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ST. CROIX RIVER DISPUTE

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HEARINGS

BEFORE A

SPECIAL SUBCOMMITTEE OF THE
COMMITTEE ON PUBLIC WORKS
UNITED STATES SENATE
EIGHTY-EIGHTH CONGRESS
SECOND SESSION



DECEMBER 10 AND 11, 1964
STILLWATER, MINN.

Printed for the use of the Committee on Public Works



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ST. CROIX RIVER DISPUTE

THURSDAY, DECEMBER 10, 1964

U.S. SENATE,
SPECIAL SUBCOMMITTEE ON AIR AND WATER POLLUTION
OF THE COMMITTEE ON PUBLIC WORKS,
Stillwater, Minn.

The Special Subcommittee on Air and Water Pollution met, pursuant to notice, at 10 a.m., Hon. Gaylord Nelson presiding.

Senator NELSON. This hearing will now come to order.

I presume that most of you have noticed that there are no-smoking signs posted here for the school. They are attempting to avoid some air pollution of the lungs. [Laughter.]

Senator NELSON. I want to welcome you all here to these hearings of the U.S. Senate Subcommittee on Air and Water Pollution.

With me on my left is Senator Lee Metcalf of Montana, with whom I serve on this Subcommittee of the Public Works Committee in Washington. I am Gaylord Nelson of Wisconsin. Senator Edmund S. Muskie, of Maine, is the chairman of this subcommittee and has designated me as acting chairman for these hearings.

For the next 2 days we shall be taking the testimony on a local and interstate controversy with important implications for Federal law.

Before the hearings get underway I would like to take just a few moments to sum up the controversy over the proposed construction of a powerplant on the St. Croix River at Oak Park Heights, Minn., and to make clear the objectives of these hearings.

We are advised that the Northern States Power Co. proposes to build a 550,000-kilowatt, coal-operated steam-electric powerplant on its 180-acre site at Oak Park Heights. It is understood it plans to build an additional 750,000-kilowatt unit at a later date.

The village of Oak Park Heights and civic and commercial organizations in Washington County are enthusiastic about the proposal. Aside from the large payroll during construction the plant would mean a more than 60-percent increase in the local school district's assessed valuation.

The additional electric power is needed for the growing Minneapolis-St. Paul area. The company points out that the cool, clean waters of the St. Croix are excellent for the efficient and economical condensing of steam.

The first unit at the site would use a maximum of 660 cubic feet per second of river water for steam condensing. The water would be returned to the river slightly chlorinated and heated some 10 to 17 degrees.

A group of Minnesota and Wisconsin Valley residents and river users incorporated themselves in August into Save the St. Croix, Inc.

We are advised that they fear that this thermal pollution may kill fish, encourage the growth of green algæ, and disrupt aquatic ecology. They also fear air pollution from ash and sulfur dioxide gas. They fear that barge traffic will disrupt pleasure boating on the river, and perhaps most of all they fear that the construction of the plant will open the clean and beautiful lower St. Croix to heavy industry, spelling the end of the river's usefulness as a prime natural recreational resource.

The company has denied each of these assertions, pointed to its own excellent record as a conservation-minded utility, and pledged to do whatever is necessary to prevent the pollution of the river. It has maintained, however, that the lower St. Croix is a commercial river already, as well as a recreational area.

At previous committee hearings on water use controversies it was found very helpful to adopt a kind of adversary proceeding.

These hearings have been designed to give both sides in this controversy equal time to present their cases.

This afternoon those who favor locating the plant at the Oak Park Heights side will have 3 hours to present their case. They will be led by Washington County Probate Judge John T. McDonough.

Friday morning Save the St. Croix, Inc. will have an equal amount of time. Friday afternoon there is reserved time for rebuttal.

The controversy over the St. Croix is interstate because the St. Croix is an interstate river. It marks the boundary between Wisconsin and Minnesota for some 100 miles north from Prescott, Wis.

The problem of planning the use of interstate waters is not limited to the St. Croix Valley. It is a national problem. As our supply of clean water grows shorter and our realization of the need for adequate planning grows more acute, the need for new ways of coping with interstate water use problems becomes clearer.

This morning we shall be taking testimony on the exact legal status of the problem as it relates to this specific situation from officials of Federal agencies involved and from representatives of both Minnesota and Wisconsin.

This committee is specifically charged with legislative responsibility in the area of air and water pollution. While this hearing will not be confined to whatever pollution aspects may be involved in this particular situation, the controversy has raised a specific question of great interest to us, the question of whether Federal statutory authority is needed to set water quality standards in appropriate instances to prevent interstate water pollution before it occurs.

Many of you will recall the great damage done to wildlife and recreational resources on the Mississippi River in 1963 as a result of two accidents involving huge quantities of oil.

Thousands of ducks were lost to us, and miles of shoreline were coated with oil along the Minnesota and the Mississippi because of a preventable catastrophe.

In two separate instances oil drums collapsed beside a tributary of the Minnesota River spilling some 3 million gallons of oil onto the ice. If the Federal Government had had the power to take preventive action, it could have prevented any serious damage to natural resources. But it apparently did not have that authority and it does not today. It can only act after interstate pollution has taken effect, when it is usually too late.

In the last session of Congress, this committee, under the leadership of Senator Muskie, wrote a bill, S. 649, the Clean Water Act of 1964, that made a start toward a more sensible handling of interstate pollution problems.

The bill passed the Senate but did not come to a vote in the House of Representatives.

The Clean Water Act provided that the Secretary of Health, Education, and Welfare would be able to hold a public hearing involving the users of a given body of water so as to arrive at a standard of water quality. The standard would be designed to protect the public health and welfare and to enhance the quality and value of the water resources. The Secretary was to take into consideration the value of the water for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural and industrial and other legitimate uses. The Secretary would promulgate the standards after giving the States reasonable time to adopt standards themselves. After the adoption of standards, the simple discharge of matter into the water, or onto the ice, which would reduce the water to below standard would be sufficient reason to initiate an enforcement action.

The objective of the standards would be to prevent pollution, and to make abatement actions unnecessary, by putting water users on notice as to the standard of water quality that would be maintained. It would discourage anyone from contemplating any use of the water that would lower the standard.

It is my understanding that Senator Muskie will reintroduce this bill early in the coming session. It is our hope that this hearing will provide useful information to guide the Congress in its consideration of this problem.

We are opening the hearing this morning with testimony from Federal Government agency witnesses. Before I call on the Public Health Service—which I believe has a representative here—I would like to summarize briefly and to enter in the record statements submitted by the following Federal agencies: The Federal Power Commission, the U.S. Army Corps of Engineers, and the U.S. Coast Guard.

The Federal Power Commission: Lawrence J. O'Connor, Sr., Acting Chairman of the FPC, states in his testimony that the Commission has no authority in this case.

FPC licensing is limited by law to hydroelectric powerplants.

In licensing hydroelectric plants, O'Connor states:

The Commission fully recognizes that there are occasions when the public is better served by retaining water resources in their natural state and foregoing water power development.

He cites, as an example, the FPC refusal to license a hydroelectric plant on the Namekagon River, a Wisconsin tributary of the St. Croix, "to avoid impairment of unique recreation resources."

The U.S. court of appeals upheld this ruling in a 1954 decision.

The U.S. Army Corps of Engineers: the Corps of Engineers reports that the Northern States Power Co. must receive a corps approval for any docking facilities they may need for coal barges. No application for such a permit had been received by the corps as of last week.

The proposed site is on the 9-foot-deep navigation channel the corps has maintained on the St. Croix as far as Stillwater since August 1938. A 3-foot channel is maintained to Taylors Falls.

Under the Oil Pollution Act of 1924 and under the Refuse Act provisions of the 1899 Rivers and Harbors Act, the corps testifies that it has responsibility for abating pollution and refuse dumping that interferes with navigation.

There is a statement also submitted by the Coast Guard, which I shall not read at this time, plus a statement submitted by Secretary Freeman of the Department of Agriculture.

Secretary Freeman states that the Department has no—

regulatory authorities or responsibilities directly pertaining to the water quality or any other aspect of the construction or operation of the proposed generating plant.

As Chairman of the Federal Interagency Recreation Advisory Council he expressed interest in the recreational value of the valley.

The Agriculture Department is working with the Interior Department on the wild rivers study. Freeman notes that the wild river task force, while concentrating on the St. Croix above Taylors Falls, had these comments to make on the lower river:

The St. Croix River below the study stretch is a recreational resource of outstanding quality, even though development precludes classifying it as a wild river. Appropriate measures should be taken to assure perpetration of this portion of the stream as a recreation resource of high quality.

Secretary Freeman urges that the recreational value of the St. Croix should be weighed against the cost involved in alternate site selections before a final decision is made on plant location.

The official statements made by the agencies just referred to will be inserted into the record at this place.

(There follows the letters from Federal agencies:)

FEDERAL POWER COMMISSION,
Washington, D.C., December 2, 1964.

Hon. EDMUND S. MUSKIE,
Chairman, Special Subcommittee on Air and Water Pollution, Committee on Public Works, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your letter of November 24, 1964, requesting an outline of the responsibilities and authority of the Federal Power Commission, under existing law and practice, with respect to the effect on water quality of steam-electric powerplants constructed along interstate streams.

The Commission's existing licensing jurisdiction, under the Federal Power Act (41 Stat. 1063, 16 U.S.C. 791-823), has been consistently held to be limited to hydroelectric projects. Steamplants constructed along interstate streams; such as, the plant proposed along the St. Croix River, therefore, are not subject to licensing by the Federal Power Commission. However, a steamplant may often require a structure in the stream, along which it is located, to impound sufficient water to remove the excess heat from the powerplant and such a structure requires special authorizing legislation by Congress (33 U.S.C. 401). The plant proposed on the St. Croix is located on an existing reservoir formed by a Federal dam on the upper Mississippi River, and therefore, does not require such a structure.

Under existing law, the Commission's responsibility for water quality standards is, therefore, limited to problems arising in connection with hydroelectric projects subject to our licensing authority. The effect of a steamplant on water quality is different from the impact of a hydroelectric station. Water pollution problems associated with steam-electric plants are almost entirely limited to those that result from the temperature rise in surface water supplies that are used in cooling the steam condensers. Hydroelectric plants do not heat the water. Nevertheless, our experience and practice in this closely related activity may be of interest to the committee.

The Commission is authorized to license hydroelectric projects only to the extent that such projects " * * * will be best adapted to a comprehensive plan

for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, and for other beneficial public uses, including recreational purposes * * *” (Federal Power Act, section 10(a)). This standard is broad enough to comprehend the avoidance or minimization of pollution and the Commission does, in fact, give consideration to this problem in passing upon license applications.

Before issuing a license for a hydroelectric project, the Commission takes steps to assure that proper consideration is given to the viewpoints of all affected interests and to the needs of all other uses of the water resources involved.

The Commission notifies Governors and State and local agencies of applications for preliminary permits and licenses for hydroelectric projects and gives them an opportunity to submit comments. In addition, notices of filings of applications are published in local newspapers and in the Federal Register. Before acting on an application, the Commission obtains the views and comments of the Department of Health, Education, and Welfare on the water quality and public health aspects of proposed projects. It also requests the Secretaries of the Army, Agriculture, and the Interior to comment on the project as it affects their interests. The comments of these agencies, together with those received from State and local agencies, are considered by the Commission in determining whether to issue a license and in framing appropriate conditions in licenses issued for both new and constructed projects to meet the statutory standard of the most comprehensive development of the waterway for beneficial public uses including conditions relating to pollution. Ordinarily, if there are protests, a public hearing is held to afford all interested parties an opportunity to present their case on the record.

We believe it is fair to state that the projects which the Commission has licensed have, in total, greatly contributed to the effectiveness of our rivers in solving pollution problems. Many streams in their natural state have periods of extremely low flow during which they all but disappear. The Commission has taken specific action in the licensing of many projects to improve their usefulness in the interest of water quality control by including provisions in the license for minimum flow releases or other operating requirements. Storage reservoirs at hydroelectric projects are usually operated to regulate natural flows so as to supplement them during low-flow periods and thus increase the production of firm power. Such streamflow regulation frequently also will be beneficial to water quality control.

The Commission fully recognizes that there are occasions when the public is better served by retaining water resources in their natural state and foregoing waterpower development. An instance was the proposed power development on the Namekagon River in Wisconsin. Notwithstanding the power benefits, the Commission denied a license to avoid impairment of unique recreational resources. Its action was sustained by the U.S. court of appeals, *Namekagon Hydro Company v. Federal Power Commission* (216 F. 2d 509 (C.A. 7, 1954)). The court there said that “Congress was aware that conflicting interests would, in all likelihood, be encountered when it formulated the statutory guides to be found in section 10(a) of the act.”

I hope that the above information will prove helpful to the subcommittee. If you should desire further information, I shall be glad to furnish it.

Sincerely,

LAWRENCE J. O'CONNOR, Jr.,
Acting Chairman.

STATEMENT OF THE CORPS OF ENGINEERS, U.S. ARMY, ON INTERSTATE ASPECTS OF
A STEAM-GENERATING POWERPLANT ON THE ST. CROIX RIVER, MINN.

This statement is in response to a request from Senator Edmund S. Muskie, chairman, Special Subcommittee on Air and Water Pollution, Senate Public Works Committee, to the Chief of Engineers, U.S. Army, for information concerning the role of the Corps of Engineers under existing law and practice and its responsibilities and authorities pertinent to the proposed construction of a steam-generating plant on the St. Croix River, Minn.

The St. Croix River navigation project was authorized by the act of August 30, 1935, pursuant to plans presented in the report of the Chief of Engineers published in House Document 184, 72d Congress. The existing project provides

for a channel 9 feet deep for a distance of 24½ miles from the mouth at Prescott, Wis., to Stillwater, Minn.; a channel 3 feet deep between Stillwater and Taylor Falls, Minn.; and improvement of the harbor and waterfront at Stillwater. The extension to provide a 9-foot channel to Stillwater was completed on August 12, 1938, when full pool at lock and dam No. 3 of the Mississippi River canalization project was reached. The Corps of Engineers maintains the 9-foot channel to Stillwater with widths suitable for the needs of navigation. Should greater widths of channel be required, by reason of the development of additional commerce, such increased widths could be provided by dredging under the existing authorization.

It is understood that the Northern States Power Co. proposes to construct dock- or barge-terminal facilities and a proposed water intake and discharge system in the St. Croix River at Bayport, Minn., about 3 miles downstream from Stillwater, in connection with the proposed steam electric-generating plant. Prior approval by the Department of the Army of the proposed construction in the navigable waters of the St. Croix River is required under section 10 of the River and Harbor Act of March 3, 1899 (30 Stat. 1151; 33 U.S.C. 403). The Department's jurisdiction over such work is directed to such control as may be necessary to protect the public rights of navigation. In acting on applications for permits for construction in navigable waters, the Department's primary interest is to insure that there will be no unreasonable interference with navigation, although it also gives consideration to the overall general public interest.

A permit issued by the Department of the Army does not give any property rights, either in real estate or material, or any exclusive privileges, and it does not authorize any injury to private property or invasion of public rights, or any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining State assent to the work authorized. It merely expresses the assent of the Federal Government so far as concerns the public rights of navigation (See *Cummings v. Chicago*, 180 U.S., 410).

Application for a permit for the construction of such facilities would be made to our district engineer, U.S. Army Engineer District, St. Paul, Minn. Formal application for such a permit has not been received.

Pollution of waters has become a problem of major concern. In this connection, the Natural Resources and Power Subcommittee of the Committee on Government Operations, House of Representatives, held extensive hearings on the problem during the 88th Congress. On June 12, 1963, the Chief of Engineers and members of his staff testified before the subcommittee on this subject.

From the standpoint of enforcement, the Department of the Army has general authority under two statutes which relate to the abatement of pollution. One is the Oil Pollution Act of 1924 (33 U.S.C. 432-437) which prohibits the discharge of oil from vessels into the coastal navigable waters of the United States. The other is the "Refuse Act" contained in the River and Harbor Act of March 3, 1899 (33 U.S.C. 407) which prohibits the discharge of refuse matter, other than that flowing from streets and sewers and passing therefrom in a liquid state, into the navigable waters of the United States. Since a primary purpose of these statutes is to protect navigation from obstruction and injury, enforcement has been concentrated on prevention of pollution, including oil, that will impede or injure navigation.

At the site of the proposed generating plant on the St. Croix River, the enforcement authority for the abatement of any pollution by oil and other refuse matter would be the "Refuse Act." The courts have held that oil is "refuse matter" within the meaning of the said section 13 (*U.S. v. Alaska Southern Packing Co.* (the *La Merced* case) (84 Fed. (2d) (444))).

The Corps of Engineers does not have any authorized reservoir projects in the St. Croix River Basin which could be considered for provision of storage for water quality control under the authority of section 2 of the Federal Water Pollution Control Act Amendments of 1961. As stated in Senate Report No. 353, 87th Congress, on this legislation, water stored and released at the proper time can do much toward reducing the temperature of water thus reducing the polluting effects of heat.

The opportunity which the committee has afforded to present this statement is appreciated.

TREASURY DEPARTMENT,
U.S. COAST GUARD,
Washington, D.C., December 3, 1964.

HON. EDMUND S. MUSKIE,
*Chairman, Special Subcommittee on Air and Water Pollution of the Committee
on Public Works, U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your request of November 24, 1964, concerning the forthcoming public hearings to be held by your subcommittee in Stillwater, Minn., on the interstate aspects of the proposed construction of a powerplant on the St. Croix River.

The proposed powerplant may have some effect on the adjacent waters and the vessel traffic on the St. Croix River. Water pollution enforcement, boating safety, and merchant marine safety are some of the statutory responsibilities of the U.S. Coast Guard that may find application.

The Coast Guard is one of several Federal agencies responsible for the enforcement of water pollution laws that are applicable to the navigable waters of the United States. Coast Guard activities which deal, either directly or indirectly, with abatement of water pollution are: enforcement of water pollution laws in cooperation with other Federal agencies; control of the carriage of dangerous cargoes; inspection and certification of vessels; licensing and documenting merchant mariners for certain classes of commercial vessels; inspection of port facilities under the port security program; recreational boating safety and regulation of motorboats; and investigation of marine casualties.

Of these water pollution abatement activities listed, only one would have possible application to a shoreside powerplant constructed on navigable waters, this is the Refuse Act of 1899. The Oil Pollution Acts of 1924 and 1961 would have no application in the instant situation since both apply to certain vessels on navigable waters where the "tide ebbs and flows" and to international sea areas generally within 50 miles from land.

The Refuse Act of 1899 (33 U.S.C. 407) makes it unlawful to deposit refuse matter of any kind, other than that flowing from streets and sewers in a liquid state, into navigable waters of the United States or into tributaries where the material may be washed into the navigable waters; further it is unlawful to deposit on a bank material of any kind which may be washed into navigable waters and impedes or obstructs navigation. This act is administered by the Secretary of the Army, and the Coast Guard is one of the Federal agencies charged with its enforcement.

Violations of the Refuse Act which are observed by Coast Guard personnel are investigated and documented; a formal report with supporting evidence is submitted to the district engineer, Corps of Engineers, for review and action. Cases reported which are legally sufficient are transmitted by the district engineer to the appropriate U.S. attorney for prosecution.

Where the discharge of refuse is not involved, the Coast Guard would have no statutory responsibility with respect to changes in water quality, such as "heat pollution," which may be occasioned by the operation of the proposed powerplant.

The Coast Guard is charged with administering Federal laws relating to boating safety on the navigable waters of the United States under authority of the Motorboat Act of 1940, as amended (46 U.S.C. 526), and the Federal Boating Act of 1958 (46 U.S.C. 527). In addition, regattas and marine parades are regulated when the location or circumstances may introduce extra or unusual hazards to the navigable waters (46 U.S.C. 454).

The Coast Guard would be responsible for enforcement of navigation laws and investigation of marine casualties should fuel for the proposed powerplant be brought in by barge. Additionally, if such fuel were of a liquid or gaseous flammable nature, the manning and construction of the maritime carrier's vessels would be subject to Coast Guard jurisdiction.

Sincerely yours,

W. D. SHIELDS,
Vice Admiral, U.S. Coast Guard, Acting Commandant.

DEPARTMENT OF AGRICULTURE,
Washington, D.C., December 7, 1964.

HON. EDMUND S. MUSKIE,
Chairman, Special Subcommittee on Air and Water Pollution, Committee on Public Works, U.S. Senate.

DEAR SENATOR MUSKIE: This is in response to your letter dated November 24, 1964. In that letter you request a statement describing the role and responsibilities of the Department of Agriculture which relate to the water quality implications of the proposal of the Northern States Power Co., to construct a large thermal electric power generating plant on the St. Croix River in the vicinity of Stillwater, Minn.

The Department of Agriculture does not have any regulatory authorities or responsibilities directly pertaining to the water quality or any other aspect of the construction or operation of the proposed generating plant. Neither does this Department have lands under its jurisdiction in the vicinity of the proposed powerplant. Yet it appears that this installation could strongly affect the activities and interests of this Department.

We understand that the proposed powerplant would divert cooling water from and return it to the St. Croix River and that its owner contemplates using that river to transport large quantities of coal by barge to provide energy for the plant. We understand also that questions have arisen regarding possible effects of the proposed plant's installation and operation on air and water pollution and on the continued utilization and enjoyment of St. Croix River Basin for various types of outdoor recreation.

The Department of Agriculture has nationwide responsibility for several activities directly related to the development and enjoyment of outdoor recreation facilities, both public and private. It provides technical and financial assistance to private landowners who wish to develop various types of income-producing outdoor recreation enterprises. Similar types of assistance are available under the Watershed Protection and Flood Prevention Act, through this Department, to qualified sponsoring organizations who develop public water-based recreation facilities in small watershed projects.

Apparently there is need for additional power in the area and the installation of a plant of the type proposed would contribute significantly to economic growth and development in the area it serves. This Department is an active participant in the administration's efforts to promote and facilitate economic development—particularly in rural areas.

We do not now have sufficient reliable information regarding the nature and magnitude of possible beneficial or adverse effects of this proposal to appraise its overall merit. We are very pleased to know that your subcommittee has scheduled a hearing on this proposal. This hearing will undoubtedly make available a great deal of pertinent official information.

The Recreation Advisory Council, on which the Department of Agriculture is represented, is also interested with problems of this nature. This Council is a Cabinet-level body established by the President in April 1962 to provide broad policy advice on all important matters affecting outdoor recreation resources. As Chairman of the RAC, I am concerned about any development which might affect the potential for outdoor recreation.

One of the studies in which the Recreation Advisory Council is interested is a study sponsored jointly by the Departments of the Interior and Agriculture to develop recommendations for a nationwide system of wild rivers. Such a system would protect and maintain certain streams in their free-flowing state so that unique fishing, canoeing, floating, and other outdoor recreation opportunities will be retained. The St. Croix is one of the rivers included in this study. Although the part of the river selected for detailed study is a segment above the location of the proposed powerplant, the draft report of the task force includes a recommendation pertaining to the lower stretch of the river which would be affected by the powerplant. This recommendation reads as follows:

"The St. Croix River below the study stretch is a recreation resource of outstanding quality, even though development precludes classifying it as a wild river. Appropriate measures should be taken to assure perpetuation of this portion of the stream as a recreation resource of high quality."

It is my understanding that there are a number of alternate sites which have been considered. I believe the cost of installation at alternate sites and the economic values to the respective communities involved should be carefully

weighed against the recreational and esthetic values which might be destroyed if the powerplant is located on the St. Croix.

Thank you for the opportunity of contributing to the hearing record.

Sincerely yours,

ORVILLE L. FREEMAN, *Secretary.*

Senator NELSON. Senator Metcalf, did you wish to make any comment?

Senator METCALF. Thank you, Mr. Chairman. No comment at this time.

I am pleased to be here, to participate in this hearing, to hear about this uniquely beautiful recreation area, and the problem of the development of this area. This is a national problem. The problem of preservation of our recreational resources is one in which we have a national interest, and I think we are going to set some precedents here today.

Senator NELSON. Thank you, Senator Metcalf.

If some of the witnesses have statements that are a repeat of something that has been said before, we would appreciate it if you would simply insert those statements into the record.

The importance of this record, which will be printed, is to have it available for the study of the Subcommittee on Air and Water Pollution and for the study of the Members of Congress in the preparation of legislation. What Senator Metcalf's or my opinion may be will not be affected by the oral presentation here because we will have before us the written record of all the testimony that is submitted.

If someone wishes to add to his testimony to cover some points that are not covered in this hearing or wishes to submit a statement, the record will remain open on these hearings until the 18th. At that time the record will be closed and sent to the printer.

I now call upon Mr. Murray Stein, chief enforcement officer and Assistant Chief, Division of Water Supply and Pollution Control of the U.S. Public Health Service.

Mr. Stein, you will be followed by Dr. Clarence M. Tarzwell. It might be helpful, in opening your remarks here, if you would give us Dr. Tarzwell's qualifications in this area of water pollution.

**STATEMENT OF MURRAY STEIN, CHIEF ENFORCEMENT OFFICER
AND ASSISTANT CHIEF, DIVISION OF WATER SUPPLY AND
POLLUTION CONTROL, PUBLIC HEALTH SERVICE, DEPARTMENT
OF HEALTH, EDUCATION, AND WELFARE**

Mr. STEIN. Yes, sir.

Dr. Tarzwell is our chief aquatic biologist. As you know, we pride ourselves on our scientific team and the variety of scientific competencies we have in water pollution control. Dr. Tarzwell is the senior member of our biologic team. Among other things, Dr. Tarzwell is an internationally acclaimed expert—in my opinion and I handle expert witnesses, I think this stands up—acclaimed expert on the effect of thermal pollution on fish and aquatic life. As a matter of fact, Dr. Tarzwell has set up the experiments and the standards that most aquatic biologists throughout the world use in determining the effect of thermal pollution on aquatic life.

We consider ourselves very fortunate in having Dr. Tarzwell on our staff.

Senator NELSON. Mr. Stein, may I interrupt you at this moment? Can everyone in the audience hear the testimony of the witness? Is there anyone who cannot hear it clearly?

All right, Mr. Stein, you may proceed.

Mr. STEIN. Thank you, sir.

In its lower reaches, the St. Croix River forms the boundary between the States of Minnesota and Wisconsin. The river is universally acclaimed as being spectacularly beautiful.

In riding up here today, I would say I want to join with that. In the course of my work, I have been working at this for 23 years, I think I have seen most of the rivers in the United States, looked at them professionally. You, indeed, have a jewel here. This is a wonderful river.

This esthetic consideration enhances the concern, which we share, for protecting and maintaining the quality of its waters. This concern has an understandably practical and realistic basis in the predominant and important use of these waters. The basin is sparsely populated and is a center for park and recreational activities in the Minneapolis-St. Paul area. The river is used for all forms of water sports, including swimming, skiing, fishing, and canoeing. There are approximately 15 marinas and boat ramps and at least 6 swimming areas within the stretch of the river from its mouth to Stillwater. Swimming from boats is also practiced. Waterside parks are found in Stillwater and Bayport, here in Minnesota, and in Hudson, Wis. Approximately 16 species of game fish, including sturgeon, northern pike, walleye, bass, and trout, and 11 varieties of rough fish make their habitat in these waters.

Federal enforcement jurisdiction and procedures to abate pollution are currently applicable in this area under the provisions of the Federal Water Pollution Control Act. Our assistance was requested by the Honorable Karl F. Rolvaag, Governor of Minnesota, and the Honorable John W. Reynolds, Governor of Wisconsin, to extend to the interstate and intrastate pollution problems of the Mississippi River from the Coon Rapids Dam in Minnesota, through Lake Pepin, including the major tributaries in the two States. The conference held in this matter between our Department and the representatives of the Minnesota and Wisconsin State Water Pollution Control Agencies on February 8, 1964, defined the enforcement area to include the lower reaches of the St. Croix River as one of the major tributaries, along with the Minnesota River, to the main stem of the Mississippi.

As recommended by the conferees, we are engaged in conducting the Twin Cities-Upper Mississippi River project to study and identify the pollution problems with a view toward their resolution.

Our Department considers this area so important that we have a resident group here right now of 23 people on the job full time, this will be expanded to 26, total complement, and we are putting about a quarter of a million dollars a year into this study. We intend to keep up with at least that scope of assistance in the area until we come up with an equitable solution to the problem.

The St. Croix River has been the subject of a routine intensive survey by the project staff and has been found to be a relatively clean stream. Three of the four largest communities along the river, Stillwater and Bayport, Minn., and Hudson, Wis., provide treatment for

their waste discharges to the St. Croix, and the fourth community, the city of Prescott, Wis., discharges its treated wastes directly to the Mississippi River. These communities range in population size from 8,100 to 1,536. Only one industry, located in Bayport, is discharging treated waste directly to the St. Croix in this stretch and the discharge appears to have no significant effect on the water quality. The survey adequately confirms the safety of these waters for bathing and further indicates their very good quality for recreational pursuits involving body contact.

The Federal Water Pollution Control Act provides procedures for the abatement of existing pollution. While Federal enforcement action to abate potential pollution is not authorized by the act, we naturally are concerned if new sources of pollution would degrade water quality when existing pollution is abated.

The Federal act also authorizes us to furnish technical assistance to State water pollution control agencies at their request to find solutions to any specific problem of water pollution confronting any State, interstate agency, community, municipality, or industrial plant. In addition, the act specifies that comprehensive programs for eliminating or reducing pollution of interstate waters and their tributaries are to be prepared and developed in cooperation with Federal agencies, State and interstate water pollution control agencies, and the municipalities and industries involved. For these purposes we are authorized to make joint investigations with any such agencies of the condition of any waters in any State or States, and of the discharges of any sewage, industrial wastes, or substance which may adversely affect such waters. The comprehensive plans are directed toward the development of both short- and long-range guidelines designed to provide a regulated supply of clean water available for all legitimate uses to the present and future population of the area.

The findings and recommendations of the ongoing project—that is, the project for which we now have 23 people and are investing a quarter of a million dollars a year—study may well result in requirements for costly remedial facilities to abate existing pollution. It appears, therefore, that it would only be equitable that every effort be made to assure that the entry of potential pollution from new sources will not leave an adverse effect on the water quality provided by the water pollution abatement program. Within the statutory authorities of the Federal act and the available staff and resources, we are prepared to cooperate to the fullest extent in these efforts.

Thank you very much, Mr. Chairman, for the opportunity to appear before your committee.

Senator NELSON. I didn't understand from your testimony the exact scope of the study that is now being made.

Mr. STEIN. We are studying the entire metropolitan area involving the Twin Cities as part of a Federal enforcement case. We were called into this case by Governors Rolvaag and Reynolds and we met with the State agencies concerned and came to some conclusions and made some recommendations. Possibly the first one, I think this is the key, is no surprise to the people here. The waters around the Twin City area, from industries, municipalities, and strong overflow sources, have created a health hazard for those engaging in water activities, have caused visual nuisance interference with fish and fishing,

caused sludge banks, which gives noxious odors, and interferes with aquatic life and feeding and spawning grounds for fish propagation. This pollution must be abated. We and the State agencies are proceeding with an active program to do that. Our study is designed to abate this pollution. The study area includes the lower reaches of the St. Croix River, the area covered of interest to this committee today. Our view has been that if the Twin City area is cleaned up, it seems to be fruitless to clean up an area and then have a potential source of pollution come in on top of the cleanup program and develop a new problem. It seems equitable that the whole area should be considered at once, and I suspect that is why the conferees included the lower regions of the St. Croix in the enforcement area.

Senator NELSON. When did your committee commence its study?

Mr. STEIN. We had the conference in February. I don't think we were fully staffed until several months later, about 3 or 4 months after that, in June, and we still aren't fully staffed. We have a complement authorization for 26 people and we have 23. We are practically completely staffed. It takes time to get experts to engage in this type of work.

Senator NELSON. And this study is being conducted under your direction, it is?

Mr. STEIN. Yes, sir; it is an enforcement action under the direction of the Department of Health, Education, and Welfare in cooperation with the State air and water pollution control agencies concerned. It is financed by the Federal Government and under the authority of the Federal Water Pollution Control Act, which is under the jurisdiction of your committee.

Senator NELSON. Based upon the findings that your committee makes, your Department has the authority to commence enforcement actions to abate this pollution after you have set some standards?

Mr. STEIN. Yes, sir. I think, though, that under the statute the first step in the enforcement action has been taken, that is, the calling of the preliminary conference. I think once we do that under the act our process is excellent. We have a mandatory procedure to follow that rule to the end. If there is a determination that interstate pollution exists, and I think from reading the summary it is very clear that pollution exists in the area, we attempt to get a solution at the conference stage and have the States take care of the remedial actions under State programs. In almost all the cases we have accomplished this. If this is not successful, then we have a public hearing and the Secretary would issue recommendations directly himself. If that is not successful, we can ask the Attorney General to bring court action. In all the cases we have had, involving more than 650 cities and about a like number of industries, we only had to go to court once against the one city. The vast majority of the cases have been solved at the conference stage.

Senator NELSON. Those are all the questions that I have.

Judge McDONOUGH. You stated earlier this is in the nature of an adversary proceeding. Will we have the opportunity of asking this witness one or two questions?

Senator NELSON. I would have no objection.

The procedure is that the governmental witnesses will go on this morning, that the proponents of the location of the plant would go on

this afternoon, the opponents tomorrow morning, and rebuttal on Friday afternoon.

I think we would go on endlessly here if we start having an audience cross-examination. But if you wish to submit some questions, I would have no objection.

Judge McDONOUGH. I have but one question.

Senator NELSON. If everybody has one, then we are done.

Judge McDONOUGH. I don't believe I am in a position of being everyone; I am in a position of being of the proponents.

Senator NELSON. If you would like to submit any questions, I will see to it that Government witnesses submit answers, and submit it for the record. I think if anybody here is entitled to ask a question of any witness, everybody should be, and if we opened it up, I have been in enough of these affairs to know that we would never conclude it. If you will submit your question, we will see to it that it is answered.

Mr. THUET. I am Paul Thuet, for the opponents. I agree with the thinking, but would we be given the right to submit questions on the same basis?

Senator NELSON. As I stated earlier, we wish every viewpoint to be heard. We will make every attempt for equal opportunity for every viewpoint. If anybody wishes to submit any questions to a witness, we are perfectly glad to submit them to that witness for an answer. If someone wishes to submit a statement himself explaining or in rebuttal, we will put that in the record as long as the material isn't repetitious. Every attempt will be made here for everybody to be fairly heard, but I know if we opened it up to questions on cross-examinations from the audience it will never be completed. I think it is perfectly fair if everyone has a chance to write down his questions and submit them, just so it is done and prepared for the record by the 18th. I am sure the Government witnesses would be happy to respond to questions after the 18th, although it wouldn't be printed in the record.

Senator Metcalf.

Senator METCALF. Thank you, Mr. Chairman.

I am in complete accord with these procedures that have been set up. Either side should have an opportunity to present its testimony, but cross-examination, as in a legal matter, is not conducive to this type of a hearing.

Mr. Stein, you are the chief enforcement officer. In determining when you are going to set up an enforcement conference and so forth, do you have standards fixed by legislation?

Mr. STEIN. No; we do not, sir.

Senator METCALF. Under the provision of S. 649 there were standards established?

Mr. STEIN. That would have authorized standards to be established; yes, sir.

Senator METCALF. Yes. When you bring an abatement action or prepare an abatement action, you said you had to find health or welfare passage?

Mr. STEIN. The words are "endangerment to health or welfare."

Senator METCALF. I am going to leave one question to the next witness. But Senator Nelson suggested that perhaps this proposed plant would develop barge traffic that would disrupt pleasure boating

on the river. Do you conceive that that would come under the jurisdiction of your agency as a ground for abatement?

Mr. STEIN. No, sir. I think what we would do is only concern ourselves with the conditions of the water quality on the river. I don't think we deal with the question of boat safety. If barge traffic or other activities would affect water quality, we would certainly be concerned. The only thing that we deal with is water quality. We are a specialty agency.

Senator METCALF. Water quality as respecting endangerment to health?

Mr. STEIN. Health or welfare.

Senator METCALF. If the water quality endangered pleasure fishing, you would consider that welfare?

Mr. STEIN. Yes, sir; yes, sir; we do.

Senator METCALF. And if the water quality was such that it endangered fishing or other body activity with the water, that would also be welfare?

Mr. STEIN. Yes, sir; right.

Senator METCALF. But you have not authority to go into these enforcement procedures in anticipation that such a pollution will occur?

Mr. STEIN. That is correct, sir. We can only deal with an existing discharge, not an anticipated one.

Senator METCALF. And you have to wait until there has been this endangerment to health or welfare?

Mr. STEIN. That is correct, sir.

Senator METCALF. If you went into court to prove a case of abatement, you would have to prove endangerment to health and welfare?

Mr. STEIN. That is correct, sir.

Senator METCALF. There are no legislative standards?

Mr. STEIN. No, sir.

Senator METCALF. I think that is all. Thank you very much, Mr. Stein.

Senator NELSON. Thank you, Mr. Stein.

We will now call on Dr. Tarzwell, chief, Aquatic Biology Section, Basic and Applied Sciences Branch of the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, Division of Water Supply and Pollution Control.

It is a pleasure, Doctor, to bring you before us.

STATEMENT OF CLARENCE M. TARZWELL, CHIEF, AQUATIC BIOLOGY SECTION, BASIC AND APPLIED SCIENCES BRANCH, ROBERT A. TAFT SANITARY ENGINEERING CENTER, DIVISION OF WATER SUPPLY AND POLLUTION CONTROL, PUBLIC HEALTH SERVICE

Dr. TARZWELL. Thank you, Senator.

Although aquatic biologists and fishery workers have for a long time recognized the great importance of temperature in the aquatic environment, it has been only in recent years that high water temperatures have become important as a water pollutant. It is not generally appreciated that merely raising the temperature of a clean water can constitute pollution. However, excessively raising the temperature

of a stream, lake, or reservoir is pollution just as much as depleting the oxygen or adding toxic materials because it interferes with, lessens, or destroys a desired beneficial use; namely, the production of sport and food fishes and other aquatic organisms.

We have seen gradual slight rises in water temperatures, which alone seemed unimportant at the time, finally destroy a large portion of the trout water in this country. Deforestation and agricultural activities in Michigan and in several other States have rendered many trout waters unsuited for trout largely through bringing about higher water temperatures. Temperature is a governing factor in determining if a stream will be a trout stream. Further, average temperatures may mean very little because it is the extremes which are governing. If temperatures in a trout stream were raised to lethal levels on only 1 day in the year and then for only a few hours, its value as a trout water would be destroyed or severely impaired.

Increased water temperatures can influence fishes and other aquatic organisms both directly and indirectly and in a variety of ways.

1. Local high temperatures may produce a thermal block to migration.

2. Sudden changes in water temperature can be lethal to fishes and other aquatic organisms.

3. Temperature can act as a directive force to control migration by repelling or directing fish into certain paths or into certain areas. Some fish swim into hot water in which they are killed or in which they do not normally live even though they might as easily have swum into water which would have been harmless. Fish acclimated to warm water are rapidly killed when they swim into cold water.

4. Temperature may increase or decrease food production and food demand and it also influences spawning.

5. Temperature influences the composition of fish populations and the relative abundance of certain species. Usually, high temperatures favor the coarse and undesirable species in more northern waters.

6. High-water temperatures favor certain species of algae and may cause blooms, especially of the undesirable blue greens.

Optimum temperature for some diatoms, a microscopic algae of great importance in the food chain, range from about 64° F. to 86° F. However, many prefer much lower temperatures and some do not live above 50° F. The blue-green algae can withstand considerably higher temperatures and the optimum temperature for many of them range from 95° F. to 104° F. and they often become a nuisance in heated waters.

It should be recognized that temperature do not have to reach lethal levels in order to render a water unfavorable for a given species of fish or even to eliminate that species. Temperature which favor competitors, predators, parasites, and disease can eliminate a species at levels far below those which are lethal. As water temperatures increase, bacterial action and the so-called natural purification process are speeded up. This may result in the depletion of oxygen during the summer in certain areas in which dissolved oxygen conditions are satisfactory at other times of the year.

Temperature seldom acts as an independent variable and generally its effects must be considered in combination with other environmental factors. Temperature and dissolved oxygen must be considered to-

gether. Temperature influences the effects of carbon dioxide, hydrogen-ion concentration, and toxicants which may be in the water. Aquatic organisms are coldblooded and their metabolism is influenced by water temperatures. As the water temperature rises, fishes require more dissolved oxygen in order to maintain a normal existence or to live at all. The effects of temperature in fishes varies with age, size, and season and is especially important for spawning and the development of eggs and fry. Winter temperature for eggs of trout must be below 58° F. and for salmon should not be above 50° F. in the mid-winter periods.

Fish become acclimated to high temperatures much more rapidly than they do to low temperatures. Thus, they can be killed in passing from warm to cold water in winter. High water temperatures, which are not harmful in summer, can be rapidly lethal in winter. While fish can be acclimated to higher temperature, there is a definite point beyond which they cannot go. When acclimated to high temperature, their resistance to low temperature is reduced.

Temperature acts through metabolism to control activity of fishes. As the temperature increases, the rate of metabolism necessary just to maintain the organism increases and the oxygen requirements increase. Thus, while a fish might survive at a given temperature by remaining inactive, forced activity would cause rapid death through oxygen deficiency. As the temperature rises, a point is soon reached where fish cannot be fully active even under conditions of oxygen saturation. Carbon dioxide also influences the oxygen requirements. Thus, if it is present in appreciable quantities, at higher temperatures, considerably more dissolved oxygen is required for fish activity and survival.

While fish may exist over a considerable range of temperature through remaining inactive and not feeding, temperature must be favorable if we are to produce a crop of desirable sport and food fishes. Water temperatures which may be resisted by adult fishes for long periods can be entirely unsuited for reproduction and the survival of the species. For example, temperature levels rapidly lethal for brook trout are 82° F. to 83° F. but for good production they should not exceed 73° F., and it is better if they do not exceed 68° F. In considering allowable temperature, it must be realized that there is a wide range between desirable temperatures and those which are rapidly lethal.

Thank you, Senator Nelson, for allowing me to present this statement.

Senator NELSON. Thank you, Dr. Tarzwell.

Senator Metcalf, do you have any questions you wish to ask?

Senator METCALF. Yes.

Dr. Tarzwell, you said "excessively raising the temperature." What did you mean by that?

Dr. TARZWELL. Any excessive raising of temperature would be raising it to a level which produced an environment that was less suitable for those organisms you wish to produce. This is going to differ with different species. In other words, a temperature which would be excessive to trout would not necessarily be excessive for the warm-water fishes—the raising of a temperature to a point where environmental conditions become less favorable for these organisms which you wish to produce.

Senator METCALF. So you couldn't measure it, or you couldn't answer the question, in the terms of raising the temperature by a certain number of degrees—it would change in different streams?

Dr. TARZWELL. It would depend, sir, upon the original temperature in the stream and how much latitude you might have. It would depend on the species which were of importance in that stream.

Senator METCALF. If the temperature of the stream were raised to such an extent that it would destroy food fish that were used for commercial fisheries, would you recommend to Mr. Stein that an abatement procedure be brought?

Dr. TARZWELL. Generally speaking, sir, the raising of the temperature would not necessarily affect the food fishes; it would more likely affect the bottom organisms which are very important in the food chain. In many instances, the food fishes can withstand higher temperatures. There are exceptions. Some of the minnows cannot stand as high a temperature as the largemouth bass, which can probably stand higher temperatures than any of the other sport fishes, but you have to consider the whole environment. But if these temperatures would render it unfit for the reproduction for the eggs or fry, or would eliminate or decrease the food organisms, I would recommend—yes—that this pollution here exists, because it is interfering with this desired use or resource.

Senator METCALF. That would be such a distraction that it would be violative of the welfare of the people?

Dr. TARZWELL. Yes, sir.

Senator METCALF. If it were just sport fishing, would you give the same answer?

Dr. TARZWELL. Yes, sir; because, from an economic standpoint, our sport fishes are worth more than our food fishes. It has been estimated that our sport fisheries in this country are worth between \$2 and \$3 billion annually. Our food fisheries produce, on the whole, including Alaska, about 5 million pounds a year. This is not of the same dollar value, but it does represent a very important high protein, high mineral, low-fat diet that we need now and perhaps we will need more in the future and would need our best efforts for the preservation.

Senator METCALF. As I came into town this morning, I notice several of those houses out on the river already—people who are preparing to do ice fishing for the rest of the winter.

If the temperatures of the stream were raised to such an extent that you couldn't move onto the river for ice fishing for a month or so, would you consider that was such a violation of the welfare that it would justify an abatement procedure?

Dr. TARZWELL. I began my fisheries career in Michigan. As you perhaps know, we have a great deal of ice fishing there. In fact, some of the species for which it is important that the harvesting be done in winter is northern pike and some of the others, and it does produce a valuable recreational resource. And if it interferes with it, it is not directly pollution, it is a side effect, but it does interfere with the harvesting of the crop—put it that way.

Senator METCALF. And you could do all those things that you suggested under the Federal law?

Dr. TARZWELL. This is out of my field of competence, sir, and I should not attempt to answer that as a scientist. I feel that Mr. Stein, who is in the legal phases, should answer that.

Senator METCALF. You would recommend to Mr. Stein that he bring a legal action in court?

Dr. TARZWELL. No, sir. I would inform him of the facts and he would decide whether or not he should bring legal action.

Senator METCALF. Thank you.

Senator NELSON. Thank you very much, Dr. Tarzwell.

Would you provide for the record locations where steam-generating plants have produced undesirable temperature conditions in streams?

Dr. TARZWELL. Yes, sir.

(Subsequently the following information was submitted:)

LOCATIONS WHERE TEMPERATURE INCREASES HAVE BEEN PRODUCED BY COOLING WATERS FROM COAL-FIRED ELECTRICITY-GENERATING PLANTS

As the number of steamplants increases, the problem of the heating of water will become more serious. This problem of heat pollution is recognized as one which will become of increasing importance in the future. Few studies have been made to date, however, concerning the effects of heated discharges on the aquatic environment and the contained biota.

The Pennsylvania Health Department has received reports of fish kills on the Delaware River below the Martins Creek plant of the Pennsylvania Power & Light Co. Reports of fish kills at the Cromby plant on the Schuylkill River have also been received. The report, "Biological Aspects of Stream Temperature Surveys," prepared for the Water Utilization Subcommittee, Pennsylvania Electric Association, by Consulting Biologists, Inc., Philadelphia, Pa., contains a table which lists the temperature at given distances in the receiving stream below the discharge of the steam-generating plant. Temperatures which are clearly lethal to aquatic organisms have been recorded at the Elrama plant on the Monongahela River, at the Seward plant on the Conemaugh River, at the Shawville plant on the West Branch of the Susquehanna River, and at the Barbadoes, Cromby, and Titus plants on the Schuylkill River. The temperature at the Shawville plant reached 114° F. in August 1960, and was still 96° F. almost 2 miles downstream and 92° F. about 5 miles downstream. The latter is 21° F. higher than the original stream temperature. At the Seward plant, on the Conemaugh River, temperatures reached a peak of 115° F. on 2 days in August 1959, and, on two occasions, were over 100° F. at distances considerably over a mile downstream. During the summers of 1959 and 1960 temperatures were recorded about 10 miles below this plant which were 5° to 13° F. higher than the original stream temperature. Temperatures above 104° F. are generally lethal to fishes inhabiting this area.

Senator NELSON. I will now call on Mr. Harold Jordahl, regional coordinator, Upper Mississippi-western Great Lakes area, for the Department of the Interior.

Mr. Jordahl.

STATEMENT OF HAROLD C. JORDAHL, JR., REGIONAL COORDINATOR,
UPPER MISSISSIPPI-WESTERN GREAT LAKES AREA, U.S. DEPARTMENT OF THE INTERIOR

Mr. JORDAHL. Mr. Chairman, the Department of the Interior welcomes this opportunity to appear before the Special Subcommittee on Water and Air Pollution on the interstate aspects of the proposed construction of a steam-generated powerplant on the St. Croix River. In a letter of November 24 to Secretary Udall, the subcommittee requested that the Department of the Interior, as an agency of the Federal Government, explain its role, in cooperation with the States of Minnesota and Wisconsin and other Federal agencies, in evaluating the effect of the proposed powerplant on water quality. We are happy to respond to this request and to be as helpful as possible, contributing what we

can in this hearing and in other ways, to analysis of the public interest in this matter.

The Department of the Interior is the one department of the Federal Government which is concerned almost solely with conservation of natural resources. Thus we are concerned with the development of such resources.

But we are not only concerned with resource development. The Department is also concerned with preservation of select areas by establishment of parks, recreation areas, seashores, and wild rivers and by encouragement of the State and local governments to establish similar types of areas. The 88th Congress, in addition to enactment of many other notable conservation measures, authorized upon our recommendation the Ozark National Scenic Riverways. And, jointly with the Department of Agriculture, we are conducting a nationwide wild river study to identify rivers or portions of rivers that by some appropriate means—Federal in some cases, State or local in others—might be protected for public recreational use. A portion of the St. Croix, above the proposed powerplant site, is involved in this national wild river study.

To meet the natural resource problems of our time and as we envision them in the future, the new emphasis of conservation, we believe, must be a concern with the environment as a whole; with prevention of environmental pollution, air, water, and land; and also with provision of quality in surroundings appropriate to the needs of different people, in different places, and in different times of the day and year. And in emphasizing this concern with the quality of living, as had President Johnson on a number of occasions, Secretary Udall and all of us in Interior are following the President's own lead in emphasizing the need to preserve natural beauty throughout the land, not only for ourselves, but for the generations that will come after us.

The Department has two legislative authorities which are germane to this problem. First, the 88th Congress passed Public Law 88-29, which provides:

That the Congress finds and declares it to be desirable that all American people of present and future generations be assured adequate outdoor recreation resources, and that it is desirable for all levels of government and private interests to take prompt and coordinated action to the extent practicable * * * to conserve, develop, and utilize such resources for the benefit and enjoyment of the American people.

This law is known as the Organic Act of the Bureau of Outdoor Recreation.

The act further provides that the Secretary of the Interior is authorized to—

provide technical assistance and advice to and cooperate with States, political subdivisions, and private interests, including nonprofit organization with respect to outdoor recreation—

to—

encourage interstate and regional cooperation in the planning, acquisition, and development of outdoor recreation resources—

and to—

cooperate with and provide technical assistance to Federal departments and agencies and obtain from them information, data, reports, advice, and assistance that are needed and can reasonably be furnished in carrying out the purpose of this act,

and promote coordination of Federal plans and activities generally relating to outdoor recreation.

Under the aegis of this authority, the Secretary of the Interior, through the Bureau of Outdoor Recreation, can advise organizations concerned with the powerplant proposal of Northern States Power Co. as to its views on the proposal in relation to outdoor recreation resources. Federal or State agencies having regulatory authority must decide themselves, of course, the weight to be given to such counsel. But our responsibility to offer advice is clear.

Second, in the Fish and Wildlife Coordination Act (the act of March 10, 1934, 48 Stat. 401, as amended by the act of August 14, 1946, 60 Stat. 1080; the act of June 19, 1948, 62 Stat. 497; and the act of August 12, 1958, 72 Stat. 563; 16 U.S.C. 661 et seq.), the Congress has stated that:

For the purpose of recognizing the vital contribution of our wildlife resources to the Nation, the increasing public interest and significance thereof due to expansion of our national economy * * *, and to provide that wildlife conservation shall receive equal consideration and be coordinated with other features of water-resource development, maintenance, and coordination of wildlife conservation * * *, the Secretary of the Interior is authorized (1) to provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife resources thereof, and their habitat, in controlling losses of the same from disease or other causes * * *.

Senator NELSON. May I interrupt one moment.

Prior to this paragraph, your testimony is that the Secretary of the Interior, through the Bureau of Outdoor Recreation, may advise appropriate State and Federal agencies respecting any recreation resource with which you, as an agency, are concerned?

Mr. JORDAHL. Yes, sir; that is correct.

Senator NELSON. As of this moment, has the Secretary of the Interior given you any instructions or made any decision by making any recommendation to the agencies concerned here respecting this project?

Mr. JORDAHL. The Secretary has specifically instructed, through me, that the various bureaus and agencies of the Department of the Interior contribute to, work with, and cooperate with a special two-State Federal task force, which was initiated by Governor Reynolds. The first meeting of the special task force was initiated December 9, yesterday, in Madison, and we will be cooperating and working closely with this particular group, Senator.

Senator NELSON. Does the statement, referred to above, also contemplate the Secretary of the Interior making recommendations to the State agencies? Do I understand it correctly, also?

Mr. JORDAHL. Yes; this authority provides we can make recommendations to our Bureau of Outdoor Recreation.

Senator NELSON. My question was: Has the Secretary of the Interior issued any instructions requesting making an appearance or statement before the Minnesota agency, which will be conducting hearings, I understand, on January 13?

Mr. JORDAHL. Not at this point, Senator. I believe that the plan is that the data gathering, survey study, et cetera, of the two-State Federal task force will become complete sometime in February. Here the facts from all agencies that have some responsibility for an analysis of the recreational impact will be under one jacket, out of which our

Bureau of Outdoor Recreation would like to evolve some recommendations on this problem.

Senator NELSON. One more thing, Mr. Jordahl. I have read your statement, which is a very comprehensive 10-page statement, and I am wondering if you might take a moment or two to compose your thoughts and do some summarizing and not read the balance, because, I conclude, unfortunately, that we will not get everybody in on the Government's side before noon. If we don't, I will, myself, be willing to conduct the hearings through the noon hours. But your full statement will appear as part of the record and it occurred to me that we won't get to the rest of them. So if you could do some summarizing, and reading of excerpts, the committee will appreciate it.

Mr. JORDAHL. Continuing under the Fish and Wildlife Coordination Act, I think the fact that is important is that the act further provides that reports and recommendations of the Secretary of the Interior shall be made an integral part of any report of the Federal Government. These reports are prepared by the Secretary of the Interior under the aegis of the Fish and Wildlife Coordination Act and become an integral part of the Federal court report of the Government. I am quoting at this point:

The reporting officers, in project reports of the Federal agencies, shall give full consideration to the report and recommendations of the Secretary of the Interior.

The act further provides that the Bureau of Mines and the Fish and Wildlife Service contribute to studies that relate to water pollution. Thus the Fish and Wildlife Service and the Bureau of Mines, both of the Interior, act in an advisory capacity to the Congress and to the Departments of Agriculture and Health, Education, and Welfare and others.

Senator METCALF. May I interrupt a moment, Mr. Chairman.

I think it should be stressed at this point that authority, both under the Outdoor Recreation Act and under the Coordination Act, is strictly advisory.

Mr. JORDAHL. That is correct, Senator, advisory in both instances; correct. The regulatory agency, whether at the Federal level or the State level, can take into consideration this advice.

This has already been noted, this is not a hydroelectric plant. The Federal Power Commission would not issue a license as a consequence under the Fish and Wildlife Coordination Act. There is no way we can express ourselves through that channel. However, if Northern States Power Co. has to have a permit from the Corps of Engineers, Department of the Army, for dock facilities, channel dredging, or the like, the Corps of Engineers, under the Coordination Act, would consult with the Fish and Wildlife Service for advice, which, again, is only advisory in nature.

We have under the act also the authority to work with and cooperate with any local groups that are concerned with adequate fish and wildlife resources involved in this particular matter.

There are a number of ways in which the agencies of the Department can be helpful and can contribute to a careful analysis of the problem. We do have technical knowledge of electrical energy needs for the entire upper Midwest region. In fact, we made a major contribution

to the fuel and power study, Lake Superior region, 1963, which contains useful data for a discussion of this proposal. We have, of course, no power marketing responsibilities in the area of the St. Croix.

Our other agencies can contribute—the Bureau of Sport Fisheries and Wildlife, the Bureau of Commercial Fisheries, and the Bureau of Mines, and certainly our Geological Survey. Bringing together this knowledge for consideration by regulatory agencies, in this case the State of Minnesota, can be the Department's contribution to any public decision relating to this matter. Thus, Secretary Udall promptly responded on behalf of President Johnson to a request made to the President by Governor Reynolds of Wisconsin on October 21, 1964, for Federal assistance to a task force of representatives from Wisconsin and Minnesota agencies. I have already noted that. And we are cooperating with that two-State group.

Some of the things which we are concerned with and which I expressed in my statement, Mr. Chairman, I will not read at this time. They have, I think, already been mentioned in your opening statement and in the statements of the Public Health Service, so I will pass over that.

In the remarks which I made in St. Paul on October 13, 1964, and which might be useful to the subcommittee as a part of this hearing record, I suggested that alternatives should be explored before a reasoned judgment is made. I did this because areas of true unspoiled, natural beauty, like the St. Croix, are relatively scarce. Sites for steam powerplants adjacent to water sources in areas, where development of various kinds have changed the natural character of the area, are usually more abundant.

Suggested for consideration and comparison were the following:

First, the present site location;

Second, other site locations;

Third, development of other energy sources;

Fourth, construction of a plant outside the metropolitan area and transmission of power via extra high voltage lines or an intertie with any surplus power sources.

There may be other alternatives.

To make the decision, benefits, and costs to society and to NSP should be analyzed and documented. Such an analysis should weigh intangibles as well as tangible evidence.

Presumably the company, given its position in the area in the sale of power, will adjust the rates in the face of increased costs in such a way that there will continue to be an equitable return to investors.

I would like to just abstract on page 8 that there is under the aegis of the Water Resources Council of the Federal level a comprehensive study of the upper Mississippi River, including the St. Croix and other tributaries. We are using as our guidelines for this study Senate Document 97, which does provide there be an analysis of alternatives. In this study we will be, of course, making analyses of the St. Croix River Basin. However, that study is not scheduled to be completed until 1969.

I have attempted so far to explain the general point of view, legal authorities and responsibilities, and analytical approaches of the Department of the Interior in matters of this type.

In addition, I would like to say a few more words, in general terms, about the broader responsibility for the conservation of natural resources. We do take a broad position on this matter. We have a general responsibility to the public and to the Congress to conserve, develop in some cases and preserve in others, the resources of the Nation. We can't do this, of course, unless environmental pollution is minimized. Here, of course, the Department has a major Federal responsibility shared in part by Interior, Agriculture, and other agencies.

President Johnson has dedicated his administration to making America a more beautiful place in which to live. He has stressed, for example, the importance of making the Potomac River that flows by the Nation's Capital a conservation model for metropolitan areas. The St. Croix could as well be a conservation model for the entire Midwest.

The unique, natural resources of this basin have in part been documented already. I would simply like to say that it has a unique fishery. It is relatively unpolluted. It is located at the doorstep of more than 2 million people, and the findings of the Outdoor Recreation Resources Review Commission that "outdoor opportunities are most urgently needed near metropolitan areas," I think, are significant in this regard.

There are only two dams which cross the river, and we have a great variety in plants, animals, topography, and water conditions which provide people with an opportunity for all forms of outdoor recreation. I know few rivers of such outstanding quality so near a large metropolitan area.

I have already noted that we are making a study for wild rivers, not only the St. Croix, but the Namekagon. We haven't attempted in preparation for this hearing to develop specific policy recommendations with respect to problems associated with steam-generating electrical plants like we are discussing here today. The Department recognizes, however, that these problems are increasing in magnitude and that additional public regulations may be necessary to safeguard the public interest and protect resources.

Several more general proposals possibly meriting reexamination in this context are Senate bills 649 and 1111 of the 88th Congress, which would provide for stronger water pollution control programs and improved institutional arrangements for river basin planning. The Department of the Interior supported both of these measures. Suggestions to require licensing by the Federal Power Commission of all new powerplant installations over a certain maximum size might be studied by the subcommittee with the view of protecting, when appropriate, the beauty of the landscape and other resources. And, perhaps, interest in the concept of a Department of Natural Resources in the Federal Government, as recently expressed by Senator Morse, is indicative of an increasing public awareness that governmental institutions to meet the mushrooming technology of the 1960's could stand reexamination.

In closing, I would like to bring to the attention of the subcommittee the splendid cooperation of Northern States Power Co. with our work on the wild rivers study. In this hearing where the public interest in the company's plant proposal is under study, I believe

your record would be seriously incomplete if I did not wholeheartedly acknowledge this splendid cooperation. The company assisted us fully on every request we made to them for information. Mr. Hibbard Hill, the vice president of NSP, expressed the fine attitude of the company toward wild rivers preservation in a speech on August 13, 1964, which I would like to quote as follows:

I want you to know that NSP, which owns most of both banks of the St. Croix for nearly 70 miles above Taylors Falls, has for many years refused to lease or sell these lands in a manner to spoil their wild attractiveness, and several years [ago] * * * NSP began its own wild river study with a view to preserving these lands for recreational uses * * *. We are as anxious as any of you to preserve the wonderful recreational value of this St. Croix Valley.

Senator NELSON. Let me interrupt and say that I am very familiar with the area of the 70 miles you are concerned with and have fished and known it as a young fellow for many, many years. I wish to join in endorsing the observation you made about Northern States Power Co.'s maintenance in its natural state in this area.

Go ahead.

Mr. JORDAHL. In the way of conclusion, I would like to say when we have decided how best to protect them, when this is fully matured and, hopefully, is in operation, I am confident that Northern States Power Co. will stand ready to help achieve the goals in this regard that are determined to be in the public interest.

Mr. Chairman, I appreciate having the opportunity to present the views of the Department of the Interior.

Senator NELSON. Did I understand you to request your remarks at the St. Paul meeting respecting this meeting be included in the record at the conclusion of your statement?

Mr. JORDAHL. Yes, sir.

Senator NELSON. Senator Metcalf, do you have any questions?

Senator METCALF. No questions.

Senator NELSON. Thank you.

(There follows the full text of Mr. Jordahl's statement and his remarks at the St. Paul meeting:)

STATEMENT OF HAROLD C. JORDAHL, JR., REGIONAL COORDINATOR, UPPER MISSISSIPPI-WESTERN GREAT LAKES AREA, U.S. DEPARTMENT OF THE INTERIOR

Mr. Chairman, I am Harold C. Jordahl, Jr., regional coordinator, Upper Mississippi-Western Great Lakes Area, U.S. Department of the Interior.

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The Department of the Interior is the one department of the Federal Government which is concerned almost solely with conservation of natural resources. Thus we are concerned with the development of such resources.

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measures, authorized upon our recommendation the Ozark National Scenic Riverways. And, jointly with the Department of Agriculture, we are conducting a nationwide wild river study to identify rivers or portions of rivers that by some appropriate means—Federal in some cases, State or local in others—might be protected for public recreational use. A portion of the St. Croix, above the proposed powerplant site, is involved in this national wild river study.

To meet the natural resource problems of our time, and as we envision them in the future, the new emphasis of conservation, we believe, must be a concern with the environment as a whole—with prevention of environmental pollution (air, water, and land) and also with provision of quality in surroundings appropriate to the needs of different people, in different places, and in different times of the day and year. And, in emphasizing this concern with the quality of living, as has President Johnson on a number of occasions, Secretary Udall and all of us in Interior are following the President's own lead in emphasizing the need to preserve natural beauty throughout the land, not only for ourselves, but for the generations that will come after us.

The Department has two legislative authorities which are germane to this problem. First, the 88th Congress passed Public Law 88-29, which provides: "That the Congress finds and declares it to be desirable that all American people of present and future generations be assured adequate outdoor recreation resources, and that it is desirable for all levels of government and private interests to take prompt and coordinated action to the extent practicable * * * to conserve, develop, and utilize such resources for the benefit and enjoyment of the American people."

This law is known as the Organic Act of the Bureau of Outdoor Recreation.

The act further provides that the Secretary of the Interior is authorized to "provide technical assistance and advice to and cooperate with States, political subdivisions, and private interests, including nonprofit organizations with respect to outdoor recreation"; to "encourage interstate and regional cooperation in the planning, acquisition, and development of outdoor recreation resources"; and to "cooperate with and provide technical assistance to Federal departments and agencies and obtain from them information, data, reports, advice, and assistance, that are needed and can reasonably be furnished in carrying out the purpose of this act, and promote coordination of Federal plans and activities generally relating to outdoor recreation."

Under the aegis of this authority, the Secretary of the Interior, through the Bureau of Outdoor Recreation, can advise organizations concerned with the powerplant proposal of Northern States Power Co., as to its views on the proposal in relation to outdoor recreation resources. Federal or State agencies having regulatory authority must decide themselves, of course, the weight to be given to such counsel. But our responsibility to offer advice is clear.

Second, in the Fish and Wildlife Coordination Act (the act of March 10, 1934, 48 Stat. 401, as amended by the act of August 14, 1946, 60 Stat. 1080; the act of June 19, 1948, 62 Stat. 497; and the act of August 12, 1958, 72 Stat. 563; 16 U.S.C. 661 et seq.), the Congress has stated that:

"For the purpose of recognizing the vital contribution of our wildlife resources to the Nation, the increasing public interest and significance thereof due to expansion of our national economy * * * and to provide that wildlife conservation shall receive equal consideration and be coordinated with other features of water resource development, maintenance, and coordination of wildlife conservation * * * the Secretary of the Interior is authorized (1) to provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife resources thereof, and their habitat, in controlling losses of the same from disease or other causes * * *"

The act further provides that: "* * * whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States, or by any public or private agency under Federal permit or license, such department or agency first shall consult with the U.S. Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular State wherein the * * * control facility is to be constructed, with a view to the conservation of wildlife resources by preventing loss of and damage to such resources."

The act further provides that reports and recommendations of the Secretary of the Interior shall be made an integral part of any report of the Federal Government and that: "The reporting officers in project reports of the Federal agencies shall give full consideration to the report and recommendations of the Secretary of the Interior * * *"

The act provides an additional authority as follows:

"The Secretary of the Interior, through the Fish and Wildlife Service and the Bureau of Mines, is authorized to make * * * investigations * * * to determine the effects of * * * polluting substances on wildlife, and to make reports to the Congress concerning such investigations and of recommendations for alleviating dangerous and undesirable effects of such pollutions. These investigations shall include (1) the determination of standards of water quality for the maintenance of wildlife; (2) the study of methods of abating and preventing pollution. * * *; and (3) the collation and distribution of data on the progress and results of such investigations for the use of Federal, State, municipal, and private agencies, individuals, organizations, or enterprises."

Thus, the Fish and Wildlife Service and the Bureau of Mines, both within the Department of the Interior, act in an advisory capacity to the Congress and to the Departments of Agriculture and Health, Education, and Welfare and others.

The Bureau of Sport Fisheries and Wildlife, at the request of numerous citizens and public officials, has already started investigations into the possible effects of the proposed NSP steamplant on wildlife under the authorities of the Fish and Wildlife Coordination Act.

Since the proposed project is not a hydroelectric plant, the Northern States Power Co. is not required by law to obtain a permit or license from the Federal Power Commission. If it were so required, that Commission would be obligated under the Fish and Wildlife Coordination Act, as now in force, to consult the Fish and Wildlife Service about this matter.

However, should the Northern States Power Co. request a permit from the Corps of Engineers, Department of the Army, for dock facilities, channel dredging or similar works affecting the river, the Fish and Wildlife Service would be consulted, under the act, prior to the decision to issue a permit. Again, the obligation upon the Army is to consult. It is not obligated to follow the advice given.

The Bureau of Sport Fisheries and Wildlife will assist local and State organizations in their fact-gathering studies on fish and wildlife habitat and resources in the St. Croix River. If these studies conclude that the proposed project operation will be harmful to the natural resources of the river, then every appropriate effort will be made within the Bureau's existing authorities to encourage Northern States Power Co. to relocate the plant or to modify the facility and operation in the interest of protecting aquatic resources.

There are also a number of other ways in which agencies of the Department can be helpful and contribute to a careful analysis of the problem. But we do have technical knowledge of electrical energy needs, costs, and sources for the upper Midwest region. In fact, we made a major contribution to the fuel and power study—Lake Superior region, 1963, which contains useful data for a discussion of the NSP proposal. We have, of course, no power marketing responsibilities in the area of the St. Croix.

As noted, the Bureau of Sport Fisheries and Wildlife can contribute; and its sister agency, the Bureau of Commercial Fisheries, can also provide technical knowledge. In addition to studies on pollution, the Bureau of Mines can advise on fuels and their costs as sources of energy for power generation. And the pioneering agency of the Federal Government in developing knowledge of water resources, the Geological Survey, can mark a significant technical contribution to understanding of water quality conditions and probable effects.

Bringing together this knowledge for consideration by regulatory agencies, in this case of the State of Minnesota, can be the Department's contribution to any public decision relating to this matter. Thus, Secretary Udall promptly responded on behalf of President Johnson to a request made to the President by Governor Reynolds of Wisconsin on October 21, 1964, for Federal assistance to a task force of representatives from Wisconsin and Minnesota agencies, "to insure that the public interest is fully protected" and "to properly assess the overall impact of the present proposal for this electric plant, and to thoroughly investigate all possible alternatives." Secretary Udall agreed that thorough investigation of the total overall effect of the proposed plant is essential, and that alternatives to the plant's construction at the proposed location should be ex-

plored. He further indicated that the Department of the Interior, in addition to its own consideration, would endeavor to arrange, as requested, for participation in the study by the U.S. Public Health Service, the Army Corps of Engineers, the Federal Power Commission, the Department of Agriculture, and such other Federal departments and agencies as might be helpful. All of these departments and agencies, plus the U.S. Coast Guard which is concerned with boating safety, have expressed their willingness to assist the task force of representatives from Wisconsin and Minnesota agencies.

