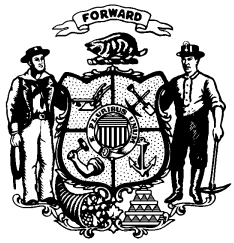
June 2000

PUBLIC SERVICE COMMISSION OF WISCONSIN
WISCONSIN DEPARTMENT OF NATURAL RESOURCES



Badger Generating Company, LLC

Electric Generation and

Transmission Facilities

Final Environmental Impact Statement

9340-CE-100

PUBLIC SERVICE COMMISSION OF WISCONSIN AND
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Badger Generating Company, LLC Final Environmental Impact Statement

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This Environmental Impact Statement for the proposed Badger Generating Facility, and the proposals to construct, operate, upgrade, and improve electric transmission lines and natural gas lines and substations complies with the Public Service Commission's requirement under Wis. Stats. § 1.11 and Wis. Adm. Code § PSC 4.30.

By: Kathleen J. Zuelsdorff June 12, 2000

Kathleen J. Zuelsdorff
WEPA Coordinator
Public Service Commission of Wisconsin

Date

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To the Reader:

This final Environmental Impact Statement (EIS) fulfills part of the requirements of the Wisconsin Environmental Policy Act (WEPA) Wis. Stat. § 1.11. WEPA requires state agencies to consider environmental factors when making major decisions. The purpose of this EIS is to provide the decision makers, the public, and other stakeholders with an analysis of the social, cultural, and environmental impacts that could result from the construction of a new power plant and its associated facilities.

The Commission decision on the merit of this project will be based on the record of a public hearing that will be held in Kenosha at the Holiday Inn Express - Harborside on Thursday, July 27, 2000. This hearing satisfies the WEPA requirements of the Public Service Commission and the Department of Natural Resources (DNR). The Commission mailed a Notice of Hearing for this project at least 30 days prior to the hearing. The EIS, as well as testimony from the public hearing, will be included in the hearing record. A Commission decision on the proposed project is expected in July 2000.

The hearing may also serve as the hearing on the DNR air pollution permit. Refer to the DNR public notice of preliminary determination for the air permit to confirm.

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Executive Summary

Proposal

Badger Generating Company, LLC (Badger Gen) is proposing to build a new natural gas-fueled, combined-cycle power plant with about 1,050 megawatts (MW) of capacity in the village of Pleasant Prairie, Kenosha County, or the village of Sturtevant, Racine County.

Badger Gen is an affiliate of PG&E Generating Company of Bethesda, Maryland, and a wholly owned indirect subsidiary of PG&E Corporation, which is also the parent company of Pacific Gas & Electric Company, the regulated California utility. Badger Gen indicates that it has sought Wisconsin sites for a new plant because it (1) identified a market for new power generation in the state and (2) noted recent adjustments in the state's construction review process that made it more favorable to power plant developers. 1997 Wisconsin Act 204 (Act 204) legalized the development of wholesale merchant plants in Wisconsin and established a mandatory 180-day timeline for regulatory review of major power plant proposals. A merchant plant is a power plant that sells electricity at wholesale, rather than providing electric service to a retail customer, and is not owned by a public utility.

Badger Gen has applied to the Public Service Commission of Wisconsin (Commission) for a Certificate of Public Convenience and Necessity (CPCN) under Wis. Stat. 196.491(3) and Wis. Admin. Code ch. PSC 111 to construct and operate a large electric power generating facility and a high-voltage electric transmission interconnection at one of two alternate sites. If approved, the new power plant would be the first electric generating facility built in Wisconsin as a true wholesale merchant plant that is not dependent on any pre-existing power purchase arrangements with public utilities. If the new electric transmission line required to connect the plant to the electric transmission grid would be built by Badger Gen, the use of eminent domain (condemnation) to acquire right-of-way easements would not apply.

The plant would be a gas-fired, combined-cycle power plant consisting of four individual units for a total combined-cycle capacity of approximately 1,050 MW. The four units would be capable of operating independently of each other but would share common fuel and water facilities. Each unit would be comprised of a generator direct-coupled to a combustion turbine, steam turbines attached to the generator via a clutch, and a heat

recovery steam generator (HRSG). To reduce the potential for fogging and icing, a combination wet/dry-cooling tower would be used. The combined-cycle plant offers a large efficiency advantage over a conventional plant. The applicant anticipates that the plant will have a 40-year life.

Proposed Power Plant Sites

Badger Gen has proposed two alternative power plant sites for the Commission to consider. The two proposed power plant sites are shown on the map in **Figure B.01**. The Pleasant Prairie site is in portions of the northwest and southwest quarters of Section 16, Township 1 North, Range 22 East, across the Canadian Pacific Railroad line from the existing coal-fired Pleasant Prairie Power Plant owned by Wisconsin Electric Power Company (WEPCO). The Sturtevant site is in the central portion of the western half of Section 21, Township 3 North, Range 22 East, in the Renaissance Business Park just northwest of downtown Sturtevant, along the Canadian Pacific railway.

Associated Facilities

Electric Transmission Line

The plant would need to be connected to the existing electric transmission system to sell its power. Badger Gen proposes to build an underground 345-kilovolt (kV), electric transmission line at either site, from the plant switchyard to a connecting point on the existing WEPCO transmission system. The underground line would be made up of six cross-linked polyethylene-insulated cables in polyvinyl chloride ducts embedded in concrete in a 10-foot-wide trench and backfilled with local soil.

Pleasant Prairie Site

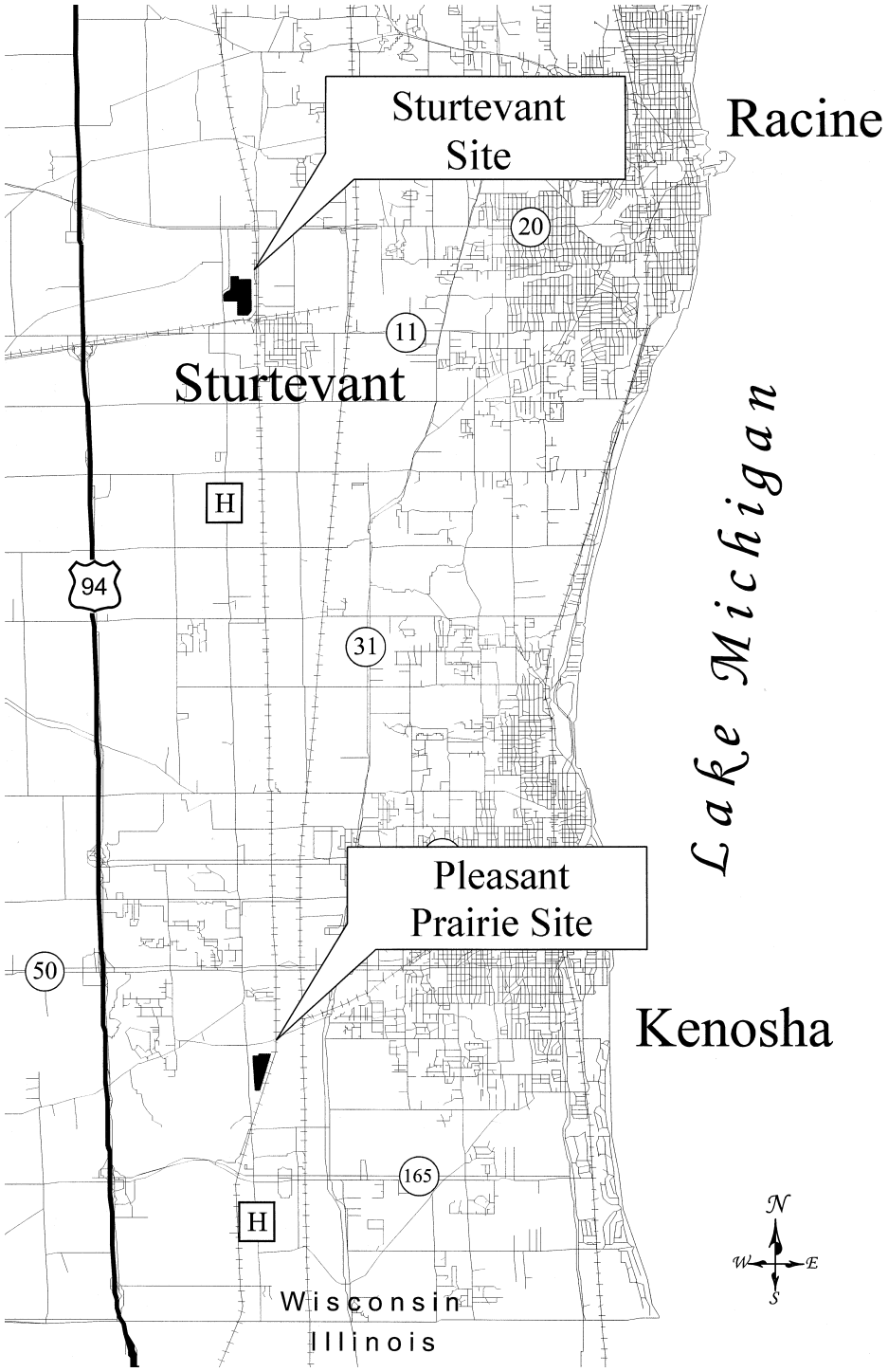
At the Pleasant Prairie site, the underground line would extend southward about 2.5 miles along one of two alternate routes to a riser substation where it would connect to the existing 345 kV Zion-Arcadian transmission line. One alternate route would follow County Trunk Highway (CTH) H for its entire length. The other would follow CTH H and then the existing Canadian Railroad line.

Sturtevant Site

At the Sturtevant site, two options for interconnection are being considered. One option would connect the site to the WEPCO Racine Substation. The other would connect the site to the Zion-Arcadian transmission line.

The connection to the Racine Substation, would consist of an underground line from the site extending generally eastward along one of two alternate routes to a riser substation south and west of Waxdale, where it would be strung onto existing transmission structures and run along these structures to the substation. The northern underground

Figure B.01 Proposed power plant sites



route would pass north of the state prison and the Waxdale complex, then southward parallel to the Union Pacific railroad tracks, overall about 2.6 miles to the riser substation and another 0.4 miles to the Racine Substation. The southern route would pass through some residential lots and south of the Waxdale complex, overall about 1.2 miles to the riser substation and another 0.9 miles overhead to the Racine Substation.

To connect to the Zion-Arcadian line, one of the two underground routes from the Sturtevant site would run southward from its riser station overhead as a second circuit on the existing structures of the Racine-Pleasant Prairie line. Near Bain Station Road in the village of Pleasant Prairie, another riser station would take the new line off the Racine-Pleasant Prairie structures and run it underground again, utilizing one of the underground routes proposed for the Pleasant Prairie power plant site, to emerge at the connection substation with the Zion-Arcadian line.

Natural Gas Pipeline

Badger Gen would obtain its natural gas from the competitive gas supply market.

ANR Pipeline Company (ANR) would transport the natural gas supply for the proposed power plant. ANR's transmission supply connections would be at the Joliet Hub in Illinois. At the Joliet Hub, interconnections can be made with Northern Border and Alliance to draw from Canadian supply areas and with ANR, Natural Gas Pipeline of America, and Midwestern to draw from the Gulf Coast and Mid-Continent supply areas.

A new 20-inch diameter natural gas pipeline would be necessary to serve the proposed project. The pipeline would operate at a pressure of 850 pounds per square inch. One common portion of the pipeline would follow the existing ANR Racine Lateral from the Racine Tap in the town of Burlington into the town of Somers in Kenosha County. This portion of the pipeline route is 14.5 miles long. Four route alternatives, two to Pleasant Prairie and two to Sturtevant, include the 14.5-mile common piece and vary in total length from 20.3 to 23.6 miles. There would also be a need for a new compressor station. The location of the compressor station is not finalized yet.

The Commission staff analysis of the natural gas facilities is based on preliminary information provided in Badger Gen's application. ANR is expected to file an application with the Federal Energy Regulatory Commission (FERC) for authorization to construct the natural gas lines, at a later date. FERC's authorization, if granted, would determine the design of the gas facilities, the location of any necessary compressors, the final route of the gas lines, and the construction conditions that must be met in building the gas lines.

Pleasant Prairie Site

The Pleasant Prairie routes, as currently proposed, would run primarily along railroad lines after leaving the common segment.

Sturtevant Site

The Sturtevant routes, as currently proposed, would run along railroad lines and through farm fields.

Water Mains

Pleasant Prairie Site

The village of Pleasant Prairie Water Utility (PPWU) would supply water service to the Pleasant Prairie site. The PPWU purchases its water on a wholesale basis from the city of Kenosha Water Utility (KWU). The KWU water treatment plant has a capacity of 40 million gallons per day (MGD) and an elevated storage capacity of 1,900,000 gallons. PPWU should be able to adequately supply the needs of the proposed facility.

To serve the proposed facility, the PPWU would need to install approximately 5,500 feet of 24-inch water main. The KWU would also need to install a new 36-inch water main from 60th Street to 66th Street regardless of whether the proposed facility is built. The 5,500 feet of new main would be installed within the right-of-way of CTH H from the Pleasant Prairie Fire Station south of CTH C and south to the power plant. There are no alternate routes proposed. According to Badger Gen, most of the water lines would be in a grassed area adjacent to the road.

Sturtevant Site

The village of Sturtevant Water Utility (SWU) would supply water service to the Sturtevant site. The SWU purchases its water on a wholesale basis from the city of Racine Water Utility (RWU). The RWU water treatment plant has a capacity of 84 MGD and an elevated storage capacity of 7,750,000 gallons. SWU should be able to adequately supply the needs of the proposed facility.

The SWU and RWU would need to install additional 24-36 inch diameter water mains in order to serve the proposed Sturtevant plant site and projected future community demand. The total length of additional main is estimated to be approximately 39,750 feet. A new 9 MGD booster station would also be constructed near CTH C. One segment of new main would extend westward from the Racine water treatment plant. Another would extend toward the power plant from the east through Sturtevant.

Sewer

At both sites, wastewater would be discharged to the existing village and city systems. Sewer mains can be tapped on the plant property at both the Sturtevant site and the Pleasant Prairie site.

Power Plant Operation

The applicant proposes to construct a gas-fired, combined-cycle power plant capable of being operated in either a base load or intermediate load mode. Because of its efficiency, the plant would probably be operated as much as possible. Actual operation would depend on market conditions, demand, and the market price for natural gas.

Planned outages of the power plant would restrict the number of hours it is available to run. The combustion turbine would probably be inspected at intervals of 6,000 equivalent operation hours (EOH). The duration of the 6,000; 12,000; and 18,000 EOH inspection outages would be expected to be two or three days in duration. The duration of the 24,000 EOH inspections would be expected to be approximately twenty-one days. Outages for maintenance of the generator and steam turbines would be less frequent and typically occur every four to ten years.

Ownership and Acquisition of Land and Right-of-Way

Current landowners at both proposed power plant sites have sales agreements with Badger Gen. The company would acquire land rights for the underground transmission line through easements or fee simple purchases, depending on the individual landowner and situation. Badger Gen does not have the right of eminent domain for either the power plant site or the transmission line route.

The natural gas pipeline would be owned by ANR. ANR would acquire and maintain the necessary pipeline easements.

The water mains and the booster station would be constructed by the appropriate municipal utility using the municipality's rights-of-way.

Environmental Issues

Pleasant Prairie Site

There are no major environmental concerns at the Pleasant Prairie site. The project is consistent with land use and development plans for the area, and the village supports it. The plant is expected to meet DNR/EPA air quality requirements. Impacts to surface waters and groundwater can be avoided. Detention ponds and drainage systems would be installed to control stormwater. The sewer connection is already on site. There would be no high capacity well. The upland site, where the plant would be built, has been in row crops for several years and would be willingly sold by the farm operator. Although there is no firm information on the natural gas connections, archeological issues would be handled through ANR and the FERC, and there do not appear to be irresolvable archeological issues at the plant site or along other connecting lines.

Existing municipal services, with the exception of some construction of new water main in the CTH H right-of-way, are adequate to handle the new facility. There would be no local adverse economic impacts, and there would be shared revenue benefits. Although there might be some congestion on CTH H during construction, there would be minimal impacts to roads or railroads from plant operation. The electric transmission line serving the plant could cross Jerome Creek or other small streams or ditches. The natural gas pipeline required could cross and affect numerous small streams and ditches as well as the Des Plaines River and the south branch of the Pike River.

With the proposed plume abatement technology, fogging and icing of the roads from the power plant plume, which would create a driving hazard, would likely occur only about three to four hours per year. With appropriate sound abatement measures, noise would reach only 50 dBA or less at the closest residences. No low frequency sound vibration is expected because of the nature of the air and steam pathways in a combined-cycle plant. Visually, the plant is smaller than the existing coal plant nearby, although it would appear larger from certain places along CTH H. However, it would fit in with the existing landscape character when viewed from CTH H with the knowledge that it is part of the village's business park and a neighbor of the existing coal plant. Visual design and landscaping would be done in consultation with the village.

Except for any concerns about the natural gas supply, which would be addressed during ANR's application to the FERC, the main impact to be expected at the Pleasant Prairie site would be the effects on the existing electric transmission system. This impact would be addressed partly through the connection to the Zion-Arcadian line to the south, and partly through an agreement with WEPCO to cover needed upgrades of other affected transmission facilities.

Sturtevant Site

There are no major environmental concerns at the Sturtevant site. The project site is a business park set aside for such use. The project is consistent with surrounding land use and area development plans, and the village supports it. Impacts to local air quality would be similar to those in Pleasant Prairie, and would be required to meet DNR/EPA air permitting standards. Impacts to surface waters and groundwater can be avoided, and the existing detention pond would be reconfigured. The sewer connection is already on site. There would be no high capacity well. The upland site, where the plant would be built, has already been graded as part of the business park development. Although there is no firm information on the natural gas connections, archeological issues would be handled through ANR and the FERC. There do not appear to be irresolvable archeological issues at the plant site or along other connecting lines.

Existing municipal services, with the exception of some new water facilities that would be paid for by Badger Gen, are adequate to handle the facility. There would be no local adverse economic impacts, and there would be shared revenue benefits. Although there might be some congestion during plant construction along West Road and CTH H and

their intersections with STH 20 and STH 11, there would be minimal impacts to roads or railroads during plant operation. The electric transmission line serving the plant could cross and affect numerous drainages as well as the Waxdale tributary to the Pike River. The natural gas pipeline required could cross numerous small streams and ditches as well as the Des Plaines River. The waterline built by the RWU would cross the Root River and the Pike River.

With the proposed plume abatement technology, fogging and icing of roads, which would create a driving hazard, would likely occur only about two hours over five years. With appropriate sound abatement measures, noise would reach only 50 dBA or less at the closest residence. No low frequency sound vibration is expected because of the nature of the air and steam pathways in a combined-cycle plant. Visually, it would be the largest building in the business park, but probably not out of scale with its surroundings. Most views of the plant would be from a distance.

Except for any concerns about the natural gas supply, which would be addressed during ANR's application to the FERC, the main impact to be expected at the Sturtevant site would be the effects on the existing electric transmission system. The reliability of the existing system if the plant is connected directly to the Racine Substation is a matter of disagreement between Badger Gen and WEPCO. The reliability would be better with a connection to the Zion-Arcadian line. However, this connection would require trenched underground 345 kV transmission lines in both Sturtevant and Pleasant Prairie.

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Background

Proposal

Badger Generating Company, LLC (Badger Gen) is proposing to build a new natural gas-fueled, combined-cycle power plant with about 1,050 megawatts (MW) of capacity in the village of Pleasant Prairie, Kenosha County, or the village of Sturtevant, Racine County.

Badger Gen is a Delaware limited-liability company and an affiliate of PG&E Generating Company (PG&E Gen), whose main office is in Bethesda, Maryland. Badger Gen and PG&E Gen are both wholly owned indirect subsidiaries of PG&E Corporation, which is also the parent company of Pacific Gas & Electric Company, the regulated California utility. Although it uses the PG&E name, PG&E Gen is a separate company from Pacific Gas and Electric Company and is not a public utility. Badger Gen is likewise not a public utility.

Badger Gen indicates that it has sought Wisconsin sites for a new plant for two main reasons. It identified a market for new power generation in the state, and it noted recent adjustments in the state's construction review process that have made Wisconsin more favorable to power plant developers. Badger Gen's proposal is in direct response to 1997 Wisconsin Act 204 (Act 204), the Electric Reliability Act, which established those conditions and legalized the development of wholesale merchant plants.

Badger Gen's objective for the proposed plant is to provide competitively priced, low-polluting electric supply and reliability benefits to eastern Wisconsin and the Midwest. Badger Gen would be qualified as an "Exempt Wholesale Generator" under the Federal Public Utility Holding Company Act and would sell electric power generated by the plant at market-based rates to utilities, power marketers, and other purchasers for resale.

The company has applied to the Public Service Commission of Wisconsin (Commission) for a Certificate of Public Convenience and Necessity (CPCN) under Wis. Stat. § 196.491(3) and Wis. Admin. Code ch. PSC 111, to construct and operate a large electric power generating facility and associated high-voltage electric transmission interconnection at one of two possible sites. A CPCN is required for any new power plant over 100 MW and for any new electric transmission line rated at least 100 kilovolts (kV), over one mile in length, and requiring any new right-of-way.

If approved, the Badger Gen plant would be the first electric generating facility built in Wisconsin as a true wholesale merchant plant. Its development is not dependent on any pre-existing power purchase arrangements with public utilities. A merchant plant is a power plant that may sell power at wholesale to utilities but does not provide retail electric service and is not owned by a public utility.

Construction Case Process -- General

Application for Commission Certification

Anyone proposing to build a power plant of 100 MW or more in Wisconsin must obtain approval from the Commission in the form of a CPCN before construction can begin. Although such a plant usually also requires air and water permitting from the Wisconsin Department of Natural Resources (DNR) before construction can begin, the Commission makes the final decision about whether or not a power plant is built and where it is sited. The Commission consists of three members, who are appointed by the Governor and confirmed by the Senate.

A CPCN is also required to construct any electric transmission line with a voltage of 100 kV or more, that is more than one mile long, and that would use new right-of-way.

The project developer must file a detailed CPCN construction application with the Commission. Under Act 204, once an application is deemed complete by the Commission, the Commission must complete its review process within six months. Court approval is needed to extend the review time beyond six months. If the Commission does not obtain a court extension or issue a CPCN within six months, the applicant's project is automatically approved as proposed.

DNR Authority

The developer of a proposed power plant must obtain several DNR permits, some delegated from the federal government as discussed below. The primary DNR approval needed before power plant construction may begin is the construction permit for a new source emitting air pollutants. DNR construction permits are general permits applicable to all facilities with similar impacts.

Other DNR permits might be required for various parts of a power plant project, depending on circumstances and the expected impacts.

Wisconsin Environmental Policy Act

Environmental Impact Statement

The Wisconsin Environmental Policy Act (WEPA), Wis. Stat. § 1.11, requires all state agencies to consider the environmental impacts of major actions that could significantly

affect the quality of the human environment. Actions on power plants designed to produce more than 20 MW require an environmental impact statement (EIS) under current Commission and DNR rules, Wis. Admin. Code §§ PSC 4.10 and NR 150.03. While the Commission is the lead agency, the EIS is prepared jointly by the two agencies. The EIS describes the project, discusses possible alternatives to the proposed action, and evaluates the project impacts on the natural and human environment.

The EIS process has several stages. First, a draft EIS is produced and circulated for comment. Then, the comments are considered in the production of a final EIS. Finally, a public hearing is required on the EIS.

The Commission must consider at least two sites for any proposal to build a power plant over 100 MW or a high voltage electric transmission line. Also, reasonable alternatives to the proposed action must be considered in the EIS under WEPA.

Public Participation in the EIS Process

Under Wis. Admin. Code § 4.30(2), the Commission must request any person it believes is interested in a proposed action to participate in ascertaining its scope. The Commission is required to distribute copies of the project application to local clerks and libraries, for inspection by the public. The Commission also generally notifies the public soon after receiving the application, partly in order to seek information that might help Commission staff prepare the EIS.

As part of its information-gathering process, and often to improve the applicant's proposal, the Commission asks the applicant to hold public information meetings in the project area early in the process. At these meetings, the public can learn more about the project and the applicant can learn more about local concerns and interests before filing its application with the Commission.

The purpose of the draft EIS and final EIS is to inform the Commissioners and the public of the potential effects of the proposed project. After the draft EIS is issued, there is a comment period of at least 45 days. After issuance of the final EIS, there is a 30-day period of review to allow individuals to read the final EIS and prepare for the public hearing. The Commission must give notice to the public and hold a public hearing in the project area. For power plants and transmission lines, this hearing normally coincides with the hearing on the CPCN, which also requires a 30-day notice to the public. The hearing is the opportunity for the public to speak directly to the Commissioners through the hearing record.

Process and Public Participation -- This Case

Process

Application Filed – PSC Docket 9340-CE-100

On December 28, 1999, Badger Gen filed a CPCN application for the power plant project and for a 345 kV transmission line that would connect the plant to the existing electric transmission system at either site. The power plant and power lines proposed in PSC docket 9340-CE-100 require CPCNs from the Commission. The power plant also requires several permits from the DNR and other agencies. There may be later certification necessary from the Commission for water supply facilities that might affect the project. The Commission deemed Badger Gen's application complete on January 27, 2000.

The Commission distributed copies of the application to local clerks and county libraries in the project area and issued a public notification to interested and affected persons on February 10, 2000, to explain the Commission's review process and to solicit comments and questions.

Draft EIS

In April 2000, the Commission issued a draft EIS on the project. The comment period for the draft EIS ended on May 30, 2000. The Commission received five letters of comment on the draft EIS. The letters are reproduced in Appendix B along with responses from Commission staff and DNR staff.

Remaining Commission Process for This Project

The remaining process at the Commission for the proposed project can be outlined as follows.

With the preparation of this final EIS, an official Notice of Hearing has been issued. The Commission will hold the hearing, set for July 27, 2000, on the final EIS and the CPCN applications. After the hearing is complete and transcripts of the hearing are received, the three Commissioners will make decisions about the project based on those hearing transcripts. The decision may be to approve, modify, or reject the proposed project. If the project is approved, the Commission will select the site for the plant and the route for the required transmission line(s).

After the Commission decisions are made, an order to the applicant will be prepared and issued. Under the law created by Act 204, since the Commission declared the CPCN application complete on January 27, 2000, the Commission's order must be issued by July 25, 2000, unless a time extension is obtained from Dane County Circuit Court. The Commission has petitioned the court for a time extension.

Eminent Domain (Condemnation)

Under Wis. Stat. § 32.03(5), an electric utility can acquire real estate or easements by condemnation for a power plant or power line needing a CPCN, but only after the Commission has issued the CPCN. Because Badger Gen is not a utility, it has no condemnation rights under Wisconsin law. It must acquire property and easements through negotiations with willing landowners. It does not have to wait until a CPCN is issued to begin negotiating purchase options and easements for the project. The company has already been working with local landowners at each site.

Badger Gen intends to build and own the transmission line, at least initially. It is possible that the Commission could order the Wisconsin Electric Power Company (WEPCO) to build the transmission line that would interconnect with its system. In that case, eminent domain law would apply. It is also possible that Badger Gen would eventually sell the line to WEPCO.

Public Participation

Previous Public Meetings

Prior to filing a CPCN application with the Commission, Badger Gen submitted permit applications to the villages of Sturtevant and Pleasant Prairie for approval. Some of those approvals required public hearings or decisions by local bodies in public meetings.

Also prior to filing, Badger Gen hosted four public information meetings near the two proposed power plant sites. Their direct-mail invitation to the first two meetings was sent to all landowners within one mile of the Pleasant Prairie Site and almost everyone in the village of Sturtevant, plus those within a half-mile of the Sturtevant site but west of the village. Their direct-mail invitation for the second two meetings was sent to all landowners within 300 feet of each originally proposed transmission line route. Attendance at all four meetings was sparse; a few dozen members of the public shared both favorable opinions and their concerns about the project.

Future Opportunities for Public Participation

Comments on the Draft EIS

There was a 45-day comment period on the draft EIS. When the draft EIS comment period ended, the Commission staff considered all the comments as it prepared a final EIS.

Public Hearing on the Final EIS and CPCN

Now that the final EIS is prepared, the Commission has issued a Notice of Hearing for a public hearing on the final EIS and the proposed project. The hearing is being held on July 27, 2000, with 1:30 p.m. and 7:00 p.m. sessions, in the Holiday Inn Express – Harborside, 5125 6th Avenue, Kenosha, Wisconsin.

At the public hearing, the applicant and the Commission staff will be presenting prepared testimony with exhibits. The main exhibit from Badger Gen will be the project application. The main exhibit from the staff will be the final EIS. The hearing will also be the Commission's opportunity to obtain direct testimony from the public on whether members are in favor, opposed, or interested in setting conditions on approval of the plant. Hearing sessions will be held in the project area.

The record of this hearing, including testimony, statements, and exhibits, will become the basis for the Commissioners' decisions.

The Commissioners' Discussion and Decisions

The Commissioners will make their decisions on the project at a meeting in the Commission offices in Madison that is open to public observation.

Everyone who attends the public hearings and signs appearance slips will receive a copy of the Commissioners' decisions by mail.

Public Access Through Other Agencies

An air permit is also part of the general project review and a subject of the EIS and the Commission's public hearing. The hearing for the air permit is generally combined with the CPCN hearing for the plant.

The DNR also may need to make permit-related decisions about process wastewater and stormwater management. Other decisions may effect Badger Gen's treatment of protected species, management of hazardous substances, and creeks and wetlands that could be affected by construction or operation. These decisions might not be made unless or until the plant is approved and the site is selected.

Other state level permits would be needed to build or operate the plant but are not required before the plant's construction can begin. Some permits are required before specific plant componets can be constructed and operated. State agency permits and approvals needed are listed in **Table 1.01.**

Federal Authority

For a proposed merchant plant, the Federal Energy Regulatory Commission (FERC) controls whether the plant can become a wholesale electricity generator and how its market rates might be determined.

The U.S. Environmental Protection Agency (EPA) delegated responsibility to the Wisconsin DNR to issue major source prevention of significant deterioration (PSD) and other air pollution permits. Other EPA requirements can also be involved, particularly if the proposed power plant site is in an area that exceeds standards for ground-level ozone levels.

Table 1.01 Permits needed to build proposed plant and electric transmission, natural gas, water, and sewer lines.

Federal Agencies	Permits and Approvals
U.S. Environmental Protection Agency	Air Quality-New Source Review (PSD) Non-attainment New Source Review (NSR) for VOCs New Source Performance Standards (NSPS) Acid Rain Program (40 CFR 72 and 75)
Federal Energy Regulatory Commission	Market-based rate approval under Section 205 of the Federal Power Act Exempt Wholesale Generator Status Transfer of Interconnection Facilities under Section 203 of the Federal Power Act, if necessary Interstate natural gas pipeline addition
Army Corps of Engineers	Wetland alteration for transmission or natural gas lines Navigable waters crossing by transmission or natural gas lines
Federal Aviation Administration	Notice of Proposed Construction or Alteration
State Agencies	**Permits/Approvals**
Public Service Commission	Certificate of Public Convenience & Necessity
Department of Natural Resources	Air Quality-New Source Review (PSD) Air Emissions Construction Permit Boiler Installation Notification Wisconsin Pollution Discharge Elimination System (WPDES) for plant site, and for stormwater discharge and hydrostatic testing of transmission and natural gas lines Threatened & Endangered Species Review for plant site and transmission and natural gas lines Hazardous waste/hazardous materials/fuel storage NR 103 Alternative Analysis for wetland alteration for transmission and natural gas lines Chapter 30 surface water diversion, navigable stream crossing for transmission and natural gas lines Shoreland Zoning Permit for navigable waters in coastal zone, for transmission, natural gas, and water lines Great Lakes basin water loss permits if applicable
Department of Agriculture, Trade, and Consumer Protection	Agricultural Impact Notification and Response, for transmission and natural gas lines on prime farmland
State Historical Society	National Historic Preservation Act 106 Compliance for sites and transmission, natural gas, and water lines
Department of Transportation	Access road construction Vehicle weight restrictions Road Crossing Permits for transmission and natural gas lines
Department of Commerce	Installation of fuel oil storage tanks Installation of combustion turbine and related equipment Construction of building/structures Installation of dust filtering/HVAC
Department of Health and Social Services	Construction of plumbing facilities

Municipal	Permits/Approvals
Villages of Pleasant Prairie and Sturtevant	Zoning/land use change for plant site Sanitary sewer connection for plant Water supply for plant Drainage plan for plant site Road/Public ROW crossing (excavation) for plant auxiliaries Heating/plumbing/buildings for plant Building permit for plant Occupancy permit for plant Construction for plant and natural gas line [why not transmission?] Stipulated Shoreland Permit for transmission and natural gas lines in navigable waters, coastal zone (could be from city of Kenosha or Racine)
County	**Permits/Approvals**
Kenosha and Racine Counties	Road Crossings for plant auxiliaries and transmission, and natural gas lines Road Opening Permit for transmission and natural gas lines Land use for plant site Drainage plan for plant site Zoning review for plant site: Agricultural preservation Flood plain Land disturbance/erosion Conditional use Sanitary/septic Road/Public ROW crossing (excavation) Surface water management

DNR wastewater discharge permits are also issued under delegated federal authority. Other federal agencies, such as the Fish and Wildlife Service or the Federal Aviation Administration, may be involved as well, depending on the site or route. Permits for altering navigable water issued under the authority of Wis. Stat. ch. 30 are coordinated with the U.S. Army Corps of Engineers permits under Section 404 of the Federal Clean Water Act.

National Historic Preservation Act Compliance

Under federal law (Section 106 of the National Historic Preservation Act), the State Historical Society of Wisconsin (SHSW) must be consulted by each of the federal agencies that have an interest in this project. These agencies must also contact any Native American peoples that may have an interest in the area affected by the project and any other individuals that may be affected by the loss or protection of historical, archeological, or traditional cultural properties as part of the project agency actions.

Section 106 covers all facets of this project, including the plant sites, the electric transmission corridors, the natural gas pipeline corridors, and any water pipeline corridors that are required solely because they are needed by the proposed plant. Discussions of Section 106 review and findings are discussed in later chapters of this final EIS under the heading "Historical and Archeological Sites." Although the results of any negotiations or

agreement under Section 106 can be incorporated into the final EIS, it is possible that they would occur during federal agency processes if the project receives Commission approval. If no historic properties are potentially affected, the Section 106 process might be completed before the CPCN is issued.

Contact with Local Governments

The villages of Pleasant Prairie and Sturtevant have both been notified about the proposed project and have acted on zoning and land use issues. They are addressing local sewer and water issues as well as building permits and local construction and aesthetic concerns. Many of their approvals could involve public hearing opportunities. Required local government considerations are listed in **Table 1.01**.

Required Permits

Table 1.01 shows permits that may be needed to build the proposed plant and its associated electric transmission, natural gas, water, and sewer lines. Additional permits may be required from agencies for the electric transmission or natural gas lines, depending on circumstances and routes. According to Badger Gen, these permits could include the following:

- Coordination regarding protected species with the U.S. Fish and Wildlife Service.
- Groundwater withdrawal permit from the DNR if well point dewatering is needed because of the construction technique selected.
- Neighborhood plan review from each town where the line would cross a roadway.
- Local permits for construction from the town, village, or city.
- Local zoning permits or conditional use permits from the town, village, or city.

2

Project Description and Overview

Generating Facilities

Description of the Generating Facilities

Type of Facilities

Badger Gen proposes to construct a gas-fired, combined-cycle power plant capable of being operated in either base load or intermediate load mode. Actual operation would depend on market conditions and the market price for natural gas. The assumed capacity factors are in the range of 40-90 percent. The combined-cycle plant offers a large efficiency advantage over a conventional simple-cycle plant. The applicant anticipates that the plant will have a 40-year life.

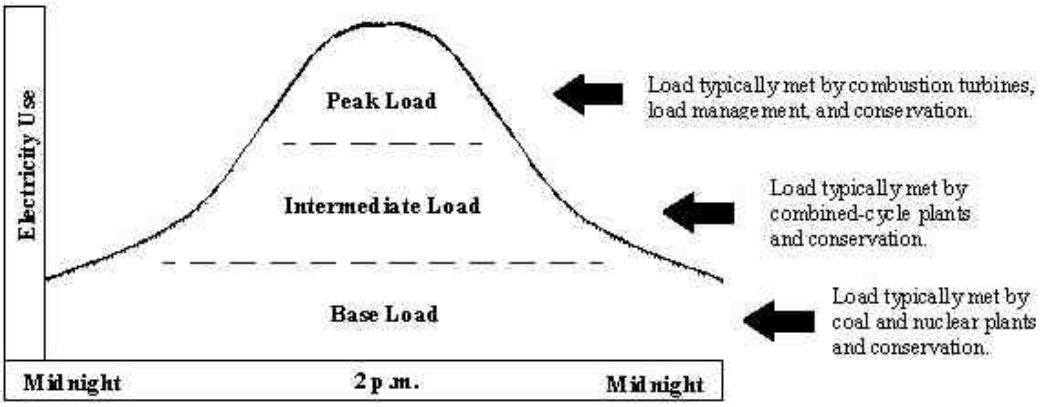
The "load curve" in **Figure 2.01** shows the total amount of electricity that electric customers demand at any given time of day. The kinds of power plants that meet the demand illustrated in the "load curve" are known as base load plants, intermediate plants, and peaking plants.

Base load plants provide a base level of electricity to the system and are typically large. Historically, nuclear or fossil fuels have powered base load plants. Base load plants tend to be operated continuously except when down for scheduled maintenance or an unplanned (forced) outage. They have a relatively high "capacity factor," typically in the range of 60 percent or greater.[1] The capacity factor is the ratio of the amount of power actually produced in a given period to that which could have been produced if the plant operated at 100 percent power for 100 percent of the time. Lower cost of fuel and higher capacity factor characteristics of base load plants generally result in a low unit cost of power. They are cheaper to run and, as such, are typically run more during any given day than intermediate and peaking plants.

Intermediate plants are typically either older, less efficient plants or newer plants constructed specifically for cyclic operation. They are normally operated only during

[1] Powerplant Technology; M.M. El-Wakil; McGraw Hill

Figure 2.01 Typical daily electric load curve, with typical plants that service each portion of a day's load



times of elevated load demand and therefore have a lower capacity factor than base load plants, typically in the 25 to 50 percent range. They are less expensive to build than base load plants.

Peaking plants are designed to provide the additional power needed during peak system demand periods, such as those caused by high air-conditioning loads during summer months. The capacity factor of peaking plants is fairly low, typically less than 15 percent. These plants are more economical to build than base load or intermediate load plants but usually more expensive to run and operate.

Size of Units and Dimensions of Plant

The footprint of the proposed Badger Gen facility is less than half of a coal facility with comparable generation capacity. Two primary reasons are:

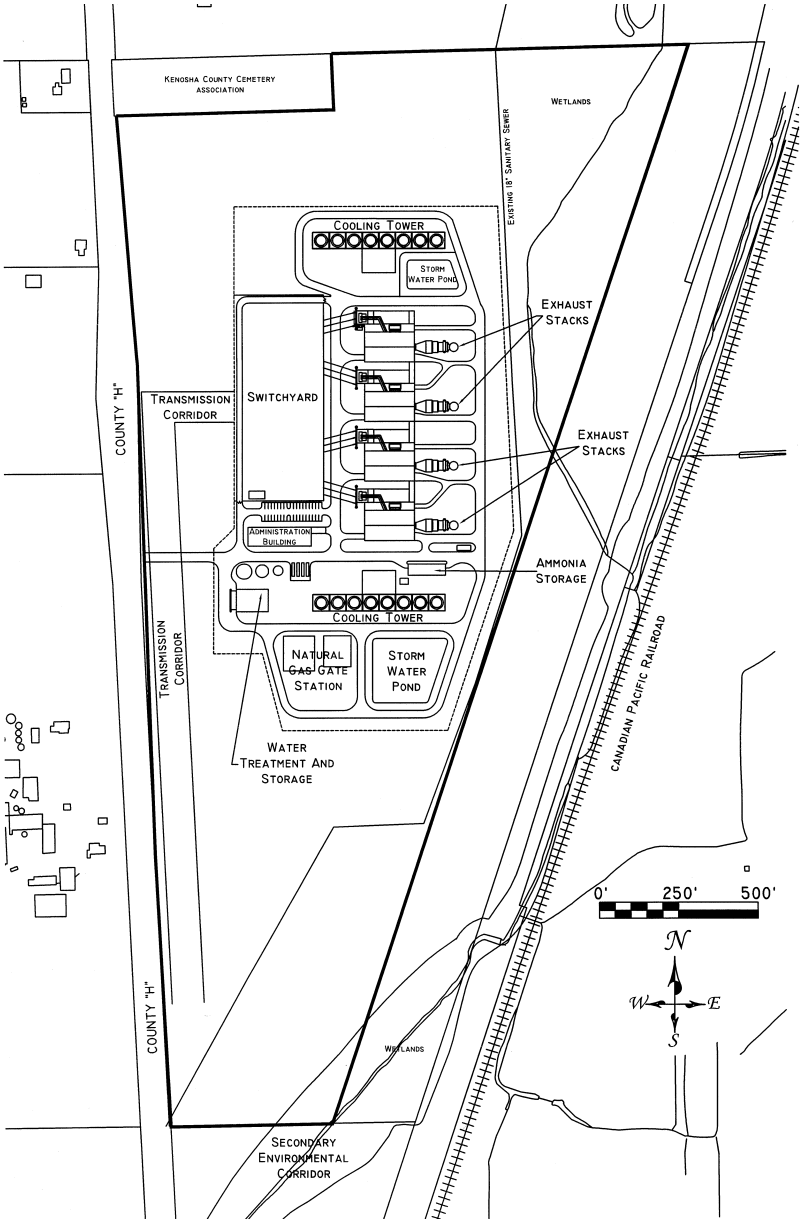
- Storage of the natural gas fuel is not necessary while a coal plant must have a coal pile nearby.
- A heat recovery steam generator (HRSG) requires much less area than a conventional boiler.

Comparing the size of Badger Gen to the existing Pleasant Prairie Power Plant in **Figure 2.02** helps one visualize this size difference better. The proposed combined-cycle plant would be located on the northern two-thirds of the outlined site. **Figure 2.03** and **Figure 2.04** show the preliminary layout for the plant in the outlined areas.

Figure 2.02 Visual comparison (bird's-eye view) of the proposed plant's footprint with the WEPCO Pleasant Prairie coal plant

The plant is configured with four units, each with a combustion turbine, generator, HRSG, and a high and intermediate/low pressure steam turbine. The combustion turbines would be directly connected to one end of the generator while the steam turbines would be connected to the opposite end of the generator through a synchronous self-shifting clutch. The steam turbine would be a double casing design. An intermediate/ low pressure turbine would be connected to the generator through a self-shifting clutch and would rotate at 3,600 revolutions per minute (RPM). A high pressure turbine would be connected to the intermediate/low pressure turbine through a gear reducer and would rotate at approximately 8,950 RPM.

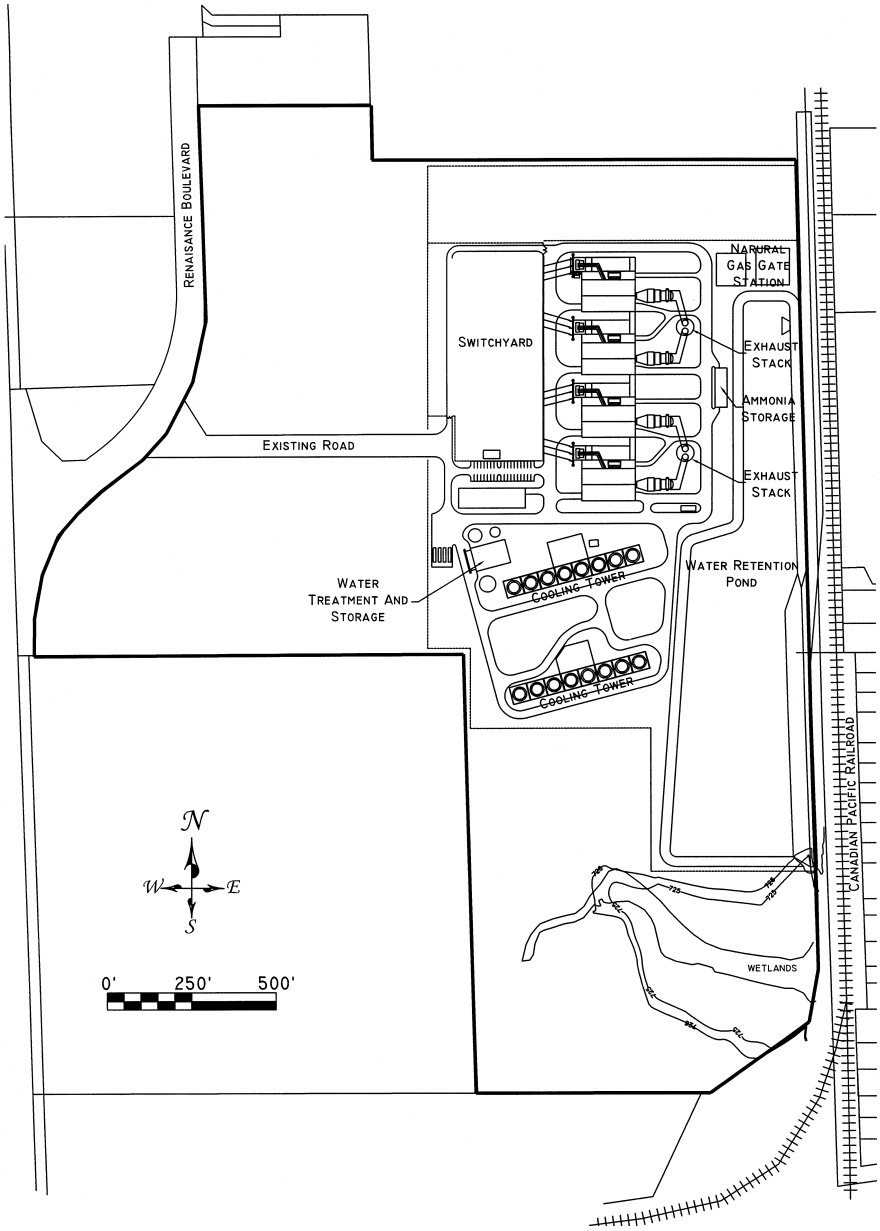
Figure 2.03 Expected layout for the proposed power plant at the Pleasant Prairie Site



Fuel to be Used

Natural gas from the supply market would be used to fuel the Badger Gen plant. No alternate supply capabilities are proposed. The four units are expected to have a maximum fuel flow of approximately 170,000 dekatherms per day. This equates to a usage of between 24,820,000 and 55,845,000 dekatherms per year using capacity factors between 40 and 90 percent. By comparison, an average residential customer uses approximately 100 dekatherms per year.

Figure 2.04 Expected layout for the proposed power plant at the Sturtevant Site



Generic Description of Combined-cycle Technology

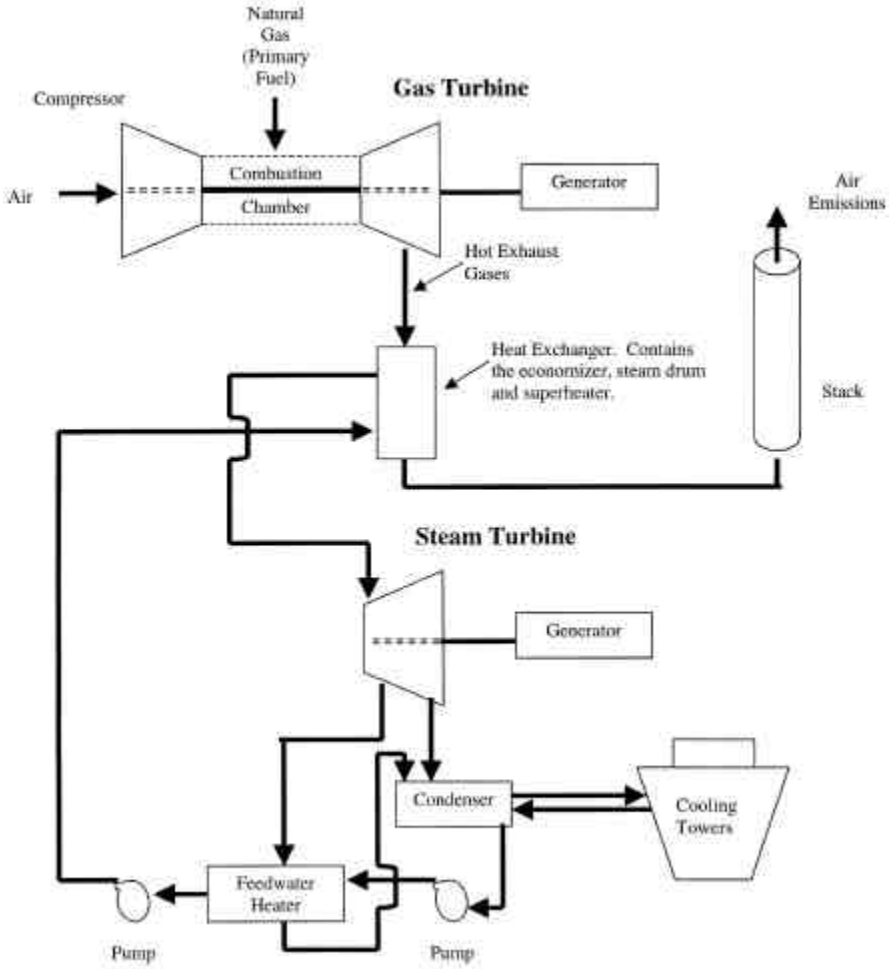
In a combined-cycle power plant, both gas and steam turbines are used to supply power to the grid. The use of the steam cycle increases the efficiency of the power plant by generating electricity from waste heat that would have otherwise been discharged into the environment from the combustion turbine.

The schematic in **Figure 2.05** illustrates the basic processes and equipment in a combined-cycle power plant.

A combustion turbine typically has three major components: a compressor, a combustion chamber and a turbine. Air is drawn into the compressor, compressed and discharged to the combustion chamber. The compressed air is heated in the combustion chamber and sent to the turbine where the gas expands over the turbine blades, causing them to rotate. The rotating blades turn a shaft connected to a generator that produces electricity.

In a combined-cycle generator, the hot air exiting the combustion turbine is routed to a HRSG, that extracts the heat used in the steam cycle. The waste heat of the combustion turbine can be used in the steam cycle because the gas cycle operates at temperatures in the range of 2,000 to 3,000°F, while the steam cycle

Figure 2.05 Basic processes and equipment in a natural gas-fired combined-cycle power plant



operates at temperatures in the range of 1,000 to 1,200°F. The HRSG supplies steam to the high and low-pressure steam turbines for additional work, and waste heat is removed from the steam in the condenser after it leaves the low-pressure steam turbine.

The heat removed from the steam passing through the condenser is typically dissipated using cooling towers, man-made cooling ponds or naturally occurring bodies of water. The heat emitted from the cooling towers is expected to be one-fourth to one-third of the heat emitted from the WEPCO Pleasant Prairie Power Plant, which has a similar megawatt capacity to the plant that is proposed.

Specific Description of the Proposed Plant

The proposed Badger Gen plant would consist of four individual units for a total combined-cycle capacity of approximately 1,050 MW. Each of the four units would be located in a separate building and would be capable of operating independently of the other units. They would, however, share common fuel and water facilities. There would be two cranes per building, one with a 20-ton capacity and one with a 40-ton capacity.

Each unit would be comprised of a generator direct-coupled to a combustion turbine, steam turbines attached to the generator via a clutch, and a HRSG. A short description of each item follows.

Combustion Turbine

The applicant states it anticipates installing ABB GT 24 combustion turbines (GT 24), or their equivalent, at the proposed power plant.

The ABB starting system is capable of bringing the GT 24 up to synchronization in as little as 35 minutes. The entire drive train, including the steam turbine, can be brought up to speed within three hours. The GT 24 has an operating speed of 3,600 revolutions per minute. The GT 24 ignites and expands the compressed air entering the unit. Two stages of combustion allow the GT24 to achieve the desired level of efficiency at lower combustion temperatures, to aid in reducing NO_x and other air emissions.

The combustion turbine exhaust temperature is approximately 1,130°F. Each combustion turbine is rated at 165 MW. A CO_2 fire protection system for the combustion turbine is part of the system supplied by ABB.

Steam Turbines

Both low pressure and high-pressure steam turbines would be provided. A gearbox would connect these turbines. After the combustion turbine is brought up to speed, sufficient steam would be available from the HRSG to connect to the generator via a synchronous self-shifting clutch. Experience with this clutch is limited in the USA.

