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February 1996

Volume 2

FINAL ENVIRONMENTAL IMPACT STATEMENT

on a

Policy Concerning Foreign Research Reactor

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Appendix A
Environmental Justice Analysis

A.1 Introduction

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,* directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Executive Order 12898 also directs the Administrator of the Environmental Protection Agency to convene an interagency Federal Working Group on Environmental Justice. The Working Group is directed to provide guidance to Federal agencies on criteria for identifying disproportionately high and adverse human health or environmental effects on minority and low-income populations. The Working Group has not yet issued the guidance directed by Executive Order 12898, although it has developed working draft definitions. The definitions used in this analysis are based on the draft working definitions. Further, in coordination with the Working Group, DOE is in the process of developing internal guidance on implementing the Executive Order. Because both the Working Group and DOE are still in the process of developing guidance, the approach taken in this analysis may depart somewhat from whatever guidance is eventually issued.

This appendix addresses environmental justice for the acceptance of foreign research reactor spent nuclear fuel containing uranium enriched in the United States. Analyses of environmental justice concerns are provided in three areas: (1) potential ports of entry, (2) potential transportation routes from candidate ports of entry to interim management sites, and (3) areas surrounding potential interim management sites. These analyses lead to the conclusion that the alternatives analyzed in this Environmental Impact Statement (EIS) would result in no disproportionately high and adverse effects on minority populations or low-income communities surrounding the candidate ports, transport routes, or interim management sites.

A.2 Concerns and Definitions

Public comments show a widespread concern for public health and safety because spent nuclear fuel is radioactive. Two related environmental documents (DOE, 1995 and DOE, 1994) have been published recently which address the safety and potential health issues due to transportation and storage of spent nuclear fuel. Analyses of radiological health effects in those documents as well as this EIS (see Chapter 4) demonstrate that the expected health effects are small. In the case of spent nuclear fuel from foreign research reactors, no fatalities are expected due to radiological exposure or traffic accidents. No significant health effects are expected for the general population. Consequently, there would be no disproportionately high or adverse human health effects imposed on any population segment. In the sections below, minority and low-income populations are identified in the areas near potential candidate ports of entry, potential interim management sites, and potential transportation routes. The 1990 census data were used in this appendix as the basis of the analysis (DOC, 1992). This allows equal comparison of data between ports, sites, and routes in different states.

The analysis uses the following draft definitions:

- *Minority* — Individuals classified by the U.S. Bureau of the Census as Negro/Black/African American, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, and other non-White persons. The minority population in an affected area is the number of individuals residing in the area who are members of a minority group.

- *Low-Income Community* — An area for which the median household income is 80 percent or below the median household income for the metropolitan statistical area (urban) or county (rural). While "80 percent" is used in this analysis based on definitions used by the U.S. Department of Housing and Urban Development, this percentage may change in the final guidelines under preparation by the Working Group and the Department of Energy.

- *Disproportionately High and Adverse Human Health Effects* — Any human health effects, including cumulative or synergistic effects, on minority or low-income populations which substantially exceed generally accepted levels of risk. This is a draft definition prepared by the Working Group which might change during preparation of the final guidelines.

- *Substantially Affect Human Health* — To impact human health such that there is a measurable incidence of any specific illness, disease, or disorder significantly higher than the national average. This is also a draft definition developed by the Working Group which might change during preparation of final guidelines.

A.3 Environmental Justice in Areas Near the Candidate Ports of Entry

Under normal port activities associated with receipt of the spent nuclear fuel shipments — including harbor activities, unloading the ship, transfer of the spent nuclear fuel casks to truck or train, and movement out of the port city — the dominant radiological impacts were shown in Section 4.2.2 to be the exposures received by the workers in the immediate vicinity of the shipping cask. These individuals include inspectors, shipping cask handlers, and truck drivers. Since the intensity of the radiation from the cask falls off with distance, the doses that might be received by other workers and members of the general population can theoretically be calculated, but would not generally be measurable or distinguishable from natural background radiation.

Potential radiological impacts to people residing near the port are associated with low probability (less than one in a million) accidents that are so severe that the spent nuclear fuel casks rupture and a fire would burn long enough around the cask that some of the radioactive material would be released. In this case, some of the radioactive spent nuclear fuel might be vaporized and lifted by the heat of the fire and carried downwind of the accident location. Where and how far this radioactive material would go before being deposited on the ground would depend on how high the heat from the fire lofts it and the particular weather conditions at the time. Most of this vaporized spent nuclear fuel would be expected to be deposited in the first few miles downwind of the fire but small amounts could be carried out for several tens of miles.

Because the particular details of both the accident conditions (such as the severity of the fire) and the weather conditions at the time of an accident could vary widely, a range of accident conditions and wind directions, wind speeds, and other weather conditions were examined during the evaluation of accident effects (see Section 4.2.2.3). Population impact evaluations were performed for distances out to 80 km (50 mi). Risks of latent cancer deaths were found to range from about 0.003 to 0.000003 latent cancer fatalities (LCF). No latent cancer fatalities would be expected due to accidents at ports.

Containerized spent nuclear fuel casks shipped under the proposed policy would be transferred from the ship at commercial or military ports by personnel experienced in handling containerized cargo, and shipped by truck or rail to one of the five candidate interim management sites. Candidate ports may handle thousands of standard containers each month, unloaded from vessels which can carry up to several thousand casks. The number of casks to be handled would be small in comparison to routine cargo handling, thus having a negligible impact on normal port activities.

As part of the environmental justice analysis, distributions of minority populations and low-income households surrounding candidate ports of entry were estimated from 1990 census data. Although radiological health effects resulting from an accident are calculated at distances up to 80 km (50 mi), the largest radiological effects would usually be expected to occur within roughly a 16-km (10-mi) radius of the accident site. Thus, the distribution of minority and low-income populations is described for circular areas defined by a 16-km (10-mi) radius, centered at each candidate port of entry.

A.3.1 Distribution of Minority Populations Near the Candidate Ports

The minority population characteristics within 16 km (10 mi) of candidate ports of entry for foreign research reactor spent nuclear fuel are presented in Table A-1. For comparison, this table lists minority population features for regions surrounding the ports and for counties which lie partially within the 16-km (10-mi) radius centered at the port. Population characteristics shown in the table were extracted from 1990 census data available from the U.S. Bureau of the Census. The data resolves population characteristics at the "block group level," which generally consists of between 250 and 550 housing units.

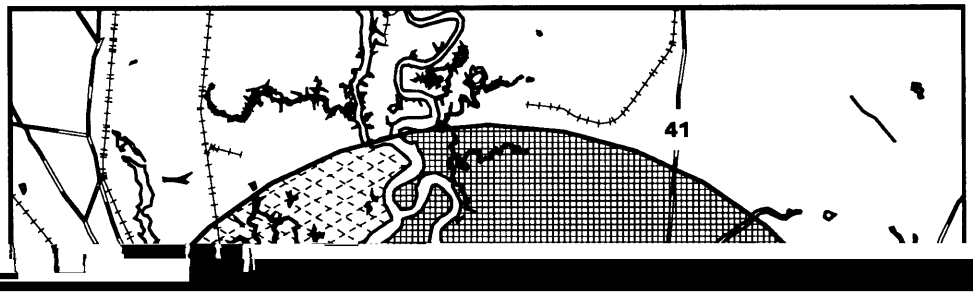
With the exception of the Port of Wilmington and 2 military ports, MOTSU (Military Ocean Terminal, SUnny Point) and NWS (Naval Weapons Station) Concord, the percentage of minority populations residing within 16 km (10 mi) of candidate ports exceeds the percentage of minority populations residing within the state. Similarly, the percentage of minority populations residing near the candidate ports exceeds the percentage of minorities residing in counties surrounding the candidate ports. Ports at MOTSU, NWS Concord, Portsmouth, and Newport News are exceptions with larger percentages of minority populations in the surrounding counties.

The racial and ethnic composition of minority populations residing near the candidate ports is shown in Table A-2. In the case of candidate ports located on the east coast, African Americans compose the largest portion of the minority population. Minority populations residing near the candidate ports on the west coast are comprised of a more uniform mixture of African Americans, Asians, Hispanics, and Native Americans. The minority population residing near the Port of Galveston on the Gulf of Mexico is predominately African American and Hispanic.

The spatial distribution of minority populations residing within 16 km (10 mi) of each of the candidate ports is shown in the maps of those ports as presented in Figures A-1 to A-11. The circle shown in each figure has a 16-km (10-mi) radius, centered on the port. As indicated in the legend of each figure, geographical areas are shaded according to the percentage of minority population within the area. Resolution in the figures is at the census block group level. Due to variations in the populations of block groups, the geographical size of any particular block group area is not necessarily proportional to the numerical population. As an example, for ease of enumeration, the U.S. Bureau of the Census may define block group boundaries which actually extend into oceans, bays, or lakes. This allows inclusion in the census data of individuals who reside on boats or offshore houses, a situation particularly predominant in locations such as Galveston (see Figure A-3).

-o Minority 'opulation 'esiding in urrounding State(s)
31.4
31.4
33.4
24.0
24.0
24.0
26.7
24.9
42.6
9.2
30.3
13.1
24.9

	% White
.43	64.8
'51	64.9
)46	50.4
141	62.6
410	50.8
315	48.5
315	63.1
498	81.3
102	70.9
359	84.6
305	48.2
231	83.3
755	76.3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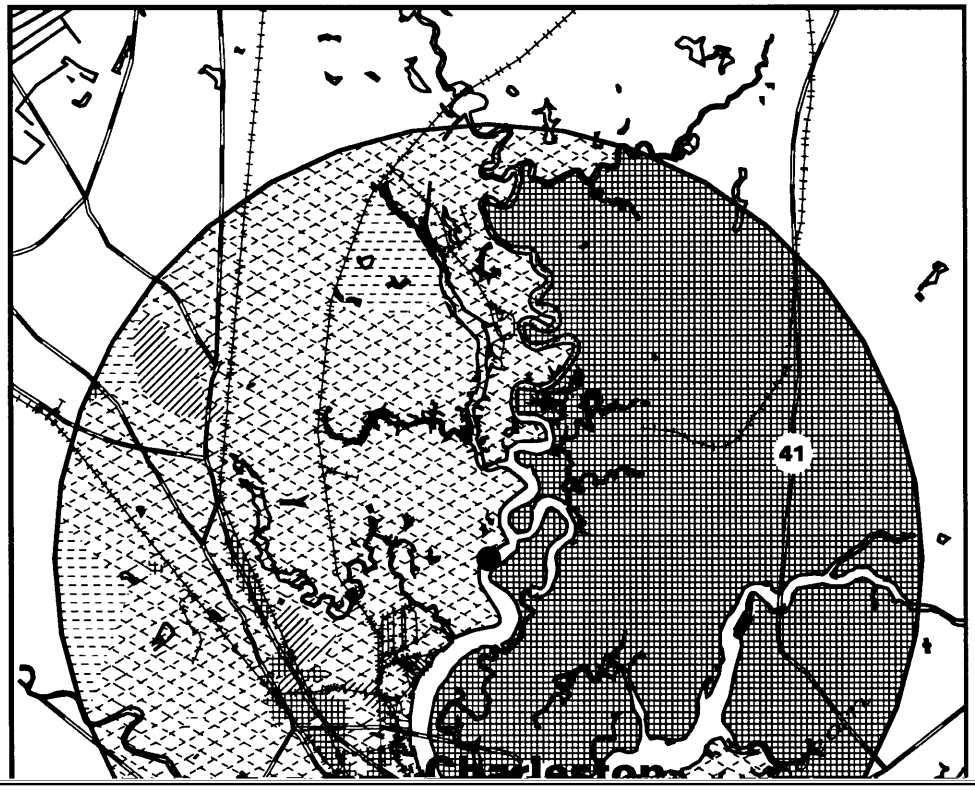
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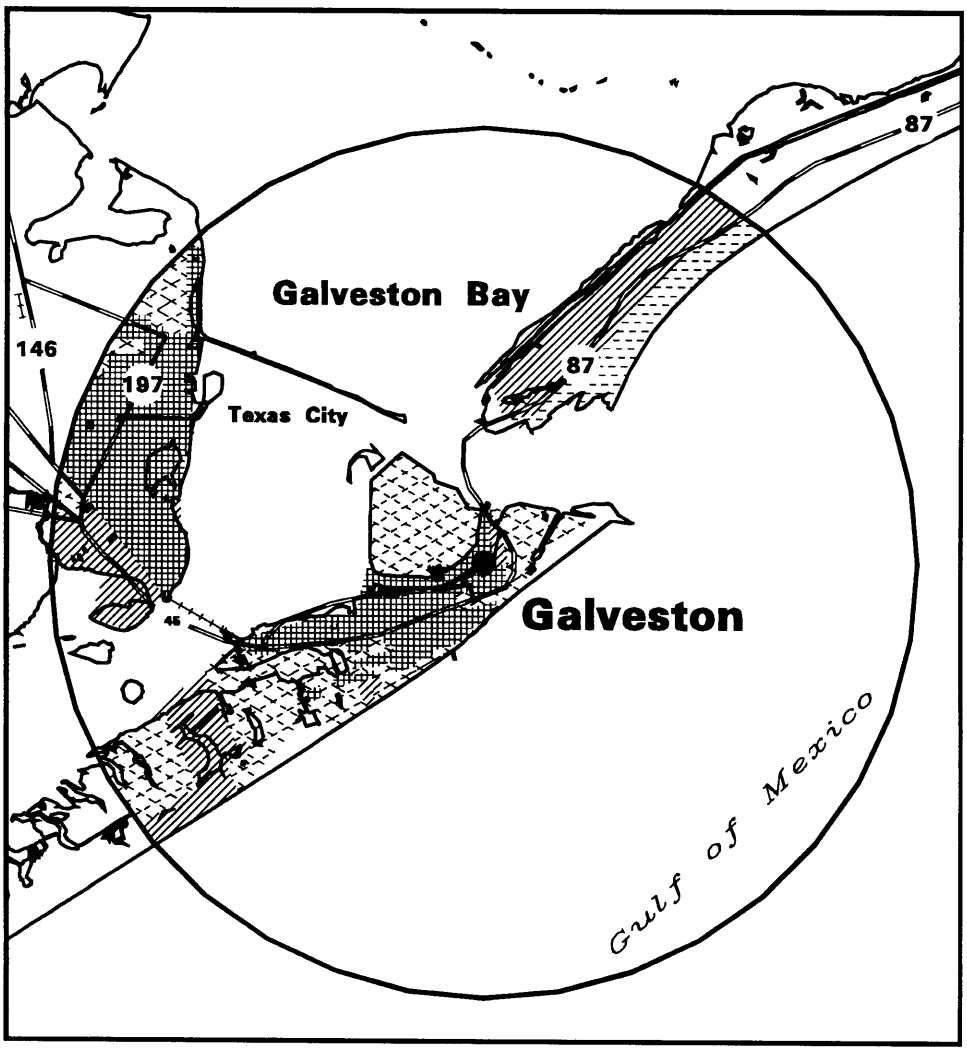