I would now like to turn to several aspects of the proposed steamplant which are of concern to the Department. (To date Interior's investigations in response to Governor Reynold's request are still underway. Thus, we cannot report any findings or conclusions at this time.)

1. The company indicated that an average of three 15-barge tows per week for 32 weeks will be required to transport coal to the first unit of the plant. In what manner and to what degree will this barge traffic affect recreation boating, swimming, fishing, and other forms of outdoor recreation? Will unloading of barges and subsequent cleaning have any deleterious effect on water quality in the St. Croix River?

2. The company indicates that the plant will use about 500 cubic feet of water per second from the St. Croix River for cooling purposes. It will be returned to the river 10° to 17° warmer. We are interested in determining the effects of this withdrawal on aquatic resources and the impact on these resources when it enters the river 10° to 17° warmer. In what other ways will this affect recreation: Boating, ice skating, swimming, fishing, etc.?

3. In what ways will the natural beauty of the area be affected? A pile of coal 50 to 60 feet high, one-half mile long, a powerplant 200 to 300 feet long and 200 feet high, and a smokestack 600 to 800 feet in the air will change the scene of the St. Croix River Valley at this point. And this is the first of a planned two-unit system.

4. What effects will plant residues have on the environment in general and, specifically, upon fish, wildlife, and outdoor recreation resources? Do stack gases pose a potential problem? Where and in what manner will ash be disposed of?

In remarks which I made in St. Paul on October 13, 1964, and which might be useful to the subcommittee as a part of this hearing record, I suggested that alternatives should be explored before a reasoned judgment is made. I did this because areas of true unspoiled natural beauty, like the St. Croix, are relatively scarce. Sites for steam powerplants adjacent to water sources in areas, where development of various kinds have changed the natural character of the area, are usually more abundant. Suggested for consideration and comparison were the following: First, the present site location; second, a site either above or below the present one or at another location in the metropolitan area; third, development of other energy sources; fourth, construction of a plant outside the metropolitan area and transmission of power via EHV lines, or an intertie with any surplus power sources.

There may be other alternatives. To make the decision, benefits and costs to society and to Northern States Power Co. should be analyzed and documented. Such an analysis should weigh intangibles as well as tangible evidence. Presumably, the company, given its position in the area in the sale of power, will adjust rates in the face of increased costs in such a way that there will continue to be an equitable return to investors. If costs were to be increased by selecting one alternative over another, the purchaser of electrical energy in the Twin Cities area would share in the increased cost and would, as a consequence, have the present outdoor recreational values of the St. Croix River Valley preserved for him. In fact, the economies of scale of the proposed plant may be such that even though an alternative site itself may cost somewhat more, the overall cost might still be somewhat less than under the present proposal. The facts concerning this matter should, of course, become known to the public.

The Federal Government, acting through the Departments of the Interior, the Army, Agriculture, and Health, Education, and Welfare and cooperating with the seven States, is now engaged in a comprehensive study of the water and related land resources of the Upper Mississippi River, including the St. Croix and other tributaries. Unfortunately, this study is in its initial stage and will not be completed until 1969. The Federal guidelines for this and similar studies, adopted by President Kennedy on May 15, 1962, bear the title, "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources," and were pub-

lished as Senate Document No. 97, 87th Congress. These guidelines provide, we feel, an appropriate policy framework and useful criteria for planning the use of the St. Croix River Valley, including the NSP proposal. Senate Document No. 97 states, "The basic objective in the formulation of plans is to provide the best use, or combination of uses, of water and related land resources to meet all foreseeable short- and long-term needs." Full consideration is to be given to needs for (1) development, (2) preservation, and (3) well-being of people and reasoned choices are to be made between them when they conflict. The guidelines indicate that all viewpoints shall be fully considered and, further, that from a national point of view, the analysis shall include a comparison of the proposed resource use and development with alternative means available for providing similar goods and services to the area and other areas.

I have attempted, so far, to explain the general point of view, legal authorities and responsibilities, and analytical approaches of the Department of the Interior in matters of this kind. In addition, I should like to say a few more words, in general terms, about the Department's broad concern for the conservation of natural resources. We adopt, of necessity in the times in which we live, a broad definition of natural resources and include in our conservation programs protection of esthetic values in addition to optimum utilization of mineral, water, land, and living resources. We believe we have a general responsibility to the general public and to the Congress to conserve, develop in some cases and preserve in others, natural resources. Success in this endeavor cannot be attained unless environmental pollution is minimized. Here, of course, the Department of Health, Education, and Welfare has a major Federal responsibility, shared in part and assisted by Interior, Agriculture, and other agencies. Healthy aquatic, land, and air environments are essential to the welfare of living resources and to the development of pleasing esthetic environments which we all seek.

President Johnson has dedicated his administration to making America a more beautiful place in which to live. He has stressed, for example, the importance of making the Potomac River that flows by the Nation's Capital a conservation model for metropolitan areas. The St. Croix could as well be a conservation model for the entire Midwest.

With the goals established by the President, the Department now finds itself more fully concerned than before for resource conservation. Each new project will have to come under a new type of scrutiny unless, in the words of the President, we find ourselves victims of "the poisons and chemicals, * * * and the waste products of progress * * *."

The St. Croix River from its headwaters in northern Wisconsin to its mouth on the muddy Mississippi River at Prescott, Wis., is indeed a great natural resource well worth careful husbandry.

It has a unique fishery. Living here are large channel catfish, the primitive rock sturgeon; panfish and prized muskellunge; smallmouth, largemouth, and white bass; walleye and northern pike; and in the spring-fed tributaries live brook, brown, and rainbow trout. Few water areas contain as abundant and varied a fish population.

It is relatively unpolluted throughout its entire course. Few river systems of this size in the United States are as clean as the St. Croix River.

It is located at the doorstep of more than 2 million people who live in the Minneapolis-St. Paul metropolitan area. Each year thousands of these residents use the St. Croix River for recreation. Thousands of watercraft, ranging in size from skiffs to luxurious pleasure yachts, ply these waters annually. The impact on the economy of these boaters and other recreationists and the numerous summer cottages and permanent homes along the river is sizable.

The significance of its location is highlighted by a finding in the report of the Outdoor Recreation Resources Review Commission that "outdoor opportunities are most urgently needed near metropolitan areas. Three-quarters of the people will live in these areas by the turn of the century. They will have the greatest need for outdoor recreation, and their need will be the most difficult to satisfy as urban centers have the fewest facilities (per capita) and the sharpest competition for land use." They further said that "most people seeking outdoor recreation want water—to sit by, to swim and to fish in, to ski across, to drive under, and to run their boats over."

Only at two points do dams cross the river: at Taylor Falls—St. Croix Falls where NSP operates a hydroelectric plant and near Gordon, Wis., where a dam creates a recreational lake.

There is great variety in plants, animals, topography, and water condition which gives people an opportunity for practically all forms of outdoor recrea-

tion—from wilderness camping to pleasure yachting. Lake St. Croix has been called the "Rhine of Mid-America," and aptly so for here the hills rise hundreds of feet from the water's edge; here a continuous woodland border provides a setting of tranquillity and great beauty, and here clean, cool waters are suitable for swimming, fishing, and boating.

I know few rivers of such outstanding quality so near a large metropolitan area.

Secretaries Udall and Freeman recognized these qualities by selecting it for thorough consideration in our joint wild rivers study. I had the pleasure of serving on the field study team. These studies grew out of recommendations by the Outdoor Recreation Resources Review Commission, and the Senate Select Committee on National Water Resources. The Senate select committee recommended "that certain streams be preserved in the free-flowing condition because their natural scenic, scientific, esthetic, and recreational values outweigh their value for water development and control purposes now and in the future."

The Department, in preparation for this hearing, has not attempted to develop any specific policy recommendations with respect to problems associated with steam-generating electrical plants like we are discussing here today. The Department recognizes, however, that these problems are increasing in magnitude and that additional public regulation may be necessary to safeguard the public interest and protect resources. Several more general proposals possibly meriting reexamination in this context are Senate bills 649 and 1111 of the 88th Congress which would provide for stronger water pollution control programs and improved institutional arrangements for river basin planning. The Department of the Interior supported both of these measures. Suggestions to require licensing by the Federal Power Commission of all new powerplant installations over a certain maximum size might be studied by the subcommittee with the view of protecting when appropriate, the beauty of the landscape and other resources. And, perhaps, interest in the concept of a Department of Natural Resources in the Federal Government, as recently expressed by Senator Morse, is indicative of an increasing public awareness that governmental institutions to meet the mushrooming technology of the 1960's could stand reexamination.

In closing, I would like to bring to the attention of the subcommittee the splendid cooperation of Northern States Power Co. with our work on the wild rivers study. In this hearing where the public interest in the company's plant proposal is under study, I believe your record would be seriously incomplete if I did not wholeheartedly acknowledge this splendid cooperation. The company assisted us fully on every request we made to them for information. Mr. Hibbard Hill, the vice president of NSP expressed the fine attitude of the company toward wild rivers preservation in a speech on August 13, 1964, and I quote as follows:

"I want you to know that NSP, which owns most of both banks of the St. Croix for nearly 70 miles above Taylor Falls, has for many years refused to lease or sell these lands in a manner to spoil their wild attractiveness, and several years [ago] * * * NSP began its own wild river study with a view to preserving these lands for recreational uses * * *. We are as anxious as any of you to preserve the wonderful recreational value of this St. Croix Valley."

When an emerging national consensus on wild rivers, and how best to protect them, has fully matured and, hopefully, is in operation, I am confident that Northern States Power Co. will stand ready to help achieve the goals in this regard that are determined to be in the public interest.

Mr. Chairman and members of the subcommittee, I thank you for the opportunity to present the views of the Department of the Interior.

REMARKS OF HAROLD C. JORDAHL, JR., REGIONAL COORDINATOR, U.S. DEPARTMENT OF THE INTERIOR, UPPER MISSISSIPPI-WESTERN GREAT LAKES AREA, BEFORE THE SAVE THE ST. CROIX COMMITTEE AT ST. PAUL, MINN., OCTOBER 13, 1964

I have had a delightful day. Your committee took me on a boat trip through beautiful Lake St. Croix this afternoon. I wish you all could have been with us on this beautiful autumn afternoon. I was not familiar with this reach of the St. Croix River and was truly impressed with its great scenic beauty.

When I received the call from Washington several days ago informing me that I should arrange my schedule to meet with you this evening, I did not realize the magnitude nor the difficulty of the assignment. In spite of several days of intensive review of available materials on this subject—speeches, news releases,

reports, clippings, correspondence, fact sheets, articles, argument and counter-argument, and any other materials which I could obtain, along with many personal visits and phone calls to professional associates in State and Federal agencies—I am not able this evening to bring to you any proposals which simplify the problem.

At this time the Department does not know whether it is a wise or unwise decision for the Northern States Power Co. to locate a large steam-generating electric plant at Oak Park Heights on the St. Croix River.

We need additional time to study this matter before we can make a reasoned judgment. It also appears to me that the same would hold true for other agencies—local, State, and Federal. Relevant facts need to be compiled, brought to bear on the problem, and analyzed and discussed in the public forum and in front of local, State, and Federal agencies which have a statutory responsibility for one or more elements of the proposal.

This is public business. The large attendance here this evening, the tremendous number of words which have been written and spoken on the subject, and the divergence of opinion dictate an intelligent analysis of all facts before irrevocable decisions are made.

Involved are the increasing electrical energy needs of the expanding Twin Cities metropolitan area, and the beauty of a magnificent river, often called the "Rhine of Mid-America." Over the long run, a short delay makes little difference.

I might point out that the Department of the Interior is vitally concerned with providing our Nation with low cost electrical energy. Much of our past and present history deals with this very subject.

I compliment you for the manner in which you are approaching the problem. You are making a sincere and thorough attempt to bring together all relevant facts. Your reliance on professional advice to assist you in reaching a conclusion is in the best traditions of democracy, for what you are fighting for are those values which, in your opinion, are vital to your way of life.

All too often across the face of America it's the same old story of "too little and too late," when it comes to protecting those values which society finds desirable and even necessary for the full and abundant life. Our Secretary of the Interior, Stewart Udall, has summed it up as the "Quiet Crisis." President Lyndon B. Johnson said in Portland, Oreg., earlier this fall, "and once nature is destroyed or beauty blighted, it can rarely be restored. It is gone forever. It is our children who will bear the burden of our neglect. We owe it to them to keep that from happening."

I am no stranger to the St. Croix River. Having grown up in northwestern Ohio where there is little in the way of clean, unpolluted streams, forests, hills and other resources which are necessary for a rewarding outdoor experience, it was a thrill and in fact an almost unbelievable experience for me some 15 years ago, to take my first canoe trip down the St. Croix River from Danbury to Grantsburg, Wis. Mrs. Jordahl and I, before we were married, canoed that same reach of the river. I recall vividly her first experience of running the Kettle Rapids. I had the immense satisfaction of taking my father-in-law, now a man of 69 years who has lived at Grantsburg a few short miles east of the river, on his first St. Croix River canoe trip. I watched him catch his first gleaming, heavy bodied muskie below the mouth of the Clam River. This same trip is now repeated with him at least once each summer.

I have floated the river many times since that first trip. I've fished for muskie. I've caught smallmouth bass in the pockets below the rapids, walleye pike in the deep holes, northern pike along the weed beds. I've seen sturgeon of 40 or more pounds taken at Norway Point and also, lunker channel catfish.

I've marveled at the physical stamina and sheer guts of the loggers and the "river pigs" of a short 60 years ago who drove the pine to mills at Stillwater and lower river cities. Pine logs lying on the bottom of the river or driven with tremendous force into the loose sands of the numerous islands and the river-bend banks still remain as markers of this bygone era.

And, as I've floated this river I've thought of the many hardships which the French Jesuits experienced as they penetrated this region and later the Voyageurs who came from Montreal, from the "Soo," from the Straits of Mackinac and from La Pointe in Chequamegon Bay. And before them, the import function the St. Croix River served the Ojibwa Indian Nation as a highway, and before the Ojibwa, the Sioux, the Fox, and the Dakota Indian. And for more than a century, this river basin was a battleground between Indian nations as they fought for the rights to trap the mink, marten, beaver, and otter, and for the lush wild rice of the Yellow River Basin and other tributary waters of the St. Croix.

This great Upper St. Croix River Basin is indeed a marvelous resource; one which is not only important to us today, but one which will be even more important to those who follow us. I hope I am privileged one year soon to show my children this unspoiled river. I've seen joy and wonder in children's faces from the Twin Cities Settlement House as their counselors glided canoes through rapids, and beneath the shade of towering elms, basswood, and maple.

The reason the upper St. Croix River is not spoiled in large measure is because Northern States Power Co. owns most of the adjacent land; land originally acquired for hydroelectric development which today is no longer economically efficient. The company has for many years refused to sell or lease lands which would spoil their wild attractiveness. The company has indicated their sincere desire to preserve this wonderful reach of the river. And although the signs of civilization are much more prevalent below Taylor Falls, the river here is also beautiful. Cliffs which tower hundreds of feet into the air and the clean, blue waters of Lake St. Croix with its woodland borders truly qualify this area as one of the great environmental resources in mid-America, and especially so because it's located almost at the doorstep of more than 2 million people. I might add that there are distressing signs of misuse of the lands along the lake and unless intelligent planning and zoning programs are conducted, the fine values of this area will be destroyed.

The beauty of the St. Croix River was recognized in the joint Interior-Agriculture Wild Rivers study initiated by Secretaries Freeman and Udall. Several hundred streams were given a preliminary screening. The list was narrowed to 64 and then to 11 for the variety of problems and opportunities which they presented. Included were the St. Croix and Namekagon Rivers. I had the pleasure of serving as the representative of our Bureau of Land Management on the field study team. The report which has now been submitted to the Washington task force is being summarized in a final report on all streams for transmittal to the two Secretaries. Cooperation from Northern States Power Co. was essential and I am pleased to report that they assisted us fully on every request we made to them for data and information. I might add that although the reach of river under study is located above the Northern States Power plant site, the Washington team does plan to give consideration to this problem.

These studies grew out of recommendations by the Outdoor Recreation Resources Review Commission and the Senate Select Committee on Water Resources, "that certain streams be preserved in their free-flowing condition because their natural scenic, scientific, esthetic, and recreational values outweigh their value for water development and control purposes now and in the future." Chairman Crafts, Director of the Department of the Interior's Bureau of Outdoor Recreation, has noted "that industrial, commercial, and other development of the Nation's rivers is on the increase. Once developed," he said, "these streams may lose forever the inherent values for outdoor recreation and related values which they now possess."

The Washington team has said that "undeveloped rivers offer unique values to all Americans. They are symbols of timelessness and continuity and of history. Rivers substantially in their natural state afford a needed variety of recreation and related experience possible nowhere else."

What the national policy shall be will only be determined in time. Meanwhile, those who are interested in resources and rivers await the release of the report to the two Secretaries and the subsequent review by the President's Recreation Advisory Council early in 1965.

The President's ad hoc Water Resources Council, which consists of the Secretaries of the Army; the Interior; Agriculture; and Health, Education, and Welfare, on May 15, 1962, transmitted to President Kennedy a document titled "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources." It is better known as Senate Document No. 97 and is our major point of reference in river basin planning. It states that the basic objective in the formulation of plans is to provide the best use, or combination of uses, of water and related land resources to meet all foreseeable short- and long-term needs. Full consideration is to be given to (1) development, (2) preservation, and (3) well-being of people and *reasoned choices will be made between them when they conflict.* [Emphasis added.]

Because of your interest in preservation let me quote further; " * * * proper stewardship in the long-term interest of the Nation's natural bounty requires in particular instances that—

"1. There be protection and rehabilitation of resources to insure availability for their best use when needed.

"2. Open space, green space, and wild areas of rivers, lakes, beaches, mountains, and related land areas be maintained and used for recreational purposes, and

"3. Areas of unique natural beauty, historical and scientific interest be preserved and managed primarily for the inspiration, enjoyment, and education of the people."

The guidelines further indicate that "all viewpoints" shall be fully considered and further, that from a national point of view, the analysis shall include a *comparison* of the proposed resource use and development *with alternative means available* for providing similar goods and services to the area and other areas. [Emphasis added]

Obviously, you feel that "all viewpoints" are not being fully considered. Otherwise there would be no need for this meeting. Likewise, "comparisons of the proposed resource use with alternative means" have not been made, in your opinion, or to your satisfaction.

As I understand the matter, the village of Oak Park Heights, the county of Washington, the State conservation department, the State water pollution control commission and the Corps of Engineers—five governmental agencies, each with certain limited and carefully prescribed statutory responsibilities and limitations—make up the decisionmaking chain dealing with this matter. Of course, the initial decision was a corporate one. After reviewing several bulky files of news clippings it is abundantly evident that this decision chain is not adequate to meet your needs. If reasoned choices are to be made between alternatives, I would concur.

Oak Park Heights and Washington County have the zoning power. Their parameters are quite limited; for example, the beneficial tax impact and payrolls may be uppermost in their minds.

The Conservation Department will review it from its point of view and within their legal framework as it relates to the water diversion, while the Water Pollution Control Commission will examine the condition of the water as it returns to the river. The Corps of Engineer will evaluate the navigation impact.

What are some of the alternatives which might be explored before a reasoned judgment is made?

First. The present site selection.

Second. Selection of a site either above or below the present one, or at another location in the metropolitan area. I understand, for example, that Pig's Eye Island in St. Paul has been considered, but there are conflicts with other existing uses of land.

Third. Development of other energy sources at the Oak Park site or at a different location; for example, natural gas has been suggested, or atomic energy.

Fourth. Construction of a plant outside the metropolitan area and use of extra-high-voltage transmission lines. Another possibility would be a transmission line intertie with existing surplus sources of power from other regions. In a 1963 report of the Department of the Interior titled, "Fuel and Power Study—Lake Superior Region," it was noted that there is an immediate availability of surplus power from the Manitoba Hydroelectric Board which might be imported into the Twin Cities area at a competitive cost. Also, the 1964 annual report of the Manitoba board has further suggestions in this regard. The same Department report explores the potential of using lignite from the Dakotas as a source of energy for electric generation, and although the report was most concerned with obtaining low-cost power for the lake head and iron range region, the possibility is evident that we might tie the Twin City needs to the needs of northern Minnesota with a consequent net gain to consumers in both areas.

There may be other alternatives. To make the decision, benefits and costs to society and to Northern States Power should be documented. And I include in such an analysis a weighing of intangibles as well as tangible evidence.

Some data needs which should be developed are as follows, and let me add that the present chain of decisionmaking may or may not develop these data (many of these questions require answers regardless of the location of a new plant, assuming, of course, that a new plant is the best alternative).

1. Impact on water resources; effects of withdrawals on fish, wildlife, microorganisms; effects of thermal pollution on living resources, etc.

2. Effects on recreation; fishing, hunting, swimming. Are there ways and means of reconciling problems which might develop between barges and pleasure

boating? How will coal barges be unloaded and cleaned and with what effects on water resources?

3. Does the tax and payroll benefit outweigh other "costs" to the local community?

4. What are the benefits and costs of each alternative? Presumably, an industry in a monopoly position will adjust rates in such a way that there will be an equitable return to investors. If costs are higher by selection of one alternative over another, the purchaser of electrical energy in the Twin Cities area will share in this increased cost and will, as a consequence, have other values preserved for him. Whether he makes use of these values is his decision.

5. In what manner can steam generating plants be designed and operated so as to minimize the impact on esthetics, recreation, fish, wildlife, and other biological resources? Do cooling towers or lagoons offer potential solutions to thermal pollution and if so, at what eventual costs to the consumer of electrical energy? Can the engineer working together with the landscape architect and the designer plan a building that is both economically efficient and a pleasing part of the environment?

6. The U.S. Public Health Service at the request of Governors Rolvaag and Reynolds have started an intensive study of the Mississippi River from Anoka to the dam at Lake Pepin. The results of their investigations should be brought to bear on this problem. The Public Health Service evaluation of the present contribution of the St. Croix River to clean waters in the Mississippi below the mouth of the St. Croix should be made known. Although the Public Health Service does not enter into the problem of pollution of interstate waters or of the atmosphere until a problem develops, their technical expertise could contribute materially to an analysis of alternatives.

7. An evaluation should be made of the potential impact on existing land use of locating a steamplant, whether at the proposed site, or at another. Obviously the county and the local unit of government will have to zone lands to permit the construction of the plant and, although there is no particular advantage for industry to locate immediately adjacent a powerplant, the zoning precedent may encourage other types of industrial expansion which may or may not conform to sound land use principles.

Our Bureau of Sport Fisheries and Wildlife, at the request of numerous citizens and elected officials has already started investigations into the possible effects of the proposed steamplant. In general, the Department's responsibility with regard to protecting fish, wildlife, and recreation values of rivers such as the St. Croix are contained in the Fish and Wildlife Coordination Act which requires developers to consult the Fish and Wildlife Service whenever waters are authorized to be impounded, diverted, or otherwise controlled for any purpose under Federal permit. Since the proposed project is not a hydroelectric plant, the company is not required by law to obtain a permit or license from the Federal Power Commission. However, should the Northern States Power Co. request a permit from the Corps of Engineers for dock facilities, intake and discharge structures, channel dredging or similar works affecting the river, the Fish and Wildlife Service would be consulted, as required by the act, prior to the corps' decision to issue a permit. However, our advice is not binding on the corps.

The Bureau of Sport Fisheries and Wildlife will assist local and State organizations in their fact-gathering studies on fish and wildlife habitat and resources in Lake St. Croix. If the studies conclude that the proposed project operation will be harmful to the natural resources of the river, then every effort will be made within the Bureau's existing authorities to encourage Northern States Power to relocate their plant or modify their facility and operation in the interest of protecting aquatic resources. I might add that this Bureau is presently scheduling meetings with other State and Federal agencies on this matter.

An even broader role is assumed by the Department on protecting natural resources. In a recent meeting of the President's Science Advisory Committee, it was noted that the Department is dedicated to sound development, conservation, and management of natural resources. The Department adopts a broad definition of natural resources and includes in its conservation programs, protection of esthetic values in addition to optimum utilization of mineral, water, land, and living resources. We have responsibility to the general public and Congress in its efforts to conserve and develop natural resources and in the process of discharging these responsibilities, we work with a wide variety of conservation organizations and many specialized industries.

Despite the lack of extensive legal involvement for pollution control, the success of Department programs cannot be attained unless environmental pollution is

minimized. Health, aquatic, and land and air environments are essential to the welfare of living resources and to the development of pleasing esthetic environments which we all seek. Thus, the Department is often placed in an advisory capacity to State and other local conservation agencies, State compacts and industrial groups through which the results of research and field management operations are brought to bear on pollution.

Although I had a general idea of the governmental agencies which might be involved or which could contribute to a resource problem of this type, I was amazed at the actual number when I listed them. There were 14 and I probably have missed several:

1. Village of Oak Park Heights.
2. Stillwater School District.
3. Minnesota Conservation Department.
4. Minnesota Water Pollution Control Commission.
5. Twin Cities Metropolitan Planning Commission.
6. St. Paul Planning Commission.
7. Wisconsin Conservation Department.
8. Wisconsin Committee on Water Pollution.
9. Wisconsin Public Service Commission.
10. Department of the Interior agencies as follows: Bureau of Mines, Fish and Wildlife Service, Geological Survey, Office of Water and Power Development, and Bureau of Outdoor Recreation.
11. Federal Power Commission.
12. U.S. Corps of Engineers.
13. U.S. Coast Guard.
14. U.S. Public Health Service.

I submit that if the professional knowledge lodged in these groups could be brought to bear on this problem through a joint effort with Northern States Power Co., a solution of maximum value to society could be found. Whether or not the numerous questions which, in my opinion, require answers will be answered remains to be seen.

President Johnson's Portland speech in September is appropriate for the discussion tonight and I quote from it as follows:

"* * * three changing forces are bringing a new era to conservation.

"The first is growing population * * *.

"The second is the triumph of technology. The bright success of science also has a darker side. The poisons and chemicals, the junked automobiles, and the waste products of progress, may be one of the deadliest threats to the destruction of nature we have ever known.

"The third is urbanization * * * access to beauty is denied and ancient values are destroyed.

"All of this requires a new conservation.

"It is not just the classic conservation of protection and development, but a creative conservation of restoration and innovation."

The President complimented the people of the Pacific Northwest and said: "You have acted in our highest traditions. For this country was built by government and people—public interest and private enterprise—working together in harmony."

If we can treat the St. Croix River Valley "with reverence and regard for the values of nature," while at the same time recognizing and meeting the electrical energy needs of a great metropolitan area, we can—public interest and private enterprise—working together in harmony, achieve a great goal.

Senator NELSON. We now have the representatives, I believe, from the conservation department of the State of Minnesota, whose spokesman is the deputy commissioner, Mr. Robert Brown.

STATEMENT OF ROBERT BROWN, ST. PAUL, MINN., DEPUTY COMMISSIONER, MINNESOTA DEPARTMENT OF CONSERVATION

Mr. BROWN. Senator Nelson and Senator Muskie, members of the subcommittee, I am representing today Commissioner of Conservation Wayne Olson, who is, in addition to being commissioner of conservation, also a member of the Minnesota Water Supply and Pollution Control Commission.

Mr. BROWN. I thought I might just abstract from it a summary of what the application is, and then go on to discuss what generally is the commissioner's authority under the statute. Hopefully, gentlemen, I would like to restrict our testimony to really what is the commissioner's authority, rather than getting into any discussion of the benefits of the application itself, since the commissioner is in a quasi-judicial situation, having to make a determination regarding the application itself.

The application is for a permit to appropriate 175,000 gallons per minute of water for two pumps, a total of 361,000 acre-feet per year.

Senator NELSON. I didn't hear how much per minute.

Mr. BROWN. It is 175,000 gallons per minute for each of two pumps, a total of 361,000 acre-feet per year.

The authority of the commissioner of conservation of the State of Minnesota to consider the application is set forth in Minnesota Statutes, 1961, chapter 105, which also prescribes the procedure to be followed, and matters to be considered in reaching a decision as to whether or not a permit should be granted. The portions of the statutes which apply have been submitted to the committee for the record.

I think here again I would like to abstract from the seven pages of statutes.

Senator NELSON. You go ahead and abstract from the pages, and we will include the full statement.

Mr. BROWN. Fine, very well.

In chapter 105.45 under "Permits and Orders of Commissioner," paragraph 2, it outlines what, I think, is basically the commissioner's authority in this matter.

If the commissioner concludes that the plans of the applicant provide for the most practical use of the waters of the State and will adequately protect public safety and promote the public welfare, he shall grant the permit, and, if that be in issue, fix the control levels of public waters accordingly. If the commissioner concludes that the proposed appropriation or use of State waters or the proposed construction is inadequate, wasteful, dangerous, impractical, or detrimental to the public interest, he shall eject the application or he may require such modification of the plan as he deems proper to protect the public interest.

Mr. Chairman, in addition to making this statement, and this is the limit of the commissioner's statement, we also have with us representatives of the State health department, Mr. Frank Woodward, director, division of environmental health, and Mr. Lyle H. Smith, executive engineer, water supply and pollution control commission, who also have statements.

I would like to make that the final statement of the commissioner. I am open for questions now. Then we may go on to the other Minnesota representatives.

Senator NELSON. Under that standard or guidance for the Commissioner, has there been any case in the State of Minnesota in which the Commissioner rejected an application on the grounds of the public welfare, the public welfare in that instance being a case of recreation values?

Mr. BROWN. Yes, we have.

Senator NELSON. Am I correct? Are there two cases that went to your Supreme Court on that issue, or did they get to the Supreme Court?

Mr. BROWN. Not involving recreation before the Supreme Court. Those cases did not involve recreation, to my recollection.

Senator NELSON. But there have been cases in which the Commissioner administratively in his capacity has rejected applications based upon grounds of recreational views in the public welfare?

Mr. BROWN. Yes, sir.

Senator NELSON. Would you submit to us those citations for inclusion in the record?

Mr. BROWN. Yes, sir.

(Subsequently, the following documents were submitted:)

STATE OF MINNESOTA, DEPARTMENT OF CONSERVATION

IN THE MATTER OF THE APPLICATION OF PULASKI LAKE SHORES ASSOCIATION, BY MILES A. CHADWICK, PRESIDENT, FOR A PERMIT TO EXCAVATE A CHANNEL, FOR NAVIGATION AND OTHER PURPOSES, BETWEEN LAKE PULASKI AND LITTLE PULASKI LAKE, ALSO KNOWN AS NORTH BAY, IN WRIGHT COUNTY, MINNESOTA (P.A. 64-557)

NOTICE OF ORDER

Pursuant to M.S.A., Chapter 105, notice is given that on the 9th day of October, 1964, the Commissioner of Conservation of the State of Minnesota, made and entered Findings of Fact herein, and pursuant thereto made the following Conclusions and Order:

CONCLUSIONS

I

That Pulaski Lake is a meandered public body of water in Wright County, Minnesota.

II

That Little Pulaski Lake and Pulaski Lake were surveyed and meandered as one body of water by the original Government Land Office Survey.

III

That Pulaski Lake is a land-locked lake, having neither inlet nor outlet, with underwater springs providing its main source of water supply.

IV

That the levels of Pulaski Lake are subject to periodic fluctuation resulting from scarcity or plenitude in its water supply.

V

That at periods of high water levels, Pulaski and Little Pulaski Lake are connected to form a continuous body of water.

VI

That at lower water stages, Pulaski Lake and Little Pulaski Lake are separated by a sand bar.

VII

That the applicant proposes to dig a ditch between Pulaski Lake and Little Pulaski Lake of sufficient width and depth to provide a permanent boating channel between them.

VIII

That the applicant's plans provide for a channel from Pulaski Lake to Little Pulaski Lake that is much deeper than any natural channel that may have previously existed between them.

IX

That Pulaski Lake is an exceptionally good fish lake, differing in quality from the other lakes in its locality, and has good populations of walleye pike and large and small mouth bass.

X

That Pulaski Lake has relatively few carp because of its present lack of carp spawning habitat.

XI

That Little Pulaski Lake, if connected to Pulaski Lake as proposed by the applicant, would provide excellent spawning area for carp.

XII

That existence of such a spawning area for the carp in Pulaski Lake would seriously endanger its value as a fish lake by causing an increase in the carp population.

XIII

That the plans of the applicant provide for construction work which is detrimental to the public interest.

ORDER

It Is Hereby Ordered, That the application of Pulaski Lake Shores Association be and is in all respects denied.

Dated at Saint Paul, Minnesota, this 9th day of October, 1964.

WAYNE H. OLSON,
Commissioner of Conservation.
By ROBERT J. BROWN,
Deputy Commissioner.

STATE OF MINNESOTA, DEPARTMENT OF CONSERVATION

IN THE MATTER OF THE APPLICATION OF ALBERT H. SHERIFF TO PLACE FILL UPON
THE BED OF LAKE MINNEWASKA, POPE COUNTY, MINN.

FINDINGS OF FACT—CONCLUSIONS—ORDER

The above entitled matter came on for hearing before Clarence Prout, Commissioner of Conservation, in the Courthouse in the City of Glenwood, Pope County, Minnesota, on Saturday, May 20, 1961, at 9:30 a.m. upon due notice pursuant to the provisions of Minnesota Statutes, Chapter 105, and was continued at that time to June 12, 1961, at 1:30 p.m. in the Centennial Building, St. Paul, Minn.

The hearing was held for the purpose of determining whether or not it is in the public interest to grant the application of Albert H. Sheriff for a permit to place fill upon the bed of Lake Minnewaska, Pope County.

The State of Minnesota appeared by Lawrence J. Vaubel, Special Assistant Attorney General in behalf of Walter F. Mondale, Attorney General. The Applicant, Albert H. Sheriff, appeared on his own behalf.

After hearing all interested parties and after due consideration of the evidence received at the hearing the Commissioner of Conservation makes the following:

FINDINGS OF FACT

I

Lake Minnewaska is a meandered public body of water situated in Pope County, Minnesota.

II

The natural ordinary high water level of Lake Minnewaska is 1138.1 feet, sea level datum, 1929 adjustment.

III

Applicant is the fee owner of Lots 1 and 7, county auditor sub. of Government Lot 2, Section 15, Township 125 North, Range 38 West, Pope County, Minnesota, and has applied to the commissioner for a permit to place fill upon the bed of Lake Minnewaska adjacent to said lots.

IV

The portion of the bed of Lake Minnewaska requested to be filled in by the applicant lies below the natural ordinary high water level of the lake.

V

The ordinary high water level of the lake abutting applicants land extends to and upon the limits of a public highway which provides public access to Lake Minnewaska when same is at its ordinary high water level.

VI

The application requests permission to place fill upon the above described portion of the bed of Lake Minnewaska to raise the same above said ordinary high water level.

VII

That portion of the lake bed that applicant seeks to fill in provides valuable habitat for wild animals that would be destroyed by filling in the same. Granting such permit to the applicant would be contrary to the public interest in maintaining that portion of the lake bed as a means of access to Lake Minnewaska and for wild life habitat.

Upon the foregoing findings of fact, the Commissioner of Conservation makes the following:

CONCLUSIONS

I

Lake Minnewaska is a meandered public body of water having a natural ordinary high water level of 1138.1 feet, sea level datum, 1929 adjustment.

II

The application of Albert H. Sheriff requests a permit to fill in and reclaim a portion of the bed of Lake Minnewaska lying below the natural ordinary high water level thereof.

III

Filling in and reclaiming the bed of Lake Minnewaska as requested by the applicant will prevent the public from gaining access to the lake at the area in question, when the lake is at its ordinary high water level.

IV

The construction proposed by applicant in filling in the bed of Lake Minnewaska would destroy a valuable wild animal habitat.

V

The filling in and reclaiming of the bed of Lake Minnewaska proposed in applicant's application is detrimental to the public interest.

Based upon the above findings of fact and conclusions, it is hereby ordered:

ORDER

I

That the application of Albert H. Sheriff to place fill upon the bed of Lake Minnewaska is rejected and in all things denied.

Dated at Saint Paul, Minn., this 22d day of January, 1962.

CLARENCE PROUT,
Commissioner of Conservation.

STATE OF MINNESOTA,
DEPARTMENT OF CONSERVATION,
St. Paul, December 3, 1964.

HON. EDMUND S. MUSKIE,
Chairman, Special Subcommittee on Air and Water Pollution,
Washington, D.C.

DEAR SENATOR MUSKIE: This letter is written in response to your request for a statement by the commissioner of conservation of the State of Minnesota, to be presented to the Senate subcommittee hearing at Stillwater, Minn., on December 10 and 11, 1964, concerning the proposed construction of a steam-generated powerplant on the St. Croix River.

I am attaching hereto a copy of the application of Northern States Power Co. for a permit to appropriate water from the St. Croix River to be used in cooling condensers in the proposed plant and returned to the river. A public hearing to consider the merits of the permit application has been tentatively set for January 13, 1965.

The authority of the commissioner of conservation of the State of Minnesota to consider the application is set forth in Minnesota Statutes, 1961, chapter 105, which also prescribes the procedure to be followed, and matters to be considered in reaching a decision as to whether or not a permit should be granted. Pertinent portions of that chapter read as follows:

"105.37 *Definitions.*—Subdivision 1. Unless the language or context clearly indicates that a different meaning is intended, the following words and terms, for the purposes of sections 105.37 to 105.55, shall have the meanings subjoined to them:

"Subdivision 2. 'Commissioner' means the commissioner of conservation of the State of Minnesota.

"Subdivision 3. 'Division' means the Division of Waters of the Department of Conservation of the State of Minnesota.

"Subdivision 4. 'Director' means the director of the Division of Waters of the Department of Conservation of the State of Minnesota.

"105.38 *Declaration of policy.*—In order to conserve and utilize the water resources of the State in the best interests of the people of the State, and for the purpose of promoting the public health, safety, and welfare, it is hereby declared to be the policy of the State:

"(1) Subject to existing rights, all waters in streams and lakes within the State which are capable of substantial beneficial public use are public waters subject to the control of the State. The public character of water shall not be determined exclusively by the proprietorship of the underlying, overlying, or surrounding land or on whether it is a body or stream of water which was navigable, in fact, or susceptible of being used as a highway for commerce at the time this State was admitted to the Union. This section is not intended to affect determination of the ownership of the beds of lakes or streams.

"(2) The State, to the extent provided by law from time to time, shall control the appropriation and use of surface and underground waters of the State.

"(3) The State shall control and supervise, as far as practicable, the construction, reconstruction, repair, removal, or abandonment of dams, reservoirs, and all control structures in any of the public waters of the State.

"105.41 *Appropriation and use of waters.*—It shall be unlawful for the State, any person, partnership, or association, private or public corporation, county, municipality, or other political subdivision of the State to appropriate or use any waters of the State, surface or underground, without the written permit of the commissioner, previously obtained upon written application therefor to the commissioner. The commissioner may give such permit, subject to such conditions as he may find advisable or necessary in the public interest. Nothing in this section shall be construed to apply to the use of water for domestic purposes serving at any time less than 25 persons or to any beneficial uses and rights, outside the geographical limits of any municipality, in existence on July 1, 1937, or to any beneficial uses and rights, within the geographical limits of any municipality, in existence on July 1, 1959.

"105.44 *Procedure upon application.*—Subdivision 1. Permit: Each application for a permit required by sections 105.37 to 105.55 shall be accompanied by maps, plans, and specifications describing the proposed appropriation and use of waters, or the changes, additions, repairs or abandonment proposed to be made, or the public water affected, and such other data as the commissioner may require.

If the proposed activity for which the permit is requested is within or affects a watershed district, a copy of the application together with maps, plans, and specifications shall be served on the secretary of the board of managers of the district. Proof of such service shall be included with the application and filed with the commissioner.

"Subdivision 2. Authority: The commissioner is authorized to receive applications for permits and to grant the same, with or without conditions, or refuse the same as hereinafter set forth. Provided, that if the proposed activity for which the permit is requested is within or affects a watershed district, the commissioner may secure the written recommendation of the managers of said district before granting or refusing the permit. Said managers shall file their recommendation within a reasonable time after receipt of a copy of the application for permit.

"Subdivision 3. Waiver of hearing: The commissioner in his discretion may waive hearing on any application and make his order granting or refusing such application. In such case, if any application be granted with conditions or be refused, the applicant may within 10 days after mailed notice thereof file with the commissioner a demand for hearing on the application. The application shall thereupon be fully heard on notice as hereinafter provided, and determined the same as though no previous order had been made. If no demand for hearing be made, the order shall become final at the expiration of 10 days after mailed notice thereof to the applicant.

"Subdivision 4. Time: The commissioner shall act upon all applications within 20 days after the application and all required data is filed in his office; either waiving hearing and making an order therein or directing hearing thereon.

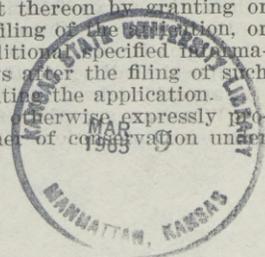
"Subdivision 5. Notice: The notice of hearing on any application shall recite the date, place, and time fixed by the commissioner for the public hearing thereon and shall show the waters affected, the levels sought to be established, or any control structures proposed. The notice shall be published by the applicant, or by the commissioner if the proceeding is initiated by him, once each week for 2 successive weeks prior to the day of hearing in a legal newspaper published in the county in which a part or all of the affected waters are located. Notice shall also be mailed by the commissioner to the county auditor and the chief executive official of any municipality or watershed district affected.

"Subdivision 6. Hearing: The hearings shall be public and shall be conducted by the commissioner or a referee appointed by him. All affected persons shall have an opportunity to be heard. All testimony shall be taken under oath and the right of cross-examination shall be accorded. The commissioner shall provide a stenographer to take testimony and a record of the testimony and all proceedings at the hearing shall be taken and preserved. The commissioner shall not be bound by judicial rules of evidence or of pleading and procedure.

"Subdivision 7. Witnesses; contempt: The commissioner may subpoena and compel the attendance of witnesses and the production of all books and documents material to the purposes of the hearing. Disobedience of every such subpoena, or refusal to be sworn, or to answer as a witness, shall be punishable as a contempt in like manner as a contempt of the district court on complaint of the commissioner before the district court of the county where such disobedience or refusal occurred.

"Subdivision 8. Permit to irrigate agricultural land: When an application for permit to irrigate agricultural land from public waters is made, a general statement in the application of the purpose of the proposed use of public waters and the acreage to be irrigated shall be sufficient compliance with the requirements of subdivision 1 with respect to maps, plans, and specifications, unless the commissioner reasonably may require additional specified information within 10 days of the filing of the application. In any such case the commissioner shall make his order granting the application unless he finds after hearing that granting thereof would be against the public interest or would deprive another than the applicant of the share of public water which such other has requested and to which he is entitled. In the case of an application for permit to irrigate agricultural land, failure of the commissioner to act thereon by granting or denial or other hearing thereon within 30 days after filing of the application, or in case the commissioner has reasonably required additional specified information than that given in the application within 20 days after the filing of such additional information, shall be deemed an order granting the application.

"Subdivision 9. Limitations on permits: Except as otherwise expressly provided by law, every permit issued by the commissioner of conservation under



the provisions of Minnesota Statutes, 1949, sections 105.37 to 105.55, or any amendment thereof, shall be subject to the following:

"(1) Cancellation by the commissioner at any time if deemed necessary by him for any cause for the protection of the public interests;

"(2) Such further conditions respecting the term of the permit or the cancellation thereof as the commissioner may prescribe and insert in the permit;

"(3) All applicable provisions of law existing at the time of the issuance of the permit or thereafter enacted by the legislature;

"(4) Any applications granted under subdivision 8, or deemed granted under the provisions thereof, shall likewise be subject to the foregoing provisions of this subdivision, and shall be subject also to cancellation by the commissioner upon the recommendation of the supervisors of the soil conservation district wherein the land to be irrigated is located.

"105.45 *Permits and orders of commissioner; notice.*—The commissioner shall make findings of fact upon all issues necessary for determination of the applications heard by him. All orders made by the commissioner shall be based upon findings of fact made on substantial evidence. He may cause investigations to be made, and in such event the facts disclosed thereby shall be put in evidence at the hearing or any adjournment thereof.

"If the commissioner concludes that the plans of the applicant provide for the most practical use of the waters of the State and will adequately protect public safety and promote the public welfare, he shall grant the permit, and, if that be in issue, fix the control levels of public waters accordingly. If the commissioner concludes that the proposed appropriation or use of State waters or the proposed construction is inadequate, wasteful, dangerous, or impractical, or detrimental to the public interest, he shall reject the application or he may require such modification of the plan as he deems proper to protect the public interest.

"In granting a permit the commissioner may include therein such terms and reservations with respect to the amount and manner of such use or appropriation or method of construction or operation of controls as appears reasonably necessary for the safety and welfare of the people of the State.

"Notice of all orders made after hearing shall be given by publication of the order once each week for 2 successive weeks in a legal newspaper in the county where the hearing was held, and by mailing copies of the order to all parties who entered an appearance at such hearing.

"The commissioner shall make his order pursuant to hearing within 60 days after the completion of the hearing.

"105.46 *Time limit.*—The commissioner shall fix the time within which all construction authorized in the permit must be completed, or within which the appropriation or use of water must be made, which time shall not exceed 5 years from the date of the permit. Such time may be thereafter extended by the commissioner for good cause shown. Permits granted in connection with the mining, transporting, concentration, or shipment of taconite, as defined in Minnesota Statutes, 1945, section 93.20, shall be irrevocable for the term thereof without the consent of the permittee, except for breach or nonperformance of any condition of the permit by the permittee and the commissioner may allow and prescribe therein such time as he deems reasonable, regardless of the limitations of time contained in this section, for the commencement or completion of any construction or operations under such permit, or the exercising of the rights granted thereunder, or may extend such time, for cause shown, upon the application of the permittee.

"105.47 *Appeals.*—Any party in interest may appeal from any determination of the commissioner to the district court of the county in which the project is wholly or partly located, at any time within 30 days after notice of the commissioner's order. Notice by publication shall be sufficient.

"The appellant shall serve the notice of appeal on the commissioner and on the attorney for any adverse party who appears of record in the proceeding. The notice of appeal with proof of service thereof shall be filed with the clerk of the court to which such appeal is taken within 5 days after the service thereof; thereupon the district court shall have jurisdiction over the appeal. The notice of appeal shall set forth the order appealed from and the grounds upon which the appeal is taken.

"When an appeal is taken from any order of the commissioner under the provisions of sections 105.37 to 105.55, the commissioner shall forthwith cause

to be made a certified transcript of all proceedings had and of all pleadings, exhibits, and files and all testimony taken or offered before him upon which said order is based, and shall file the same with the clerk of the district court where the appeal is pending.

"Upon such appeal being perfected, it may be brought on for trial at any time by either party upon 10 days' notice to the other, and shall then be tried by the court without a jury, and determined upon the record. At such trial the findings of fact made by the commissioner shall be prima facie evidence of the matters therein stated, and his orders shall be deemed prima facie reasonable. If the court shall determine that the order appealed from is lawful and reasonable, it shall be affirmed. If the court finds that the order appealed from is unjust, unreasonable, or not supported by the evidence, it shall make such order to take the place of the order appealed from as is justified by the record before it.

"Any person aggrieved may appeal to the supreme court from the judgment of the district court made therein as in a civil action, except that the appeal must be taken within 30 days from date of the entry of such judgment.

"The pendency of any such appeal shall not stay the operation of the order of the commissioner, but the district court or the supreme court in their discretion may suspend the operation of the commissioner's order pending a determination of the appeal; provided the appellant shall file an appropriate bond approved by the court conditioned that he shall answer for all damages caused by the delay in the enforcement of the commissioner's order."

A copy of the notice of hearing will be mailed to all agencies of the U.S. Government and the State of Wisconsin who would appear to have an interest in the matter.

Yours very truly,

WAYNE H. OLSON,
Commissioner of Conservation.

Senator NELSON. Senator Metcalf, do you have any questions?

Senator METCALF. No.

Senator NELSON. Is there somebody else?

Mr. BROWN. Yes, sir.

At this time Mr. Lyle Smith from the water supply and pollution control commission would like to give his case.

Senator NELSON. Mr. Smith, you may proceed.

STATEMENT OF LYLE H. SMITH, DEPARTMENT OF HEALTH BUILDING, UNIVERSITY CAMPUS, MINNEAPOLIS, MINN., EXECUTIVE ENGINEER, WATER SUPPLY AND POLLUTION CONTROL COMMISSION

Mr. SMITH. I am Lyle Smith, the executive engineer from the Minnesota Water Supply and Pollution Control Commission.

I have a statement which I would like to read which has been approved by the water supply and pollution control commission. This is a relatively brief statement. [Reading:]

The commission welcomes this subcommittee to Minnesota and welcomes this opportunity at a hearing of this type to present information relative to water pollution control activities in the State.

First, it should be pointed out that the commission has scheduled a public hearing for 10 a.m. on January 13, 1965, in the Auditorium Theater in Stillwater. This hearing is being called for the purpose of hearing evidence and receiving information bearing upon the application by the Northern States Power Co. for a permit for the discharge of circulating water to the St. Croix River from the proposed Allen S. King generating plant, unit No. 1, to be constructed in Oak Park Heights, Minn.

The majority powers and duties of the commission are defined in Minnesota Statutes, section 115.03.

"115.03 *Powers and duties.*—Subdivision 1. The commission is hereby given and charged with the following powers and duties :

"To administer and enforce all laws relating to the pollution of any of the waters of the State ;

"To investigate the extent, character, and effect of the pollution of the waters of this State and to gather data and information necessary or desirable in the administration or enforcement of pollution laws, and to make such classification of the waters of the State as it may deem advisable ;

"To establish and alter such reasonable pollution standards for any waters of the State in relation to the public use to which they are or may be put as it shall deem necessary for the purposes of sections 115.01 to 115.09 ;

"To make and alter reasonable orders requiring the discontinuance of the discharge of sewage, industrial waste, or other wastes into any waters of the State resulting in pollution in excess of the applicable pollution standard established under this subdivision ;

"To require to be submitted and to approve plans for disposal systems or any part thereof and to inspect the construction thereof for compliance with the approved plans thereof ;

"To issue, continue in effect, or deny permits, under such conditions as it may prescribe for the prevention of pollution ; for the discharge of sewage, industrial waste, or other wastes ; or for the installation or operation of disposal systems or parts thereof ;

"To revoke or modify any permit issued under sections 115.01 to 115.09 whenever it is necessary, in the opinion of the commission, to prevent or abate pollution of any waters of the State ;

"To prescribe and alter rules and regulations, not inconsistent with law, for the conduct of the commission and other matters within the scope of the powers granted to and imposed upon it by sections 115.01 to 115.09, provided that every rule or regulation affecting any other department or agency of the State or any person other than a member or employee of the commission shall be filed with the secretary of state ; and

"To conduct such investigations and hold such hearings as it may deem advisable and necessary for the discharge of its duties under sections 115.01 to 115.09, and to authorize any member, employee, or agent appointed by it to conduct such investigations or hold such hearings."

Senator NELSON. I wonder, Mr. Smith, if those parts which are direct excerpts from your statutes might be better given in a casual summary and let us introduce those in the record, because I don't think a first impression of reading the statutes is easily interpreted by a layman or by lawyers. It would be better use of our time if you introduced these into the record, as such, and made a general summary, if you wish to do that.

Mr. SMITH. The statement goes on to excerpts from the statute, the definition of "pollution," of the "waters of the State," "disposal system," "industrial waste," and also a subdivision relative to the obtaining of a permit. It also defines "person" for the use of the act.

I will continue by reading an excerpt from its statement.

The commission has a history of cooperating with water pollution control agencies in adjoining States as is indicated by joint resolutions with such agencies in North Dakota and Wisconsin and specifically a joint resolution of the Minnesota Water Pollution Control Commission and the Wisconsin Committee on Water Pollution regarding the St. Croix River, dated the 11th day of August 1953.

The two States of Minnesota and Wisconsin have a history of cooperation in numerous stream surveys of all common boundary waters which include the Mississippi River, the St. Croix River, and the St. Louis River.

Meetings have been held with, and information has been supplied to, the Wisconsin Committee on Water Pollution relative to the proposed project on which this hearing is being held.

The commission is not unfamiliar with the problem of thermal pollution as several permits for heated waste discharge have been issued and thermal pollution is dealt with in standards adopted by the commission for three sections

of the Mississippi River and in proposed standards for two sections of the lower Minnesota River and tributaries thereto.

The commission welcomes any comments or suggestions which this committee may wish to offer and desires to request a copy of the transcript of this hearing.

I have, in addition, four attachments which I will not read.

Senator NELSON. You wish the attachments to be included as part of the record?

Mr. SMITH. Those are to be included; yes, sir.

Senator NELSON. Does the Commission have some standards on which they may act in a case such as this? I realize it is governed by sections of the statute you have included here, but if recreation values are impaired, for example, is that a standard taken into consideration by your Commission?

Mr. SMITH. Certainly, yes.

Senator NELSON. Your full statement, as well as your impromptu extemporaneous remarks, will be included.

Senator Metcalf, do you have any questions?

Senator METCALF. I have a question.

As a preface to my question, because you didn't read it, as suggested by the chairman, I want to read the definition of pollution:

"Pollution" means the contamination of any waters of the State so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially harmful or detrimental or injurious to public health, safety, or welfare; to domestic, commercial, industrial, or recreational use; or to livestock, wild animals, bird, fish, or other aquatic life.

You heard Dr. Tarzwell's testimony?

Mr. SMITH. Yes, sir.

Senator METCALF. Do you consider under that definition of "pollution" that the increase of the temperature of the water so as to harm sport fishing or to create algae in the water, as suggested by Dr. Tarzwell, would come under the jurisdiction of the Commission?

Mr. SMITH. It is my impression, yes, sir, that has been taken into consideration in the issuance of permits for waste discharge and other installations in the State of Minnesota.

Senator METCALF. If there were no impurities on the water discharge, but merely an increase in the temperature that caused the effects that were suggested by Dr. Tarzwell, that would be something that the Commission would look to as contamination?

Mr. SMITH. Yes, sir.

Senator METCALF. Thank you very much.

Senator NELSON. You included in your submission here a joint resolution of the Minnesota Water Pollution Control Commission and the Wisconsin Committee on Water Pollution—a joint resolution adopted on the 11th day of August 1953, the resolved part of which says:

Resolved, That the Minnesota Water Pollution Control Commission and Wisconsin Committee on Water Pollution each does hereby agree to require the effective correction of existing pollution and prevention of additional pollution within the boundaries of its State as provided by the laws of such State to the end that said waters may be maintained or rendered suitable for all purposes heretofore defined and that, in furtherance of said objectives, the guiding policy shall be the requirement that facilities for treatment of sewage for all sewered municipalities shall provide at least effective sedimentation plus chlorination—

and so forth.

What effect do you conclude that this resolution has? Does it have any legal consequences?

MR. SMITH. The effect, I believe, is to show that the two States have in the past worked closely together, whether the implementation was Minnesota or Wisconsin. The two water pollution control agencies worked very closely together in surveys and in determining what steps should be taken to prevent undesirable conditions in waters.

Senator NELSON. I noticed the opening "whereas" says:

Whereas the St. Croix River is an interstate stream common to the States of Minnesota and Wisconsin, and pollution thereof originating in one State does or may adversely affect public health or public rights in both States, thus creating a problem of common interest and requiring correction by said States.

Have the Minnesota Water Pollution Control Commission and the Wisconsin Committee on Water Pollution been in regular conference on this matter? Have they conferred on the matter that is pending before this committee now?

MR. SMITH. The commission and the committee members have not, but staff members have.

Senator NELSON. Do you know whether or not there is going to be any presentation of evidence by either or both of these commissions at the hearing in Minnesota on January 13?

MR. SMITH. The Wisconsin Committee on Water Pollution has been notified of the hearing. What they plan to do, I do not know.

Senator NELSON. Thank you. I have no further questions. Thank you very much.

MR. SMITH. Yes, sir.

Senator NELSON. The statement, with the appending affidavits and so forth, will be included in the record.

(There follows the full text of Mr. Smith's statement, applications, and resolutions:)

STATEMENT OF THE MINNESOTA WATER POLLUTION COMMISSION

The commission welcomes this subcommittee to Minnesota and welcomes this opportunity at a hearing of this type to present information relative to water pollution control activities in the State.

First, it should be pointed out that the commission has scheduled a public hearing for 10 a.m. on January 13, 1965, in the auditorium theater in Stillwater. This hearing is being called for the purpose of hearing evidence and receiving information bearing upon the application by the Northern States Power Co. for a permit for the discharge of circulating water to the St. Croix River from the proposed Allen S. King generating plant, unit No. 1, to be constructed in Oak Park Heights, Minn.

The majority powers and duties of the commission are defined in Minnesota Statutes, section 115.03:

"115.03 *Powers and duties.*—Subdivision 1. The commission is hereby given and charged with the following powers and duties:

"To administer and enforce all laws relating to the pollution of any of the waters of the State.

"To investigate the extent, character, and effect of the pollution of the waters of this State and to gather data and information necessary or desirable in the administration or enforcement of pollution laws, and to make such classification of the waters of the State as it may deem advisable.

"To establish and alter such reasonable pollution standards for any waters of the State in relation to the public use to which they are or may be put as it shall deem necessary for the purposes of sections 115.01 to 115.09.

"To make and alter reasonable orders requiring the discontinuance of the discharge of sewage, industrial waste, or other wastes into any waters of the State

resulting in pollution in excess of the applicable pollution standard established under this subdivision;

"To require to be submitted and to approve plans for disposal systems or any part thereof and to inspect the construction thereof for compliance with the approved plans thereof;

"To issue, continue in effect or deny permits, under such conditions as it may prescribe for the prevention of pollution, for the discharge of sewage, industrial waste or other wastes, or for the installation or operation of disposal systems or parts thereof;

"To revoke or modify any permit issued under sections 115.01 to 115.09 whenever it is necessary, in the opinion of the commission, to prevent or abate pollution of any waters of the State;

"To prescribe and alter rules and regulations, not inconsistent with law, for the conduct of the commission and other matters within the scope of the powers granted to and imposed upon it by sections 115.01 to 115.09, provided that every rule or regulation affecting any other department or agency of the State or any person other than a member or employee of the commission shall be filed with the secretary of state; and

"To conduct such investigations and hold such hearings as it may deem advisable and necessary for the discharge of its duties under sections 115.01 to 115.09, and to authorize any member, employee, or agent appointed by it to conduct such investigations or hold such hearings.

"Subdivision 2. In any such hearing or investigation, any member of the commission, or any employee or agent thereto authorized by the commission, may administer oaths, examine witnesses, and issue, in the name of the commission, subpoenas requiring the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in any such hearing or investigation. Witnesses shall receive the same fees and mileage as in civil actions.

"Subdivision 3. In case of contumacy or refusal to obey a subpoena issued under this section, the district court of the county where the proceeding is pending or in which the person guilty of such contumacy or refusal to obey is found or resides, shall have jurisdiction upon application of the commission or its authorized member, employee, or agent to issue to such person an order requiring him to appear and testify or produce evidence, as the case may require, and any failure to obey such order of the court may be punished by said court as a contempt thereof."

"Pollution" is defined in section 115.01, subdivision 5:

"Subdivision 5. 'Pollution' means the contamination of any waters of the State so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially harmful or detrimental or injurious to public health, safety, or welfare; to domestic, commercial, industrial, or recreational use; or to livestock, wild animals, bird, fish, or other aquatic life."

"Waters of the State" are defined in section 115.01, subdivision 9.

"Subdivision 9. 'Waters of the State' means all streams, lakes, ponds, marshes, watercourses, waterways; wells, springs, reservoirs, aquifers, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the State or any portion thereof."

"Disposal system" is defined in section 115.01, subdivision 8.

"Subdivision 8. 'Disposal system' means a system for disposing of sewage, industrial waste and other wastes, and includes sewer systems and treatment works.

"Industrial waste" is defined in section 115.01, subdivision 3.

"Subdivision 3. 'Industrial waste' means any liquid, gaseous or solid waste substance resulting from any process of industry, manufacturing trade or business or from the development of any natural resource.

Section 115.07, subdivision 1 regarding the obtaining of permits reads as follows:

"Subdivision 1. Obtain permit: It shall be unlawful for any person to construct, install, or operate a disposal system, or any part thereof, until plans therefor shall have been submitted to the commission unless the commission shall have waived the submission thereof to it and a written permit therefor shall have been granted by the commission.

"Person" is defined in section 115.01, subdivision 10.

"Subdivision 10. 'Person' means the State or any agency or institution thereof, any municipality, governmental subdivision, public or private corporation, individual, partnership, or other entity, and includes any officer or governing or

managing body of any municipality, governmental subdivision, or public or private corporation."

The commission has a history of cooperating with water pollution control agencies in adjoining States as is indicated by joint resolutions with such agencies in North Dakota and Wisconsin and specifically a joint resolution of the Minnesota Water Pollution Control Commission and the Wisconsin Committee on Water Pollution regarding the St. Croix River dated the 11th day of August 1953.

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Meetings have been held with, and information has been supplied to, the Wisconsin Committee on Water Pollution relative to the proposed project on which this hearing is being held.

The commission is not unfamiliar with the problem of thermal pollution as several permits for heated waste discharge have been issued and thermal pollution is dealt with in standards adopted by the commission for three sections of the Mississippi River and in proposed standards for two sections of the lower Minnesota River and tributaries thereto.

The commission welcomes any comments or suggestions which this committee may wish to offer and desires to request a copy of the transcript of this hearing.

The following documents are submitted for the record :

Application by Northern States Power Co. for permit for discharge of circulating water to St. Croix River, Allen S. King Generating Plant, unit No. 1, Oak Park Heights.

Notice of public hearing on application by Northern States Power Co. for permit for discharge of circulating water to St. Croix River from Allen S. King Generating Plant, unit No. 1, Oak Park Heights, Minn.

Joint resolution, Minnesota Water Pollution Control Commission and Wisconsin Committee on Water Pollution dated 11th day of August 1953.

Policy statement adopted by the Water Pollution Control Commission on April 18, 1963.

NORTHERN STATES POWER CO.,
Minneapolis, Minn., August 5, 1964.

Re application for permit for discharge of circulating water to St. Croix River—Allen S. King Generating Plant, unit No. 1, Oak Park Heights.

WATER POLLUTION CONTROL COMMISSION,
State of Minnesota,
Minneapolis, Minn.

GENTLEMEN : Northern States Power Co. hereby makes application for a permit to discharge to the St. Croix River circulating water for condenser cooling from its proposed Allen S. King Generating Plant, unit No. 1, in Oak Park Heights, Minn.

The location of the point of discharge is shown on the attached print of drawing NF-E5577-P1, which is the tentative layout of the proposed plant.

Applications are being made to the Minnesota Department of Conservation for a permit to appropriate the water from the St. Croix River which will be used for the condenser cooling and to appropriate ground water for the plant sanitary system and feedwater makeup.

It is necessary that this plant be in service early in 1968. To that end construction must begin in January 1965 and site preparation in October 1964.

The maximum full-load heat rejection from the plant is estimated at 2,520 times 10^6 British thermal units per hour and the average daily heat rejection from the plant is estimated at 2,320 times 10^6 British thermal units per hour. The maximum rate of discharge is estimated at 660 cubic feet per second; the minimum rate is estimated at 395 cubic feet per second.

A separate application will be made for the plant sanitary sewage disposal system.

If further information is required, we are available at the convenience of your staff to discuss the proposed design in greater detail.

We respectfully request that the commission issue a permit to Northern States Power Co. to discharge circulating water from Allen S. Knight unit No. 1 to the St. Croix River.

Yours very truly,

HIBBERT HILL,
Vice President-Engineering.

STATE OF MINNESOTA WATER POLLUTION CONTROL COMMISSION

Notice of public hearing on application by Northern States Power Co. for permit for discharge of circulating water to St. Croix River from Allen S. King Generating Plant, unit No. 1, Oak Park Heights, Minn.

Pursuant to authorization of the Water Pollution Control Commission and in accordance with applicable statutes, a public hearing will be held by said commission or by one or more authorized members, employees, or agents thereof in the Auditorium Theater at 215 South Second Street, Stillwater, Minn., on January 13, 1965, at 10 a.m., for the purpose of hearing evidence and receiving information bearing upon the application by the Northern States Power Co. for a permit for the discharge of circulating water to the St. Croix River from the proposed Allen S. King Generating Plant, unit No. 1, to be constructed in Oak Park Heights, Minn.

Testimony offered thereat should be pertinent to the matter at hand and confined to water pollution control aspects or related matters which are within the jurisdiction of the Water Pollution Control Commission. Evidence may be presented in either written or oral form.

ROBERT N. BARR, M.D.,

Secretary, Water Pollution Control Commission.

Dated: November 30, 1964.

 JOINT RESOLUTION—MINNESOTA WATER POLLUTION CONTROL COMMISSION AND WISCONSIN COMMITTEE ON WATER POLLUTION

Whereas the St. Croix River is an interstate stream common to the States of Minnesota and Wisconsin and pollution thereof originating in one State does or may adversely affect public health or public rights in both States, thus creating a problem of common interest and requiring correction by said States; and

Whereas sewage and industrial wastes, now discharged into said river and its tributaries, do create or are likely to create a nuisance or render such waters harmful or detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate uses, or to livestock, wildlife, fish or other aquatic life; and

Whereas protection of public health and preservation of public rights demand that said waters shall be made suitable for legitimate uses: Now, therefore, be it

Resolved, That the Minnesota Water Pollution Control Commission and Wisconsin Committee on Water Pollution each does hereby agree to require the effective correction of existing pollution and prevention of additional pollution within the boundaries of its State as provided by the laws of such State to the end that said waters may be maintained or rendered suitable for all purposes heretofore defined and that, in furtherance of said objectives, the guiding policy shall be the requirement that facilities for treatment of sewage for all sewered municipalities shall provide at least effective sedimentation plus chlorination, with such design of treatment plants that secondary or other higher degrees of treatment may be added as conditions may require, and that facilities for treatment of industrial waste shall provide the most effective treatment warranted by conditions in each case with the understanding that additional or special type treatment be required where water uses so dictate; and be it further

Resolved, That adoption of this resolution by the water pollution control agency of each State shall be evidenced by the signature of its executive officer.

Dated this 11th day of August 1953.

A. J. CHESLEY, M.D.,

Secretary, Minnesota Water Pollution Control Commission.

THEODORE F. WISNIEWSKI,

Director, Wisconsin Committee on Water Pollution.

 MINNESOTA WATER POLLUTION CONTROL COMMISSION—ST. CROIX RIVER

STATEMENT OF POLICY

Present and future uses of the St. Croix River and the necessity for preservation of this river were discussed.

M made by Dr. Barr, S by Mr. D. Wilson, and C, that the following be adopted as a general policy of the commission to be applied to the municipalities on the St. Croix River:

1. Provision should be made for both primary and secondary treatment, with chlorination, for all new sanitary sewage discharges. Equivalent treatment should be provided for industrial wastes.
2. Where a lesser degree of treatment is now provided, additional treatment facilities should be constructed as rapidly as is feasible.

April 18, 1963, commission action.

Senator NELSON. Is there another witness for Minnesota?
Will you state your name for the record, please?

**STATEMENT OF FRANK L. WOODWARD, DIRECTOR, MINNESOTA
DIVISION OF ENVIRONMENTAL HEALTH**

Mr. WOODWARD. My name is Frank L. Woodward. I am State sanitary engineer of Minnesota. My title is director, division of environmental health.

Senator NELSON. I am glad to have you appear before the Commission. You may read excerpts of your statement, or summarize anything that should be summarized, and all the statements you submit will be included in the printed record.

Mr. WOODWARD. I am here at the direction of the secretary of the State board of health. The statement I am making is the statement of the State Board of Health of Minnesota.

Senator NELSON. Thank you.

Mr. WOODWARD. I believe, Senator, this being very short and there being nothing in terms of quotes, that I might read the entire two pages and a bit more and will also submit attachments to which I will make reference in the statement.

Senator NELSON. Thank you.

Mr. WOODWARD (reading):

The Minnesota State Board of Health is honored to have the opportunity of being represented at this hearing for the purpose of presenting this statement regarding the activities and concerns of the board in matters relating to air pollution. While Minnesota is not likely to experience air pollution problems as extensive as those that have been encountered in the more heavily industrialized areas, the State board of health has long recognized the need for development of a program of air pollution control.

The Minnesota Legislature, in 1917, authorized the State board of health to adopt regulations having the force of law relating to matters of public health. In general, the board has requested specific amendments to the law, Minnesota statutes, section 144.12, to authorize the adoption of regulations under this authority for particular areas of concern. In 1957, the board requested the legislature to amend the statute to permit adoption of regulations on atmospheric pollution. Before passage, this amendment was reworded to read: "atmospheric pollution which may be injurious or detrimental to public health." Attachment A to this statement contains the pertinent material relating to this permissive authority.

Feeling the need for development of some competence in the field of air pollution control, the board has made several requests for appropriations to establish a minimum air pollution control program but, thus far, these requests have not been fruitful. The board, nonetheless, has made every effort to use its influence constructively in these matters in every way possible. Some examples of these efforts follow:

1. For the past 11 years the board has participated in the national air sampling network, operating an air sampling station on the roof of the State board of health building in Minneapolis and also assisting in arrangements for establishing stations in other parts of the State. During the past 9 years, the board has participated in the radiation surveillance network of the U.S. Public Health

Service, collecting air samples at the same location in addition to other measures carried on for detection of radioactive contamination of the environment. Thus far, these requests have not been fruitful.

