

Docket

JUN 24 1975

R. C. DeYoung, Assistant Director for Light Water Reactors,
Group 1, RL

WPPSS 3, 5 SKR INPUT FROM AAB

PLANT NAME: WPPSS 3, 5
LICENSING STAGE: CP
DOCKET NUMBER: 50-508/500 ⁵⁰⁹
MILESTONE NUMBER: 24-31
RESPONSIBLE BRANCH: LWR 1-3; P. O'Reilly, LPM
REQUESTED COMPLETION DATE: June 16, 1975
DESCRIPTION OF RESPONSE: AAB SKR Input Complete

Enclosed is input material for the following sections of the WPPSS
3, 5 Safety Evaluation Report:

- 2.1 Site Description and Demography
- 2.2 Nearby Industrial, Transportation & Military Facilities
- 3.5.1 Tornado Missiles
- 3.5.2 Turbine Missiles.

Input material on control room habitability and radiological consequences of design basis accidents will be forwarded at a later date. The applicant has not yet provided an adequate description of engineered safety features and his LOCA dose model. CSB must also complete their review of the bypass leakage and shield building and ECCS area pressure transients before AAB can complete the dose calculations.

This review was coordinated by F. Kantor of the Accident Analysis Branch.

Original Signed by
H. R. Denton

Harold R. Denton, Assistant Director
for Site Safety
Division of Technical Review
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: See next page

8605290507 750624
PDR ADOCK 05000508
E PDR

JUN 24 1975

R. C. DeYoung

- 2 -

cc: w/o enclosure

A. Giambusso

W. McDonald

J. Panarella

w/enclosure

S. Hamner

F. Schroeder

R. Boyd

O. Parr

P. O'Reilly

TR A/D's

TR T/C's

SS B/C's

S. Varga

R. Klecker

D. Eisenhower

K. Murphy

K. Campe

H. Fontecilla

F. Kantor

E. Adams

Distribution:

Central Files ✓

NRR/Reading

AAB/Reading

OFFICE	AAB/SS/TR	AAB/SS/TR	AD/SS/TR			
NAME	F. Kantor/vg	B. Grimes	H. Deaton			
DATE	6/19/75	6/23/75	6/23/75			

WPPSS 3, 5 SER

2.0 Site Characteristics

2.1 Geography and Demography

2.1.1 Site Location

The site is located in southeastern Grays Harbor County, Washington, one mile southeast of the confluence of the Satsop and Chehalis Rivers. The site is approximately 16 miles east of Aberdeen, Washington, and 26 miles west-southwest of Olympia, Washington. The geographic location of the site is shown in Figure 2.1.

