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A Place for Participation by Ecologists in Site Selection for Nuclear Power Plants*

*By: Ray T. Oglesby
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Summary:

As New York hastily feels its way into the era of nuclear power, there is a necessity for equally rapid growth of environmental safeguards. Although the Environmental Protection Act presents an opportunity for safeguards through site selection, it does not contain the mechanism for accomplishment. Since the situation is both complex and unique, guidelines are suggested which could be applied by an independent group of ecologists before investment in sites has reached the place where they must be defended strongly by the investors.

It has become increasingly evident to scientific observers that the nuclear power industry is developing without sufficient thought being given to environmental safeguards for the coming generation. In response, standards of radiological and thermal pollution have been subject to criticism. Also, alterations have been made in the authority of regulatory agencies, and new legislation has been passed. New York's Environmental Protection Act is an example of a recent attempt to balance the need for electric power against the need for environmental protection.

The feeling is growing that such simplistic laws relating to discharge standards alone may be insufficient. Choice of sites is now made primarily by considering such factors as the area's potential market size, transmission to other areas and economical source of water for conducting waste heat. The practice is to select sites and then defend them with studies made by professional consultants. Environmental study is a means of affirming the site decision, not arriving at it. Under these circumstances, the opportunity for rational decision is reduced, and the procedure may be wasteful for everyone involved. In the balance, most of the concrete information supplied in respect to a site comes from the developer's staff. Regulatory agencies have very limited resources upon which to base independent judgment.

Judgment is difficult. Specific undesirable effects of both large amounts of radiation and heat are known. It is much more difficult to say how much is too much in a particular situation. However, the following guidelines may provide some insight into the site selection problems:

- (1) Temperature increase in the receiving body of water should be kept at a minimum.
- (2) Heat storage in most bodies of water should be minimized.
- (3) Pumping from one body of water and discharging into another or removing cooling water from the deep part of a lake and releasing it at the surface may produce undesirable effects, and such practices should be carefully studied before putting them into practice.

- (4) Fish spawning and nursery areas should generally be avoided at both source and discharge points.
- (5) Either source or receiving water low in dissolved oxygen and/or high in biodegradable organic material is generally poorly suited for a power company's needs.
- (6) The toxicity of substances poisonous to aquatic life is generally increased at elevated temperatures.
- (7) The equilibrium concentration of radionuclides in a system is a function of hydraulic retention time and biological concentration factors. In large freshwater lakes both are quite difficult to assess accurately.
- (8) Hydraulic effects of a high volume discharge may produce significant changes in the currents of a lake resulting in changed patterns of siltation and biological reproduction and growth.

These guidelines should be among the first considerations in site selection. Their application requires the skill of professional ecologists with various specialties: limnology, physiology, fish, algae, etc. Unfortunately, there is no mechanism at present by which the ecologists, who are available principally in the academic community, may enter the judgment under two necessary conditions:

- (1) Independence of the developer
- (2) At the initiation of site selection

Thus there is a serious deficiency in the established process of site selection, and the prospect of effective environmental protection is not encouraging.