LEGEND

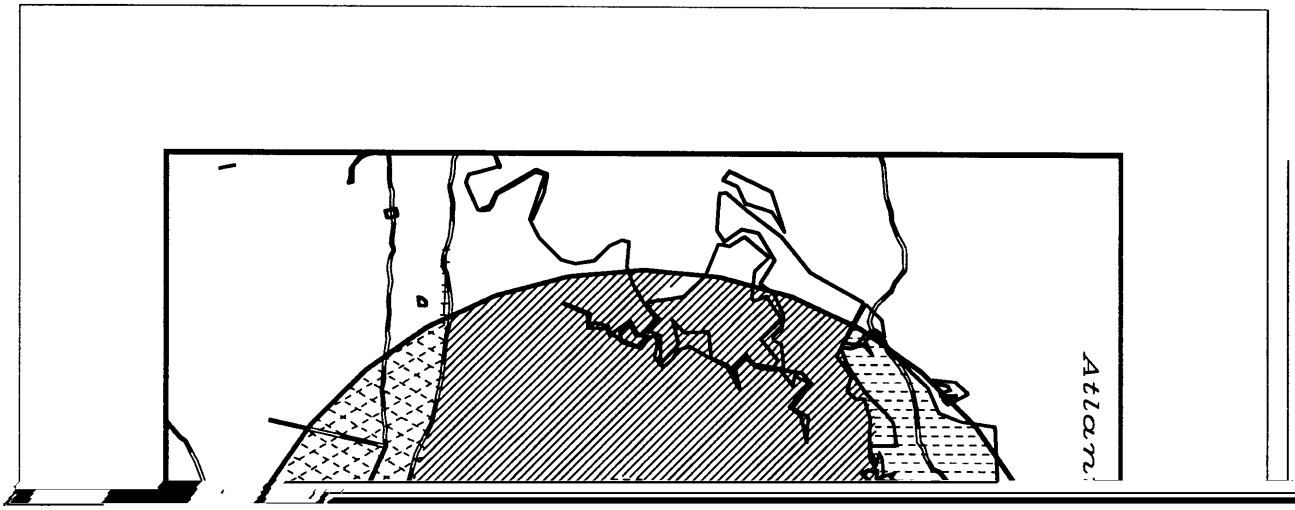
- Terminal
- Surface Water Shoreline
- Rail Lines
- State & US Highways
- P < 1%
- 1% <= P < 10%
- 10% <= P < 50%
- P >= 50%

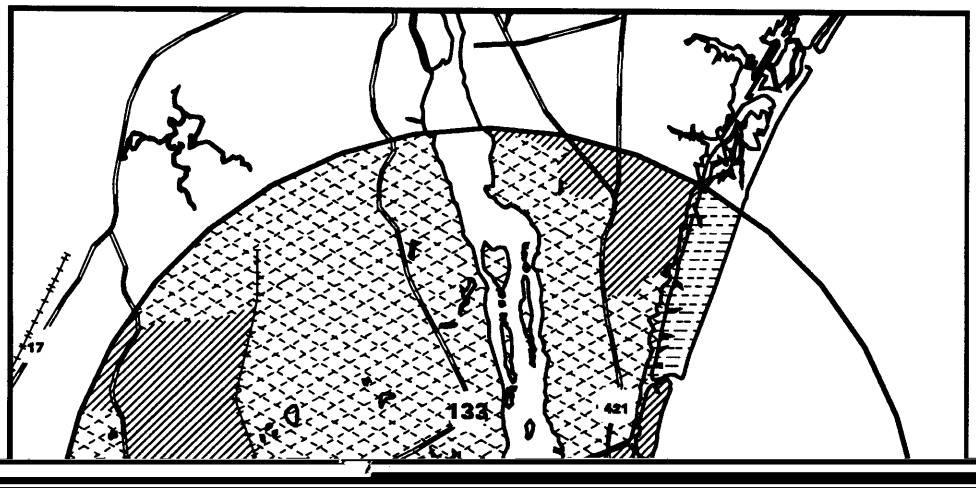
SUMMARY STATISTICS	
WITHIN 16 KM (10 Miles) RADIUS OF THE PORT	
TOTAL POPULATION	73,322
MINORITY POPULATION	36,375
PERCENTAGE	50%

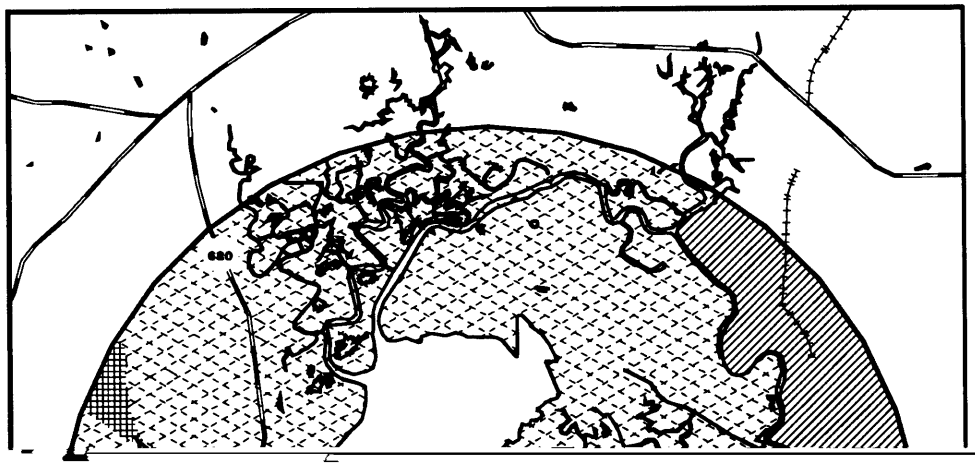
0 1 2 3 4 5 6
miles

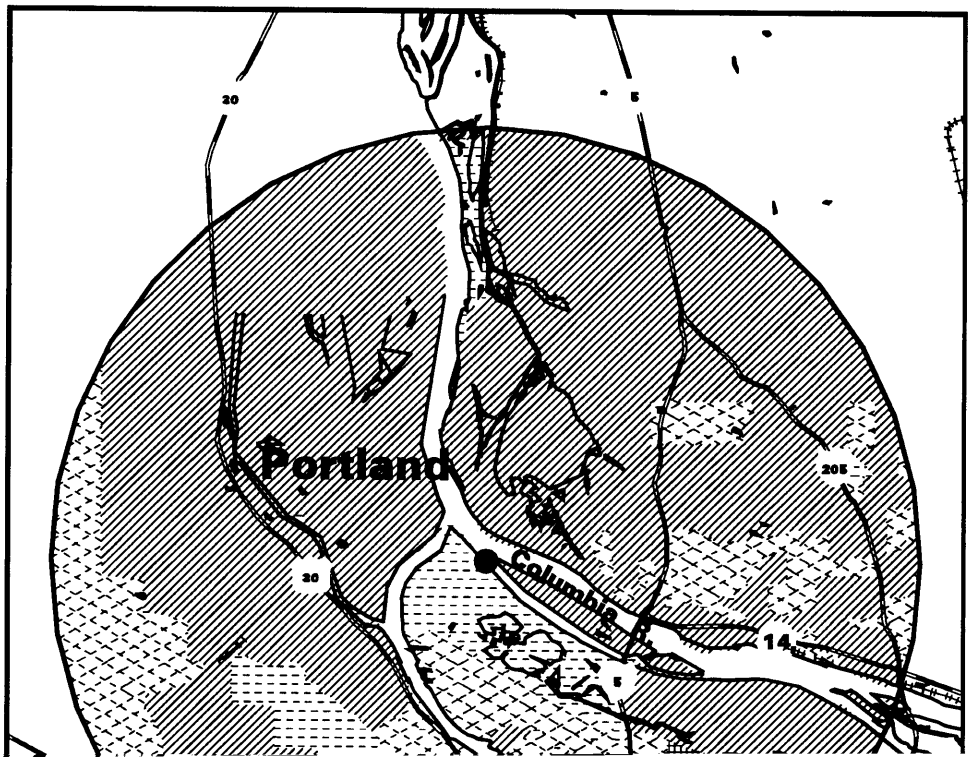
Figure A-3 Distribution of the Minority Population Residing within 16 km of the Port of Galveston, Texas