2. The board has diverted personnel from other programs, insofar as possible, to develop a limited competence to provide technical consultative assistance to local government units, industries, and others in the design of solutions to specific air contamination problems. These activities have included the acquisition of some basic equipment for field investigations and analysis.

3. A joint study of air pollution, as a present and future problem in Minnesota, was undertaken in 1959 and 1960 cooperatively with the U.S. Public Health Service. The report of this 9-month appraisal was issued in early 1961 and widely circulated. A copy of this report is attached (attachment B). (In committee files.)

A copy of this report is included in booklet form. I recommend, for the record, the committee might only wish to take the conclusions which appear at the beginning of the report. This is attachment B.

Senator NELSON. The staff will put the appropriate summary or excerpts from that report into the record, and your remarks, in toto, as read will be part of the record.

Mr. WOODWARD. We are furnishing the entire report because there is background material there which we think may be of value in your interpretation.

Senator NELSON. You may continue.

Mr. WOODWARD (reading):

4. At the request of the Ramsey County legislative delegation and officials of the city of St. Paul, a bill was prepared proposing a State air pollution control program for consideration by the 1963 legislature. The bill was not enacted.

5. In March of 1964 the board appointed an air pollution advisory committee to assist in the development of recommendations concerning "specific legislative needs at the State and local levels of government in this problem area, in air pollution, with appropriate recognition of the special control problems presented by the Twin Cities metropolitan complex," and to "assist in the delineation and definition of the appropriate role of the State government and the State board of health in air pollution regulatory and control functions in the State." The full charge to this committee and a copy of the membership of this committee are appended (attachments C). This committee has just completed a progress report and has prepared recommendations for air pollution legislation to be submitted to the board for its consideration. The progress report and the legislative recommendations are also attached (attachment D). It is planned that a bill will be drawn with the assistance of the Office of the Revisor of Statutes for presentation to the forthcoming session of the State legislature.

When preliminary proposals for a large electric-generator plant at Oak Park, Minn., became known, the board immediately requested the assistance of the U.S. Public Health Service's Division of Air Pollution to evaluate this matter, and this assistance was forthcoming. A report of the Public Health Service evaluation has just been received and a copy of the conclusions and recommendations of this report is attached (attachment E). Also, the board requested and obtained in September 1964 an emergency grant of \$3,000 from the State Legislative Advisory Committee in order to enable the board to contract for the consultative services of a qualified air pollution control expert to render an additional objective opinion concerning these questions and to offer recommendations for any special controls necessary to prevent objectionable air pollution problems as a result of this facility. This independent report is expected to be available in the near future.

I might point out the reason we had to get outside consultation is because under our program we have not been able to develop the competence within the State service that could answer some of the questions that are necessary on the case.

It seems apparent that while Minnesota does have specific air pollution problems, none of these are of grave magnitude or insoluble. It is the viewpoint of the board that principal objectives of air pollution control activities at the local and State levels of government in Minnesota for the foreseeable future can be

principally directed at the prevention of the development of conditions evident in many much more highly industrialized areas of the country today. The resolution of existing air pollution problems and the control and preservation of the generally excellent quality of the air resources in Minnesota require only public and industrial recognition of the need for broadened State and local authority to deal effectively with air pollution problems and adequate financing translated into effective programing by the State legislature.

The board has a long history of cooperating with its neighboring States in matters of joint interest, and it will most certainly cooperate with Wisconsin in any matters suggesting an interstate air pollution problem.

That is the end of my statement.

Senator NELSON. I notice on the first page of your testimony, the third paragraph, that you state that the board made several requests for appropriations to establish a minimum air pollution control program. To whom were those requests made?

Mr. WOODWARD. These are made in our biennial budget.

Senator NELSON. To the State government?

Mr. WOODWARD. Yes.

Senator NELSON. Have you made any requests to the Federal Government under the Clean Air Act of 1964?

Mr. WOODWARD. We have not because of the fact we have no air pollution money at the State level to match the money from the Clean Air Act.

Senator NELSON. I see.

Mr. WOODWARD. I might point out, when I say we have borrowed people from other programs, the people we have borrowed are people who are now on funds supplied by the Federal program grants. These cannot be matched against the clean air funds, as we understand it. This puts us at a point where we just can't match any Federal money in this field. We are without a specific State appropriation.

Senator NELSON. Did you have any questions, Senator Metcalf?

Senator METCALF. Mr. Chairman, this attachment E, which is the evaluation of the air pollution aspect of the proposed large electric generator plant, sets forth at least a marginal case for air pollution. Suppose under standards established over in Wisconsin, either by statute or otherwise, it was felt that here was a case for a denial as a result of that pollution, and Minnesota went right ahead and said there wasn't any air pollution, what would happen?

Mr. WOODWARD. You are speaking of attachment E?

Senator METCALF. Yes. I am saying, as I read attachment E, the case is at least marginal.

Mr. WOODWARD. Attachment E is the summary and conclusion of the report of the specialists on air pollution—

Senator METCALF (interrupting). After you read that summary report and your agency comes to the conclusion that pollution which would only exceed human perception threshold for sulfur dioxide occasionally and long-term chronic effects will be experienced by long-lived vegetation such as trees would not justify the denial of a license, but Wisconsin said it would, what would you do about it?

Mr. WOODWARD. Senator, I don't feel that the State Board of Health of Minnesota is in any position to issue a permit for—you mention materials likely to cause pollution, nor to deny the issuance of a permit. Our authority in this field is so limited due to the adoption of regulations and no regulations have been adopted. I might point out that one of the reasons that we had for requesting the authority without adopting the regulations in 1957 was the knowledge that air pollution

is becoming a problem in many areas, and we wish to be in a position to adopt the regulations if an emergency appeared to be created somewhere.

With the inclusion in that authority of the amendment that I cited in quotation marks which requires that before we could adopt regulations, the pollution would have to be injurious or detrimental to public health, this limits any authority we might have pretty narrowly. We know that in some cases vegetation, for instance, may be affected before health would be affected.

We also know that there is a great lack of an agreement on what levels of various substances will be health hazards and whether you are talking about this thing from immediate health hazard or a long-term exposure to these hazards.

I am sure the Senator is aware this is a field in which there is a great deal of lack of knowledge at the present time, just what the effects are of air pollution.

Senator METCALF. My point is, under the present law in Minnesota, even though it had been determined that there would be damage to vegetation, and perhaps damage to public health, the State of Wisconsin couldn't do anything about it?

Mr. WOODWARD. This is undoubtedly true, because the State Board of Health of Minnesota, as I see it, could not use this as a basis for making a case against the plant. I think the authority isn't there. I am not an attorney. Perhaps some attorneys disagree with this to the extent of our authority.

Senator METCALF. One of the purposes of this hearing is to try to ascertain the need for Federal standards and Federal regulations in this area. This possible pollution in the area in the State of Minnesota is a case in point. As you say, prevailing winds blow toward Wisconsin. This seems to be that it is a case in point where nothing can be done unless there are Federal standards and Federal enforcement procedures.

With all goodwill from the State of Minnesota under your existing laws, and with all the cooperation you have with the State of Wisconsin, it would seem to me you can't do anything about it.

Mr. WOODWARD. I agree with this, as the matter stands at this moment. I am trying to bring out also the fact that we recognize a need for some authority in the field of air pollution. I know that this becomes a record for other people as well as the Senate committee.

Senator METCALF. Thank you very much.

Senator NELSON. Thank you.

The attachments to your statement, except for "B," will be placed in the printed record. Attachment B will be filed with the committee. (The attachments referred to are as follows:)

ATTACHMENT A

CHAPTER 361—S. F. No. 812

AN ACT Relating to the powers of the State board of health, authorizing the board to make regulations relating to atmospheric pollution control, ionizing radiation control, and the handling and use of radioactive isotopes and fissionable materials; amending Minnesota Statutes 1953, section 144.12.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. Minnesota Statutes 1953; Section 144.12, is amended to read:

"144.12. The board may adopt, alter, and enforce reasonable regulations of permanent application throughout the whole or any portion of the state,

or for specified periods in parts thereof, for the preservation of the public health. Upon the approval of the attorney general and the due publication thereof, such regulations shall have the force of law, except insofar as they may conflict with a statute or with the charter or ordinance of a city of the first class upon the same subject. In and by the same the board may control, by requiring the taking out of licenses or permits, or by other appropriate means, any of the following matters:

"(14) Atmospheric pollution which may be injurious or detrimental to public health; and

"(15) Sources of ionizing radiation, and the handling, storage, transportation, use and disposal of radioactive isotopes and fissionable materials."

Approved April 10, 1957.

ATTACHMENT C

STATE OF MINNESOTA,
DEPARTMENT OF HEALTH,
Minneapolis.

CHARGE TO ADVISORY COMMITTEE ON AIR POLLUTION

The State board of health for some time has been cognizant of the fact that troublesome air pollution problems now exist in small as well as in large communities throughout the State, and that unless adequate preventive efforts are undertaken now or in the very near future, the number and intensity of these problems will rapidly increase in the coming years. Our complex society, with its great urban concentrations of population, its interdependent economic system, and its increasing need for utilization of natural resources cannot exist without using air as a receptor for its waste products. The "public interest," however, in contrast demands a preservation of a quality of the air resources consistent with public health, comfort, welfare, protection of property, and continued economic development and growth for the State and its communities. Air pollution control as a public problem requires a reconciliation of these divergent interests. The determination of the level of air pollution which is acceptable in our society must realistically involve questions of fact and value, of health, of esthetics, of engineering, and of law. There is no magic formula, no simple legal remedy, and it is in recognition of the complexity of these matters that the State board of health requests the assistance and counsel of this committee. For working objectives, the board charges the advisory committee on air pollution to—

- (1) Gather and interpret available information regarding air pollution as a problem in Minnesota.
- (2) Stimulate interest, planning, and action directed to the conservation of the vital air resource of the State.
- (3) Develop recommendations concerning specific legislative needs at the State and the local levels of government in this problem area, with appropriate recognition of the special control problems presented by the Twin City metropolitan complex.
- (4) Assist in the delineation and definition of the appropriate role of the State government and the State board of health in air pollution regulatory and control functions in the State.

AIR POLLUTION ADVISORY COMMITTEE MEMBERSHIP LIST

- Dr. Ellen Z. Fifer, health officer, 5925 West 37th Street, St. Louis Park, Minn.; 10200 Penn South, Bloomington, Minn.; Richfield, Minn. (mailing address: 10200 Penn South, Bloomington, Minn).
- Otto Christenson, executive secretary, Minnesota Employers' Association, Pioneer Building, St. Paul, Minn.
- Joseph T. Ling, Ph. D., Minnesota Mining & Manufacturing Co., 900 Bush Avenue, Building 42-2W, St. Paul, Minn.
- L. O. Mayer, general superintendent, power production, Northern States Power Co., 15 South Fifth Street, Minneapolis, Minn.
- F. C. Anderregg, utility supervisor, Great Northern Oil Co., Pine Bend, Minn.
- Orville C. Peterson, executive secretary, League of Minnesota Municipalities, 314 Social Science Building, University Campus, Minneapolis, Minn.
- Ralph Keyes, executive secretary, the Association of Minnesota Counties, Griggs-Midway Building, St. Paul, Minn.

George W. Martens, alderman, City Hall, Minneapolis, Minn.
 Demetrius G. Jelatis, mayor, city of Red Wing, Red Wing, Minn.
 Mace Harris, vice president, Northwest Paper Co., Cloquet, Minn.
 Dr. Harold J. Paulus, associate professor, School of Public Health, 1140 Mayo,
 University Campus, Minneapolis, Minn.
 Bernard T. Holland, commissioner, Department of Public Utilities, Court House,
 St. Paul, Minn.

DEPARTMENT OF HEALTH RESOURCE PERSONS

Robert N. Barr, M.D., secretary and executive officer.
 F. L. Woodward, director, division of environmental health.
 Warren R. Lawson, M.D., chief, section of radiation and occupational health.
 G. J. Raschka, associate chief, section of radiation and occupational health.

ATTACHMENT D

DECEMBER 7, 1964.

Subject: Progress report, Advisory Committee on Air Pollution.

Dr. ROBERT N. BARR,
*Secretary and Executive Officer, Minnesota State Board of Health,
 University Campus, Minneapolis, Minn.*

DEAR DR. BARR: Since the organizational meeting held on March 31, 1964, this advisory committee and its subcommittees have met many times and heard testimony from several experts on air pollution problems. As the chairman of this advisory committee, I am submitting the following progress report for your consideration:

After reviewing the existing Minnesota State statutory authority and the existing legislation adopted by other States, it is our opinion that specific legislation is needed in Minnesota at the State and local levels of government to provide authority for air pollution control. This also will enable governments at the various levels to utilize funds available under the Federal Clean Air Act. The details and the essentials of the needed legislation are summarized in the "suggested outline of proposed air pollution control legislation," as attached. This outline has been prepared after much deliberation and work by the members of the advisory committee.

As far as the role of the State government and the State board of health in the air pollution control program is concerned, we feel that air pollution is a statewide problem and the ultimate responsibility for dealing with it should rest with the State government. However, primary responsibility for the enforcement and administration of air pollution control programs should remain with local units of government. We recommend that the Minnesota State Department of Health should be assigned responsibility as the State agency and assume responsibility for providing the technical assistance and research in air pollution problems and their control. We also recommend that an advisory committee broadly represented should be appointed to assist the State agency in carrying out its assignment.

Our committee has reviewed a considerable amount of available literature in the field of air pollution with emphasis on that concerning or applicable to Minnesota. It was the opinion of this committee that very little work has been done on the collection of technical information on air pollution problems in Minnesota except for a report entitled "Appraisal of Air Pollution in Minnesota" prepared by the Minnesota Department of Health in 1961. We also found that funds, manpower, and the laboratory facilities are not presently available for detailed studies of air pollution problems which are necessary for establishment of a soundly based control program. The committee feels the State agency should be given a substantial appropriation by the legislature in order to effectively carry out its responsibilities.

In regard to stimulating interest, planning, and action directed to the conservation of the vital State air resources, I am glad to report that very great interest in air pollution has developed within the committee and among those who are associated with the committee members. Since many members of this committee also have outside interests in activities related to air pollution, such as the upper midwest section of the Air Pollution Control Association, we feel we are gradually moving in the direction of stimulating the interest of others in the conservation of air resources. We believe periodic news releases about the activity of this

advisory committee and other activity related to air pollution may also be helpful in the promotion of air resources conservation.

This report only covers the progress of the work of this committee up to the present time. Further recommendations will be made as they become available.

It is very important for us to receive the comments of the State board of health on our proposals so we can determine the direction we are to follow.

Very sincerely yours,

BERNARD T. HOLLAND,
Chairman, Advisory Committee on Air Pollution.

SUGGESTED OUTLINE OF PROPOSED AIR POLLUTION CONTROL LEGISLATION, ADVISORY COMMITTEE ON AIR POLLUTION, DECEMBER 7, 1964

I. INTRODUCTION

It is the purpose of this outline to set forth the basic elements which, in the judgment of the advisory committee, should be included in legislation establishing an air pollution program for the State of Minnesota. The recommendations are organized in outline form rather than bill form with the thought that the requirements of legislative drafting may necessitate rearrangement and some reorganization.

The general principles on which the proposed legislation should be based are as follows:

(1) Air pollution is a problem of statewide concern and ultimate responsibility for dealing with it should rest with the State government. Primary responsibility for the enforcement and administration of air pollution control programs, however, should remain with local units of government.

(2) An effective air pollution control program must utilize the resources of both the State and its political subdivisions and can be best accomplished by cooperative action between local governmental units combined with overall direction and technical assistance from the State.

(3) A comprehensive air pollution control program must take into consideration factors in addition to those purely affecting health; therefore, it must deal with matters that affect the public welfare, including injury to agricultural crops and livestock, damage to and deterioration of property, and hazards to air and ground transportation.

(4) Because of the unavailability of necessary data and studies at the present time, no standards regarding air pollutant emissions or ambient air quality should be included in the legislation, but the State should be given authority to adopt such standards after appropriate hearings and procedural safeguards.

II. OUTLINE OF PROPOSED LEGISLATION

A. *Statement of policy*

The legislation should contain a clear statement of the reasons for establishing an air pollution control program and the objectives which are sought by it. Although not essential to the validity of legislation, such policy statements do serve to focus the attention of legislators, courts, and the public on the intention of the legislature, and to some degree enhance the legislation's chances of passage and success in court. Such a policy statement might read as follows:

"The Legislature of the State of Minnesota finds that the growth in the amount and complexity of air pollution brought about by urbanization and industrial development has resulted in mounting dangers to the public health and welfare, and that the prevention and control of air pollution at its source is essential to achieve a reasonable degree of purity of air resources for the State. It is the purpose of this act to protect the State's air resources so as to promote the public health and welfare and the productive capacity of its population, to encourage and assist the development and operation of regional air pollution control programs, to initiate and accelerate a State research and development program to achieve the prevention and control of air pollution, to provide technical and financial assistance to local governments in connection with the development and execution of air pollution programs and to designate a State agency with the authority to develop statewide standards, rules, and regulations for air quality and to enforce, in cooperation with local governments, these standards, rules, and regulations."

B. Definitions

The legislation should contain as a minimum the following definitions:

1. "Air pollution": This term should be defined broadly enough to include factors in addition to those affecting health only.
2. "Air pollution control agency": This term should be defined in substantially the same way as it appears in the Federal Clean Air Act, Public Law 88-206, section 9.
3. "State air pollution agency": The State agency designated by this act to direct the State air pollution control program. The advisory committee recommends that the State agency be the State board of health.
4. "Municipality": Any city, village, borough, county, or town having village powers pursuant to Minnesota statutes section 368.01.
5. "Standards": This term should be defined to mean rules of the State agency which establish minimum levels of air pollution applicable to sources of pollutants and to the atmosphere, i.e., emission standards and ambient air quality standards.
6. "Rules and regulations": This term should be defined to include all other rules of the State and local agencies other than standards.
7. Various technical definitions (to be supplied later). (Dr. Ling will provide the writer of the bill any technical definitions needed.)

C. Authorization for municipalities to conduct air pollution control programs

1. Every municipality should be authorized to conduct air pollution control programs consisting of the following elements:
 - (a) Prevention and control of air pollution.
 - (b) Abatement of air pollution nuisances.
 - (c) Establishment of air pollution control agencies.
 - (d) Research and fact finding studies in air pollution.
 - (e) Inspection and enforcement to insure compliance with air pollution standards, rules, and regulations.
2. Municipalities should be authorized to enter into cooperative agreements with other units for regional air pollution control programs pursuant to the Joint Powers Act, Minnesota Statutes section 471.59.
3. Existing air pollution control programs in municipalities should not be affected by this act except where inconsistent with provisions relating to authority of State air pollution control agency.
4. Municipalities should be authorized to finance air pollution control programs by—
 - (a) General taxation.
 - (b) Issuance of general obligation bonds for necessary capital acquisitions.
 - (c) Imposition of permit fees and inspection fees for the installation of air pollution control devices.
 - (d) Taxation outside mill limitations and indebtedness limitations.

In addition municipalities should be given clear authority to accept State and Federal aid for these programs.

5. Local air pollution control agencies should be given authority to adopt air pollution rules and regulations including emission and air quality standards in the absence of State rules, regulations and standards, and where State rules, regulations and standards exist, to adopt rules, regulations and standards more restrictive than those of the State to fit the local need.
6. Municipalities shall be required to consult with the responsible State agency with regard to technical assistance before developing air quality and emission standards.
7. Local planning agencies should be required to consult with the State agency and any existing local air pollution control agency for recommendations as to factors affecting the location of air pollution sources in the area of the planning agency's jurisdiction.

D. The State agency—Its powers and duties

The State's activity in the field of air pollution control should be centered in an existing State agency, the State board of health. This agency should be given the following duties and responsibilities:

1. Development of air pollution standards: The State agency should have the authority to adopt minimum statewide standards governing the air quality. Standards for emission may be established to attain the air quality standards designated and may vary from area to area to fit local conditions. These stand-

ards should be based on technically substantiated criteria and commonly accepted practice. The standards would be adopted by rule of the agency after hearing and notice, and would be statewide in application but would not preclude the adoption of more restrictive standards by any local air pollution control agency.

2. Research and technical assistance: The State agency should be responsible for conducting the research necessary for an adequate air pollution control program. The agency should be empowered to conduct this research in cooperation with local air pollution control agencies where requested. The agency should be staffed to enable it to provide technical assistance to local agencies in conducting programs.

3. Regulatory activity: The agency should be empowered to enforce air pollution rules and regulations in those situations:

- (a) Where no local regulation has been undertaken;
- (b) Where local regulations have not been enforced; or
- (c) Where conflicts between local jurisdictions have substantially impeded adequate regulation.

State action in the enforcement field should be undertaken only after a formal determination by the agency that one of the three above-mentioned conditions exist. The agency should be directed to use all available means of persuasion, conciliation, and informal contact to achieve compliance before resorting to enforcement procedures.

4. The agency should be charged with the responsibility of stimulating and encouraging local and regional activity in the air pollution control field.

5. The agency should be given the responsibility of administering any program of State financial assistance to local air pollution control agencies.

6. Advisory committees. The agency should be required to appoint an advisory committee broadly representative of all sections of the State's government and economy. The agency should be required to consult with this committee on all matters affecting air pollution including the establishing of standards, the conduct of research, and the enforcement of standards, rules, and regulations.

7. The agency should be given a substantial appropriation by the legislature in order to carry out these responsibilities effectively.

8. Tax exemption. The advisory committee recommends that the legislature give due consideration to the allowance of tax exemption or for an accelerated depreciation schedule to be applied to the cost of the installation of air pollution equipment.

ATTACHMENT E

AN EVALUATION OF THE AIR POLLUTION ASPECTS OF THE PROPOSED STEAM-ELECTRIC PLANT AT OAK PARK, MINN.

(Technical Assistance Branch, U.S. Public Health Service, December 1954)

SUMMARY AND CONCLUSIONS

The installation and operation of the 550,000-kilowatt steam-electric plant at Oak Park, Minn., will generate large quantities of air pollutants, principally sulfur oxides, nitrogen oxides, and particulate matter. The particulate emissions will be controlled by an electrostatic precipitator with a design efficiency of 99 percent. Thus the minimum particulate emission will about 0.56 ton per 24-hour day. It can be expected that this emission will be somewhat higher in actual operation.

A 785-foot stack will be installed to permit dispersion and dilution of gaseous pollutants. Calculations indicate that ground level concentrations of sulfur dioxide will probably not cause acute damage to vegetation. However, existing information is inadequate to predict with assurance whether long-term chronic effects will be experienced by long-lived vegetation such as trees. It is expected that the human perception threshold for SO_2 will be exceeded occasionally within a mile of the plant.

The installation and operation of a second unit of 750,000-kilowatt capacity will more than double air pollution emissions. It can be expected that some damage to sensitive vegetation could occur. It can also be expected that SO_2 ground concentrations will exceed the threshold perception limits more often than with only the 550,000-kilowatt unit in operation; however, this condition will still be experienced rather infrequently.

If the 550,000-kilowatt unit is built and operated, a SO₂ monitoring network should be activated. This will assist in determining the effects of SO₂ on the surrounding vegetation and people, as well as provide guides for future installation design.

Prevailing winds in this area are such that air pollutants will often be carried into Wisconsin. Therefore, officials of that State should take part in air pollution activities connected with the proposed plant.

Plans and studies should be started now to obviate future air pollution problems indicated by plans for expansion of this plant beyond the initial 550,000-kilowatt capacity.

Senator NELSON. Are there any other witnesses from Minnesota?

(There was no response.)

Senator NELSON. I will call upon the attorney general's office from the State of Wisconsin to submit their statement.

Will you state your name for the record?

STATEMENT OF WARREN M. SCHMIDT, MADISON, WIS., ASSISTANT ATTORNEY GENERAL OF WISCONSIN

Mr. SCHMIDT. Warren M. Schmidt. I am assistant attorney general for the State of Wisconsin.

The members of the subcommittee requested a summary of the regulatory statutes of the State of Wisconsin. This summary was prepared by Mr. Roy Tulane from our office. I would request that this be admitted into the record.

Senator NELSON. I note that the summary is a summary of the statutes with some citations, some court cases. We will accept the statements submitted in behalf of the attorney general of the State of Wisconsin, and will incorporate it as part of the record.

If, in looking at the statutes, the committee wishes to ask some questions for interpretation, which may not be clear, I take it the attorney general's office will be prepared to respond in writing to the committee?

Mr. SCHMIDT. Yes. It would be given the highest priority.

I would ask that the addenda portions also be included.

Senator NELSON. That will also be included.

(There follows material submitted by Mr. Schmidt.)

STATEMENT ON BEHALF OF THE STATE OF WISCONSIN PREPARED BY ROY G. TULANE, ASSISTANT ATTORNEY GENERAL OF WISCONSIN

Memorandum in re proposed Northern States Power Co. steam-electric plant on the St. Croix River near Bayport, Minn.

The powers of the State Conservation Commission of Wisconsin are set forth in section 23.09 (1) which reads:

"Purposes.—The purpose of this section is to provide an adequate and flexible system for the protection, development and use of forests, fish and game, lakes, streams, plant life, flowers, and other outdoor resources in the State of Wisconsin."

The validity of this delegated power to the conservation commission is upheld in *State v. Olson*, (1940) 235 Wis. 473, 293 N.W. 262.

The State board of health is established by section 140.01 of the statutes. In addition to the extensive powers conferred upon it by section 140.05 of the statutes, its specific powers in regard to waters of the State are set forth in section 144.01.

"Definitions.—The following terms as used in sections 144.01 to 144.12 mean:

"(1) 'Waters of the State' including those portions of Lake Michigan and Lake Superior bordering upon Wisconsin, and all lakes, bays, rivers, streams, springs, ponds, wells, and bodies of surface or ground water, natural or artificial within the State or its jurisdiction.

Certain powers of the board of health in regard to waters are set out in section 144.03 which reads:

"Power of State board of health.—(1) The State board of health shall have general supervision and control over the waters of the State, drainage, water supply, water systems, sewage and refuse disposal, and the sanitary condition of streets, alleys, outhouses, and cesspools, insofar as their sanitary and physical condition affects health or comfort."

The said powers of the State board of health are exercised jointly with the committee on water pollution established by section 144.52(1) which reads:

"Water pollution.—(1) Committee: The committee on water pollution shall consist of the commissioner of administration or his representative, a member or other representative of the public service commission designated by the commission, a conservation commissioner or an employee designated by the conservation commission, the State health officer, or a member of the board of health, designated by the board, and the State sanitary engineer, or other engineer appointed by the State board of health."

And extensive powers and duties are established by section 144.53 of the statutes. The attorney general of Wisconsin has ruled that under its powers, particularly sections 144.53 (4) and (5), (1951) 40 Op. Atty. Gen. p. 43 that the committee on water pollution had power to issue general and special orders to regulate pollution of interstate waters by Wisconsin polluters. The committee on water pollution has engaged in conferences with its Minnesota counterparts to regulate pollution of interstate waters, particularly at the St. Louis River as it flows between Duluth and Superior.

The State Public Service Commission of Wisconsin created by section 195.01(1) Stats., is given extensive powers over navigable waters and navigation by ch. 30 Stats., and is given similar power over regulation of dams and bridges, and by section 31.02 is given its power to regulate the level and flow of all navigable waters in the State.

In the case of *Georgia v. Tennessee Copper Company*, (1907) 206 U.S. 230, the State of Georgia was allowed to bring an original action in the U.S. Supreme Court, in its capacity as sovereign and as *parens patriae*, against a company located in Tennessee to halt air pollution which affected the people of Georgia. Under this case and other cases defining the role of the sovereign State to act on the behalf of its people to halt injurious effects arising in another State, it would appear that the State of Wisconsin, at least, acting on the basis of an investigation by its various State agencies would have power to bring an action to halt any injurious activities taking place in Minnesota.

ADDENDA

Jurisdiction of the State of Wisconsin, Wisconsin Constitution Article IX

"EMINENT DOMAIN AND PROPERTY OF THE STATE"

"Jurisdiction on rivers and lakes; navigable waters: Section 1. The state shall have concurrent jurisdiction on all rivers and lakes bordering on this state so far as such rivers or lakes shall form a common boundary to the state and any other state or territory now or hereafter to be formed, and bounded by the same; and the river Mississippi and the navigable waters leading into the Mississippi and St. Lawrence, and the carrying places between the same, shall be common highways and forever free, as well to the inhabitants of the state as to the citizens of the United States, without any tax, impost or duty therefor."

State boundaries, Wisconsin constitution, article II

"State boundary: Section 1. It is hereby ordained and declared that the state of Wisconsin doth consent and accept of the boundaries prescribed in the act of congress entitled 'An act to enable the people of Wisconsin territory to form a constitution and state government, and for the admission of such state into the Union,' approved August sixth, one thousand eight hundred and forty-six, to wit: Beginning at the northeast corner of the state of Illinois—that is to say, at a point in the center of Lake Michigan where the line of forty-two degrees and thirty minutes of north latitude crosses the same; thence running with the boundary line of the state of Michigan, through Lake Michigan, Green Bay, to the mouth of the Menominee river; thence up the channel of said river to

the Brule river; thence up said last-mentioned river to Lake Brule; thence along the southern shore of Lake Brule in a direct line to the center of the channel between Middle and South Islands, in the Lake of the Desert; thence in a direct line to the head waters of the Montreal water, as marked upon the survey made by Captain Cramm; thence down the main channel of the Montreal river to the middle of Lake Superior; thence through the center of Lake Superior to the mouth of the St. Louis river; thence up the main channel of said river to the first rapids in the same, above the Indian village, according to Nichollet's map; thence due south to the main branch of the river St. Croix; thence down the main channel of said river to the Mississippi; thence down the center of the main channel of that river to the northwest corner of the state of Illinois; thence due east with the northern boundary of the state of Illinois to the place of beginning, as established by 'An act to enable the people of the Illinois territory to form a constitution and state government, and for the admission of such state into the Union on an equal footing with the original states,' approved April 18th, 1818."

"Enabling act accepted: Section 2. * * * The propositions contained in the act of congress are hereby accepted, ratified and confirmed, and shall remain irrevocable without the consent of the United States; * * *"

Powers of the Governor to protect the rights, interests or property of the State (Wis. Stats., 1963)

"14.12 State property; legal protection of: The governor, whenever in his opinion the rights, interests or property of the state have been or are liable to be injuriously affected, may require the attorney-general to institute and prosecute any proper action or proceeding for the redress or prevention thereof; and whenever he receives notice of any action or proceeding between other parties by which the rights, interests or property of the state are liable to be injuriously affected, he shall inform the attorney-general thereof and require him to take such steps as may be necessary to protect such rights, interests, or property."

Senator NELSON. Will you thank the attorney general for having sent you with this material.

Mr. SCHMIDT. I will, yes, sir. (Witness excused.)

Senator NELSON. I will now call on Prof. William Lord of the University of Wisconsin. Professor Lord is chairman of the Joint State-Federal Task Force on the St. Croix River and a distinguished professor at our university.

Professor Lord.

STATEMENT OF PROF. WILLIAM LORD, CHAIRMAN, JOINT STATE-FEDERAL TASK FORCE ON THE ST. CROIX RIVER

Professor LORD. Thank you very much, Mr. Chairman.

I am here at the request of Governor Reynolds of Wisconsin as chairman of the task force. Governor Reynolds has followed the controversy over the proposed Allen S. King plant with interest and with concern over the likely effects of this plant, if constructed, on the people of Wisconsin.

The Governor is impressed by the need for all available pertinent information to be brought to bear to establish the extent of any of these effects in Wisconsin, or for that matter, in Minnesota, and to contribute to making the eventual decision wholly consistent with the public interest. Consequently, Governor Reynolds has asked the State agencies in both States, together with the Federal agencies with responsibilities and competence in the areas of concern, to work together in assembling relevant information and making it available.

This group, the joint task force, consists of the conservation departments of both the States of Wisconsin and Minnesota, the water pol-

lution control agencies of both States, the Wisconsin Department of Resource Development, the Wisconsin Office of the Attorney General, the U.S. Federal Power Commission, the U.S. Army Corps of Engineers, the U.S. Coast Guard, the U.S. Public Health Service, the U.S. Department of Agriculture, and the U.S. Department of the Interior, including bureaus and agencies within the larger agencies above mentioned. I should add, perhaps, more agencies, either on a State or Federal level, will be added in the near future.

The assignment of the task force is to assemble and summarize available information and to draw the implications of this information for the Northern States Power Co.'s proposal, but not to make recommendations about proposed developments.

Senator NELSON. When does the task force expect to complete whatever it is doing?

Professor LORD. Sir, we expect to complete our report and make it available during the month of February.

Senator NELSON. When you say "summarize," do you mean stating what the law is; what the authorities of the agencies are—that sort of thing?

Professor LORD. I will cover it in just a second, just exactly how we conceived this.

In other words, though, our assignment is to eliminate or reduce, insofar as possible, those points of conflict which are over matters of fact while leaving to the appropriate regulatory body those points of conflict which are over matters of value.

The task force held its initial meeting yesterday, and divided into subcommittees or work groups to study the subject areas. These areas are: First, water quality, covering the effects of the proposed developments on the physical and chemical conditions in the St. Croix River, and the implications of such effects on fish, wildlife, and aquatic plants. This also includes the nature and cost of any modifications of the proposed plant which might reduce any possible deleterious effects which are revealed.

Senator NELSON. What was the last statement about costs?

Professor LORD. To determine whether, in effect, any deleterious effects of the proposed plant on fish, wildlife, or aquatic resources exist then, if any modifications can be made in the proposed installations, to reduce these effects and, if so, how much they will cost.

Senator NELSON. What basis to you have for making an evaluation on cost valuation? Do you have any help from experts of Northern States or fields of this area?

Professor LORD. We have been asked and have been very fortunate in attaining cooperation of the company in this matter, Senator. We also have people with competence in this field from the Federal agencies.

Senator NELSON. I was interrupted momentarily when you were saying something. Does this task force contemplate inquiring into cost factors that might be involved in the plant being in a different location?

Professor LORD. Yes, yes, sir; I will get to that in a minute. We do contemplate doing this.

Senator NELSON. If I will just stop asking questions, we will get it all? [Laughter.]

Professor LORD. The second committee deals with recreation and navigation. It covers the facilities in barge traffic required to supply coal to the proposed development and the effects of such facilities and traffic on the recreational use of the river. This also includes the nature and costs of any improvements to navigation which might be required to make this traffic possible.

The third subcommittee or work group deals with air pollution and covers the effects of stack acids and any associated or particular matter on human, plant, or animal communities, together with the nature and costs of measures appropriate to eliminate or reduce such effect, if any.

The fourth subcommittee or work group deals with fuel and power and covers the electric power needs of the Twin Cities area, together with alternative sources and methods of meeting such needs and the competitive costs of resorting to such alternatives.

The fifth subcommittee or work group, and the last one, deals with the economic impacts of the proposed developments. It covers the extent and incidence of any increases in employment, tax base, and associated economic activities attributable to the proposed development.

We anticipate that the reports of the several subcommittees will be assembled and made available to all interested parties during the month of February 1965.

As chairman, I would like to acknowledge the splendid cooperativeness in our first task force meeting by virtually all the agencies involved and by the Northern States Power Co.

I hope our findings will be of value to the meeting, to the regulatory agencies, and to the general public.

I wish to thank the committee for making it possible for me to give my testimony.

Senator NELSON. On what date do you expect to have this report?

Professor LORD. Senator, we have asked the individual subcommittees to report to the overall committee by the 10th of February. We will then assemble these with brief introductory and summary material and make it available by the end of the month of February.

Senator NELSON. It is my understanding that the hearing will be on January 13 before the Conservation Commission and the Water Pollution Control Commission of Minnesota. I don't know whether I understand correctly that they are required to make a decision within 60 days. Can anybody answer that here?

Mr. THUET. I am Paul Thuet, representing the Save the St. Croix, Inc.

It was agreed—at least a general understanding was reached—that if there were any reports after the testimony on the 13th and 14th of January, any reports that would be made available would be incorporated into the record.

Senator NELSON. My question is of the Minnesotan people who can speak as to the law on whether or not there is a 60-day deadline on making a decision after hearing.

Mr. VAUBEL. Yes, sir.

Senator NELSON. Will you identify yourself, sir?

Mr. VAUBEL. Lawrence Vaubel, special assistant attorney general of the State of Minnesota.

The commissioner of conservation is required by chapter 105 that has been submitted to the subcommittee to make his findings, conclusions, and orders within 60 days following the conclusion of his public hearing.

Senator NELSON. It would seem to me the task force report, though it may be very valuable, will not be of much value if it isn't available.

When do you think, February?

Professor LORD. By the end of February.

Senator NELSON. By the end of February, which might give the commission 2 or 3 days to look at it, in which time—I am just wondering, has your task force group considered or will you be considering requesting that they set a little later date on the hearing in Minnesota so they will have the benefit of the information that your group has compiled?

Professor LORD. We have made no such request, Senator. Our function, as we interpret it, is strictly information gathering. I think that would be up to the Minnesota agency if they wished to delay the hearing a short time so our findings could be incorporated into the procedures, that would be up to them.

Senator NELSON. It would seem to me that some of the factors in the findings by your task force will be the only facts of that kind available for consideration and might very well be of compelling value in making the decision.

I am wondering if I might ask the representative of Minnesota, the deputy attorney general, whether or not there is any chance the hearings might be set at a somewhat later date.

Mr. VAUBEL. Regardless of the day the hearing is set, the commissioner of conservation may recess this hearing from time to time if he finds that further information is necessary or may be available.

Senator NELSON. So he could conduct the hearing and not conclude it on the 13th, but recess it to await the submission of further materials?

Mr. VAUBEL. That is right.

Senator NELSON. I would assume, then, that the joint State-Federal task force would be the appropriate group to request the agency to hold the hearing record open until they can present their material?

Mr. VAUBEL. Yes, indeed. The commissioner solicits any such recommendations from any agency that may wish to be heard or may be conducting any study that would provide help to the commissioner in reaching his final decision.

Senator NELSON. I assume the joint task force may request it of the commissioner?

Mr. VAUBEL. Yes, they may.

Senator NELSON. Thank you.

Was that the conclusion of your speech?

Professor LORD. That concludes my prepared remarks.

Senator NELSON. I have no questions.

Senator METCALF. I have no questions.

Senator NELSON. Thank you very much, Professor Lord.

Professor LORD. Yes, sir.

Senator NELSON. Does that conclude the witnesses representing governmental units?

(There was no response.)

Senator NELSON. As I stated earlier to Judge McDonough, if you have a question of the Government witnesses, if you would submit it in writing, we will see to it that they get the question. If you want to cross-examine the Government witness, I would ask you to do it outside. I am sure that they will respond to any questions you might have. If you will get them to Mr. Spring or one of the staff members here, we will be happy to get them distributed.

We will recess until 1:30.

(Whereupon, at 12:20 p.m., the hearing was recessed, to reconvene at 1:30 p.m., the same day.)

AFTERNOON SESSION

Senator NELSON. The subcommittee will resume its hearing.

I understand that Judge John T. McDonough, of Stillwater, the Washington County probate juvenile judge, will be in charge of the presentation.

Judge McDonough.

STATEMENT OF JUDGE JOHN T. McDONOUGH, STILLWATER, MINN.

Judge McDONOUGH. Senator Nelson, Senator Metcalf, members of the staff of the subcommittee, the Senate Public Works Committee, we have listened to the testimony this morning with great interest, and during the period of time that this controversy or this issue has been raised, it has been the position of the committee which I represent, the Committee of Organizations of the St. Croix Valley for Progress, in the St. Croix Valley, that determines as to water pollution and air pollution cannot be determined in debates in open halls, it cannot be determined in hearings such as this. They have to be determined by duly constituted quasi-judicial administrative quasis established under the laws of the State of Minnesota. It has been our position all along that the laws of the State of Minnesota actually will not only protect the interests of the people of the State of Minnesota but the people of the State of Wisconsin. It has been our position, and many of us are lifelong residents of this valley for two, three, five generations, that we know this river, that we would not permit the river to be polluted to the detriment of wild life, to the detriment of the recreational facilities that we do have within the river, stretching not only from Prescott but up to Taylors Falls and into the wild regions north of the Taylors Falls Dam. However, this has become an issue which seems to be subjected to debate outside of the duly regulatory bodies that have been established by law in the State of Minnesota, and, as such, we are appearing on behalf of the committee of organizations.

Now, this afternoon we will have four speakers. The first really needs no introduction throughout the country as far as being a conservationist is concerned, as far as being a man who is cognizant and knowledgeable in the field of water pollution, in the field of water conservation, and in the field of conservation itself. He is not a young man. He is at least 70 years old. He has been in this field for many, many years. I am certain that he will qualify himself before you and in many respects he is not appearing as a proponent either for or against this plant. He is one of the charter members of the

St. Croix River Association, which is one of the organizations which has attempted to maintain the St. Croix as a type of river you gentlemen have seen this past 2 days. He has been a lifelong resident, his father and grandfather before him, of this valley, and I am quite certain his statement, as lengthy and thorough as it is, will be of great interest not only to you but the people in this audience.

It gives me great pleasure to introduce to this committee my very good friend, my very qualified friend, Mr. Chester Wilson, former conservation commissioner of the State of Minnesota and an attorney practicing in the State of Minnesota, as an independent witness. Mr. Wilson.

Senator NELSON. Mr. Wilson, the committee is pleased to have an opportunity to hear your presentation.

STATEMENT OF CHESTER S. WILSON, STILLWATER, MINN.

Mr. WILSON. Mr. Chairman and members of the committee, I appreciate the courtesy of the proponents of this project in yielding to me some of their time, for I wish to make it clear, as Judge McDonough has already indicated, that I do not appear at this hearing either for or against the Northern States Power Co.'s powerplant project, nor as the representative of any special interest or organization. I am speaking entirely on my own responsibility as a private citizen, in the interest of the general public. In that regard I attempted to follow what is commonly known as the "golden rule" for conservation and management of natural resources; that is, the achievement of the greatest good to the greatest number of people in the long run.

My position on this project, at present, is the same as that taken by the St. Croix River Association, composed of members from all the communities along the river in both Wisconsin and Minnesota from St. Croix Falls and Taylors Falls to the mouth. I have been a member of that organization for a long time, and have taken an active part in its efforts to protect and improve the river for navigation, recreation, and other purposes of public interest. Acting upon my advice, this association has refused, thus far, to take a stand for or against the powerplant project and, instead, adopted a resolution requesting the Governors of Wisconsin and Minnesota to see that a thorough investigation of the project was made by the appropriate public agencies and, in the meantime, the association is reserving judgment on the project until the results of those investigations are made known.

As a basis for my comments on the problems at hand, I will give a summary of my background and qualifications, as should be done by any witness who assumes to testify or express an opinion in a case like this.

I was born in Stillwater on the St. Croix River and have spent most of my life here except for temporary absences in military or public service. I am now actively engaged in the general practice of law in Stillwater, specializing in land and water cases.

I have made much use of the St. Croix River for recreational purposes during the past 70 years, beginning with the time when, as a boy, I swam in the river off the log and lumber rafts which then occupied a large part of its surface and, continuing through subsequent years,

with canoeing, boating, fishing, camping, and related activities. For some years, beginning in 1911, I was a scoutmaster, and made much use of the river for these purposes with the boys of my troop.

In view of the special interest of this committee in water pollution, I may say that for several years, after I was appointed an assistant attorney general of Minnesota in 1925, I served (among other assignments) as legal counsel to the State board of health in the administration of its regulations relating to water pollution, long before the passage of our present Water Pollution Act. I continued to counsel the board on legal matters, as far as my other duties would permit, after I was appointed deputy attorney general in 1939.

For 12 years, beginning in 1943, I served as commissioner and sole head of the State department of conservation, having charge of administration of the State's water resources and water conservation laws, State lands and minerals (including iron mines), State forests, State parks, and game and fish, and serving ex officio as a member of the State soil conservation committee, also as a member of the State water pollution control commission after its creation. I cooperated with the State board of health and other interested State departments in securing the enactment of the original State Water Pollution Control Act in 1945, and served as chairman of the water pollution control commission thereby created for the first 7 years of its existence. During that period, I was called to Washington by the U.S. Public Health Service to serve on the Board of Consultants, representing different State water pollution control agencies, who assisted in framing the model State Water Pollution Control Act which was published and distributed by the Public Health Service in 1950, with the endorsement of the Council of State Governments. This manifested a recognition by the Public Health Service of the merits of the Minnesota Water Pollution Control Act and the progress which our commission had made thereunder.

In 1956, after the end of my service as commissioner of conservation, I was retained by the U.S. Public Health Service as special consultant on water pollution control matters and am still on their staff in that capacity, subject to call when needed, though not continuously engaged.

In that connection, I served as chairman of the hearing board for the first case of application of the Federal Water Pollution Control Act on interstate waters in Arkansas and Louisiana in 1957 and, again in the same capacity, for hearings on pollution of the Missouri River at Sioux City, Iowa, in 1959, and at Kansas City, Kans., and Missouri, in 1960.

I made a study of the water pollution control laws of the various States for the U.S. Public Health Service and presented the results through a paper on "Legal Aspects of Water Pollution Control," delivered at the National Conference on Water Pollution called by President Eisenhower at Washington in December 1960.

In 1961, at the request of the U.S. Public Health Service, I prepared and delivered a paper on legal problems of ground water contamination at the national conference on ground water pollution held at Cincinnati, Ohio.

In 1961, I served as consultant on water pollution control provisions in connection with the drafting of a complete code of water laws for the new State of Alaska.

In 1962, I served as special consultant to the Minnesota State Water Resources Board in preparing a report for the 1963 legislature on revision of State water laws.

For several years, up to February 1964, I served on a part-time basis as special assistant attorney general and legal counsel for the State water pollution control commission. Besides handling the general legal work for the commission, I conducted the presentation of the testimony in its behalf at the hearings held on the classification and standards for the Mississippi River in 1962; worked with the technical staff in drafting the classifications and standards which were adopted by the commission; and assisted in preparing the preliminary draft for a long-range water pollution control plan and program to be presented by the commission at the 1965 session of the legislature.

In my capacity as general legal counsel for the commission, I served as one of the conferees, together with the chairman and executive engineer, at the hearing on pollution of the Mississippi River held by the U.S. Public Health Service at St. Paul, Minn., in February 1964.

My service as general counsel for the commission ended shortly thereafter but I am still serving, under a special assignment from the attorney general, as attorney for the commission in an appeal to the courts taken by the north suburban sanitary sewer district from the Mississippi River classifications and standards adopted by the commission. However, I am not, in any sense, speaking for the commission here but only for myself, as I have said before.

While serving on the bill-drafting staff of the State revisor of statutes, during the 1963 session of the legislature, I drew the bulk of the provisions embraced in the so-called Rosenmeier Act enacted at that session, amending and strengthening the original Water Pollution Control Act and adding some far-reaching new provisions. With the combination of the provisions of the old act, and the Rosenmeier Act, Minnesota now has a set of State water pollution control laws which have few, if any, equals in effectiveness anywhere in the country.

I have also drawn numerous other bills for water pollution control measures, including the act providing for creation of local sanitary districts adopted by the 1961 legislature and a bill for creation of an enlarged special sanitary district for the Twin Cities metropolitan area, which has not yet been acted upon by the legislature.

Bearing on recreational interests which may come within the scope of this hearing, I may say that I served as one of the citizen members, appointed by President Eisenhower and reappointed by President Kennedy, on the Outdoor Recreation Resources Review Commission which was created by act of Congress in 1958 and made its report to the President and Congress in January 1962. As will be seen from that report, we were much concerned with the damaging effect of pollution on the recreational use of waters, and made strong recommendations for pollution control.

I am also a member of the Stillwater City Park Commission, which is directly concerned with the use of the St. Croix River as a great recreational asset of the community. Incidentally, the city of Stillwater, in addition to a fine waterfront park on the Minnesota side of the river, has a large park across the river on the Wisconsin side, including a bathing beach.

It is important at the outset to consider the nature of the waters with which this hearing is concerned, consisting of the widening of the St. Croix River known as Lake St. Croix, which extend for about 25 miles from Stillwater to the mouth. This is a beautiful body of water, bordered for the most part by sloping, wooded bluffs of medium height, but with no high rock cliffs or other unusual features such as are found at The Dalles near St. Croix Falls and Taylors Falls, about 30 miles above Stillwater.

The entire structure of the river from St. Croix Falls to the mouth was navigable for flat-bottomed steamboats in the early days. The lake below Stillwater is now on the 9-foot navigation channel connecting with the Mississippi River. The head of the slack water navigation pool from the Red Wing Dam extends for a few miles above Stillwater, and above that there is a navigable channel of variable depth up to the falls subject to numerous obstructions at low water.

During the logging era the entire St. Croix River above Stillwater and all its tributaries that were large enough were used for driving pine logs cut in the surrounding territory down to the boom above Stillwater. There the logs were sorted among the respective owners and made into rafts in the lake below for delivery to sawmills located along the lake on both sides or to mills at lower points on the Mississippi River. The first sawmill on the St. Croix was completed at Marine, about 12 miles above Stillwater, in 1839. There was also an early mill at Arcola between Marine and Stillwater. Beginning with the first sawmill at Stillwater in 1884, many more mills were built during the logging era along the upper part of the lake, so that by 1890 there was a string of several mills extending over a space of about 7 miles on the Minnesota side from Stillwater down to Lakeland, opposite Hudson. On the Wisconsin side there were mills across the river from Stillwater and at Hudson.

In those days the lake was so full of rafts of logs and lumber and the channel was so occupied by large and small steamboats pushing rafts to their destinations that there was little room left for recreation.

At that time little use was made of the river for that purpose except by adventurous boys, a few fishermen, and occasional steamboat excursions. Extensive recreational use of the river for the purposes now common did not begin until after the last log drive came down in 1914 and the bed was cleared of sunken logs and snags in the ensuing years. Since then recreational use of the river has steadily increased until now it is heavily used for boating, canoeing, fishing, swimming, and related purposes.

There is also substantial commercial fishing on Lake St. Croix for rough fish.

Lake St. Croix up to Stillwater was included in the 9-foot navigation channel, connecting with the Mississippi River, through completion of the dam at Red Wing in 1938. Along with many others, I took an active part in this program as an emissary of the upper Mississippi and St. Croix River Improvement Commission created by the Minnesota Legislature. The public sentiment in favor of the project in both States was practically unanimous, except for the railroads. The avowed objective was to encourage the development of commercial navigation up to Stillwater on the St. Croix, also serving other communities below on both sides, and to stimulate the development of in-

dustries which would benefit from that navigation. The latter aim was expressed on the part of the Wisconsin people through a large sign erected at the east end of the Stillwater Bridge, proclaiming that St. Croix County welcomes industry.

I do not have the figures for the amount of Federal money that has been spent on construction and maintenance on the Red Wing Dam and the improvement and maintenance of the 9-foot channel up to Stillwater, but it undoubtedly totals many millions of dollars. The use of the channel for commercial navigation on the St. Croix thus far has been limited principally to the transportation of coal and phosphate for fertilizer to the barge terminal at Stillwater, averaging about 20 tows per year for the past 5 years, or less than one tow per week for the navigation season. This has demonstrated the usefulness of the channel, holding out hope for future expansion of the enterprise, but so far it has not yielded very high dividends on the Federal investment. Barge transportation for the benefit of local industry has been limited to coal for the Minnesota State Prison at Bayport. No new industries have yet been developed along the St. Croix as the result of the 9-foot channel. The pending Northern States Power Co. project is the first prospect in that direction.

On the other hand, recreational use of both the St. Croix and the Mississippi within the stretch of the pool of the Red Wing Dam has gained immense benefits from the 9-foot channel project, both as a result of a large expansion of the water surface available for recreational purposes outside of the navigation channel and the maintenance of a stabilized water level throughout the open season. The benefits of the stabilized pool level have been especially great on the St. Croix, where the river fluctuated through a wide range in a state of nature. At times the water would get so low at Stillwater that a man could wade most of the way across. The uniform pool level maintained since the dam was constructed has been a great boon, both for recreational use of the river and for enhancement of shoreline property values all the way up to the head of the pool above Stillwater.

The principal assets of Lake St. Croix today consists of its scenic beauty and its great potential for both commercial and recreational navigation and related uses, as well as for lakeshore residential development. The St. Croix also has substantial potential for water supply, which is not now being used but may have to be used at no distant date to augment the supply from the Mississippi River for the fast-growing population of the Twin City metropolitan area, since the total water consumption from the Mississippi by that area is already approaching the low flow of the river.

There has been some confusion in connection with the publicity relating to the Northern States Power Co., project because of the wild river study which has recently been made of the St. Croix by the U.S. Department of the Interior, along with other rivers, pursuant to recommendations of the Outdoor Recreation Resources Review Commission. That study is limited to the river above the falls. Settlement and development along the banks of the river below the falls began in the early days before the Civil War, and has proceeded so far on both sides of the river that there is not now the remotest possibility that that section of the river or any considerable part of it could ever be restored to a state of nature so as to meet the standards for wild rivers contemplated by the Outdoor Recreation Resources Review

Commission and the Department of the Interior. The fact is that the entire St. Croix Valley was logged off during the era before mentioned. Much of it is occupied by farms together with many small cities or villages scattered throughout the valley. There is nothing like a virgin wilderness of any substantial size anywhere in the valley. However, the river banks above the falls are comparatively free from artificial developments, are lined by second growth timber as well as by occasional stands of old pine trees that were skipped by the loggers, so that part of the river can now undoubtedly meet the requirements for wild river status. It is to be hoped that it will be finally approved and established as such, but that has nothing to do with the problems here at hand relating to Lake St. Croix.

In order to support the future increased population of the Twin City metropolitan area, including Washington County along Lake St. Croix, it will ultimately be necessary to use all the assets of the St. Croix River and Lake above mentioned to the limit of their potential. Necessarily there will be some conflict between recreational use of the river and use for commercial navigation, industrial development, or water supply. Here as elsewhere such conflicts must be resolved by proper planning and regulation, with due regard for all interests affected in both the adjoining States, including recreational interests. The fears that recreational uses of the St. Croix would suffer serious impairment from commercial river transportation or the development of industry along the lake or river have been greatly exaggerated.

A substantial increase of barge transportation on Lake St. Croix, even to the extent of many times the present volume, would be a highly desirable fulfillment of the hopes entertained when the 9-foot channel was constructed, and would pay substantial dividends on the Federal investment in the project through the resulting benefits to the economy and prosperity of the adjacent region in both Wisconsin and Minnesota.

There is no possibility that commercial transportation on the St. Croix will increase enough to curtail materially the use of the lake for pleasure boating or other recreational purposes. The effect on recreational use of the lake of the limited amount of barge transportation required to serve the proposed Northern States Power plant would be negligible.

A modern towboat pushing its barges slowly along the main channel of the lake creates no disturbance or hazard to use of the river for recreational purposes which is at all comparable to what is caused by a single powerboat towing a water skier on a zigzag course around the lake. What is most needed to make the lake safe and enjoyable for general recreational use by the public is strict regulation of abuses by high-powered speedboats, not curtailment of commercial navigation. There is also need for much more public access to the lake.

As for the development of industry, the proposed Northern States Power plant itself (aside from problems of water and air pollution, to be discussed later) would have no direct physical effect on the use of the lake for recreation or any other purposes. It is true that the aesthetic sensibilities of some people might be offended by the appearance of the plant. In contrast, the plant might be quite interesting to other people. At any rate, the view of the plant would be limited to

a short section of the lake, most of which would be out of sight of the plant.

There is little or no ground for any fears that future industrial development will occupy so much of the shores of Lake St. Croix as to interfere materially either with the use of the lake for recreation or with residential property development. Such industrial development will, of course, be controlled by zoning, either under local ordinances already in force or under comprehensive regional plans which are already well underway. Furthermore, there are practical limitations which would restrict the location of industry on the lake to points which are suitable for barge docks and also reasonably accessible by railroads or highways. There are only a few limited areas on the lake which would meet those conditions; mostly at places already used or useful for industrial purposes in the existing cities or villages. There is little probability that much, if any, of the lakeshore which is suitable either for private residential development or public recreational use will be occupied by industry.

The proposed site of the Northern States Power plant is in the middle of a stretch of the lake shore between Stillwater and Bayport that has been used for industrial or other utilitarian purposes since long before anyone now living can remember and is now used for such purposes, including the Stillwater barge terminal, a large marina, and the Stillwater sewage treatment plant immediately north of the proposed site, and the large Andersen Corp. window frame plant on the south. The proposed powerplant site is not suitable nor likely to be wanted except for industrial use. It has been approved for such use by the present local authority, the village of Oak Park Heights, and it would unquestionably be zoned for industrial or commercial use in any comprehensive plan that might later be developed by higher authority.

On the whole, it is safe to say that the total impairment of recreational use of Lake St. Croix that could possibly result from all the commercial navigation and all the industrial development that is ever likely to occur will be very small in comparison with the great benefits which recreational use and residential development have derived from the 9-foot channel project, and that in spite of all such navigation and industry the lake will continue to have a very high potential for both recreation and shoreline property development.

There are some extremists who advocate a form of segregation on Lake St. Croix which would bar the development of all further industry around the lake. This proposal, if carried out, would defeat the purposes for which large sums of public money were spent in putting the St. Croix on the 9-foot channel. It would be a severe blow to the future economy and prosperity of the adjacent territory and to the welfare of all people who make their living and pay taxes there. The interests of all these people would be sacrificed for the benefit of a few who want the lake restricted to special uses for their own enjoyment. This would be zoning with vengeance.

Under the constitution private property cannot be taken nor can its usefulness and value be curtailed by zoning or otherwise beyond the scope of the police power except by due process of law, upon reasonable grounds and upon payment of just compensation for any loss sustained by the owners. If the extremists had their way as above described on

Lake St. Croix, it would result in very extensive damage to the interests of the general public of the surrounding territory without compensation. It is unthinkable that any responsible authority would ever attempt to establish such zoning restrictions, and any such restrictions, if attempted, would undoubtedly be stricken down by the courts as unreasonable and inimical to the public welfare.

I have discussed the foregoing matters because they have been so widely agitated and have tended to becloud the real issues with which this committee is concerned; namely, the problems of water pollution and air pollution. I can say with confidence that both these problems can safely be left to the Minnesota authorities concerned, that is, the water pollution control commission as to water pollution and the State board of health as to air pollution, with the assurance that the proposed plant will not be built if they find that its operation would cause any harmful pollution of the waters of Lake St. Croix or any air pollution that would endanger the public health.

With respect to water pollution, it is clear that there are no present grounds for intervention by Federal authority under the Federal Water Pollution Control Act, because no discharge of sewage or industrial waste that might harm anyone or anything in Wisconsin has yet occurred or is likely to occur. The long record of the exercise of initiative by the water pollution control agencies of both Minnesota and Wisconsin in dealing with their own pollution problems and in cooperating on the solutions of those problems affecting interstate waters gives positive assurance that the construction of the Northern States Power Plant will not be permitted by the Minnesota Water Pollution Control Commission except upon strict conditions that will meet standards acceptable to the corresponding authorities in Wisconsin and the U.S. Public Health Service and will protect the waters of the lake against harmful pollution. The Minnesota Commission has ample authority, probably stronger than that of the corresponding agencies in most other States, for enforcement of any such conditions which it may impose. Furthermore, the commission's permits, standards, and regulations are always subject to revocation or modification as future conditions may require for prevention, abatement, or control of pollution. No one can get a vested right to pollute waters under a Minnesota permit.

There has never been any need for the exercise of Federal authority to deal with pollution originating in Minnesota and affecting interstate waters in the past, and there is none in this case. I say this advisedly with full knowledge of the facts of recent pollution problems that have arisen on the Mississippi River, the full story of which is too long to relate here. All concerned may be assured that the pollution problems of the interstate waters between Minnesota and Wisconsin will be effectively dealt with by the authorities of whichever State is responsible unless and until the improbable day comes that they forsake their past policy of action and cooperation.

Yet I know that these agencies have asked for and received much valuable advice and assistance from the U.S. Public Health Service in dealing with their pollution problems. I am assured that the Minnesota Water Pollution Control Commission has done so in this case so as to have the full benefit of any recommendations which the U.S. Public Health Service may see fit to make. I believe that I can say,

further, based on past experience, that both the Minnesota Water Pollution Control Commission and the State board of health welcome any investigation of this matter that may be made by your committee or any other authorized Federal agency. Despite the fact that such investigations may be construed as critical of the State authorities, they realize that the attendant publicity focuses the attention of the public and the State legislature on important problems and helps the State agencies in getting both legal and financial support for their efforts.

With respect to air pollution, the Minnesota State Board of Health has already tackled the general problem on its own initiative, without any prodding from Federal authority. Among other steps, the board secured the enactment by the 1957 legislature of a provision adding pollution of the atmosphere to the subjects on which the board may adopt regulations having the force of law. Last spring the board set up an advisory committee on air pollution, which has recently released its report and recommendations for legislation on the subject for submission at the 1965 session of the legislature.

However, without waiting for the passage of further legislation, I believe that the State board of health has sufficient power under existing laws to deal with the Northern States Power project and protect the public health against injury from air pollution that might result therefrom. The board has asked the U.S. Public Health Service to investigate and report on the air pollution problems involved in the project, and has engaged a private consulting firm to do likewise.

The Minnesota State Board of Health, beginning before the creation of the water pollution control commission, has had a long history of cooperation with its Wisconsin counterpart in public health matters, and will undoubtedly welcome such cooperation in this case.

If it should appear as a result of the studies underway that the construction or operation of the Northern States Power Plant as now planned will cause air pollution endangering the public health, I am confident that the Minnesota Board may be depended upon to take appropriate and effective action for protection of the public health against such danger.

Here again, as with water pollution, the company would get no vested right to cause air pollution by reason of any approval of its plans that might be given by the State board of health. The operation of the plant would always be subject to future remedial action either by the board or by the legislature, if necessary, for the protection of the public health. If necessary the company could be compelled to modify or stop any methods or practices that might turn out at any future time to be injurious to the public health.

In conclusion, I reaffirm the position taken by the St. Croix River Association, to reserve judgment on the project until the investigations undertaken by the responsible State authorities are completed and the results are announced.

Mr. Chairman, in view of some things that went on this morning, if I may, I should like to make a couple of further comments.

Senator NELSON. Go ahead.

Mr. WILSON. Regarding the question whether other interests outside of public health will be adequately protected by present legal provisions, I have to say that the Minnesota Legislature has always been very mindful of these other considerations, and so as incorporate

in our definition of public waters and our definition of pollution and has recognized underway is the very great importance of recreational interests and other interests besides the public health in water pollution. And in view of the interest aroused in this project and the fact there is going to be quite a while before this project can be constructed and gotten underway, I think it may be safely assumed on the recommendation of this special advisory committee that was created at the instance of our State board of health and whose recommendations include the full scope of public interests, recreations and otherwise, that might be affected, I think it can be safely assumed, if it appears necessary, this coming legislature, which convenes in January, will take action on that matter. If it were necessary, effective action to deal with those matters could be enacted at this session. And I am quite sure that the Northern States Power Co. being well aware of that would hesitate to risk any considerable investment in an enterprise that might be curtailed or might have to make substantial changes in view of the prospect of future regulation. The Minnesota authorities have not hesitated to deal with existing industry or future industries in the public interests relating to any of those activities.

I should like to say further, in view of the testimony given this morning by my very good friend and long-time associate in water pollution control efforts, Murray Stein of the enforcement division of the water pollution control and water supply, particularly respecting the investigations that were made at the preliminary hearing here last winter on the Mississippi River pollution. I should like to read a few comments from the transcript of testimony of that hearing, the closing statements made by Mr. Stein, and before I do so I should like to point out that that was in no sense an enforcement action, it was a preliminary investigation undertaken and a conference held under the Federal Water Pollution Control Act at the direction of the Secretary of Health, Education, and Welfare to determine whether any enforcement action was required. As a result of that hearing it was made very clear that the remedial measures necessary to correct the overflow and pollution of the Mississippi River, which were under study at that time, had been initiated at the instance of the Minnesota Water Pollution Control Commission in 1956, that an engineering study that cost over half a million dollars had been made, and that the actual construction of enlargements to the Twin City sewage and treatment plant at an estimated cost of nearly \$23 million was already underway, commenced in 1961, 2 years before this hearing was held.

And as a result of that hearing, those remedial measures have—no action was taken, no enforcement action whatever, nothing was done in any effort to require any further remedial measures, nor to accelerate those already underway, because it appeared they were being pushed just as fast as possible from a practical standpoint. And it further appeared that investigations were underway for future action contemplated in this metropolitan area in an effort to see to it that no crisis of that kind would develop again, and in that connection, gentlemen, I think it is in order for me to point out that the Twin Cities on their own initiative, long before there was a Federal Water Pollution Control Act, long before we had a State water control commission, at the instance of our State board of health, spent their good money in large sums under which the Twin Cities metropolitan sani-

tary district was created and built the first sewage treatment plant on any of the large central rivers of the country for any metropolitan area. There wasn't another metropolitan area on the Mississippi, Ohio, or Missouri at that time that had a sewage treatment plant. And that plant for at least 20 years after its construction put the Mississippi River in a condition which met the standards that had been concurrently adopted by the Wisconsin and Minnesota authorities, and it was not until the population explosion overtook this metropolitan area, caught them by surprise, demonstrated that the estimated life of their project was going to be seriously shortened, that any serious overloading occurred that harmed the Mississippi River. That, of course, is a serious condition, but, as I said, it was being dealt with. And in contemplation of that I should like to read the comments that were made by Mr. Stein at the conclusion of that conference last February.

He said:

The Minnesota group, which has a large bulk of industries and municipalities in this area, by virtue of indicating their future plans certainly believes that adequate remedial facilities have not been constructed yet. As to the nature of the delays, the delays, if any, come from the very people you have dealing with a very large complicated metropolitan area. You may be very much better than a lot of metropolitan areas, but this problem is indigenous through large metropolitan areas throughout the country. It is pretty evident, too, that both State agencies concerned have active and vigorous programs. All the people who have participated here at these municipalities, the industries, the citizens' groups, all want a clean river.

And Mr. Stein said further:

I think both States should be commended for the efforts they have made in this area considering the limitations of their personnel and their funds. You have to consider these things. I do think that if you went around the country and saw how pollution problems were handled you would realize that in coping with a metropolitan problem as is presented by St. Paul and Minneapolis your States agencies have done a job—

and I can say this after listening to this for several days—

which, in my opinion, has been as good as any State has done in dealing with this problem.

A couple of other points that I think should be of interest to anyone dealing in this problem from an actual standpoint.

I think it will be generally accepted by industrial engineers that we have had too much concentration of industry in this country, in the large centers, and that it is desirable to disperse industry, if that can economically be done. The Northern States Power Co. already has three plants, two plants in the Twin City area, another one just a short distance to the west, up the Minnesota River, and the alternate site proposed for the plant, this new projected plant, would be on the Mississippi River—well, almost within St. Paul, just within the limits of the Ramsey County line in which the city of St. Paul is situated. It could concentrate further industry in that area. And likewise from the national defense standpoint, it would put three very important plants producing the electrical power for this entire region, consisting of the plant above St. Anthony Falls at Minneapolis, the existing plant at St. Paul, and this new plant, all within, far within the range of a single atomic bomb. Therefore, from the defense standpoint, strategically, the dispersion of these plants would be pretty high up. This is not said to suggest any concession should be

made on that account on the matter of very strict regulation from the standpoint of both water pollution control and air pollution control.

And on this wild river proposition, I for one am most deeply in sympathy with that movement. I think you could tell that from my background. I was interested in the comment that was made by my good friend Orville Freeman on the lower St. Croix, I appreciate his appreciation of this river out here which we folks are very proud, but if we are honest we have to admit that the beautiful scenery on the St. Croix River has nothing to distinguish it from equally beautiful scenery for 200 or 300 miles down the Mississippi. It doesn't include any of the spectacular formations or Maiden Rock on Lake Pepin, and Lake Pepin is a more explicit body of water than the St. Croix, or Sugar Loaf down at Winona. So if the Department of the Interior is going to bite off any more than it has already tried to chew with this wild river program, which I heartily endorse, they are going to have quite an order to fill if they take in all sections of the river down the Mississippi and all rivers of the country, which we admit might compare with the St. Croix River in beauty and usefulness and recreation.

On the definition of thermal pollution, that has been questioned here. I believe Senator Metcalf raised some question about that. I might say although our legal definition does not expressly mention thermal pollution, it has always been construed to include it ever since any problem with our nature of laws. The Northern States Power Co. is the largest industry causing any thermal pollution. They have never questioned but that it was included within our definition and they do not do so now. The fact they have applied for a permit indicates very clearly they concede our definition will much apply to thermal pollution. I have introduced bills to the commission that were introduced through previous sessions of the legislature in broader definition, to include not only thermal pollution, but nuclear waste pollution, but I still believe that our present definition would be construed by the court as broad enough to include effects of that type as well as actual chemical contamination.

Now, in regard to the comments that were made by Mr. Woodward about the authority of the State board of health. I don't think the State board of health fully appreciates all the powers that it could invoke, and I want to call particular attention to the fact that in addition to our health laws we have a very strong public nuisance law in Minnesota which provides that anything that endangers health, safety, or repose of a considerable number of members of the public is a public nuisance and a misdemeanor, and it may be enjoined and abated.