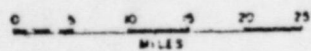


Figure 2.1
Site Location

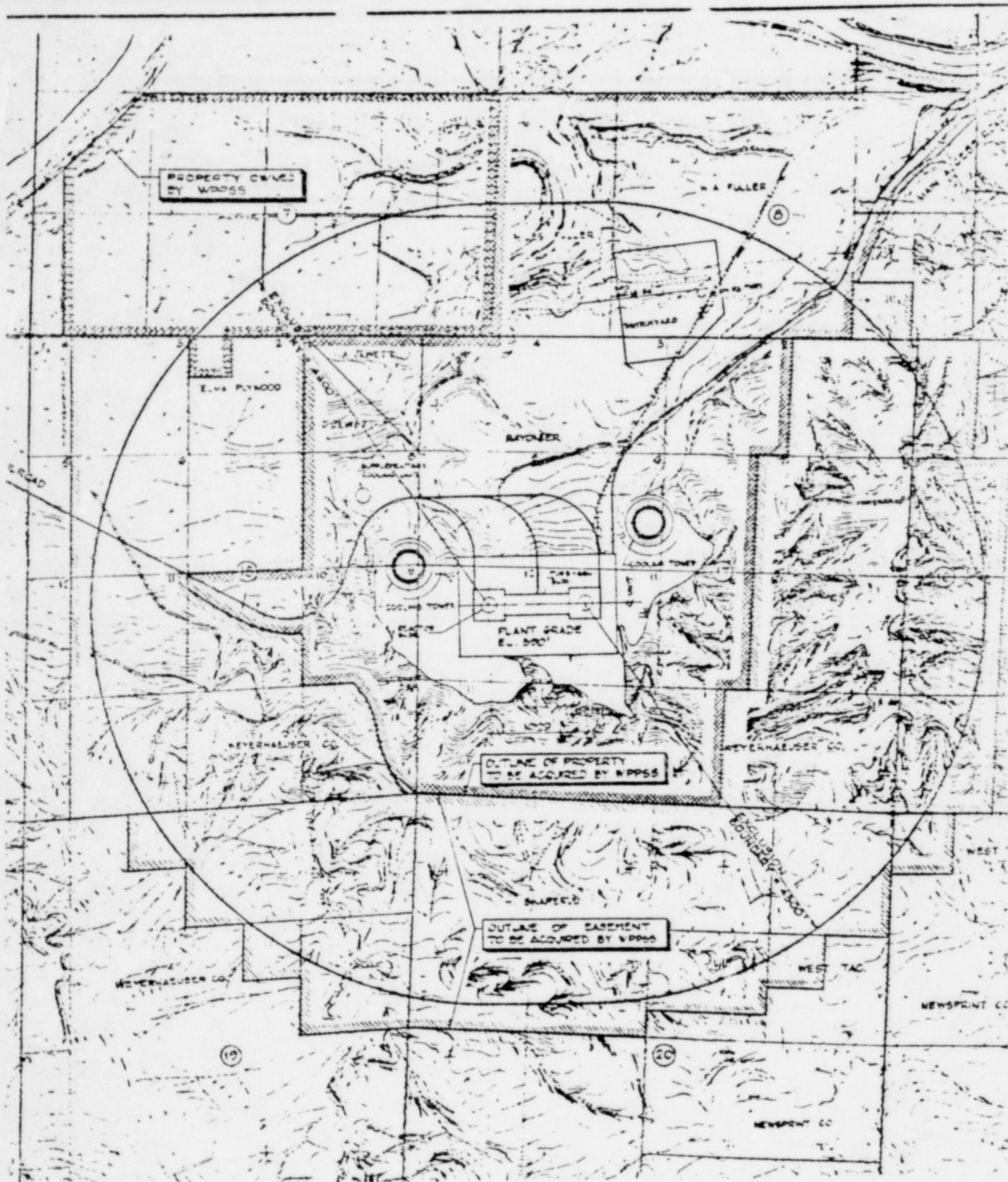


Figure 2.2
Site Property Limits and
Exclusion Area

2.1.2 Site Description and Exclusion Area Control

The site consists of 2450 acres, the largest part of which is located on a ridge above the Chehalis River. The planned location of the plant structures is at an elevation of 390 feet above MSL. The principal features of the site including the plant structures and boundary lines are shown in Figure 2.2.

The exclusion area is approximately circular in shape with a minimum boundary distance of 4,300 feet (1,310 meters). The applicant will own only part of the exclusion area and will obtain the authority to determine all activities within the balance of the exclusion area by entering into agreements with the land owners and through the granting of appropriate easements on these non-owned properties which will convey to the applicant the authority to control access. The only activities unrelated to plant operation on the non-owned properties within the exclusion area will be timber farming activities, and these activities will be controlled through the use of easements.

The applicant presently owns about 272 acres (not all of which is within the exclusion area) and is negotiating to purchase approximately 796 acres within the exclusion area which are presently owned by private corporations. It is the applicant's intent to purchase the mineral rights on all lands to be acquired in fee. The applicant expects all land purchases to be

completed by July, 1975. We will require that the portion of the exclusion area required for plant construction, which is included in the portion the applicant intends to own, be acquired by the applicant before an LWA can be issued.