Heat Recovery Steam Generator (HRSG)

The HRSG would be used to remove heat from the combustion turbine exhaust and transform water into steam for use in the steam cycle.

Generally, as shown in **Figure 2.05**, the steam cycle utilizes six major components: the steam drum (or steam generator) fed from tubes in the turbine exhaust passage, an economizer, the superheater, the steam turbine, a condenser and the feedwater heater. The source of heat for the economizer, superheater and steam drum is the exhaust gas of the combustion turbine. The source of heat for the feedwater heater is steam bled off of the high-pressure portion of the steam turbine. Water from the condenser is pumped to the feedwater heater and then to the economizer. Heat is added to the water by each of these in order for the water to be at the correct inlet temperature for the steam drum. In the steam drum the water is converted to steam. From the steam drum, the steam goes to the superheater. In the superheater, additional energy, in the form of heat, is added to the steam. The steam exiting the superheater is sent to the high-pressure steam turbine and then to the low-pressure steam turbine. The steam exits the low-pressure steam turbine to the condenser. The anticipated design of the Badger Gen facility would not use a feedwater heater or steam turbine extraction equipment. The applicant states that steam jet air ejectors would be used to evacuate air from the condensor and heat the water being pumped to the econmizer.

Cooling Towers

Steam exiting a steam turbine is condensed into liquid form prior to being pumped back to the HRSG. The steam is turned to liquid through the removal of heat by the condenser. The applicant states that heat removed by the condenser would be released into the environment through the use of cooling towers.

A conventional cooling tower uses "wet" evaporative cooling to dissipate the heat. (See **Figure 2.06**.) In wet cooling, the water exiting the condenser is pumped to the top of the tower and then cascades to the bottom of the tower through packing media. Air is drawn from outside the tower through the packing media, where heat and moisture are transferred to it from the cascading water. The moist, warm air leaving the packing media exits out the top of the tower.

In **Figure 2.06**, the air exiting the top of the tower is typically invisible during warm weather. In colder weather the air exiting the cooling tower can become a visible plume if the ambient air temperature causes the air leaving the tower to cool below its dew point. The plume persists until the air exiting the tower sufficiently mixes with the cooler, dryer air surrounding the tower. If the plume returns to ground level prior to dissipating, it can cause problems such as localized fogging or icing of downwind structures and roadways.

To address the potential for localized fogging and icing, the applicant has stated that it intends to install a combination wet/dry-cooling tower. (**Refer to Figure 2.07).** In the wet/dry tower intended for use, the water exiting the condenser is pumped to the top of the tower where it flows through sections of finned tubes. The air being drawn over the finned tube sections removes heat from the water but does not gain moisture content. Upon leaving the dry portion of the tower, the water is sent to the wet section of the tower. This portion of the tower works in the same manner as the wet tower previously described. The high moisture air leaving the wet section of the tower is mixed with the

air used to cool the dry section prior to exiting the tower. Lower-moisture air exits the wet/dry tower and typically does not result in a persistent plume. This reduces the occurrence of localized fogging and icing. The localized fogging and icing expected to occur due to plant operations is described in the sections on fogging and icing in Chapters 4 and 5.

Figure 2.06 Basic process in a conventional cooling tower with wet evaporative cooling

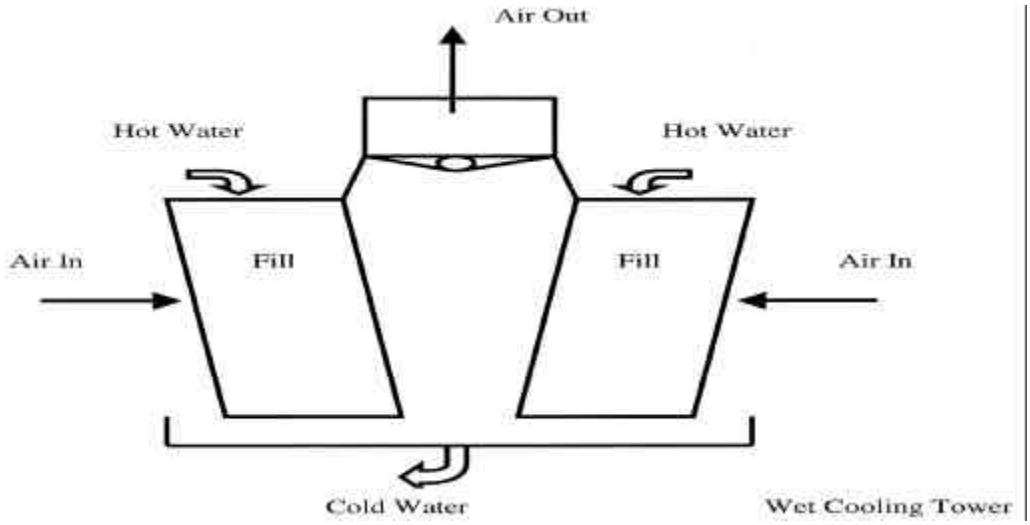
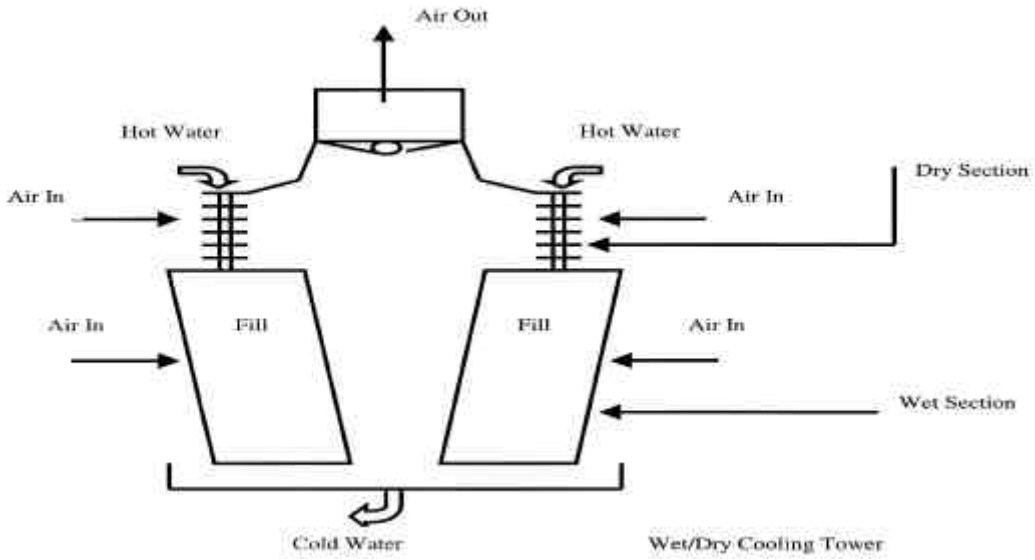


Figure 2.07 Basic processes in the proposed cooling tower, with wet/dry cooling



Generators

The generators would be connected to the main power transformers. Synchronization speed would be 3,600 RPM. Each generator would be totally enclosed and air-cooled. Air-to-water heat exchangers in the base of the generator would transfer the heat to the water where it would then be cooled in a separate circuit. This style of generator typically has high reliability. The nameplate rating of the generator is expected to be 340 megavolt-amperes (MVA).

Main Power Transformer

A separate main power transformer for each generator would be provided. These main power transformers would be connected into the switchyard as shown in **Figure 2.03** or **Figure 2.04.** Efficiencies of 99 percent for transformers of this type are common. The voltage would be stepped up from 21 kV to 345 kV.

Operating Characteristics of the Plant

Badger Gen has indicated that the full-load heat input for each unit would be 1,782 million BTU per hour (MMBTU/hr).

Combustion turbines have historically been designed for full capacity to meet peaking load requirements. Since these units are expected to operate as base load plants at variable loads, improving efficiency at reduced load operation takes priority. The turbine efficiency would be improved by installing variable inlet guide vanes to reduce the amount of mass flow through the combustion turbine at reduced loads.

Efficiency and Heat Balance

The overall efficiency of Badger Gen is expected to be 52-58 percent. In comparison, the existing base-load coal plants in Wisconsin typically have an overall efficiency of approximately 30 percent.

The heat balance for the plant is shown schematically in **Figure 2.08**.

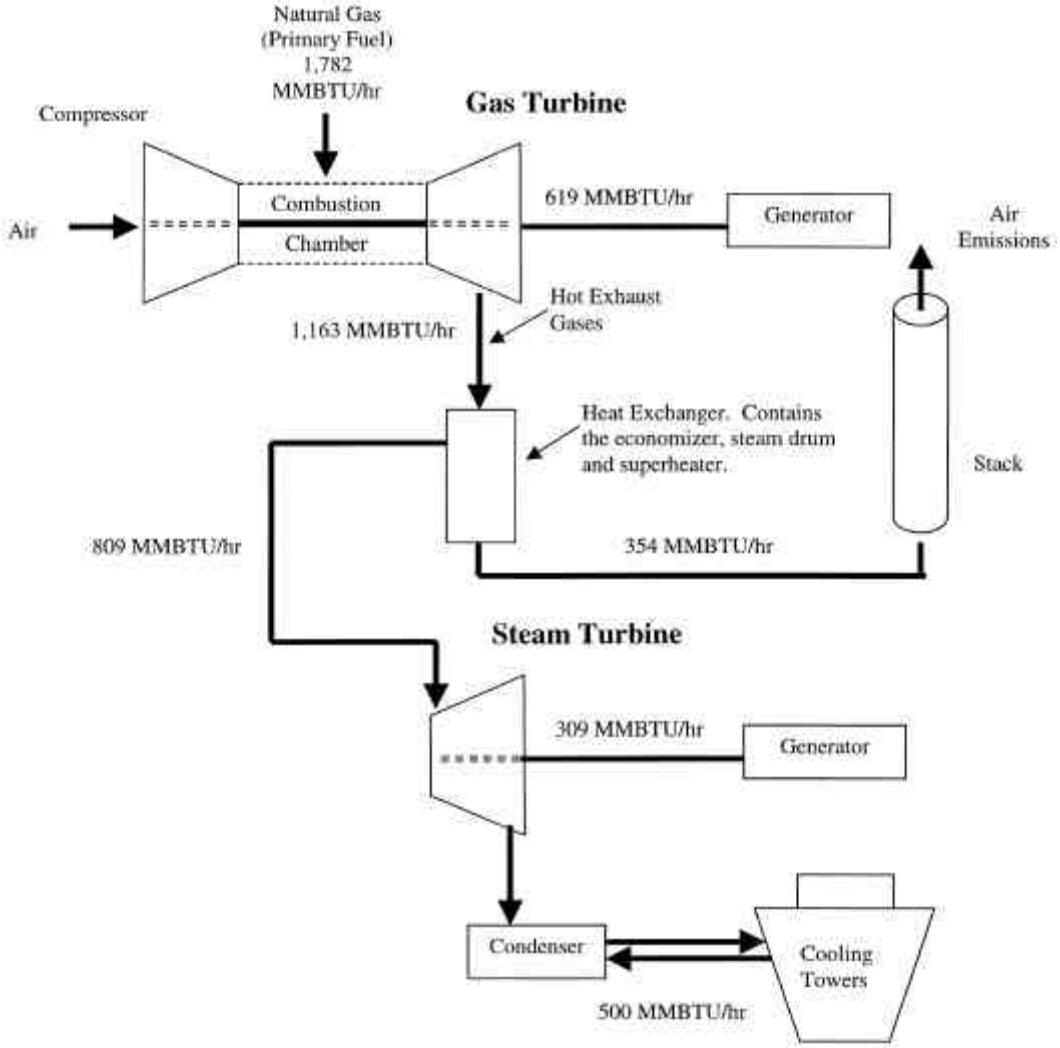
The combustion turbine would use approximately 35-38 percent of the energy from the natural gas fuel to produce electricity. The remaining energy would become heat exhausted to the HRSG. The HRSG would transfer approximately 45 percent of the energy from the combustion turbine into steam, similar to that of a conventional plant. About 20 percent of the total energy would be exhausted up the stack from the HRSG.

Steam from the HRSG would drive a turbine to convert an additional 17 percent of the total energy input into electricity. This would boost the overall plant efficiency to approximately 52-58 percent. The remaining 25-30 percent of total heat input would be emitted to the atmosphere through the cooling towers.

At standard ambient conditions of 59°F and 60 percent relative humidity, the GT 24 would have an expected heat rate of approximately 9,075 BTU/kWh without the HRSG.

Combined-cycle configuration for each unit would result in efficiencies of up to 58 percent and a heat rate of approximately 6,500 BTU/kWh.

Figure 2.08 Basic heat balance for the proposed combined-cycle power plant



Location Alternatives

Badger Gen has proposed that the power plant be located on one of two sites. One site is a farm parcel to the west and across the railway from the existing WEPCO Pleasant Prairie Power Plant along CTH H, in the village of Pleasant Prairie. The other site is the southern portion of the Renaissance Business Park at the western end of the village of

Sturtevant, south of STH 20 and north of STH 11. The two sites will be discussed at length later in this document.

Originally, Badger Gen identified eight potential power plant sites. The following sections discuss the criteria and the reasoning used by Badger Gen to identify the eight sites, screen out six, and select two sites for proposal.

Site Selection Criteria

Badger Gen's evaluation process included thirteen criteria:

- Proximity to a natural gas supply
- Proximity to the existing electric transmission system
- Site size and buffering potential
- Site zoning designation
- Transportation infrastructure
- Availability of water
- Topography
- Wetlands and water bodies
- Potential site contamination
- Air emission dispersion environment
- Proximity to sensitive receptors
- Capacity for water disposal
- Regulatory procedures in the relevant jurisdiction

Badger Gen conducted a screening process as a private business activity, without Commission participation. The six sites considered by Badger Gen but not proposed to the Commission are discussed below, along with Badger Gen's reasons for their rejection.

Racine Landfill Site

This site is located at the western-most end of a large landfill, within the city of Racine next to the existing WEPCO Racine Substation. Payne and Dolan, Inc. own most of the site. The ANR Racine lateral natural gas pipeline is about three miles to the south of this site. Transportation to the site is limited to a small, city street. Badger Gen rejected this site because Payne and Dolan, Inc. would need to relocate its asphalt plant located on the property. Finding an alternative site for the asphalt plant was a condition that could not be met.

Mount Pleasant Site

This 80-acre site is located in the town of Mount Pleasant, immediately to the south of the S.C. Johnson Waxdale facility. It is approximately one-quarter mile to the west of the landfill site described above. This site was rejected because it is close to a residential neighborhood, and would be visible from STH 50.

Town of Somers Site

This site is located in the town of Somers in northwest Kenosha County and is currently agricultural. The town of Somers had planned to amend its land-use plan to designate this parcel and the surrounding area as a future industrial park. The site apparently met the applicant's thirteen screening criteria. However, a non-binding referendum by the town in April 1999 indicated to Badger Gen that public support for a power plant on this parcel was lacking, and the company dropped the site from further consideration.

County ML Site

This 40-acre parcel located on the north side of CTH ML in the village of Pleasant Prairie was rejected because its size and site configuration were inadequate for the facility being planned.

Christianson Site

This 100-acre parcel located on the south side of CTH ML in the village of Pleasant Prairie, and immediately southwest of the CTH ML site, was rejected because the presence of extensive wetlands on the southern half of the site made development difficult.

Marshalling Yard Site

After rejecting the five sites above, Badger Gen indicated that it had three "finalist" sites: the Renaissance Industrial Park site near Sturtevant (called the Sturtevant site in this document), the Kevek site in Pleasant Prairie (called the Pleasant Prairie site in this document), and the 100-acre site described below.

The third site is adjacent to a large flour mill on the site of the former American Motors marshalling yard in the city of Kenosha. This site is crossed by a WEPCO 345 kV electric transmission line, is appropriately zoned, and has access to city water and sewer. Natural gas service is on the site, but would have to be upgraded to serve a power plant. The site is relatively well buffered from sensitive receptors, although there is limited residential development one-half mile to the west and immediately to the southwest that would potentially be affected.

However, the Pike River crosses the site, and much of the developable land on the site is designated as floodplain. Although Badger Gen's preliminary analyses indicated that adequate compensatory storage could be developed to allow moving the floodplain, it found that the process of obtaining floodplain resignation through the Federal Emergency Management Agency (FEMA) could take as long as two years. Badger Gen has indicated that this was not acceptable given the planned timing for this project, and it rejected the site for this reason.

The Proposed Sites as Valid Alternatives

Badger Gen's choices of the Pleasant Prairie and Sturtevant sites, based on its screening and selection criteria, are reasonable.

However, as of the date of this document, Badger Gen has chosen to file an air permit application with the DNR only for the Pleasant Prairie site. If the Commission were to approve the Sturtevant site, Badger Gen would need to submit an air permit application for that site.

Expected Hours of Operation and Expected Life of the Plant

See the section at the beginning of this chapter for an understanding of how the unit would be operated.

The combustion turbine vendor recommends that the GT 24 combustion turbine be inspected at intervals of 6,000 equivalent operation hours (EOH). An EOH is equal to hours of operation, adjusted for the number of starts and the number of sudden load changes. The duration of the 6,000; 12,000; and 18,000 EOH inspection outages would be expected to be two or three days. The duration of the 24,000 EOH inspections would be expected to be approximately twenty-one days. These outage durations would not include any cool-down period. Also, any required repair or replacement might add to the outage duration.

Outages for the generator and steam turbines would be less frequent and typically occur every five to ten years, depending on the capacity factor of the unit and unit specifics. Badger Gen would coordinate a combustion turbine outage with a steam turbine or generator outage for economic reasons.

Natural Gas Source and Availability

Badger Gen would obtain its natural gas from the competitive gas supply market. Natural gas is transported into the area on interstate pipeline systems and is distributed in the area by WEPCO, the local gas distribution utility. However, the quantity of natural gas needed for the power plant would exceed WEPCO's distribution abilities.

ANR Pipeline Company (ANR) has agreed to provide the transportation of natural gas for the project. In order to ensure capacity to guarantee delivery of enough natural gas to fuel the plant, ANR would build, own, and operate a new, 20-inch natural gas pipeline and compressor station. There would be no natural gas storage at the power plant site. Badger Gen and ANR expect the natural gas supply to be available to meet the plant's needs. The gas transported in the new line would be dedicated to the Badger Gen plant. It would be unavailable to other users. Natural gas for other users in the area is currently available through WEPCO.

ANR's transmission supply connections would be at the Joliet Hub in Illinois. At the Joliet Hub, interconnections can be made with Northern Border and Alliance to draw from Canadian supply areas and with ANR, Natural Gas Pipeline of America, and Midwestern to draw from the Gulf Coast and Mid-Continent supply areas.

Potential Impact on Competition

Project Purpose

Badger Gen intends to sell its output to the wholesale electricity market. It would sell at market-based rates to utilities, power marketers, and other purchasers for resale in Wisconsin and the Midwest. Badger Gen expects to operate in an intermediate-to-baseload mode, depending on the regional power market's demand for energy and on transmission system conditions.

Badger Gen also indicates that, by adding a substantial amount of new generating capacity and a new market participant, the project would increase the competitiveness of the midwestern wholesale power market. It expects that the plant's output would help alleviate transmission constraints in the region. Wisconsin would benefit even if Badger Gen were to sell power to the south, as this would tend to increase Wisconsin's ability to use the transmission system to import power from Illinois.

Entry of Badger Gen into the WUMS Wholesale Market

Wis. Stat. § 196.491(3)(d)(7) requires the Commission, before issuing a CPCN, to make the finding that the proposed wholesale merchant power plant facility "will not have a material adverse impact on competition in the relevant wholesale electric service market." The analysis that follows addresses this subject.

Presently, due to transmission system constraints and congestion, the relevant wholesale market from an anti-trust perspective is the geographic region of the Wisconsin Upper Michigan System (WUMS). During the 1997 FERC merger docket of Alliant Energy Corporation, the FERC considered the WUMS region to be an "island system," meaning that the relevant operational wholesale market is limited to the WUMS area.[2] When a market becomes so limited, utilities or other participants with a large market share or concentration can obtain leverage over the prices being paid in that market. In essence, a large electric generating firm in a narrow competitive energy market can influence prices to its advantage and everyone else's detriment. In economics, such leverage is referred to as horizontal market power and is policed by federal and state anti-trust law.

Table 2.01 depicts the expected competitive wholesale marketplace in WUMS for the year 2002. **Table 2.01** uses expected uncommitted capacity data. Uncommitted capacity simply refers to the amount of electrical generation that is neither committed in long-term contract nor used to serve native load responsibilities. It is the FERC-approved measure used to gauge potential anti-competitive effects in short-term wholesale power and energy markets having duration less than three years. Badger Gen's 1,050 MW is incorporated in the table with the assumption that only 33 percent of the project's capacity will be uncommitted, with the rest being sold under long-term contract. Data for the

[2] Transmission-related facts supporting this WUMS market conclusion have not changed since 1997.

uncommitted capacity for the state's public utilities in WUMS comes from a recent FERC filing by Madison Gas and Electric Company, seeking authority for market-based tariffs.[3]

Table 2.01 Wholesale market competition

Wholesale Market Competition **Uncommitted Capacity Test in WUMS for Summer Peak**			
	2002	Market	
Before Badger Gen	MW	Share	HHI
WEC	104	17.7%	314
Alliant	109	18.6%	345
WPSR	224	38.2%	1456
MG&E	0	0.0%	0
Imports	150	25.6%	0
Munis	0	0.0%	0
	587	100.0%	2115
With Badger Gen			
WEC	104	11.1%	123
Alliant	109	11.6%	135
WPSR	224	23.9%	572
Badger Gen	350	37.4%	1395
MG&E	0	0.0%	0
Imports	150	16.0%	0
Munis	0	0.0%	0
	937	100.0%	2225

The following assumptions are used for **Table 2.01**. First, the analysis assumes that either an Independent System Operator (ISO) or a statewide transmission company (Transco) is in place by 2002, eliminating the potential for any vertical market power abuse. This appears likely given recent Midwest ISO developments in the state. Second, the analysis only examines summer peak, or the period of most congestion. A more sophisticated analysis would examine other periods and hours as well, but this is not needed for the "new entrant" reasons discussed below. Total import capability is also limited to 150 MW due to transmission constraints.

Table 2.01 provides two measures of market concentration. The first is the conventional market share calculation; the other is the Herfindahl-Hirschman Index, (HHI).[4] The HHI

[3] Madison Gas and Electric Company Market Power Analysis, Henwood Energy Services, Inc., Sacramento, November 2, 1999.

statistic is sanctioned by federal anti-trust law to measure potential horizontal market power effects.[5] The HHI threshold at which markets are considered under federal anti-trust law to be highly concentrated begins at 1,800. At the 2,115 to 2,225 levels indicated in Table 2.1, the markets portrayed in Table 2.01 would ordinarily be considered highly concentrated with a high likelihood of significant adverse competitive consequences. However, this is not the case here because Badger Gen is a new entrant to the WUMS market, not an incumbent firm planning a merger or additional capacity. In economic theory, new entrants can discipline the potential for the exercise of horizontal market power. Under the federal anti-trust guidelines, the ease of entry is a specific mechanism that can make even highly concentrated markets conform to the normal price behavior found in typical competitive markets.[6] In summary, even though WUMS is a highly concentrated wholesale market, the fact that Badger Gen would be a new entrant means that the Badger Gen facility is unlikely to adversely impact competition in WUMS. In fact, the Badger Gen facility would probably improve the competitive market.

Auxiliary Facilities

Fuel Storage

It is anticipated that natural gas will be the only fuel used to generate electricity at the power plant. The natural gas would be obtained on a competitive basis from the gas supply market. After metering, the natural gas would flow through a moisture separator and fine filter to remove any particles or dust. The gas would be preheated prior to entering the combustion turbine. Preheating the gas improves the efficiency of the turbine. There would not be any large back-up diesel oil storage tanks on site, although approximately five smaller diesel oil storage tanks would be on site. Four of these tanks would be located with four small diesel electric generators. The tanks would be skid mounted and hold approximately 500 gallons. The diesel electric generators would operate in the event of a loss of station power and would be used to produce the electricity required to ensure a safe shutdown of the combustion turbines. The fifth tank would be located with the diesel-powered fire pump. This tank will also hold approximately 500 gallons.

The only other tanks that would be housed on site would be tanks for aqueous ammonia, sodium hydroxide and sulfuric acid. (See **Figures 2.03** and **2.04**.) The applicant states the aqueous ammonia would be stored in four 14,000-gallon tanks. The aqueous

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[4] The HHI value is calculated by summing the squares of market share. For instance (20*20) + (30*30) + (50*50) = 3800.

[5] 1992 Horizontal Merger Guidelines, U.S. Department of Justice and Federal Trade Commission, as revised April 8, 1997.

[6] Ibid. See Section 3.0 Entry Analysis.

ammonia is a reagent for the selective catalytic reduction process used to reduce NO_x emissions from the power plant. There would be 10,000 gallons of sodium hydroxide and 5,000 gallons of sulfuric acid stored on-site. These chemicals would be used in the treatment process to produce demineralized water. For further information on these chemicals, please see the section on hazardous materials later in this chapter.

Steam Sale Issues

The applicant states that there are no steam hosts for the plant anticipated at this time. If the applicant should reconsider this position in the future, based on the current proximity of large commercial and industrial concerns in the area of the two proposed plant sites it appears the opportunity for steam sales would be greater at the Sturtevant site than at the Pleasant Prairie site.

Water Supply, Storage and Treatment

For both sites, the applicant states that the water use at the proposed facility would be, on average, approximately 6.3 million gallons per day (MGD), with an estimated maximum usage of approximately 7.0 MGD. This water would be used for evaporative cooling, fire protection and domestic purposes such as showers, sinks, toilets and drinking fountains.

Water entering the facility would be stored in a large tank capable of holding approximately one million gallons. (See **Figures 2.03** and **2.04**.) Water would be drawn from this tank and pumped to an on-site treatment facility where it would undergo demineralization. The bottom portion of the tank would store water that would be dedicated to fire protection. The tank's supply tap for the on-site treatment facility would be set above the level dedicated to fire protection. The on-site water treatment facility would produce high quality demineralized water that would be stored in a second one million-gallon tank. The demineralized water would be used for steam cycle make-up, power augmentation and various purposes during plant start-up.

At both the Pleasant Prairie and Sturtevant sites water for domestic uses, such as drinking fountains, showers, toilets and sinks would be obtained directly from the municipal supply.

Water Discharge

Wastewater

Sanitary wastewater from the plant control building and employee locker room would be discharged, without pretreatment, directly into the municipal sanitary sewer system.

Operational wastewater would also be discharged to the municipal sewer system. Operational wastewater may consist of any combination of boiler makeup water blowdown, demineralizer wastewater, cooling tower blowdown or floor drains. Prior to

entering the municipal sewer system, demineralizer wastewater would be adjusted for pH in a neutralization tank in order to meet municipal discharge requirements. Municipal sewer operations in Wisconsin typically require the pH of wastewater discharge to be no lower than 5.0 and no higher than 10.0. Any wastewater that could potentially contain small quantities of oil would be treated in an oil/water separator. Once separated, the clean effluent would be discharged into the municipal sewer system. It is expected that the oil and sludge from this process would either be recycled or disposed of off-site by a licensed contractor.

The applicant states that the maximum wastewater discharge anticipated from the facility will be 2.0 MGD, with an estimated average discharge of 1.3 MGD.

Yard Runoff

If the Pleasant Prairie site were selected, a permanent stormwater basin would be constructed to allow collected sediment to settle out prior to discharge and to ensure that current peak runoff rates are not increased. It is anticipated that the collected stormwater would ultimately be discharged to the tributary of Jerome Creek that is located on the proposed site, in accordance with DNR permitting. The tributary crosses the northeast and the southeast portions of the site (**Figure 2.03**).

The Sturtevant site currently contains a stormwater detention basin. However, the current detention basin would need to be altered to allow placement of the facility. The applicant states that the area of the current detention basin, **Figure 2.04**, would be used to the extent practicable, again in accordance with DNR permitting.

Solid Waste Generation and Recycling

Some solid waste would be generated during plant operation, including wastes from offices and other facilities. Normal maintenance would also be expected to generate small quantities of solid waste periodically. When disposal of wastes is necessary, contractors would be hired. To encourage and support the recycling program, Badger Gen states that it would place appropriate containers for recyclable waste in and around the construction offices, warehouses, craft change houses, lunchrooms, and other areas of the proposed project.

Connection to the Electric Transmission System

The Proposed Transmission Line Connection

Badger Gen plans to build a new transmission line to connect to the existing transmission system. The line would connect the plant to existing lines or substations operating at 345 kV. This is the highest transmission voltage used in Wisconsin, and the 345 kV network is the backbone of the state's transmission system.

Although Badger Gen proposes to build the line, it could turn the line over to WEPCO, the utility that owns the transmission system around the proposed sites and that serves the surrounding area, before the plant begins operation. However, WEPCO does not desire to take possession of a radial transmission line that employs solid-dielctric cable technology. The ultimate disposition of the line is the subject of ongoing discussion between WEPCO and Badger Gen.

The transmission line would begin at an electrical switchyard on the plant site, shown in **Figures 2.03** and **2.04**. This switchyard would look much like any other large electrical substation. It would consist primarily of current-carrying rigid aluminum buswork supported by insulators mounted on a steel frame. Circuit breakers and disconnect switches would be installed to control connection of the generating units to the transmission line. The steel framework would extend as high as 50 feet into the air to support the buswork and connections from the generators and to protect all equipment from lightning strikes. The ground would be covered with crushed stone. The switchyard is expected to cover an area of about 300 feet by 700 feet, surrounded by a fence.

The applicant proposes to use underground transmission technology in building the new line. The line would begin at a transition station within the electrical switchyard, where the connection between the underground line and the overhead buswork would be made. Depending on the site and transmission line route chosen by the Commission, the total length of underground transmission line would be between about 2.5 and 5 miles in length. For the Sturtevant site, the proposed line would be partially underground, but would also have an overhead section, as much as 12 miles in length, installed on existing transmission line structures. Site-specific details of routes and auxiliary transmission facilities are presented in Chapters 4 and 5.

The Underground Transmission Line

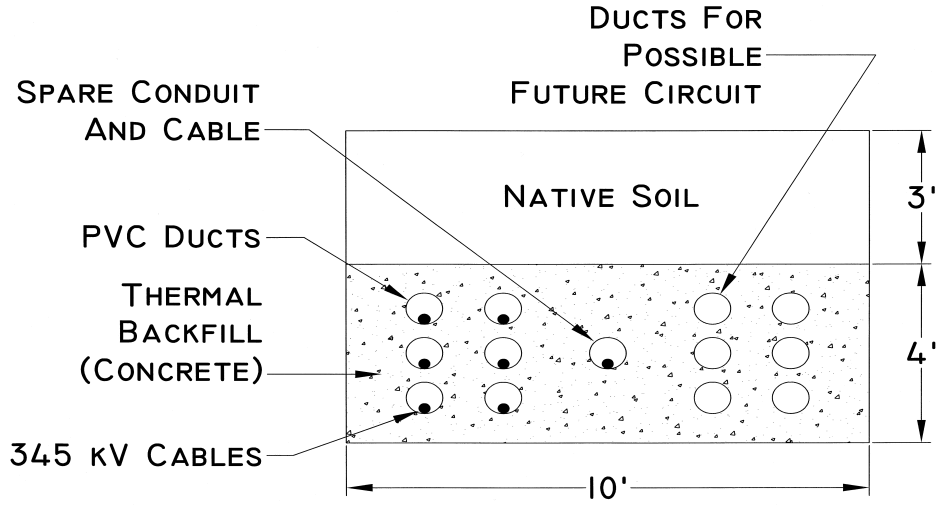
The proposed underground transmission line sections would consist of 345 kV solid-dielectric cables installed in underground polyvinyl chloride (PVC) ducts. These cables employ a plastic material, cross-linked polyethylene, as the insulating material (dielectric). No special insulating fluids or gases would be used.

The transmission connection would be a single circuit made up of six separate cables – three separate phases of two cables each. A seventh cable would be installed as a spare. In addition, Badger Gen proposes to install six extra PVC ducts so that a second circuit could be added in the future.

The PVC ducts would be surrounded by concrete. The concrete serves to provide structural support and protection for the ducts and also to facilitate heat dissipation from the cables. **Figure 2.09** shows an approximate cross-section of the proposed underground line design.

As indicated in **Figure 2.09,** the trench would be 10 feet wide at the bottom. The trench might be wider at grade level, as required to ensure stability of the trench walls during construction. The cables would be spliced at intervals of approximately 2,000 to 2,500 feet, and concrete vaults would be installed for this purpose. Each vault would have its top visible at grade level, and be fitted with a removable cover or access panel.

Figure 2.09 Approximate cross section of trench containing underground transmission line



Transmission System Impact Assessment

WEPCO owns the transmission lines and substations surrounding the proposed plant sites. WEPCO is obligated to arrange to interconnect merchant power plants, but the developer of a merchant plant must, in general, pay for the interconnection. This includes paying for reinforcements that are required to accommodate the output of the new power plant.

Accordingly, Badger Gen and WEPCO must perform a study to confirm that the proposed interconnection is feasible, and to discover what other system improvements, if any, would be required to allow the plant to operate. Any such improvements should be regarded as part of this project.

WEPCO has performed such a study. The study and results for the Pleasant Prairie and Sturtevant sites are discussed in Chapters 4 and 5, respectively. The following section, however, provides some general information on the assessment of transmission systems. This information may be useful in interpreting the study results presented in Chapters 4 and 5.

Utilities plan reinforcement of the electric power system to ensure that electric service to customers will be reliable. A reliable system is one that is able to deliver customers'

electricity demand while satisfying a range of system security criteria. System security criteria relate to the ability of the system to remain stable when subjected to disturbances, avoiding blackouts.

The transmission system must be able to deliver power to customers over a wide range of electricity demand conditions and power plant generation levels. While accommodating the connection of a new power plant, the system must be able to continue to deliver power where it is needed without introducing the threat of reliability problems. Moreover, standard practice among transmission engineers is to specify that not only must system operation continue within allowable parameters with all transmission lines and transformers in service, but that these parameters not be violated even under "single-contingency" conditions – that is, with any one line or transformer out of service.

The connection of a new source of power to the system raises two primary concerns. First is the possibility of thermal overloads. When forced to carry large amounts of power, transmission lines and other system components heat up. This can lead to equipment damage or cause transmission lines to stretch and sag, violating safety clearances. Accordingly, thermal limits must be established that restrict the amount of power a line is allowed to carry. By introducing additional power to the system, which nearby lines must deliver, a new plant may cause thermal limits to be violated under some circumstances.

The second concern is that connection of a new generator may degrade the system's dynamic stability. Dynamic stability concerns the behavior of the single complicated system formed by the transmission network and connected generators. The generators all rotate in synchrony, which they maintain through the exchange of power across the transmission system. Under some circumstances, a line outage or other disturbance can disrupt this synchronism or otherwise cause stability to be lost. This could cause severe voltage variations, frequency variations or blackouts.

Analysis can reveal whether a new plant is likely to cause thermal overload or dynamic stability problems. If the potential for such problems is only significant a few hours each year, the power plant owners might accept having to reduce generation levels during those periods to prevent problems. If the threat of problems is frequent, then some transmission improvements would probably be necessary to permit connection of the power plant. Such improvement projects might include:

- Building a new electric transmission line.
- Replacing an existing line's conductors (current-carrying wires) with larger ones able to carry more power.
- Raising or re-tensioning existing conductors to alleviate excessive sag.
- Adding circuit breakers or otherwise changing the system configuration.

Natural Gas Pipeline System Connection

ANR would construct, own, and operate the natural gas transmission facilities to either of the proposed power plant sites. The new line would connect the plant to ANR's existing Racine Tap in the town of Burlington in Kenosha County. The Racine Tap currently connects ANR's two Racine Lateral pipelines to the larger natural gas transmission lines coming into Wisconsin from the Joliet Hub. ANR has not yet filed an application with the FERC for authorization to build. Therefore, all natural gas pipeline construction information must be considered preliminary and subject to change.

The Racine Lateral would need to be upgraded for ANR to serve the power plant adequately. The upgrade is expected to be a new 20-inch diameter pipeline, also originating at the Racine Tap and following the existing Racine Lateral into the town of Somers. The alternative power plant sites would be to the north and south of the Racine Lateral. At different places along the Racine Lateral, the new pipeline would turn and follow one of two alternative routes to whichever power plant site is selected. The four alternative pipeline routes range from 20 to 24 miles in length.

A new natural gas compressor station would also probably be needed, either at the Racine Tap, at the turn for the route to the power plant, or at the power plant itself.

A natural gas metering and control station containing gas flow meters and pressure control equipment would be installed at the power plant site. Refer to **Figure 2.02 and Figure 2.03** for relative locations of the gas metering and control equipment. At the Pleasant Prairie site, the new line would approach from the north, and this equipment would be located just south of the water treatment equipment, between CTH H and the southern stormwater pond. At the Sturtevant site, the new line would approach from the south, and the gas metering and control equipment would be located at the northeast corner of the plant between the power block area and the railway that runs along the eastern property boundary.

Overall, the proposed natural gas facilities would be designed, constructed, tested, operated, and maintained to meet the requirements of 49 CFR Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards;" 18 CFR Part 2.69, "Guidelines to be Followed by Natural Gas Pipeline Companies in the Planning, Clearing, and Maintenance of Rights-of-Way and the Construction of Aboveground Facilities;" and other applicable federal, state, and local standards as shown in **Table 1.01** in Chapter 1.

Construction

Generating Facilities

Construction Activities and Schedule

Construction for the proposed power plant cannot be started until Badger Gen receives the necessary DNR air emissions permits, including Commission approval of the project. The company anticipates that local, state, and federal permitting will be completed by summer of 2000. If approved, construction will begin shortly thereafter. Badger Gen expects the plant to be in service on or about June 1, 2002.

Major construction activities would occur on site or adjacent to the site. The 2-year construction schedule would include the following construction activities:

- Site survey.
- Soil and rock borings for geotechnical design, requiring a mobile drilling rig.
- Installation of facilities needed for temporary construction water supply, with connection to the new water supply.
- Installation of temporary wood support poles needed for temporary electric power and telephone service for the plant construction area.
- Site clearing and preliminary grading, requiring heavy earth-moving equipment.
- Construction of permanent plant perimeter fencing.
- Construction of areas for contractors' trailers, materials and equipment set-down and staging, and parking.
- Construction of a temporary roadway into the site construction area.
- Trenching and backfilling for all underground utilities within and adjacent to the site (natural gas, telephone service, raw water supply, potable water supply, storm sewer, and sanitary sewer).
- Construction of a gas metering and control station.
- Soil subbase preparation and construction of equipment and building foundations.
- Installation of major equipment and tanks.
- Construction and erection of facility buildings.
- Installation of all supporting utility systems.
- Installation of electric transmission power transformer and substation.
- Erection of combustion turbines, generators, and exhaust stacks.
- Removal of temporary access roads and other temporary facilities.
- Paving of primary access road and main facility parking and access areas.
- Final grading, landscaping, seeding, and mulching.

Solid Waste and Recycling

During construction, Badger Gen intends to implement a program to minimize solid waste and encourage recycling. The program would include the following:

- Sending wastes from clearing and grubbing to local composting facilities where available.
- Segregating wastes into stockpiles of metal and scrap wood regularly available for salvage.
- Utilizing excess excavation materials in the final grading plan, to eliminate disposal and create a balanced cut and fill for the proposed project (in compliance with all flood plain and other water-related regulatory requirements).
- Minimizing spills when transferring fluids or refueling vehicles through careful transfer processes and containment structures, to reduce the amount of solid waste generated in spill cleanups.
- Producing mulch for landscaping purposes from scrap lumber not suitable for salvage.
- Including reuse and recycling capabilities in the evaluation criteria when selecting construction materials and aids.

Electric Transmission Facilities

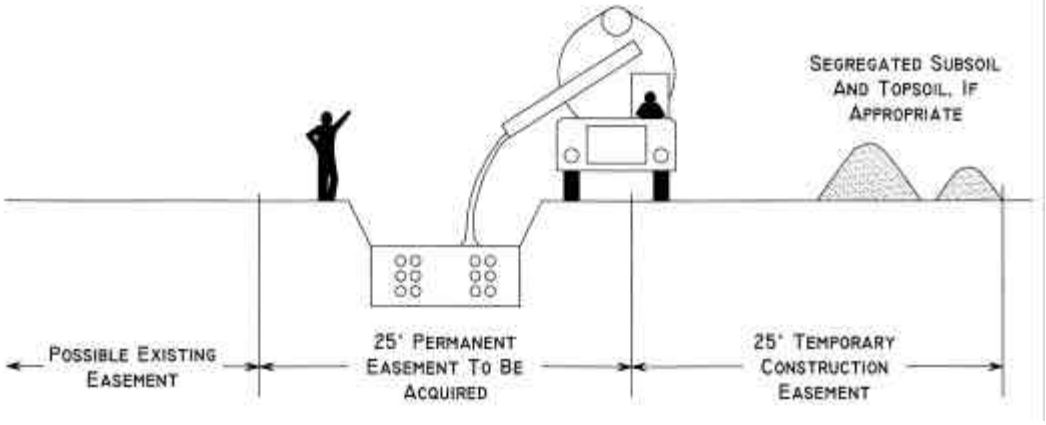
Underground Line Construction

Construction of the underground transmission line would be similar to much other underground utility construction. Initially, vegetation clearing and grading would be carried out as necessary to permit other construction activities to proceed. Existing underground utilities would be identified and marked prior to beginning trenching. Construction crews would then begin trenching, taking care to keep topsoil segregated from subsoil and to employ erosion control measures. The next step would be PVC duct assembly and installation in the trench, and installation of pre-cast or poured-in-place concrete splice vaults. When duct assembly is complete, concrete backfill can be poured around the ducts, and excavated subsoil and topsoil can be replaced. Excess subsoil would be disposed of off site. Cable pulling and splicing may occur any time after a section of duct bank is complete. **Figure 2.10** illustrates a typical cross-section of the line during construction.

The length of trench open at any one time may be between 300 and 2,500 feet. Crossings of public roads would be accomplished one half at a time, with the other half kept open for traffic at all times. Driveways and single-lane roads would have temporary bypasses or bridges installed while construction proceeds. Owners and users of driveways and access roads would be consulted in advance, and construction schedules would be developed in accordance with those consultations. Any driveway closures would be limited to one working day.

Agricultural drain tile systems would be identified in advance and restored after construction. If soil conditions dictate, drain tiles would be maintained in working order during construction. After construction, the ground surface would be restored and revegetated to approximate pre-construction conditions. In order to ensure future equipment access to the line, and to prevent excessive dehydration of the soil (which could inhibit heat transfer from the cables) trees would not be allowed within 25 feet to 30 feet of the transmission line centerline, and small bushes would not be allowed within 15 feet to 20 feet of the centerline. Excavated areas of roads and driveways would be repaved, and cut fences would be replaced with new permanent materials.

Figure 2.10 Representative cross-section of the underground transmission line during construction. Precise arrangement and dimensions may vary among and along routes.



Overhead Line Construction

If the plant were built at the Sturtevant site, the transmission connection may include not only a new underground portion, but also a new overhead portion, to be installed on existing transmission line structures. These structures are designed to support one transmission circuit (consisting of three current-carrying wires) on each side. At present, only one circuit is installed on these structures, leaving room for a new circuit that would form part of the transmission connection to the proposed plant.

Installation of overhead transmission conductors is more straightforward than construction of the underground parts of the transmission line. The conductor material would be transported to the site on flatbed trailers. New insulators would be installed on the existing structures, as would pulley blocks to facilitate installation. The next step would be to feed pilot lines through the blocks. Using these pilot lines, specialized truck-mounted equipment would then pull new wires into place and would establish the correct tension. The wire would then be secured to the insulators, and the blocks removed.

Schedule

The applicant proposes to begin operation of the power plant by June 2002. Badger Gen expects that construction of the underground transmission line would begin in late summer 2001, and would be completed by March 2002.

Repairs

If a section of transmission cable failed, it would need to be repaired. It would not be necessary to repair the cable before returning the underground transmission line to service, however, since the initial cable installation will include a spare cable. After a cable failure, the failed cable would be switched out and the spare cable connected in its place. This process could be completed within a single work shift.

Badger Gen would keep a spare length of cable, equal in length to the longest installed section of cable, which would be used to replace any failed section of cable. This would eliminate any delay for procurement of replacement cable. Before replacing a failed section of cable, crews would first have to perform tests to determine which section of cable contained the failure. Then splice vaults at each end of the failed section would be opened, and the failed section of cable would be removed. The PVC duct would be checked and cleaned in preparation for installation of new cable. The work crew would then carefully pull the spare length of cable into the duct, cut it to length and splice it into the existing cable at both ends. The splice vaults would then be closed. When convenient, the repaired cable could then be switched into the underground transmission line in place of the spare cable.

The work crew would have to possess specialized skills, particularly the ability to install the 345 kV cable splices. Once an appropriate crew reaches the site, the applicant estimates that the entire cable repair process would take between five and ten days. The transmission line would not need to be de-energized for most of the repair process, however. The applicant believes de-energization should only be necessary when switching the spare cable into service in place of the failed cable, and when switching the repaired cable back into service at the end of the process.

In addition to the repair process described above, it is possible that a cable failure could occur that would damage or obstruct the duct to the extent that excavation of the duct bank would be required to accomplish a repair. This is considered unlikely, however.

Reliability of Proposed Cable Technology

In North America, solid-dielectric cable technology is considered mature at voltages up to 138 kV. In addition, a small number of solid-dielectric cable installations have been made in this country at 230 kV (the next standard North American voltage below 345 kV), although these are short lines without splices. This would be the first commercial application in North America of 345 kV solid-dielectric cables. The developer would need to rely on cable manufactured overseas and on installation expertise that is not yet well established in North America.

Nonetheless, several years of recent European experience with solid-dielectric cables indicate that satisfactory performance at voltages up to 400 kV can be achieved. Accordingly, it is reasonable to believe that it is possible to construct a highly reliable 345 kV solid-dielectric cable transmission line, given enough care in design and installation. Extrapolation from historical performance data suggests that the chance of a failure in the proposed line is likely to be less than 3 percent in any given year.

Of course, the cables are at risk of damage from careless excavation as well as from failures due to cable flaws or operating stresses. The concrete surrounding the PVC ducts would help to minimize the chance of future cable damage by diggers. In addition, pre-printed plastic warning tape would be installed in the soil directly above the cable ducts. (See **Figure 2.09**.)

Hazardous Chemicals Management

Badger Gen has itemized the more notable hazardous chemicals to be used and protections to be in place during construction or operation.

During Construction

Although there are several potential contaminant sites within a half-mile of either alternative power plant site, the sites themselves do not appear to have any contamination that would need to be addressed during construction.

Badger Gen would use a number of chemicals during construction. A summary of typical chemical usage, quantity and storage methods during construction is provided in **Table 2.02.**

Diesel and gasoline fuel would likely be temporarily stored on site during construction activities in tanks within Aboveground containment units consisting of dikes capable of containing at least 110 percent of the storage tanks' capacity. Curbs and dikes would be coated or lined to prevent leakage of the material to be contained. A maintenance truck would likely fuel construction equipment. This would be a continuously staffed operation. Spills from fueling would be expected to be relatively small.

Badger Gen's construction superintendent would be responsible for reporting spills and overseeing the cleanup and disposal of any affected soil and spill clean-up materials.

Minor spills of fuel or other chemicals would be cleaned with absorbent pads or other manufactured absorbent products stored on the maintenance truck or in a marked cabinet that is readily accessible. Larger-quantity spills would not be expected to exceed the capacity of a 55-gallon drum and would be removed from within the containment area using a vacuum-tank truck, or pumped into a suitable container. Soil or absorbent materials that have come in contact with fuel or chemicals would be immediately removed, stored, and disposed of in accordance with state regulations. The equipment is

expected to be kept in good working condition so that transmission, hydraulic, or brake fluid leaks do not occur. The chemical storage areas would include hose stations, spill kits, safety showers, eye wash stations, and first aid kits.

Table 2.02 Expected typical on-site chemical storage during Badger Gen power plant construction

Product	Nominal Quantity	Storage Method
Medium WT Motor Oil (New)	300 gals.	5 gals. On pallets
Waste Oil	300-750 gals.	55 gals. Drums (bermed)
WD-40	165 gals.	55 gals. on pallets
Thinners/solvents	Small quantities	1 gal. or less containers in storage cabinet
Carboline	75-150 gals.	5 gals. On pallets
Gasoline	750 gals.	Aboveground portable storage tank or fuel truck
Diesel Fuel	300-750 gals.	Aboveground storage tank or fuel truck
Chemicals utilized in Cleaning of HRSG & Piping: Citric Acid 50% (3%Wt Conc.) Caustic Soda 30% (pH to 9.0) OSI-1 Inhibitor (0.1 Vol. %) Sodium Nitrite (0.5% Wt) Pen-7 Surfactant (0.1% Vol.) Antifoam Agent	 21,600 lbs. 475 gals. 40 gals. 1,650 lbs. 40 gals. 40 gals.	Delivered by contractor at time of service
Ion Resin AMBERLITE IRN 150	18 lbs.	Standard manufacturer-supplied containers
Drying Agent (Bluegel)	3 lbs.	Standard manufacturer-supplied containers
Potassium permanganate Hydrochloric Acid Potassium hydroxide Caustic Soda (sodium hydroxide) Oxalic Acid	3-5 lbs.	Standard manufacturer-supplied containers

During Operation

During regular operation, certain chemicals may be present at the plant. These would include cleaning detergent chemicals for combustion turbine water wash and other typical cleaning solvents. A preliminary list of chemicals and products that might be used during regular operation is included in **Table 2.03**. Discussions about more prevalent materials follow.

Table 2.03 Expected typical chemical storage during regular power plant operation

Product	Nominal Quantity	Storage Method
Emergency Diesel Fuel	4 x 400 gals.	Storage tanks (4)
Aqueous Ammonia (< 20% conc.) (SCR)	4 x 14,000 gals.	Bulk storage tanks (4)
Aqueous Ammonia (1-2% conc.) (HRSG)	4 x 270 gals.	Storage tanks (4)
Aqueous Ammonia (< 20% conc.) (Refill for HRSG dosing tanks)	4 x 60 gals.	Barrels (4)
Sulfuric Acid	5,000 gals.	Storage Tank
Caustic Soda (sodium hydroxide)	10,000 gals.	Storage Tank
Oxygen CO_2 Propane Acetylene	20 bottles 20 bottles 20 bottles 10 bottles	Steel pressure bottles
Oxygen scavenger, biocides, laboratory chemicals	30 day supply	Manufacturer's original containers
Step-up transformer insulation oil*	4 x 18,500 gals.	Transformer vessel (steel tank)
Auxiliary transformer insulation oil*	4 x 2,200 gals.	Transformer vessel (steel tank)
Lube oils (turbines and misc.)*	32,000 gals.	Lube oil tanks (steel)
Hydraulic oil (steam turbine)*	440 gals.	Oil tanks (steel)
* These fluids would be contained in the operating equipment. Turbine and transformer oils have long life and gradual degradation, so there would be no spare oil on-site. There would also be hydrogen cylinders associated with the hydrogen-cooled generators with each combustion turbine.		

Aqueous Ammonia

Trucks would deliver aqueous ammonia at less than 20 percent concentration for use in the NO_x control process. It would be stored on-site in an enclosed ammonia storage building located next to the turbine building (**Figures 2.03** and **2.04**). Four 14,000-gallon tanks would be housed in this building. Spill control would be through use of a common concrete containment structure for the four tanks or through the use of double-walled steel storage tanks with leak detection, depending on the final plant design.

Transfer of ammonia from delivery vehicles would occur within a diked concrete containment area capable of holding over 120 percent of the delivered truck volume plus six inches of water. Any release of ammonia solution from the tank should be retained within the concrete containment area. A spill-prevention control and countermeasure plan would be in place prior to delivery of ammonia.

Caustic Soda and Sulfuric Acid

Caustic soda (sodium hydroxide - NaOH) and sulfuric acid (H_2SO_4), used in the water treatment process to produce demineralized water, would be stored inside the water treatment building in separate aboveground tanks. The caustic soda tank would hold 10,000 gallons, and the sulfuric acid tank would hold 5,000 gallons. They would be in individual diked containment areas able to contain the entire contents of the tanks.

Raw water, demineralized water, and neutralization tanks would be located as shown in **Figures 2.03** and **2.04**. The neutralization tank would have a secondary containment structure to collect any potential spills.

Outdoor Transformers

The outdoor transformers would be located within containments designed to contain greater than 100 percent of the mineral oil content of the transformer, plus sufficient capacity for water to fight fires. The stormwater from this containment area would be discharged to an oil/water separator. An oil stop valve would prevent large amounts of oil from being drained into the oil separator.

