TABLE 2.8

DEPTH TO Ra-226 ACTIVITY CONCENTRATION LEVELS LESS THAN 16 pCi/g BELOW THE SURFACE OR 6 pCi/g AT THE SURFACE

Borehole Number	Depth	Borehole Number	Depth
R1	-- (a)	R27	15 cm (0.5 ft)
R2	--	R28	240 cm (7.9 ft)
R3	--	R29	210 cm (6.9 ft)
R4	--	R30	195 cm (6.4 ft)
R5	--	R31	210 cm (6.9 ft)
R6	--	R32	225 cm (7.4 ft)
R7	45 cm (1.5 ft)	R33	>240 cm (7.9 ft)
R8	--	R34	210 cm (6.9 ft)
R9	--	R35	225 cm (7.4 ft)
R10	--	R36	>225 cm (7.4 ft)
R11	--	R37	>225 cm (7.4 ft)
R12	15 cm (0.5 ft)	R38	>210 cm (6.9 ft)
R13	225 cm (7.4 ft)	R39	15 cm (0.5 ft) (b)
R14	15 cm (0.5 ft)	R40	-- (2)
R15	210 cm (6.9 ft)	R41	-- (2)
R16	135 cm (4.4 ft)	R42	>225 cm (7.4 ft)
R17	15 cm (0.5 ft)	R43	>240 cm (7.9 ft)
R18	--	R44	--
R19	--	R45	--
R20	--	R46	--
R21	--	R47	--
R22	--	R48	--
R23	15 cm (0.5 ft)	R49	--
R24	15 cm (0.5 ft)	R50	--
R25	15 cm (0.5 ft)	R51	--
R26	15 cm (0.5 ft)	R52	--

(a) Less than 16 pCi/g at depths greater than 15 cm (0.5 ft) or less than 6 pCi/g at depths less than 15 cm.

(b) Borehole logger readings increasing at maximum depth indicating possible Ra-226 concentrations greater than 16 pCi/g below maximum hole depth.

TABLE 2.9A

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES
OBTAINED IN THE VICINITY OF THE TAILINGS
DISPOSAL AREA - ALONG RADIALS

	Ra-226 (pCi/g)				U-238/Ra-226
Depth:	0 - 15 cm 0 - 0.5 ft		15 - 30 cm 0.5 - 1 ft		0 - 15 cm 0 - 0.5 ft
Radial Coordinate					
C 30	46.0(a)	(3.0)(b)	3.6	(0.20)	0.75
C 55	19.0	(1.2)	11.0	(0.12)	0.88
C 80	35.0	(2.2)	3.8	(0.23)	0.59
C 150	2.8	(0.21)	2.6	(0.28)	0.78
C 200	1.1	(0.10)	3.5	(0.14)	1.8
D 50	53.0	(3.4)			0.74
D 65	23.0	(0.36)	2.5	(0.12)	0.77
D 100	13.0	(0.87)	5.0	(0.36)	0.62
D 200	17.0	(0.44)	13.0	(1.2)	1.4
D 300	15.0	(0.97)	1.5	(0.13)	4.3
D 450	2.6	(0.19)	1.7	(0.12)	1.9
E 100	110.0	(5.4)	18.0	(0.79)	0.37
E 390	11.0	(0.13)	2.5	(0.10)	<0.11
E 400	3.5	(0.21)	7.7	(0.50)	2.1
E 410	2.2	(0.25)	2.1	(0.25)	2.8
E 494	6.7	(0.31)	0.94	(0.11)	1.1
G 200	1.0	(0.10)	0.51	(0.05)	4.0
G 300	0.82	(0.11)	0.88	(0.07)	7.1
H 350	1.7	(0.14)	2.5	(0.21)	4.0
I 300	0.72	(0.05)	0.50	(0.08)	6.1
J 400	1.5	(0.14)	1.5	(0.16)	6.2
K 400	1.1	(0.14)	1.2	(0.17)	6.6
K 450	0.96	(0.12)	0.85	(0.09)	3.9
K 475	1.6	(0.14)			5.1
M 850	0.96	(0.18)	3.7	(0.30)	<1.4
M - A	6.0	(0.15)	17.0	(0.71)	1.1

(a) Measured value of Ra-226 in pCi/g.