SENATOR NELSON. May I interrupt you there. Are you saying the Minnesota law provides that if a public nuisance originates in Minnesota, but the nuisance is in Wisconsin, that under the law the public health service, the board of health in Minnesota taking cognizance of the nuisance in a place where they don't have jurisdiction, may then abate that nuisance?

MR. WILSON. I didn't say that.

SENATOR NELSON. This was the point being made this morning and the nuisance, I would guess, is likely to be in Wisconsin because the winds blow that direction.

MR. WILSON. Senator, I fully appreciate that point. I certainly do not question the desirability of having effective Federal legislation

that will deal with that very problem. All I am pointing out is under our public nuisance law our board of health has broader authority than they would under their own regulation, which, as Mr. Woodward pointed out, is strictly limited to dealing with the public health. I believe this public nuisance provision would be construed by the courts as applying to a broader scope of public welfare, but I think that is an academic argument, I think we can depend on our legislature to broaden the definition of air pollution, to take everything into effect long before this plant is to be built.

Judge McDonough is calling attention to the fact that time is flying, and I think, Mr. Chairman, I have completed all I have to say on the subject, and I thank you very much for your attention.

Senator NELSON. I would like to ask a couple of questions. I might say at the outset, I don't share your confidence that the Federal Government under the present law nor any State in the Nation under its present laws, based upon the laws they have or their performance on them, is fully prepared to protect the recreational values and the health of the public. It may very well be as Mr. Stein said, that Minnesota has done as well as any State in the Nation. I think, in fact, Minnesota and Wisconsin rank among the two most conscientious States in the country in terms of protecting their water. We really have done nothing about air in either State, but have in terms of protecting water. So Minnesota may well have done as well as any other State, but that is pretty poor and I conclude the same about my State.

If you will look at the result across the Nation you will find out that despite your testimony that there is adequate authority at the State level to watch out for the public health and recreation values. We have in fact polluted almost all of the fresh water assets in America.

In my State we have found that we have nondegradable detergents in part of the underground water supply in 60 of our 72 counties. In fact, if you look at the results, it has been disgraceful in this country. That doesn't mean that many State officers have not been very conscientious at the State level. It means that there are always powerful economic forces that oppose effective pollution control. In order to get the necessary authority and money you have to go to the legislature where the opposition has been most effective. Therefore the responsible people who are concerned at the State and local level never had the tools to act. Anyone who has had the opportunity to read the hearings conducted by the subcommittee on air and water pollution must certainly be shocked almost out of his conscience. It is the most shocking report on the destruction of our resources I have ever read. It is a disgrace to the Nation. To say we don't need Federal laws, that there are adequate State laws, compels me to say the evidence is clear that we have lost the battle with the laws we have got. I have to say for the record that I simply disagree with you on that.

Judge McDONOUGH. Is this on your time or ours?

Senator NELSON. You keep track of your time and I will keep track of mine. [Applause.]

Senator METCALF. Mr. Chairman, this is a fact-finding committee, and I feel that I would like to ask some questions of the witness, and I am sure that both Senator Nelson and I will stay here as long as you want. We want to find out your opinion. We have come a long way for this, and I am sure—

Judge McDONOUGH. The only reason I asked the Senator, because actually it wasn't a question, it was a speech. He is available any time.

Senator NELSON. I recognized it as a speech, too, I think everyone else did. I intended to make a speech. [Laughter.]

Now, on the effect on the St. Croix, do you know how much water this powerplant would use?

Mr. WILSON. No, I have made no study of the details of their proposal, as I have said before, reserving my own judgment in advising everybody else to do likewise until the responsible authorities have made their investigations.

Senator NELSON. So then you really can't conclude that it won't have any effect on recreation values if you don't even know how much water the plant is going to use?

Mr. WILSON. I would be very strongly opposed to the construction of this plant if it had any appreciable effect on the recreational values of the St. Croix River, and may I say, Senator, I do not think that the exercise of any Federal authority that now exists or might hereafter be created would result in the imposition of any higher requirements for the protection of recreation than will be applied by the Minnesota Water Pollution Control Commission. And I would like to cite one more point in that connection.

That is that the commission has elected as its chairman one of the outstanding conservationists and leading members of the Izaak Walton League of this country, Dr. Malcolm Hargraves, a distinguished physician from the Mayo Clinic, and they follow him. You couldn't get a more ardent defender for protection of recreational issues other than Dr. Malcolm Hargraves. As long as I have had anything to do with that commission they have given very great weight to recreation and so has the legislature.

Senator NELSON. I would like to make clear, my own feeling is that my experience in dealing with people in the conservation department, the departments of public health and on the National and State level, that they rank among the most conscientious people we have in this field. I would like to make it clear in the record in terms of the remarks I made about pollution across the Nation that I was not referring to this particular case. It was only a general response to your statement that present laws were adequate.

Mr. WILSON. I wasn't speaking of any situation outside of that with which we are concerned. I am quite familiar with these reports of national pollution and I certainly concur with you, Senator, a hundred percent about the disgraceful condition of our country, and I certainly would in the claim we are up to par here in the Northwest, we have a great deal to do. All I am saying, our agencies are sincerely determined to do their best to do the job. They welcome your interests. They welcome the very fine help they get from the Public Health Service, and I think the combination of all working together we ought to make a lot of progress.

Senator NELSON. On the barge traffic, I have no notion what it is. Do you have any notion how much barge traffic there will be?

Mr. WILSON. You will be told that. I know what the company estimates and I have also conferred with the manager of the local bargeline, but I prefer to leave those figures to the company.

Senator NELSON. It was on that basis you concluded—

Mr. WILSON. All I am saying, based on my knowledge of the old steamboat days when the river was almost entirely occupied by steamboats pushing rafts to and fro, any possible barge traffic that could possibly occur here on the St. Croix River would not occupy any substantial fraction of the surface of that river at any time, nor cause any hazard comparable to that which we are enduring constantly from these high-powered speedboats.

Senator NELSON. I was interested in your statement about a regional plan being developed for the area. I wasn't aware of one, but I hope there is one.

Mr. WILSON. That is going on right now. This country is divided into three regions: central, south, and north for planning and zoning purposes. All of our rural townships have village powers, including the power of zoning, and they have all adopted zoning ordinances but, in order to have more effective ordinance, they have pooled their resources into a region. This area here, the city of Stillwater cooperates in that—

Senator NELSON. A one-county region?

Mr. WILSON. No; about the middle third of Washington County.

Senator NELSON. So it isn't a regional planning development affecting the whole St. Croix Valley?

Mr. WILSON. No. As you know, we have a very active metropolitan planning commission created by the legislature very many years ago and they have developed, more or less, regional plans or criteria for general zonings, and that sort of thing, but they do not have any authority to develop a certificate which will result in the adoption of zoning ordinances. This plan which is underway now is based on the proposal. After the plan is completed, each of the component municipalities will adopt coordinating agencies. It is quite effective. There is no possibility under any plan that could possibly conceive this area where the Northern States Power Co. area is situated would be otherwise than industrial.

Senator NELSON. I think of a plan by region as involving 40 or 50 miles of the river. It won't work unless you include the watersheds involved. A 701 grant from the Federal Government for the purpose of developing a comprehensive regional plan would be very valuable.

Mr. WILSON. I would be highly in favor of that, Senator. We haven't come that far.

Senator NELSON. Thank you very much.

Senator Metcalf had a question or two.

Senator METCALF. Mr. Wilson, your testimony has been very helpful, I think, and you brought qualifications to the committee that are rather overwhelming. You were a member of the Outdoor Recreation Resource Review Commission?

Mr. WILSON. Yes, sir.

Senator METCALF. What was the position of that Commission as far as Federal standards on air and water pollution?

Mr. WILSON. I don't recall that we made any study of air pollution; that is, no specific study, although it was brought up a few times. It is standards on water pollution. You will see, from the report, that they put the emphasis on urging all State agencies to get on with a better job of protecting their waters for recreational purposes. That

was the primary emphasis of the recommendation in that report. But it was also contemplated, of course, that the Federal Water Pollution Control Act would be applied wherever the State agencies fell down.

Senator METCALF. Mr. Wilson, you summarized my memory of the report.

Mr. WILSON. And I might say, Senator, in view of the efforts that you have been making on this air pollution problem, "an ounce of prevention is worth a pound of cure."

Senator METCALF. We feel the same way about it. That is why we are concerned with this area and not, as a specific case, because this committee, of course, has no jurisdiction to prevent a power company from building or not building, but we are concerned with preventing further pollution of our remaining water resources.

I was impressed by your confidence and optimism that the State of Minnesota, and its various agencies concerned with air and water pollution, would be able to do this job but, because the State of Minnesota probably has done an adequate and efficient job and I certainly accept your assurances, is that any reason why we should not have minimum Federal standards for air and water pollution?

Mr. WILSON. No. One point to be remembered, of course, is the problem of administration. As you know, the Federal Water Pollution Control Act has been developed on a strong basis of requiring State action first. There has always been great opposition, nationwide, to any extension of Federal authority, except in case of necessity. But I think it must be conceded that there may be air pollution problems that will cross State lines where State authorities could not be depended upon to handle the problem and, for that reason, I certainly agree that some Federal legislation should be desirable. However, if that legislation goes so far as to have actual standards imposed by Federal authority, rather than basing the efforts upon getting State authority to exercise first, you have immediately created a very great administrative policy. You will have to have an army of inspectors to gather all the evidence and carry on all the enforcement procedures. That involves some very serious questions that I haven't thought through. I am not an expert on air or water pollution. I take the advice of the engineers on that. I have never been brought in on close studies of the air pollution problems; I have no strong opinion to express; but I do say the Minnesota laws and authorities are adequate to deal with this immediate problem.

Senator METCALF. We tried to do the thing that you suggested in imposition of such Federal standards as we have been able to enact in the Clean Water Act. That was what Mr. Stein was talking about, where there is an enforcement procedure under the provision entitled "enforcement measures against pollution of interstate or navigable waters." The first action authorized is a conference such as was held and such as you testified about and from where you read testimony. And, of course, Mr. Stein, this morning, said, after such a conference, there is only one instance when they had to go to court to bring an abatement. It is the desire of all of us at the Federal level to find minimum standards and apply them in such a way that we will encourage Federal action. I am encouraged today by your testimony and, yet, as this develops, I can see how trees growing over on the other

side of the river in the State of Wisconsin would be destroyed and, perhaps, the State of Minnesota wouldn't even have jurisdiction even under the public nuisance law to prevent such destruction.

Mr. WILSON. I agree with you there; we would not have a jurisdiction. That is a criminal statute and also a civil statute in the sense it furnishes the basis for an injunction. It would have no application outside of the boundary of Minnesota.

Judge McDONOUGH. But people from Wisconsin can come over here and sue.

Mr. WILSON. The judge said—any individual or public agency damaged in Wisconsin could sue in the Federal courts—State courts.

Senator METCALF. This is a very inadequate remedy, both you and I will agree. After the fact each individual whose fishing rights have been damaged, whose trees and plants have been damaged, even whose health has been damaged, would have to come into court on a civil action and assume the burden of proof. These are the very things we are trying to avoid. This committee's jurisdiction is to ascertain and determine whether or not we need some further amendments to the Air and Water Pollution Control Act. And perhaps if all the States were as vigorous in their prosecution as the State of Minnesota, and you had the cooperation that I am informed you have between Minnesota and Wisconsin, we wouldn't need this committee in action. Because of your wide experience and influence, I wanted to be sure that you weren't saying here today, that we didn't need Federal standards in States that haven't achieved Minnesota standards.

Mr. WILSON. No, Senator; I certainly believe in having some kind of effective measures that will take the ounce of prevention, as I said, which is always worth a pound of cure. It is pretty much a question of political and governmental strategy which is the best way to control this. The whole water pollution control system has been developed on the basis of attempting to build up the States and a great deal of progress has been made along that line. The Public Health Service started out by promulgating with the assistance of the counsel of State governments the Water Pollution Control Act, which I had a finger in drafting in the first instance and revising later. There is one thing about it, it is human nature. If you can get people to do something for themselves, to apply their own provisions within the State, you may get more effective action on these local problems than if you try to crack down on them with a big stick from above. I have always said, in any case where the States fall down and do not meet the problem, that the exercise of authority by the Federal Government is justified in the general public welfare.

Senator NELSON. I want to thank you very much for taking the time to appear, Mr. Wilson.

Who is your next witness, Judge?

Judge McDONOUGH. The next witness will be the president of the Northern States Power Co.

Our next witness is no stranger to our people. This company was conceived and born in this town over 60 years ago. They did not announce in the newspaper that they were going to build a plant here. The Northern States Power Co. came over here; they talked to the governmental and civic leaders of the St. Croix Valley, a good per-

centage of them, relative to whether or not they wanted this plant. After these discussions they made their announcement that they would build this plant here. We don't want them here if it is going to pollute this river, but at the same time, we don't want anybody else to make the assumption that the Water Pollution Control Commission, the Department of Conservation, State of Minnesota, will not protect the rights of the people of the States of Wisconsin and Minnesota. This is a technical question which these two bodies, the regular quasi-judicial bodies, the Minnesota Procedure Act will certainly govern.

The president of the Northern States Power Co. is an engineer, and it gives us great pleasure to introduce Mr. Earl Ewald.

Senator NELSON. Mr. Ewald, we are pleased to have you take the time to come and give your report.

STATEMENT OF EARL EWALD, PRESIDENT OF NORTHERN STATES POWER CO.

Mr. EWALD. My name, as you heard, is Earl Ewald. I am president of Northern States Power Co., a Minnesota corporation. In the following statement I shall frequently refer to that company as "NSP." I have previously supplied this subcommittee with written data relating to the capacity of the electric generating plant proposed to be built at Oak Park Heights, Minn., on the St. Croix River. The dimensions of the plant, the amount of coal to be burned, and the plant's use of water from the St. Croix River are detailed in such written material.

(There follows data relating to NSP Co. plan.)

NORTHERN STATES POWER CO.—DATA RELATING TO STEAM-ELECTRIC GENERATING PLANT AT OAK PARK HEIGHTS, MINN.

Location

On the west shore of Lake St. Croix in the village of Oak Park Heights, near Bayport, Washington County, Minn. Site includes part of the NE $\frac{1}{4}$ of section 3, T. 29 N., R. 20 W., all of Government lots 2 and 3, section 2, T. 29 N., R. 20 W., and part of Government lot 5, section 34, T. 30 N., R. 20 W. Total area of site approximately 180 acres.

Capacity

Unit No. 1 nameplate rating, 550,000 kilowatts.
Expected maximum capability unit No. 1, 610,000 kilowatts.
Provisions will be made for a second unit of somewhat larger size.

Cost

| Estimated for unit No. 1: | |
|---------------------------|-------------------|
| Powerplant | \$63,000,000 |
| Substation | 2,100,000 |
| Transmission outlets | 3,200,000 |
| Total | 68,300,000 |

Construction schedule

Construction to begin in 1965. Unit to be placed in service in 1968.

Employment and payroll

Construction employment will average more than 150 men during each of the 3 years required to build the plant. Employment at the site will reach more than 400 during periods of peak construction activity. Total construction payroll during the 3-year period will be about \$7 million.

The operating staff for the plant will total about 60 men. The initial operating payroll for the plant will be approximately \$500,000 annually.

Design and fuel

The plant will be a conventional steam-electric generating facility of the most advanced engineering design. It will compare with the most efficient steam-electric generating units in the Nation. The unit will operate at 3,500 pounds per square inch steam pressure and 1,000° F. The boiler will be fired with coal.

Physical aspects

The initial plant building will be 200 by 250 feet in plan and 200 feet high. In addition to the turbogenerator, boiler and associated equipment, the structure will house offices, maintenance shops, laboratories, and storage areas.

The building will be given architectural treatment. The plant area will be landscaped.

The stack for the plant will be 785 feet high above grade.

Facilities for unloading barges will be located adjacent to the shore of the lake.

Coal delivery

About 60,000 tons of coal will be delivered per week initially over a period of about 30 weeks. The coal storage pile will be approximately 2,400 feet long, 500 feet wide, and 35 feet high above grade. Plant consumption of coal is 240 tons per hour at rated capacity.

Cooling water

Water for condensing steam will be drawn into the plant from the lake at the rate of about 660 cubic feet per second, and the same amount of water will be returned to the lake. The cooling water will not be contaminated in any way. The intake will withdraw water from the lower, cooler portion of the lake. At the point of discharge at the surface of the lake, the total temperature rise of the condensing water will be about 17° in the summer and about 30° in the winter.

Handling of waste products

An electrostatic precipitator at the plant will remove 99 percent of the solids in flue gases exhausted from the stack. The height of the stack will assure rapid dispersion of gases high into the atmosphere.

Mr. EWALD. I will not now repeat these, but I should like to devote such time as may be permitted to me to a discussion of the following matters:

First, NSP's electric load doubles approximately every 10 years. As a result of this growth we will have to add generating capacity to the system at the rate of about 200,000 kilowatts a year in each of the next 10 years. Such growth requires continuous planning for needed future facilities. We like to keep our preliminary plans 20 years ahead of construction.

In accordance with such planning, we purchased the plant site in Oak Park Heights in 1942, 22 years ago. Subsequently, as our plans matured, we made additional purchases of land to enlarge the site. Such purchases were made in 1954, 1957, 1958, and 1964.

This site was selected in 1942 for future development for four specific reasons:

(A) It is close to the electric load in the eastern and northern parts of the metropolitan area of Minneapolis and St. Paul, including Washington County. Being close, it can serve this load with greatest economy and, of greater importance, with the greatest reliability.

(B) The site is on a navigable river, where its fuel can be delivered with greatest economy and where the necessary cooling water is available.

(C) The site is in an industrial area of the St. Croix Valley, having the needed railway connections, as well as a river which has been dredged and improved for commercial navigation.

(D) We were informed that the community would welcome construction of a generating plant at this location. This welcome has been repeated from time to time over the years, as it has been repeated today.

In the years since 1942 our system planning has taken cognizance of this site. Now it has become desirable to develop it.

Second, NSP is well aware of the need for preserving wild areas of land and water for public recreation and is in full sympathy with such planning. To this end NSP has cooperated with the Department of the Interior in its study of the wild portion of the St. Croix River north of Taylor Falls, north of a point about 30 miles upstream from the site of the proposed generating plant.

In this area NSP has for many years owned most of both banks of the St. Croix River for a distance of about 70 miles above Taylors Falls. The company has refused to sell or lease these lands or to exploit them in any way. The public has had free access to such lands for hunting, fishing, canoeing, and camping. Several years before Secretary Udall made public his wild river concept, NSP initiated studies with a view to preserving these wild lands in perpetuity for recreational uses. We have consulted with appropriate agencies in the States of Minnesota and Wisconsin in the course of these investigations and have received advice from them. At the moment these studies are in abeyance, since we have agreed with a team from the Department of the Interior that we would maintain the status quo pending resolution of the recommendations made by that team to Secretary Udall.

Third, the St. Croix River, in the vicinity of the site of the proposed generating plant, is by no means a free-flowing or wild river. The river had been a regulated stream for more than 60 years. In the late 19th century, dams were used to regulate the river to facilitate the movement of logs. With the advent of the 20th century, various dams were constructed on the main stem and tributaries to permit the generation of electric power, and since the 1930's the river below Stillwater has been maintained at an elevation about 10 feet above low water by a dam constructed for navigation purposes. The concept of a "wild river," as that term is used in the study now being carried on by the Joint Interior-Agriculture Wild Rivers Study Team, relates only to that portion of the St. Croix River from near Gordon, Wis., downstream along the Minnesota-Wisconsin border to Taylors Falls. It does not relate to the St. Croix River below St. Croix Falls.

I mention these matters because, in certain newspaper and magazine articles relating to our proposed plant on the St. Croix River, emphasis has been given to the concept of a free-flowing and wild river.

Within a distance of about 4 miles of the site for the proposed plant, there are three substantial towns having a total population of about 16,000 and, in addition, smaller communities and suburban developments, all bordering on the river. Although the river below Stillwater is used for recreational purposes, such as swimming, fishing, and boating, it is, in fact, also commercialized. The recreational uses by the public, however, are restricted because of limited public access. Much of the shoreline is privately owned and posted against use by the public.

A glance at the photograph before you, if you gentlemen have seen it before, will confirm that the proposed plant site is located in an industrial area. North of the site lies Stillwater, in which are located several industries. A barge terminal and the Stillwater sewage plant border the plant site to the north. Just downstream is the village of Bayport, in which is located a sewage plant discharging to the river, and immediately to the south of the site is the Andersen plant, one of the world's largest manufacturers of windows.

Senator NELSON. Does Bayport have a sewage treatment plant?

Judge McDONOUGH. They do have a sewage plant.

Mr. WILSON. The outlet is at the southeast corner of the building, directly at the entrance of the St. Croix. It serves both the city of Bayport and the State prison. It is in process of enlargement right now.

Senator NELSON. Thank you.

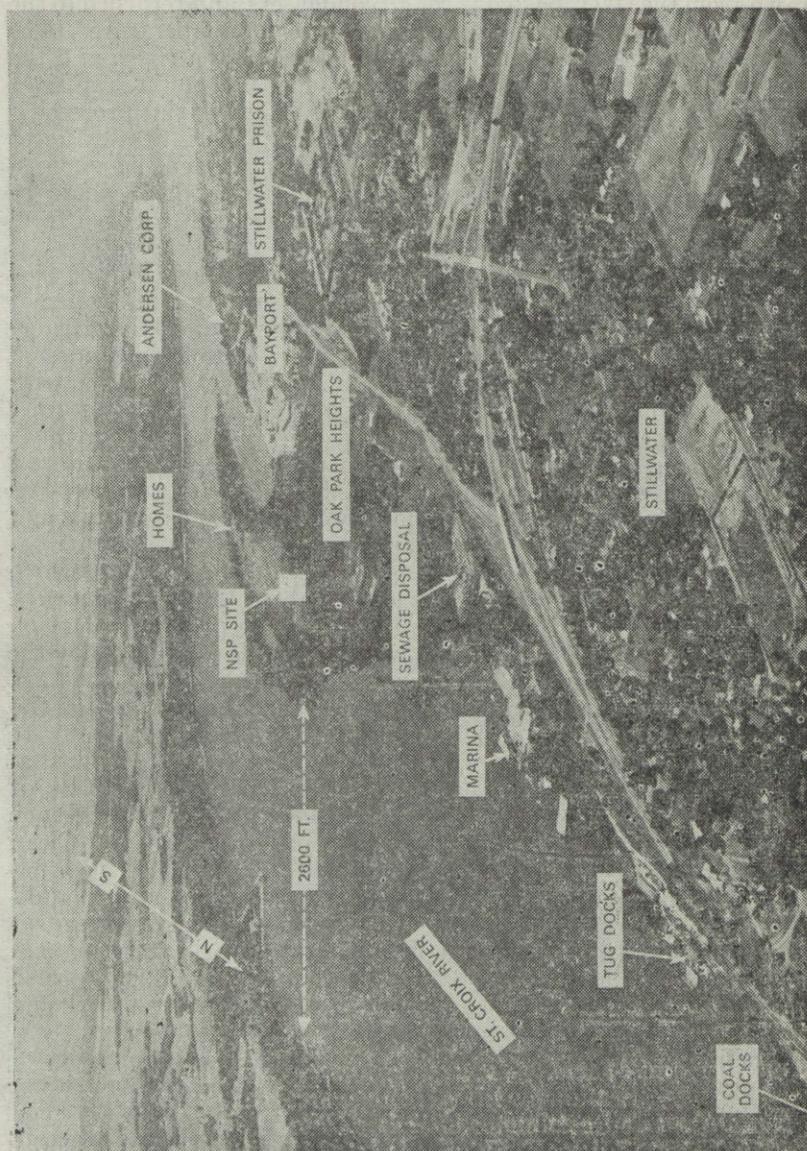
Mr. EWALD. Adjoining the site to the west is the Minnesota State Prison. Running along the entire westerly boundary of the site are railroad tracks. On the site itself NSP has a large propane storage tank and an electric substation.

Fourth, in designing and locating this plant, Northern States Power has been well aware of the public interest. The plant will produce electricity at lower cost than will any existing plant in this area. By virtue of its location, the plant will increase the reliability of service in this part of the metropolitan area. These facts are of vital concern to all of the people in the metropolitan area and western Wisconsin who are our customers. The plant design incorporates provisions to meet the highest standards which can reasonably be applied in the areas of water and air pollution, architecture, and landscaping. In January, Northern States Power will submit detailed evidence on these points to the Minnesota Water Pollution Control Commission and to the Minnesota Department of Conservation at public hearings. Both of these agencies, I am informed, proceed in cooperation with their Wisconsin counterparts under long-standing agreements, which, I believe, are adequate to protect the interstate interests. Each of these agencies has a staff of consultants fully competent to weigh the questions before it.

I hope that this committee, in its deliberations, will not be influenced by unsupported claims or fears as to the effect of the construction and operation of the plant. Complete technical data relating to the plant will be presented in the form of testimony in a public hearing before those State commissions and departments which are authorized by law to conduct such hearing and to make appropriate rulings thereon.

Northern States Power will be pleased to submit to this subcommittee such portions of the testimony taken at such hearing as your committee may request.

Fifth, Northern States Power has always cooperated with and supported the Minnesota Water Pollution Control Commission in its program to control pollution of the Mississippi and Minnesota Rivers. In 1963, the commission adopted pollution standards for the Mississippi River which, among other things, regulate the discharge of circulating water into the Mississippi River from Northern States Power's Riverside and High Bridge plants. In this connection, it should be



explained that these standards regulate the amount of heat which can be discharged by our plants into the river. Our generation of electricity requires large quantities of river water for cooling purposes. Water is drawn from the river, passed through condensers, and returned to the river basically unchanged, except for a rise in temperature. The heated water then mixes with the main stream of the river, and the heat is dissipated to the air. This process does not pollute the river in the sense of adding wastes like a sewage or industrial processing plant might do. On October 19 of this year Northern States Power appeared at a hearing of the commission and supported the commission's proposed standards for the Minnesota River which would be applicable to the control of the heat content of water discharged from Northern States Power's Black Dog plant.

In cooperation with the commission, Northern States Power has, during 1963 and 1964, conducted temperature surveys and studies of the Mississippi River downstream from its Riverside and High Bridge plants. These surveys and studies have been given to the commission and show that the operation of these plants, in fact, complies with the thermal standards adopted by the commission. Similar studies have also been made in connection with the operation of the company's Black Dog plant, and again show compliance with proposed standards, as adopted and proposed by the commission, adequately protect the public and various water users from any adverse effects that could be caused by the operation of these plants.

As a result of our experiences in operating said three plants, which have a combined total generating capacity of about 1,458,000 kilowatts, the company is confident that the operation of the proposed plant on the St. Croix River will also comply with standards established by the commission in connection with its operation.

As far as atmospheric pollution is concerned, the statutes of the State of Minnesota grant authority to the State board of health to control atmospheric pollution which may be injurious or detrimental to public health. Pursuant thereto, the Governor of the State of Minnesota has designated the State board of health as the State agency for the purpose of administering the provisions of the Federal Clean Air Act. The State board of health has had the benefit of information from the company with respect to the proposed plant, and, in addition, as I am informed, has retained the services of an independent consultant who is an expert in the field of atmospheric pollution and who has made studies with respect to this plant. I am also informed that the State board of health has had the benefit of research work and studies made by experts from the U.S. Public Health Service.

In conclusion, gentlemen, I am glad to have had the opportunity of explaining our position before your committee. Northern States Power Co. has had a policy throughout its history of being a good citizen in the community where it operates. We are deeply concerned, as your committee and as many other people are, with the protection of our natural resources and the avoidance of problems of water and air pollution. We have very carefully weighed these factors since the beginning of this project and we have reexamined them many times in recent months.

As a result of this consideration and concern, and reexamination, we are thoroughly convinced that the best interests of all the people in

this metropolitan area and western Wisconsin will be served by the construction of this plant as proposed.

From the beginning of this project I have issued orders to our engineers to design it in accordance with the latest technical advances and to apply all reasonable safeguards against the possible dangers that we are considering here. We have proceeded in an orderly manner to obtain the necessary clearances from the regulatory agencies who have authority under existing law to give us permits to build this powerplant. On the basis of our experience I am informed by our engineers that we can conform with the standards which are likely to be adopted in view of, for instance, water pollution, in view of the standards that were adopted on the Mississippi and Minnesota Rivers. I am of the opinion, on the basis of the information my engineers have given me, that this powerplant can be built at this location and operated, and that the normal present activities regarding recreation and enjoyment of the St. Croix River can continue without impairment, and that the plant will be a good neighbor in this community. We are in no sense proceeding arbitrarily. We have very carefully reviewed these various aspects of the project, and we are proceeding, as I said, in an orderly manner to obtain the permits to allow us to proceed. We will comply with the regulations of the agencies which have authority to impose regulations in the area of pollution.

Senator NELSON. Thank you very much, Mr. Ewald.

Mr. EWALD. Surely.

Senator NELSON. As you may be aware, the Subcommittee on Air and Water Pollution hasn't just selected this one area in the United States. It has been conducting hearings on the west coast, the Midwest, East, and South and, in fact, it is my understanding the chairman intends to continue with a whole series of hearings in all parts of the Nation. I don't think we have held any up on the Great Lakes, and some 15 or 20 hearings that were scheduled last year, because of the pressure of business, had to be canceled. So that there will be understanding by the public and the company, this is a part of a whole series of this hearing on this question all across the Nation.

This subcommittee prepared a bill last year that set water quality standards in advance. It passed the U.S. Senate with majority support in both political parties and failed to come out of the committees in the House of Representatives. This is a series of hearings to gather information at the local level about the kinds of problems that are involved. This particular one happens to be interesting in that it involves two States, as well as the immediate pouring of the waters from this river into the Mississippi, which is an interstate water. It involves a question of what laws are applicable in the State of Wisconsin, if any, and what laws are applicable in the State of Minnesota, and what laws are applicable at the Federal level.

The purpose is to gather information for the purpose of deciding what we need to do, if anything, further in the field of Federal legislation. It also, of course, will be a beneficial record for use of the legislators of Minnesota and Wisconsin, as well as legislators across the Nation. It is a serious problem. You have maintained a good record in this field and you have preserved the upper St. Croix, which anybody who has ever lived along it recognizes and appreciates.

Thank you.

On the question of thermal studies, has your company or has the industry done any studies on the effects of introducing heat—thermal pollution, so to speak—in streams or lakes as an effect on algae and fish?

Mr. EWALD. Yes; there are such studies. I am not competent to review them for you.

Senator NELSON. I was wondering if there were studies.

Mr. EWALD. Yes; there are.

Senator NELSON. Have they been done by the industry or your company?

Mr. EWALD. Our company has made no specific studies along this line. However, we have engaged experts to assist us in our testimony before the Water Pollution Control Commission on this particular project on this subject.

Senator NELSON. I wasn't aware of the studies that were made. Did they get to the point of the effect on fish and algae and other kinds of aquatic life?

Mr. EWALD. I don't believe there have been any final decisions made; no.

Senator NELSON. I see. In the question of the difference in water temperature, are the comparative figures that are used to show the difference between the water temperature intake and the water temperature as it comes out of the plant taken of the water at the bottom of the river or at the surface?

Mr. EWALD. The only temperatures that we have talked about in our information thus far, and it is in the data sheet that you have, in that the water that is taken through the condensers, is that specific water will be increased in temperature a maximum of 17°. That is to say, under the worst conditions, the water—the difference in the temperature between the water taken in and the same water expelled from the plant condensers—will be a rise of 17°. An average will be 10°. Now, then, this water is dumped into the lake and returned to the lake. It immediately mixes with the other water so you would never have that much temperature rise in the area, you see.

Senator NELSON. What I was getting at is how the difference in the temperature is arrived at. Do you measure the temperature of the water at the bottom of the stream or when you take it out and when it goes back in. Is it surface temperature, and the temperature when it goes back in—

Mr. EWALD (interrupting). I am sorry to say the complete development of this subject is very complex. We have employed the University of Minnesota to build a model of the river at this area in order that we can study the waterflow and the very temperature effects you are talking about. I am not able, today, to answer specific questions. This matter of how this water mixes and what these temperature changes are is a long one and it needs much more competent technical people to develop it than I.

Senator NELSON. We would be happy to have someone answer it for you.

If the difference is 10° at one stage, or 17° at one stage, is that difference based upon the temperature taken at the intake of the river below the surface, or the temperature at the plant, or at the surface of the river?

Mr. EWALD. I don't think I made myself clear to you before. If we take a given gallon of water that is going to go through the plant,

whatever its temperature was before it went into the plant, it will be increased an average of 10° as it goes through the plant. The 10° of temperature will be added. We will probably take the water out low in the river and it will go out on the surface.

Senator NELSON. Do you take the temperature of the water at the place you take it in at the bottom of the river? Is that where the temperature is measured or is it measured at the intake of the plant or at the river surface? Where do you get your two figures? You had to take the temperature two places because of the 10° difference.

Mr. EWALD. It doesn't make any difference whether the water is taken from the bottom or top or whether it is hot or cold. We would add 10° to the water, Senator.

Senator NELSON. What I am getting at is that there have been instances where they take the water from the bottom, but the figures they use to show the difference were surface temperatures versus outlet temperatures, which is quite a difference. Do you get my point?

Mr. EWALD. I think so.

Senator NELSON. The water frequently is 10° or 20° colder down at 30 feet than what it is on the surface. The difference between the surface temperature and the difference it comes out of the plant is one figure, and the temperature at the bottom of the river might be 10° or 20° colder. My point is: Where do you put the thermometer to get the differences in the temperature?

Mr. EWALD. I was being perfectly honest with you. I was telling you the water that is put through the condenser in the powerplant will be increased in temperature by 10° , a maximum of 17° , and then that water is immediately mixed with the river water back in the river. I wasn't attempting to tell you what the change in the river temperature would be, you see. So, the addition of 10° , on the average, doesn't make any difference. The water will probably be taken out of the bottom of the river—that is the coolest water—but whether you add 10° to that water or add 10° to warmer water. In other words, we are making a perfectly honest statement of fact. This is what the condenser will do. The mixing and actual effect is a complicated story that comes under another study.

Senator NELSON. As I understand it, from the fact sheet you have submitted, do you use 660 cubic feet per second in the first unit, or approximately that?

Mr. EWALD. That is the figure I recall, Senator.

Senator NELSON. How does that consumption compare with the low flow of this river in the summertime?

Mr. EWALD. It is slightly more than—very slightly more than the lowest flow, as I remember it—but, of course, that is not of vital concern in that this is a large lake, as you know, and the fact that the amount of water taken through the plant approaches of the flow of the river doesn't concern us particularly. There will be recirculation, of course.

Senator NELSON. Then if another unit is added, slightly bigger, you will be using twice the low flow of the river?

Mr. EWALD. No; I don't think that is a correct conclusion.

Senator NELSON. I didn't see the figure on the second unit. I assumed it would take twice as much.

Mr. EWALD. I am afraid I have misstated myself. I think it is with two units that we approach the low flow of the river, not with one.

Senator NELSON. Did I misread that?

Mr. EWALD. The low flow is about 1,300 cubic feet per second so this would be right. With the two units we would be approaching a figure of about equal to the low flow of the river. I misstated it the first time.

Senator NELSON. I note the Government's figures are that: once in 30 years, the low flow is 550 cubic feet; once in 20, it is 700 feet; once in 10, it is 1,000 feet; once in 5 years, it is 1,400 feet; once each year, it is 3,930. Did I understand correctly that it is 660 and, if it were two units, it would be roughly twice that?

Mr. EWALD. Assuming the second unit were the same size as the first unit, yes.

Senator NELSON. Is the power that you are producing here, all of it—well, what is the area of distribution, is what I am getting at.

Mr. EWALD. Well, we are part of a large interconnected network, as you know. We have been planning connections and doing quite a job of integrating our regional area here, so all these power facilities are connected together. In our own case, the Northern States Power Co. system, the Twin Cities metropolitan area represents about 65 percent of our load, and our present peakload is just about—our capacity at the present time is 2 million kilowatts and our load is a million eight. So, the production of this plant will be very largely for the metropolitan area of the Twin Cities.

Senator NELSON. I see. And what is the particular—I realize there are geographic questions, but what is the advantage of this location here over any area in the metropolitan area or any area nearby on the Mississippi?

Mr. EWALD. The first thing the matter of service is important. We wanted to have a plant on the eastern and northern side of the metropolitan areas, and the transmission connections to the metropolitan areas are shorter from this plant than from the available other sites we have.

Senator NELSON. What kind of cost factor is involved in the miles of transmission?

Mr. EWALD. In transmission itself there is an addition of \$3.1 million of capital cost to get to an alternate site, compared to this one.

Senator NELSON. Once you have the alternate site, was there a difference in the cost of transmitting it?

Mr. EWALD. Yes. This is a relatively minor cost, but nonetheless to be considered. A particular alternate that I have in mind that I mentioned would be \$3 million of transmission. There would be a transmission cost due to losses of about \$40,000 a year in connection with that transmission. There would also be higher construction costs at the alternate site than there are at this Oak Park Heights site. This is a particularly advantageous one from the point of view of foundations. It has a good rock ledge underneath, and we don't have to have much piling.

Senator NELSON. I don't believe you were here this morning, but there was an appearance on behalf of the joint State-Federal task force which was attended yesterday by the president of the Wisconsin company, and in the testimony of Professor Lord, he stated that the answers to these kinds of questions that I am asking here about alternate sites and costs would be taken up, and that would be part of their accumulation of information. Is that your understanding?

Mr. EWALD. That is my understanding.

Senator NELSON. If that is the case, so far as I am concerned, I won't pursue the question. There is no use in duplicating in my questions to you what they will cover in their report.

I don't have any further questions. Senator Metcalf may have some. I appreciate very much your taking your time to come over here this afternoon and making your appearance.

Senator Metcalf.

Senator METCALF. I concur with the chairman's appreciation of your appearance. I congratulate you and the company you represent on a fine experience and attitude toward conservation and preservation of our resources as testified to by the Department of the Interior and authenticated by your own testimony today.

This is a most interesting situation where choosing an alternate site, as you said, might increase its costs somewhat. Would that also increase its rates?

Mr. EWALD. The differences we are talking about here as between two sites, Senator, are not of such a magnitude that they would, in themselves, cause us to increase our rates, but they do, nevertheless, affect our rates in the long run, as you well know, and they are significant costs.

Senator METCALF. As you also testified, it would affect the stability and the service you are rendering in certain specific areas?

Mr. EWALD. That is right.

Senator METCALF. On the other hand, the people who enjoy that additional stability and maybe a little bit lower rate are the same people who are going to participate and enjoy the recreational facilities along the river. So, we have a weighing of two values here that sometimes we don't have when it is just a question of industrial pollution.

Mr. EWALD. In that connection, Senator, I would like to make one point, too. As we look toward the future development of the power industry and we know electricity is a vital thing to the community and will continue to grow, we need all of these sites. We, and when I say "we," I mean the community, need this natural resource as a powerplant site very much in the long run.

Senator METCALF. Your point is that if you don't build such a plant here this year, a decade from now when your demands double again, you are going to have to go back and ask for permission to build such a plant, is that right?

Mr. EWALD. That is exactly right, Senator, and we can make substantial financial benefits by building it now.

Senator METCALF. It would be our hope, perhaps, that the technology would be such that a decade from now we would be able to take care of preservation of other resources, too.

You have said that you decided to develop this plant for four specific reasons. There would be a saving in a shipment of coal, wouldn't there, if this plant were built at some place farther down the river?

Mr. EWALD. That is true. There would be a saving if we were to build a plant farther down the Mississippi, but that saving would be of the order of \$80,000 a year as compared with the \$40,000 transmission costs. So, it is about half eaten up by the extra transmission costs.

Senator METCALF. We think out West where we are just moving into a position of thermal power, that the best way to transport coal is by electric transmission. We are building some of our plants near the mines, I would think there would be a question here of weighing costs of transmission against the costs of barging coal but those things would be things for the company to determine rather than for this committee, of course.

The problem, it would seem to your company is going to face if we set national standards, and we have already had witnesses who have suggested that there be minimum national standards, and we have persuaded both parties in the Congress, as Senator Nelson pointed out, that there should be such standards, is that it could be that you would be underway on construction of a plant and then find out that you couldn't conform to such standards. Perhaps that is something we don't have to worry about in this particular case because Mr. Wilson's testimony is that perhaps the best conservation department in the Nation is that of Minnesota, but let's take some other utility companies that are doing the same thing in States where there are no standards. Wouldn't it be well to have some minimum Federal standards?

Mr. EWALD. I don't think I am qualified to comment on that, Senator. I believe, at the moment, the State standards are adequate for our requirements.

Senator METCALF. Would you be opposed to establishing similar standards at a Federal level?

Mr. EWALD. If they are reasonable, I certainly would not.

Senator METCALF. Are the standards that you have supported at the other dam—what did you call it, Black Dog?

Mr. EWALD. Black Dog plant. We consider them real good.

Senator METCALF. Are they the same as you would have to meet here on the St. Croix River?

Mr. EWALD. I don't know the answer to that, because the Commission has not yet ruled on the St. Croix River with respect to water pollution.

Senator METCALF. Did you anticipate that they would be the same?

Mr. EWALD. I don't know. I would expect in my own mind that the St. Croix might be more, the standards on the St. Croix might be more liberal than those on the Minnesota.

Senator METCALF. What do you mean by more liberal?

Mr. EWALD. In their allowance of temperature induction into the water.

Senator METCALF. I see.

That is all. Thank you.

Senator NELSON. I have a couple of questions.

I have been advised that the Pennsylvania Electric Co. of Johnstown has devised a means to turn sulfuric dioxide gas into sulfuric acid at a profit. If this is correct, is your company aware of this? Is it a possibility here?

Mr. EWALD. Yes, Senator. We are aware of the work that is being done that you mentioned on the removal of sulfuric dioxide, but by no means is it economically feasible, in my opinion, insofar as I have been informed. We are very much interested, in fact, we are supporting the research work done in this direction. We hope that

there will be a breakthrough in not too many rounds of powerplants before we will be able to salvage it. My understanding now is that it is not economically feasible.

Senator NELSON. I don't have any notion about the information that I have here, but is it your understanding that the Pennsylvania company does convert it into sulfuric acid at a profit, or are you not aware one way or the other?

Mr. EWALD. No, I understand that it is feasible to do so physically, but that it is not economically feasible. You are saying, doing it at a profit. Do you mean they pay for the installation and justify it economically? I am saying that my understanding is that it is not economically justifiable and possible.

Senator NELSON. I see. My understanding was that it was, but I have not seen the material upon which that statement was made.

I suppose the difference in cost involved here in some of your other plants is that you use natural gas and this one uses coal. Is that a problem of cost or is that a problem of something else?

Mr. EWALD. Senator, we use interruptible natural gas in several of our powerplants, but this is only available to us during the summer months, during the off-peak period of the pipeline. In all of our major plants we have to use coal during our heavy load winter period. The use of this interruptible natural gas was considered for Bayport, but we have to be certified by the Federal Power Commission. A supply has to be available, and in a broad way there will not be sufficient noninterruptible gas available, nor are we likely to be able to receive certification for it. I question whether we will be able to use interruptible natural gas, but in any event, we would have to use coal for a very large part of the year.

Senator NELSON. I have just one question relative to the question that Senator Metcalf asked concerning water quality standards. I am asking the question simply because this is the issue we have been dealing with at the congressional level. There is authority, if public health and welfare is involved, for the Department of Health, Education, and Welfare, Federal, to come in and get started on an action of enforcement to abate a source of pollution. But it is always an after-the-fact situation. Any business under present law may go right ahead and build a plant that creates a pollution situation which is injurious to the public health and nothing can be done until after the pollution occurs. My question is, Would it, in your viewpoint, be better if there were quality standards set in advance? In other words would it be better if studies were made, hearings held, and the river were classified as a certain quality type of water. Some are trout streams, for example, and some are not. Standards would be set in advance to guide businessmen and industrialists. If some industry intended to introduce something to lower the standard, immediately action could be started and the issue settled before the investment has been made. My question is, Would that or would that not, in your judgment, be better than the present situation?

Mr. EWALD. If there is a complete enough study and complete enough information is available so that the standards you are talking about are reasonable in terms of the present state of the particular art you are talking about, obviously it would be better to have the standards established in advance.

Senator NELSON. I intended the question to be put that way.

Mr. EWALD. Take the case of air pollution in the case we are talking about here, coal and boilers. This industry has advanced very rapidly. The first 500-kilowatt plant was built in 1961. It went in service with the burning of coal ash. The building of electrostatic precipitators to take the solid gases out of the stack has come forward in tune with the development. As you pointed out, we are working diligently on the research and development for removing the sulfuric dioxide. The standards to regulate must take cognizance of the state of the art and be able to meet them in reasonable terms.

Senator NELSON. I agree, and the committee in all of its deliberations has always aimed at taking into consideration the state of the art. More than that, there may be times when it isn't feasible, though you could do it. Congress and the committee has always taken that into consideration.

Mr. EWALD. I think our industry has done an outstanding job, and I think we are in the forefront of our industry in taking the attitude, the position, that we want to cooperate in establishing of the highest matters of this kind, air pollution.

Senator NELSON. I thank you very much.

Judge McDONOUGH. One closing statement and some resolutions from Washington County.

First of all, again we assume the State of Minnesota, through its water pollution control commission, through the department of conservation, the State board of health, will protect the interests of the people of Minnesota and Wisconsin. Much emphasis has been placed on recreation. We don't believe they are mutually exclusive terms here. The six barge tows a week for 40 weeks out of the year will not interfere in that degree, which will make this a commercial river.

Senator NELSON. Six?

Judge McDONOUGH. Maybe an average of three.

Senator NELSON. Six barge tows?

Judge McDONOUGH. Yes, 6 tugs a week pushing so many barges, I think it would be more than 15, no more than 15, because of the locks they have to go through.

Senator NELSON. Fifteen what, barges?

Judge McDONOUGH. Barges.

So, aside from the fact of the air pollution, aside from the fact of water pollution, aside from any effect it has on aquatic plants of the river, you have emphasized algae. I would like to point out to the good Senator from Wisconsin, we have three major industries in Washington County. Of seven metropolitan counties, we have the highest per capita debt. The reason we do is because of these magnificent and excellent school systems we are providing for the children of Washington County. We have three major industries, and 30 percent of the employees come from your State of Wisconsin, all the way from Menomonie, Ellsworth, and 30 to 40 miles north of us. This is true of the Chemolite factory which is the Minnesota Mining factory south of us, and I believe there are many employees from the Northwestern Refining factory at St. Paul. The total evaluation of these plants is \$1,370,552.96. If this plant comes in here, the increased tax bases for industrial purposes will be \$2,355,864, almost a million dollars more.

Now, recreation is a wonderful thing, but it could be ashes in our mouth if you don't have employment. You must remember, you will not have the industrialization west of here in the State of Wisconsin—

Senator NELSON (interrupting). On the employment question, what is the unemployment rate in Washington County?

Judge McDONOUGH. The unemployment rate is low, but I would like to know the unemployment of the counties of Polk and St. Croix. I don't know what the unemployment rate is. It is very, very, low. We do have it, but 30 percent of our employees in this country come from the State of Wisconsin.

The past week we have been discussing many of these problems with people in North Hudson, River Falls, and Ellsworth, and they have been lawyers, councilmen, a couple of judges, and businessmen, relative to the establishment of this plant here. Of course, our question from these gentlemen in every instance, is, "What would you be doing if this plant were to be located in Hudson, Wis.?" They say they would be 100 percent for it. I don't say this out of disrespect; I have the greatest respect for you. We have followed your great career and we know of your great interest in conservation, but I wonder if you would be at this table if this hearing were being held in the city of Hudson.

Senator NELSON. Since you have asked the question, my answer is yes. [Applause.]

So that you may have a complete answer, this is a hearing that I am conducting in behalf of the Subcommittee on Air and Water Pollution. As Governor of the State of Wisconsin I conducted hearings and investigations in all kinds of conservation matters and tackled them hard and disputed with all kinds of powerful economic interests in my own State.

Is that the end of your presentation?

Judge McDONOUGH. Yes; it is.

(There follows additional data from NSP):

NORTHERN STATES POWER CO.,
Minneapolis, Minn., December 17, 1964.

Mr. RON M. LINTON,
Chief Clerk and Staff Director, Committee on Public Works, U.S. Senate, New
Senate Office Building, Washington, D.C.

DEAR MR. LINTON: At the meeting of the U.S. Senate Subcommittee on Air and Water Pollution held in Stillwater, Minn., on December 10 and 11, 1964, requests were made for certain information to be supplied to the subcommittee. In response thereto I enclose the following memoranda:

1. Allen S. King plant, land acquisition to make up present proposed site.
2. The volume of water in Lake St. Croix.
3. Cooling tower cost.
4. NSP, total system (including NSP Wisconsin), generating capacity, by type of fuel burned (as of December 1, 1964).
5. 1963 kilowatt-hour output data, Northern States Power Co. Minneapolis and suburbs.
6. SO₂ removal from flue gas.
7. Sulfur dioxide removal from flue gases, review of literature.

I am also enclosing a copy of a letter dated November 12, 1964, from Pioneer Service & Engineering Co. addressed to Mr. D. F. McElroy, manager of engineering, Northern States Power Co., re Allen S. King generating plant, unit 1, sulfur removal system.

I trust that the enclosures will provide you with all of the information which you requested. If further information is desired, please write or call me.

Very truly yours,

DONALD E. NELSON, General Counsel.

Allen S. King plant—Land acquisition to make up present proposed site

| Parcel No. | Date acquired | Acreage | Parcel No. | Date acquired | Acreage |
|------------|----------------|---------|-------------|---------------|---------|
| 1 | Nov. 2, 1942 | 30.30 | 8 | May 21, 1964 | 1.93 |
| 2 | Dec. 10, 1942 | 31.90 | 9 | do | 3.70 |
| 3 | Dec. 23, 1954 | 19.43 | | | |
| 4 | Sept. 3, 1957 | 50.00 | Total | | 187.43 |
| 5 | July 2, 1958 | 6.00 | 10 (option) | | 6.37 |
| 6 | Sept. 25, 1958 | 8.47 | | | |
| 7 | May 7, 1964 | 35.70 | Total | | 193.80 |

THE VOLUME OF WATER IN LAKE ST. CROIX

The Northern States Power Co.'s data sheet on page 2 shows the surface area of Lake St. Croix at normal pool as follows:

| | <i>Acres</i> |
|---|--------------|
| From Stillwater Bridge to A. S. King plant site | 790 |
| From A. S. King site to Chicago Northwestern bridge at Hudson | 1,320 |
| From C. & N.W. Bridge to Prescott | 5,500 |

If we assume that the average depth of the river is 20 feet, then the total volume of the lake would be approximately 152,200 acre-feet.

The distance from Stillwater to Prescott, which is the length of Lake St. Croix is approximately 24 miles. The width of the lake varies from 2,000 feet to approximately a mile and has an average width of approximately 3,000 feet.

For the purposes of relating volume of Lake St. Croix to the circulating water requirements of the Allen S. King plant, we believe that only that portion of the lake above the Chicago Northwestern Railroad bridge at Hudson is of significance. The volume of water in this portion of Lake St. Croix is 42,200 acre-feet.

The Division of Waters of the Department of Conservation, State of Minnesota, Bulletin No. 11, published in August 1961 and entitled "Water Resources of Minneapolis-St. Paul Metropolitan Area," show in figure 9 the duration curve of daily recorded flows in the St. Croix River at St. Croix Falls for the period of 1911-54. These duration curves show that the daily flow equaled or exceeded 95 percent of the time is about 1,200 cubic feet per second. The daily flow exceeded 90 percent of the time is about 1,500 cubic feet per second. The flow in the St. Croix River where it enters Lake St. Croix is equal to the flow in the St. Croix River at St. Croix Falls plus the contribution made by the Apple River. Northern States Power Co. annual duration curves of monthly mean flows at the plant site show that flows equaled or exceeded 99 percent of the time is 1,180 cubic feet per second, 95 percent of the time is 1,550 cubic feet per second, and 90 percent of the time is 1,750 cubic feet per second, with a minimum mean monthly flow of record of 913 cubic feet per second, which occurred in August 1934. The State's flows at St. Croix Falls corrolate very well with our curves which show the addition of the contribution of the Apple River.

In addition to the flow entering Lake St. Croix from the St. Croix River is a contribution made by the flow out of the Jordan sandstone which underlies the lake. We have no measurement of this, however, our temperature measurements indicate cool water at the bottom of the lake during the hottest part of the summer which may indicate some considerable volume of inflow contributed from the aquifer.

COOLING TOWER COST

There are three methods of using cooling towers at the Allen S. King plant unit No. 1 and two types of towers that may be employed. The two are the mechanical and natural draft towers. The mechanical draft towers have large fans which draw the air in through the tower sides, up through the water spray and discharges it out the top of the tower. These generally are long, rectangular structures with several fans on the top and with reinforced concrete basins below the tower in which to collect the water which is sprayed through the tower. The second type of tower is a natural draft tower which, as the name implies, has a natural draft and does not depend upon fans. This is a large diameter, conical shaped, structure up to 250 feet in diameter and 300 feet high.

The three schemes for employing cooling towers at the Allen S. King plant are as follows: Scheme A is to use the towers during periods when the lake water

is warm to reduce the temperature of the circulating water discharge from 5° to 10°. This is partial cooling. Scheme B employs a closed system for use during the summer only. As in scheme A the balance of the year the discharge would be to the lake. Scheme C is a closed year-around system where makeup water is added to the system to replace that which is lost through evaporation and water is cooled by use of the towers and recycled through the plant. Here the use of cooling towers in the winter is anticipated and it is evident that the mechanical draft tower would not be tolerable in this community because of the large amount of fog which would be discharged at a low level. Natural draft towers will release fog at a higher elevation and, therefore, would be less objectionable.

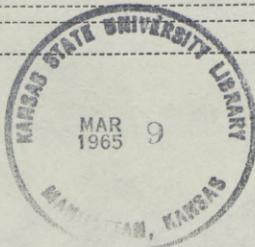
The following tabulation indicates the capital investment required in the various types of towers under the three schemes.

| | | |
|---|-------|-------------|
| Scheme A. Helper tower: | | |
| Mechanical draft..... | | \$1,265,000 |
| Natural draft..... | | 2,875,000 |
| Scheme B. Closed system summer only: | | |
| Mechanical draft..... | | 2,000,000 |
| Natural draft..... | | 3,611,000 |
| Scheme C. Closed system year-around: Natural draft..... | | 3,795,000 |

It is obvious that the large capital investment for natural draft towers make them unattractive for use under schemes A and B. Therefore, we believe that if towers were to be installed at this site the choice would be mechanical draft towers. We have no choice under scheme C due to the fog problem. The operating cost of natural draft towers is very low. The operating and maintenance cost for mechanical towers is in the neighborhood of \$50,000 annually. The carrying charges on the investment in mechanical towers under scheme A is approximately \$190,000. The total additional cost of helper towers under scheme A is approximately \$240,000 annually. The carrying charges on the capital invested under scheme B, closed cycle summer only, is \$300,000 plus \$50,000 operating cost makes a total annual cost of \$350,000. The annual cost of the closed cycle year-around natural draft under scheme C is \$570,000 plus approximately \$10,000 in operating and maintenance making a total of \$580,000 annually.

NSP—Total system (including NSP Wisconsin)—Generating capacity, by type of fuel burned (as of Dec. 1, 1964)

| | Number of units | Rated capacity (kilowatts) | Net capacity (kilowatts (1) (2)) |
|---------------------------------|-----------------|----------------------------|----------------------------------|
| Steamplants: | | | |
| Coal and natural gas: 1 | | | |
| Black Dog..... | 4 | 416,250 | 460,900 |
| High Bridge..... | 6 | 423,250 | 482,800 |
| Island..... | 1 | 20,000 | 22,400 |
| Lawrence..... | 3 | 45,000 | 51,500 |
| Red Wing..... | 2 | 23,000 | 29,000 |
| Riverside..... | 7 | 262,000 | 289,300 |
| Sioux Falls (coal and oil)..... | 3 | 15,500 | 16,100 |
| Whitney..... | 2 | 20,000 | 22,100 |
| Wilmarth..... | 2 | 25,000 | 27,900 |
| Total, 9 plants..... | 30 | 1,250,000 | 1,402,000 |
| Coal only: | | | |
| Edison..... | 2 | 6,500 | 3,300 |
| French Island..... | 2 | 25,000 | 24,800 |
| Minnesota Valley..... | 3 | 60,000 | 73,800 |
| Southeast..... | 2 | 30,000 | 40,000 |
| Winona..... | 3 | 26,000 | 27,200 |
| Bison..... | 2 | 10,000 | 12,100 |
| Minot..... | 3 | 5,800 | 5,500 |
| Fargo..... | 6 | 20,000 | 23,900 |
| Grand Forks..... | 4 | 16,000 | 20,100 |
| Riverside..... | 1 | 216,000 | 225,000 |
| Total, 10 plants..... | 28 | 415,300 | 455,700 |



NSP—Total system (including NSP Wisconsin)—Generating capacity, by type of fuel burned (as of Dec. 1, 1964)—Continued

| | Number of units | Rated capacity (kilowatts) | Net capacity (kilowatts) (1) (2) |
|------------------------|-----------------|----------------------------|----------------------------------|
| Diesel plants: | | | |
| Bridgewater..... | 2 | 1,840 | 1,770 |
| Chetek..... | 2 | 2,000 | 1,930 |
| Clear Lake..... | 3 | 3,400 | 3,300 |
| Dodge Center..... | 2 | 1,840 | 1,770 |
| Eau Galle..... | 1 | 500 | 485 |
| Excelsior..... | 4 | 4,000 | 3,870 |
| Faribault..... | 4 | 4,000 | 3,870 |
| Glenwood..... | 4 | 4,000 | 3,870 |
| Hudson..... | 2 | 1,100 | 1,050 |
| Mobile unit No. 3..... | 1 | 175 | 165 |
| New Richland..... | 2 | 1,840 | 1,770 |
| Pipestone..... | 3 | 3,000 | 2,900 |
| Ramona..... | 1 | 20 | 20 |
| St. James..... | 2 | 1,840 | 1,770 |
| Salem..... | 3 | 1,760 | 1,700 |
| Tracy..... | 2 | 1,840 | 1,770 |
| Viroqua..... | 2 | 1,840 | 1,770 |
| Fargo..... | 3 | 2,760 | 2,660 |
| Mobile unit No. 1..... | 1 | 760 | 740 |
| Mobile unit No. 2..... | 1 | 1,000 | 970 |
| Minot..... | 2 | 1,520 | 1,470 |
| Total, 21 plants..... | 47 | 41,035 | 39,620 |
| Hydroplants: | | | |
| Apple River..... | 4 | 3,000 | 3,140 |
| Black Brook..... | 2 | 540 | 490 |
| Cannon Falls..... | 3 | 1,900 | 1,890 |
| Cedar Falls..... | 3 | 6,000 | 6,150 |
| Chetek..... | 1 | 250 | 195 |
| Chippewa Falls..... | 6 | 21,600 | 16,250 |
| Colfax..... | 2 | 1,200 | 1,060 |
| Coon Rapids..... | 5 | 6,500 | 1,400 |
| Dells..... | 7 | 9,500 | 8,470 |
| Eau Galle..... | 2 | 400 | 355 |
| Hatfield..... | 2 | 4,800 | 5,970 |
| Hennepin Island..... | 5 | 12,400 | 1,970 |
| Holcombe..... | 3 | 33,750 | 33,750 |
| Huntingdon..... | 2 | 640 | 400 |
| Jim Falls..... | 3 | 14,400 | 10,600 |
| Little Falls..... | 1 | 300 | 200 |
| Lower Dam..... | 10 | 8,000 | 1,240 |
| Main Street..... | 2 | 960 | 0 |
| McClure..... | 1 | 160 | 160 |
| Menomonie..... | 2 | 5,400 | 5,370 |
| Mounds..... | 1 | 180 | 100 |
| Neshonoc..... | 2 | 200 | 190 |
| Rapidan..... | 2 | 1,500 | 1,350 |
| Rice Lake..... | 2 | 320 | 320 |
| Riverdale..... | 2 | 500 | 560 |
| St. Cloud No. 1..... | 4 | 1,200 | 0 |
| St. Cloud No. 2..... | 2 | 1,000 | 840 |
| St. Croix..... | 2 | 300 | 50 |
| St. Croix Falls..... | 8 | 23,200 | 21,950 |
| Trego..... | 2 | 1,200 | 1,180 |
| Willow Falls..... | 2 | 600 | 550 |
| Wissota..... | 6 | 35,280 | 31,900 |
| Total, 32 plants..... | 101 | 197,180 | 158,050 |

¹ None of these plants has a firm capability based on use of natural gas because natural gas is available to company for electric generation on an interruptible basis only.

Kilowatt-hour output data, 1963—Northern States Power Co., Minneapolis and suburbs

| | <i>Kilowatt-hour output</i> |
|--|---|
| Hydroplants----- | 699, 095, 191 |
| Diesel plants----- | 2, 652, 555 |
| Steamplants ¹ ----- | ² 8, 027, 473, 095 |
| ¹ Steamplant fuel consumed (Mega B.t.u.): | |
| Coal----- | <i>Percent</i> 58.7 |
| Oil (boiler torches)----- | .2 |
| Gas (natural and Koppers)----- | 41.1 |
| ² Steamplant kilowatt-hour output by fuels: | |
| Coal (including torch oil)----- | <i>Kilowatt-hour output</i> 4, 728, 181, 653 |
| Gas----- | 3, 299, 291, 442 |
| Total ----- | 8, 027, 473, 095 |

NOTE.—All natural gas used for electric generation is available to company on an interruptible basis only, and therefore must have coal as a standby. Natural gas is generally not available during the period Nov. 15 to Mar. 15.

SO₂ REMOVAL FROM FLUE GAS

From a practical point of view there appears to be no economical means of removing SO₂ from flue gas. Considerable developmental work has been done in this direction and removal is accomplished on a comparatively small scale in England. One of the more well-publicized efforts is the project presently being undertaken by the Pennsylvania Electric Co. at their Seward station. The results of this catalytic pilot plant operation at Seward Station indicates that full-scale commercial sulfur removal from the gaseous discharge of a steam generating plant is feasible, however, it has not been developed to a point where this process is practical for a plant the size of the proposed Allen S. King plant.

There are other methods of extracting SO₂, some of which are outlined in the attached "review of literature." Our engineers have investigated the utilization of the Pennsylvania Electric Co.'s removal method and estimate that the total cost of installing the facility would be between \$17 and \$20 million. The calculated return from the sale of sulfuric acid recovered from the plant would be in the neighborhood of \$1,560,000 per year. This indicates that the removal of sulfur by this method would be extremely uneconomical.

The report, in letter form, from our consulting engineers, Pioneer Service & Engineering Co., is attached which provides additional detail to supplement this statement.

SULFUR DIOXIDE REMOVAL FROM FLUE GASES REVIEW OF LITERATURE

A number of methods are available to extract the sulfur dioxide from flue gas (8). The more important ones are as follows (bibliography attached).

A. PROCESSES REGENERATIVE BY PHYSICAL MEANS*Dimethylaniline process*

This process employs the reaction of dimethylaniline with sulfur dioxide and through an elaborate system regenerates the dimethylaniline and removes the sulfur dioxide in the form of dry gas. This process operates at high levels (5.5 percent) of sulfur dioxide with removal of 99 percent of the gas.

Sulfidine process

This process uses similar methods to remove sulfur dioxide. It is adaptable to concentrations from 1 to 16 percent SO₂. At 7 percent SO₂, the steam requirements are 1 to 1.2 per ton of SO₂ produced.

Ammonia process

This process strips the SO₂ from the flue gas with ammoniated salts and the final product is ammonia sulfate and sulfur. The process requires large amounts of ammonia. It can be operated at relatively low concentrations of SO₂.

Basic aluminum sulfate process

This process uses basic aluminum sulfate to strip the flue gas of SO_2 and is regenerated with steam. The end product is sulfuric acid. This may be useful in concentrations down to 1 percent SO_2 .

B. PROCESSES REGENERATIVE BY CHEMICAL MEANS

Sodium sulfite-zinc sulfite process

The SO_2 is removed with sodium sulfite and reacted with zinc. This process requires elaborate equipment, but gives almost complete removal of SO_2 .

Wet thioegen process

This process uses large quantities of water and is useful only at high SO_2 concentrations.

C. NONREGENERATIVE PROCESSES

Ammonia-sulfuric acid process

This process is very similar to the ammonia process, regenerative. Nearly complete removal of SO_2 is accomplished at concentrations as low as 0.1 percent SO_2 . This is presently being used in a pilot plant operation at North Wilford Power Station, Nottingham, England (2).

Lime-neutralization process

Lime is used to react with the SO_2 to form an end product of calcium sulfate which is discharged into the river. This process requires large volumes of water and can only be used in already polluted rivers. Presently the process is being used in Great Britain at the Battersen and Bankside Stations. The alkaline water process was also incorporated here (2).

Absorption by alkaline water

Here the SO_2 is absorbed by the alkalinity of the natural water and discharged into the river.

Catalytic oxidation to sulfuric acid

SO_2 is catalytically reacted with O_2 in the flue gas and is converted to SO_3 which is extracted as H_2SO_4 . This process has the advantage of working at low concentrations of SO_2 and also operating at high temperatures. This is presently being used at Pennsylvania Electric Co.'s Seward Generating Station (3, 4, 6, 7).

Alkalized alumina process (5)

The SO_2 is absorbed on alkalyzed alumina at high temperatures and regenerated from the alumina by a separate operation.

D. SUMMARY

The physical regenerative processes are only adaptable to conditions where the SO_2 in the flue gases exceeds 1 percent. The chemical regenerative processes are not economically feasible, but operate best in 0.5 to 1 percent SO_2 . Almost complete removal of SO_2 can be achieved by these methods. The nonregenerative processes operate best at less than 1 percent and do accomplish almost complete removal of SO_2 . Product disposal becomes a problem here.

NOTES

(1) Bureau of Mines Information Circular (7836, 1958, 96 pages): "Sulfur Dioxide—Its Chemistry and Removal From Industrial Waste Gases."

(2) Institution of Chemical Engineers (Trans. V38, No. 2, 1960, pp. 54-62): "Development of Fulham-Simon-Curves Flue Gas Washing Process," C. W. Wood.

(3) Journal on Applied Chemistry (vol. 8, 1958, pp. 781-786): "Catalytic Oxidation of Sulfur Dioxide at Low Concentrations."

(4) Iron and Steel Engineering (41:167 May 1964): "System Eliminates Solids and Sulfur Fumes from Stack Discharge."

(5) American Society of Mechanical Engineers Transcript (ser. No. A86:353-8, discussion 358-60 July 1964): "Removal of Sulfur Dioxide From Flue Gas With Alkalyzed Alumina at Elevated Temperatures," D. Bienstock and others.

(6) Mechanical Engineering (86:58 August 1964): "Sulfur-Smoke Removal System."

(7) Combustion (November 1964, p. 57): Taken from article in Electrical Times, 1964, 146 (July 16), 94 "Removing Sulfur From Flue Gases."

(8) Air Pollution Handbook (1956, pp. 13-84): Megill, Holden, and Ackley.

(9) British Chemical Engineering (vol. 7, No. 11, November 1962, pp. 833-836): "Recovery of Sulfur in Marketable Form From Flue Gases," E. Willis.

(10) Journal of the Air Pollution Control Association (vol. 10, 1960, pp. 121-125): "Bench-Scale Investigation on Removing Sulfur Dioxide From Flue Gases," D. Bienstock and J. H. Field.

PIONEER SERVICE & ENGINEERING CO.,
Chicago, Ill., November 12, 1964.

Re Allen S. King generating plant, unit 1, project 2121-7569A (R/E 5577), sulfur removal system.

Mr. D. F. McELROY,
Manager of Engineering, Northern States Power Co.,
15 South Fifth Street,
Minneapolis, Minn.

(Attention: Mr. N. R. Fitch).

DEAR MR. McELROY: As we told you in a recent telephone conversation, our first step in the investigation of the sulfur removal system from powerplant stack gases was to contact the group who developed the pilot plant for a sulfur removal system as described in the copy of Public Service magazine forwarded to us with your letter of October 15. Our first contact was with Research-Cottrell, Inc., one of the participants in the pilot plant. Research, in addition to giving us an estimate of the dust- and mist-removal equipment also gave us the name of the contact at the headquarters of General Public Utilities. This is the group which coordinates the research and development efforts on this sulfur removal system study.

We have discussed the status of the system study with Mr. Lambert of GPU.

Mr. Lambert, incidentally, is an employee of Pennsylvania Electric Co. The pilot plant is located in Pennsylvania Electric's Shawville Station. The GPU group planned to build a prototype plant which would be scaled up from the pilot plant. This prototype to be installed on a 250-megawatt unit. This plan was abandoned because of the cost (\$10 million estimated installation cost with little or no salvage value) and the requirement that most of the economizer surface would have to be removed from the boiler to give the 850° F. exit gas required; however, they are proceeding with a prototype which will be installed at the Portland Station of Metropolitan Edison Co. This will take a side stream of 125,000 pounds per hour of flue gas and they expected to be in operation in somewhere around a year.

