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BOUCHEY,G.D. Washington Public Power Supply System
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DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards Amend 5 to environ rept.Largest portion of amend reflects revisions to estimates & projections of population distribution.

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Revised 7/31/81 GD

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Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

July 17, 1981
GO-2-81-187

Docket No. 50-397

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

Subject: WPPSS Nuclear Project No. 2
Environmental Report - Operating License Stage
Amendment No. 5

The Supply System hereby submits sixty-one (61) copies, including three (3) notarized originals, of Amendment 5 to the WNP-2 ER-OL. The largest portion of the amendment reflects revisions to estimates and projections of the population distribution out to fifty miles. Estimates of radiological dose to the population reported in Section 5.2 have not been revised because changes in the population projections would not substantially alter the estimated dose. Other portions of the amendment address sanitary waste treatment and terrestrial environmental monitoring programs.

Distribution is being made concurrently according to the ER-OL distribution list provided by the NRC.

Very truly yours,

G D Bouchey

G. D. Bouchey, Director
Nuclear Safety

shm

Enclosures:
61 copies of Amendment 5
to the WNP-2 ER-OL

cc: J. R. Lewis, BPA, w/encls.
N. S. Reynolds, Debevoise & Liberman
R. Auluck, NRC, w/encls.

C001
S
61/61

Letter, G. D. Bouchey to H. R. Denton Subject: WPPSS Nuclear Project No. 2 Environmental Report - Operating License Stage Amendment No. 5

STATE OF WASHINGTON)
) ss
COUNTY OF BENTON)

G. D. BOUCHEY, being first duly sworn, deposes and says: That he is the Director of Nuclear Safety, for the WASHINGTON PUBLIC POWER SUPPLY SYSTEM, the applicant herein; that he is authorized to submit the foregoing on behalf of said applicant; that he has read the foregoing and knows the contents thereof; and believes the same to be true to the best of his knowledge.

DATED 7/17/81, 1981

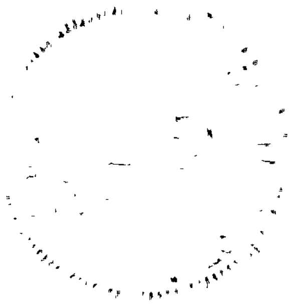
G D Bouchey
G. D. BOUCHEY

On this day personally appeared before me G. D. BOUCHEY to me known to be the individual who executed the foregoing instrument and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 17 day of July, 1981.

M. Toley Utecht
NOTARY PUBLIC in and for the State of Washington, residing at

Richland, Wa.



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Superseded

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4 (revision bar: 5.1-2 to 5.1-8); 1 (revision bar: 6.1-1 to 6.1-2); 4 (revision bar: 6.1-4 to 6.1-5)

The above provisions provide the necessary assurances that the exclusion area will be properly controlled. If at some time in the future, the Supply System should decide that an easement would be useful in ensuring continued control, there is a provision in Paragraph 5(b) of the lease as follows:

> "Subject to the provisions of Section 161 q of the Atomic Energy Act of 1954, as amended, the Commission has authority to grant easements for rights-of-way for roads, transmission lines and for any other purpose and agrees to negotiate with the Supply System for such rights-of-way over the Hanford Operations Area as are necessary to service the Leased Premises."

Pursuant to this provision, the Supply System could obtain from ERDA an easement over the exclusion area in question which would assure that neither the construction of permanent structures nor the conducting of activities inconsistent with the exclusion area would be carried on therein.

2.1.2.2 Control of Activities Unrelated to Plant Operation

The exclusion area will encompass the future WNP-1 and 4, their respective access roads, and the H. J. Ashe Substation. Other than these facilities there are no activities unrelated to the operation of WNP-2 within the exclusion area.

Both WNP-1 and 4 and their respective access roads (see Figure 2.1-3), will be owned and operated by WPPSS. The H. J. Ashe Substation will be owned by the Bonneville Power Administration and is considered a part of WNP-2 normal operation.

2.1.3 Population Distribution

As described in Section 2.1.1 WNP-2 is located on the Hanford Reservation at a point approximately 3.5 miles from the east boundary and approximately 8 miles from the south boundary. The Reservation is surrounded on all four sides by unoccupied desert land which is dedicated primarily to nuclear activities.

Table 2.1-1 presents the compass sector details for 1970 and the forecasts for the same compass sectors by decade from 1980 to 2020. For convenience, cumulative totals are also shown in Table 2.1-1 for the various radii.

Figures 2.1-7 and 2.1-8 show the locations of towns and major physical features within 10 and 50 miles of the site. The major population centers within 50 miles of the site are the Tri-City area of Richland, Pasco and Kennewick, and the cities lying along the Yakima River from Prosser to Wapato. It can

be seen from Figure 2.1-7 that there are no towns located within 10 miles of the site, with the exception of a small part of Richland.

Nuclear facilities in the vicinity of the site are the planned WPPSS Projects No. 1 and 4 (WNP-1 and WNP-4) about 1 mile to the east of the site, the ERDA facilities on the Hanford Reservation (including the FFTF and the Hanford N Reactor), and the Exxon fuel fabrication facilities in the Horn Rapids industrial triangle approximately 8 miles to the south, and the Exxon research laboratory in North Richland.

The 1980 to 2020 forecasts presented here are based on a number of county forecast series generated by such sources as Bonneville Power Administration,(2) Pacific Northwest Bell,(3) Washington Office of Program Planning and Fiscal Management,(4) Portland State University Center of Population Research and Census,(5) Tri-City Nuclear Industrial Council,(6) Pacific Northwest River Basins Commission,(7) and Woodward-Clyde.(8) For those counties in Washington and Oregon included in the 50-mile radius, a composite of all forecast series which serve as control totals was developed. To forecast the population for the rural farm sectors the availability of irrigation water was estimated; then in some cases, county trends had to be extrapolated to the year 2020. Following this quantification an average of 16 persons/irrigated acre was applied to the acres represented in the sector.(9) Projections for nonfarm areas were made by assuming the difference between the computed rural additions and the total projected population as available from the composite estimate. The assumptions for all population forecasts and distributions are documented in a separate report.(10)

2.1.3.1 Population Within 10 Miles

Figure 2.1-9 presents the distribution of the 1970 population within 10 miles of the site, while Figures 2.1-10 to 2.1-14 present the estimated populations by decade from 1980 to 2020. As indicated in Table 2.1-1 about 5,860 people were estimated to be living within a 10-mile radius of the project site in 1970. Since the site is situated within the Hanford Reservation, there are no significant clusters of population within a 10-mile radius except a small part of North Richland.

The closest inhabitants to the project site occupy farms that are thinly spread over four compass sectors east of the Columbia River. None of these farms are located within
1 | 4 miles of the proposed plant site. Only 130 persons
reside in the 4- to 5-mile sector and all are east of the Columbia River. Within a 5-mile radius of the site, there are no public facilities (schools, hospitals, etc.) or

business facilities. There are no primary transportation routes or other causes for use by large numbers of the public.

In 1970, an estimated 5,860 persons, 70% of whom are to the SSE in North Richland and the rest primarily east of the Columbia River, resided within a 10-mile radius of the site. This number represents only 3% of the total population within a 50-mile radius.

No population growth within the 5-mile radius is forecast. The Hanford Reservation is expected to remain dedicated primarily to industrial use without private residences. No change in the use of the land east of the Columbia River is expected since it currently is irrigated to about the maximum practical amount. Recreational use of the Columbia River is expected to remain near the current level.

Population growth between the 5- and 10-mile radius will occur primarily in the S and SSE sectors due to residential expansion in North Richland. By reactor start-up time in 1980, the population in the 10-mile radius is estimated at 8830 which is a 51% increase over 1970. The population is estimated at 10,320 in 1990, 11,070 in 2000 and 11,810 in 2010 within the 10-mile radius. By the end of the reactor life in 2020, the population within the 10-mile radius is estimated at 12,550 which is a 114% increase over 1970.

2.1.3.2 Population Between 10 and 50 Miles

Figure 2.1-15 presents the distribution of the 1970 population within 50 miles of the site, while Figures 2.1-16 to 2.1-20 present the estimated populations by decade from 1980 to 2020. As indicated in Table 2.1-1, about 185,660 people were estimated to be living within a 50-mile radius of the WNP-2 project in 1970.

Beginning with the 10-mile radius, the population count increases rapidly because of the Tri-City region to the south and southeast. Total population within the 20-mile radius was estimated to be 63,960 in 1970 or about 34% of the total. By the time the 30-mile radius is reached, another 38,140 persons can be added to the resident population, thus making the number of residents in the entire 30-mile radius total 102,100. Most of this zone's population count stems from the contribution of compass sectors containing the Tri-Cities and the residents of the fringe areas. Based on 1970 census reports, the Tri-Cities are the only significantly large population centers located in the 10- to 30-mile zone: Richland (26,290), Kennewick (15,212), and Pasco (13,920). The next 10 miles (to the 40-mile range)

adds another 30,030 persons for a total 40-mile radius count of 132,130 while the 50-mile range adds the final 53,530 persons for a total of 185,660 persons living within a 50-mile radius of the construction site in 1970.

The primary future increase in population is expected to be in the SE to SSW sectors which include the entire Tri-Cities and adjoining areas. Little increase is generated westward. The population increases in the rural areas are based on the expected increase in irrigated agriculture. The rest of the population increase is primarily in the Tri-City area as a result of increased activity on the Hanford Reservation and expansion of agricultural activities throughout the general region.

By reactor start-up time in 1980, the population in the 50-mile radius is estimated at 219,730, which is an increase of 18% over 1970. The population is estimated at 236,590 in 1990, 248,480 in 2000 and 256,210 in 2010 within the 50-mile radius. By the end of the reactor life in 2020, the population within the 50-mile radius is estimated at 267,690, which is a 44% increase over 1970.

2.1.3.3 Transient Population

A significant employment force related to the Hanford Reservation exists near the project site. The North Richland industrial complex is closest to the site (about 9 miles) and includes such facilities as Battelle, Washington Public Power Supply System, U.S. Testing, Exxon, and the various service facilities of Atlantic Richfield Hanford Company. Employment in this area amounts to about 4,000 with most of the workers on the day shift. Also within the 10-mile radius are about 2,100 operations workers employed three shifts a day at the various Hanford operations within the Reservation area. In early 1974, there were about 2,600 construction workers employed within the 10-mile radius as well, with many of these close to the proposed construction site. Most of these workers are included in the population counts furnished earlier. The majority of them live in areas from 10 to 30 miles from the project.

A transient agricultural labor force ranging from 2000 in January to nearly 6000 at the June peak exists within the 50-mile radius from the project site. Some of these workers may come within 4 miles of the site during various parts of the year. Since this labor force consists of migrant workers and their families, it has not been covered in the population forecasts.

2.1.4 Uses of Adjacent Lands and Waters

Significant changes occurred in the uses of adjacent lands and waters in the last 5 years as a result of increased construction activity on the Hanford Reservation, new industrial development in the Tri-Cities, and expansion in irrigated agriculture near the Tri-Cities.

New land uses within a 5-mile radius of the WNP-2 site are the construction of the Fast Flux Test Facility (FFTF) and of WPPSS Nuclear Projects No. 1 and 4 (WNP-1 and WNP-4), associated roads and railroads, and intake and outfall facilities on the Columbia River for WNP-1 and WNP-4. No significant changes have occurred or are foreseen for the small agricultural area within the 5-mile radius east of the Columbia River.

Major changes in land use outside the Hanford Reservation include urban residential growth and new industrial plants in the Tri-Cities. This growth is described in Section 2.1.3. In addition, significant expansion in irrigated agriculture has taken place in the Tri-City area. Most major new irrigation developments occurred in the Hermiston-Boardman area in Oregon and in the Plymouth area in Washington. Other new developments are in the hills adjacent to the Snake River east of Pasco, along the Yakima River west and north of West Richland, and in the hills northwest of the Hanford Reservation.

The Tri-City Herald reports that 204,000 new acres have been irrigated in the Mid-Columbia Region in the last 5 years.[11] Significant new irrigation development is expected soon in the Horse Heaven Hills southwest of the Tri-Cities (about 300,000 acres) and in the Columbia Basin Project north and east of the Columbia River (about 470,000 acres).

The principal sources of water for the irrigated areas south and west of the Tri-Cities are the Columbia, Snake, and Yakima Rivers. Groundwater is being pumped in the hills northwest of the Hanford Reservation and is expected to be used for new areas surrounding Pasco. New irrigation in the Columbia Basin Project will receive its water from Grand Coulee Dam on the Columbia River.

As a result of the population increase in the Tri-Cities, increased use is made of the Columbia River for water supplies and for recreation. New parks have been constructed fronting the river in north Richland and near Plymouth. A recreational community known as "Desert-Aire" is being developed on the Columbia River just north of Priest Rapids Dam.

The locations of the nearest potential milk cow (out to 5 miles), nearest potential milk goat (out to 15 miles), nearest potential resident (out to 5 miles), nearest potential vegetable garden (out to 5 miles) and nearest site boundary are shown for the 16 compass sectors in Table 2.1-2.

