

## 6. DEMAND ESTIMATION FOR EVACUATION SCENARIOS

An evacuation “case” defines a combination of Evacuation Region and Evacuation Scenario. The definitions of “Region” and “Scenario” are as follows:

**Region**            A grouping of contiguous evacuation ERPAs, that forms either a “keyhole” sector-based area, or a circular area within the EPZ, that must be evacuated in response to a radiological emergency.

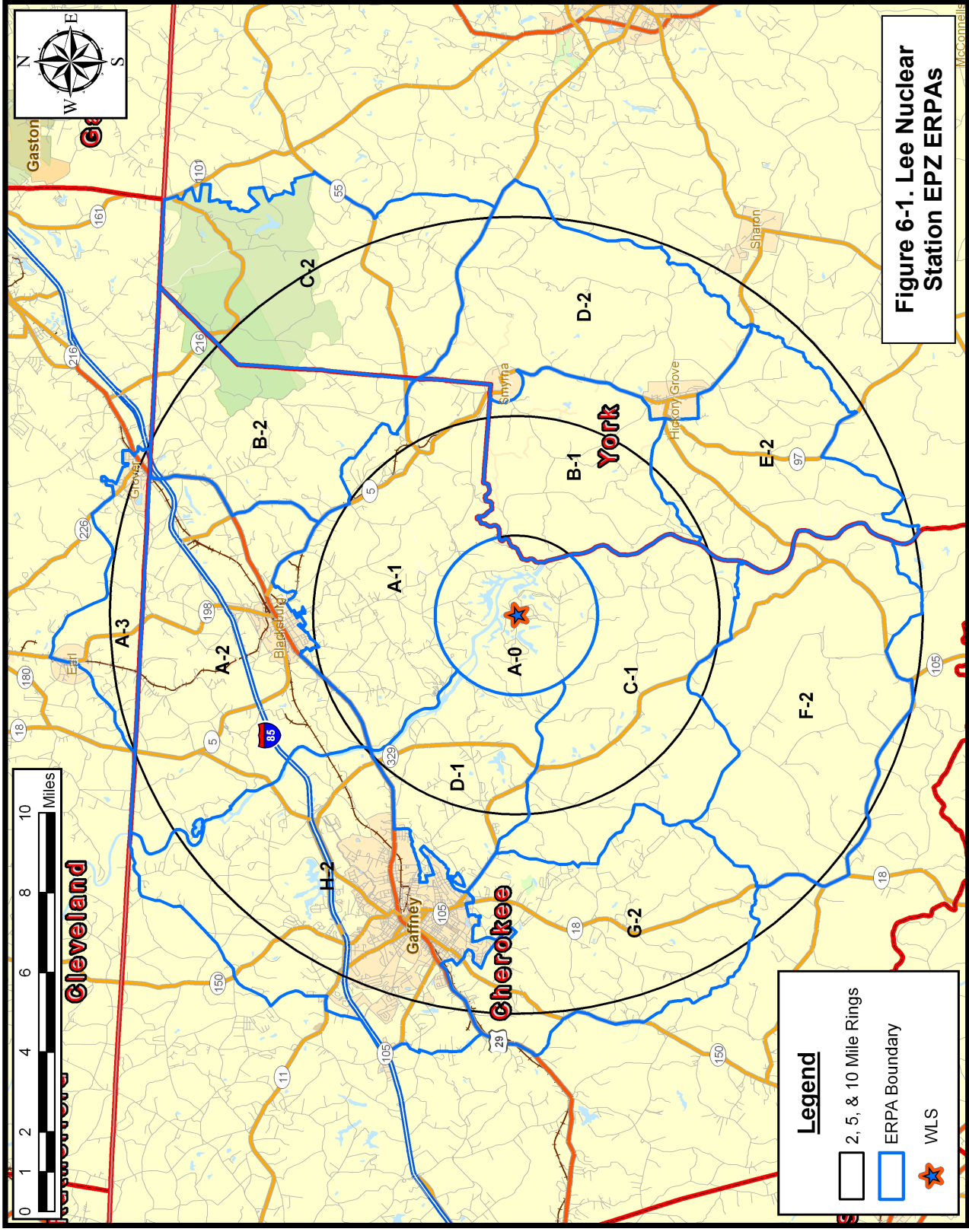
**Scenario**         A combination of circumstances, including time of day, day of week, season, and weather conditions. Scenarios define the number of people in each of the affected population groups and their respective mobilization time distributions.