The remainder of the property within the exclusion area will not be owned by the applicant. This property is owned by individuals or private corporations with the exception of a 16 acre tract which is owned by the State of Washington. These lands are all commercial tree farms. The easements to be obtained by the applicant on these non-owned lands will specify that the applicant will be notified in advance of the commencement of any activity which is undertaken in these areas and in advance of any entry on these lands by the owner, his agents or employees. In addition, no buildings or residences of any kind may be constructed in these areas other than temporary structures and facilities as may be necessary for timber farming operations. Plans and specifications for construction of any such temporary buildings will be submitted to the applicant for review and approval. The mineral rights for the non-owned lands will not be acquired by the applicant, however, the easements will include control over mineral rights and will specifically exclude mineral exploration and mining activities. The applicant expects all negotiations concerning the agreements and easements on the non-owned lands within the exclusion area to be completed by July, 1975.

We conclude that the authority granted to the applicant through the agreements and easements entered into with the property owners of the land within the exclusion area which the applicant will not own can comply with the requirements of 10 CFR Part 100. However, before giving a final opinion on this matter, we will require that the applicant produce for our review the executed agreements granting the easements, or produce persuasive evidence such as letters of intent with the property owners including the State of Washington, to demonstrate reasonable assurance that the applicant will have the proper authority regarding activities within the exclusion area.

The exclusion area will not be traversed by any public waterways or railroads. A Grays Harbor County road, an extension of Keyes Road, will provide vehicular access to the exclusion area. A Bonneville Power Administration transmission corridor also crosses the exclusion area. The applicant has initiated discussions with the County and BPA to obtain the authority to control access to the exclusion area on these routes and anticipates that final agreements will be made prior to August 1, 1975.

2.1.3 Population and Population Distribution

The proposed site is located in a rural area with low population. The 1970 Census population and the projected resident populations in the area surrounding the site are shown in Table 2.1.

TABLE 2.1
1970 Census and Projected Population

<u>Radius, Miles</u>	<u>1970</u>	<u>1980</u>	<u>2020</u>
0 - 10	9,733	10,451	13,469
0 - 30	124,557	141,275	219,785
0 - 50	345,941	391,475	601,690

The 1980 cumulative resident population as a function of distance is shown in Figure 2.3. For reference, the cumulative population corresponding to a moderately populated area of 500 people per square mile is also shown. The data in Figure 2.3 illustrate that the population at all distances out to 50 miles from the site is less than 500 people per square mile.