There has been no attempt made to size or price hardware for anything larger than this 250-megawatt prototype unit and Mr. Lambert is of the opinion that there would be little interest in estimating a larger unit until the prototype is operating. This is because there have been some problems encountered in the pilot plant that must be worked out on the prototype; there have also been some problems on design of the larger components as well as selection of materials that can stand up in the atmosphere of the system.

One of the problems has been leakage around the air heater which has resulted in an acid concentration that has attacked materials on the cold end of the system; such as, the stainless steel used in the mist collectors and fans, which tended to disintegrate within a week's time. Another problem, and one which makes the operating cost high, is loss of the catalyst bed due to attrition from frequent handling in cleaning because the dust-removal system is not as effective as desired. The acid produced is not of a quality or concentration that can be marketed so it is recommended that a facility be installed to further concentrate the acid to a more salable concentration.

The GPU group feel confident that all of these problems can be solved but, as stated above, can give us no information of a type that could be used for application to the Allen S King generating plant. From what we were able to get from Research, the dust collectors ahead of the catalyst would be at least twice the size of those which they are proposing for the Allen S King Generating Plant

now. The mist collectors, some 23 in number, would add up to even more area than the dust collectors. Although, for the prototype plant, Monsanto, one of the other participants, will furnish one of their mist collectors but this too will take almost as much space as those required by Research. A "horseback" estimate for a 500 megawatt unit, according to Research, might range between \$17 and \$20 million.

In view of the reluctance to give us estimated sizes for components, we feel that further efforts directed toward a plant layout will not develop anything in value for future use. Our plan, unless you have other thoughts, is to follow closely this and the other methods of sulfur removal some of which are also approaching prototype stage and, when we find that someone is ready to talk about application of their equipment, we will resume our activity.

Very truly yours,

V. H. SIMON,
Mechanical Engineer.

Senator NELSON. We will open tomorrow morning at 9 o'clock.
(Whereupon, at 4 p.m., the hearing was adjourned until 9 a.m., Friday, December 11, 1964.)

ST. CROIX RIVER DISPUTE

FRIDAY, DECEMBER 11, 1964

U.S. SENATE,
SPECIAL SUBCOMMITTEE ON AIR AND WATER POLLUTION
OF THE COMMITTEE ON PUBLIC WORKS,
Stillwater, Minn.

The Special Subcommittee on Air and Water Pollution met, pursuant to adjournment, at 9 a.m., Hon. Gaylord Nelson presiding. Senator NELSON. We will call these hearings to order.

Mr. Thuet, do you wish to open?

STATEMENT OF PAUL THUET, COUNSEL, SAVE THE ST. CROIX, INC.

Mr. THUET. Yes.

Senator Nelson, Senator Metcalf, and staff, my name is Paul Thuet. I am counsel for the Save the St. Croix Committee.

I would like to make the statement that I do serve also as State senator in the State of Minnesota.

I want to make it clear to the committee that I, in no way, am appearing for the State of Minnesota. I represent no agency. I am appearing here strictly as the attorney.

I have been counsel for the committee and corporation since it was instituted.

Many, many people wanted to testify here today. We felt, to conserve time, we would have a limited number. We have a list of our witnesses here. They will cover specific areas. We hope they will be short and we will be able to cover them within the time allotted. However, some governmental subdivisions from Wisconsin wish to be heard and I understand one is present here now. There would be two additional people who will come in approximately at noon and we would yield a portion of our time for them to be heard.

Mr. Arthur Olson of the St. Croix County Board of Supervisors is here at this time and I would like to call on him. He is not connected in any way with our association. He wishes to make a free and independent statement on their position.

I would like to call on Mr. Arthur Olson.

Senator NELSON. Will you state your name for the record and whom you represent?

STATEMENT OF ARTHUR N. OLSON, HUDSON, WIS., ST. CROIX COUNTY BOARD OF SUPERVISORS

Mr. OLSON. My name is Arthur N. Olson, from Hudson, Wis. I am with the St. Croix County Board of Supervisors. I am also the

chairman of the air and water pollution committee of the said county.

Over 25 miles of the St. Croix River borders St. Croix County. A lot of swimming, boating, fishing, and sailing start and stop on our shores. We swim all summer long, fish, and there is also ice fishing all winter long. St. Croix County recognizes the need for additional public access to the St. Croix River for recreational purposes.

Two years ago we established St. Croix Park. This park is about 5 miles south of Hudson, Wis., a wonderful area for swimming, a large expansive beach. We put in restroom facilities, black-top road, and parking. People from all over the United States have stopped there. Bus loads of children and adults come from the Twin Cities area for the purpose of swimming, boating, and just relaxing. The tourists themselves find many things in St. Croix Valley they wish to remember.

The county has built several wayside stops for public use. One of the most beautiful sights in St. Croix County is directly across the river from where we are now. At this point you will see a beautiful view of the valley itself and of the St. Croix River. We have established a historic monument there. We hope you gentlemen will get a chance to visit that place before you go back to Washington.

Our State forester has told us at the last county board session that there are two camping area facilities being established for tourists.

Dairying itself is our most important single source of income in St. Croix County. We are very proud of our production records. We have over 42,000 milk cows in St. Croix County, and over the age of 2 years we have over 48,000.

Our farms, there were over 38,000 acres of land in corn in the year 1962, 47,000 acres of oats, 4,200 acres of soybeans, 53,000 acres of alfalfa, and 17,000 acres of clover and timothy hay, a substance which is required for our dairies.

Of course, the most important thing we have in St. Croix County is our people. There are 30,000 of us. The residential growth in our valley itself and St. Croix County has been a healthy one. People are moving from the larger cities to the rural areas every day. One of our biggest drawings is the fact we have pure air and good water. They come and see it and they live and stay.

You very probably wondered why I am bringing up the facts on St. Croix County, which you probably can get from many of our books, but actually we suspect that our beautiful St. Croix River, the area surrounding, and these resources are being endangered. Forty-three percent of St. Croix County's population are under the age of 19 years. Gentlemen, that is 43 percent. We have to speak for them. Whatever decisions that are made on air and water pollution, these children have to be taken into account, their welfare has to be established. Eleven percent of our population is 65 years and over. We understand that these people are more susceptible to respiratory diseases through air pollution.

I would like to take the time just to read a resolution that our county board adopted at the November session.

Whereas NSP proposes to build a powerplant at the village of Bayport, Washington County, Minn.; and

Whereas evidence has been submitted tending to show that damage will be done to water life and plant life in the St. Croix River due to heated water coming out of said plant; and

Whereas evidence has further been submitted tending to show that the air will be polluted by the coal burned in said plant, which polluted air will be harmful to people, animals, and crops in St. Croix County, which polluted air will tend to drift into St. Croix County because of prevailing westerly and northwesterly winds: Now, therefore, be it

Resolved, That the Governor of the State of Wisconsin, the State department of agriculture, public service commission, industrial commission, department of health, conservation department, and the president of Northern States Power Co. be respectfully requested to inquire into the proposed project and determine whether or not any damages may be inflicted on St. Croix County and propose measures to protect the river and the environs from such damage, if any.

(Signed) ARTHUR N. OLSON.

STATE OF WISCONSIN,
County of St. Croix, ss:

I, Lola M. Turnquist, county clerk in and for said county, do certify the above to be a true and correct copy of a resolution adopted by the St. Croix County Board of Supervisors on November 13, 1964.

(Signed) LOLA M. TURNQUIST.

By county board action at the last session, because of the air pollution problems that might take place and the water pollution, they have established a water and air pollution committee to study the effect on St. Croix County and its people. As it stands now, we see no legal means of protecting this great resource, and before it is sold to anyone we should be consulted. To sell something that does not belong to you is wrong, legally and morally. Our people have appealed to us as county supervisors to do something.

I am here as a county supervisor to appeal to you gentlemen. We urge your committee to pass or find some legislation to protect our interest in a matter such as this.

At this time I would like to thank you gentlemen for your work in trying to protect our natural resources all over the country from undue exploitation.

Thank you very much.

Senator NELSON. Thank you. [Applause.]

Mr. THUET. On behalf of Save the St. Croix, we would like to introduce our speaker who, in turn, will introduce the following speaker. This is Mr. Adrian Warren, who is chairman of Save the St. Croix, a resident of Houlton, Wis., and a St. Paul businessman.

Adrian.

STATEMENT OF ADRIAN L. WARREN, HOULTON, WIS., CHAIRMAN OF SAVE THE ST. CROIX, INC.

Mr. WARREN. Mr. Chairman, members of the subcommittee, ladies and gentlemen, my name is Adrian L. Warren, a resident of Houlton, Wis., just across the river on the bank of the beautiful St. Croix.

We are gratified that this committee has found time in its busy schedule to come to Minnesota to study a situation we feel is of vital concern not only to the people of Minnesota and Wisconsin, but one which embraces a principle important to the welfare of all Americans.

I am speaking today as chairman of Save the St. Croix, Inc., an organization of some 500 people supported by more than 10,000 petitioners in Minnesota and Wisconsin who have joined together in

opposition to the proposed Northern States Power Co. generating plant at Oak Park Heights, Minn.

Briefly, our opposition to the plant is based on fears that it would aggravate air and water pollution, pose a hazard to water safety and detract from the overall recreational value of the St. Croix Valley.

Since NSP announced its intentions to build the plant at Oak Park Heights, we have raised many questions as to its effects in these areas, questions which we feel have not been answered to any degree of satisfaction. In our search for answers we have gathered a wealth of information which will be submitted to you today and which we feel supports our position that the plant's economic promise does not outweigh the disadvantages it will bring.

Our complete statements of policy have been submitted, but, to summarize events leading to the formation of Save the St. Croix and to reemphasize our basic stand, I would like to add the following information.

During the summer of 1964, many residents of the St. Croix Valley became alarmed at the prospect of a powerplant at Oak Park Heights. Scientists and engineers who studied the proposed plant concluded there were ample grounds for concern in the areas of air and water pollution. This concern for the welfare of the St. Croix River spread to the many who come from the surrounding areas to enjoy this fine river. In addition, people throughout the Nation who learned of the proposed powerplant and to whom conservation is a major concern became interested in this specific problem. All of these make up the movement to save the St. Croix.

A major function of our organization has been the gathering and evaluating of information that bears on the proposed powerplant. Prime sources of information are announcements of plans by Northern States Power Co. itself. The implications of such information are worked out by our technical committee which consists of scientifically and technically trained men.

Reports, announcements, and speeches are written and sent to interested persons, including governmental bodies which we are sure welcome information and manifestation of informed concern.

Committee representatives have spoken at meetings, on television and radio. Our reports have been placed before other organizations with the result that many organizations have themselves become a part of the movement to save the St. Croix. These activities have been given wide publicity to the problems engendered by the proposed construction of a mammoth coal-burning generating plant.

To justify the truly significant support we have received, Save the St. Croix must continue to work within the framework of a policy that is socially acceptable. A policy confined to narrow selfish ends can find no wide support and deserves none. We must, therefore, urge the expansion of the recreational uses of the St. Croix River Valley by the establishment of more parks and campsites along its shores.

In yet a wider context, the total needs of the people must be considered in such a decision as the location of a powerplant.

Thus, we come to regional planning. Our magnificent assets in beauty, resources, and industry can be put to best human use by planning. It must be remembered that there is no longer any pressing need to increase our productive efficiency. Our problem is to live well

with the most productive capacity in the history of man. Electricity is already penny cheap; there is no longer any need to sacrifice good rivers to make it cheaper.

Sharing our concern for the future of the St. Croix River and Valley are numerous other conservation-minded groups, civic and professional organizations, municipalities and boating clubs. We have submitted statements from 26 of these organizations with a description of each and the number of individuals and families they represent. These organizations are: Citizens Natural Resources Association, Inc., of Wisconsin; Clear Air, Clear Water, Unlimited; Franconia, Minn. Residents Friends of the Wilderness; Hudson, Wis., City Council; Izaak Walton League of America, Minnesota Division; Kinni-Croix Recreational Area; Lakeland, Minn., Village Council; Lakeland Shores, Minn., Village Council; Minnesota Society of Architects; Miss' Croix Yacht Club; North Central Marine Association; River Falls, Wis., Boat Club; River Falls, Wis., Sportsmen's Club; St. Croix County Board; St. Croix Valley Rod and Gun Club; St. Croix River Association; St. Croix Yacht Club; St. Joseph's, Wis., Township; St. Paul Planning Board; St. Paul Yacht Club; Save the St. Croix, Inc.; Suburban Boating Club; Minnetonka, Minn., 10,000 Lakes Boating Club; Winford Lands Homeowners Association; Women's Club, Hudson, Wis.

Incidentally, two of these, the Lakeland, Minn., Village Council and the Lakeland Shores, Minn., Council fall within the confines of Washington County contrary to some information we have heard.

Now, gentlemen, so that we can all better understand the problem at hand, I would like to present at this time the spokesman for the St. Croix River Association, the dean of groups that support our border stream and has worked for 53 years for the best interests of the valley. Mr. James Taylor Dunn, their respected president and chief librarian of the Minnesota Historical Society, will speak on the history and nature of the St. Croix Valley.

Mr. Chairman, Mr. James Taylor Dunn.

Senator NELSON. Thank you.

STATEMENT OF JAMES TAYLOR DUNN, PRESIDENT OF THE ST. CROIX RIVER ASSOCIATION

Mr. DUNN. Mr. Chairman, members of the committee, before I present my prepared statement I would like to acknowledge the very excellent summary made yesterday afternoon by the St. Croix River Association's valued friend and long-time active member, Chester Wilson, when he stated about the stand that has been taken by this association, and of our recommendation early in September to Governors Rolvaag and Reynolds, a joint commission be formed to study the effect of the Northern States Power Co.'s plant at Oak Park Heights.

May I further acknowledge for the record that the idea for such commission came from an outstanding editorial published on August 4, 1964, in the Red Wing, Minn., Daily Republican Eagle. The St. Croix River Association, which is made up of members from both sides of the river, is delighted that Governor Reynolds has taken this step.

The St. Croix River begins its winding journey to the Mississippi at Upper St. Croix Lake, just 32 miles south of Superior, Wis. It travels

165 miles in a southerly direction, draining a vast region of 7,650 square miles, until it reaches the great Father of Waters at Prescott, Wis. For 127 of these miles the St. Croix has since 1848 formed the boundary between the States of Wisconsin and Minnesota.

From the beginning of white man's settlement in the St. Croix Valley, the river below The Dalles of the twin villages of Taylors Falls, Minn., and St. Croix Falls, Wis., has served as an important, even an essential, part of the everyday life of the area. In the winter there was ice skating and iceboating on the wide expanse of Lake St. Croix, and during the summer, the pioneers made pleasure trips on its clear waters, fishing, hunting, and picnicking from the decks of paddle-wheel steamers and lesser craft. Such excursions were often the only forms of entertainment available to the pleasure-starved early settlers. And they made the most of the watery playground at their doorsteps. Later in the century tourists by the hundreds came to the St. Croix Valley to see for themselves the beauties they had read about in the books and in the newspapers of Chicago, St. Louis, and New York. Then, as now, residents and visitors needed the river. Its beauties invigorated them and made them whole.

All too frequently, however, as the century progressed, their anticipated pleasures died aborning, for throughout the latter half of the 19th century the lumber industry completely controlled the river. Its representatives ignored the loud complaints of those who wished to use the waters for pleasure or out of necessity. Usually the stream was so choked with logs that mail and fishing boats and pleasure steamers could not get through. The slab and sawdust dynasties of Stillwater and Hudson, believing that business came first, turned a deaf ear to both laws and pleas to keep the channel open.

To get an idea of the enormity of the lumber industry, from 1838, when the first St. Croix log was commercially cut at Marine Mills, Minn., down to the turn of the century when the entire northern reaches of the river had been ruthlessly stripped of the stately white pine and the lumberjacks and sawyers moved on to better forests on the west coast, the St. Croix was a one-industry river. For over half a century, logs were the sole foundation of the valley's prosperity and the river served as the only means of getting them to market. From 1840 through 1903, the estimated yield of St. Croix forests came to the astronomical total of over 11½ billion board feet.

After all those logs had been sawed, and the valley lay stripped, lumbering was no longer a force in the valley's economy. Area residents then began looking to the future, to the development of the river, for recreational purposes. On September 23, 1911, interested residents met at Taylors Falls and formed the St. Croix River Improvement Association to act as a clearinghouse for problems facing the valley. The organization soon made its influence felt in the lower valley of western Wisconsin and eastern Minnesota. Interestingly enough, one of the earliest problems our predecessors in the new association had to face (this was in 1912) was the arbitrary attitude of the Minneapolis Electric Co. (an antecedent of the present-day Northern States Power Co.) in regulating the flow of water over the then-new hydroelectric dam at St. Croix Falls. The complete shutting down of this man-made obstruction was especially aggravating on weekends when the river was heavily used by boaters and fishermen. This was

over 50 years ago. The river association accused the electric company of monopolistic tendencies and of trying to control both the St. Croix and Mississippi Rivers.

Since its formation, therefore, the St. Croix River Association has worked long and hard for the best interests of the valley and it has made every effort to live up to its slogan: "All united to save for our children the uses and beauties of our river and valley." Sometimes it has succeeded; at other times it has failed. What is important, however, is that the organization has not feared to speak out when the valley's natural treasures have been threatened. Its members believe that the destruction of such resources is irrevocable, and that we cannot pass this way again.

Minnesota-born Supreme Court Justice William O. Douglas has warned us that some day—

Americans are going to wake up to the fact that they need more than beer and television for recreation.

Here in the heart of what has long been publicized as the "Friendly Valley" we have an important and heavily used Midwestern playground at the very doorstep of a burgeoning metropolitan complex. And let us not forget that with our ever-growing population, recreation, too, has become a moneymaking industry in its own right. The St. Croix River and its lake are probably the most popular and heavily used boating waters between Lake Michigan and the west coast, with the possible exception of the Mississippi at St. Louis. For this reason, the St. Croix River Association continues to be concerned over what man will do to the clear air and the placid, clean waters of this border stream and what our boaters, canoeists, wildlife enthusiasts, and fishermen will do when threatened by the dangers of heavy barge traffic. Did we not learn this lesson 75 years ago? Will coal barges and dense smoke replace the log rafts and sawdust of yesteryear?

Carl Carner, well-known New York State author and historian, succinctly summarized the problem when he testified at the Nation's Capital last summer against another powerplant to be constructed by Consolidated Edison in the highlands of the Hudson River: "We believe that ugliness begets ugliness," he said, "and that nature's beauty, once destroyed, may never be restored by an artifice of man." On July 10, 1964, Senator Hubert H. Humphrey wrote to me as president of the St. Croix River Association: "The St. Croix River is, indeed, one of the beautiful sites, not only of Minnesota but of our entire country," he said. And he added, "I love it as you do." To protect this beauty, the Northern States Power Co. promises every effort of good design and landscaping of its two proposed 20-story plants at Oak Park Heights to minimize the damage to the natural wildlife area of marsh and beach upon which it hopes to build. But is this enough? What will we be sacrificing in return for economic benefits which may be short lived? The St. Croix River Association is of the firm opinion that Lake St. Croix answers a recreational—yes, even a spiritual—need which is more necessary to America's health and well-being than all the commercial products it can provide; than all the money its clear waters can earn.

Thank you very much, gentlemen. [Applause.]

Senator NELSON. Thank you.

Mr. Thuet, do you have another witness?

Mr. THUET. At this time, we would like to dwell on the more technical aspects of the matters before us. We would like to call on Mr. Francis T. Hertes, who is a civil engineer—chairman of what we call our technical committee—who will speak on streamflow and the need for standards.

STATEMENT OF FRANCIS T. MERTES, HUDSON, WIS., CIVIL ENGINEER, HYDRAULIC SPECIALTY CONSULTING ENGINEER

Mr. MERTES. My name is Francis T. Mertes. I am a self-employed engineer with a hydraulic background, consulting engineer, from Hudson, Wis. I am registered as a professional engineer in the State of Minnesota and State of Wisconsin.

Mr. Chairman and members of the committee, I hope that our testimony here today, which was preceded by many months of study and opinionseeking, can be of some value in pointing the need for a strong Federal Water Pollution Preventative Act as proposed in S. 649 and authored by Senator Muskie.

The subject resource for these hearings, the St. Croix River and abutting valley, have been described very aptly by Mr. Dunn. I would like to add more detail to some of the aspects of usage and presumption as to why these usages occur.

Many persons have used the St. Croix Valley for residential purposes for many years. The trend has more recently become intensified to a point where the St. Croix Valley might be called a valley of commuters from work to a beautiful clean valley. The river is the focal point. These people have located their homes here, as I have, so we can view the river and its valley, relieve worldly tensions, and enjoy the river and valley for fishing, boating, swimming, and hunting. All of these residents have established a claim on its cleanliness. It would be folly for anyone to say that most of these residents would have located here regardless of the cleanliness.

Boaters by the thousands swarm to the river on weekends and many take advantage of this resource during the week. They come here because the river is clean, cool, and of quality acceptable to health standards. These people lay claim to their portion of the river. The rapidly growing marina industry which serves and adds to the economic structure of our valley also have their claim to a continuing clean, recreational river.

Many species of fish abound the river due to its cool temperature, lack of pollution, and adequate oxygen supply. Commercial and recreational fishermen alike derive income and pleasure from these fish. They also have claim to their part of this resource.

Then what of the many people who neither fish nor own boats but who derive great pleasure, relief, and a feeling of general satisfaction from just driving to and through the parks and roads adjacent to the river? They, too, have justifiable claim to recreational use of the valley. And what would the valley be without pure water?

We must also consider the thousands of YMCA youngsters who use the camp 3 miles south of Hudson. In addition to excellent swimming and canoeing, the valley provides them with many nature trails

for hiking and camping. They have used these resources for many years and they have a right to continue to do so.

And what of the St. Croix Valley Rod & Gun Club who drive their major income from a large ice fishing contest every year? A sizable portion of these funds are used to develop and foster good hunting and fishing habits in our youth. Both of these groups, too, lay claim to a portion of the river.

What of the Hudson Boosters who sponsor auto racing on the river's ice each winter? Their income from the annual event is used to support little league baseball during the summer. Their right to continue this program should be protected.

Many more groups could be listed, each day more and more citizen organizations, conservation groups, and various communities lay claim to their share of this resource. For too long we have been unaware that it needed active protection, but now we face an impending desire by the few to take what is not rightfully theirs alone.

I speak not entirely of the power company, but also of those proponents of extensive valley industrialization at the expense of dissipating a public resource for their own profit without due recourse to proper democratic or corporate practice.

In a corporation, as we know, all of the owners or their representatives must agree to sell before ownership can transfer. We submit that the resources of this valley are also public property, so all who share in these resources should also have a voice in its impending sale.

We are obligated to preserve the recreational aspects of this river, not only for the present but also for future generations. In addition to its recreational values, we must also consider the industrial potential of the St. Croix Valley. Sound long-range planning dictates that we do not abandon our clean, cool water to one industry who would spoil it and jeopardize our present favorable position to future industry that could locate here without destroying the recreational values of our river.

The problems we face in this valley have been explained in a general way, so I will turn to the specifics of heat pollution.

First, I would stress that fact that the amount of heat pollution is dependent upon the flow for heat dilution. As General Wilson, Chief of Engineers, U.S. Army Corps of Engineers, has said, "Dilution is not the solution to pollution."

This is our opinion, gentlemen, on diluting the flow, diluting the heat exchange.

The riverflow data we have used for our calculations has been collected from flow records published by the U.S. Geological Survey. We have added the recorded flow of the St. Croix at Taylors Falls, Minn., to the Apple River at Somerset, Wis., to arrive at an estimated flow at the proposed powerplant site, so we feel this method is quite accurate.

Lowest flow at the plant site was 80 cubic feet per second in 1910. The average flow of the river is calculated over a long period 4,328 cubic feet per second. According to the Northern States factsheet and their permit request to the Minnesota Water Pollution Control Commission, the plant will need 660 cubic feet per second, or 300,000 gallons per minute. This represents 825 percent, or more than eight

times the low flow. I would also stress the fact that this is 15.3 percent of the total average flow, which includes all of the flood flows in many years which has occurred and brings the average very high.

Before going on, I would like to emphasize the fact that the technology of thermal transfer or heat exchange in rivers is not an exact science. It is an approximate science.

Senator NELSON. Mr. Mertes, are there any estimates on the cubic footage of water in St. Croix Lake?

Mr. MERTES. Mr. Chairman, we have hoped to calculate this, but we have not as yet accomplished this. We hope that some of the studies that are being accomplished will come up with this answer and compare the total volume in the lake with the volume needed to cool the turbines.

Senator NELSON. I think that would be a significant factor because if a second unit of this plant were built and some 1,200 or 1,400 cubic feet per second were being used and the riverflow was low there might be very dramatic consequences, it seems to me, in heating up the whole lake all the way down to the dam. I think it would be of value to this committee, and to the Minnesota Pollution and Conservation Committee, to have statistics submitted as to what would be the effect on this lake at such time as the powerplant was using the total flow of the rivers; and how long it would take when it was using the total flow to fill the whole lake with water that had been heated in the plant from 10° to 17°. I realize some of these things would take some long scientific investigation, but if we knew the total cubic feet in that lake we would have some rough estimate how long it would take before the heated water constituted total footage in the lake.

Mr. MERTES. We could calculate this, Mr. Chairman, if you would prefer, and I am not sure we could have it completed by the time the record is closed on this hearing, but we would be glad to do this if the task force is not already going to accomplish this.

Senator NELSON. I don't know whether the task force will or not.

Mr. MERTES. We could contact the task force. If they have intentions to do this we will not duplicate it; if they do not we will calculate it and furnish it.

Senator NELSON. All right.

Mr. MERTES. I was stating that the technology of thermal transfer is not an exact science, but it is an approximate science. We have been able to delineate there is a problem, but how great it is is another item. The point is that we have a potential problem to bring out, you are innocent until proven guilty, but when health hazards are concerned, we have proposed to reverse the rule to read, "Guilty until proven innocent."

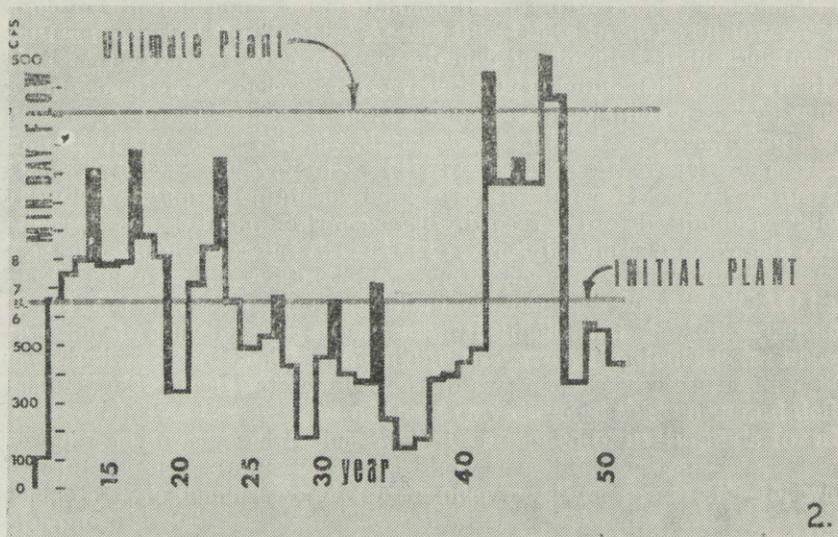
Our history is a long story of about learning about potentials too late after people become sick and resources have been lost as detergents, atomic fallouts and many, many other items, X-rays, these are all on history in finding out there is damage later. I think we should figure these are potential dangers and find out whether or not they can be solved before we pose them.

Now let's consider some of the facts concerning the amount of riverflow this proposed plant will ultimately use:

The data presented by NSP states an anticipated rise of 10° to 17° of the water passing through the plant for cooling. If the riverflow equals the plant needs, the whole river will be heated approximately 15° . If the riverflows are less than plant needs, recirculation will raise the temperature in excess of 15° . If, for example, the water temperature was 70° F., as it is many times during our summers, and the plant needs dictated recirculation four times this could mean that the water temperature could reach 100° F., as it is many times this could mean that the water temperature could reach 100° F. in the discharge area, that is, if the proper distribution did not take place or the transfer within the pool did not result rapidly.

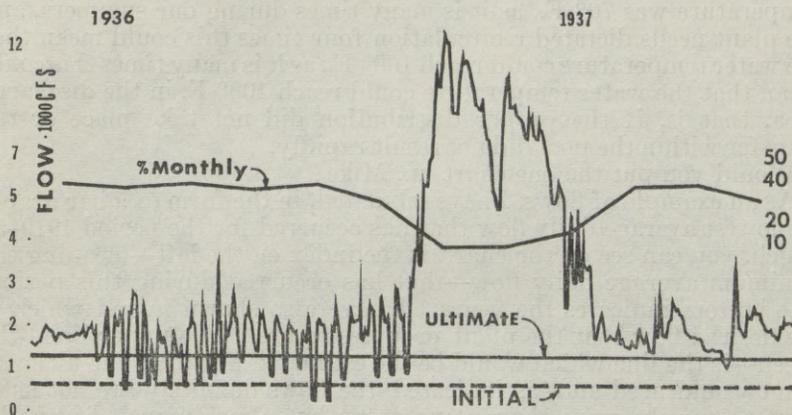
Would you put the one chart up, Mike?

As an example of flows, I have tabulated, in the form of a bar graph, the lowest average daily flow that has occurred for the period 1910-50 which, you can see on the chart, is the index on the left—meaning the minimum average daily flow—that has occurred during this period. The bottom indicates the years. I have also shown in red which is the desired flow that the plant proposes to use. The upper line—the green—is the line which would be the estimated flow that the ultimate plant would need and, as indicated, the flows definitely are not sufficient to supply more than plant needs but almost equals it on the initial plant and on the ultimate plant only 37 of the 40 years would the low riverflow have been equal to the plant needs. This chart we will furnish for the record by the 18th in another form.



The other chart which I have prepared is a typical low-flow year which indicates the trends throughout the whole year. The index on the left also is the flow that occurs during each day during the year, and it is during the year 1936 and 1937, and in the lower dashed

line is the line which the initial plant is proposed to use. The solid red line is the ultimate plant usage which indicates that many, many times, except during the high-flow years, the plant needs will equal or exceed the riverflow. I will submit this also for the record.



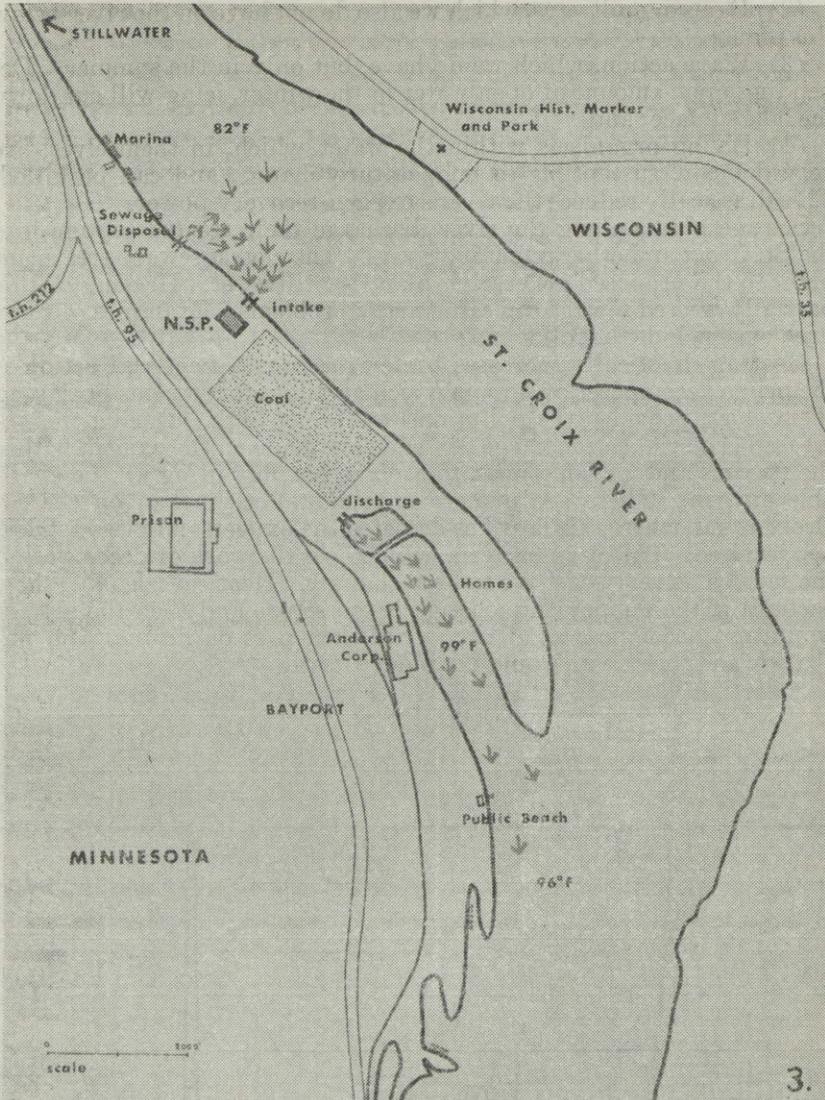
At this time I would like to point out the proposed plant orientation with respect to the surrounding topography. The Stillwater sewage plant, like most sewage plants, does not give complete treatment and it is located just upstream from the plant on the same side of Lake St. Croix. The proposed location of the powerplant is approximately 1,000 feet above the north end of what is called Andersen's Bay, which also will be used as a discharge channel to the river. Along the bay is the village of Bayport, which also has its beach at the mouth of the bay.

I have prepared another chart which shows these various aspects and items which I would like to point out quickly and which also will be submitted for the record. (See chart on p. 116.)

We have shown on here, which is true to scale—made up from the aerial photograph we have on the wall back there—the sewage treatment plant; the marina above it; and the possible flows that may come out of the sewage treatment plant. I have also indicated a temperature of 72° in the upper portion above the plant intake which was a temperature recorded in two of the Minnesota Health Department water-sampling programs.

If the water is pulled in which is mixed with some of the sewage, heated 17° in the plant, we would have a resultant temperature of 99° in Andersen's Bay. According to the power company statement by Mr. Hill at the water pollution commission board meeting, the flow would be retained somewhere in the neighborhood of 10 hours in the bay losing 3° , so we would have a resulting temperature from this situation of 96° as it passes by the public beach and enters the mixing zone of the river.

I might point out that the coal pile, as indicated, is drawn to scale. I would like to indicate the size of it. It is large enough to put the whole Andersen Corp. plant in it which would be a shame, because, that is a very, very clean and beautiful industry.



Water, which has a large amount of oxygen within it, dissolved or free, has a maximum capability to carry or hold oxygen based on the temperature of the water. If water is heated, some oxygen will be driven off. The carrying capacity reduces quite sharply. This then means that, as the plant heats the water, oxygen will be driven off. The amount will vary with the amount of heating.

Oxygen recovery in a stream occurs by various means:

(1) Rapids in a river, which we do not have on the St. Croix below this site;

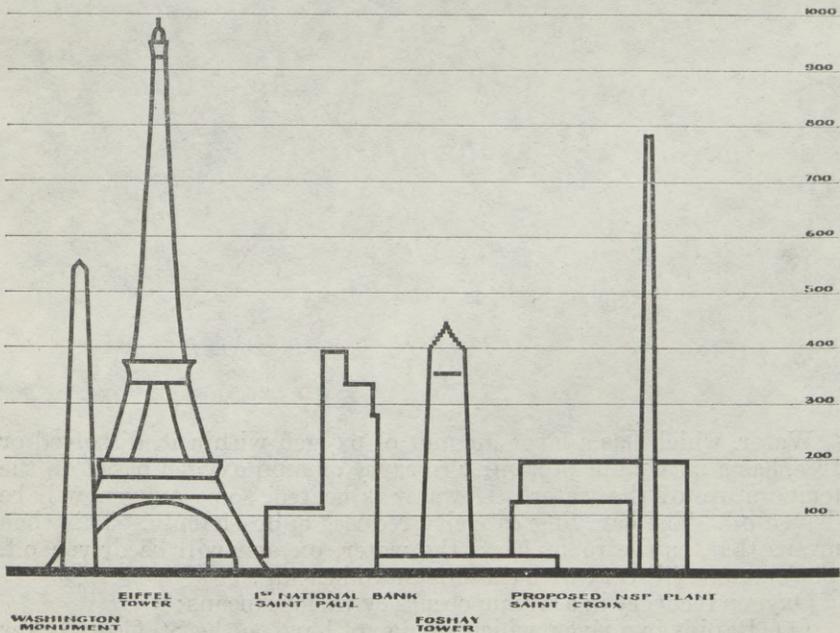
(2) Dams or spillways, which we also do not have on the river below this plant;

(3) Wave action, which we do have, but only in the summer. Depending upon amount of open water in the winter, icing will cut down the lake surface; and

(4) Living organisms within the water which, in themselves, are very delicate, susceptible to temperature change, and can be killed. This drastically reduces the river's oxygen-recovery power.

Sewage plants along the river discharge their treated sewage into the St. Croix and other tributary rivers. The closest sewage treatment plant to the proposed generating plant is Stillwater. Heating of this partially treated sewage can cause many problems. Examples of these problems include the following:

Heating drastically increases bacterial action. Bacterial action is the prime decomposer of sewage which accounts for streams purifying themselves, provided the pollution level is not high. During this increased bacterial action, large demands are made on the oxygen within the streams and, at sometimes, to a point possibly using all the available oxygen. There are numerous accounts, other than on the St. Croix as yet, where this heat has depleted the oxygen and mass fish kill has resulted. The clean bacteria, which does the work of decomposing the sewage, is very sensitive to heat changes. Heat can also kill these bacteria if the temperature change is too severe and then the sewage would not decompose at all; it would then pass on downstream unabated; and the stream would not purify itself.



The river presumably would be partially ice free for a considerable distance downstream—approximately 3 miles or so—and, as stated by Mr. Hill of the Northern States water pollution, it would be clear possibly down to the Hudson Bridge. Warm water tends to remain on the top of the pool of water thus tending to render the mixing inefficient. This ice-free area would then affect the ice fishing, ice sailing, and the auto racing.

Now, some would presume that this increase in temperature during the winter would be beneficial, but we have to consider the foods upon which fish feed. Some eggs of a food chain called *Daphnia* have to be chilled or frozen before they hatch. Some of another food chain, called diatoms, abound only at temperatures below 50° F. If the river temperatures are affected enough, these fish foods may not be available. Yes, there are other foods, but can we risk the loss of these? Gentlemen, we cannot answer this question; we need biological studies by fisheries experts for this.

As water temperatures rise, aquatic organisms require more dissolved oxygen, yet temperature is the most important single factor affecting the solubility of oxygen.

We are not just concerned with the present changes, we are also concerned with what will happen in the future. We do not want to see the growth of the valley stagnated because we have used up all the resources of the river. Our residential and recreational population, as I have previously stated, has grown by leaps and bounds. All of the towns along the river have sewage treatment plants. These plants are presently doing the job of reducing the sewage to a point where the river is acceptable for all the uses we have described. But none of these sewage plants have complete treatment, so they must rely on the bacteria and oxygen in the river to completely purify this sewage.

When all studies on the river water's characteristics are completed, we may find that the biological oxygen demand is as high as it can presently be. We must, therefore, make every effort to require every water user to keep or return the water in as good a state as it was when taken from the river. At least, all technological ability must be used to insure that river quality will not be jeopardized.

There are many pollutant elements we cannot control, or do we even know their source. In the St. Croix Valley we have an unusual situation where a certain amount of the drainage area contributing to the river is wooded. Rainfall water partially decays the fallen leaves and grasses, and then carries certain minute portions of decayed matter into the stream, creating an oxygen demand for further decay. Naturally, we do not wish to reduce the wooded area, so we live with nature's oxygen demand.

The counties abutting the river are heavily farmed, and, as such, fertilized. A certain portion of these fertilizers find their way to the stream, causing some effects on plant growth and many other yet unknown effects.

With this area becoming a "suburbia," we are subject to some uncontrollable erosion which results in silt in the stream. Lake St. Croix is quite large and can, perhaps, stand a substantial amount of silting

before it gets filled, but this is not the problem as much as the effect on plants, micro-organisms, and fish spawn which can be trapped or destroyed on the bottom of the river.

Many beneficial pesticides are now being used to great advantage to the farmer and homeowners, and must continue to be used, but a certain portion of these have found their way into streams, having harmful effects on fish and aquatic plants.

The St. Croix River is used very extensively by boats, as we all know, and this will continue and increase in the future. Although both the States of Minnesota and Wisconsin now have boat toilet laws, there will still be some uncontrollable pollution added to the waters from this source.

I reiterate that we must extend a herculean effort to preserve what water quality we now have with the realization that with "progress" comes some uncontrollable pollution; but, if we overuse our natural resources, we will destroy those resources and pay much too much for the march of progress.

We now come to the control of this resource by legal means. As such, no written standards of water quality have been set for the St. Croix River, nor have any hearings been set to search out people's desires and needs as guide in establishing standards.

We have been told that there is not time to establish standards previous to consideration of this plant, the proposed Allan S. King steam-electric generating plant.

If we had Federal standards, talked of as provided in S. 649, then we would have guidelines to protect our resources. I am convinced that no equitable evaluation of powerplant effects on this valley can be made without such standards, even if they do require considerable study.

To the best of our knowledge, there are only a few scattered water test results available and a short, 2-week study made recently by the Department of Health, Education, and Welfare. I don't believe these are sufficient to make a proper assessment of our present situation, much less project the future effects of this proposed plant.

There are those who would object to evaluation of the future of our natural resources by the Federal Government, and, as stated previously, there are many, many groups who would like to use the Government, the Federal Government, to be the "big bad wolf" in this situation so they could make the determination, so they would thus be influenced by local pressure, lobbys, and other efforts and could make a judgment more equitable to all concerned than any other governmental unit.

So we submit, Mr. Chairman, that we are in favor of S. 649, at least in its provisions to provide Federal standards which would not duplicate necessarily the State standards but supplement if the State standards were not available. [Applause.]

Senator NELSON. Thank you very much.

Senator Metcalf, did you have any questions?

Senator METCALF. No.

Senator NELSON. Thank you.

(The full text of Mr. Mertes follows:)

PREPARED STATEMENT OF FRANCIS T. MERTES, P.E., ON STREAMFLOW AND THE
NEED FOR STANDARDS

Mr. Chairman, members of the committee, I hope our testimony here today, which was preceded by many months of study and opinion seeking can be of some value in pointing the need for a strong Federal water pollution preventative act as proposed in Senate bill 649 and authored by Senator Muskie.

The subject resource for these hearings, the St. Croix River and abutting valley have been described very aptly by Mr. Dunn. I would like to add more detail to some of the aspects of usage and a presumption as to why these usages occur.

Many persons have used the St. Croix Valley for residential purposes for many years. The trend has more recently become intensified to a point where the St. Croix Valley might be called a valley of commuters—from work to a beautiful clean valley. The river is the focal point. These people have located their homes here, as I have, so we can view the river and its valley, relieve worldly tensions and enjoy the river and valley for fishing, boating, swimming, and hunting. All of these residents have established a claim on its cleanliness. It would be folly for anyone to say that most of these residents would have located here regardless of the cleanliness.

Boaters by the thousands swarm to the river on weekends and many take advantage of this resource during the week. They come here because the river is clean, cool, and of quality acceptable to health standards. These people lay claim to their portion of the river. The rapidly growing marina industry which serves and adds to the economic structure of our valley also have their claim to a continuing clean, recreational river.

Many species of fish abound the river due to its cool temperature, lack of pollution, and adequate oxygen supply. Commercial and recreational fishermen alike derive income and pleasure from these fish. They also have claim to their part of this resource.

Then what of the many people who neither fish nor own boats but who derive great pleasure, relief, and a feeling of general satisfaction from just driving to and through the parks and roads adjacent to the river? They, too, have justifiable claim to recreational use of the valley. And what would the valley be without pure water?

We must also consider the thousands of YMCA youngsters who use the camp 3 miles south of Hudson. In addition to excellent swimming and canoeing, the valley provides them with many nature trails for hiking and camping. They have used these resources for many years and they have a right to continue to do so.

And what of the St. Croix Valley Rod & Gun Club who derive their major income from a large ice-fishing contest every year? A sizable portion of these funds are used to develop and foster good hunting and fishing habits in our youth. Both of these groups, to, lay claim to a portion of the river.

What of the Hudson Boosters who sponsor auto racing on the river's ice each winter? Their income from this annual event is used to support little league baseball during the summer. Their right to continue this program should be protected.

Many more groups could be listed. Each day, more and more citizen organizations, conservation groups, and various communities lay claim to their share of this resource. For too long we have been unaware that it needed active protection but now we face an impending desire by the few to take what is not rightfully theirs alone.

I speak not entirely of the power company, but, also, of those proponents of extensive valley industrialization at the expense of dissipating a public resource for their own profit without due recourse to proper democratic or corporate practice.

In a corporation, as we know, all of the owners of their representatives must agree to sell before ownership can transfer. We submit that the resources of this valley are also public property so all who share in these resources should also have a voice in its impending sale.

We are obliged to preserve the recreational aspects of this river, not only for the present but also for future generations. In addition to its recreational

values, we must also consider the industrial potential of the St. Croix Valley. Sound long-range planning dictates that we do not abandon our clean, cool water to one industry who would spoil it and jeopardize our present favorable position to future industries that could locate here without destroying the recreational values of our river.

The problems we face in this valley have been explained in a general way so I will turn to the specifics of heat pollution.

First, I would stress the fact that the amount of heat pollution is dependent upon the flow for heat dilution. As General Wilson, Chief of Engineers, U.S. Army Corps of Engineers, has said, "Dilution is not the solution to pollution."

The riverflow data we have used for our calculations has been collected from flow records published by the U.S. Geological Survey. We have added the recorded flow of the St. Croix at Taylors, Minn., to the Apple River at Somerset, Wis., to arrive at an estimated flow at the proposed powerplant site, so we feel this method is quite accurate.

Lowest flow at the plant site was 80 cubic feet per second in 1910. The average flow of the river is 4,328 cubic feet per second. According to the Northern States fact sheet, and their permit request to the Minnesota Water Pollution Control Commission, the plant will need 660 cubic feet per second, or 300,000 gallons per minute. This represents 825 percent, or more than eight times, the low flow. I would also stress the fact that this is 15.3 percent of the total average flow.

Before going on, I would like to emphasize the fact that the technology of thermal transfer or heat exchange in rivers is not an exact science. It is an approximate science. It is not hard to delineate the problem but the magnitude is more difficult to ascertain. The point is that we have a potential problem. In law, the rule is innocent until proven guilty but, when health hazards are concerned, we should reverse the rule to read "Guilty until proven innocent."

Now let's consider some of the facts concerning the amount of riverflow the proposed plant will ultimately use:

The data presented by NSP states an anticipated rise of 10° to 17° of the water passing through the plant for cooling. If the riverflow equals the plant needs, the whole river will be heated approximately 15°. If the riverflows are less than plant needs, recirculation will raise the temperature in excess of 15°. If, for example, the water temperature was 70° F., as it is many times during our summers, and the plant needs dictated recirculation four times, this could mean that the water temperature could reach 100° F. in the discharge area if the proper distribution did not take place or the transfer within the pool did not result rapidly.

As an example of flows, I have tabulated in the form of a bar graph the lowest average daily flow for the years 1910-50 and, of these low days, plant needs exceeded the lowest daily flow 18 of these years. If, according to NSP's announced plans, a second plant is built, this low-flow day would have been exceeded in 37 of the 40 years in this record.

The other chart I display is a typical low-flow year plotted by riverflow any day. It can be easily seen that plant needs exceeded the flow provided by the river many times during this year.

At this time, I would like to point out the proposed plant orientation with relation to the surrounding topography. The Stillwater sewage plant, like most sewage plants, does not give complete treatment and it is located just upstream from the plant on the same side of Lake St. Croix. The proposed location of the powerplant is approximately 1,000 feet above the north end of what is called Andersen's Bay, which also will be used as a discharge channel to the river. Along the bay is the village of Bayport which also has its beach at the mouth of the bay.

This illustration shows possible mixing with river water that would occur in the river before intake to the plant would occur. This means that the sewage effluent would not be effectively mixed with the river or purified before it is pulled into the plant and heated 17° F. If we assume a temperature of 83° F. for the river water, which it could easily be, add 17° F. to it and we have a resultant outflow of 100° F. water from the plant, mixed with sewage. It has been stated, by NSP officials, that about a 10-hour retention would result in the bay with about 3° F. loss of heat here. This means that the water would be discharged into the river at 97° F. and, then, would depend completely on mixing for residual river temperature.

Water, which has a large amount of oxygen within it, dissolved or free, has a maximum capability to carry or hold oxygen based on the temperature of the water. If water is heated, some oxygen will be driven off. The carrying capacity reduces quite sharply. This, then, means that, as the plant heats

the water, oxygen will be driven off. The amount will vary with the amount of heating. Oxygen recovery on a stream occurs by various means:

1. Rapids in a river, which we do not have on the St. Croix below this site;
2. Dams or spillways, which we also do not have on the river below this plant;
3. Wave action, which we do have, but only in the summer. Depending upon amount of open water in the winter, icing will cut down the lake surface; and
4. Living organisms within the water which, in themselves, are very delicate, susceptible to temperature change, and can be killed. This drastically reduces the river's oxygen-recovery power.

Sewage plants along the river discharge their treated sewage into the St. Croix and other tributary rivers. The closest sewage treatment plant to the proposed generating plant is Stillwater. Heating of this partially treated sewage can cause many problems. Examples of these problems include the following:

Heating drastically increases bacterial action. Bacterial action is the prime decomposer of sewage, which accounts for streams purifying themselves, provided the pollution level is not high. During this increased bacterial action, large demands are made on the oxygen within the streams and at some times to a point possibly using all the available oxygen. There are numerous accounts, other than on the St. Croix as yet, where this heat has depleted the oxygen and mass fish kill has resulted. The clean bacteria, which does the work of decomposing the sewage, is very sensitive to heat changes. Heat can also kill these bacteria if the temperature change is too severe and then the sewage would not decompose at all; it would then pass on downstream unabated and the stream would not purify itself.

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Now, some would presume that this increase in temperature during the winter would be beneficial but we have to consider the foods upon which fish feed. Some eggs of a food chain called *Daphnia* have to be chilled or frozen before they hatch. Some of another food chain, called diatoms, abound only at temperatures below 50° F. If the river temperatures are affected enough, these fish foods may not be available. Yes, there are other foods but can we risk the loss of these? Gentlemen, we cannot answer this question; we need biological studies by fisheries experts for this.

As water temperatures rise, aquatic organisms require more dissolved oxygen yet, temperature is the most important single factor affecting the solubility of oxygen.

We are not just concerned with the present change; we are also concerned with what will happen in the future. We do not want to see the growth of the valley stagnated because we have used up all the resources of the river. Our residential and recreational population, as I have previously stated, has grown by leaps and bounds. All of the towns along the river have sewage treatment plants. These plants are presently doing the job of reducing the sewage to a point where the river is acceptable for all the uses we have described. But none of these sewage plants have complete treatment so they must rely on the bacteria and oxygen in the river to completely purify this sewage.

When all studies on the river water's characteristics are completed, we may find that the biological oxygen demand is as high as it can presently be. We must, therefore, make every effort to require every water user to keep or return the water in as good a state as it was when taken from the river. At least, all technological ability must be used to insure that river quality will not be jeopardized.

There are many pollutant elements we cannot control, nor do we even know their source. In the St. Croix Valley, we have an unusual situation where a certain amount of the drainage area contributing to the river is wooded. Rain-fall water partially decays the fallen leaves and grasses, and then carries certain minute portions of decayed matter into the stream, creating an oxygen demand for further decay. Naturally, we do not wish to reduce the wooded area so we live with nature's oxygen demand.

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The St. Croix River is used very extensively by boats, as we all know, and this will continue and increase. Although both the States of Minnesota and Wisconsin now have boat toilet laws, there will still be some uncontrollable pollution added to the waters from this source.

I reiterate that we must extend a herculean effort to preserve what water quality we now have with the realization that with "progress" comes some uncontrollable pollution; but, if we overuse our natural resources, we will destroy those resources and pay much too much for the march of progress.

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If we had Federal standards, as provided in S. 649, then we would have guidelines to protect our resources. I am convinced that no equitable evaluation of powerplant effects on this valley can be made without such standards, even if they do require considerable study.

To the best of our knowledge, there are only a few scattered water test results available and a short, 2-week study made recently by the Department of Health, Education, and Welfare. I don't believe these are sufficient to make a proper assessment of our present situation, much less project the future effects of this proposed plant.

There are those who would object to evaluation of the future of our natural resources by the Federal Government. Some would like the Federal Government to be the "Big Bad Wolf" in this respect; so I submit that the Federal Government should intervene because it is far less likely to be influenced by local pressures, lobbies, and other efforts and could make a judgment more equitable to all concerned than could any other governmental unit.

Mr. THUET. Our next speaker, Mr. Chairman, will be our president of Save the St. Croix, a very eminent chemical engineer, who has lived in this valley for over 20 years, Mr. Carl A. Pemble.

STATEMENT OF CARL A. PEMBLE, PRESIDENT, SAVE THE ST. CROIX, INC.

Mr. PEMBLE. Senator Nelson, Senator Metcalf, and others here, thank you for helping in the general problem of which you are an example. My remarks may seem, to some extent, to repeat those of Mr. Mertes. However, I will pay more attention to the amount of heat, how it gets into the river, and its effect, especially in the hot days of August, which is the critical month.

It is unfortunate that the extent of concern by so many for conservation of and for the St. Croix River is manifested only now after the future of the river has been placed in doubt. Perhaps too many of us believed that the best things in life are free until we learned that our right to clean air and clean, cool water must be defended.

However, we are not engaged in a fight, but in the resolution of a problem about the use of natural resources. To this project we bring our different needs, values, and opinions. And here again, we see that a lot of trouble could have been avoided had the opinions of all been considered much sooner. Instead, there has been and still is stubborn resistance to regional planning.

Some people, beyond differing with the values we place on the river, say they can see no cause for concern about water and air pollution. Very well, we shall submit facts and figures to show that there is cause for concern. You know, people have stood up at meetings to say, "Give us the facts, but don't bother us with figures. Your numbers are too big and scary."

But if we want to understand what goes here, we can't avoid the numbers. I hope you will notice how just "big" and "scary" numbers are.

My report is documented in footnotes, but they would be too cumbersome to mention here in my oral summary.

My calculations have been checked by competent colleagues.

I would like to correct a little slip of Mr. Ewald's. He mentioned 1,300 cubic feet per second as the minimum low flow in the record. I am sure this was a mistake. On the fact sheets of Northern States Power it shows much lower flow and such are a matter of record of the geological survey. It might give rise to questions later on. I am sure there was no intention to deceive there.

Senator METCALF. While we are talking about the statement of Mr. Ewald, I wonder if you would comment on the fact, in his fact sheet he said, in the winter water temperature would be increased to 30°. Wasn't that a slip, too?

Mr. PEMBLE. No. They increase the temperature more in the winter so the ice won't clog up their canals and their condensers and so forth. They could have a freezeup that would shut them down if they allowed the ice to melt.

Senator METCALF. So there would be such an increase. The statement was, at the point of discharge the total temperature rise of the condensing water will be about 17° in the summer. He testified that would be 10° to 17° in the summer, and about 30° in the winter.

Mr. PEMBLE. Yes.

Senator METCALF. That was not a slip?

Mr. PEMBLE. That is correct, that is quite correct. They would have to do some recirculating by some other means, I suppose, than out through the river. That is necessary, otherwise, they would have frozen canals and it would shut them down.

Senator NELSON. We didn't get to inquiring about this question yesterday, as I recall. This afternoon I would like to pose the question to the Northern States Power Co.

It is my understanding that as a matter of policy or law in England the power companies are required when they are drawing the water from public streams to erect cooling towers in order to return the water back to the stream in roughly the same condition and the same temperature as it was withdrawn.

My inquiry is whether there is any reason why a country such as ours, which is obviously much richer than England, shouldn't require the same standards. Are you aware of this practice and policy, and do you have any information on it?

Mr. PEMBLE. Yes. It is covered later in my report, this particular point. So, if you don't mind, I will continue and take it up at that time.

Senator NELSON. You just proceed.

Mr. PEMBLE. In regard to the proposed plant, I am going to consider just the first unit, because the application for a permit to dump

heat into the St. Croix River before the water pollution control commission covers just this first unit now. We must remember the second unit, planned for completion in 1970, would more than double the pertinent figures that follow in this report.

The expected maximum capability of its first unit is 600,000 kilowatts. This is more than twice the peakload of the city of St. Paul. Not that St. Paul needs this electricity, the generating capacity within the city limits is already double the peakload of the city.

The boiler capacity, the fundamental measurement of the plant's coal-burning ability is 240 tons per hour. This amounts to over 5,000 tons a day, or 2 million tons per year, which is twice the coal burned in the city of St. Paul, Minneapolis, and adjacent suburbs in the year of 1958 in accordance with the board of health survey. The proposed plant, being the most efficient, would be run at maximum capacity for as much time as possible. And, of course, load fluctuates and at times it would be lower than capacity load, but this point wouldn't slow down at such times. The less efficient plans would ease off, this would be the most economical way in which to operate the whole system. It is all one big system with more than one plant on the lines.

Now, only about two-fifths of all this power, this energy, goes to make electricity which is salable. About the same amount of power in the form of waste heat goes out with the steam from the condensers, the lower pressure steam—pardon me, not from the condensers, from the turbines—it goes to the condensers where this heat is removed from it by transference through the walls of the condensers to another body of water which we call the coolant on the outside wall, so to speak, of the condensers.

One method of disposing of this heat is to circulate this coolant water through huge trickling towers where by evaporation and contact of the air, the heat is lost to the atmosphere. The cooled water then can return to the condensers. Or another variation as suggested by Senator Nelson would be that these waters would be returned to the river somewhat cooled by passage through these trickling towers.

In response to the other question, the cost of these towers, this is according to Mr. Hill, a statement made at the water pollution control commission meeting on August 21, would be a half million or \$600,000 a year which sounds like a lot of money, but in view of the scope of this operation, when you reduce this to cost per kilowatt-hour, it turns out to be about a penny for a hundred kilowatt-hours.

The Northern States Power Co. wants to save this penny and dump the heat right into the river. This would be accomplished by simply circulating the water through the condensers, from the water from the river, and the company has applied to the water pollution control commission for permission to dump into the St. Croix River 2,520 million British thermal units per hour.

What will be the effects of dumping this heat into the river?

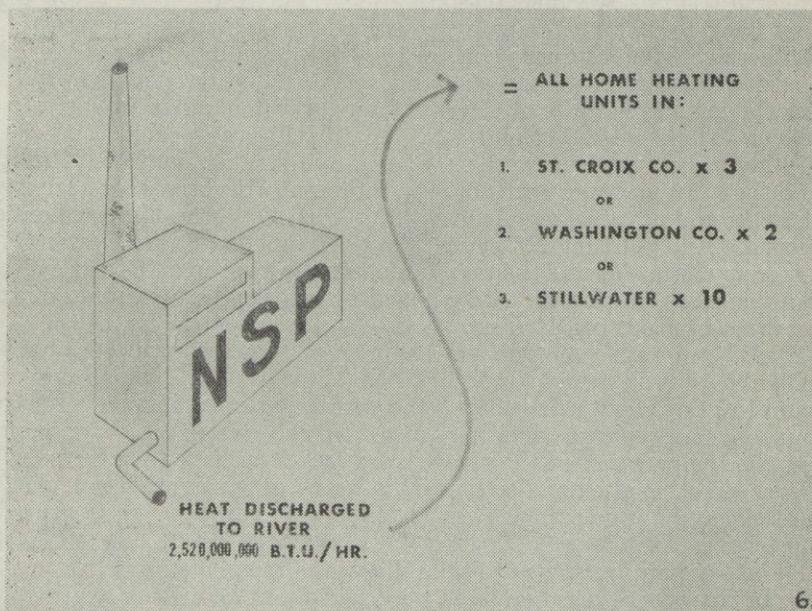
There are two obvious facts that indicate need to study the hazard. A little aside here, we didn't go off half-cocked or something of that sort, we didn't all of a sudden become knowledgeable about this. We see this is an enormous amount. We made some careful studies and this indicates that more studies are needed until we arrive at the point where we feel a very comprehensive study is needed by duly qualified experts and authorities.

This is an enormous amount of heat, it is the equivalent of 2,000 tons of coal burned per day. To put this in familiar terms, it would be the heat output of 20,000 home heating furnaces going full blast. That is about 10 times the domestic heating capacity of the city of Stillwater.

The second obvious fact is that the St. Croix River is a small river as regards flow. It is quite obvious if you go above Stillwater. At Stillwater it becomes broader and deeper, forming Lake St. Croix.

From Lake St. Croix, below the sewage plant as Mr. Mertes pointed out, they propose to take 660 cubic feet per second, lead it down to a canal to the condensers, and heat it there by 17 degrees.

We have had statements that there will be a cooling effect as it spends its 10 hours going down through the bay, but I suspect this would be sort of an average figure for the year. I am going to be concerned here with the hot months of August, which, in my opinion, not so very much cooling could occur there.



The heated water then flows down through the bay and mixes with the St. Croix River at the site of the Bayport swimming beach, and what is designated as the "mixing zone," whose boundaries vary with flow and other factors. Within this "mixing zone," temperatures vary from that of the upstream temperatures from the condensers down to the temperature of the river below, vary from place to place and time to time. This mixing thing presents, in itself, some hazards for fish life and aquatic life.

As the mixing waters seek downstream, the mixing finally is complete enough so that the temperature pattern of the river resembles that of the normal river upstream, except that it is warmer. To estimate the effects on the life and sanitary problems of the river, we have

to know how much warmer it is. Essentially this downstream temperature is governed by three factors. In fact, there may be some arguments on a rather middling basis as to whether these figures would be exact. Of course, they wouldn't be, it is too complicated for that, but nevertheless it has become the practice to use the figures arrived at by the method I am going to present as an index of what would happen downstream, and especially in August your temperatures downstream would be very close to this.

This temperature downstream is determined by three factors. One, the amount of heat injected per given time. Two, the flow of the river, that is, its volume per given time. And, three, the temperature upstream. On a whole, whether you have recirculation or not doesn't make any difference in the downstream—well, it is part of the mechanism, the low flow inevitably occurs so you get double passage through the condenser—but you can calculate this without any reference of the amount taken through the condensers. We know the amount of heat injected, that is specified in the application. Daily flow records go way back to 1902. Temperature records are quite inadequate.

There is some information, a 10-year sampling program by the board of health in Minnesota, and in this 10-year period, however, for the critical months of August, there were only two temperatures taken. These were 77° and 82°. In this 10-year period there were 310 August days, there were only 2 samplings taken on these 310 days, and these 2 samplings were not even representative because it happened that those Augusts were Augusts of record flow, the highest flow on record. And yet that 82° appears in the Northern States Power Co.'s summary data sheet as the maximum temperature in a 10-year survey, random sampling by the State board of health, the maximum of two temperatures out of 310 days.

Furthermore, these were not samples of the water in question because they were taken from the Stillwater Bridge by dipping out samplings of about a foot below the surface, you see, it wasn't for this purpose this work was done, and measuring the temperature, you don't get the temperature of the river that way. You have to traverse with the thermotting stick on down into the water, get an average calculation cost, an average calculation for anything you can call temperature of the river.

The company proposes to take the water from the river, not up by the bridge where these samples were taken, but below the sewage outflow, where you have quite different water indeed, biologically and from a sanitary viewpoint, possibly from a temperature viewpoint.

You will also note there were no storm sewers in Stillwater and at times of heavy rainfall a bypass of raw sewage can occur.

Our information about urban temperatures is quite inadequate. And also other factors about water quality that depend on this survey are likewise inadequate for the same reasons.

If the company has anticipated a plant at Oak Park Heights for 20 years, it should have been gathering data during this time, if they were really concerned about the welfare of the public, because this is vital data to know what the effects of the plant will be. You don't get this from an ouija board. However, this deficiency of data does not prevent calculation of the temperature rise. We can calculate how much the temperature is increased without reference to the

temperature upstream, and this figure has some importance because it gives us an idea of the magnitude of the increase in the first place, and then if at some time in the future we would have figures on upstream temperatures, all we would have to do is to add them all and we would have our downstream temperature.

To predict what might happen in the future we have to look to the past records, and we can apply these formula and these data to the past records of the riverflow and come up with an answer to what would have been the temperature rises at times in the past. Then we can expect somewhat the same sort of thing to happen in the future.

If this plant had been on the river since 1902, and we focus our attention on the months of August, a rise of more than 5° would have occurred on 42 percent of these months. This is the whole river downstream, not just below the condensers. As an example of what would happen during a particular month of August, I took August 1936—there are charts for this on a submitted report—and for the first 15 days the temperature rise was more than 10° and averaged 10° for about 6 more days and then fell somewhat.

Since fish must live through each day, these figures are significant. Smallmouth bass and walleyed pike are valued game fish in the St. Croix. Their need for cool water should be considered. Carp are an undesirable species and thrive in warm water.

Moderate temperature changes can make considerable change here, as Mr. Mertes mentioned. I won't go over that again, except I will mention one thing. It promotes the growth of blue-green algae, an obnoxious growth of no use to fish life, and the company will use chlorine to get rid of this blue-green algae from the condensers and canals. Otherwise they choke them up and lower their efficiency by obstructing heat transfer.

There has been mention of heat dissipation. I don't want to impose upon the time too much, but the heat loss would have to take place through the surface. In August, the heat is passing into the river from the air. This is evident from the fact that your surface water is somewhat warmer than a few feet down, and if this is occurring, it couldn't, of course, be passing in the other direction. It wouldn't until the temperature of the river has been raised to something like the temperature of a stagnant upshaded pond in August. This is an equilibrium with the area, see. Springs and tributaries would dilute the water downstream, but not restore normal temperature.

Consider again the mixing zones. The importance of mixing is indicated by a report on a 265,000-kilowatt plant on the Delaware River. After this plant was in operation, mixing was such a problem that two jetties had to be built. After that they rerouted the effluent to discharge above rapids instead of below. After that they built two more jetties. You see, mixing was quite a problem there. They considered the placid slow waters of the St. Croix with this river, the Delaware River, that they were dealing with there.

More data about the river at Oak Park Heights should be available soon from the Public Health Service surveys which Mr. Mertes mentioned, and a model is being run at the University of Minnesota, under the auspices of Northern States, to study mixing. The results should be available soon. Again we must ask, "Wouldn't it have been better to enlighten decisions with investigations made earlier instead of after

decisions have been made and hopes raised for tax windfalls and real estate windfalls?"

When all the data is in and the predictions are made and argued, a good solution depends on what the people want and need.

The magnitude of protest against this proposed plant location shows very clearly what the people want. They want clean rivers, clean air, unspoiled natural areas. The people of this country have built the greatest farming and industrial system in the history of man. They spoiled many rivers and natural resources and they didn't much care where there seemed to be so many rivers and unboundless natural resources.

But now, when food and industrial goods are plentiful for most of us, and could be plentiful for all so far as productivity capacity is concerned, when we make millions of boats and fishing rods, from water skis to swimming suits, we need the few good rivers left.

The men whose talents have brought this boon of time of plenty have licked this matter of production. They have become so expert that they can continue without spoiling natural resources. Now let the decisions rest, not only on the cost of the electricity and pennies for kilowatt-hours, let's rule out the spoilage of good rivers at the price of electric power. [Applause.]

Senator METCALF. Just a minute.

What would you estimate would be the average number of kilowatts used in the home per month?

Mr. PEMBLE. My wife takes the readings. Maybe 800 to a thousand, I would say. There must be people here who read their meters. We read our own and it is around that.

Senator METCALF. Say there were a thousand kilowatts, it would cost a dime a month for a consumer to cool this water, wouldn't it?

Mr. PEMBLE. Well, yes.

Senator METCALF. It would raise the average light bill a dime a month.

Mr. PEMBLE. If you did this on all the plants, but, of course, this is just part of the system.

Senator METCALF. But if it costs, and from my experience with the utilities, they base their rates on their highest costs, so they would probably raise it a dime a month. This was the question that I was going into with Mr. Ewald yesterday. We have an area here that provides recreation, not only for the people of St. Croix and Washington County, but for the people of St. Paul and Minneapolis. We have an area that will probably provide, as you pointed out, electric power for that same group of people. It is going to send this power back into St. Paul or Minneapolis or some other area, at least larger than the immediate vicinity.

So we have to weigh the two considerations, it would seem to me it would be worth a dime a month to the people of the area to have a recreational resource. [Applause.]

Please.

Mr. PEMBLE. We are touching here about planning, you are talking planning now. We can indicate planning, the planners, the professionals should get at the job and do it, if it means calling in the Metropolitan Planning Commission or call in a bigger planning commission, if necessary. Some kind of overall planning must inevitably

come to the whole country. But we can only indicate by these examples the need and value of such planning, we can't take on the job, of course, but it is something that should be done.

Senator METCALF. Now, you were a little bit critical about the figures on temperature because there were only two samples taken in 10 years.

Mr. PEMBLE. Yes.

Senator METCALF. Would you tell us how many samples were taken for you to determine average flow of the river?