A total of 22 Regions were defined which encompass all the groupings of ERPAs considered. These Regions are defined in Table 6-1. The ERPA configurations are identified in Figure 6-1. Each keyhole sector-based area consists of a central circle centered at WLS, and three adjoining sectors, each with a central angle of 22.5 degrees. These sectors extend to a distance of 5 miles from WLS (Regions R02 and R04 to R10), or to the EPZ boundary (Regions R03 and R11 to R22).

A total of 12 Scenarios were evaluated for all Regions. Thus, there are a total of  $12 \times 22 = 264$  evacuation cases. Table 6-2 is a description of all Scenarios.




Each combination of region and scenario implies a specific population to be evacuated. Table 6-3 presents the percentage of each population group assumed to evacuate for each scenario. Table 6-4 presents the vehicle counts for each scenario.

Table 6-1. Description of Evacuation Regions																
Region	Description	ERPA														
		A-0	A-1	A-2	A-3	B-1	B-2	C-1	C-2	D-1	D-2	E-2	F-2	G-2	H-2	
R01	2 mile ring	X														
R02	5-mile ring	X	X			X		X								
R03	Full EPZ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Evacuate 2 mile ring and 5 miles downwind																
Region	Wind Direction Toward:	ERPA														
		A-0	A-1	A-2	A-3	B-1	B-2	C-1	C-2	D-1	D-2	E-2	F-2	G-2	H-2	
R04	N, NNE, NE	X	X													
R05	ENE, E	X	X			X										
R06	ESE	X				X										
R07	SE,SSE,S	X				X		X								
R08	SSW, SW	X						X								
R09	WSW,W, WNW	X						X		X						
R10	NW,NNW	X	X							X						
Evacuate 5 mile ring and downwind to EPZ boundary																
Region	Wind Direction Toward:	ERPA														
		A-0	A-1	A-2	A-3	B-1	B-2	C-1	C-2	D-1	D-2	E-2	F-2	G-2	H-2	
R11	N	X	X	X	X	X	X	X		X						
R12	NNE	X	X	X	X	X	X	X	X	X						
R13	NE	X	X	X	X	X	X	X	X	X	X					
R14	ENE, E	X	X			X	X	X	X	X	X					
R15	ESE	X	X			X	X	X	X	X	X	X				
R16	SE	X	X			X	X	X	X	X	X	X				
R17	SSE	X	X			X	X	X	X	X	X	X	X			
R18	S	X	X			X	X	X	X	X	X	X	X			
R19	SSW, SW	X	X			X	X	X	X	X	X	X	X	X		
R20	WSW	X	X			X	X	X	X	X	X	X	X	X	X	X
R21	W, WNW	X	X			X	X	X	X	X	X	X	X	X	X	X
R22	NW,NNW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X



**Figure 6-1. Lee Nuclear Station EPZ ERPAs**

**Legend**

-  2, 5, & 10 Mile Rings
-  ERPA Boundary
-  WLS

<b>Table 6-2. Evacuation Scenario Definitions</b>					
<b>Scenario</b>	<b>Season</b>	<b>Day of Week</b>	<b>Time of Day</b>	<b>Weather</b>	<b>Special</b>
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Midweek	Midday	Ice	None
9	Winter	Weekend	Midday	Good	None
10	Winter	Weekend	Midday	Rain	None
11	Winter	Midweek, Weekend	Evening	Good	None
12	Summer	Midweek	Midday	Good	New Plant Construction