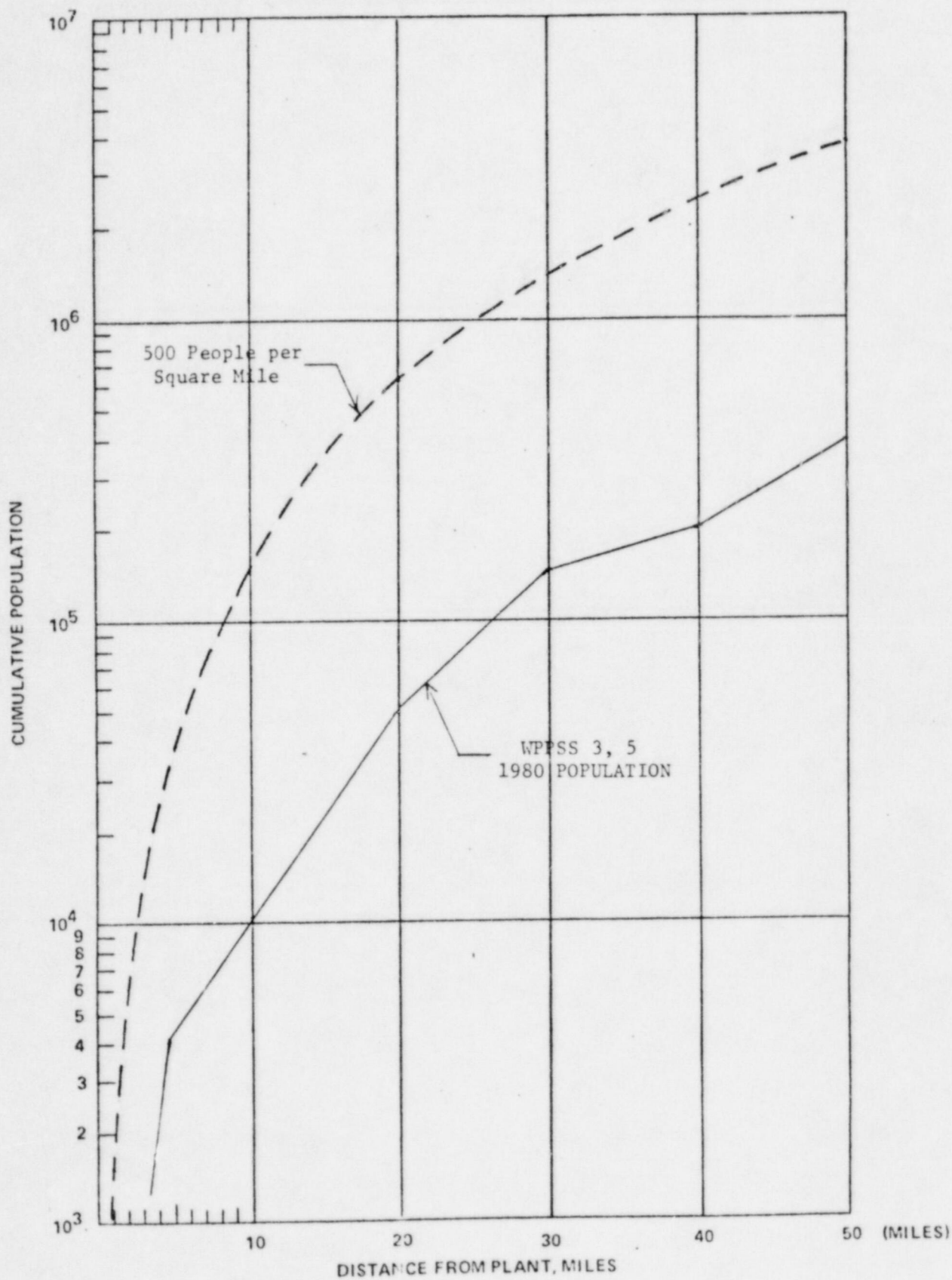


FIGURE 2.3 CUMULATIVE POPULATION DISTRIBUTION

We obtained an independent estimate of the 1970 population within 50 miles of the site from Bureau of the Census data and found that our population figure (370,784) agreed reasonably well with the applicant's value. The applicant's projected population growth rate to the year 2020 for the area within 50 miles of the site was compared to the population projections of the Bureau of Economic Analysis for Economic Area 155, an area comprising approximately the western half of the State of Washington. This comparison showed that the applicant's growth projection of about 12% per decade was higher than the BEA projection of 6% per decade for Area 155.

Grays Harbor County attracts a number of daily and seasonal transients, primarily during the summer months. The majority of these transients are visitors to the Pacific Coast area of the county some 30 miles west of the site. We conclude that these transients (other than highway travelers) do not significantly alter the population distribution (e.g., the average transient population at parks within 10 miles of the site would increase the population density by about 15%).

The applicant has selected a low population zone with an outer radius of 3 miles. The total 1970 resident population within the low population zone was 260 persons, the majority of which resided in the Chehalis River Valley. There are no significant transient populations within the low population zone other than highway travelers through the area. As a result of our evaluation of the low population zone proposed by the applicant for the WNP-3 and WNP-5 site, we conclude that there is reasonable assurance that the 10 CFR Part 100 definition of the low population zone can be satisfied in that we have not identified any unusual characteristics with respect to the low population zone which would prevent the development of appropriate emergency response procedures.

