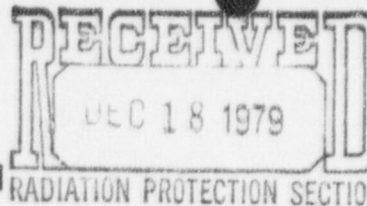




*radiological assessment*  
*NRC question*

**PHILLIPS URANIUM CORPORATION**

BOX 26236 4501 INDIAN SCHOOL ROAD N.E.  
ALBUQUERQUE, NEW MEXICO 87125



UFS: L3-37(1)(a)

*S 1/2*  
SEE REPORT #4

TELEPHONE: 505 265-4481

December 11, 1979

Mr. Gerald W. Stewart  
Environmental Specialist III  
New Mexico Environmental Improvement Div.  
P. O. Box 968  
Santa Fe, New Mexico 87503

Dear Mr. Stewart:

Please find attached Phillips Uranium Corporation's response to a request for additional information dated February 19, 1979. I apologize for the lengthy delay in responding; however, major adjustments to the license application precluded answering this request until the application had been resubmitted. This packet is submitted in duplicate so that you may retain one copy for your files and send the other to the NRC.

We trust this information will enable the NRC to continue its radiological assessment.

Sincerely yours,

*Juan R. Velasquez*  
Juan R. Velasquez

JRV:dq-(RC)

*- last map of land ownership out to Joe Guiza*  
*- see blueprint of tailings disposal (1st stage + final)*

9805080289 791211  
PDR ADOCK 04008731  
C PDR

Information requested from Phillips Uranium Corporation  
for radiological assessment:

1. Meteorology

Tables 1-1 through 1-6 provide the information as requested. The annual average mixing depth used for radiological dose assessment conducted by Dames & Moore is 1000 meters.

2. Detailed site plot plan

Attached is a map of the site and the surrounding five mile area. This map has been compiled by PUC using USGS topographic sheets as the base. In conjunction with this map is attached a detailed updated plot plan of the mill site layout (MP-01, Rev. 3), and two drawings detailing the first stage and final stage of the tailings impoundment area (M-312, Rev. 2 and M-313, Rev. 2, respectively).

3. Demography

The procedure used to provide the information requested comprised of (1) procuring an adequate base map, (2) obtaining current estimates and future projections from a number of sources, and (3) locating these population centers by compass direction within appropriate radial distances.

A number of sources were consulted in deriving the desired population numbers for this task. The following agencies were contacted and supplied helpful information: The Navajo Tribe, Information Services Department, Eastern Navajo Agency, Office of Information & Statistics; McKinley Area Council of Governments; Middle Rio Grande Council of Governments; Economic Opportunity Council, Inc. of San Juan County, New Mexico State Energy & Minerals Department; Bureau of Business & Economic Research, University of New Mexico; and San Juan Basin Regional Uranium Study, U. S. Department of the Interior.

### 3. Demography (Continued)

New Mexico's past history is reflected today in its diverse population base, consisting of three distinct cultural groups: Native Americans, Anglo Americans, and Spanish Americans. Considerable care was exercised in determining the Indian population. Thirty-seven Navajo tribal chapter houses were located within an 80 kilometer radius of the Nose Rock Mine/Mill site. When a tribal chapter house fell within a specific sector, the entire Indian population for that particular chapter was recorded for that sector even though portions of the chapter were geographically located in other sectors. Once the tribal chapter house was located, it was assumed that future populations would likewise be distributed accordingly. Future Indian populations were computed by increasing the current estimate at a 2 percent per annum rate (Faich, Ronald, G., 1979, "1978 Chapter Population Estimates," The Navajo Nation, Navajo Research and Statistics Center).

Projections for the incorporated communities of Gallup, Grants, and Milan were obtained from the San Juan Basin Regional Uranium Study. This study projected population levels for seven scenarios over a 1980-1985-1990-1995-2000 time series. The highest population scenario is 120 percent greater than the baseline projection for the year 2000. The baseline assumes that the population of each community will grow but without any additional increases in coal and uranium activity above present (1978) levels.

Population projections for the small unincorporated communities, such as Bluewater, Crownpoint, Prewitt, and Thoreau, varied depending on location to anticipated economic activity centers 20 years hence. Sources for predicting future population of these smaller communities included the San Juan Basin Regional Uranium Study, McKinley Area Council of Governments, New Mexico State Energy & Minerals and attachment one to the Mill Source License Application, the Baseline Study of the Nose Rock Project.

Table 3-1, attached, shows the population distribution within a 80 kilometer (50 mile) radius of the site as requested. Approximately 83,000 persons presently inhabit the 7,854 square mile area. Plates 2-2-1 and 2-2-2 provide the distribution by sector as requested.

The projected population distribution in the year 2002 (final year of operation) for the 50 mile radius is shown in Table 3-2. It is estimated that approximately 171,000 persons will reside in this area by 2002. Plates 3-3 and 3-4 provide the anticipated distribution by sector as requested.

Table 3-3 shows population distribution for 1978 and that anticipated in 2002 in the principal compass directions. Table 3-4 shows the population distribution by radial distance from the project site for 1978 and that anticipated in 2002.

#### 4. Land Use

- a. As can be seen by the map provided in response to the request delineated in Item 2, the land surrounding the mill site is only very sparsely populated and in general very desolate. Land use is primarily limited to year-round livestock grazing.
- b. Table 4-1 provides the information requested. Additionally, the topographic map provided herewith has noted on it the location of these residences.
- c. There are no milk producing livestock within five miles of the mill site, nor is there any sort of dairy industry.
- d. Grazing (Source: Soil Conservation Service and Bureau of Land Management)
  - i) Duration of grazing season (mo./yr.).

Grazing is year-round.
  - ii) Percentage of feed which is pasture graze.

100% native grassland feed.
  - iii) Percentage of feed which is stored.

There is no supplemental stored feed.
  - iv) Percentage of stored feed grown locally (within 10 miles).

There is no stored feed grown locally.
  - v) Quality of grazeland, in terms of acres or hectares per animal unit month.

There is very little information available on the productivity of the land in the region. However, the Soil Conservation Service estimates that the federal land which exists in the region may require 2009 acres per 264 animal unit month.

#### 4. Land Use (Continued)

##### d. Grazing

- v) The federal land can be generally considered to be in better condition than the land used by the Navajo which is generally controlled by the Bureau of Indian Affairs and/or the Navajo Tribe.

- e. The topographic map provided herewith has designated upon it the surface owner in the upper left-hand corner of each section. In most cases, the land is owned or controlled by the Navajo Nation and/or the federal government. The majority of the land is Withdrawn (W), Indian Allotted (IA) or Navajo Tribal Fee Land. Approximately 100 of the 125 sections in a five mile square area around the site are of this status. Such land is restricted for use by individual Indians and their families for grazing and habitation. Of the remaining 25 sections, approximately 12 are owned by the State of New Mexico (S), leased out primarily for grazing, approximately five are owned by the U. S. Government (US), administered by the Bureau of Land Management, approximately five are held in trust by the federal government for the Navajo Tribe (NTT). The remaining three are privately owned in fee, two by Phillips Uranium Corporation and one by a local Navajo.

Around the perimeter of Section 12 in the adjacent sections to the North, Northwest, West, Southwest and South (Sections 1, 2, 11, 14 and 13, T18N R12W, respectively), PUC has successfully restricted access to these properties by acquiring either the business or grazing lease from the federal or state government. In a direction to the Southeast, PUC owns Section 18 and to the East and Northeast (Section 6 & 7, T18N R11W), PUC is currently negotiating with the Navajo Tribe to obtain ownership of these sections. It is hoped that prior to operation of the mill, PUC will control an exclusion area surrounding the perimeter of the restricted area boundary fence of at least one-half mile.

#### 5. Source Terms

- a. Table 5-1 provides a list of the release points requested. The central mill discharge point has been designated as the yellowcake drying and packaging stack.

5. Source Terms (Continued)

- b. Table 5-2 provides the emission data requested.
- c. Phillips Uranium Corporation cannot provide the information requested regarding the description of the mines and their related emissions as we believe this request goes beyond the statutory authority of the NRC.
- d. Phillips proposes to separate the tailings material into a sand and slimes fraction. During the operational life of the mill the slimes fraction will be kept under water behind an earthen dam forming an evaporation impoundment. Therefore, the exposed area of the slimes portion will be 0%.

The sands portion of the tailings will be overlain with a soil cover on a continual basis as it is deposited in the disposal area. It is anticipated that a maximum of 12 acres of sand tailings will be exposed at any one time.

The estimated exposure rates above the sands and slimes portions of the tailings are 0.25 mR/hr and 3.81 mR/hr., respectively.

The distance and direction from the center of the sands and slimes areas to the central mill point (the yellowcake drying and packaging stack) is 1082.3 and 1013.7 meters, respectively.

The average and maximum depth of sand tailings is estimated to be 47 feet and 75 feet, respectively. After the water overlying the slimes fraction has evaporated the average and maximum depth of slimes tailings is estimated to be 29 feet and 43 feet, respectively.

- e. Ore will be hauled via a private road for a distance of approximately 2.5 miles in 30 ton trucks. The ore will contain approximately 15-20% moisture as it is removed from the mine. Therefore, because of the short haul distance and wet condition of the ore, there will be no fugitive dust emissions resulting from transportation.

TABLE 1-1

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS A

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.002161	0.000457	0.000000	0.000000	0.000000
NNE	0.000748	0.000000	0.000000	0.000000	0.000000
NE	0.000748	0.000000	0.000000	0.000000	0.000000
ENE	0.000374	0.000000	0.000000	0.000000	0.000000
E	0.000748	0.000000	0.000000	0.000000	0.000000
ESE	0.001153	0.000343	0.000000	0.000000	0.000000
SE	0.002972	0.001142	0.000000	0.000000	0.000000
SSE	0.000748	0.000000	0.000000	0.000000	0.000000
S	0.000520	0.000228	0.000000	0.000000	0.000000
SSW	0.000894	0.000228	0.000000	0.000000	0.000000
SW	0.001642	0.000228	0.000000	0.000000	0.000000
WSW	0.001153	0.000343	0.000000	0.000000	0.000000
W	0.000520	0.000228	0.000000	0.000000	0.000000
WNW	0.001933	0.000685	0.000000	0.000000	0.000000
NW	0.001527	0.000343	0.000000	0.000000	0.000000
NNW	0.003055	0.000685	0.000000	0.000000	0.000000

TABLE 1-2

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS B

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.005066	0.001142	0.001599	0.000000	0.000000
NNE	0.000638	0.000343	0.000457	0.000000	0.000000
NE	0.001553	0.000571	0.000114	0.000000	0.000000
ENE	0.000000	0.000000	0.000114	0.000000	0.000000
E	0.001864	0.000913	0.000457	0.000000	0.000000
ESE	0.005085	0.003083	0.002284	0.000000	0.000000
SE	0.007913	0.004339	0.002740	0.000000	0.000000
SSE	0.001781	0.000343	0.000343	0.000000	0.000000
S	0.000850	0.000457	0.000457	0.000000	0.000000
SSW	0.000998	0.000799	0.001142	0.000000	0.000000
SW	0.002289	0.001142	0.000799	0.000000	0.000000
WSW	0.002076	0.001028	0.001142	0.000000	0.000000
W	0.003302	0.001599	0.000685	0.000000	0.000000
WNW	0.002991	0.001256	0.001142	0.000000	0.000000
NW	0.009445	0.001827	0.001827	0.000000	0.000000
NNW	0.008842	0.003083	0.001256	0.000000	0.000000

TABLE 1-3

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS C

WIND DIRECTION	WINDSPEED CLASS (KNOTS)					
	0-3	4-6	7-10	11-16	17-21	OVER 21
N	0.001506	0.002284	0.003197	0.000457	0.000000	0.000000
NNE	0.000355	0.000228	0.000457	0.000114	0.000000	0.000000
NE	0.000386	0.000343	0.000000	0.000000	0.000000	0.000000
ENE	0.000000	0.000000	0.000571	0.000000	0.000000	0.000000
E	0.000481	0.000685	0.000913	0.000000	0.000000	0.000000
ESE	0.001759	0.003197	0.007879	0.002398	0.000114	0.000228
SE	0.002468	0.003654	0.011190	0.001370	0.000000	0.000000
SSE	0.000576	0.001028	0.001827	0.000343	0.000000	0.000000
S	0.000855	0.000457	0.001370	0.000343	0.000000	0.000000
SSW	0.000418	0.000457	0.001599	0.001484	0.000000	0.000000
SW	0.000741	0.000571	0.002969	0.000457	0.000144	0.000000
WSW	0.000773	0.000685	0.003768	0.001599	0.000571	0.000457
W	0.001045	0.001142	0.003768	0.000799	0.000000	0.000000
WNW	0.001353	0.003311	0.004567	0.000457	0.000000	0.000000
NW	0.003841	0.006508	0.009363	0.000343	0.000000	0.000000
NNW	0.003197	0.003654	0.010391	0.000913	0.000000	0.000000