TABLE 2.1-1

POPULATION IN 50-MILE RADIUS OF WNP-2 BY 10-MILE RADII AND COMPASS SECTOR IN 10-YEAR PERIODS 1970 - 2020

Radii Miles &	Compass Sector	1970 Number	1970 Radii Total	1980 Number	1980 Radii Total	1990 Number	1990 Radii Total	2000 Number	2000 Radii Total	2010 Number	2010 Radii Total	2020 Number	2020 Radii Total
	TOTAL	185,660		219,730		236,590		248,480		256,210		267,690	
0-4	ALL	0		0		0		0		0		0	
4-5	NORTH	0		0		0		0		0		0	
	NNE	0		0		0		0		0		0	
	NE	20		20		20		20		20		20	
	ENE	40		40		40		40		40		40	
	E	50		50		50		50		50		50	
	ESE	20		20		20		20		20		20	
	SE	0		0		0		0		0		0	
	SSE												
	S												
	SSW												
	SW												
	WSW												
	W												
	WNW												
	NW												
	NNW		130		130		130		130		130		130
5-10	NORTH	60		60		60		60		60		60	
	NNE	120		120		120		120		120		120	
	NE	240		240		240		240		240		240	
	ENE	240		240		240		240		240		240	
	E	280		280		280		280		280		280	
	ESE	250		250		250		250		250		250	
	SE	240		240		240		240		240		240	
	SSE	4,080		5,100		5,610		5,870		6,120		6,370	
	S	10		1,960		2,940		3,430		3,920		4,410	
	SSW	200		200		200		200		200		200	
	SW	10		10		10		10		10		10	
	WSW	0		0		0		0		0		0	
	W												
	WNW												
	NW												
	NNW		5,730		8,700		10,190		10,940		11,680		12,420
10-20	NORTH	370		370		370		370		370		370	
	NNE	360		360		360		360		360		360	
	NE	220		220		220		220		220		220	
	ENE	620		620		620		620		620		620	
	E	510		510		510		510		510		510	
	ESE	240		240		240		240		240		240	
	SE	5,880		6,330		6,560		6,680		6,810		6,940	
	SSE	35,580		46,910		52,580		55,420		58,250		63,910	
	S	11,120		13,240		14,300		14,830		15,360		16,360	
	SSW	1,920		2,650		3,020		3,210		3,400		3,590	
	SW	600		940		1,110		1,200		1,280		1,360	
	WSW	660		780		840		870		900		930	
	W	0		0		0		0		0		0	
	WNW	0		0		0		0		0			
	NW	10		10		10		10		10			
	NNW	10	58,100	10	73,190	10	80,750	10	84,550	10	88,340		95,410

TABLE 2.1-1
(sheet 2 of 2)

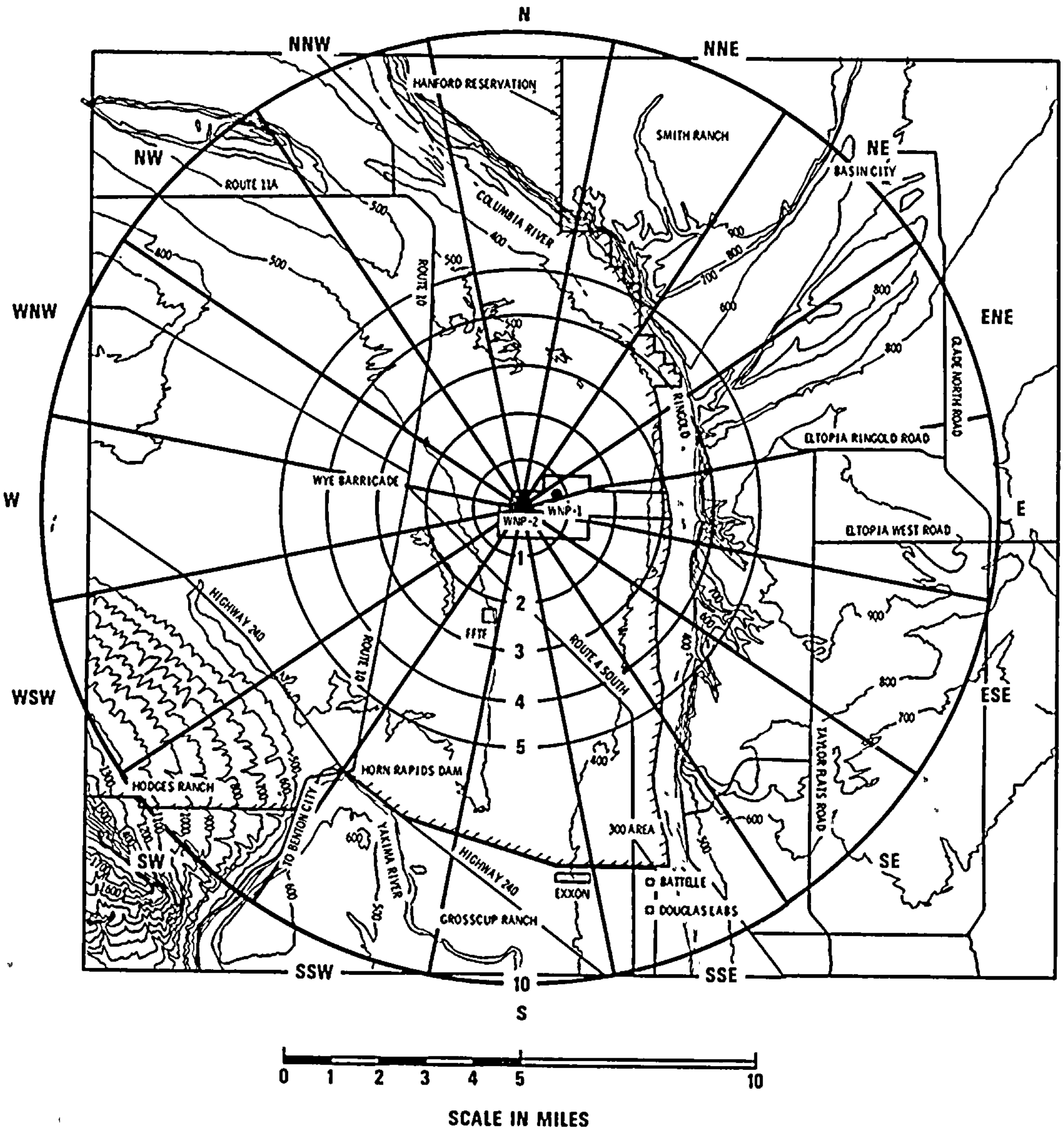
Radii Miles & Compass Sector		1970 Number	1970 Radii Total	1980 Number	1980 Radii Total	1990 Number	1990 Radii Total	2000 Number	2000 Radii Total	2010 Number	2010 Radii Total	2020 Number	2020 Radii Total
20-30	NORTH	760		760		760		760		760		760	
	NNE	5,020		5,690		5,880		5,970		6,070		6,170	
	NE	820		820		1,030		1,310		1,310		1,310	
	ENE	1,370		2,400		3,330		3,590		3,840		4,090	
	E	260		260		700		700		700		700	
	ESE	110		110		110		110		110		110	
	SE	2,750		3,290		3,560		3,700		3,830		3,960	
	SSE	18,560		20,550		21,540		22,030		22,530		23,030	
	S	300		470		540		570		640		710	
	SSW	620		620		620		620		620		620	
	SW	4,770		5,070		5,220		5,300		5,370		5,440	
	WSW	2,080		2,080		2,080		2,080		2,080		2,080	
	W	100		100		100		100		100		108	
	WNW	70		70		70		70		70		70	
	NW	190		190		190		190		190		190	
	NNW	360	38,140	360	42,840	360	46,090	360	47,460	360	48,580	360	49,700
30-40	N	880		880		880		880		880		800	
	NNE	2,550		2,850		3,000		3,070		3,150		3,480	
	NE	780		800		890		1,890		1,900		1,910	
	ENE	590		590		900		2,360		2,360		2,360	
	E	200		200		200		200		200		200	
	ESE	130		130		130		130		130		130	
	SE	1,120		1,120		1,120		1,120		1,120		1,120	
	SSE	280		280		280		280		280		280	
	S	1,150		1,490		1,660		1,750		1,830		1,910	
	SSW	100		100		100		100		100		100	
	SW	850		850		850		850		850		850	
	WSW	19,940		22,100		23,180		23,720		24,260		24,800	
	W	2,450		2,450		2,450		2,450		2,450		2,450	
	WNW	360		500		570		610		640		670	
	NW	550		550		550		550		550		550	
	NNW	1,100	30,030	1,420	36,310	1,580	38,340	1,660	41,620	1,740	42,440	1,820	43,510
40-50	N	17,650		17,850		17,950		18,000		18,050		18,200	
	NNE	530		530		530		530		530		530	
	NE	830		850		860		1,360		1,370		1,390	
	ENE	110		110		110		1,040		1,040		110	
	E	200		200		200		200		200		200	
	ESE	500		500		500		500		500		500	
	SE	2,910		2,910		2,910		2,910		2,910		2,910	
	SSE	720		720		720		720		720		720	
	S	10,940		13,550		14,860		15,510		16,170		16,830	
	SSW	680		1,590		2,050		2,280		2,510		2,740	
	SW	670		670		670		670		670		670	
	WSW	3,280		3,330		3,360		3,370		3,380		4,430	
	W	12,790		14,010		14,620		14,930		15,230		15,530	
	WNW	390		390		390		390		390		390	
	NW	460		460		460		460		460		460	
	NNW	870	53,530	890	58,560	900	61,090	910	63,780	910	65,040	910	66,520

*See appendix section for description of forecasting procedures.

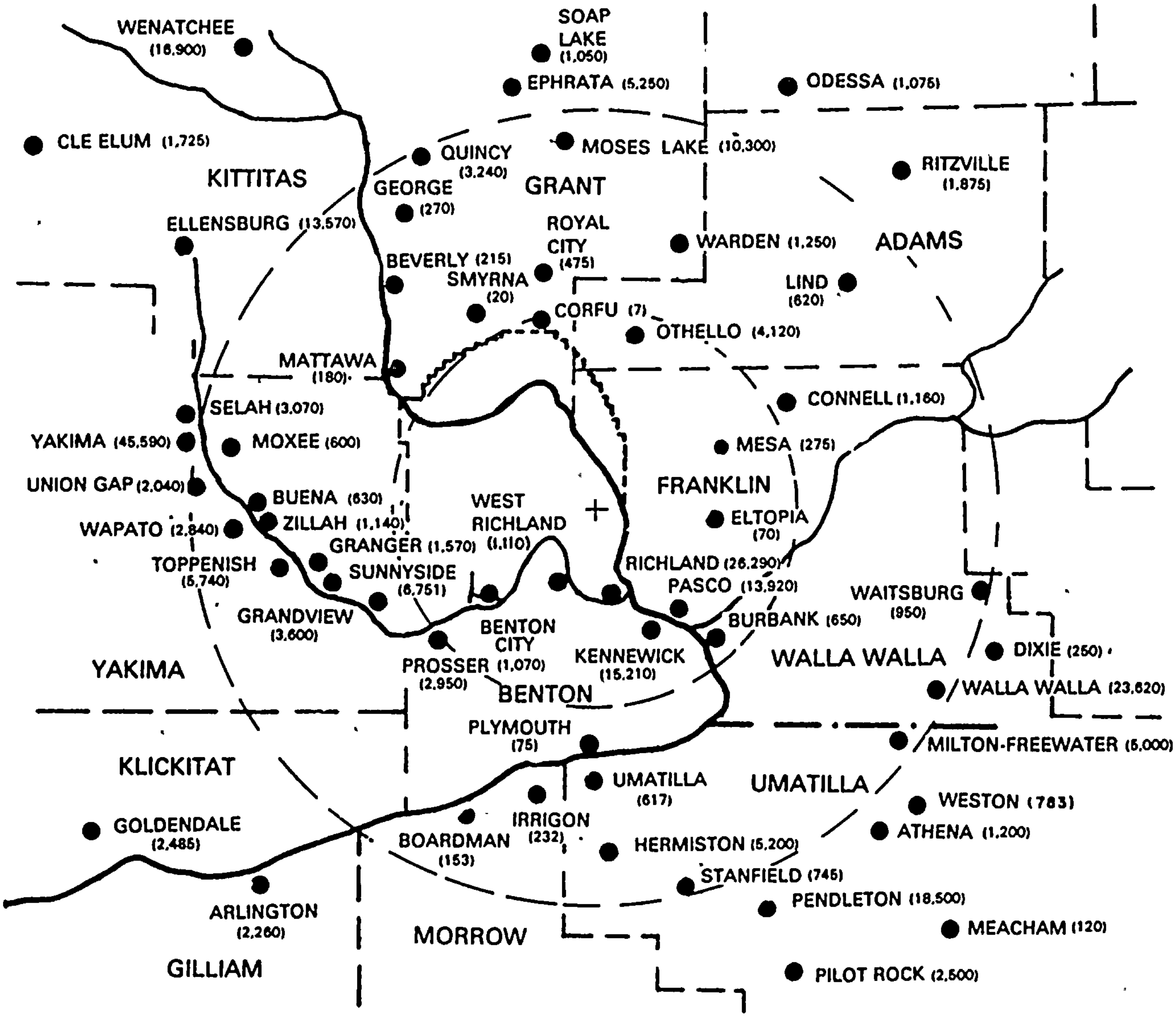
TABLE 2.1-2

DISTANCES IN MILES FROM CENTERLINE OF CONTAINMENT BUILDING TO VARIOUS ACTIVITIES

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1. Potential milk cow (5 mi)	-	-	5	4	4	4	4	-	-	-	-	-	-	-	-	-
2. Potential milk goat (15 mi)	8	7	5	4	4	4	4	6	10	8	7	10	-	-	-	-
3. Nearest potential residence (5 mi)	-	-	5	4	4	4	4	-	-	-	-	-	-	-	-	-
4. Nearest site boundary	0.3	0.3	0.4	1.1	1.5	1.2	0.8	0.7	0.7	0.7	0.6	0.5	0.2	0.2	0.3	0.3
5. Nearest potential vegetable garden (5 mi)	-	-	5	4	4	4	4	-	-	-	-	-	-	-	-	-



WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	ORIENTATION MAP OF THE AREA WITHIN A 10-MILE RADIUS OF THE SITE FOR WNP-2
	FIG. 2.1-7

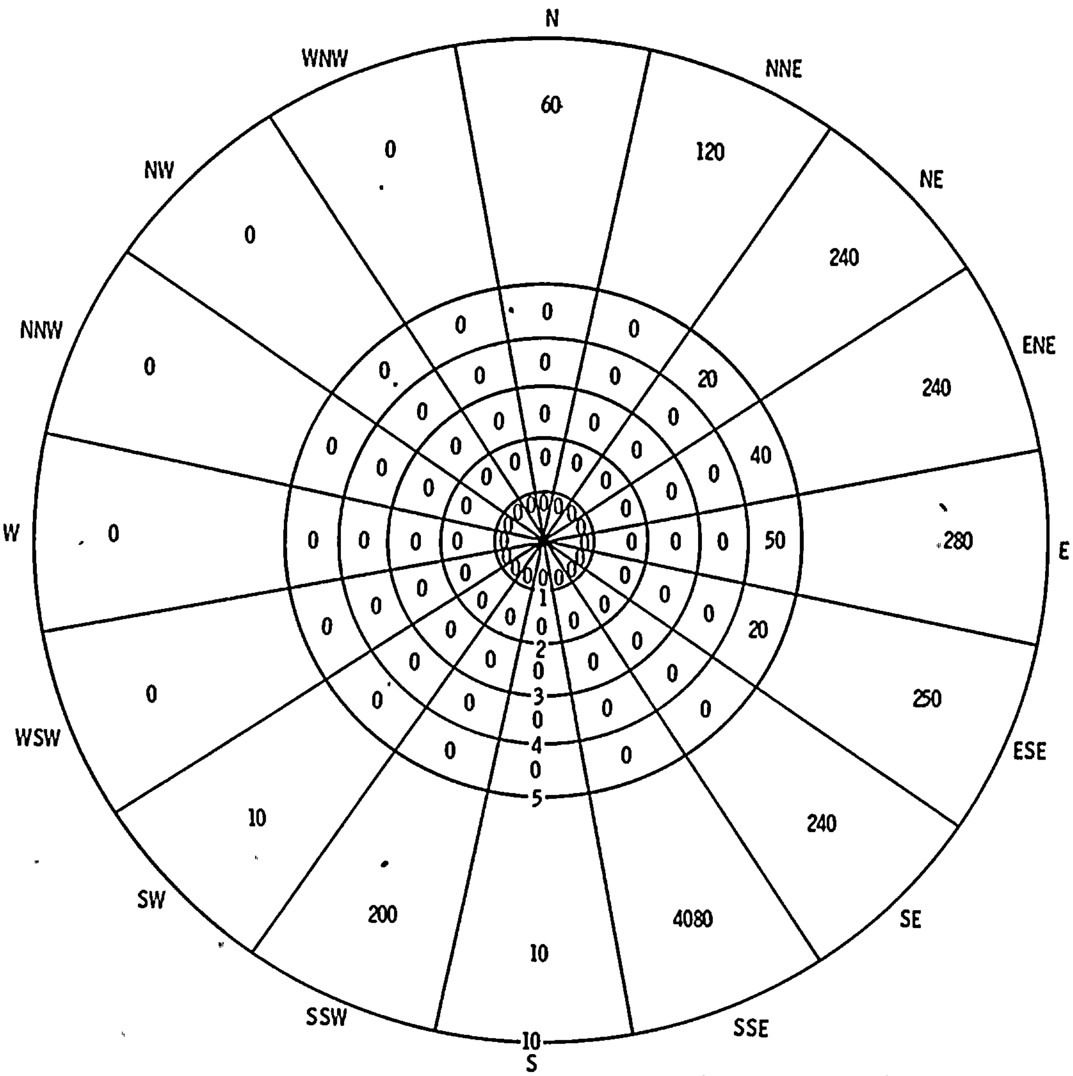


SOURCES FOR POPULATION DATA

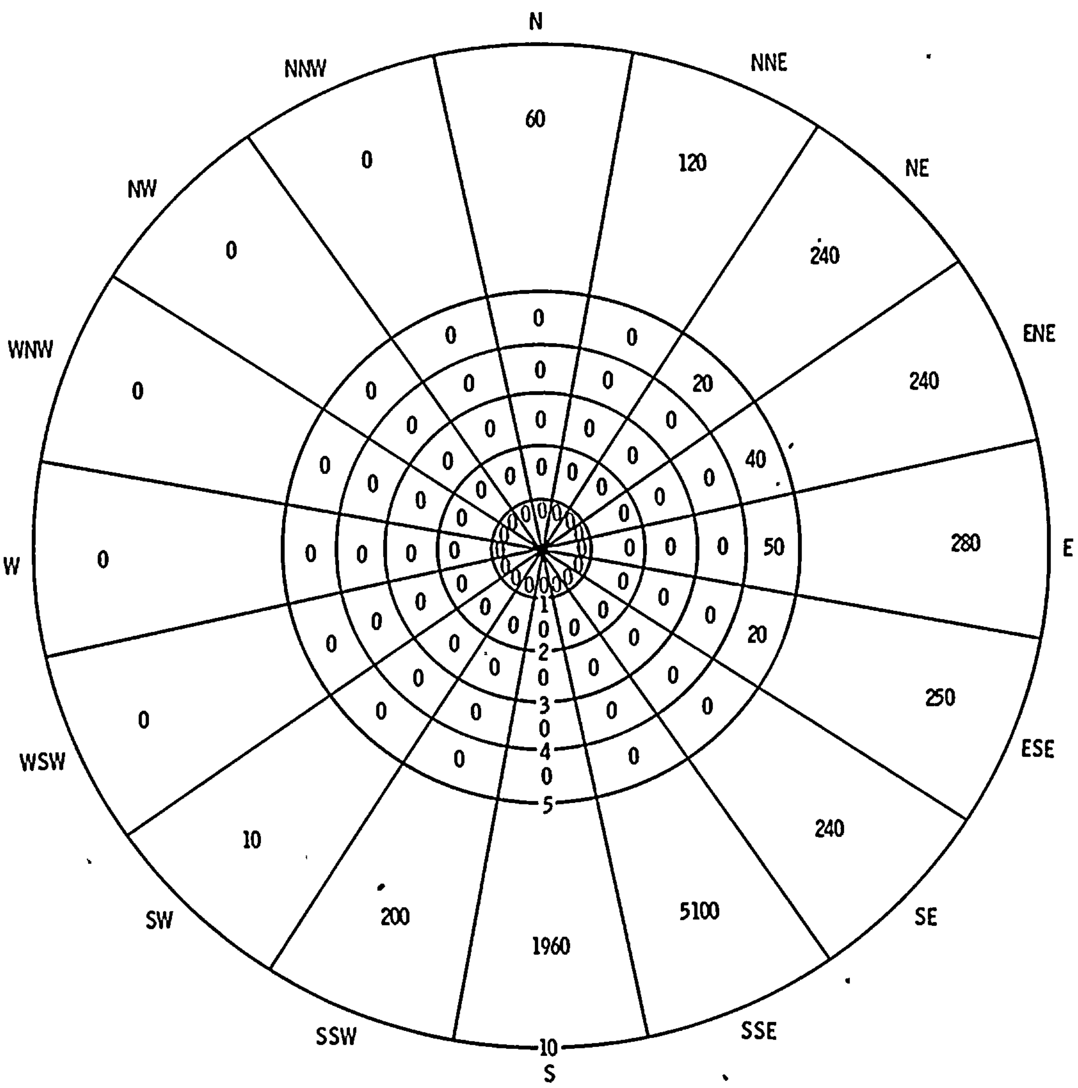
RAND McNALLY ROAD ATLAS (1972)

WASHINGTON STATE CENSUS BOARD (1970)

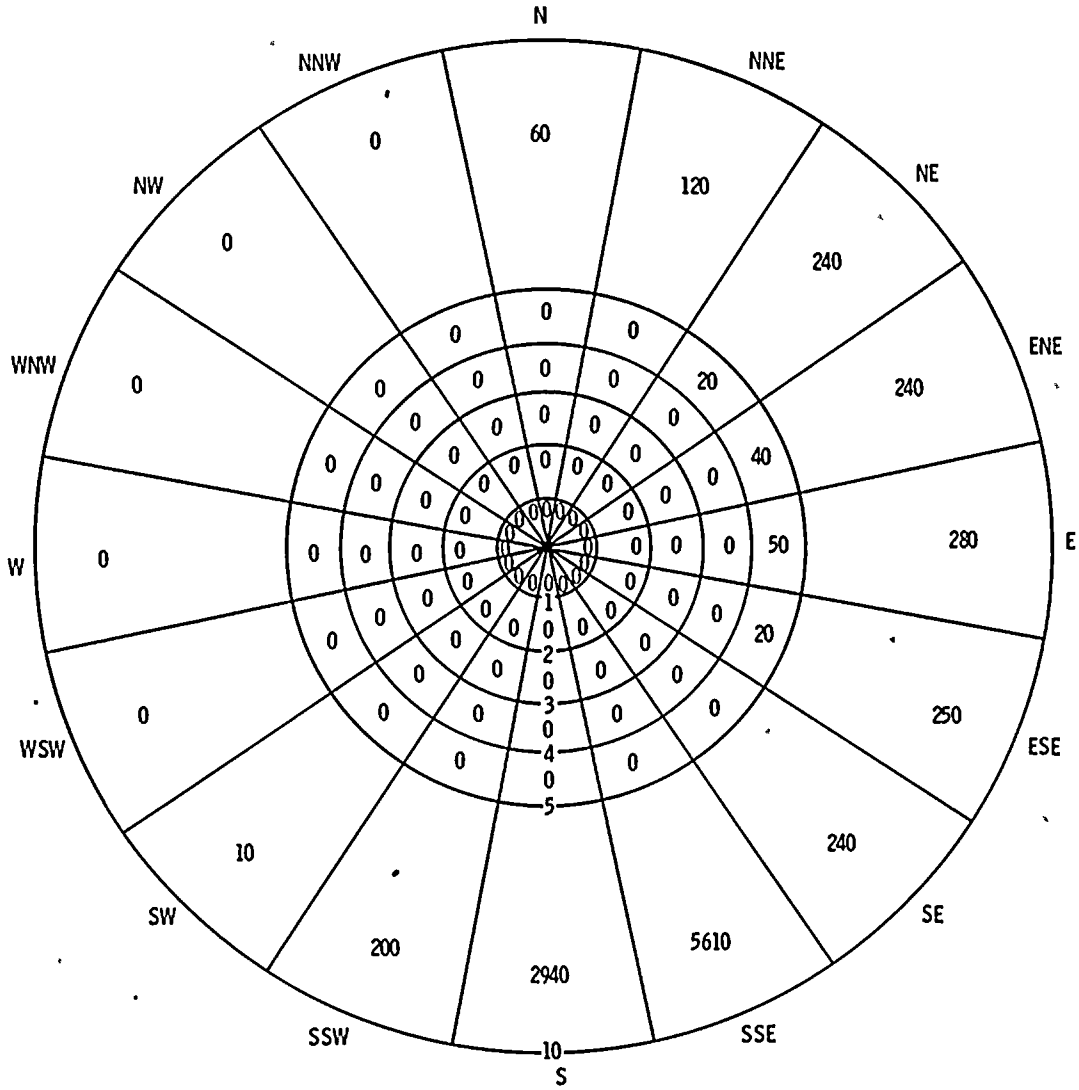
WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	POPULATION DISTRIBUTION IN 25 AND 50 MILE RADII AROUND THE SITE FIG. 2.1-8