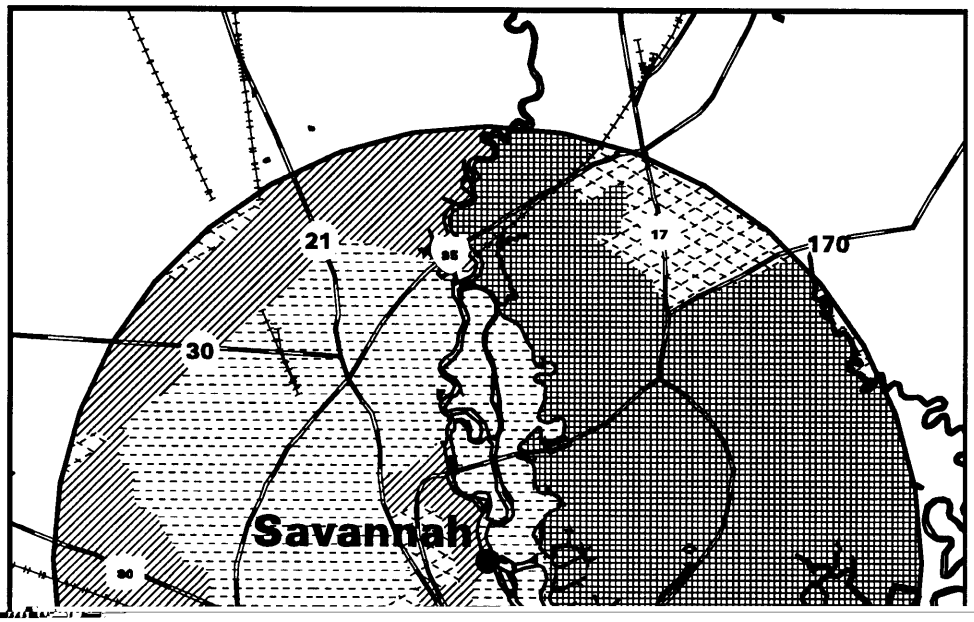
Newport News
Bay

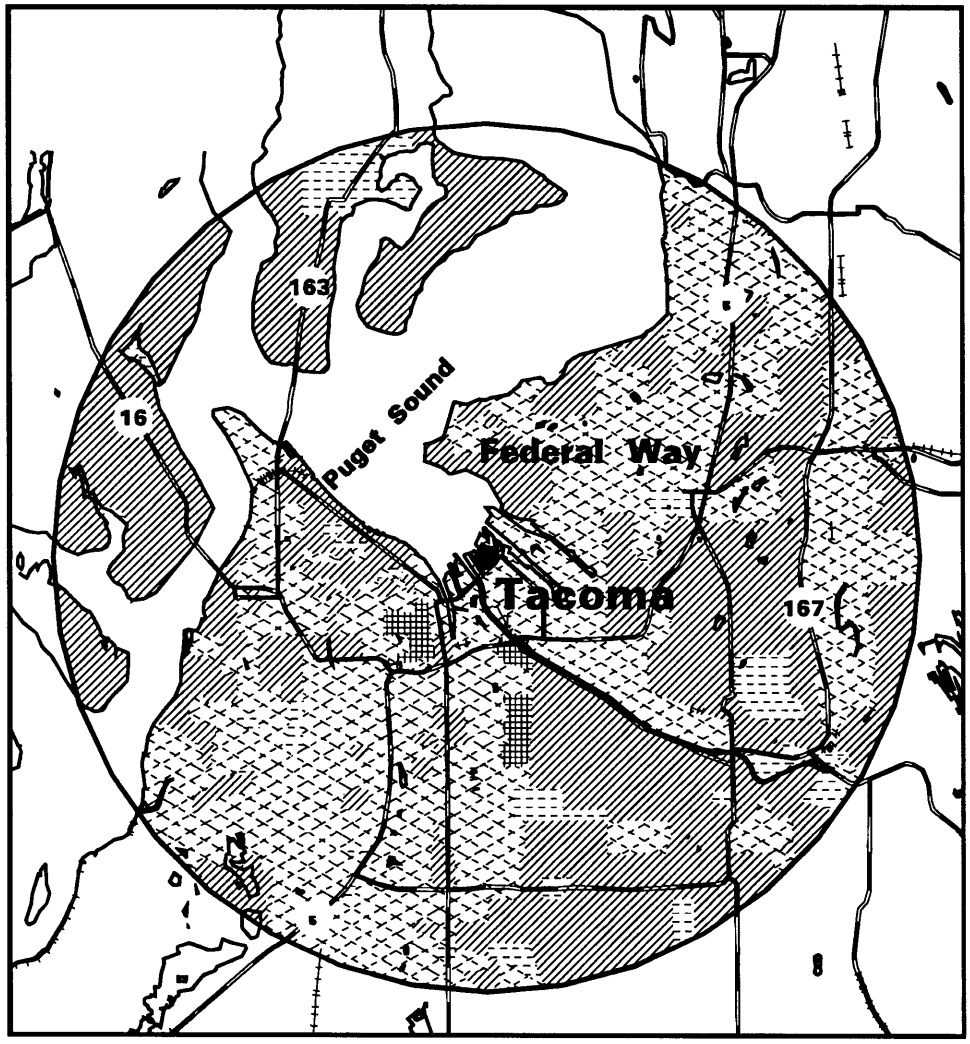

Atlan


17
133
421


620


20
5
Portland
20E
20
Columbia
14
5


21
17
170
30
Savannah



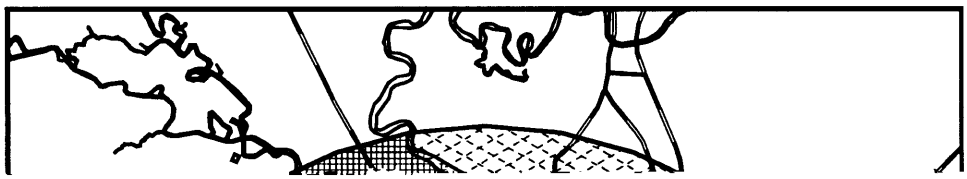
LEGEND

- Terminal
- Surface Water Shoreline
- Rail Lines
- State & US Highways
- P < 1%
- 1% <= P < 10%
- 10% <= P < 50%
- P >= 50%

SUMMARY STATISTICS	
WITHIN 16 KM (10 Miles) RADIUS OF THE PORT	
TOTAL POPULATION	511,575
MINORITY POPULATION	86,341
PERCENTAGE	17%

0 1 2 3 4 5 6
miles

Figure A-10 Distribution of the Minority Population Residing within 16 km of the Port of Tacoma, Washington



A.3.2 Distribution of Low-Income Households Near the Candidate Ports

The number of low-income households near the candidate ports is shown in Table A-3. Except for the ports of MOTSU and Hampton Roads, the percentage of low-income households immediately surrounding the port is larger than the percentage of low-income households in the surrounding counties. Similarly, for most of the candidate ports, the percentage of low-income households near the port exceeds the percentage of low-income households in the surrounding state, although the ports of Charleston, MOTSU, Newport News, and NWS Concord are exceptions.

Distributions of low-income households near the candidate ports are shown in the maps of the ports presented in Figures A-12 through A-22. In these figures, geographical areas defined by census block group boundaries are shaded according to the percentage of low-income households within the block group. Since the number of households within a block group varies, the size of a shaded area is not necessarily proportional to the population within that area.

A.4 Environmental Justice Along Transportation Routes

The dominant radiological impacts associated with the normal or incident-free (accident-free) transportation activities would be the exposures received by the workers in the immediate vicinity of the cask, principally the truck drivers or train personnel. These individuals would be the only people receiving a measurable exposure during a routine spent nuclear fuel shipment.

The dose received by an individual near a spent nuclear fuel cask during shipment would be proportional to both the distance from the cask and the time of exposure. As discussed in Chapter 4 and Appendix E, the radiation dose rate from a cask containing spent nuclear fuel decreases with distance from the cask. Individuals living along the transportation routes would therefore be expected to receive low exposures because of both their distance from the cask and their short time of their exposure. While it is possible to make estimates of the collective dose of the population along a route, as in Chapter 4 and Appendix E, these minuscule doses would only be meaningful in the collective sense.

Ground and barge transportation accidents would be expected to result in no additional radiological impacts to the population in the vicinity of the accident. Potential radiological impacts from low probability accidents, which vary considerably, would be dependent on the accident conditions (such as the severity of an associated fire) and the weather conditions at the time of an accident. Since shipping accidents could occur at any location along the routes, it is not possible to identify the racial and economic composition of the populations that might be impacted. In general, however, the principal radiological impacts would be limited to the area within a few miles of the accident location and could be expected to impact a broad mixture of the population in the area.

Tables A-4 and A-5 show minority populations and low-income households, respectively, residing in 800-m (0.5-mi) wide corridors on each side of the road, rail, or barge routes from each of the candidate ports of entry to the Idaho National Engineering Laboratory and the Savannah River Site, both of which could receive spent nuclear fuel in the near term. In these tables, a county is called a "surrounding" county if its boundaries lie at least partially within the 800-m (0.5-mi) corridor. Routes used for this analysis are described in Appendix E.

As a general observation, percentages of minority populations residing along ground transportation routes (Column 7 of Table A-4) from candidate ports on the west coast to the Idaho National Engineering Laboratory are noticeably less than those for transportation from candidate east coast ports to the Savannah River Site. In addition, a higher percentage of minority individuals were found to reside along rail transportation routes than along truck transportation routes. The percentages varied from a minimum

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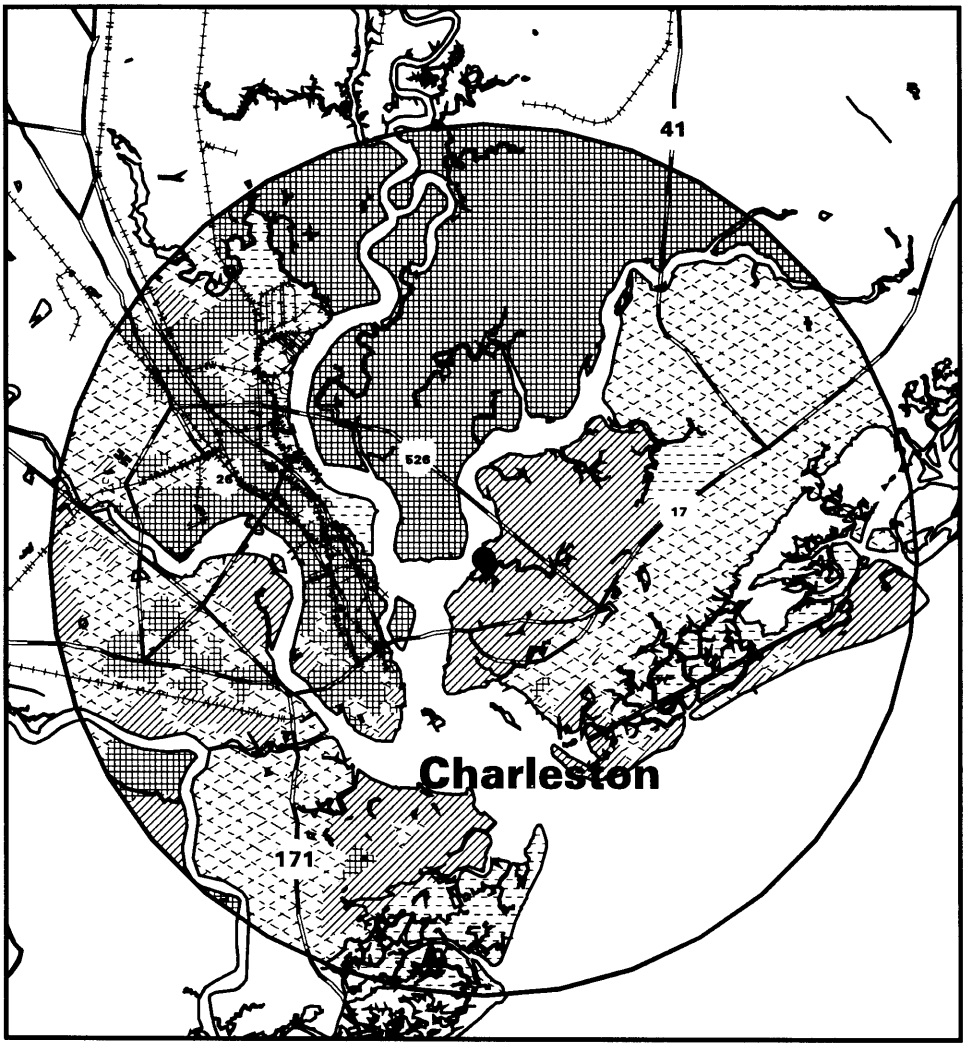


