Maximally Exposed Offsite Individual Location Determination for NESHAPS Compliance

by

A. A. Simpkins

Westinghouse Savannah River Company
Savannah River Site
Aiken, South Carolina 29808

DOE Contract No. **DE-AC09-96SR18500**

This paper was prepared in connection with work done under the above contract number with the U. S. Department of Energy. By acceptance of this paper, the publisher and/or recipient acknowledges the U. S. Government's right to retain a nonexclusive, royalty-free license in and to any copyright covering this paper, along with the right to reproduce and to authorize others to reproduce all or part of the copyrighted paper.

MAXIMALLY EXPOSED OFFSITE INDIVIDUAL LOCATION DETERMINATION FOR NESHAPS COMPLIANCE

Ali A. Simpkins

Technical Reviewer

January 2000

UNCLASSIFIED

DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION

APC &
Reviewing

Official:
(Name and Title)

Date: 2/1/00

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

SAVANNAH RIVER SITE

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

This report has been reproduced directly from the best available copy.

Available for sale to the public, in paper, from: U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, phone: (800) 553-6847
fax: (703) 605-6900
email: orders@ntis.fedworld.gov
online ordering: <http://www.ntis.gov/ordering.htm>

Available electronically at <http://www.doe.gov/bridge>
Available for a processing fee to U.S. Department of Energy and its contractors, in paper, from:
U.S. Department of Energy, Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831-0062, phone: (865) 576-8401
fax: (865) 576-5728
email: reports@adonis.osti.gov

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Key Words

Atmospheric Dispersion
Dose Determination
Atmospheric Releases

Retention: Lifetime

MAXIMALLY EXPOSED OFFSITE INDIVIDUAL LOCATION DETERMINATION FOR NESHAPS COMPLIANCE

A. A. Simpkins

Issued: January 2000

SRTC

**SAVANNAH RIVER TECHNOLOGY CENTER
AIKEN, SC 29808
Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808**

**PREPARED FOR THE U.S. DEPARTMENT OF ENERGY UNDER CONTRACT NO.
DE-AC09-96SR18500**

ABSTRACT

The Environmental Protection Agency (EPA) requires the use of the computer program CAP88 for demonstrating compliance with the National Emission Standard for Hazardous Air Pollutants (NESHAPS.) One of the inputs required for CAP88 is the location of the maximally exposed individual (MEI) by sector and distance. Distances to the MEI have been determined for 15 different potential release locations at SRS. These locations were compared with previous work and differences were analyzed. Additionally, SREL Conference Center was included as a potential 'offsite' location since in the future it may be used as a dormitory. Worst sectors were then determined based on the distances.

TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. METHODOLOGY.....	1
2.1. DETERMINATION OF MEI LOCATION.....	3
2.2. DETERMINATION OF WORST SECTOR.....	3
3. ANALYSIS OF RESULTS	9
4. CONCLUSIONS.....	11
5. REFERENCES	12

LIST OF TABLES

TABLE 1. POTENTIAL RELEASE POINTS FOR NESHAPS COMPLIANCE.....	1
TABLE 2. DISTANCE TO THE NEAREST RESIDENCE, SCHOOL, BUSINESS, OR FARM FOR DEMONSTRATING NESHAP COMPLIANCE.....	4
TABLE 3. DISTANCE TO THE NEAREST RESIDENCE, SCHOOL, BUSINESS OR FARM FOR DEMONSTRATING NESHAP COMPLIANCE.....	5
TABLE 4. RATIO OF MEI DISTANCE FOR 1999 TO MEI DISTANCE FOR 1990	5
TABLE 5. RELATIVE AIR CONCENTRATIONS AT OFFSITE LOCATIONS CORRESPONDING TO TABLE 2 (HIGHEST HIGHLIGHTED).....	7
TABLE 6. RELATIVE AIR CONCENTRATIONS AT OFFSITE LOCATIONS CORRESPONDING TO TABLE 3 – (HIGHEST HIGHLIGHTED).....	8
TABLE 7. LOCATION OF MEI FOR NESHAPS CALCULATIONS.....	9
TABLE 8. COMPARISON OF DISTANCES DETERMINED IN 1999 AND 1990	10
TABLE 9. COMPARISON OF RELATIVE AIR CONCENTRATIONS USING 1999 AND 1990 DISTANCES.....	10

LIST OF FIGURES

FIGURE 1. LOCATION OF MAJOR SITE AREAS WITH POTENTIAL TO RELEASE RADIOACTIVE MATERIALS.....	2
--	---

MAXIMALLY EXPOSED OFFSITE INDIVIDUAL LOCATION DETERMINATION FOR NESHAPS COMPLIANCE

By A. A. Simpkins

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

1. INTRODUCTION

The Environmental Protection Agency (EPA) requires the use of the computer code CAP88 (Beres 1990) for demonstrating compliance with the National Emission Standard for Hazardous Air Pollutants (NESHAPS). To demonstrate compliance, the location of the maximally exposed individual (MEI) is needed as input to CAP88. This location is entered as sector and distance to the receptor. These distances and sectors were originally determined in 1990 with virtually no documentation and are determined now with strict documentation.

2. METHODOLOGY

To determine the location of the MEI, the nearest offsite individual is identified for each of the sixteen compass point sectors surrounding each potential release point. Next, CAP88 is executed to determine which sector would result in the highest dose (referred to as the worst sector.) A listing of each of the potential release points is shown in Table 1 and is graphically depicted in Figure 1. Table 1 also shows the location of each of the potential release points using the site coordinate system.

Table 1. Potential Release Points for NESHAPS Compliance

Location	Easting Coordinate	Northing Coordinate
A-Area	51860	106670
APT	75000	75000
C-Area	46230	67630
Center	58000	62000
D-Area	20940	65280
E-Area	58000	75000
F-Area	53970	78020
H-Area	63380	71900
K-Area	40740	54130
L-Area	50460	45910
M-Area	50040	104830
N-Area	51000	65000
P-Area	64800	43800
S/Z-Area	64010	73750
T-Area	17500	71500

Figure 1. Location of Major Site Areas with Potential to Release Radioactive Materials

2.1. Determination of MEI Location

NESHAPS calculations are performed in accordance with 40CFR61 (EPA 1989). In reference to determining the location of the MEI, Section 92 states:

'Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any offsite point where there is a residence, school, business or office.Distances from the points of release to the nearest residence, school, business or office and the nearest farms producing vegetables, milk, and meat.'

The E&GIS Group was contacted to determine the location of the nearest offsite individual in each of the sixteen compass sectors for each potential release location. Appendix A contains a complete copy of the results of this study (Mackey 1999). Site wide photography taken in 1998 was examined to pinpoint the location of buildings or farms. For conservatism, all cultivated fields were assumed to be vegetable-producing farms.

The Savannah River Ecology Lab (SREL) Conference Center, which is located onsite along Highway 278, may be used as a dormitory in the future. This location was also considered as a potential residence location. Table 2 shows the distance to the nearest offsite individual for each of the sixteen sectors for each release location and Table 3 contains similar results with the inclusion of the SREL Conference Center. Appendix B shows the distances that were determined in the previous study performed in 1990.

Table 4 shows the ratio of distances determined in 1999 to those determined in 1990. Looking at Table 4, the only areas that show considerable differences are A Area and D Area, both of which are close to the site boundary. One reason for the differences may be that the photography in 1998 has greater detail. Another reason may be that some of the buildings/farms that were selected using the 1998 photography may not have existed in 1990.

Independent review of the photography for A Area and D Area validated that correct methods were used with the current study. For A Area, the north-northwest sector was looked at closely because this was the location of the worst sector during the previous analysis. To ensure proper selection of nearest building/farm a field verification was preformed for questionable sectors for the A Area release location. This field verification determined that there is a habitable structure at the questionable location.