Mr. PEMBLE. In 10 years?

Senator METCALF. In the month of August?

Mr. PEMBLE. Thirty-one.

Senator METCALF. You made 31?

Mr. PEMBLE. No, we didn't make them. These readings of flow come from the Geological Surveyor Record.

Senator METCALF. Are they daily readings?

Mr. PEMBLE. Yes. They take readings at the St. Croix Falls and mouth of the Apple River, and by adding the two you get pretty close to the flow of water at Stillwater.

Senator METCALF. Instead of two flows of 10 years, you have a daily sample to ascertain the average flow?

Mr. PEMBLE. That is right. I think Mr. Mertes has more information on that than I do, but this is a matter of record.

Senator METCALF. Thank you very much for your testimony, Mr. Pemble.

(The full text of Mr. Pemble's statement follows:)

AN ANALYSIS OF HEAT REJECTION TO THE ST. CROIX

(By Carl A. Pemble, president, Save the St. Croix, Inc.; chemical engineer; 20-year valley resident; appointed in May 1964 by St. Croix River Association to investigate possible effect of proposed NSP plant)

Senator Nelson, members of the Senate committee, participants, and those who came to listen. Thank you for this help in solving our problem.

Many of you are long-time champions of conservation. Had your counsel been heeded in the past, this problem might have been solved in a more satisfactory manner. It is unfortunate that the extent of concern by so many for conservation and for the St. Croix River is manifested only now after the future of the river has been placed in doubt. Perhaps too many of us believed that the best things in life are free until we learned that our right to clean air and clean cool water must be defended.

However, we are not engaged in a fight but in the resolution of a problem about the use of natural resources. To this project we bring our different needs, values, and opinions. And here again we see that a lot of trouble could have been avoided had the opinions of all been considered much sooner. Instead there has been and still is stubborn resistance to regional planning.

Some people, beyond differing with the values we place on the river, say they can see no cause for concern about water and air pollution. Very well, we shall submit facts and figures to show that there is cause for concern. You know, people have stood up at meetings to say, "Give us the facts, but don't bother us with figures. Your numbers are too big and scary."

But there's no avoiding the numbers. I hope you see clearly just how big and scary they are.

THE PROPOSED PLANT

In regard to heating the river, we shall consider just the first unit, because only unit No. 1 is covered by the application now pending with the Minnesota Water Pollution Control Commission. The second unit would be larger, more than doubling the pertinent figures that follow.

The expected maximum capability of unit No. 1 is 600,000 kilowatts¹ more than twice the peak load of the city of St. Paul. Not that this power is for St. Paul; the generating capacity within the city is already double the peak load.²

Boiler capacity is rated at 240 tons of coal per hour.¹ This is 5,760 tons per hour or 2 million tons per year, twice the coal burned in St. Paul, Minneapolis, and adjacent suburbs in the year 1958.³ This proposed plant being the most efficient in the system would run at full capacity as much as possible. The difference between load and capacity of the system would ease the load on less efficient plants.⁴

The power of the coal burned would amount to about 1½ million kilowatts. Only about two-fifths of this would leave the plant as electric power. A like amount is carried by the exhaust steam to the condensers where the heat is dumped by the condensing steam which returns to the boilers as water for another cycle. This waste heat is at too low a temperature to be useful for power. Disposal is a serious problem. One method is to circulate water from the coolant side of the condensers through huge trickle towers where cooling occurs by contact with the air and by evaporation. The use of such towers would cost about \$500,000 per year more than would cooling the condensers with the river.⁴ Considering the size of the operation, this is not too costly—on the order of a cent for 100 kilowatt-hours.

The Northern States Power Co. proposes to dump the waste heat into the St. Croix River, and has applied for permit specifying a maximum heat rejection of 2,520 million B.t.u. per hour.

EFFECTS OF HEATING THE RIVER

There are two obvious facts that indicate need to study the potential effects of dumping this heat into the river.

The first is that it is an enormous amount of heat, equivalent to 2,000 tons of coal burned per day. It is the heat output of 20,000 home furnaces going full blast, about 10 times the heat from all the home furnaces in Stillwater, full on.

The second obvious fact is that the St. Croix is a small river as far as flow is concerned. This is quite apparent above Stillwater.

At Stillwater, it becomes broader and deeper, forming Lake St. Croix.

A maximum of 660 cubic feet of water per second would be taken from below the Stillwater sewage disposal outfall and conducted through a canal to the condensers where it would be heated a maximum of 17° Fahrenheit. The heated water would flow 1,000 feet to the bay and discharge into the river above the present site of the Bayport swimming beach. Here the heated water would mix with the river forming what is called the "mixing zone," the boundaries of which vary with flow and other factors. Within the mixing zone, temperatures would range from the downstream "mixed river" temperature to 17° above the upstream normal temperature. At times the flow through the condensers would exceed the flow of the river, in which case recirculation would occur increasing overall temperature rise to more than 17°. As flow decreases, the situation approaches that of lagoon cooling.

In this complicated system, there is one parameter that is easily calculated. It is the temperature that would result from the rapid and complete mixing of the flow of heat and the flow of the river. For convenience, we will call this the "mixed river temperature." It can be calculated from the rate of heat rejection and the temperature and flow of the river just upstream. By making such calculations, using recorded values of past flow and temperature, we can learn what to expect in the future.

Daily flow has been recorded since 1902, but temperature records are inadequate. There is some information in the records of the water sampling program by the State board of health, covering the past 10 years, but only two samplings were in the critical month of August. Moreover, these months happened to be months of abnormal flow, the highest of record for August.⁵ The temperatures

¹ Northern States Power summary data sheet.

² Statement by Mr. Earl Ewald, president of Northern States Power Co., Aug. 10, 1964.

³ "An Appraisal of Air Pollution in Minnesota"—Minnesota Department of Health, 1961. Refers to a project by Sanford Research Institute.

⁴ Statement by Mr. Hibbard Hill, vice president in charge of engineering, Northern States Power Co., at water pollution control commission meeting on Aug. 21, 1964.

⁵ Aug. 27, 1953, and Aug. 3, 1955—see "Surface Water Supply of the United States," by U.S. Geological Survey.

of the two samples were 77° and 82°. This figure, 82°, appears in the Northern States Power Co. summary data sheet as the maximum temperatures recorded in the random samples by the Minnesota Department of Health 1953-63. The rest of the information about water quality and temperature from this sampling program is also of dubious value, not having been made with the present problem in mind. Furthermore, sampling was at the Stillwater bridge above the sewage plant outfall. The powerplant intake is planned to be below the sewage plant outfall. In this connection, it should be noted that Stillwater has no separate storm sewers.

If the company has anticipated a plant at Oak Park Heights for 20 years, it should have been gathering the needed data about water quality.

However, this deficiency of data does not prevent calculation of the temperature rise of the river equivalent to the heat input, which has significance because when added to the upstream temperature, it gives the mixed river temperature.⁶

The first chart shows the temperature rise for each August, 1902 to 1963, based on the average flow for that month. Forty-two percent showed a rise of more than 5°.⁶

The second chart shows the temperature rise for each day of August 1936, which seems typical of those Augusts with a rise of more than 5 percent. Here the temperature rise was more than 10° for the first 15 days.

The third chart shows temperature rises for the day of lowest flow in each August. For those 54 years, there were 12 rises of more than 10°, including 1 of 25°.

Since fish must live through each day, these figures are significant. Small-mouth bass and walleyed pike are valued game fish in the St. Croix. Their need for cool water should be considered. Carp, which are undesirable, thrive in warm water.

Moderate temperature changes can have great effect on the complicated ecology of a river.⁷ Warm water promotes growth of blue-green algae, and the company would use chlorine to combat it because it fouls up flumes and condensers.⁸ Other bad effects are oxygen reduction, aggravation of pollution problems, bad odors and fog, especially in the winter when the bay and a channel all the way to Hudson will remain unfrozen.⁵

There has been mention of heat dissipation. Any heat loss from the river would have to take place via the surface. In August, heat must be passing into the river through the surface as indicated by surface temperatures higher than temperatures a few feet down. There must be a net heating effect resulting from sun, air contact, and evaporation. This flow of heat would not reverse unless the river temperature were higher than the temperature of an unshaded stagnant pond in August. Springs and tributaries would dilute the heated water but would not restore normal temperature.

Consider again the mixing zone. The importance of mixing is indicated in a report on a 265,000-kilowatt plant on the Delaware River.⁷ After this plant had started operation, mixing was such a problem that two jetties were built to improve mixing. Next the effluent was rerouted to discharge above rapids instead of below. Even after this, two more jetties were built to improve mixing.

More data has now been collected by the U.S. Public Health field unit located in Minneapolis, and Northern States Power Co. is having work done on mixing at the University of Minnesota. The results should be available soon. Once again we must ask, "Wouldn't it have been better to enlighten decisions with earlier investigation? Objectivity is poorly served by investigations after decisions have been announced and hopes of tax and real estate windfalls have been raised."

THE DECISION

When all the data is in, predictions are made and argued, a good decision must rest on what people want and need.

The magnitude of protest against this proposed plant location shows what people want. They want and need clean rivers and clean air and unspoiled

⁶ For the specified heat input of 2,520 million B.t.u. per hour, and equivalent temperature rise is 11,200° F. Flow of river in cubic feet per second.

⁷ "Research Project on Effects of Condenser Discharge Water on Aquatic Life," Lehigh University, 1960.

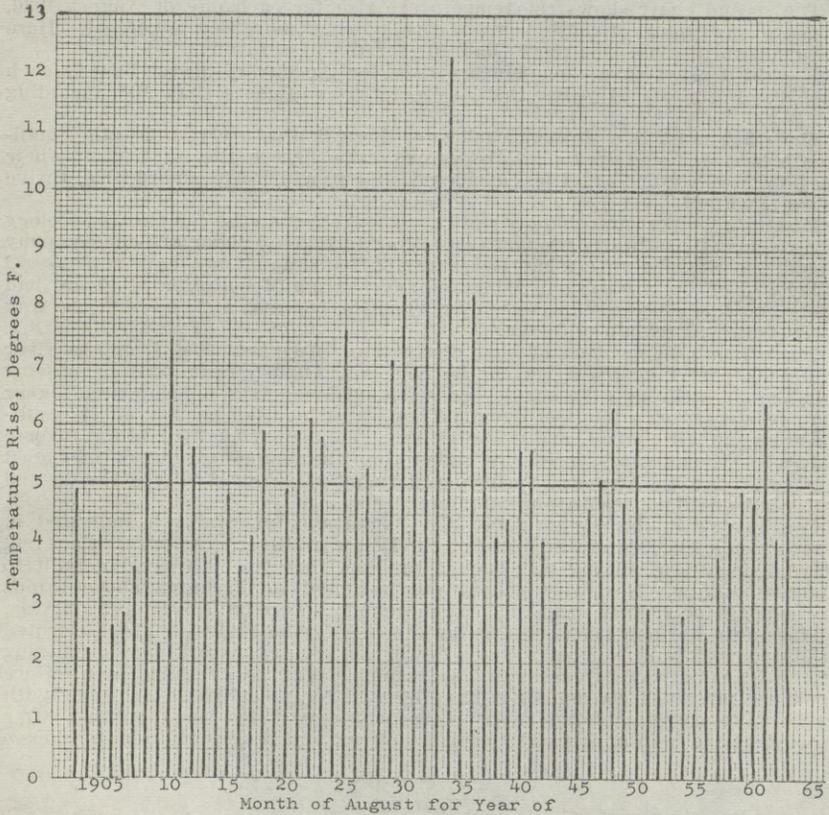
⁸ Statement by Mr. Hibbard Hill, vice president in charge of engineering, Northern States Power Co., at water pollution control commission meeting on Aug. 21, 1964.

natural areas. The people of this country have built the greatest farming and industrial system in the history of man. They spoiled many rivers and destroyed many natural resources when rivers seemed many and resources seemed endless, and when the need for industry and power was great.

But now, when food and industrial products are plentiful for most—and could be plentiful for all as far as productive capacity is concerned; now, when we make millions of boats, fishing rods and swimming suits, we need the few good rivers that are left.

The men whose talents have brought this boon of time and plenty have licked the problem of production. They have become so expert that they can continue their good work without spoiling natural resources. Now let their decisions rest not only on the cost of kilowatt-hours in pennies. Rule out the spoilage of good rivers as part of the price of electric power.

TEMPERATURE RISE OF THE ST. CROIX RIVER
EQUIVALENT TO HEAT INPUT OF ONE UNIT OF PROPOSED PLANT
2,520,000,000 B.T.U. PER HOUR

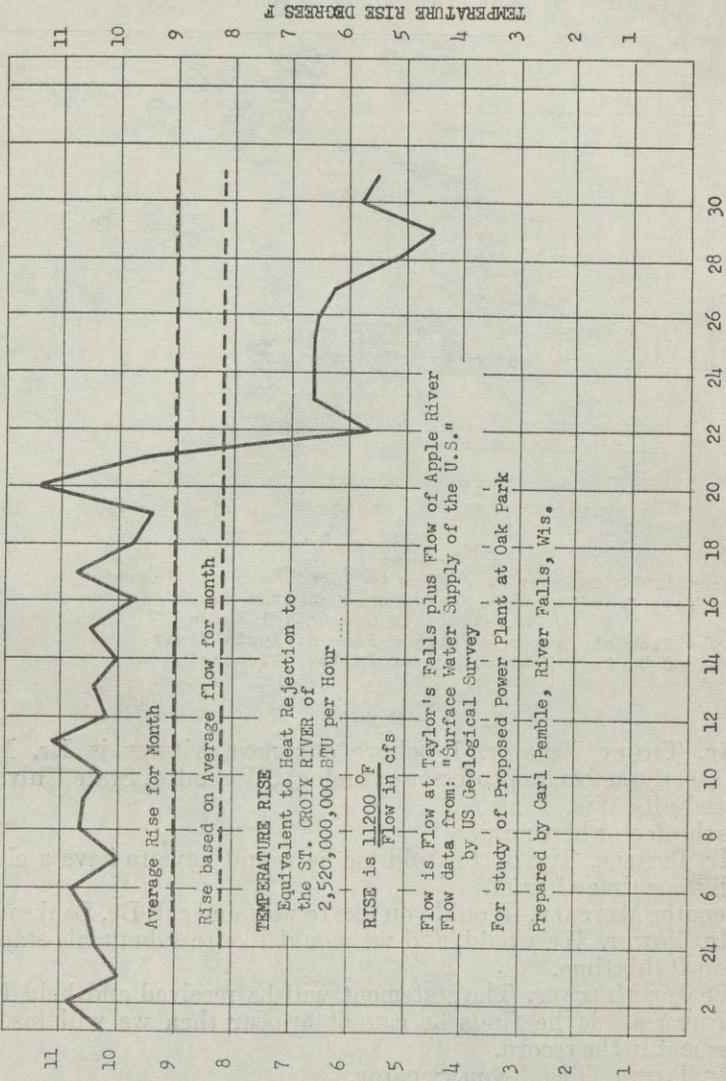


Calculated from average flow for each August of year indicated
 Rise = 11,200 degrees F. / Flow in cubic feet per second
 Flow = Flow at Taylor's Falls + Flow of Apple River
 Flow data from "Surface Water Supply of the United States"
 by United States Geological Survey

For Study of proposed power plant at Oak Park Heights, Minn.
 Prepared by Carl Pemble, River Falls, Wisconsin

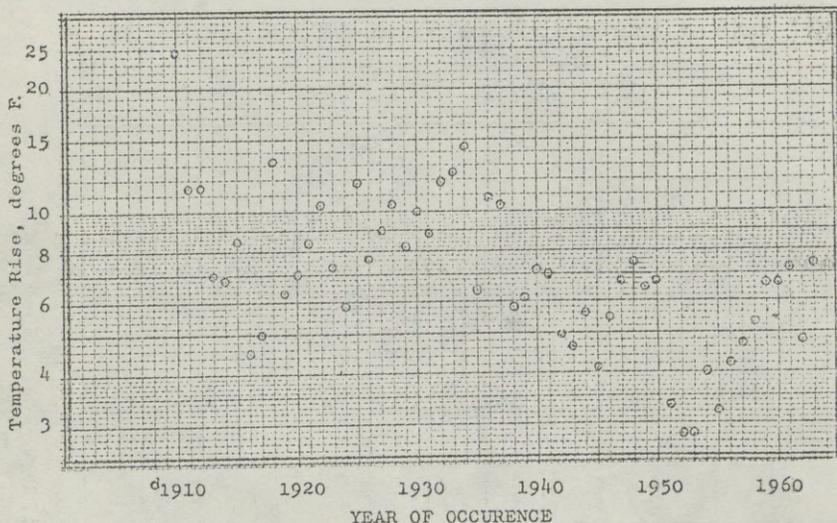
Chart 1

CHART NO. 2



TEMPERATURE RISE OF THE ST. CROIX RIVER
EQUIVALENT TO HEAT INPUT OF ONE UNIT OF PROPOSED PLANT
2,520,000,000 B.T.U. PER HOUR

FOR DAY OF LEAST FLOW IN AUGUST FOR EACH YEAR



Rise = 11200 degrees F. / Flow in Cubic Feet per Second
Flow data from "Surface Water Supply of the United States
by United States Geological Survey
Flow = Flow at Taylor's Falls + Flow of Apple River
Prepared by Carl Pemble, River Falls, Wisconsin

Chart 3

Mr. THUET. Senator, I believe our next witness is Dr. Martin Laakso, the associate professor of biology, Wisconsin State University, River Falls, Wis.

Is the doctor here now?

Mr. PEMBLE. The doctor told me he would have to have a class up until some time after 11.

Senator METCALF. Would you like to wait and call Dr. Laakso later?

Mr. THUET. We would, and we would like to submit his statement to you at this time.

Senator METCALF. The statement will be received and held for his appearance. If he finds he cannot appear then we will insert his statement in the record.

Mr. THUET. Thank you, Senator.

Our next witness is Mr. Humphries, a member of the "Save the St. Croix," chemical engineer, who lives at Lakeland, Minn., which, of course, is on the St. Croix. He will discuss the effects of the Northern States powerplant on air pollution.

Senator METCALF. Mr. Humphries, we are glad to have you before the committee.

STATEMENT OF C. R. HUMPHRIES, LAKELAND, MINN., CHEMICAL ENGINEER

Mr. HUMPHRIES. Thank you, Senator Metcalf.

I would like to take this opportunity to thank you members of the committee for holding hearings of this sort around the country because as we have gotten into this study, we have been astonished to find what a tremendous problem and what very large results and consequences can come from inadequate consideration of it.

Senator METCALF. I read the staff study, which you probably have examined, but when these hearings first opened I was astounded and appalled at the amount of material that is being discharged into the atmosphere, not just by plants such as this, but all over the country.

Mr. HUMPHRIES. Yes, sir. We are going to make a comparison, actually, of this plant with those figures.

As I was introduced, I am a chemical engineer and an individual who has worked with Mr. Mertes on his technical committee in trying to develop an understanding of the matter as far as we could.

I would like to depart from my prepared notes, which you have, very briefly to give you a quick résumé of why we began this investigation.

Actually, I began it as an individual with friends who are neighbors on the river, John Blickenderfer, who is a chemical engineer and a longtime friend; Robert Wallin, who is a mechanical engineer; Ruele Philips, who is an electrical engineer; and more recently Paul Leland, who is an aeronautical engineer and a registered professional engineer in the State of Minnesota.

All of us are residents of Washington County and of the school district No. 834. We want it emphatically understood that we are not opposed to industry. We are not opposed to the development of a broader industrial base for tax purposes. Furthermore, we are all strongly favorable to a tax reform program in the State which is specifically designed to relieve the load on real estate taxes. I feel so strongly about this that I requested permission to appear and did so before the Interim Tax Study Commission of the State of Minnesota, testifying that I felt it was absolutely necessary that new sources of taxes be derived in the State for school and county purposes.

Senator METCALF. I wonder if the record would show that I am told you are a member of the school board here?

Mr. HUMPHRIES. That is correct, sir, but I wish to have it understood that I speak as an individual citizen since the board, the school boards, speaks as a single voice by virtue of majority decision, and I do not care to speak as a school board member, sir.

Senator METCALF. I would understand that, but I think it would be helpful to the Senators who are going to examine this record to know that you have had some experience with the school board.

Mr. HUMPHRIES. Yes, sir; I have been on the school board in this area for 4 years.

In examining the fact sheet that was presented by the company, NSP, it seemed obvious to us, as neighbors and engineers, that this

fact sheet was really a very limited bill of particulars and our discussions were quite informal for some time. But, because there arose an immediate polarization on this matter, we felt a community responsibility, as experienced engineers, to try to develop something that would approximate a complete rationale of the whole matter. In that way, we were trying to do the job that the Governor of Wisconsin's task force is now setting out to do. We made some attempts to have the metropolitan planning commission make such investigations but we were not able to conduct this, at least, successfully.

We would also like to emphasize that the problems that are elucidated by this situation are going to be intensified. As Mr. Ewald testified yesterday, there is an increasing need for electric power that no one can deny or wants to deny. So if we visualize problems at this state of the game, imagine what they will be when they are twice this in 10 years and four times this in 20 years.

As we proceeded in the study, there were four things that came out, and I will comment briefly on them because we have commented in detail in the written report:

One was the quantity of sulfur dioxide, commonly known as SO_2 , is really large. Frankly, I am disappointed that, in the early fact sheets, there was no reference whatsoever to the fact that a poisonous effluent like SO_2 was going to be coming from this plant. There were, indeed, electrostatic precipitators that would remove dust and I certainly commend the company for that move. The quantity of sulfur dioxide is based on a very high sulfur content of this coal. It is 3.4 percent of that combined with the fact there will be a very large amount burned. Approximately 1,700,000 tons per unit will produce 100,000 tons of SO_2 in our area per unit per year. To get some perspective of this, we did a little looking around, and I would like to make a modification, if you please, in the official notes. There was a typing omission. The first line should read, "The expected 200,000 tons," and here is the insertion, "is about 10 percent of the amount of total gaseous pollution released in the entire Greater Chicago area." This reference is to an article that appeared in a magazine. And another astonishing thing: This will be almost 1 percent of the total sulfur dioxide in the United States from all causes—not just powerplants. So I believe it can be seen the quantity of material here is very great.

Another comparative figure is that in a survey made by the department of health in 1957, I believe, it was discovered that there was an estimated effluent of 31,000 tons of sulfur dioxide in the whole Twin City area compared with 200,000 from this single plant to the 31,000 in the total Twin City area a few years back.

I would also like to call your attention to the fact that comparisons to this plant and the plants in St. Paul are not accurate unless they include the consideration that the plants from St. Paul are powered by interruptible natural gas; which is, a low sulfur-containing fuel. The low sulfur-containing fuel is used in the summertime when the problem, as I will show you later, would be most aggravated so that—from figures we got from Northern States Power Co. that they burned last year 1.3 million tons of coal for one and a half million kilowatts—and pardon the numbers—you can estimate that three quarters of the total energy derived from the Twin Cities plant is from natural gas.

I understand from listening to Mr. Ewald, and I also understand from the Federal Power Commission, that there are problems in using natural gas on a noninterruptible basis. I am sure this is not an easy problem and I, certainly, don't want anyone to think that we think it is.

The second consideration that I would like to direct your attention to is that the question now is whether any of this huge quantity of gas comes down to the ground, and then I would like to cover, if it comes down to the ground, does it cause damage? Now, this was a rather difficult problem to tackle because there was a general absence of data but, by sheer luck, we discovered that data has been taken and, to my knowledge, this is the first time it has been introduced by anyone into this consideration. Data has been taken for a number of years on the KSTP tower in St. Paul. This tower is over 500 feet high and its elevation, at its foot, is about 250 feet higher so we have an elevation of almost 700. The purpose of these measurements all the way up the KSTP tower, as a matter of fact, is to measure macroinversion. The macroinversions are the meteorological phenomena that could really give us a problem with this plant, in our view, and I think this is sustained in the literature as you read it.

The microinversions, which we see very frequently, will probably be confined to the height of the bank or, perhaps, a hundred feet over that and, of course, the high stacks will greatly relieve any problems derived from those. Of course, in the early days of SO₂ effluent, it was dumped out at treetop level and everybody knows what particular damage was done, particularly in your State, Senator, from sulfur dioxide.

I would like to comment on these. These were taken in 1962. They were for a whole year and they were presented as a report of progress at the American Industrial Hygiene Association's annual meeting in Philadelphia, Pa., May 1964.

Senator NELSON. May I interrupt to ask, Who was taking the data?

Mr. HUMPHRIES. A professor at the University of Minnesota who has told me that he would be very glad to verify the data but, he also emphasized, that he is a personal friend of some of the people at NSP and cannot be involved in this matter as a partisan but he would be very glad to authenticate the data and warrant that it is true and present the original.

Senator NELSON. I take it he wasn't gathering data for purposes of this hearing?

Mr. HUMPHRIES. That is correct, sir. He was gathering this data for the purpose of research at the University of Minnesota.

So it was fortunate that we stumbled across the data—rather we found it in our searches. We searched far and wide for this data to show the occurrences of microinversions to a height of approximately 800 feet. It is the view of those people that took it that these inversions must have frequently occurred at much higher altitudes, perhaps at 4,000 to 5,000 feet, although the data will not show this. If you will notice, there are 164 incidences or a number of inversions during the year and the very significant thing is the high number in July, August, September, and October. Now, I know that people at Stillwater are mad at me but I want them to know that this data shows that, during those summer months, they are going to be in real danger from sulfur

dioxide pollution of their city and, particularly, those who live up near the golf course because, during those summer months, the prevailing winds, as shown by wind erosions that are published by a number of sources—I have this one in my hand from the Metropolitan Planning Commission. During the summer months, the prevailing winds are from the southeast and 3 percent of the time their velocity is lower than 8 miles per hour. Now, I am given to understand that at this time of low wind velocity and temperature inversion where there is, in a sense, a lid on the atmosphere preventing just the wholesale dispersion of this material and definitely limiting it like a container that had definite size, this is the situation which will provide the hazard, and it definitely occurs, and it occurs a great deal of the time during the summer months. I think this puts the real finger of suspicion on a full coal-burning plant on this site.

Now, my last point is that to say the least, as was gone into yesterday and as gone into by written disclosure here, the laws in Minnesota and Wisconsin, perhaps the United States, governing air pollution are inadequate. I believe that we can say in Minnesota that they are nonexistent. There are no standards although the department of health was given authority to prepare such standards. As was testified yesterday, it was made difficult to prepare such standards because the standards would have to take into consideration proof that such concentrations cause damage.

I would like to call your attention to the fact that there is a great deal of difference of opinion between authorities on what causes damage on sulfur dioxide and sulfur trioxide, which is also produced to the extent of 1 to 5 percent of the total emission, in people. Industrial standards are set in the 5 to 10 parts per million level, but there is increasing suspicion that very much lower concentrations, three-tenths of a part per million, five-tenths of a part per million, which occurs occasionally, continuously, could cause great damage to people who have respiratory ailments, any cardiac problems, and just have grown old.

Now, Mr. Leland specifically asked me to submit a letter for him to the record. The only point I would like to mention in this, that Mr. Leland says that he signed the petition in Stillwater welcoming NSP to the valley. However, he does now feel that a plant of this size must not burn coal and contaminate the property, the lungs and eyes of our people with SO_2 . There is no tax benefit, no financial windfall in our area that could justify endangering the health and lifespan of our people. I would like to submit this for the record.

(The letter is as follows:)

BAYPORT, MINN., *December 9, 1964.*

MR. C. RAYMOND HUMPHRIES,
Stillwater, Minn.

DEAR RAY: I have analyzed the data obtained by other technical specialists of the group of six engineers and scientists that have recently studied the air pollution problem that would be created in the St. Croix Valley by the operation of the Northern States Power Co.'s proposed plant at Oak Park Heights on the St. Croix River. After obtaining recent information from NSP with respect to the quantities of coal to be burned and NSP's own estimates of the tremendous quantities of sulfur dioxide that would be dumped into the air above the plant, I am forced to agree, albeit with reluctance that great hazards are present in the system of operation now planned by NSP.

The reluctance of which I speak is genuine. I can fully appreciate the anticipation of the people in all forms of commerce in the valley that this plant provides a sudden spurt to the economy of this edge of Washington County, and as a full-time, enthusiastic resident of the St. Croix Valley I have anticipated the potential tax relief offered by this new industry with pleasure. In fact, before analyzing the air pollution problem, I signed the petition in Stillwater welcoming NSP to our valley, and have consistently avoided any association with the Save the St. Croix until my own investigation had reached its conclusion.

At this time I am now ready to go on record, as a registered professional engineer, as being decidedly opposed to the establishment of a coal-burning powerplant in the St. Croix Valley. I feel that a plant of the size that is planned by NSP must not burn coal and contaminate our property and the lungs and eyes of our people with SO_2 and sulfuric acid. There is no tax benefit, no sudden spurt to the economy, no financial windfall to our area that could justify endangering the health and lifespan of our people. A method must be found, before this plant is activated, to remove the SO_2 from the exhaust products issuing from the smokestack(s), or else natural gas should be burned or one or more nuclear plants should be designed to provide the necessary power.

Please add these comments to those of the other participants in these studies, with the hope that the residents of Washington County may be helped before it is too late, and that the Northern States Power Co. may be encouraged to consider other than strictly coal-consuming methods of producing heat to power electrical generators. Surely, when the lives and health of the residents of the St. Croix Valley might be endangered by the establishment of the presently planned coal-burning plant, a utility company with NSP's broad scope should be willing to consider systems other than the one currently selected in spite of the fact that the presently planned plant system probably is the rockbottom cheapest way for electric power to be generated in this area of the United States.

PAUL M. LELAND.

Mr. HUMPHRIES. The last point relates to the level of the banks of the St. Croix Valley which creates a special problem here. As you will note in my notes, the department of health commented specifically that Bayport and Stillwater were in sites which were not generally suitable for dispersion of pollutants. This was put into a report almost 6 years ago.

Mr. Mertes drew this chart and I would prefer he make the comments on it and I wish to thank you gentlemen for the opportunity to appear.

Senator NELSON. Thank you. [Applause.]

Did you have any questions, Senator Metcalf?

Senator METCALF. No questions.

Senator NELSON. Thank you very much.

STATEMENT BY C. R. HUMPHRIES ON AIR POLLUTION

A proposal to build a large, soft-coal-burning thermal electric generating plant on Lake St. Croix at a site in Oak Park Heights has been made. Although the eventual size has been disclosed as exceeding a million-kilowatt capacity, requests to the U.S. Army Engineers, the Minnesota Water Pollution Control Commission and Minnesota Conservation Department have been related to the first unit of 500,000 kilowatts only.

This report will deal with the air pollution which will be brought about by this plant and the problems we think will result from it.

We would like to make four principal points:

1. The quantity of the principal pollutant, sulfurdioxide, will be huge.
2. The valley site and atmospheric conditions of the area lead to the possibility of frequent ground-level concentrations of dangerous proportions.
3. The price paid for the economic benefits could be corrosion of materials, damage to vegetation, and, worst of all, damage to human health.
4. Present laws appear to be wholly inadequate to prevent serious air pollution.

Point 1

One million seven hundred thousand tons per year of soft coal containing 3.4 percent sulfur has been given by NSP as the quantity they will burn for the first unit. This will produce at least 100,000 tons of sulfur dioxide per year. A second coal-burning unit could double that to 200,000. These figures contrast with the 31,000 tons of sulfur dioxide emitted over Minneapolis-St. Paul and suburban area in 1956 (Stanford Research Institute survey). NSP burns both natural gas and coal in its present plants located in the Twin Cities. Natural gas is a very low sulfur-containing fuel. The natural gas is on an interruptible basis. Present NSP coal consumption for these three plants totaling 1,500,000-kilowatt capacity is 1,300,000 tons per year. Therefore from the data given by NSP for the St. Croix plant, it may be estimated that three-fourths of the energy produced in the present units is from natural gas. Therefore comparisons of air pollution problems of NSP's St. Paul-Minneapolis plants and the proposed St. Croix unit are not valid.

The expected 200,000 tons of SO₂ is approximately 10 percent of the total gaseous pollutants released in the entire Greater Chicago area (Bregman, I.I.T. Research Institute magazine *Frontier*, spring 1954, p. 11), and almost 1 percent of the total U.S. output of sulfur dioxide from all causes (1963 Report of Department of Health, Education, and Welfare, "Troubled Air," p. 11).

Discussion of the complex chemistry of sulfur dioxide and its great hazard to health and property would seem redundant at this time, as it has been singled out by the Clean Air Act, Public Law 88-206, as one of the major unsolved problems in air pollution. It is the object of a great deal of research directed to eliminating it altogether as an effluent by extraction processes. This will cost money, and if the market for possible byproducts like sulfuric acid cannot absorb the additional costs ("Sulfur-Smoke Removal System," *Public Service* magazine, September 1964, p. 16), this could shade the overall economics in favor of atomic powerplants, six of which are already under construction in areas where air pollution is already a serious problem.

The pollution of the air in the St. Croix Valley and the surrounding territory a mere 5 to 10 years before the full solution to the sulfur dioxide problem would seem to be an unnecessary sacrifice, if alternate solutions or alternate sites for this plant are possible. We think there are such solutions and such sites.

Point 2. Ground-level pollution

The use of the very high stacks, 700 to 800 feet, disclosed in public releases by NSP, makes it clear that they intend to rely on dispersion methods to try to eliminate the hazards arising from the large volume of sulfur gases released. It is almost certain that low-altitude release of these high quantities of SO₂ would cause visible vegetative devastation and noticeable human problems so tragically evident in low-altitude releases of large quantities of sulfur dioxide in the past.

A basic question at issue is whether a clear and present danger from the huge volumes of gas is eliminated or has it been reduced? Examination of the literature on this score discloses that tall stacks may not be successful in serving their purpose (staff report, Committee on Public Works, U.S. Senate, September 1963, and Louis McCabe, "Air Pollution"). It is reported that tall stacks, even as high as 700 feet, can contribute little in dealing with conditions where available volume of diluting air is simply insufficient to satisfy the need of satisfactory dispersion.

The local conditions of vertical and horizontal air movements are strongly influential, as are also the changes of air temperature with pressure (adiabatic lapse rate. In well-mixed air the dry adiabatic lapse rate is 5.4° F. per 1,000 feet. When this condition exists, a plume will rise directly into the atmosphere until it reaches air of similar density (W. L. Faith, "Air Pollution Control," p. 32). If the air temperature increases with height, a condition of temperature inversion exists. Under these conditions the atmosphere is said to be stable, and very little mixing takes place. That is, the pollutants do not disperse. A "lid" is placed over the available atmospheric dump, permitting the development of very high concentrations in the atmosphere over the source of effluent. The tragic results in New York City, Donora, Pa., and London, England, occur when the "lid" stays on for extended periods, and neither horizontal nor vertical air currents are present to carry away the noxious effluents. These relatively rare extreme occurrences are not the only hazards. Temperature inversion lasting even several hours can contribute to the direction of "slugs" of the highly concentrated stack gases coming to the ground before adequate dilution to minimize

hazards has occurred. Prevailing wind directions and the season of occurrence can be important since favorable conditions in mild weather can find windows of residences open.

Problems for the site selected have been predicted in a publication of the Minnesota Department of Health ("An Appraisal of Air Pollution in Minnesota," January 1961, p. 46). Both Stillwater and Bayport are specifically identified as locations where "local conditions for the dispersion of pollution are adversely affected by their location in river valleys." Low-level inversions (generally between the banks of a river) would be pierced by the high stacks. High-level inversions covering substantial areas have been measured on a high tower located in the Twin Cities up to an altitude approximately 800 feet over the altitude of the river bottom (500 feet plus difference in altitude between the river and the foot of the KSTP tower). The number of inversions for the 1962 year totaled 164, meaning that conditions existed for a rapid return of the stack gases to the ground for the period of these inversions. The exact concentrations and location of such return is difficult to predict as is recognized by the previously cited data. Attempts may be made to make predictions based on the Bosanquet and Pearson equations, and by Sutton. However, their usefulness has been reported as unreliable in estimating the dispersion of powerplant stack gases (Journal of Air Pollution Control Association, February 1961, p. 60). The Metropolitan Land Study Report No. 4, April 1960, notes that the most serious air pollution problems occur when wind velocity is under 8 miles per hour. In the summertime when windows are open, the most frequent winds are from the southeast. Winds under 8 miles per hour occur 3 percent of the time. This direction should be considered as the location of activities that produce offensive odors.

A reference to the "frequency of inversion chart" shows that large-scale high-level inversions occur over two-thirds of the days in August and September, and about one-half of the days in June and July. The town of Stillwater, especially the higher bluffs, will be the most likely target for high concentration "slugs" reaching the ground when both people and vegetation are likely to be affected.

There seems to be little disagreement that the only sure way to control noxious effluent is not to produce it.

However, the need for electric power is growing rapidly. Requirements in the Nation and in our region will double every 10 years, at least into 1980. How best can we accommodate the growing needs of vital industry, yet not destroy irreplaceable natural resources?

The practice of the air pollution control board in the city of Chicago requires the power companies to burn low sulfur content natural gas during periods when the meteorological conditions are unfavorable. High sulfur fuels are permitted only when the conditions for dispersion are favorable.

NSP, by burning natural gas in the Twin Cities units during the warmer months, is already practicing this method in part. Favorable meteorology and fuel regulations would make it possible to decrease the great height of the stacks, reopening the question of alternate site locations. The sale of the natural gas to homes in the winter may not be feasible to the extent practiced now in the Twin Cities, thereby affecting their ability to get the lowest possible gas rate for their plants, but it would seem more in the public interest to have a slightly higher power cost than to take unpredictable risks with human lives and health.

Point 3

The damage to vegetation and materials which sulfur gases in the form of sulfur dioxide and sulfuric acid (to which it can become oxidized and which exists in the stack effluent to the extent of 1 to 5 percent of the total sulfur burned) is well known, and needs no detailed documentation. Dr. James Roger Fox will submit a discussion of these hazards to health as a separate report. It will suffice to say that exposures of 0.3 parts per million are suspect, especially if the exposure is to elderly people, or to those with respiratory ailments or cardiac problems. We feel that high concentrations at the stack exist up to 4,000 parts per million, plus inversions, low wind velocities, or both, indicate real possibilities that dangerous concentrations can exist. People may avoid polluted streams or drinking polluted water or other sources of public health hazard. One has no choice but to breathe the air as he finds it.

The economic costs of air pollution have been calculated in a study by the U.S. Department of Health at Steubenville, Ohio, as \$95 per capita per year. Close at hand we have the example of damage to buildings and claims paid for crop damage from the coal-burning generating plant at Alna, Wis.

The power company has alternate choices, and will increasingly be required to solve its serious environmental problems. The people of the States of Wisconsin and Minnesota and those of the expanding Twin City metropolitan area who use the St. Croix River, as well as those who live in the valley, have only one St. Croix Valley.

Point 4

There appears at best to be some confusion regarding authority and standards in the application of air pollution laws in Minnesota. There is a statute act, S. 812, April 10, 1957, "Delegating to the State board of health the power to make regulations relating to atmospheric pollution which may be injurious or detrimental to public health." These regulations have the force of law, "except where they conflict with a statute or with the charter or ordinance of a city of the first class."

In a report entitled, "An Appraisal of Air Pollution in Minnesota," January 1961, published by the Minnesota Department of Health, the conclusions state: "Now is the time to take action to combat air pollution; first, to cope with existing problems, and second, to conserve vital air resources for the future. * * * Present laws in Minnesota are limited in scope and do not adequately meet present and future needs."

C. W. Griffen, Jr., engineer-journalist, in one of the increasing number of articles on air pollution, said in Reporter magazine of September 10, 1964, re injury of health by air pollution:

"To wait for irrefutable cause-effect proof could of course delay action forever. The assumption that each disease has a single, discrete cause, so fruitful in the etiology of communicable diseases, appears false in analyzing chronic diseases like bronchitis. Moreover, the theory that a public agency confronted with a community health hazard should proceed like a murder trial jury, taking action only if the hazard is proved guilty beyond reasonable doubt, could have disastrous consequences. If the sanitation pioneers of the 19th century had postponed action on water purification and sewage treatment until they had irrefutable proof that filth causes disease, the world would have suffered untold thousands of unnecessary deaths."

It is difficult to believe that in an age where man is preparing to fly to the moon, that serious risks to human health and property, strongly suspect from data collected in extensive experience elsewhere, must be subordinated to local land-use ordinances, real estate tax benefits, and bottom-dollar production economies.

Are we to presume that air pollution, which has already become a serious problem in other parts of the country, cannot happen here?

Inversions occurring in 1962—Occurrences by month

| Month | Duration in hours | | | | | | | | | | Total number of inversions | Total hours of inversion | Percent of total hours equipment not working |
|----------------|-------------------|----|----|----|----|----|----|----|----|----|----------------------------|--------------------------|--|
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | | | |
| January..... | | 3 | 3 | 1 | 1 | 1 | 1 | | | | 11 | 90 | 4.3 |
| February..... | 1 | | 1 | | 1 | 2 | | 1 | | | 6 | 62 | 6.9 |
| March..... | | 1 | | 3 | 6 | 1 | | | | | 11 | 100 | 4.3 |
| April..... | 7 | 5 | 3 | 2 | 3 | 1 | | | | | 21 | 110 | 7.5 |
| May..... | | | 2 | 1 | | | | | | | 3 | 20 | 29.0 |
| June..... | 1 | 3 | 2 | 3 | 5 | | | | | | 14 | 100 | 0 |
| July..... | 1 | 2 | 2 | 12 | 1 | | | | | | 18 | 128 | 2.4 |
| August..... | 2 | 3 | 4 | 4 | 7 | 1 | | | | | 21 | 154 | 0 |
| September..... | 1 | 2 | 3 | 3 | 5 | 8 | 2 | 2 | | | 26 | 258 | 3.9 |
| October..... | | 5 | 4 | 1 | 1 | 3 | 2 | 2 | | | 18 | 158 | 3.2 |
| November..... | | 3 | 1 | 2 | | | | | 1 | | 7 | 52 | 38.1 |
| December..... | 1 | | 2 | 2 | 1 | | 1 | 1 | | | 8 | 70 | 8.6 |
| Total..... | 14 | 27 | 27 | 34 | 31 | 17 | 6 | 6 | 1 | 1 | 164 | | |

Note.—Presented as a report of progress at the American Industrial Hygiene Association annual meeting in Philadelphia, Pa., May 1964.

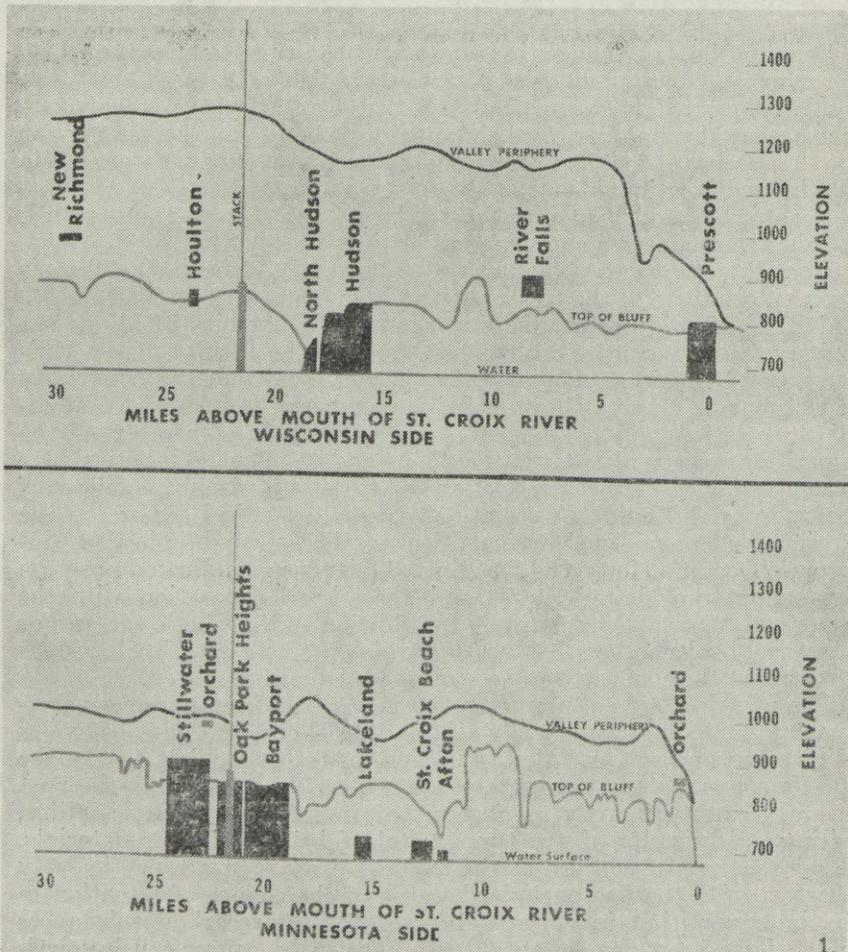
Mr. Mertes.

MR. MERTES. This chart we prepared, data collected off the U.S. Geological Survey charts, shows a profile of the St. Croix River and

the valley on the Wisconsin side and also on the Minnesota side. It shows it from Prescott up to and above Stillwater on the Minnesota side and above New Richmond on the Wisconsin side. The blue line shows the water surface of the St. Croix River. The solid black area shows the upper and lower limit and the elevations of the various cities within the valleys. The green line is the line which designates the top of the bluff within the lower valley, and the top line, the black solid one, shows the valley periphery. Now, the point we try to bring out with this, particularly on the Wisconsin side as we see there, the valley is a very definite bowl and the red is the proposed smokestack which is 800 feet high, but only 200 feet high with relation to the valley perimeter on the Wisconsin side, and, of course, much more on the Minnesota side.

That is all I have. We will submit this chart for the record by December 18.

(Subsequently, the chart referred to was submitted:)



Senator METCALF. Mr. Mertes, since this is going to be reproduced in the record and the colors aren't going to be there, let's identify the lines, beginning at the top. You identified them by color. Would you identify them by position?

Mr. MERDES. You will note there are letters on there stating valley periphery on top and the green line is designated by lettering.

Senator METCALF. That is the second line?

Mr. MERDES. Yes.

Mr. THUET. May it please the committee, we have a report of Dr. James Rogers Fox that will be presented by our chairman, Mr. Adrian Warren.

STATEMENT OF JAMES ROGERS FOX, M.D., PRESENTED BY ADRIAN WARREN, CHAIRMAN, SAVE THE ST. CROIX, INC.

Mr. WARREN. The report, gentlemen, is quite lengthy. I think what we would like to do is perhaps read excerpts of it. The entire report, as I understand, has been placed in the record.

Senator NELSON. The entire report will be printed in the record, so if you would like to summarize it, it would be fine.

Mr. WARREN. The doctor, James Rogers Fox, asked that you gentlemen accept his apologies for being unable to be present personally for the time assigned for the professional report as an expert witness. He asks his qualifications—

Senator NELSON (interrupting). Excuse me, I was going to ask that. Are you introducing his qualifications?

Mr. WARREN. Yes. They are as follows: B.A. from St. Thomas College, graduate of the University of Minnesota with an M.D., M.B., and B.S. He did postgraduate work at the University of Minnesota and the University of Edinburgh. He is on the faculty of the University of Minnesota. He is on the visiting faculty of the University of Edinburgh, Great Britain. He is a member of the American Medical Association and component societies. He is a member of the American Society of Internal Medicine and component societies. He is a fellow of the American College of Chest Physicians, a fellow of the Industrial Medical Association. He is a medical adviser to the President's Council on Physical Fitness. He is a public health educator—"Doctor's House Call" radio and television syndicated program throughout the United States and abroad in cooperation with the American Medical Association. In addition to that, he is the author of several books on health education which are used by school systems throughout the country. So he is quite well qualified.

The principal air pollutants that one considers from power generating stations includes smoke, fly ash, hydrocarbons, and gaseous oxides of nitrogen and sulfur. Merely because of esthetic objections, smoke and fly ash emissions have received considerable attention in the past several years, primarily as a result of interference with visibility, soiling and corrosion of structures, metals, fabrics, and other materials. Those that are of concern to the medical profession are particularly related to (1) the fine particles because of the chance of retention in the lung resulting in chronic disease, (2) hydrocarbon substances which have been demonstrated definitely to be cancer-causing irritants, (3) the gaseous oxides of nitrogen and sulfur. In themselves

there is danger, but even more completely is the fact that there is the ability, in some instances, of an increase in the rate of oxidation to result in the trioxides. I believe Mr. Humphries mentioned the trioxides. The effect of all these various noxious agents upon the community is dependent upon a number of factors, including the fuel that is used, the protection of the effluent byproducts, the physical location of the community (good versus bad air circulation), the usual humidity of the community and the protective measures established by the local health officer. Larger particles of dust, particularly in concentrated amounts, can result in local skin irritation, upper local upper respiratory secretions and irritations, but, most importantly, in lung irritation. The result of this latter generally comes only after chronic exposure.

The hydrocarbons have been shown to be cancer causing in nature. In areas of heavy concentration of hydrocarbons, the incidence of cancer of the lung is greater. The oxides of nitrogen are definitely dangerous, but fortunately are very seldom in sufficiently high concentration to be significant. The oxides of sulfur, however, can result in acute respiratory problems, as well as chronic reaction. These will cut the ability of the little hairlike cilia to function and will increase the amount of mucus formation. With this combined abnormal functioning, the ability to exchange air is lessened, the promotion of a chronic cough is increased, and, although mortality is not great, morbidity is. Thus, it becomes just as evident that the control of air pollution is important to the health and the life of these United States as was the need for proper water supply and sewage disposal back at the turn of the century. Let us hope that instead of a drive for clean water, as currently is promoted by the Government, a drive for clean air before it becomes dirty can be effected.

The last factor that enters into the medical profession's evaluation is that of safety. Since I have been asked to cover all of the causes and influences of this proposal upon the health of the community, it may be pointed out that the medical profession prefers to prevent accidents and illness, rather than to treat what has occurred. Since far and away the greatest proportion of deaths in children are accidental, and since the number of deaths on the highways are about the same as the number of deaths from cancer, it is well to realize that any increase in potential can result in an increased number of injuries and deaths. Therefore, with industrialization as a part of the influence of a powerplant in the St. Croix River Valley, necessarily there will arise further problems of safety and safety control, including river traffic, which is not well patrolled and even now, railroad traffic, construction, et cetera.

In summary, gentlemen, the effects of the powerplant upon a community are dependent upon the size of the plant, the type of fuel that is being used, and the protective measures instituted.

Secondly, the effects include those of mental reaction and those of physical reaction. Mental reaction is one which has no mortality attendant to it, but does have a good deal of morbidity.

Thirdly, the morbidity of the physical reaction varies from simple irritation of the skin, the mucous membranes and the lung tissues, whereas the mortality is related to chronic irritation of the lung tissues, resulting in respiratory collapse, or heart failure. One other

is that of "epidemic" mortality in the case of severely concentrated noxious fumes.

Fourth, the change of the temperature of the river water will promote additional bacteria growth. Other discharges into the river will have their rate of growth increased.

Fifth, safety problems, accidents and injuries will increase with the advent of industrialization.

Senator NELSON. Thank you very much.

Senator Metcalf, any questions?

Senator METCALF. No questions.

(There follows complete text of statement of Dr. Fox:)

STATEMENT OF JAMES ROGERS FOX, M.D.

The impact of the erection of a powerplant of the magnitude proposed by Northern States Power in any community must be considered medically in two areas. The first is that of emotional reaction of the community, the second is that of the physical effects on the community. This is particularly true in the St. Croix River Valley proposal, as it relates to the mental health of those in the community. To have a handful of people change the entire way of life of a given area without the consideration of their desires or needs invariably results in an emotional response varying from simple anger to extreme anxiety and even depression. It is quite evident that there has been an emotional response by reason of the fact that this committee is meeting and by reason of the fact that such concerted effort to obtain facts for presentation to the community has been undertaken not by just a few but by hundreds of people in the St. Croix Valley. Medically speaking, it is not desirable to have a community emotionally disturbed. Therefore, as is the case in health education, all the facts must be known and understood by the persons involved in order for them to arrive at a stable reaction of reason and adjustment. In a sentence, since the proposed powerplant will influence the life and living habits and the mental health of thousands of people from Prescott to Riverside, the ideal medical recommendation is that each be given the opportunity to agree or to disagree with the proposal, for mental health is as important as physical health.

The physical effects resulting from the construction of a powerplant of the size proposed by Northern States Power is more tangible and more readily understood. To background your evaluation of my next points of testimony, you have been supplied copies of (1) "The Power Industry and Air Pollution," as presented in November 1962 by HEW. (2) "The Summary of an International Conference on the Medical Aspects of Air Pollution" held in Vienna, August 1960, (3) "A Summary of Conference in Emphysema," stressing "Air Pollution and Chronic Pulmonary Insufficiency," presented in Aspen and published in *The American Review of Respiratory Diseases* in 1961, (4) an article on "Air Pollution and Respiratory Disease" as published in the *Annals of Allergy*, in 1963 and most importantly (5) a "Physician's Guide to Air Pollution" as published in the *Journal of the American Medical Association*. These represent a bibliography of well over 150 other publications. Thus, the first physical effect of a powerplant of the type proposed is that of air pollution. You will note that in a number of the studies and opinions expressed, metropolitan areas are cited as being dangerous. This is only the fact that there are more people available for the contamination to affect and, in general, metropolitan areas have the older age group in higher numbers. It does not matter where the plant is located for, if it is contaminating the air, as the population grows, the problem is compounded. Thus, the same precautions are necessary in considering the dangers of air pollution no matter where the location may be—metropolitan, suburban, or rural.

To best understand the medical effect of air pollution, it is well to know the mechanics of the respiratory system. We all, of course, realize the effect of an irritant in the air which causes the eyes to burn. This same type of sensitivity reaction can occur in the linings of the nose and of the sinuses. The sinuses are air spaces in the bony portion of our skull, which spaces are lined in a manner similar to that of the nose. This lining secretes the same type of material as does the nasal passage. Thus, irritation of this lining can result in symptoms referable to the nose and sinuses. The same situation prevails in the throat, however there

is a different reaction in the pulmonary tree. Actually, this term, "pulmonary tree," is a good one, because it describes the fact that your lungs and your tubes are much like an inverted tree with the trunk in the throat. The trunk is the trachea. From it arise major branches which become smaller branches. These are known as bronchi and bronchioles. Finally, the leaves of the tree are numerous as are the little air sacs that exist in the lungs. The tubes have a series of little fine hair-like organs, known as cilia. These act to sweep the secretions, that occur within the lung, upward along with the foreign air pollution particles. When there is considerable activity, a cough develops to help clear what has been swept along. Anything that interferes with the action of the cilia, or that will result in increase secretions of mucus, will result in ultimate damage of a permanent nature to the lungs. This may be known as chronic bronchitis, or it may be emphysema.

The principal air pollutants, that one considers from power generating stations, include smoke, fly ash, hydrocarbons and gaseous oxides of nitrogen and sulfur. Merely because of esthetic objections, smoke and fly ash emissions have received considerable attention in the past several years, primarily as a result of interference with visibility, soiling and corrosion of structures, metals, fabrics, and other materials. Those that are of concern to the medical profession are particularly related to (1) the fine particles because of the chance of retention in the lung resulting in chronic disease, (2) hydrocarbon substances which have been demonstrated definitely to be cancer causing irritants, (3) the gaseous oxides of nitrogen and sulfur. In themselves there is danger, but even more completely is the fact that there is the ability, in some instances, of an increase in the rate of oxidation to result in the trioxides. I believe Mr. Humphries mentioned the trioxides. The effect of all these various noxious agents upon the community is dependent upon a number of factors, including the fuel that is used, the protection of the effluent byproducts, the physical location of the community (good versus bad air circulation) the usual humidity of the community and the protective measures established by the local health officer. Larger particles of dust, particularly in concentrated amounts, can result in local skin irritation, upper local upper respiratory secretions and irritations, but most importantly, in lung irritation. The result of this latter generally comes only after chronic exposure.

The hydrocarbons have been shown to be cancer causing in nature. In areas of heavy concentration of hydrocarbons, the incidence of cancer of the lung is greater. The oxides of nitrogen are definitely dangerous, but fortunately are very seldom in sufficiently high concentration to be significant. The oxides of sulfur, however, can result in acute respiratory problems, as well as chronic reaction. These will cut the ability of the little hairlike cilia to function and will increase the amount of mucus formation. With this combined abnormal functioning, the ability to exchange air is lessened, the promotion of a chronic cough is increased and although mortality is not great, morbidity is. Thus, it becomes just as evident that the control of air pollution is important to the health and the life of these United States, as was the need for proper water supply and sewage disposal back at the turn of the century. Let us hope that instead of a drive for clean water, as currently is promoted by the Government, a drive for clean air before it becomes dirty can be effected.

One other health matter to be considered, as it relates to the actual physical plant for power, is that of the water to be used by the plant. Obviously, the intake of water has no effect, so we are not concerned about the effluent flow. There is no contamination of the water in advance of the effluent flow, but there is a change in the oxygen content. Most importantly, the water to be returned to the river will be hot water. Since I am not an expert in conservation, I am not qualified to point out what change in balance of the fish, the mammals and the flora will be, but I am qualified to state that hot water promotes the growth of organisms and of plants. Certainly no one could state that the St. Croix River will be overwhelmingly contaminated as a result of the hot water, so that bacteria and fungi just sweep through the entire river. It is true, however, that there will be a change and a promotion of the growth of bacteria and of fungi and algae, also it is possible that with contaminants and hot water combining a local problem could arise.

The last factor that enters into the medical profession's evaluation is that of safety. Since I have been asked to cover all of the causes and influences of this proposal upon the health of the community, it may be pointed out that the medical profession prefers to prevent accidents and illness, rather than to treat what has occurred. Since far and away the greatest proportion of deaths in

children are accidental and since the number of deaths on the highways are about the same as the number of deaths from cancer, it is well to realize that any increase in potential can result in an increased number of injuries and deaths. Therefore, with industrialization as a part of the influence of a powerplant in the St. Croix River Valley, necessarily there will arise further problems of safety and safety control, including river traffic, which is not well patrolled and even now, railroad traffic, construction, etc.

SUMMARY

(1) The effects of a powerplant upon a community are dependent upon the size of the plant, the type of fuel that is being used and the protective measures instituted.

(2) The effects include those of mental reaction and those of physical reaction. Mental reaction is one which has no mortality attendant to it, but does have a good deal of morbidity.

(3) The morbidity of the physical reaction varies from simple irritation of the skin, the mucous membranes and the lung tissues, whereas the mortality is related to chronic irritation of the lung tissues, resulting in respiratory collapse, or heart failure. One other is that of "epidemic" mortality in the case of severely concentrated noxious fumes.

(4) The change of the temperature of the river water will promote additional bacteria growth. Other discharges into the river will have their rate of growth increased.

(5) Safety problems, accidents and injuries will increase with the advent of industrialization.

Senator NELSON. I notice we have of record here six additional witnesses. We started at 9:30. The allocated time was 3 hours. We will continue to 12:30. We will come back at 1:30 for whatever rebuttal either side may wish to make. I would suggest, therefore, that those who have prepared text to summarize their remarks. The text of all statements will be put into the record. So if it is possible for those of you who are going to testify from now on to give a little thought to summarizing your testimony before you get up here, it would expedite the hearings and make it possible to conclude them within the 3-hour period. The committee staff and the rest of us do have a plane to catch out of Minneapolis at 6 o'clock.

Who is the next witness?

Mr. THUET. The next witness will be Mr. Robert Burns, who is an attorney in St. Paul. He will discuss the areas of possible future resolution relative to pollution.

May I ask as to procedure this afternoon before calling Mr. Burns? Will each proponent and opponent be given some time for summation, 10 or 15 minutes after rebuttal perhaps?

Senator NELSON. Anyway you wish to use it. The rebuttal time can be used for summation if you wish.

Mr. THUET. The reason I ask, I am on here, I would just as soon include it at the end.

Senator NELSON. That is perfectly all right. The reason for having an adversary proceeding is to afford an opportunity for each side to make a response, if they desire, to any points made by the other side. As a matter of fact, if you aren't prepared to make a response now we will accept your response in writing prior to the 18th of December at which time the record will be closed. So if you would rather prepare some remarks and send them to the committee instead of giving them "off the cuff" at a rebuttal session, then the committee will accept them and they will be part of the record.

Mr. THUET. Thank you.

Mr. Burns.

STATEMENT OF ROBERT W. BURNS, ST. PAUL, MINN., ATTORNEY

Mr. BURNS. Mr. Chairman and gentlemen of the committee, what I have here is the legal report, Mr. Chairman and gentlemen of the committee. What I am giving is the legal report of the "Save the St. Croix, Inc.," and it is divided into two parts. This is shown in the testimony that is already filed with the committee.

The first part is related to some suggested changes in the Federal Air and Water Pollution Control Acts, while the second part explores some possible areas of Federal legislation that are not specifically covered by the two Federal acts.

As to the Federal Air and Water Pollution Control Acts, when the specification data of the proposed NSP plant on the St. Croix River was first examined, it appeared that a problem of interstate air pollution might exist. At the same time we wondered if the provisions of the Federal Air Pollution Control Act, which as you know is sometimes called the Clean Air Act, might also apply. Specifically, we wondered if section 5 would apply. Section 5, as you know, states that pollution of air in any State which endangers health shall be subject to abatement proceedings. As you know, this is an administrative proceeding in the office of the Secretary of Health, Education, and Welfare, and consists of a series of hearings designed to stop or abate in one way or another air or water pollution. After a study of the act, it was rather doubtful that abatement would apply to situations where it appeared from a set of proposed plant specifications, or that there would be future or anticipatory air pollution. The abatement seems to apply in actual pollution. In other words, the plant would be in operation. The facilities would be working before there would be any possibility of this administrative proceeding to take jurisdiction over the matter.

Accordingly, we wanted to check this, so we wrote the General Counsel of the Department of Health, Education, and Welfare in Washington. We asked them specifically if section 5, the abatement section, would apply in a case of anticipatory air pollution. Their answer was in the negative, stating that in their opinion section 5 did not authorize abatement proceedings on the basis of expected or future air pollution. Copies of their correspondence are attached on record with the statement of this committee.

Senator NELSON. I might say at this point in testimony yesterday, President Ewald of the Northern States Power stated that he thought also that so far as water pollution was concerned it would be beneficial to have quality standards established in advance rather than after the fact. And you are testifying as to a point that is of particular interest to this subcommittee, because this is one of the precise questions we considered in the last session of Congress, and I anticipate we will consider in the next session of Congress.

Mr. BURNS. Thank you.

As the record shows, the counsel of the Department felt that they could not take jurisdiction in this matter on the basis of the present statute.

Senator NELSON. I might say, so nobody is misled, President Ewald's testimony was as to water pollution and not the air pollution.

Mr. BURNS. I am also going into air pollution in a moment.

I think the basic reasons for any relief in future air pollution situations, such as in the present controversy, represents a weakness. There is no redress available until after actual pollution has started, by which time it is often too late for an appropriate remedy. Also, the Air Pollution Control Act is often the only statutory remedy available in questions of interstate pollution. For example, if there is a complete absence of any interstate agreements such as a contract arrangement of some kind between two adjoining States, there is no interstate forum or hearing to be heard except through that of the Secretary of Health, Education, and Welfare. It is, therefore, doubly important that the Federal statutes offer an appropriate remedy for all types of situations. To remedy the problem of future air, it is suggested that the abatement section of the Air Pollution Control Act be changed to include a provision for abatements in situations where there is a reasonable expectancy that future pollution will occur from a proposed plant or industrial facility.

We drafted the following merely as a guide for the committee in suggesting the inclusion of anticipatory air pollution into the Clean Air or Federal Air Pollution Control Act. That amendment is on the record. I don't think I will bother to read all of it here. The first section is already there. It states that pollution in the air of any State which endangers the health or welfare of any persons shall be subject to abatement. We propose the following sentence be added to cover future anticipatory air pollution. It might read as follows:

Pollution of interstate or navigable waters shall include anticipatory pollution, if such anticipatory pollution reasonably appears from the plans, specifications, prototypes, or models of proposed industrial plants and facilities, buildings, and structures, that after completion and operation of such proposed industrial plants and facilities, buildings, and structures, pollution of waters will result which endangers the health of any persons.

That is a possible suggestion for the Air Pollution Control Act. Now, the same problem applies to the Water Pollution Act. They had exactly the same—almost substantially the same, anyway—provision for abatement, and we propose that a change also be made to that act. I will not take the time to read it. The language is almost identical to the one I just read, except it applies to water pollution. In other words, we have the abatement section which is an administrative proceeding to modify or halt air or water pollution, and we ask that this be revised somewhat so that future or anticipatory water and air pollution will be included in the abatement proceedings. That is the object of the two recommended changes that we have submitted.

Now, there is another possible change in the Federal statutes regarding the Water Pollution Control Act, which I will touch on very briefly. As you probably know, in both acts, as a matter of fact, the Secretary of Health, Education, and Welfare has the power to conduct research investigations and surveys. This is found in the Clean Air Act in section 3(a)(3). Now, section 3(a)(3) also provides that the Secretary alone, with the request of State, can come in and undertake investigation, research, and surveys if the Secretary believes that an air pollution problem exists in a State other than the State in which the source of pollution exists. In other words, the Secretary can act alone without the request of a local or State government, insofar as research is concerned, where air pollution drifts across a line. The whole purpose of this is to bring in the authority of the Public Health Depart-

ment and other facilities of the Department of Health, Education, and Welfare for research and investigation, and now, as I say, the Clean Air Act, one provision in a-3, that the Secretary has the power, if he believes the situation warrants it, he may come in and investigate it without the request of a local government unit. This is in the air act.

It is felt that the Secretary of Health, Education, and Welfare should have the same power in interstate situations where water pollution is concerned. We, therefore, propose the following as a suggestive change. The suggested change there is exactly the same as you find in the air act. We propose to update section 466c(b) of the Water Pollution Act so that the Secretary may, upon request of any State water pollution control agency, or interstate agency, or if in the Secretary's judgment such problem may affect any community or communities in a State other than that in which the source of the matter causing or contributing to the pollution is located. And then the statute goes on as is now stated. In other words, the whole problem here is to bring in or update, rather, the research facilities so they are compatible, so that the water act is compatible with the Clean Air Act, insofar as the research power of the Secretary of Health, Education, and Welfare.

Those are some specific suggestions that we have to the present statutes in the Water Pollution Control Act and the Air Pollution Control Act.

I would now like to discuss in very brief general terms some areas that might be further in need of Federal legislation. Although they relate to pollution of water and air, they are not specifically covered by the existing Federal acts.

First of all, there appears to be a very vexing problem on interstate boundaries relative to water and air pollution. Often industrial or community growth will take place in one State along its borders with its sister States. Similar development in the second State may often be nonexistent or at present will be at a slower rate. As a result, the communities in the developing State will receive all the economic benefits such as the property tax deduction, increased employment opportunities, but the only benefits to the communities in the developing State, the only benefits that they receive are to stand by helplessly and watch pollution of their air or their interstate waters. Eventually, however, as a usual course, the communities will be called in to pay the expense of cleaning up resultant pollution.

To rebalance, interstate control of air and water pollution is necessary. Since it is desirable to keep control measures on a local level, compacts between States for the purpose of interstate control of pollution have been developed. As you probably know, both the Federal Air and Water Pollution Acts recognize this and encourage the establishment of interstate commerce. Section 1857a of the air act, and section 466a of the water act provides that interstate compacts will be created with the consent of Congress. However, there is a problem here because the development of interstate compacts or contract agreements among States to control water and air pollution has been disappointingly slow. Because of such slow development, it is felt that further measures are needed at the Federal level to encourage formation of interstate compacts between States for the control of air and water pollution. The legislative study as to possible incentives to

encourage a more rapid growth in compacts between States is suggested. Further, it appears that development of interstate compact arrangements are badly needed in a particular distressed area, along State borders, but if such compact arrangements cannot or are not agreed upon within a reasonable time, then the possibility of preempting State control in favor of Federal control should be considered.

There is another important area and this relates to desirable locations of what I might call "heavy river users" types of industry. Heavy river user industries might be defined as those industries which utilize the waters of interstate waterways for manufacturing processes or for transportation purposes. These include the Federal chemical industry, electric generating plants fueled by coal, gas, or atomic energy, chemical industries, mining industries, grain and oil storage and shipping, fertilizer facilities, and the like. All of these industries use interstate waters for shipping or for discharge of industrial waste. At present, there are no restrictive measures either at the State or Federal level relative to the location of such industry along interstate rivers. There are, of course, no zoning controls at these levels that simultaneously encompass the problem of locating industry along the borders of two adjoining States. In fact, there is a total lack of any controls except at a strictly local governmental level.

Now, the location of these industries in and around the metropolitan areas is today a vital question because of vast increase of recreational areas, municipal and residential, adjacent to or on the water levels. Historically, the matter of commercial and industrial zoning has been traditionally left to local governmental units. This, however, leaves no overall perspective of the question or the control over the matter. For example, the instant controversy which is on the location of the powerplant on the St. Croix, there are no overall zoning or other restrictions as to industrial use of the river that consider both people in the interested States of Minnesota and Wisconsin. It would appear, then, that it would be advantageous to require the so-called "heavy river user" types of industry to locate in specific areas such as industrial parks, industrial complexes or specified industrial sites of one kind or another.

