Reevaluation considered the improved geotechnical properties of the interim soil cover and the use of lower radium content soils in regrading of the north cell than was assumed in the Reclamation Plan for two representative cross sections. The first cross section consisted of interim soil cover, 4 feet of low radium content soils (windblown tailings and affected soils) and 2.5 feet of regraded coarse tailings over fine-grained tailings. This cross section modeled as-built conditions in the interior portions of the north cell and is shown on Sheet 4. The second cross section consisted of interim soil cover over coarse-grained tailings and modeled as-built conditions around the perimeter of the north cell. The original cross section, modeled in the Reclamation Plan, consisted of soil cover including windblown tailings and affected soils and 7 feet of coarse tailings over fine-grained tailings.

Revegetation of all disturbed areas was completed as specified during October 1989. Settlement monitoring indicates that settlement is decreasing and is not expected to impact the interim soil cover/radon barrier.

Canonie appreciated this opportunity to provide engineering and construction monitoring services. Please call if you have any questions or comments regarding this report.

Respectfully submitted,

Oliver P. Wesley

Oliver P. Wesley, P.E.
Project Manager
New Mexico Professional Engineer License No. 8029

OPW/jb

REFERENCES

REFERENCES

REFERENCES

Canonie Environmental Services Corp., 1987, "Reclamation Plan, License No. SUA-1475, Volumes I and II," prepared for UNC Mining and Milling, a Division of United Nuclear Corporation, Gallup, New Mexico, 92 pages.

Canonie Environmental Services Corp., 1988a, "Amendment I, Reclamation Plan, License No. SUA-1475," prepared for UNC Mining and Milling, a Division of United Nuclear Corporation, Gallup, New Mexico, 20 pages.

Canonie Environmental Services Corp., 1988b, "Responses to the Nuclear Regulatory Commission Geotechnical Comments," prepared for United Nuclear Corporation, Church Rock Reclamation Plan, Gallup, New Mexico, 12 pages.

Canonie Environmental Services Corp., 1988c, "Responses to the Nuclear Regulatory Commission Geotechnical Comments," prepared for United Nuclear Corporation, Church Rock Reclamation Plan, Gallup, New Mexico, 37 pages.

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United States Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, 1989, "Calculation of Radon Flux Attenuation by Earthen Uranium Mill Tailings Covers," Regulatory Guide 3.64.

TABLES

TABLES

TABLE 1

EARTH-MOVING EQUIPMENT

Two Caterpillar 633 Scrapers
One Caterpillar D-8H Dozer
One Caterpillar D-6 Dozer
One Caterpillar D-3B Dozer
One Caterpillar 14 G Grader
One Caterpillar 12 G Grader
One Caterpillar 631 Water Wagon
One Tampo Pneumatic Roller
One Caterpillar 825 Sheepsfoot Compactor
One Ingersol Rand EP-60DD Smooth Drum Vibratory Roller

TABLE 2

REVEGETATION SEED MIXTURE AND APPLICATION RATES

Scientific Name	Common Name	Growth Habit [a]	Pounds Pure Live Seed/Acre [b]
Agropyron smithii	Western Wheatgrass	NS	5.0
Bouteloua gracilis	Blue Grama	NB	2.0
Oryzopsis hymenoides	Indian Ricegrass	NB	4.0
Sporobolus airoides	Alkali Sacaton	NB	0.5
Bouteloua curtipendula	Sideoats Grama	NB	2.0
Hilaria jamisii	Galleta	NS	3.0

[a] NB - Native Bunchgrass
NS - Native Sodgrass

[b] Seeding rate is for drill seeding. In the case of broadcast seeding, the seeding rate was doubled.