TABLE 1-4

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS D

WIND DIRECTION	WINDSPEED CLASS (KNOTS)					OVER 21
	0-3	4-6	7-10	11-16	17-21	
N	0.000911	0.001599	0.004681	0.005367	0.000228	0.000114
NNE	0.000354	0.000343	0.001028	0.001370	0.000000	0.000000
NE	0.000773	0.000343	0.000228	0.000228	0.000000	0.000000
ENE	0.000165	0.000114	0.000000	0.000228	0.000000	0.000000
E	0.000798	0.000457	0.001370	0.000685	0.000114	0.000000
ESE	0.002150	0.003425	0.010391	0.013359	0.002740	0.001941
SE	0.003341	0.003768	0.013131	0.016214	0.004910	0.001028
SSE	0.001089	0.001142	0.006737	0.006052	0.001484	0.000799
S	0.001114	0.001256	0.002055	0.002398	0.000228	0.000343
SSW	0.000721	0.001370	0.002398	0.003882	0.001256	0.000913
SW	0.000899	0.000913	0.004453	0.007079	0.003083	0.001484
WSW	0.000480	0.000913	0.005937	0.012217	0.006280	0.003996
W	0.000531	0.001142	0.006965	0.011875	0.003311	0.002055
WNW	0.001151	0.002055	0.007879	0.014615	0.003654	0.000913
NW	0.002720	0.00411	0.011875	0.013245	0.002055	0.000571
NNW	0.001188	0.002855	0.014273	0.012788	0.003654	0.000571

TABLE 1-5

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS E

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.000000	0.001370	0.005937	0.000000	0.000000
NNE	0.000000	0.000114	0.000343	0.000000	0.000000
NE	0.000000	0.000343	0.000228	0.000000	0.000000
ENE	0.000000	0.000000	0.000114	0.000000	0.000000
E	0.000000	0.000228	0.000114	0.000000	0.000000
ESE	0.000000	0.002055	0.003425	0.000000	0.000000
SE	0.000000	0.003425	0.006508	0.000000	0.000000
SSE	0.000000	0.002740	0.004225	0.000000	0.000000
S	0.000000	0.001370	0.002740	0.000000	0.000000
SSW	0.000000	0.000799	0.001142	0.000000	0.000000
SW	0.000000	0.000685	0.001484	0.000000	0.000000
WSW	0.000000	0.000913	0.007993	0.000000	0.000000
W	0.000000	0.001713	0.007536	0.000000	0.000000
WNW	0.000000	0.004453	0.039735	0.000000	0.000000
NW	0.000000	0.003996	0.041105	0.000000	0.000000
NNW	0.000000	0.001827	0.019297	0.000000	0.000000

TABLE 1-6

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS F

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.013118	0.005252	0.000000	0.000000	0.000000
NNE	0.002377	0.000685	0.000000	0.000000	0.000000
NE	0.002151	0.000571	0.000000	0.000000	0.000000
ENE	0.000678	0.000343	0.000000	0.000000	0.000000
E	0.001587	0.000114	0.000000	0.000000	0.000000
ESE	0.010965	0.005024	0.000000	0.000000	0.000000
SE	0.015777	0.006166	0.000000	0.000000	0.000000
SSE	0.008759	0.004339	0.000000	0.000000	0.000000
S	0.007638	0.002398	0.000000	0.000000	0.000000
SSW	0.003733	0.001370	0.000000	0.000000	0.000000
SW	0.005315	0.002169	0.000000	0.000000	0.000000
WSW	0.006095	0.004111	0.000000	0.000000	0.000000
W	0.012426	0.006965	0.000000	0.000000	0.000000
WNW	0.027763	0.019525	0.000000	0.000000	0.000000
NW	0.043785	0.023065	0.000000	0.000000	0.000000
NNW	0.022350	0.015072	0.000000	0.000000	0.000000

## 1978 POPULATION DISTRIBUTION, NOSE ROCK

DISTANCE FROM PROJECT SITE KM-MILES		N 0.0°	NNE 22.5°	NE 45°	ENE 67.5°	E 90°	ESE 112.5°	SE 135°	SSE 157.5°
0.1	0.062	0	0	0	0	0	0	0	0
0.5	0.312	0	0	0	0	0	0	0	0
1.0	0.625	0	0	0	0	0	0	0	0
2.0	1.25	0	0	0	0	0	0	0	0
3.0	1.88	0	0	0	0	0	0	0	0
4.0	2.50	0	0	0	0	0	0	0	0
5.0	3.125	0	0	0	0	0	0	0	0
10.0	6.25	0	0	0	0	0	0	0	12
20.0	12.5	0	0	0	0	0	0	0	0
30.0	18.75	0	0	0	0	0	252	0	0
40.0	25.0	0	0	0	0	1203	0	0	0
50.0	31.25	0	0	635	0	0	0	0	120
60.0	37.5	0	1248	0	1434	0	0	0	0
70.0	43.75	0	2353	729	0	0	0	230	0
80.0	50.0	0	0	0	0	1821	0	0	15150
TOTAL		0	3601	1364	1434	3024	252	230	15282

Sources: Eastern Navajo Agency, Office of Information & Statistics; The Navajo Tribal Council, Middle Rio Grande Council of Governments of New Mexico.

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## PROJECT, PHILLIPS URANIUM CORPORATION

S	SSW	SW	WSW	W	WNW	NW	NNW	TOTALS
180°	202.5°	225°	247	270°	292.5°	315°	337.5°	
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	2	8	5	0	15
0	7	7	2	5	0	0	0	21
10	25	42	18	75	24	46	24	276
425	4095	0	0	969	0	0	0	5489
514	0	0	475	267	0	0	0	1508
1143	901	893	0	0	0	0	174	4314
160	1717	1864	1003	1441	0	528	0	7468
350	85	2670	1665	498	1208	0	0	9158
175	0	1482	20097	2479	0	1032	0	28577
0	2428	618	1980	737	767	2100	633	26234
2777	9258	7576	25240	6473	2007	3711	831	83060

ibe, Information Services Dept.; The McKinley Area Council of Governments;

9805080289-1

## PROJECTED POPULATION DISTRIBUTION FINAL YEAR OF OPERATION

DISTANCE FROM PROJECT SITE KM-MILES		N 0.0°	NNE 22.5°	NE 45°	ENE 67.5°	E 90°	ESE 112.5°	SE 135°	SSE 157.5°
0.1	0.062	0	0	0	0	0	0	0	0
0.5	0.312	0	0	0	0	0	0	0	0
1.0	0.625	0	0	0	0	0	0	0	0
2.0	1.25	0	0	0	0	0	0	0	0
3.0	1.88	0	0	0	0	0	0	0	0
4.0	2.50	0	0	0	0	0	0	0	0
5.0	3.125	0	0	0	0	0	0	0	0
10.0	6.25	0	0	0	0	0	0	0	20
20.0	12.5	0	0	0	0	0	0	0	0
30.0	18.75	0	0	0	0	0	410	0	0
40.0	25.0	0	0	0	0	1930	0	0	0
50.0	31.25	0	0	1020	0	0	0	0	190
60.0	37.5	0	2010	0	2310	0	0	0	0
70.0	43.75	0	3780	1170	0	0	0	370	0
80.0	50.0	0	0	0	0	2930	0	0	43390
TOTAL		0	5790	2190	2310	4860	410	370	43600

Sources: Eastern Navajo Agency, Office of Information & Statistics; The Navajo T  
Middle Rio Grande Council of Governments of New Mexico; and San Juan Ba

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Also Available  
Aperture Car

N (2002), NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

S	SSW	SW	WSW	W	WNW	NW	NNW
180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	10	10	0
0	10	10	0	10	0	0	0
20	40	70	30	120	40	70	40
680	14730	0	0	1560	0	0	0
830	0	0	760	430	0	0	0
1840	1450	1440	0	0	0	0	280
260	6050	3000	1610	2320	0	850	0
6590	140	4290	2680	800	1940	0	0
5010	0	2380	29370	3990	0	1660	0
0	3100	990	3180	1180	1230	3380	1020
15230	25520	12180	37630	10410	3220	5970	1340

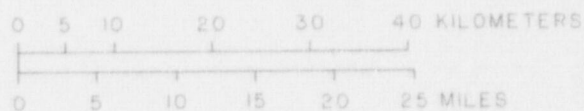
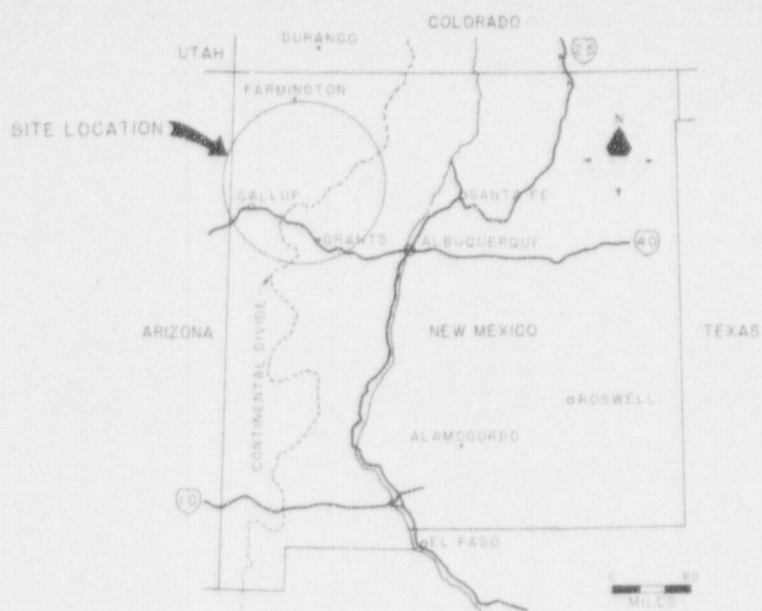
tribe, Information Services Dept.; The McKinley Area Council of Governments,  
 sin Regional Uranium Study, U. S. Department of the Interior.