Turbine Building Area

All surface run-off water from floor drains inside the turbine building would lead to a concrete wastewater pit to collect it for processing through the oil/water separator before discharge to the municipal sewer.

Overall Handling and Emergency Response Procedures

The company has stated its intention to perform the following activities related to hazardous materials:

- Design and utilize appropriate containment structures for chemical storage and protection.
- Provide secondary containment for chemical containers per regulatory requirements.
- Transport and store chemicals in appropriately sized containers that meet regulatory specifications.
- Train personnel in chemical handling and emergency response.
- Keep supplies of appropriate emergency response and spill cleanup materials ready for use on site.

- Conduct regular inspections of storage areas.
- Create and maintain written emergency response and spill prevention plans.
- Create and maintain written standard operating procedures for activities, such as chemical unloading.

Spill Prevention and Emergency Response

For both construction and operation, the facility would develop and implement an emergency response and spill prevention plan. The company would also obtain an agreement with the local emergency planning committee (LEPC) that coordinates emergency response activities. In addition, the facility would designate an emergency coordinator, whose primary responsibilities would be as follows:

- Coordinating emergency response activities with the LEPC.
- Conducting emergency response drills.
- Assessing the type and extent of an emergency.
- Contacting the necessary emergency support services.
- Directing personnel until the outside response team arrives and assumes control.
- Maintaining hazard control.

Directing physical operations to make the emergency area as safe as possible before, during, and after an emergency.

Standard Operating Procedures

Badger Gen would create standard operating procedures (SOPs) pertaining to environmental protection, safety, and health protection for both the construction and operation phases of the project. The SOPs would be updated throughout the life of the facility. The SOPs could apply to a variety of activities, including, chemical inventory management, maintenance of chemical handling safety equipment, tank integrity testing and inspection, loading and unloading procedures, and evaluating environmental "events." All SOPs would be readily available to all employees and offsite emergency response personnel along with copies of the Material Safety Data Sheets (MSDS) on each hazardous substance used or stored at the facility.

Prior to performing any work, construction company employees, subcontractors, and plant personnel would be trained specifically on spill notification requirements, community right-to-know information, environmental/health and safety procedures, and evacuation. In addition, outside contractors would be given access to a complete list of the MSDS for construction and a copy of the plant's "Written Hazard Communication Program Training Material."

3

Alternatives to the Project

Conservation and Demand-Side Management

Demand-side management (DSM) includes energy conservation, fuel switching and load management. Energy conservation reduces the use of electric energy. Fuel switching replaces the use of electricity with the use of another fuel such as natural gas. Load management reduces the peak demand for electricity during a specific period.

Examples of energy conservation include: installing more efficient appliances, improving building insulation, redesigning industrial processes to use less energy, and reducing lighting loads through use of solar daylighting. Examples of fuel switching include replacing electric appliances such as water heaters and clothes dryers with natural gas and using propane for heating fuel instead of electric heat. Examples of load management include programs that control air-conditioner loads during times of extreme demands for electric power and programs that provide monetary incentives for large users of electricity to shed loads during peak periods.

DSM as an Alternative to Building a Power Plant

New power plants are built to generate more electricity, and to provide added capacity to generate when demand for electricity is at its greatest. DSM can often substitute for building power plants by reducing the use of, or demand for, electricity. Decreasing demand can have the same effect as increasing supply.

Advantages of DSM Over Power Plants

Using DSM to meet system electric needs can have many advantages over using supply resources such as power plants and power lines. These advantages can be both economic and environmental.

The most significant economic advantage is that, if cost-effective, DSM will reduce customer's electric bills. This can help make Wisconsin businesses more competitive. By reducing the amount of dollars spent on energy in Wisconsin, DSM can also improve the state's economy in general. This is because most of every dollar spent on coal, natural gas or uranium leaves Wisconsin and our economy.

From an environmental perspective, DSM is the best option for meeting energy needs. Conservation and some forms of fuel switching reduce air pollution, water use, coal and uranium mining, disposal of radioactive waste, production of greenhouse gases, and the depletion of non-renewable resources. Conservation, fuel switching and load management, by reducing the need for power plants and power lines, also reduce the negative impacts of those facilities such as the use of valuable land, destruction of natural habitats, and aesthetic impacts.

Almost all of the environmental impacts of the proposed power plant, noted elsewhere in this final EIS, could be avoided if DSM could substitute for the power plant. There are, however some potential negative impacts associated with DSM measures. Switching fuels will still have impacts due to the use of the alternate fuel. Load management, if not designed properly, can lead to discomfort or the inefficient disruption of industrial production. High-efficiency fluorescent light bulbs have disposal problems. Overall, though, the negative effects of DSM measures are negligible compared to the building and operation of power plants.

The Commission's Legal Requirements Regarding DSM as an Alternative

Under Wis. Stat. § 196.491(3)(d), Commission must find that a proposed power plant is the power plant "in the public interest considering alternative sources of supply, alternative locations or routes, individual hardships, engineering, economic, safety, reliability, and environmental factors." DSM, if available, can be an alternative to a power plant as a source of supply. However, because the proposed plant is a merchant plant, the Commission "may not consider alternative sources of supply" determining that the plant is in the public interest. See Wis. Stat. § 196.491(3)(d)3.

Since DSM is an "alternative source of supply" under Wis. Stat. § 196.491(3)(d), it cannot be considered in making the public interest determination.

Difficulties in Comparing DSM to Merchant Plants

Even if the Commission were to attempt to compare DSM to the proposed power plant, it would not be a meaningful comparison. Because the plant is a merchant plant, the applicant has not justified its application on the basis that the plant is needed. Neither is Badger Gen required to provide any data on how much capacity or energy produced by the plant will be on call to meet Wisconsin energy needs, nor any data on the costs of generating electricity at the Badger Generating Facility.

Lack of this information makes comparing conservation and the proposed power plant difficult, if not impossible. With no costs to compare to the cost of equivalent DSM, and no data on when the plant would supply its energy, DSM's cost-effectiveness as an alternative cannot be determined. In fact, one cannot even determine how much DSM

would be equivalent to the proposed plant, because the energy output and capacity that DSM would be replacing is not known.

Renewable Resources

The proposed power plant will use natural gas as the fuel to generate electricity. Renewable resources that can be used as alternative to natural gas include solar power, wind power, geothermal energy, tidal or wave action, and biomass fuels.

Advantages of Renewable Resources over a Power Plant Fueled by Natural Gas

Generation from renewable resources generally has more benign environmental impacts than fossil fuel powered generation. Most of the environmental advantages of renewable resources are related to air emissions. None of the renewable resources noted above produce significant emissions, if any, except for the burning of biomass fuel. However, if new biomass fuel is continually re-grown to supply fuel, the net contribution to global greenhouse gases will be negligible as the new crops absorb carbon dioxide. Each of the renewable resources above would have their own impacts on land use. Only the use of biomass fuels will have water use impacts similar to a fossil fueled power plant. Some renewable technologies also have their own types of negative impacts. For instance, wind power has been criticized for aesthetic reasons and for causing bird collisions.

Commission's Legal Requirements Regarding Renewable Resources as an Alternative to a Natural Gas Fueled Power Plant

As is the case with DSM noted in the previous section, renewable resources are "alternative sources of supply." Therefore, under Wis. Stat. § 196.491(3)(d)3, they cannot be considered by the Commission as an alternative to the proposed technology for the merchant plant.

4

Environmental Review – Pleasant Prairie Site

Site Description

The Pleasant Prairie site is located in portions of the northwest and southwest quarters of Section 16, Township 1 North, Range 22 East, within the village of Pleasant Prairie in Kenosha County **[Figure 4.01]**.

The site is located along CTH H immediately west of the WEPCO Pleasant Prairie Power Plant, between Bain Station Road and 95th Street, at the north end of the Pleasant Prairie business and industrial area called LakeView Corporate Park. There is an existing aboveground electric power transmission line along the eastern site boundary and a railway approximately 300 feet east of the site. A sanitary sewer line was installed on the site in a north-south alignment from the northeast corner to the southwest corner in 1998. Adjacent properties include a county cemetery, the WEPCO power plant, the Lakeview Technical Academy, and CTH H. Surrounding land use is illustrated in **Figure 4.02**.

The plant would occupy less than 35 acres of the site parcel's approximately 95 acres. The 95-acre site parcel is actually comprised of two land parcels, which can be seen in the 1999 aerial photograph in **Figure 4.03.** The north parcel is about 49 acres, and the south parcel is about 46 acres. The majority of the proposed site was in row crop agriculture in 1999, most recently soybeans. A farm operator whose main operation is across CTH H from the site currently owns the property. There is also a forested corridor along a ditch on the south end of the site. The ditch, which also traverses part of the northeast corner of the property, is a tributary to nearby Jerome Creek, which feeds the Des Plaines River.

Figure 4.01 Proposed power plant sites

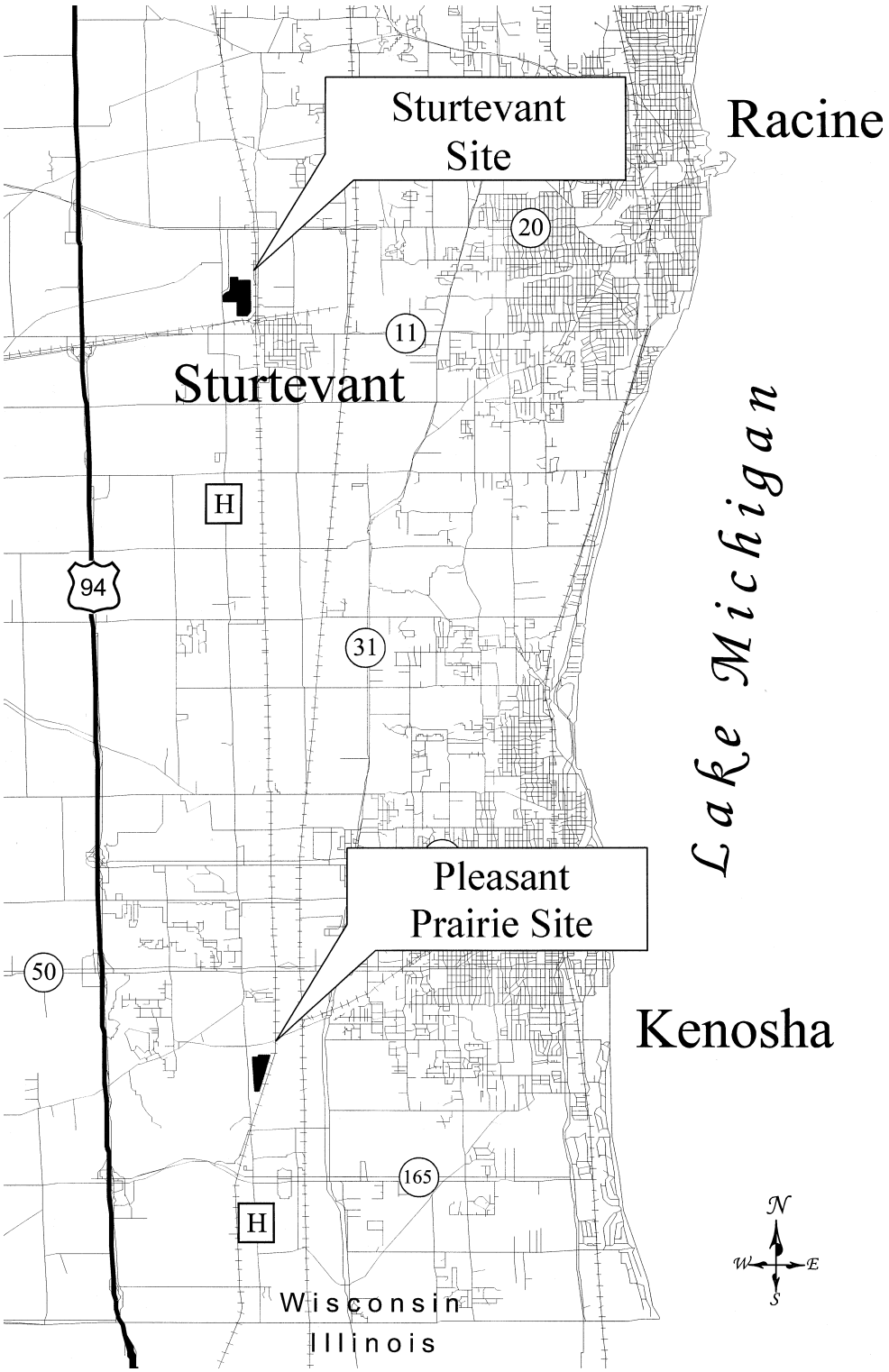


Figure 4.02 Land use in the area of Pleasant Prairie generation site

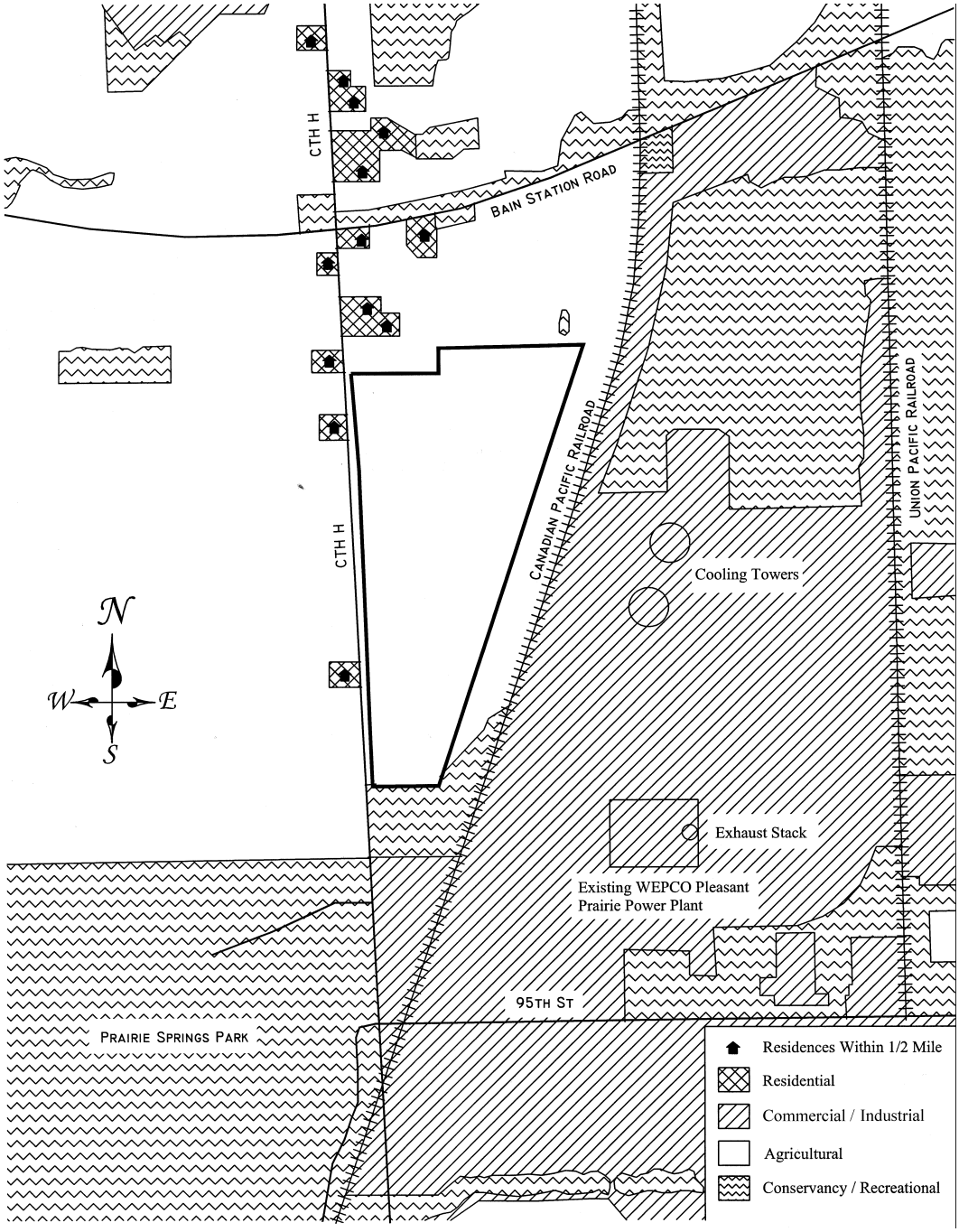


Figure 4.03 Aerial view of the proposed power plant at the Pleasant Prairie Site

Natural Resources at Plant Site and Auxiliary Facilities

Air Quality

Source Description

Badger Gen has submitted an air pollution control permit application to construct and operate the proposed combined-cycle generating station at this site, with four combined-cycle generating units capable of producing a total of about 1,050 megawatts. Power production is expected to occur throughout the year, as either base load or intermediate load. The power plant is expected to burn only natural gas. Badger Gen is proposing to build 120-foot stacks.

The plant would be subject to the federal Phase II Acid Rain law, requiring an acid rain permit and emissions monitoring.

Background Air Quality

The Clean Air Act requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for air pollutants that might be injurious to public health or welfare. The following pollutants have NAAQS and are collectively referred to as "criteria pollutants:"

- Particulate matter less than 10 microns in diameter (PM_{10}).
- Sulfur dioxide (SO_2).
- Carbon monoxide (CO).
- Nitrogen dioxide (NO_2), often discussed with other nitrogen oxides (NO_x).
- Ozone (O_3).
- Lead (Pb)

The state regulates air pollutant emissions under Wis. Admin. Code chs. 400-499, and has adopted the EPA's primary and secondary NAAQS. Primary standards protect human health while secondary standards protect public welfare from known or anticipated adverse effects associated with exposure to air pollutants. The EPA describes an area as "nonattainment" if the ambient air quality standard for one or more criteria air pollutants is not met, or "attained."

The area of the state that includes the Pleasant Prairie site is presently classified as severe non-attainment for ozone. The area is also presently classified as attainment for all other criteria pollutants. Because of these designation and the proposed project's potential emissions (see discussion below), the proposed project is subject to Prevention of Significant Deterioration (PSD) Review for PM, NO_x, CO, and SO_2, and to volatile organic compound (VOC) non-attainment New Source Review. Federal regulations

require major sources[7] to apply Best Available Control Technology (BACT) for control of PSD-applicable pollutants. VOC emissions would need to be controlled to the Lowest Achievable Emission Rate (LAER). Also, Badger Gen would need to obtain offsets for VOC emissions at a rate of 1.3 to 1. These offsets can be obtained from the market.

The maximum predicted impact of 24-hour average levels of particulate matter less than 10 microns in diameter (PM_{10}) exceeds the level that triggers a requirement for air monitoring. The DNR has supplied the applicant with ambient monitoring data that can be used to evaluate compliance with PM_{10} air standards.

Impacts During Construction

Air pollutant emissions during construction would come from construction equipment, the vehicles that deliver all the materials used to build the power plant, and vehicles bringing workers to the site. Encouraging workers to car pool or arranging for a shuttle to bring some workers to the site could slightly reduce construction impacts.

Dust on the construction site would need to be kept under control. Wetting the disturbed areas periodically, or when necessary, and covering soil stockpiles to control soil movement by wind would be needed.

Estimated Potential Emissions During Operation

Criteria Pollutants

Table 4.01 summarizes the potential annual emissions from the power plant with all four units operating and burning natural gas. The table shows that NO_x, CO, and PM_{10} would be emitted at over 100 tons per year, making the proposed power plant a "major source."

A New Source Performance Standard (NSPS) regulates pollutant emissions from a given process. The process considered for the proposed plant would be combustion of natural gas with emission controls. Badger Gen's proposed NO_x emission rate is 2.5 to 3.5 parts per million (ppm), well below the NO_x NSPS level of 156.8 ppm. The proposed SO_2 emission rate of 0.0022 pounds per million Btu (lb/MMBTU) is also below its NSPS of 0.769 lb/MMBTU.

The proposed control technologies for reducing NO_x emissions are dry low-NO_x combustors and selective catalytic reduction. Low-NO_x combustors supply air for combustion in two stages. The first stage is combustion with limited air and the second stage mixes in more air. The staging decreases NO_x formation. Selective catalytic reduction uses a catalyst to accelerate the reaction of NO_x with aqueous ammonia to form nitrogen gas and water. This technology is expected to reduce NO_x emissions by about 90 percent. Badger Gen expects that NO_x emissions would be reduced to 2.5 ppm during normal operation and to 3.5 ppm during power augmentation.

[7] A plant that emits over 100 tons per year of at least one criteria pollutant is classified as a "major source."

Table 4.01 Annual potential emissions

Pollutant	Potential Emissions (tons/year)
Nitrogen oxides	470.9
Carbon monoxide	898.9
PM_{10}	529.7
Sulfur dioxide	75.6
Sulfuric acid mist	46.1
Ammonia	466.1
Formaldehyde	55.0

Some ammonia would not react with the NO_x and would go up the stack. The expected average concentration of ammonia that goes up the stack is 10 ppm or less.

Using an oxidation catalyst would reduce both CO and VOCs. The catalyst increases the speed of conversion of CO to carbon dioxide (CO_2). No reagent is needed.

Natural gas does not contain significant amounts of sulfur or sulfur-containing compounds. Therefore, no controls are needed to limit SO_2 emissions.

Table 4.02 shows potential emissions in pounds per hour (lbs/hr) from each unit and summed for the whole plant. The emission rates for NO_x, SO_2, and PM would be used when considering the potential impact of the proposed plant on local air quality.

One hazardous air pollutant, formaldehyde, may be emitted at a level that would require the Maximum Available Control Technology (MACT). As required by the expected terms of the DNR air permit, compliance testing for formaldehyde would be conducted in the first 90 days of operation of the facility.

Table 4.02 Potential emissions in lbs/hr when firing natural gas and all CCs operate

Pollutant	CC unit #1	CC unit #2	CC unit #3	CC unit #4	Total all units (lbs/hr.)
NO_x	25.5	25.5	25.5	25.5	101.9
SO_2	4.5	4.5	4.5	4.5	18.0
CO	13.3	13.3	13.3	13.3	53.2
PM	30.5	30.5	30.5	30.5	122.0
VOC	2.8	2.8	2.8	2.8	11.2
Formaldehyde	7.4	7.4	7.4	7.4	29.6
Ammonia	27.3	27.3	27.3	27.3	109.2

Chiwaukee Prairie

The proposed facility at Pleasant Prairie is approximately four miles west of the Chiwaukee Prairie Preserve. If the pollution abatement controls on nitrogen oxide emissions are operating properly and the plant is operating at the requested capacity, the additional nitrogen deposition (measured as elemental nitrogen or N) at the preserve

would be anticipated to be significantly less than one percent of the existing atmospheric deposition of 6-12 lbs N/acre/year.

Visibility Impacts

Any facility emitting PM/PM_{10} and NO_x may have an adverse impact on visibility through atmospheric discoloration or reduction of visual range due to increased haze. The Clean Air Act Amendments require evaluation of visibility impairment in the vicinity of PSD Class I areas due to emissions from new or modified air pollution sources. Since there are no PSD Class I areas within 100 kilometers of either site, visibility impacts on Class I areas should be negligible.

Water Vapor Emissions - Plume

Under certain meteorological conditions, the stack would also emit a visible steam plume that, after traveling a relatively short distance, would dissipate by dispersion and evaporation. A visible plume can be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed at the time required for evaporation and dispersion.

Comparisons with NAAQS

The projected emissions from the plant need to be compared to the federal air quality standards, the NAAQS. At the Pleasant Prairie site, there is already a significant emission source within the combustion impact area. That source is the Pleasant Prairie Power Plant operated by WEPCO. The emissions of both power plants must be included when considering the impact of the proposed power plant on ambient air quality and assessing whether the air quality remains within the bounds set by the NAAQS.

Table 4.03 identifies the emission rates from the proposed power plant that were used in the air quality modeling analysis. These rates would be the lbs/hr rates from **Table 4.02** above for PM, SO_2, and NO_x.

Table 4.03 Emission rates (maximum hourly rates at 100 percent load conditions)

Stack ID	PM rate (#/hr)	SO_2 Rate (#/hr)	NO_x Rate (#/hr)
1	30.5	4.5	25.5
2	30.5	4.5	25.5
3	30.5	4.5	25.5
4	30.5	4.5	25.5

The background concentration used in the air quality modeling analysis is identified in **Table 4.04**. The table also illustrates where the nearest existing monitoring sites are for the different pollutants.

Table 4.04 Background concentrations (in μg/m³)

Pollutant	Averaging Period	Monitor ID	Ambient Air Quality (μg/m³)	NAAQS (μg/m³)
SO_2	3-Hour	Madison East H.S. Dane Co.	137.5	1,300
	24-Hour	Madison East H.S. Dane Co.	40.8	365
	Annual	Madison East H.S. Dane Co.	8.5	80
NO_2	Annual	UWM, Milwaukee Co.	32.8	100
CO	1-Hour	N/A	N/A	40,000
	8-Hour	N/A	N/A	10,000
PM_{10}	24-Hour	Rodefeld Landfill	48.4	150
	Annual	Rodefeld Landfill	22.6	50
TSP	24-Hour	Oilgear Company, Milwaukee	76.0	N/A

Table 4.05 shows the modeling results for particulates and NO_x. The percentages at the bottom of the table show that none of the pollutants represented would exceed the NAAQS.

Table 4.05 Air quality modeling results for Pleasant Prairie Site

	TSP - 24 hr.	PM_{10} - 24 hr.	PM_{10}-Annual	NO_x - Annual
New source impact	26.4	26.4	1.3	5.1
Level of significant impact	5	5	1	1
All sources impact	47.5	47.5	16.7	11.3
Existing concentration	48.4	48.4	29.3	32.8
Total concentration	95.9	95.9	29.3	44.1
NAAQS (State AQS)	150	150	50	100
Percent NAAQS (State AQS)	64%	64%	58.6%	44.1%

At this time, the DNR expects eventually to be able to issue the appropriate air pollution control permit for the proposed Badger Gen power plant at this site. The DNR has not made its final decision on Badger Gen's LAER, BACT or MACT proposals.

Geology

Both the Pleasant Prairie and Sturtevant sites are located in an area of thick, glacial deposits. Depth to bedrock is a minimum of 100 feet. High-capacity wells in this region pump groundwater from aquifers within the bedrock. Construction reports for wells show bedrock near the Pleasant Prairie site at 120 to 200 feet below ground.

Impacts After Construction

Construction of a power plant would not affect the area's geology. There would be no high capacity well.

Topography

Both the Pleasant Prairie and the Sturtevant sites are nearly flat. The topography at both sites has been altered to improve drainage. The Pleasant Prairie site is about 40 or 50 feet lower in overall elevation than the Sturtevant site. A drainage ditch was excavated across the northeast portion of the Pleasant Prairie site at some time in the past.

Impacts After Construction

Construction of a power plant would change the topography slightly. The ground would be made more level for buildings and to further manage run-off water. Because the site is nearly flat, the potential for erosion due to construction activities is low. Further, the facility will have to follow a stormwater management plan that meets local and state standards.

Soils

The site is within a larger geographic area with soils derived from 100 to 200-foot deep, unconsolidated, glacial till interlaced with variable quantities of glacial lake and glacial outwash materials. Much of the resulting soils is fine-grained and generally not very well drained. The site is typical of this area, made up of relatively poorly drained silt loams and loams, particularly along the ditch that runs in its eastern and southern sides. The smaller portions of the site that are on well drained, higher ground can be found mostly in the northwestern one-third of the site, along CTH H, where the power plant is expected to be built.

Impacts During and After Construction

All of the soil materials on which Badger Gen would build have supported crops and are the types of soil materials that can support the proposed construction. Construction would remove, compact, and mix soil profile layers. Any equipment operated during wet periods on the poorly drained soils where nothing is to be built would damage their structure. Those poorly drained soils have required tile drainage to crop, and their hydrological and biological functions would support and improve from landscaping with, for instance, native prairie or wetland communities. Construction and landscaping would need to avoid compaction that would damage soil percolation and avoid causing erosion of soil that would plug the drainage ditch.

Water Resources

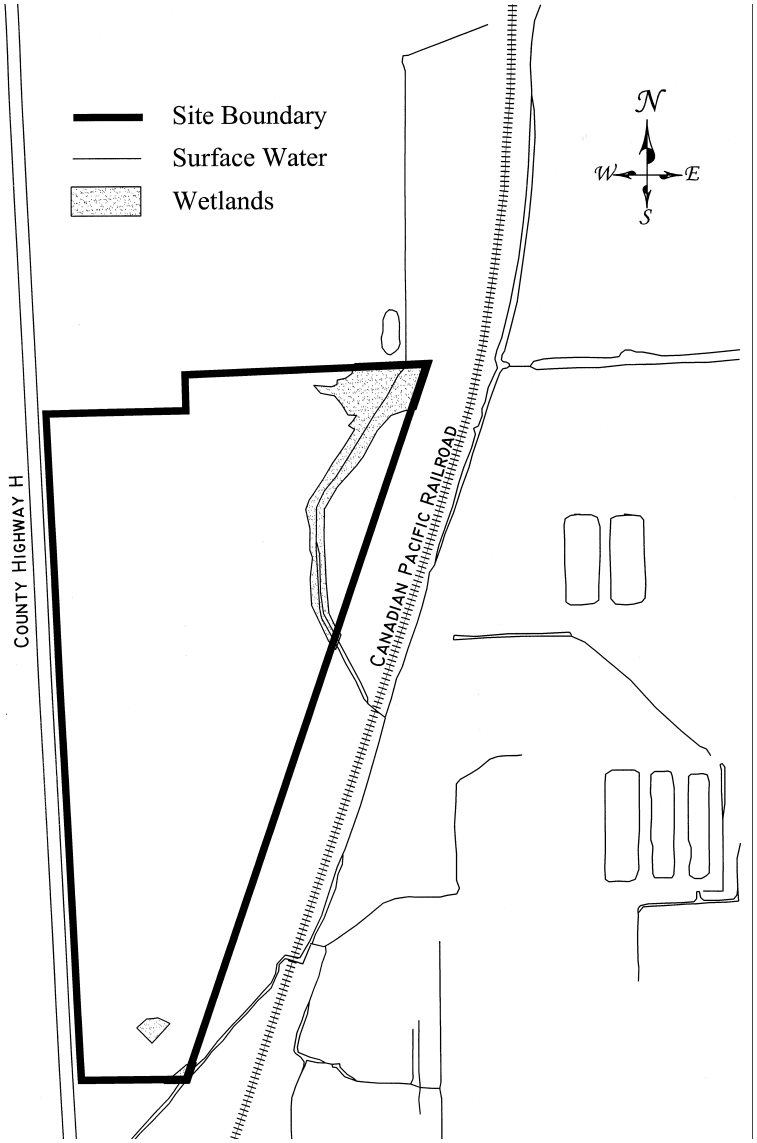
Watershed and Floodplain

The Pleasant Prairie site is located in the Des Plaines River watershed. The river is about 1.5 miles west of the site. A ditch, which begins north of the site, continues generally south along the northeastern portion of the property, then southeast (off-site) across an adjacent strip of agricultural land, and then under the Canadian Pacific Railroad, where it

joins Jerome Creek. Refer to **Figure 4.04**. Jerome Creek continues south and then southwest under the railroad, crosses next to the southeast corner of the site, and then continues southwest under 88th Avenue next to Lake Andrea (a former gravel pit). The creek then joins the Des Plaines River about 1.1 miles southwest of the site.

Figure 4.05 shows the boundary line that represents the 100-year interval for floods. This boundary is based on South East Wisconsin Regional Planning Commission (SEWRPC) information. The floodplain extends out from Jerome Creek and the on-site ditch. The village of Pleasant Prairie, as part of its floodplain ordinance, has adopted this boundary line.

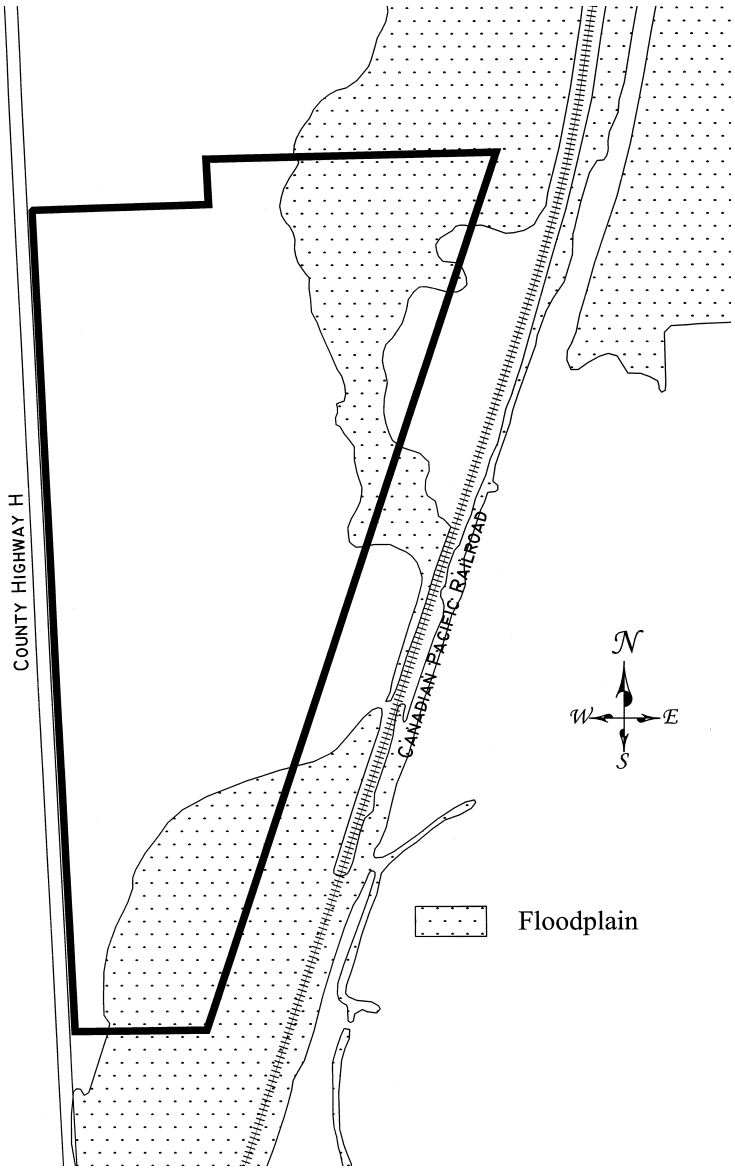
Figure 4.04 Surface waters and wetlands at the Pleasant Prairie Site



Wetlands

Badger Gen would need a federal permit to construct anything in a "jurisdictional wetland." In June 1999, a DNR specialist and a Natural Resource Conservation Service (NRCS) specialist identified three jurisdictional wetland areas on the Pleasant Prairie site. Two of these areas are associated with the on-site ditch and Jerome Creek. Based on the DNR wetland classification system, the majority of these two areas is classified as scrub-shrub and forest with broad-leaved deciduous vegetation and wet, palustrine soil. A portion of one area is classified as emergent wet meadow with narrow-leafed persistent vegetation and wet, palustrine soil.

Figure 4.05 Floodplain area at the Pleasant Prairie Site



The third area identified as a jurisdictional wetland is a depression within an active farm field in the Jerome Creek floodplain. This farmed wetland was planted to soybeans, and does not meet the Army Corps of Engineers (COE) Wetland Delineation Manual criterion that requires more than 50 percent of the dominant vegetation to be hydrophytic (plants that naturally occur in soils that are at least periodically saturated with water).

However, some soybean crops within the delineated wetland were dead or stressed, apparently due to previous flooding. If left unplowed for several years, it is likely that hydrophytic vegetation would dominate the area. Without proper management, the moisture-loving species might be nuisance species. Based on the DNR wetland classification system, this area is classified as emergent wet meadow with non-persistent vegetation and wet, palustrine soil. It should be noted that this classification is based, in part, on the current cultivation in this area.

Impacts to Water Resources

Badger Gen proposes no construction or grading in the floodplain or in the wetland areas. Therefore, construction and operation of the proposed power plant would not directly impact water resources. (See **Figure 4.04**.) An approved stormwater management plan and the nearly level topography should limit the potential for erosion into the creek and wetlands during and after construction.

Vegetation and Wildlife

This site has been farmed for over 35 years and there is very little non-farm vegetation. Row crops are the predominant vegetation. In two locations on wet soil, box elder is growing with an understory of sandbar willow, cattail, brome grass, and reed canary grass. These two locations are (1) along the drainage ditch that crosses the northeast corner of the site and (2) on the northwest side of a tributary to Jerome Creek that crosses the southeast corner of the site. These plants are typical of species that grow on disturbed sites. Animals at this site are those that live in agricultural and suburban areas: primarily small mammals, such as mice and rabbits, as well as raccoons, various common birds and insects.

Nuisance Species

The Pleasant Prairie site supports smooth brome and reed canary grasses, both of which are exotic species that create problems in natural areas or restorations. Although it is a native species, narrow-leaved cattail is also listed by the DNR as a species that can create problems in natural areas or native plant restorations. (Refer to www.dnr.state.wi.us/org/land/er/invasive/eislist.htm.)

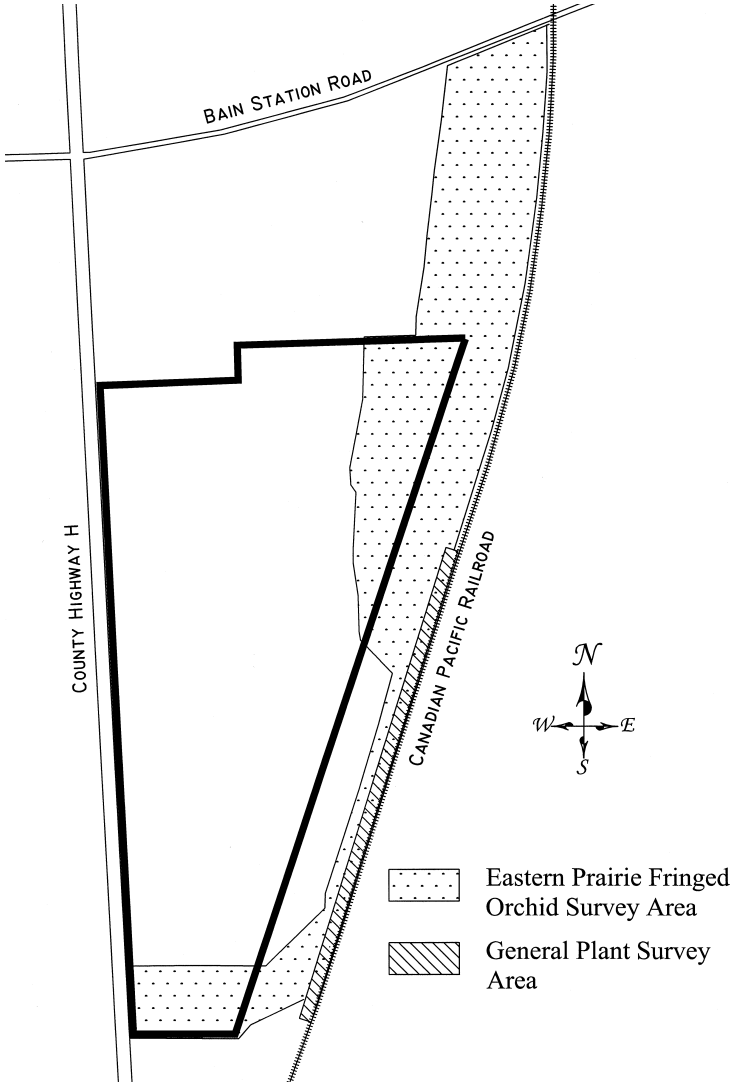
Threatened and Endangered Species

Figure 4.06 shows where Badger Gen's consultant surveyed for endangered or threatened plant species, or species of special concern in Wisconsin, especially the eastern prairie fringed orchid. The consultant found none of these plant species. The section on

air emissions discusses the potential for the proposed plant to affect plant species in the nearby Chiwaukee Prairie.

In both Racine and Kenosha counties, the eastern prairie fringed orchid is an endangered species that grows in wet, grassland areas. The consultant surveyed for this orchid in wet areas on the site. The DNR identified a prairie remnant along the railroad tracks that are located north-northeast of the site. This remnant could contain endangered or threatened species, or species of special concern in Wisconsin. Badger Gen's consultant surveyed a representative portion of the track (2,400 feet in length).

Figure 4.06 Areas for eastern prairie fringed orchid survey and general plant vegetation survey at the Pleasant Prairie Site



Jerome Creek and its tributaries could contain the pirate perch, which is a fish species of special concern in Wisconsin. However, the presence of this species in this reach of the stream and tributaries has not been documented. The ditch that crosses this site discharges into Jerome Creek. Badger Gen would discharge stormwater to this ditch, keeping the rate of flow the same as now exists and using a retention basin to control flow and water quality.

The peregrine falcon, known to occur in Kenosha and Racine Counties, was on the federal endangered species list until 1999. It is still protected by the Migratory Bird Treaty Act. This species nests on cliffs, towers, and smokestacks. It has been observed nesting on the stacks of the Pleasant Prairie Power Plant.

Impacts During Construction Including Mitigation Measures

Construction of the proposed project would not impact any endangered or threatened species, or species of special concern.

The DNR's stormwater management permit will require use of proper erosion control methods during construction. This prevents unnecessary erosion, and the resulting deposits of soil and dust that could affect nearby waterways and vegetation.

Badger Gen would need to take precautions to ensure that construction equipment used at the Pleasant Prairie site does not bring in nuisance plant species not already present. It is especially important that seeds of purple loosestrife are not carried in on construction equipment to contaminate the adjacent wetland areas.

Impacts During Operation, Including Mitigation Measures

With careful selection and management of plantings, Badger Gen's proposed project could improve the status of (uncultivated) vegetation and wildlife on-site. Badger Gen would locate the proposed facilities on higher ground, while either leasing the lower areas for farming or managing them to foster natural vegetation. Wildlife habitat on these lands could be improved by planting native species that provide cover and food. These lower areas where construction would not occur correspond to the 100-year floodplain on the proposed site (and land to the east). Refer to **Figure 4.05**.

Pirate perch, should they exist in Jerome Creek, would not be affected by the discharge of stormwater into a ditch that feeds Jerome Creek. This is because Badger Gen intends to keep the rate of discharge the same as now exists and to use a sedimentation basin to control water quality.

Refer to the Air Quality Section for a discussion of the potential impacts of air emissions on vegetation.

Local Community

Site History

The proposed site is and has been farmed for over 35 years. However, land use to the east of the site changed dramatically about 20 years ago, when WEPCO built the Pleasant Prairie Power Plant. A 1963 air photo shows that the Pleasant Prairie site was farmed, as is the land surrounding it on three sides (except for the Kenosha County cemetery). To the south, land was forested or fallow. A rail line is east of the proposed site.

In the late 1970's, WEPCO built a large (1,200 megawatt), coal-fired power plant and an electric transmission line on land adjacent to the eastern edge of Badger Gen's proposed site. Unit 1 of WEPCO's Pleasant Prairie Power Plant became operational in 1980 and Unit 2 in 1985. The electric transmission line is located next to Badger Gen's proposed site. Beyond that, about 300 feet east of the proposed site, is the rail line owned by the Canadian Pacific Railroad. Beyond the rail line are WEPCO's other power plant facilities. All land to the east, northeast, and southeast of the proposed site is now owned by WEPCO.

Land Use

Existing Land Uses and Zoning

The site is currently farmed and has no buildings. It was part of the Kenosha County Farmland Preservation Program for Prime Agricultural Land. On August 16, 1999, the Board of the village of Pleasant Prairie unanimously voted to rezone the site to heavy manufacturing (M-2). Under this zoning, the proposed plant would require a conditional use permit.

Figure 4.02 shows current land use on and surrounding the proposed site. Land to the west and north of the site is farmland and zoned for agricultural preservation. The Kenosha County Cemetery is adjacent to the northwest corner of the site. WEPCO's property to the east is zoned M-2. To the south of the site is undeveloped land zoned as Lowland Resource Conservancy (C-1). To the southwest of the site is farmed land, zoned as Agricultural Land Holding (A-4).

Within a half-mile of the site, land uses are mixed, with residential, commercial, industrial, agricultural, and recreational lands. Generally, but not always, zoning reflects existing land uses.

Residential

Residential developments are not located near the Pleasant Prairie Site. Two homes are located across CTH H from the site. A third home is located across CTH H from the cemetery just north of the site. These three farmhouses are the nearest residences.

To the north, between the site and Bain Station Road, are two more farmhouses and two residences in a wooded setting. Other homes and housing developments are located about half a mile or more away - to the south and north along CTH H, and to the east on the other side of WEPCO's property. Between the site and Bain Station Road, there are two parcels of land zoned Urban Single-Family Residential (R-3). About half a mile north is land zoned Multiple Family Residential (R-11) and about half a mile south is a small parcel of land zoned Suburban Single Family Residential.

Commercial and Industrial

WEPCO's existing transmission line is adjacent to the eastern site boundary. The Canadian Pacific railroad track lies about 300 feet east of the site and just beyond the tracks is WEPCO's property with its existing power plant. WEPCO owns additional land northeast and southeast of the site. Most of the land owned by WEPCO is zoned heavy manufacturing (M-2). Commercial buildings are located along County Road H to the south and north of the site. Southwest of the site, part of the Prairie Springs Park is zoned Planned Business Recreation (B-5).

Public Lands

The Kenosha County Cemetery is adjacent to the northern site boundary. Burials at this cemetery took place between 1924 and 1972. Lake Andrea is about 1,000 feet to the southwest of the site boundary. The lake is part of Prairie Springs Park (425 acres), which is a restored sand and gravel excavation site. This park has entrances off Lakeview Parkway. Other parks are about three or more miles away. Most are in the city of Kenosha. Refer to **Table 4.06.**

Table 4.06 Public lands near the Pleasant Prairie Site

Park	Ownership	Distance from site	
Prairie Springs Park	Village of Pleasant Prairie	560 feet	SSW
Schulte Park	City of Kenosha	2.8 miles	ENE
Peat State Wildlife Area	DNR	3.0 miles	WSW
Bong State Recreation Area/Brighton Dale County Park	DNR/Kenosha County	3.0 miles	NW
Various City Parks	City of Kenosha	More than 3.0 miles	E and ENE
Bristol Woods County Park/Pringle Nature Center	Kenosha County	4.5 miles	W
Chiwaukee Nature Preserve (unique natural features)	DNR/The Nature Conservatory/UW-Parkside	5.5 miles	ESE
Petrifying Springs Park/ Hawthorne Hollow Nature Area	Kenosha County/ HYSLOP Foundation	7.5 miles	NE

The northern end of the site appears to be within three miles of the Kenosha Regional Airport. The Federal Aviation Administration (FAA) places restrictions on the height of buildings and towers in the vicinity of public airports and private airports open to the public. However, according to the Height Limitation Zoning Ordinance map for Kenosha Regional Airport no portion of the site falls within the established height limitation zones. In accordance with FAA policy, Badger Gen would complete and file a *Notice of Proposed Construction or Alteration*, FAA Form 7460-I, with the FAA prior to final design of the selected project if the Pleasant Prairie site were approved.

Agricultural

There is agricultural land adjacent to the east and north boundaries of the site. The farmland east of the site is located under an existing transmission line. Agricultural land lies to the west and southwest, across CTH H from the site boundary. All adjacent farmland, except that to the southwest, is zoned Agricultural Preservation (A-1). Farmland to the southwest is zoned Agricultural Land Holding (A-4).

Between the proposed site and Bain Station Road, some land currently in farmland is zoned Urban Single Family Residential (R-3). North of Bain Station Road, farmland within half a mile of the site is zoned Agricultural Land Holding (A-4); Heavy Manufacturing (M-2); Agricultural-Related Manufacturing, Warehousing, and Marketing (A-3); and Multiple Family Residential (R-11).

Forests

Near the proposed site, there are trees in yards, and along ditches and field lines. There are woods in the Prairie Springs Park. Other than these areas, the nearest woods are located about half a mile from the site. To the southwest and to the north are woodlands zoned as Upland Resource Conservancy (C-2) and Agricultural Land Holding (A-4). About half a mile to the southwest of the site boundary is the beginning of woodlands associated with the Des Plaines River.

Sensitive Populations

The most vulnerable members of our population are the young, the old, and the sick. Nursing homes, schools, daycare facilities, and hospitals are places where large numbers of these categories of people are most likely to be found. None of these institutions are within half a mile of the Pleasant Prairie site. **Table 4.07** shows the location of the nearest of these institutions. All of these are in the town of Pleasant Prairie, but separated from the proposed site by other structures, such as WEPCO's power plant, trees, roads, buildings, etc.

Table 4.07 Sensitive populations at the Pleasant Prairie Site

Distance and direction From site boundary		Facility Type	Name
0.8 mile	NW	School	Pleasant Prairie Elementary
0.9 mile	NE	Day Care	Pleasantview Day Care
1.5 mile	NE	Hospital	St. Catherine Medical Center
1.7 mile	SE	Day Care	Lakeview Day Care
1.8 mile	ENE	School	Whittier Elementary
2.8 mile	SE	School	Prairie Lane Elementary
4.2 mile	SE	Nursing Home	Carey Manor

Changes to Land Uses From Construction or Operation

About thirty-two of this site's ninety-five acres would be removed from agricultural production**.** Refer to **Table 4.08**. The floodplain that makes up most of the rest of the site would either remain in agriculture and green space or be converted entirely to green space. Refer to **Figure 4.05**. The addition of the proposed power plant would not change surrounding land uses. In the past, farming continued adjacent to the much larger Pleasant Prairie Power Plant. In the same way, farming would continue across CTH H from Badger Gen's proposed power plant.

Table 4.08 Badger Generation's proposed changes in land use at the Pleasant Prairie Site

Changes	Agriculture*	Buildings & Pavement	Lawns & Landscaping
Acres now	66	0	0
Acres after construction	34	13	19
*Land currently farmed that is not in the 100-year floodplain and not in the CTH H right-of-way.			

Any new gas pipeline or electric transmission line construction would serve only the new plant, and thus would not be expected to lead to changes in adjacent land uses. The expected addition of about 35 employees to run the proposed plant would be a negligible increase in area employment, given the highly developed nature of the Racine/Kenosha area. Similarly, any arrangements for water supply would not change the character of the surrounding area.

Compatibility With Local Land Use Plans

Proposed land use for the site has shifted with time from agricultural to lower-medium density residential and secondary environmental corridor. Currently the site is zoned for heavy manufacturing. Badger Gen's plans for the site are compatible with the secondary environmental corridor and current zoning.

The Land Use Plan for the Kenosha Urban Planning District: 2010 shows a continuation of existing land uses surrounding the site, except for the Prime Agricultural Land to the west, across CTH H. The plans show development of this farmland into a lower-

medium density residential area. In the past, plans for the land adjacent to the much larger Pleasant Prairie Power Plant were changed from farming to lower-medium density residential. The proposed Badger Gen plant fits in with the character of the surrounding landscape, both commercial development further south and the existing Pleasant Prairie plant. Since nearby commercial development does not preclude residential development in Kenosha County, the proposed plant would not affect future land uses surrounding the site and is therefore compatible with local land use plans.

Municipal Services

Sewer and Wastewater

Connection to Community Systems

The connection to the local sewer system would be within the site boundary. No modification of the local community sewer system would be required beyond the site boundary.

The wastewater discharge from the Badger Gen power plant would be connected to an existing, on-site sanitary sewer line. Wastewater flow from the plant would be conveyed to the existing Kenosha sewage collection system through the village of Pleasant Prairie's existing sewage collection system. The application states that the village of Pleasant Prairie's sewage collection system currently has adequate capacity to convey the estimated plant discharge.

Capability of the Local Utilities

The applicant states that the maximum wastewater discharge anticipated from the power plant would be 2.0 MGD, with an estimated average discharge of 1.3 MGD. If the Pleasant Prairie site were selected, the plant's wastewater discharge would be treated by the city of Kenosha. The Kenosha sewage treatment facility has a maximum capacity of 68 MGD and an average daily flow of approximately 28 MGD. On this basis, it appears that the Kenosha sewage treatment facility has adequate capacity to treat the discharge that would be generated if the Pleasant Prairie site were selected.

Potential Local System Impacts

No adverse impact on the village's water system is expected. In fact, according to the village, the uncontaminated discharge from the plant would move the current discharge from the LakeView Corporate Park through the sewage system at a faster rate. At this time, during low flow periods, anaerobic conditions are created that cause a need for a greater degree of water treatment than would be necessary during larger flow periods. The anaerobic conditions cause problems like an increase of hydrogen sulfide levels in LakeView Corporate Park and in the STH 165 area and its tributaries. The waste flows from this part of the village are not sufficient to make the LakeView lift station operate at a high level, so the sewage turns anaerobic and produces a foul odor. The discharge volume of wastewater from the power plant would help to improve the function of the sewer system during times of low flow and help the local system to avoid the anaerobic conditions.