TABLE 3

SOIL ANALYSES FOR FERTILIZER REQUIREMENTS

Sample Identification	Soil pH	Soluble Salts (mmhos/cm)[a]	Lime	Organic Matter (%)	Nitrate Nitrogen (NO_3-N) (ppm)[b]	Phosphorus (PO_4) (ppm)	Potassium (K) (ppm)	Zinc (Z) (ppm)	Iron (Fe) (ppm)	Manganese (Mn) (ppm)	Copper (Cu) (ppm)	Sulfate (SO_4) (ppm)
Soil Cover Borrow	7.15	3.6	Med	1.20	9.6	8.8	179	2.46	45.4	11.2	4.66	860
Sandstone Outcrop Area	7.14	1.65	High	1.57	2.8	6.4	192	2.24	40.0	9.6	4.68	202

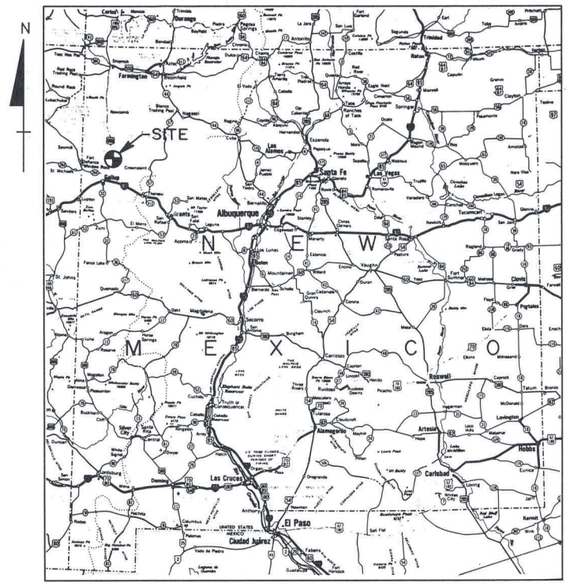
[a]Millimohs per centimeter.

[b]Parts per million.

FIGURES

FIGURES

DRAWING NUMBER 86-060-E342

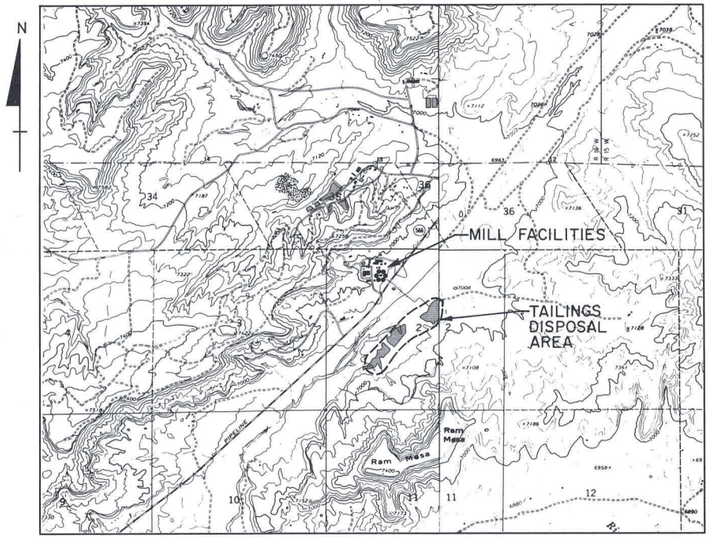


LOCATION MAP

SCALE

50 0 50 100 MILES

INDEX OF DRAWINGS		
SHEET NO.	DRAWING NO.	TITLE
1 of 4	86-060-E342	TITLE SHEET
2 of 4	86-060-E321	SITE PLAN
3 of 4	86-060-E322	NORTH CELL INTERIM STABILIZATION AS-BUILT CONDITIONS
4 of 4	86-060-E343	DETAIL SHEET



REFERENCE:
- U.S.G.S. 7.5' TOPOGRAPHIC MAPS OF HARD GROUND FLATS AND OAK SPRING, NEW MEXICO. DATED: 1963. PHOTOREVISED IN 1979.