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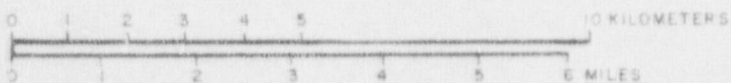
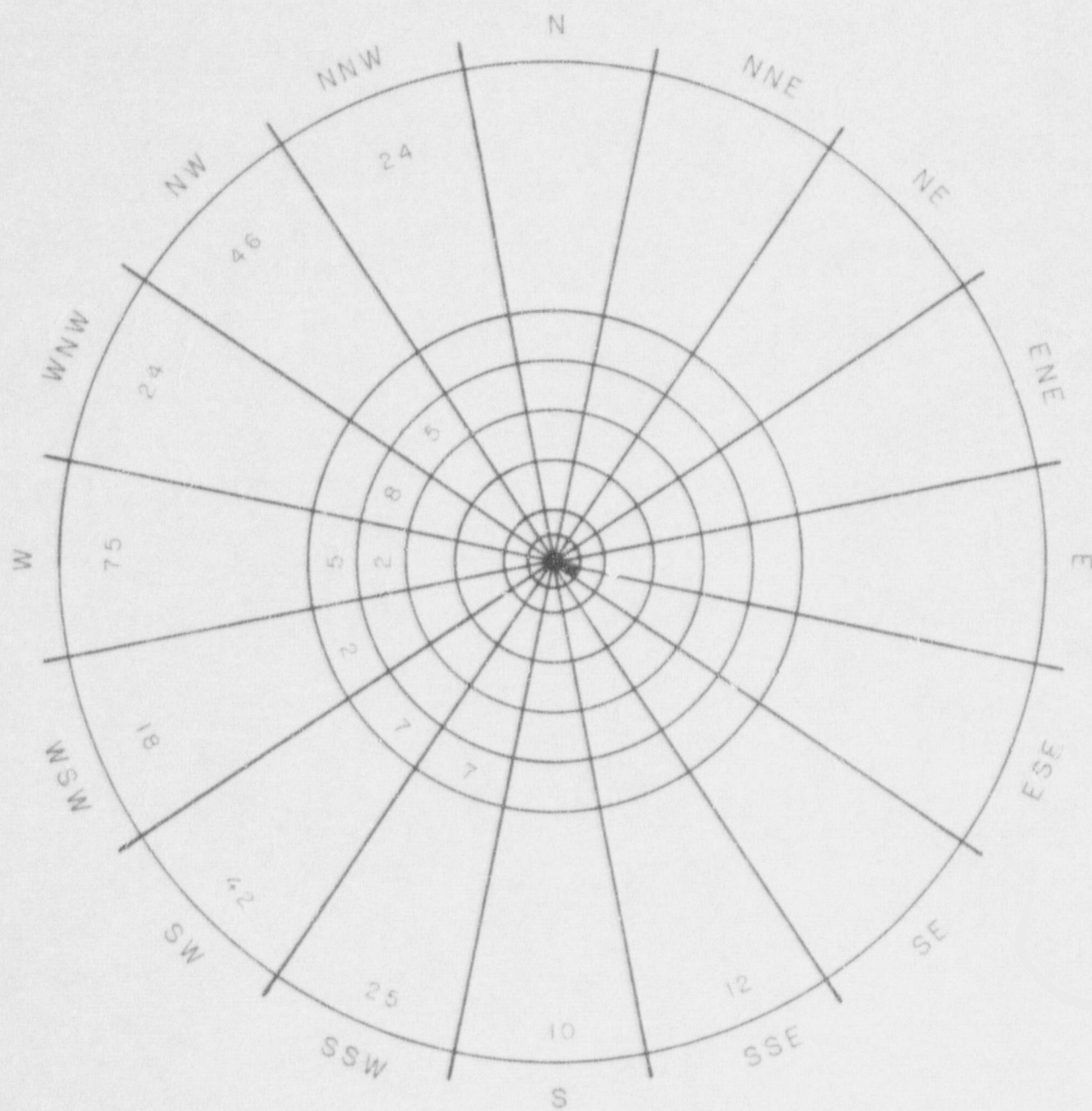
Also Available on  
Aperture Card

ESTIMATED POPULATION DISTRIBUTION  
WITHIN AN 80 KILOMETER (50 MILE)  
RADIUS OF THE NOSE ROCK SITE, 1978

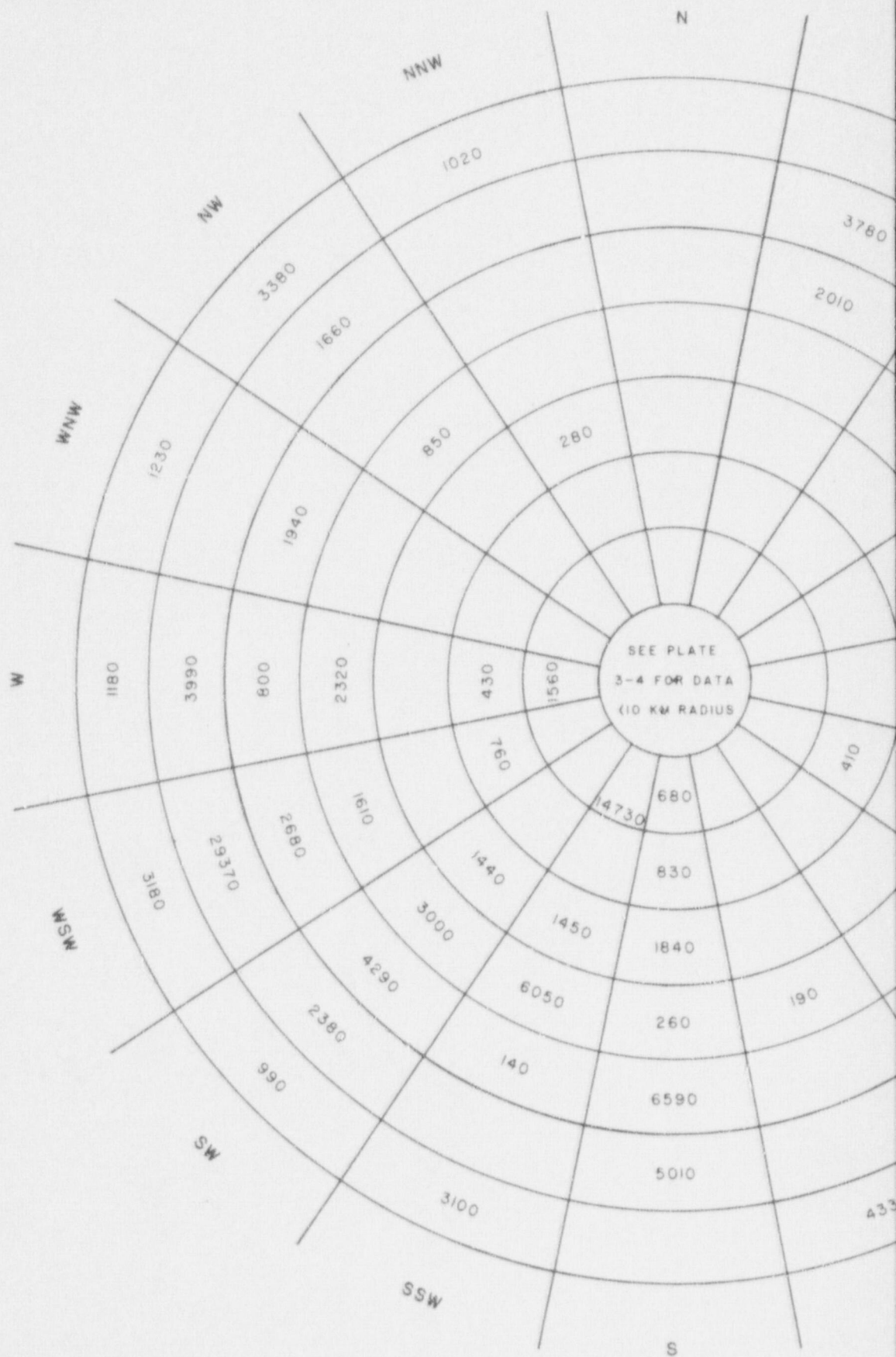
9805080289-3

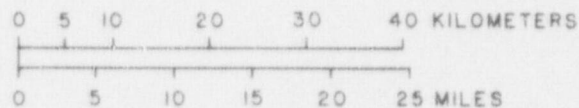
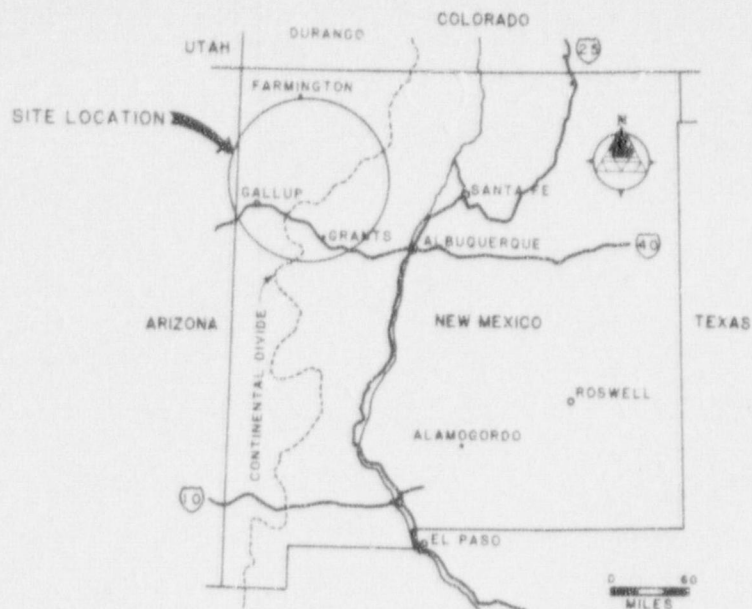
DAMES & MOORE

PLATE 2-2-1



ESTIMATED POPULATION DISTRIBUTION  
 WITHIN A 10 KILOMETER (6.25 MILE)  
 RADIUS OF THE NOSE ROCK SITE, 1978



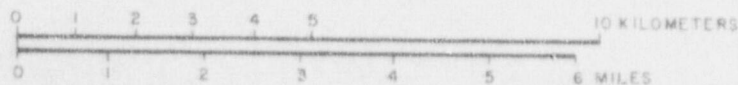
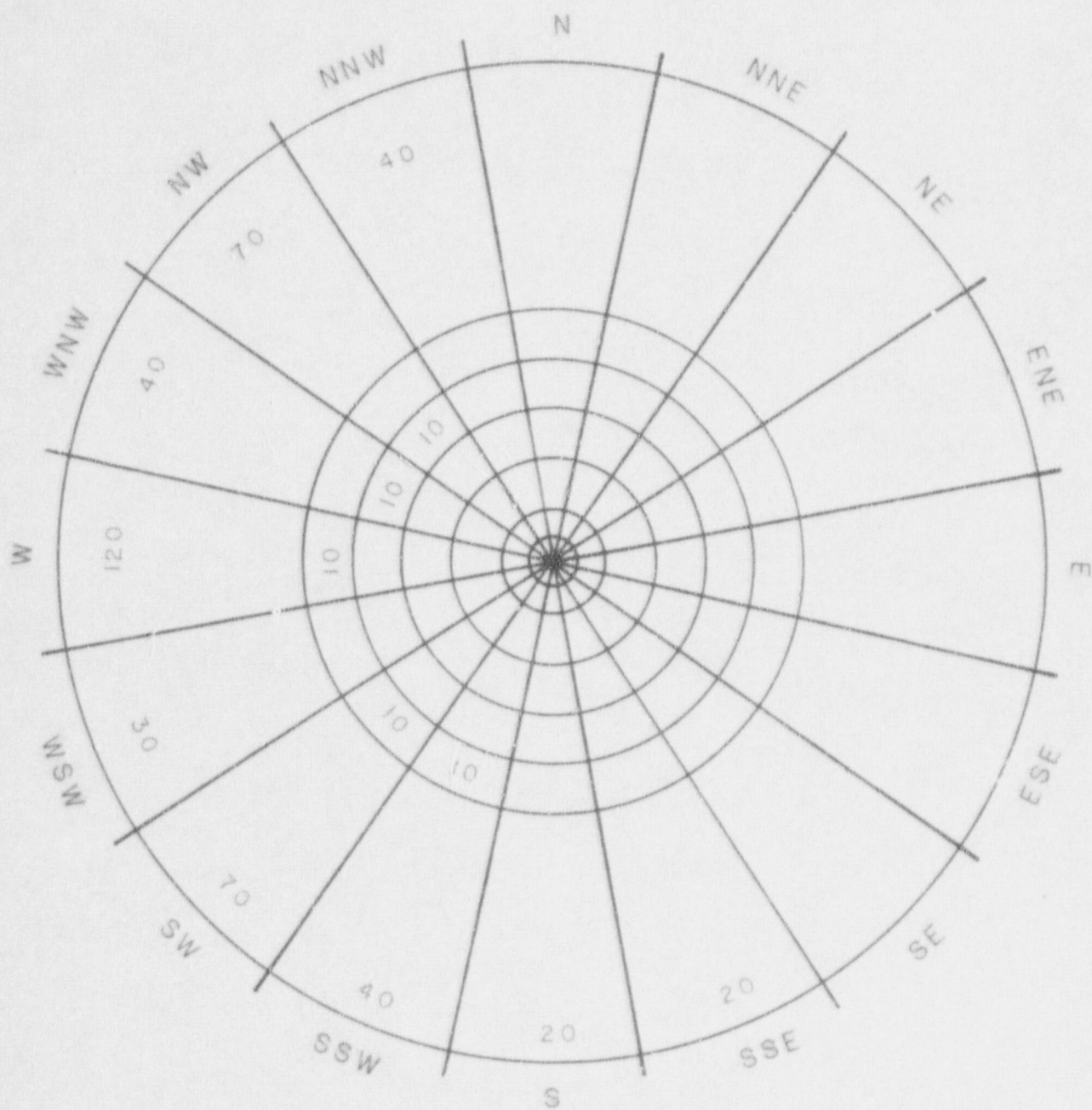