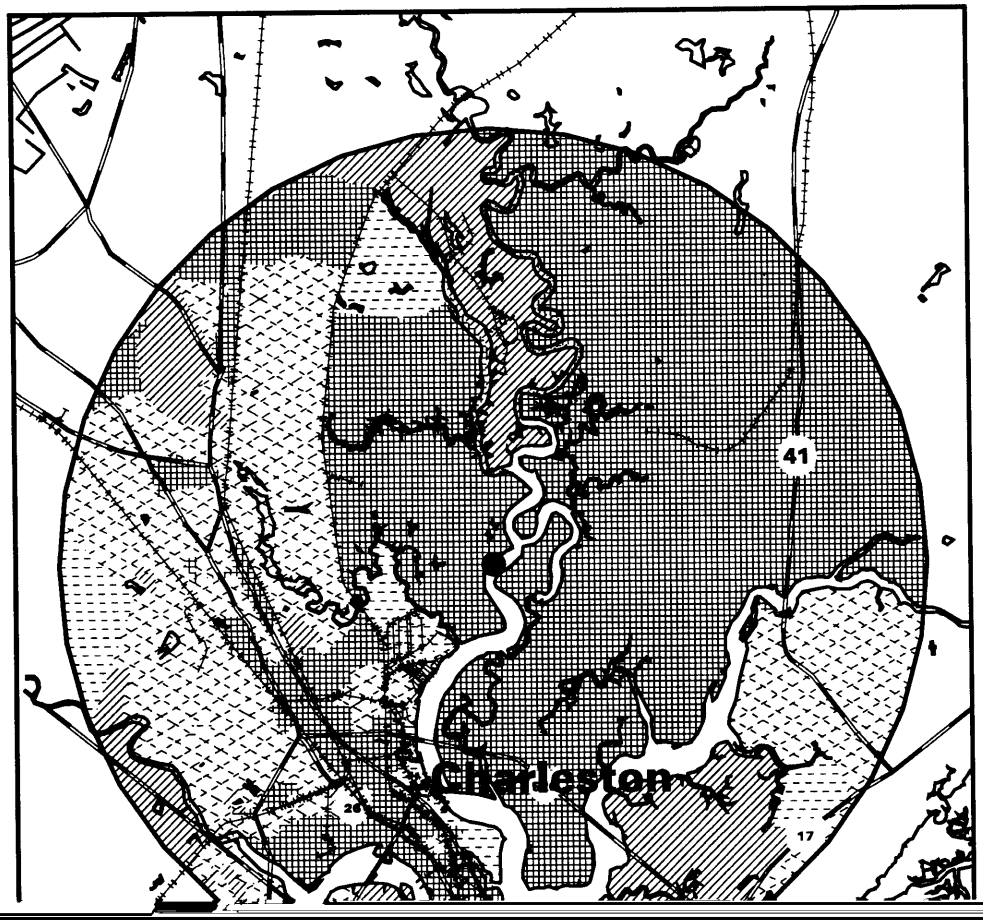
LEGEND

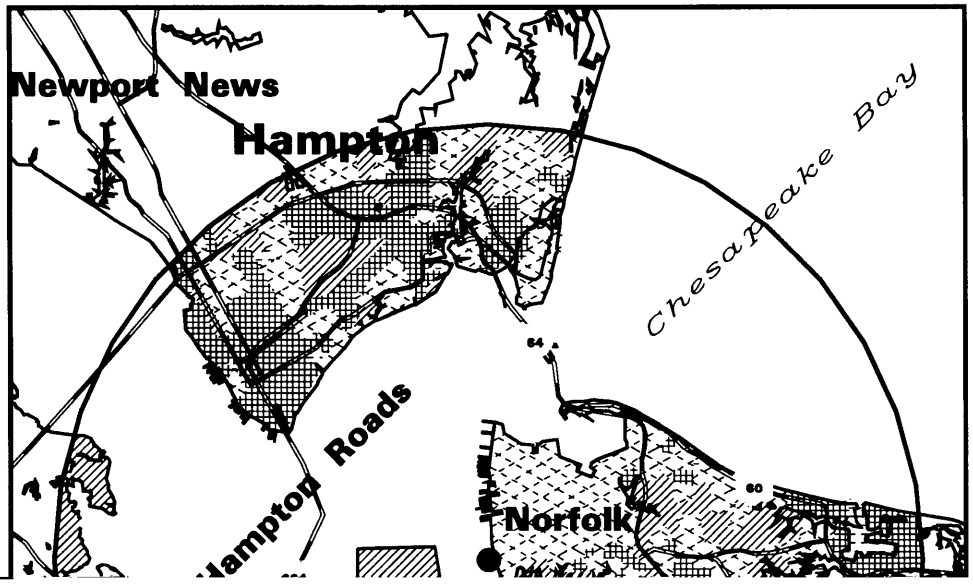
- Terminal
- Surface Water Shoreline
- Rail Lines
- State & US Highways
- P < 1%
- 1% <= P < 25%
- 25% <= P < 50%
- P >= 50%

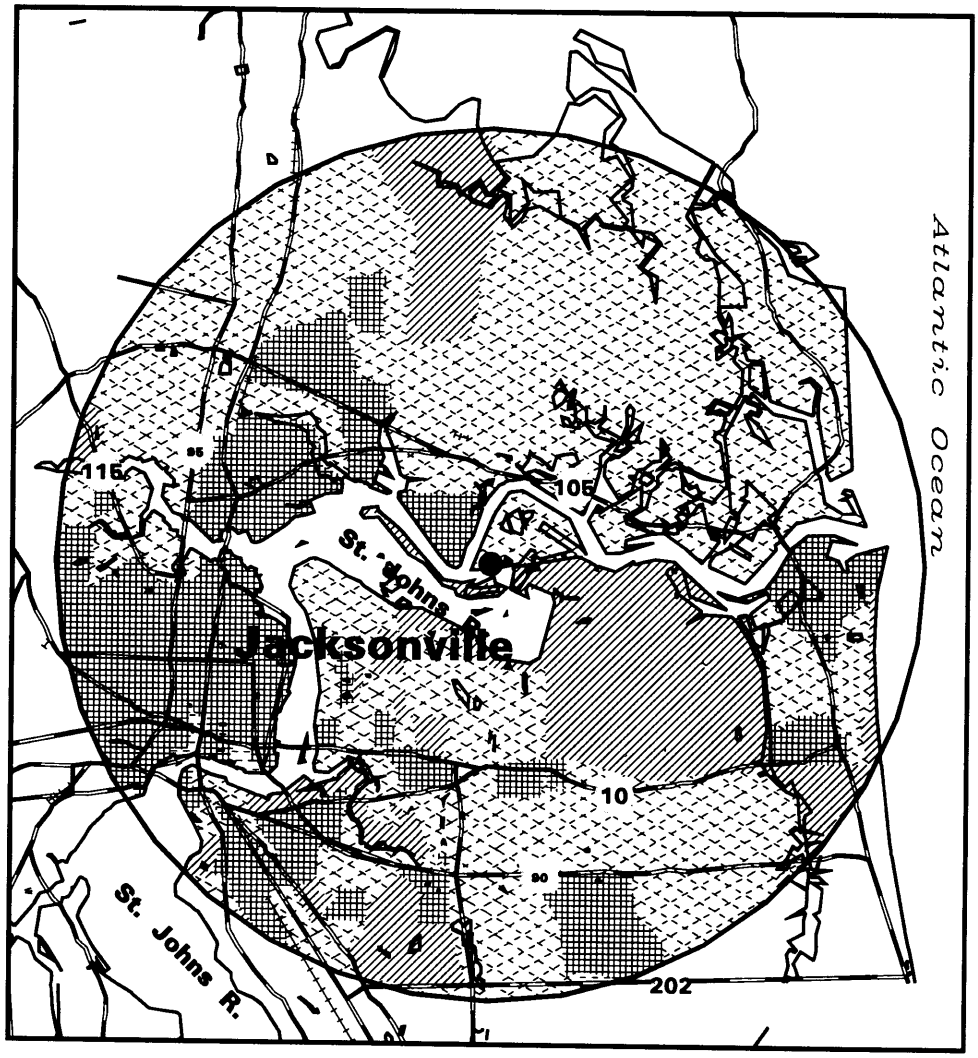
SUMMARY STATISTICS	
WITHIN 16 KM (10 Miles) RADIUS OF THE PORT	
TOTAL HOUSEHOLDS	85,851
LOW INCOME HOUSEHOLDS	36,904
PERCENTAGE	43%

0 1 2 3 4 5 6
miles

Figure A-12 Distribution of Low-Income Households Residing within 16 km of the Wando Terminal, Port of Charleston, South Carolina


41
Charleston
26
17


Newport News
Hampton
Chesapeake Bay
Hampton Roads
Norfolk



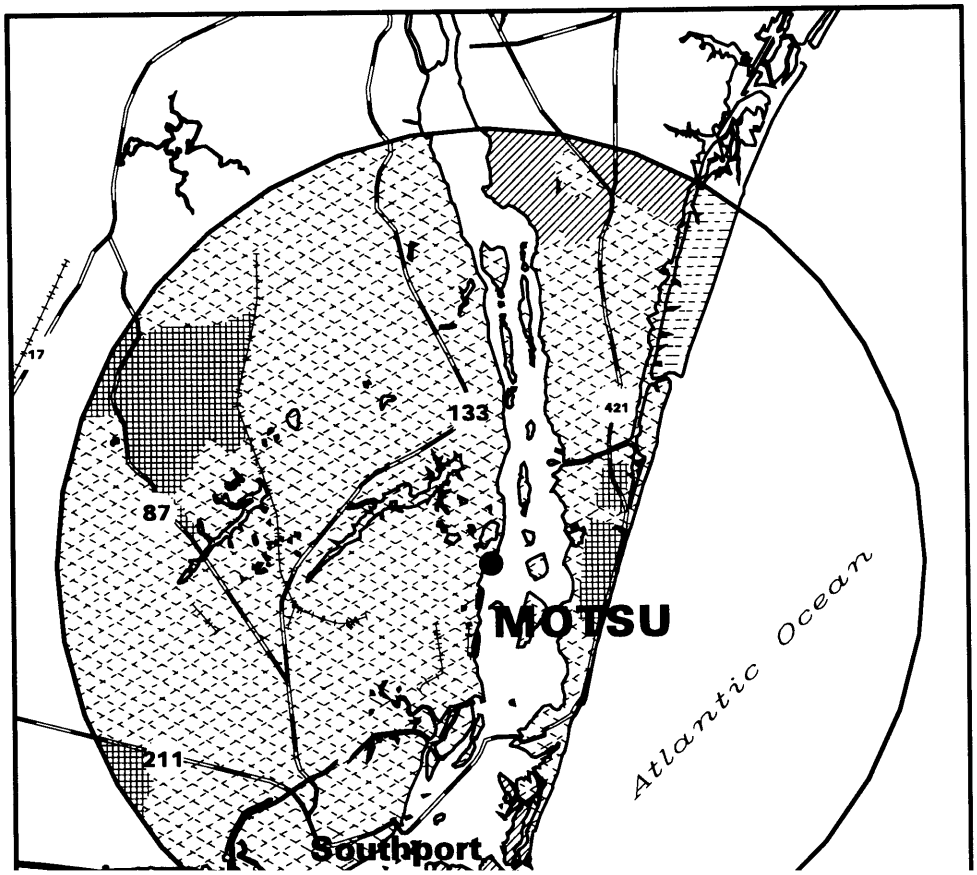
LEGEND

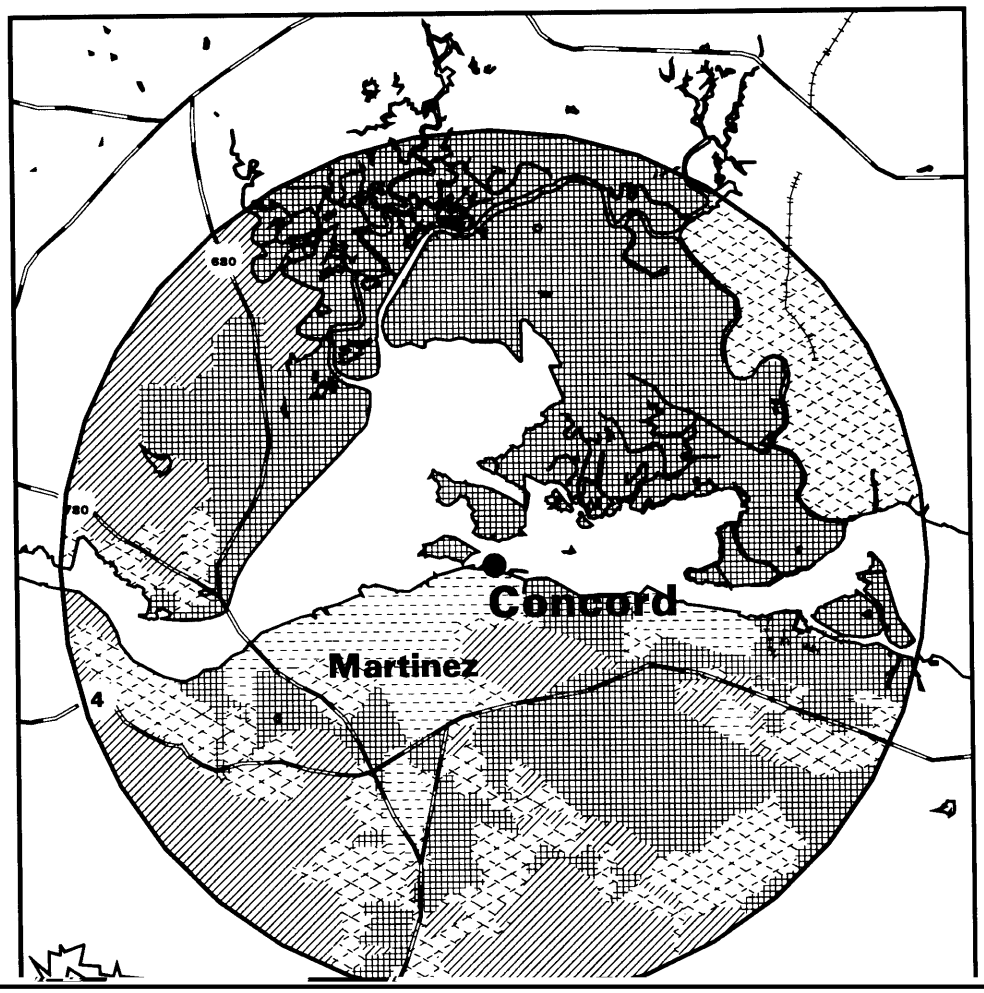
- Terminal
- Surface Water Shoreline
- Rail Lines
- State & US Highways
- P < 1%
- 1% <= P < 25%
- 25% <= P < 50%
- P >= 50%