(b) Number in parentheses is the value to be added or subtracted from the measured value to show the range at the 95 percent confidence level.

TABLE 2.9B

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES OBTAINED IN THE VICINITY OF THE TAILINGS DISPOSAL AREA - BOREHOLES

	Ra-226 (pCi/g)				U-238/Ra-226
Depth:	0 - 15 cm 0 - 0.5 ft		15 - 30 cm 0.5 - 1 ft		0 - 15 cm 0 - 0.5 ft
Borehole Number					
R 5	1.0 (a)	(0.06) (b)	--	--	6.9
R 7	5.0	(0.48)	27.0 (a)	(0.57) (b)	2.6
R 8	2.4	(0.13)	1.4	(0.04)	3.3
R 9	1.4	(0.11)	1.5	(0.11)	4.2
R 15	106.0	(3.4)	--	--	0.41
R 16	72.0	(0.46)	22.0	(0.53)	0.63
R 28	9.1	(1.4)	--	--	1.3
R 29	11.0	(0.27)	--	--	1.2
R 42	42.0	(0.61)	88.0	(0.44)	0.57
R 46	2.5	(0.24)	1.7	(0.07)	6.6

(a) Measured value of Ra-226 in pCi/g.

(b) Number in parentheses is the value to be added or subtracted from the measured value to show the range at the 95 percent confidence level.

TABLE 2.9C

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES OBTAINED IN THE VICINITY OF THE TAILINGS DISPOSAL AREA - SOUTH OF BORROW PIT NO. 2

	Ra-226 (pCi/g)				U-238/Ra-226
Depth:	0 - 15 cm 0 - 0.5 ft		15 - 30 cm 0.5 - 1 ft		0 - 15 cm 0 - 0.5 ft
Location					
SBDD-1	0.97 (a)	(0.04) (b)	0.64 (a)	(0.10) (b)	4.5
SBDD-2	1.1	(0.09)	0.80	(0.10)	5.2
SBDD-3	1.1	(0.12)	0.76	(0.05)	5.6

(a) Measured value of Ra-226 in pCi/g.

(b) Number in parentheses is the value to be added or subtracted from the measured value to show the range at the 95 percent confidence level.

TABLE 2.9D

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES
OBTAINED IN THE VICINITY OF THE TAILINGS DISPOSAL AREA -
NORTHEAST TAILINGS AREA

	Ra-226 (pCi/g)				U-238/Ra-226
Depth:	0 - 15 cm 0 - 0.5 ft		15 - 30 cm 0.5 - 1 ft		0 - 15 cm 0 - 0.5 ft
Location					
B 4	2.0 (a)	(0.04) (b)	2.1 (a)	(0.11) (b)	1.4
B 6	7.5	(0.50)	2.1	(0.21)	<0.52
B 5	4.4	(0.23)			2.1
B 3	18.0	(0.18)			0.80
B 7	21.0	(0.93)			1.4
B 1	8.4	(0.59)	0.65	(0.10)	
B 2	8.6	(0.60)	1.8	(0.15)	
E 100	110.0	(5.4)			0.37
E 494	6.7	(0.31)	0.94	(0.11)	1.4
E 450	7.0	(0.25)			1.2
E 400	3.5	(0.21)	7.7	(0.50)	2.1
E 410	2.2	(0.25)	2.1	(0.25)	2.4
E 390	11.0	(0.13)	2.5	(0.10)	<0.11
FL 141	16.0	(0.92)			0.56
FL 400	6.5	(0.30)			1.1
FL 446	7.4	(0.52)			
NT-1	11.0	(0.29)			1.0
NT-2	9.6	(0.33)			0.99
NT-3	10.4	(0.85)			1.3

(a) Measured value of Ra-226 in pCi/g.