Potential Local Rate Impacts

Commission staff did not perform a cost-of-service study to evaluate the rate impact of siting the power plant. When establishing sewer rates for regulated sewer utilities, Commission staff performs a cost-of-service study that differs in many ways from the cash flow analysis typically performed when establishing rates for non-regulated sewer operations. The Commission does not directly regulate the sewer operations of Kenosha or Pleasant Prairie. As such, any comparison of present and projected sewer rates made by Commission staff using its standard methodology would not accurately reflect the potential sewer rate impacts under a cash flow analysis.

An empirical review of the issue suggests that the siting of the power plant should result in rates that are the same or possibly lower than those in effect at the time the plant is constructed. It appears that the sewer infrastructure, currently in place, is adequate to handle the projected effluent discharge from the plant. As such, there are no additional capital expenses to be recovered. If the expenses to be recovered through the sewer rates are predominately fixed in nature, such as debt expenses associated with sewer facilities already in service, then additional sales could have the effect of lowering sewer rates. If, however, the expenses to be recovered are predominately variable in nature, such as expenses associated with chemicals and pumping, then it is most likely that rates will remain constant as a result of the additional flow caused by the power plant's discharge of effluent. This is the result that is expected. The plant's effluent is not projected to be high strength because it would be pretreated at the plant prior to discharge.

Yard Runoff

If the Pleasant Prairie site were selected, a permanent stormwater basin would be constructed to allow collected sediment to settle out prior to discharge and to ensure that current peak runoff rates are not increased. (See **Figure 2.03**.) It is anticipated that the collected stormwater would ultimately be discharged to the tributary of Jerome Creek that is located on the proposed site, following requirements under the site's WPDES stormwater permit from the DNR. Badger Gen has not applied for this permit and does not intend to apply for it unless the Commission selects the Pleasant Prairie power plant site.

Refuse Collection

The local community would not have the responsibility of handling solid wastes from the project.

Non-recyclable materials would be eliminated through private contractors. Solid waste and debris that cannot be recycled, reused or salvaged would be stored in on-site dumpsters or similar containers for disposal. Programs would be developed to ensure that potentially hazardous wastes are separated from normal waste. Implementation would include segregation of storage areas and proper labeling of containers. Badger Gen indicates that all disposal contractors would be licensed in accordance with applicable regulatory requirements, and all disposal sites would be either local or regional licensed facilities.

Water System

Capability of Local Water Utility

The village of Pleasant Prairie Water Utility (PPWU) would supply water service to the Pleasant Prairie site. Based on its 1998 Annual Report on file with the Commission, the PPWU serves 4,405 customers with total annual sales of 434,912,000 gallons of water. For the calendar year 1998, the maximum volume pumped in one day by PPWU was 1,964,000 gallons. The PPWU purchases its water on a wholesale basis from the city of Kenosha Water Utility (KWU).

Based on its 1998 Annual Report, the KWU serves 27,433 customers with total annual sales of 4,083,323,000 gallons. For calendar year 1998, the maximum volume pumped in one day by KWU was 23,304,000 gallons. The KWU water treatment plant has a capacity of 40 MGD. Additionally, it has an elevated storage capacity of 1,900,000 gallons. Based on the data contained in the 1998 Annual Report, the KWU should be able to adequately supply the needs of the proposed facility.

The KWU is a diverter of Great Lakes water at an "authorized base level" of water loss from the Great Lakes basin. The power plant project would be in the Des Plaines River watershed, part of the Mississippi basin, but its wastewater would be discharged to the Kenosha sewer system. However, the project would use more water than the wastewater discharged to the sewer. If the project water use caused the water utility's consumption to go over its authorized base level, the utility might have to apply to the DNR. The DNR and utility would then have to comply with the consultation and comment procedures involving the states and provinces of the Great Lakes basin under Wis. Admin. Code § 142.07.

Water Main Construction

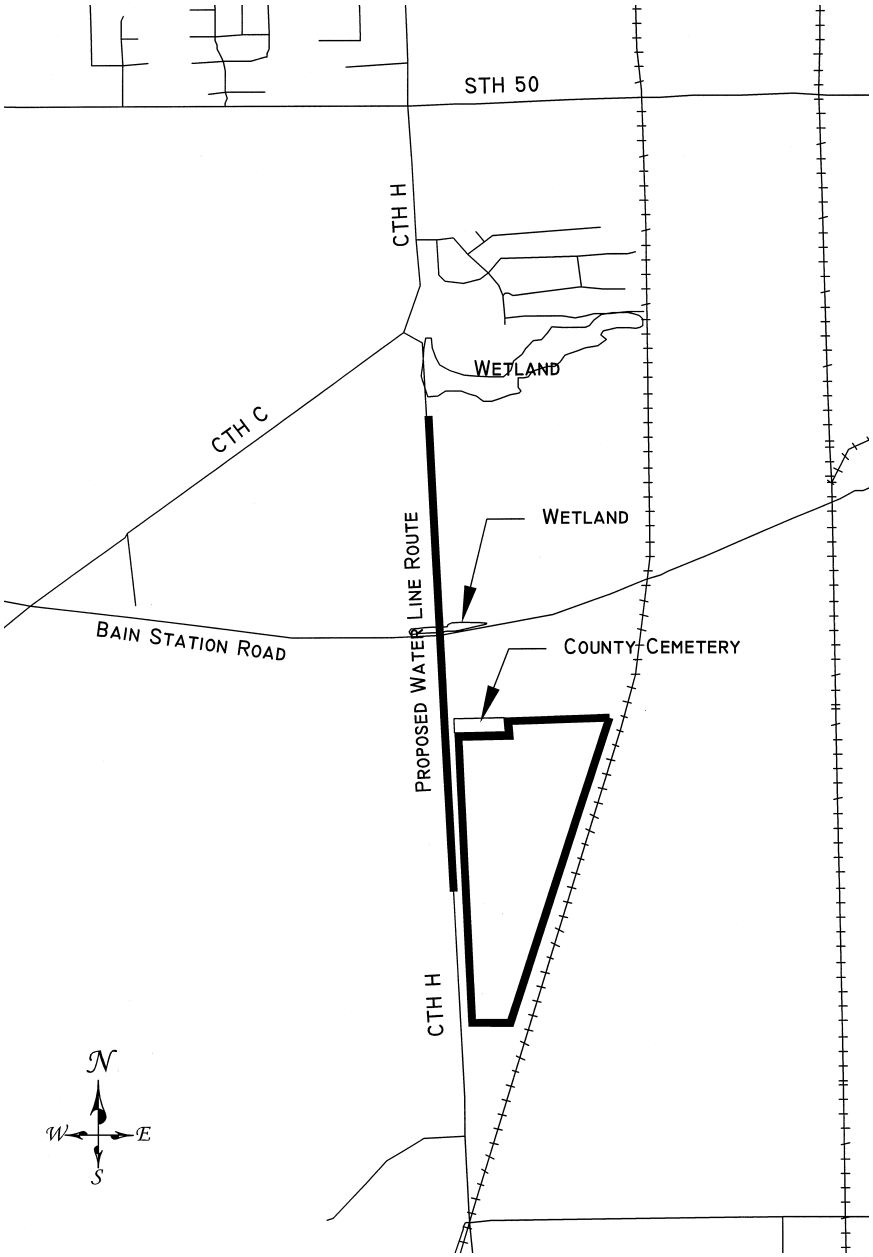
To serve the proposed facility adequately, the PPWU would need to install approximately 5,500 feet of 16-inch water main. Based on the information contained in the application, no other water system infrastructure additions or upgrades would be needed if the power plant at the Pleasant Prairie site were approved. The KWU would need to install a new 36-inch water main from 60th Street to 66th Street, regardless of whether the proposed facility is built.

The 5,500 feet of new main would be installed within the right-of-way of CTH H from the Pleasant Prairie Fire Station, south of CTH C, to the power plant (**Figure 4.07**). There are no alternate routes proposed. According to Badger Gen, most of the water lines would be in the grassed area adjacent to the road, located about 20 to 30 feet from the edge of the existing pavement. Badger Gen also indicates that a 20- to 50-foot wide area would be required for construction of the main. However, the estimated right-of-way width is 150 feet. This right-of-way width would include parts of the fields and lawns that lie along CTH H.

It has not yet been determined whether the main would be constructed on the east or west side of the road, but the two sides have similar uses along this part of CTH H.

About 66 percent of the water main right-of-way would overlap CTH H's right-of-way. Farmland comprises about 24 percent. About 7 percent of the road is lined by residential property. Small areas of wetland have been identified by the applicant on the east side of the road at the north end of the proposed water main and on both sides of CTH H just north of Bain Road. The west side of the road may be more suitable because the SHSW may request that the utility avoid construction along the county cemetery just north of the power plant site on the east side of the road.

Figure 4.07 Proposed water main route to serve the power plant at the Pleasant Prairie Site



Potential Local Rate Impacts

Badger Gen would pay for any upgrades needed to serve the power plant. There would be no adverse fiscal impact on the community expected from construction of the main.

Using information contained in the Badger Gen's application, annual reports on file with the Commission for KWU and PPWU, and previously performed cost-of-service studies, Commission staff performed rudimentary cost-of-service studies to assess the potential water rate impacts associated with siting the proposed power plant at the Pleasant Prairie location.

To bound the possible modes of operation, staff performed a cost-of-service study for each utility assuming a 90 percent capacity factor for the upper bound and a 40 percent capacity factor for a lower bound. This was done in recognition of the fact that the proposed facility would operate in either base load or intermediate mode, depending on market conditions. Staff took into account the impact of both increased water usage and the additional plant in service. For KWU, the wholesale revenues resulting from the increased sale of water were not calculated using rates currently authorized for use by the Commission. They were calculated using wholesale rates that KWU projects would result if the generating facility were located in Pleasant Prairie. Additional retail revenues for the PPWU were calculated using currently authorized water rates.

Based on the results of the cost-of-service studies, it is anticipated that for both KWU and PPWU the additional revenues generated by water sales due to the siting of the power plant at Pleasant Prairie would slightly exceed the additional expenses incurred in providing service to the generating facility at a capacity factor of either 40 or 90 percent. Local water rates are not expected to increase as a result of this project and could decrease.

Police System

No significant impacts to county services are anticipated. The Pleasant Prairie Police Department would be the police agency providing protection to the proposed plant, not the Kenosha County Sheriff.

The village of Pleasant Prairie has indicated that no additional resources would be necessary to protect the plant site during construction or operation. The village indicated that the plant would utilize very little of the existing police resources, based on the type of land use and the number of employees involved. During construction, the plant site fencing, on-site security, and access to local patrol cars are expected to help avoid added burdens to the department.

Fire Protection and Emergency Medical Service

Badger Gen states that it would work with state and local officials during the design phase of the plant fire protection system to address all state and local standards. Badger Gen would work with the local fire and rescue department on personnel training and familiarization with the areas within the power plant. This training and familiarization

would be important for the department to locate and respond to any on-site emergencies that may occur.

The village of Pleasant Prairie has indicated that it is capable of providing all necessary fire protection and rescue services to the plant. It has already acquired equipment and material that would be needed in order to deal with emergency responses at the existing coal-fired WEPCO Pleasant Prairie Power Plant. The village also has trained personnel who can react and work in a power plant environment. The village expects additional expenses required to handle the new proposed gas-fired plant to be minimal and expects more demand for fire protection and emergency services during construction than during plant operation.

Schools

Plant construction and operation would not be expected to increase the population of local families significantly. No impacts to kindergarten through twelfth grade enrollment in the village are anticipated.

Roads and Railroads

Existing

The Pleasant Prairie site is near several major transport corridors. Refer to **Table 4.09** and **Figures 4.1** and **4.2**.

Required Additions or Surface Changes

No changes to the transportation system are required for this project. When CTH H was rebuilt in the early 1960s, additional right-of-way was acquired. Kenosha County's five-year plan for transportation improvement does not include CTH H. However, should the roadway be widened, this would not affect the proposed layout of Badger Gen's facilities.

Table 4.09 Major transport corridors at the Pleasant Prairie Site

Highways	**Approximate Location from Site**
Interstate 94/41	2 miles west
CTH H (88th Avenue)	On western site boundary
STH 50 (75th Street)	1 ¼ miles north
STH 31 (Green Bay Road)	¾ mile east
STH 165 (104th Street)	1 mile south
Rail Corridors	**Approximate Location from Site**
Canadian Pacific Railroad	300 feet east

Table 4.10 Impact of construction traffic at the Pleasant Prairie Site

Approaches to site	STH 165	STH 50	CTH H
	Existing traffic		
1996 Average Daily Traffic (both directions)	8,300 STH 165, at CTH H	24,500 STH 50, south of site	5,200 CTH H, west of site
	Added traffic during peak construction		
Commuters in light vehicles	300-500 per day		300-500 per day
Deliveries using mid-size trucks to full size semi-trucks	500 per day	Minimal	500 per day

Impact During Construction and Operation

Badger Gen would direct all truck traffic to the site by way of I90/94 to STH 165 to CTH H. Employee traffic may also take the route of I90/94 to STH 50 to CTH H or Bain Station Road to CTH H. Badger Gen estimated the maximum traffic flow due to the proposed plant. In **Table 4.10**, these estimates of added traffic during peak construction periods are compared to 1996 traffic counts by the Wisconsin Department of Transportation. Badger Gen would use a railroad siding within two miles of the proposed site as an offloading point for over-weight and over-sized equipment. It would need various transport permits to move this special equipment to the site.

Construction impacts would include some traffic back-ups and congestion during shift changes or the transport of special (wide or heavy) loads. This congestion would be most noticeable near the site, particularly on the smaller access roads, such as CTH H and Bain Station Road and the intersection of CTH H with STH 165 and STH 50. Lane closures might occur during the construction of water or gas pipelines. All construction impacts to roads would be temporary. Refer to the section on Noise for a discussion of the traffic noise.

Traffic generated by the proposed plant after construction would be so minimal as to have no impact on the road system. During operation, a maximum of 35 employees over two to three shifts, seven days a week would result in fewer than 50 employee vehicle-trips per day. Fewer than 5 semi-truck and 50 light truck trips would occur per day.

Fogging and Icing

Potential for Plume Development

In general, waste heat from the power plant steam cycle condenser is released into the outside air through cooling towers. This can produce a water vapor plume that has length, breadth, density, and direction. These plume characteristics depend on weather conditions and the design of the cooling tower. A plume is often considered a negative

visual impact. More importantly, it can affect driving conditions. A plume touching the ground results in fog. If the temperature is below freezing, that fog creates ice on road surfaces.

The existing Pleasant Prairie power plant uses the standard cooling tower design. Badger Gen's proposed plant would use a different design that reduces plume formation. In a standard cooling tower, air is forced over water to cool the water, which continues to cycle through the plant. Because the water is cooled through evaporation, the air forced through the cooling tower becomes hot and humid, and rises to mix with the outside air. This humid, hot air produces a plume of water vapor when it meets cooler outside air (because cold air holds less water than hot air). Refer to the cooling tower section in Chapter 2 for more information.

Badger Gen proposes to use a type of cooling tower called a wet/dry tower. The air is forced over some open water, but also over some water in closed tubes. Heat released through the closed tubes produces hot, dry air. This type of tower reduces plume formation by increasing the amount of hot, dry air released and decreasing the amount of hot, humid air. While Badger Gen proposes to use a wet/dry tower, the final design of that tower is not complete. According to the Badger Gen environmental report, "The specific level of abatement has not been finalized."

Potential for Fogging or Icing

Badger Gen used a computer program to predict how often the plume from the proposed plant would create fogging or icing conditions on roads. The input data included five years of historic weather data (1982 through 1986). Sixty-five sites were identified as "receptors," or places where the computer program would look for fogging and icing conditions. The receptor sites used in the program are shown in **Figure 4.08.** These sites are along roads surrounding the proposed plant site. Icing is most likely to occur on roads, pavement, parking lots, airport runways, and the sides of buildings. Fogging and icing are most likely to be a hazard on roads.

The computer results show that the proposed plant would produce fogging and icing conditions in fall and winter on CTH H. There would also be some effect on Bain Station Road. **Table 4.11** summarizes the number of occurrences. **Table 4.11** shows the computer results by year, day, hour, and receptor.

Badger Gen predicts that the proposed plant would create only about three and a half hours per year of fogging or icing on nearby roads. Badger Gen reached this conclusion by comparing the weather conditions at General Mitchell Field in Milwaukee to days when the computer model predicted ice on CTH H or Bain Station Road. On days of rain, fog, snowfall, or blowing snow at General Mitchell Field, Badger Gen concluded that plant-induced fogging and icing would not be important, since there might already be fog and ice on Pleasant Prairie roads and drivers would already be more cautious. However, plant-induced fogging and icing would add to any existing weather hazards, including weather-induced fogging and icing.

Figure 4.08 Receptor sites used in Pleasant Prairie fogging study

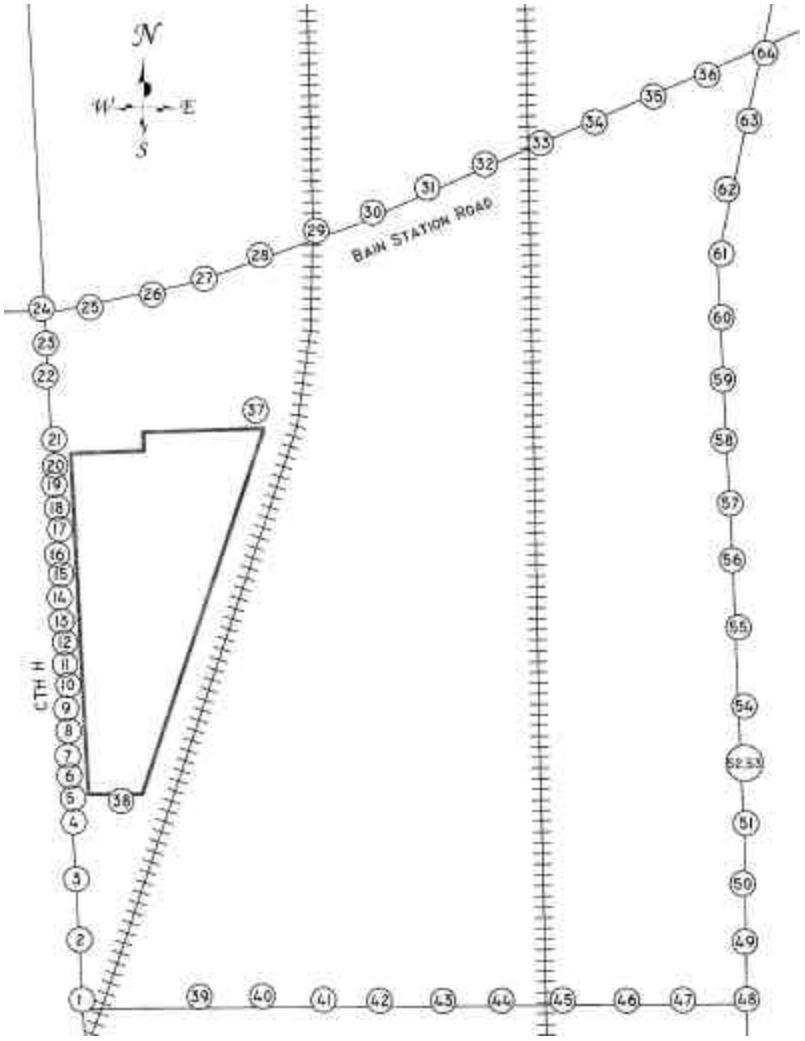


Table 4.11 Predicted increase in hazardous road conditions over a 5-year period Pleasant Prairie Site

	Fog*		Ice*	
Location	**HOURS**	**Days with Hour(s)**	**HOURS**	**Days with Hour(s)**
CTH H	17	10	17	10
Bain Station Road	1	1	1	CTH H

* On one day with fog on CTH H, there is also an occurrence of ice on Bain Station Road. On one day of fog on CTH H, there is also an occurrence of ice on CTH H. Otherwise, the days and hours of fog and ice do not overlap.

Table 4.12 Fogging and icing predictions Pleasant Prairie Site

Year	Day	Hour	Receptor	Receptor Number	Prediction
1982	2	17	CTH H	25	ICE
'82	3	23	CTH H	8, 9	ICE
'82	22	7	CTH H	14, 20	ICE
'82	22	8	CTH H	13, 19	ICE
'82	22	10	CTH H	14, 20	ICE
'82	22	15	CTH H	13, 14, 19, 20	ICE
'82	22	16	CTH H	13, 19	ICE
'82	22	19	CTH H	21, 65	ICE
'82	31	4	CTH H	7	ICE
'82	63	10	CTH H	10	ICE
1983	33	4	CTH H	10	ICE
'83	33	6	CTH H	10	ICE
'83	92	7	CTH H	10	FOG
'83	331	13	CTH H	10	FOG
'83	331	19	CTH H	11, 17	FOG
'83	331	20	CTH H	11	FOG
'83	331	22	CTH H	17	FOG
'83	331	23	CTH H	17	FOG
'83	332	2	CTH H	15, 21, 65	FOG
'83	345	7	CTH H	15, 21, 65	FOG
'83	355	1	CTH H	21, 65	ICE
1984	346	8	Bain Station Rd	26	FOG
1985	1	1	CTH H	9, 10, 15	ICE
'85	313	16	CTH H	9	FOG
'85	313	17	CTH H	9	FOG
'85	319	24	CTH H	13, 19	FOG
'85	320	1	CTH H	13, 19	FOG
'85	335	10	CTH H	12, 18	FOG
'85	335	16	Bain Station Rd	27	ICE
1986	32	1	CTH H	21	ICE
86	36	5	CTH H	6, 7	FOG
86	36	6	CTH H	6	FOG
86	36	7	CTH H	6, 7	FOG
86	322	9	CTH H	11	FOG
86	322	11	CTH H	10, 15	ICE
86	322	12	CTH H	9	ICE

Noise

Applicable Local Noise Ordinances

Pleasant Prairie and Kenosha County have octave band noise limits in their zoning codes. The codes are published in octave bands for which instrumentation is no longer available. Badger Gen's consultant, Hessler Associates, Inc., has converted the code octave band limits to currently measurable octave band limits. The noise limits in decibels (dB) by octave bands are given in **Table 4.13**.

The overall "A" and "C" weighted noise level limits for the plant using the converted octave band requirements would be 48 dBA and 66 dBC [8]. Under the village's performance standards, these limits may be raised by 10 dB in all octave bands because the proposed plant would not be located within 200 feet of any R-district in accordance with Table II, item 5 of section 12.12-4(e) of the local codes. Thus, the overall limits would be 58 dBA and 76 dBC. Badger Gen has indicated that the plant acoustical design would comply with the local codes.

Table 4.13 Pleasant Prairie and Kenosha County zoning ordinance noise limits, by code octave bands and by octave bands converted for modern measurement equipment

Zoning Limits - Code Octave Bands			Zoning Limits - Converted Octave Bands	
Band Range (Hertz)	**Band Center Frequency (Hertz)**	**Sound Level Limit (dB)**	**Band Center Frequency (Hertz)**	**Sound Level Limit (dB)**
20-75	39	65	31	67
			63	60
75-150	106	55	125	54
150-300	212	50	250	49
300-600	424	45	500	44
600-1200	849	40	1000	40
1200-2400	1697	40	2000	39
Above 2400	4899	35	4000	36
			8000	33

[8] **Sound levels** are measured with a device called a sound level meter in units known as decibels (dB).

Everyday sounds are comprised of sound waves of many different frequencies. The frequency of a sound wave is measured in Hertz (Hz), with one Hertz equal to one sound wave cycle per second. While the frequency range of human hearing is generally accepted to be 20-20,000 Hz, the ear is not equally sensitive to sounds through that entire range.

When sound level measurements are taken, it is customary to use weighting networks in conjunction with the sound level meter to approximate the sensitivity of the human ear across the frequency range of human hearing. Three internationally standardized weighting characteristic curves exist for sound measurements: characteristic A for sound levels below about 55 dB, characteristic B for sound levels between about 55 and 85 dB, and characteristic C for sound levels above about 85 dB. When sound levels are measured using a weighting characteristic, the measurements are designated by adding the characteristic curve letter after the abbreviation for decibels, such as 58 dBA.

Receptors in the Existing Environment

Three immediate receptor residences, one of which is the current landowner, surround the site as shown in **Figure 4.09**. There are no schools, hospitals, houses of worship, or commercial operations nearby. On the east side, the coal-fired WEPCO Pleasant Prairie Power Plant is not considered a sensitive receptor.

Ambient sound level measurements were made at a single point (**See Figure 4.09)**, 100 feet from the center of CTH H. Ambient noise levels at any other point along the road could be extrapolated from this single measurement by treating the spread of the noise as a cylinder spreading from a line source, which would be CTH H. Across the highway from the measuring point are two of the receptor residences and large farm fields. To the north and south of the site, the distances to receptors are greater. To the east of the site is the existing coal plant.

Since noise levels vary slowly with longer time periods but also instantaneously as individual events occur, ten-minute samples were recorded during each of the four time periods and statistics were computed. These included L_1, L_{10}, L_{50}, and L_{90} levels, and an "equivalent" level L_{eq}. The measured and computed dBA-weighted levels are given in **Table 4.14**.

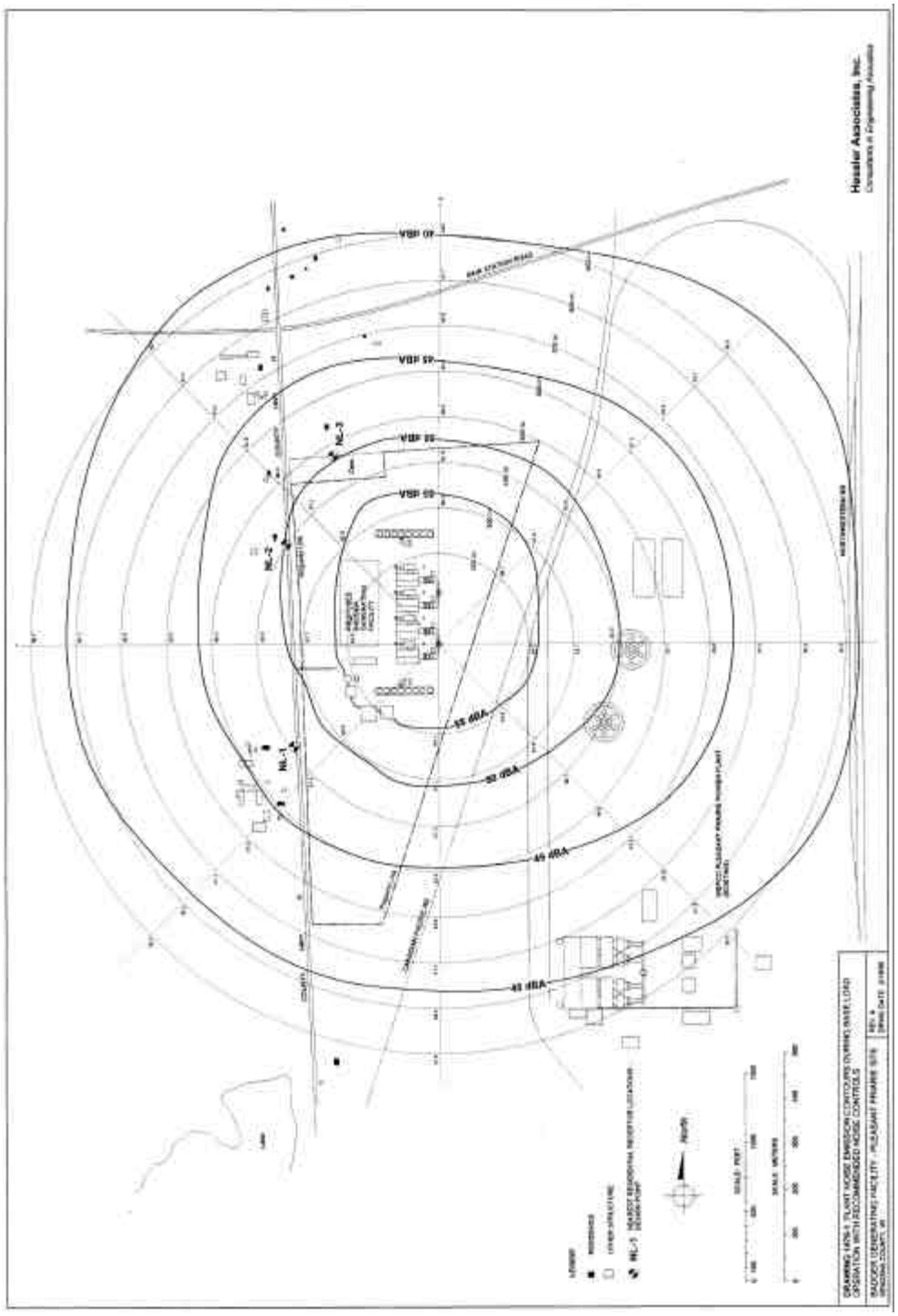
The L_{eq} is an average sound energy level, and the other four levels represent the sound levels exceeded 1, 10, 50, and 90 percent of the sampling time. The L_1 level is essentially the peak or the sound from the loudest events. The L_{10} level is used by the Federal Highway Administration to assess the need for traffic noise mitigation, and high values of L_{10} indicate dominant traffic as the source. The L_{50} level is the level where half of the time the noise is louder or quieter. The L_{90} level is typically used to classify noise environments in residential communities. It is usually "residual," representing the absence of identifiable sporadic sources like vehicle passes, barking dogs, aircraft flyovers, and other noise sources commonly found in the environment.

Table 4.14 A-weighted ambient sound measurements at Pleasant Prairie Site

Time of Day	L_1 DBA	L_{10} dBA	L_{50} DBA	L_{90} DBA	L_{eq} dBA
Morning	72.1	67.2	58.1	52.2	63.1
Midday	70.3	63.0	49.6	43.5	58.5
Evening	70.1	63.7	52.5	47.9	59.2
Night	66.3	56.7	51.0	49.5	55.0
Average*	70.8	64.6	53.4	47.9	60.3

* Average dBA is averaged over daytime (7 a.m. - 10 p.m.).

Figure 4.09 Projected noise levels with distance from the power plant at the Pleasant Prairie Site



The average daytime L_{90} level at the noise measuring point (**see Figure 4.09**, east of the site, new CTH H) has been estimated at 48 dBA. According to EPA typing, 48 dBA corresponds to an "urban residential" environment. The obvious local land use is farming, so this categorization probably results from traffic along CTH H. The operation of the WEPCO Pleasant Prairie coal plant can increase the L_{90} levels at certain frequencies slightly, at times when the highway is quiet.

Construction Noise Impacts

Construction noise would come from a series of intermittent sources, most of which would be diesel engine drive systems that power most construction equipment. There would also be very loud noise (ranging from 120 - 134 dBA at 50 feet from the event) created during short-term steam or air blows in the final stages of plant installation. **Table 4.15** ranks the construction noise sources and their levels at the closest receptors (see **Figure 4.09**).

Table 4.15 Estimated maximum noise levels for typical construction equipment in dBA at the Pleasant Prairie Site

	Maximum Noise Level (dBA)		
Construction Equipment	**Typical Range at 50 Feet**	**Average at 50 Feet**	**Expected at Receptors**
Steam blow off (4-8" line)	124-134	129	103
Air blow off (4-8" line)	120-130	125	99
Blasting	93-94	94	68
Dozer (250-700 hp)	85-90	88	62
Front end loader (6-15 yd^3)	86-90	88	62
Trucks (200-400 hp)	84-87	86	60
Grader (13-16' blade)	83-86	85	59
Shovels (2-5 yd^3)	82-86	84	58
Portable generators 950-200kW)	81-87	84	58
Derrick crane (11-20 T)	82-83	83	57
Mobile cranes (11-20 T)	82-83	83	57
Concrete pumps (3-150 yd^3)	78-84	81	57
Tractor (3/4-2 yd^3	77-82	80	54
Unquieted paving breaker	75-85	80	54
Quieted paving breaker	69-77	73	47

Steam and Air Blows

During the startup phase of the project, the installed steam piping would be cleaned with high pressure and temperature steam blown through the steam piping to clean out all debris, dust, grit, and loose mill scale before any steam is directed to the steam turbines. This would be done intermittently during a 2- to 3-week period near the end of plant construction. The steam would be exhausted to the atmosphere by a temporary steam blow valve equipped with a silencer. Steam blows range from thirty seconds in duration to five minutes, with an average duration of about one minute.

Air blows would use air compressed in the piping (at lower pressures compared to steam blows) and released through a temporary blow valve and silencer. Typical durations for air blows would be thirty seconds to one minute.

Table 4.15 shows that anyone in the residences across CTH H from the proposed plant would be exposed to maximum levels of about 100 dBA when they occurred. Nearby residents would probably benefit from advance notice.

Individual Equipment Noise

Since the construction noises would be intermittent and their values here are considered maximum values, they could be considered to contribute to the L_1 ambient values in **Table 4.14** above, which account for ninety-nine percent of the sounds perceived. The measured ambient L_1 values for morning, midday, and evening ranged from 70.1 to 72.1 dBA, at about 700 feet from the proposed power plant sources. With the exception of the steam and air blow offs, none of the construction sources in **Table 4.15** would be louder than 68 dBA, which is less than daytime L_1 peak levels for car and truck passes on CTH H (See **Table 4.14**).

Composite Construction Noise

Various combinations of machines are used during different phases of construction. Hessler Associates has provided average long-term noise levels from composite sources based on measurements conducted at fifteen power plant construction sites across the nation. These can be used to predict levels at the receptor residences for the construction site.

T**able 4.16** illustrates the estimated increases in noise level at the site for the five basic phases of power plant construction. It shows that there would be no increase over the average day-night ambient noise level at the residences across CTH H from the site during the concrete pouring, mechanical equipment installing, and clean-up and testing phases of construction. During excavation and steel erection, an average increase in

Table 4.16 Expected composite noise levels and noise level increases in dBA for the five basic phases of construction at the Pleasant Prairie Site

Phase	Construction Activity	Expected Levels (Leq) at Residences Near Site		
		LTCN*	AMB**	INC***
1	Excavation	62.6	59	3.6
2	Concrete pouring	58.6	59	0.0
3	Steel erection	62.6	59	3.6
4	Installing mechanical equipment	57.6	59	0.0
5	Clean-up, testing, and line cleaning	52.6	59	0.0
6	Unsilenced steam blow - line cleaning	102.6	59	43.6

* LCTN -- Predicted long-term composite construction noise level, L_{eq} for the indicated phase.
** AMB -- Average measured daytime-nighttime ambient noise level, L_{eq}.
*** INC -- Increase of construction noise over ambient noise.

about 3.6 dBA would occur. The construction noise would therefore be audible during these activities. Being audible, it does have the potential to distract or be at least temporarily annoying. Overall, with the exception of the steam and air blow off, none of the five phases of construction activity appear to create an appreciable potential adverse impact on the community.

The estimated noise at sensitive receptors can be evaluated individually in terms of interference with activities such as outdoor speech, sleep, or enjoyment of recreation facilities. To provide a scale for comparison, **Table 4.17** shows dBA levels for common sounds.

Table 4.17 Decibel values in dBA for common sounds

Example Event	Loudness (dBA)
Rustling leaves	20
Soft whisper	30
Normal conversation	50
Air conditioner	60
Busy traffic	70
Noisy restaurant	70
Vacuum cleaner	70
Washing machine	80
Heavy city traffic	80
Garbage disposal	80
Power mower	90
Chain saw	110
Screaming baby	110
Thunderclap overhead	120
Jet takeoff at 200 feet	130
Gunshot	140

Mitigation Plans

Badger Gen has stated its intention to employ all reasonable noise mitigation measures to minimize adverse effects of construction-generated noise. All construction equipment mufflers would be maintained in good order. Steam and air blows would be limited to daytime hours, and Badger Gen would notify local residents before doing them. To the extent possible, higher noise activities would be minimized during any second shift construction.

Operational Noise Impacts

Audible Noise

Design Goal

It is generally accepted by the acoustic community that an increase in 3 dBA is just perceptible, or audible to an observer paying careful attention to the noise level. An increase in 5 dBA is more noticeable, and an increase in 10 dBA is very noticeable. These perceptions apply only if the new noise source does not contain prominent tones or any other adverse character.

In order to reach a plant design goal that limits new noise to that barely noticeable, Badger Gen had the plant's proposed noise level set equal to the minimum measured existing L_{50} level over all measurement periods, about 50 dBA according to **Table 4.14**. Mathematically, this would add no more than 3 dBA at the nearby residences at points NL-1, NL-2, and NL-3 in **Figure 4.09**.

Effect of the Design Goal

If the design goal were achieved, noise from the plant would be just perceptible or faintly audible to a careful observer during the quietest time of the day or night for about fifty percent of the observed time. The rest of that time, noise from the plant would be inaudible because it would be masked by other noises that are currently ambient noises. The plant noise could become perceptible during the remaining portion of the day or night, but only for the brief periods when the ambient is at a near minimum level or around the L_{90} level. These situations are illustrated in the computed increases to the L_{10}, L_{50}, and L_{90} ambient levels shown in **Table 4.18**. In the table, increases in dBA levels of 3.0 or greater are identified. Across CTH H, then, the plant at its design goal might be just perceivable about fifty percent of the time at midday and more noticeable ten percent of the time. It also might be just perceivable about ten percent of the time in the evening and at night.

Table 4.18 Computed results of adding design goal noise level to existing ambient levels at L_{10}, L_{50}, and L_{90}, in dBA at closest receptor residences

		Morning	Midday	Evening	Night
L_{10}	Ambient	67	63	64	58
	Add	50	50	50	50
	Total	67	63	64	58
	Increase	0.1	0.2	0.2	0.8
L_{50}	Ambient	58	50	53	51
	Add	50	50	50	50
	Total	59	53	55	54
	Increase	0.6	3.0	1.8	2.5
L_{90}	Ambient	52	44	48	50
	Add	50	50	50	50
	Total	54	51	52	53
	Increase	2.1	7.0	4.1	3.0

Achieving the Design Goal

Badger Gen indicates that the design goal of 50 dBA appears achievable.

It would be achieved by a stepwise process during plant design. The first step would be to predict the cumulative sound levels at all the sensitive receptor sites as if standard, "off the shelf," unmitigated equipment was used to construct the plant. All the component

equipment noise sources would be identified and ranked in this process. The ranking would show the degree of noise reduction needed for each noise source. Then, the model would be adjusted step by step based on the economical and technical feasibility of quieting each component.

The cooling towers appear to be the greatest noise sources in the proposed plant. Half the plant's noise emissions would probably be budgeted to the cooling towers. The balance of the plant would then be allowed to emit no more noise than the cooling towers. The cooling towers, and the balance of the plant, would need to be limited to 47 dBA to make the total plant noise less than or equal to 50 dBA. At this site, the cooling towers would be about 700 feet from the closest receptor residence's property line. Two standard, unabated, 8-cell cooling towers would produce a noise level of about 60 dBA at that location. 60 dBA is far greater than 50 dBA, so the cooling towers would require noise abatement. Measures to take could include air path silencers on the air inlets and exhausts, larger and slower-speed fan design, low-noise blades, water splash mats, or enclosed water pumps, or possibly other things. At the same time, the building housing the gas and steam turbines and generators would need to be fitted with the appropriate acoustical properties, and the turbine air inlets would need to be muffled. The final plant design would be a balance of measures that help the company satisfy the design goal without reducing the plant's performance.

Badger Gen intends to utilize landscape buffer zones and noise-attenuating materials to help achieve local compliance and to minimize the impact of the facility on the surrounding area. Final noise mitigation measures would be decided in consultation with the local municipality. In the end, it might also be appropriate for the company to consider negotiating a "noise easement" from the nearest resident, near the NL-1 point in **Figure 4.09**.

Low Frequency Noise

Low frequency noise and vibration have been identified in some Wisconsin combustion turbine plants. It is felt as a vibration or rattling of structures and is not clearly identifiable when measuring or estimating sound using the A-weighted decibel scale.[9] Sound pressure[10] levels must be measured or determined across the full range of sound frequencies. Airborne sound waves in the frequency range below 40 Hz, if high enough in magnitude, can couple with frame building walls and windows and cause vibration.

The vibration problem occurs with simple-cycle combustion turbine plants, but generally not with combined-cycle plants. The combustion turbine plants discharge their exhaust

[9] When noise measurements are taken, it is customary to use A-weighting of the sound meter to approximate the sensitivity of the human ear across the frequency range of human hearing. Because its response curve is clearer in the lower frequencies, C-weighting of the sound meter can give a better indication of the potential for low-frequency vibration.

[10] Sound pressure level measurements are only made with a sound level meter that does not compensate for the sensitivity of the human ear across the frequency range of human hearing. Such devices are said to have a "flat" frequency response.

gases directly to the atmosphere through exhaust silencers, which do not silence well below 40 Hz. Most large combustion turbines create very high levels of acoustic energy below 40 Hz, and this energy can radiate as airborne waves and easily propagate over large distances. In combined-cycle plants, the turbine exhaust gases are directed through a heat exchanger system and HRSG, not through an exhaust silencer, and then to the atmosphere. The exhaust gases lose energy in the boiler tubes. Low frequency exhaust noise is reduced to very low levels, and vibration problems do not appear. For this project, even when the plant is only in the combustion turbine mode, the exhaust gases would go to the heat exchanger system.

The company provided measurements and estimates for this project using the C-weighted scale, which more easily enables identification of low frequency noise. C-weighted measurements of ambient noise at different times of day are shown in **Table 4.19**. The C-weighted design goal has been set at 75 dBC, which would also meet the local municipal performance requirement of 76 dBC. **Table 4.20** shows the computed increases to the L_{10}, L_{50}, and L_{90} ambient levels at the receptors caused by the proposed plant operating at its design goal of 75 dBC.

The table shows that an increase of at least 3 dBC can be expected at any time of the day, ninety percent of the time, but that the local performance standard is essentially reached.

Table 4.19 C-weighted ambient sound measurements at Pleasant Prairie Site

Time of Day	L_1 DBC	L_{10} dBC	L_{50} dBC	L_{90} DBC	L_{eq} dBC
Morning	84.5	74.0	68.3	66.1	72.3
Midday	78.6	70.1	64.2	61.8	67.7
Evening	79.8	72.9	66.0	63.7	69.7
Night	72.1	66.9	64.9	63.5	65.6
Average*	78.8	71.0	65.9	63.8	68.8

* Average dBC is averaged over all data and entire day.

Table 4.20 Computed results of adding design goal noise level to existing ambient levels at L_{10}, L_{50}, and L_{90}, in dBC at closest receptor residences

		Morning	Midday	Evening	Night
L_{10}	Ambient	74	70	73	67
	Add	75	75	75	75
	Total	78	76	77	76
	Increase	3.5	6.1	4.2	8.7
L_{50}	Ambient	68	64	66	65
	Add	75	75	75	75
	Total	76	75	76	75
	Increase	7.5	11.1	9.5	10.5
L_{90}	Ambient	66	62	64	64
	Add	75	75	75	75
	Total	76	75	75	75
	Increase	9.4	13.4	11.6	11.8

There apparently is no useful correlation measurement between the ambient increase in dBC and community reaction. However, the national standards for combustion turbine installation sound emissions suggest that 75-80 dBC sound emissions would be enough to avoid low frequency noise problems, and resulting increases in dBC appear to remain within that range.

Prominent Tones

Some power plants in Wisconsin have exhibited problems with certain frequencies of sound (tones) carrying farther from the plant and creating impacts. Usually, these problems have been associated with large fans that are used in coal-fired plants. Even though many pieces of the combined-cycle plant equipment would be potential tonal noise sources, the broadband sources (towers, turbines, and generators) would be much more prominent and would mask them within 1,000 feet.

Transient Noise

During normal start-up and shutdown of the power plant, controlled steam venting must occur. Under emergency conditions, safety valves may open, temporarily emitting very high noise levels. Hessler Associates, Inc. recommends a transient source design goal of no more than 8 dBA above the steady state design goal (50 dBA at the Pleasant Prairie site) to limit noise impacts from these safety valves. Badger Gen would apparently need to install silencers on the valves as part of the plant design.

Visual Landscape

Existing Visual Landscape

In this part of Wisconsin, farmland mingles with housing developments, large commercial or industrial buildings, and transmission lines. The LakeView Corporate Park, the Kenosha Regional Airport, and a large granary are located in this area. The landscape is generally flat with few woods, so that people can see for long distances. The water vapor cloud (plume) from the existing Pleasant Prairie coal plant is often visible from as much as six miles away. From CTH H, the main building of the existing power plant, because of its size, is visible from about a mile away. Closer to the proposed site, the Pleasant Prairie coal plant is a dominant feature in the landscape. The actual size of the existing plant is hard to judge because it is set off by itself with no familiar structures to put it in proportion.

The existing power plant and commercial buildings south of it give a strong visual impression of modern industry. However, the existing farm field on the proposed site, the Kenosha County Cemetery with the woods around it, and the farm fields west of CTH H give a strong visual impression of rural Wisconsin. **Figures 4.10 and 4.11** show these two impressions with views along CTH H toward the south and toward the north.

The four locations from which the proposed plant would be most visible are:

- A farmhouse across CTH H from the northern end of the proposed site.
- A farmhouse across CTH H from the southern end of the proposed site.
- A farmhouse across CTH H from the Kenosha County Cemetery.
- The nearest entrance to Prairie Springs Park.

The actual views seen by people in the houses west of CTH H, or in the general vicinity of the houses, will vary depending on the location of windows, the screening provided by yard trees and bushes, the habits of individuals, and the direction in which people are looking. **Figures 4.12-4.15** show one view from near each of the three houses and the entrance to Prairie Springs Park.

The views shown in the photos are all from the western side of the proposed site. Due to the location (and size) of WEPCO's property and the location of the railroad tracks, there are no near-views of the proposed site from the east and south. The proposed site for the plant is not visible.

Changes in Views and Impacts of Construction and Operation

Changes in Views

In views of the proposed plant from the east and south, the plant would appear very small and blocked or heavily framed by either the existing power plant or commercial buildings. The same would be true of views from further west than CTH H and from Bain Road, north of the site. Badger Gen's application, filed also with county and town

officials, contains illustrations of how the proposed plant might look in these distant "viewsheds."

Between the northern site boundary and Bain Station Road are four houses. Woods and distances would mitigate the view of the proposed plant from these four houses in much the same way and to about the same extent as they mitigate the view of the existing power plant.

For closer views on CTH H, plant facilities would be set back about 150 feet south of the cemetery property and about 300 feet east of CTH H. It is likely that the facilities of the power plant closest to the road would include (from the north) a cooling tower and stormwater pond, the plant substation (switchyard), the administrative building, the water treatment tanks and equipment, and the natural gas handling equipment. The main plant building that holds the four turbines would be located behind the substation and administrative building. The cooling towers would be located behind the water treatment facilities. The underground transmission corridor would run adjacent to CTH H. It is likely that Badger Gen would locate the power plant's facilities in the northern three-fourths of the site because there is floodplain at the southern end of the site. Refer to **Figures 2.03, 4.02, and 4.05**. Badger Gen's proposed site is a somewhat triangular-shaped property between WEPCO's Pleasant Prairie Power Plant property and CTH H (88th Avenue), with the "tip" of the triangle pointing south.

The main building of the existing Pleasant Prairie plant would lie to the southeast of the Badger Gen facilities, with the existing plant's cooling ponds and cooling tower lying to the east of the proposed plant. The main building is about 250 feet high and consists of two stories (of unequal height). The height of the proposed plant (about 90 feet) would be roughly equal to the height of the existing plant's first story. The proposed plant's administration/service building would be about 30 feet high. The proposed plant's four stacks would be about 120 feet high. The existing coal plant's stack is about 450 feet high.

From the northwest on CTH H, the proposed plant would appear larger or about the same size as the existing Pleasant Prairie plant, because the proposed plant, while actually smaller, would be closer to the viewer. Beyond CTH H, the further away the viewer, the larger the existing plant would appear compared to the proposed plant. From the southwest the proposed plant would appear smaller, side by side with the existing coal plant.

From the west on CTH H, the existing power plant would be more or less visible to one side of Badger Gen's plant, depending on how far north or south the viewer stands. Across CTH H from the northern part of the proposed site, the proposed plant would probably block out much of the view of the existing plant's main building. Across CTH H from the southern part of the proposed site, the proposed plant would probably block out the view of the existing plant's cooling tower.

Construction Impacts

From a visual perspective, the construction of the proposed plant could appear chaotic or interesting, depending on the viewer's frame of mind. However, it would not appear out of place, given the industrial frame of the existing power plant and its water vapor plume.

Impacts of Operation

The proposed plant would change the view of people living in or working around the three houses nearest to the site. These people would no longer see a power plant from a distance with natural lines and colors in the foreground, but rather would see a commercial-looking building, possibly with natural lines and colors curving behind and to one side of it (assuming the floodplain area is altered to a conservancy area). The most "different-looking" aspect of the proposed plant would be the substation (switchyard) with its electrical equipment.

It is difficult to predict the exact visual impact to people living at the farmhouses, because visual impacts depend on many variables, such as the location of windows, the habits of individuals, and the positioning of yard trees and bushes. The general impact is that people living near or driving past the site would lose any sense of countryside when looking to the east.

Mitigation Methods

There is probably no attractive way to mitigate the view of construction. However, the final appearance of the proposed plant could be altered by a number of details, such as bush and tree plantings, fences, paint colors, and lighting. The success of this type of mitigation depends on the final design. Badger Gen proposes to use a plume mitigation system in its cooling towers that would keep the visible water vapor to a minimum. For more information, refer to the sections describing the cooling tower, in Chapter 2, and its impacts, in this chapter.

Lighting

Badger Gen would light the plant site in a manner similar to other industrial sites. Lighting may also increase at special times during construction or operation (for construction at night or during special plant maintenance). This means that the level of light would increase near the site. Further from the site, the increased light levels would blend in with the lights of the existing power plant to the east and the industrial/ commercial area to the south. Badger Gen would use outdoor light fixtures that shade the source of light, directing the light downward, so that it is unlikely that their lighting would light up the night sky or create a nuisance for nearby homeowners. Badger Gen would decide on the location of lights during the "final project design phase." The FAA may also require a light or lights on the plant stack. However, lighting the stacks would not create a new effect in the surrounding area, given the existing power plant to the southeast.

Figure 4.10 View along CTH H toward the south, showing the existing plant.

Figure 4.11 View along CTH H toward the north, showing the proposed site.

Figure 4.12: View from driveway of the house across from the cemetery toward the proposed site. The proposed plant would probably block the view of the existing plant building.

Figure 4.13 View of the site from the farmhouse across CTH H from the northern end of the site. The proposed plant would probably block the view of the horizon.

Figure 4.14 View of the site from near the farmhouse across CTH H from the southern end of the site. The proposed plant would probably block the cooling tower and most of the horizon.

Figure 4.15 View toward the east from the park entrance closest to the site. Part of the proposed plant would probably appear at the far left of the photo, behind the trees.

Historical and Archeological Sites

Known and Listed Historic Properties - Compliance With Wisconsin Statutes

Under Wis. Stat. § 44.40, the Commission must determine if project construction and operation could affect historic properties listed with the State Historical Society of Wisconsin (SHSW). The listings at the SHSW show no traditional cultural, archeological, or historic architectural properties that would be affected by the construction and operation of the proposed facilities.

Surveys to Locate and Evaluate Historic Properties - Compliance With National Historic Preservation Act

Because there are federal permits and approvals required for the plant, the more stringent federal requirements of Section 106 of the National Historic Preservation Act (NHPA) supersede those of Wis. Stat. § 44.40. Section 106 applies to all construction aspects necessary for the power plant project. Enforcement is through the federal permits. At the plant site, under Section 106, the SHSW has required Badger Gen to have all areas of proposed new ground-disturbing activity surveyed by a qualified archeologist to locate and evaluate the significance of any archeological sites that may be present. Badger Gen has had this survey performed by Great Lakes Archeological Research Center, Inc. (GLARC).

Existing Resources at the Plant Site

GLARC's site literature review and on-site work could not identify any areas that met the criteria for inclusion on the National Register of Historic Places (NRHP). Archival and literature searches revealed thirty-nine listed archeological sites within one mile of the proposed power plant site. Only two prehistoric archeological sites were identified within the limits of the site. Both are small, transitory campsites. Extensive plowing and subsequent erosion has destroyed any undisturbed subsurface features or context that may once have existed.

