

APR 6 1959

Mr. James E. Lewis, President
Radiochemistry, Inc.
1111 W. St. Catherine
Louisville 10, Kentucky

not attached complete

Dear Mr. Lewis:

This is in reply to your letter of March 4 to the Hazards Evaluation Branch requesting information bulletins or publications which describe the requirements and recommended procedures for conducting a safety and engineering survey relative to the selection of a site for a commercial test reactor. Attached are copies of our regulations dealing with standards for protection against radiation (Part 20), facility licensing (Part 50) and a copy of a reactor safety bibliography.

At the present time we do not have published bulletins or reports that describe the information on site selection we believe you are asking for. There are hazards evaluation reports on file in our public document room, however, which indicate the type of information that is needed in selection of a site for a reactor. While we do not have extra copies for distribution, the reports are available for inspection during office hours at our office in Washington D. C. at 1717 N. St. N. W. Reproduced copies of these reports may be procured upon receipt of an order by the Commission's Public Document Room. The charge for reproduced copies of the Commission's public records is 35¢ per page for legal size or smaller, with correspondingly higher prices for larger pages such as maps and drawings. Copies of reports also may be requested from the applicant who has submitted the report to the Commission. Two of the reports which deal with test reactors and which might be of interest to you are the Hazards Summary Reports for the Westinghouse Test Reactor and for the General Electric Test Reactor.

On inspection of these reports you will note that there are no hard and fast rules or criteria for selection of a site to accommodate a nuclear power or test reactor,

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although there are several factors which are analyzed in evaluation of the suitability of a site. The more desirable site is one that offers a high degree of protection to the public over and above that engineered into the reactor facility from any radiation or radioactive effluents resulting from operation of the reactor. The factors which are important from the environmental safety standpoint in selecting a site include:

1. Distance from the reactor facility to the nearest site boundary
2. Population density in the neighboring areas
3. Meteorological conditions at the site
4. Site hydrology and geology
5. Earthquake history.

These five factors are all interrelated and dictate in varying degrees the engineered protective devices for the particular reactor facility under consideration, and the dependence which can be placed on the devices. It is necessary to analyze each of the environmental factors to ascertain the character of protection it might afford for operation of the proposed facility or the kind of restrictions it might impose on the proposed design and operation.

The more desirable site when considered in light of the above factors would have the following characteristics:

1. The exclusion radius should put enough distance between the reactor and the site boundary to minimize possible exposure of persons at the site boundary to direct radiation which might result from reactor accidents, and to assure that the levels of radioactivity at the site boundary from normal operation effluents do not exceed those described in the Commission's regulations.
2. The population density in the neighboring areas should be as low as practicable.

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3. The meteorological conditions at the site should provide favorable conditions for rapid diffusion and dilution of any gaseous effluents in the atmosphere; and the prevailing wind direction should be away from the areas of high population.
4. The hydrology and geology of a site should be favorable for the management of the liquid and solid effluents (including possible leaks from the reactor and associated processes) to avoid contamination of surface and ground waters and other mineral resources. Thus, if there is a choice between sites, the one in which water supplies are least vulnerable should be selected. In this respect many soils offer a factor of safety in their capacities to remove and retain some of the more hazardous radioactive fission products.
5. Location of a reactor of substantial power in an area with an earthquake history presents a problem in engineering of the safety mechanisms and components of the facility. However, a fault line should be avoided in location of the facility and advice of competent seismologists should be obtained in selection of a site from this respect.

This first three factors obviously relate to control of: (1) direct radiation from the reactor facility and (2) gaseous effluents transporting radioactivity. They have an effect on the integrity of containment required for the facility, the biological shielding required and the degree of dependence on air cleaning and ventilation systems. A less favorable exclusion area and neighboring population density would require correspondingly higher specifications on containment and other protective components.

The fourth factor relates to control of liquid effluents to avoid contamination of surface or ground waters and the hydrogeological picture indicates the degree of dependence on the liquid effluent control system.

The fifth factor established design conditions to be satisfied in order to avoid any possible disaster from release of large quantities of fission products resulting from an earthquake.

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Mr. James E. Lewis - 4 -

We hope the above information will be helpful to you as a guide in conducting a site selection survey.

We will be pleased to discuss these questions further at any time.

Sincerely yours,

~~SIGNED~~

~~and~~

~~DISPATCHED~~

Harold L. Price, Director
Division of Licensing and
Regulation

Enclosure:
1 Copy Part 20
1 Copy Part 50

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