

ENCLOSURE 1

EVALUATION OF THE BAILLY SITE WITH
RECOMMENDATIONS 1 THROUGH 9
OF THE
SITING POLICY TASK FORCE

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October 24, 1980

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RECOMMENDATION 1

Revise Part 100 to change the way protection is provided for accidents by incorporating a fixed exclusion and protection action distance and population density and distribution criteria.

1. Specify a fixed minimum exclusion distance based on limiting the individual risk from design basis accidents. Furthermore, the regulations should clarify the required control by the utility over activities taking place in land and water portions of the exclusion area.
2. Specify a fixed minimum emergency planning distance of 10 miles. The physical characteristics of the emergency planning zone should provide reasonable assurance that evacuation of persons, including transients, would be feasible if needed to mitigate the consequences of accidents.
3. Incorporate specific population density and distribution limits outside the exclusion area that are dependent on the average population of the region.
4. Remove the requirement to calculate radiation doses as a means of establishing minimum exclusion distances and low population zones.

RESPONSE

The staff has not yet proposed siting criteria for the forthcoming siting rule since we have not reached that point in our continuing technical evaluation where we can discern proposed criteria. The staff will identify proposed siting criteria by about December 1980 and will publish a proposed rule in May 1981. Consequently, we are not able at this time to make a comparison of the Bailly site with the criteria in the proposed siting rule. We have compared the characteristics of the Bailly site with the four suggestions for revisions to Part 100 contained in Recommendation 1 of the Report of the Siting Policy Task Force, NUREG-0625. We used the illustrative example of population density and distribution limits given in NUREG-0625. This usage is intended only as an example, although the Task Force considered it to be based upon a fair understanding of both individual and societal risks in the event of a spectrum of large accidental releases of radioactivity.

For the purposes of this comparison, the State of Indiana is taken as the region with which the population density around the Bailly site is compared. The beginning year of reactor operation is assumed to be 1985 for selecting the applicable population data. The comparison of the Bailly site with Recommendation 1 of the Task Force is shown in the attached table. As can be seen from this table, the Bailly site does not comply with Recommendation 1 when the illustrative example given in NUREG-0625 is used.

Comparison of Bailly Site with Recommendations and
Illustrative Example of Siting Policy Task Force (NUREG-0625)

<u>Siting Policy Task Force Recommendations</u>	<u>Numerical Values Using Illustrative Example of NUREG-0625 Taking 1985 as Beginning of Reactor Operation and State of Indiana as Region</u>	<u>Bailly Site</u>
1. Specify a fixed minimum exclusion distance based on limiting the individual risk from design basis accidents.	1. 0.5 Mile	1. 0.11 Mile*
2. Specify a fixed minimum emergency planning distance of 10 miles. The physical characteristics of the zone should provide reasonable assurance that evacuation of persons, including transients, would be feasible if needed to mitigate the consequences of accidents.	2. ---	2. Two large steel mills located less than 1 mile and about 3 miles from site. About 170 workers per plant would be required to remain for periods of up to several days in order to properly bank the plant furnaces, in event of an accident.
3. Incorporate specific population density and distribution limits outside the exclusion area that are dependent on the average population of the region.		
a. From 0 to 5 miles, the population density at the beginning of reactor operation should not exceed one-half the average population density of the region, or 100 persons/square mile, whichever is greater. Transients should be weighed according to their fractional occupancy.	a. From 0 to 5 miles, the average population density should not exceed 100 persons/square mile.	a. The 1985 population density for Bailly is projected to be 505 persons/square mile in this region.

*This exclusion distance does not require any special or unique containment features as discussed in our responses to Recommendation 6.