(b) Number in parentheses is the value to be added or subtracted from the measured value to show the range at the 95 percent confidence level.

TABLE 2.9E

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES OBTAINED IN THE VICINITY OF THE TAILINGS DISPOSAL AREA - WEST TAILINGS AREA

	Ra-226 (pCi/g)		U-238/Ra-226
Depth:	0 - 15 cm 0 - 0.5 ft		0 - 15 cm 0 - 0.5 ft
Location			
WTA 1-1	5.3 (a)	(0.37) (b)	2.3
WTA 1-2	6.3	(0.41)	2.6
WTA 1-3	26.0	(0.77)	0.83
WTA 1-4	3.1	(0.33)	1.9
WTA 3-1	4.0	(0.10)	2.4
WTA 3-2	1.2	(0.05)	3.8

(a) Measured value of Ra-226 in pCi/g.

(b) Number in parentheses is the value to be added or subtracted from the measured value to show the range at the 95 percent confidence level.

TABLE 2.9F

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES OBTAINED IN THE VICINITY OF TAILINGS DISPOSAL AREA - ELEVATED ACTIVITY AREA ON RADIAL "N"

	Ra-226 (pCi/g)				U-238/Ra-226
Depth: Radial Coordinate	0-15 cm 0-0.5 ft	15-30 cm 0.5-1 ft	30-45 cm 1-1.5 ft	45-60 cm 1.5-2 ft	0-15 cm 0-0.5 ft
N 13	17.0 (a)	20.0 (a)	11.0 (a)	21.0 (a)	1.1
N 150D	58.0	106.0	61.0		0.69
N 150	0.95				0.39
N 150A	0.84	13.0			<1.8

(a) Measured value of Ra-226 concentration in pCi/g.

TABLE 2.9G

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES OBTAINED AT MISCELLANEOUS LOCATIONS IN THE TAILINGS AND MILL AREAS

Location	Description (a) of Surface Sampling Location	Ra-226		U-238/Ra-226
MF-1	NE corner of mill fence (outside mill area	24(b)	(0.97)(c)	1.7
MF-2		89	(0.95)	
566-1	NE corner of Hwy 566 and tailings road	31	(1.9)	0.68
566-2		99	(1.1)	1.3
566-3	NE side of Hwy 566; 1,600 ft from tailings road	47	(2.8)	0.75
566-4		43	(0.19)	0.62
CB No. 2 30 - 45 cm (1 - 1.5 ft)	Center of catch basin	405	(6.4)	1.5
Tailings	Central Cell			
F1-F5		721	(11.8)	<0.01
F6-F10		724	(16.6)	<0.11

(a) Unless otherwise noted.

(b) Measured value of Ra-226 in pCi/g.

(c) Number in parenthesis is the value to be added or subtracted from the measured value to show the range at the 95 percent confidence level.

TABLE 2.10

DEPTH TO 16 pCi/g FOR BOREHOLES IN THE MILL AREA

Borehole Number	Depth to <16 pCi/g cm (ft)	Borehole Number	Depth to <16 pCi/g cm (ft)
R 56	*	R 82	--
R 57	*	R 83	*
R 58	**	R 84	*
R 59	*	R 85	*
R 60	*	R 86	135 (4.4)***
R 61	*	R 87	*
R 62	*	R 88	*
R 63	*	R 89	*
R 64	*	R 90	*
R 65	**	R 91	*
R 66	*	R 92	45 (1.5)
R 67	*	R 93	45 (1.5)
R 68	*	R 94	*
R 69	*	R 95	*
R 70	45 (1.5)	R 102	*
R 71	**	R 103	*
R 72	**	R 104	*
R 73	45 (1.5)	R 105	*
R 74	45 (1.5)	R 106	*
R 75	**	R 107	*
R 76	**	R 108	*
R 77	**	R 109	*
R 78	15 (0.5)	R 110	*
R 79	**	R 111	*
R 80	**	R 112	*
R 81	**	R 113	*

* Less than 6 pCi/g at surface, less than 16 pCi/g below 15 cm.