VICINITY MAP

SCALE

2000 0 2000 4000 FEET

AS-BUILT CONSTRUCTION DRAWINGS NORTH CELL INTERIM STABILIZATION

MC KINLEY COUNTY, NEW MEXICO

PREPARED FOR

UNC MINING AND MILLING
GALLUP, NEW MEXICO

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1	12-30-89	AS-BUILT CONSTRUCTION DRAWING FOR NORTH CELL INTERIM STABILIZATION REPORT.	M.B.H.	mjg	DHG

TITLE SHEET

PREPARED FOR

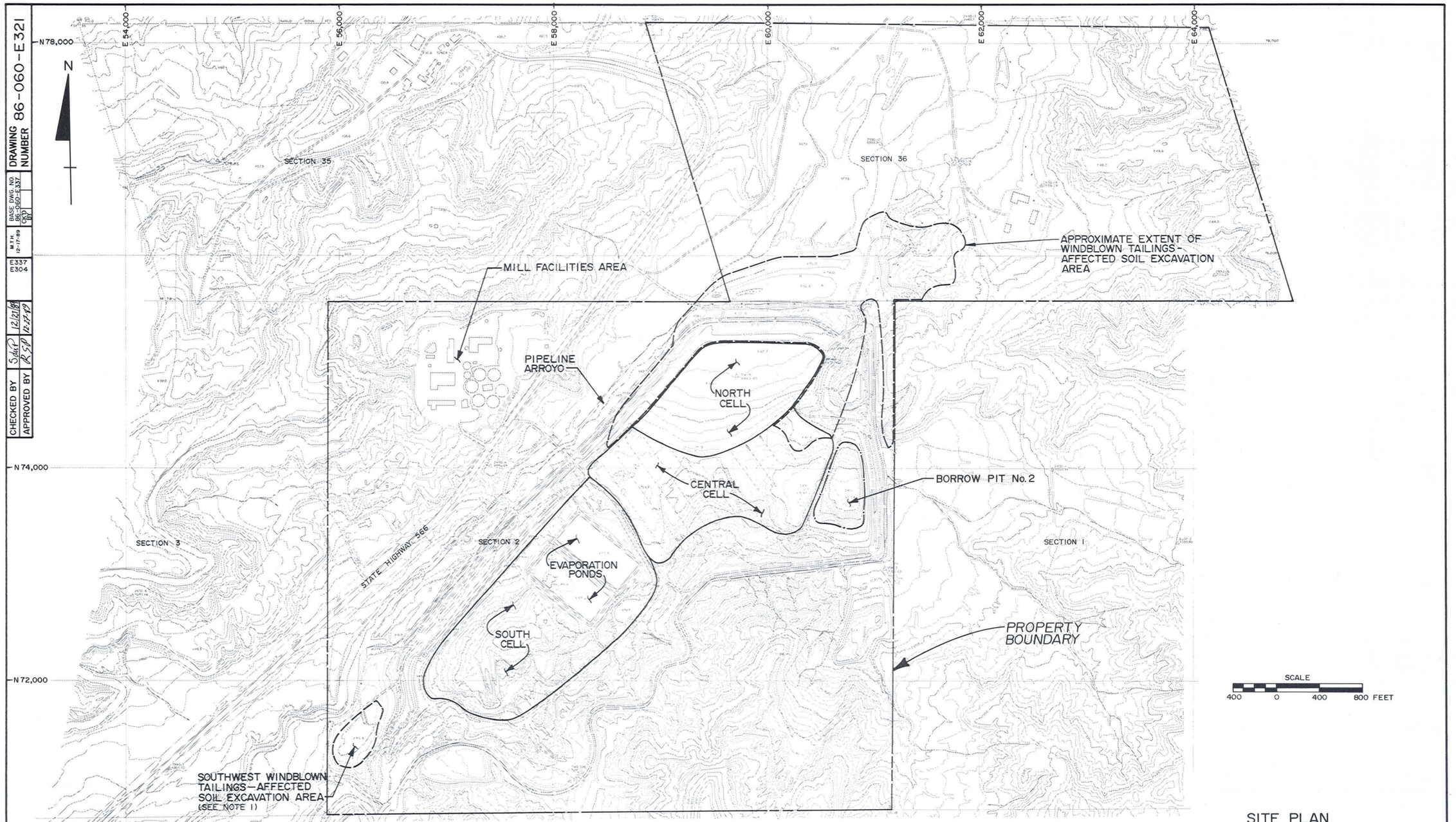
UNC MINING AND MILLING
GALLUP, NEW MEXICO