Comparison of Bailly Site with Recommendations and
Illustrative Example of Siting Policy Task Force (NUREG-0625)

<u>Siting Policy Task Force Recommendations</u>	<u>Numerical Values Using Illustrative Example of NUREG-0625 Taking 1985 as Beginning of Reactor Operation and State of Indiana as Region</u>	<u>Bailly Site</u>
b. No more than one-half of the allowed number of persons in the zone are permitted in any one 22- $\frac{1}{2}$ ^o sector.	b. From 0 to 5 miles, no more than 3930 persons in any one sector. (Based on 100 people per square mile)	b. 11,027 persons are projected to be in the SE sector in 1985.
c. From 5 to 10 miles, the population density at the beginning of reactor operation should not exceed three-quarters the average population density of the region, or 150 persons/square mile, whichever is greater.	c. From 5 to 10 miles, the average population density should not exceed 150 persons/square mile. Bas	c. The population density for Bailly in this zone is projected to be 395 persons/square mile.
d. No more than one-half of the allowed number of persons in the zone from 5 to 10 miles are permitted in any one 22 $\frac{1}{2}$ ^o sector.	d. From 5 to 10 miles, no more than 17,670 persons allowed in any one sector. (Based on 150 people per square mile)	d. 38,477 persons are projected to be in the SW sector in 1985.
e. From 10 to 20 miles, the population density at the beginning of reactor operation should not exceed twice the average population density of the region, or 400 persons/square mile, whichever is greater.	e. From 10 to 20 miles, the average population density should not exceed 400 persons/square mile.	e. The population density for Bailly in this zone is projected to be 715 persons/square mile.
f. No more than one-half of the allowed number of persons in the zone from 10 to 20 miles are permitted in any one 22 $\frac{1}{2}$ ^o sector.	f. From 10 to 20 miles, no more than 188,500 persons allowed in any one sector. (Based on 400 people per square mile)	f. 351,280 persons are projected to be in the WSW sector (City of Gary, Ind.) in 1985.

RECOMMENDATION 2

Revise Part 100 to require consideration of the potential hazards posed by man-made activities and natural characteristics of sites by establishing minimum standoff distances for:

1. Major or commercial airports,
2. LNG terminals,
3. Large propane pipelines,
4. Large natural gas pipelines,
5. Large quantities of explosive or toxic materials,
6. Major dams,
7. Capable Faults.

RESPONSE

The Bailly site does not comply totally with the objective of the Task Force regarding Recommendation 2; namely, that an activity at a facility hosting a hazardous activity would not endanger the nuclear plant. While we have not assessed in detail deviations from the recommendation of the Task Force for large natural gas pipelines, we believe this is specific deviation could represent a significant departure from the intent of this recommendation. Though the presence of a large quantity of fuel oil adjacent to the Bailly site poses a potential hazard, it does not necessarily violate the Task Force recommendation regarding nearby explosive or toxic materials. Otherwise, the Bailly site clearly complies with five of the seven minimum standoff distances suggested by the Task Force. The specific distances from the Bailly site to the seven potential man-made hazards and/or natural characteristics of a site which are listed in Recommendation 2, are provided below where possible. These distances are compared with the opinions of the Task Force regarding the distances which would provide reasonable assurance that a nuclear power plant would not be unduly threatened by the proximity of these seven potential hazards.

1. Major or Commercial Airports

There are three major airports, none of which are close to the Bailly site. These are:

<u>Major Airport</u>	<u>Distance to the Bailly Site</u>	<u>Distance Stated in the Discussion by the Task Force</u>
Midway, IL	37 miles northwest	5 miles
Southbend, IN	50 miles west	"
O'Hare, IL	57 miles northwest	"

There are three commercial airports within a 20 mile radius of the Bailly Site. These are:

<u>Commercial Airport</u>	<u>Distance to the Bailly Site</u>	<u>Distance Stated in the Discussion by the Task Force</u>
Michigan City, IN	13 miles east	5 miles
Valparaiso, IN	13 miles southeast	"
Gary, IN	13 miles west	"

RECOMMENDATION 2 (CONT'D)

2. LNG Terminals

There are no liquid natural gas terminals close to the Bailly site. However, there is an LNG compressor station about 25 miles to the southeast where LNG is stored during the summer for injection into two NIPSCO pipelines for peak demand during winter. The total maximum storage capability will be about 4 billion cubic feet at standard temperature and pressure. The minimum distance discussed by the Task Force for this type of facility is 5 miles.

3. Large Propane Pipelines

There are no large propane pipelines close to the Bailly site. The minimum distance discussed by the Task Force for this type of facility is 1.5 miles.