** Greater than 6 pCi/g at surface, less than 16 pCi/g below 15 cm.

*** Sediment on top of concrete to approximately 1.5 meters.

TABLE 2.11

Ra-226 ACTIVITY CONCENTRATIONS IN SOIL SAMPLES
OBTAINED FROM THE MILL AREA BOREHOLES

	Ra-226 (pCi/g)			
Depth: Borehole Number	0 - 15 cm 0 - 0.5 ft		15 - 30 cm 0.5 - 1 ft	
R 57	1.9 (a)	(0.26) (b)	1.2 (a)	(0.06) (b)
R 58	6.6	(0.29)	--	--
R 65	5.5	(0.17)	11.0	(1.0)
R 70	--	--	26.0	(1.3)
R 72	25.0	(0.89)	6.2	(0.33)
R 73	27.0	(0.44)	19.0	(0.93)
R 74	--	--	40.0	(0.63)
R 79	--	--	1.9	(0.18)

(a) Measured value of Ra-226 concentration in pCi/g.

(b) Number in parenthesis is the value to be added or subtracted from the measured value to show the range at the 95 percent confidence level.

TABLE 2.12

ORE STORAGE PAD BOREHOLE LOGGING RESULTS

Background borehole logger reading = 1.7
95 percent confidence limits for a single reading, 0.8 - 2.6

Estimated mean borehole logger reading for 6 pCi/g = 5.6
Estimated mean borehole logger reading for 16 pCi/g = 12.8

	Borehole Number (a)						
Depth	M-1	M-2	M-4	M-5	M-6	M-7	M-8
Surface	1.8	1.7	6.1	2.0	3.9	7.8	17.0
15 cm	1.8	1.9	4.1	1.5	2.2	10.4	30.0
30 cm	2.0	2.0	2.3	1.5	1.7	14.0	25.0
45 cm	2.0	2.0	2.3	1.7	1.5	10.9	6.8
60 cm	2.0	1.9	2.5	2.0	1.7	11.4	3.8
75 cm	1.9	2.0	2.0	2.0	1.7	4.5	2.8
90 cm	2.0	2.0	1.9	2.1	1.9	2.5	2.3
105 cm	1.9	2.0	1.9	2.1	1.9	2.0	2.2
120 cm	2.0	2.0	1.9	2.0	2.0	2.0	rock

135 and below - all readings less than 3.0

	Borehole Number						
Depth	M-9	M-10	M-11	M-12	M-13	M-14	M-15
Surface	39.0	31.0	7.2	7.0	35.0	38.0	6.2
15 cm	60.0	45.0	3.8	3.0	23.0	50.0	3.6
30 cm	86.0	35.0	2.1	2.2	8.0	30.0	2.0
45 cm	88.0	13.5	2.1	2.2	3.2	9.2	2.0
60 cm	56.0	5.5	2.5	2.2	2.5	4.0	2.0
75 cm	23.0	3.0	3.0	2.2	2.2	3.2	1.8
90 cm	7.6	2.9	mud	water	mud	mud	1.7
105 cm	5.0	---	---	---	---	---	1.8
120 cm	3.1	---	---	---	---	---	mud
135 cm	2.9	---	---	---	---	---	---

150 and below - all readings less than 3.0

(a) Borehole No. M-3 not drilled.