The nearest population center, as defined in 10 CFR Part 100, is the Aberdeen-Hoquiam urban area, which contained a 1970 population of 28,549 persons. Furthermore, we project that no area closer than the Aberdeen-Hoquiam area will develop into a population center within the

operating lifetime of the proposed WNP-3 and WNP-5 facilities. The Aberdeen-Hoquiam populated area, as well as its political boundary, begins at a point more than ten miles west of the site. This distance satisfactorily meets the 10 CFR Part 100 requirement that the population center distance be more than one-and-one-third times the low population zone distance.

2.1.4 Conclusion

On the basis of the 10 CFR Part 100 definitions of the exclusion area, low population zone, and the population center, and the calculated radiological consequences of postulated design basis accidents (presented in Chapter 15 of this report), we conclude that the exclusion area, low population zone, and population center distances specified for the WPPSS Nuclear Project 3 and 5 meet the requirements of 10 CFR Part 100 and are acceptable.

2.2 Nearby Industrial, Transportation and Military Facilities

There is little industrial activity in the vicinity of the proposed site. One small manufacturing facility employing 10 persons is located 4.8 miles northwest of the site. The applicant states that there are plans to construct a chemical plant 4.7 miles east-northeast of the site. This facility will employ about 50 people and the main product will be bleaching chemicals for the pulp industry. A quantity of methanol and nitrogen gas will be stored at the chemical plant but, because of their distance from the site, these materials will present no hazard to the proposed nuclear plant.

U. S. Highway 12, the major highway in the vicinity of the site, is a four lane divided highway which passes in an east-west direction through the Chehalis Valley about 3 miles north of the site.

A single track railroad line, maintained by the Union Pacific Railroad, runs along the south bank of the Chehalis River approximately one mile north of the proposed location of the plant structures (and about 350 feet lower in elevation). A main line of the Northern Pacific Railroad runs through the Chehalis Valley about three miles north of the site. The average daily rail traffic on the Union Pacific line is comprised of two freight trains carrying mainly lumber and related products. Some hazardous materials are shipped on this line and consist primarily of caustic soda, chlorine, and propane. It is also projected that about one tank car of methanol will be shipped on the railroad every three

to four months when the new chemical plant east-northeast of the site is in operation. The applicant has evaluated postulated accidents on the railroad one mile north of the site including an explosion, formation of a flammable vapor cloud, and a chlorine release. We have reviewed the analyses and agree with the applicant that the occurrence of any of these railroad accidents will not adversely affect the safe operation of the nuclear plant.

The Chehalis River flows in a westerly direction in the valley about one mile north of the site. The river is used by small pleasure and fishing craft and is not utilized for commercial barge transportation in the vicinity of the site.

Elma Municipal Airport is located approximately two miles northeast of the site. The airport has a single turf runway 2,000 feet in length and is used by light private aircraft. It is estimated that at present there are approximately 1,825 operations per year. The applicant states that expansion of the airport is currently under study and, depending on the results of the study and availability of resources, there are plans to pave the runway and extend it to approximately 3,500 feet. With the proposed improvements the airport will be capable of handling aircraft up to 12,500 pounds gross weight. The applicant cites a Washington State planning document which projects a growth to approximately 4,000 operations per year for the Elma airport. The Federal Aviation Administration's national airport system plan, published in 1972, projects 7,000 operations per year at Elma in 10 years, all of which will be aircraft under 12,500 pounds.

The nearest airport with commercial scheduled flights is Bowerman Airport located in Hoquiam about 22 miles west of the site. An airway between Olympia and Hoquiam passes near the site area and there are currently 12 scheduled flights per day between these cities by single engine and light twin-engine aircraft at altitudes between 5,000 and 10,000 feet. This airway is also routinely used for training flights by the U. S. Army from Fort Lewis, Washington, flying single and twin-engine aircraft and helicopters. The applicant has obtained estimates of the military traffic which indicate that the maximum number of such flights is 15 to 20 per day with the average estimated to be approximately 12 to 15 per month.

On the basis of previous analyses of aircraft activity at other nuclear power plant sites, we conclude that the type and number of aircraft described above are not significant with respect to plant safety.