Next to the power plant site to the north is a Kenosha County cemetery, with small concrete grave markers. Burials were made in this cemetery from the late nineteenth century through 1972. The cemetery is clearly marked and delineated, fenced, and maintained.

Potential Impacts

GLARC and the SHSW agree that the proposed power plant itself would not have an adverse affect on sites or properties eligible for the NRHP. They also have determined that the small cemetery to the north is not threatened by the proposed power plant although it may be adversely impacted by the proposed water line if that line is constructed down the east side of CTH H.

The SHSW recommends no further investigations but may request some work by the village water utility.

It is always possible that undiscovered artifacts or archeological sites might be found. If such finds were made, they would need to be reported to the SHSW at once. If human remains were discovered at any time during the project construction, construction would need to stop and Badger Gen would need to contact the SHSW immediately for compliance with Wis. Stat. § 157.70, which provides for the protection of burial sites.

Economic Impacts

Shared Revenue Payments

A power producer like Badger Gen is exempt from local property taxes. Such a power producer pays a fee to the Department of Revenue based on the value of the power sales. Money from state general revenues is shared with the affected village and county. These shared revenue payments begin during construction and continue during operation. The village of Pleasant Prairie would receive a distribution of 6 mills times the first $125 million in the account. Kenosha County would receive a distribution of 3 mills times the first $125 million in the account. Distribution of the money during the construction period may increase as the value of the plant increases. Distributions of this money over the first eight to ten years of power plant operation are estimated to be in the range of $1 million dollars per year. These payments would be about $750,000 to the village and $375,000 to the county.

Jobs

The typical number of construction employees on any single day is about 100. The peak number of workers could be 250 on one shift. If there is more than one shift of workers, the maximum could be 325. Over the course of the project, a total of 525 would be employed. This would include specialists that do technical work on the turbines and test them. The number of permanent employees that would operate the proposed power plant is about 35. The number of jobs for construction or operation is insignificant when compared with the number of workers at the Wisconsin Electric power plant across the railroad tracks and in the entire Racine-Kenosha area.

Development Impacts

No secondary development is likely to occur if the proposed power plant is built. Natural gas is already available in the area. The new pipeline to the proposed power plant is not designed to serve any other customers. The electric transmission line connected to the proposed power plant will not serve other customers. Badger Gen has stated it has no intention of selling steam.

Electric Transmission Line

Existing System and Proposed Connection

The Pleasant Prairie site is adjacent to the existing WEPCO Pleasant Prairie Power Plant and the associated Pleasant Prairie substation. This is a major substation, from which 345 kV transmission lines connect to Waukesha, Racine and northern Illinois.

While this might seem the ideal place to connect the proposed Badger Gen facility, the preliminary engineering analysis indicates that there are problems with this interconnection approach. The essence of the problem is that the existing Pleasant Prairie Power Plant – Wisconsin's largest – already relies on these transmission connections to deliver its power output reliably. Connecting another large plant to this same substation could overload these transmission lines. Attempting to transfer the combined output of both plants through these transmission lines could also threaten the operating stability of the existing Pleasant Prairie plant.

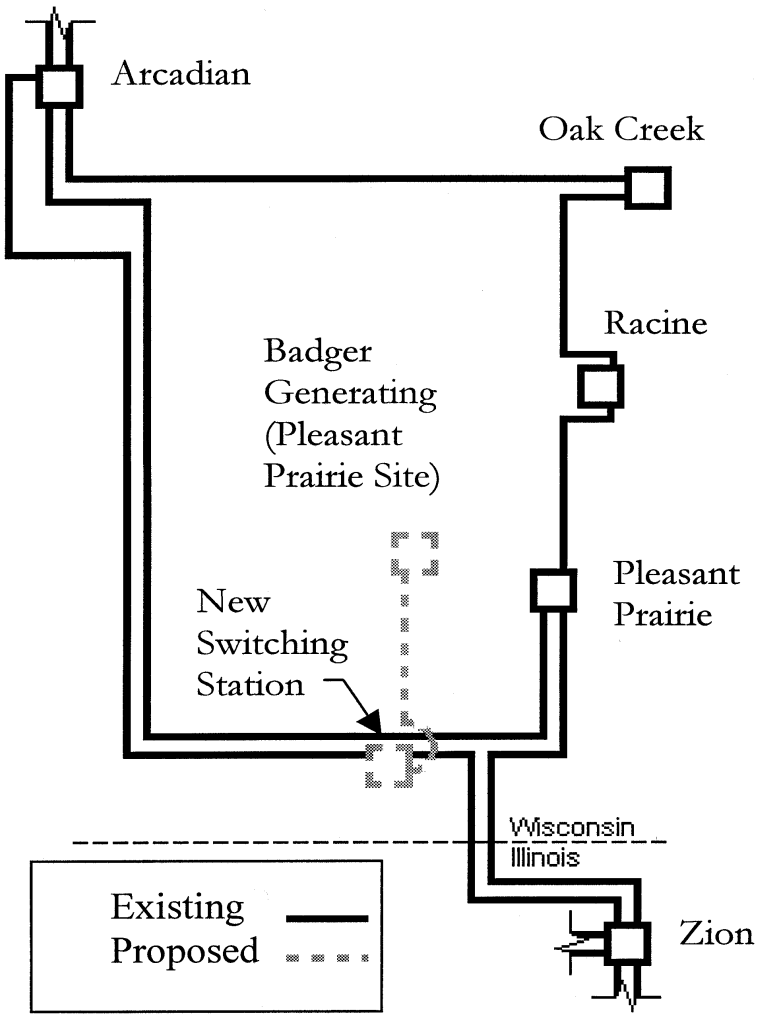
An alternative 345 kV transmission line is nearby, however, that does not have the same disadvantages. This line connects the Arcadian substation, near Waukesha, to Commonwealth Edison Company's non-operational Zion power plant, located just south of the Wisconsin border on Lake Michigan. Badger Gen is proposing to build a new underground transmission line that would connect to this Zion-Arcadian transmission line.

In general, there are two ways to make such a connection. If two separate transmission line circuits are built from the power plant to the interconnection point on the existing transmission line, the plant can be "looped in" to the existing line. This means that the existing Zion-Arcadian line would be broken into two pieces and each piece would be extended to the new plant to create a Zion-Badger Gen line and a Badger Gen-Arcadian line. In this arrangement, the new interconnection point would require only facilities to make the transition between an underground cable and an overhead transmission line.

Badger Gen is proposing to make a connection with just one new transmission circuit, however. This approach, in effect, would convert the existing Zion-Arcadian line into three lines, connecting the new interconnection point to Zion, Arcadian, and Badger Gen, respectively. In this arrangement circuit breakers must be installed in a new switching station at the interconnection point. This results in a somewhat larger transmission station than for the loop-in connection described in the previous paragraph, as circuit breakers and associated equipment must be located there, in addition to the underground-to-overhead transition equipment. This proposed connection is depicted in **Figure 4.16**.

Utilities generally connect power plants to the transmission system using at least two separate transmission lines. This is to ensure that the plant could continue to provide

Figure 4.16 Proposed interconnection between Badger Generating Plant at Pleasant Prairie Site and existing transmission system. Only 345 kV transmission lines are shown.



power to the system even with one line out of service. The proposed single-line connection would mean that the entire plant would be instantly removed from the system if that line were to fail. Badger Gen, which will not directly serve retail customers in Wisconsin but instead expects to sell its power on the wholesale power market, states that it is prepared to take this risk.

While Badger Gen views this as an assumable risk, such as a sudden loss of over 1,000 MW of generation in Wisconsin would have an impact on the rest of the system, and thus on other Wisconsin utilities and customers. The Wisconsin utilities should address the question of whether this impact would be acceptably small.

Assessment of Transmission System Impacts

Transmission System Impact Study

The Badger Gen plant must interconnect with WEPCO's transmission system, and WEPCO has a responsibility to ensure that any interconnection does not cause system reliability to fall below acceptable levels. WEPCO conducted two studies to assess possible impacts of interconnecting the proposed Badger Gen plant with the existing transmission system. One study examined the steady-state impact on system voltages and the potential for thermal overloads of transmission facilities. The second considered impacts on system dynamic stability. Chapter 2 included an introduction to these topics in its discussion of transmission connections. The following sections describe WEPCO's analysis. While these sections describe particular improvements, it is important to note that the degree to which Badger Gen is driving the need for those improvements, and to which Badger Gen should bear the associated costs, is the subject of ongoing discussion between Badger Gen and WEPCO.

Steady-State Analysis

WEPCO's steady-state study considered both single and double contingencies. That is, it examined the voltage problems and overloads that could occur with as many as two major pieces of the transmission system out of service. Some double-contingency analyses focus only on double outages that could result from a common cause, such as the outage of two transmission lines that occupy a single set of structures. In the case of multiple outages that are not linked by a single mode of failure, many analyses allow system configuration or generation levels to be modified after the first outage, so as to be better prepared for a subsequent outage. WEPCO's analysis employed a more conservative approach; it considered all major double outages and did not allow for system adjustment after the first outage. Badger Gen contends that this is an unreasonably high standard as it is a more demanding standard than has typically been used in transmission system planning in Wisconsin and other parts of the U.S. WEPCO, in contrast, considers this an appropriate standard. WEPCO has applied this standard in assessing interconnection of its own new power plants. In addition, WEPCO believes that the fact that they will not be able to directly control this plant increases the importance of minimizing possible adverse impacts on the power system.

The steady-state study identified a number of possible transmission system thermal overload problems. Most of these potential overloads are situations that WEPCO is familiar with and has plans to fix in the near future. These planned projects include replacing substation equipment, raising conductors to increase clearances and installing new conductors with higher current-carrying capacity in place of existing conductors. In some cases, the age and condition of structures suggest that the existing structures should be replaced at the same time that conductors are replaced.

The study did identify one significant new potential overload. This involves the 18-mile, 138 kV transmission line between the Paris Substation in north-central Kenosha County and the St. Martins Substation southwest of Milwaukee. WEPCO found that, with

Badger Gen units on line and a particular pattern of generation by other power plants in the region, the outage of two major 345 kV lines would cause this line to overload. Installing larger conductors in place of the existing conductors could alleviate this problem. WEPCO estimates that this work would cost approximately $5.8 million.

In addition, this study identified potential for low-voltage problems in southeastern Wisconsin. These problems are particularly acute in the case in which Badger Gen is modeled as selling power to Wisconsin utilities, rather than Illinois utilities. These problems are partly a consequence of the fact that, in order to model such a sale of power, it is necessary to reduce generation elsewhere in Wisconsin. Utilities generally turn off the highest-cost plants first. This leads to shutting off generation, in the model, in places where that generation is important in supporting system voltages.

These problems with low voltage could be alleviated by installing capacitors at substations in southeastern Wisconsin. WEPCO estimates that this work would cost approximately $3.7 million.

Dynamic Stability Analysis

In a properly functioning power system, all generators rotate in synchrony. If synchronism is lost between generators or different parts of the power system, the system will no longer be able to effectively transfer electricity. Installation of new generation can have an adverse effect on the ability of other generators to maintain stable, synchronous operation when the system is subjected to disturbances. This, in turn, can lead to forced disconnection of generators, severe voltage and frequency fluctuations and customer outages. Dynamic stability analysis allows the potential for these problems to be assessed.

WEPCO's dynamic stability study did not find any instances in which interconnection of the proposed Badger Gen plant caused an unacceptable deterioration in the stability of other generators on the system. This study did, however, identify situations in which stable, synchronous operation of the Badger Gen units themselves could be at risk. If these generating units were to lose synchronism with the rest of the power system, they would have to be disconnected.

The study identified two distinct power system disturbance situations that could cause stability problems. One of these is a short circuit at Commonwealth Edison Company's Zion Substation in combination with a failure of one of the circuit breakers responsible for isolating the short circuit. Such circuit breaker failures are rare, but it is standard practice to consider this possibility in performing dynamic stability studies.

Badger Gen could avoid stability problems caused by such an event at Zion by disconnecting some generating units in the early stages the disturbance, allowing the other units to remain on line. This is probably the course of action that Badger Gen would take in this case. Alternatively, it might be possible to replace circuit breakers and associated equipment at Zion, which would bring about stability improvements through faster circuit breaker action in the case of a short circuit.

The other situation that raised dynamic stability concerns involves a short circuit occurring in the Arcadian Substation in combination with a pre-existing outage of the Badger Gen-Zion transmission line. This problem could be alleviated by reducing the generation level at the Badger Gen plant in the event of an outage of the Badger Gen-Zion transmission line, in preparation for a possible second outage. As an alternative, a change in the 345 kV system configuration at the Arcadian Substation, which would allow more of the system to remain connected in the event of a short-circuit event, could alleviate these dynamic stability concerns. WEPCO estimates that one approach to this work would cost approximately $5 million, although the feasibility of this approach has not been confirmed.

Neither the steady-state analysis nor the dynamic stability analysis identified any problems that would require construction of additional new transmission lines anywhere in the state.

Pertinent Agreements Needed

Badger Gen will need to reach an agreement with WEPCO regarding how the interconnection is to be accomplished. This interconnection agreement will also include details of the allocation of interconnection and system improvement costs between Badger Gen and WEPCO.

In addition, Badger Gen will have to obtain reservations for use of the transmission system before it is able to carry out power sales to particular parties. Studies are required to assess the impact of these particular power transactions, and these studies may identify additional weaknesses in the transmission system that will need to be corrected before the transaction reservations can be approved. This may lead to the need for additional transmission system reinforcement, and the costs of such upgrades would most likely be assigned to Badger Gen.

The analysis already conducted by WEPCO does provide some insight into the likely need for upgrades to accommodate future power transactions. Specifically, it appears that the improvements already identified would allow a wide range of possible power transactions, and that additional upgrades would probably not be required in the near future to allow Badger Gen to sell the power it generates.

In considering the possibility of future system reinforcement in the vicinity of the proposed power plant, it is worth noting that the existing Pleasant Prairie-Racine 345 kV transmission line structures have space for installation of a second 345 kV transmission circuit. This means that a future connection between the Badger Gen plant and the Racine substation should be achievable with costs and environmental impacts limited to those associated with adding a new circuit on these existing structures. This situation further reduces the chances that interconnection of the Badger Gen plant would lead to the need to build completely new transmission lines.

Proposed Transmission Routes and Riser Substation Sites

The two proposed routes for the underground transmission line are called Route E and Route W (See **Figure 4.18**). Route E would begin at the proposed power plant site switchyard and follow CTH H to the existing Arcadian-Zion transmission line. The Arcadian-Zion transmission line is 2.4 miles south of 95th Street. This transmission line runs east-west between the parts of CTH ML that go east and west from CTH H in the village of Pleasant Prairie. Route W would begin at the proposed power plant switchyard and follow CTH H south to the existing Canadian Pacific rail line. Route W would then follow the rail line south to the Arcadian-Zion transmission line.

Depending upon the presence of other utilities in road or railroad rights-of-way, Badger Gen proposes to acquire only 25 percent of additional right-of-way width as new right-of-way. However, Badger Gen is uncertain about the actual centerline at this point, and also about the actual right-of-way widths. The CTH H right-of-way ranges from 80 to 140 feet wide and is usually 90 to 100 feet wide. Badger Gen examined a 200-foot wide corridor for both routes, to ensure that all possible impacts were identified. A 50-70 foot corridor would be needed for construction and permanent right-of-way for the proposed underground transmission line.

There would be riser substation sites at each end of the transmission line. Each riser substation would use a 360-foot by 200-foot area. **Figures 4.17** shows front and side views of the riser structure.

Figure 4.17 Front and side views of the proposed riser structures at the tie-in riser substation to the WEPCO line.

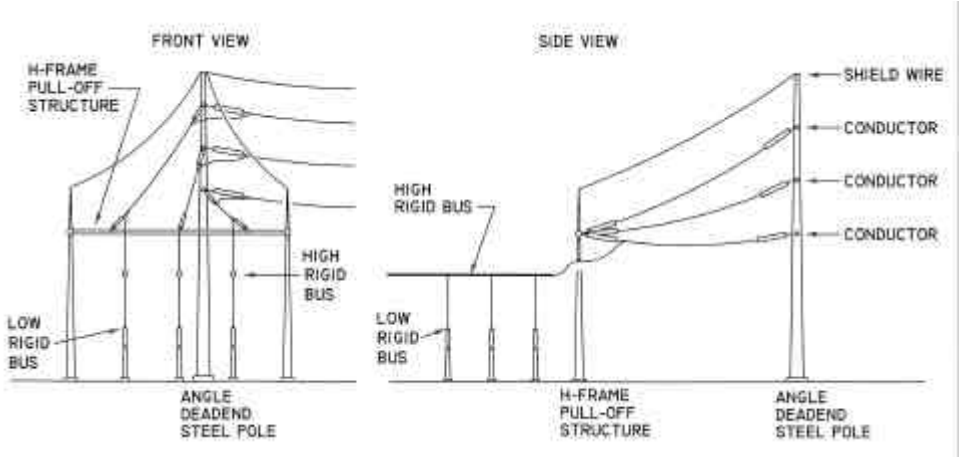
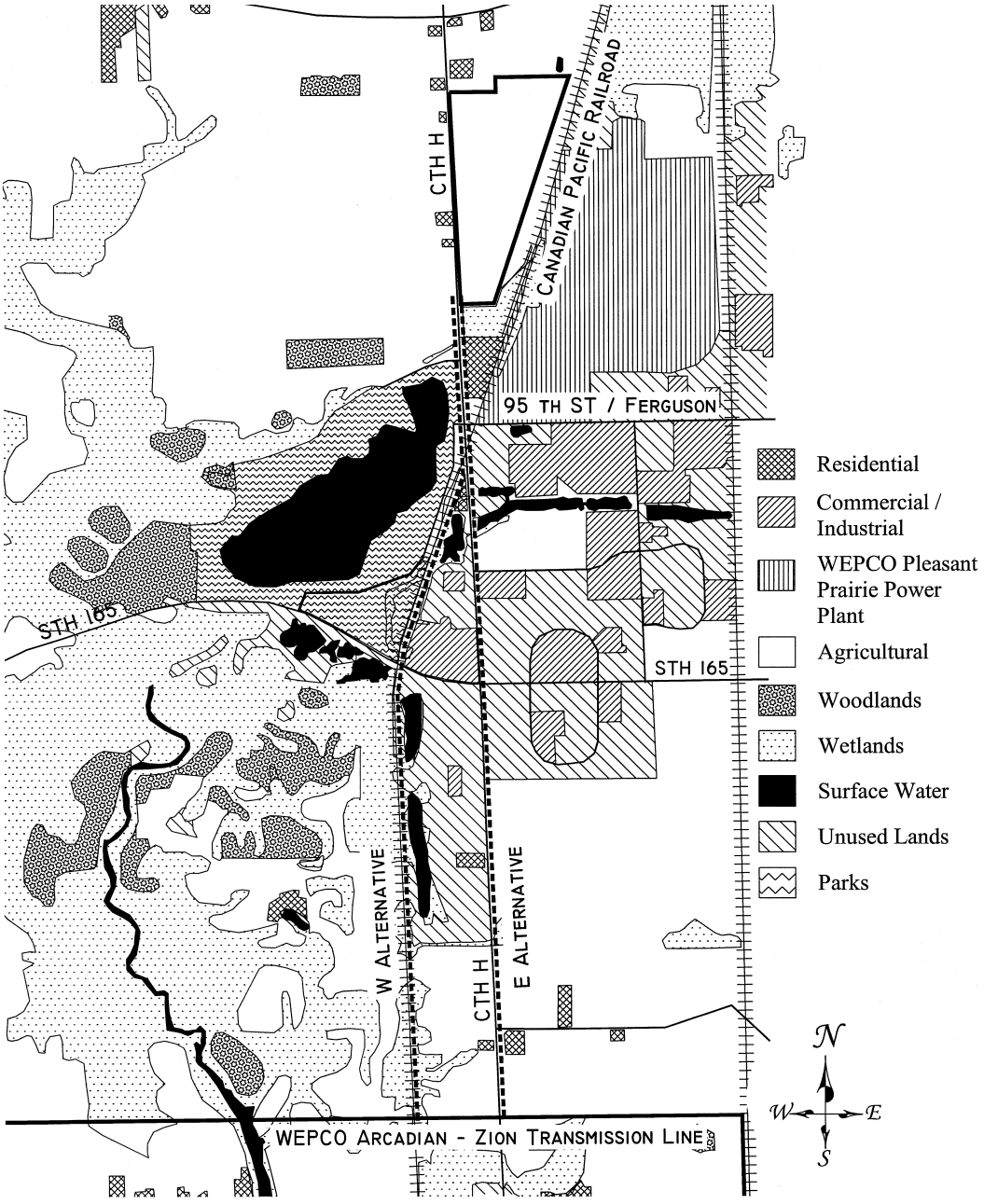


Figure 4.18 Proposed east and west electric transmission routes to connect the Pleasant Prairie Site to the Existing WEPCO Zion-Arcadian electric transmission line.



Environmental Factors – Transmission Route E and Riser Substation

Existing Natural Resources and Potential Impacts

Soils

Soils vary from well drained to poorly drained in the area that would be crossed by the transmission line. Well-drained soils tend to be on low broad ridges and hills. These soils include loamy soils that formed in wind deposited soil (loess) on underlying glacial till containing fine particles of soil (silt and clay). Poorly drained soils are usually found on flats, drainageways, depressions and foot slopes. Some of the soils occurring on flats and depressions are highly organic muck soils. These soils are likely to be tile drained if they have been in farm use. Erosion of upland soils should be prevented. Slopes in the area vary from zero to 12 percent grade, and some soils are already eroded. The water level in some of the poorly drained soils is within one to three feet of the surface for several months during the year. During construction and any repairs, soil water flowing into and out of the trench would need to be addressed.

Geology

The bedrock is 100 to 300 feet below the ground. The top layer of bedrock is Niagara Dolomite. Construction of the proposed transmission lines would not affect the bedrock.

Vegetation and Wildlife

Plants and animals were identified for a 150-foot wide corridor. Actual construction and operation are expected to occur in a 50- to 75-foot wide right-of-way. The most common vegetation along this route is lawn grass with ornamental shrubs and small trees. The trees and shrubs may not be replanted over the line. Wildlife may include moles, voles, rabbits, chipmunks and squirrels. Birds such as robins, sparrows, mourning doves, and meadowlarks may use this area. Other birds such as cardinals, blue jays, gold finches and house finches could also be present. Migrating geese may graze on the lawns during spring and fall migration. Overall, although some individual animals might be lost during transmission line construction, the area populations of those species would probably not be significantly affected.

Measures to minimize electrocution of birds on risers and other aboveground components may be helpful.

Water Resources: Wetlands, Streams, and Groundwater

There are a few wetlands on Route E, for a length of about 1,125 feet. Using this route would affect 1.3 acres of wetlands. It could affect one or more small streams and drainage ditches.

Precautions to prevent the spread of purple loosestrife from contaminated equipment would be necessary. Purple loosestrife is an invasive, non-native weed that can be transferred into or out of a wetland by seeds or plant parts carried on construction

equipment. Once introduced to a wetland, it spreads rapidly, crowding out native vegetation and reducing available wetland wildlife habitat. Purple loosestrife has little value for wildlife in providing food or cover. Cleaning construction equipment before leaving a construction site can prevent further spread. Because cleaning may not remove all seeds or plant parts, wetland sites should be inspected in the years immediately following construction. Such inspections allow early identification and removal of new infestations.

Existing Local Community Resources and Potential Impacts

Site and Route History and Potential Contamination Present

The Pleasant Prairie area was in agricultural use until the Lakeview Corporate Park was created. Much of the area east of the railroad tracks has been farmed. Wetter soils west of the tracks have limited farming to drier areas. The railroad has been in its present location for a long time. No contamination has been reported where the Pleasant Prairie transmission line routes are proposed.

Consistency with Current and Planned Land Use

The area between the power plant site and 95th Street/Ferguson is zoned Lowland Resource Conservancy on the east side of the road and Agricultural Land Holding on the west side of the road. Further south of the proposed power plant location, the area is zoned Suburban Single-Family Residential and Heavy Manufacturing on the east and Planned Business Recreation on the west. South of 95th Street/Ferguson, to the end of the proposed transmission line, the land east of the railroad tracks is zoned Heavy Manufacturing and Limited Manufacturing on both sides of CTH H for about two miles, then Neighborhood Business for a short distance, and Agricultural Land Holding for the remaining distance to the end of the transmission line.

The present land uses on the west side of CTH H, going south from the proposed power plant location, are agriculture, Prairie Springs Park, and a triangular area between the road and the railroad that contains a pump station, a stormwater retention pond, and three businesses. On the east side is Lakeview Technical Academy, an empty area that is partly cultivated, two connected stormwater retention ponds, and several businesses in the Business Park. Further south there are two businesses and farm buildings on the west side of CTH H and at least two businesses to the east of CTH H, with access from STH 165.

The existing land use at the projected south riser substation site is agricultural.

Placing the transmission line near CTH H, with the transmission line right-of-way overlapping the road right-of-way, would affect current or planned land use only if that land use required underground utilities that usually would be placed under, over, or at the same level as the transmission line. Construction or repair of such utilities would be more complicated near the transmission line than in other areas. Once built, the transmission line would not interfere with access roads or other facilities for new occupants of the

industrial park. Trees and large shrubs cannot be planted over the transmission line. This would limit future landscaping choices along CTH H.

Land uses, plans and zoning along either side of CTH H are compatible with a transmission line.

Roads, Railroads and Other Utilities

Space for construction along CTH H from the power plant to STH 165 is limited in some places by buildings and ponds of water. Construction could interfere with other utilities. Otherwise, the road right-of-way is relatively wide and could allow room for the transmission line.

Badger Gen prefers to keep the transmission line location far enough from other utilities to prevent any future damage to the transmission line from repair work of the other utilities. Where the trench would cross access roads to business parking and delivery areas, the trench could be covered with a metal plate to allow access across the open trench.

Visual Landscape

During construction the visual landscape would change as any existing trees, shrubs and grass were removed from the area where the transmission line would be built. The changes to the visual landscape would be similar to that for any utility activity replacing or installing new water, sewer or natural gas lines. After construction, grass would be planted on disturbed areas. No trees or large shrubs would be allowed to grow in the transmission line right-of-way.

Historical and Archeological Sites

The proposed transmission line, as part of the overall power plant project, is subject to Section 106 of the National Historic Preservation Act. However, there are no known historic or archeological sites along the proposed route. The route would cross areas that have been previously disturbed or surveyed. The SHSW has requested that all previously undisturbed right-of-way areas be field surveyed by a qualified archeologist to locate and evaluate the significance of any sites that are present but as yet unknown. If archeological materials are discovered during construction, the contractor would have to stop construction at that place and follow the directions of the SHSW to avoid or reduce adverse effects on that newly discovered archeological or historical site.

Noise

There would be noise from use of construction equipment during trench excavation, during cable pulling, and when backfilling the trench. **Table 4.21** shows the noise level of construction equipment that would be used to dig the trench for the transmission line and for the equipment used to pull the transmission line conductors through the conduits. There would be noise from equipment used to backfill and compact soil in the trench that would be similar to the noise when excavating the trench. In a normal light industrial area, the noise levels typical of equipment used to build an underground transmission line are normally acceptable. In a residential area, the noise of all but the front-end loader and

Table 4.21 Construction noise for the transmission line (A-weighted decibels)

Equipment	Distance from Noise Source (dBA) 50 feet	100 feet
Front End Loader	88	82
Bulldozer	88	82
Dump Truck	86	80
Backhoe	84	78
Mobil Crane	83	77
Tractor	80	74

the bulldozer are normally acceptable. **Table 4.21** illustrates construction equipment noise levels within 100 feet. **Table 4.22** also shows the distances of residences and play areas from the line.

Table 4.22 Distances of residences and play areas from the transmission centerline

Distance	Houses	Schools	Parks	Playgrounds	Commercial /Industrial /Offices
0 feet	0	0	0	0	0
25 feet	0	0	0	0	0
25-50 feet	1	0	0	0	0
50-100 feet	2	1	0	0	0
100-150 feet	0	0	0	0	5
150-300 feet	0	0	1	0	1

- at longest distance within each group (e.g. at 25 ft. for 0-25 ft.)

There would be no noise during normal operation of the line. If a fault developed in the transmission line, there would be some noise from the equipment used to pull the damaged cable out of the conduit and from pulling the new cable into place. Noise decreases by 6 dB every time the distance from the source doubles.

Human Health and EMF

The subject of magnetic fields and human health is very complex. To date, there has been no strong or convincing proof that exposure to EMF constitutes a serious health hazard to humans. Several epidemiological studies have shown an association between

the risk of childhood leukemia and the kind of electrical wires outside the home. However, other epidemiological studies have found no link to leukemia. For example, a study published in "The New England Journal of Medicine" in July 1997 found little evidence that exposure to magnetic fields in a residential setting increases the risk of acute lymphoblastic leukemia in children. Taken as a whole, the studies conducted to date have not been able to establish a cause-and-effect relationship between actual magnetic field exposure and human disease.

In 1991, the U.S. Congress requested the National Academy of Sciences to review the literature on the health effects from exposure to EMF. The National Research Council was given the task of conducting the review. A 16-member committee composed of scientists and other experts reviewed more than 500 studies spanning 17 years of research. The studies reviewed covered a wide range of subject areas including cellular and molecular effects, epidemiology, and animal and tissue effects. Based on this comprehensive evaluation, the committee issued a 300-page report in October 1996. This report concluded that the current body of scientific evidence does not show that exposure to EMF presents a health hazard to humans. The report stated that no conclusive or consistent evidence to date had shown that exposure to residential EMF produces cancer, neurobehavioral problems, or reproductive and developmental effects.

In 1992, the National Energy Policy Act established a federal scientific and engineering research program to study EMF. This program is called the EMF Research and Public Information Dissemination (RAPID) Program. The National Institute of Environmental Health Sciences (NIEHS) is charged with evaluating the human health effects of exposure to EMF. In the Spring of 1998, a scientific working group established to advise the NIEHS voted to list EMF as a Class 2B possible carcinogen using a classification system developed by the International Agency for Research on Cancer (IARC). This is not a determination of carcinogenicity. In the IARC classification system a substance must be placed in Class 2B if there is inadequate epidemiological evidence and insufficient animal data supporting carcinogenicity. In the case of EMF, the scientific support for a serious health risk is very small, even after over 15 years of research. The NIEHS continues to study and evaluate EMF. While a scientific consensus has yet to be reached on this issue, evidence is growing that any health concern is likely to be small.

There is still some concern, however, in the scientific community. This concern arises from the persistence of findings from a number of studies that shows an association between residential power line configurations and childhood leukemia. At this time, it is unknown what may be the cause of such an association. The National Research Council's EMF committee recommended continued research focusing on the specific causes of this link to childhood leukemia. The committee also identified the need for more research into the relationship between high exposures to EMF and breast cancer in animals already exposed to other carcinogens.

This issue is further complicated by the lack of a plausible biological mechanism that explains how exposure to magnetic fields might cause human disease. In addition,

sources of magnetic fields are not limited to electric power lines. Sources of magnetic fields include appliances such as vacuum cleaners, microwaves, computers, electric blankets, fluorescent lights, electric baseboard heat, and even the electrical wiring in the home. We are exposed to magnetic fields at home, in the work place, and in school. Since magnetic fields are created whenever we use electricity, utilities and the Commission have limited control over magnetic field exposure.

Magnetic Field Estimates

Magnetic fields would decrease with distance from the buried transmission line. Over the line, the field strength would be 34 milliGauss (mG). Within 25 to 30 feet from the line, magnetic fields would drop to one to two milliGauss. Within 50 feet from the line, the magnetic fields would be less than one milliGauss. These field levels would occur if 2,000 amps of current is flowing in the transmission line. This is the greatest likely current level.

Aesthetic Impacts of the Transmission Line

The impact of the presence of the transmission line could be the absence of trees and tall shrubs on one side of the road. If the landscaping on both sides of the road is lawns with low shrubs and flower beds closer to the road with trees and shrubs further back, the presence of the underground transmission line would not be apparent. The aesthetic impact, even initially, would likely be low.

Environmental Factors – Transmission Route W and Riser Substation

Existing Natural Resources and Potential Impacts

Soils

Soils along this route vary from poorly drained to moderately well drained in the area that would be crossed by the transmission line. There are some muck soils (wet organic soils such as peat) that are crossed just south of the intersection of the railroad tracks and CTH H. A significant fraction of the soils have high water levels for several months per year. Land slopes vary from level to 12 percent grade. The railroad forms a causeway through several of these soils isolating those on the east from those on the west.

Geology

The bedrock is 100 to 300 feet below ground. The top layer of bedrock is Niagara dolomite. Construction of the proposed transmission lines would not affect the bedrock.

Vegetation and Wildlife

The west side of the railroad tracks has three areas of prairie and six separately designated wetlands. The wetlands are wet meadow, emergent with narrow-leaved persistent plants such as cattails, sedges and grasses with standing water during much of the growing season. The wetland areas are close to larger wetlands further west in the Des Plaines River floodplain. Much of the area west of the tracks is in the 100-year floodplain of the

river. Likely wildlife on the west side of the tracks (to the Des Plaines River) would include: muskrats, deer, red and gray fox, raccoon, opossum, beaver, white footed mice, deer mice, herons, shore birds, Canada geese, red-tailed hawk, sharp tailed hawk, osprey, marsh hawk, Great Blue heron, red-winged blackbird, Great Horned owl, screech owl, long eared owl, kestrel, wood duck, and blue winged teal. Some of these birds may nest in this area. Larger numbers would be present during spring and fall migration. The larger area of the Des Plaines River area includes several habitat types: lowland hardwoods, sedge meadow, deep marsh, shallow marsh, low prairie, fresh wet meadow and shrub carr.

Precautions may be needed on risers and other aboveground structures to prevent electrocution of birds.

Water Resources: Wetlands, Streams, Groundwater and Floodplain.

Wetlands occur along 1.15 miles on the west side of the tracks and 0.25 miles along the east side of the tracks. **Figure 4.18** shows the wetland areas. Des Plaines Wetlands Conservancy owns wetlands south of STH 165 and west of the Canadian Pacific Railroad tracks. This organization owns multiple parcels. Three fourths of a mile of land on the west side of the railroad tracks, in the area with wetlands, is in the100-year floodplain. One portion (0.4 miles) is not in the floodplain. This portion is north and south of an access road to buildings about 0.3 miles west of the railroad tracks. The area in 100-year floodplain on the east side of the tracks is 0.4 miles in length. The Des Plaines River is about two miles west of the railroad tracks. Much of the area from the railroad tracks west to the other side of the river is wetland and land with a high water table some of the year.

The route could also cross and affect one or more small streams and drainage ditches.

Land on the east side of the railroad tracks is owned by Lakeview Corporate Park. Two stormwater retention basins are close to the east side of the cleared area near the railroad. One of these basins is very close to the railroad tracks.

Purple loosestrife is a wetland concern. Purple loosestrife is an invasive, non-native weed that can be transferred into or out of a wetland by seeds or plant parts carried on construction equipment. Once introduced to a wetland, it spreads rapidly, crowding out native vegetation. Purple loosestrife has little value for wildlife in providing food or cover. Cleaning construction equipment before leaving each construction site can prevent further spread. Because cleaning may not remove all seeds or plant parts, wetland sites should be inspected in the years immediately following construction. Such inspections allow early identification and removal of new infestations.

Existing Local Community Resources and Potential Impacts

Site History and Potential Contamination Present

Parts of the area west of the railroad tracks have been farmed and are currently farmed. Other areas appear to be wet or wooded and not recently farmed. Areas to the east of

the tracks have been farmed. No soil contamination has been reported for either of the Pleasant Prairie transmission line routes along the railroad tracks.

Consistency With Current and Planned Land Use and Agriculture

The proposed transmission line would pass through several zoning districts. The area between the power plant site and 95th Street/Ferguson is zoned Lowland Resource Conservancy on the east side of the road and Agricultural Land Holding on the west side of the road. Further south of the power plant, the area is zoned Suburban Single-Family Residential and Heavy Manufacturing on the east and Planned Business Recreation on the west. South of 95th Street/Ferguson, to the end of the proposed transmission line, the land west of the railroad tracks is zoned Lowland Resource Conservancy and Park/Recreational. South of 95th Street/Ferguson, the area east of the railroad tracks is zoned Heavy Manufacturing and Limited Manufacturing on both sides of CTH H for about two miles, Neighborhood Business for a short distance, and Agricultural Land Holding for the remaining distance to the end of the proposed transmission line.

The present land uses west of CTH H, east of the Canadian Pacific Railroad and south of STH 165 are business and farming. The present land uses west of CTH H, east of the Canadian Pacific Railroad and north of STH 165 are farmland, parkland, a pump station, and three businesses. South of the proposed power plant and north of 95th Street/ Ferguson, on the eastside of CTH H are wetlands and the Lakeview Technical Academy. There are no residences within 300 feet of the proposed transmission line.

Placing the transmission line on the west side of the railroad tracks would put the line in areas zoned Lowland Resource Conservancy, Planned Business Recreation, and Park/Recreational. South East Wisconsin Regional Planning Committee (SEWRPC) identified this area as a primary environmental corridor and as a natural area of local significance. It is significant because of the size of the open space and wildlife habitat. It is also identified as Class 1 wildlife habitat. The Eastern Massasauga rattlesnake and bullfrog may occur there. It is outside sewer and water service areas. There are no residences.

Placing the transmission line on the east side of the railroad tracks would put the line in areas zoned Agricultural Land Holding, Suburban Single-Family Residential, Heavy Manufacturing, and Limited Manufacturing. This area has been identified as a transitional farm area by SEWRPC. There are no houses or playgrounds within 300 feet of the west transmission line route. There is one school that is 50 to 100 feet of this transmission line route. There are two parks and two offices within 150 to 300 feet from this transmission line route.

Land uses, plans and zoning along the east side of the railroad tracks are compatible with a transmission line. Land uses along the west side of the railroad tracks are not compatible with a transmission line because burying the transmission line and future repairs could adversely affect the wetlands' local hydrology.

Roads, Railroads and Other Utilities

Construction along CTH H from the power plant to the Canadian Pacific Railroad could interfere with other utilities if the utilities are located close to both sides of the road. There appears to be room to avoid other utilities on the east side of CTH H. Once the route is along the railroad tracks, there could be a buried railroad signal line that should be avoided. The presence of water and sewer mains is unlikely, because they would be better located along CTH H to be closer to existing and future companies sited in the business/ industrial park. Construction along CTH H between the power plant and the railroad should not affect traffic because the right-of-way is reasonably wide.

Construction along the east side of the railroad tracks may be constrained by the water retention basin just south of STH 165 that is very close to the railroad.

Visual Landscape

During construction the visual landscape will change as existing trees, shrubs and grass are removed from the area where the transmission line will be built. The changes to the visual landscape will be similar to any utility activity replacing or installing new water, sewer or natural gas lines. After construction, grass or native plants would be planted on disturbed areas. If the construction occurs on the west side of the railroad tracks, native prairie and wetland species could be used. No trees or large shrubs would be allowed to grow in the transmission line right-of-way.

Historical and Archeological Sites

The route has been examined under Section 106 of the National Historic Preservation Act. There are no known sites along any of the proposed routes. The routes would cross areas that have been previously disturbed or surveyed. The SHSW requests that all previously undisturbed right-of-way areas be field surveyed by a qualified archeologist to locate and evaluate the significance of any archeological sites that may be present but are at this time unknown. If archeological materials are discovered during construction, the contractor would have to stop construction at that place and follow the directions of the SHSW to avoid or reduce adverse effects on that newly discovered archeological or historical site.

Noise

The existing noise level that is exceeded 90 percent of the time at the power plant site is 47 to 49 dBA. There would be noise from construction equipment during trench excavation, during cable pulling, and during backfilling the trench, as shown in **Table 4.21**. The noise level from backfilling and compacting soil in the trench would be similar to the noise level from excavating the trench. In a normal light industrial area, the noise levels typical of equipment used to build an underground transmission line are normally acceptable. In a residential area, the noise of all but the front-end loader and bulldozer are normally acceptable.

There would be no noise during normal operation of the line. If a fault developed in the transmission line, there would be some noise from the equipment used to pull the

damaged cable out of the conduit and from pulling the new cable into place. Noise decreases by 6 dB every time the distance from the source doubles.

Magnetic Fields

Magnetic fields would decrease with distance from the buried transmission line. Over the line, the field strength would be 34 milliGauss (mG). Within 25 to 30 feet from the line, magnetic fields would drop to one to two mG. Within 50 feet from the line, the magnetic fields would be less than one mG. These field levels would occur if 2,000 amps of current is flowing in the transmission line. This is the greatest likely current level.

A discussion of research on potential health impacts of magnetic fields can be found in the earlier section of this chapter devoted to electric transmission line Route E.

Aesthetic Impacts of the Transmission Line

The impact of the presence of the transmission line could be the absence of trees and large shrubs over the transmission line. Where the area is currently grass, there would be little visual impact.

5

Environmental Review – Sturtevant Site

Site Description

The Sturtevant site is the central portion of the western half of Section 21, Township 3 North, Range 22 East, just northwest of downtown Sturtevant in Racine County. (See **Figure 5.01**.)

The site is located on the south side of the existing Renaissance Business Park. Nearby land to the west supports crops or homes lining West Road. Adjacent properties include homes on West Road, the other business residences of Renaissance Business Park, a 150-foot WEPCO easement and the Canadian Pacific Railroad rights-of-way along the eastern side of the Park, and a Canadian Pacific rail yard to the south. Most of the village of Sturtevant lies to the southeast. Surrounding land use is illustrated in **Figure 5.02**.

The plant would occupy less than 35 acres of the site parcel's approximately 95 acres. The site parcel actually combines four parcels of land within the Renaissance Business Park development, south of the existing businesses. Most of it was cleared and graded for development in 1999. Part of the site is a wooded and herbaceous corridor along a non-navigable surface drainage to the south branch of the Waxdale tributary of the Pike River. This drainage enters the site from the west and crosses the property via an excavated ditch. The flow continues eastward through a wooded corridor, and then through an herbaceous wetland. There is a large water detention basin on the northeastern side of the parcel. At the south end of the parcel is a drainageway, and there is also a topsoil distribution pile to the east of the park road that ends in a cul-de-sac. (See **Figure 5.03**.)

Figure 5.01 Proposed power plant sites

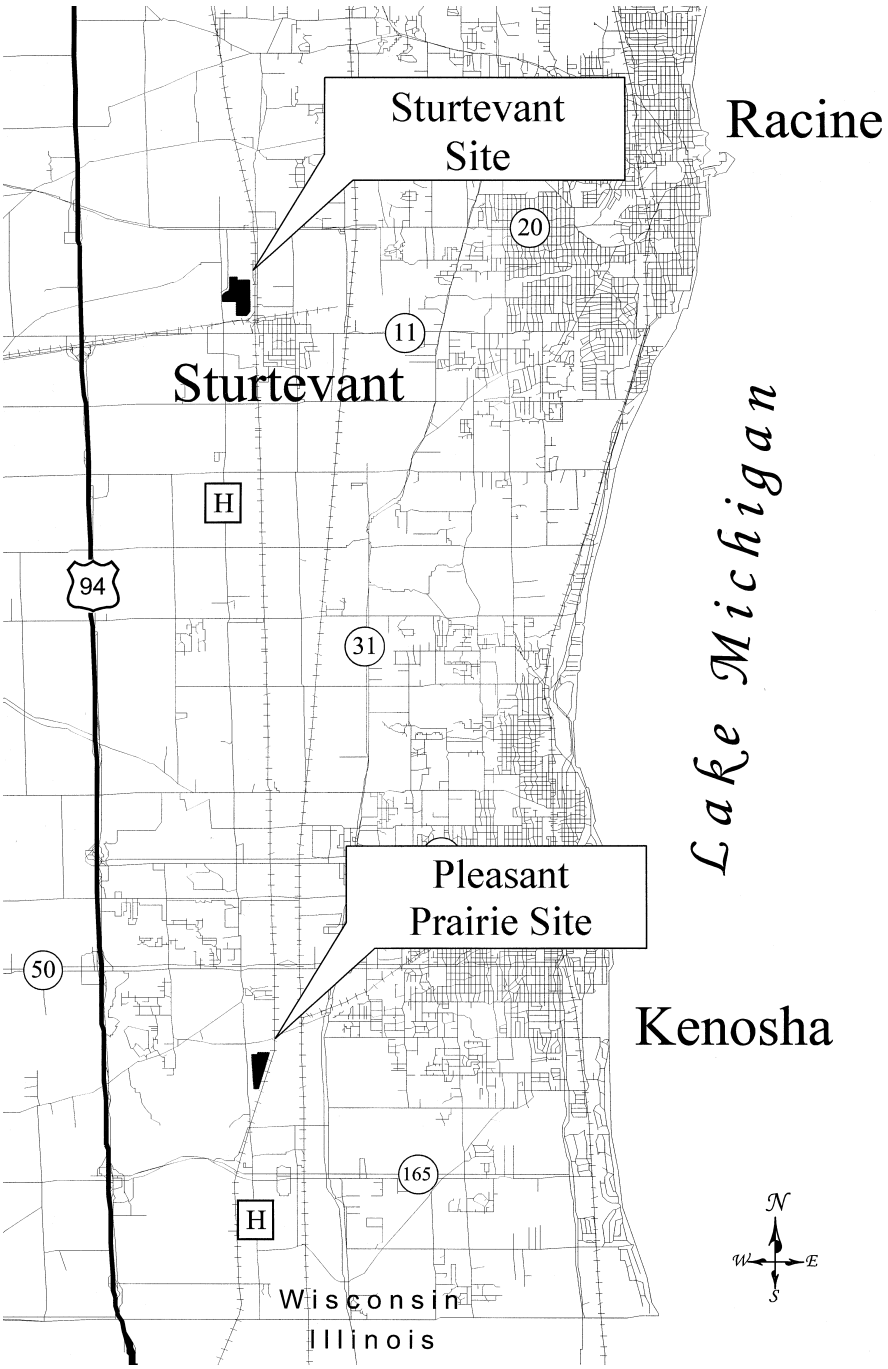
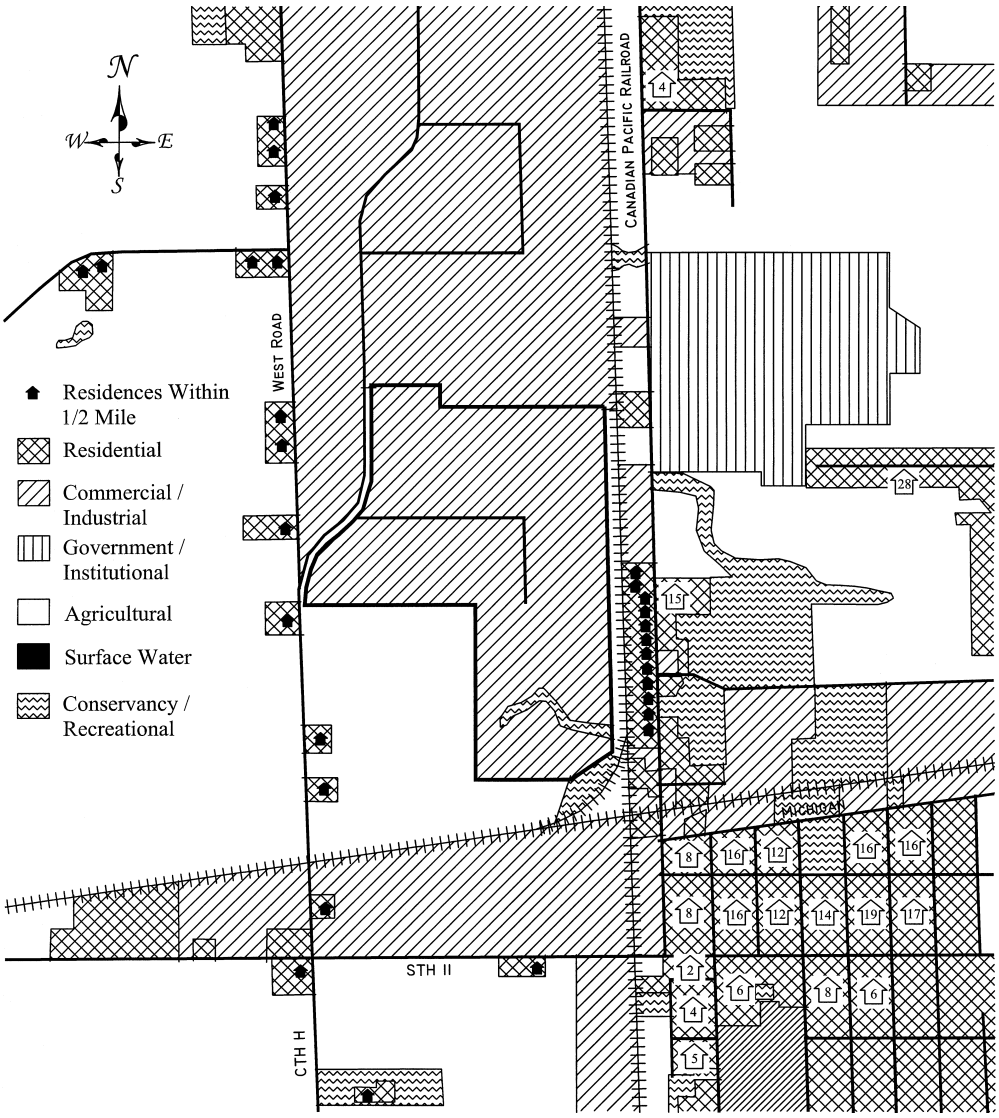


Figure 5.02 Types of land use surrounding the Sturtevant Site



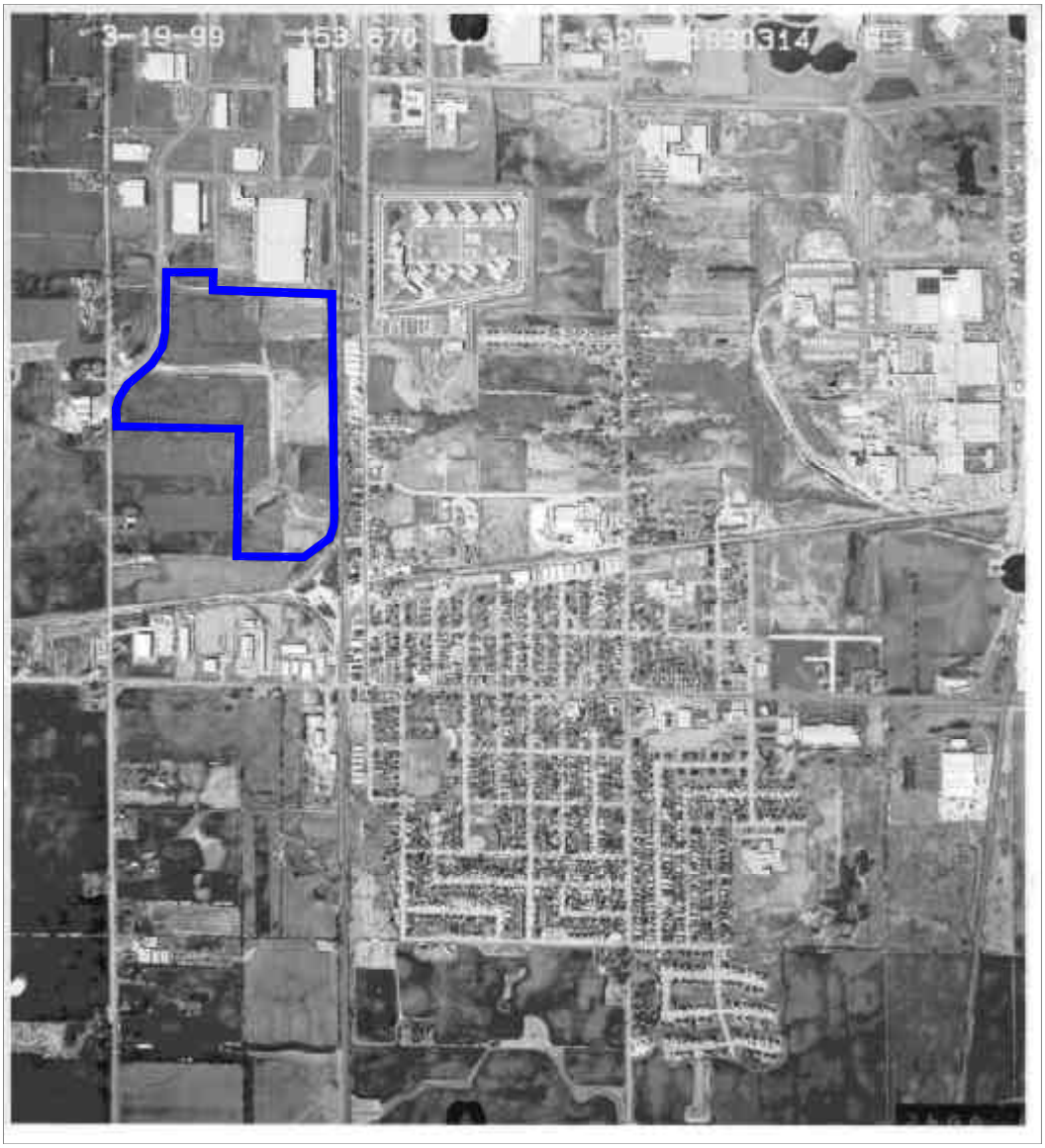
Natural Resources at Plant Site and Auxiliary Facilities

Air Quality

Source Description

Badger Gen has submitted an air pollution control permit application to construct and operate the proposed combined-cycle generating station at the Pleasant Prairie site. It has not submitted an application for the Sturtevant site. Badger Gen has indicated that, if the Commission approves the power plant at the Sturtevant site, it would file the appropriate

Figure 5.03 Aerial view of the proposed power plant at the Sturtevant Site



air pollution control permit application. DNR staff expects that the emissions and modeling inputs would be similar for both sites, which are relatively near each other geographically.