CanonieEnvironmental

DATE: 12-20-89	SHEET 1 of 4	DRAWING NUMBER 86-060-E342	REV. 1
SCALE: AS SHOWN			

86-060-E304

DRAWING NUMBER	BASE DWG. NO.	M.T.H.	E337			
86-060-E321	86-060-E337	12-17-89	E304			
	CK'D BY					
CHECKED BY	Stat?	12/21/89				
APPROVED BY	R.S.P	12-27-89				



REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W, N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, NEW MEXICO. DATED: 9-29-89. SCALE: 1"=200'.

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
2	1-25-90	ADDED APPROXIMATE EXTENT OF WINDBLOWN TAILINGS-AFFECTED SOIL EXCAVATION AREA.	M.B.H.	mjy	DHG
1	12-30-89	AS-BUILT CONSTRUCTION DRAWING FOR NORTH CELL INTERIM SABILIZATION REPORT.	M.T.H.	mjy	DHG

SITE PLAN

PREPARED FOR

UNC MINING AND MILLING GALLUP, NEW MEXICO

CanonieEnvironmental

12-17-89
86-060-E337

DATE: 11-29-89
SCALE: AS SHOWN

SHEET 2 of 4

DRAWING NUMBER 86-060-E321 REV. 2

86-060-E304

DRAWING NUMBER 86-060-E322

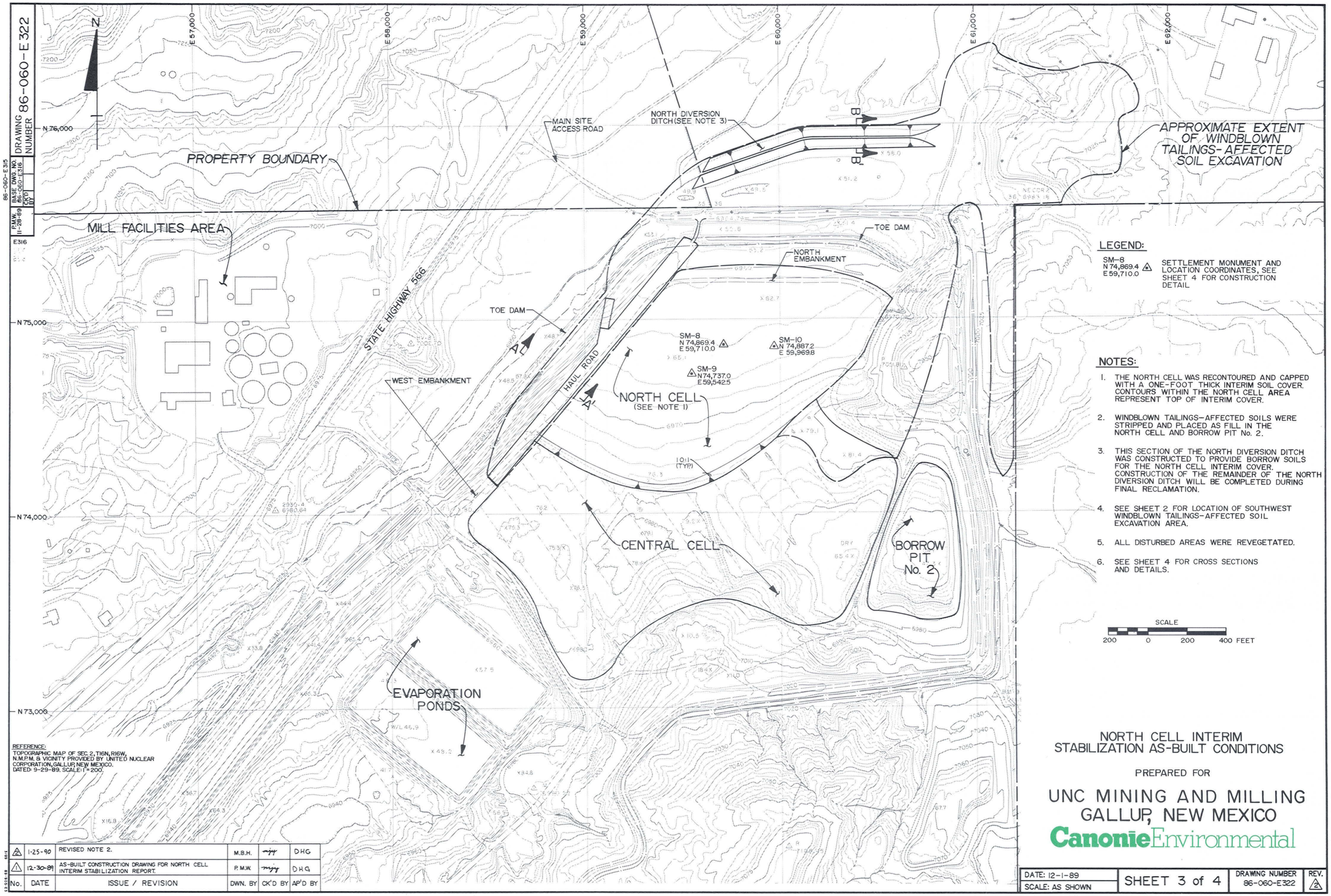
86-060-E315

BASE DWG. NO. 86-060-E316

P.M.W. 11-28-89

CK'D BY

E316



REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W, N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, NEW MEXICO. DATED: 9-29-89. SCALE: 1" = 200'.

LEGEND:

SM-8 N 74,869.4 E 59,710.0 — SETTLEMENT MONUMENT AND LOCATION COORDINATES, SEE SHEET 4 FOR CONSTRUCTION DETAIL

NOTES:

1. THE NORTH CELL WAS RECONTOURED AND CAPPED WITH A ONE-FOOT THICK INTERIM SOIL COVER. CONTOURS WITHIN THE NORTH CELL AREA REPRESENT TOP OF INTERIM COVER.
2. WINDBLOWN TAILINGS-AFFECTED SOILS WERE STRIPPED AND PLACED AS FILL IN THE NORTH CELL AND BORROW PIT No. 2.
3. THIS SECTION OF THE NORTH DIVERSION DITCH WAS CONSTRUCTED TO PROVIDE BORROW SOILS FOR THE NORTH CELL INTERIM COVER. CONSTRUCTION OF THE REMAINDER OF THE NORTH DIVERSION DITCH WILL BE COMPLETED DURING FINAL RECLAMATION.
4. SEE SHEET 2 FOR LOCATION OF SOUTHWEST WINDBLOWN TAILINGS-AFFECTED SOIL EXCAVATION AREA.
5. ALL DISTURBED AREAS WERE REVEGETATED.
6. SEE SHEET 4 FOR CROSS SECTIONS AND DETAILS.

SCALE
200 0 200 400 FEET

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
2	1-25-90	REVISED NOTE 2.	M.B.H.		D.H.G.
1	12-30-89	AS-BUILT CONSTRUCTION DRAWING FOR NORTH CELL INTERIM STABILIZATION REPORT.	P.M.W.		D.H.G.