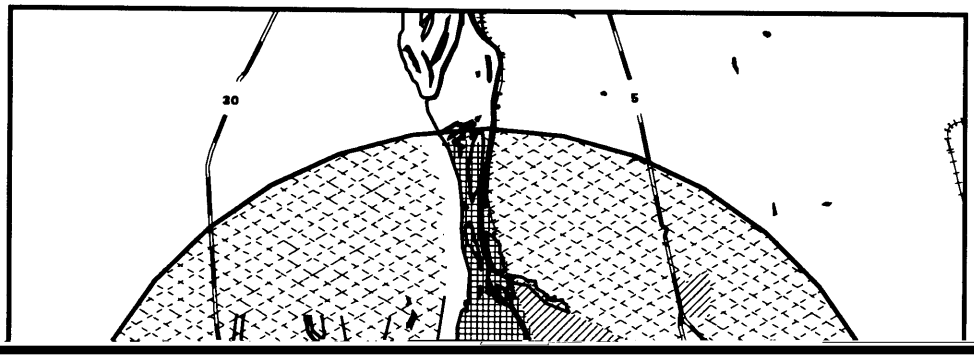
SUMMARY STATISTICS	
WITHIN 16 KM (10 Miles) RADIUS OF THE PORT	
TOTAL HOUSEHOLDS	125,930
LOW INCOME HOUSEHOLDS	61,852
PERCENTAGE	48%

0 1 2 3 4 5 6
miles

Figure A-16 Distribution of Low-Income Households Residing within 16 km of the Port of Jacksonville, Florida


17
133
421
87
MOTSU
Atlantic Ocean
211
Southport


620
720
4
Concord
Martinez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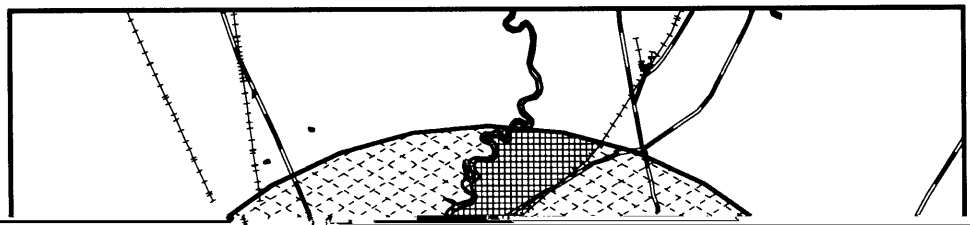

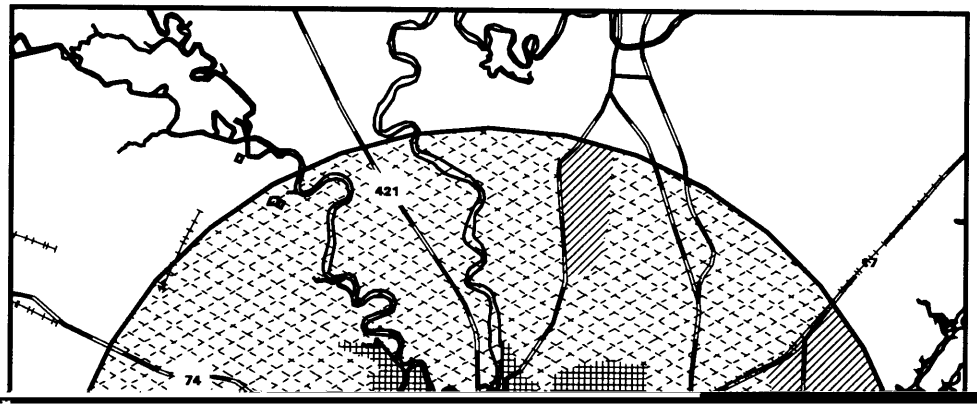
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74

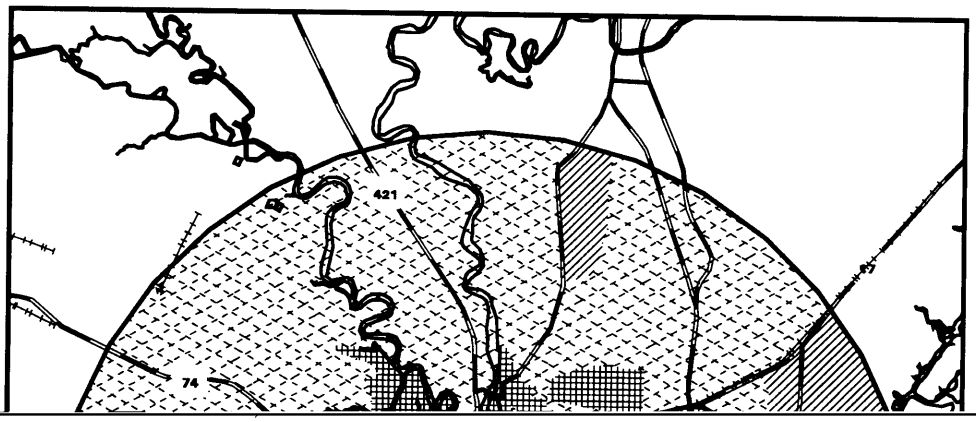

421
74

Table A-4 Minority Populations Residing Near Ground and Barge Transportation Routes

Route No.	Port	Destination	Mode	Total Pop. Along Route	Minority Pop. Along Route	% Minority Pop. Along Route	Total Pop. in Surrounding Counties	Minority Pop. in Surrounding Counties	% Minority Pop. in Surrounding Counties
	Charleston, SC:								
1	Wando Terminal	INEL	Rail	709,863	177,890	25.1	8,562,589	2,027,753	23.7
2	Wando Terminal	INEL	Truck	514,213	90,978	17.7	8,205,925	1,508,320	18.4
3	Wando Terminal	SRS	Rail	19,633	8,783	44.7	693,370	246,297	35.5
4	Wando Terminal	SRS	Truck	84,729	36,613	43.2	1,180,381	403,989	34.2
5	NWS Terminal	INEL	Rail	709,863	177,890	25.1	8,562,589	2,027,753	23.7
6	NWS Terminal	INEL	Truck	503,081	79,646	15.8	8,205,925	1,508,320	18.4
7	NWS Terminal	SRS	Rail	19,633	8,783	44.7	693,370	246,297	35.5
8	NWS Terminal	SRS	Truck	75,476	31,538	41.8	1,180,381	403,989	34.2
9	Galveston, TX	INEL	Rail	390,876	124,553	31.9	3,794,113	1,006,498	26.5
10	Galveston, TX	INEL	Truck	600,239	205,700	34.3	9,292,668	2,858,758	30.8
11	Galveston, TX	SRS	Rail	528,014	286,872	54.3	8,577,378	3,424,688	39.9
12	Galveston, TX	SRS	Truck	429,057	189,407	44.1	7,965,572	3,038,319	38.1
13	Hampton Roads, VA	INEL	Rail	1,005,972	354,386	35.2	11,758,163	2,982,158	25.4
14	Hampton Roads, VA	INEL	Truck	603,551	115,107	19.1	10,248,206	1,954,088	19.1
15	Hampton Roads, VA	SRS	Rail	221,375	107,613	48.6	2,655,287	984,457	37.1
16	Hampton Roads, VA	SRS	Truck	212,286	98,584	46.4	2,266,251	880,358	38.8
17	Jacksonville, FL	INEL	Rail	697,964	200,596	28.7	8,106,565	1,742,778	21.5
18	Jacksonville, FL	INEL	Truck	622,326	167,802	27.0	10,644,968	2,317,151	21.8
19	Jacksonville, FL	SRS	Rail	52,145	36,707	70.4	1,217,454	388,456	31.9
20	Jacksonville, FL	SRS	Truck	72,821	30,887	42.4	2,154,525	678,172	31.5
21	MOTSU, NC	INEL	Rail	753,535	184,459	24.5	9,084,840	2,087,107	23.0
22	MOTSU, NC	INEL	Truck	515,468	91,325	17.7	9,446,043	1,856,873	19.7
23	MOTSU, NC	SRS	Rail	75,932	33,173	43.7	1,302,260	499,281	38.3
24	MOTSU, NC	SRS	Truck	93,987	40,073	42.6	1,518,891	517,912	34.1
25	NWS Concord, CA	INEL	Rail	344,524	72,137	20.9	4,655,756	973,603	20.9
26	NWS Concord, CA	INEL	Truck	267,109	57,926	21.7	4,655,756	973,603	20.9
27	NWS Concord, CA	SRS	Rail	1,443,296	796,105	55.2	30,242,508	13,433,482	44.4
28	NWS Concord, CA	SRS	Truck	1,240,640	536,731	43.3	28,254,357	11,932,215	42.2

Table A-4 Minority Populations Residing Near Ground and Barge Transportation Routes (Continued)

Route No.	Port	Destination	Mode	Total Pop. Along Route	Minority Pop. Along Route	% Minority Pop. Along Route	Total Pop. in Surrounding Counties	Minority Pop. in Surrounding Counties	% Minority Pop. in Surrounding Counties
29	Portland, OR	HS	Barge	28,430	3,599	12.7	1,099,340	140,872	12.8
30	Portland, OR	INEL	Rail	162,678	26,252	16.1	1,300,552	154,630	11.9
31	Portland, OR	INEL	Truck	124,067	15,463	12.5	1,563,392	172,864	11.1
32	Portland, OR	SRS	Rail	950,116	193,322	20.3	15,663,396	3,695,119	23.6
33	Portland, OR	SRS	Truck	671,113	130,098	19.4	11,149,104	2,395,779	21.5
34	Savannah, GA	INEL	Rail	680,075	178,683	26.3	7,696,157	1,661,208	21.6
35	Savannah, GA	INEL	Truck	574,641	140,293	24.4	9,931,415	2,135,851	21.5
36	Savannah, GA	SRS	Barge	1,715	520	30.3	124,099	56,936	45.9
37	Savannah, GA	SRS	Rail	13,835	11,330	81.9	369,053	151,266	41.0
38	Savannah, GA	SRS	Truck	51,065	18,916	37.0	1,135,620	402,488	35.4
39	Tacoma, WA	INEL	Rail	255,650	45,100	17.6	2,427,856	290,185	12.0
40	Tacoma, WA	INEL	Truck	178,532	29,787	16.7	3,141,728	488,589	15.6
41	Tacoma, WA	SRS	Rail	753,535	184,459	24.5	17,228,536	3,946,748	22.9
42	Tacoma, WA	SRS	Truck	514,955	91,051	17.7	8,850,682	1,470,687	16.6
43	Wilmington, NC	INEL	Rail	753,535	184,459	24.5	9,084,840	2,087,107	23.0
44	Wilmington, NC	INEL	Truck	514,955	91,051	17.7	9,446,043	1,856,873	19.7
45	Wilmington, NC	SRS	Rail	75,932	33,173	43.7	1,302,260	499,281	38.3
46	Wilmington, NC	SRS	Truck	102,951	37,735	36.7	1,518,891	517,912	34.1

INEL = Idaho National Engineering Laboratory, SRS = Savannah River Site, HS = Hanford Site

Table A-5 Low-Income Households Residing Near Ground and Barge Transportation Routes

