

GGNS
 EARLY SITE PERMIT APPLICATION
 PART2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.1-5

ESTIMATED TOTAL 2002 POPULATION WITHIN A 30-MILE RADIUS
 (PERMANENT AND WEIGHTED TRANSIENT)

Radial Distance from the Site	Area (sq. mi.)	Permanent Population	Weighted Transient Population	Total	Population Density (Persons / sq. mi.)
"0 to 10" (Note 1)	388 (Note 2)	(Note 1)	(Note 1)	20,505	53
10 to 20	943	42,400	6,037	48,437	51
20 to 30	1,570	50,584	8,766	59,350	38
0 to 30	2,901	--	--	128,292	44

NOTES:

1. The "0 to 10" area presents the population of the "10-Mile EPZ" which is an irregular shape, based on a 10-mile radius circle but expanded to include certain communities slightly beyond the 10-mile radius.
2. This area is that associated with the 10-Mile EPZ which is slightly larger than a 10-mile radius circle. This modified EPZ is described in detail in Part 4 of the application.

GGNS
EARLY SITE PERMIT APPLICATION
PART2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.1-6

PROJECTIONS OF ESTIMATED TOTAL POPULATION FOR 2030 AND 2070
(PERMANENT AND WEIGHTED TRANSIENTS)

Radial Distance from the ESP Site	Area (sq. mi.)	Projected to 2030				Projected to 2070			
		Projected Permanent Population	Projected Weighted Transients	Total	Projected Population Density (persons / sq. mi.)	Projected Permanent Population	Projected Weighted Transients	Total	Projected Population Density (persons / sq. mi.)
"0 to 10" (Note 1)	388 (Note 2)	(Note 1)	(Note 1)	21,751	56	(Note 1)	(Note 1)	23,692	61
10 to 20	943	45,746	6,569	52,315	55	50,788	7,369	58,157	62
20 to 30	1,570	54,325	9,435	63,760	41	59,944	10,431	70,375	45
0 to 30	2,901	--	--	137,826	48	--	--	152,244	52

NOTE:

1. The "0 to 10" area presents the population of the "10-Mile EPZ" which is an irregular shape, based on the 10-mile radius circle but expanded to include certain communities slightly beyond the 10-mile radius.
2. This area is that associated with the 10-Mile EPZ which is slightly larger than a 10-mile radius circle. This modified EPZ is described in detail in Part 4 of the application.

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.3-15

DELETED

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.3-143

ANNUAL AVERAGE X/Q AND D/Q
(DATA PERIOD 2002 - 2003)

Location	Direction	Distance (miles)	Distance (meters)	χ/Q (sec/m ³) No Decay Undepleted	χ/Q (sec/m ³) No Decay Depleted	D/Q (per sq. meter)
SITE BOUNDARY	S	0.72	1155	2.2E-06	1.9E-06	7.9E-09
SITE BOUNDARY	S-SW	0.73	1169	3.7E-06	3.3E-06	8.1E-09
SITE BOUNDARY	SW	0.85	1364	6.8E-06	6.0E-06	8.7E-09
SITE BOUNDARY	W-SW	0.85	1364	8.8E-06	7.8E-06	6.8E-09
SITE BOUNDARY	W	0.98	1575	6.7E-06	5.8E-06	5.1E-09
SITE BOUNDARY	W-NW	0.98	1575	4.2E-06	3.7E-06	4.5E-09
SITE BOUNDARY	NW	0.98	1575	2.6E-06	2.3E-06	5.3E-09
SITE BOUNDARY	N-NW	0.67	1076	3.3E-06	2.9E-06	8.7E-09
SITE BOUNDARY	N	0.58	934	3.9E-06	3.5E-06	1.2E-08
SITE BOUNDARY	N-NE	0.52	841	3.0E-06	2.8E-06	9.6E-09
SITE BOUNDARY	NE	0.52	841	1.9E-06	1.8E-06	7.3E-09
SITE BOUNDARY	E-NE	0.52	841	2.4E-06	2.2E-06	7.4E-09
SITE BOUNDARY	E	0.56	904	1.5E-06	1.4E-06	5.6E-09
SITE BOUNDARY	E-SE	0.67	1086	8.8E-07	7.9E-07	3.3E-09
SITE BOUNDARY	SE	0.60	963	1.2E-06	1.1E-06	3.9E-09
SITE BOUNDARY	S-SE	0.60	963	2.0E-06	1.8E-06	8.6E-09
NEAREST HOME	S	3.45	5548	1.8E-07	1.4E-07	5.2E-10
NEAREST HOME	S-SW	1.05	1686	2.0E-06	1.7E-06	4.4E-09
NEAREST HOME	N	0.81	1310	2.2E-06	1.9E-06	6.6E-09
NEAREST HOME	N-NE	0.64	1029	2.1E-06	1.9E-06	7.0E-09
NEAREST HOME	E-NE	0.63	1021	1.7E-06	1.5E-06	5.4E-09