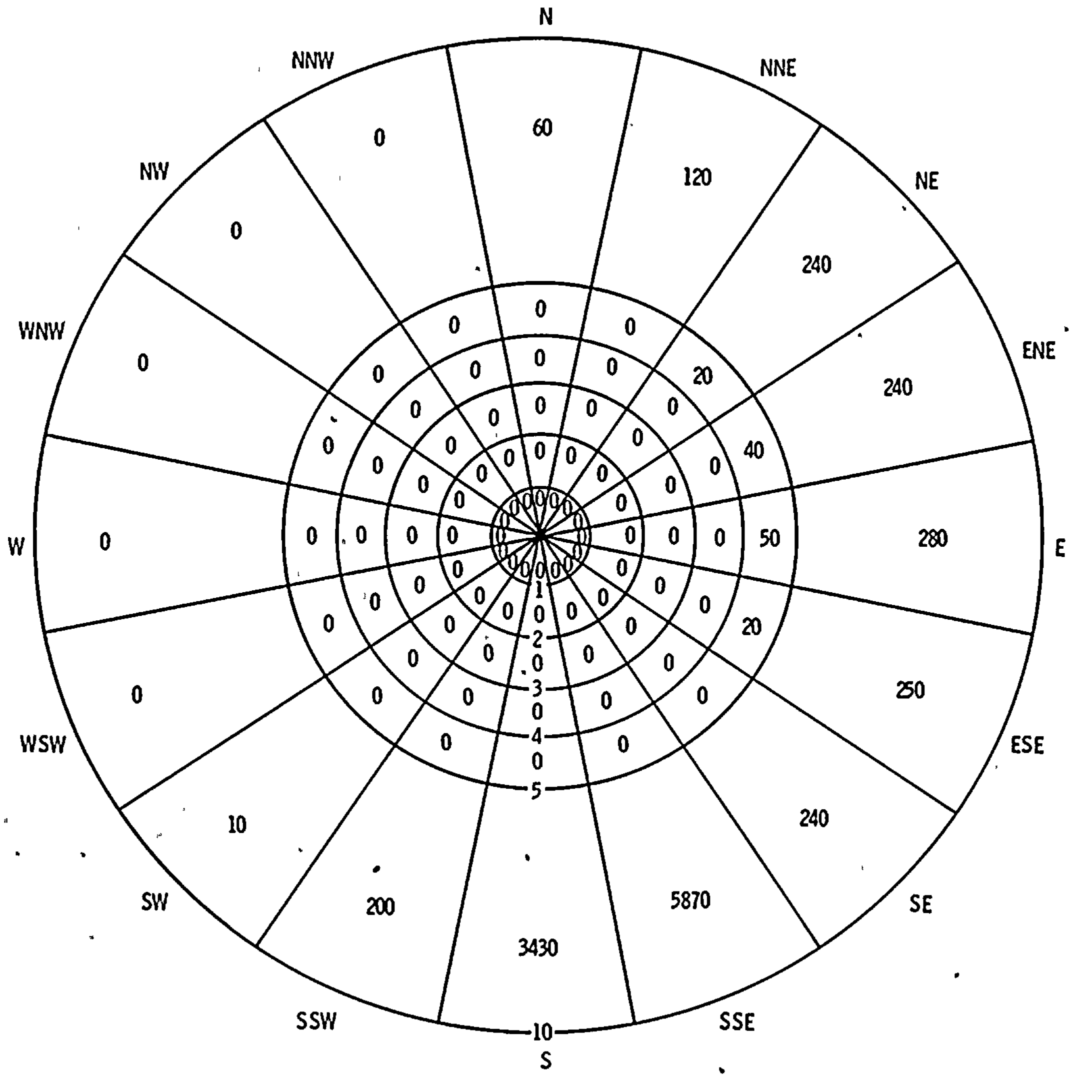
WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 1970 POPULATION WITHIN A 10-MILE RADIUS OF WNP-2 FIG. 2.1-9



WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 1980 POPULATION WITHIN A 10-MILE RADIUS OF WNP-2
	FIG. 2.1-10



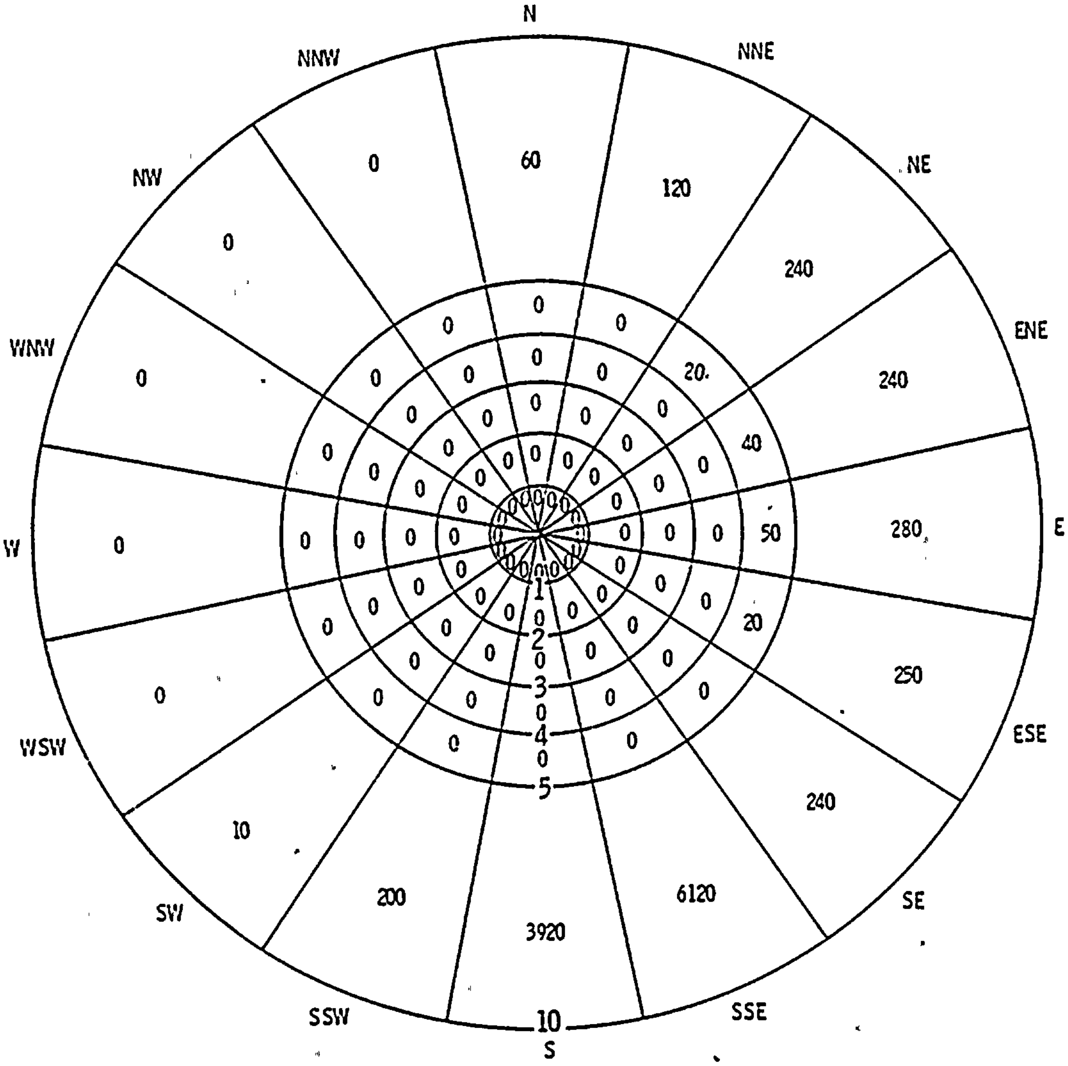
WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 1990 POPULATION WITHIN A 10-MILE RADIUS OF WNP-2
	FIG. 2.1-11



WASHINGTON PUBLIC POWER SUPPLY SYSTEM
WPPSS NUCLEAR PROJECT NO. 2
Environmental Report

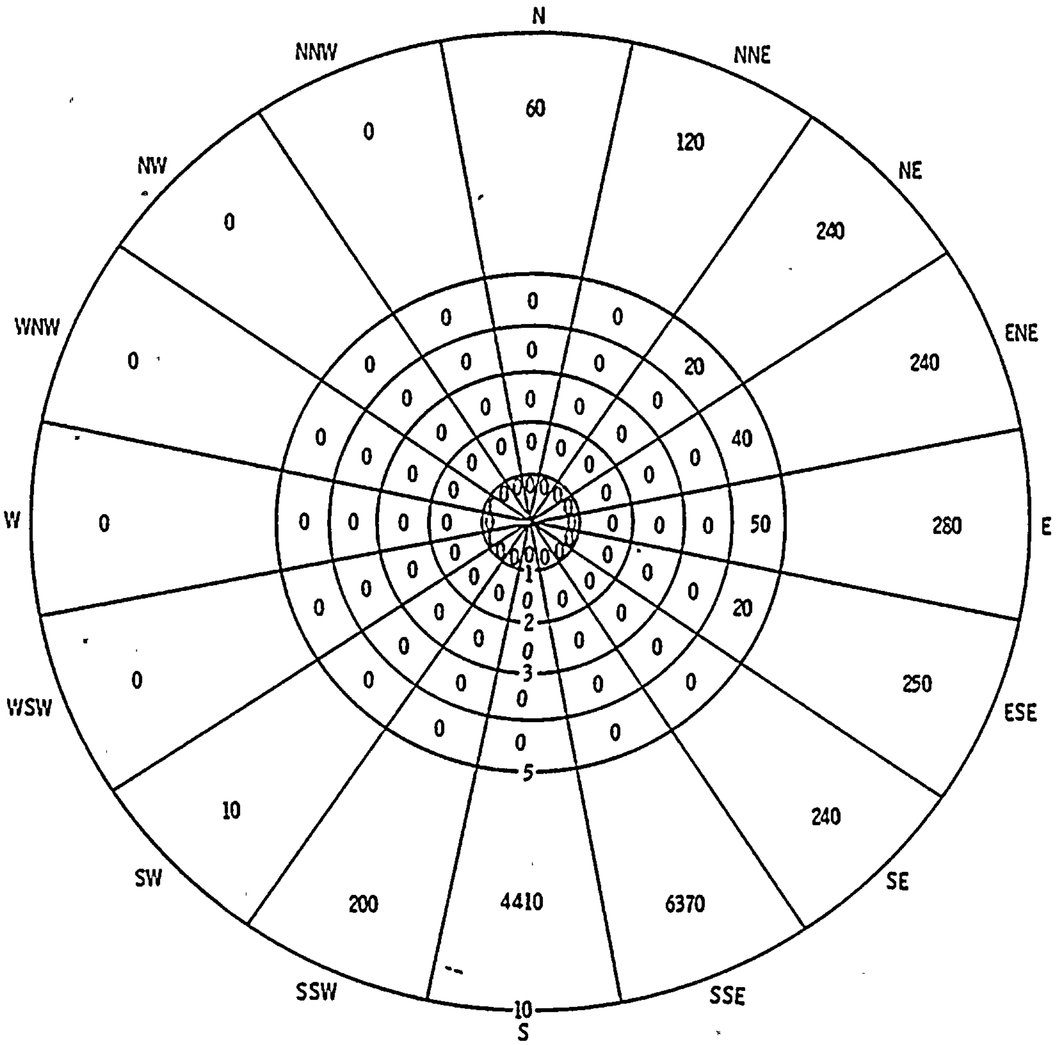
GEOGRAPHIC DISTRIBUTION
OF THE ESTIMATED 2000 POPULATION
WITHIN A 10-MILE RADIUS OF WNP-2

FIG. 2.1-12



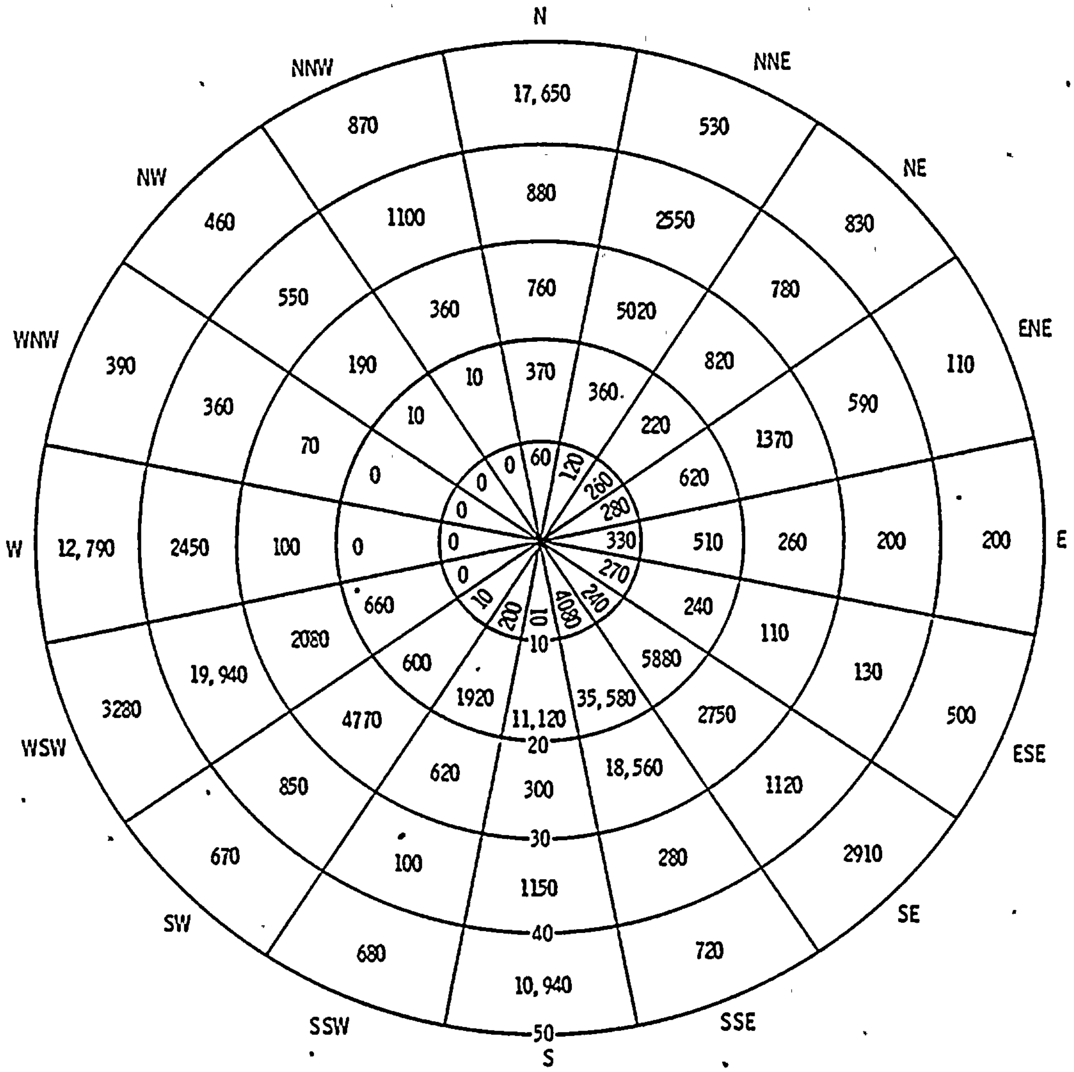
Amendment 1, May 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 2010 POPULATION WITHIN A 10-MILE RADIUS OF WNP-2
	FIG. 2.1-13