The plant would be the same as proposed for Pleasant Prairie, with four combined-cycle generating units capable of producing a total of about 1,050 megawatts. Power production is expected to occur throughout the year, at either base load or intermediate load. The power plant is expected to burn only natural gas. Badger Gen is proposing to build two 120-foot stacks at the Sturtevant site, rather than four stacks as proposed at the Pleasant Prairie site.

The plant would be a Phase II Acid Rain affected unit, requiring an acid rain permit and emissions monitoring.

Background Air Quality

The Clean Air Act requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for air pollutants that might be injurious to public health or welfare. The following pollutants have NAAQS and are collectively referred to as "criteria pollutants:"

- Particulate matter less than 10 microns in diameter (PM_{10})
- Sulfur dioxide (SO_2)
- Carbon monoxide (CO).
- Nitrogen dioxide (NO_2), often discussed with other nitrogen oxides (NO_x).
- Ozone (O_3).
- Lead (Pb).

The state regulates air pollutant emissions under Wis. Admin. Code chs. 400-499, and has adopted the EPA's primary and secondary NAAQS. Primary standards protect human health while secondary standards protect public welfare from known or anticipated adverse effects associated with the presence of air pollutants. The EPA describes an area as "nonattainment" if the ambient air quality standard for one or more criteria air pollutants is not met, or "attained."

Because it is proposed for this area, the proposed project is subject to Prevention of Significant Deterioration (PSD) review for PM, NO_x, CO, and SO_2, and ozone non-attainment New Source Review. This area is presently classified as severe non-attainment for ozone. Federal regulations require major sources to apply Best Available Control Technology (BACT) for control of PSD-applicable pollutants. Volatile organic compound (VOC) emissions would need to be controlled to the Lowest Achievable Emission Rate (LAER). Also, Badger Gen would need to obtain offsets for VOC emissions at a rate of 1.3 to 1. These offsets can be obtained from the market.

The maximum predicted impact of 24-hour average levels of particulate matter less than 10 microns in diameter (PM_{10}) exceeds the level that triggers a requirement for air monitoring. The DNR has supplied the applicant with ambient monitoring data that can be used to evaluate compliance with PM_{10} air standards.

Impacts During Construction

There would be air pollutant emissions from construction equipment, the vehicles that deliver all the materials used to build the power plant, and vehicles bringing workers to the site. Encouraging workers to car pool or arranging for a shuttle to bring some workers to the site could slightly reduce construction impacts.

Dust on the construction site would need to be kept under control. Wetting the disturbed areas periodically, or when necessary, and covering soil stockpiles to control soil movement by wind would do this.

Estimated Potential Emissions During Operation

Criteria Pollutants

Table 5.01 summarizes the potential annual emissions expected by the DNR from the power plant with all four units operating and burning natural gas. The table shows that NO_x, CO, and PM_{10} would be emitted at over 100 tons per year, making the proposed power plant a "major source."

A New Source Performance Standard (NSPS) regulates pollutant emissions from a given process. The process considered for the proposed plant would be combustion of natural gas. Badger Gen's proposed NO_x emission rate is 2.5 to 3.5 parts per million (ppm), well below the NO_x NSPS level of 156.8 ppm. The proposed SO_2 emission rate of 0.0022 pounds per million Btu (lb/MMBTU) is also below its NSPS of 0.769 lb/MMBTU.

The proposed control technologies for reducing NO_x emissions are dry low-NO_x combustors and selective catalytic reduction. Low-NO_x combustors supply air for combustion in two stages. The first stage is combustion with limited air and the second stage mixes in more air. The staging decreases NO_x formation. Selective catalytic reduction uses a catalyst to accelerate the reaction of NO_x with aqueous ammonia to form nitrogen gas and water. This technology is expected to reduce NO_x emissions by about 90 percent. Badger Gen expects that NO_x emissions would be reduced to 2.5 ppm during normal operation and to 3.5 ppm during power augmentation.

Some ammonia would not react with the NO_x and would go up the stack. The expected average concentration of ammonia that goes up the stack is 10 ppm or less.

Table 5.01 Annual Potential Emissions

Pollutant	Potential Emissions (tons/year)
Nitrogen oxides	470.9
Carbon monoxide	898.9
PM_{10}	529.7
Sulfur Dioxide	75.6
Sulfuric Acid Mist	46.1
Ammonia	466.1
Formaldehyde	55.0

Using an oxidation catalyst would reduce both CO and VOCs. The catalyst increases the speed of conversion of CO to carbon dioxide (CO_2). No reagent is needed.

Natural gas does not contain significant amounts of sulfur or sulfur-containing compounds. Therefore, no controls are needed to limit SO_2 emissions.

Table 5.02 shows potential emissions in pounds per hour (lbs/hr) from each unit and summed for the whole plant. The emission rates for NO_x, SO_2, and PM would be used when considering the potential impact of the proposed plant on local air quality.

One hazardous air pollutant, formaldehyde, may be emitted at a level that would require the Maximum Available Control Technology (MACT). Actual emissions would be determined during the initial emission compliance testing before the proposed power plant begins commercial operation.

Table 5.02 Potential emissions in lbs/hr when firing natural gas and all CCs operate

Pollutant	CC unit #1	CC unit #2	CC unit #3	CC unit #4	Total all units (lbs/hr.)
NO_x	25.5	25.5	25.5	25.5	101.9
SO_2	4.5	4.5	4.5	4.5	18.0
CO	13.3	13.3	13.3	13.3	53.2
PM	30.5	30.5	30.5	30.5	122.0
VOC	2.8	2.8	2.8	2.8	11.2
Formaldehyde	7.4	7.4	7.4	7.4	29.6
Ammonia	27.3	27.3	27.3	27.3	109.2

Chiwaukee Prairie

The Sturtevant power plant site is north and west of the Chiwaukee Prairie Preserve, farther away than the Pleasant Prairie site. If the NO_x controls were operating properly and the plant were operating at the requested capacity, the additional nitrogen deposition at the preserve would be less than that expected from the Pleasant Prairie site. The impacts of this increase in nitrogen deposition on the vegetation, soils and animal life at the preserve would be as small or smaller than expected from the Pleasant Prairie site.

Visibility Impacts

Any facility emitting PM/PM_{10} and NO_x may have a potential adverse impact on visibility through atmospheric discoloration or reduction of visual range due to increased haze. The Clean Air Act Amendments require evaluation of visibility impairment in the vicinity of PSD Class I areas due to emissions from new or modified air pollution sources. Since there are no PSD Class I areas within 100 kilometers of either site, visibility impacts on Class I areas would be negligible.

Water Vapor Emissions - Plume

Under certain meteorological conditions, the stack would also emit a visible water vapor plume that, after traveling a relatively short distance, would dissipate by dispersion and evaporation. A visible water vapor plume can be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed at the time required for evaporation and dispersion.

Comparisons with NAAQS

The projected emissions from the plant need to be compared to the federal air quality standards, the NAAQS. At the Sturtevant site, there is already a legally significant emission source within the combustion impact area. That source is the Pleasant Prairie Power Plant operated by WEPCO. The emissions of both power plants must be included when considering the impact of the proposed power plant on ambient air quality and whether the air quality remains within the bounds set by the NAAQS.

Table 5.03 identifies the emission rates from the proposed power plant that were used in the air quality modeling analysis. These rates would be the lbs/hr rates from **Table 5.02** for PM, SO_2, and NO_x.

Table 5.03 Emission rates (maximum hourly rates at 100 percent load conditions)

Stack ID	PM rate (#/hr)	SO_2 Rate (#/hr)	NO_x Rate (#/hr)
1	61	9	51
2	61	9	51

The background concentration used in the air quality modeling analysis is identified in **Table 5.04.** The table also illustrates where the nearest existing monitoring sites are for the different pollutants.

Table 5.04 Background concentrations (in $\mu g/m^3$)

Pollutant	Averaging Period	Monitor ID	Ambient Air Quality ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
SO_2	3-Hour	Madison East H.S. Dane Co.	137.5	1,300
	24-Hour	Madison East H.S. Dane Co.	40.8	365
	Annual	Madison East H.S. Dane Co.	8.5	80
NO_2	Annual	UWM, Milwaukee Co.	32.8	100
CO	1-Hour	N/A	N/A	40,000
	8-Hour	N/A	N/A	10,000
PM_{10}	24-Hour	Rodefeld Landfill	48.4	150
	Annual	Rodefeld Landfill	22.6	50
TSP	24-Hour	Oilgear Company, Milwaukee	76.0	N/A

Table 5.05 Air quality modeling results

	TSP - 24 hr	PM_{10} - 24 hr	PM_{10}-Annual	NO_x - Annual
New source impact	26.4	26.4	1.3	5.1
Level of significant impact	5	5	1	1
All sources impact	47.5	47.5	16.7	11.3
Existing concentration	48.4	48.4	29.3	32.8
Total concentration	95.9	95.9	29.3	44.1
NAAQS (State AQS)	150	150	50	100
Percent NAAQS (State AQS)	64%	64%	58.6%	44.1%

Table 5.05 shows the modeling results for particulates, NO_x and ozone. The percentages at the bottom of the table show that none of the pollutants represented would exceed the NAAQS.

At this time, the DNR expects eventually to be able to issue the appropriate air pollution control permit for the proposed Badger Gen power plant. The DNR has not made its final decision on Badger Gen's LAER, BACT or MACT proposals.

Geology

Both the Pleasant Prairie and Sturtevant sites are located in an area of thick, glacial deposits. Depth to bedrock is a minimum of 100 feet. High-capacity wells in this region pump groundwater from aquifers within the bedrock. Construction reports for wells show bedrock near the Sturtevant site at 100 to 215 feet below ground.

Impacts After Construction

Construction of a power plant would not affect the area's geology.

Topography

Both the Pleasant Prairie and the Sturtevant sites are nearly flat. People have changed the topography of both sites to improve drainage. The Sturtevant site is about 40 or 50 feet higher in overall elevation than the Pleasant Prairie site. During the recent development of Renaissance Business Park, topography on the Sturtevant site was changed to relocate an intermittent stream and create a sedimentation basin.

Impacts After Construction

Construction of a power plant would change the topography slightly to make the ground more level for buildings and to further manage run-off water. Because the site is flat, the potential for erosion due to construction activities is low. Badger Gen will have to develop and follow a construction site erosion control plan for whichever site is selected.

Soils

The site is within a larger geographic area with soils derived from 100 to 200-foot deep, unconsolidated, glacial till interlaced with variable quantities of glacial lake and glacial outwash materials. Much of the resulting soils is fine-grained and generally not very well drained, but approximately one-half of the site area's original soils consists of relatively well-drained silt loams. More poorly drained soils could originally be found in eastward drainageways in the northern half and southern end of the site.

However, the topography has been altered in the business park, and the soils have been graded. A water retention basin has been created in the northeastern corner of the site, and the topsoil appears to have been removed from the rest of the site and stockpiled for redistribution.

Impacts During and After Construction

All of the soil materials on which Badger Gen would build have supported crops and are the types of soil materials that can support the proposed construction. Construction would remove, compact, and mix remaining soil profile layers. Any equipment operated during wet periods on the poorly drained soils where nothing is to be built would damage their structure. No building would occur in the drainage way at the south end of the site. The soils there might be reconstituted with stockpiled topsoil and planted for landscaping to maintain the drainage way and associated wetland. The soils' hydrologic and biological functions would probably improve with landscaping over the long term if the replanting were done with native prairie or wetland communities.

Part of the proposed power plant would be built over what is now the western half of the park's water retention pond. While the existing retention pond outlet would be maintained, the retention pond would be drastically reconfigured and extended to just north of the drainage way and wetland.

Water resources

Watershed and Floodplain

The Sturtevant site is located in the Lake Michigan watershed, about six miles west of the lake. Two intermittent drainages on the site flow east, under the Canadian Pacific Railroad, and combine to form the Waxdale Tributary of the Pike River. The Waxdale Tributary flows into the Pike River about 1.5 miles east of the site, and the Pike River

flows into Lake Michigan at Kenosha, about eight miles southeast of the site. The site's topography was changed during construction of a detention basin for the Renaissance Business Park development. As part of these changes, the location of the site's intermittent drainages was changed. The ditch that was the North Branch of the Waxdale Tributary now runs east-west near the northern property line. The South Branch runs generally east, through the middle of the southernmost portion of the site.

Construction for the Renaissance Business Park also changed floodplain elevations on the site. **Figure 5.04** shows that the current 100-year floodplain is limited to the new detention basin and the east-west ditch that is now the North Branch of the Waxdale Tributary. The village of Sturtevant has jurisdiction over the floodplain, with DNR review. Badger Gen proposes to modify the detention basin (and corresponding floodplain). However, Badger Gen also proposes a reconstruction that will store the same volume of water as the existing facility. The village has given preliminary approval to this plan.

Wetlands

Badger Gen would need a federal permit to construct in a "jurisdictional wetland." A field inspection in June 1999 identified one jurisdictional wetland area on the Sturtevant site. Refer to **Figure 5.04**. This wetland area is associated with the on-site portion of the South Branch of the Waxdale Tributary. The western portion of this wetland area has a generally sparse herbaceous layer, including species such as bittersweet, nightshade, and giant ragweed. The shrub/sapling and tree strata are denser, dominated by box elder and Eastern cottonwood trees. Narrow-leafed cattail, prairie cordgrass, and sedges dominate the eastern portion of this wetland area.

Impacts to Water Resources

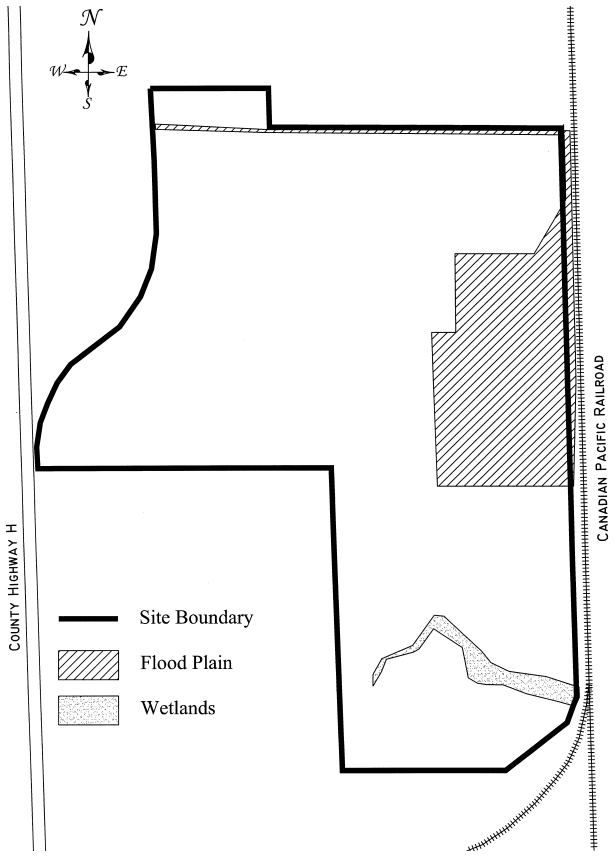
Badger Gen proposes no building or grading in the floodplain or in the wetland area. There would be no direct impacts to water resources from plant construction or operation.

Vegetation and Wildlife

Existing

This site was farmed for over 30 years and little non-farm vegetation remained. More recently, the Sturtevant site was graded as part of the development of Renaissance Business Park. The site is now fallow. A few plants typical of disturbed areas grow along the property boundary. Animals on-site are typical species of agricultural and suburban areas. The animal species at the Sturtevant site are similar to those at the Pleasant Prairie site. However, the diversity of species is likely to be less at Sturtevant, since it is in a more developed area.

Figure 5.04 Floodplain and wetland at the Sturtevant Site



Nuisance Species

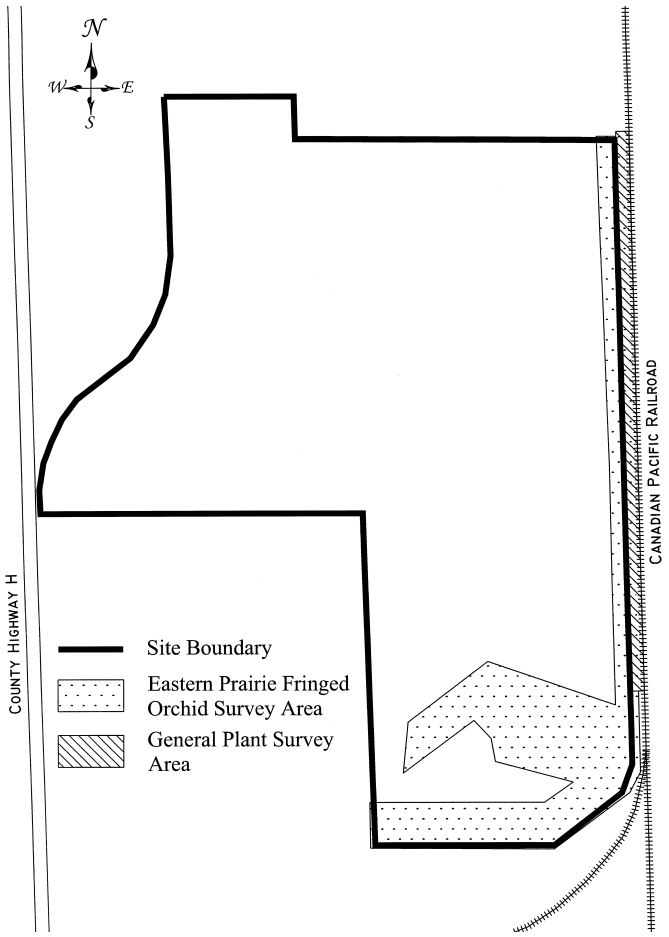
Although native, the narrow-leaved cattail, giant ragweed, and eastern cottonwood are listed by the DNR as species that can dominate natural areas or native plant restorations. (Refer to www.dnr.state.wi.us/org/land/er/invasive/eislist.htm.) These plants were identified by Badger Gen's consultant as growing on-site during the spring of 1999.

Threatened and Endangered Species

Figure 5.05 shows where Badger Gen's consultant surveyed for endangered or threatened plant species, or species of special concern in Wisconsin, especially the eastern prairie fringed orchid. The consultant found none of these plant species.

In both Racine and Kenosha counties, the eastern prairie fringed orchid is an endangered species that grows in wet, grassland areas. The consultant surveyed for this orchid in wet areas on the site. The DNR identified the rail corridor to the east of the site as a possible location for prairie remnants that could include endangered or threatened species, or species of special concern in Wisconsin. Badger Gen's consultant surveyed a representative portion of the track (2,200 feet in length).

Figure 5.05 Survey areas for Eastern Prairie Fringed Orchid and other species



The peregrine falcon, known to occur in Kenosha and Racine Counties, was on the federal endangered species list until 1999. It is still protected by the Migratory Bird Treaty Act. This species nests on cliffs, towers, and smokestacks. The topography is very flat in this area but peregrines have been observed nesting on the stacks of the coal plant in Pleasant Prairie.

Impacts During Construction Including Mitigation Measures

Construction of the proposed project would not impact any endangered or threatened species, or species of special concern. The DNR's stormwater management permit will require use of proper erosion control methods during construction. This prevents unnecessary erosion, and the resulting deposits of soil and dust that could affect adjacent waterways and vegetation.

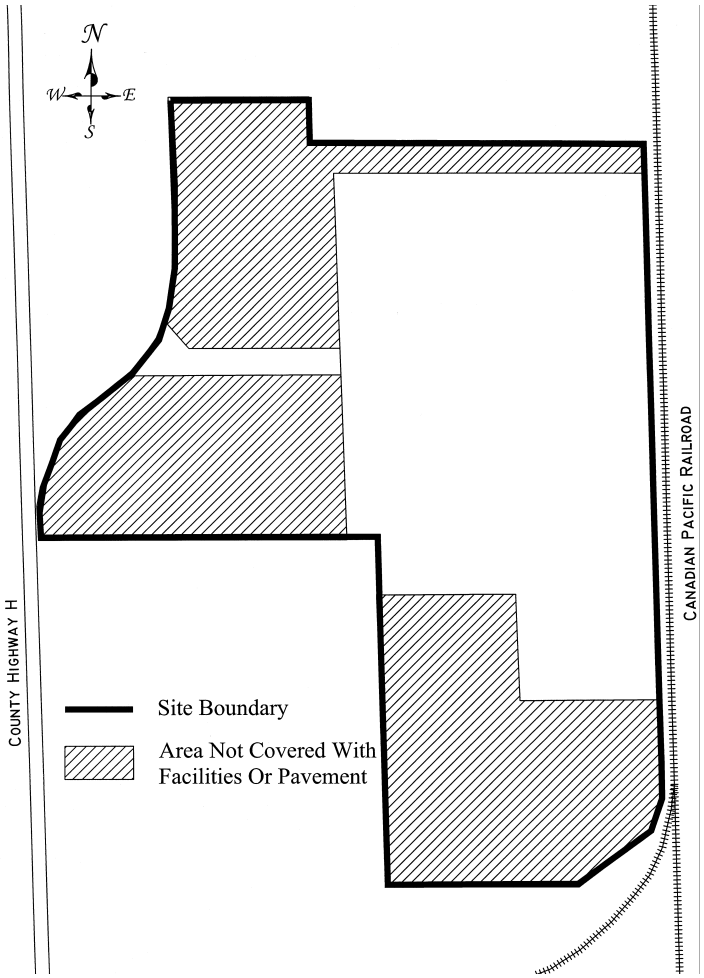
Although the concern is not as great as it is at the Pleasant Prairie site, Badger Gen would also need to take precautions to ensure that construction equipment does not bring in nuisance plant species not already present.

Impacts During Operation, Including Mitigation Measures

With proper management, Badger Gen's proposed project could improve the status of uncultivated vegetation and wildlife on-site. **Figure 5.06** shows the general portions of the site that Badger Gen would not use for plant facilities. The vegetation that Badger Gen would plant on these portions of the site is not yet determined. Badger Gen would create grass lawns and ornamental plantings on some parts of this area. Other parts could be restored to a more natural landscape that provides cover and food for wildlife.

There is no concern over the possible effect of air emissions on nearby natural areas. (Refer to the Air Quality Section in this chapter).

Figure 5.06 Areas at the Sturtevant Site not planned for power plant facilities



Local Community

Site History

The proposed site was farmed for at least half a century. It is now part of the recently developed Renaissance Business Park. Renaissance Park is a 350-acre commercial/light-industrial park of which 270 acres are located south of STH 20. The site contains roads, and several large commercial buildings are present between it and STH 20.

Prior to 1970, there was only scattered commercial development along the rail lines east and south of the proposed site, a railroad station to the southeast, homes along Wisconsin Avenue, and an institution, St. Bonaventure School, northeast of the site. To the north and west was farmland. About 35 years ago, an electric transmission line was built east of the site.

In the last 35 years, land use surrounding the site has changed. Residential and commercial development has continued in the village of Sturtevant, east and south of the site. Residential, commercial, and industrial development has occurred along roads in the farmland west and north of the proposed plant site. The site of St. Bonaventure School has become the site of the Racine Correctional Institution. Residential, commercial, and industrial development continues through the present in the area of the Sturtevant site.

Land Use

Existing Land Uses and Zoning

Figure 5.02 shows land uses on and surrounding the proposed Sturtevant Site. The site is now vacant land, awaiting the construction of commercial or industrial facilities. To the west and south is farmland. To the north and east are commercial and industrial properties. There are about ten homes immediately to the east across the Canadian Pacific railway and WEPCO's existing transmission line. The site is zoned as an industrial district. The proposed plant would require a conditional use permit. Except for the farmland, the land immediately adjacent to the site is zoned for business district or manufacturing.

The Canadian Pacific Railway runs along the eastern border of the site. Across the railroad from the northern half of the site, there is storage and commercial development. Across the railroad from the southern half of the site, there are homes. To the southeast about one-eighth of a mile, across two rail tracks and a railroad depot, is the village of Sturtevant. To the south is farmland to the Canadian Pacific rail tracks, and beyond the tracks is a developing commercial area zoned as an industrial district. The western site boundary borders farmland on its southern half. The northern half borders part of the Renaissance Business Park, with farmland and residences beyond that. North of the site is the remainder of the Renaissance Business Park with its access roads and commercial buildings. The Racine Correctional Facility is about 300 feet northeast of the site.

Residential

The nearest residences to the proposed site are farmhouses to the west and southwest of the site and about ten residences on Wisconsin Avenue near the southeastern site boundary. Other housing developments are separated from the site by distance and intervening buildings, primarily businesses or the Racine Correctional Facility. The village of Sturtevant's downtown area is separated from the proposed site by two rail lines and the train depot.

Commercial/Industrial

Commercial buildings are located throughout the general area of the site, as well as, immediately north of the site, in the Renaissance Business Park. East of the site, across the Canadian Pacific rail line, are storage and commercial operations. There are also commercial operations to the south beyond the rail line. The land along the railroad tracks to the east and south of the site is zoned as Business District or Industrial District.

Public Lands

The closest public lands are parks in the village of Sturtevant. Memorial Park/Fireman's Park is about 550 feet east-southeast of the Sturtevant site, separated from the site by rail tracks and some commercial development. North Park and South Park are 1,550 feet and 3,250 feet southeast of the Sturtevant Site. They are separated from the site by two rail lines, a rail depot, and portions of the village of Sturtevant. Other parks, including the Hawthorne Hollow Nature Area and Bong State Recreation Area, are over three miles from the proposed site.

Agricultural

There is agricultural land immediately to the south and southwest of the proposed site, and west of the site, across CTH H. This land is zoned as Agriculture. Within half a mile of the site to the south, across the rail line, is farmland. Some of this land is zoned as Agriculture and some is zoned as Industrial District.

Forests

The only woodland within half a mile of the proposed site is located about quarter of a mile to the east, along a tributary of the Pike River. Within a half-mile of the site, there are yard trees, field edges, property lines, and trees planted along drainage ditches.

Sensitive Populations

The most vulnerable members of our population are the young, the old, and the sick. Nursing homes, schools, daycares, and hospitals are places where large numbers of these categories of people are most likely to be found. **Table 5.06** lists all these institutions within a half-mile of the site boundary. There is no nursing home or hospital within a half-mile; **Table 5.06** lists the nearest location to the site boundary. There is one daycare about a quarter of a mile to the east of the site boundary. The other places within half a mile of the site boundary are located in the village of Sturtevant and separated from the proposed site by railroad tracks and a train depot.

Table 5.06 Sensitive populations at the Sturtevant Site

Distance and Direction From Site Boundary		Facility Type	Name
1500 feet	E	Day Care	Little Folks Day Care
2000 feet	SE	Church	United Church of Christ
2200 feet	SE	Day Care	Kids Town USA
2350 feet	SE	School/Church	St. Sebastian
0.5 miles	NE	Nursing Home	Loving Care Homes (Wash. Ave)
0.6 miles	SSE	Day Care	Little People Family Day Care Center
4.9 miles	NE	Hospital	St. Lukes Hospital

Changes to Land Uses from Construction or Operation, Including Mitigation

About thirty-two of the site's 99 acres would be altered by development of the power plant. Refer to **Table 5.07.** Badger Gen states that, "The portion of the property not occupied by plant facilities will be developed for aesthetics or continued use for agricultural purposes." **Figure 5.07** illustrates the general location of property that would not be used for plant facilities or pavement. The addition of the proposed power plant in the Renaissance Business Park would be very similar to the addition of a large business facility. Therefore, surrounding land uses would not change because of the proposed power plant.

Table 5.07 Badger Generation's proposed changes in land use at the Sturtevant Site

Changes	Graded Land	Buildings & Pavement	Lawns & Landscaping	Open land/ Green space	Detention Pond	Other *
Acres presently	56	2.6	0	0	12	29
Acres after construction	0	13	19	25.7	13	29

*Includes 20.6 acres of floodplain, 1.5 acres of wetland, and 6.6 acres of agriculture.

Any new gas pipeline or electric transmission line construction would serve only the new plant, and thus not affect adjacent land uses. The expected addition of about 35 employees to run the proposed plant would be a negligible increase in area employment, given the highly developed nature of the Racine/Kenosha area. Similarly, any arrangements for water supply would not directly change the character of the surrounding area.

Compatibility With Local Land Use Plans

Proposed land use for the site has shifted over time from agricultural to medium density residential to commercial. The Renaissance Business Park is currently zoned as an industrial district. The proposed power plant is therefore compatible with local land use plans.

Municipal Services

Sewer and Wastewater

Connection to Community Systems

The connection to the local sewer system would be within the site boundary. No modification of the local community sewer system would be required beyond the site boundary.

The wastewater discharge from the Sturtevant power plant would be connected to an on-site sanitary sewer system located within the Renaissance Business Park just west of the site. From there, it would be conveyed through the existing village of Sturtevant sewage collection system to the existing Racine Wastewater Treatment Plant.

Capability of Local Utilities

If the Sturtevant site were selected, the plant's wastewater discharge would be treated by the city of Racine. The Racine sewage treatment facility has a maximum design capacity of 30 MGD and an average daily flow of approximately 25 MGD. On this basis, it appears that the Racine sewage treatment facility has adequate capacity to treat the maximum of 2 MGD discharge that would be generated by the plant. Wastewater flow from the proposed facility would be conveyed to the Racine sewage collection system through the village of Sturtevant's existing sewage collection system.

Potential Local System Impacts

No local system impacts are expected.

Potential Local Rate Impacts

Commission staff did not perform a cost-of-service study to evaluate the rate impact of siting the power plant. When establishing sewer rates for regulated sewer utilities, Commission staff performs a cost-of-service study that differs in many ways from the cash flow analysis typically performed when establishing rates for non-regulated sewer operations. The Commission does not directly regulate the sewer operations of Racine or Sturtevant. Any comparison of present and projected sewer rates made by Commission staff using its standard methodology would not accurately reflect the potential sewer rate impacts under a cash flow analysis.

An empirical review of the issue suggests that the siting of the power plant should result in rates that are the same or possibly lower than those in effect at the time the plant is constructed. It appears that the sewer infrastructure currently in place is adequate to handle the projected effluent discharge from the plant. As such, there are no additional capital expenses to be recovered. If the expenses to be recovered through the sewer rates are predominately fixed in nature, such as debt expenses associated with sewer facilities already in service, then additional sales could have the effect of lowering sewer rates. If, however, the expenses to be recovered are predominately variable in nature, such as expenses associated with chemicals and pumping, then it is most likely that rates will remain constant as a result of the additional flow caused by the power plant's discharge of

effluent. This is the result that is expected. The plant's effluent is not projected to be high strength because it would be pretreated at the plant prior to discharge.

Yard Runoff

For yard runoff water, the existing stormwater detention basin would be redesigned and reconstructed to make room for the power plant and to manage the increased runoff that the plant would generate. The new basin would drain to the nearby Waxdale Tributary as required under the site's WPDES stormwater permit from the DNR. Badger Gen has not applied for this permit and would not apply for it unless the Commission selects the Sturtevant power plant site.

Refuse Collection

Waste Generation and Recycling

Some solid waste would be generated during plant operation, including wastes from offices and other facilities. Normal maintenance would also be expected to generate small quantities of solid waste periodically. Where disposal of wastes is necessary, contractors would be hired.

During construction, Badger Gen intends to implement a program to minimize solid waste and encourage recycling. The program would include the following:

- Sending wastes from clearing and grubbing to local composting facilities where available.
- Segregating wastes into stockpiles of metal and scrap wood regularly available for salvage.
- Utilizing excess excavation materials in the final grading plan, to eliminate disposal and create a balanced cut and fill for the proposed project (in compliance with all flood plain and other water-related regulatory requirements).
- Minimizing spills when transferring fluids or refueling vehicles through careful transfer processes and containment structures, to reduce the amount of solid waste generated in spill cleanups.
- Producing mulch for landscaping purposes from scrap lumber not suitable for salvage.
- Including reuse and recycling capabilities in the evaluation criteria when selecting construction materials and aids.

To encourage and support the recycling program, Badger Gen would place appropriate containers labeled for recyclable waste in and around the construction offices, warehouses, craft change houses, lunchrooms, and other areas of the proposed project.

Local Community Impacts

The local community would not be responsible for handling solid wastes from the project.

Non-recyclable materials would be eliminated through private contractors. Solid waste and debris that cannot be recycled, reused or salvaged would be stored in on-site dumpsters or similar containers for disposal. Programs would be developed to ensure that potentially hazardous wastes are separated from normal waste. Implementation would include segregation of storage areas and proper labeling of containers. Badger Gen indicates that all disposal contractors would be licensed in accordance with applicable regulatory requirements, and all disposal sites would be either local or regional licensed facilities.

Water System

Capability of Local Water Utility

The SWU would supply water service to the Sturtevant site. Based on its 1998 Annual Report on file with the Commission, the SWU serves 1,326 customers with total annual sales of 176,532,000 gallons of water. For the calendar year 1998, the maximum volume pumped in one day by SWU was 949,000 gallons. The SWU purchases its water on a wholesale basis from the RWU.

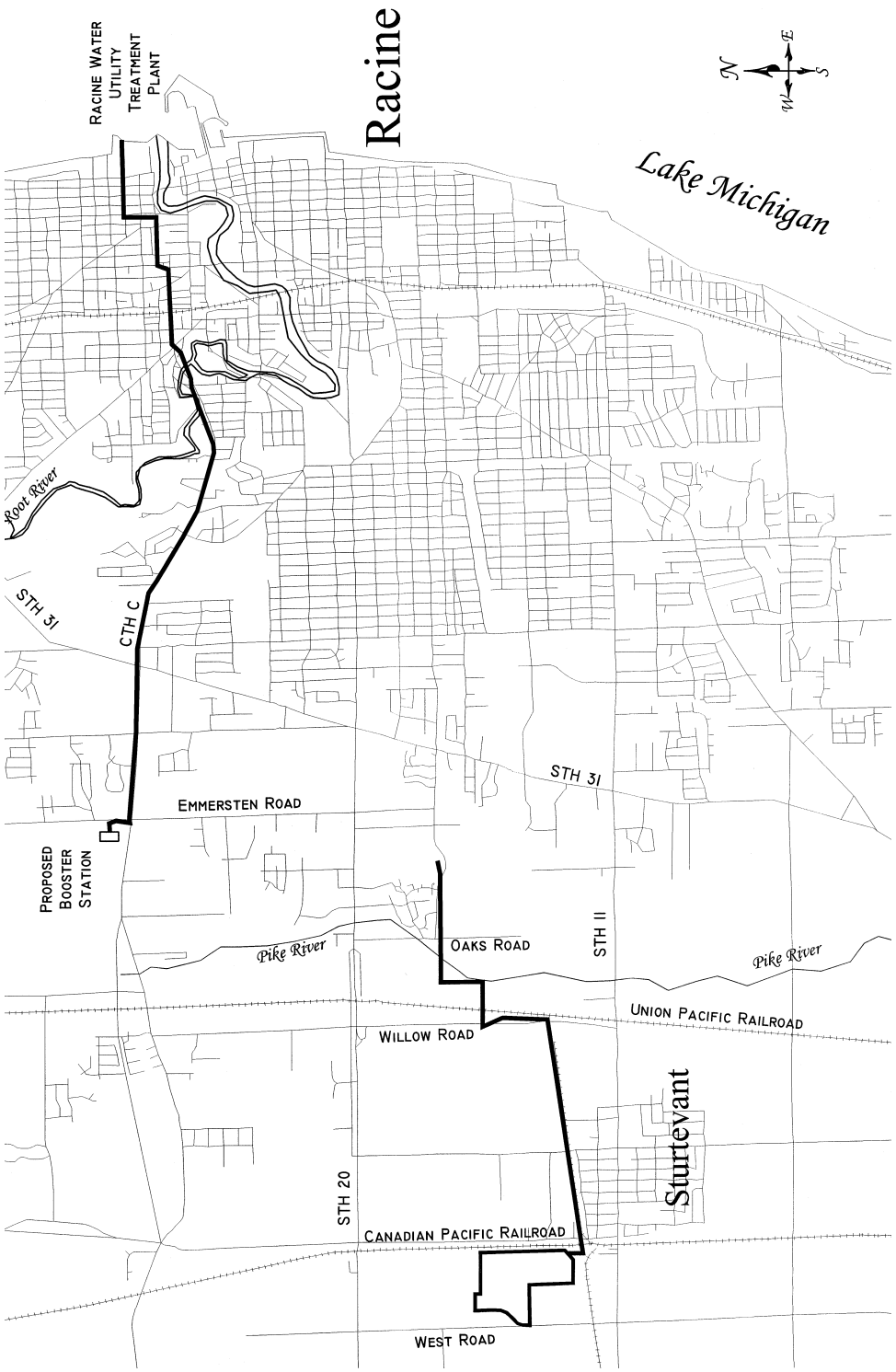
Based on its 1998 Annual Report, the RWU serves 30,767 customers with total annual sales of 7,799,393,000 gallons. For calendar year 1998, the maximum volume pumped in one day by RWU was 43,738,000 gallons. The RWU water treatment plant has a capacity of 84 MGD. Additionally, it has an elevated storage capacity of 7,750,000 gallons. Based on the data contained in the 1998 Annual Report, the RWU should be able to adequately supply even the maximum 7.3 MGD needs of the proposed facility.

The RWU is a diverter of Great Lakes water at an authorized base level of water loss from the Great Lakes basin. The power plant project would be in the Pike River watershed, part of the Great Lakes basin, and its wastewater would be discharged to the Racine sewer system. However, the project would use more water than the wastewater discharged to the sewer. If the project water use caused the water utility's consumption to go over its authorized base level, the utility might have to apply to the DNR. The DNR and utility would then have to comply with the consultation and comment procedures involving the states and provinces of the Great Lakes basin under Wis. Admin. Code § 142.07.

Water Facilities Construction

The SWU and RWU would need to install additional water mains in order to serve the proposed Sturtevant plant site and projected future community demand. The water main addition would consist of three main segments (**Figure 5.07**). The total footage of additional main is estimated to be approximately 39,750 feet.

Figure 5.07 Routes for new water main and booster station required by Badger Gen at the Sturtevant Site



Racine Segment

The first segment would extend from the water treatment facility to a new 9 MGD booster station located near the corner of Spring Street and Emmersten Road, approximately 23,250 feet in length. The route would extend from the Water Utility west along Hubbard Street, south along Erie Street, west on Prospect Street, south on Marquette Street, and west along West Street/Spring Street/CTH C to Emmersten Road. The RWU expects the pipe for this section to be either 24 or 36 inches in diameter. The larger diameter would be used if the utility decides to add more capacity in anticipation of future community growth. However, this section of main would be constructed solely because of the demand generated by the proposed facility. Badger Gen would be responsible also for 7/9 of the booster station construction, equivalent to the facilities needed for the power plant's 7 MGD requirement.

From the Water Utility to Emmersten Road, the proposed water main would be installed within existing rights-of-way either under existing pavement or in the sidewalk area next to the road. At the Root River, the main would be either suspended under the existing bridge or buried in the riverbed. Badger Gen expects that a 20- to 50-foot wide area would be disturbed by construction. However, its estimated right-of-way width is 150 feet. This right-of-way width would include portions of properties alongside the streets in which the main is constructed. About 59 percent of the right-of-way area would be street right-of-way, and about 27 percent of the right-of-way area would be residential properties. There would be no wetlands, woodlands, or farmlands affected. There is no alternative route proposed. If the Sturtevant site is selected by the Commission, the State Historical Society of Wisconsin (SHSW) will require an archeological survey of water main right-of-way areas not yet disturbed or already surveyed.

Suburban Segment

The second segment of main would be needed and constructed by the RWU in the city of Racine and town of Mount Pleasant regardless of whether the proposed power plant is built. It is not shown in **Figure 5.07** or considered here.

Sturtevant Segment

The third segment of main would, like the first segment, be constructed only if the proposed power plant is built. This segment would begin just west of Racine and be constructed through the village of Sturtevant. It would serve the proposed facility from the east and consist of approximately 16,500 feet of 24-inch main. Approximately 3,000 feet of this main would be in the village of Sturtevant.

As shown in **Figure 5.07**, the route for the main would begin at a point approximately 1,000 feet west of Meadow Lane along 16th Street in the city of Racine. From there, it would extend west along 16th Street from the connection point to Oaks Road. At Oaks Road, the route would continue west within the right-of-way of a pre-existing 24-inch water line and follow the 24-inch line across the Pike River, then south, then west to Willow Road. It then would follow Willow Road south to the east-west Canadian Pacific Railroad Racine Line. The route will then follow the railroad right-of-way across Wisconsin Street and across the north-south Canadian Pacific rail line. After crossing the

north-south Canadian Pacific rail line, the route would continue northward within the north-south Canadian Pacific railroad right-of-way to the site.

The estimated right-of-way width for this portion of the water supply line would be 20-30 feet, depending on the location. Half of the overall right-of-way area on the route would be shared with railroad right-of-way, and almost a fourth would be shared with street or road right-of-way. The line itself would be installed in public right-of-way, but construction activity in the line's right-of-way overall would affect about half an acre of farmland, about half an acre of woodland, and about half an acre of wetland along the length of the route. The Pike River crossing would probably be buried in the riverbed. If the Sturtevant site is selected, the SHSW will require an archeological survey of previously undisturbed or unsurveyed right-of-way.

Potential Local Rate Impacts

Commission staff performed rudimentary cost-of-service studies to assess the potential water rate impacts associated with siting the proposed generating facility at this location. This was done using information contained in the Badger Gen's application, annual reports on file with the Commission for the RWU and the SWU, and previously performed cost-of-service studies.

To bound the possible modes of operation, staff performed a cost-of-service study for each utility assuming a 90 percent capacity factor for the upper bound and a 40 percent capacity factor for a lower bound, in recognition of the fact that the proposed generating facility may operate in either base load or intermediate mode at either site. Staff took into account the impact of both increased water usage and the additional plant in service. For the RWU, the wholesale revenues resulting from the increased sale of water were not calculated using rates currently authorized for use by the Commission. They were calculated using wholesale rates that RWU projects would result if the generating facility were located in Sturtevant. Additional retail revenues for the SWU are calculated using currently authorized water rates.

Based on the results of the cost-of-service studies, it is anticipated that additional revenues generated by the RWU through wholesale water sales resulting from the potential construction of the power plant in Sturtevant would slightly exceed the additional expenses incurred in providing service at a generating facility capacity factor of either 40 or 90 percent. RWU water rates are not expected to increase and could, in fact, decrease.

In the case of the SWU, the results of the cost-of-service studies performed suggest that the additional revenues realized by sales to the power plant would exceed the additional expenses for generating facility capacity factors over 70 percent. For capacity factors above 70 percent, SWU water rates are not expected to increase and could possibly decrease. For generating facility capacity factors in the 40 to 70 percent range, it appears the additional operating expenses would exceed the revenue generated through the

additional water sales to the generating facility. SWU water rates, under these conditions, are not expected to decrease and could actually increase.

Secondary Development -- Storage Tanks

The RWU has indicated the potential need in its 2000 capital improvements plan for two new storage tanks and associated piping on its west side. One tank would be an elevated reservoir to hold 1-1.5 million gallons. The other would be a standpipe to hold three million gallons. The purpose of the tanks would be to handle utility demands if the power plant is built in Sturtevant, but the tanks are not needed for the power plant directly. Together with the piping, they would cost a total of $3.85 million in 2002 and 2003. Badger Gen is not expected to contribute to this cost, so further Racine utility rate changes might occur. If the power plant is not built in Sturtevant, these two tanks are not expected to be needed. At this point, it is not known where they would be located.

Through its Division of Water, Compliance, and Consumer Affairs, the Commission has asked the RWU to file a separate application to build the booster station and mains if the power plant is approved and the Sturtevant site is selected. The storage tanks and associated piping have been excluded from the Commission's acknowledgement of the RWU's 2000 capital improvements plan. If the plant is located in Sturtevant, the RWU will include the tanks and associated piping in a later capital improvements plan.

Police System

The village of Sturtevant and Racine County have indicated their willingness and ability to provide the necessary police protection services for the plant. The village of Sturtevant has a full time, nine-member Police Department, and the village has in place agreements with the Racine County Sheriff's department, town of Mt. Pleasant, and town of Caledonia to support its efforts.

No adverse impacts on the county's systems are anticipated. The village has indicated that, if the plant were sited in Sturtevant, Badger Gen's agreement with it would cover revenue needed in the future to offset any increase in the public safety aspect of the plant over what is expected.

Fire Protection and Emergency Medical Service

Badger Gen states that it would work with state and local officials during the design phase of the plant fire protection system to address all state and local standards. Badger Gen would work with the local fire and rescue departments on personnel training and familiarization with the areas within the power plant. This training and familiarization would be important for the department to locate any on-site emergencies that may occur.

The village of Sturtevant has already made improvements in order to address the needs of the manufacturers and businesses within the Renaissance Business Park. The village has indicated that its fire and rescue departments would respond to any emergency incident at the power plant. The village also has mutual-aid and automatic-aid agreements with the town of Mt. Pleasant and the town of Caledonia, and pending agreements with the city of

Racine. The regional Hazardous Materials team would be at disposal in "a matter of minutes."

The village has indicated that, if the plant were sited in Sturtevant, Badger Gen's agreement with it would cover revenue needed in the future to offset any increase in the public safety aspect of the plant over what is expected.

Schools

Plant construction and operation would not be expected to increase the population of local families significantly. No impacts to kindergarten through twelfth grade enrollment in the village are anticipated.

Roads and Railroads

Existing

The Sturtevant site is near several major transport corridors. Refer to **Table 5.08** and **Figure 5.02**.

Table 5.08 Major transport corridors at the Sturtevant Site

Highways	Approximate Location from Site
Interstate 94	2 miles west
CTH H (Renaissance Boulevard)	On western site boundary
STH 20 (Washington Avenue)	¾ mile north
STH 31 (Green Bay Road)	3 miles east
STH 11 (Durand Road)	¼ mile south
Rail Corridors	**Approximate Location from Site**
Canadian Pacific Railroad	300 feet east
STMP&P Railroad	400 feet south

Required Additions or Surface Changes

No changes to the transportation system are required for this project. However, due to continuing development in this general area (such as the Sturtevant Renaissance Business Park), the Wisconsin Department of Transportation (DOT) is in the process of upgrading about three miles of STH 11, from CTH H to I94. DOT will then install a light at the intersection of STH 11 and CTH H.

Growth in this area has also prompted Racine County and the village of Sturtevant to exchange jurisdiction over two roads near the proposed site. Renaissance Boulevard and

the southern end of West Avenue will become CTH H. There would be no stop along this stretch of CTH H between STH 20 and STH 11. Wisconsin Avenue, the current CTH H, will become a village road. The village and town have an improvement program for 90th Street, as this is a major arterial.

Impact During Construction and Operation

Badger Gen would direct all heavy truck traffic to the site by way of I90/94 to STH 20 (or STH 11) to CTH H. Employee traffic may also take the route of I90/94 to STH 20 (or STH 11) to West Road. Badger Gen estimated the maximum traffic flow due to the proposed plant. In **Table 5.09**, these estimates of added traffic during peak construction periods are compared to 1996 traffic counts by the DOT. Badger Gen would use a railroad siding within two miles of the proposed site as an offloading point for over-weight and over-sized equipment. It would need various transport permits to move this special equipment to the site.

Table 5.09 Impact of construction traffic Sturtevant Site

Approaches to site	STH 11	STH 20	CTH H (Renaissance Blvd. & West Rd.)	West Road
	EXISTING TRAFFIC			
1996 Average Daily Traffic (both directions)	24,800 west Sturtevant limits	21,000 2 miles east of I-94	9,000 south of STH 20	2,600 105th Street
	ADDED TRAFFIC DURING PEAK CONSTRUCTION			
Commuters in light vehicles	300-500 per day		300-500 per day	
Deliveries using mid-size trucks to full size semi-trucks	500 per day		500 per day	Minimal

Construction impacts would include some traffic back-ups and congestion during shift changes or the transport of special (wide or heavy) loads. This congestion would be most noticeable near the site, particularly on the smaller access roads, such as CTH H and West Road and at the intersections of these roads with STH 20 and STH 11. Lane closures might occur during the construction of water or gas pipelines. All construction impacts to roads would be temporary. Refer to the section on Noise for a discussion of the noise effects of road traffic.

Traffic generated by the proposed plant after construction would be so minimal as to have no impact on the road system. During operation, a maximum of 35 employees over two to three shifts, seven days a week would result in fewer than 50 employee vehicle-trips per day. Fewer than five semi-truck and 50 light truck trips would occur per day.

Fogging and Icing

Potential for Plume Development

In general, waste heat from the power plant steam cycle condenser is released into the outside air through cooling towers. This can produce a water vapor plume that has length, breadth, density, and direction. These plume characteristics depend on weather conditions and the design of the cooling tower. A plume is often considered a negative visual impact. More importantly, it can affect driving conditions. A plume touching the ground is fog. If the temperature is below freezing that fog creates ice on road surfaces.

The existing Pleasant Prairie power plant uses the standard cooling tower design. Badger Gen's proposed plant would use a different design that reduces plume formation.

In a standard cooling tower, air is forced over water to cool the water, which continues to cycle through the plant. Because the water is cooled through evaporation, the air forced through the cooling tower becomes hot and humid, and rises to mix with the outside air. This humid, hot air produces a plume of water vapor when it meets cooler outside air (because cold air holds less water than hot air). Refer to the cooling tower section in Chapter 2 for more information.

Badger Gen proposes to use a type of cooling tower called a wet/dry tower. The air is forced over some open water, but also over some water in closed tubes. Heat released through the closed tubes produces hot, dry air. This type of tower reduces plume formation by increasing the amount of hot, dry air released and decreasing the amount of hot, humid air. While Badger Gen proposes to use a wet/dry tower, the final design of that tower is not complete. According to the Badger Gen environmental report, "The specific level of abatement has not been finalized."

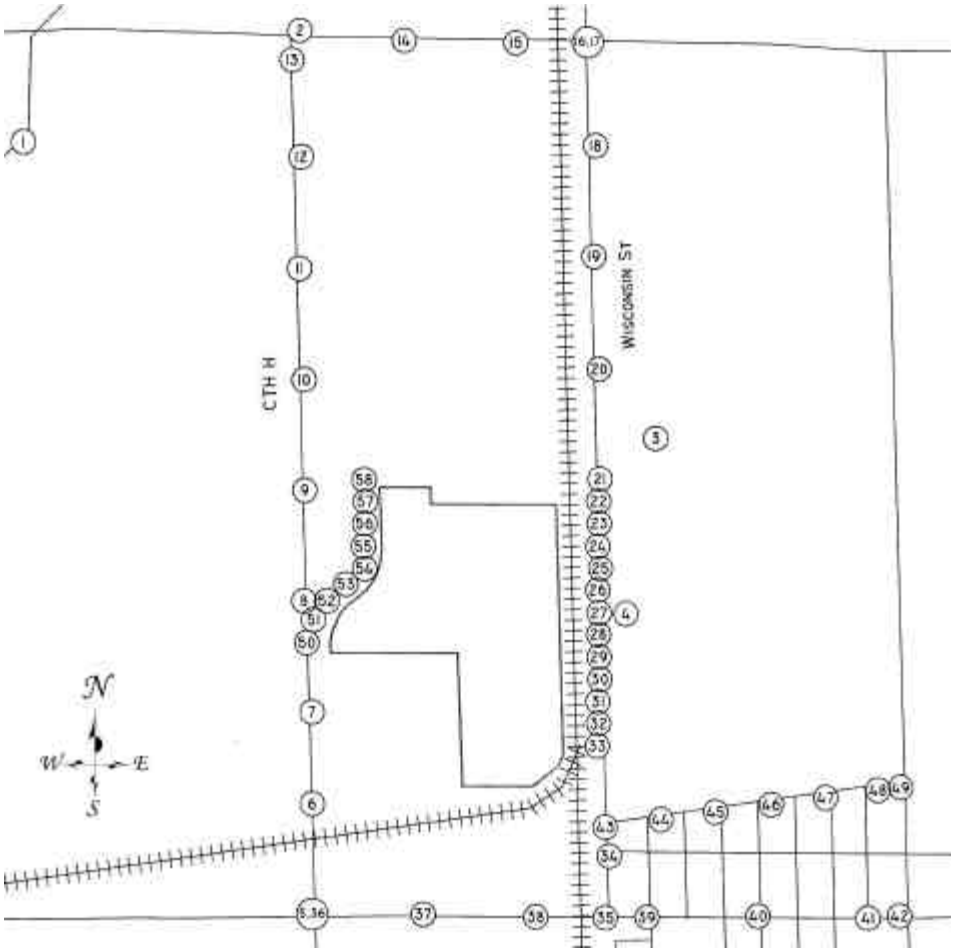
Potential for Fogging or Icing

Badger Gen used a computer program to predict how often the plume from the proposed plant would create fogging or icing conditions on roads. The input data included five years of historic weather data (1982 through 1986). Fifty-eight sites were identified as "receptors," or places where the computer program would look for fogging and icing conditions. The receptor sites used in the program are shown in **Figure 5.08**. These sites are mostly along roads surrounding the proposed site. Receptor sites were also chosen for the Racine Correctional Facility, Treadwell School, and a trailer park on Washington Avenue north of the proposed power plant site. Icing is most likely to occur on roads, pavement, parking lots, airport runways, and the sides of buildings. Fogging and icing are most likely to be a hazard on roads.