**APERTURE  
CARD**

*Also Available on  
Aperture Card*

**9805080289-3/01**

ESTIMATED POPULATION DISTRIBUTION  
WITHIN AN 80 KILOMETER (50 MILE)  
RADIUS OF THE NOSE ROCK SITE, 2002



ESTIMATED POPULATION DISTRIBUTION  
WITHIN A 10 KILOMETER (6.25 MILE)  
RADIUS OF THE NOSE ROCK SITE, 2002

TABL

POPULATION DISTRIBUTION BY PRINCIPAL C

PHILLIPS URANIUM CORP

Compass Directions from Project Site		<u>Present Estima</u>
		<u>Number</u>
N	0.0°	0
NNE	22.5°	3601
NE	45°	1364
ENE	67.5°	1434
E	90°	3024
ESE	112.5°	252
SE	135°	230
SSE	157.5°	15282
S	180°	2777
SSW	202.5°	9258
SW	225°	7576
WSW	247.5°	25240
W	270°	6473
WNW	292.5°	2007
NW	315°	3711
NNW	337.5°	831
TOTAL		83060

COMPASS DIRECTIONS, NOSE ROCK PROJECT,  
 ORATION, 1978 and 2002

<u>Percent</u>	<u>Number</u>	<u>Percent</u>
0	0	0
4.3	5790	3.4
1.6	2190	1.3
1.7	2310	1.4
3.6	4860	2.8
0.3	410	0.2
0.3	370	0.2
18.4	43600	25.5
3.4	15230	8.9
11.2	25520	14.9
9.1	12180	7.1
30.4	37630	22.0
7.8	10410	6.1
2.4	3220	1.9
4.5	5970	3.5
1.0	1340	0.8
100.0	171030	100.0

APPROPRIATE  
 CARD

Available on  
 Future Card

9805080289-4

POPULATION DISTRIBUTION BY RADI  
PHILLIPS URANIUM CORPO

<u>DISTANCE FROM PROJECT SITE</u>		<u>PRES</u>
<u>KM</u>	<u>MILES</u>	<u>Increment</u>
		<u>Number</u>
0.1	0.062	0
0.5	0.312	0
1.0	0.625	0
2.0	1.25	0
3.0	1.88	0
4.0	2.50	15
5.0	3.125	21
10.0	6.25	276
20.0	12.5	5489
30.0	18.75	1508
40.0	25.0	4314
50.0	31.25	7468
60.0	37.5	9158
70.0	43.75	28577
80.0	50.0	26234
TOTAL		83060

# AL DISTANCES, NOSE ROCK PROJECT, RATION, 1978 and 2002

## ENT TOTAL ESTIMATE (1978)

al	Cumulative	
	Number	Percent

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
<0.1	15	<0.1
<0.1	36	<0.1
0.3	312	0.4
6.6	5801	7.0
1.8	7309	8.8
5.2	11623	14.0
9.0	19091	23.0
11.0	28249	34.0
34.4	56826	68.4
31.6	83060	100.0

100.0

## FUTURE TOTAL PROJECTION (2002)

Incremental		Cumulative	
Number	Percent	Number	Percent

0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
20	<0.1	20	<0.1
30	<0.1	50	<0.1
450	0.3	500	0.3
16970	9.9	17470	10.2
2430	1.4	19900	11.6
6940	4.1	26840	15.7
15300	8.9	42140	24.6
20760	12.1	62900	36.8
47730	27.9	110630	64.7
60400	35.3	171030	100.0

171030

100.0

9805080289-5

TABLE 4-1  
 LOCATION OF RESIDENCES WITHIN  
 A FIVE MILE RADIUS OF THE MILL RELEASE POINT

<u>Reference #</u>	<u>Bearing</u> (degrees)	<u>Distance</u> (ft.)	<u>Elevation</u> (ft. above MSL)	<u>Location</u>
1	207	6100	6450	SE/4, Sec. 14, R12W, T18N
* 2	222	16000	6540	SE/4, Sec. 25, R12W, T18N
3	222	18300	6580	NE/4, Sec. 28, R12W, T18N
4	222	20500	6600	NW/4, Sec. 27, R12W, T18N
* 5	234	14400	6460	SW/4, Sec. 21, R12W, T18N
6	249	22700	6590	W/2, Sec. 20, R12W, T18N
7	261	25600	6620	SW/4, Sec. 18, R12W, T18N
8	271	23000	6670	SE/4, Sec. 7, R12W, T18N
9	291	19800	6680	SE/4, Sec. 5, R12W, T18N
10	354	24700	6320	NE/4, Sec. 23, R12W, T19N

\*New residences not appearing on USGS topographic base map.

TABLE 5-1

DISTANCE TO VARIOUS OTHER MILL PARTICULATE EMISSION  
SOURCES FROM CENTRAL MILL POINT\*

NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

Release Point	Distance from C.M.P. (m)	Direction (Degrees)
Grinding Bldg. Area #10	213.4	7.5
Ore Stockpile	327.7	15.5
Sands Disposal Area	1082.3	29.5
Slimes Disposal Area	No emission - 100% water cover.	

\*Central mill release point is taken to be the yellowcake  
facility discharge stack.

TABLE 5-2

EMISSION DATA

NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

Source Parameter	Ore Stockpiles	Grinding Facility	Yellowcake Facility	Sand Tailings
Stack Height	ground level	-	90 ft.	ground level
Ore Process Rate	2500 tpd	2500 tpd	2500 tpd	2500 tpd
Filter Types	-	none	none	-
Control Devices	natural moisture		Venturi Scrubber	Chemical stabilizer
Control Efficiency	80%	-	99.5%	85%
Flow rates	-	-	1250 SCFM	-
Dust Release Rates (lbs/yr)	$4.88 \times 10^3$	$4.29 \times 10^3$	$9.43 \times 10^2$	$9.90 \times 10^3$



Information requested from Phillips Uranium Corporation  
for radiological assessment:

1. Meteorology

Tables 1-1 through 1-6 provide the information as requested. The annual average mixing depth used for radiological dose assessment conducted by Dames & Moore is 1000 meters.

2. Detailed site plot plan

Attached is a map of the site and the surrounding five mile area. This map has been compiled by PUC using USGS topographic sheets as the base. In conjunction with this map is attached a detailed updated plot plan of the mill site layout (MP-01, Rev. 3), and two drawings detailing the first stage and final stage of the tailings impoundment area (M-312, Rev. 2 and M-313, Rev. 2, respectively).

3. Demography

The procedure used to provide the information requested comprised of (1) procuring an adequate base map, (2) obtaining current estimates and future projections from a number of sources, and (3) locating these population centers by compass direction within appropriate radial distances.

A number of sources were consulted in deriving the desired population numbers for this task. The following agencies were contacted and supplied helpful information: The Navajo Tribe, Information Services Department, Eastern Navajo Agency, Office of Information & Statistics; McKinley Area Council of Governments; Middle Rio Grande Council of Governments; Economic Opportunity Council, Inc. of San Juan County, New Mexico State Energy & Minerals Department; Bureau of Business & Economic Research, University of New Mexico; and San Juan Basin Regional Uranium Study, U. S. Department of the Interior.

### 3. Demography (Continued)

New Mexico's past history is reflected today in its diverse population base, consisting of three distinct cultural groups: Native Americans, Anglo Americans, and Spanish Americans. Considerable care was exercised in determining the Indian population. Thirty-seven Navajo tribal chapter houses were located within an 80 kilometer radius of the Nose Rock Mine/Mill site. When a tribal chapter house fell within a specific sector, the entire Indian population for that particular chapter was recorded for that sector even though portions of the chapter were geographically located in other sectors. Once the tribal chapter house was located, it was assumed that future populations would likewise be distributed accordingly. Future Indian populations were computed by increasing the current estimate at a 2 percent per annum rate (Faich, Ronald, G., 1979, "1978 Chapter Population Estimates," The Navajo Nation, Navajo Research and Statistics Center).

Projections for the incorporated communities of Gallup, Grants, and Milan were obtained from the San Juan Basin Regional Uranium Study. This study projected population levels for seven scenarios over a 1980-1985-1990-1995-2000 time series. The highest population scenario is 120 percent greater than the baseline projection for the year 2000. The baseline assumes that the population of each community will grow but without any additional increases in coal and uranium activity above present (1978) levels.

Population projections for the small unincorporated communities, such as Bluewater, Crownpoint, Prewitt, and Thoreau, varied depending on location to anticipated economic activity centers 20 years hence. Sources for predicting future population of these smaller communities included the San Juan Basin Regional Uranium Study, McKinley Area Council of Governments, New Mexico State Energy & Minerals and attachment one to the Mill Source License Application, the Baseline Study of the Nose Rock Project.

Table 3-1, attached, shows the population distribution within a 80 kilometer (50 mile) radius of the site as requested. Approximately 83,000 persons presently inhabit the 7,854 square mile area. Plates 2-2-1 and 2-2-2 provide the distribution by sector as requested.

The projected population distribution in the year 2002 (final year of operation) for the 50 mile radius is shown in Table 3-2. It is estimated that approximately 171,000 persons will reside in this area by 2002. Plates 3-3 and 3-4 provide the anticipated distribution by sector as requested.

Table 3-3 shows population distribution for 1978 and that anticipated in 2002 in the principal compass directions. Table 3-4 shows the population distribution by radial distance from the project site for 1978 and that anticipated in 2002.

#### 4. Land Use

- a. As can be seen by the map provided in response to the request delineated in Item 2, the land surrounding the mill site is only very sparsely populated and in general very desolate. Land use is primarily limited to year-round livestock grazing.
- b. Table 4-1 provides the information requested. Additionally, the topographic map provided herewith has noted on it the location of these residences.
- c. There are no milk producing livestock within five miles of the mill site, nor is there any sort of dairy industry.
- d. Grazing (Source: Soil Conservation Service and Bureau of Land Management)
  - i) Duration of grazing season (mo./yr.).

Grazing is year-round.
  - ii) Percentage of feed which is pasture graze.

100% native grassland feed.
  - iii) Percentage of feed which is stored.

There is no supplemental stored feed.
  - iv) Percentage of stored feed grown locally (within 10 miles).

There is no stored feed grown locally.
  - v) Quality of grazeland, in terms of acres or hectares per animal unit month.

There is very little information available on the productivity of the land in the region. However, the Soil Conservation Service estimates that the federal land which exists in the region may require 2009 acres per 264 animal unit month.

#### 4. Land Use (Continued)

##### d. Grazing

- v) The federal land can be generally considered to be in better condition than the land used by the Navajo which is generally controlled by the Bureau of Indian Affairs and/or the Navajo Tribe.
- e. The topographic map provided herewith has designated upon it the surface owner in the upper left-hand corner of each section. In most cases, the land is owned or controlled by the Navajo Nation and/or the federal government. The majority of the land is Withdrawn (W), Indian Allotted (IA) or Navajo Tribal Fee Land. Approximately 100 of the 125 sections in a five mile square area around the site are of this status. Such land is restricted for use by individual Indians and their families for grazing and habitation. Of the remaining 25 sections, approximately 12 are owned by the State of New Mexico (S), leased out primarily for grazing, approximately five are owned by the U. S. Government (US), administered by the Bureau of Land Management, approximately five are held in trust by the federal government for the Navajo Tribe (NTT). The remaining three are privately owned in fee, two by Phillips Uranium Corporation and one by a local Navajo.

Around the perimeter of Section 12 in the adjacent sections to the North, Northwest, West, Southwest and South (Sections 1, 2, 11, 14 and 13, T18N R12W, respectively), PUC has successfully restricted access to these properties by acquiring either the business or grazing lease from the federal or state government. In a direction to the Southeast, PUC owns Section 18 and to the East and Northeast (Section 6 & 7, T18N R11W), PUC is currently negotiating with the Navajo Tribe to obtain ownership of these sections. It is hoped that prior to operation of the mill, PUC will control an exclusion area surrounding the perimeter of the restricted area boundary fence of at least one-half mile.

#### 5. Source Terms

- a. Table 5-1 provides a list of the release points requested. The central mill discharge point has been designated as the yellowcake drying and packaging stack.

5. Source Terms (Continued)

- b. Table 5-2 provides the emission data requested.
- c. Phillips Uranium Corporation cannot provide the information requested regarding the description of the mines and their related emissions as we believe this request goes beyond the statutory authority of the NRC.
- d. Phillips proposes to separate the tailings material into a sand and slimes fraction. During the operational life of the mill the slimes fraction will be kept under water behind an earthen dam forming an evaporation impoundment. Therefore, the exposed area of the slimes portion will be 0%.