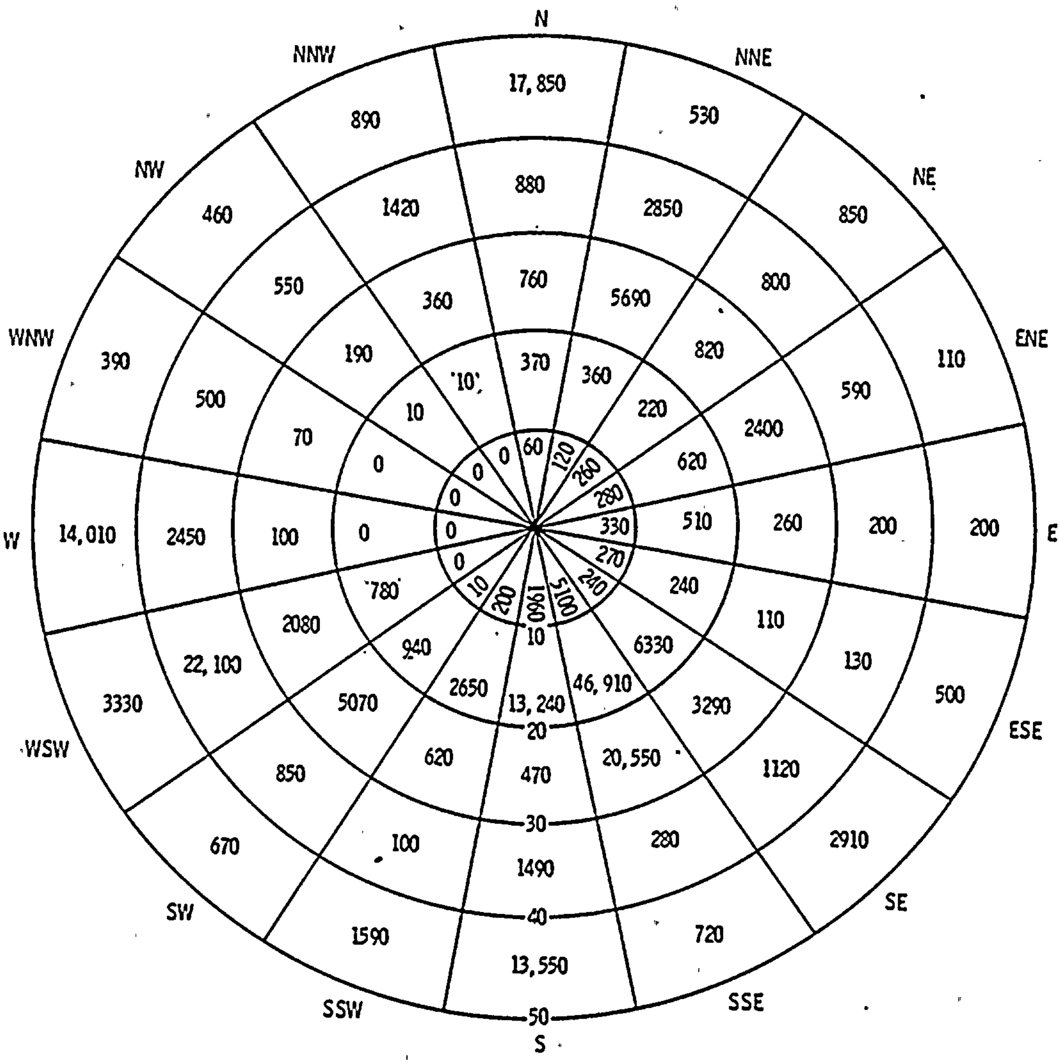
Amendment 1, 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 2020 POPULATION WITHIN A 10-MILE RADIUS OF WNP-2
	FIG. 2.1-14



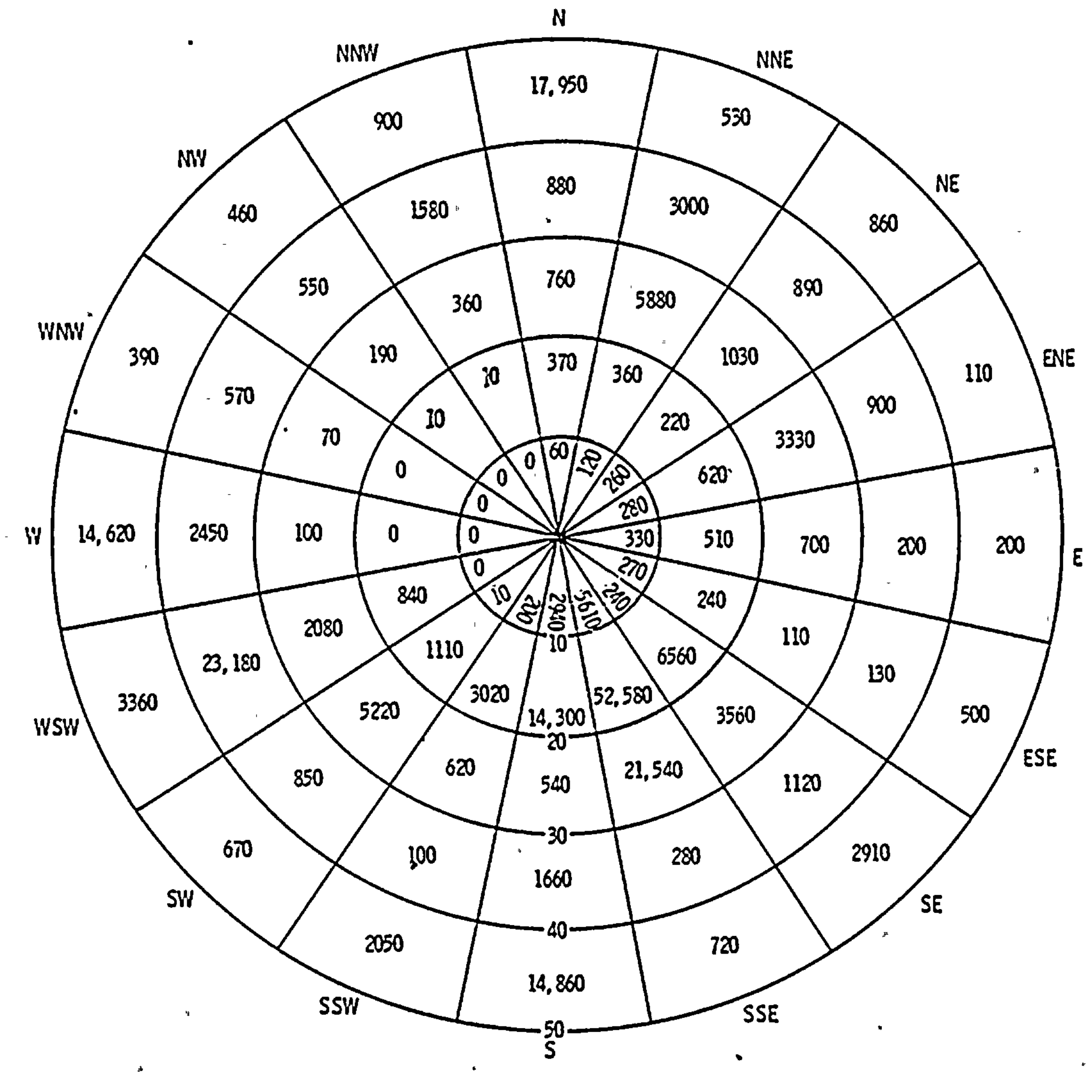
Amendment 1, May 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 1970 POPULATION WITHIN A 50-MILE RADIUS OF WNP-2 FIG. 2.1-15



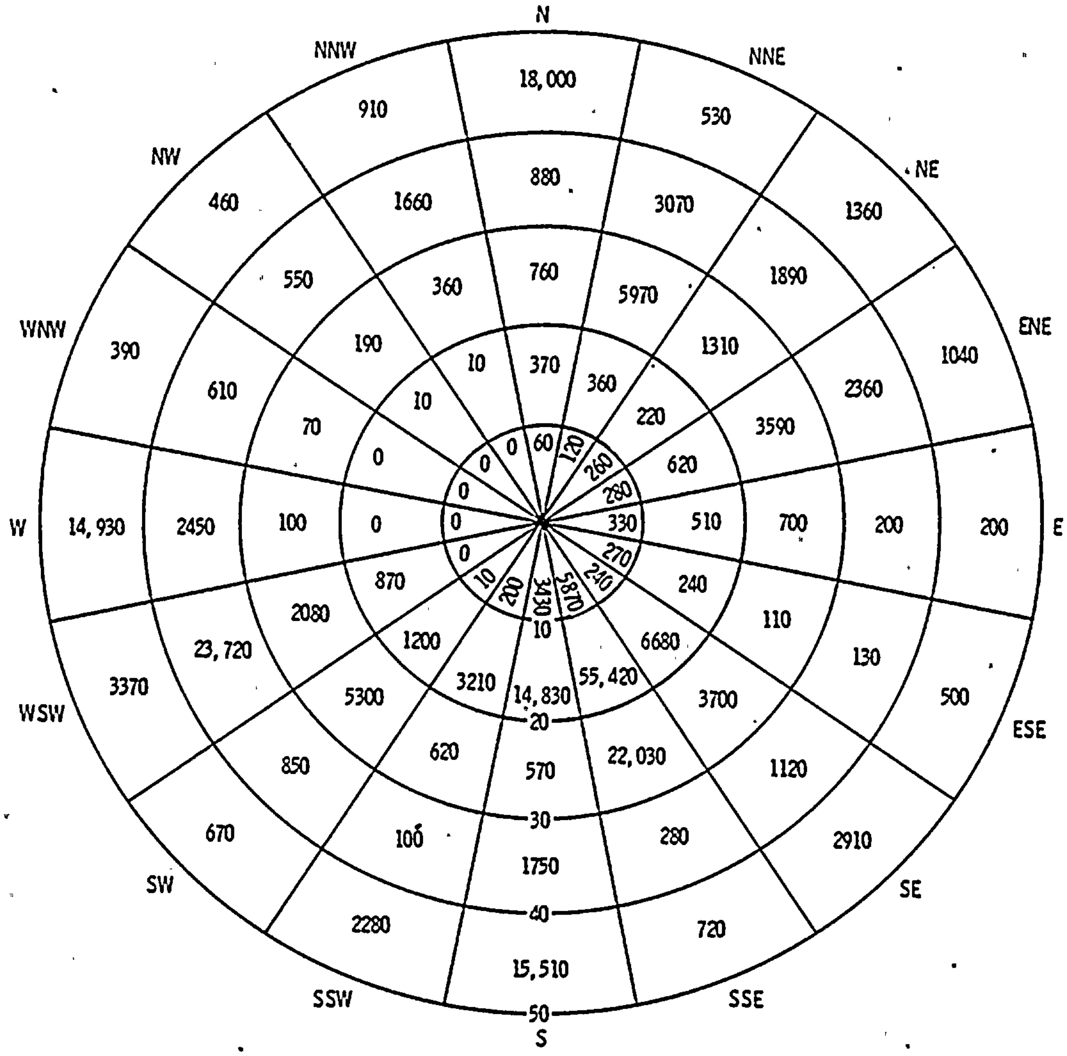
Amendment 1, May 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 1980 POPULATION WITHIN A 50-MILE RADIUS OF WNP-2
	FIG. 2.1-16