The computer results show that the proposed plant would produce icing conditions in winter on Wisconsin Avenue. There would also be some effect on Renaissance Boulevard (CTH H), West Road, and Park Court. No fog conditions were predicted.

Table 5.10 summarizes the number of occurrences. **Table 5.11** shows the computer results by year, day, hour, and receptor.

Figure 5.08 Fogging and icing receptor locations at the Sturtevant Site



Badger Gen predicts that the proposed plant would create only about 2 hours of icing over five years on nearby roads. Badger Gen reached this conclusion by comparing the weather conditions at General Mitchell Field in Milwaukee to days when the computer model predicted ice on area roads. On days of snowfall or blowing snow at General Mitchell Field, Badger Gen concluded that plant-induced icing would not be important, since there might already be ice on the roads and drivers would already be more cautious. However, plant-induced icing would add to any existing weather hazards, including weather-induced icing.

Table 5.10 Predicted increase hazardous road conditions over a 5-year period at the Sturtevant Site

	Ice*		Fog	
Location	**HOURS**	**Days with Hour(s)**	**HOURS**	**Days with Hour(s)**
Wisconsin Street	17	5		
Renaissance Boulevard	2	1		
West Road	2	1	None	
Park Court	1	1		

* For the same two hours on one day, icing conditions are predicted for West Road and Renaissance Blvd. For the same hour on the same day, icing conditions are predicted to occur on Park Court and Wisconsin Street. Otherwise, the days and hours of predicted icing conditions do not overlap.

Table 5.11 Fogging and icing predictions at the Sturtevant Site

Year	Day	Hour	Receptor	Receptor Number	Prediction
1982	9	20	Wisconsin St	33	ICE
'82	9	21	Wisconsin St	30-32	ICE
'82	10	11	Wisconsin St	30	ICE
'82	10	12	Wisconsin St	28	ICE
'82	10	13	Wisconsin St	28	ICE
'82	10	15	Park Court	4	ICE
'82	10	15	Wisconsin St	27, 29	ICE
'82	10	16	Wisconsin St	28, 30	ICE
'82	16	4	Wisconsin St	29, 31	ICE
'82	16	5	Wisconsin St	29-32	ICE
'82	22	15	West Road	8	ICE
'82	22	15	Renaissance Blvd	51-53	ICE
'82	22	16	West Road	8	ICE
'82	22	16	Renaissance Blvd	51-53	ICE
'82	23	17	Wisconsin St	26	ICE
'82	23	19	Wisconsin St	28	ICE
1983	358	2	Wisconsin St	31	ICE
83	358	3	Wisconsin St	29, 31	ICE
'83	358	6	Wisconsin St	31	ICE
'83	358	7	Wisconsin St	29	ICE
'83	358	8	Wisconsin St	31	ICE
'83	358	21	Wisconsin St	29, 31	ICE
1984	None				
1985	None				
1986	None				

Noise

Applicable Local Noise Ordinances

The village of Sturtevant and Racine County have nuisance ordinances in their zoning requirements that prohibit annoyance from noise. They do not define any quantitative decibel limits.

The town of Mount Pleasant has noise limits for industrial land use. The overall "A" and "C" weighted level limits for the plant would be 61 dBA and 80 dBC. These limits are greater than those of the village of Pleasant Prairie. The plant would be to the north and east end of the site, so the distances to Mount Pleasant receptors would be greater than the distances at the Pleasant Prairie site to its receptors. Thus, Mount Pleasant's noise limits are probably not of concern to the project.

Existing Environment

There would be potential receptor residences located to both the east and west of the Renaissance Business Park. To the south are the railroad yard, a variety of light industrial businesses, some of which use the yard, and STH 11. To the north at some distance is the closed-wall factory building of the Golden Books printing plant. Therefore, places to the north and south of the proposed power plant site do not need to be considered sensitive receptors for noise impacts.

Since noise levels would vary slowly with longer time periods but also instantaneously as individual events occur, ten-minute samples were recorded during each of the four time periods and statistical matrices were used. These included L_1, L_{10}, L_{50}, and L_{90} levels, and an "equivalent" level L_{eq}. The measured and computed dBA-weighted noise levels are given in **Table 5.12**.

Table 5.12 A-weighted ambient sound measurements for two measuring points at Sturtevant Site

Time of Day	Measuring Point 1 - East on Main					Measuring Point 2 - West on West Rd				
	L_1	L_{10}	L_{50}	L_{90}	L_{eq}	L_1	L_{10}	L_{50}	L_{90}	L_{eq}
Morning	71.1	64.1	55.0	49.5	60.6	66.4	54.5	49.7	47.2	55.1
Midday	75.9	68.4	60.4	49.9	65.5	61.5	56.9	53.3	50.8	54.6
Evening	70.6	64.0	55.6	48.1	60.1	60.9	52.6	46.8	42.5	50.5
Night	62.9	57.4	47.6	45.1	53.0	66.3	55.2	46.6	44.5	53.6
Average*	72.5	65.5	57.0	49.2	62.1	62.9	54.7	49.9	46.8	53.4

* Average dBA is averaged over daytime (7 a.m. - 10 p.m.).

While the L_{eq} can be considered an average sound energy level, the other four levels represent the sound levels exceeded 1, 10, 50, and 90 percent of the sampling time. The L_1 level is essentially the peak or the sound from the loudest events. The L_{10} level is used by the Federal Highway Administration to assess the need for traffic noise mitigation, and high values of L_{10} indicate dominant traffic as the source. The L_{50} level is the level where half of the time the noise is louder or quieter. The L_{90} level is typically used to classify noise environments in residential communities. It usually represents the absence of identifiable sporadic sources like vehicle passes, barking dogs, aircraft flyovers, and other noise sources commonly found in the environment. The dominant noise source for L_{90} levels in residential communities is usually from far-off unidentifiable highway noise.

The average daytime L_{90} level for the noise measuring point on Main Street **(see Figure 5.09)** has been estimated to be about 49 dBA. For the noise measuring point on West Road, it has been estimated at about 47 dBA. According to typing of typical residential area sound levels by the EPA, 47 and 49 dBA both correspond to an "urban residential" environment. This categorization probably results from traffic along Main Street, West Road, and perhaps STH 11 and the roads inside the Renaissance Business Park.

The L_{10} values at the Sturtevant site are consistently greater at any time of day than the L_{90} values. Average L_{10}s for Main Street and West Road have been estimated to be about 65.5 dBA and 54.7 dBA, respectively. Road traffic is the most likely cause of these higher sound averages.

Construction Noise Impacts

As described for the Pleasant Prairie site in Chapter 4, the construction noise to build the proposed plant would consist mostly of a series of intermittent sources, most of which would originate from the diesel engine drive systems that power most construction equipment. It is likely that during peak construction, construction work may occur for up to 16 hours per day.

Steam and Air Blows

The very loud (ranging from 120 – 134 dBA at 50 feet from the event) short-term steam or air blows would also be necessary. **Table 5.13** illustrates and rank-orders the estimated noise sources expected during construction, including the noise level at the closest receptors (see **Figure 5.09**). As illustrated in **Table 5.13,** anyone in the residences on the Main Street side of the industrial park east of the proposed plant would be exposed to over 100 dBA when steam blows occurred. On West Road, residences would be exposed to over 90 dBA. The steam and air blows would be well above the existing ambient maximum noise.

Individual Equipment Noise

As described for the Pleasant Prairie site, construction noises would contribute to the L_1 ambient values in **Table 5.12**, which are practically maximum values, computed

Figure 5.09 Audible sound altervation from the proposed plant at the Sturtevant Site

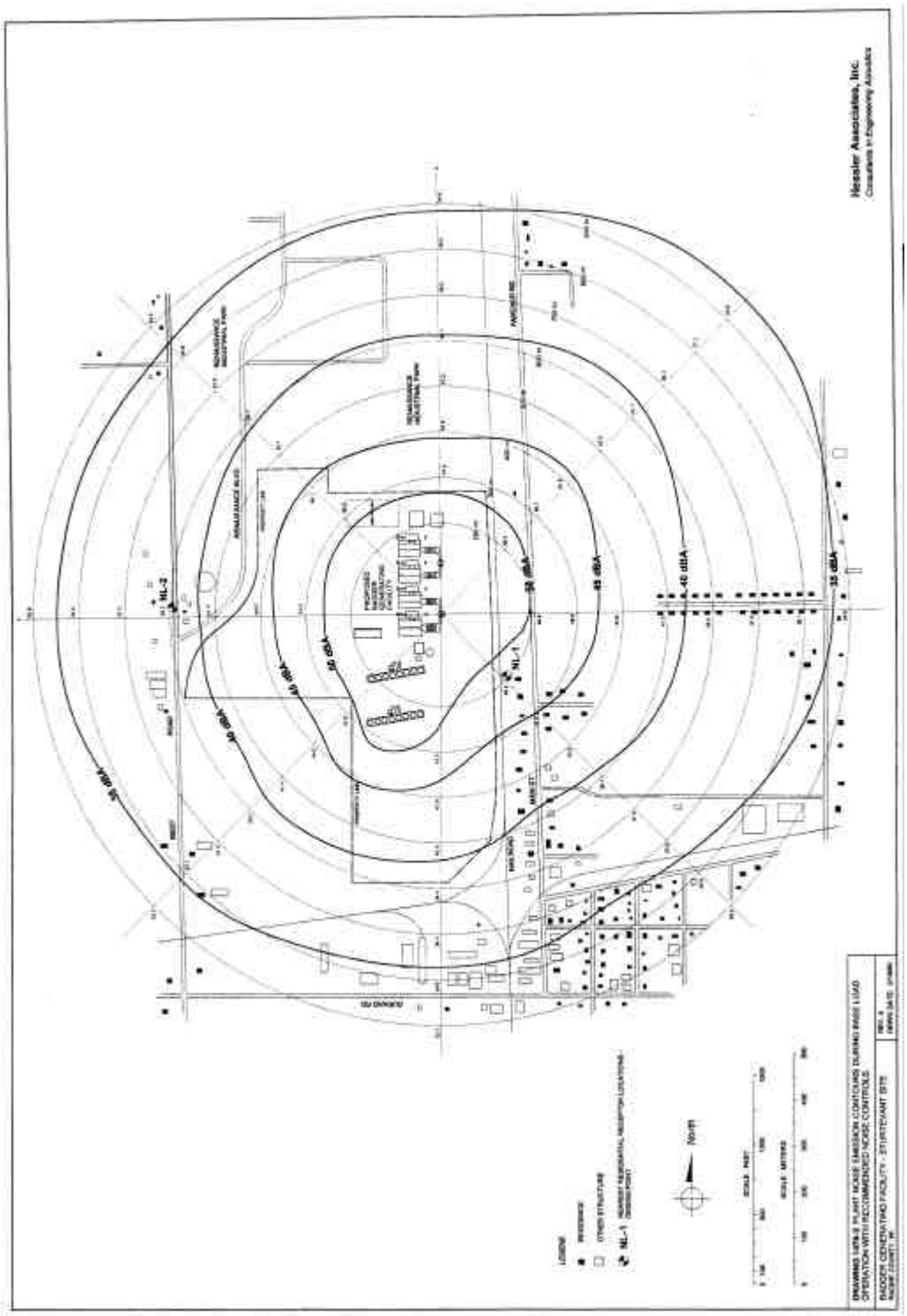


Table 5.13 Estimated maximum noise levels for typical construction equipment in dBA at the Sturtevant Site

Construction Equipment	Maximum Noise Level (dBA)			
	Typical Range at 50 Feet	Average at 50 Feet	Expected at Receptors	
			Main St	West Rd
Steam blow off (4-8" line)	124-134	129	105	98
Air blow off (4-8" line)	120-130	125	101	94
Blasting	93-94	94	70	63
Dozer (250-700 hp)	85-90	88	64	57
Front end loader (6-15 yd^3)	86-90	88	64	57
Trucks (200-400 hp)	84-87	86	62	55
Grader (13-16' blade)	83-86	85	61	54
Shovels (2-5 yd^3)	82-86	84	60	53
Portable generators 950-200kW)	81-87	84	60	53
Derrick crane (11-20 T)	82-83	83	59	52
Mobile cranes (11-20 T)	82-83	83	59	52
Concrete pumps (3-150 yd^3)	78-84	81	57	50
Tractor (3/4-2 yd^3	77-82	80	56	49
Unquieted paving breaker	75-85	80	56	49
Quieted paving breaker	69-77	73	49	42

to account for ninety-nine percent of the sounds perceived. On Main Street, the measured ambient L_1 values for morning, midday, and evening ranged from 70.6 to 75.9 dBA, at about 850 feet from the proposed cooling towers site. On West Road, the measured ambient L_1 values for morning, midday, and evening ranged from 60.9 to 66.4 dBA, at about 1,800 feet from the proposed cooling towers site. The Sturtevant site appears to differ from the Pleasant Prairie site in that, in addition to the steam and air blows, blasting could have an impact. It is not known yet whether blasting would actually be needed, but at the Main Street measuring point, blasting would be about 70 dBA, which is near the lower end of the ambient L_1 range. As the day moves toward evening, blasting might become more noticeable. At the West Road measuring point, blasting would be within the L_1 range, as loud as some of the louder sounds now experienced there. Again, blasting could become more noticeable as afternoon moves into evening.

Composite Construction Noise

As described for the Pleasant Prairie site, composite construction machine noise levels can be used to predict noise levels at the nearest receptor residences to the Sturtevant construction site. **Table 5.14** illustrates the comparisons and the estimated increases in noise level at the receptor locations for the five basic phases of power plant construction.

As shown in **Table 5.14**, there would be no increase over the average day-night ambient noise level at Main Street or West Road from the Sturtevant site during the concrete pouring, mechanical equipment installing, and clean-up and testing phases of construction. Thus, there would be no appreciable noise impact from plant construction

Table 5.14 Expected composite noise levels and noise level increases in dBA for the five basic phases of construction at the Sturtevant site

Phase	Construction Activity	Expected Levels (L_{eq}) at Main St			Expected Levels (L_{eq}) at West Rd		
		LTCN*	AMB**	INC***	LTCN*	AMB**	INC***
1	Excavation	64.5	59.8	4.7	58	53.5	4.5
2	Concrete pouring	60.5	59.8	0.7	54	53.5	0.5
3	Steel erection	64.5	59.8	4.7	58	53.5	4.5
4	Installing mechanical equipment	59.5	59.8	0	53	53.5	0
5	Clean-up, testing, and line cleaning	54.5	59.8	0	48	53.5	0
(5)	(Unsilenced steam blow - line cleaning)	104.5	59.8	44.7	98	53.5	44.5

* LCTN -- Predicted long-term composite construction noise level, L_{eq} for the indicated phase.
** AMB -- Average measured daytime-nighttime ambient noise level, L_{eq}.
*** INC -- Increase of construction noise over ambient noise.

during those activities. During excavation and steel erection, an average increase in about 4.7 dBA would occur at Main Street and an average increase in 4.5 dBA would occur at West Road. Since the increases are just under 5 dBA, the construction noise would be perceptible during these activities. If it is audible, it has the potential to distract or be temporarily annoying, especially at night. Overall, with the exception of the steam and air blows, none of the five phases of construction activity appear to create an appreciable adverse impact on the community.

As described for the Pleasant Prairie site, the estimated construction noise (and operational noise) at sensitive receptors can be evaluated individually in terms of interference with activities such as outdoor speech, sleep, or enjoyment of recreation facilities. A scale of common sounds for comparison can be found in **Table 4.17** in the Noise section of Chapter 4.

Mitigation Plans

Badger Gen states that it would employ all reasonable noise mitigation measures to minimize adverse effects of construction-generated noise. All construction equipment mufflers would be maintained in good order. Steam and air blows would be limited to daytime hours, and Badger Gen would notify local residents in advance. To the extent possible, higher noise activities would be minimized during any second shift construction.

Operational Noise Impacts

Audible Noise

While construction noise would be emitted during the development of the site and erection of the plant, operational noise would be emitted throughout the life of the plant. Audible frequency operational noise levels from the plant must be at a low level compared to the existing ambient levels so that the overall increase is minimal. Thus,

Badger Gen has a design goal for the Sturtevant site as well as for the Pleasant Prairie site. A plant design goal at Sturtevant would limit new noise so that the nearest receptor residences on either side of the site would experience increases of no more than 3 dBA. **Table 5.15** shows that the design goal for the plant would be 48 dBA at the Main Street measuring point and 47 dBA at the West Road measuring point in order to add no more than 3 dBA at the nearby residences.

Effect of the Design Goal

As described for the Pleasant Prairie site, a design goal equal to the lowest L_{50} (48 and 47 dBA) would make the plant just perceptible or faintly audible to a careful observer during the quietest time of the day or night for about fifty percent of the observed time. The rest of that time, the plant would be inaudible because its noise would be masked by other noises that are currently ambient noises. The plant noise could become perceptible during the remaining portion of the day or night, but only for the brief periods when the ambient noise is at a near minimum level or around the L_{90} level. These situations are illustrated in the computed increases to the L_{10}, L_{50}, and L_{90} ambient levels shown in **Tables 5.15** and **5.16**. In the tables, increases in dBA levels of 3.0 or greater are identified.

Table 5.15 Computed results of adding design goal noise level to existing ambient levels at L_{10}, L_{50}, and L_{90}, in dBA at closest receptor residences along Main Street

		Morning	Midday	Evening	Night
L_{10}	Ambient	64	68	64	57
	Add	48	48	48	48
	Total	64	68	64	58
	Increase	0.1	0.0	0.1	0.5
L_{50}	Ambient	55	60	56	48
	Add	48	48	48	48
	Total	56	60	57	51
	Increase	0.8	0.3	0.6	3.0
L_{90}	Ambient	50	50	48	45
	Add	48	48	48	48
	Total	52	52	51	50
	Increase	2.1	2.1	3.0	4.8

Table 5.16 Computed results of adding design goal noise level to existing ambient levels at L_{10}, L_{50}, and L_{90}, in dBA at closest receptor residences along West Road

		Morning	Midday	Evening	Night
L_{10}	Ambient	55	57	53	55
	Add	47	47	47	47
	Total	56	57	54	56
	Increase	0.6	0.4	1.0	0.6
L_{50}	Ambient	50	53	47	47
	Add	47	47	47	47
	Total	52	54	50	50
	Increase	1.8	1.0	3.0	3.0
L_{90}	Ambient	47	51	43	45
	Add	47	47	47	47
	Total	50	52	48	49
	Increase	3.0	1.5	5.5	4.1

Along Main Street, it might be just perceptible fifty percent of the time at night, and more noticeable ten percent of the time at night. It might also be just perceptible for about ten percent of the time in the evening.

Along West Road, it would be just perceptible fifty percent of the time in the evening and at night, and more noticeable ten percent of the time in the evening and at night. It might be just perceptible also about ten percent of the time in the morning.

Achieving the Design Goal

Badger Gen has indicated that the design goal of 48 and 47 dBA appears achievable.

At the Sturtevant site, the cooling towers would be about 560 feet from the closest receptor residence's property line. Two standard, unabated, 8-cell, cooling towers would produce a noise level that far exceeds 48 or 47 dBA, so the cooling towers would require noise abatement. Measures to take would be similar to measures listed in the discussion of the Pleasant Prairie site in Chapter 4. Again, the final plant design, in consultation with local authorities, would be a balance of measures that help the company satisfy the design goal without reducing the power plant's performance.

Badger Gen states that it intends to comply with the appropriate codes and ordinances related to noise emanating from the site. It has implied, but not stated directly, that it would attempt to reach the design goals described here.

Low Frequency Noise

The potential for low frequency noise in combustion turbine plants is discussed in the noise section in Chapter 4. That discussion is followed by a description of the low frequency sound muffling in a combine-cycle plant like the one proposed. Both discussions also apply to this section as well.

The company provided measurements and estimates for this project using the C-weighted scale, which more easily enables identification of low frequency noise. (See **Table 5.17**) **Table 5.18** shows the computed increases to the L_{10}, L_{50}, and L_{90} ambient levels caused by the proposed plant operating.

Table 5.17 C-weighted ambient sound measurements for two measuring points at Sturtevant Site

Time of Day	Measuring Point 1 - East on Main					Measuring Point 2 - West on West Rd				
	L_1	L_{10}	L_{50}	L_{90}	L_{eq}	L_1	L_{10}	L_{50}	L_{90}	L_{eq}
Morning	83.7	73.4	66.8	62.9	71.5	79.1	68.6	66.3	64.2	68.2
Midday	91.0	82.3	69.1	62.4	78.6	70.8	67.9	66.0	64.2	66.2
Evening	79.0	71.7	64.7	60.8	68.5	72.8	68.1	62.9	60.3	65.1
Night	73.5	66.7	62.0	60.2	64.2	84.7	73.3	64.8	62.7	71.7
Average*	81.8	73.5	65.7	61.6	70.7	76.9	69.5	65.0	62.9	67.8

* Average dBC is averaged over all data and entire day.

The table shows that the nearby Mt. Pleasant performance standard is easily reached. Although there is no useful correlation measurement between the increase in dBC and community reaction and no design goal for low frequencies from a combined-cycle plant, national standards for combustion turbine installation sound emissions suggest that 75-80 dBC sound emissions would be enough to avoid low frequency noise problems. Except for midday, at Main Street, the resulting totals in dBC in **Table 5.18** appear to remain within that range.

Prominent Tones

Some power plants in Wisconsin have exhibited problems with certain frequencies of sound (tones) carrying farther from the plant and creating impacts. Usually, these problems have been associated with large fans that are used in coal-fired plants. Even though many pieces of the combined-cycle plant equipment would be potential tonal noise sources, the broadband sources (towers, turbines, and generators) would be much more prominent and would mask them within 1,000 feet.

Transient Noise

During normal start-up and shutdown of the power plant, controlled steam venting must occur. Under emergency conditions, safety valves may open, temporarily emitting very

Table 5.18 Computed results of adding design goal noise level to existing ambient levels at L_{10}, L_{50}, and L_{90}, in dBC at the closest receptor residences

Measuring Point 1		Time of Day	Morning	Midday	Evening	Night
East on Main	L_{10}	Ambient	73	82	72	67
		Add	75	75	75	75
		Total	77	83	77	76
		Increase	3.9	0.7	5.0	8.9
	L_{50}	Ambient	67	69	65	62
		Add	75	75	75	75
		Total	76	76	75	75
		Increase	8.8	6.9	10.7	13.2
	L_{90}	Ambient	63	62	61	60
		Add	75	75	75	75
		Total	75	75	75	75
		Increase	12.4	12.8	14.4	14.9
Measuring Point 2		**Time of Day**	**Morning**	**Midday**	**Evening**	**Night**
West on West Road	L_{10}	Ambient	69	68	68	73
		Add	75	75	75	75
		Total	76	76	76	77
		Increase	7.3	7.9	7.7	3.9
	L_{50}	Ambient	66	66	63	65
		Add	75	75	75	75
		Total	76	76	75	75
		Increase	9.2	9.5	12.4	10.6
	L_{90}	Ambient	64	64	60	63
		Add	75	75	75	75
		Total	75	75	75	75
		Increase	11.1	11.1	14.8	12.5

high noise levels. Hessler Associates, Inc. recommends a transient source design goal of no more than 8 dBA above the steady state design goal (48 and 47 dBA at the Sturtevant site) to limit noise impacts from these safety valves. Badger Gen would need to install silencers on the valves.

Visual Landscape

Existing Visual Landscape

The Sturtevant site is in a highly developed area where commercial/industrial buildings and roads are the most prominent features. The landscape is generally flat. Small housing developments occur along major roads and in more wooded areas just off major roads. The village of Sturtevant is large enough to create its own, clearly defined visual presence. There is farmland to the west and southwest of the site. The site itself is on former, treeless farmland. The site lies within the Renaissance Business Park, an extensive (350 acre) commercial/light industrial park that spans STH 20. The eastern site boundary

is a railroad embankment with an active railroad track and signal wires. The northwest site boundary is Renaissance Road (CTH H). Two electric transmission lines are located between 1-1.5 miles east of the site and an existing electrical substation is located about one mile to the ESE of the proposed site. Prominent features on the skyline include the water tower for the business park (about 165 feet) and the watchtower for a nearby prison.

The street that turns off Renaissance Boulevard and runs east from the business park's water tower would become the access road to the plant site. Plant construction would remove about half of this street. **Figures 5.10-5.13** are photos taken from the proposed access road at a location near the front and center of the proposed plant. These photos show the large size of the business park and the proposed site. The proposed plant facilities would cover about half of the site. Existing commercial/industrial development shows in the distance in all views. Lights for the county prison show in the view toward the east.

There are no houses as close to the Sturtevant site as at the Pleasant Prairie site. The views of the proposed plant that people living near the Sturtevant site would have are remote. **Figures 5.14-5.19** show views of the proposed plant site from the nearest houses. The closest houses from which people could view the proposed plant include:

- The house in the pines, nearest to the Renaissance Park water tower, almost directly across from the proposed access road.
- Two farmhouses on West Road, southwest of the plant site.
- Two houses on West Road, northwest of the plant site.

In addition, the site is visible from the railroad embankment behind the houses on Wisconsin Avenue. It is possible that the proposed plant's stacks could be seen from the backyards of a few of these properties, during the winter months.

The closest park is the Fireman's/Memorial Park in Sturtevant, about a quarter of a mile east of the proposed site. Downtown Sturtevant is separated from the site by railroad tracks and a railroad station.

Changes in Views and Impacts of Construction and Operation

Changes in Views

Badger Gen's proposed site is a somewhat L-shaped property. The long side of the L is along the Canadian Pacific railroad track, with the top of the "L" pointing toward Sturtevant and the foot of the "L" pointing toward West Road. Badger Gen would center the proposed plant's facilities in the base of the "L," the portion of the site that is furthest from Sturtevant and furthest from West Road. Badger Gen would locate the plant facilities closest to the northern site boundary (by the Golden Books plant) and the eastern site boundary (by the railroad embankment).

Figure 2.04 shows the proposed layout of the plant facilities. The existing retention pond, narrowed and lengthened, would lie closest to the railroad tracks (the eastern site boundary). A corridor for the underground transmission lines that connect the power plant to the electric system would lie closest to the Golden Books plant (north). From the transmission corridor south would be the power plant's substation (switchyard), a parking lot, and the main office building. The main office building would lie closest to Renaissance Boulevard (the western site boundary). Between these facilities and the retention pond, a large, metal building would house four turbines. The water treatment tanks and cooling towers would be located to the south of all these facilities, and to the west of the retention pond.

The building that houses the turbines would look like the other commercial/industrial buildings in the general area and in Renaissance Park. About 90 feet high, it would be one of the largest buildings in the park. However, it would probably not be out of scale with its surroundings. In addition, most people would see it from a distance (over a quarter of a mile away), which would make it appear to blend in with its surroundings more. The retention pond and cooling towers would also probably not look out of place. The parking lot would be one of the smallest in the park. The administration/service building would be about 30 feet high. The most conspicuous features of the proposed plant would be the power plant substation with its electrical equipment and the power plant's two exhaust stacks, each of which would reach to about 120 feet. The Pleasant Prairie site would have four, more slender, stacks compared to the Sturtevant's two stacks. However, the overall visual impression of the stacks at the two sites would not differ appreciably. The stacks would probably not appear out of place, since they would be narrower and shorter than the 165-foot water tower nearby.

Impacts of Construction

From a visual perspective, the construction of the proposed Badger Plant could appear chaotic and/or interesting, depending on the viewer's frame of mind. However, it would not appear out of place, given its location in the Renaissance Business Park.

Impacts of Operation

The proposed Badger Plant would change the view of the few people who live closest to the site. However, the distance of the plant from these people would reduce its apparent size and its setting among other commercial/industrial buildings would reduce its visual impact. Houses with the closest and most direct views of the proposed plant are at 2236 West Road, 2102 West Road, 2617 West Road, and from the backyard of the home on Wisconsin Avenue across from Park Court. Other houses are either further away (for example, houses on Sorenson Road) or have obscured views. Houses with obscured views include most houses on the west side of Wisconsin Avenue, which have garages, sheds or shrubbery screening their views toward the railroad tracks. Houses near the corner of West Street and Sorenson Road would have the visual effect of an existing industrial building reducing the visual effect of the Badger Gen plant.

The closest commercial buildings are Golden Books and Borzynski Farms. The portion of Golden Books that is closest to the proposed power plant is the factory wing, which has no windows. It also has no openings on the side of the building that would face the power plant. The view from Borzynski Farms is somewhat blocked by a rise in the land across the road from the farm. The proposed plant may also be visible at a distance from the second floor of the Railroad Hotel.

From CTH 20, the plant would be hard to distinguish from other buildings. From CTH 11, the plant would probably appear as a small part of the horizon. Badger Gen's application, which has also been filed with county and village officials, contains illustrations of how the proposed plant would look from these and other distant viewsheds.

The views from Fireman's/Memorial Park would not change appreciably, due to the houses and trees between the park and the proposed site. The top of the power plant might be visible, but it would just be another addition to the skyline. The power plant would not be visible from the top of the mound just inside the park because a farmhouse and a line of willows and evergreens would block the view.

Mitigation of Visual Impacts

There is probably no attractive way to mitigate the view of construction. However, the final appearance of the proposed Badger Plant could be altered by a number of details, such as bush and tree plantings, fences, paint colors, and lighting. The success of this type of mitigation depends on the final design. Badger Gen proposes to use a plume mitigation system in its cooling towers that would keep the visible water vapor to a minimum. For more information on this, refer to the sections describing the cooling tower, in Chapter 2, and its impacts, in this chapter.

Lighting

Badger Gen would light the plant site in a manner similar to other industrial sites. Lighting may also increase at special times during construction or operation (for example, due to construction at night or during special plant maintenance). This means that the level of light would increase near the site. Further from the site, the increased light levels would blend in with the lights of surrounding businesses, homes, and institutions. Badger Gen would use outdoor light fixtures that shade the source of light, directing the light downward, so that it is unlikely that their lighting would light up the night sky or create a nuisance for nearby homeowners. Badger Gen would decide on the location of lights during its "final project design phase." FAA may also require a light or lights on the plant stacks. However, lighting the stacks would not make the plant appear out of place, given its highly developed surroundings.

Figure 5.10 View to the east from a location near the front, center of the proposed plant. Plant facilities, located between here and the Canadian Pacific RR, would fill this view.

Figure 5.11 View to the west from a location near the front, center of the proposed plant. The plant would be behind the viewer. This road would become the plant's driveway.

Figure 5.12 View to the south from a location near the front, center of the proposed plant. Plant service building & cooling towers would be located on left side of picture.

Figure 5.13 View to the north from a location near the front, center of the proposed plant. The plant's substation (switchyard) would be located on the right side of the picture.

Figure 5.14 Good view of the site from the Canadian Pacific railroad embankment.

Figure 5.15 View from the same location on the embankment toward Wisconsin Avenue at the property closest to the site and least screened from the railroad tracks.

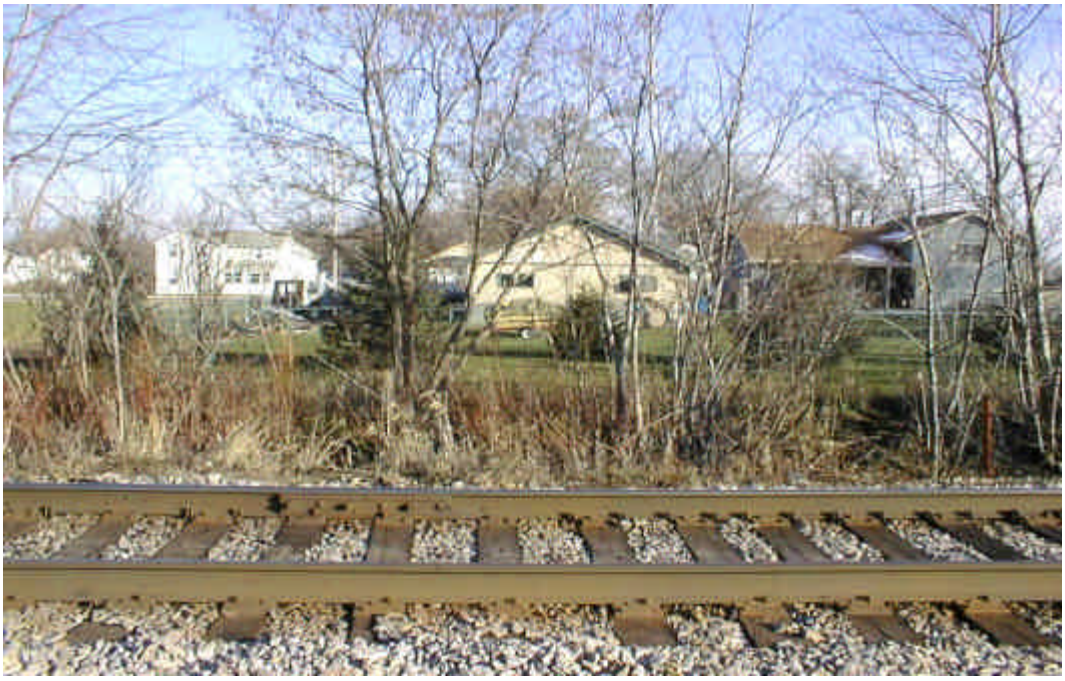


Figure 5.16 View of the proposed site from a location near the closest farmhouse southwest of the site. Golden Books is the building on the left.

Figure 5.17 View of the proposed site from the water tower driveway. The access road is in the middle of the picture. The green house in the pines is directly behind the viewer.

Figure 5.18 View of the proposed plant site from West Road, north of the water tower. Golden Books building is on left. The plant would extend from Golden Books south.

Figure 5.19 View of the proposed site from the corner of West Road and Sorenson Road. The building shown belongs to Leman VSA. The plant would be in the middle distance.

Historical and Archeological Sites

Known and Listed Historic Properties - Compliance with Wisconsin Statutes

Under Wis. Stat. § 44.40, the Commission must determine if project construction and operation could affect historic properties listed with the SHSW. The listings at the SHSW show no traditional cultural, archeological, or historic architectural properties that would be affected by the construction and operation of the proposed facilities.

Surveys to Locate and Evaluate Historic Properties - Compliance with National Historic Preservation Act

Because there are federal permits and approvals required for the plant, the more stringent federal requirements of Section 106 of the NHPA supersede those of Wis. Stat. § 44.40. Section 106 applies to all construction aspects necessary for the power plant project. Enforcement is through the federal permits. At the plant site, under Section 106, the SHSW has required Badger Gen to have all areas of proposed new ground disturbing activity surveyed by a qualified archeologist to locate and evaluate the significance of any archeological sites that may be present. Badger Gen has had a survey performed at the site by GLARC. The RWU would need to have similar surveys done on the proposed water main routes if the Sturtevant site is selected.

Existing Resources at the Plant Site

GLARC's site literature review and on-site work could not identify any areas that met the criteria for inclusion on the NRHP. Archival and literature searches revealed no listed archeological sites within one mile of the power plant site.

Potential Impacts

Both GLARC and the SHSW have concluded that the proposed power plant construction in the Renaissance Business Park would not have an adverse affect on sites or properties eligible for the NRHP. The SHSW has recommended no further investigations at the Sturtevant site. It still recommends survey of undisturbed right-of-way for the new water mains and booster station.

It is always possible that undiscovered artifacts or archeological sites might be found during construction. If such finds were made, they would need to be reported to the SHSW at once. If human remains were discovered at any time during the project construction, construction would need to stop and Badger Gen would need to contact the SHSW immediately for compliance with Wis. Stat. § 157.70, which provides for the protection of burial sites.

Economic Impacts

Shared Revenue

A power producer like Badger Gen is exempt from local property taxes. The power producer pays a fee based on the value of the power plant to the Wisconsin Department of Revenue. A portion of the fee is shared with the affected village and county. Payments begin during construction and continue during operation. The village of Sturtevant would receive a distribution of 6 mills times the first $125 million in the account. Racine County would receive a distribution of 3 mills times the first $125 million in the account. Distribution of the money during the construction period may increase as the value of the plant increases. Distributions of this money over the first eight to ten years of power plant operation are estimated to be in the range of $1 million dollars per year. These payments would be about $750,000 to the village and $375,000 to the county.

Jobs

The typical number of construction employees on any single day is about 100. The peak number of workers could be 250 on one shift. If there is more than one shift of workers, the maximum would be 325. Over the course of the project, a total of 525 would be employed. This would include specialists that do special work on the turbines and test them. The number of permanent employees that would operate the proposed power plant is about 35. The number of jobs for construction or operation is insignificant when compared to the number of workers in the Renaissance Business Park and in the entire Racine area.

Development Impact

No secondary development is likely to occur if the proposed power plant is built. Natural gas is already available in the area. The new pipeline to the proposed power plant is not designed to serve any other customers. The electric transmission line connected to the proposed power plant will not serve other customers. Although there are nearby industries, Badger Gen would use its own steam to generate electricity. The company states that it does not intend to seek potential industrial, commercial, or institutional steam users.

Electric Transmission Line

Existing System and Proposed Connection

Badger Gen proposes to connect its plant to the 345 kV transmission system in the area. Originally, Badger Gen proposed a 345 kV transmission line between the Sturtevant site and the nearby Racine Substation. Its application included two possible underground transmission routes that extended east from the Sturtevant site to existing transmission structures near the Racine Substation. However, the utility that owns the Racine

substation and the surrounding transmission facilities, WEPCO, has maintained that such a connection is unsuitable without extensive construction of additional new transmission lines. While it has not conducted a detailed study of a direct Racine interconnection, WEPCO asserts that without significant additional upgrades, connecting the Badger Gen plant directly to the Racine Substation could lead to line thermal overloads or dynamic stability problems that could affect customers or nearby generation.

Badger Gen disagrees with this assessment. It contends that there are straightforward solutions to any such problems, and that extensive new transmission construction would not be required. Badger Gen has expressed a willingness to take such measures, which might include certain generator equipment modifications, reducing plant generation levels under certain conditions, or even sudden disconnection of one or more generating units. Nonetheless, in the absence of agreement with WEPCO on this issue, Badger Gen has proposed an alternate approach to interconnection from the Sturtevant site. This will ensure that both sites considered in this approval process have viable transmission system connection possibilities.

Badger Gen's alternate interconnection approach from the Sturtevant site involves building a transmission line to a new switching station on the Zion-Arcadian line, just as proposed for the Pleasant Prairie site. This alternate approach was proposed after the application was filed, so it does not appear in the application. However, this approach relies heavily on routes that were identified in the application. The transmission line would follow one of the two already-identified underground routes between the Sturtevant site and the existing WEPCO 345 kV line. These transmission structures are designed to support two transmission lines – composed of three current-carrying conductors – on each side. Conductors are now installed on only one side. Badger Gen proposes to use the other side of these structures for the overhead part of this line, roughly between the existing Racine Substation and the proposed Pleasant Prairie plant site. From the Pleasant Prairie site the transmission line would again be installed underground, along the underground routes identified for the Pleasant Prairie site. These routes are discussed in more detail in the following sections of this chapter.

In general, installing new conductors on existing transmission structures is a very low-impact way to install a new transmission line. No new structures or right-of-way would be required, and construction would involve little more than installing new insulators and stringing new conductors. One important consideration with this approach, however, is that it might interfere with future plans to use these structures for a new transmission connection between the Racine and Pleasant Prairie Substations. Accordingly, the precise design of this overhead transmission line section, and the location of its endpoints, should be selected in a manner that would facilitate its eventual incorporation into a line that might continue to the Racine Substation, or further north. In particular, it may be appropriate to ensure that conductors are suitably large for use in such a future line and that the endpoints chosen do not unnecessarily complicate future connections.

Figure 5.20 Proposed interconnections between Badger Generating Plant at Sturtevant Site and the existing transmission system. Only 345 kV transmission lines are shown.

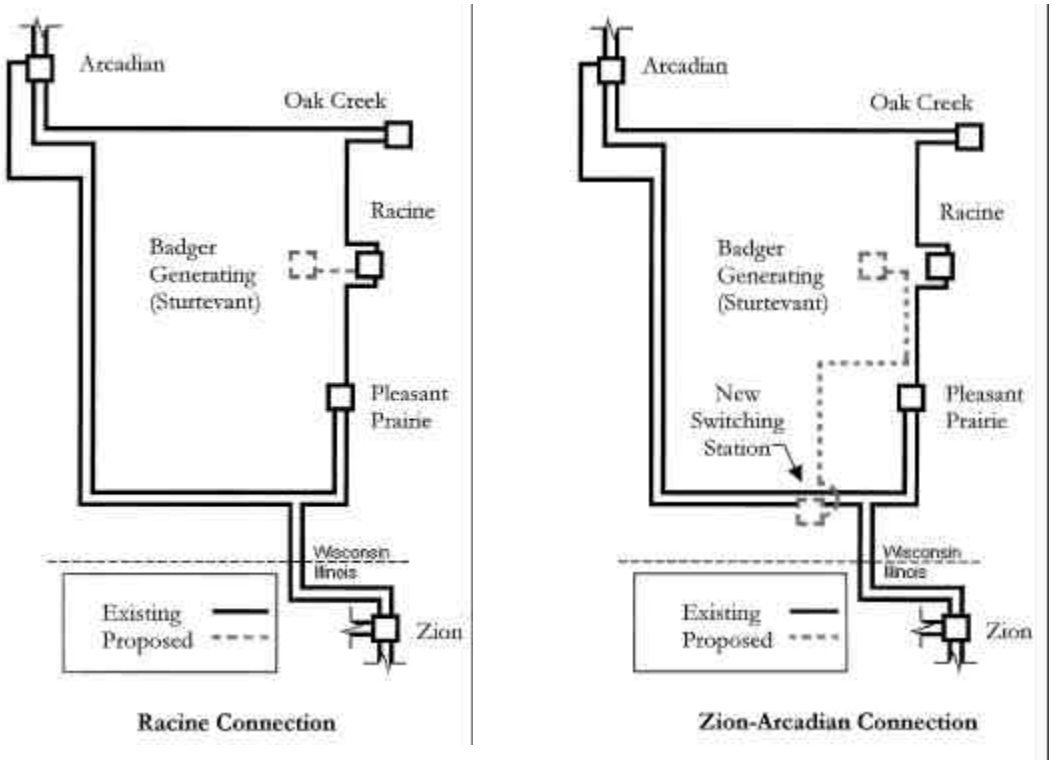


Figure 5.20 depicts both Badger Gen's original interconnection proposal (to the Racine Substation) and their revised proposal (an interconnection with the Zion-Arcadian line). In order to connect to the Zion-Arcadian line a new switching station would be required, just as would be true for a connection from the Pleasant Prairie site.

For the Sturtevant site, as well as the Pleasant Prairie site, Badger Gen proposes to connect to the existing transmission system with a single line. Utilities generally connect power plants to the transmission system using at least two separate transmission lines. This is to ensure that the plant could continue to provide power to the system even with one line out of service. The proposed single-line connection would mean that the entire plant would be instantly removed from the system if that line were to fail. Badger Gen, which will not directly serve retail customers in Wisconsin but instead expects to sell its power on the wholesale power market, states that it is prepared to take this risk.

While Badger Gen views this as an assumable risk, such a sudden loss of over 1,000 MW of generation in Wisconsin which will have an impact on other Wisconsin utilities and customers. The Wisconsin utilities should address the question of whether this impact would be acceptably small.

Assessment of Transmission System Impacts

Transmission System Impact Study

WEPCO has not conducted a detailed study of the impacts of interconnecting the Badger Gen plant directly to the Racine substation. For a connection to the Zion-Arcadian line, there is little difference in the impact on the power system between locating the plant at the Pleasant Prairie site and locating it at Sturtevant. Accordingly, WEPCO's steady-state and dynamic stability studies that were described in Chapter 4, for the Pleasant Prairie site, also apply to the Sturtevant site. All of the discussion and conclusions in that section apply equally to a Zion-Arcadian connection from the Sturtevant site.

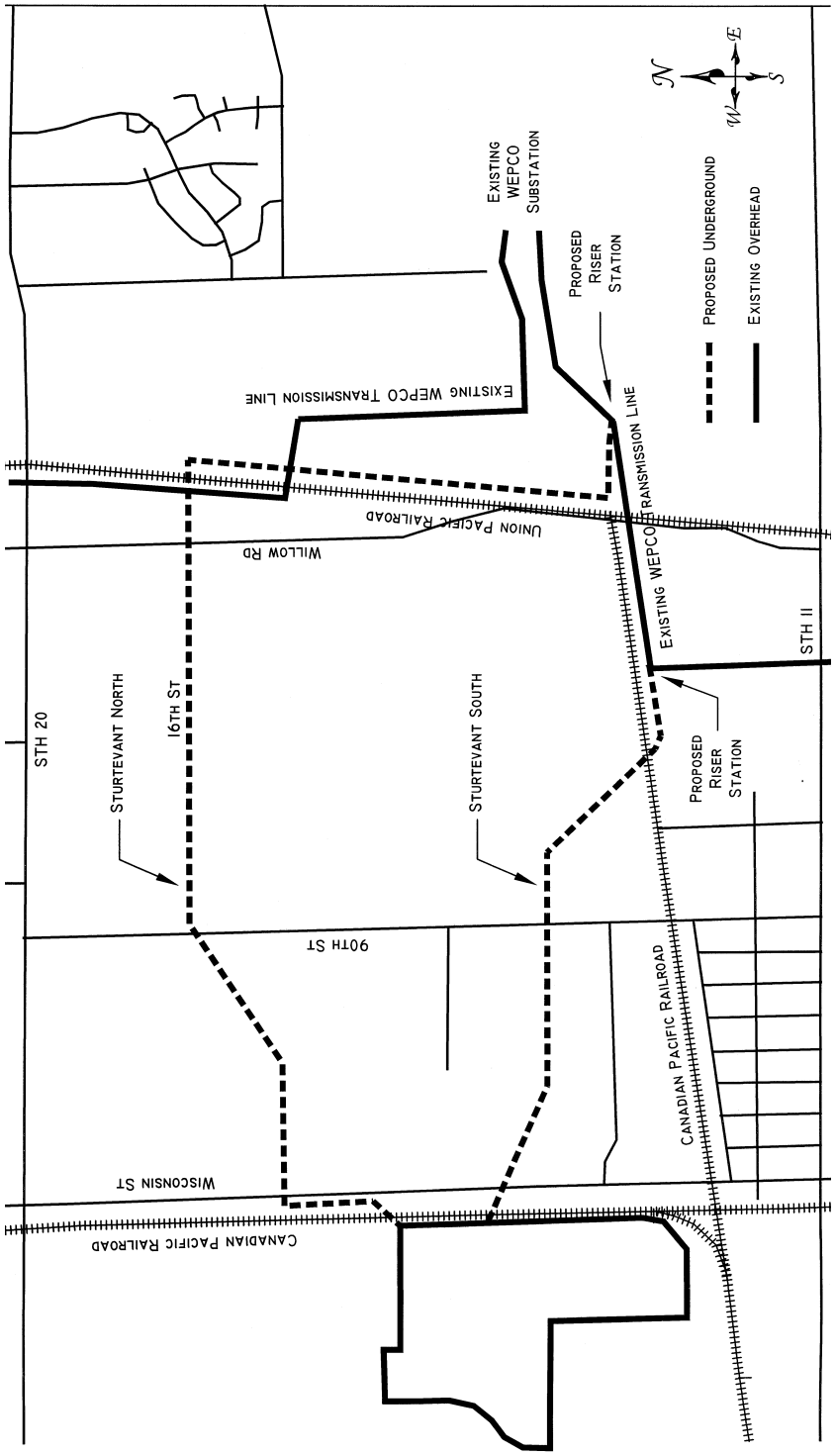
Proposed Transmission Routes and Riser Substation Sites

The two proposed routes for the transmission line between the Sturtevant site and the existing WEPCO transmission line are called Route N and Route S (See **Figure 5.21**).

Route N would begin at the power plant switchyard about 0.7 miles south of STH 20. The route would cross the north-south Canadian Pacific Railroad tracks and go north along Wisconsin Street to the north edge of the Racine Correctional Institute. It would then go east for a quarter of a mile and then angle northeast across a detention pond to 90th Street. It would be north of Park Court and Fireman's Park. It would cross 90th Street and continue east along the north side of 16th Street to Willow Road and through the length of a residential lot and under the Union Pacific Railroad tracks. The route would turn south on the east side of the railroad tracks and parallel the tracks to a point about 250 feet north of an existing overhead transmission line east of the SC Johnson Waxdale plant. The route would turn east-southeast and go about 700 feet to a proposed riser station located west of the second transmission tower east of Willow Road. The length of this underground route is 2.6 miles. From the riser station, the transmission line would go either about 0.4 mile to the Racine Substation or south on existing transmission line towers about 11 miles and then underground on one of the routes identified in Chapter 4 to an interconnection with the Arcadian-Zion transmission line.

Route S to the Racine Substation would begin at the power plant switchyard about 0.6 miles north of Durand Avenue (STH 11). It would go southeast for about a quarter of a mile and then go east through the length of three residential lots, crossing 90th Street. Then the line would go through the length of a residential lot on the east side of 90th Street, angle to the southeast, cross the east-west Canadian Pacific Railroad tracks, and connect to a new aboveground transmission line on one side of existing transmission line poles. The length of this underground route is 1.2 miles. The length of the overhead line to the Racine Substation would be 0.9 miles.

Figure 5.21 Proposed underground electric transmission routes for the Sturtevant Site.



To connect the Sturtevant site directly to the Zion-Arcadian line in the village of Pleasant Prairie, an overhead circuit would connect one of the Sturtevant underground line routes with one of the Pleasant Prairie underground line routes. The route for the aboveground portion of the transmission line would be along the unused side of an existing WEPCO transmission line between the Racine Substation and the Pleasant Prairie Power Plant. The new circuit would be installed on the existing transmission towers. The route for the Badger Generating transmission line would start where the Racine-Pleasant Prairie transmission line has a right angle bend near the east-west Canadian Pacific Railroad (slightly west of where the spurs for Waxdale connect to the railroad).

The existing transmission line goes south near a field edge and the boundary between Sturtevant and the town of Mount Pleasant. **Figure 5.22** shows the route. The line is close to Union Pacific Railroad right-of-way for 5.7 of its roughly 11 miles.

Near Bain Station Road there would be a riser station. From there the route would be underground on the east and south side of the proposed power plant site. From the southwest corner of the site moving south, two optional underground transmission line routes available would be as described for the Pleasant Prairie site in Chapter 4. The riser stations near Bain Station Road and at the connection point would be about 300 by 200 feet in area. **Figure 4.18** shows views of the riser structure.