**Note: Schools are assumed to be in session for the Winter season (midweek, midday).**

Scenarios	Residents With Commuters in Household	Residents With No Commuters in Household	Employees	Transients	Shadow	Special Events	School Buses	Transit Buses	External Through Traffic
1	68%	32%	96%	50%	40%	0%	10%	100%	100%
2	68%	32%	96%	50%	40%	0%	10%	100%	100%
3	10%	90%	47%	100%	35%	0%	0%	100%	100%
4	10%	90%	47%	100%	35%	0%	0%	100%	100%
5	10%	90%	10%	45%	31%	0%	0%	100%	60%
6	68%	32%	100%	30%	40%	0%	100%	100%	100%
7	68%	32%	100%	30%	40%	0%	100%	100%	100%
8	68%	32%	100%	30%	40%	0%	100%	100%	100%
9	10%	90%	47%	60%	35%	0%	10%	100%	100%
10	10%	90%	47%	60%	35%	0%	10%	100%	100%
11	10%	90%	10%	25%	31%	0%	0%	100%	60%
12	68%	32%	96%	50%	40%	100%	10%	100%	100%

**Resident Households With Commuters** ..... Households of EPZ residents who await the return of commuters prior to beginning the evacuation trip.

**Resident Households With No Commuters** .... Households of EPZ residents who do not have commuters or will not await the return of commuters prior to beginning the evacuation trip.

**Employees** ..... EPZ employees who live outside of the EPZ.

**Transients** ..... People who are in the EPZ at the time of an accident for recreational or other (non-employment) purposes.

**Shadow** ..... Residents and employees in the shadow region (outside of the EPZ) who will spontaneously decide to relocate during the evacuation. The basis for the values shown is a 30% relocation of shadow residents along with a proportional percentage of shadow employees. The percentage of shadow employees is computed using the scenario-specific ratio of EPZ employees to residents.

**Special Events** ..... Additional vehicles in the Lee Nuclear Station area during the construction phase of a new unit.

**School and Transit Buses** ..... Vehicle-equivalents present on the road during evacuation servicing schools and transit-dependent people (1 bus is equivalent to 2 passenger vehicles).

**External Through Traffic** ..... Traffic on local highways and major arterial roads at the start of the evacuation. This traffic is stopped by access control approximately 1-2 hours after the evacuation begins.

Scenarios	Residents with Commuters	Residents without Commuters	Employees	Transients	Shadow	Special Events	School Buses	Transit Buses	External Traffic	Total Scenario Vehicles
1	18,136	8,384	8,423	1,395	7,768	-	37	84	6,300	50,527
2	18,136	8,384	8,423	1,395	7,768	-	37	84	6,300	50,527
3	1,814	24,706	4,124	2,790	6,813	-	-	84	6,300	46,631
4	1,814	24,706	4,124	2,790	6,813	-	-	84	6,300	46,631
5	1,814	24,706	877	1,256	6,091	-	-	84	3,780	38,608
6	18,136	8,384	8,774	837	7,847	-	368	84	6,300	50,730
7	18,136	8,384	8,774	837	7,847	-	368	84	6,300	50,730
8	18,136	8,384	8,774	837	7,847	-	368	84	6,300	50,730
9	1,814	24,706	4,124	1,674	6,813	-	37	84	6,300	45,552
10	1,814	24,706	4,124	1,674	6,813	-	37	84	6,300	45,552
11	1,814	24,706	877	698	6,091	-	-	84	3,780	38,050
12	18,618*	8,616*	8,423	1,395	7,768*	2,525	37	84	6,300	54,149

\*The peak construction year estimated by Duke Energy is 2011. The permanent resident population and shadow population have been extrapolated to 2011 using the estimated average yearly percentage growth provided by the US Census for each county.