4. Large Natural Gas Pipelines

There are two, large natural gas pipelines which traverse the Bailly site and are used in the startup of NIPSCO's two coal-fired units on the site. A 16-inch line will be within 200 feet of the reactor building while a 10-inch line will be within 150 feet of this structure. The licensee has stated its intention to install redundant seismic Category 1 valves which would limit the release of natural gas in the event of any pipe break. The minimum distance discussed by the Task Force for this type of potential hazard is 0.5 miles.

5. Large Quantities of Explosive or Toxic Materials

There are no known large quantities of explosive or toxic materials close to the Bailly site. There may be explosive or toxic materials on the adjacent Bethlehem steel facility but we are not presently aware of any. The minimum distance discussed by the Task Force for this type of hazard is 5 miles.

There is a 450,000 gallon tank on the site containing No. 2 fuel oil which is used for a 33 MWe peaking unit (Unit No. 10). This tank is about 390 feet away from the nearest safety-related structure. There also are a total of six oil tanks immediately adjacent to the western boundary of the Bailly site on the Bethlehem Steel property. The total storage capacity in these tanks is 31 million gallons of oil. The stored oil is usually Number 6, Bunker Grade C, but occasionally Number 1 and 2 heating oil are also stored in the tanks. The shortest distance from these tanks to the Bailly facility is about 1025 feet. While this oil would probably not explode, it could burn for an extremely long period of time, thereby imposing an external heat load on the Bailly facility and could release large clouds of thick, black smoke which could adversely affect control room habitability and the operation of the Bailly diesel-generators. It should be noted that while this potential hazard is not unique, the

RECOMMENDATION 2 (CONT'D)

total quantity of oil stored nearby in this instance is quite large. Protective measures, including moving these tanks some distance from the Bailly facility, are possible. It is not clear from NUREG-0625 what distance was regarded applicable for oil storage tanks.

There was a NIKE-HERCULES missile site about 2.5 miles to the southeast which has been deactivated and the missile site taken by the National Park Service. The minimum distance discussed by the Task Force for this type of hazard is 5 miles.

6. Major Dams

There are no major dams close to the Bailly Site. (It should also be noted that Bailly is not a floodplain site.) The Task Force stated that no floodplain site be closer than five miles from a major dam.

7. Capable Faults

The nearest capable fault is the Mississippi Valley fault zone which is conservatively assumed to extend as far north as Vincennes, Indiana, about 200 miles from the Bailly site. There are a number of closer faults which are not capable; they are relatively old, ranging in age from 260 to 120 million years before the present (mybp). Their closest approach is about 25 miles from the site. The Task Force discussed that a capable fault be no closer than 12.5 miles. These faults are summarized below:

<u>Fault</u>	<u>Capable</u>	<u>Age (mybp)</u>	<u>Closest Approach to the Bailly Site</u>
Mississippi fault zone	Yes	-	200 miles south
Sandwich fault	No	260	50 miles west
(unnamed)	No	260	25 miles south
Rough Creek-Shawneetown fault	No	120	250 miles south

RECOMMENDATION 3

Revise Part 100 by requiring a reasonable assurance that interdictive measures are possible to limit groundwater contamination resulting from Class 9 accidents within the immediate vicinity of the site.

RESPONSE

The staff has considered a number of measures to implement this recommendation and has determined that this is technically feasible within the existing state-of-the-art for hydrology. Among the feasible engineering approaches which can be readily implemented on a generic basis is the installation of a relatively impermeable barrier (e.g., a slurry wall) around a plant which has had a Class 9 accident leading to a liquid release containing radioactive fission products into the environs. The radioactively contaminated water could then be pumped out while the impermeable barrier isolated the contaminated water from the surrounding aquifer.

In the event that it is not feasible to place an impermeable barrier around a given nuclear power plant, it would still be feasible to establish a number of wells in concentric circles around the plant site. These wells could then be pumped in a manner which would establish a cone of depression in the underlying groundwater centered under the plant. This would force all contaminated water released from the plant to the center of the cone of depression, thereby permitting the contaminated water to be pumped from the innermost concentric rings of wells. Other methods of interdicting contaminated releases (e.g., slant drilling under the plant) are also technically feasible within the existing state-of-the-art.