The sands portion of the tailings will be overlain with a soil cover on a continual basis as it is deposited in the disposal area. It is anticipated that a maximum of 12 acres of sand tailings will be exposed at any one time.

The estimated exposure rates above the sands and slimes portions of the tailings are 0.25 mR/hr and 3.81 mR/hr., respectively.

The distance and direction from the center of the sands and slimes areas to the central mill point (the yellowcake drying and packaging stack) is 1082.3 and 1013.7 meters, respectively.

The average and maximum depth of sand tailings is estimated to be 47 feet and 75 feet, respectively. After the water overlying the slimes fraction has evaporated the average and maximum depth of slimes tailings is estimated to be 29 feet and 43 feet, respectively.

- e. Ore will be hauled via a private road for a distance of approximately 2.5 miles in 30 ton trucks. The ore will contain approximately 15-20% moisture as it is removed from the mine. Therefore, because of the short haul distance and wet condition of the ore, there will be no fugitive dust emissions resulting from transportation.

TABLE 1-1

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS A

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.002161	0.000457	0.000000	0.000000	0.000000
NNE	0.000748	0.000000	0.000000	0.000000	0.000000
NE	0.000748	0.000000	0.000000	0.000000	0.000000
ENE	0.000374	0.000000	0.000000	0.000000	0.000000
E	0.000748	0.000000	0.000000	0.000000	0.000000
ESE	0.001153	0.000343	0.000000	0.000000	0.000000
SE	0.002972	0.001142	0.000000	0.000000	0.000000
SSE	0.000748	0.000000	0.000000	0.000000	0.000000
S	0.000520	0.000228	0.000000	0.000000	0.000000
SSW	0.000894	0.000228	0.000000	0.000000	0.000000
SW	0.001642	0.000228	0.000000	0.000000	0.000000
WSW	0.001153	0.000343	0.000000	0.000000	0.000000
W	0.000520	0.000228	0.000000	0.000000	0.000000
WNW	0.001933	0.000685	0.000000	0.000000	0.000000
NW	0.001527	0.000343	0.000000	0.000000	0.000000
NNW	0.003055	0.000685	0.000000	0.000000	0.000000

TABLE 1-2

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS B

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.005066	0.001142	0.001599	0.000000	0.000000
NNE	0.000638	0.000343	0.000457	0.000000	0.000000
NE	0.001553	0.000571	0.000114	0.000000	0.000000
ENE	0.000000	0.000000	0.000114	0.000000	0.000000
E	0.001864	0.000913	0.000457	0.000000	0.000000
ESE	0.005085	0.003083	0.002284	0.000000	0.000000
SE	0.007913	0.004339	0.002740	0.000000	0.000000
SSE	0.001781	0.000343	0.000343	0.000000	0.000000
S	0.000850	0.000457	0.000457	0.000000	0.000000
SSW	0.000998	0.000799	0.001142	0.000000	0.000000
SW	0.002289	0.001142	0.000799	0.000000	0.000000
WSW	0.002076	0.001028	0.001142	0.000000	0.000000
W	0.003302	0.001599	0.000685	0.000000	0.000000
WNW	0.002991	0.001256	0.001142	0.000000	0.000000
NW	0.009445	0.001827	0.001827	0.000000	0.000000
NNW	0.008842	0.003083	0.001256	0.000000	0.000000

TABLE 1-3

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS C

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21 OVER 21
N	0.001506	0.002284	0.003197	0.000457	0.000000
NNE	0.000355	0.000228	0.000457	0.000114	0.000000
NE	0.000386	0.000343	0.000000	0.000000	0.000000
ENE	0.000000	0.000000	0.000571	0.000000	0.000000
E	0.000481	0.000685	0.000913	0.000000	0.000000
ESE	0.001759	0.003197	0.007879	0.002398	0.000114
SE	0.002468	0.003654	0.011190	0.001370	0.000000
SSE	0.000576	0.001028	0.001827	0.000343	0.000000
S	0.000855	0.000457	0.001370	0.000343	0.000000
SSW	0.000418	0.000457	0.001599	0.001484	0.000000
SW	0.000741	0.000571	0.002969	0.000457	0.000144
WSW	0.000773	0.000685	0.003768	0.001599	0.000571
W	0.001045	0.001142	0.003768	0.000799	0.000000
WNW	0.001353	0.003311	0.004567	0.000457	0.000000
NW	0.003841	0.006508	0.009363	0.000343	0.000000
NNW	0.003197	0.003654	0.010391	0.000913	0.000000

TABLE 1-4

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
 NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS D

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.000911	0.001599	0.004681	0.005367	0.000228
NNE	0.000354	0.000343	0.001028	0.001370	0.000000
NE	0.000773	0.000343	0.000228	0.000228	0.000000
ENE	0.000165	0.000114	0.000000	0.000228	0.000000
E	0.000798	0.000457	0.001370	0.000685	0.000114
ESE	0.002150	0.003425	0.010391	0.013359	0.002740
SE	0.003341	0.003768	0.013131	0.016214	0.004910
SSE	0.001089	0.001142	0.006737	0.006052	0.001484
S	0.001114	0.001256	0.002055	0.002398	0.000228
SSW	0.000721	0.001370	0.002398	0.003882	0.001256
SW	0.000899	0.000913	0.004453	0.007079	0.003083
WSW	0.000480	0.000913	0.005937	0.012217	0.006280
W	0.000531	0.001142	0.006965	0.011875	0.003311
WNW	0.001151	0.002055	0.007879	0.014615	0.003654
NW	0.002720	0.00411	0.011875	0.013245	0.002055
NNW	0.001188	0.002855	0.014273	0.012788	0.003654
					0.000114
					0.000000
					0.000000
					0.000000
					0.000000
					0.000000
					0.001941
					0.001028
					0.000799
					0.000343
					0.000913
					0.001484
					0.003996
					0.002055
					0.000913
					0.000571
					0.000685

TABLE 1-5

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
 NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS E

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.000000	0.001370	0.005937	0.000000	0.000000
NNE	0.000000	0.000114	0.000343	0.000000	0.000000
NE	0.000000	0.000343	0.000228	0.000000	0.000000
ENE	0.000000	0.000000	0.000114	0.000000	0.000000
E	0.000000	0.000228	0.000114	0.000000	0.000000
ESE	0.000000	0.002055	0.003425	0.000000	0.000000
SE	0.000000	0.003425	0.006508	0.000000	0.000000
SSE	0.000000	0.002740	0.004225	0.000000	0.000000
S	0.000000	0.001370	0.002740	0.000000	0.000000
SSW	0.000000	0.000799	0.001142	0.000000	0.000000
SW	0.000000	0.000685	0.001484	0.000000	0.000000
WSW	0.000000	0.000913	0.007993	0.000000	0.000000
W	0.000000	0.001713	0.007536	0.000000	0.000000
WNW	0.000000	0.004453	0.039735	0.000000	0.000000
NW	0.000000	0.003996	0.041105	0.000000	0.000000
NNW	0.000000	0.001827	0.019297	0.000000	0.000000

OVER 21

TABLE 1-6

ANNUAL AVERAGE JOINT RELATIVE WIND DISTRIBUTION  
NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

## STABILITY CLASS F

WIND DIRECTION	WINDSPEED CLASS (KNOTS)				
	0-3	4-6	7-10	11-16	17-21
N	0.013118	0.005252	0.000000	0.000000	0.000000
NNE	0.002377	0.000685	0.000000	0.000000	0.000000
NE	0.002151	0.000571	0.000000	0.000000	0.000000
ENE	0.000678	0.000343	0.000000	0.000000	0.000000
E	0.001587	0.000114	0.000000	0.000000	0.000000
ESE	0.010965	0.005024	0.000000	0.000000	0.000000
SE	0.015777	0.006166	0.000000	0.000000	0.000000
SSE	0.008759	0.004339	0.000000	0.000000	0.000000
S	0.007638	0.002398	0.000000	0.000000	0.000000
SSW	0.003733	0.001370	0.000000	0.000000	0.000000
SW	0.005315	0.002169	0.000000	0.000000	0.000000
WSW	0.006095	0.004111	0.000000	0.000000	0.000000
W	0.012426	0.006965	0.000000	0.000000	0.000000
WNW	0.027763	0.019525	0.000000	0.000000	0.000000
NW	0.043785	0.023065	0.000000	0.000000	0.000000
NNW	0.022350	0.015072	0.000000	0.000000	0.000000

## 1978 POPULATION DISTRIBUTION, NOSE ROCK

DISTANCE FROM PROJECT SITE KM-MILES		N 0.0°	NNE 22.5°	NE 45°	ENE 67.5°	E 90°	ESE 112.5°	SE 135°	SSE 157.5°
0.1	0.062	0	0	0	0	0	0	0	0
0.5	0.312	0	0	0	0	0	0	0	0
1.0	0.625	0	0	0	0	0	0	0	0
2.0	1.25	0	0	0	0	0	0	0	0
3.0	1.88	0	0	0	0	0	0	0	0
4.0	2.50	0	0	0	0	0	0	0	0
5.0	3.125	0	0	0	0	0	0	0	0
10.0	6.25	0	0	0	0	0	0	0	12
20.0	12.5	0	0	0	0	0	0	0	0
30.0	18.75	0	0	0	0	0	252	0	0
40.0	25.0	0	0	0	0	1203	0	0	0
50.0	31.25	0	0	635	0	0	0	0	120
60.0	37.5	0	1248	0	1434	0	0	0	0
70.0	43.75	0	2353	729	0	0	0	230	0
80.0	50.0	0	0	0	0	1821	0	0	15150
TOTAL		0	3601	1364	1434	3024	252	230	15282

Sources: Eastern Navajo Agency, Office of Information & Statistics; The Navajo Tribal Council; Middle Rio Grande Council of Governments of New Mexico.

APERTURE  
CARD

PROJECT, PHILLIPS URANIUM CORPORATION

Also Available on  
Aperture Card

S	SSW	SW	WSW	W	WNW	NW	NNW	TOTALS
180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°	
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	2	8	5	0	15
0	7	7	1152	5	0	0	0	21
10	25	42	18	75	24	46	24	276
425	4095	0	0	969	0	0	0	5489
514	0	0	475	267	0	0	0	1508
1143	901	893	0	0	0	0	174	4314
160	1717	1864	1003	1441	0	528	0	7468
350	85	2670	1665	498	1203	0	0	9158
175	0	1482	20097	2479	0	1032	0	23577
0	2428	618	1980	737	767	2100	633	26234
2777	9258	7576	25240	6473	2007	3711	831	83060

ibe, Information Services Dept.; The McKinley Area Council of Governments;

9805080289-6

## PROJECTED POPULATION DISTRIBUTION FINAL YEAR OF OPERATION

DISTANCE FROM PROJECT SITE KM-MILES		N 0.0°	NNE 22.5°	NE 45°	ENE 67.5°	E 90°	ESE 112.5°	SE 135°	SSE 157.5°
0.1	0.062	0	0	0	0	0	0	0	0
0.5	0.312	0	0	0	0	0	0	0	0
1.0	0.625	0	0	0	0	0	0	0	0
2.0	1.25	0	0	0	0	0	0	0	0
3.0	1.88	0	0	0	0	0	0	0	0
4.0	2.50	0	0	0	0	0	0	0	0
5.0	3.125	0	0	0	0	0	0	0	0
10.0	6.25	0	0	0	0	0	0	0	20
20.0	12.5	0	0	0	0	0	0	0	0
30.0	18.75	0	0	0	0	0	410	0	0
40.0	25.0	0	0	0	0	1930	0	0	0
50.0	31.25	0	0	1020	0	0	0	0	190
60.0	37.5	0	2010	0	2310	0	0	0	0
70.0	43.75	0	3780	1170	0	0	0	370	0
80.0	50.0	0	0	0	0	2930	0	0	43390
TOTAL		0	5790	2190	2310	4860	410	370	43600

Sources: Eastern Navajo Agency, Office of Information & Statistics; The Navajo T  
Middle Rio Grande Council of Governments of New Mexico; and San Juan Ba

N (2002), NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

S	SSW	SW	WSW	W	WNW	NW	NNW
180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	10	10	0
0	10	10	0	10	0	0	0
20	40	70	30	120	40	70	40
680	14730	0	0	1560	0	0	0
830	0	0	760	430	0	0	0
1840	1450	1440	0	0	0	0	280
260	6050	3000	1610	2320	0	850	0
6590	140	4290	2680	800	1940	0	0
5010	0	2380	29370	3990	0	1660	0
0	3100	990	3180	1180	1230	3380	1020
15230	25520	12180	37630	10410	3220	5970	1340

APERTURE  
CARD

Also Available  
Aperture Card

tribe, Information Services Dept.; The McKinley Area Council of Governments,  
sin Regional Uranium Study, U. S. Department of the Interior.