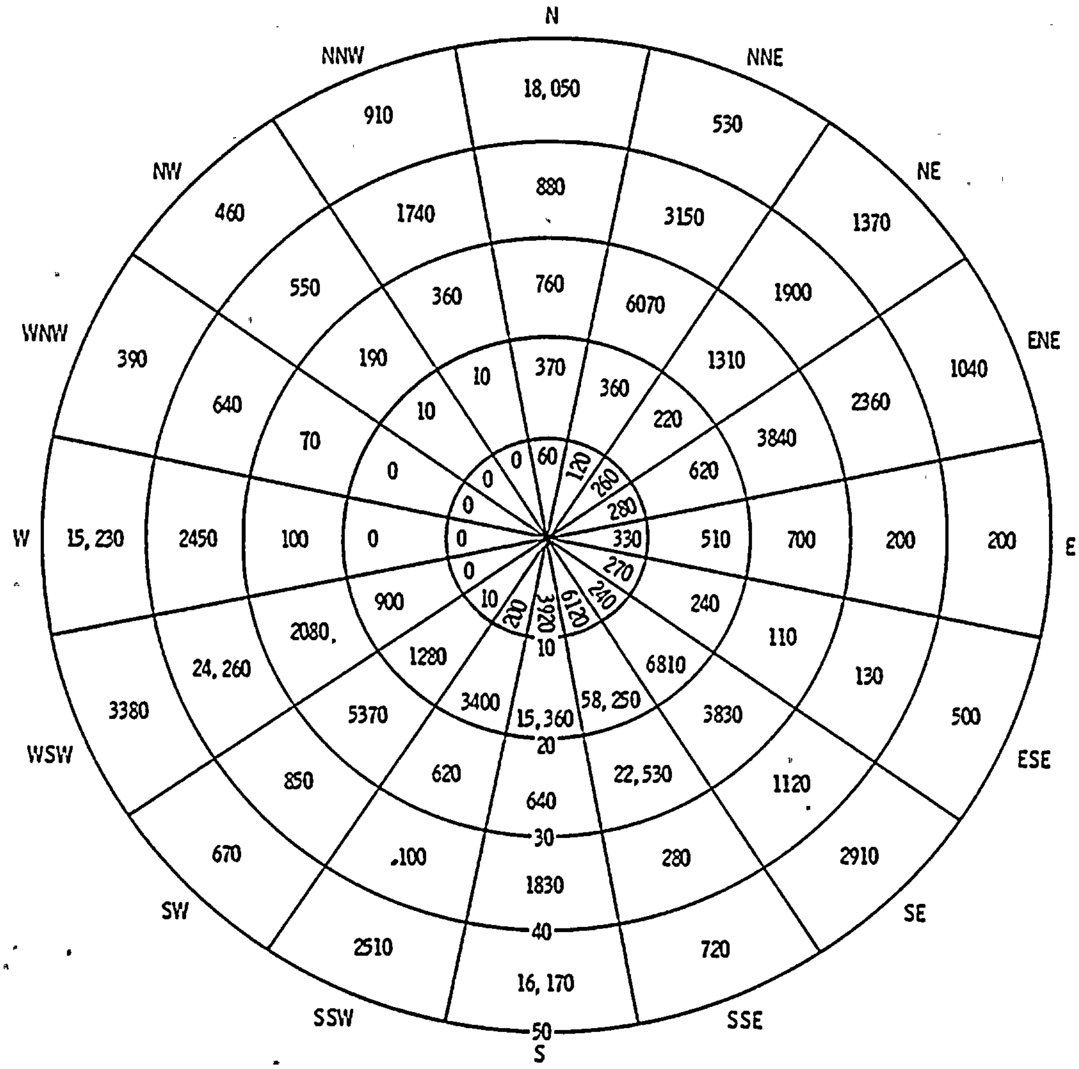
Amendment 1, May 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 1990 POPULATION WITHIN A 50-MILE RADIUS OF WNP-2
	FIG. 2.1-17



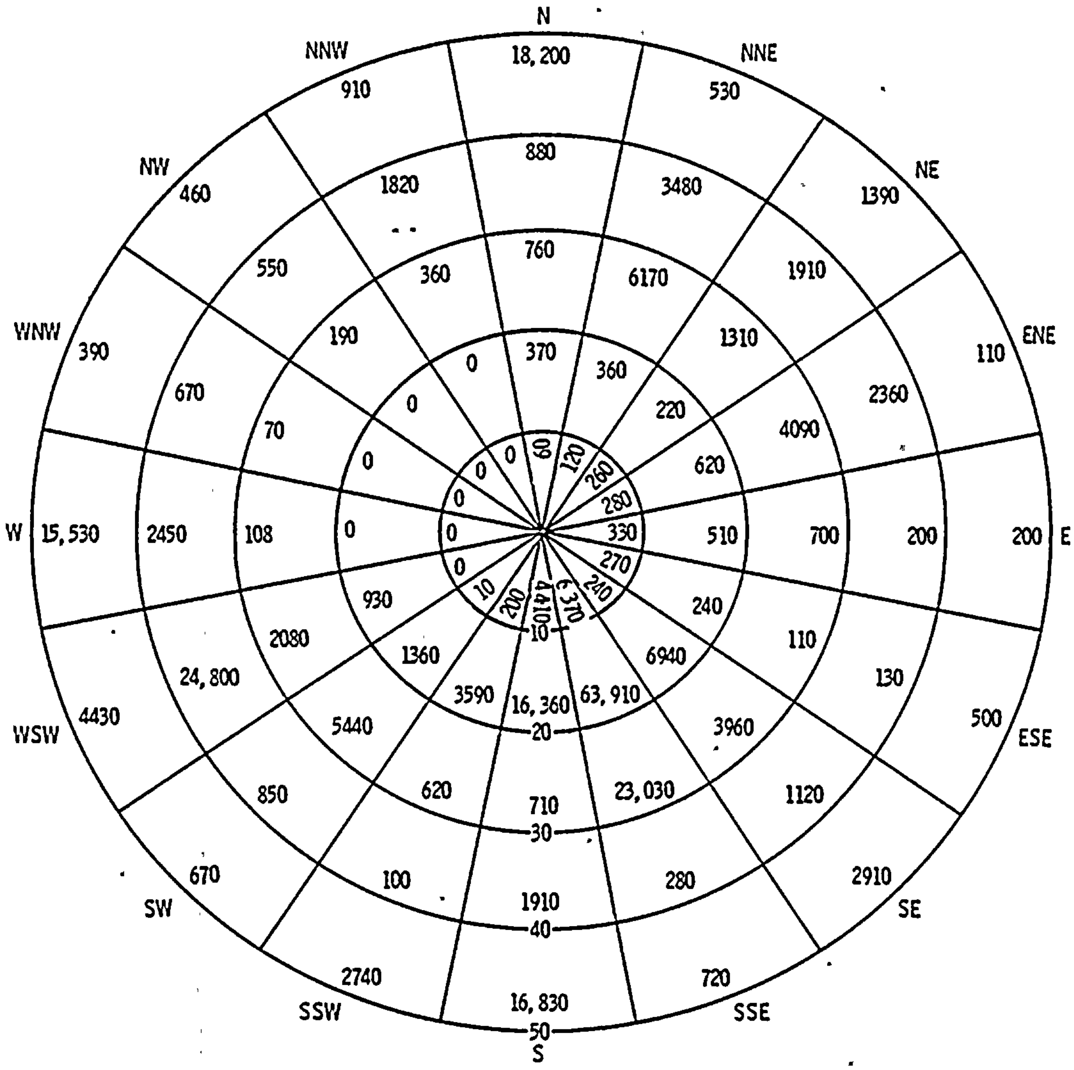
Amendment 1, May 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 2000 POPULATION WITHIN A 50-MILE RADIUS OF WNP-2
	FIG. 2.1-18



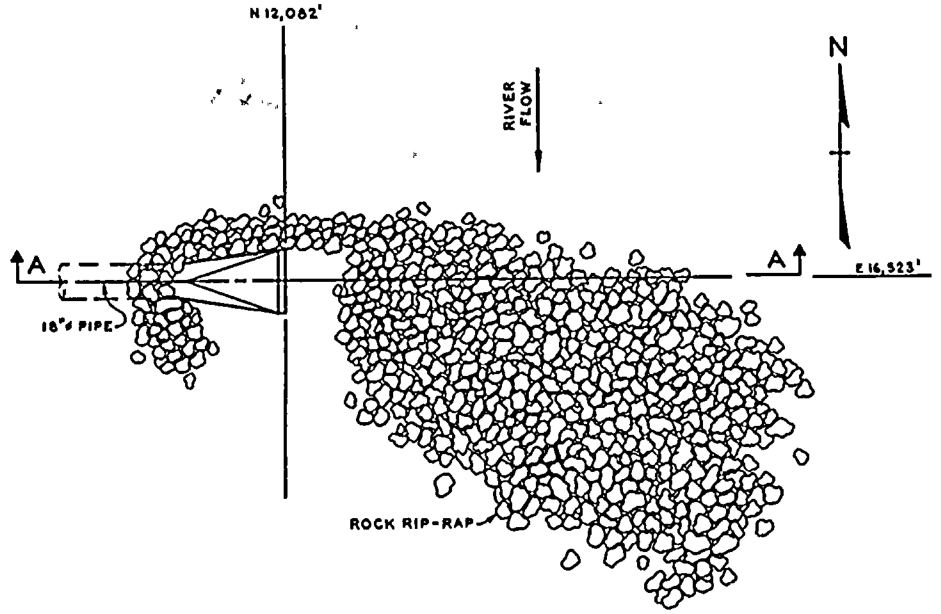
Amendment 1, May 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 2010 POPULATION WITHIN A 50-MILE RADIUS OF WNP-2
	FIG. 2.1-19

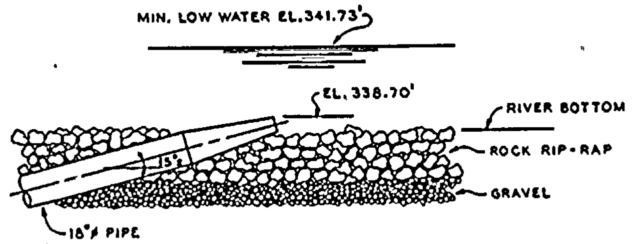


Amendment 1, May 1978

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	GEOGRAPHIC DISTRIBUTION OF THE ESTIMATED 2020 POPULATION WITHIN A 50-MILE RADIUS OF WNP-2
	FIG. 2.1-20



PLAN



SECTION A-A

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	RECTANGULAR SLOT DISCHARGE FIG.3.4-10

3.7 SANITARY AND OTHER WASTES

3.7.1 Sanitary Waste

The sanitary waste system has been designed on the basis of 100 persons, at 25 gallons per capita per day, producing a total maximum of 2500 gallons of wastewater per day. This will be processed and disposed of by means of septic tanks, a distribution box and a tile field facility located at about N11500, W600 (See Figure 2.1-4). The invert at the distribution box is at elevation 419.83 while the water table is at approximately 379.6. A septic tank and seepage pit are also located at the makeup water pump house. The invert will be at elevation 366.5 while the water table is at approximately 341.2.

The septic tank/tile field method of sanitary wastewater disposal is expected to have minimal environmental impact due to the good soil drainage characteristics above the ground water table.

3.7.2 Storm Water and Roof Drains

Storm water and roof drains will be collected in a separate drain system and routed to an evaporation/leach area located at about N12600, W325 (see Figure 2.1-4).

3.7.3 Filter Backwash Water

Periodically, filter backwash water from the makeup demineralizer system, is routed to the evaporation/leach area. The filters accumulate and store backwash water that is released at a flow rate of up to 525 gpm for a period of about 5 minutes per week.

3.7.4 Gaseous Wastes

During plant shutdown and outages, a fuel burning auxiliary boiler furnishes auxiliary steam and heating. In addition, three standby diesel generators will operate on an infrequent, intermittant basis. 1

The three standby diesel engine driven generators will be test run for about one (1) hour monthly. Also, each generator set will be operated at full load for 24 hours at least once during an 18month period. Two of the units consume 340 gph of fuel, each at full load, while the third will use 170 gph at full load. Assuming full load operation, with a fuel oil sulfur content of 0.4%, this equipment will exhaust about 1400 lbs of SO_2, 980 lbs of NO_x, and 34 lbs of particulates per year.