There may be differences when comparing this study to the previous study because of how the sectors were defined. Current methods utilized computer models to overlay exact 22.5 degree sectors centered upon true North. Previous studies might not have used such sophisticated methods to define sectors.

2.2. Determination of Worst Sector

Now that distances have been determined as shown in Tables 2 and 3, CAP88 is executed for each of these distances and corresponding sectors to determine which sector would provide the highest dose to the offsite individual. The relative air concentrations, which are directly proportional to dose, are shown in Tables 5 and 6 both without and with considering the

Table 2. Distance to the Nearest Residence, School, Business, or Farm for Demonstrating NESHAP Compliance

Sector	Release Area – Distance (m)														
	A	APT	C	Center	D	E	F	H	K	L	M	N	P	S/Z	T
S	20575	20750	15102	15033	7329	19235	19026	18466	13401	9621	19788	17874	10928	19054	5628
SSW	7758	23038	13477	16784	5355	17637	16135	19398	11102	12970	7077	15119	11828	19795	4613
SW	4761	21743	12751	16203	4996	16564	15328	18080	10986	12513	4815	14134	16535	18359	4450
WSW	2639	15574	13236	17004	5792	13316	10229	15194	10957	14074	3137	14786	18419	13893	4551
W	2141	14625	10481	13839	6390	10967	9442	12817	13296	16377	2440	11832	20514	12603	4816
WNW	1173	12396	10150	13690	7810	11557	9996	12346	12912	16446	2203	11634	19459	11259	5670
NW	699	10193	11904	14434	8180	10525	9450	11820	13212	17200	1538	13389	20252	11027	6221
NNW	973	9932	12693	15032	8291	11007	9948	11623	17025	19539	1342	13723	19772	11828	6394
N	1159	9478	14475	15813	14868	11478	10933	12380	19027	21069	1932	15188	19021	11795	9117
NNE	2626	9580	17761	15987	21224	13534	14180	12723	21491	21372	3390	16996	16182	12225	18430
NE	3770	11461	20048	17228	27066	15598	16290	14682	22663	17868	5200	19334	13493	14319	25253
ENE	13725	12540	20209	16283	23297	17575	18973	15792	16431	12843	14176	18584	8468	15703	28951
E	21107	13408	16904	13012	21689	17761	19279	15872	17341	13483	22659	15260	9662	15974	25043
ESE	24872	13106	17939	15233	16802	15806	17303	14046	13847	11386	24661	16644	9845	14389	18494
SE	28548	16035	16414	15131	15032	19002	19820	17815	12227	10054	27997	15855	9268	18351	16808
SSE	27453	18700	15450	15025	10533	18650	19115	18078	11098	9906	26800	15059	9617	18656	10478

Table 3. Distance to the Nearest Residence, School, Business or Farm for Demonstrating NESHAP Compliance
(SREL Conference Center Included – Italics show distances that change as a result of Conference Center Included)

Sector	Release Area – Distance (m)														
	A	APT	C	Center	D	E	F	H	K	L	M	N	P	S/Z	T
S	20575	20750	15102	15033	7329	19235	19026	18466	13401	9621	19788	17874	10928	19054	5628
SSW	7758	23038	13477	16784	5355	17637	16135	19398	11102	12970	7077	15119	11828	19795	4613
SW	4761	21743	12751	16203	4996	16564	15328	18080	10986	12513	4815	14134	16535	18359	4450
WSW	2639	15574	13236	17004	5792	13316	10229	15194	10957	14074	3137	14786	18419	13893	4551
W	2141	14625	10481	13839	6390	10967	9442	12817	13296	16377	2440	11832	20514	12603	4816
WNW	1173	12396	10150	13690	7810	11557	9996	12346	12912	16446	2203	11634	19459	11259	5670
NW	699	10193	11904	14434	8180	10525	9450	11820	13212	17200	1538	13389	20252	11027	6221
NNW	973	9932	12693	15032	8291	11007	9948	11623	17025	19539	1342	13723	19772	11828	6394
N	1159	8370	14475	<i>14740</i>	14868	11478	10933	12380	19027	<i>19960</i>	1932	15188	<i>18150</i>	<i>10940</i>	9117
NNE	2626	9580	<i>16390</i>	15987	<i>21224*</i>	<i>12160</i>	<i>12750</i>	<i>11460</i>	<i>20210</i>	21372	3390	<i>15690</i>	16182	12225	18430
NE	3770	11461	20048	17228	27066	15598	16290	14682	22663	17868	5200	19334	13493	14319	23770
ENE	<i>12320</i>	12540	20209	16283	23297	17575	18973	15792	16431	12843	<i>12740</i>	18584	8468	15703	28951
E	21107	13408	16904	13012	21689	17761	19279	15872	17341	13483	22659	15260	9662	15974	25043
ESE	24872	13106	17939	15233	16802	15806	17303	14046	13847	11386	24661	16644	9845	14389	18494
SE	28548	16035	16414	15131	15032	19002	19820	17815	12227	10054	27997	15855	9268	18351	16808
SSE	27453	18700	15450	15025	10533	18650	19115	18078	11098	9906	26800	15059	9617	18656	10478

* No Change – Distance to SREL Conference Center greater than distance to the nearest offsite individual so original distance used.

Table 4. Ratio of MEI distance for 1999 to MEI distance for 1990

Sector	A	APT	C	Center	D	E	F	H	K	L	M	P	S/Z	T
S	1.0	1.0	0.9	1.0	0.7	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9
SSW	1.1	1.0	0.9	1.0	0.9	1.0	1.0	1.0	1.0	0.9	1.0	1.0	0.9	0.7
SW	0.9	1.0	1.0	1.0	0.7	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
WSW	0.8	1.0	1.0	1.0	0.9	1.0	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.1
W	0.8	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.8
WNW	0.5	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
NW	0.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0
NNW	0.7	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	0.9
N	0.6	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	0.7
NNE	0.6	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.8	1.0	1.1	0.9
NE	0.5	1.0	1.1	1.0	1.0	0.9	0.9	1.0	1.0	1.0	0.7	1.0	1.0	0.9
ENE	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
E	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ESE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
SE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SSE	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9

Table 5. Relative Air Concentrations At Offsite Locations Corresponding To Table 2 (Highest Highlighted)