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.3-143 (Continued)

Location	Direction	Distance (miles)	Distance (meters)	χ/Q (sec/m ³) No Decay Undepleted	χ/Q (sec/m ³) No Decay Depleted	D/Q (per sq. meter)
NEAREST HOME	E-SE	1.06	1708	4.1E-07	3.5E-07	1.5E-09
NEAREST HOME	SE	2.39	3843	1.3E-07	1.0E-07	3.7E-10
NEAREST HOME	S-SE	1.42	2283	4.5E-07	3.9E-07	2.0E-09
NEAREST GARDEN	S	3.45	5548	1.8E-07	1.4E-07	5.2E-10
NEAREST GARDEN	S-SW	1.05	1686	2.0E-06	1.7E-06	4.4E-09
NEAREST GARDEN	N	1.49	2404	8.0E-07	6.8E-07	2.3E-09
NEAREST GARDEN	E-NE	0.63 ²	1021	1.7E-06	1.5E-06	5.4E-09
NEAREST GARDEN	E-SE	1.06	1701	4.1E-07	3.6E-07	1.6E-09
NEAREST GARDEN	SE	4.17	6704	5.5E-08	4.2E-08	1.4E-10
NEAREST GARDEN	S-SE	4.70	7561	7.0E-08	5.3E-08	2.4E-10
RV AREA	E-NE	0.39	620	4.1E-06	3.8E-06	1.2E-08
ESC	N-NW	0.20	314	2.9E-05	2.7E-05	6.0E-08
GIN LAKE	W-NW	0.46	747	1.6E-05	1.4E-05	1.5E-08
HAMILTON LAKE	W	0.55	884	1.8E-05	1.6E-05	1.3E-08
SITE GARDEN	S-SE	0.69	1107	1.5E-06	1.4E-06	6.8E-09
NEAREST MILK COW	S-SW	10	16093	4.7E-08	4.7E-08	8.7E-11
NEAREST MEAT COW	S	4	6437	1.1E-07	1.1E-07	4.0E-10

NOTES:

1. Combined vent – Ground Level Releases Only.
2. Dose analyses were done using a distance of 0.63 miles for the nearest garden, based on ER Section 2.7, Reference 29. Later, more accurate data places the distance at 0.67 miles. Use of 0.63 miles is conservative for the dose calculations.

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.4-7
(UFSAR TABLE 2.4-7)

PROBABLE MAXIMUM PRECIPITATION AT PLANT¹ SITE

Duration, hr.	Accumulated Depth of Precipitation, in.
0.5	8.2
1.0	11.6
1.5	14.0
2.0	16.2
2.5	18.3
3.0	20.4
3.5	22.3
4.0	24.1
4.5	25.9
5.0	27.4
5.5	29.0
6.0	30.5

NOTES:

1. GGNS Unit 1 specific analysis based on HMR 33 and USACE EM-1110-2-1411.

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.4-8
(UFSAR TABLE 2.4-9)