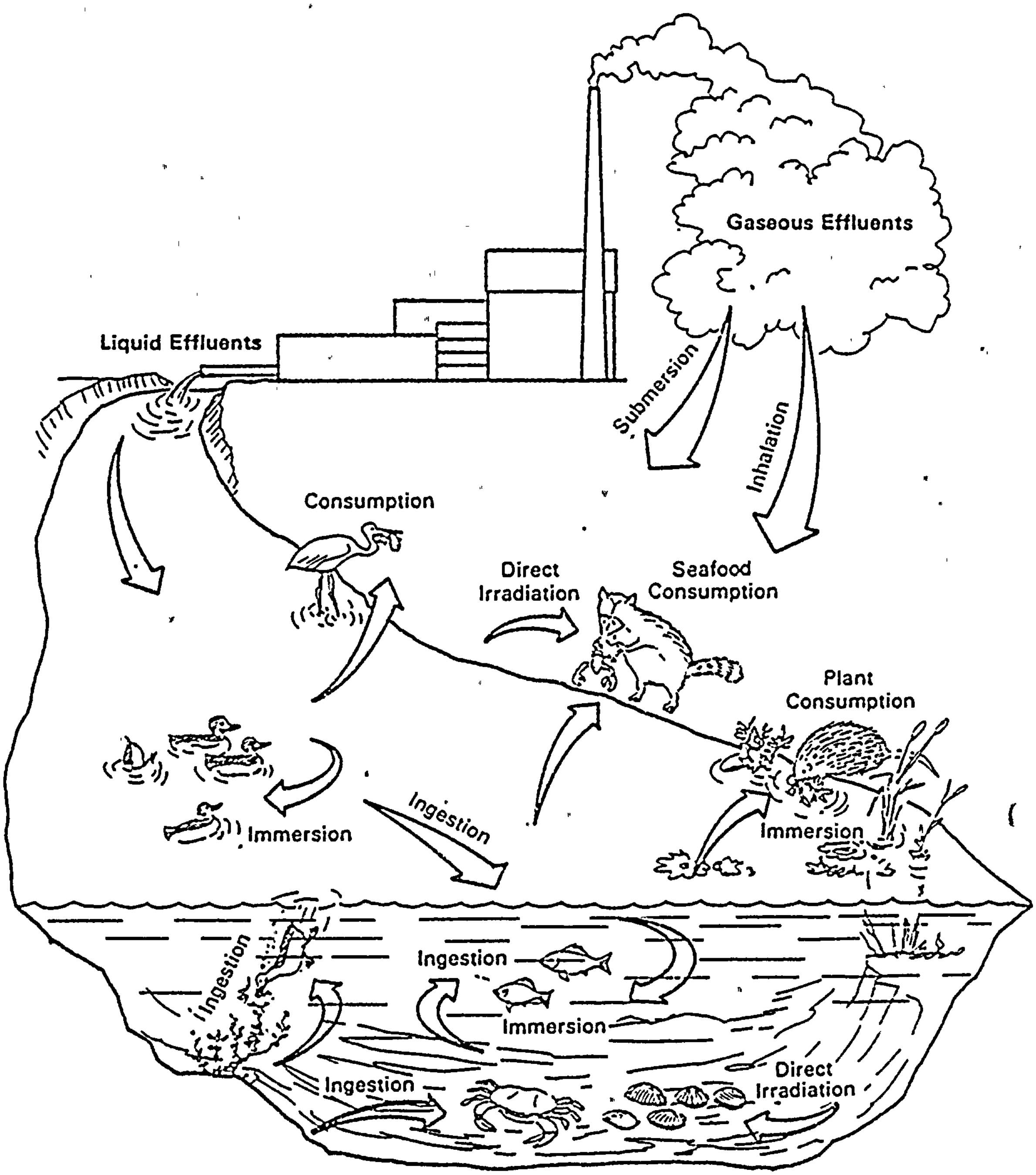
The heating boiler provides building heat and supplies steam to the radwaste system, when needed. It is expected that

the equivalent of only 3 months at 25% of full load operation,
will be required annually. The heating boiler, consuming
1 No. 2 fuel oil, containing 0.4% sulfur will produce approximately
13,650 lbs of SO_2, 9,800 lbs of NO_x, and 340 lbs of particulates
per year.

TABLE 5.2-15

ESTIMATED ANNUAL POPULATION DOSES ATTRIBUTABLE AT WNP-2 AND COMBINED RADIONUCLIDE RELEASES OF WNP-1, WNP-2 AND WNP-4

	Pathway	Total Body Dose Man-Rem WNP-2	Total Body Dose Man-Rem Combined	Remarks
	AIR			
	Submersion in Cloud	1.6	2.1	No credit taken for shielding.
	Direct Radiation	--	--	
3	Inhalation/Transpiration	2.3E-2	1.0E-1	
	Farm Products	6.9E-2	2.7E-1	
	WATER			
	Fish Consumption	3.9E-4	4.3E-4	Complete mixing in river was assumed.
3	Drinking Water	7.7E-4	8.0E-2	Complete mixing in river was assumed.
	Water Recreation	3.0E-4	3.0E-4	Complete mixing in river was assumed.
	Irrigated Farm Products	1.8E-4	8.0E-3	
	TRANSPORTATION OF RADIOACTIVE MATERIALS	5	15	From reference 8.



WASHINGTON PUBLIC POWER SUPPLY SYSTEM WPPSS NUCLEAR PROJECT NO. 2 Environmental Report	EXPOSURE PATHWAYS FOR ORGANISMS OTHER THAN MAN
	FIG. 5.2-1

TABLE 5.2-14

ANNUAL DOSES RECEIVED VIA MAJOR PATHWAYS FOR WNP-2 AND FOR WNP-2, WNP-1 AND -4 COMBINED

	Annual Dose (mrem)				
	WNP-2	WNP-1 & -4	Combined	Appendix I Limits per Reactor	
AIR PATHWAY					
Air Submersion[(a)]					
Total Body	0.47	0.38	0.85	5	
Skin	0.84	0.60	1.4	15	
Infant's Thyroid[(b)]	9.1	1.8	11	15	
Nearest Resident[(c)]					
Thyroid	2.0	0.37	2.4	15	3
Total Body	0.15	6-8E-2	0.22	10	
LIQUID PATHWAY					
Drinking Water					
Total Body	1.7E-5	1.8E-3	1.8E-3	3	
Fish Consumption					
Total Body	2.2	6.2E-2	2.3	3	
Bone	1.6	4.0E-8	1.6	10	
Nearest Resident[(d)]					
Total Body	0.10	2.9E-2	0.13	3	
All Others	<0.10	<3.0E-3	~0.1	10	
AIR DOSE (mrad/yr)[(e)]					
Gamma Air Dose	2.9	-	-	10	
Beta Air Dose	1.9	-	-	20	

(a) Located 3.5 miles ESE of WNP-2.
(b) Milk and inhalation at nearest residence.
(c) Inhalation, air submersion, ingestion of farm products, contaminated ground.
(d) Swimming, boating, shoreline, ground contamination, ingestion of farm products.
(e) At a location 0.5 miles southeast of the plant.

TABLE 5.2-13

CUMULATIVE POPULATION, ANNUAL POPULATION DOSE, FROM SUBMERSION IN AIR CONTAINING RADIONUCLIDES FROM THE WNP-2 AND COMBINED RELEASES OF WNP-2 AND WNP-1 AND -4

Radius (miles)	Cumulative Population (2020)	Cumulative Annual Population Dose (man-rem)		Annual Average Dose (mrem)	
		WNP-2	Combined	WNP-2	Combined
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	130	0.0086	0.010	0.066	0.078
10	12,650	0.44	0.56	0.035	0.045
20	108,060	1.3	1.8	0.012	0.016
30	157,760	1.5	2.1	0.0093	0.013
40	201,270	1.5	2.1	0.0075	0.010
50	267,790	1.6	2.2	0.0058	0.0081

The annual population dose from all sources attributable to all three plants operating simultaneously is 18 man-rem. By comparison the background radiation dose rate from natural sources in this region is approximately 105 mrem/yr,[a] resulting in an annual dose of 28,000 man-rem to the same population. Therefore, routine operations of the WNP-1, WNP-2 and WNP-4 operating simultaneously at this site, will contribute a very small increment to the total-body dose already received as a result of the natural background radiation.

3

(a) Approximately 80 mrem/yr from external sources and 25 mrem/yr from internal sources (mostly K-40)[8]

Construction workers at WNP1 and WNP-4 will receive some radiation dose due to the operation of WNP2. If an individual were to work 0.5 mile from WNP-2, he would receive a total-body dose of 2.5 mrem/yr from N-16 turbine shine.[10] This worker would also receive about 0.7 mrem/yr due to the airborne release of radioactive material from WNP-2. When WNP-2 begins operation, approximately 3200 construction workers will be building WNP-1 and WNP-4. If these workers are located an average of 1 mile from WNP-2, the total-body radiation dose to those workers would be 4.4 man-rem/yr.

Transportation of Radioactive Materials

Since the locations of fuel fabrication plants, reprocessing plants and waste disposal facilities have not been determined, transportation routes have not been decided. However, a generic study[8] has estimated that radiation dose rates to the general public from transportation of radioactive materials will not exceed 5 man-rem/yr per unit. It is expected that the value estimated from the actual routing of the plant's radioactive material transport will be lower than this since much of the route will be through sparsely populated regions of the western United States or the waste may not be transported outside of the Hanford Reservation.

5.2.5 Summary of Annual Radiation Doses

Table 5.2-14 lists the annual radiation doses received by individuals residing near the site from the major pathways. It is conceivable that one individual residing at Taylor Flat could be exposed simultaneously via several pathways. If this individual were an avid fisherman, drank milk from the nearest cow and ate farm products affected by plant effluents (liquid and airborne), he might receive a total-body radiation dose of 2.3 mrem/yr, a thyroid dose of 2.4 mrem/yr and a bone dose of 1.8 mrem/yr.

The estimated annual doses to the population affected by the operation of the WNP-2 and the combined operation of WNP-2, WNP-1 and WNP-4 are given in Table 5.2-15. The total population dose estimate includes the transportation of radioactive materials (spent fuel and wastes) from the plants as well as the doses received via the air and water pathways. The dose to the population from the direct radiation from the plants is assumed negligible, since the closest point to the site continuously occupied is more than 3 miles away from any one plant, and the point occupied intermittently by a fisherman is more than 2 miles.

5.4 EFFECTS OF SANITARY WASTE DISCHARGES

The amount of sanitary waste processed at the plant is quite small relative to the capacity of the soil to accommodate these wastes. Consequently, the environmental effects of sanitary waste discharge due to the operation of WNP-2 are negligible. Less than 2 gpm of sanitary waste will be generated at maximum operation of the facility. By comparison, WNP-1 and -4 will generate about 3 gpm.(1)

The disposal of the sanitary wastes to a septic tank and subsequent discharge to tile fields will have no measurable effect on the water quality or biota of the Columbia River. The arid climate and porous ground result in satisfactory drainage without the waste surfacing due to ground saturation or plugging. Proper design of the tile fields results in ample disinfection before the liquids enter the water table and eventually the Columbia River. The maximum nutrient loading to the river under steady conditions would be 0.5 lb/day of nitrogen and 0.2 lb/day of phosphorus. | 1
This waste loading would cause an increase in concentration for these constituents of less than 0.003 ppb for the lowest river flow. This compares with ambient concentrations of from 20 to over 1000 ppb.

Much of the liquid will not enter the water table (60 feet | 1
below the ground surface) because the moisture in the ground at the shallow depths of the leach lines moves toward the surface due to evaporation and evapo-transpiration. Contamination of the groundwater by pathogenic bacteria, if it occurs, will be restricted to within a few feet of the tile field where saturated flow conditions exist. All of the plant water for normal operation of WNP-2 comes from the Columbia River rather than groundwater sources. A well will supply makeup to the makeup water filters during outages and | 1
emergencies. Because of the limited use of groundwater at the site and because of the limited zone of potential contamination of groundwater by tile field drainage, the operation of the sanitary tile fields will have not measurable effect on the overall groundwater resources outside the plant boundary.

The sanitary waste disposal system will conform to applicable State and County regulations, and will comply with the Washington State Site Certification Agreement which requires that sanitary wastes not enter State waters.

5.5 EFFECTS OF OPERATION AND MAINTENANCE OF THE TRANSMISSION SYSTEM

Effects of operating and maintaining the transmission lines are expected to be as described in the FES for the construction permit stage. However, the H. J. Ashe substation which is being constructed by the Bonneville Power Administration to handle the WNP-2 500 KV transmission line and 230 KV start-up line has not been described and assessed previously. The Ashe substation is located about 1/2 mile due north of WNP-2. The substation requires about 37 acres of land with a 2000-ft long access road requiring about 1 acre. The Ashe substation is scheduled to be completed just prior to the startup of WNP-2. NEPA requirements for the construction and operation of the Ashe substation and transmission lines serving WNP-2 are being addressed by the Bonneville Power Administration.(1)

6.1.4.2 Land Use and Demographic Surveys

Land use in the immediate vicinity of the WNP-2 site is
under the control of Department of Energy (previously ERDA), 1
and the staff of the Richland Operations Office provided the
source material required for land use descriptions of Hanford
Project facilities. Additional information related to off-
project land uses was obtained primarily from the Bureau of
Reclamation Regional Office, which is responsible for much
of the land development in surrounding areas, from the Soil
Conservation Service, and from the Washington State Depart-
ment of Agriculture. Some information was provided by the
County Planning Offices in adjacent counties; however, this
was generally related to county zoning rather than actual
current land use. The collected published data were supple-
mented with information obtained from personal conversation
with county planning and other local, county, State and
Federal agency officials and through reconnaissance surveys
of those areas where missing or questionable data were
concerned.