	A-Area	APT	C-Area	Center	D-Area	E-Area	F-Area	H-Area	K-Area	L-Area	M-Area	N-Area	P-Area	S/Z-Area	T-Area
S	1.54E-09	1.78E-09	2.23E-09	2.32E-09	7.97E-09	1.74E-09	1.31E-09	1.84E-09	2.81E-09	3.63E-09	1.61E-09	1.83E-09	3.53E-09	1.75E-09	1.14E-08
SSW	1.33E-08	5.72E-09	7.14E-09	6.14E-09	2.23E-08	5.79E-09	6.77E-09	5.13E-09	9.67E-09	5.97E-09	1.49E-08	6.27E-09	8.86E-09	5.01E-09	2.66E-08
SW	5.78E-08	9.70E-09	1.78E-08	1.15E-08	4.65E-08	1.11E-08	2.01E-08	1.00E-08	2.03E-08	1.58E-08	5.74E-08	1.57E-08	1.42E-08	9.82E-09	5.35E-08
WSW	8.84E-08	9.69E-09	1.33E-08	7.32E-09	3.73E-08	9.85E-09	2.25E-08	8.39E-09	1.62E-08	1.23E-08	7.28E-08	1.17E-08	1.03E-08	9.36E-09	4.96E-08
W	8.59E-08	8.43E-09	1.30E-08	7.49E-09	2.59E-08	9.94E-09	1.40E-08	8.22E-09	1.05E-08	8.04E-09	7.46E-08	1.13E-08	6.32E-09	8.40E-09	3.62E-08
WNW	1.10E-07	1.12E-08	1.12E-08	7.44E-09	1.98E-08	9.10E-09	1.15E-08	8.41E-09	9.89E-09	6.29E-09	6.26E-08	9.59E-09	4.92E-09	9.38E-09	2.89E-08
NW	1.38E-07	1.58E-08	1.08E-08	7.74E-09	2.81E-08	1.13E-08	1.46E-08	9.83E-09	1.29E-08	7.30E-09	8.70E-08	9.44E-09	5.73E-09	1.07E-08	3.86E-08
NNW	1.55E-07	1.98E-08	1.44E-08	9.13E-09	3.22E-08	1.33E-08	1.84E-08	1.25E-08	1.10E-08	8.07E-09	1.32E-07	1.32E-08	7.35E-09	1.22E-08	4.41E-08
N	1.51E-07	2.52E-08	1.26E-08	1.01E-08	9.76E-09	1.49E-08	1.75E-08	1.36E-08	9.53E-09	8.52E-09	1.06E-07	1.19E-08	9.91E-09	1.44E-08	1.84E-08
NNE	7.50E-08	2.23E-08	9.48E-09	9.18E-09	6.96E-09	1.12E-08	1.18E-08	1.21E-08	8.17E-09	9.30E-09	5.81E-08	9.96E-09	1.20E-08	1.27E-08	8.32E-09
NE	6.69E-08	1.84E-08	9.80E-09	8.79E-09	4.99E-09	9.90E-09	1.24E-08	1.06E-08	7.01E-09	9.96E-09	4.67E-08	1.02E-08	1.42E-08	1.10E-08	5.41E-09
ENE	1.49E-08	1.84E-08	9.40E-09	1.02E-08	6.17E-09	9.28E-09	1.08E-08	1.05E-08	1.04E-08	1.54E-08	1.43E-08	1.04E-08	2.33E-08	1.06E-08	4.82E-09
E	8.04E-09	1.03E-08	1.05E-08	8.99E-09	7.47E-09	6.14E-09	9.66E-09	7.05E-09	9.67E-09	1.28E-08	7.41E-09	1.19E-08	1.85E-08	6.99E-09	6.34E-09
ESE	4.83E-09	8.98E-09	7.02E-09	6.25E-09	9.81E-09	5.97E-09	7.64E-09	6.91E-09	1.06E-08	1.22E-08	4.88E-09	7.66E-09	1.35E-08	6.71E-09	8.77E-09
SE	2.58E-09	5.15E-09	4.77E-09	4.51E-09	9.06E-09	3.40E-09	3.87E-09	3.70E-09	8.85E-09	8.37E-09	2.64E-09	4.96E-09	1.03E-08	3.57E-09	7.98E-09
SSE	2.00E-09	3.88E-09	3.80E-09	3.83E-09	1.07E-08	2.98E-09	2.73E-09	3.09E-09	6.53E-09	6.11E-09	2.05E-09	3.91E-09	6.45E-09	2.98E-09	1.08E-08

Table 6. Relative Air Concentrations At Offsite Locations Corresponding To Table 3 – (Highest Highlighted)

	A-Area	APT	C-Area	Center	D-Area	E-Area	F-Area	H-Area	K-Area	L-Area	M-Area	N-Area	P-Area	S/Z-Area	T-Area
S	1.54E-09	1.78E-09	2.24E-09	2.32E-09	7.97E-09	1.74E-09	1.31E-09	1.84E-09	2.81E-09	3.63E-09	1.61E-09	1.83E-09	3.53E-09	1.75E-09	1.14E-08
SSW	1.33E-08	5.72E-09	7.14E-09	6.14E-09	2.23E-08	5.79E-09	6.77E-09	5.13E-09	9.67E-09	5.97E-09	1.49E-08	6.27E-09	8.86E-09	5.01E-09	2.66E-08
SW	5.78E-08	9.70E-09	1.78E-08	1.15E-08	4.65E-08	1.11E-08	2.01E-08	1.00E-08	2.03E-08	1.58E-08	5.74E-08	1.57E-08	1.42E-08	9.82E-09	5.35E-08
WSW	8.84E-08	9.69E-09	1.33E-08	7.32E-09	3.73E-08	9.85E-09	2.25E-08	8.39E-09	1.62E-08	1.23E-08	7.28E-08	1.17E-08	1.03E-08	9.36E-09	4.96E-08
W	8.59E-08	8.43E-09	1.30E-08	7.49E-09	2.59E-08	9.94E-09	1.40E-08	8.22E-09	1.05E-08	8.04E-09	7.46E-08	1.13E-08	6.32E-09	8.40E-09	3.62E-08
WNW	1.10E-07	1.12E-08	1.12E-08	7.44E-09	1.98E-08	9.10E-09	1.15E-08	8.41E-09	9.89E-09	6.29E-09	6.26E-08	9.59E-09	4.92E-09	9.38E-09	2.89E-08
NW	1.38E-07	1.58E-08	1.08E-08	7.74E-09	2.81E-08	1.13E-08	1.46E-08	9.83E-09	1.29E-08	7.30E-09	8.70E-08	9.44E-09	5.73E-09	1.07E-08	3.86E-08
NNW	1.55E-07	1.98E-08	1.44E-08	9.13E-09	3.22E-08	1.33E-08	1.84E-08	1.25E-08	1.10E-08	8.07E-09	1.32E-07	1.32E-08	7.35E-09	1.22E-08	4.41E-08
N	1.51E-07	3.01E-08	1.26E-08	1.10E-08	9.76E-09	1.49E-08	1.75E-08	1.36E-08	9.53E-09	9.06E-09	1.06E-07	1.19E-08	1.05E-08	1.58E-08	1.84E-08
NNE	7.50E-08	2.23E-08	1.04E-08	9.18E-09	6.16E-09	1.27E-08	1.33E-08	1.37E-08	8.74E-09	9.30E-09	5.81E-08	1.09E-08	1.20E-08	1.27E-08	8.32E-09
NE	6.69E-08	1.84E-08	9.80E-09	8.79E-09	4.99E-09	9.90E-09	1.24E-08	1.06E-08	7.01E-09	9.96E-09	4.67E-08	1.02E-08	1.42E-08	1.10E-08	5.81E-09
ENE	1.69E-08	1.84E-08	9.40E-09	1.02E-08	6.17E-09	9.28E-09	1.08E-08	1.05E-08	1.04E-08	1.54E-08	1.62E-08	1.04E-08	2.33E-08	1.06E-08	4.82E-09
E	8.04E-09	1.03E-08	1.05E-08	8.99E-09	7.47E-09	6.14E-09	9.66E-09	7.05E-09	9.67E-09	1.28E-08	7.41E-09	1.19E-08	1.85E-08	6.99E-09	6.34E-09
ESE	4.83E-09	8.98E-09	7.02E-09	6.25E-09	9.81E-09	5.97E-09	7.64E-09	6.91E-09	1.06E-08	1.22E-08	4.88E-09	7.66E-09	1.35E-08	6.71E-09	8.77E-09
SE	2.58E-09	5.15E-09	4.77E-09	4.51E-09	9.06E-09	3.40E-09	3.87E-09	3.70E-09	8.85E-09	8.37E-09	2.64E-09	4.96E-09	1.03E-08	3.57E-09	7.98E-09
SSE	2.00E-09	3.88E-09	3.80E-09	3.83E-09	1.07E-08	2.98E-09	2.73E-09	3.09E-09	6.53E-09	6.11E-09	2.05E-09	3.91E-09	6.45E-09	2.98E-09	1.08E-08

SREL Conference Center, respectively. Since relative air concentration is directly proportional to dose, the concentrations for each sector and distance are compared to determine which is the highest. The maximum concentration has been highlighted. Table 7 shows a summary of the worst sector and distance for each of the potential release locations both considering and not considering the SREL Conference Center. The numbers in parentheses refer to input required for CAP88.