UNIT HYDROGRAPHS FOR PLANT¹ SITE DRAINAGE BASINS

	Basin A	Basin B
Area, sq mi	2.8	0.6
Unit Hydrograph Duration, hr	0.5	0.25
Lag, hr	1.6	0.65

Basin A		Basin B	
Time After Storm Starts, hr	Q, cfs	Time After Storm Starts, hr	Q, cfs
0.5	70	0.25	66
1.0	387	0.5	310
1.5	753	0.75	476
2.0	858	1.0	332
2.5	607	1.25	171
3.0	371	1.5	94
3.5	220	1.75	54
4.0	139	2.0	30
4.5	85	2.25	18
5.0	55	2.5	11
5.5	35		
6.0	22		

NOTES:

1. GGNS Unit 1 specific analysis based on HMR 33 rainfall rates and USACE EM-1110-2-1411.

GGNS
 EARLY SITE PERMIT APPLICATION
 PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.4-9
 (UFSAR TABLE 2.4-10)

PRECIPITATION DISTRIBUTION FOR PMF PEAK DETERMINATION

Basin A		Basin B	
Time, hr	Incremental Precipitation, in.	Time, hr	Incremental Precipitation, in.
0.5	1.53	0.25	1.06
1.0	1.53	0.5	1.07
1.5	1.82	0.75	1.07
2.0	1.82	1.0	1.07
2.5	1.82	1.25	1.10
3.0	2.14	1.5	1.28
3.5	2.14	1.75	1.53
4.0	2.44	2.0	1.82
4.5	8.24	2.25	5.34
5.0	3.35	2.5	2.90
5.5	2.14	2.75	1.16
6.0	1.53		

NOTES:

1. GGNS Unit 1 specific analysis based on HMR 33 and USACE EM-1110-2-1411.

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE 2.4-37
(UFSAR TABLE 2.4-27)

TRAVEL TIME ANALYSIS PARAMETERS

GGNS Unit 1 Analysis Parameter	Soil Types			Totals
	Terrace Deposits	Clay-Silt Alluvium	Alluvial Aquifer	
Hydraulic Conductivity, K, ft/yr (Note 1)	3.0 x 10 ⁵	5.0 x 10 ³	1.3 x 10 ⁵	
Hydraulic Gradient, I (Note 1)	0.0147	0.0139	0.0026	
Effective Porosity, O (Note 1)	0.25	0.25	0.25	
Ground Water Velocity, V, ft/yr (Note 1)	17,650	278	1352	
Distance, X, ft (Note 2)	2100	3000	2200	7300
Time, t, yr	0.12	10.79	1.63	12.54
Time-Pulse Width, Δt, yr	0.000866			
Mean Grain Size, d ₅₀ , ft	8.2 x 10 ⁻⁴	6.6 x 10 ⁻⁵	9.8 x 10 ⁻⁴	
Longitudinal Dispersion Coefficient, D _L , ft ² /yr	14.47	0.018	1.32	
Ion Exchange Capacity, Ex, Millequiv/gm	0.076	0.076	0.076	
Calcium Concentration, C _{Ca} Millequiv/ml	0.0070	0.0085	0.0085	
Equilibrium Constant, K _{Ca} ^{Sr}	0.81	0.81	0.81	
Equilibrium Constant, K _{Ca} ^{Cs}	29	29	29	
Distribution Coefficient, K _d , ml/gm				
Sr-90	8.79	7.24	7.24	
Cs-137	314.85	259.29	259.29	
ESP Site Characteristic Chemical Elements and Distribution Coefficient Data	Chemical Element	Nuclide of Interest	Distribution Coefficient, K_d, ml/gm	
	Cesium	Cs-134, Cs-137	7.24	
	Cobalt	Co-60	60	
	Iron	Fe-55	220	
	Nickel	Ni-63	400	
	Strontium	Sr-90	259.29	

NOTES:

- Parameters and values considered as site characteristics for the ESP site.
- Distance through the terrace deposits from the ESP power block area to the MS River is reduced by approximately 1830 ft. due to the location of the ESP power block area.