Demographic data for the latest census year (1970) were obtained from Bureau of the Census publications. Information for population projections was available from the Washington State Office of Program Planning and Fiscal Management,[39] the Portland State University Center for Population Research and Census,[40] the Bonneville Power Administration,[41] the Pacific Northwest River Basins Commission,[42] Pacific Northwest Bell,[43] and the Tri-City Nuclear Industrial Council.[44] Rural population trends were based also on estimates developed for the Columbia Basin Development League.[45] Information from these sources were used by the Applicant to project population for future census years over the expected life of the plant.[46,47]

In conjunction with the construction of WNP-1 and -4, the
Applicant is conducting a program to monitor the socioeconomic
effects. The results of this study will be partially appli-
cable to WNP-2. The purpose of the study is to document,
assess, and project the primary and secondary socioeconomic
effects and impacts of construction and operation of WNP-1
and -4. Two phases are defined in implementing the study.
The first phase will emphasize measurement and documentation
of socioeconomic effects into the peak of construction of 1
the WNP-1 and WNP-4 projects. Preliminary reports will be
on an annual basis for each of these years. The second
phase of the study will be to prepare a final report which
will: 1) make an evaluation of the accuracy of a previously
conducted impact projection report and 2) make new pro-
jections, if found necessary, independent of the previous
study, based on updated information developed in the pre-
liminary reports.[46,47]

The important socioeconomic factors expected to be studied in detail are listed below:

- in-migrant workers and families
- resident workers and families
- the relationship between contract construction on WNP-1 and -4 and secondary employment
- economic conditions in the study area
- schools
- housing
- government services and facilities
- traffic flow and transportation
- social and health services
- police and fire protection

6.1.4.3 Terrestrial Ecology

The important local flora and fauna are being identified to the species level,
1 and the relationships of the fauna to the vegetation and to the salient cli-
4 matic and soil features of the local environment are being described (48-51).
The Bald Eagle is the only threatened animal species to occur in the area. No other Federally designated threatened or endangered animals or plants live in
2 the area. Recommendations will be made to preserve special habitats necessary for the continued protection of such species should they occur. The important shrub-steppe food chains are also being identified.

The preoperational monitoring program will focus on establishing a baseline
1 for evaluating cooling tower drift effects.

Aerial Photography. Aerial photographs in natural and infrared color of the site and adjacent area were made by the Supply System to provide a basis for mapping the extent of existing plant communities between the plant site and the Columbia River. Photography is not believed to be sophisticated enough to detect incipient changes due to cooling tower drift but, if done repeatedly,
4 1 it may reveal destructive vegetational damage over a long period of years. In the year preceding plant operation, the site will be photographed during the seasonal peak of plant growth in early May, meteorological conditions permitting.

Vegetational Analyses. A program to establish a data base for terrestrial ecosystems in the vicinity of WNP-1, 2, and 4 was initiated in 1974.[48] 4
Vegetation recovery study areas were established at five locations within approximately one mile of the site. Two of these plots are located within an area burned by wildfire in 1970 and three are in areas that escaped the fire. Figure 6.1-2 shows the location of terrestrial ecology study sites. Knowledge from these studies will apply to construction impacts because the 1970 fire was extremely hot, destroying virtually all plant life and all seeds which would have normally germinated the next year. As with construction areas, vegetation of these areas depends on new seeds blowing in from unburned areas.

Species composition and relative abundance of seed plants at the five study plots were measured according to a canopy cover method of vegetational analysis developed for shrub-steppe and meadow-steppe vegetation.[38] The percent of canopy (ground) cover provided by various botanical categories for 1975 through 1978 is shown in Figure 6.1-4.

The dominant species in burned and unburned areas is cheatgrass (Bromus tectorum) which comprises almost all the annual grass category. The primary productivity (grams of dry matter produced per square meter per year) of the Hanford bitterbush-cheatgrass ecosystem is similar to other United States arid 4
land ecosystems.[51] The data presented in Figure 6.1-5 reflects that primary productivity varies from year to year depending upon the weather and other environmental variables.

The preoperational monitoring program will include continued analyses of plant communities on the five (5) previously established study plots. Field examination of these plots and a control will be conducted yearly at the time of peak flowering. Primary productivity, canopy cover, and frequency of occurrence will be obtained. 1

The emphasis of preoperational studies will be to establish a baseline for assessing impacts on indigenous vegetation caused by cooling tower drift. Vegetation study plots for litterfall analysis will be established adjacent to the soil sampling plots discussed in Section 6.1.4.1. The species studies will be sagebrush and bitterbrush. Both are long-lived evergreen shrubs about 0.75 meters tall that put on new leaves every year. Leaves are dropped more or less continuously throughout the year and can be collected in specially designed litterfall collectors. Means and standard errors will be calculated for litterfall collections. The collected material will be pooled, dried, and chemically analyzed for mineral content. These litterfall studies will commence one year prior to plant operation.

Animal Studies. Studies have focused on censuses of mammals and birds in the vicinity of the site. Small mammal populations were sampled using a live trap-mark-release-recapture technique in two contrasting plant communities. One is a burned community, dominated by cheatgrass, and the other is an unburned, shrub-dominated community (Figure 6.1-2). Trapping is done periodically throughout the year to obtain information concerning the seasonal appearance of young animals. The weights, age, sex, general health, and the occurrence of external parasites are recorded before release.

The small mammal population is dominated by one species, the Great Basin Pocket Mouse. The pocket mouse population varies greatly accordingly to the season of the year. The largest population normally occurs in late summer with the addition of young animals. A comparison of pocket catches in burned and unburned study plots is shown below:

1

	Unburned		Burned	
Year	Spring	Summer	Spring	Summer
1974	--	46	--	29
1975	36	27*	27	13*
1976	52	53	8	2
1977	43	30	7	14
1978	15	56	1	5
	37	42	11	13

*Trapping session conducted in July

These data indicate that a large population of pocket mice resides in the unburned plot and only a small population resides on the burned plot. It is not known if the small population on the burned plot is a result of the burning or whether some other factors are involved, i.e., predation.

An aerial census of larger mammals, i.e., deer and coyote, was made once in winter to obtain an estimate of the use of the local areas.

Bird surveys have been taken on a twenty (20) acre study plot near WNP-2. Only three resident species were spotted during a three-day period in June 1976. The total was fourteen (14) Western Meadowlarks, six (6) Horned Larks, and two (2) Shrikes. The 1977 and 1978 results are similar to those of 1978.[51]

4 These preliminary studies have revealed no detrimental effects of plant construction on the indigenous animal and bird populations. Plant operation is expected to be less disruptive and detrimental than plant construction.

The approach in the thermal-hydraulic analysis was to select realistic values for those key assumptions normally used in the Safety Analysis Report in which very conservative estimates are made. Other assumptions which are of lesser significance use values as described in the SAR or in NRC regulatory guides. Where parameters are not specifically mentioned, NRC assumptions, whose inherent conservatism has been well documented, have been employed. Peak clad temperatures were calculated for a spectrum of break sizes.

The realistic analysis shows no heatup of fuel into the perforation range. The parameters used to predict the activity released to the environment are:

1. no fuel rods are damaged,
2. fission products released are a result of coolant activity and spiking activity from reactor shutdown,
3. primary containment leak rate is 0.5% per day,
4. reactor building leak rate is 100% per day,
5. plateout and condensation effects are assumed to reduce the source term by a factor of 4,
6. standby gas treatment system filter efficiency is 99.9% for I_2 and CH_3I and 0% for noble gases.

7.1.8.1.2 Estimated Dose

The dose calculated for this accident is shown in Table 7.1-2.

7.1.8.1.3 Probability Considerations

Based on estimates of pipe failure rates contained in the literature and on the number of pipes that satisfy the conditions for a large break design basis accident, the probability of a large break is within the range of an emergency condition (See Section 7.1.11.)

The probability that an HPCS diesel generator will be unable to start when desired should also fall within the range of an emergency condition based on an analysis using failure rates from references 5, 6, and 7 considering anticipated downtime and the interval between HPCS diesel tests.

Since each probability is low and the outcomes are not critically interdependent, the joint probability of pipe break and HPCS failure is expected to be very low so as to place this event in the fault condition. (See Section 7.1.11).

7.1.8.2 Steam Line Break Accident (SLBA)

The postulated accident is a sudden circumferential severance of one main steam line outside the containment. This results in steam being released to the steam tunnel and the turbine building.

7.1.8.2.1 Estimated Release

The mass of coolant released during the 4 second isolation valve closure time is 23,000 pounds of steam. Because there is no fuel damage during this accident, the iodine released to the turbine building is proportional to the amount of steam released.

Based on past BWR operating experience, the I-131 coolant activity is assumed to be 0.005 ci/gm with corresponding amounts of I-132 and I-135.

7.1.8.2.2 Estimated Dose

The dose calculated for this accident is shown in Table 7.1-2.

7.1.8.2.3 Probability Considerations

The design basis main steam line break accident postulated complete severance of one of the main steam lines while the reactor is at power followed by total isolation of the break within four seconds. The probability of this event is essentially the probability of the severance. Based upon estimates of pipe failure rates contained in the literature[8] and considering the number of locations where the rupture could occur in the main steam system, the probability of pipe severance should be well within the "emergency category" (See Section 7.1.11.)

7.1.8.3 Control Rod Drop Accident (CRDA)

The postulated accident is a reactivity excursion caused by accidental removal of a control rod from the core at a rate more rapid than can be achieved by the use of the control rod drive mechanism. In the CRDA, a fully inserted control rod is assumed to fall out of the core after becoming disconnected from its drive and after the drive has been removed to the fully withdrawn position. The design of the control rod velocity limiter limits the free fall velocity to 3 ft/sec. Based on this velocity and assuming the reactor is at full power, the maximum rod worth is approximately 1%, resulting in the perforation of less than 10 rods.

quirement was not calculated. Energy requirements for the acrolein system would be comparable to the intermittent chlorination system.

10.5.6 Effect on Capacity Factor

None of the alternatives considered would have any effect on the plant capacity factor.

10.5.7 Monetized Cost

The annual cost of the alternatives were not calculated because of the lack of real value of the alternatives.

10.5.8 Environmental Effects

The composition of the cooling tower blowdown water with biological control by means of intermittent chlorination or intermittent chlorination combined with mechanical cleaning would be essentially identical. The environmental effects of small quantities of acrolein or acrolein neutralized with sodium sulphite have not been fully explored.

10.6 SANITARY WASTE SYSTEM

The WNP-2 sanitary waste system has been designed on the basis of 100 persons, at 25 gallons per capita per day, producing a total maximum of 2500 gallons of waste water per day.

10.6.1 Range of Alternatives

The design for the WNP-2 sanitary waste treatment system is described in Section 3.7. Alternative methods for the disposal of nonradioactive sanitary waste include:

a. Municipal Sewage Plant

Disposal of WNP-2 sanitary waste to a municipal waste treatment facility would result in no disposal facilities at the site. However, the nearest municipal plant is some 12 miles remote and would present extreme problems in the transport of the sewage, cost of the pipe line and maintenance of the remote pumping systems.

b. Biological Sewage Treatment Facility

A standard package type biological treatment facility of the extended aeration type could be provided. This type of system would include aeration of the incoming waste with recycled activated sludge, gravity separation of the biological floc and excessive sludge. The clarified supernatent would be discharged to the Columbia River.

10.6.2 Alternatives Compared Based on Short Term Environmental Effects

The short term environmental effects due to construction would be negligible in the case of the biological sewage treatment plant. Short term effects of the pipe line would be the normal disruption of soil and vegetation caused by the construction of buried utilities.

10.6.3 Alternatives Compared Based on Long Term Environmental Effects

There would be no measurable alternative environmental effects if the waste were transported to a remote municipal sewage facility. Barring operator error or mechanical failure there would be no significant environmental effects upon the Columbia River (minimum licensed flow of 2.3×10^{10} gpd) from the discharge of an anticipated maximum of 2500 gallons of treated waste water per day.

10.6.4 Selected System

The recommended septic and tile field system described in Section 3.7.1 was chosen for the following reasons:

a. It provides the simplest and most reliable system.

b. The environmental impact of discharging approximately 2500 gallons per day of sanitary waste water to a subsurface tile field would be negligible. No sanitary waste would be discharged to the Columbia River.

10.6.5 Power Consumption

Power costs associated with the transport of 2500 gallons per day would be very small. Power requirements for an extended aeration type biological treatment facility would be about 1 hp.

10.6.6 Effect on Capacity Factor

None of the alternatives considered would have any effect on the plant capacity factor.

10.6.7 Monetized Cost

A cost comparison for the alternative systems was not made because of the large range in costs. Incremental costs associated with transport to the municipal facility would be extremely great while incremental costs associated with disposal by means of a package sewage treatment facility would be negligible.

The annual cost of the alternatives was not calculated because of the small size equipment involved and the lack of value.

10.6.8 Environmental Effects

The addition of approximately 2500 gallons of sanitary waste water per day would have a negligible effect upon local sewage treatment facilities. Similarly, when properly operated, with all components functioning as designed, the extended aeration type biological waste water treatment plant effluent would have no perceptible effect on the Columbia River. The discharge from the selected system to the permeable soils at the site is expected to have the least environmental effect of the alternatives.

10.7 LIQUID RADWASTE SYSTEMS

The design of the plant limits the quantities of radioactive materials in effluents including liquid wastes to levels which are within the numerical guides for design objectives and limiting conditions of operations set forth in 10CFR50, Appendix I, as indicated in Sections 3.5 and 5.2.

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