Table 7. Location of MEI for NESHAPS Calculations

Area	Offsite MEI 1999		SREL Included 1999		Offsite MEI 1990	
	Sector	Distance	Sector	Distance	Sector	Distance
A-Area	NNW(2)	970	NNW(2)	970	NNW(2)	1360
APT	N(1)	9480	N(1)	8370	N(1)	9350
C-Area	SW(7)	12750	SW(7)	12750	SW(7)	13100
Center	SW(7)	16200	SW(7)	16200	SW(7)	16420
D-Area	SW(7)	5000	SW(7)	5000	WSW(6)	6640
E-Area	N(1)	11480	N(1)	11480	N(1)	11050
F-Area	WSW(6)	10230	WSW(6)	10230	SW(7)	15230
H-Area	N(1)	12380	NNE(16)	11460	N(1)	12370
K-Area	SW(7)	10990	SW(7)	10990	SW(7)	11920
L-Area	SW(7)	12510	SW(7)	12510	ENE(14)	12670
M-Area	NNW(2)	1340	NNW(2)	1340	NNW(2)	1370
N-Area	SW(7)	14130	SW(7)	14130	SW(7)	14320
P-Area	ENE(14)	8470	ENE(14)	8470	ENE(14)	8450
S/Z-Area	N(1)	11800	N(1)	10940	N(1)	10970
T-Area	SW(7)	4450	SW(7)	4450	WSW(6)	4270

3. ANALYSIS OF RESULTS

Table 8 shows the ratio of distances determined in this study to distances determined in 1990. Looking at Table 8, noticeable differences are seen for the following locations: A Area, D Area, and F Area. If the ratio shown in the last column of Table 8 is less than one, the resulting dose could increase since the MEI is now closer to the release location. Calculations were performed for each of the areas to demonstrate the magnitude of the differences.

Table 9 shows the comparison of relative air concentrations using 1990 distances versus 1999 distances. Relative air concentration is directly proportional to dose so this table represents potential dose differences that would be seen using the new distances. The largest difference is seen in D Area. This is due to the fact that not only did the distance between the MEI and the release location decrease, but the worst sector changed.

Table 8. Comparison of Distances Determined in 1999 and 1990

Area	Offsite MEI 1999		Offsite MEI 1990		Ratio Dist 1999/1990
	Sector	Distance	Sector	Distance	
A-Area	NNW(2)	970	NNW(2)	1360	0.7
APT	N(1)	9480	N(1)	9350	1.0
C-Area	SW(7)	12750	SW(7)	13100	1.0
Center	SW(7)	16200	SW(7)	16420	1.0
D-Area	SW(7)	5000	WSW(6)	6640	0.8
E-Area	N(1)	11480	N(1)	11050	1.0
F-Area	WSW(6)	10230	SW(7)	15230	0.7
H-Area	N(1)	12380	N(1)	12370	1.0
K-Area	SW(7)	10990	SW(7)	11920	0.9
L-Area	SW(7)	12510	ENE(14)	12670	1.0
M-Area	NNW(2)	1340	NNW(2)	1370	1.0
N-Area	SW(7)	14130	SW(7)	14320	1.0
P-Area	ENE(14)	8470	ENE(14)	8450	1.0
S/Z-Area	N(1)	11800	N(1)	10970	1.1
T-Area	SW(7)	4450	WSW(6)	4270	1.0

Table 9. Comparison of Relative Air Concentrations using 1999 and 1990 Distances

	1999 Distance	1990 Distance	% Difference
AREA	Chi/Q	Chi/Q	
A	1.55E-07	1.31E-07	18%
APT	2.52E-08	2.57E-08	-2%
C	1.78E-08	1.72E-08	3%
CENTER	1.15E-08	1.13E-08	2%
D	4.65E-08	3.16E-08	47%
E	1.49E-08	1.56E-08	-4%
F	2.25E-08	2.03E-08	11%
H	1.36E-08	1.36E-08	0%
K	2.03E-08	1.84E-08	10%
L	1.58E-08	1.56E-08	1%
M	1.32E-07	1.30E-07	2%
P	2.33E-08	2.33E-08	0%
S	1.44E-08	1.57E-08	-8%
T	5.35E-08	5.36E-08	0%

4. CONCLUSIONS

Distances to the maximally exposed offsite individual have been determined for demonstrating NESHAPS compliance. Should the SREL Conference Center become a potential offsite location, distances also have been included for this facility. Three release locations (APT, H, S/Z) would show increases in dose predictions if the SREL Conference Center were considered.

5. REFERENCES

- Beres, Deborah A. 'The Clean Air Act Assessment Package -- 1988 (CAP88) A Dose and Risk Assessment Methodology For Radionuclide Emissions To Air, Volume 1, User's Manual,' U.S. Environmental Protection Agency, Washington, D.C. 1990.
- EPA 1989 U.S. Environmental Protection Agency, 1989, "National Emission Standards for Hazardous Air Pollutants; Radionuclides," Title 40 Code of Federal Regulations, Part 61, Volume 54, No 240, Washington, D.C.
- Mackey, Hal. "NESHAPS Distances Summary Memo, Tables, and Figures (U)" Westinghouse Inter-Office Memorandum: PECD-EGIS-99-0035, September 13, 1999, Westinghouse Savannah River Company, Aiken, SC.

WESTINGHOUSE SAVANNAH RIVER COMPANY

APPENDIX A. Mackey's NESHAPS Distance Memo

PECD-EGIS-99-0035

September 13, 1999

To: Ali Simpkins, SRTC, 773-42A, RM228

From: Hal Mackey, E&GIS, 730-2B, RM 1109

NESHAPS Distances Summary Memo, Tables, and Figures (U)

Attached are Tables and Figures which summarize our efforts to date for estimating the distances from 15 points (source locations-- A, APT, C, Center of SRS, D, E, F, H, K, L, M, N, P, SZ, T) on the SRS to the nearest offsite feature of interest, i.e., buildings, fields, etc., for the 16 directional sectors from each center point, plus an estimate to the SREL Conference Center. Distances are in meters and coordinates for the off-site locations are in UTM's. In the summary table, we also provide information on the 1996 SRS ortho-photographic tile which was used to identify the off-site feature, its direction, and the type of feature. Site-wide SRS photography from the summer of 1998, taken by Bechtel Nevada, was also reviewed to verify the off-site features, thus some minor changes were made based on off-site changes from 1996 to 1998. Figures are provided to show the general location of each feature for each center and sector. Note, a number of the off-site features are used several times for a number of the sectors. At this point in time, we have not conducted off-site visits to verify the identity of the off-site features. Thus, feature selection is based entirely on photographic interpretation. In addition, the final two columns in the summary table are a comparison of the distances from 1989 versus the distances for 1999 (units are kilometers), for those source locations in common for the two years. There is general agreement for most points (a few tenths of a kilometer). However, there are several distances of a few kilometers different. No attempt has been made to determine if in these latter cases if there were a change in landuse, criteria for off-site feature location, or technical difference in determination of off-site features between our determination in 1999 and in the selections in 1989.

The entire effort has been save as a GIS project, thus both the data base (1996 photography, sectors, etc.) can be review independently, or we would be happy to review the effort and every point selection with you if needed.

This completes the effort at this time. I would recommend that field visits and verification be conducted for at least a sub-set of the off-site points to test the accuracy of the photo interpretation. In addition, a support document to provide QA/QC verification would be in order, so that future updates would be easy and defensible for any NESHAPS based calculation for existing and/or future dose calculations.