NORTH CELL INTERIM STABILIZATION AS-BUILT CONDITIONS

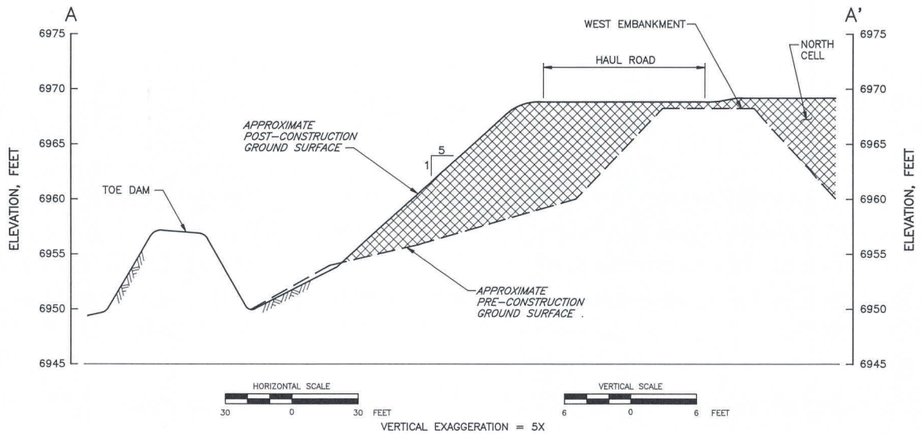
PREPARED FOR

UNC MINING AND MILLING
GALLUP, NEW MEXICO

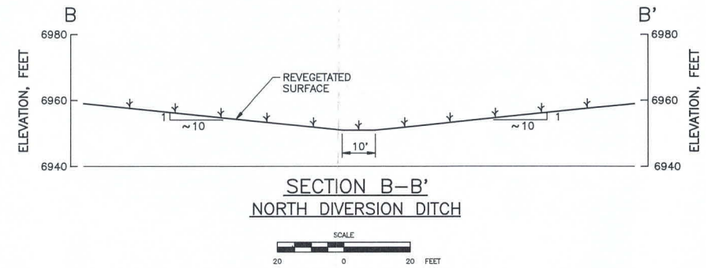
CanonieEnvironmental

DATE: 12-1-89 SCALE: AS SHOWN	SHEET 3 of 4	DRAWING NUMBER 86-060-E322	REV. 2

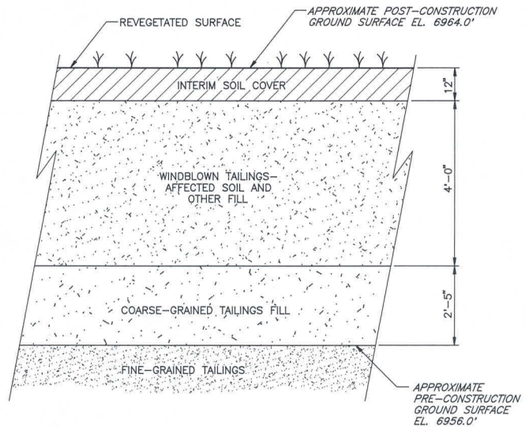
DRAWING NUMBER 86-060-E343



SECTION A-A'

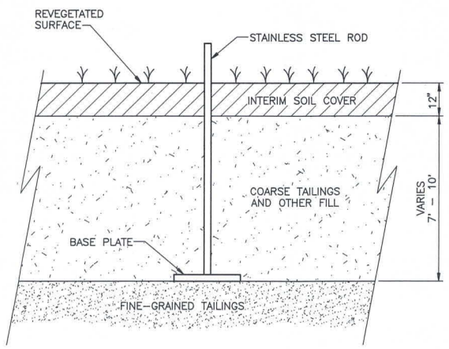


SECTION B-B'
NORTH DIVERSION DITCH



APPROXIMATE AS-BUILT SOIL PROFILE AT SM-8

NOT TO SCALE



SETTLEMENT MONUMENT (TYP.)

NOT TO SCALE

NOTE:

1. SEE SHEET 3 FOR PLAN LOCATION OF SECTIONS AND PROFILE.

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1	12-30-89	AS-BUILT CONSTRUCTION DRAWING FOR NORTH CELL INTERIM STABILIZATION REPORT.	M.B.H.	mjg	DHG

DETAIL SHEET

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DATE: 12-20-89	SHEET 4 of 4	DRAWING NUMBER 86-060-E343	REV. 1
SCALE: AS SHOWN			