9805080289-7

## POPULATION DISTRIBUTION BY PRINCIPAL C

PHILLIPS URANIUM CORP

Compass Directions from Project Site		Present Estima
		<u>Number</u>
N	0.0°	0
NNE	22.5°	3601
NE	45°	1364
ENE	67.5°	1434
E	90°	3024
ESE	112.5°	252
SE	135°	230
SSE	157.5°	15282
S	180°	2777
SSW	202.5°	9258
SW	225°	7576
WSW	247.5°	25240
W	270°	6473
WNW	292.5°	2007
NW	315°	3711
NNW	337.5°	831
TOTAL		83060

E 3-3

COMPASS DIRECTIONS, NOSE ROCK PROJECT,  
ORATION, 1978 and 2002

APERTURE  
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Also Available on  
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te (1978)

Future Projection (2002)

Percent

Number

Percent

0	0	0
4.3	5790	3.4
1.6	2190	1.3
1.7	2310	1.4
3.6	4860	2.8
0.3	410	0.2
0.3	370	0.2
18.4	43600	25.5
3.4	15230	8.9
11.2	25520	14.9
9.1	12180	7.1
30.4	37630	22.0
7.8	10410	6.1
2.4	3220	1.9
4.5	5970	3.5
1.0	1340	0.8
100.0	171030	100.0

9805080289-8

TABL

POPULATION DISTRIBUTION BY RADI

PHILLIPS URANIUM CORPO

<u>DISTANCE FROM PROJECT SITE</u>		<u>PRES</u>
<u>KM</u>	<u>MILES</u>	<u>Increment</u>
		<u>Number</u>
0.1	0.062	0
0.5	0.312	0
1.0	0.625	0
2.0	1.25	0
3.0	1.88	0
4.0	2.50	15
5.0	3.125	21
10.0	6.25	276
20.0	12.5	5489
30.0	18.75	1508
40.0	25.0	4314
50.0	31.25	7468
60.0	37.5	9158
70.0	43.75	28577
80.0	50.0	26234
TOTAL		83060

AL DISTANCES, NOSE ROCK PROJECT,  
RATION, 1978 and 2002

APERTURE  
CARD

Also Available on  
Aperture Card

PRESENT TOTAL ESTIMATE (1978)

al Percent	Cumulative	
	Number	Percent
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
<0.1	15	<0.1
<0.1	36	<0.1
0.3	312	0.4
6.6	5801	7.0
1.8	7309	8.8
5.2	11623	14.0
9.0	19091	23.0
11.0	28249	34.0
34.4	56826	68.4
31.6	83060	100.0

100.0

FUTURE TOTAL PROJECTION (2002)

Incremental		Cumulative	
Number	Percent	Number	Percent
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
20	<0.1	20	<0.1
30	<0.1	50	<0.1
450	0.3	500	0.3
16970	9.9	17470	10.2
2430	1.4	19900	11.6
6940	4.1	26840	15.7
15300	8.9	42140	24.6
20760	12.1	62900	36.8
47730	27.9	110630	64.7
60400	35.3	171030	100.0

171030

100.0

9805080289-9

TABLE 4-1LOCATION OF RESIDENCES WITHIN  
A FIVE MILE RADIUS OF THE MILL RELEASE POINT

<u>Reference #</u>	<u>Bearing</u> (degrees)	<u>Distance</u> (ft.)	<u>Elevation</u> (ft. above MSL)	<u>Location</u>
1	207	6100	6450	SE/4, Sec. 14, R12W, T18N
* 2	222	16000	6540	SE/4, Sec. 25, R12W, T18N
3	222	18300	6580	NE/4, Sec. 28, R12W, T18N
4	222	20500	6600	NW/4, Sec. 27, R12W, T18N
* 5	234	14400	6460	SW/4, Sec. 21, R12W, T18N
6	249	22700	6590	W/2, Sec. 20, R12W, T18N
7	261	25600	6620	SW/4, Sec. 18, R12W, T18N
8	271	23000	6670	SE/4, Sec. 7, R12W, T18N
9	291	19800	6680	SE/4, Sec. 5, R12W, T18N
10	354	24700	6320	NE/4, Sec. 23, R12W, T19N

\*New residences not appearing on USGS topographic base map.

TABLE 5-1

DISTANCE TO VARIOUS OTHER MILL PARTICULATE EMISSION  
SOURCES FROM CENTRAL MILL POINT\*

NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

Release Point	Distance from C.M.P. (m)	Direction (Degrees)
Grinding Bldg. Area #10	213.4	7.5
Ore Stockpile	327.7	15.5
Sands Disposal Area	1082.3	29.5
Slimes Disposal Area	No emission - 100% water cover.	

\*Central mill release point is taken to be the yellowcake  
facility discharge stack.

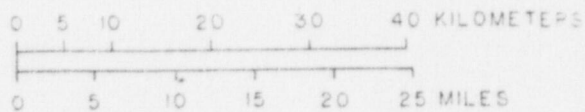
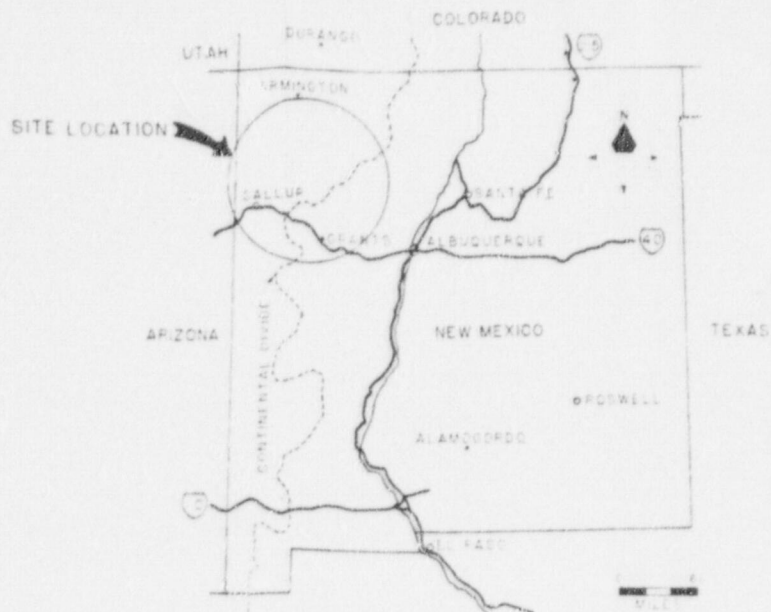
TABLE 5-2

EMISSION DATA

NOSE ROCK PROJECT, PHILLIPS URANIUM CORPORATION

Source Parameter	Ore Stockpiles	Grinding Facility	Yellowcake Facility	Sand Tailings
Stack Height	ground level	-	90 ft.	ground level
Ore Process Rate	2500 tpd	2500 tpd	2500 tpd	2500 tpd
Filter Types	-	none	none	-
Control Devices	natural moisture		Venturi Scrubber	Chemical stabilizer
Control Efficiency	80%	-	99.5%	85%
Flow rates	-	-	1250 SCFM	-
Dust Release Rates (lbs/yr)	$4.88 \times 10^3$	$4.29 \times 10^3$	$9.43 \times 10^2$	$9.90 \times 10^3$





**APERTURE  
CARD**

Also Available on  
Aperture Card

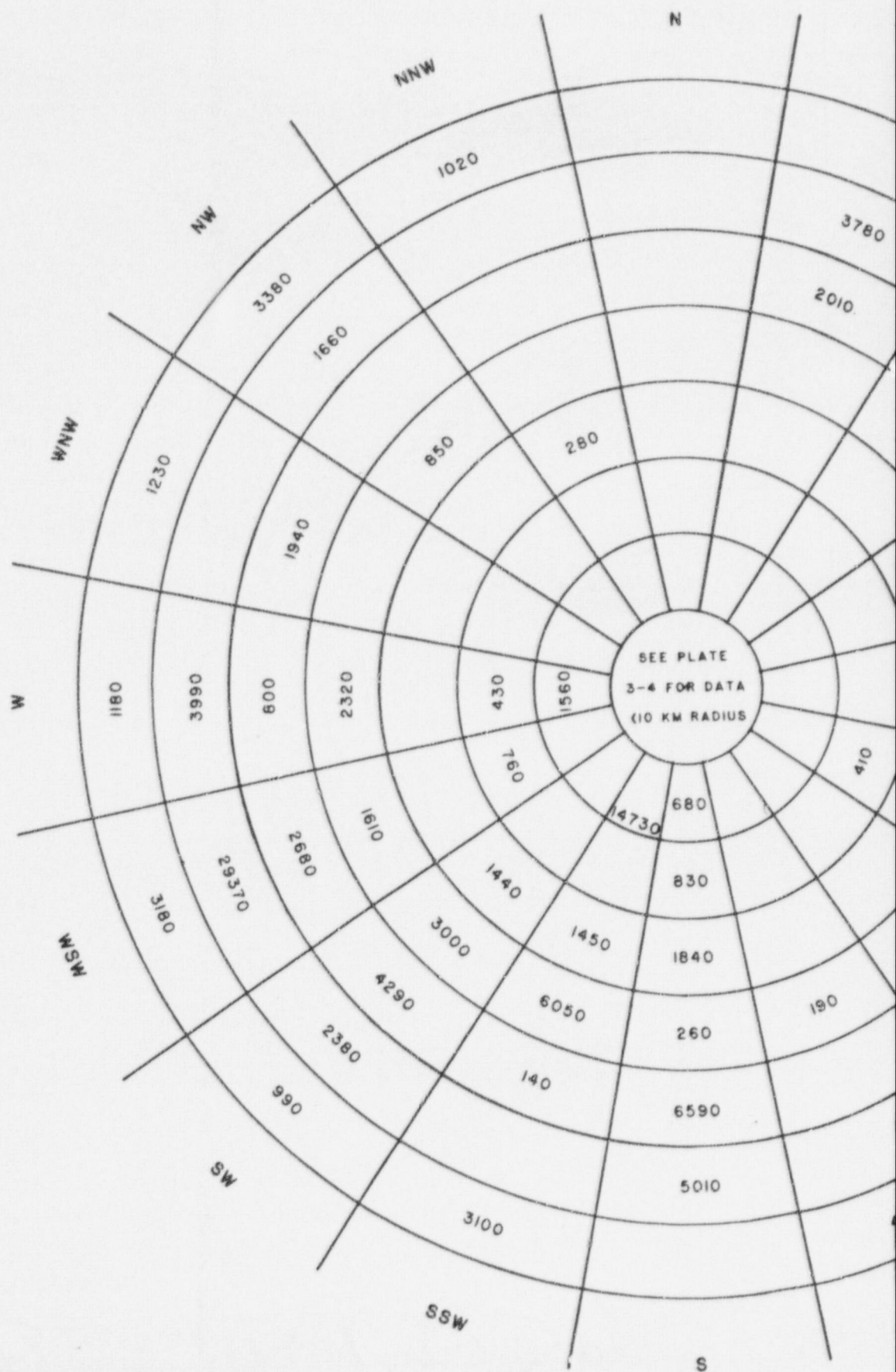
ESTIMATED POPULATION DISTRIBUTION  
WITHIN AN 80 KILOMETER (50 MILE)  
RADIUS OF THE NOSE ROCK SITE, 1978