CC: EGIS File
John Gladden, SRTC
Russ Beckmeyer, E&GIS
Larry Koffman, E&GIS
Cheryl Hardy, E&GIS

**Nearest Offsite Points of Interest
Hal Mackey, Cheryl Hardy, and Larry Koffman
-draft-example-9/13/99**

AREA	UTM_E	UTM_N	SECTOR	DISTANCE	AZIMUTH	TYPE-COMMENTS	89Distance	99distance
A-Area	431264.0	3690881.8	N	1158.8	354.21	Field, D-2	1.8	1.159
A-Area	431890.9	3692303.1	NNE	2626.3	11.00	Field, D-2	1.93	2.26
A-Area	433533.7	3692818.3	NE	3770.0	34.60	Field, E-2	3.59	3.77
A-Area	443826.5	3695499.1	ENE	13724.8	64.79	Field, 9-6468	7.93	13.725
A-Area	452104.2	3693695.3	E	21106.5	78.82	Building, K-1	18.56	21.106
A-Area	453892.7	3679167.0	ESE	24872.4	114.78	Building, K-6	24.73	24.872
A-Area	448365.2	3666787.3	SE	28548.0	143.12	Field, I-10	26.64	28.548
A-Area	443219.0	3664962.5	SSE	27452.6	154.09	Field, H-11	22.14	27.453
A-Area	427401.7	3669540.4	S	20575.0	190.78	Building, C-9	13.48	20.575
A-Area	427082.9	3683265.0	SSW	7758.0	213.23	Field, C-5	5.64	7.758
A-Area	427458.0	3687021.2	SW	4760.6	234.99	Building, C-4	3.89	4.761
A-Area	428786.2	3689210.0	WSW	2639.1	258.33	Field, C-3	2.59	2.639
A-Area	429235.6	3689828.3	W	2140.6	272.33	Building, C-3	2.15	2.141
A-Area	430265.7	3690111.6	WNW	1172.7	288.73	Field, D-2, BN1998	1.49	1.173
A-Area	430904.3	3690245.4	NW	698.6	317.41	Field, D-2	1.47	0.699
A-Area	430912.4	3690584.5	NNW	972.8	331.32	Building, D-2	1.3	0.973
A-Area	442748.0	3694450.7	ENE	12315.5	67.10	Conference, H-1		
APT	443837.7	3695491.9	N	9478.1	6.22	Field, photo number	15.14	9.478
APT	445001.3	3695388.8	NNE	9580.3	13.22	Field, H-1	16.13	9.58
APT	449712.7	3695182.6	NE	11461.2	37.04	Field, J-1	16.56	11.461
APT	454548.0	3690337.1	ENE	12540.4	69.79	Building, L-2	15.14	12.54
APT	456150.2	3685518.7	E	13407.9	92.03	Building, L-4	14.72	13.408
APT	453893.4	3679170.2	ESE	13106.4	121.45	Building, K-6	14.72	12.106
APT	455886.3	3676875.6	SE	16034.6	124.66	Field, L-7	14.35	16.035
APT	452524.0	3670131.6	SSE	18699.6	148.15	Field, K-9	14.33	18.7
APT	446387.1	3665646.4	S	20750.0	169.57	Field, I-11	14.33	20.75
APT	430270.5	3666713.1	SSW	23038.0	212.46	Building, D-10	15.86	23.038
APT	424792.0	3673822.9	SW	21743.1	235.35	Field, B-8	12.81	21.743
APT	427531.4	3682787.0	WSW	15573.6	257.46	Field, C-5	12.81	15.573
APT	428351.8	3688616.6	W	14624.5	279.65	Field, C-3	12.96	14.624
APT	431479.5	3691228.9	WNW	12396.2	294.21	Field, D-2	13.2	12.396
APT	437088.9	3694550.2	NW	10193.4	325.89	Building, F-1	14.45	10.193
APT	437408.7	3694446.3	NNW	9931.5	327.09	Building, F-1	14.45	9.931
APT	442747.9	3694450.3	N	8374.4	359.61	Conference, H-1		
C-Area	434174.3	3693299.5	N	14474.6	348.44	Field, Photo Number		
C-Area	443825.8	3695493.4	NNE	17761.4	22.29	Field, I-1		
C-Area	448711.8	3695363.2	NE	20047.6	35.44	Building, J-1		
C-Area	456151.3	3685518.7	ENE	20209.4	71.13	Building, L-4		
C-Area	453892.2	3679168.6	E	16904.4	89.42	Building, K-6		
C-Area	452523.4	3670132.1	ESE	17938.5	119.65	Field, K-9		
C-Area	446387.1	3665644.7	SE	16413.8	144.72	Field, I-11		
C-Area	443219.5	3664963.6	SSE	15449.8	155.86	Field, H-11		
C-Area	434920.2	3664141.2	S	15102.0	187.52	Building, E-11		
C-Area	429505.9	3667892.4	SSW	13476.5	213.37	Building, D-10		
C-Area	427484.4	3670599.8	SW	12751.0	227.84	Building, C-9		
C-Area	425727.6	3672145.0	WSW	13235.7	237.94	Field, B-8		
C-Area	426668.1	3680933.5	W	10481.4	279.72	Field, B-6		
C-Area	427531.0	3682786.1	WNW	10149.6	290.94	Field, C-5		
C-Area	427092.0	3685717.5	NW	11904.2	303.42	Field, C-4		
C-Area	430903.6	3690240.3	NNW	12692.7	331.01	Field, D-2?		
C-Area	442747.0	3694451.1	NNE	16394.9	20.22	Conference, H-1		
Center	439050.1	3695529.9	N	15813.3	352.94	Building, H-1	16.1	15.813
Center	444021.6	3695503.8	NNE	15987.4	10.92	Field, H-1	16.26	15.987
Center	454548.1	3690334.9	NE	17228.2	52.06	Building, L-2	17.55	17.228
Center	456152.0	3685519.0	ENE	16282.9	69.18	Building, L-4	16.58	16.283
Center	453892.4	3679167.4	E	13011.8	92.55	Building, K-6	13.2	13.012
Center	455392.4	3675142.9	ESE	15232.6	107.55	Field, L-7	15.3	15.233
Center	452518.8	3670135.0	SE	15131.2	129.47	Field, K-9	15.3	15.131
Center	448362.0	3666785.9	SSE	15024.5	149.86	Field, J-10	15.3	15.024
Center	443328.6	3664990.1	S	15032.5	170.34	Field, H-11	15.13	15.032
Center	434920.5	3664141.1	SSW	16783.9	200.51	Building, E-11	17.23	16.784
Center	428567.9	3669311.4	SW	16203.2	229.20	Building, C-9	16.42	16.203
Center	425728.1	3672142.5	WSW	17003.5	242.79	Field, B-8	17.23	17.004