A slurry wall was installed in 1977 at the Bailly site and there are existing wells within this boundary for the purpose of construction dewatering. Accordingly, most of the measures which would probably be initiated to implement Recommendation 3, are presently in place. These measures can be supplemented if necessary. The staff concludes, therefore, that the Bailly site can comply with Recommendation 3.

RECOMMENDATION 4

Revise Appendix A to 10 CFR 100 to better reflect the evolving technology in assessing seismic hazards.

RESPONSE

This recommendation is not site specific and, therefore, the Bailly site is not assessed against it.

RECOMMENDATION 5

Revise Part 100 to include consideration of post-licensing changes in offsite activities:

1. The NRC staff shall inform local authorities (planning commission, county commissions, etc.) that control activities within the emergency planning zone (EPZ) of the basis for determining the acceptability of a site.
2. The NRC staff shall notify those federal agencies as in Item 1 above that may reasonably initiate a future federal action that may influence the nuclear power plant.
3. The NRC staff shall require applicants to monitor and report potentially adverse offsite developments.
4. If, in spite of the actions described in Items 1 through 3, there are offsite developments that have the potential for significantly increasing the risk to the public, the NRC staff will consider restrictions on a case-by-case basis.

RESPONSE

This recommendation is not site specific and, therefore, the Bailly site is not assessed against it.

RECOMMENDATION 6

Continue the current approach relative to site selection from a safety viewpoint, but select sites so that there are no unfavorable characteristics requiring unique or unusual design to compensate for site inadequacies.

RESPONSE

The Bailly site has an extremely small exclusion boundary (i.e., 188 meters) and is quite close to the adjacent Bethlehem Steel facility. The Bailly containment is a General Electric Mark II pressure suppression system designed by Sargent & Lundy. The primary containment is a steel-lined, prestressed concrete structure while the secondary containment is a reinforced concrete structure. The containment is similar to that of the Zimmer and LaSalle facilities. The design basis leakage rate for the primary containment of all three facilities is 0.5 percent per day of the enclosed free volume. Accordingly, the Bailly site characteristics have not necessitated any special design features for either the primary or secondary containments.

The licensee proposed in its construction permit application to install foundation piles under the safety-related structures of the Bailly facility. This foundation design was proposed in recognition of the potential for differential settlements attributable to a wedge-shaped, compressible clay layer under the site. We did not regard this design feature as either unique or unusual at the CP stage of our review. Based on numerous considerations, we reaffirm our previous conclusion that a pile foundation for a nuclear power plant is neither unique or unusual.

The staff concludes that the Bailly facility does not require any unique or unusual design features to compensate for site inadequacies. The Bailly site, therefore, satisfies Recommendation 6.

RECOMMENDATION 7

Revise Part 100 to specify that site approval be established at the earliest decision point in the review and to provide criteria that would have to be satisfied for this approach to be subsequently reopened in the licensing process.

RESPONSE

The first portion of this recommendation is not applicable to Bailly inasmuch as the earliest decision point in our review (i.e., the decision to issue a construction permit) has been reached. The CP was issued in May 1974.

The staff cannot compare the Bailly site against the second portion of the recommendation inasmuch as the criteria to be satisfied in any subsequent reopening in the licensing process, have not been established.

RECOMMENDATION 8

Revise Part 51 to provide that a final decision disapproving a proposed site by a state agency whose approval is fundamental to the project would be a sufficient basis for NRC to terminate review. Such termination of a review would then be reviewed by the Commission.

RESPONSE

This recommendation is not pertinent to the Bailly site inasmuch as we have completed our review leading to our decision on issuance of the construction permit. Furthermore, it is our understanding that no Indiana agency has expressed disapproval of the Bailly facility nor has the water usage permit which is fundamental to the operation of the plant, been denied or challenged by an Indiana agency.

RECOMMENDATION 9

Develop common bases for comparing the risks for all external events.

RESPONSE

This recommendation is not site specific and, therefore, the Bailly site is not assessed against it.