3.0

TAE 3.1

SUMMARY OF GEOTECHNICAL PROPERTIES
PIPELINE ARROYO BORROW MATERIAL

Sample Identification	Depth of Sample	Liquid Limit	Plasticity Index	Unified Soil Classification	Grain-Size Analysis (U.S. Standard Sieve Size Numbers) Percent Passing						
					200	100	40	10	4	3/8	3/4
74 SHB-2	10	38	20	CL	92	98	99	99	100		
78 SHB-7	2.5-4.5	26	5	ML-CL	57	84	99				
	6.0-7.7	--	NP	SM	31	67	99				
78 SHB-8	9.5-10.5	31	14	CL	63	84	96	98	100		
78 SHB-13	0-1.5	22	1	SM	49	81	99				
78 SHB-14	0-1.5	28	12	CL	57	80	91	94	95	99	100
78 SHB-30	9.5-11	--	NP	SM	23	74	100				
78 SHB-31	4.5-6	29	14	CL	55	79	90	95	98	100	
78 SHB-42	4.5-6	28	14	CL	65	74	82	87	92	96	100
86-RP-P2	10.5-11	NT	NT	CL	100						
86-RP-P3	10.5-11	NT	NT	SM	66	96	100				
86-RP-P4	5.5-6	NT	NT	SM-ML	32	56	84	97	98	100	
86-RP-P5	0-3	NT	NT	ML	65	86	98	99	100		
86-RP-P5	3-6	NT	NT	ML	68	87	98	99	99	100	
86-RP-P5	6-6.5	NT	NT	SM	48	83	95	97	98	100	
86-RP-P6	0-3	NT	NT	CL	70	89	98	99	100		
86-RP-P6	3-6	NT	NT	SM	51	80	97	98	99	99	100
86-RP-P8	11-11.5	NT	NT	ML	93	99	100				
86-RP-TP1	5-6	NT	NT	SM	18	32	87	97	98	100	
86-RP-TP2	6-7	NT	NT	SM-ML	40	67	95	97	98	100	
86-RP-TP3	0-10	NT	NT	CL-ML	85	97	99	100			
				Average:	58.5	80.6	95.5	97.9	98.8	99.7	100.0
				Standard Deviation:	22.5	16.0	5.48	3.05	2.02	0.90	0.0
				95 Percent Confidence Level (+/-):	9.61	6.84	2.34	1.30	0.86	0.39	0.0

Notes:
1. NT = Not tested.
2. NP = Non-plastic.
3. Data also include the South Diversion Ditch and the Runoff Control Ditch material.
4. Results provided in Appendix A.

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TABL 2

SUMMARY OF GEOTECHNICAL PROPERTIES
EXISTING SOIL STOCKPILE

Boring Identification	Depth of Sample	Liquid Limit	Plasticity Index	Unified Soil Classification	Grain-Size Analysis (U.S. Standard Sieve Size Numbers) Percent Passing						
					200	100	40	10	4	3/8	3/4
78 SHB-18	4.5	26	11	CL	52	79	90	95	99		100
	14.5	32	11	CL	92	98	99	100			
78 SHB-19	4.5	22	NP	SM	41	64	82	88	94	98	100
78 SHB-31	9.5	26	11	CL	52	83	98	99	100		
78 SHB-33	4.5	27	9	CL	51	77	98	100			
	14.5	21	NP	SM	47	86	99	100			
78 SHB-32	4.5	--	NP	SM	29	70	96	100			
89 SS-1	SURFACE	--	NP	ML	55	80	97	99	100		
90 SS-1	SURFACE	23	3	SC-SM	50	79	92	94	96	98	100
90 SS-2	10.5-12.5	26	7	ML-CL	54	84	94	97	98	100	
				Average:	52.3	80.0	94.5	97.2	98.7	99.6	100.0
				Standard Deviation:	16.0	9.1	5.34	3.91	2.11	0.84	0.0
				95 Percent Confidence Level (+/-):	9.92	5.64	3.31	2.42	1.31	0.52	0.0

Notes:

1. NP = Non-plastic
2. Results provided in Appendix A

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TAE 3.3

SUMMARY OF GEOTECHNICAL PROPERTIES
NORTH AND CENTRAL CELL INTERIM COVER SOILS

Sample Identification	Depth of Sample	Liquid Limit	Plasticity Index	Unified Soil Classification	(U.S. Standard Sieve Size Numbers) Percent Passing						
					200	100	40	10	4	3/8	3/4
North Cell:											
89 NC–1	0–5	26	10	CL	61	80	94	96	96		100
89 NC–2	0–5	--	NP	SM	47	70	92	98	99	100	
89 NC–3	0–5	27	10	CL	61	84	95	98	100		
89 NC–4	0–4	33	16	CL	70	89	97	99	100		
89 NC–5	0–1	--	NP	SM	45	69	99	100			
89 NC–6	0–1	25	8	CL	56	76	87	92	97	100	
89 NC–7	0–2	27	8	SC – SM	48	63	70	74	79	86	93
89 NC–8	0–1	31	13	CL	63	80	96	97	98	99	100
89 NC–9	0–1	34	17	CL	60	85	98	99	100		
89 NC–10	0–1	--	NP	SM	20	25	43	48	56	63	73
89 NC–11	0–1	22	7	SC – SM	43	63	90	98	99	99	100
89 NC–12	0–1	43	21	CL	63	82	100				
Central Cell:											
90 CC–1	SURFACE	27	9	CL	60	83	94	96	97	99	100
90 CC–2	SURFACE	32	16	CL	61	84	96	99	100		
90 CC–3	SURFACE	35	15	CL	65	86	96	98	99	100	
90 CC–4	SURFACE	30	15	CL	68	86	96	98	99	100	
90 CC–5	SURFACE	31	11	CL	66	87	96	98	99	100	
90 CC–6	SURFACE	26	12	SC	48	56	90	93	94	96	98
90 CC–7	SURFACE	26	8	CL	59	85	95	97	98	99	100
				Average:	56.0	75.4	90.7	93.6	95.3	96.9	98.1
				Standard Deviation:	11.9	15.5	13.3	12.4	10.6	8.82	6.30
				95 Percent Confidence Level (+/–):	5.33	6.96	5.97	5.59	4.78	3.97	2.03

Notes:
1. NP = Non–plastic
2. Results provided in Appendix A

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TABLE 3.4

LIMESTONE ROCK QUALITY RATINGS
GALLUP SOURCE

Best-Case Results

Lab Test	Result	Score	Weight	Score x Weight	Maximum Score
Specific Gravity	2.64	8	12	96	120
Absorption, %	1.1	5	13	65	130
Sodium Sulfate, %	2	9.5	4	38	40
L.A. Abrasion, %	19	2	1	2	10
Totals				201	300
Rating				201/300 X 100% = 67.0	

Worst-Case Results

Lab Test	Result	Score	Weight	Score x Weight	Maximum Score
Specific Gravity	2.64	8	12	96	120
Absorption, %	1.5	4	13	65	130
Sodium Sulfate, %	2	5.5	4	22	40
L.A. Abrasion, %	22	2	1	2	10
Totals				172	300
Rating				172/300 X 100% = 57.3	

Source: Gallup Sand and Gravel Quarry, 7 miles north of Thoreau, New Mexico.

TABLE 3.5

BASALT ROCK QUALITY RATINGS
GRANTS SOURCE

Lab Test	Result	Score	Weight	Score x Weight	Maximum Score
Specific Gravity	2.805	10	9	90	90
Absorption, %	0.4	8.5	2	17	20
Sodium Sulfate, %	1.7	9.6	11	105.6	110
L.A. Abrasion, %	21	1.8	1	1.8	10
Totals				214.4	230
Rating				214.4/230 X 100% = 93.2	

Source: Marinelli Construction Quarry, 18 miles east of Grants, New Mexico.