Route No.	Port	Destination	Mode	Total Households Along Route	Low-Income Households Along Route	% Low-Income Households Along Route	Total Households in Surrounding Counties	Low-Income Households in Surrounding Counties	% Low-Income Households in Surrounding Counties
	Charleston, SC:								
1	Wando Terminal	INEL	Rail	279,468	141,864	50.8	3,256,143	1,359,530	41.8
2	Wando Terminal	INEL	Truck	199,269	81,749	41.0	3,082,221	1,266,095	41.1
3	Wando Terminal	SRS	Rail	7,305	3,358	46.0	242,968	101,094	41.6
4	Wando Terminal	SRS	Truck	31,040	15,664	50.5	419,616	175,993	41.9
5	NWS Terminal	INEL	Rail	279,468	141,864	50.8	3,256,143	1,359,530	41.8
6	NWS Terminal	INEL	Truck	193,945	79,186	40.8	3,082,221	1,266,095	41.1
7	NWS Terminal	SRS	Rail	7,305	3,358	46.0	242,968	101,094	41.6
8	NWS Terminal	SRS	Truck	27,339	13,019	47.6	419,616	175,993	41.9
9	Galveston, TX	INEL	Rail	157,276	83,829	53.3	1,410,581	568,315	40.3
10	Galveston, TX	INEL	Truck	230,042	110,020	47.8	3,471,001	1,440,001	41.5
11	Galveston, TX	SRS	Rail	189,537	103,279	54.5	3,135,368	1,315,512	42.0
12	Galveston, TX	SRS	Truck	157,216	74,900	47.6	2,912,738	1,217,498	41.8
13	Hampton Roads, VA	INEL	Rail	372,127	184,477	49.6	4,350,161	1,774,235	40.8
14	Hampton Roads, VA	INEL	Truck	234,717	98,570	42.0	3,895,065	1,611,870	41.4
15	Hampton Roads, VA	SRS	Rail	83,505	42,094	50.4	963,965	403,155	41.8
16	Hampton Roads, VA	SRS	Truck	80,245	37,427	46.6	782,526	332,806	42.5
17	Jacksonville, FL	INEL	Rail	271,994	140,535	51.7	3,097,768	1,304,381	42.1
18	Jacksonville, FL	INEL	Truck	240,520	106,683	44.4	4,036,596	1,686,985	41.8
19	Jacksonville, FL	SRS	Rail	18,576	10,158	54.7	449,914	193,017	42.9
20	Jacksonville, FL	SRS	Truck	27,436	14,176	51.7	784,169	332,060	42.3
21	MOTSU, NC	INEL	Rail	294,953	148,549	50.4	3,458,175	1,443,995	41.8
22	MOTSU, NC	INEL	Truck	199,145	82,005	41.2	3,591,483	1,507,703	42.0
23	MOTSU, NC	SRS	Rail	28,089	13,791	49.1	465,649	197,699	42.5
24	MOTSU, NC	SRS	Truck	35,670	16,610	46.6	547,984	235,188	42.9
25	NWS Concord, CA	INEL	Rail	128,843	66,118	51.3	1,643,159	675,769	41.1
26	NWS Concord, CA	INEL	Truck	97,241	44,810	46.1	1,643,159	675,769	41.1
27	NWS Concord, CA	SRS	Rail	488,799	257,198	52.6	10,625,645	4,386,618	41.3
28	NWS Concord, CA	SRS	Truck	436,446	184,959	42.4	10,022,988	4,153,610	41.4

Table A-5 Low-Income Households Residing Near Ground and Barge Transportation Routes (Continued)

Route No.	Port	Destination	Mode	Total Households Along Route	Low-Income Households Along Route	% Low-Income Households Along Route	Total Households in Surrounding Counties	Low-Income Households in Surrounding Counties	% Low-Income Households in Surrounding Counties
29	Portland, OR	HS	Barge	11,458	4,582	40.0	428,477	178,142	41.6
30	Portland, OR	INEL	Rail	63,053	29,047	46.1	497,875	206,447	41.5
31	Portland, OR	INEL	Truck	49,120	20,461	41.7	595,780	247,985	41.6
32	Portland, OR	SRS	Rail	368,054	183,842	49.9	5,842,902	2,398,677	41.1
33	Portland, OR	SRS	Truck	261,130	106,936	41.0	4,245,248	1,761,997	41.5
34	Savannah, GA	INEL	Rail	265,122	133,766	50.5	2,932,786	1,231,245	42.0
35	Savannah, GA	INEL	Truck	224,123	97,864	43.7	3,767,606	1,570,456	41.7
36	Savannah, GA	SRS	Barge	595	248	41.7	42,983	18,577	43.2
37	Savannah, GA	SRS	Rail	4,868	2,669	54.8	134,291	56,688	42.2
38	Savannah, GA	SRS	Truck	19,340	9,235	47.8	408,100	171,672	42.1
39	Tacoma, WA	INEL	Rail	98,487	48,094	48.8	917,614	377,168	41.1
40	Tacoma, WA	INEL	Truck	68,303	29,265	42.8	1,212,119	493,235	40.7
41	Tacoma, WA	SRS	Rail	448,663	225,672	50.3	6,455,529	2,633,674	40.8
42	Tacoma, WA	SRS	Truck	223,282	99,101	44.4	3,387,084	1,375,781	40.6
43	Wilmington, NC	INEL	Rail	294,953	148,549	50.4	3,458,175	1,443,995	41.8
44	Wilmington, NC	INEL	Truck	198,884	81,839	41.1	3,591,483	1,507,703	42.0
45	Wilmington, NC	SRS	Rail	28,089	13,791	49.1	465,649	197,699	42.5
46	Wilmington, NC	SRS	Truck	39,759	18,538	46.6	547,984	235,188	42.9

INEL = Idaho National Engineering Laboratory, SRS = Savannah River Site, HS = Hanford Site

Table A-6 Minority Populations Residing Near the Candidate Interim Management Sites

Candidate Management Site	*Population within 80 km of Site*	*Minority Population within 80 km of Site*	*% Minority Population within 80 km of Site*	*Population in Counties Surrounding Site*	*Minority Population in Counties Surrounding Site*	*% Minority Population in Counties Surrounding Site*
Savannah River Site	566,823	214,016	37.8	944,982	330,078	34.9
Idaho National Engineering Laboratory	176,311	15,449	8.8	265,823	21,828	8.2
Hanford Site	383,934	95,042	24.8	565,871	116,610	20.6
Oak Ridge Reservation	863,758	53,185	6.2	1,220,355	65,346	5.4
Nevada Test Site	12,421	2,005	16.1	777,797	186,714	24.0

largely within 80 km (50 mi) of the candidate management site at the Idaho National Engineering Laboratory. Hispanics and African Americans compose nearly 85 percent of the minority population surrounding the Nevada Test Site. The total and minority populations residing within 80 km (50 mi) of the Nevada Test Site are ten times smaller than those of each of the other sites. The Oak Ridge Reservation is surrounded by the smallest percentage of minorities among the five candidate management sites. Minorities residing within 80 km (50 mi) of the site comprise approximately 6 percent of the total population, and African Americans make up nearly 75 percent of this minority population. The Savannah River Site has the largest surrounding minority population of the five candidate interim management sites: African Americans compose approximately 94 percent of the minority population residing within 80 km (50 mi) of this site.

Figures A-23 to A-27 show the distribution of minorities residing within 80 km (50 mi) of each of the candidate management sites. These illustrations were obtained from an analysis of 1990 census data using a geographical information system. The data were obtained from U.S. Bureau of the Census Tiger Line files which contain political boundaries and geographical features, and Summary Tape Files which contain demographic information. Data were resolved to the block group level, usually 250 to 550 household units. In the legend of each figure, "P" denotes the percentage of the total population within block groups comprised of minority members. The most heavily shaded areas shown in these figures indicate block groups for which the minority population exceeds 50 percent.

The minority population residing near the Hanford Site is spread throughout the area with concentrations in directions northeast, southeast, and southwest of the site. By contrast, the minority population surrounding the Idaho National Engineering Laboratory resides in quadrants northeast and southeast of the site. None of the block groups located within 80 km (50 mi) of the Nevada Test Site contained 50 percent of minority residents during the 1990 census. Due to the sparse population surrounding the site, block groups would be relatively large in geographical area. Minorities within 80 km (50 mi) of the Savannah River Site reside throughout the area with concentrations south of the site. As discussed above, no significant radiological health effects are expected for workers or the general population surrounding the five candidate interim management sites, including minority or low income workers.

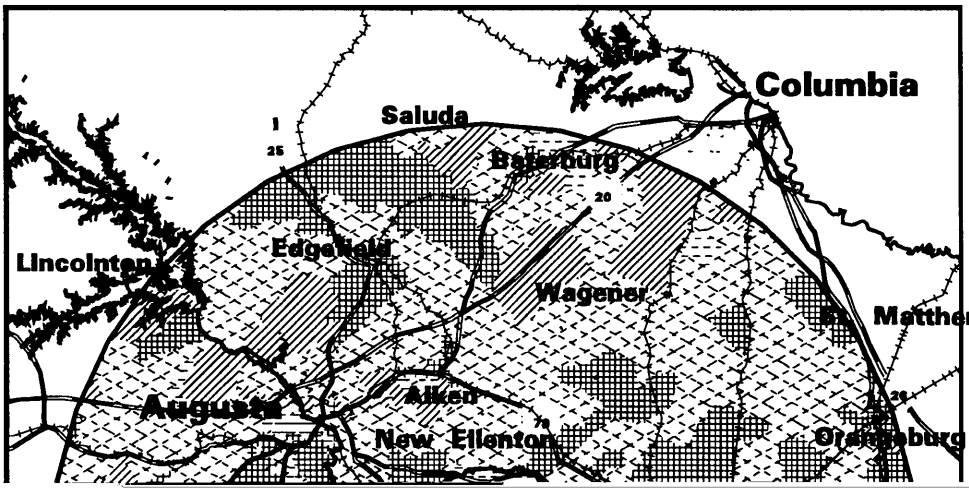
A.5.2 Distribution of Low-Income Households Near the Candidate Management Sites

Table A-8 demonstrates the number of low-income households in areas surrounding the candidate interim management sites. Except for the Nevada Test Site, the number of low-income households immediately surrounding the sites is typical of the corresponding number for surrounding counties. In the case of the Nevada Test Site, the percentage of low-income households in the area surrounding the site is noticeably larger than that for the relatively affluent nearby counties.

Table A-7 Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Candidate Management Sites

Candidate Manage-ment Sites	*Total Pop.*	*Total Minority Pop.*	*% Minority Pop.*	*Amer. Indian, Eskimo, or Aleut Pop.*	*% Amer. Indian, Eskimo, or Aleut*	*Asian or Pacific Islander Pop.*	*% Asian or Pacific Islander*	*African Amer. Pop.*	*% African Amer.*	*Hispanic Origin Pop.*	*% Hispanic Origin*	*Other Race*	*% Other Race*	*White*	*% White*
SRS	566,823	214,016	37.8	1,136	0.2	5,557	1.0	201,302	35.5	5,874	1.0	145	0.0	352,807	62.2
INEL	176,311	15,449	8.8	3,977	2.3	1,753	1.0	505	0.3	9,075	5.1	138	0.1	160,862	91.2
HS	383,934	95,042	24.8	7,913	2.1	5,296	1.4	4,331	1.1	76,933	20.0	568	0.1	288,891	75.2
ORR	863,758	53,185	6.2	2,985	0.3	4,695	0.5	40,695	4.7	4,518	0.5	290	0.0	810,573	93.8
NTS	12,421	2,005	16.1	273	2.2	49	0.4	634	5.1	1,048	8.4	0	0.0	10,415	83.8