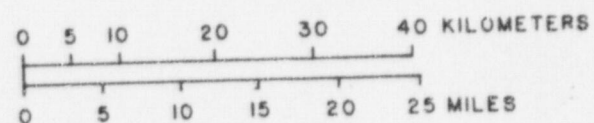
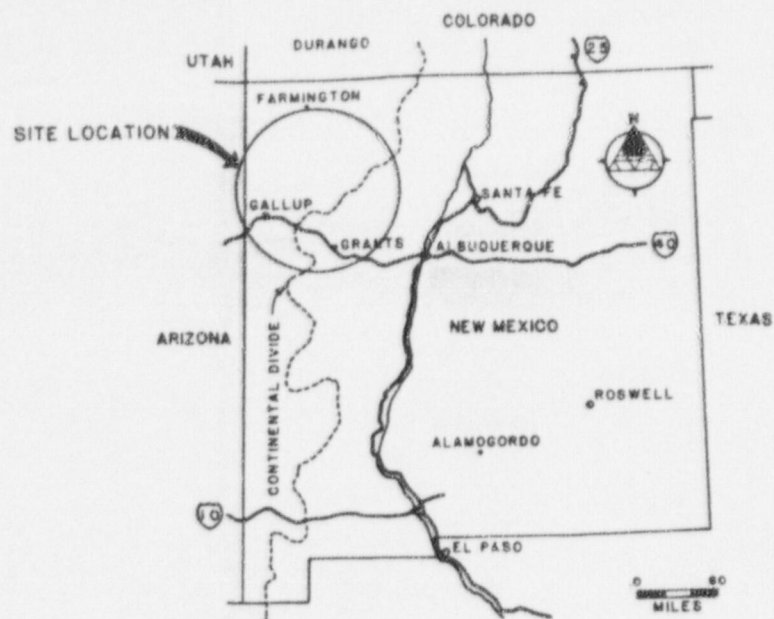
9805080289-10

DAMES & MOORE

PLATE 2-2-1







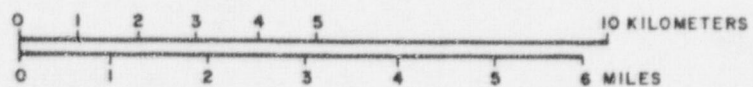
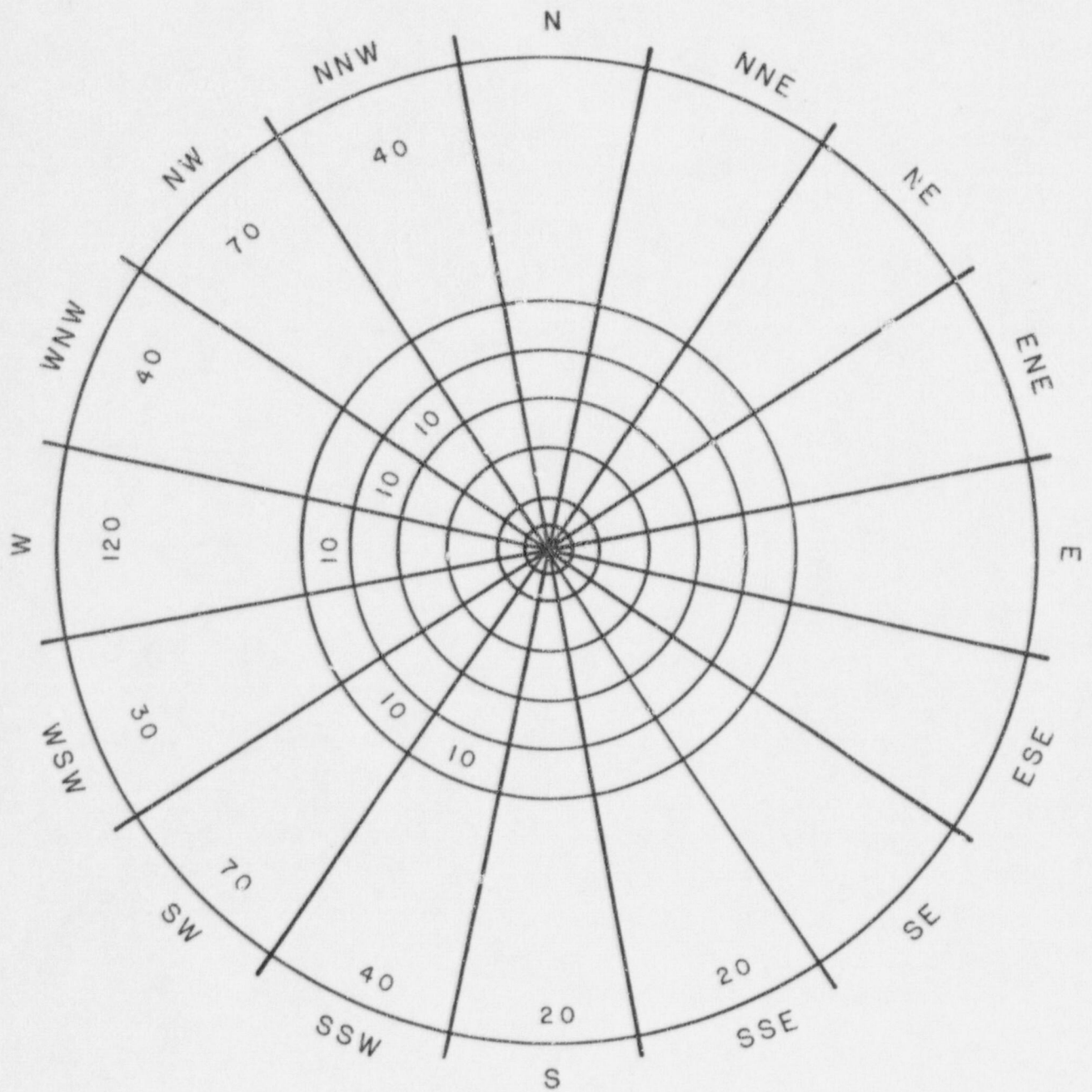
**APERTURE  
CARD**

Also Available on  
Aperture Card

ESTIMATED POPULATION DISTRIBUTION  
WITHIN AN 80 KILOMETER (50 MILE)  
RADIUS OF THE NOSE ROCK SITE, 2002

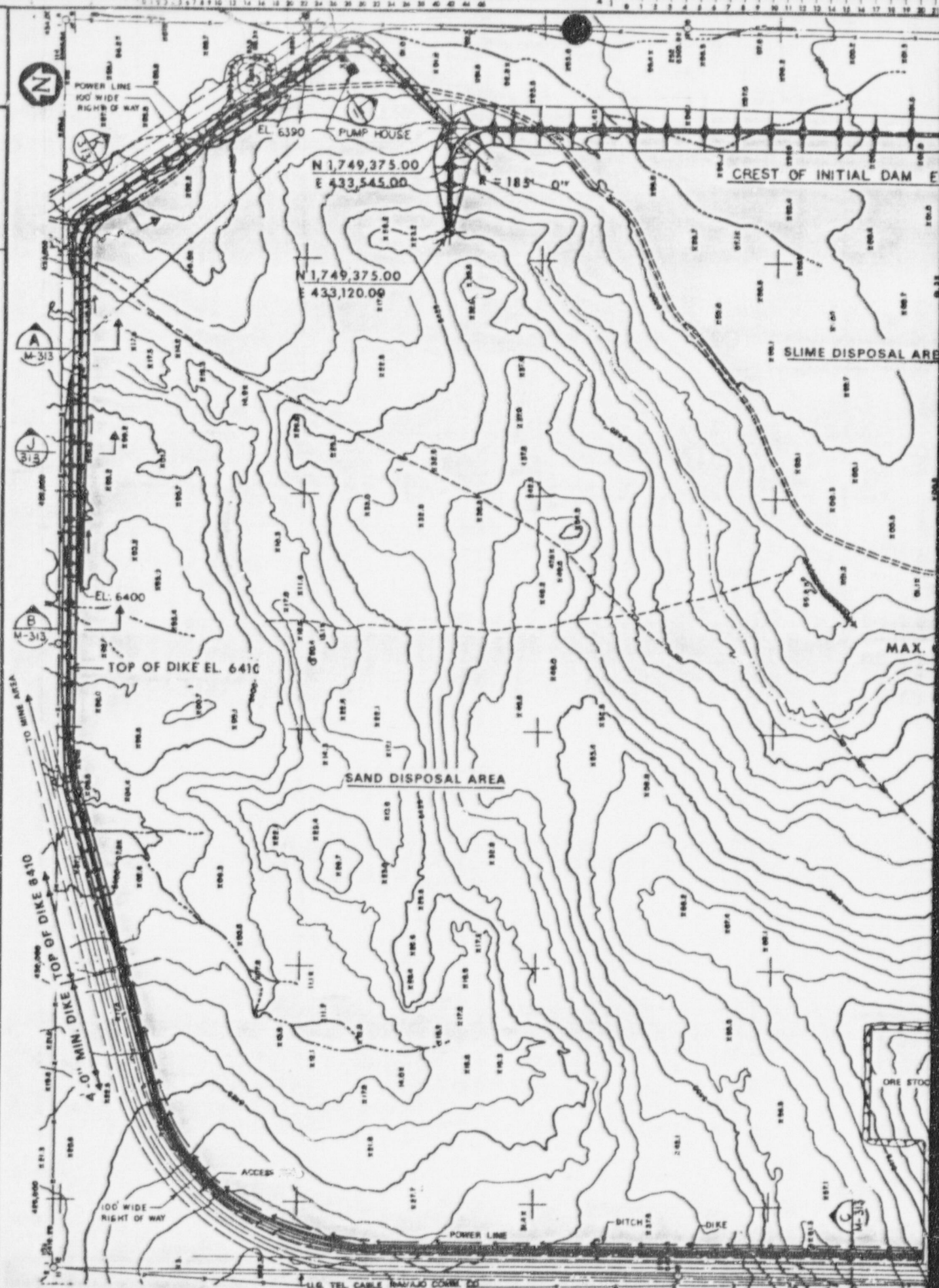
9805080289-11

DAMES & MOORE



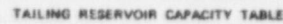
ESTIMATED POPULATION DISTRIBUTION  
WITHIN A 10 KILOMETER (6.25 MILE)  
RADIUS OF THE NOSE ROCK SITE, 2002

M-312



REVISIONS				REVISIONS			
NO.	DESCRIPTION	BY	DATE	NO.	DESCRIPTION	BY	DATE
1	ISSUED FOR APPROVAL	EL	12-1-77	1	ISSUED FOR APPROVAL	EL	12-1-77
2	ISSUED FOR CONSTRUCTION	EL	1-6-78	2	ISSUED FOR CONSTRUCTION	EL	1-6-78
3	ADDED PUMP CAPACITY & CONTRACTED FILL GR. ELEV.	NON		3	ADDED PUMP CAPACITY & CONTRACTED FILL GR. ELEV.	NON	
4	CAPACITY TABLE			4	CAPACITY TABLE		
5	REMOVED CON. TABLE	S.F.	3-27-78	5	REMOVED CON. TABLE	S.F.	3-27-78

Also Available on  
Aperture Card





TAILING SOLIDS AND EVAPORATION STORAGE	END 5TH YEAR	STAGE ONE	6416.5
STORM STORAGE			6418.5
FREEBOARD			6420
MAXIMUM OPERATING LEVEL			
FINAL STAGE			
STORM WATER 380 ACRE-FT.			6473.5
FREEBOARD			6475

\* MAXIMUM PROBABLE STORM  
WITH 8.4 INCHES RUNOFF  
VOLUME INCLUDES RUNOFF  
FROM SAND DISPOSAL AREA.

NOTE: SAND DISPOSAL AREA NORMAL OPERATING LEVEL 3200. MAXIMUM ESTIMATED  
LEVEL FROM MAXIMUM PROBABLE STORM 8404.46 FREEBOARD 5.56 FT.  
ESTIMATED TIME TO PUMP RUNOFF TO SLIME POND 49 HOURS.