Center	427323.7	3682521.1 W	13838.7	280.89 Field, C-5	14.17	13.839
Center	427531.4	3682787.1 WNW	13690.1	282.15 Field, C-5	13.85	13.69
Center	430904.2	3690240.2 NW	14434.0	315.84 Field, D-2	14.65	14.434
Center	437408.4	3694446.0 NNW	15031.7	346.23 Building, photo number	15.3	15.032
Center	442747.0	3694450.2 N	14741.9	6.86 Conference, H-1		
D-Area	428321.2	3688577.4 N	14867.9	348.57 Building, C-3	9.52	14.868
D-Area	436279.4	3694588.7 NNE	21223.9	13.55 Field, photo number	16.92	21.224
D-Area	446623.9	3696213.4 NE	27065.9	34.44 Building, photo number	23.87	27.066
D-Area	453892.8	3679167.0 ENE	23296.9	76.80 Building, K-6	24.3	23.297
D-Area	452522.9	3670132.6 E	21688.9	99.89 Field, K-9	18.63	21.689
D-Area	445173.9	3664688.5 ESE	16802.0	123.25 Field, I-11	14.87	16.802
D-Area	443192.4	3664951.1 SE	15032.0	126.60 Field, H-11	10.38	15.032
D-Area	434920.9	3664140.4 SSE	10533.3	158.84 Building, E-11	6.97	10.533
D-Area	430269.9	3666714.2 S	7329.1	186.78 Building, D-10	5.34	7.329
D-Area	428567.9	3669311.5 SSW	5355.0	208.84 Building, C-9	3.39	5.355
D-Area	427480.7	3670627.8 SW	4996.1	227.41 Building, C-9	2.79	4.996
D-Area	425692.2	3672131.6 WSW	5792.0	250.97 Field, B-8?	1.66	5.792
D-Area	424791.7	3673822.5 W	6389.6	268.18 Field, B-8	1.66	6.389
D-Area	423726.5	3676322.2 WNW	7810.0	287.05 Field, A-7	2.64	7.81
D-Area	425582.7	3679953.2 NW	8180.4	316.48 Field, B-6	3.76	8.18
D-Area	426652.3	3680933.1 NNW	8291.3	326.56 Field, B-6	8.01	8.291
D-Area	442747.2	3694450.2 NNE	23506.9	29.13 Conference, H-1		
E-Area	437408.8	3694446.9 N	11478.1	353.86 Building, Photo Number		
E-Area	443831.3	3695495.3 NNE	13534.2	22.55 Field, H-1		
E-Area	447651.7	3695705.4 NE	15597.6	35.28 Field, I-1		
E-Area	454549.3	3690334.8 ENE	17574.6	65.08 Building, L-2		
E-Area	456151.3	3685518.0 E	17761.0	81.59 Building, L-4		
E-Area	453892.7	3679165.8 ESE	15805.7	103.79 Building, K-6		
E-Area	452522.3	3670132.0 SE	19001.8	132.39 Field, K-9		
E-Area	443210.4	3664964.8 SSE	18650.1	165.23 Field, H-11		
E-Area	434920.5	3664140.5 S	19235.3	190.57 Building, E-11		
E-Area	429504.4	3667895.7 SSW	17637.3	210.57 Building, C-10		
E-Area	424797.9	3673817.9 SW	16564.1	235.87 Field, B-8		
E-Area	425605.4	3679970.2 WSW	13316.1	256.38 Field, B-6		
E-Area	427678.7	3684345.6 W	10966.7	276.55 Field, C-4		
E-Area	428834.7	3689261.2 WNW	11556.7	302.29 Field, C-3		
E-Area	430906.0	3690245.9 NW	10525.3	312.95 Field, D-2		
E-Area	433535.4	3692817.8 NNW	11007.3	332.46 Field, E-2		
E-Area	442747.0	3694450.8 NNE	12164.7	19.75 Conference, H-1		
F-Area	434974.0	3693786.6 N	10933.3	348.80 Field, Photo Number	10.29	10.933
F-Area	443830.3	3695492.1 NNE	14179.7	28.30 Field, H-1	11.35	14.18
F-Area	446619.5	3696218.1 NE	16290.0	35.71 Building, Photo Number	14	16.29
F-Area	454549.1	3690336.1 ENE	18973.0	67.06 Building, L-2	17.49	18.973
F-Area	456151.9	3685519.0 E	19279.4	82.29 Building, L-4	18.8	19.279
F-Area	453892.8	3679166.4 ESE	17302.5	102.62 Building, K-6	18.8	17.302
F-Area	448364.8	3666788.1 SE	19820.4	144.77 Field, J-10	18.98	19.82
F-Area	443212.1	3664960.6 SSE	19114.8	160.78 Field, H-11	18.96	19.115
F-Area	434921.0	3664140.2 S	19025.9	186.02 Building, E-11	16.93	19.026
F-Area	428567.3	3669312.0 SSW	16135.0	211.29 Building, C-9	11.85	16.135
F-Area	424793.0	3673820.2 SW	15327.9	232.63 Field, B-8	11.49	15.328
F-Area	427016.3	3680970.7 WSW	10228.5	257.93 Field, C-6	9.39	10.228
F-Area	427678.8	3684344.0 W	9441.9	277.54 Field, C-4	9.39	9.442
F-Area	427227.9	3685002.6 WNW	9996.4	280.92 Field, C-4	9.4	9.996
F-Area	430904.7	3690242.9 NW	9449.6	319.23 Field, D-2	9.43	9.45
F-Area	431510.1	3691323.4 NNW	9947.8	325.94 Field, E-2	9.43	9.948
F-Area	442746.8	3694450.4 NNE	12754.0	26.27 Conference, H-1		
H-Area	439049.6	3695529.0 N	12379.7	353.17 Building, Photo Number	11.54	12.38
H-Area	443830.6	3695492.9 NNE	12722.6	15.07 Field, H-1	12.59	12.723
H-Area	448711.5	3695363.3 NE	14681.8	33.91 Building, J-1	13.08	14.682
H-Area	454549.0	3690335.9 ENE	15791.7	62.90 Building, L-2	15.35	15.792
H-Area	456152.7	3685517.2 E	15871.5	81.36 Building, L-4	15.47	15.872
H-Area	453893.2	3679166.6 ESE	14046.2	106.46 Building, K-6	15.52	14.046
H-Area	452524.0	3670131.9 SE	17814.8	136.97 Field, K-9	16.44	17.815
H-Area	450086.1	3667934.0 SSE	18078.4	147.43 Field, J-10	17.71	18.078