SRS = Savannah River Site, INEL = Idaho National Engineering Laboratory, HS = Hanford Site, ORR = Oak Ridge Reservation, NTS = Nevada Test Site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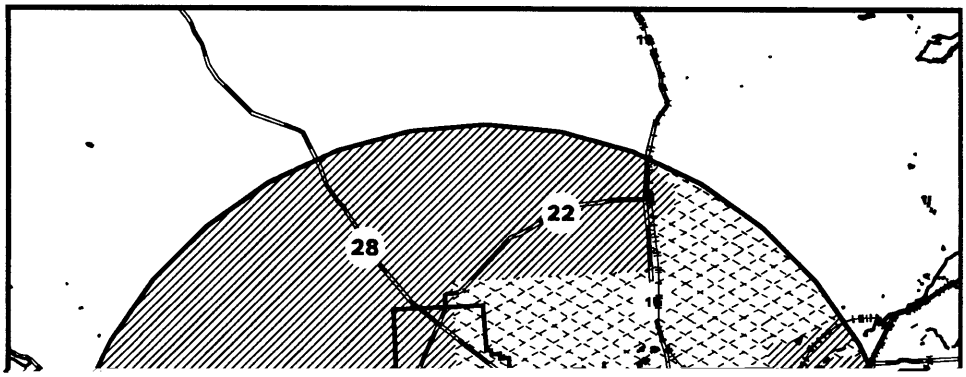
Edgefield
Lincolnton
Wagener
Matther
Aiken
Augusta
New Ellenton
Orangeburg
25
20
26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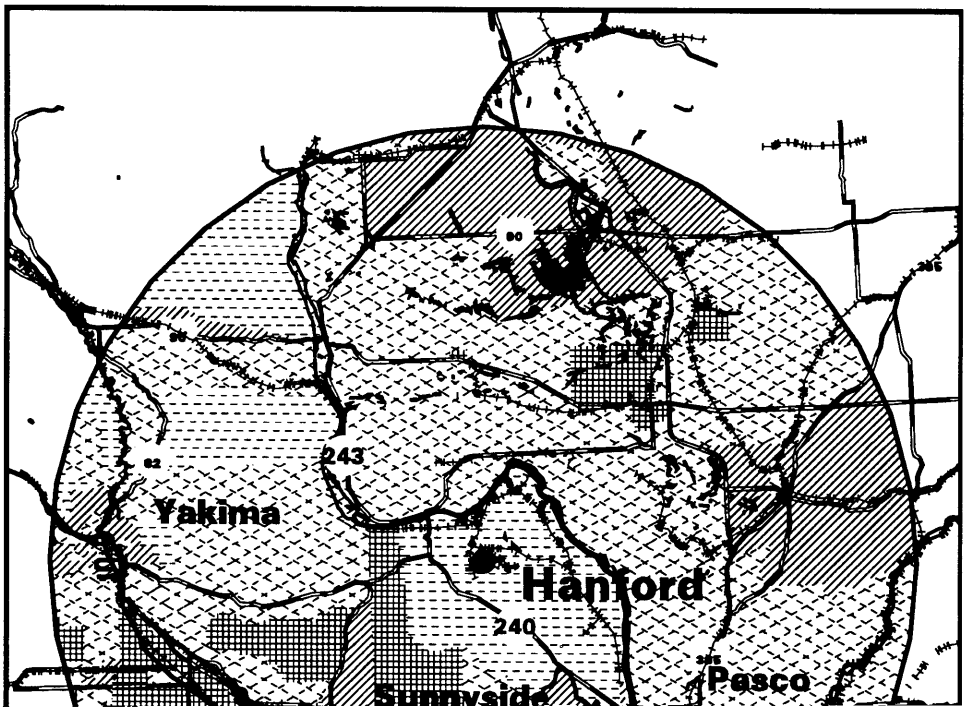
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243
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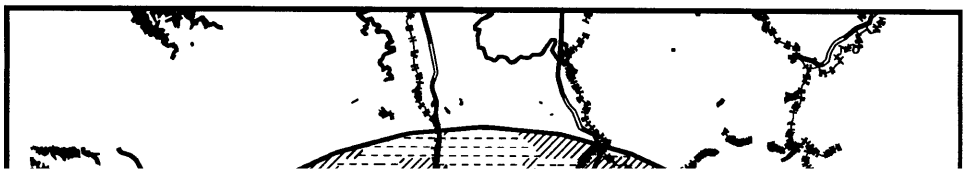
Hanford
240
Pasco
Sunnyside



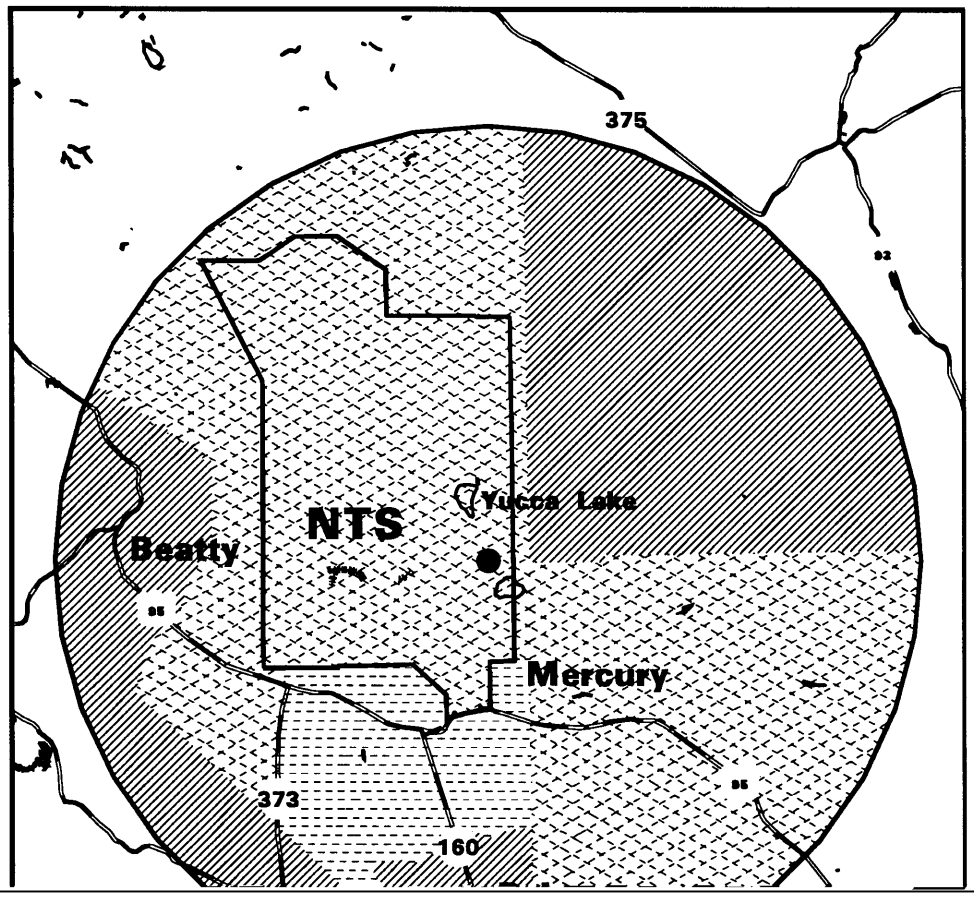
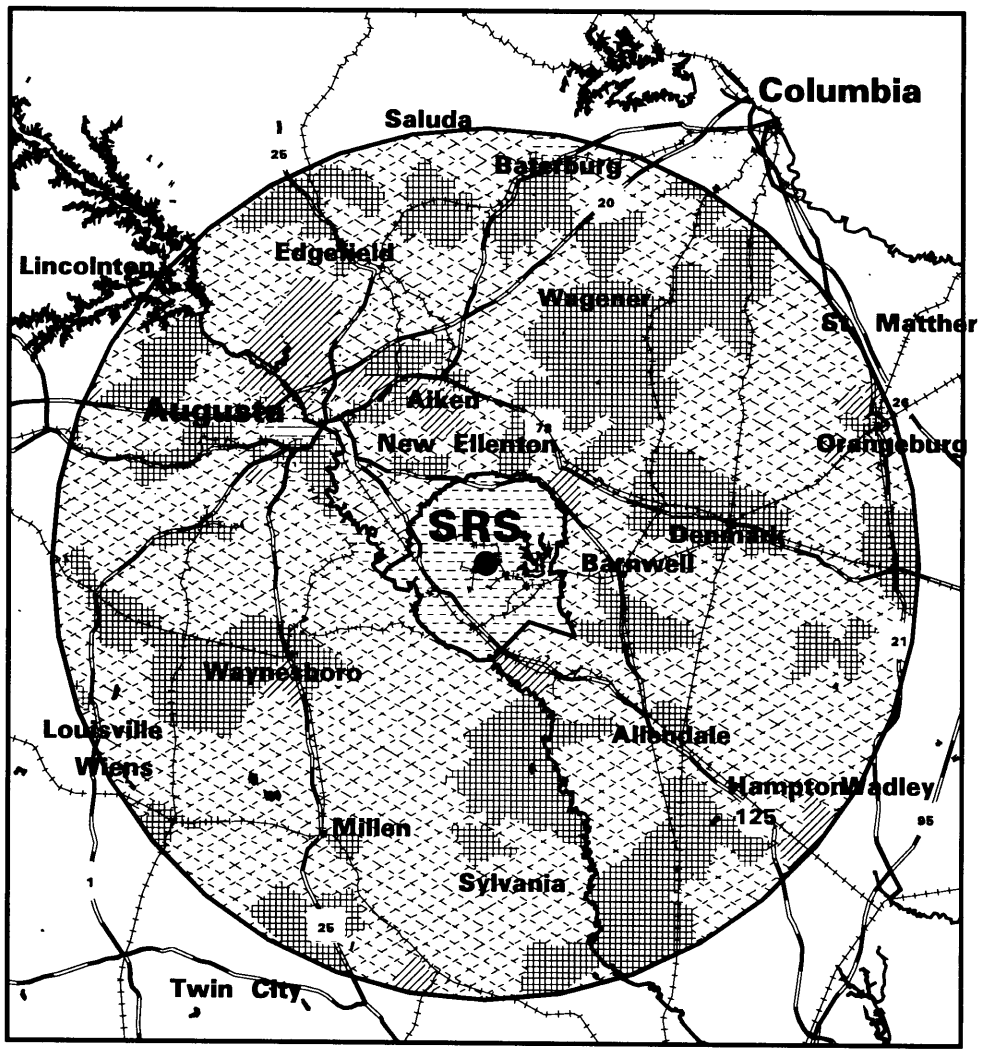

375
92
Yucca Lake
NTS
Beatty
95
Mercury
373
160
95

Table A-8 Low-Income Households Near the Candidate Interim Management Sites

Candidate Management Site	*Households within 80 km of Site*	*Low-Income Households within 80 km of Site*	*% Low-Income Households within 80 km of Site*	*Households in Counties Surrounding Site*	*Low-Income Households in Counties Surrounding Site*	*% Low-Income Households in Counties Surrounding Site*
Savannah River Site	197,937	82,930	41.9	332,193	137,883	41.5
Idaho National Engineering Laboratory	55,109	22,452	40.7	87,723	36,821	42.0
Hanford Site	136,496	57,667	42.2	204,501	86,693	42.4
Oak Ridge Reservation	335,589	147,537	44.0	468,276	206,898	44.2
Nevada Test Site	4,194	2,024	48.3	301,810	119,625	39.6

Figures A-28 through A-32 show the distribution of low-income households within 80 km (50 mi) of each of the candidate interim management sites. The symbol "P" in each legend represents the percentage of low-income households. The heaviest shading indicates where these households total 50 percent or more.

For the Hanford Site, the Idaho National Engineering Laboratory, and the Nevada Test Site, block groups containing 50 percent or more low-income households lie largely south of the site. Low-income households reside throughout the 80-km (50-mi) radius, centered at the Savannah River Site. For the proposed action, no disproportionately high adverse effects are projected for low-income households in the vicinity of the interim management sites.