As a local example, there are areas available today and presently used for this purpose on both the Minnesota and Mississippi Rivers. However, there are presently no incentives to encourage industry to choose these areas over others. The sites are chosen at random solely on the basis of economic reasons. Now, the confinement of location to industrial parks or complexes would obviously preserve greater portions of interstate waterways as a sort of water supply, as preferred recreational and residential areas. Perhaps more important, such confinement would present a more expeditious avenue of administering air and water pollution controls. The controlled facilities would be concentrated in a given area. Also, there is a definite advantage to industries located in such complexes or parks. Facilities to remove pollutants from industrial wastes and discharges could be pooled by the various participants at less expense to the industries than comparable costs where such industry was separately located. Also, the industries expenses for research and development for facilities to remove noxious air pollutants, and other things of that nature, in a specific industrial area could also be pooled.

It is therefore felt that studies leading to legislation for the purpose of urging and encouraging these heavy types of industry that utilize the river to locate in well-defined industrial areas and complexes. It should be contemplated by the subcommittee. This should be done for the ultimate purpose of (1) better control of water and air pollution, and (2) for the preservation of rapidly diminishing recreational, wild-life, and residential areas along interstate waterways.

In summation, it is asked first that the Federal Air and Water Pollution Control Acts be changed to include anticipatory for future air pollution problems. Second, the Water Pollution Control Act be changed so that it is compatible with the Air Pollution Control Act with respect to the secretary's authority to come in and conduct research investigations and surveys. Third, that the possibility of better incentives studied to encourage the creation of compacts between States for interstate air and water pollution control agencies. And fourth, studies be made to encourage heavy industry so they locate within well-defined areas along interstate waterways in order to have air and water pollution control.

That, gentlemen, is the substance of the report of the legal section. I thank you for your audience.

Senator NELSON. Thank you, Mr. Burns.

Any questions, Senator?

Senator METCALF. No, I have no questions, but I want to thank the witness for supplying us with suggested language because that is always helpful when we try to draw up this legislation.

Mr. BURNS. Thank you.

Mr. THUET. I would like to say to your witnesses, unless we are confined pretty much to 5 minutes, we will just not finish, and I wish you would keep that in mind.

I would like to call Mr. George Richter.

STATEMENT OF GEORGE RICHTER, UNIVERSITY OF MINNESOTA, B.B.A. INDUSTRIAL RELATIONS

Mr. RICHTER. My name is George Richter. I, like most of the witnesses today, cannot qualify as an expert.

I would like to give, with your permission, a background history of some Northern States Power Co.'s actions and statements leading up to and including their decision in proposing the steam-generating plant at Oak Park Heights. We quote from some of the company's annual reports.

The company considers its reputation for fairness and fine service as one of its most valuable assets and continually endeavors to keep its customers, employees, and shareholders informed of its activities.

Incidentally, each annual report contains corporate information for plans of the future. Reviewing NSP's report to its stockholders from early 1950, we find the first mention made of proposed steam-generating plants was on the inside cover of the 1956 annual report. There it said:

The company has already acquired the land for two steamplants that will be built along the Mississippi River within the next 10 to 12 years. Eventually these may total over 1 million kilowatts each. One is near Red Wing, Minn., and the other one at Newport, Minn.

This was a full-page statement with a map showing these locations. There was also a newspaper story in the November 19, 1958, St. Paul Dispatch, headlined: "Two Hundred Million Dollar NSP Plant Planned," and a second, dated November 20, 1958, St. Paul Pioneer Press:

A million kilowatt steam-electric generating station is planned by Northern States Power Co. in the Prairie Island area between Red Wing and Hastings. Arrow shows the approximate location 8 miles northwest of Red Wing. Construction will begin in the late 1960's or the early 1970's.

Nowhere do we find any evidence of any sort that Northern States Power has ever planned a steam-generating plant on Lake St. Croix.

I have been informed, and I believe, that Oak Park Heights was purchased and used for a substation and transmission lines. As late as in May of 1964, Northern States Power was negotiating with the St. Paul City Council on the Red Rock site. Out of the clear sky, on May 6 and 7, all Twin City papers carried press releases about NSP building a steam-generating plant at Oak Park Heights.

The April 1964 shareholders bulletin is the first reference to anything at Bayport. The report goes on and tells about the midcontinent area planners program.

We call your attention to this report of May 1964, the first reference of any sort to its stockholders for NSP at Oak Park Heights. Why this sudden change in plans? Northern States did not give a ready answer, and on July 10, Mayor Vavoulis and the St. Paul City Council asked the president of NSP to meet with them to reconsider their decision.

We quote from the paper:

During the information session Mayor George Vavoulis asked NSP officials why a new \$63 million generating plant would not be located at Red Rock, a site on the St. Paul-Newport border.

He, Mayor Vavoulis, criticized the company's public relations, saying he has heard much rumored information about NSP's proposal to locate the plant on the St. Croix River.

Mr. Ewald, at that time—and I would be glad to submit this to the committee, you don't have it—gave a formal statement there and I quote parts of it:

Because the construction of a major generating plant requires 4 years' time for engineering and construction, it is essential that the plans be firmly established about 5 years in advance.

He also said, "In preliminary studies of the site at Newport we have worked" with the aviation authorities and received conditional approval for a stack of about 400 feet high. "A need for 800 feet high," to shorten this, he said that—

it made it apparent that the location at this plant site was impossible if Holman Airport were to be developed.

We have checked with the offices of the Federal Aviation Authority, Metropolitan Airports Commission, and the State aeronautical commission and find no record of a formal application for such a smoke-stack. In the words of the aviation officials, they tell me that the contacts were cursory and no determination was asked for or arrived at.

Also, to shorten this, the same thing was true of any reference made to water studies on the Mississippi. The only thing they tell me, there, that instead of talking about a 500,000-kilowatt-generating plant, they asked about a 2,000,000-kilowatt plant at Red Rock. This is four times as large as the proposed unit on the St. Croix. Until this, there was no reference to any studies of water conditions at any time on the St. Croix River.

Nowhere in any statement has Northern States said it considered other locations in its consideration for the plant site. We have been unable to document where it was talked about the possibilities of other sources of fuel; such as, gas, lignite, or atomic energy. I ask the question: Are we, as consumers, stockholders, and citizens not entitled to know what considerations, if any, have been given to alternate sites and fuel?

Now, we submit the press release, September 21, page 108, "Electrical World," and, in short, it says by 1980 there will be five new generating plants in the Twin City metropolitan area. Of these, four are coal burning.

Now, do we as consumers, stockholders, and citizens have to give up other natural resources and put up with all the disadvantages of coal-fired plants in the metropolitan area just because Northern States Power is going to make a decision?

Again, I humbly ask, who can help us? We started in the beginning—who can ask these questions; who can answer them? We asked Northern States Power a question and they say it will be settled in a quote, "orderly procedure." The only thing we can find in the orderly procedure is asking for a permit to use the water. Gentlemen, we need your help. We ask who is there to evaluate the need, economic feasibility, and the impact upon recreational and esthetic aspects of these plants in our two States?

Now to get back to the St. Croix controversy: Northern States, in three public sessions, has always said they welcome all inquiries about all aspects about the steam-electric plant it plans to build at Oak Park Heights on the Minnesota side of the St. Croix River.

Gentlemen, we know of numerous organizations who, in their search for information, have contacted Northern States Power to have them present their side at a public meeting. They were all turned down with Northern States giving the excuse that it is not an issue for public discussion; that it is in the hands of commissions and should be settled, and I quote again, "in an orderly fashion."

Gentlemen, I know we are pressed for time. I do want to say that I am not here to impugn the motives and actions of Northern States Power. However, it is noted under existing authority in the State of Minnesota—I don't know to whom this company is accountable—there is no State regulatory body in Minnesota that has any control over power companies. We are one of four States that do not have any public commissions of any sort. We do not have a public service commission in Minnesota. The other four States are Alaska, South Dakota, Texas, and Nebraska, and Nebraska has no private power company. Likewise, I feel there is no State, Federal, or local authority to whom anyone can appeal regarding the overall impact and effects of this plant on the surrounding area.

Thank you.

Senator NELSON. Thank you very much, Mr. Richter.
(The full text of Mr. Richter's statement follows:)

STATEMENT OF GEORGE E. RICHTER, UNIVERSITY OF MINNESOTA

With your permission, I would like to background the history of some of Northern States Power Co.'s actions and statements leading up to and including their decision in proposing a steam-generating plant at Oak Park Heights.

NSP is a public utility owned by individual investors and, as such, we assume that this corporation has a peculiar responsibility to the public: consumers; communities they serve; and, probably above all, their shareholders. They have in the past, apparently, as a responsibly managed company, recognized this obligation. We quote from the 1957 annual report of NSP to its stockholders, page 17:

"The company considers its reputation for fairness and fine service as one of its most valuable assets and continually endeavors to keep its customers, employees, and shareholders informed of its activities."

Each annual report of the corporation, in addition to the usual corporate financial statements, usually has other sections devoted to legal matters, labor relations, finance, current building and expansion projects, plus a section telling of construction planned years in advance.

In reviewing NSP reports to stockholders from early 1950, we find first mention made of proposed steam-generating plants was on the inside cover of the 1956 annual report:

"The company has acquired two parcels of land for future steamplants along the Mississippi River. One is near Red Wing and the other at Newport, Minn., where barge coal and adequate cooling water are available."

The next reference to proposed plants was in the 1959 annual report, page 16, in a section titled, "Building for the Future."

"To keep ahead of the ever-increasing demands for electricity and gas, the company plans far ahead and builds with an eye to the future. It is estimated the installed generating capability of the NSP system will exceed 3 million kilowatts by 1969. The company has already acquired the land for two steamplants that will be built along the Mississippi River within the next 10 to 12 years. Eventually, these may total over 1 million kilowatts each. One is near Red Wing and the other at Newport, Minn."

This was a full-page statement with a map showing the proposed locations.

We now submit the attached copy of two newspapers' stories. One, November 19, 1958, St. Paul Dispatch headlined, "\$200 Million NSP Plant Planned," and a second, dated November 20, 1958, St. Paul Pioneer Press. A map illustrating the Prairie Island site across from Diamond Bluff, Wis., accompanied the following statement:

"A million kilowatt steam-electric-generating station is planned by Northern States Power Co. in the Prairie Island area between Red Wing and Hastings. Arrow shows the approximate location 8 miles northwest of Red Wing. Construction will begin in the late 1960's or the early 1970's, and the complete installation will cost about \$200 million at today's prices."

The 1960 annual report under legal section, page 11, concluded: "* * * and the necessary proceedings to obtain transmission outlets for the company's proposed Red Rock generating station and for the expansion of the company's transmission system."

Nowhere do we find any evidence of any sort that NSP has ever planned a steam-generating plant on Lake St. Croix. The property they owned at Oak Park Heights was purchased and used as a substation.

Out of a clear sky, on May 6 and 7, 1964, both Twin City papers carried press releases about NSP building a steam generating plant at Oak Park Heights.

April 1964 Shareholders Bulletin (specific date not included, apparently published in May) tells of the May 6 shareholders' meeting:

"Plans to construct a 500,000-kilowatt-electric generating unit at an estimated cost of \$60 million were announced by Earl Ewald, executive vice president. It will be located on a site near Bayport, Minn., on the St. Croix River. The new unit will be of the most advanced engineering design and will be the largest and most efficient in the upper Midwest."

Why this sudden change of plans from Red Rock to Oak Park Heights? Northern States did not give a ready answer, and on July 10, Mayor Vavoulis and the St. Paul City Council asked the president of NSP to meet with them to reconsider their decision.

One month later, August 10, the St. Paul papers reported that Mr. Earl Ewald met informally with the St. Paul council. We quote from the St. Paul Dispatch:

"During the information session, Mayor George Vavoulis asked NSP officials why a new \$63 million generating plant would not be located at Red Rock, a site on the St. Paul-Newport border.

"He [Mayor Vavoulis] criticized the company's public relations, saying he has heard much rumored information about NSP's proposal to locate the plant on the St. Croix River.

"Earl Ewald, NSP president, presented the company's plans, and in an obvious reference to the Save the St. Croix Committee which opposes the plant on that river, said, 'We are finding out that there is a great deal of public opinion on this and that it is loaded with dynamite.'"

We further attach and submit for your evaluation Mr. Ewald's statement of August 10, 1964, "Generating Station Site Location, Northern States Power Co." We quote from paragraph 2:

"The location of large, efficient, centralized generating units is the most important element in the whole power system planning problem. These plans are developed on a preliminary basis over 20 years into the future and as conditions develop and changes in the art occur, the plans are modified so that the system development plans reaching 10 years into the future are fairly definitely established. Because the construction of a major generating plant requires about 4 years' time for engineering and construction, it is essential that the plans be firmly established about 5 years in advance."

We again submit that nowhere in any public statement or report has NSP indicated that the Oak Park Heights location was planned or considered for any purpose other than as a substation.

We refer to page 3, paragraph 1:

"In our preliminary studies of the site at Newport we had worked with the aviation authorities and received conditional approval for a stack about 400 feet high. When the new studies developed the need for an 800-foot stack, we rechecked with the aviation authorities and we found that new developments were being planned at the Holman Airport which would place this site directly in the path of a landing pattern. This made an 800-foot stack an impossible hazard and it even cast doubts on the advisability of a 400-foot stack. * * * These studies then made it apparent that the location of the plant at this site was impossible if the Holman Airport were to be developed."

We have checked with the offices of the Federal Aviation Authority, Metropolitan Airports Commission and the State aeronautical commission and find no record of a formal application for such a smokestack. In the words of the aviation officials the contacts were cursory and no determination was asked for or arrived at.

We further refer to Mr. Ewald's statement of August 10, page 4, paragraph 1:

"Although our preliminary studies indicate that this generating unit would cause a very reasonable temperature rise, it is not clear at this stage whether such a temperature rise would be considered acceptable at this site by the water pollution control commission." (We have been unable, however, to find evidence of any formal request made to the water pollution commission for a generating plant.)

We further quote from Mr. Ewald, page 4, paragraph 3:

"It was the coincidence of these developments which lead us to our decision to locate the plant at Bayport. It was obvious to us that the airport problem was one that would require time for its solution. It was obvious that the cooling water problem was critical and that a definite answer on that would not be available until further results of our studies were available. These factors together with the electrical operating considerations made it clearly desirable to install the 1968 unit at Bayport and delay the development of the Newport site until the other problems had been resolved."

We wish to call your attention that the only reference to any public authority on the Red Rock and Prairie Island sites were some informal inquiries to the water pollution control commission. Also when NSP was talking to the water pollution commission, they were talking about a 2-million-kilowatt plant at Red Rock. This is four times as large as the proposed first unit on the St. Croix. Until August 1964, there were no references to any studies of water conditions on the St. Croix.

Nowhere in any statement has Northern States said it considered other locations in its considerations for plant site. Nowhere has it documented its possible

consideration of other sources of fuel such as gas, lignite, or atomic energy. Are we as consumers, stockholders, and citizens not entitled to know what considerations, if any, have been given to alternate sites and fuel? Also, are we not entitled to know if other plants are being planned; and if so, are others being planned for the St. Croix area? Do they plan to use Red Rock, Prairie Island, and Monticello in the future along with the St. Croix?

We submit the attached press release, dated September 21, 1964, page 108, *Electrical World*, "MAPP Study Plans 5,956 Mw by 1980."

Are these coal-fired plants necessary just because NSP joined Mid-Continent Area Power Planners?

Do we as consumers, stockholders and citizens have to give up other natural resources and put up with all the disadvantages of coal-fired plants in the metropolitan area just because NSP has made a decision?

Again, who can help us? Who can answer these questions? What "orderly procedure" is there other than asking for a permit to use water? Who is there to evaluate the need, economic feasibility, and the impact upon recreational and esthetic aspects of these plants in our two States?

At present we are asked to take NSP's word for everything and are told not ever to raise a question.

Now to get back to the current St. Croix controversy. We wish further to call to your attention another statement of Northern States Power Co. In all their formal statements to stockholders and people writing about St. Croix and at the three public meetings that NSP attended, NSP's statements started with the following:

"Northern States Power Co. welcomes inquiries about all aspects of the steam electric plants it plans to build at Oak Park Heights on the Minnesota side of the St. Croix River."

We know of eight organizations that contacted NSP to have them present their side at a public meeting. All were turned down with NSP giving the excuse that this is not an issue for public discussion; that it is in the hands of commissions and should be settled in an orderly fashion.

Also, NSP has repeatedly stated that they are not arbitrary and they wish to abide by the wishes of the communities they serve.

Documented NSP statements and actions behind the Oak Park Heights site selection do not verify NSP's statements and concern about their long-range planning and concern for communities and conservation.

It is not my purpose to impugn here the motives and actions of NSP. However, it should be noted there is no authority to whom this company is accountable for any of its actions. There is no State regulatory body in Minnesota that has any control over power companies. There is no public service commission in the State of Minnesota. Likewise, there is no State, Federal, or local authority to whom anyone can appeal regarding the overall impact and affects of this plant on the surrounding area.

On behalf of the hundreds of thousands in this area who are accustomed to using the St. Croix Valley as a recreational and living area plus those who just appreciate its scenic beauty; we ask help, we need help. Please help us get answers to our questions.

Mr. Ewald, I believe, expressed the issue best, in a prepared TV statement:

"The issue is whether or not the valley is going to be industrialized or kept for recreational uses."

[From the St. Paul Pioneer Press, Nov. 20, 1958]

TWO HUNDRED MILLION DOLLAR NSP PLANT PLANNED

Northern States Power Co. today announced plans for a million-kilowatt steam-electric generating station on the west bank of the Mississippi River in the Prairie Island area north of Red Wing.

Construction of the first unit will begin in the late 1960's or early 1970's, Allen S. King, Northern States Power president, said.

Northern States said the plant would cost around \$200 million at today's costs but the figure could change considerably by the time construction starts.

King said the firm now is taking steps to buy the land for the plant and a substation as well as procuring right-of-way for transmission lines.

The plans call for four units, each with a capacity of 250,000 kilowatts. The largest units now in operation in the NSP system are 100,000 kilowatts.

King said use of electricity in this area has doubled every 10 years over the past few decades. The proposed plant, he said, will lie between the rapidly expanding areas served by the company in southeastern Minnesota and west-central Wisconsin.

[From the Electrical World, Sept. 21, 1964]

MAPP STUDY PLANS 5,956 MEGAWATTS BY 1980

Preliminary expansion plans of members of Mid-Continent Area Power Planners envision the addition of 5,956 megawatts of new capacity in 11 new stations in the United States and Canada between 1968 and 1980 and supporting high-voltage transmission lines between Winnipeg and the Twin Cities area, plus transmission in North Dakota.

New generation would consist of 2,956 megawatts of fossil-fuel capacity, including two new 200-megawatt lignite-burning plants in North Dakota; 2,380 megawatts of hydrocapacity at three sites on the Nelson River in Manitoba; and 620 megawatts of nuclear capacity near the Twin Cities.

These projections were presented to a MAPP management meeting in Winnipeg July 23-24 by Stanley Mleczeko of Sanderson & Porter.

They are contained in a preliminary report of five plans for the development of systems in the upper Midwest and Manitoba. According to Sanderson & Porter, the plan that appears best suited to the power needs of the MAPP area indicates maximum development of the hydropotential on the Nelson River as soon as possible.

Mleczeko presented this timetable for the proposed stations: 1968: Coal-fired, 515-megawatt station, Twin Cities, currently authorized; 1969: Lignite-fueled, 200-megawatt station near Stanton, N. Dak., to be privately financed; 1970: Hydroplant of 630 megawatts at the Kettle site on the Nelson River; 1972: Coal-fired, 627-megawatt station, Twin Cities area; 1974: Hydroplant of 540 megawatts at the Long Spruce site on the Nelson River; 1975: Coal-fired, 627-megawatt station, Twin Cities area; 1976: Lignite-fueled, 200-megawatt station near Stanton; 1977: Nuclear plant of 620 megawatts near the Twin Cities; 1978: Hydroplant of 1,210 megawatts at the Limestone site on the Nelson River; and 1980: Coal-fired, 787-megawatt station, Twin Cities area.

Results of the 3-month study, according to Mleczeko, show that interchange of large blocks of power between MAPP members in the United States and Canada is feasible. The study recommends that a full-scale engineering study be made with a view toward beginning construction of the new generating facilities and transmission lines. Electrical World learned that consideration is being given to lines at 345 kilovolts initially but with 500 kilovolts a possibility.

The two 200-megawatt lignite-fuel stations were offered as a minimum generating requirement from North Dakota's lignite fields. They would be in addition to two plants already authorized for construction in the Stanton area. Mleczeko noted that lower lignite costs might justify additional stations to be built under the MAPP plan in the Stanton area of North Dakota.

The study by Sanderson & Porter was sponsored by these MAPP members: Minnkota Power Co-op.; Northern States Power Co.; Otter Tail Power Co.; Minnesota Power & Light Co.; and Manitoba Hydro-Electric Board.

GENERATING STATION SITE LOCATION, NORTHERN STATES POWER CO.

(By Earl Ewald, president, August 10, 1964)

Planning a power system is a tremendously complex engineering problem involving consideration of a great many engineering and economic factors. The Northern States Power Co. has a planning organization which has developed a great deal of experience and is utilizing the very latest techniques available to science and engineering. NSP's planning organization has been instrumental in the formation of Mid-Continent Area Power Planners which is coordinating the planning of utilities in the 10-State upper Midwest area. This accomplishment has attained national recognition and NSP is established as one of the leading planning organizations of our industry in the United States.

The location of large, efficient, centralized generating units is the most important element in the whole power system planning problem. These plans are

developed on a preliminary basis over 20 years into the future and, as conditions develop and changes in the art occur, the plans are modified so that the system development plans reaching 10 years into the future are fairly definitely established. Because the construction of a major generating plant requires about 4 years' time, for engineering and construction, it is essential that the plans be firmly established about 5 years in advance.

As a part of this planning program, NSP owns several future generating station sites. The ones located at Newport and Bayport, for example, have been owned by NSP for about 20 years. When we first considered the location of a generating station at the Newport site we anticipated that the total capacity of the station would be about 200,000 or 250,000 kilowatts. By the late 1950's, we realized that larger generating units would be more efficient and we expanded the plans for the site to include a million-kilowatt installation. We then bought more land to accommodate the larger plant size.

Beginning in 1961, when the first 500,000-kilowatt unit was successfully installed in the United States, it became evident that substantial economic advantages in first cost and efficiency would accrue for the very large sized units. At the same time, NSP had been expanding its interconnection program with adjacent utilities and developing plans for major transmission ties to other large metropolitan areas like Chicago and St. Louis. The requirements of reliability of service would not allow us to install generating units as large as 500,000 kilowatts without the high-capacity interconnecting lines to other large utilities which would make it possible for us to draw upon other power sources in the event of a shutdown of the large unit. Thus the developments of the art and the perfection of our plans very recently brought us to the conclusion that our 1968 installation would be a 500,000-kilowatt unit. This is a very much larger size than had been anticipated in the past and the change involved necessary modifications of our planning.

There are two aspects of the modern electric-generating plant which are very important to its immediate environment. One is the discharge of stack gases and the other is the temperature effect on the circulating water used to condense the steam coming through the turbines.

In the light of the present-day conditions at the Newport site, with its proximity to the downtown St. Paul area, where there is a high concentration of industry, automobile traffic, and other sources of air pollution, and considering the heavy industrial development in the immediate vicinity of the Newport plant site, preliminary studies indicated, without question, that a very high stack of about 800 feet would be necessary to adequately disperse the stack gases. A modern generating plant is equipped with electrostatic precipitators which remove virtually all the fly ash, soot, and other solid materials from the stack emission so there is no problem from those sources.

In our preliminary studies of the site at Newport we had worked with the aviation authorities and received conditional approval for a stack about 400 feet high. When the new studies developed the need for an 800-foot stack, we rechecked with the aviation authorities and we found that new developments were being planned at the Holman Airport which would place this site directly in the path of a landing pattern. This made an 800-foot stack an impossible hazard and it even cast doubts on the advisability of a 400-foot stack. One of the large components of stack emission is water vapor which under certain weather conditions causes a steam plume from the stack which can cause difficulties to aircraft. It should be remembered, also, that in addition to the stack causing hazards to the aircraft, we must consider the hazard the aircraft cause to the powerplant. One of our prime responsibilities is to avoid service interruptions in the community and we must, therefore, design to eliminate the hazard of a major accident such as an airplane crashing into the powerplant. These studies then made it apparent that the location of the plant at this site was impossible if the Holman Airport were to be developed.

The other major environmental problem involving circulating water was also found to be critical at the Newport site. Our modern generating station will remove great volumes of water from the river, pass them through our cooling condensers, and return it to the river without any pollution or damage to the water except that the water will be slightly increased in temperature. This increase in temperature of the river water becomes important in certain seasons of the year when the weather is hot and when the flow in the river is low, particularly if there are heavy concentrations of organic matter present in the water. We have been working with the water pollution control commission for several years studying the effects of temperature increases in the Mississippi

in the metropolitan area. These studies have not been completed and the water pollution commission has not yet determined the reasonable limits of temperature increases allowable. The water pollution control commission has established zones in the Mississippi through the metropolitan area and the Newport plant site is in the most critical zone. This is because the location is below the Twin Cities, it is directly below the metropolitan sewage disposal plant, and it is directly above the city of South St. Paul. Although our preliminary studies indicate that this generating unit would cause a very reasonable temperature rise, it is not clear at this stage whether such a temperature rise would be considered acceptable at this site by the water pollution control commission.

This planning and engineering of our new plant additions is a continuing process and we are installing new generating units constantly. For example, we installed a large generator at the High Bridge Station in St. Paul in 1962. We installed another large unit at the Riverside plant in Minneapolis in 1964, and there will be additional units installed from time to time after the 1968 installation. The electrical requirements of the system and the development of the transmission have been modified in recent years because of our proposed interconnection with Chicago, and need for large blocks of power to the Eau Claire area, and the future potential of a large interconnection to the north in Canada. The electrical considerations of power distribution and strategic location of power sources around the metropolitan area indicate the desirability at this time of installing a large unit of capacity on the east side of the metropolitan area at the Bayport site.

It was the coincidence of these developments which led us to our decision to locate the plant at Bayport. It was obvious to us that the airport problem was one that would require time for its solution. It was also obvious that the cooling water problem was critical and that a definite answer on that would not be available until further results of our studies were available. These factors together with the electrical operating considerations made it clearly desirable to install the 1968 unit at Bayport and delay the development of the Newport site until the other problems had been resolved.

Other economic considerations, such as plant construction costs, taxes, and fuel costs, were not decisive in the selection of the Bayport site as compared to the Newport site.

We feel that our decision is soundly based upon careful consideration of the overall welfare of the metropolitan area. It places the new capacity where it will do the best electrical job of supplying the load. It avoids any possibility of air pollution or cooling water problems or interference with air transportation and the corollary hazard to the powerplant. With a high stack at Bayport there will be no difficulty from air pollution because the gases will be adequately dispersed. Water conditions on the St. Croix are excellent and the small temperature increase for a few hundred yards of the river will cause no harmful effects.

Because of the time considerations we must begin construction on this new plant in a very few months. Under no circumstances could we consider locating the unit at the Newport site since there is obviously not time to resolve the potential problems. The project involves a capital expenditure of over \$60 million and it is absolutely essential for the operation of our power supply system that it be completed and in service in the early months of 1968.

I have indicated that we installed a large generating unit at the High Bridge plant in 1962. We now have installed in the city limits of St. Paul a total of 505,000 kilowatts of generating capacity which is over twice the total of the peakload which we supply in the city of St. Paul. Because the Mississippi River provides favorable barge transportation for coal and makes available adequate circulating water, we have always maintained, over the years, substantially more generating capacity in the St. Paul area than the load requirements of that area would require.

Our guiding philosophy is that we will be a good corporate citizen wherever we serve, and the application of this philosophy is clearly evident in St. Paul. We have a capital investment in the area of more than \$175 million; NSP is the largest taxpayer in Ramsey County; we are paying more than \$4.8 million in property taxes in the county in 1963 and our gross revenue taxes to the city of St. Paul in that year totaled over \$2 million. There are 1,000 NSP employees in the St. Paul area and we are very proud of the civic contributions which they make from our manager, Mr. Owens, on down. Every year NSP employees are among the strongest workers and supporters in charitable fund drives and civic activities of all types.

The location of this 1968 generator unit has been very carefully planned taking into consideration the best interests of the entire metropolitan area. This careful, competent, engineering planning has brought NSP to a position of leadership in the utility industry in the United States and it is an important factor in our having been able to reduce rates eight times since 1961, bringing to our customers savings in excess of \$13 million per year.

Mr. THUET. We are taking these somewhat out of order, so that we can try to get as much information before you as we can in the time left.

We would like to call Mr. Sigurd Olson of Ely, Minn., at this time.

Senator NELSON. We are pleased to have you here, Mr. Olson. I think everyone across the Nation who has had a concern in the area of conservation is well aware of your distinguished reputation as a conservationist, ecologist, and author. We are pleased to have you with us.

**STATEMENT OF SIGURD F. OLSON, ELY, MINN., ECOLOGIST, AUTHOR,
AND CONSERVATIONIST**

Mr. OLSON. Senator and members of your committee.

I was very pleased to be asked to appear before you because this to me is a vital issue, not purely a local issue, but a national one.

Senator NELSON. May I ask, before you start, Mr. Olson, are you representing only yourself or are you representing any organizations?

Mr. OLSON. I represent a number of organizations. I am consultant to the Secretary of the Interior and to the Director of the National Park Service, on the preservation of natural areas and wildlife all over the United States and Alaska. I am also consultant to the President's Quetico-Superior Committee, which has to do with the country along the border. I am also consultant on the same matters to the Izaak Walton League of America, and I do represent the entire organization of some 40,000 members when I give my testimony. They are all in agreement. I also represent as consultant the Wilderness Society of America with another 40,000 members.

As far as the Department of the Interior is concerned, I cannot speak for the Department, naturally, but I can say that the Department is tremendously concerned about this issue and is following this proceeding with a great deal of interest. And when it is called upon to participate in the final decisions, which I hope it will be, I know that all that has been said today, and all that will be said in the future in other hearings, will be seriously considered and heavily weighed.

I come to you, not as a stranger in this country. I was born in Wisconsin, lived most of my boyhood there, knew the headwaters of the St. Croix as a boy very intimately, especially the Nemakagon River and all the little trout streams which poured its cold, clear waters into that river and ultimately into the St. Croix.

When I was a student at the University of Wisconsin, I worked with the Wisconsin Geological Survey. I surveyed some of the tributaries; among them, the Yellow River which runs, also, into the St. Croix. Later on as a young man, when I was a guide on canoe trips up to the border country and other places, I guided a canoe party down from the headwaters of the Kettle River down into the St. Croix and clear down the St. Croix to the Mississippi. Since then I have enjoyed and known the St. Croix all during my life. So, what I say, I say with real depth of feeling, with a great deal, I think, of personal knowledge and experience in this area.

I was very pleased, and you had been informed before, that the St. Croix was 1 of the 12 rivers in the United States out of a total of 640 considered as worthy of inclusion in which we hope will be called the national rivers system of the United States. That was a conclusion that both Wisconsin and Minnesota should take pride in. It proves that the St. Croix is an unusually beautiful river with unique recreational natural values and should be preserved.

I will admit that the wild river section of the St. Croix may never cover the part of the St. Croix which we call Lake St. Croix today—the widening of the St. Croix between here and the Mississippi. But I want to speak about it just the same because this St. Croix River pours its clean, unpolluted waters into this widening—into this lake—and gives it the quality and the character that it has today.

This morning, I drove along the widening. I looked at the site of the proposed steamplant. I noticed the number of fishhouses out on the ice—people already enjoying ice fishing. I looked over the shores with new interest because of this controversy. And, again, I was impressed that so close to the metropolitan area of the Twin Cities of almost 2 million people, is this beautiful recreational region. I left the Lowry Hotel this morning and, within half an hour, we were here, an amazingly short distance for people in that area to reach a relatively natural region such as this.

A question of what to do with the St. Croix as far as Northern States Power Co.'s proposed concern, is a vital one. It is a philosophical one and, I might say, an ethical one. And by ethical I might mean a matter of right and wrong. When we talk about the ethics of conservation and land utilization, we are dealing with what is right as far as our total enjoyment is concerned. Whether we have the right to destroy for future generations, by a decision we might make now, is a matter of ethics, morality, and responsibility.

The Twin Cities are blessed by their beautiful lakes which, through foresight almost half a century ago, were saved from the ordinary type of development and have made the Twin Cities world famous as one of the most delightful places in the world to live. This area here, I predict, if the population growth continues, will be engulfed by the metropolitan complex, instead of 2 million, there may be 3 or 4 million people in here, and this region, if it is preserved, will have much more significance than it has now—important though it is today.

I was in Ottawa, Canada, a month ago, looking over their "green deal." The metropolitan city of Ottawa decided a few years back that, the way it was growing, it would lose its character entirely unless the city bought a belt of green open countryside around it. They did this at a cost of \$20 million. And, I might say, that Ottawa is prouder now of that move than almost anything else they have done. In a hundred years from now, people will laud their vision in doing that sort of thing.

My work, as you can gather, is largely the preservation of natural areas but, inevitably, we begin to talk about not only natural areas but the total environment and the total environment means towns, suburbs, and metropolitan regions. The problems of our cities have been manifold and increasingly so in the future.

I will not attempt to talk about the changes that will come if such a plan is put up here in the ecology of the waters. I was pleased to see this morning how carefully they have been worked out by many

witnesses. I do know, as an ecologist myself—I could elaborate but, because of shortness of time, I will not add to testimony which has already been given, but there is no doubt in my mind but what such a plant will change drastically the ancient ecology of the St. Croix Valley and, particularly, this region, just as it is commonsense to know what is involved in environmental changes brought about by pollution of various kinds—thermal changes, and so on—as to what is going to happen.

What I want to talk about particularly, and that is my major point, is that as long as there is an alternative site in the metropolitan area where there are already industrial complexes, wouldn't it be the thing to do to put such a plant there? One of the previous speakers spoke of the need of zoning—industrial zoning—and putting big complexes into industrial zones where they can be better controlled; where they can be planned for; and where the effluence will not be as objectionable.

Very well, I thought, but part of the solution of this problem would be exactly that.

This area, it seems to me, illustrates what an old Greek philosopher said some 2,000 years ago. He said, "Life is a gift of nature, but a beautiful life is a gift of wisdom." In order to live a beautiful life, we have to use wisdom. If we are forced to use wisdom in our expanding technological civilization, and with our expanding population, the big question is: Are we wise enough to control an environment so that America will always be a beautiful place in which to live? I believe we have that wisdom if we want to use it. I believe we can do this thing if we use the information we have now.

No one is against industry; no one is against this company. I happen to own a little stock—I like this company and their dividends have been good—so I can speak as a stockholder, too, and hope that the company will prosper but that the company will not, in the process of prospering, sacrifice great intangible values involved with the welfare of our people, when there are alternatives to their expansion.

I think, Mr. Chairman, that summarizes pretty well what I had to say. I merely want to add this further thought. This is not purely a local issue. This is a national issue. We are concerned with city problems and recreational areas all over the country. There have been editorials in many great newspapers all over the land about the St. Croix. There was one in the Washington Post the other morning, stating the problem. Why were these people interested elsewhere? Simply because the issue of preserving open space in America, space which is rapidly decreasing, is one of the vital issues facing us of this generation. One of the greatest challenges we have is keeping America beautiful, planning so that there will always be open space, and so that we can always say that this is the land we love because it gives us opportunities, not only to make a living, but the opportunity of a good life.

Thank you. [Applause.]

Senator NELSON. Thank you, Mr. Olson.

So that your testimony may be statistically accurate, you referred to the St. Croix as having been selected to be included in 1 of the 12 wild rivers. I believe that list has been expanded, has it not?

Mr. OLSEN. It has been expanded, as I recall, 22, now. They are surveying the Suwanee down in Florida, Wolf River in Wisconsin, that

you and I know very well; the Buffalo River in Arkansas; they have been going around and picking out another dozen or so. The surveys are going on rapidly. What the final number will be, I don't know, but each one of these rivers will have to have congressional action. They will have to be set up like the current river in Arkansas and Missouri. I have been in favor of this thing for a long time because I think the rivers of America have been neglected. They have been a very important part of our history.

Last night I spoke at the annual meeting of the Fort Snelling Park Association here at the Sheraton-Ritz, and what this community, I am talking about the metropolitan community, has done in setting up that State park, recognizing the park of Minnesota and Mississippi River here, plainly and historically, to have another beautiful area of that set aside, most of the work was done about 5 years by such dedicated souls as Sam Morgan and Tom Samson, the former Governor of Minnesota, and so on. It is really a miracle. And in Minnesota, too, they have studied many rivers that will not be included in the national system, but rivers are becoming important as they are declining in wildness. I think of all the rivers in Minnesota, maybe some less than 10,000, they figure now only 700 miles of free flowing—

Senator NELSON (interrupting). You mean 10,000 miles of river?

Mr. OLSON. Yes, sir; 10,000 miles.

And you well remember the battle to save the Nemaquon, considered the last river of its size in Wisconsin.

Senator NELSON. I think your testimony as to the recreation value is significant testimony and should be considered in judging this matter. I am not aware of any other metropolitan area this size that has a river in as good a natural state as this one, are you?

Mr. OLSON. No; I think I will agree with you on that. I can't think of any other large river where you can still catch bass and walleye, and picnic and paddle a canoe, or use a motorboat this close to a great metropolitan area. That makes it doubly valuable and doubly significant to me.

Senator NELSON. I want to thank you very much, Mr. Olson, for coming here to give us your testimony. We appreciate your taking the time to come.

Mr. OLSON. Thank you.

Senator NELSON. In looking at the time, I would like to suggest that we just continue until we complete without an interruption for lunch. So if you have some remarks, either side, in rebuttal, we will just take them at the conclusion of the testimony. If you prefer, we will accept them in writing in Washington by the 18th of December. Otherwise I fear we may not make the other commitments we have.

Mr. THUET. Senator, we have two or three people who I am sure their testimony will be very short, have come a considerable distance, and perhaps, with this in mind, I would certainly be willing to submit any remarks I have in writing.

Prof. Robert McCabe is here from the University of Wisconsin. We would like to call on him for a few minutes. He is here now.

Senator NELSON. Mr. McCabe, we welcome you to the committee.

Professor McCabe is a very distinguished professor at our university and an old friend of mine. We are pleased you have taken the time to come from Madison and make your appearance.

STATEMENT OF ROBERT A. McCABE, PROFESSOR OF WILDLIFE
MANAGEMENT, UNIVERSITY OF WISCONSIN

Mr. McCABE. Senator Nelson, Mr. Chairman, Senator Metcalf, I would like to make this observation to your panel—

Senator NELSON (interrupting). Would you, for purposes of the record, identify your professional field?

Mr. McCABE. I consider myself a professional conservationist, and in this role am employed by the University of Wisconsin as the professor of wildlife management.

This morning we have heard some very brilliant testimony by largely Minnesota people, and I would suggest we might extend our time to the opponents in this case to allow for a few extended, in quotation, "remarks," of Wisconsin interests which are mine today. I would like to preface my remarks in saying, in addition to my own statement, I have resolutions from seven Wisconsin organizations and conservation groups. And while it was the hope of each that their particular resolution be read aloud at this meeting, this obviously is not possible, but I would like to tell the committee who these people are.

Senator NELSON. If you can recite, Professor, what the organizations are, and we will accept the resolutions for inclusion into the record.

Mr. McCABE. Thank you.

The first is the Wisconsin State Division of the Izaak Walton League; the Daniel Boone Hunters League of Wisconsin; the Badger Fishermen's League of Milwaukee; the John Muir Chapter of the Sierra Club; the Citizens Natural Resources Association of Wisconsin; the Milwaukee County Conservation Alliance; and the Dane County Conservation League.

(The resolutions referred to appear in the appendix.)

Senator NELSON. You are here in behalf of all of these organizations?

Mr. McCABE. I act as their representative or their courier. I also will say I was directed to put in vigorous opposition to the proposed operation. Vigorous is not my word. This is what was asked of me.

Now, my own statement.

I would like to preface my remarks by quoting from a book entitled "Water, Land, and People" by Bernard Frank and Anthony Netboy:¹

"The United States, in fact, has never faced up squarely to its water problems. Our policies, whether administered by Federal, State, or municipal agencies, have been, to a large extent, a potpourri of conflicting measures. One community often strives to obtain benefits that prove harmful to other communities, or even to an entire region.

"Our water problems, like the land problems to which they are intimately related, are the result of civilized man's constant efforts to adapt his physical environment to his economic and social needs. In other words, they are due to our lack of foresight, and often to greed and indifference to the welfare of our fellows. They are also, to a large extent, the result of ignorance of the laws of nature, as well as a reluctance to adjust our methods of land use and our ideas about property rights to these natural laws." These words were published in 1951.

¹ Bernard, Frank, and Anthony Netboy, 1951, "Water, Land, and People," Alfred A. Knopf, New York, pp. 331.

In any advanced society, particularly in a democracy which we here concede to be the acme among societies, there will occur conflicts of social values. When such conflicts as the one that brings us together today involve bilateral State equities, economic versus recreational interests, small community advantages versus broad benefits to State citizenry, a degrading use of a resource versus nondegrading uses, et cetera—someone or some group somewhere in our social structure must make a value judgment.

I submit that in a country like ours with its superb standards of living, and where we act as the mother hen feeding, teaching, and protecting half of the world's people, we cannot afford to foul our resource base which makes up a substantial part of our living standard. And further that such judgments as must be made should favor the integrity of the resource as opposed to the benefits which accrue to the exploiter.

If we were an underdeveloped nation, there might be economic justification or harnessing some rivers and making open sewers of others. Only those who knew the Potomac, the Des Plaines, the Ohio, the San Antonio, the Detroit, or any other rivers in the days before they were burdened with industrial and municipal pollution know the degree to which these bodies of water have lost their identity as rivers of note.

In the case of the St. Croix, the judgments to be made will be affected by two major lines of reasoning:

The first concerns the scientific data on the relationship of the industrial pollution to the biological, physical, and recreational aspects of the river; the second concerns the credo or conservation philosophy which must govern the attitudes of the public and government and which should precede ruling or legislation.

I will address myself not to the matter of thermal pollution of the river and the attendant deleterious effect on plants, animals and aquatic habitat, nor to the engineering, economic or hydrologic feasibility of the proposal in question, nor to the projecting of potential pollution by satellite industries that may be attracted to this area, but will instead attempt to develop the basic tenets—both esthetic and recreational—that give meaning to value judgments in conservation.

In December 1960, a National Conference on Water Pollution presented a series of recommendations to the Department of Health, Education, and Welfare.² Most appropriate among them was (No. 7):

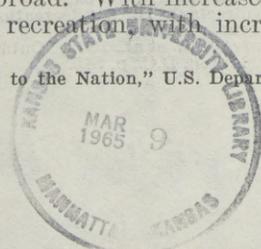
That public policy formally recognize the recreation value of our water resources as a full partner with domestic, industrial and agricultural values in water quality management policies and programs.

This and other recommendations would have been given stature and power were it not for the statement tucked away between recommendations 11 and 12. It reads:

No agreement was reached among the conferees as to extension of authority of the Federal Government in the area of water pollution.

Nonetheless the idea of equal consideration for the recreational values of our resources was now abroad. With increased population, with increased time to devote to recreation, with increased where-

² Anon., 1961, "Clean Water—A Challenge to the Nation," U.S. Department of Health Education, and Welfare, pp. 41.



withal to pursue recreation and with increased mobility, such activity has become big business.

One study made 4 years ago in Wisconsin³ showed that \$581,295,311 was spent in a 12-month period on vacation-recreation activities; slightly more than 50 percent of this revenue came from nonresidents; and more than 30 percent was paid to businesses not ordinarily considered as catering to tourists. If these figures are even reasonably accurate, the tourist-vacation industry is the third largest in the State.

The Wisconsin Department of Resource Development⁴ predicts that in 1980 Wisconsin will, if it can maintain its competitive position, receive 123 million recreational visits from nonresidents alone.

I quote these data not to impress you with the economics, however important these may be, but to indicate urgency for protecting every aspect of the resource base on which future resident and nonresident recreation will be dependent.

St. Croix, Polk, and Burnett are three of the five Wisconsin counties having the highest use by Twin City boaters. In addition, Burnett County draws heavily from the Chicago area. Over and above the obvious financial return to this area from increased use by Twin City people is the need for maintaining recreational waters to meet the demands of an increasing population in the coming decades.

The polluted Wisconsin River is consoled by being called the hardest working river in the Midwest or the United States, and perhaps satisfaction should stop here. I remember, as a boy in Milwaukee, my old neighbor saying as he pointed to a "ragman's" horse drawing a cart down Muskego Avenue, "Robert, there goes the hardest working horse in Milwaukee." And to see the load that the beast pulled one could only concur. Let me describe that horse to you. It was a chestnut gelding of once fine proportions but was now swaybacked, poorly groomed, harness-sore, pitifully thin, constantly functioning at maximum effort, its eyes reflecting no spirit and its life span shortened with each day's load.

It would be an exaggeration to refer to the hard-working Wisconsin River in this context, but the St. Croix need not share the Wisconsin's distinction. It can work best as the generator of man's spirit through recreation and yet need not be ashamed of its economic justification. The recent ORRRC⁵ report expresses itself on this point as follows:

Thus, while recreation is and should be considered one of that order of services which must be provided for its benefit to the public without a dollar-and-cents accounting of immediate benefits, it does make sound fiscal sense. In urban areas, recreation is often a wise economic use of land, increasing values beyond its cost; in some underdeveloped areas, it may be a means of economic rebirth; and throughout the Nation it provides a major market for goods and services.

The upshot of this issue is simply this: It is economically unwise and recreationally unsound for one person, one group, or one locality to expend, alter or destroy the natural features of an environment that are part of a broader resource base important to a regional or national public.

³ Fine, I. V., and E. E. Werner, 1961, "The Tourist-Vacation Industry in Wisconsin," vol. II, No. 4, Wisconsin Commission papers.

⁴ Carley, David (director), 1962, "Recreation in Wisconsin," Wisconsin Department of Resources Development, p. 97.

⁵ Rockefeller, Laurance S., et al., 1962, "Outdoor Recreation for America," Superintendent of Documents, Washington, D.C., p. 245.

The credos of conservation which I believe are germane to this hearing are three. First, that a major effort should always be made by persons and governments concerned to avert pollution before it occurs, before resources are defiled, and before control measures become necessary.

I will not belabor this tenet for, if it were not considered vital by some of us, half of this hearing would be unnecessary.

Second, that natural resources belong to all the people, and that the right to use these resources for private or public gain should not include the inherent right to pollute.

While this philosophy should be a truism, it is not. We tend to default on resource jeopardy when the resource is distant, and those with vision and of immediate concern are often overwhelmed by economic pressures. It is difficult to resist the proposition that says "let me exploit your natural resources, and I'll share the profits." "Sharing" frequently tells you nothing about the degree to which the resource is altered by use or the degree to which other resources are affected or for that matter how the benefits are shared.

Lastly, that the burden of proof on whether a change through use (real or anticipated) is detrimental to a resource, and hence adverse to the public interest shall be the obligation of the exploiter.

If this basic conservation philosophy has been stated by others, I yield, but if not, I claim pride of authorship. The role of the oppositionist falls to those who propose the safeguarding of a major national heritage; namely, our natural resources. The merit of the exploiters' case it seems to me should be judged on the opposition to safeguards of public interest.

Those of us who appear in defense of the St. Croix are not opposed to progress, free enterprise, or comforts and economic well-being of even this small area of the north-central region. We contend that the site of the alleged commercial bonanza be located elsewhere. A condenser, dynamo, or turbine does not care if the hydroenergy or coolant is already polluted, but we as conservationists are acutely aware of the consequences if the clean water of the St. Croix is used.

Those of you in public office who today sit in judgment know that whatever your decision, complete satisfaction will not be achieved and the ramifications are apt to linger. To judge in favor of a speechless, unarmed resource may only honor your stand as a profile in courage. [Applause.]

Senator NELSON. Thank you, Professor McCabe.

Mr. THUET. We have one other witness we would like to call from Wisconsin, Martin Hanson, president of the Wisconsin Resource Conservation Council.

Before calling him, however, we have read into the record, I believe, the statement of Dr. Martin Laakso, and we would like to put in the record also—the oral testimony will not be necessary—the statement of Kathryn C. Setzer, so our last witness will be Martin Hanson of the Wisconsin Resource Conservation Council.

STATEMENT OF MARTIN LAAKSO, PH. D., ASSOCIATE PROFESSOR OF BIOLOGY,
WISCONSIN STATE UNIVERSITY, RIVER FALLS, WIS.

The Northern States Power Co. proposal to use water from the St. Croix River to absorb exhaust heat from the powerplant will, if carried out, change the

environment in an area which provides a recreational and esthetic resource of considerable magnitude as attested by the evident popular interest. The available data on volume and temperature of the river water particularly during the summer months, suggests that the added heat may cause drastic changes in plant and animal populations in the affected areas. The extent to which these temperature changes will alter the environment can be assessed only after completion of current studies on mixing which will provide a partial basis for estimating probable consequences on biota. Previous studies on heat damage in rivers were carried on at Lehigh University yielding information which undoubtedly can also be applied to the present situation to determine probable consequences to be expected from the proposed installation.

An evaluation taking into account the limited available data must incorporate various untested assumptions thereby incurring danger of possible error. Judgments based on anything less than a rigorous analysis of all known facts would obviously be less reliable, amounting to mere conjecture.

STATEMENT OF KATHRYN C. SETZER, HUDSON, WIS., ON RECREATION AND FAMILY LIFE ON THE ST. CROIX

Mr. Chairman, members of the committee, I am Mrs. Robert J. Setzer. My technical knowledge is limited. However, I am grateful for this opportunity to express not only my own views on the subject of the proposed powerplant on the St. Croix River, but also the views of many of my neighbors.

We are relative newcomers to the valley. We built our home on the Wisconsin shore of Lake St. Croix because of the beauty of the valley. I do not think this plant would add beauty. No matter how nicely the building and stack would be landscaped and floodlighted, I feel that the plant will become an objectionable and prominent feature of the landscape. I would like to show you a chart showing the relative size of this plant in comparison to other well-known buildings. If we wanted to look at tall buildings and smokestacks, we would have built our home in downtown St. Paul or Minneapolis. We prefer wooded river banks.

We also considered the recreational opportunities offered by Lake St. Croix when we built our home. This valley is near enough to my husband's place of business so that our family can enjoy these recreational opportunities as a complete family unit. This is a distinct advantage over owning a home in a more remote lake area where it would be likely that my husband would be able to be home only on weekends. As my husband and I both feel that we have benefited from outdoor experiences in our childhood, we want our children to enjoy these same benefits.

Our children are still quite young, but as we have watched youngsters in our neighborhood gain outdoor skills and water skills, we anticipate the days when our children will become swimmers and boaters instead of waders and sand diggers. We feel that a healthy outdoor life helps children become healthy adults. The future of our country depends upon the youth of our country; we feel we should try to preserve some of the beauty of our country for them to enjoy.

As a mother, I am concerned with providing for my children as healthy an environment as possible. This begins in infancy when much of a mother's time is spent in sterilizing bottles, doing baby laundry, and getting inoculations and vaccinations. As infants become toddlers, most mothers try to remove as many hazards as possible from their homes. However, we can control only part of a child's environment. We have no control over the air our children breathe. They breathe the air that's available. If the air that's available is laden with sulfur, I think I would be derelict in my duty to my children if I did not try in some way to control the sources of pollution.

If the river becomes polluted, I would also be neglecting my responsibilities as a mother if I let my children swim in the river.

If the river becomes unsafe for small boats, I would also be derelict in my responsibilities if I let my children learn boating skills on the river. When I refer to boat safety now, I am thinking about the probable increase in barge traffic. We teach our children basic water safety rules, but even experienced boaters can have difficulties in rivers shared by commercial and pleasure craft. I have read a paper entitled "Safe Boating and Locking Procedures" which was

given to boaters going through the Hastings locks. With your permission, I would like to read the first five paragraphs.

"Do stay clear of towboats and barges in the open river. In passing be careful of the dangerous backwash and turbulence created by the tow's propellers.

"Do avoid cruising beside or crisscrossing in front of the tows. A tow with its barges is long and may not be able to stop in time if your motor should fail in its path. In passing a tow, a small boat should be at least 25 feet away from the side of the tow.

"Do signal if a tow is bearing down on you and you are without power. Wave your hands, outstretched, palms down, crossing them in front of you. At night, blink your lights.

"Do make sure a tow is not approaching when you are fishing or launching your boat into a river that has a bend or is very narrow. A long tow must steer the bends by power. If he encounters a boat in trouble, he either must cut his engines and lose steerage, resulting in a possible head-on crash into the bank, or swamp a small boat.

"Do head into the wake when a tow passes and avoid being trapped broadside to the bank. If you are trapped without power near the bank, all passengers should step onto the bank."

These paragraphs say nothing that reassures me as to the safety of small boats and small boaters when they share a river with barges and tows. And the barge traffic will be enormously increased on the St. Croix river if the proposed plant is constructed.

Figures from the U.S. Corps of Engineers show that in 1964 through the month of September 30,567 tons of coal went by barge from Prescott to Stillwater. NSP has stated that about 50,000 tons of coal each week will be needed for the first unit of the plant. NSP also said that the coal would be barged in tows of 15 barges. This makes me think they've never really looked at the St. Croix River. A 15-barge tow could never get through the narrows where the Kinnikinnic empties into the St. Croix, or get past Catfish Bar or past the old Hudson highway bridge and the Hudson railway bridge. Barge men have said that it would be more likely to take coal up the St. Croix in units of two, four, or six barges.

During 1964 through September, a total of 1,026,939 tons of coal went by barge to Minneapolis and St. Paul. A tremendous amount of coal, yes, but this was to supply two large cities. In one season, 1,700,000 tons of coal would be going to the first unit of the proposed plant. This indicates to me that barge traffic would indeed become extremely heavy on the St. Croix River. In my own mind, even one injury or death due to barge traffic would be one too many.

If this plant is constructed, if air and water pollution result from the operation of this plant, if the river becomes unsuitable for the use of small boats and small boaters because of the increase in barge traffic, then the St. Croix River will lose its recreational value forever. This valley will no longer provide a healthy environment for our children—yours and mine.

Senator NELSON. I am pleased to welcome Martin Hanson here. Mr. Hanson is recognized across the country as a distinguished conservationist and is the creator of a remarkable film on the Apostle Islands. I know him to be a great conservationist. As Governor of our State I had the privilege of appointing him as chairman of the committee he is now here representing.

STATEMENT OF MARTIN HANSON, PRESIDENT, WISCONSIN RESOURCE CONSERVATION COUNCIL

Mr. HANSON. Mr. Chairman, Senator Metcalf, I truly appreciate being able to speak here.

My name is Martin Hanson, president of the Wisconsin Resource Conservation Council. The purpose of this council is to promote the wise use of the State's natural resources by banding together those organizations interested in these resources. Attached is a list of 33 State organizations that are members.

On December 5, 1964, the executive committee of our council went on record opposing the proposed powerplant on the St. Croix River by the Northern States Power Co. Some of the executive committee felt we did not have enough facts to make this decision at this time. Others felt that Wisconsin would have its interest in the St. Croix River spoiled without any of the benefits from the proposed plant. However, Mrs. McCormack, of the Wisconsin Federation of Women's Clubs, summed up the entire executive committee's feelings when she stated, "It is a shame to industrialize this lovely river valley."

At a general membership meeting of our council in February 1963 the council strongly supported the Clean Water Act of 1964, bill S. 649. I commend this Air and Water Pollution Subcommittee for the leadership shown in drafting this bill that strengthens the Federal powers in controlling water pollution. I feel that any necessary amendments to strengthen this act as it relates to thermal pollution, air pollution, or protecting the esthetic values of water would be strongly supported by the Wisconsin Resource Conservation Council.

Thank you.

Senator NELSON. Thank you, Mr. Hanson.

Senator NELSON. Did you have any questions, Senator Metcalf?

Senator METCALF. No.

Senator NELSON. We would like to ask some questions, but we are pressed for time.

Mr. THUET. That completes our presentation.

Senator NELSON. What is your preference here? You may, if you wish, make any remarks, either side, or, if you prefer and think it may be more accurate for the record, we would be happy to accept a statement of comment or rebuttal on any points you wish to make by December 18.

Do you, Judge, have a preference in that respect?

Mr. WILSON. Mr. Chairman, I think that I have some significant comments to make from an absolutely independent and impartial point of view on the testimony that has been given here this morning.

Senator NELSON. We will welcome it.

Mr. WILSON. If the submission of written statements is going to be permitted, I would be glad to make them that way.

Senator NELSON. We don't want to direct the method in which you present your material. If you wish to comment orally here, you may. However, we would be perfectly happy to accept from each side statements of rebuttal and additional information that you may have neglected to give us if you can have it to us by December 18, which is a week from today.

Mr. WILSON. Do I understand there will be further time for oral comments here this afternoon?

Senator NELSON. Yes. We are pressed for time. If it is something that you could put into the record in writing, we would prefer to take it that way, unless you can say what you have to say fairly briefly.

Mr. WILSON. I think I could say what I have to say in about 20 minutes.

Senator NELSON. You may proceed with whichever method you wish.

Mr. WILSON. Do you want to proceed with that now or later?

Senator NELSON. We would like to do it now, yes.

Mr. WILSON. Then, Mr. Chairman, if you will permit, I will go as far as I can. That will run up to 1 o'clock.

STATEMENT OF CHESTER S. WILSON

Mr. WILSON. I want to say regarding the testimony concerning the physical effects of this plant, all of the testimony that has been given here this morning emphasizes the importance of this problem and certainly should be, and I assume will be, submitted to the Minnesota Water Pollution Control Commission as to water pollution, and to the Minnesota State Board of Health as to air pollution, and will undoubtedly be given full consideration by them.

In that behalf, I want to repeat what I said in my main remarks here, that whatever they do about the matter, it is always subject to future regulation. That relates particularly to this matter of cooling towers that was mentioned by one of the witnesses. If it should turn out, which I don't think it will turn out, that the conditions under which this plant is build should do material harm to the water of the St. Croix for recreational purposes or for any other purpose the water pollution control commission could require the compliance with whatever conditions they might see fit to impose.

Senator NELSON. Might I ask a question at this point. Cooling towers, as you know, are required in England. I understand the testimony this morning to have been that it would cost the average family about 10 cents a month in additional rate. Is there any reason you can think of why we shouldn't require cooling towers in advance?

Mr. WILSON. No. I would say this, Mr. Chairman, that if it appears from expert opinion that the use of the resources of the St. Croix River for cooling water are going to do any substantial harm to its value for recreation or any other value, then cooling towers should be put in in advance, and I, for one, would cheerfully pay my cost as a consumer of electricity.

Senator NELSON. I would guess, since this is a natural resource, and the testimony is perfectly clear it will alter the temperature of the river from 10° to 17° in the summer and greater in the winter, that the very fact it alters it ought to require the company to do it. Wouldn't you take that position as a conservationist?

Mr. WILSON. Mr Chairman, as a lawyer I do not like to express conclusions upon insufficient evidence. I do not think we have sufficient evidence here. It has been altogether onesided. I think we have to hear the whole story before it is safe to express any conclusion on that point. I want to say this, that if it appears that a certain amount of the cooling capacity of the water of the St. Croix River can safely be used without harm to the recreational use or other public interest in that river, then I cannot see how, from the public standpoint, there could be any objection to that.

Something was said about a need of saving this capacity for future industry. For what future industry could it be saved that would be of greater benefit to the public than the production of electricity for general consumption? If it would be saved for some industry that is going to produce goods for profit, that could hardly be justified. I don't see how the capacity of that river can be better applied to the public benefit than to have it used by a great public utility that is producing something that everybody has to have.

Senator NELSON. I might make this observation, since in this case the public would pay for it. I think the public ought to have an opportunity to decide whether they want it or not.

Mr. WILSON. Mr. Chairman, I agree with that statement a thousand percent, and the public will have an opportunity to decide through the public hearing and to influence the decision. I don't know whether you mean this should be referred to a general referendum, there is no provision for that and I don't suppose there could be. But, certainly, the interests of the public will be given the fullest consideration by the Minnesota Water Control Commission. Let me say again, the company cannot get any vested right to use the water of this river by any permit that might be issued by that commission.

This matter of which industry is going to get the first crack at the use of that river for cooling involves the same principle as has been applied for a long, long time in the allocation of water in all the Western States, which are all under the prior appropriation system in which they follow the rule "first in time, first in right." We already have a measure of that here in Minnesota under our Water Conservation Act. But the company could not even get vested right to use the water because that, too, would be subject to future control by the State authorities. If you were going to bar the development of all industry that could safely use that water without harm to the value of the water just because you are waiting to see whether some industry will come along later and want a share of it, you are proceeding upon an absolutely impractical economic principle. Certainly it would be very difficult to conceive of any future industry, as I say, that could put the value of that water to any greater public benefit than a public utility manufacturing electricity. I am certainly not carrying the ball for the Northern States Power Co., I am looking at this thing from the standpoint of the general public. The same thing would apply if this were an REA plant, and let me say I have been very strongly in favor of the REA program.

Senator METCALF. Would you yield to me a moment? As one who has had experience in western water law, I do want to assure you this principle of appropriate first in time, first in right does apply, but we also have different degrees as to the allocation of the use of water. Domestic and recreation uses are permitted above the use for industrial uses of water. First in time, first in right will not take care of the fact that if you were going to use water for a mining purpose, you couldn't take it away from a city for domestic purposes.

Mr. WILSON. Senator, I wouldn't think of suggesting that. I was assuming here—

Senator METCALF. I want to point out, it isn't quite an appropriate analogy.

Mr. WILSON. It is only appropriate here as between one industry and another. I certainly would never suggest that the Northern States Power Co. should be given any right to the use of this water that would in any substantial sense interfere with prior recreational use or any other public use of that water. The reason I brought that point up was because of the one witness who said we ought to save that water for some future industry.

On this matter of the establishment of standards in advance, that is a subject to which I have given very extensive study. Mr. Ewald's

testimony that standards are desirable in advance reflects generally the attitude of industry throughout the country. The inclusion in our law of the requirement for standards was really at the insistence of industrial representatives. Wisconsin law does not require it. And I am here to say that the Wisconsin Water Pollution Committee has made outstanding progress and I think that they have quite fairly recognized the interest of their industries in a State that is much more highly industrialized than Minnesota without the necessity of establishing standards in advance. They do establish what amounts to practical standards by following a sensible and uniform policy as they have done on the Wisconsin River in the conditions of their permits by treating everybody alike. That is a highly flexible matter and subject to change.

Here in Minnesota we are in the grip of the New York system of standards that was imposed by our commissions during the last legislature. I am frank to say that that stems very largely from industrial sources and meets with very strong disapproval by the majority of State water pollution control authorities. I have even heard men in the Federal service express strong disapproval of that system of standards because it ties the hands of pollution authorities. Nevertheless, we are in it here in Minnesota.

Let me say this, no standards have been adopted by the St. Croix because it is a long process and none seemed to have been necessary before this. Our commission proceeded to adopt standards for the Mississippi River because they had to do that in order to carry on a program of abatement of the remaining sources of pollution on that river as well as to establish standards for future municipal or industrial sewage and waste control on the Mississippi River. They are in the process of doing the same thing on the Minnesota River, where they do have very acute conditions. So far they have needed none on the St. Croix River, but there would still be time to establish standards on the St. Croix River if it appears necessary.

However, I am very sure, as I mentioned, standards are necessary for enforcement purposes in Minnesota. They are not necessary for the purpose of granting permits any more than they are in Wisconsin. I am sure that our commission, if it should grant a permit in this case, would impose strict conditions that would comply with any future standards that could be contemplated.

If the commission desires to go into this matter of standards further, I would refer you to my analysis of that subject as printed in the printed proceedings of the Water Pollution Control Conference held in Washington in 1960.

I think I have about 5 minutes left. Maybe the chairman will allow me a little more because of the questions with which I was interrupted. [Laughter.]

Mr. WILSON. I want to emphasize again, any permit granted by our commission would be subject to future modification if required by standards adopted later. The same would apply as to air pollution. Although we have no standards, no regulations yet on air pollution, I am quite confident that our State board of health would not set the seal of approval on any project that would be either materially harmful to the public health or recreation or any other interest. There is very close integration between the board of health and—

Senator NELSON (interrupting). May I make a comment at this stage.

I don't know of any board of health or any agency in any city in America which has positively come up and put its stamp of approval upon the pollution of the air, but the fact is our cities are horribly polluted.

Mr. WILSON. That is certainly a very regrettable situation, but I think it should be borne in mind that our board of health has been moving on this air pollution problem here in Minnesota. As pointed out before, the situation has not become acute in this State.

Senator NELSON. I hope not.

Mr. WILSON. We are in a much better position to do what I said before, apply the ounce of prevention, than they have been in other States where the air pollution problem is already acute. If anybody thinks a serious air pollution problem of long standing cannot be licked, let them take a look at what has been done in Pittsburgh.

Now I want to say that I cannot too strongly concur with the views expressed here by my longtime friend and coworker in the conservation field, Sigurd Olson. He and I were on the firing line in many a battle, notably the establishment of the boundary waters in the canoe country. If Sig were here, he would say, I am sure, that that canoe country would not be established under Federal authority as it is today if I had not done what I did when I was commissioner of conservation. I would like to assure Sig that there is no danger that the water pollution control commission is going to allow any pollution of this river out here that would interfere with the accomplishment of the aims. It would have to be done, I think, practically over the dead body of Malcolm Hargraves, who is a longtime associate in the Izaak Walton League of both Sigurd Olson and myself. All three of us are longtime members of the Izaak Walton League and hard workers in the furtherance of this program.

In conclusion, Mr. Chairman, and particularly in view of some of the other comments that were made here, the threat to the public use of Lake St. Croix is not in danger of water pollution or air pollution, if we may assume, as I think we can, that the authorities will do their duty with respect to those matters. The threat to the use of Lake St. Croix by the general public of this great metropolitan area and all the area in the valley in both States does not lie in water pollution or air pollution, it is in the creeping segregation of the shores of Lake St. Croix, a large part of which, as someone has already mentioned, is in private ownership and posted with no trespassing signs. The general public, who has to depend on the use of water, buy the little boats that they carry on their car tops or trailers, or who has to depend on going into a boat livery to rent a small boat to get out on the lake to fish, must have two things in order to enjoy a great recreational asset like Lake St. Croix. They must have unlimited points of access, places to get to the river, to park their cars and trailers.

Senator NELSON. Does the Minnesota commission have condemnation purchases for access to public waters?

Mr. WILSON. May I finish with what I was about to say?

Senator NELSON. Go ahead.

Mr. WILSON. They must have two things: points of access where they can either park their cars or trailers or else rent boats; they must

also have ample shorelines where they can land and have picnics and let their kids wade in the water and generally enjoy the lake. We are very, very short of that in both States on Lake St. Croix.

Now as to what can be done about it. Our State conservation department does have certain limited authority and very limited funds to acquire access on public waters, which is nowhere nearly adequate to deal with Lake St. Croix. Our counties are now under a bill, which I drew myself and which was passed by the recent legislature, which gives them very ample authority to carry on county park programs, including full power of condemnation. We are in the process here of trying to develop a program for that with the help that we hope to get under the Landrum Water Conservation Act recently passed by Congress. The trouble is, it is a race against time. There won't be much money available under that act next year. Every year, in fact, every month, the property is being split up, subdivided, expensive homes are being built on it, and unless that program can be very greatly expedited it is going to be too late. As I said before, unless that program is greatly expedited, the use of Lake St. Croix is very largely going to be limited to those fortunate people who own waterfront on Lake St. Croix and the people in the higher income brackets who can afford to keep their boats at marinas.

Thank you very much.

Senator NELSON. May I ask a question? I have no notion what the capacity of Lake St. Croix is, but in your testimony you assert you have no worry whatsoever about the pollution of that lake by the heating of it. You have no worry about the damage that might come as a consequence. Could you answer this: Supposing when this plant is completed and you have a low flow for 3 solid months and the plant uses the total capacity of that stream for that period, can you tell us what would be the consequence to that lake in terms of fish, algae, all aquatic aspects?

Mr. WILSON. Obviously the answer to that question is a matter for expert determination, but I think I can speak with assurance for both the commissioner of conservation, who has the responsibility for granting the water use permit, and the water pollution control commission, who has the responsibility for imposing amount of pollution requirements. Speaking on the history of past cases, especially the establishment of these Mississippi River standards, both those authorities give full consideration to the low flow. Standards and conditions are always based upon an assumption that at times the low flow will be reached.

I already pointed out in my previous testimony that the water consumption of the metropolitan area is very close to the low flow of the Mississippi River already, and these standards that were adopted by the commission the year before last on the Mississippi River take that fact into consideration.

Senator NELSON. To get back to answering my question—if we accept the statistics that have been presented that the plant will use the total flow of the river during some periods and that it will heat the water by 10° to 17°, what effect will this have on the river and the lake if this should occur over a period of 3 months? You have asserted here it will have no damage. Since you have asserted that, I assume it is based on some knowledge you have as a conservationist.

That is my question. On what basis do you make that assertion, assuming my set of facts?