H-Area	443321.0	3664987.8 S	18465.6	170.70 Field, H-11	17.85	18.466
H-Area	430270.6	3666714.0 SSW	19398.2	211.29 Building, D-10	16.67	19.398
H-Area	427480.3	3670628.3 SW	18080.4	225.47 Building, C-9	14.34	18.08
H-Area	425606.7	3679968.9 WSW	15194.2	257.26 Field, B-6	12.81	15.194
H-Area	427678.8	3684344.0 W	12817.0	274.64 Field, C-4	12.79	12.817
H-Area	430108.5	3689975.5 WNW	12345.5	302.78 Field, D-3	11.83	12.345
H-Area	433535.4	3692817.3 NW	11820.2	323.87 Field, E-2	11.74	11.82
H-Area	437408.9	3694447.3 NNW	11623.0	344.50 Building, F-1	11.54	11.623
H-Area	442747.2	3694450.5 NNE	11455.4	11.23 Conference, H-1		
K-Area	434671.0	3693514.0 N	19026.9	349.40 Field, Photo Number	17.9	19.027
K-Area	443825.5	3695493.2 NNE	21491.3	15.22 Field, H-1	20.57	21.491
K-Area	454548.6	3690335.3 NE	22663.2	46.34 Building, L-2	19.36	22.663
K-Area	453893.4	3679167.7 ENE	16430.6	74.20 Building, K-6	17.1	16.431
K-Area	455393.9	3675145.2 E	17341.0	88.48 Field, L-7	14.78	17.341
K-Area	450086.1	3667933.0 ESE	13847.0	119.34 Field, J-10	11.64	13.847
K-Area	445969.7	3665469.5 SE	12227.1	139.32 Field, I-11	10.76	12.227
K-Area	443202.7	3664958.5 SSE	11097.6	152.02 Field, H-11?	10.76	11.098
K-Area	439284.3	3661446.1 S	13401.0	174.39 Field, G-12	10.95	13.401
K-Area	434920.3	3664140.7 SSW	11102.1	196.06 Building, E-11	10.58	11.102
K-Area	429505.2	3667893.7 SW	10986.1	230.76 Building, C-10	10.58	10.986
K-Area	428567.8	3669311.8 WSW	10957.0	239.65 Building, C-9	8.86	10.957
K-Area	424795.8	3673819.6 W	13296.2	265.46 Field, B-8	8.86	13.296
K-Area	426607.9	3680760.6 WNW	12911.7	297.19 Field, Photo Number	9.64	12.912
K-Area	427458.6	3682680.3 NW	13212.2	306.32 Field, C-5	12.42	13.212
K-Area	430905.0	3690240.5 NNW	17024.7	334.81 Field, D-2	15.81	17.025
K-Area	442747.2	3694450.3 NNE	20211.5	13.07 Conference, H-1		
L-Area	443841.3	3695490.3 N	21068.8	4.87 Field, H-1	20.34	21.069
L-Area	453653.4	3692375.4 NNE	21372.1	32.93 Building, K-2	19.92	21.372
L-Area	456641.2	3684642.5 NE	17867.6	55.10 Building, L-4	15.27	17.868
L-Area	453893.6	3679167.5 ENE	12843.2	68.38 Building, K-6	13.42	12.843
L-Area	455392.7	3675145.9 E	13482.5	86.94 Field, Photo Number	11.42	13.482
L-Area	452020.7	3669242.9 ESE	11386.4	117.20 Building, K-9	10.25	11.386
L-Area	448364.4	3666787.8 SE	10053.8	139.82 Field, J-10	9.16	10.054
L-Area	443992.4	3664820.6 SSE	9906.3	167.61 Building, H-11	9.16	9.906
L-Area	443323.1	3664990.4 S	9620.5	171.29 Field, H-11	9.5	9.62
L-Area	434844.4	3663641.9 SSW	12970.3	212.74 Field, E-11	12.09	12.97
L-Area	434921.4	3664140.0 SW	12512.6	213.69 Building, E-11	12.09	12.513
L-Area	429502.4	3667895.0 WSW	14073.7	241.62 Building, C-10	12.5	14.074
L-Area	425721.2	3672137.3 W	16376.6	261.32 Field, B-8	12.5	16.377
L-Area	426984.7	3681382.2 WNW	16445.7	294.35 Field, C-5	13.24	16.446
L-Area	427648.8	3684101.1 NW	17199.6	303.55 Field, C-4	15.77	17.2
L-Area	431264.9	3690883.4 NNW	19538.9	326.58 Field, D-2	19.18	19.539
L-Area	442747.0	3694450.6 N	19958.7	2.01 Conference, H-1		
M-Area	431261.0	3690881.0 N	1932.4	-0.19 Field, D-2	1.8	1.932
M-Area	431924.3	3692272.0 NNE	3390.1	11.03 Field, E-2	1.93	3.39
M-Area	434146.5	3693270.9 NE	5200.0	33.43 Field, Photo Number	3.59	5.2
M-Area	443830.4	3695492.6 ENE	14175.7	62.16 Field, H-1	7.98	14.176
M-Area	453653.6	3692373.9 E	22658.5	80.96 Building, K-2	18.56	22.658
M-Area	453894.4	3679167.6 ESE	24661.4	113.02 Building, K-6	24.73	24.661
M-Area	448364.1	3666786.8 SE	27997.3	141.98 Field, J-10	26.64	27.997
M-Area	443209.5	3664961.9 SSE	26800.4	153.16 Field, H-11	22.14	26.8
M-Area	427401.6	3669539.1 S	19788.4	190.88 Building, C-9	13.48	19.788
M-Area	427329.4	3683060.7 SSW	7076.9	213.35 Field, C-5	5.64	7.077
M-Area	427256.6	3686266.3 SW	4815.2	235.80 Field, C-4	3.89	4.815
M-Area	428180.8	3688329.3 WSW	3136.5	258.26 Field, C-3	2.59	3.136
M-Area	428836.7	3689267.4 W	2439.8	277.16 Field, C-3	2.15	2.44
M-Area	429236.1	3689828.3 WNW	2202.8	293.19 Building, C-3	1.49	2.203
M-Area	430098.8	3689961.5 NW	1537.6	310.86 Field, D-3	1.47	1.538
M-Area	430904.8	3690244.1 NNW	1342.2	344.50 Field, D-2	1.3	1.342
M-Area	442747.1	3694450.4 ENE	12740.7	64.07 Conference, H-1		
N-Area	437408.4	3694446.6 N	15187.7	355.02 Building, Photo Number		
N-Area	443824.4	3695493.2 NNE	16996.4	17.43 Field, H-1		
N-Area	449869.0	3695043.5 NE	19333.9	35.18 Field, J-1		
N-Area	456151.1	3685517.8 ENE	18584.4	70.13 Building, L-4		

N-Area	453893.6	3679166.6 E	15259.5	90.18 Building, K-6		
N-Area	452521.4	3670133.2 ESE	16644.0	123.10 Field, K-9		
N-Area	448362.5	3666788.3 SE	15855.1	141.80 Field, J-10		
N-Area	443230.6	3664968.3 SSE	15058.6	161.88 Field, H-11		
N-Area	439286.0	3661446.4 S	17874.0	177.56 Field, G-12		
N-Area	430270.1	3666713.8 SSW	15119.3	213.24 Building, D-10		
N-Area	427480.0	3670627.9 SW	14134.4	231.76 Building, C-9		
N-Area	425708.4	3672130.1 WSW	14785.8	240.61 Field, B-8		
N-Area	426986.1	3681385.0 W	11832.2	279.76 Field, C-5		
N-Area	427532.1	3682784.4 WNW	11634.0	287.03 Field, C-5		
N-Area	430903.6	3690239.5 NW	13388.7	324.38 Field, Photo Number		
N-Area	431263.9	3690884.5 NNW	13723.4	327.16 Field, Photo Number		
N-Area	442747.0	3694450.3 NNE	15690.3	14.84 Conference, H-1		
P-Area	448712.0	3695363.1 N	19021.0	8.35 Building, J-1	17.88	19.021
P-Area	454682.5	3690111.1 NNE	16182.4	32.79 Field, L-2	14.52	16.182
P-Area	456640.6	3684642.5 NE	13492.6	52.85 Building, L-4	11.04	13.493
P-Area	453892.9	3679167.1 ENE	8467.8	71.72 Building, K-6	9.71	8.468
P-Area	455395.0	3675149.8 E	9662.4	98.05 Field, L-7	9.59	9.662
P-Area	455482.7	3674592.1 ESE	9845.3	101.18 Field, L-8	9.21	9.845
P-Area	452516.5	3670136.1 SE	9268.3	133.53 Field, K-9	9.21	9.268
P-Area	450085.3	3667933.4 SSE	9616.9	153.43 Field, J-10	9.47	9.617
P-Area	446386.7	3665646.5 S	10928.0	176.76 Field, I-11	9.87	10.928
P-Area	443379.9	3664990.8 SSW	11827.8	191.64 Field, H-11	10.42	11.828
P-Area	434921.4	3664140.4 SW	16534.6	220.96 Building, E-11	15.68	16.535
P-Area	430270.2	3666713.6 WSW	18419.2	237.33 Building, D-10	16.68	18.419
P-Area	425607.1	3679969.5 W	20514.3	279.22 Field, B-6	16.68	20.514
P-Area	426984.8	3681384.1 WNW	19458.6	284.00 Field, C-6	18.8	19.459
P-Area	430904.5	3690241.7 NW	20251.5	312.15 Field, D-2	19.67	20.251
P-Area	437408.8	3694446.7 NNW	19772.0	334.42 Building, Photo Number	18.72	19.772
P-Area	442747.6	3694450.6 N	18154.6	349.85 Conference, H-1		
SZ-Area	439049.8	3695528.7 N	11794.9	353.71 Building, Photo Number		
SZ-Area	443840.2	3695489.1 NNE	12224.7	16.63 Field, H-1		
SZ-Area	448711.5	3695363.5 NE	14318.9	35.77 Building, J-1		
SZ-Area	454548.5	3690334.3 ENE	15703.2	65.05 Building, L-2		
SZ-Area	456151.3	3685518.2 E	15973.7	83.46 Building, L-4		
SZ-Area	453894.5	3679166.9 ESE	14389.2	108.42 Building, K-6		
SZ-Area	452521.0	3670133.8 SE	18351.0	137.77 Field, K-9		
SZ-Area	450086.5	3667932.6 SSE	18655.7	147.90 Field, J-10		
SZ-Area	443324.5	3664989.2 S	19054.2	170.43 Field, H-11		
SZ-Area	430270.1	3666714.0 SSW	19795.0	209.99 Building, D-10		
SZ-Area	427479.9	3670627.8 SW	18358.5	223.81 Building, C-9		
SZ-Area	426674.6	3680939.3 WSW	13893.2	257.78 Field, B-6		
SZ-Area	427679.1	3684345.2 W	12603.4	272.14 Field, C-4		
SZ-Area	433534.2	3692818.0 NW	11258.6	322.90 Field, E-2		
SZ-Area	437409.0	3694446.5 NNW	11027.2	344.61 Building, F-1		
SZ-Area	430273.7	3690117.9 WNW	11827.5	301.95 Field, D-2		
SZ-Area	442747.0	3694450.3 N	10937.2	12.74 Conference, H-1		
T-Area	427449.8	3683846.1 N	9116.7	348.48 Field, C-4		
T-Area	433536.2	3692818.4 NNE	18429.7	13.21 Field, Photo Number		
T-Area	443831.1	3695496.8 NE	25253.4	35.01 Field, H-1		
T-Area	456150.5	3685517.7 ENE	28950.8	68.14 Building, L-4		
T-Area	453893.2	3679167.5 E	25042.9	79.84 Building, K-6		
T-Area	444648.2	3664710.0 ESE	18493.9	123.09 Building, H-11		
T-Area	439286.0	3661444.5 SE	16807.9	142.84 Field, G-12		
T-Area	431843.9	3664758.9 SSE	10478.0	165.13 Field, D-11		
T-Area	428567.7	3669312.1 S	5627.5	186.27 Building, C-9		
T-Area	427480.2	3670627.8 SSW	4613.4	201.75 Building, C-9		
T-Area	425726.6	3672140.5 SW	4450.1	231.29 Field, B-8		
T-Area	424795.2	3673821.0 WSW	4551.3	255.91 Field, B-8		
T-Area	424489.5	3673981.0 W	4815.7	258.62 Field, B-8		
T-Area	423727.5	3676322.9 WNW	5669.7	284.16 Field, A-7		
T-Area	425592.6	3679958.5 NW	6220.7	324.02 Field, B-6		
T-Area	426595.1	3680733.9 NNW	6393.7	335.45 Field, B-6		
T-Area	442747.0	3694450.2 NE	23774.2	34.34 Conference, H-1