In addition, the Air Force conducts high altitude flights between McCord AFB and U. S. Air Bases in the Pacific that, according to the information in the PSAR, may occasionally bring aircraft within 10 miles of the site. The applicant has been requested to provide information regarding the number of flight and an estimate of the probability of a damaging aircraft accident at the site. We will determine, upon receipt and review of this information, whether these activities impose any significant risk on the plant.

The applicant states that there are no military facilities or pipelines in the vicinity of the site. The area around the plant will be cleared to provide a minimum distance of 300 feet from the safety related structures to protect the plant against forest fires.

On the basis of our review of the industrial, transportation, and military activities in the vicinity of the proposed WPPSS 3, 5 site, we conclude that there are no nearby activities which have the potential for interfering with the safe operation of the WPPSS 3,5 plant and that with respect to offsite hazards the plant design is acceptable.

3.5.1 Tornado Missiles

We have reviewed the information presented in the PSAR regarding tornado missiles and find the applicant's missile velocities unacceptable. On the basis of our previous evaluations, we will require that the WPPSS 3, 5 plants be designed to withstand the impact of the following spectrum of missiles (described in WASH-1361) and impact velocities:

A - Wood plank	4" x 12" x 12'	200 lb	420 fps
B - Steel pipe	3" Ø, 10' long, schedule 40	78 lb	210 fps
C - Steel rod	1" Ø x 3' long	8 lb	310 fps
D - Steel pipe	6" Ø, 15' long, schedule 40	285 lb	210 fps
E - Steel pipe	12" Ø, 15' long, schedule 40	743 lb	210 fps
F - Utility pole	10.5" Ø x 35' long	1490 lb	210 fps
G - Automobile	20 ft ² frontal area	4000 lb	100 fps

These missiles are to be considered as striking in all directions. Missiles A, B, C, D, and E are to be considered at all elevations and missiles F and G at elevations up to 30 feet above all grade levels within 1/2 mile of the facility structures.

Alternatively, based on an interim review of TVA's Topical Report TVA-TR74-1, we have found that the use of their no-tumbling horizontal velocities in addition to a 4000-lb automobile at 70 mph forms an adequately conservative design basis for WPPSS 3, 5. Vertical velocities equal to 80% of the TVA no-tumbling horizontal velocities will also be acceptable on an interim basis. These velocities are summarized in the following table.

TORNADO MISSILE VELOCITIES ACCEPTED IN INTERIM

EVALUATION OF TVA-TR74-1

			<u>Horizontal Velocity</u>	<u>Vertical Velocity</u>
A - Wood plank	4" x 12" x 12'	200 lb	368 fps	294 fps
B - Steel pipe	2" Ø, 15' long, schedule 40	115 lb	268 fps	214 fps
C - Steel rod	1" Ø 3' long	8 lb	256 fps	207 fps
D - Steel pipe	6" Ø, 15' long, schedule 40	300 lb	230 fps	184 fps
E - Steel pipe	12" Ø, 30' long, schedule 40	1500 lb	205 fps	164 fps
F - Utility pole	14" Ø x 35' long	1500 lb	241 fps	193 fps
G - Automobile	20 ft ² frontal area	4000 lb	100 fps	80 fps

Missiles A, B, C, D, E, and F are to be considered at all elevations and missile G at elevations up to 30 feet above all grade levels within 1/2 mile of the facility structures.

3.5.2 Turbine Missiles

The applicant has arranged Unit 3 and 5 turbine generators in a peninsular orientation. This configuration excludes all systems either essential to a safe plant shutdown, or susceptible to significant radiological consequences when damaged, from the low trajectory turbine missile strike zone. We are currently performing a generic study on the matter of turbine missiles. When the results of our study are available, we will evaluate the significance of potential high trajectory turbine missiles on this facility and will determine whether additional protection is required beyond that already offered by the present turbine orientation and structural barriers described in the applicant's PSAR. It is anticipated, however, on the basis of the staff's preliminary analysis of high trajectory missile damage probability with respect to WPPSS Units 3 and 5, that additional protection requirements (if any) would be primarily related to items such as overspeed protection and valve testing procedures.