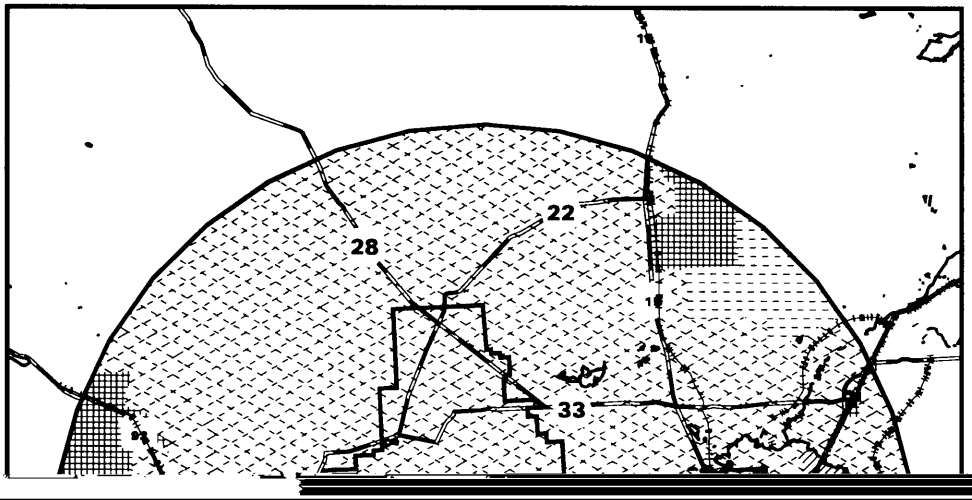
LEGEND

- Terminal
- Surface Water Shoreline
- Rail Lines
- State & US Highways
- P < 1%
- 1% <= P < 25%
- 25% <= P < 50%
- P >= 50%

SUMMARY STATISTICS	
WITHIN 80 KM (50 Miles) RADIUS OF THE SITE	
TOTAL HOUSEHOLDS	197,937
LOW INCOME HOUSEHOLDS	82,930
PERCENTAGE	42%

0 5 10 15 20 25 30 miles

Figure A-28 Distribution of Low-Income Households Residing within 80 km of the Savannah River Site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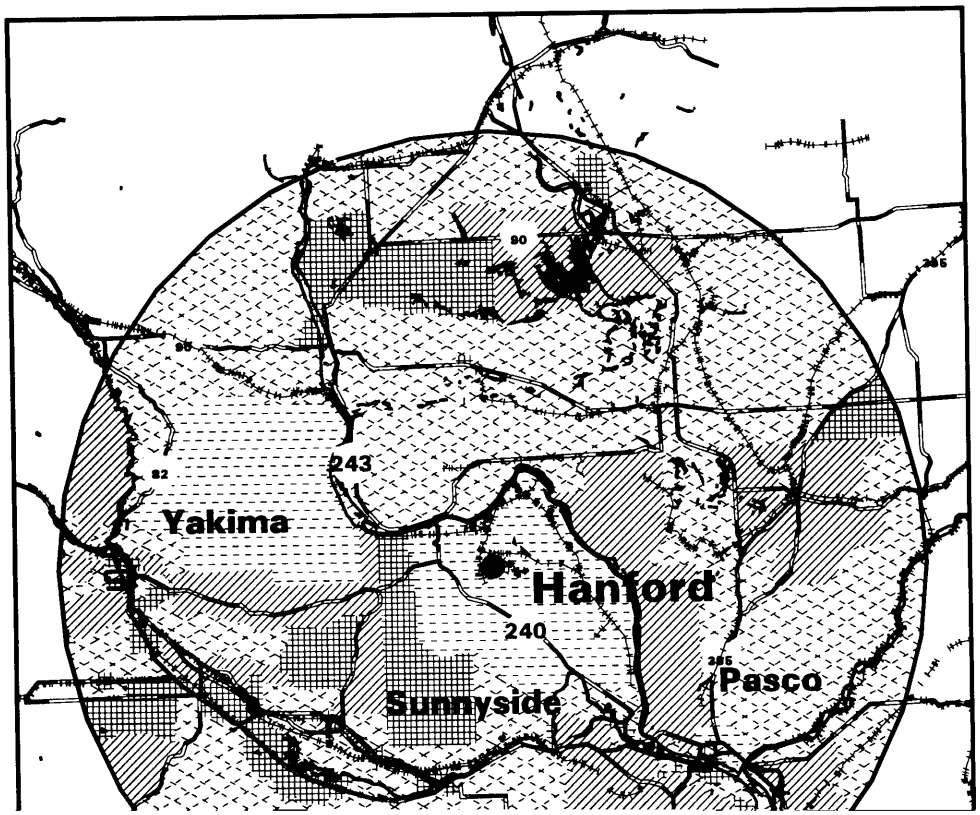
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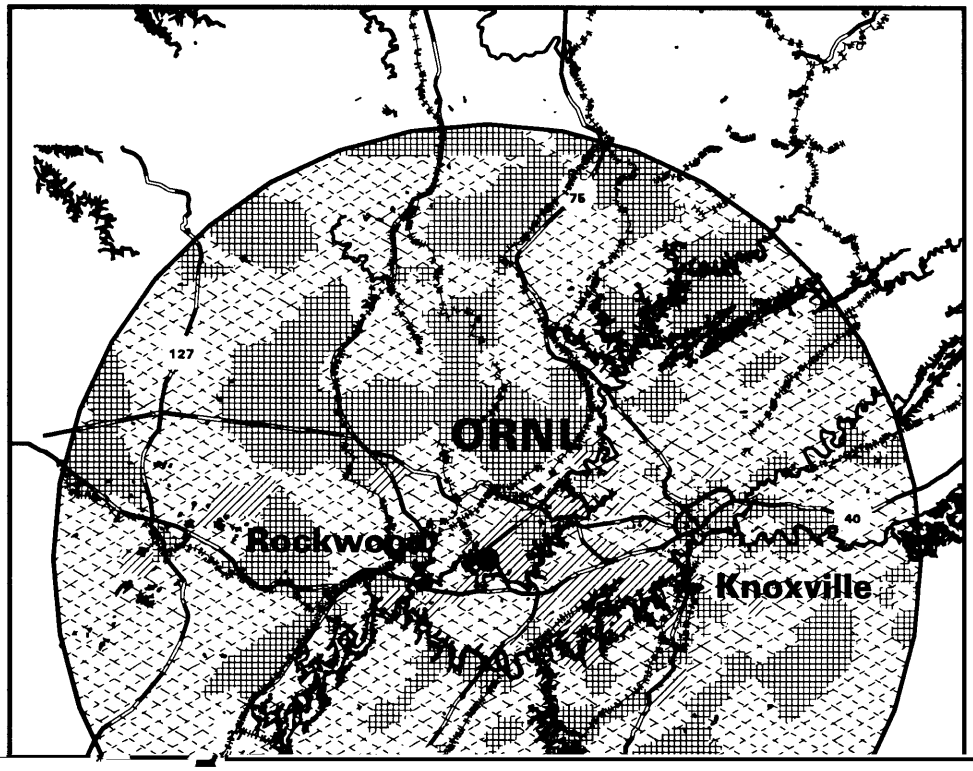
Yakima
Hanford
240
395
Pasco
Sunnyside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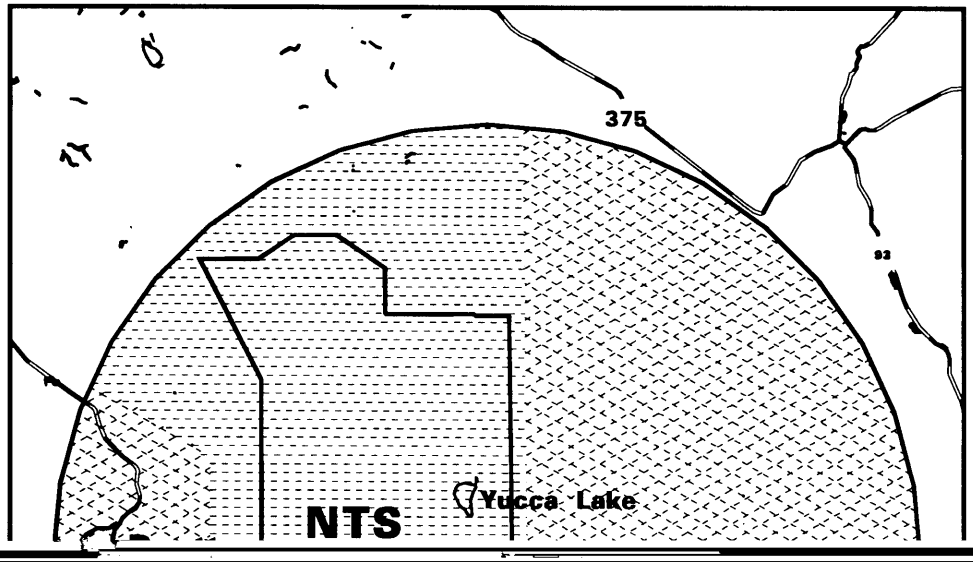
ORNL
Rockwood
40
Knoxville


375
93
NTS
Yucca Lake

3. The Programmatic SNF&INEL EIS defines low-income populations as those in a poverty status as determined annually by the U.S. Census Bureau, based on the Consumer Price Index, and aggregated by the thresholds set forth by the Census Bureau (i.e., a group of people and/or a community experiencing common conditions of exposure or impact, in which 25 percent or more of the population is characterized as living in poverty), a method used by the U.S. Environmental Protection Agency. This Final EIS uses the definition of low-income community established by the U.S. Department of Housing and Urban Development (given in Section A.2 above). Both definitions are permitted under the draft guidance developed by the Interagency Working Group.

These different definitions and assumptions have resulted in differences in the characterization of low-income and minority populations. The two sets of data are summarized in Tables A-9 and A-10 and the most significant differences are discussed below.

Table A-9 Comparison of the Programmatic SNF&INEL EIS's and the FRR SNF Final EIS's Minority Characterization Results

Candidate Management Site	*Total Individuals Residing within 80 km (50 mi)*		*Minority Individuals Residing within 80 km (50 mi)*		*% of Minority Individuals Residing within 80 km (50 mi)*	
	Programmatic SNF&INEL EIS	*FRR SNF Final EIS*	*Programmatic SNF&INEL EIS*	*FRR SNF Final EIS*	*Programmatic SNF&INEL EIS*	*FRR SNF Final EIS*
Savannah River Site	619,959	566,823	233,955	214,016	37.7	37.8
Idaho National Engineering Laboratory	172,366	176,311	11,722	15,449	6.8	8.8
Hanford Site	370,807	383,934	75,381	95,042	20.3	24.8
Oak Ridge Reservation	867,231	863,758	49,742	53,185	5.7	6.2
Nevada Tests Site	11,918	12,421	759	2,005	6.4	16.1

FRR SNF = Foreign Research Reactor Spent Nuclear Fuel

Table A-10 Comparison of the Programmatic SNF&INEL EIS's and the FRR SNF Final EIS's Low-Income Characterization Results

Candidate Management Site	*Total Population Residing within 80 km (50 mi)*		*Low-Income Group Residing within 80 km (50 mi)*		*% of Low-Income Group Residing within 80 km (50 mi)*	
	Programmatic SNF&INEL EIS (Individuals)	*FRR SNF Final EIS (Households)*	*Programmatic SNF&INEL EIS (Individuals)*	*FRR SNF Final EIS (Households)*	*Programmatic SNF&INEL EIS*	*FRR SNF Final EIS*
Savannah River Site	619,959	197,937	107,764	82,930	17.4	41.9
Idaho National Engineering Laboratory	172,366	55,109	23,416	22,452	13.6	40.7
Hanford Site	370,807	136,496	65,584	57,667	17.7	42.2
Oak Ridge Reservation	867,231	335,589	134,661	147,537	15.5	44.0
Nevada Tests Site	11,918	4,194	1,474	2,024	12.4	48.3

FRR SNF = Foreign Research Reactor Spent Nuclear Fuel

The minority populations identified are reasonably consistent between the Programmatic SNF&INEL EIS and the FRR SNF Final EIS, except for results obtained at the Nevada Test Site (the largest proportional difference) and the Hanford Site (the largest difference in numbers of individuals), as shown in Table A-9. The range in results for both locations is due to the different aggregations of the demographic data used (census tracts vs. blocks), and the differences in the methods used to account for the population of tracts or groups lying only partly within the area being analyzed, as discussed above. For example, both sites are

located in rural or sparsely populated regions so that census tracts surrounding the sites are relatively large in geographical area. In addition, the outskirts of Las Vegas, Nevada begin approximately 80 km (50 mi) from the Nevada Test Site, making the analysis particularly sensitive to differences in treatment of census tracts or block groups that lie partly within a circle of an 80-km (50-mi) radius centered at that site. Most areas within the zone of impact of the Nevada Test Site are restricted access and unpopulated land.

As a result of the different definitions used for identification of low-income populations, the results of these analyses are markedly different, as shown in Table A-10. Both sets of data are correct. They simply reflect the fact that different definitions and assumptions can result in different characterizations of low-income populations.

The approach to evaluating environmental justice used in this document may change as a result of future guidance issued by the Interagency Working Group or DOE. Nevertheless, as demonstrated by the different approaches discussed above, the conclusions are not expected to change because the impacts resulting from the proposed action under all alternatives present no significant risk to the potentially affected populations. As a result, no disproportionately high and adverse effects would be expected for any particular segment of the population, including minority and low-income populations.

References

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