- Apt_dist.shp
- Apt_sec.shp
- Areas.shp
- Lakes.shp
- ≡ Mstreams.shp
- ≡ Mroads.shp
- Srsbnd

APT NESHAPS Points **-draft-9/13/99-EGIS**

C-Area NESHAPS Points -draft-9/13/99-EGIS

- Center_dist.shp
- Center_sec.shp
- Areas.shp
- Lakes.shp
- ≡ Mstreams.shp
- ≡ Mroads.shp
- Srsbnd

Center of SRS NESHAPS Points -draft-9/13/99-EGIS

- D-area_dist.shp
- D-area_sec.shp
- Srscenter
- Areas.shp
- Lakes.shp
- ≡ Mstreams.shp
- ≡ Mroads.shp
- Srsbnd

D-Area NESHAPS Points **-draft-9/13/99-EGIS**

- E-area_dist.shp
- E-area_sec.shp
- Areas.shp
- Lakes.shp
- ≡ Mstreams.shp
- ≡ Mroads.shp
- Srsbnd

E-Area NESHAPS Points -draft-9/13/99-EGIS

- F-area_dist.shp
- F-area_sec.shp
- Areas.shp
- Lakes.shp
- ▲ Mstreams.shp
- ▲ Mroads.shp
- Srsbnd

F-Area NESHAPS Points -draft-9/13/99-EGIS

- M-area_dist.shp
- M-area_sec.shp
- Areas.shp
- Lakes.shp
- ▲ Mstreams.shp
- ▲ Mroads.shp
- Srsbnd

M-Area NESHAPS Points **-draft-9/13/99-EGIS**

- N-area_dist.shp
- N-area_sec.shp
- Areas.shp
- Lakes.shp
- ≡ Mstreams.shp
- ≡ Mroads.shp
- Srsbnd

N-Area NESHAPS Points -draft-9/13/99-EGIS

- P-area_dist.shp
- P-area_sec.shp
- Areas.shp
- Lakes.shp
- ∩ Mstreams.shp
- ∩ Mroads.shp
- Srsbnd

P-Area NESHAPS Points -draft-9/13/99-EGIS

- Sz-area_dist.shp
- Sz-area_sec.shp
- Areas.shp
- Lakes.shp
- ▲ Mstreams.shp
- ▲ Mroads.shp
- Srsbnd

SZ-Area NESHAPS Points -draft-9/13/99-EGIS

APPENDIX B. Offsite MEI Locations for 1990

Table B1. Distance to Nearest Residence, School, Business, or Farm from 1990 Study (Bold shows worst sector)

Sector	A-Area	APT	C-Area	Center	D-Area	E-Area	F-Area	H-Area	K-Area	L-Area	M-Area	P-Area	S/Z-Area	T-Area
N	1,960	9,350	15,540	16,100	15,080	11,050	11,310	12,370	19,460	20,970	1,980	19,010	10,970	12,340
NNE	4,230	10,600	18,130	16,260	20,970	13,790	14,180	12,820	21,420	21,720	4,300	16,140	11,430	21,030
NE	6,940	11,460	18,440	17,550	27,760	16,690	17,500	14,930	22,320	17,800	7,160	13,580	14,170	28,190
ENE	14,190	12,370	17,980	16,580	22,930	17,830	18,700	15,540	16,140	12,670	14,480	8,450	15,240	25,290
E	22,340	13,270	16,910	13,200	23,980	18,060	19,010	15,540	17,200	13,580	22,860	9,650	16,000	24,080
ESE	24,300	12,970	18,060	15,300	17,050	16,080	17,040	13,730	13,730	11,610	24,680	10,260	14,630	19,500
SE	27,920	15,990	16,300	15,300	14,930	19,280	19,760	17,500	12,140	10,560	28,190	9,350	18,890	17,370
SSE	26,710	19,310	15,540	15,300	11,920	18,890	19,010	17,650	11,010	9,960	26,820	9,500	19,500	11,120
S	20,210	20,670	16,760	15,130	9,800	21,180	19,310	18,180	13,420	9,650	20,270	10,860	20,110	5,940
SSW	7,240	23,230	15,240	17,230	5,730	17,140	16,290	20,270	11,540	14,030	7,160	11,770	21,640	6,550
SW	5,430	22,020	13,100	16,420	7,390	16,380	15,230	18,340	11,920	13,430	5,330	17,500	19,660	5,030
WSW	3,470	15,690	13,180	17,230	6,640	13,260	11,920	15,290	10,860	14,180	3,350	18,400	13,710	4,270
W	2,560	15,080	11,580	14,170	6,490	10,820	9,500	13,190	13,120	16,890	2,440	20,360	12,950	6,250
WNW	2,260	12,520	10,210	13,850	8,450	11,430	10,110	12,520	12,820	16,140	2,130	19,160	10,970	5,940
NW	1,660	10,260	12,340	14,650	8,300	10,360	9,350	12,070	13,120	18,550	1,520	20,060	10,970	6,400
NNW	1,360	9,960	12,880	15,300	8,450	11,660	10,260	11,770	16,890	19,910	1,370	19,760	10,360	6,860

**MAXIMALLY EXPOSED OFFSITE INDIVIDUAL LOCATION DETERMINATION
FOR NESHAPS COMPLIANCE**

DISTRIBUTION (12)

S. Wood, 773-A

D. B. Moore-Shedrow, 773-A

J.B. Gladden, 773-42A

G.T. Jannik, 773-42A

A. A. Simpkins, 773-42A

G. Whitney, 703-A

SRTC Records(4), 773-52A

ED Records(3), 773-42A