

• Assessment of Social Values in Thermal Power Plant Siting

A methodology was developed to facilitate the selection of favorable thermal power plant site and design alternatives from the community perspective. A two-stage, multicriteria decision technique was employed to combine technical assessments of effects of the proposed site/design alternatives with corresponding community values. In the the first stage, sub-models are used to develop indices of plant impact on each of ten decision criteria. These criteria include effects on aesthetics, water quality, cost of power, air quality, ecology, social quality, local economy, recreational opportunities, cultural resources, and human health and safety. In the second stage, each of the impact indices is weighted by corresponding community values and then summed to provide an overall index of plant acceptability.

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The objective of this project was to develop a methodology for incorporating early in the power plant siting and design process the values of the potentially affected community. A multiple-criteria decision technique is used which combines technical estimates of plant effects in ten areas of potential impact with measures of community values in these same areas. Auxiliary methodologies are provided for obtaining community values from representative citizenry and for assessment of plant effects in the ten areas of potential impact.

Originally, FY-1977 funds for this project were to be largely devoted to developing the methodologies for assessing effects of proposed power plants relative to the ten judgment criteria. Remaining funds were to be allocated to select a suitable site for initial testing of the methodology. FY-1978 funds were to be used to ready the assessment methodologies for application and to test application of the methodology.

In March of 1977, however, word was received that FY-1978 funding would not be available for this project. Consequently, the remaining FY-1977 funds were redirected to accelerated completion of the criteria assessment methodologies. By the end of FY-1977, eight impact assessment methodologies, representing five of the original eight judgment criteria, were complete.^(a) Completed assessment methodologies include those for aesthetics, water quality, local economic effects, recreational opportunities, and cultural resources. Methodologies for assessing effects on air quality and human health and safety are currently being compiled. The land use criterion, although discarded as redundant with other criteria early in the development of this project, should be reexamined for unique attributes.

Although the site assessment methodology is near completion in the sense that the components are present, we would recommend a comprehensive review of the methodology as a system. This should be followed by refinements as necessary and testing prior to application. The review of the whole system, although scheduled for FY-1977, was preempted by the need to complete all assessment methodologies prior to expiration of the funding.

^(a) One of the original judgment criteria, cultural/recreational effects, was judged too complex for treatment as a single criterion and was subsequently split into four criteria, each with a separate assessment methodology.

Work in FY-1977 focused on completion of the methodologies for assessing power plant impact for the judgment criteria discussed below:

Cost of Power

This work included an assessment of how the mechanisms by which alternative power plant sites and designs affect local and system-wide electrical rates. An index measuring the impact of local and service area commercial, industrial, and residential rate changes was developed and reported.

Water Quality

A report was issued describing the method for assessing water quality impacts.⁽¹⁰⁾

Ecological Effects

The methodology initially developed in FY-1976 for quantifying ecological effects of plant construction and operation was extensively revised. The method is now based on diversity and importance of affected habitat.

Social Quality and Local Economic Effects

The original cultural/recreational criterion, judged too complex for treatment as a single criterion, was split into four

independent criteria: social quality, local economic effects, recreational opportunities, and cultural resources. Separate methodologies, based on multiple-criteria decision techniques, were developed for quantified assessment of plant impact on social quality and the local economy. Major factors in the index of social quality effects included public services, social structure, housing, and government capability to accommodate growth. Principal factors used for the local economic effects index included employment, wages and salaries, business opportunities, and public revenues.

Recreational Opportunities and Cultural Resources

Separate indices were developed for impacts on recreational opportunities and cultural resources. Methodologically similar, the assessments are based on evaluation of the quality of resources preempted from public access by plant construction.

Human Health and Safety

Funding available in FY-1977 was inadequate to thoroughly treat the human health and safety criterion. However, an approach was outlined based on probable local concentration of plant emissions known to have adverse health effects.

• Social Impact Methodology Evaluation

Both beneficial and adverse changes in way of life can occur with the siting of a large electric power plant in a community. In order to permit adequate planning for these social and economic changes, it is important that they be accurately predicted. In this research project, we are evaluating the accuracy of available methods for predicting the social and economic changes that may occur in communities, and we are assessing the effectiveness of ways in which communities and utilities have managed adverse changes. Two approaches are being used to accomplish this. First, we will identify social and economic changes as they occur during the construction of Puget Sound Power and Light Company's Skagit Nuclear Project in Skagit County, Washington. To date, we have developed a means of identifying these changes and a description of current conditions in Skagit County for six aspects of community life, including demography, economy, housing, public services, community structure, and social well-being. Second, we are identifying changes that have occurred in communities at other western energy sites during power plant construction. For each site, actual social and economic changes will be compared with those that were predicted in order to identify the strengths and weaknesses of the methods used.

Social Impact Assessment Methodology: Pacific Northwest Plants

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The ability to accurately predict both the occurrence and the magnitude of social and economic impacts associated with thermal power plant construction is a critical prerequisite to effective impact assessment and management. Since only a few research efforts have either monitored or identified these impacts through post hoc studies, however, the strengths and weaknesses of available predictive methods and management strategies remain unclear. Until the adequacy of these methods and strategies is determined, progress in the area of social impact assessment and management will be impeded. By monitoring social and economic impacts as they occur during construction at a site in Washington and by performing retrospective analyses at other western energy sites, this research will contribute to the development of both more accurate predictive methods and more effective management strategies.

The site that has been selected for a detailed case study is Puget Sound Power and Light Company's Skagit Nuclear Project in Skagit County, Washington. It is anticipated that construction of this project, which will be monitored for social and economic impacts as they occur during construction, will begin in June 1978. To date, a monitoring system and a baseline profile of current social and economic conditions in Skagit County and four "impact communities" have been developed. Six major aspects of community life are described in the profile and will be monitored during construction: demography, economy, housing, public services, community structure, and social well-being. In addition, the profile includes a description of the county's planning and growth management capabilities. Changes resulting from the Skagit Nuclear Project will be isolated from those that are already occurring in Skagit County.

In preparation for the retrospective studies of other western energy sites, contact has already been made with other utilities. In addition, preliminary social

and economic information on a number of sites at various stages of construction and operation has been obtained and reviewed. A final selection of sites will be made during the first quarter of FY-1978. These

retrospective studies of the social impact predictive methods, monitoring systems, and impact management strategies used at these sites will be carried out by collecting and analyzing secondary data.