BM # 238 EL. 6491.94

APT. NO. PE-5623		CONTRACT NO. PHILLIPS 9468		DATE JUNE 23RD		ISSUED FOR CONSTRUCTION	
PHILLIPS URANIUM CORPORATION MOSE ROCK MILL CROWNPOINT				 WESTERN KNAPP ENGINEERING A DIVISION OF ARTHUR G. MCKEE & CO. SAN ANTONIO, CALIFORNIA			
TAILING DISPOSAL SYSTEM TAILING AREA, FIRST STAGE PLAN				SCALE 1" = 250' DRAWING NO. UD-9		AREA 60 SHEET NO. M-312	
						REVISION 	

TAILING DISPOSAL SYSTEM  
TAILING AREA, FIRST-STAGE  
PLAN

SCALE 1" = 250'

UD-9

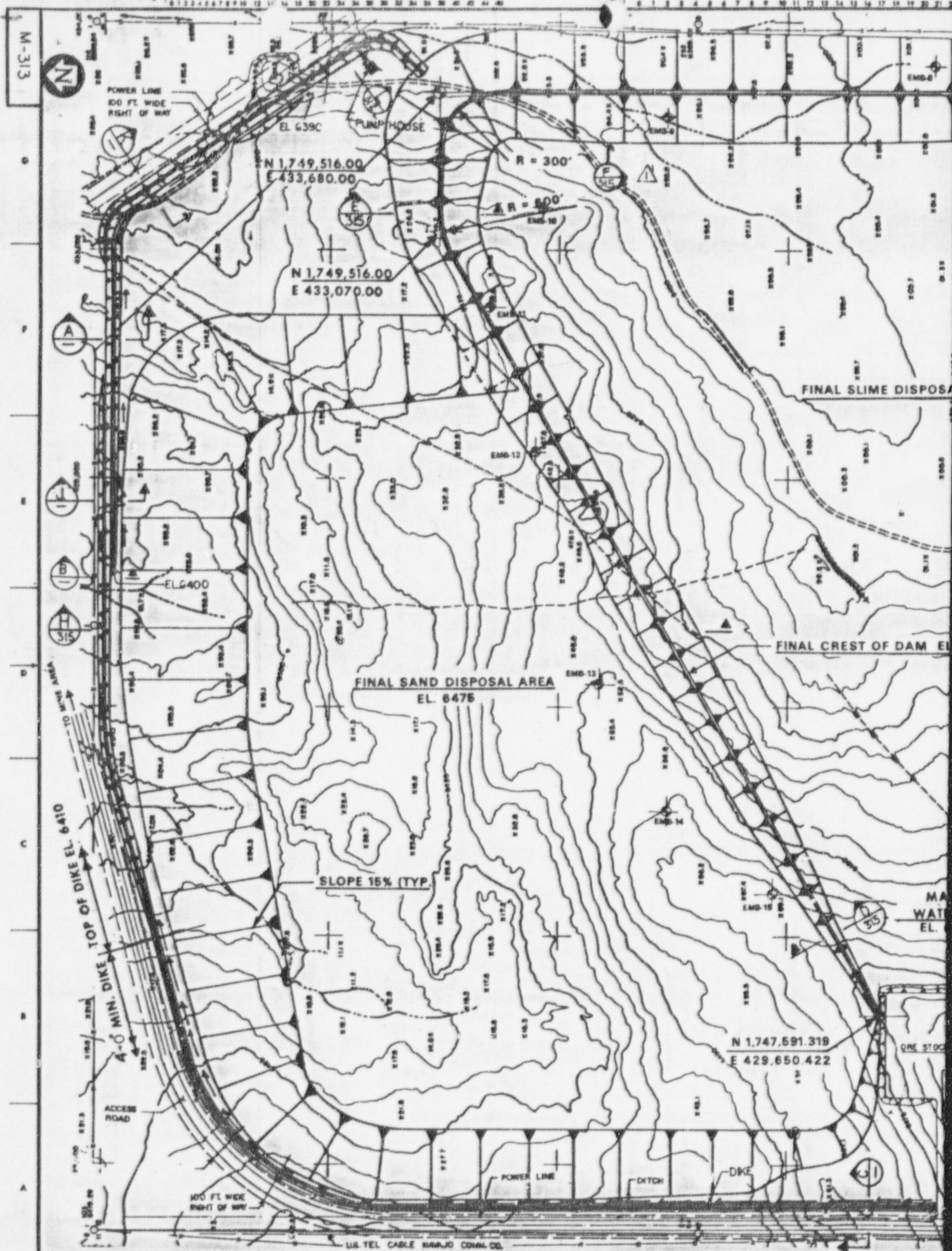
**CITIZENSHIP**

REVISION

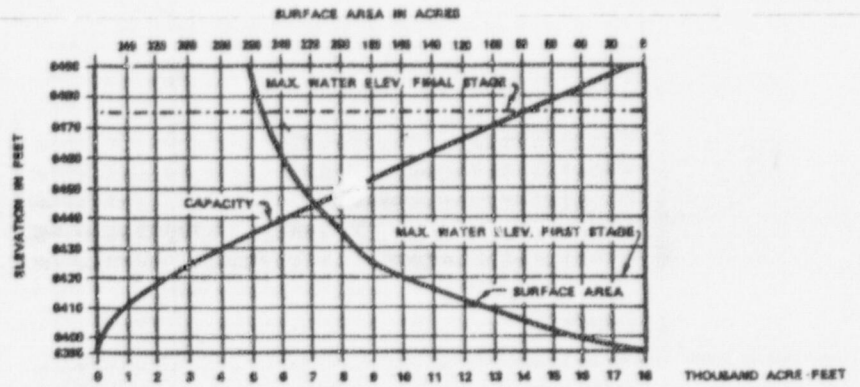
A<sup>1</sup>

△



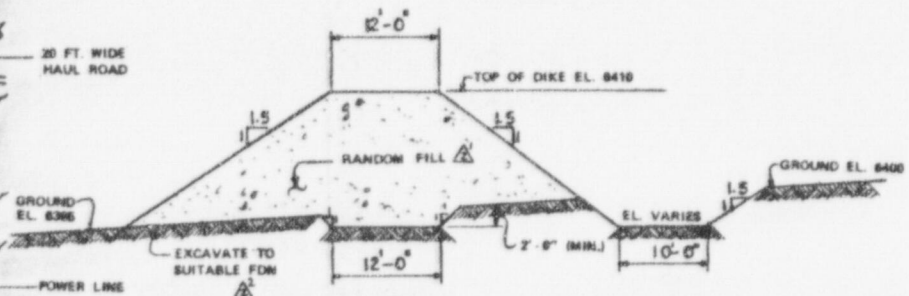


NO.	DESCRIPTION	BY	CHKD.	DATE	NO.	DESCRIPTION	BY	CHKD.	DATE
1	ISSUED FOR APPROVAL								
2	ISSUED FOR CONSTRUCTION								
3	REV. SEC (M) ADDED SEE (1) 1 WAS OPERATING 1/1/74								
4	REV. COMPACTED TO RANDOM, ADDED EXCAVATE TO SUITABLE FOR S.V.								

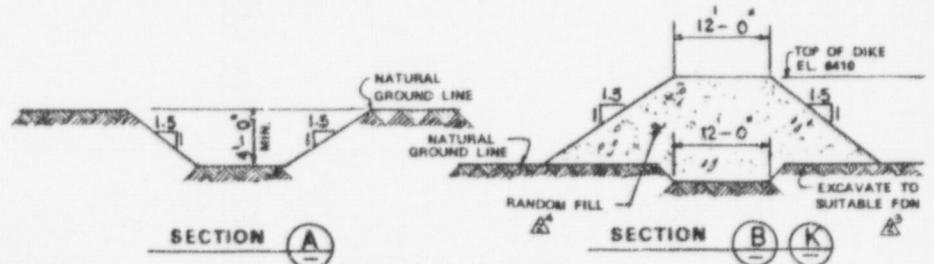


CAPACITY CURVE

SLIME DISPOSAL AREA

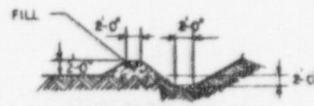


SECTION J



SECTION A

SECTION B



SECTION C

APERTURE CARD

Also Available on Aperture Card

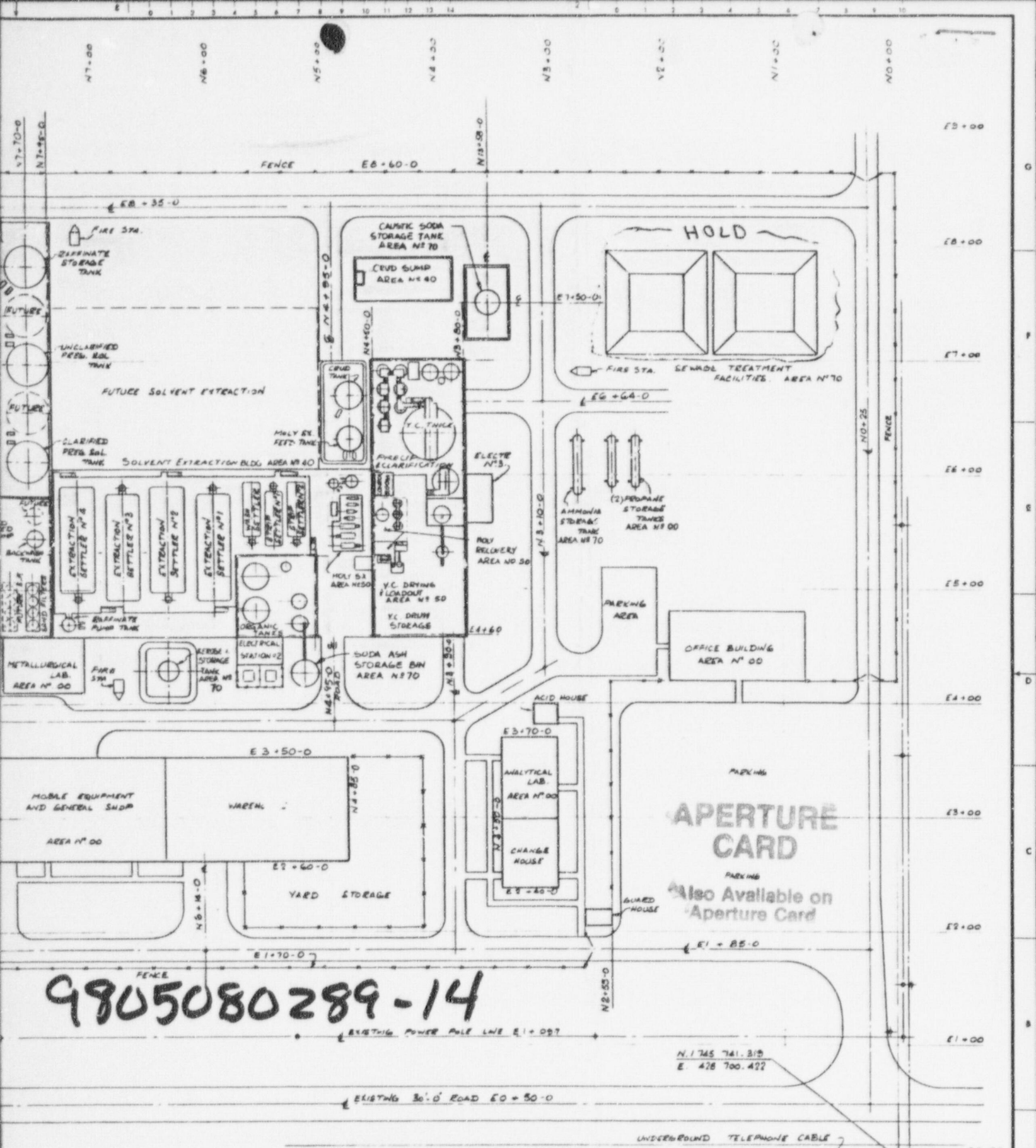
9805080289-13

N 1,745,741.319  
E 428,700.422  
BM. # 238 EL. 6491.94

APR NO. PS-5432	CONTRACT NO. PHILLIPS-9482	PROJECT 2280	ISSUED FOR CONSTRUCTION
PHILLIPS URANIUM CORPORATION NOBLE ROCK MILL CROWSPONT NEW MEXICO			WESTERN KNAPP ENGINEERING A DIVISION OF ARTHUR & MOORE & CO. SAN FRANCISCO CALIFORNIA
TAILING DISPOSAL SYSTEM TAILING AREA, FINAL STAGE, PLANS, SECTIONS & DETAILS			SCALE 1" = 200' SHEET NO. UD-9 M-313

REVISION	DATE	BY	CHKD	APP'D
1	10-22-64	PHIL		
2	11-12-64	PHIL		
3	11-12-64	PHIL		
4	11-12-64	PHIL		
5	11-12-64	PHIL		
6	11-12-64	PHIL		
7	11-12-64	PHIL		
8	11-12-64	PHIL		
9	11-12-64	PHIL		
10	11-12-64	PHIL		
11	11-12-64	PHIL		
12	11-12-64	PHIL		
13	11-12-64	PHIL		
14	11-12-64	PHIL		
15	11-12-64	PHIL		
16	11-12-64	PHIL		
17	11-12-64	PHIL		
18	11-12-64	PHIL		
19	11-12-64	PHIL		
20	11-12-64	PHIL		





9805080289-14

ISSUED FOR CONSTRUCTION

DESIGNED  
DRAWN  
CHECKED  
APPROVED 1  
APPROVED 2  
APPROVED 3

ISSUE	A	B	C	D	E	F	G	H	I
CLIENT					54	58	120		
FIELD									
BILL MAT'L									
SPEC.									
ENG. REQ.									
P.O.									
MICRO FILM					14	140			