Mr. WILSON. I certainly would not say that on the assumption of the facts stated here this morning there would be no damage to the river. All I have to say about that is that, like any lawsuit, the evidence is not all in yet. I don't think anybody is in a position to express a conclusion just based on the testimony we heard here this morning. Both of the State agencies have sought the aid of the U.S. Public Health Service, the water pollution control commission has also, I am sure, enlisted the aid of other witnesses from the conservation department and the university, and the State board of health has employed a very high-grade private consulting firm. Their report is not before you. And for that reason, the fact that there is still much testimony to be submitted, I think it is utterly premature to express any positive conclusions. I would like to call your attention to the fact that Dr. Carswell expressed none whatever so far as this particular project is concerned.

Senator NELSON. He testified as to the effects of thermal pollution.

Mr. WILSON. Yes; he testified to that. As I say, everything that has been said here about this is highly pertinent, it should be considered. I hope that these gentlemen who were here this morning will appear before the water pollution control commission and give their testimony there. I think I can assure them that it will be given the very most careful consideration.

Senator NELSON. I want the record to be accurate. You quoted the Public Health Service; let me quote it to you.

The company testifies that they will use in the first unit 660 cubic feet of water per second with one unit. It will be approximately twice that with two units, so we are talking about 660 feet per one unit. Public Health Service's survey says once in 30 years the flow of that stream will be 550 cubic feet per second, that is the low flow; once in 20 years it will be 700 feet per second; once in 10 years it will be 1,000 feet per second; once in 5 years it will be 1,400 feet per second; once each year it will be to a low of 3,930 feet.

When the first plant is built you are going to have an occasion of once every 20 years when the plant will be using the total capacity of the stream. Once in every 30 years one unit of the plant would use 110 feet per second more than the total flow of the stream. If you put two units in, once in every 30 years the plant is going to be using better than two times the total flow of the stream. Once in 20 years there is 700 feet per second, so once in 20 years when two units are in there it would again be using twice as much as the total flow. Once every 5 years it will go to 1,400 feet per cubic second, which is about the total flow of the stream, when used by two units. My question is, what will happen to that lake under those circumstances?

Mr. WILSON. Mr. Chairman, all I have to say about that is that I don't think those circumstances will ever be reached because I cannot conceive of the commissioner of conservation, who is responsible, and I know he is responsible, to the needs of the people of this State and most notably to the recreational issues of the State, ever granting any permit for water use that would reach those proportions.

Senator NELSON. Are they going to issue an order that the stream-flow shall not get that low?

Mr. WILSON. No, but they take land on the Northern States Power Co. They can't use that much money.

Senator NELSON. You would agree if they should use that total amount of stream, they shouldn't have the permit to construct on the river, is that correct?

Mr. WILSON. They should have no permit that is going to interfere materially with the public interests in that river for recreation or any other purpose. I would not assume here to apply that general proposition to a particular state of facts until all the evidence is in.

Senator NELSON. My understanding is that the commission isn't going to permit the circumstance to occur.

Mr. WILSON. I didn't say that. The commission can't stop natural circumstances but they certainly can stop the company from using so much of that river or discharging so much heat into the river that it would do any material harm to the public interests. They can do that at any time, and from past history I think they can be depended upon to do so.

Senator NELSON. Would you agree, then, if the facts are that they will use the total flow of the stream that they should not have the permit to construct then?

Mr. WILSON. Mr. Chairman, I don't think I care to amplify my comments. I think my previous comments covered that point completely.

Judge McDONOUGH. May I answer part of that. Drawing conditions—

Senator NELSON (interrupting). You can testify, if you wish. I think probably it would be more orderly if you want to respond, Judge, when we have completed here.

Mr. WILSON. All I am saying is that it is the duty of the public authorities to be continually on guard and if any condition should occur at any future time such that the public interests would be impaired by letting that company use the total flow or less at any time, it should be stopped, and I am confident that it would be stopped. The Corps of Engineers isn't going to let them use the total flow. There has to be a minimum flow going downriver to support navigation. It is inconceivable they could get a permit—

Senator NELSON. If they would be using the total flow, they would be taking it out of the river and returning it. My question still is, then, if you don't wish to comment on whether or not a permit should be issued if they use the total flow, would you again comment on what would happen to the aquatic conditions in that lake, if for a 3-month period you had a low flow of 550 feet and you are using it all and heating it by 15°?

Mr. WILSON. That possibility is certainly a very big point that should be weighed and the effects of it considered. You have to bear in mind that there is a difference between an industry that is going to use water for a consumptive purpose and one that returns water to the stream. If you have a sufficient body of water, even though the flow is low, it may be large enough to counteract the adverse effects of temperature for a short period of time, if not for a long time. I am sure that all of those possible conditions will be considered and weighed by the water pollution control commission, and if they grant a permit in this case, of which there is no certainty whatever at this time, that it will be upon such conditions that will amply safeguard the public interests and all other public interests in that water.

Senator NELSON. You don't know what will happen to that lake is the answer to my question, is that not correct?

Mr. WILSON. I am not a hydraulic nor pollution expert, and I would be going outside of my field as a lawyer if I attempted to answer that question.

Senator NELSON. If the permit is granted and the unit is built and it turns out that the company is using the total flow, that it is having an adverse effect on that lake, does the commission have the power to order the plant to shut down?

Mr. WILSON. Definitely—wait a minute. You said shut down?

Senator NELSON. Yes, they couldn't use the water.

Mr. WILSON. They could stop the water use, and if they would shut it down, that would be the result.

Senator NELSON. Has that ever happened in your State?

Mr. WILSON. No, fortunately not.

Senator NELSON. But you are confident if it had an adverse effect they would shut the plant down?

Mr. WILSON. Yes, I don't think they would hesitate to do so, from what I know about the present application.

A VOICE. Oh, Henry.

Senator NELSON. We will only have one witness testifying.

Mr. WILSON. The Northern States Power Co., as has been testified here, is a part of a great network and they could find temporary substitutes for that power if it were necessary to shut the plant down in order to protect that water. They could and should be required to switch in power from other stations until they could remedy the difficulty. They had better anticipate that because I, for one, if I am still alive at that time, would certainly be among the leaders of a movement to require them to comply with those conditions.

Senator NELSON. If the facts are as they appear on the usage of the water, is there any reason you can think of why the plant shouldn't be placed on the Mississippi?

Mr. WILSON. I haven't analyzed that proposition. I mentioned a couple of considerations here yesterday, that is, from the standpoint of good industrial engineering of not having too much concentration of industry in the large centers.

Senator NELSON. I am talking about down the Mississippi from the cities, out of the cities.

Mr. WILSON. You mean downriver?

Senator NELSON. Yes.

Mr. WILSON. From the standpoint of water use, I can't think of any. But you might run into a similar problem down there. As I mentioned yesterday, I think that we folks who are so proud of the St. Croix would have to admit that Lake Pepin is just as fine a body of water as the St. Croix. If somebody were going to put a plant down there that would do harm to Lake Pepin, I don't think we would be very good citizens in getting rid of the problem by shoving it off on them. I don't think the plant should be located anywhere on the Mississippi or anywhere else where it would do any serious harm to the public interest.

Senator NELSON. You see, that body of water, as you are well aware, has a much larger capacity, it is already polluted, and if you fly over it, you can even see it from the air when you pass the two rivers.

Mr. WILSON. It is being temporarily polluted because of the overloading by the Twin Cities and St. Paul plants, yes, but that is going to be cured by the completion of the construction of those plants next year, and then the Mississippi River and Lake Pepin will be restored to a good condition. I doubt that there is very substantial pollution reaching Lake Pepin. In any event, you have this problem, here again it is a question of economic strategy and allocation of resources. I think without doubt the company could meet the thermal pollution standards that have been set or will be set by the commission on the Mississippi River in the Twin City area. That would add to the already quite heavy burden that that river must bear. Even with the best treatment of sewage from the big metropolitan area there is going to be some effluent go into that river that requires the use of oxygen in the recovery area of the river. Every time you put hot water in that you add a load to the capacity. Someday the ultimate capacity of the river will be reached. I don't think it would be reached by the construction of this plant. I don't think that is an objection to the location of the plant on the Mississippi River. I think they could undoubtedly comply with the requirements for using water downstream. If they got an alternative site down there, from that standpoint I don't know how there could be any objection to it.

They want to locate the plant here for other reasons, which I think Mr. Ewald explained. Naturally the people here would like to get some benefit of their long-delayed hopes of some economic value gained out of all the expenditure that was made for putting this territory on the 9-foot channel.

Senator NELSON. Judge McDonough, did you wish to make a comment?

Judge McDONOUGH. I had one statement that will take just a few seconds.

STATEMENT OF JUDGE JOHN T. McDONOUGH

Judge McDONOUGH. We have no intentions of reviewing the testimony of Mr. Humphries or Mr. Mertes or these other people who testified relative to air and water pollution. This will be done with great particularity mostly through scientific studies that will be presented through the Minnesota water pollution in joint hearings with the department of water pollution. We don't know the veracity of the statistics, whether or not they have made any mistakes in putting their material together. They will have the opportunity also of presenting that to the hearings that will be held here in the State of Minnesota.

I would like also to add that before this plant is built I am quite certain that the State of Minnesota will have an adequate air pollution law. I know one will be introduced at the next session of the legislature. I am quite certain they will set up standards, and they will be strict standards, before this plant is even in operation. Before 1 ton of coal is burned, we will have an air pollution law in the State of Minnesota.

Do they have one in Wisconsin?

Senator NELSON: No.

Judge McDONOUGH. Second, your purpose for being here, gentlemen, is to determine from our experience, our problems here, whether

or not you would need national standards. I think it is highly out of order and I think it is quite irrelevant to make a determination, if this is your purpose in being here, where this plant should be located, whether it is on the St. Croix River or Mississippi River. That is beside the point.

Senator NELSON. I would like to have it clearly understood that this committee is making no determination about anything. We seek only information that may be of value to our legislative committee. I do not have a position as to where it should be built or whether it should be built at all. If I seem to ask some sharp questions, it is only for the purpose of seeking information.

Judge McDONOUGH. In the past 2 days many of the questions of specifically yourself, Senator, have been on the question of recreation on the St. Croix, this wonderful resource. We feel they are not mutually exclusive terms, the plant, one or the other. At the most, six over a 40-week period are not going to—this company will certainly try to see to it that these tows are not on Saturdays and Sundays. They will not interfere in that regard with the use of this river. That is about all we do have to say.

We want to thank you for coming to our valley. We welcome you in this valley and we hope you have enjoyed the short stay in this valley.

Senator NELSON. I was born and raised in the valley, and I am glad to come back for a visit.

Senator METCALF. Would you supply for the record, Judge, the various acres of acquisition of different plots over here. Yesterday you testified that there had been longtime planning for the plant and cited that the acquisition of land had gone back, I believe, as far as 1928. Would you put behind those dates the amount of acres, area of land, acquired?

Judge McDONOUGH. It is 3,280 feet; isn't it? How many acres, 180 acres of swamp?

Senator METCALF. I understand there were several different acquisitions.

Judge McDONOUGH. Yes. The latest was 2 years ago but the bulk of it was picked up during this period of time.

Senator METCALF. Would you just put that in the record, as to the amount? (Included in N.S.P. additional statement on pp. 97 ff.)

Judge McDONOUGH. We can get the exact dates the land was acquired and mail it to you. We can do that from the courthouse, as to each plat.

Senator METCALF. The second thing, I would like to have the information as to the amount of power in the system of Northern States Power, that is, hydropower, and the amount that is interruptible gas power, and the amount that is coal generally. Some comment was made by a stockholder of Northern States Power about the mid-continent area power project, and that was on, quite probably, an irrelevant matter, and I am very much interested and concerned with it, as the officials of Northern States Power know, and I would like to have some information as to how this was generated. It seems to me it would be important to this hearing, too, because, as Mr. Wilson testified, if an occasion arose where the whole flow of the river were taken you might have to close the plant down.

Judge McDONOUGH. When you talk about the flow of the river, this is a big lake, you should discuss pool levels.

Senator METCALF. When you discuss pool levels and increase the temperature of the water 5°, 10°—

Judge McDONOUGH (interrupting). May I make a suggestion?

Senator METCALF. Yes.

Judge McDONOUGH. I don't know why your committee shouldn't receive a transcript and filings of the joint hearings of the joint commissions, and I am quite certain every one of these questions will be answered by men competent to answer.

Senator METCALF. I don't believe the Northern States Power Co. would want to supply me with information I requested, and that is the information as to how much power—

Judge McDONOUGH. I have these questions. The other question relative to the utilization will come out of our hearings.

Senator METCALF. Would you supply those two questions?

Judge McDONOUGH. Amount of hydropower, amount of interruptible gas, and the amount of coal, we will do that and give you the information of the fact.

Senator NELSON. Perhaps the power company would rather answer, Judge, but is the power company doing any research so they will be prepared to comment on how much water there is in that lake and what would happen if it used the whole flow, that sort of question?

Judge McDONOUGH. Absolutely.

Senator NELSON. They will be prepared January 13?

Judge McDONOUGH. Absolutely.

Senator NELSON. There was testimony on the record this morning which I have no way of evaluating, but it would cost something like 10 cents a family or a penny a kilowatt.

Judge McDONOUGH. Each year they have savings, I think, of about \$10 million a year to their system up here. If they had to put on cooling towers, there would be no problem there at all. You wouldn't have to increase the rates, it would be a question of they wouldn't be decreased. We get a decrease as of this year 10 cents a month, 15 cents a month, because of the savings last year. There would be no problem with cooling towers. Whether or not a cooling tower or cooling towers should be placed there is for determination by the Minnesota Water Pollution Control Commission based on the temperatures, which they have been taking down at this plant, not at the mouth of the river, they take them all over the river, as has been testified to by Mr. Pemble.

I mention the name Pemble and I forget the question. [Laughter.]

Senator NELSON. The cooling tower.

Judge McDONOUGH. If they feel from this they should have cooling towers, there will be cooling towers, but if the evidence shows there is no necessity for cooling towers, that is something else again. I don't think we should jump to the conclusion as a matter of law in order to get this permit they should have to put up cooling towers. Maybe they will have to put up cooling towers.

Senator NELSON. Could we get for the record a response as to what is the feasibility of the cooling towers, would it add to the cost to the consumer, and, if so, how much, and what would it do in terms of cooling?

Judge McDONOUGH. The statement I gave you would be the statement they would give, that for all practical purposes, what were the savings last year, at least \$10 million, the cooling tower is an insignificant cost.

Senator NELSON. Could you answer as to how effective is the cooling tower?

Judge McDONOUGH. As I told somebody else, we could have the biggest ice cream factory in the St. Croix River so the luxury boats could get their ice cream right away. That would be very expensive, but they can lower the temperature of that water down to 32° scientifically.

Senator NELSON. We would like to have something in the record as to that, if you would.

I have a statement here I will place in the record presented to the committee by a very distinguished conservationist of the State of Wisconsin, an old friend of mine, Bill Ruth, who is president of the Wisconsin Wildlife Federation, which is a very fine organization in our State. I ask that be put into the record.

(The statement is as follows:)

STATEMENT OF THE WISCONSIN WILDLIFE FEDERATION, WILLIAM RUTH, PRESIDENT

The Wisconsin Wildlife Federation is a statewide federation of conservation clubs and is the Wisconsin affiliate of the National Wildlife Federation.

We are greatly concerned as to the effect a powerplant such as the one proposed will have on the St. Croix River—one of the few rivers left that is reasonably free of pollution—and the esthetic value of the area.

We are concerned about the following, which we have no positive assurance will not happen:

(1) We know that water used for cooling the plant will warm the water in the river at the outflow and will change the ecology of the water over a large area.

(2) Traffic on the river will be increased tremendously and as a result will interfere with recreational and esthetic use of the resources.

(3) The increased traffic will increase organic pollution proportionally.

(4) Air pollution will be increased tremendously and settling residues will scar and deface the area for miles around.

At the present time and within available knowledge we oppose further polluting of air and water both by organic pollution and indirectly by warming the water which this proposed plant would apparently cause.

On the basis we request of the departments of the U.S. Government or the States of Minnesota and Wisconsin that may have jurisdiction over this proposal, that a permit be not granted until such time as it can be shown that detrimental effects from the plant on recreational resources, water resources, and other public interests are minimal and acceptable.

If they can set up standards that will leave the river and the area in its present condition—that we would call acceptable.

We are not as optimistic as some that the States' pollution control departments will be able to deal with our pollution problems as they need to be dealt with.

This is not a reflection on the departments of either Wisconsin or Minnesota. We have confidence in their ability, but recognize their limitations due to a lack of needed laws and funds to do the job.

As an example—with present funds it takes 7 years for the staff of the Wisconsin Committee on Water Pollution to cover the State.

It is not possible to clean up our waters as they should be under these conditions.

We should all insist to the legislatures of the States that the pollution control departments be given an adequate budget and authority.

We support the concept of using water-quality standards as a base for intelligent use of our water resources. Senate bill 649 of the 88th Congress which provided for the setting of water-quality standards by the Federal Government was a good measure and one which the Wisconsin Wildlife Federation supported.

We believe that legislation of this type should be reintroduced into the new Congress.

If a water-quality standard had been established for the St. Croix River which provided for no reduction in the present river condition, there might not be a need for this hearing.

That is to say, if the NSP plant were to lessen water quality in the river below its present level with this standard, the plant obviously would not be built.

Further, we feel that this problem is one which is a land-use problem as a water problem.

We need more comprehensive land and water planning.

It appears that we do not have such planning in this basin. Otherwise there would be no problem. To achieve such a goal is complicated here by the fact that we have two States and several counties.

How then can we make sure that planning on one side of the river or the other side, by county, by regional planning commissions or the States is truly comprehensive and complements each other in place of conflicting?

I understand that there is a metropolitan planning commission for the Twin Cities area which includes this portion of the St. Croix.

I wonder what plans they have prepared for this area? On the Wisconsin side I understand there is no planning commission.

It may be desirable in situations of this type for some type of Federal-State planning which would insure development programs of advantage to people from both States.

I understand that Federal legislation has been suggested to deal with problems of this type. We will support similar legislation if this subcommittee wishes to have it introduced into the new Congress.

Senator NELSON. Did you want to make a response, Mr. Thuet?

Mr. THUET. I would like to say this, Senator. I was going to submit a statement. I would ask your indulgence for 5 minutes and this will be our rebuttal.

Senator NELSON. You may submit something for the record if you have anything further, Judge.

STATEMENT OF PAUL THUET

Mr. THUET. After Mr. Wilson testified I felt I should bring to the committee's attention certain facts.

In this case there are two bodies authorized to hear this matter, and those are the commissioner of conservation, who is an executive appointed by the Governor, and the water pollution control system, which is a quasi-judicial body charged with the protection of water for public use. In order to get into the other facets which we talked about today and yesterday we must actually strain their duties under these laws to the absolute utmost. When you say protect the public, for public use, when you get into various matters, we have to strain them. Then the people, like ourselves, who are interested parties, have to come in by the side door, so to speak, before these various commissions, the commissioner of conservation, and the water pollution control commission, for the reason that there is no law whereby John Q. Public can start an action against the Northern States Power Co., all he can do is come in as a witness and testify at these hearings.

At that point the real problem comes into play. Here you have a huge industrial utility that comes in, all of these commissions with all their expertise, all the facilities, with limited jurisdiction and little or no funds. Frankly, as you can tell by the testimony, Senators, if it hadn't been for the Federal Government in this case the citizenry would be lost. For example, in the State of Minnesota we are looking in the next 4 months for a hundred million dollars just to sustain life,

so to speak, in the State of Minnesota financially to keep our schools and school aids. That is not even adding 10 cents to the investigative moneys that are going to be due to the board of health, the water pollution control commission or the commissioner of conservation, so they have no funds on a State basis. If the Federal Government doesn't help us, we are dead. We don't have this amount of money, we haven't the facilities.

Then picture, if you can, the sense of frustration of our members in the State of Wisconsin. Here they stand on the river bank in Wisconsin and what can they do about this? There is no adequate remedy, except all they can do is come in and testify. So the result is going to be this. The city of Hudson sits over there and we are all concerned with it, all right. The city of Stillwater, you are polluting the St. Croix River. Certainly they can't say it is our St. Croix on the Minnesota side, a molecule of water on one side or the other. So Hudson is going to say, you polluted the river so therefore we are going to get a tax base now. The river is going down the drain, so to speak. So then in retaliation or in self-protection all of a sudden we have another sewer, so to speak, because once she goes you are going to go all the way and you will get an industrial concentration.

There is one other thing I would like to say, and that is about this matter we have adequate remedies if and when the plant is built. This is poppycock, absolute raw poppycock. As the courts do, and we all know, when somebody comes in and says, there is a public nuisance and you stop him, the court says, you must take into consideration the investment, the service granted. And you can't conceivably tell me the court is going to close down a \$60 million plant after it is built. Then we are hooked.

How much can we do? We feel we have no adequate remedy at law, that Senate bill 649 is almost a must, particularly in interstate cooperation, and to set some sort of standards so we can get some protection.

I want to say this in closing, so far as the commissions are concerned I have no objection; I think they do a fine job, but I don't think we can just close our eyes and everything is going to come out by Christmas. They won't do it, they don't have the authority nor the funds.

Another thing, our people have been accused that we don't like power companies. I would like to say of our witnesses, we are stockholders, I am and I am sure half of our people are stockholders, but we do say there is a time and the time is now when the stockholders' interest and the profit interest has got to be weighed against what is good for all the people in this St. Croix Valley, and I suggest the whole United States. I do think it is important that we have a law such as you are looking into, that we implement what we presently have and give protection to the citizens of both States.

I want to thank you very much for your courtesy.

Judge McDONOUGH (rising in audience). We are for S. 649. I wish it were a law now. If it were, I am quite certain we could start constructing that plant next week.

Senator NELSON (addressing Judge McDonough). Your remarks are in the record.

(Addressing Mr. Thuet.) Would you submit for questioning?

Mr. THUET. Yes, sir.

Senator METCALF. I think I want to underscore this statement that present remedies are inadequate and insufficient. It really isn't a remedy to say that you can prosecute your public nuisances, especially when you have a power company supplying power to schools and hospitals and other agencies. If a time came and it was a question of keeping power in the hospitals and a question of fish, I think any court would say, "Well, we just have to let the fish die." The time to establish adequate standards is in advance, to anticipate such situations. That is why we are here. I welcome this statement that S. 649, the standards section, should be the law. If it were the law, we would have some Federal power to keep this river and other rivers all over the country clean and to prevent pollution.

In my State, as someone pointed out, we have some landmark cases in air pollution. We found that when a huge corporation with a lot of employment was involved, the public nuisance law just wasn't adequate to control the dumping of sulfur dioxide into the air. That is the purpose of this hearing, to ascertain whether or not the present remedies, even in such a State as Minnesota, are adequate and whether we have to have Federal standards. I think the statement that you made is as important a statement as has been made in this hearing.

Mr. THUET. One other comment along this line.

When these people came to me and said, what do we do to stop this, we think it is bad, we had to wait until Northern States Power filed a little old permit application before we could even get a forum in which we could be heard. There is just no forum available in any State to take care of the anticipatory breaches or anticipatory dates. This is one reason we are very strongly in sympathy with your proposed legislation.

Senator NELSON. I want to endorse what Senator Metcalf said. I hope that it is clear that this subcommittee does not have the power nor does the parent Committee on Public Works have the power to do anything except gather information in hearings such as this and prepare and propose legislation in Congress. No power is vested in this subcommittee to take any action respecting any pollution of any kind anywhere in this country. This is a legislative body.

I want to thank Judge McDonough and the representatives of the Northern States Power Co. and those who appeared with them on the side of their position. I want to thank Mr. Warren, who is the chairman of the Save the St. Croix Committee and the others who worked with him on their side. I want to thank those who have come here to present testimony, some of them, such as Mr. Olson, coming all the way from Washington, D.C.

I think this has been a very orderly, a very useful, a very constructive hearing.

I recognize, as everybody does here, that there are strong feelings about the location of this plant on both sides. We can make no decision about that. But I certainly want to commend all of you, the audience as well as those who appeared on both sides, for the informative presentations you made, for your graciousness to each other, and to the members of this committee. I think this is the finest audience and the finest group of witnesses that have appeared before any committee on air and water pollution that it has been my privilege to serve

APPENDIX

PROponents

STATE OF MINNESOTA,
HOUSE OF REPRESENTATIVES,
December 16, 1964.

Hon. GAYLORD NELSON,
U.S. Senator,
Washington, D.C.

DEAR SENATOR NELSON: Please include this statement in the official record of the committee hearings on air and water pollution control which you chaired at Stillwater on December 10 and 11, 1964.

Even though the States of Minnesota and Wisconsin are in the forefront on regulations pertaining to air and water pollution control there is a need for Federal legislation establishing minimum standards in this field where interstate questions are involved.

I have lived in the St. Croix Valley all of my life. My grandfather settled in Stillwater before 1890 and worked as a lumberjack and in the various sawmills on this river. The idea that the lower St. Croix River is primarily for recreational use is entirely a new concept because the lower St. Croix has been used for industrial and commercial purposes for years.

Of course, the lower St. Croix is being also used for recreational purposes but apparently by relatively few. The shoreline on both sides is privately owned with "no trespassing" signs predominating. The only exceptions are the few municipally owned boat launching sites and bathing beaches. The so-called Save the St. Croix, Inc., seeks to save this body of water, but for whom?

Our community encourages industry just as does St. Croix County of your State. Public officials of this county and Hudson, Wis., admit they wish this plant were located in Wisconsin. I suggest that the best way to eliminate opposition to the proposed NSP plant on the St. Croix River from Wisconsin, would be to erect the plant in Wisconsin. I'm sure that Wisconsin residents would not be voicing objections if their tax base could be so affected. However, I am pleased that the plant will be located in my district in Minnesota.

We of the St. Croix Valley are in the metropolitan area. The so-called wild river part of the St. Croix has no application to the lower St. Croix, but begins several miles north at St. Croix Falls, Wis. Unless the Federal Government wishes to subsidize Washington County, I feel we have as much right to our fair share of industry and a consequent balanced economy as has any other community. We resent being relegated to the role of tax burdened unpaid custodians of the private playground for luxury boatowners and luxury shoreline property owners. I hope my community will not become a battleground in the war on poverty. The poverty stricken people of West Virginia have beautiful scenery, but with no jobs and industry, I doubt that much happiness prevails.

Any Federal laws or regulations pertaining to water pollution should also consider the damage done to our boundary waters by the luxury boat owners. I hope your committee will return in the summer to view on Monday morning the picnic garbage, waste, pop tops from beer cans, oil slicks and human feces which pollutes our water and litters our islands much more than could a responsible conservation minded concern such as the Northern States Power Co.

I was pleased to attend your committee hearing on Thursday, December 10, 1964, and intended to make a statement at that time as a proponent of the NSP plant project. I favor the plant unless the requirements of the State agencies concerned cannot be met. Incidentally, a representative of the U.S.

Public Health Service stated at a public meeting 2 months ago that the public interest was being well protected by the Minnesota State agencies.

The Minnesota legislative committee of which I am chairman met on December 11, 1964, and, hence, I was unable to attend the hearing of your committee on that date. My committee was holding a hearing pertaining to strengthening the air pollution control laws of Minnesota.

With best personal regards, I am,

Yours truly,

HOWARD R. ALBERTSON.

STATE OF MINNESOTA,

SENATE,

December 11, 1964.

HON. GAYLORD NELSON,
Chairman, U.S. Senate Subcommittee on
Water and Air Pollution:

Mr. Chairman and members of the Senate Subcommittee on Air and Water Pollution, let me say, first of all, that I want to thank you for the privilege of testifying before the committee.

I will leave the technical and mechanical testimony to the experts in that field and express some views generally shared as they reflect the sentiments of the people in my area.

Needless to say, most of the people in Washington County who have written or contacted me, are overwhelmingly in favor of the NSP location here. As far as I have been able to analyze the NSP plant location controversy, it resolves itself down for the most part as to who is going to get the tax base as a result of the location selection, and the controversy, for the most part, is motivated strictly by economics.

We in the area feel that we have made our contribution to the wild river program by having the northern part of the St. Croix so designated. Now there are about 12,000 lakes in Minnesota and about 30 rivers in our beautiful State and a similar situation in Wisconsin, so why should certain forces want to single out for recreation only, that portion of the St. Croix River that has traditionally been commercial and is located in a county that has been recently designated by the Federal Government agency as a metropolitan county?

When we adopt policies affecting the economy of specific areas, we should weigh heavily the needs and desires of the people who live in the respective immediate areas. For example, in the case of the NSP location, should it cause the water temperature to rise a little and should it cause a little more barge traffic on the river and the pollution affects upon the water are nullified and controlled, then our policies should be moulded to help the economy of the people in that area—especially when the people are so solidly for a plant location here such as NSP.

Let me say as a real estate broker operating in the St. Croix Valley, that the location of the NSP plant here is not going to devalue property along the St. Croix River. In fact, I predict that property values will go higher and higher. I have already noticed the trend in my business of a stimulated interest in people to locate in this area by the fact that NSP will be locating here.

As for the temperature of the water rising a little in the river, let me say that I am sure that this event would be most welcomed by the swimmers and water skiers who will appreciate a little warmer water in our Minnesota climate.

In conclusion, if any governmental agency adopts a policy to deny or restrict a metropolitan county economic growth and prosperity, so that it can be used as a public playground only, then I suggest that the Government take steps to lessen the impact of loss of industry, loss of employment, and loss of tax base by subsidizing that area to compensate the people in the area who have to pay the bill for everybody.

Very truly yours,

RAPHAEL SALMORE,

State Senator, 50 District, Washington County.

The following resolutions were submitted for the hearing record by John T. McDonough, probate-juvenile judge of Washington County, Minn.:

UNANIMOUS SUPPORT

Whereas surveys show that over 90 percent of all residents and property owners in Washington County wholeheartedly support the location of the NSP plant on the St. Croix River in Oak Park Heights;

And whereas the people who must bear the burden of taxes in the area and whose futures are linked with the economic progress of the area, know that the advantages of the NSP plant will far outweigh any possible disadvantages, and that the drawbacks cited by the opponents are either greatly exaggerated or completely without foundation;

And whereas the location of the NSP plant in the St. Croix Valley holds the promise of a bright future for the area in which we can begin to realize our potential for industrial development to complement our natural and recreational resources;

And whereas we who live and pay taxes in the valley have the right to determine our own future course, and reject attempts by outsiders and people who do not pay taxes in the area to divide us and tell us that we cannot have industrial development: Be it therefore

Resolved, That we, along with the great majority of other Washington County residents, reaffirm our support of the NSP plant location in Oak Park Heights and that we ask other persons and agencies that have become involved in this matter to respect our rights and priorities as residents of the affected area.

TO EXPEDITE HEARINGS

Whereas NSP obtained the property for its steamplant in Oak Park Heights more than 20 years ago; and

Whereas NSP publicly announced plans for construction of its steamplant on the St. Croix River in May 1964; and

Whereas the local governing bodies gave their hearty approval to the construction of this plant; and

Whereas NSP has applied to the Minnesota Water Pollution Control Commission and to the Minnesota Department of Conservation for necessary permits to construct the plant; and

Whereas hearings have been requested to be held in November 1964; and

Whereas it is absolutely necessary that major construction of this plant begin on the plant site early in the spring of 1965 so that the plant can be completed in 1968; Be it therefore

Resolved, That we respectfully urge the Minnesota Water Pollution Control Commission and the Minnesota Department of Conservation to expedite these hearings and studies concerning NSP's applications and make their findings at the earliest possible date so that NSP can maintain its construction schedule for the benefit of all of its customers.

PARK

Whereas the lower St. Croix Valley has had commerce and industry since the fur trading and logging days, and

Whereas commercial and industrial activities have been developed and carried on in the valley in complete harmony with our recreational resources and have contributed to the economy of the valley, and

Whereas the apparent basic purpose of those opposing the NSP plant in Oak Park Heights is to set aside the entire valley as a recreational area or park solely for pleasure purposes thereby restricting industrial development, commercial navigation, and certain types of land ownership, and

Whereas the establishment of such a park or recreational area would require the public acquisition of large tracts of land along the river and the ac-

quisition of other areas for public access to the river across private lands, and
Whereas the establishment of a park would raise the question as to whether or not existent commercial and industrial enterprises would be allowed to remain in the area : Be it therefore

Resolved, That we are opposed to the establishment of a park or recreational area that would do away with present and future industrial development in the valley.

The three foregoing resolutions have been adopted by the following Washington County, Minn., communities, boards, and organizations :

| | |
|---|--|
| Village of Afton | Town of Oak Park |
| Village of Mahtomedi | Town of Oneka |
| City of Stillwater and Stillwater Board of Water Commissioners | Town of Northdale |
| Village of Willernie | Town of Woodbury |
| Village of Dellwood | Grant Town Board |
| Village of Forest Lake | Village of Oak Park Heights |
| Marine on St. Croix | Village of Hugo |
| Town of Lincoln | Village of Lake Elmo |
| Town of West Lakeland | St. Croix Valley Area Chamber of Com- merce |
| May Township | Fraternal Order of Eagles No. 94 |

The village of Bayport, the Washington County Farm Bureau Association, and the Stillwater Planning and Zoning Commission also passed resolutions in favor of the plant's construction at the Oak Park Heights site.

STILLWATER GAZETTE,
Stillwater, Minn., December 15, 1964.

Re Stillwater subcommittee hearings, December 10 and 11, 1964, Stillwater, Minn.

AIR AND WATER POLLUTION SUBCOMMITTEE,
U.S. Senate

(Attention of chairman, Senator Edmund S. Muskie).

DEAR SIR: As a matter of record, I would like to testify as an independent witness regarding the testimony given at a recent subcommittee hearing in Stillwater, December 10 and 11, in which witnesses, pro and con, gave their reactions to Northern States Power Co.'s plan to build a \$63 million generating plant in Oak Park Heights, Minn., on the St. Croix riverbanks in the State of Minnesota.

Many unsubstantiated allegations were made at that hearing and I know your committee is going to have a tough time distinguishing fact from fiction. One such item you will find in your records is a statement to the effect that the entire river would be diverted to cool the plant, or that the entire river will be heated by the discharge of hot water from the plant. These are simply not facts. Tests are being conducted at the University of Minnesota right now which will soon have the correct water usage and water-heating data for you if you wish to set the record straight. I'm sure the NSP president, Ray Ewald, will be glad to go over the university tests with you.

Another witness testified that Stillwater has no storm sewers and is, or implied, that the city is dumping raw sewage into the St. Croix above the proposed plant site. Mr. Chairman, Mr. Pemble, the witness who testified to this effect did not check with the city at all on these matters and he simply doesn't have the facts.

Stillwater, a community of around 9,000, just recently built a million dollar sewage disposal plant. It also has over 30 blocks of underground storm sewers (8,000 to 10,000 feet); the city just recently passed a resolution to spend \$17,000 more for more storm sewer units, and has plans for a 5-year street and sewer construction program which will add even more storm sewer footage.

Fran Mertis, of Hudson, Wis., testified that, on the basis of his opinions and findings, he felt the old adage * * * "innocent until proven guilty" * * * should be put aside in the hearings and that you gentlemen should find NSP "guilty, until proven innocent" for proposing to build its generating plant here. Some

of this testimony should have been stricken from the records, as far as I'm concerned.

You'll notice, if you take the time to check into this, that not one person speaking against the NSP plant was a city or county official, officially speaking, for a city or community in Washington County, or Oak Park Heights where NSP wishes to build its plant.

You'll notice, if you want to probe further, that all but two or three of the witnesses who testified against the plant have either their home or business roots in Wisconsin or St. Paul. Why?

To help you answer that last question you might look into the fact that was pointed out by another witness, George Richter, who runs a business in St. Paul. Richter pointed out that NSP had originally announced it would build the huge new plant on the Mississippi near St. Paul. When aviation officials told NSP, verbally, that they were wasting their time trying to put up an 800-foot smokestack, in the path of Holman Field aircraft, NSP turned to Oak Park Heights to put up the plant.

At no time, when the plant was scheduled for the St. Paul area, did any of the St. Paul businessmen voice their fears of air, water, or smoke pollution. Not until St. Paul realized that a huge tax windfall was slipping from their grasps did they mobilize to oppose the plant.

Then, suddenly, the St. Paul Council, planning commission, St. Paul newspapers, and St. Paul businessmen with boats on the St. Croix all seemed to realize that the same plant that was to have been built on the Mississippi was a disastrous, poisonous, monstrosity of a plant that will pollute the air, river, and communities of the St. Croix Valley. How nice of them to think of our welfare.

My point of all this is this: If the plant was and is supposed to be such a pollution generator that will fill the air for miles with poisonous vapors, and heat the water to such extent that it will kill all the fish, then this plant should not be allowed to be built anywhere.

If the other, though smaller, NSP plants of this type are polluting the country then it is your duty to stop these plants, too, from operating.

But, if you gentlemen find that you can allow a \$63 million generating plant to be built, with safeguards you feel necessary, then you should suggest to your fellow legislators, who may have to deal with this later, that NSP, or any other industry for that matter, should be allowed to build where they want to.

Why should a Save the St. Croix Committee, headed by one Adrian Warren of Houlton, Wis., who operates a business in St. Paul, and other members from St. Paul and Wisconsin; why should these people be able to dictate to NSP where NSP can build, if it can be built to protect the safeguards of river, air, and humans around it? What the controversy really boils down to is the fact that St. Paul is fighting to regain the plant it thought was theirs but which NSP has decided will be Oak Park Heights' instead.

Cordially yours,

V. L. HAMANN, *Managing Editor.*

OPPONENTS

(The following resolutions were submitted by Robert A. McCabe:)

DANE COUNTY CONSERVATION LEAGUE,
Madison, Wis., December 10, 1964.

To Whom It May Concern:

The board of directors of the Dane County Conservation League, meeting on October 6, 1964, and again on December 9, 1964, voted, all members present concurring, to go on record in opposition to the plan of the Northern States Power Co. for the construction of a coal-burning generating plant on the St. Croix River at Oak Park Heights, Minn.

The directors represent a membership of approximately 900 sportsmen and conservationists, in and around Dane County, Wis.

The league recognizes the need for economic development of the St. Croix River Valley, and the importance in such development of inexpensive electric power. We recognize the very natural interest on the part of local government and citizens in broadening their tax base and adding employment in their area.

The league also recognizes, however, the great economic value, throughout the lower St. Croix River Valley, of recreational and residential development, which

could unquestionably be discouraged by the presence of a powerplant of the magnitude proposed, no matter how carefully designed, operated, and maintained. The visual presence of the plant with its coal piles, docks, smokestack, and various other installations, the tremendous increase in barge traffic, the likelihood of thermal pollution of the St. Croix River and the possibility of air pollution in the valley, all would have a most serious and damaging effect on esthetic, scenic, and recreational values in this area. The economic benefits to be gained through planned development of these values must be considered, too.

The league would urgently recommend that every alternative to this location be explored, and that every effort be made to preserve the unique qualities of the St. Croix River for what we feel is a higher use.

EUGENE M. ROARK, *Secretary.*

RESOLUTION OF THE MILWAUKEE COUNTY CONSERVATION ALLIANCE, INC.,
MILWAUKEE, WIS.

Whereas the Northern State Power & Electric Co. of Minnesota has applied to State agencies for the authority to construct a \$68 million utility for the purpose of producing electric power on the Minnesota boundary of the St. Croix River; and

Whereas such installation poses a great threat to air pollution and water pollution of the St. Croix River which constitutes a great threat to aquatic life; and

Whereas such plant would be powered by the use of coal which would be transported up the river in coal barges and would destroy much of the esthetic value of the waterway; and

Whereas the St. Croix River is being considered for designation as a wild river area; and

Whereas the people of the State of Wisconsin vigorously oppose such installation for the above specified reasons: Now, therefore, be it

Resolved, That the Milwaukee County Conservation Alliance of Milwaukee, Wis., at its regular monthly meeting, held Tuesday December 8, 1964, at the Milwaukee Journal Co., Seaway Lounge, 133 West State Street, Milwaukee, Wis., voted to vigorously oppose said installation.

WALTER FUHRMAN, *Secretary.*

RESOLUTION OF THE CITIZENS NATURAL RESOURCES ASSOCIATION OF WISCONSIN

Whereas the Northern States Power Co. has revealed plans for the construction of a huge coal-burning electric power generating plant on the lower St. Croix River; and

Whereas the St. Croix remains at present one of our more beautiful and relatively unspoiled streams; and

Whereas there is a steadily mounting demand for the types of recreation provided by rivers such as the St. Croix, while the number of unspoiled and pollution-free rivers continues to decrease; and

Whereas careful studies have apparently not been made, nor full consideration given to the possible effects of the proposed generating plant on the esthetic and recreational values of the St. Croix; and

Inasmuch as the fate of the St. Croix is the rightful concern, not only of those people living in the immediate vicinity of the proposed plant and who would benefit financially from its construction, but also of all those who have visited, used and enjoyed this beautiful stream, and who are deeply concerned over the steady erosion of our Nation's beauty in the name of commerce and financial gain: Now, therefore, be it

Resolved, That the Citizens Natural Resources Association of Wisconsin, Inc., is opposed to the construction of this generating plant on the St. Croix River. We respectfully urge the directors of Northern States Power Co. to give full consideration to the esthetic and recreational values of the St. Croix, to locating an alternative site for this plant, and to the possibility of using a less objectionable fuel for its operation from a standpoint of minimizing air pollution.

ROY O. GROMME, *President.*

RESOLUTION OF THE BADGER FISHERMAN'S LEAGUE, INC., MILWAUKEE, WIS.

The Badger Fishermen's League Inc., of Milwaukee having as its membership a group of conservation-minded sportsmen takes the following stand in opposition to the construction of a steam-electric generating plant on the lower St. Croix River.

"Whereas a public announcement of plans by the Northern States Power Co. to construct a large electric powerplant on the St. Croix River; and

"Whereas such powerplant in our opinion would detract from the conservation and recreation value of that river; and

"Whereas the St. Croix River is one of the few remaining rivers in the North Central States that is relatively free of pollution and industrial contamination; and

"Whereas the people of Wisconsin have as much equity and concern for this river as residents of Minnesota; and

"Whereas adequate studies are as yet not available to indicate how much additional damage will be done by air and water pollution to the fish and wildlife of this river. In addition there have been no feasibility studies on the location of such a plant on the Mississippi River where such a plant could serve the proposed needs as indicated by the Northern States Power Co.; and

"Whereas it is not the purpose of this organization to cause undue hardship and economic privation to any group of American citizens however small, we feel that the long-range conservation and recreational values must have precedent particularly in this case when clean rivers are so rare in our entire Nation: Now, therefore, be it

Resolved, That the Badger Fishermen's League, Inc., of Milwaukee be opposed to the construction of an electric generating plant on the St. Croix River. We suggest to all parties and persons concerned that full consideration be given to the conservation and recreational values of the St. Croix, keeping in mind that the St. Croix River is part of a broad and important recreational base for Wisconsin and Minnesota citizens and further that every possible effort be made to locate the proposed plant on the Mississippi River site."

CHARLES H. BREES,
Chairman, Legislative Committee.

RESOLUTION OF THE SIERRA CLUB, JOHN MUIR CHAPTER, MADISON, WIS.

Be it resolved, The Sierra Club, represented by its John Muir Chapter in Wisconsin, is opposed to the construction of a 500,000-kilowatt coal-burning generating powerplant being proposed by Northern States Power Co. to be built in Oak Park Heights, Minn., for the following reasons:

1. The St. Croix watershed is unspoiled, running clean, and unfettered in its upper reaches and is one of the high priority streams of our local Sierra Club program of "Saving our Wild Rivers."

2. The area of river in question is relatively unspoiled, therefore, commercial exploitation is contrary to Sierra Clubs' concepts of preservation of scenic and esthetic values.

3. Water use and overuse will create a thermal pollution which will affect the ecology of this river. Proposed chlorination of effluent will also affect the ecology. We feel that adequate studies in this area have not been made. In this, the Sierra Club would make these demands on the people or organizations involved: An ecological study of the pollutant effects of this proposed plant by: (1) Northern States Power Co., (2) State of Minnesota, (3) State of Wisconsin, (4) U.S. Department of Interior. Only after complete evaluation of suggested studies should the permit of powerplant be granted or disallowed.

4. A navigable stream is the property of all the people—it is part of the public domain. The Sierra Club recognizes the need for considering economic and recreational values, as well as scenic and esthetic values. This boundary water section of the St. Croix River has great recreational use by the people of Wisconsin as well as those from Minnesota. The proposed barge traffic required to transport the vast coal tonnage required for the proposed plant will certainly infringe on the rights of the recreationist, and in an all time factor the many will be sacrificing to the gain of the few.

5. Since there are no Federal statutes which consider scenic values in determining use of a stream, we request that our opposition to the construction of this power development be made a matter of national issue.

J. J. WERNER, *Chairman.*

RESOLUTION OF THE DANIEL BOONE HUNTERS LEAGUE OF WISCONSIN

The Daniel Boone Hunters League of Wisconsin having as its membership a group of conservation-minded sportsmen takes the following stand in opposition to the construction of a steam-electric generating plant on the lower St. Croix River.

"Whereas a public announcement of plans by the Northern States Power Co. to construct a large electric powerplant on the St. Croix River; and

"Whereas such powerplant in our opinion would detract from the conservation and recreation value of that river; and

"Whereas the St. Croix River is one of the few remaining rivers in the North Central States that is relatively free of pollution and industrial contamination; and

"Whereas the people of Wisconsin have as much equity and concern for this river as residents of Minnesota; and

"Whereas adequate studies are as yet not available to indicate how much additional damage will be done by air and water pollution to the fish and wildlife of this river. In addition there have been no feasibility studies on the location of such a plant on the Mississippi River where such a plant could serve the proposed needs as indicated by the Northern States Power Co.; and

"Whereas it is not the purpose of this organization to cause undue hardship and economic privation to any group of American citizens however small, we feel that the long-range conservation and recreational values must have precedent, particularly in this case when clean rivers are so rare in our entire Nation: Now, therefore, be it

Resolved, That the Daniel Boone Hunters League be opposed to the construction of an electric-generating plant on the St. Croix River. We suggest to all parties and persons concerned that full consideration be given to the conservation and recreational values of the St. Croix, keeping in mind that the St. Croix River is part of a broad and important recreational base for Wisconsin and Minnesota citizens and further that every possible effort be made to locate the proposed plant on the Mississippi River site."

CHARLES H. BREES,
Chairman, Legislative Committee.

RESOLUTION OF THE WISCONSIN STATE DIVISION OF THE IZAAK WALTON LEAGUE OF AMERICA, INC.

The Izaak Walton League of America has, since its inception, been dedicated to preventing new and eradicating existing pollution to safeguard human health and to assure the healthy aquatic environment for wild creatures. The Wisconsin chapter of the Izaak Walton League has similarly espoused to this dedicated purpose. The stand thus taken places the Izaak Walton League in opposition to the construction of a steam-electric generating plant on the lower St. Croix River. The following resolution presents the stand of the State Izaak Walton League:

"Whereas the Northern States Power Co. plans to construct a large electric powerplant on the St. Croix River; and

"Whereas said plant will require the burning of considerable amounts of coal and discharge heated water into the St. Croix River; and

"Whereas said river is one of the last rivers in Wisconsin and Minnesota to be relatively free of pollution and contamination from industrial wastes; and

"Whereas this river is an important recreational and tourist attraction for both Wisconsin and Minnesota; and

"Whereas data are not yet available to show what deleterious effects the proposed powerplant will have on fish, wildlife, and plants in and along the river; and

"Whereas the voice of Wisconsin interests in this water resource should be heard: Now be it therefore

Resolved, That the Wisconsin chapter of the Izaak Walton League go on record as opposing the construction of such electric-generating plant on the lower St. Croix River.

We trust that the Senate committee conducting these hearings will give proper consideration to the conservation and recreational values of the St. Croix River."

A. J. MERTENS, *President, Manitowoc, Wis.*

WISCONSIN RESOURCE CONSERVATION COUNCIL,
Fond du Lac, Wis., December 16, 1964.

SENATE AIR AND WATER POLLUTION SUBCOMMITTEE,
Stillwater, Minn.

SENATOR NELSON AND SENATOR METCALF: My name is John L. Franson, 150 Warner Street, Fond du Lac, Wis. Unfortunately I was not able to appear before your subcommittee hearing on December 11 with the opponents to the proposed powerplant on the St. Croix River. I am, therefore, submitting this to be added to the subcommittee's testimony as Senator Nelson indicated could be done by December 18.

I am testifying as the secretary of the Wisconsin Resource Conservation Council, a group of over 30 organizations in Wisconsin interested in the protection of our Nation's resources. As secretary, I have already submitted to your committee a statement in opposition to the proposed powerplant by our group and so the statements that I shall now make may simply be considered as a supplement to our previously prepared statement. Our president, Martin Hanson, also had the opportunity of testifying before the subcommittee. I do not claim to be an expert nor am I a technician on the matter of pollution. But I speak as a citizen, as one that has to live with the polluted waters in Wisconsin. In addition to the 2 years that I have served as secretary to the Wisconsin Resource Conservation Council, I have served 4 years as secretary to the Fond du Lac County Conservation Alliance—a position which I still enjoy. I am also chairman of the resource council's pollution committee and this committee has been working diligently to try to correct and investigate pollution problems and laws in Wisconsin. So you see, I am not unfamiliar with the problems that our State faces in regard to water pollution.

The people of Wisconsin are very concerned over what might happen to the St. Croix River should the proposed powerplant be constructed. We are asking ourselves not only how seriously will it damage the river in the area but we are also wondering whether or not the whole St. Croix Valley along this wild river might not become industrialized as a result of this plant. My constituents and myself feel that the St. Croix River is as much Wisconsin's river as it is Minnesota's. Many of the people of our State enjoy it and we are proud of the St. Croix.

But the St. Croix is only one example of a wild river which we are concerned with. We may have a dozen wild rivers left in Wisconsin and we are concerned with them all, for they are all being endangered either by commercial exploitation on their banks or by pollution of their water.

It has been stressed that Wisconsin and Minnesota have excellent pollution laws. This may be so. But I must concur with Senator Nelson that despite these laws we are losing the battle of clean water. I feel this is primarily because the public is more sensitive to local economics than it is toward the resource. In Wisconsin it happens that when large industries are threatened with action taken against their pollution, they simply threaten in return to move out of the State. This throws the local communities into an uproar and I am afraid that now, in my opinion, our State finds itself relatively helpless as far as these large industries are concerned. The only answer to this problem lies in uniform standards on a nationwide basis.

I would like to say that we are strongly in need of the Federal Government's help in protecting our water resources. I feel that bill S. 649, recently defeated in the House, was the very last our Federal Government could have done in providing minimum water standards and I encourage this subcommittee to renew

its efforts towards this legislation—you will be opposed. You will be opposed by industry for obvious reasons. You will be opposed by local communities that fear even the word Federal Government because they feel it is so far removed from them and their interests. You will be opposed by State agencies and bureaucrats because they abhor any imposition made upon them. But I say to you again, we need your help. We want your help. Federal help is badly needed for it is only on the Federal level that the proper perspective can be taken in regard to our water resources.

I would like to close in pledging our support to your efforts and I would like to request 50 copies of the transcript of this hearing so that I may distribute them to the member organizations of the council.

JOHN L. FRANSON, *Secretary.*

OFFICE OF THE MAYOR,
Prescott, Wis., December 18, 1964.

RON N. LINTON,
Chief Clerk and Staff Director,
U.S. Senate Committee on Public Works,
Washington, D.C.

Subject: Committee hearing on Northern States Power Co. proposed plant on St. Croix River at Bay Port, Minn.

DEAR SIR: At the last regular meeting of the Common Council of the City of Prescott, held on December 14, 1964, the above subject was discussed. The council feels that the majority of the people of this city do not want the St. Croix River to be contaminated like the Mississippi River that it joins here at Prescott.

The following motion was approved by the council:

"To notify the Committee on Public Works that the City Council of the City of Prescott, Wis., is on record as unalterably opposed to the location of a Northern States Power Co. plant at Bayport, Minn., on the St. Croix River."

Yours very truly,

E. C. MAY, *City Clerk-Treasurer.*

RESOLUTION OF THE ST. CROIX COUNTY, WIS., BOARD OF SUPERVISORS

Whereas NSP proposes to build a powerplant at the village of Bayport, Washington County, Minn., and

Whereas evidence has been submitted tending to show that damage will be done to waterlife and plantlife in the St. Croix River due to heated water coming out of said plant; and

Whereas evidence has further been submitted tending to show that the air will be polluted by the coal burned in the said plant, which polluted air will be harmful to people, animals, and crops in St. Croix County, which polluted air will tend to drift into St. Croix County because of prevailing westerly and northwesterly winds: Now, therefore, be it

Resolved, That the Governor of the State of Wisconsin, the State department of agriculture, public service commission, industrial commission, department of health, conservation department, and the president of Northern States Power Co. be respectfully requested to inquire into the proposed project and determine whether or not any damages may be inflicted on St. Croix County and propose measures to protect the river and the environs from such damage, if any.

(Signed) ARTHUR N. OLSON.

FRIENDS OF THE WILDERNESS,
Duluth, Minn., December 9, 1964.

SAVE THE ST. CROIX COMMITTEE,
Hudson, Wis.

GENTLEMEN: Would you kindly present this statement at the hearings to be held on December 10 and 11 in the junior high school at Stillwater, Minn.?

We, the Friends of the Wilderness, a nonprofit conservation organization, founded in 1949 to coordinate the efforts of thousands of individuals and hundreds of organizations in the preservation of the wilderness character of the boundary waters canoe area of the Superior National Forest, have this to say in regard to the important question in regard to the construction and locating of a generating plant on the St. Croix River.

We believe that this plant should and could be located in another area, already contaminated and should not be located on the St. Croix River. There are plenty of other areas in the same State that will serve the cause of the Northern States Power Co. without additional cost. The St. Croix River, though not a wilderness, has great recreational and scenic values, not only to the State of Minnesota but to our great and good neighbor, Wisconsin.

Our population is increasing at a rate that was considered fantastic 20 years ago. Our mobility and leisure are increasing even faster. The pressures that have besieged our unique wilderness canoe country have doubled and tripled since the end of World War II and you can say the same for the lovely St. Croix River and adjacent area.

It is easy and human to forget that we do not lead our lives apart, that we are all fellow citizens of a democratic community, all part of a nation that exists perilously in a savage and predatory world.

But many of us think that the major and most compelling argument against this new generating plant in the St. Croix River area is that it is not good even vital for the future welfare of our country or State. This area, scenic and recreationwise as it is, will be needed by the generations of Americans that we hope and believe are to come indefinitely into the infinite future. We must all realize that we have an obligation to preserve some of our extant natural areas and our natural open spaces particularly those in accessible locations, such as the St. Croix Valley, to pass on reasonably intact to the generations to come of our prodigiously growing population.

We have been faced in the wilderness canoe country, many of these same natural questions that are being raised here at this hearing, only on a much larger scale.

The fact is, that so many people will be affected by this new generating plant and so many will stand to be hurt, even though it will help taxwise the county in which it is planned to be located.

We do not feel that such a plant is necessary in such a location, when the Northern States Power has additional sites in locations, that have already been polluted, both air and waterwise, by other industrial activity.

We, the Friends of the Wilderness, thank you for your consideration of our views and we emphatically support the efforts of the Save the St. Croix Committee.

Thank you and may our wilderness canoe country—Minnesota's greatest treasure—live unspoiled forever and forever.

Very sincerely,

WILLIAM H. MAGIE, *Executive Secretary.*

The following newspaper article was submitted for the record by Martin Hanson, president of the Wisconsin Resource Conservation Council:

[From the Nation, Dec. 21, 1964]

THE ST. CROIX—WHO OWNS A RIVER?

(By Alfred D. Stedman¹)

ST. PAUL, MINN.—Until it loses itself in the foul and polluted Mississippi a few miles below Minneapolis and St. Paul, everything about the St. Croix River is lovely: its source in cold northern Wisconsin springs and lakes, its long quiet southward meanderings that for 100 miles from the boundary between Minnesota and Wisconsin, its incoming trout brooks and bass streams, the overlooking hills, the gorge near its midpoint known as The Dalles, and the broad expanse called Lake St. Croix that lazes for more than 20 miles from the fine old historic Minnesota town of Stillwater to the mouth.

And it is right here on this beautiful lower expanse that a fight presently centers between the onward push of industry and the stubborn defenders of a river and valley they love. More and more people among the 'Twin Cities' 1½ million feel a sharp personal appreciation of their great luck in having so

¹ Alfred D. Stedman has recently retired from the St. Paul Pioneer Press and Dispatch, where he was at various times Washington correspondent and associate editor. Mr. Stedman was for 5 years Assistant Administrator of the Agricultural Adjustment Administration; he has written widely on conservation.

fine a stream so near at hand. It is called the cleanest large river left in mid-America, with Stillwater (1960 population 8,310) as the largest center on its whole course. To it come more and more visitors from Wisconsin as well as Minnesota to sail and swim and water-ski and fish and play. More and more year-around or summer homes peep from the timbered hills. Right now the upper reaches of the St. Croix and its main northern tributary, the Namekagon, are among 12 U.S. streams being studied by a team of national experts for possible designation as "wild rivers," suitable to be preserved for recreation in the years to come.

That study may be extended to include the lower St. Croix. But cutting across the beginnings of plans for tomorrow's conservation needs there is today a Northern States Power Co. project that opponents say (and backers deny) would open a door to industrial degradation of the lower St. Croix Valley. At the village of Oak Park Heights on the Minnesota shore just below Stillwater, the company is petitioning to build an enormous coal-burning electric generating plant at a cost of \$68 million. This would be a 550,000-kilowatt station, larger than any that had been installed anywhere in the United States prior to 1961. Later a second unit of even larger capacity would be added.

It is sad that the same cool clean waters where thrive game fish like walleyed pike and smallmouth bass, and which outdoorsmen love best for boating and bathing, are also especially prized by power companies. The cooler and cleaner the water, the more efficiently it will cool electric generators.

The St. Croix runs consistently cooler and far cleaner than either the Mississippi or the Minnesota that joins the murky Father of Waters near the Twin Cities. But if the power project wins official approval, the lower St. Croix Valley and Lake St. Croix will never be the same. Homes dotting the hills below Stillwater will look down on a powerplant 350 feet long and 200 feet high, flanked by a coal pile nearly half a mile in length, with the layout to be vastly expanded later. A stack 600 to 800 feet tall will belch smoke into the sky. To bring coal upstream from the Illinois coal fields, those placid waters will be plied each week through the navigation season by 3 huge tows of 15 barges per tow, or by larger numbers of smaller tows. Though the company promises to hold barge traffic to a minimum on summertime holidays and weekends, the question of barge-traffic dangers to boaters and bathers, especially children, is a live issue.

In times of lowest water, when the weather can also be the hottest and natural water temperatures the highest, the amount of water to be drawn from Lake St. Croix to cool the powerplant might equal most of the river's flow into the lake. The record low-average flow for July is 783 cubic feet per second, and the maximum use by the proposed plant (first unit) is placed at 660 cubic feet. At the point of their return to the St. Croix, the waters would be warmed 10° to 17°—up to hot-weather maximums of 84° to 99°.

Every major effect on aquatic life and human recreation of both the warm-up of waters by the plant (thermal pollution) and of air pollution from the stack is in dispute. Scientific studies by Federal, State, and power company experts are underway.

The economic push to get official sanction for the plant is tremendous. The need for additional power in the Twin Cities area has hardly been challenged, and the business and political interests of Stillwater would be more than human if they didn't thrill to the promises of a \$7 million construction payroll, an annual operating payroll later for 60 employees of \$500,000, and a 64 percent jump in local tax revenues.

Backing the project are nearly every chamber of commerce in the immediate Washington County area of Minnesota, nearly all official governing bodies of county, towns and villages, luncheon clubs, veterans' groups, the county unit of the National Farm Organization and the Central Labor Union, AFL-CIO.

But the opposition also is militant and sturdy; in number and in scope as well, it is rising. It is led by an organization called "Save the St. Croix, Inc.," made up of valley residents and people from Wisconsin, Minnesota and elsewhere who cherish the river. Save the St. Croix now has several hundred members and is raising funds for attorneys' fees and other costs of fighting the project. More than 20 groups, including the Minnesota division of the Izaak Walton League of America and the Minnesota Society of Architects, have expressed concern about the project or have come out against it. Petitions of protest are declared to have gained more than 10,000 signatures.

Right now supporters and opponents are scrambling to be ready for concurrent hearings by two Minnesota agencies beginning January 13. University of Minnesota thermal pollution studies financed by the Northern States Power Co. are due to be presented. The company asks one permit from the Minnesota Department of Conservation for continuous diversion from the St. Croix River of water in an amount that in a year could cover to 1-foot depth an area of 631,000 acres, or nearly 1,000 square miles. It asks a second permit from the Minnesota Water Pollution Control Commission to discharge the same water back into the river in a heated and chlorinated condition.

The opposition centers, not against building such a plant somewhere near the Twin Cities, but specifically against the St. Croix as a site. It contends that since the plant could be located on the Mississippi, already polluted by human and industrial wastes, it is not necessary or excusable to contaminate the only major stream hereabouts that is still cool and clean.

The Northern States Power Co. makes a sweeping defense of its first unit plan. "We are convinced," it says, "that operation of such a plant as we propose to build will not be detrimental to the interests of residents of the St. Croix Valley nor detract from the pleasures of those who use the valley for recreation. We would not be building a plant here if we thought it would mar the beauty of the valley or restrict or interfere with activities in the area."

Concerning the feared effects on fish life or other river biology, the company says that the rise of temperature will average only about 10° and will decrease sharply within a short distance downstream as the discharge mixes with the river water. It asserts that there will be no pollution from the cleaning of barges, and that the initial barge traffic of 2 million tons of coal a year won't disturb boaters or swimmers. As to air pollution, it says that 98 percent of the fly ash will be removed from the smoke and that the stack exhaust, mostly water vapor, will be dissipated high in the atmosphere.

But opposite views as to the initial plant's effects are argued by champions of the St. Croix. They contend that warming the river is sure to multiply nuisance fish, hurt game fish, and spur growth of green scum algae. In summer, they say, the waters will be made too warm for swimming on such nearby beaches as Bayport. They point out that on the Mississippi and Minnesota warm water checks freezing for considerable distances below powerplants, and foresee that the St. Croix will be lost to winter sports for comparable distances below any new plant that warms this river. They warn that leaching of sulfur from the huge coal pile could produce dangerous acid pollution.

As to air pollution, Save the St. Croix describes the real danger to people and vegetation as arising from poisonous gases, especially sulfur gas, which can be converted to acids and brought back to ground levels with the rain.

On such immediate effects of the new plant, the power company has gained a degree of avowed or unannounced support in official conservation circles. Some agree that injury to the river will be minimal, and a few say openly that, as between more business and beauty or recreation on the St. Croix, they vote for business.

But overshadowing all issues of immediate effects on recreational and scenic values of this first power unit is the great question of whether its location on the lower St. Croix would start a march of heavy industry through the valley that in the long run could be revolutionary. If this huge plant attracts an influx of heavy industry, still graver troubles with water and air pollution and serious shrinkage of outdoor values would be the prospect. The power company acknowledges that it will have no control over what other industries may do about following it into the valley, but it makes two comments.

One is that the St. Croix has been historically a commercial stream, with some industries operating there now. True, long ago the fur traders used it as the shortest water route from the Mississippi to Lake Superior, canoeing all the way north to Upper St. Croix Lake, then portaging to the Bois Brule and descending that tumbling stream to the Greatest Lake. True, also, the lumbermen made a shambles of the region's forests before their sawmills vanished, along with the logs that once jammed the St. Croix, and nature began a century-long job of reclothing the denuded lands. So, though perhaps open to other interpretations, history along the St. Croix seems to suggest that unguided exploitation of nature's bounties can lead to public costs as well as private profits.

But the Company also doubts that it would lead other heavy industry into the valley. In its experience, the company says, "our powerplants do not attract other industrial establishments to their immediate area. As far as power rates or service are concerned, there is no advantage in being located next to a generating station. In the nearly 12 years that it has been in existence, our Minnesota River Black Dog plant, for instance, has not attracted industrial plants as next-door neighbors."

Opponents answer that the Northern States Power Co. itself, by planning now to follow up its first generating station with another unit of even greater capacity, is already taking an important step toward industrializing the lower valley. They add that, once the company wins a test case for its first station, chances of heading off that next step toward more industry will be poor. As for the Minnesota River, they describe industrial development there as having been well advanced before the Black Dog powerplant was ever built. Whatever special factors may be keeping other industries at a distance from the Minnesota River plant area, they are regarded as unlikely to apply on the St. Croix.

Instead, if once the mammoth new power operation gets underway on the St. Croix, strong forces toward further industrializing are considered by "Save the St. Croix" spokesmen as almost certain to be generated. They foresee that the heavy upstream coal movement will induce the barge operators to seek cargo for the downstream haul. That in itself could attract industries, and the enlarged barge traffic would almost certainly produce enterprises for the cleaning, servicing, loading, and fueling of the tows.

"In actuality," says State Representative William J. O'Brien of St. Paul, a staunch conservationist with deeply rooted interest in the St. Croix, "I am not terribly concerned about the power company project itself. The number of cement plants, oil refineries, and other industrial establishments which I fear would undoubtedly follow a new powerplant give me great concern."

Not the wastes of a vast human population but industrial wastes would seem the most likely threat to the now cool and fresh St. Croix. Twin Cities people know that one in every 20 oil barges is a "leaker," and they commonly see oil slicks on their rivers. They hear that far down the Mississippi any fish caught taste of petroleum. They know that industrial accidents happen, that last year, for example, tow oil spills killed 8,000 ducks and greased bathing beaches for 100 miles along the stream. They know that the Minnesota River, like the Mississippi, is heavily polluted by industrial wastes.

And all this devastation occurs despite the fact that most industries cooperate with the Minnesota Water Pollution Control Commission and that the total bill for building sewage systems in the Twin Cities area is expected to exceed \$200 million in about 35 years. So far as industrial wastes are concerned, what has happened before can reasonably be expected to happen on the St. Croix.

Thus momentous questions arise out of the fight over the fate of the St. Croix. Essentially similar questions are coming up in other struggles to save for general enjoyment some natural treasures: remnants of giant redwoods in California, the Indiana Dunes, Storm King Mountain on the Hudson, the Great Falls of the Potomac, Fire Island of New York, tracts of wilderness and wild rivers elsewhere.

What limits are to be placed on industrial invasion in America? What guidelines are to be established? Who is to determine where, when and how a public resource can be used by industry? Is that to rest with the industry or local municipality immediately concerned? Or should final decision be reserved to a national or interstate agency?

On the St. Croix, as elsewhere, defenders of natural resources find that no general forum exists for hearing and deciding such questions. To be sure, as to all effects on navigation, the Northern States Power Co. will require a permit for its project from the U.S. Army Corps of Engineers. And as to the effects on recreation, the corps will be "advised" by the Interior Department's Bureau of Sport Fisheries and Wildlife. But these are not general forums for broad decisions on the questions at stake.

Some Minnesota officials are fond of saying that nobody can stop the Northern States Power Co. from building any plant it wants on St. Croix shore property it already owns. Smoke rising from the stack will float around in Wisconsin as well as Minnesota skies, but as yet the only public body having legal power to control air pollution by the plant is the village council of Oak Park Heights, with a 1960 population of 332. Federal and State agencies by the dozen are now

empowered to study, to report and recommend State or local controls of air pollution, but none has power to decide, to act and to enforce.

Northern States Power, up to this writing, has not acknowledged any Wisconsin jurisdiction over its project. Yet the St. Croix rises and flows for a fourth of its course in that State. Half of the water to be used would seem to belong to Wisconsin. And that State has never admitted that issues of pollution on the St. Croix should be decided on one side of the river alone.

In fact, Wisconsin's Gov. John W. Reynolds, before his defeat for reelection, directed a task force of four State agencies to study the power project's effects on the St. Croix basin as a natural resource and recreational asset. And Governor-elect Warren P. Knowles says that "I would expect to continue the investigation and make every effort to see that the recreational values of the St. Croix River are fully protected, and take such further steps as may be required to safeguard the interest of boaters from pollution of the river."

"If the [Save the St. Croix] charges should be proved," said Wisconsin Senator Gaylord Nelson in calling a public hearing by his Senate Air and Water Pollution Subcommittee in Stillwater on December 10 and 11, "I cannot believe that Wisconsin should be powerless to act in this case."

Thus the groundwork for interstate action is already laid. In fact, the Secretary of Health, Education, and Welfare is specifically empowered by the Federal Water Pollution Control Act to draw up programs and support interstate compacts for water pollution control.

Against a backdrop of hurry, hurry to get Minnesota's January 13 hearings over and the Northern States Power plant under construction on a basis of permits from one State only, Congress itself is being urged to establish a Federal authority with powers to act and to define clear guidelines for decisions on questions like those about the St. Croix. Senator Nelson seems to be moving in that direction.

"Isn't it about time," asked the Washington Post recently in an editorial that drew commendation from Senator Douglas of Illinois, "that Congress and the administration took a systematic look at this problem?" And it said that "If and when choice recreation areas and unspoiled lakes and rivers are wholly invaded by industry, it will not be because anyone planned it that way. It will be simply because in area after area long-term conservation interests are subordinated to short-term commercial interest."