Environmental Factors - Underground Transmission Route N and Riser Substation

Existing Natural Resources and Potential Impacts

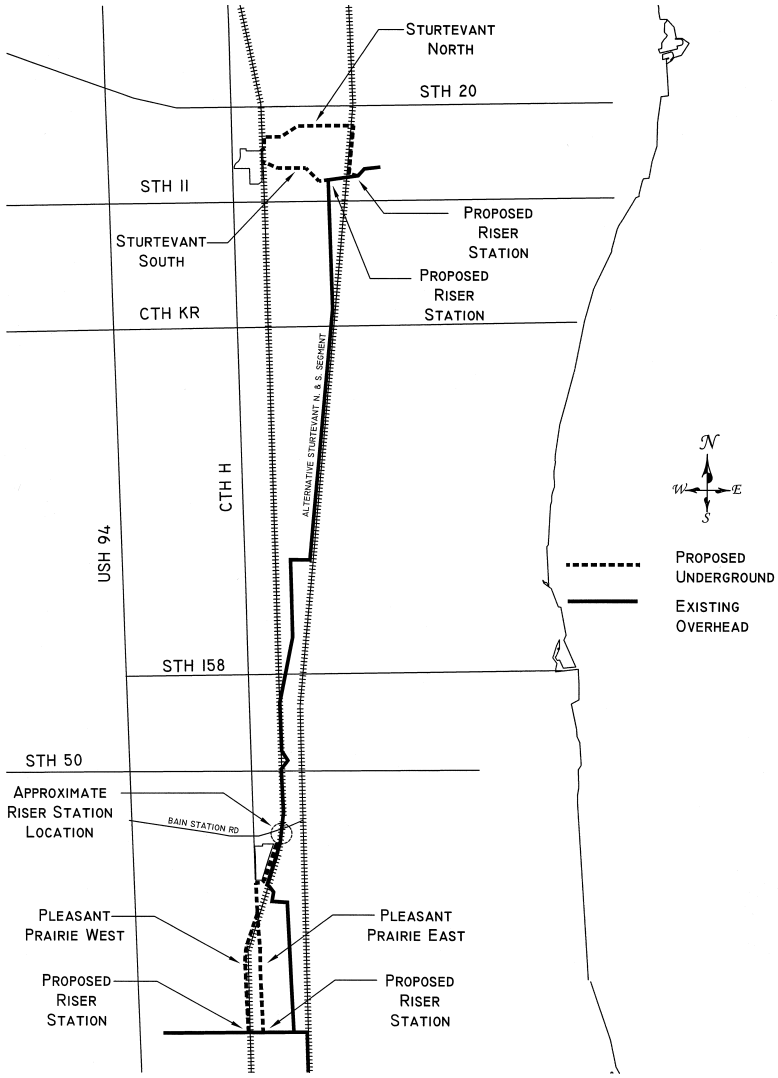
Soils

Soils vary from well drained to poorly drained in the proposed transmission right-of way. Well drained to moderately well drained soils tend to be on low broad ridges and hills. These gently sloping soils include loamy soils that formed on glacial outwash over silt and clay loam. Some soils on hills have eroded so the topsoil is thinner than on uneroded areas. Poorly drained soils are usually found on flats, drainageways and depressions and need to be drained to be productive. Some of the poorly drained soils have a high water table most of the year. Some soils have water within one to three feet of the surface for several months of the year. If these soils are or have been farmed, some form of drainage has been installed. These soils formed on glacial lakebeds, glacial outwash on clay, and on silt/clay flat areas. Some of the soils occurring on flats and depressions are highly organic muck soils. Slopes in the area vary from zero to six percent grade. Trench construction would alter the soils where they have not been disturbed by previous construction.

Geology

The bedrock is 100 to 215 feet below the ground. The top layer of bedrock is Niagara Dolomite. Construction of the proposed transmission lines would not affect the bedrock.

Figure 5.22 Routes for the possible southern connection to the Zion-Arcadian line from the Sturtevant power plant site



Vegetation and Wildlife

Plants and animals were identified for a 150-foot wide corridor. Actual construction and operation is expected to occur in a 50 to 75-foot right-of-way although the right-of-way width is 150 feet. Vegetation along the railroad right-of-way includes common wildflowers and invasive weeds such as yarrow, ragweed, burdock, thistles, goldenrod, Queen Anne's lace, Dame's rocket, black medick, heart-leaved umbrella wort, smooth brome, horseweed, catnip, common plantain, vetch, nightshade, false Solomon's seal, cattail and meadow rue. Trees and shrubs along the railroad right-of-way include boxelder, elm, silver maple, black willow, common buckthorn, sandbar willow and prickly ash. Crops on the farm field north of the prison may change from year to year. Vegetation along 16th Street depends on landscaping efforts in front of new businesses,

and the stage of construction on other parcels. Wildlife could include mice, voles, rabbits and chipmunks. Birds such as robins, sparrows, and mourning doves may also use this area. Other birds such as cardinals, chickadees, blue jays, gold finches and house finches could also be present. Migrating geese may graze on the lawns during spring and fall migration. The land on the west side of the Union Pacific Railroad tracks are residential backyards to about 400 feet south of the edge of Waxdale. South of that point, Willow Drive is near the west edge of the Union Pacific Railroad tracks. Cropland on a narrow space occupies the area east of the railroad to the edge of J.I. Case High School playing fields. Further south there are businesses to the east of the farm fields. There is a triangular area east of the tracks, between two drainage ditches, that is overgrown with boxelders.

Measures may be helpful to minimize electrocution of birds on risers and other aboveground structures.

Water Resources: Wetlands, Streams and Groundwater

This route would cross an area where there is an intermittent stream and about 1,150 feet of soils that have a high water level several months per year. A detention basin occupies some of this area. There is an area with a high water table near the east end of the east-west part of the route and along 2,000 feet of the north-south part of the route that parallels the Union Pacific Railroad.

Existing Local Community Resources and Potential Impacts

Site and Route History and Potential Contamination Present

Much of the area along this route is being converted from farmland to a business/ industrial park. Another part of the area was recently converted to use as a prison. No contamination has been reported for the north transmission line route including the section that parallels the Union Pacific Railroad.

Consistency with Current and Planned Land Use and Agriculture

Sturtevant zoned the area between the proposed power plant location and 90th Street institutional. This area is around the prison. Along 16th Street west of 90th Street, two-thirds of the area is zoned industrial. The area closer to Willow Road is zoned agriculture. The area east of Willow Road is zoned agriculture-urban holding, which is an overlay on industrial zoning. There are houses on narrow deep lots on the east side of Willow Road for 0.6 miles north from Waxdale.

The present land use along Wisconsin Street is a state prison on the east side and industrial park on the west side of the Canadian Pacific Railroad tracks. The area between the railroad tracks and Wisconsin Street has residential use, a governmental building and two office buildings. The industrial park was agricultural land until recently. Just before the transmission line would turn to the east after leaving the park, there is a small wetland between the railroad and the street. Land use along the part of the route that goes east from Wisconsin Street is the state prison to the south and agricultural to the north. The Wisconsin Department of Corrections is proposing to build a new Probation and Parole

Hold-Workhouse Facility on state-owned land north and east of the existing prison. The currently planned location would be built directly on top of the underground transmission line route that would angle to the northeast, from a location north of the existing prison to 16th Street. An alternative route to avoid conflict would be for the underground transmission line to continue eastward along the edge of the existing prison facilities to 90th Street and go north near 90th Street to 16th Street. This would lengthen the route by about 770 feet. Farmland and a detention basin are located where the line angles to the northeast. Along 16th Street land use is commercial, industrial and unused near the west end and agricultural to the east. The Danfoss and Putzmeister businesses are near the corner of 16th Street and 90th Street. The Johnson Wax Professional Building is north of the route. Once across Willow Road, the route would go through a residential lot to agricultural land and cross the Union Pacific Railroad. The line would then go south through agricultural land next to the railroad to an existing transmission line near the east-west Canadian Pacific Railroad. The closest building to the north-south part of the transmission line, on the east side of Willow Drive, would be about 260 feet from the proposed transmission line. The present land use is agricultural.

Placing the transmission line along Wisconsin Street might interfere with the addition of new businesses between the street and the Canadian Pacific Railroad to the west. The section of the route near the prison is a compatible land use. Construction along 16th Street, with the transmission line right-of-way overlapping the road right-of-way would only affect current or future land uses if that land use required underground utilities that usually would be placed under, over, or at the same level as the transmission line. Construction or repair of such utilities would be more complicated near the transmission line than in other areas. Once built, the transmission line would not interfere with access roads or other facilities for new occupants of the business park north of 16th Street.

Roads, Railroads and Other Utilities

Construction along Wisconsin Street and 16th Street from the power plant to the Union Pacific Railroad could affect other utilities, if the other utilities are spread across the road or rail right-of-way in such a way that there is no room for the proposed transmission line. Construction up to and along the Union Pacific Railroad could affect other utilities built parallel to this railroad.

Badger Gen prefers to keep the transmission line location far enough from other utilities to prevent any future damage to the transmission line from repair work of the other utilities. Where the trench would cross access roads to business parking and delivery areas, the trench can be covered with a metal plate to allow access except when actually placing the concrete and then soil in the trench.

Visual Landscape

During construction, the visual landscape will change as existing trees, shrubs and grass are removed from the area along Wisconsin Street. Along 16th Street and the area along the Union Pacific Railroad, grass and weeds would be removed. The changes to the

landscape will be similar to any utility activity replacing or installing new water, sewer or natural gas pipelines. After construction, grass would be planted on disturbed areas unless the land is being farmed. In the case of farmland, the farmer could specify whether to plant a cover crop or not. No trees or large shrubs would be allowed to grow in the transmission right-of-way.

Historical and Archeological Sites

The route has been examined under Section 106 of the National Historic Preservation Act. There are no known historic or archeological sites along any of the proposed routes. The SHSW requests that a survey of the previously undisturbed portions of route right-of-way be performed by a qualified archeologist to locate and evaluate the significance of any archeological sites not yet known. If archeological materials are discovered during construction the contractor would have to stop construction at that place and follow the directions of the SHSW to avoid or reduce adverse effects on that newly discovered archeological or historic site.

Noise

There would be noise from use of construction equipment during trench excavation, during cable pulling, and when backfilling the trench. **Table 4.21** shows noise levels from the construction equipment that would be used to dig and backfill the trench for the transmission line and for the equipment used to pull the transmission line conductor through the conduit. There would be noise from equipment used to backfill and compact soil in the trench that would be similar to the noise when excavating the trench. In a light industrial area, the noise levels typical of equipment used to build an underground transmission line are normally acceptable. In a residential area at a distance of 100 feet from the construction, the noise of all but the front end loader and dump truck are normally acceptable. In residential areas, noise from trucks and busses during the day is between 70 and 80 dBA. Noise from freight trains can be between 80 and 95 dBA.

There would be no noise during normal operation of the line. If a fault developed in the transmission line, there would be some noise from the equipment used to pull the damaged cable out of the conduit and from pulling the new cable into place. Noise decreases by 6 dB every time the distance from the source doubles.

Table 5.19 shows that one house is very close to the construction. People living in that house could be significantly bothered by construction noise. If construction occurs near them during the winter, less noise would be heard with windows closed, storm windows and doors on and curtains pulled. Other houses and offices are between 100 and 300 feet from this route and noise levels would be no greater than those shown in the table in Chapter 4.

Magnetic Fields

The expected magnetic field estimates from the underground line would be identical to those discussed in the section on Pleasant Prairie Transmission Route E in Chapter 4. A

general discussion of the subject of magnetic fields and human health is also in that section of Chapter 4.

Table 5.19 Distances of buildings and play areas from the transmission centerline

Distance	Houses	Schools	Parks	Playgrounds	Commercial / Industrial /Offices
0-25 feet	1	0	0	0	0
25-50 feet	0	0	0	0	0
50-100 feet	0	0	0	0	0
100-150 feet	1	0	0	0	0
150-300 feet	2	0	0	0	5

Environmental Factors - Underground Transmission Route S and Riser Substation

Existing Natural Resources and Potential Impacts

Soils

About one half mile of the route is on well-drained soils. About three fourths of a mile is on somewhat poorly to poorly drained soils with a high water table part of the year. Well drained to moderately well drained soils tend to be on low broad ridges and hills. These soils include a silt loam soil that developed in a thin silt layer over clay loam glacial till with a slope of two to six percent. The somewhat poorly drained soils developed from glacial outwash materials on clay deposited by glacial lakes. They have a seasonal water table within three feet of the surface and occur in drainageways and depressions. The soil near the connection with the existing transmission line is poorly drained. Slopes in the area vary from zero to six percent grade.

Geology

The bedrock is predominantly dolomite, and is 100 to 215 feet below the ground. The top layer of bedrock is Niagara Dolomite. Construction of the proposed transmission lines would not affect the bedrock.

Vegetation and Wildlife

Vegetation along the route varies from farmed fields to wetland, forested wetland, and fallow fields. Fields that are fallow for a year or two are likely to contain Queen Anne's Lace, goldenrod, yarrow, mullein, wild parsnip, daisies and ragweed. Wetland areas could contain a mixture of black ash, elm, silver maple, skunk cabbage, cattails, some sedges and grasses. Wildlife could include muskrats, opossums and wood ducks. Agricultural fields occupy the greatest area along this route, about 509,120 square feet or 11.7 acres.

Measures such as plastic spirals on the shield wire may be helpful to minimize electrocution of birds on risers and other aboveground components.

Water Resources: Wetlands, Streams and Groundwater

Wetlands on the rights-of-way amount to about 160,300 square feet or 3.68 acres. The route crosses or is next to wetlands for about 0.6 miles (47 percent). The route also is in 100-year floodplain for 780 feet (0.15 miles) south of the prison. The route is near the Waxdale Tributary to the Pike River for about 0.07 miles.

Purple loosestrife is a wetland concern. It is an invasive, non-native weed that can be transferred into or out of a wetland by seeds or plant parts carried on construction equipment. Once introduced to a wetland, it spreads rapidly, crowding out native vegetation. Purple loosestrife has little value for wildlife in providing food or cover. Cleaning construction equipment before leaving every construction site can prevent further spread. Because cleaning may not remove all seeds or plant parts, wetland sites should be inspected in the years immediately following construction. Such inspections allow early identification and removal of new infestations.

Existing Local Community Resources and Potential Impact

Site and Route History and Potential Contamination Present

This route is through an area that is a mixture of wetland, woods and garden space near the Waxdale Tributary to the Pike River. No contamination has been reported for this transmission line route.

Consistency with Current and Planned Land Use and Agriculture

This route is cross-country for its entire length. It goes east through about 0.6 miles in or near wetlands along the Waxdale Tributary. One-third of a mile of the route is on the edge of or through wetlands that are near the Waxdale tributary to the Pike River. The route crosses and is on the edge of 0.15 miles of the 100-year flood plain. The route would disturb land that has not been disturbed recently.

This route appears to be the least compatible with current and planned land uses of all the routes proposed for either power plant site.

Roads, Railroads and Other Utilities

This route would cross Wisconsin Street and 90th Street. It would have to avoid utilities that are in or adjacent to the rights-of-way of these two streets. The route would also cross the right-of-way of the east-west Canadian Pacific Railroad. There should be few utilities on this route.

Visual Landscape

During construction, the visual landscape would change as existing trees, shrubs and grass are removed from the area of construction of the underground transmission line. The changes to the visual landscape would be similar to that for any utility activity or installing new water, sewer or natural gas lines. After construction, grass would be planted on disturbed areas. No trees or large shrubs would be allowed to grow in the transmission right-of-way. In wetland areas, nothing might be planted to allow adjacent plants to spread onto the right-of-way. Shrubs and trees would be controlled.

Historical and Archeological Sites

The route has been examined under Section 106 of the National Historic Preservation Act. There are no known sites along the proposed route. The SHSW requires that the route be field-surveyed to locate and evaluate the significance of any archeological sites that may be present.

Where archeological materials are discovered during construction, the contractor would have to stop construction at that place and follow the directions of the SHSW to avoid or reduce adverse effects on the newly discovered archeological or historic site.

Noise

There would be noise from use of construction equipment during trench excavation, cable pulling, and backfilling of the trench. **Table 4.21** shows the noise level of construction equipment that would be used to dig the trench for the transmission line and for the equipment used to pull the transmission line conductors through the conduits. There would be noise from equipment used to backfill and compact soil in the trench that would be similar to the noise when excavating the trench. In a normal light industrial area, the noise levels typical of equipment used to build an underground transmission line are normally acceptable. In a residential area, the noise of all but the front end loader and bulldozer would be acceptable. For comparison, a TV is usually 70 dB and a garbage disposal 80 dB. Noise decreases by 6 dB every time the distance to the source doubles.

There would be no noise during normal operation of the line. If a fault developed in the transmission line, there would be some noise from the equipment used to pull the damaged cable out of the conduit and from pulling the new cable into place. Noise decreases by 6 dB every time the distance from the source doubles.

Table 5.20 shows that one house would be very close to the construction activities. People living in that house could be significantly bothered by construction noise. Other houses and offices are between 100 and 300 feet from this route and noise levels would be shown in **Table 4.21** (for 100 feet) or more.

Table 5.20 Distances of residences, play areas, and businesses from the transmission centerline

Distance	Houses	Schools	Parks	Playgrounds	Commercial /Industrial /Offices
0-25 feet	1	0	0	0	0
25-50 feet	1	0	0	0	1
50-100 feet	0	0	1	0	2
100-150 feet	1	0	0	0	1
150-300 feet	8	0	0	1	2

Magnetic Fields

The expected magnetic field estimates from the underground line would be identical to those discussed in the section on Pleasant Prairie Transmission Route E in Chapter 4. A general discussion of the subject of magnetic fields and human health is also in this section of Chapter 4.

Environmental Factors – Aboveground Route S to Racine Substation

Existing Natural Resources and Potential Impacts

Soils

The soils affected by the existing transmission line include poorly drained soils near the Waxdale tributary to the Pike River and near the Pike River. Other soils are silt loams on drainageways with two to six percent grade. The existing transmission line route also crosses an old gravel pit.

Vegetation and Wildlife

Land use along the route varies from farmed fields to an old gravel pit and a wet area near the Pike River. Old field areas are likely to contain Queen Anne's lace, goldenrod, yarrow, mullein, wild parsnip, daisies and ragweed. Wildlife could include mice, voles, and rabbits. Purple loosestrife precautions, described earlier, would be needed.

Water Resources: Wetlands, Streams, and Floodplain

The existing transmission line does not cross the 100-year floodplain. It crosses a pond that is in part of an old quarry.

Existing Local Community Resources and Potential Impacts

Site History and Potential Contamination Present

Soils along the existing transmission line route could be contaminated from casual disposal of rubbish on private lots or in the old gravel pit under the existing transmission line west of the Racine Substation. Since no excavation is required to add a second circuit to the existing transmission line poles, no disturbance of contaminated soil is likely.

Consistency with Current and Planned Land Use and Agriculture

Using the open side of the existing transmission line structures is consistent with current and planned land use. If construction occurs when crops are growing, there would be some effect on agriculture during construction. There would be minimal effect on agriculture if construction occurs when the ground is frozen. The addition of a second circuit on the existing single pole structures would not cause any incremental impacts effects on agriculture.

Roads, Railroads and Other Utilities

The existing transmission line crosses the east-west route of the Canadian Pacific Railroad and the north-south route of the Union Pacific Railroad. Construction vehicles would

have to either drive across the tracks or drive around using existing roads. No impacts on roads or the railways are expected.

Visual Landscape

The addition of another set of wires to the poles would slightly change the existing visual landscape. The change would be much less significant than the construction of a new aboveground transmission line.

Noise

There would be noise from trucks used to position spools of conduit, move construction workers from place to place, and install insulators and attach conductors on each arm. The pulling and connecting process for the conductors would probably not add very much to local noise, depending on location.

Aesthetic Impacts

If the work is done when the ground under the existing transmission line is dry, there would be no visible ruts. The scene would change from three large wires and a small shield wire on one side of existing pole to six large wires on the same poles and two small shield wires. This is a minor change.

Environmental Factors – Aboveground Route S to Pleasant Prairie

Existing Natural Resources and Potential Impacts

Soils

Soils in the existing transmission line right-of-way include these that are typically found in wetlands and some that have water within one to three feet below the ground some of the year. Many of these soils have drainage systems to allow agricultural use. Slopes vary from zero to twelve percent. Ruts from movement of construction vehicles are less likely to occur if construction occurs on frozen ground.

Vegetation and wildlife

The line would cross agricultural land along 6.6 miles and wetland along 0.2 miles of the route. Wildlife including birds may feed in the agricultural fields, especially just before and after harvest. If wetlands are not disturbed by humans during the growing season and provide adequate cover, some birds may nest in them. Precautions to prevent electrocutions of birds in flight might be necessary in places where bird pathways are known because of the increased number of conductor obstacles.

If the riser station where the aboveground segment ends is north of Bain Station Road, the underground part of the transmission line that follows the railroad and then turns to CTH H, would be trenched through the Bain Station Prairie and wetland areas. The prairie area is a moderate to good quality wet-mesic prairie with prairie dock and goldenrods.

Water Resources: Wetlands and Streams

The route crosses wetlands for 1,000 feet. These wetlands are close to drainage ditches that drain farmland soils with high seasonal water tables.

Existing Local Community Resources and Potential Impacts

Route History and Potential Contamination Present

The route is predominantly through farm fields or near field edges along a railroad. No soil contamination has been reported for this transmission line route.

Consistency With Current and Planned Land Use and Agriculture

Adding a second transmission line to existing poles designed to hold two lines is consistent with current land use plans. Current land use along this route is 73 percent agriculture and 23 percent unused land. If construction occurred before crops were planted or after harvest, there would be minimal effect on agriculture. Once the second line was on the existing poles, there would be an effect on agriculture only if the conductors or poles were damaged by an ice storm or a vehicle collision with a pole. Trucks used to repair the transmission line could damage crops.

Roads, Railroads and Other Utilities

Adding a second circuit to an existing transmission line would probably not affect roads and railroads. WEPCO was expecting to build a second transmission line on these poles at some future date.

Visual Landscape

The visual landscape would change slightly by adding a second set of these conductors to existing poles.

Historical and Archeological Sites

The addition of a second line to existing poles would have no effect on historic and archeological sites.

Noise

There would be some noise from vehicles and equipment during the construction of this line. The noise level would be similar to a delivery truck. **Table 5.21** shows the distance of buildings from the existing transmission line.

Table 5.21 Distance of buildings and parks from the transmission line

Distance	Houses	Parks	Commercial/Industrial/Office Buildings
0-25 feet	0	0	0
25-50 feet	0	0	0
50-100 feet	1	0	0
100-150 feet	0	0	0
150-300 feet	19	1	4

Magnetic Fields

Magnetic fields would decrease with distance from the overhead transmission line as shown in **Table 5.22**. The variation among the magnetic field estimates are caused by the

minimum distance from the bottom wire to the ground and whether electricity is flowing in one or both transmission lines. There is some cancellation of the magnetic field when current flows in both lines in opposite directions.

Table 5.22 Magnetic field values for Racine-Pleasant Prairie 345 kV Transmission Line (mG)

Distance from center of transmission lines (feet)	Current flow in one line Sag 30 feet	Current flow in both lines Sag 30 feet	Current flow in one line Sag 20 feet	Current flow in both lines Sag 20 feet
Under the lines	259	252	181	155
50	178/85*	151/53	139/76	115/46
100	62/37	51/23	57/36	46/21
150	30/21	23/13	29/21	22/13
300	8/7	6/5	8/7	6/5

*a/b shows the field on both sides of the transmission line.

Aesthetic Impacts

The aesthetic impacts would be small because the poles and conductors of an existing transmission line have been in view of neighbors and people using roads in this area. The view would change from a structure with four wires on one side to a structure with four wires on each side.

6

Natural Gas Pipelines

Description of Existing Natural Gas System

The Badger Gen application states that the natural gas supply for the proposed power plant will be supplied by ANR. The analysis of the gas facilities is based on preliminary information provided in Badger Gen's application. ANR is expected, at a later date, to file an application with the FERC for authorization to construct the natural gas lines. FERC's authorization, if granted, will determine the design of the gas facilities, the location of any necessary compressors, the final route of the gas lines, and the construction conditions that must be met in building the gas lines.

Natural gas is transported into the Racine and Kenosha Counties area through interstate pipeline systems. ANR Pipeline Company (ANR) has three large, high-pressure, gas pipelines running generally northward through the western portions of these counties. The three large ANR lines begin in the Chicago area of Illinois and transport natural gas northward into Milwaukee and other areas in eastern Wisconsin. From these large lines, two smaller ANR gas lines extend into the eastern parts of Racine and Kenosha Counties. The two smaller lines are referred to as ANR's Racine Lateral.

Another interstate pipeline company, NGPL, Natural Gas Pipeline Company of America, has an interstate gas line that extends to the Wisconsin-Illinois border south of Kenosha.

Natural gas transported into the area on the interstate pipeline systems is delivered into the distribution systems of local distribution utilities. The local gas distribution utility in the area of the proposed Badger Gen power plant sites is WEPCO.

Description of Needed Facilities

Size and Length of Pipeline

The Badger Gen application states that a new 20-inch diameter natural gas pipeline would be necessary to serve the proposed project. The pipeline is expected to operate at an operating pressure of 850 pounds per square inch gauge (psig). Four route alternatives are described in the application, varying in length from 20.3 to 23.6 miles in length.

Width of Rights-of-Way

Badger Gen provided diagrams illustrating typical pipeline construction cross sections across a right-of-way for construction of natural gas pipelines. These diagrams showed the total width of the work area to be used for construction to be 75 feet. For the purposes of this document, the width of the construction work area will be assumed to be 75 feet.

This document assumes that where paralleling an existing pipeline, 25 feet of the work space would overlap the existing permanent pipeline easement, 25 feet would be acquired as new permanent easement and 25 feet would be temporary easement used only during construction. It is also assumed that where the gas line would be built in a totally new easement, 50 feet of the 75 foot total work space would consist of permanent easement, with the remaining 25 feet consisting of temporary construction easement.

Aboveground Facilities

The size and design of the compressor station are not known at this time. The specific location and layout of the compressor station has not been selected. It is expected that the compressor station will use natural gas as its fuel.

One location of this station could be at the existing Racine Tap located approximately a third of a mile south of the intersection of STH 142 and Wheatland Road in the town of Burlington, Racine County. The Racine Tap is the starting point of the existing ANR Racine lateral. The new compressor station could also be located at the junction of the existing ANR Racine lateral gas line with the starting points of the new gas line segments leading to the proposed power plant sites, which are generally described below in section C, Proposed Locations and Routes. The compressor station could also be located on the power plant site.

It is expected that aboveground control valves would be located at several points along the new natural gas line. The specific locations of these control valve sites are not known at this time.

A gas metering and control station will be located on the proposed power plant site. This station will contain gas flow meters and pressure control equipment.

Owner of Facilities – Relationship Between Power Plant Owner, Interstate Pipeline, and Local Distribution Company

The application stated that ANR would be the builder, owner and operator of the new natural gas pipeline and compressor station needed to serve the Badger Gen project. ANR is an interstate pipeline company that is subject to regulation by the FERC. The local distribution company that provides retail natural gas service to the area of the proposed project is WEPCO. WEPCO's existing natural gas distribution facilities are not adequate to serve the proposed Badger Gen project.

Costs

The application states that the natural gas line and compressor station are estimated to cost in the range of approximately $30 million to $40 million.

Construction Activities

It is expected that ANR will construct the natural gas line using standard pipeline construction practices and will comply with all applicable construction and safety codes. The gas pipeline construction would commence following the receipt of all required permits and the acquisition of sufficient right-of-way (ROW). Pipeline construction would begin with the preparation of the work area. If necessary, vegetation clearing and surface grading would be done to provide a sufficiently clear and level area to facilitate pipe-laying operations and allow passage of required construction equipment. Clearing and grading, if required, would be done on the minimum area necessary and in such a manner as to minimize interference with existing natural drainage.

Following clearing and grading operations, a trench would be dug for the pipeline. The width of the trench would typically be approximately 14 inches greater than the diameter of the pipe and the depth of the trench would be sufficient to allow a cover of at least 36 inches above the top of the pipe. Material excavated during trenching operations that is suitable for backfill would be temporarily piled on one side of the ROW, separating topsoil and subsoil, if applicable. Material that is unsuitable for backfill or in excess of backfill needs would be hauled away to a suitable location. Prior to beginning trenching operations, standard precautions would be taken to identify and avoid any existing underground utility lines that cross the ROW. Proper erosion control practices would be employed to minimize erosion during trenching and construction activities.

Railroads and large highways would be crossed by boring under them and installing the pipe through the bore hole. Crossings of driveways would normally be accomplished by open cut, if possible. Crossings accomplished through cuts would be coordinated to ensure that any disruption to traffic would be minimized.

Pipe sections that have previously been delivered to one or more staging areas in the vicinity of the project site would be positioned along the prepared ROW. The pipe sections would then be lined up on supports and welded into a continuous pipeline along the side of the trench. A qualified inspector would visually and radiographically inspect completed welds. An external coating that is applied at the pipe mill would protect all piping. Following inspection of the welds, a coating would be applied to each welded joint and the coating on the remainder of the pipe would be inspected and repaired as necessary.

The bottom of the trench would be inspected to ensure that it is free of rocks and debris. If necessary, sand or soil padding would be placed in the bottom of the trench. The pipeline would then be lowered into the trench using side-boom tractors. A final inspection would be done to ensure that the pipeline is properly placed on the bottom of

the trench, that all bends conform to the alignment of the trench, and that the pipe coating has not been damaged. The trench would then be backfilled, using material originally excavated from the trench, if possible. The fill would be compacted to avoid future settlement. Finally, the ROW would be restored to the extent possible to pre-construction conditions. Surface grading would be done to reestablish natural contours. Re-vegetation would be accomplished in a manner compatible with pre-construction conditions and adjacent vegetation patterns. Roads and paved driveways crossed by open cutting would be repaved.

Proposed Locations and Routes

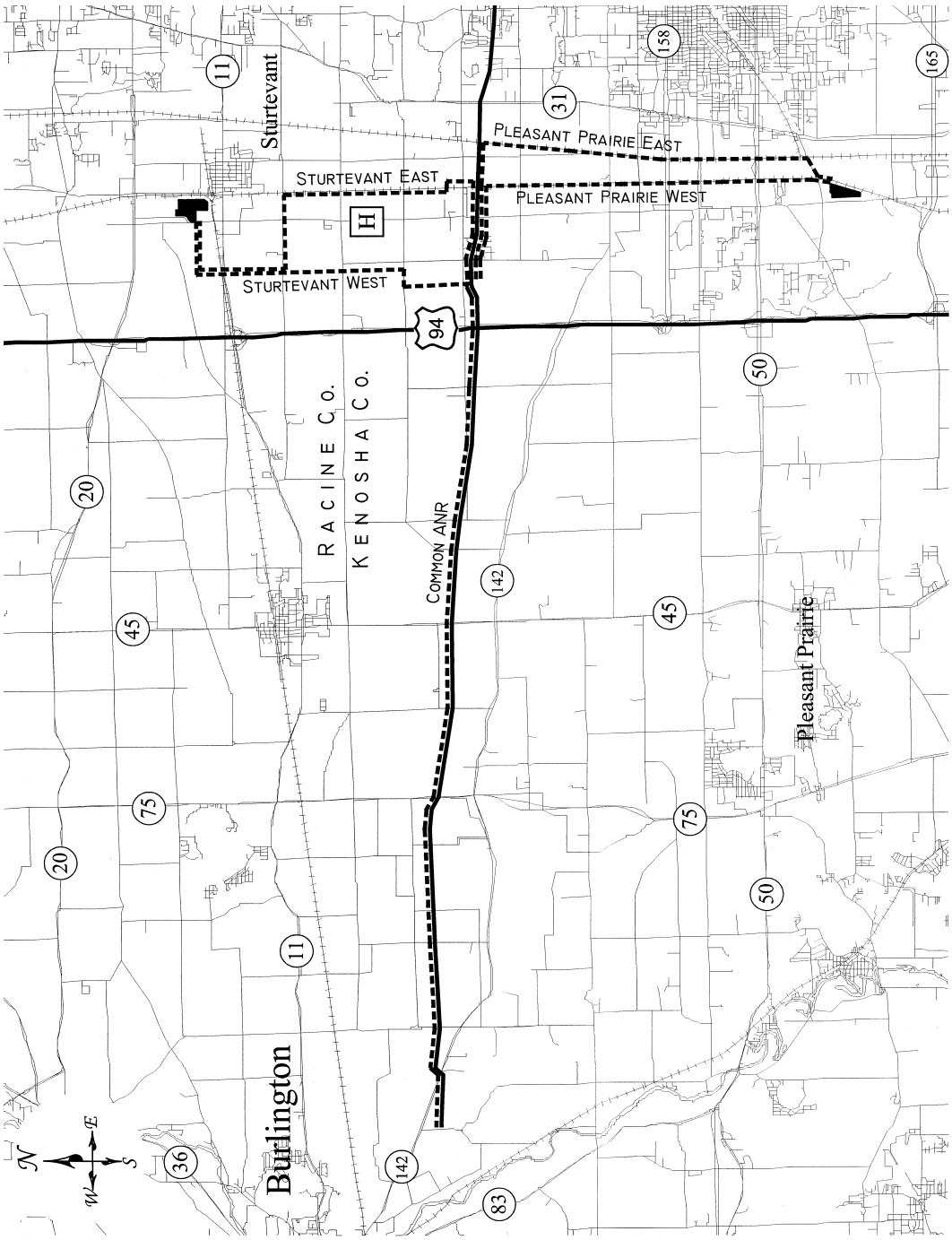
Four alternative gas pipeline routes were described in the Badger Gen project application. The four routes share a common segment for the western portions of the routes. This common segment is called the Common ANR segment. The eastern portion of the four routes differ and are described below as the Sturtevant West, Sturtevant East, Pleasant Prairie West and Pleasant Prairie East segments. The general locations of the alternate route segments are shown in **Figures 6.01 and 6.02**. Two of the routes would serve the proposed Sturtevant power plant site. The other two routes would serve the proposed Pleasant Prairie power plant site.

Common ANR Segment

All four route alternatives identified in the Badger Gen application use this segment. Fourteen and one-half miles of gas line would be built adjacent to a portion of the existing ANR Racine Lateral gas line. It is assumed the new line would be located about 25 feet away from the existing ANR pipeline along this segment.

Starting at the existing Racine Tap in the town of Burlington, Racine County, the new line would run eastward through the towns of Brighton and Paris, Kenosha County, ending in Section 18 of the town of Somers, Kenosha County. The western end of this segment at the existing Racine Tap is located about a third of a mile south of the intersection of STH 142 and Wheatland Road. The eastern end of this segment is located about half of a mile east of I-94 and about a quarter of a mile south of CTH E.

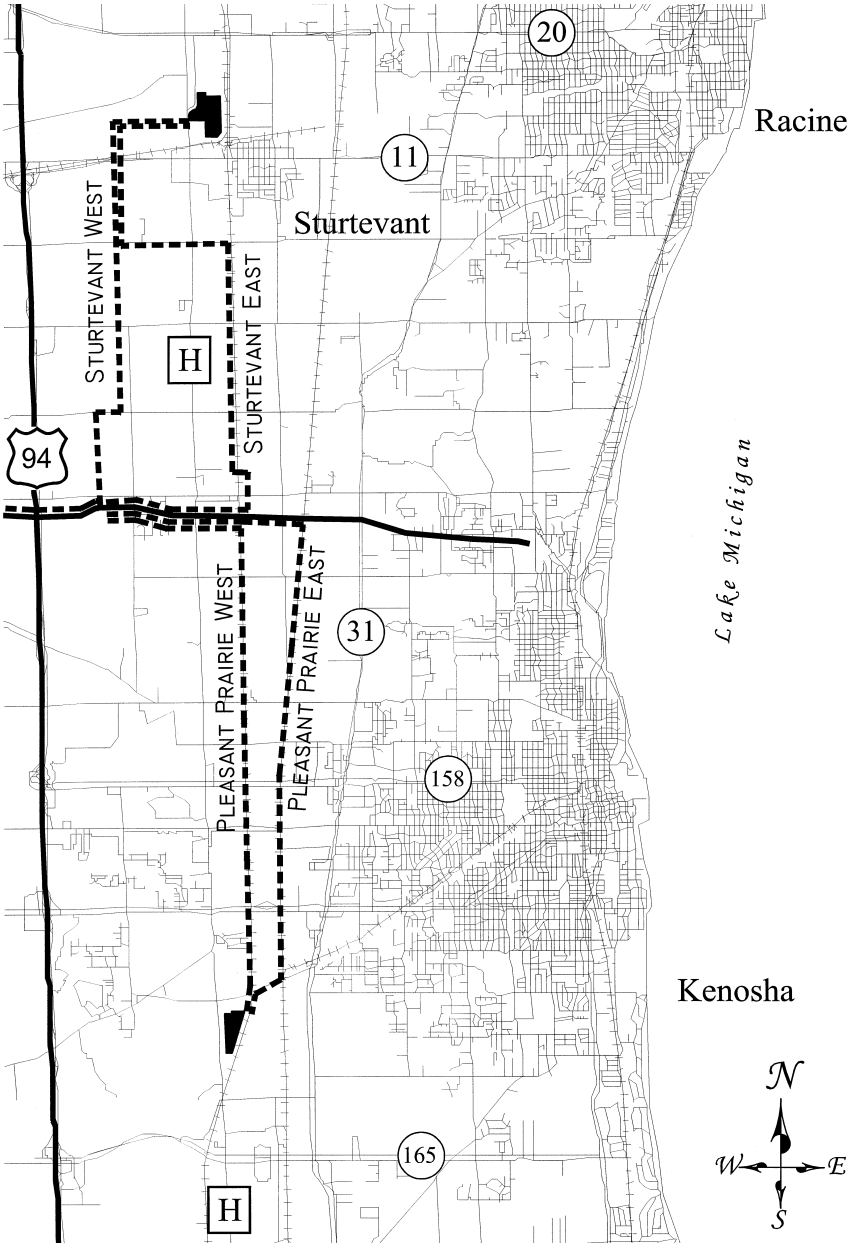
Figure 6.01 Preliminary ANR Pipeline construction routes, including common route to the west, to supply the power plant at either site



Sturtevant West Segment

From the eastern end of the Common ANR segment, the Sturtevant West segment turns northward for about five miles and then eastward for about one mile into the Sturtevant project site. This segment passes primarily through the middle of active farm fields.

Figure 6.02 Preliminary eastern route options for ANR Pipeline construction.



Sturtevant East Segment

From the eastern end of the common ANR segment, the Sturtevant East segment continues eastward along the existing ANR Racine lateral for about two miles, then turns northward for about three and a half miles along an existing railroad line, then turns westward for about one and a half mile along Chicory Road, where it joins the Sturtevant West segment passing through farm fields for the remaining two miles or so into the Sturtevant project site.

Pleasant Prairie West Segment

From the eastern end of the Common ANR segment, the Pleasant Prairie West segment continues eastward along the existing ANR Racine lateral for about two miles, then turns southward for about six miles following close to an existing railroad line until it reaches the Pleasant Prairie project site.

Pleasant Prairie East Segment

From the eastern end of the Common ANR segment, the Pleasant Prairie West segment also continues eastward along the existing ANR Racine lateral for about two and a half miles, then turns southward for about six miles following an existing railroad line until it reaches the Pleasant Prairie project site.

Environmental Factors

The analysis of the proposed gas pipeline routes is based on routing information provided in Badger Gen's application. ANR is expected, at a later date, to file an application with the FERC for authorization to construct the natural gas lines. FERC's authorization, if granted, will determine the final route of the gas lines, along with construction conditions that must be met in building the gas lines.

Given that ANR has yet to apply to FERC for a construction certificate, the gas line route alternatives must be considered preliminary and subject to change. The analysis in this document assumes that the routes provided in Badger Gen's application will be what ANR will propose to FERC. In addition, the analysis assumes that construction practices and conditions that FERC typically requires for construction of new natural gas lines will apply to the new gas lines to serve the Badger Gen project. It should be noted that there is a chance that the routes ANR will include in its construction application to FERC could differ from those described in this document. There is also the chance that the construction practices and conditions applicable to the lines could also differ from those described in this document.

Aesthetics

The new gas line would be underground. The ROW for the gas line and the clearing of vegetation necessary for construction could modify the visual landscape in some areas. The areas the gas line would pass through, however, are used primarily for agricultural,

with smaller areas of residential and commercial development. The potential aesthetic impacts from ROW vegetation clearing are expected to be limited to a few small wooded parcels. In these wooded parcels, the tree clearing needed to construct the gas line is expected to be an area 25 feet wide or so, as the existing ANR Racine Lateral already passes through these parcels.

Agriculture

The construction of a new, large diameter, natural gas pipeline involves significant excavation of soil and requires the use of heavy construction equipment. The nature of the construction needed to build a new pipeline through agricultural lands can create both short and long-term problems.

Pipeline construction through agricultural lands can result in short-term losses and temporary yield reductions in crops near the construction activities. Crops growing within both the permanent and temporary easement areas would be removed for the construction of the pipeline, likely resulting in the total loss of those crops in the year of construction. Dust from construction work can coat leaves on nearby crops, encouraging crop diseases or reducing yields. The effects from dust coating are limited to the year of construction.

The construction of a new gas pipeline can also result in significant long-term agricultural impacts. Poor construction practices can lead to long-term effects on agricultural productivity along the pipeline. Potential problems can arise from the mixing of topsoil with subsurface soil layers, from the compaction of the soil, from an increase in density of rocks in upper soil levels, and from damage to tile drainage systems.

Interstate pipeline companies, such as ANR, when building new interstate gas pipelines under FERC construction certificates, generally must follow pipeline construction practices contained in the FERC Upland Erosion Control, Revegetation and Maintenance Plan (Upland Plan). The Upland Plan was developed to address the major problems arising from new pipeline construction through agricultural lands. The Upland Plan contains many pipeline construction practices that have been developed to substantially reduce long-term agricultural impacts.

For the purposes of the analysis in this document, it is assumed that ANR will follow the FERC Upland Plan in constructing the new natural gas lines needed to serve the Badger Gen project.

The construction of a large diameter pipeline requires the excavation of a deep trench in which to bury the pipeline. The trench for the gas line needed for the proposed power plant is expected to be about 2.5 to 3 feet wide and at least 4.5 feet deep. Mixing of the topsoil layer with subsoils removed from the trench can have significant impacts on future agricultural productivity. In addition, the repeated movement of heavy construction equipment over the construction work area can cause rutting of the soil,

which can lead to topsoil mixing with lower subsoil layers, again resulting in decreased agricultural productivity.

The FERC Upland Plan includes provisions for limiting the potential effects of topsoil mixing. The Upland Plan calls for topsoil segregation in all agricultural areas except for pasture lands. Topsoil segregation consists of removing the topsoil and storing it in a pile at the edge of the construction work area. Subsoils removed from the pipeline trench are stored in a second pile separated from the topsoil pile. The pipeline builder under the Upland Plan has the choice to segregate topsoil from either the entire work area or from just over the trench and from under the subsoil storage area. The Upland Plan requires the top twelve inches of topsoil to be segregated if the topsoil is deeper than 12 inches. For areas with topsoil less than twelve inches deep, every effort is required to be made to segregate the entire topsoil layer.

Construction of large diameter pipelines requires heavy equipment that travels for extended periods over the work space of the new pipeline's ROW. The repeated passage of heavy machinery on the soil surface causes compaction. It is most severe when soils are at a moisture content that is high enough to lubricate the soil particles so they would slide into compaction arrangements. Compaction is also influenced by soil texture. The effects of compaction are a reduction of root penetration, low friability, reduced pore space, and a decrease in the rate of downward movement of moisture. This affects the rate of crop growth and germination. Water infiltration is also reduced, causing increased surface runoff, which may lead to accelerated erosion. Severe compaction is difficult to eliminate through normal agronomic practices or freeze-thaw action.

The Upland Plan requires the builder of a pipeline to test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas affected by construction. The Upland Plan requires severely compacted agricultural areas to be plowed with deep tillage implements to reduce compaction. In areas where topsoils and subsoils have been segregated during construction, the Upland Plan requires the subsoil to be deep plowed before the topsoils are replaced. Alternatively, the Upland Plan allows for making arrangements with the landowner to plant and plow under a "green manure" crop such as alfalfa to decrease soil bulk density and improve soil structure. Additional tilling is called for if subsequent construction and cleanup activities result in further compaction.

Rocks in the soil can damage farm implements and reduce crop production. Rocks can be brought to the surface when soil is removed and returned to the pipeline trench. After the pipe is lowered into the trench, backfilling begins. The trench is backfilled with spoil material previously excavated from the trench. To protect the pipeline from abrasion from rocks, the construction contractor uses a backfilling-padding machine which sorts the spoil material, allowing finer sized materials to "pad" the pipe before the larger sized material is returned. If the contractor returns the sorted material of concentrated rock to the upper layers of the trench, excessive rocks near the surface could result from future frost heaving or deep plowing.

The Upland Plan requires removal of excess rock from at least the top twelve inches of soil to the extent practicable in agricultural and residential areas. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. The Upland Plan indicates that the construction contractor should make diligent efforts to remove stones greater than four inches if the off-ROW areas do not contain stones greater than four inches. The Upland Plan also indicates that a landowner may approve other rock size provisions in writing as part of the easement agreement.

Pipeline construction can affect tile systems used to remove excess water from low-lying or otherwise wet fields. Drainage tile systems are common in the general project area. The specific locations, however, of tile systems along the possible gas line routes are not known. During pipeline construction, subsurface drainage tiles can be crushed, severed, clogged with soil, or collapsed from the pressure of heavy equipment. If not repaired or replaced, crop yields can be reduced drastically and substantial problems can be created for the operation of farm equipment in the wet fields.

The Upland Plan requires identification before construction of the existing tile systems and fields where new tile systems are planned to be installed within three years. As part of actual pipeline construction, the Upland Plan requires that tile lines be located and marked and damaged tiles identified and repaired to their original or better condition. This plan also requires that the pipeline be buried at an appropriate depth to ensure no interference with the tile systems.

The majority of the agricultural land along the gas pipeline routes is used for the production of corn and soybeans. Also produced along the routes, in lesser quantities, are hay, wheat, cabbage and pumpkins.

Construction of a new natural gas pipeline along that portion of the existing ANR Racine Lateral line (Common ANR segment) that is necessary for all of the route alternatives, could affect about 96 acres of agricultural land. This estimate assumes using a construction work area 75 feet wide. The other estimates of potential agricultural effect that follow below also assume a 75-foot wide construction work area.

Construction of the gas pipeline would potentially affect an additional 53 acres of agricultural land if constructed along the Sturtevant West route alternative, an additional 71 acres along the Sturtevant East route alternative, an additional 54 acres along the Pleasant Prairie West route alternative or an additional 56 acres if constructed along the Pleasant Prairie East route alternative.

Combining the new gas pipeline along the common portion of the ANR Racine Lateral with each of the four route alternatives results in the total potential impact to agricultural lands of about 149 acres when using the Sturtevant West route, 167 acres with the Sturtevant East route, 150 acres with the Pleasant Prairie West route and 152 acres with the Pleasant Prairie East route.

Air Pollutants

Air quality impacts during construction of the natural gas facilities are expected to be minimal. These impacts would be short-term and local. Fugitive dust may be generated from exposed soils during gas line compressor station construction. Dust generated by vehicular traffic related to the gas line construction could be a problem for localized areas under dry conditions. The extent of fugitive dust generated during construction would depend on the level of construction activity and on the moisture content and texture of the soils that would be disturbed. Exhaust from construction equipment and trucks may affect local air quality, but the impacts should be minimal and short-term.

During operation, the compressor station would emit varying amounts of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), and hydrocarbons (HC). Of these, the pollutant of greatest concern would be NO_x, the primary component of which is N_2O. Emissions of HC are expected to be below significant federal impact levels established by the U.S. Environmental Protection Agency for all combustion turbines and reciprocating engines. Emissions of SO_2 would be proportional to the amount of sulfur in the fuel. As the fuel is expected to be natural gas, which contains very little sulfur, the amount of SO_2 is expected to be low.

Federal and state air quality regulations will be applicable to the compressor station installation and operation. The air quality permitting process will address the potential air quality impacts of the compressor station and will ensure that any applicable air quality regulations are met.

Archeological and Historic Sites

Construction and operation of the gas pipelines potentially could affect historic properties. Historic properties include prehistoric and historic archeological sites, districts, buildings, structures, objects, and locations with traditional cultural value to Native Americans or other groups. Project impacts could include the physical disturbance of archeological sites, the demolition, removal or alteration of historic or architecturally significant structures, or the introduction of visual or audible elements that could alter the setting associated with historic properties.

No information has been provided on existing historic resources in the gas line project area or on the gas line's potential to affect historic properties. After ANR files an application with FERC for the gas line construction, an analysis of the project's effects on historic properties will be conducted under the National Historic Preservation Act.

Engineering Considerations and Constraints

The construction of a large-diameter, high-pressure natural gas pipeline is subject to certain engineering limitations and constraints. Large natural gas pipeline construction requires adequate working space. The natural gas pipeline for the Badger Gen power

plant is estimated to need a total construction working space of about 75 feet wide. While construction can physically be done in narrower areas, the confined construction increases the difficulty and cost.

Buildings are one construction constraint. Buildings represent an obstacle that must be worked around. A building along the edge of an easement can limit the space available for construction of a new gas line and can result in less efficient and more expensive construction requirements.

Existing utilities such as aboveground electric distribution lines can also be a construction constraint. The lines are a physical obstruction to the movement and use of construction equipment. Electric distribution lines also represent a potential safety hazard when large construction equipment is operated nearby. The presence of such lines frequently leads to increased construction costs.

Other construction constraints may be present in some areas. Shallow bedrock or rock outcroppings can lead to both physical obstructions to construction and increased complexity of construction due to the need to remove rock. Extensive wetlands areas or wide water bodies can also lead to more complex construction requirements.

The Sturtevant East and the Pleasant Prairie East and West route segments pass through a residential subdivision on the west edge of the unincorporated community of Somers. These segments follow the existing ANR Racine Lateral gas lines through this subdivision. Houses in the subdivision have been built extremely close to the existing gas lines. Construction of an additional natural gas line through this subdivision would be difficult, if possible at all.

A second area of congestion is located along the Common ANR segment, on the west side of CTH MB in the town of Paris. At this location there are houses in and on the edges of a small woods through which the existing ANR gas lines pass. Construction of a new gas line adjacent to the existing lines in this area could also be physically constrained, though not as severely as in the Somers residential area.

The southern two miles or so of both the Pleasant Prairie East and West route segments pass through an area that has a number of extensive developed areas. Both routes follow existing railroad lines into Badger Gen's proposed Pleasant Prairie power plant site. Adjacent and near the two railroad lines in this area are a concrete plant, a flour milling operation and an adjacent rail yard, a pasta factory, housing developments, man-made and natural lakes, a WEPCO fly ash disposal basin, and other small commercial operations. While the area along both routes is congested, it is expected that a natural gas line could be constructed through the area. The existing structures and other features, however, will have a strong influence on the final alignment of the natural gas line.

Another consideration in determining a location for new high-pressure gas lines is the potential for third-party damage. New high-pressure gas lines are designed, built, and maintained to strict standards. Problems can arise, however, when pipelines are damaged

from improper excavation activities. Third-party damage is the leading cause of failure of gas pipelines. The analysis of potential gas line routes includes consideration of potential third-party damage. One location of potential concern is road rights-of-way. Historically, highway departments do not have a good record of consistently checking for existing utility facilities before excavating in roadways. A prudent approach to minimizing the risk of gas line failure is to try, whenever feasible, either to keep high-pressure gas lines out of road rights-of-way or to minimize the length of new lines built along roads.

The only portion of the proposed gas line routes that runs close to roads is approximately 1.5 miles of the Sturtevant East segment. This portion of the Sturtevant East segment is located along Chicory Road. If the gas line is built within the ROW of Chicory Road, the concern of third-party damage potential identified in the previous paragraph would be present. If the gas line were located on private lands outside the ROW of Chicory Road, the third-party damage concern is greatly reduced. If the gas line were located outside the road ROW, it would likely have to be offset from the road a couple of hundred feet due to the presence of existing houses close to the road.

Land Use and Development Restrictions

The natural gas line would be located within an easement. The easement is a legal transfer of rights to allow the construction, ongoing operation, and maintenance of the gas line across private property. Landowners retain ownership of their property, but use of that property is restricted.

Modern easements specify allowable land uses. Types of land uses that do not interfere with pipeline safety are generally acceptable, such as dairy operations, crop farming, some tree farms, pasture, hunting, biking, hiking, snowmobiling, and parking lots. Other activities with the potential to damage the pipeline are restricted. Restricted activities include construction, that requires excavation, such as new buildings, house additions, garages, patios and pools. The installation of concrete is also often prohibited.

Future development of individual properties for residential, commercial, or industrial uses can be affected by easement restrictions, limiting the spatial arrangement of new buildings in the vicinity of the easement. The specific location of an easement through a parcel determines the magnitude of this impact. For example, a pipeline easement crossing at an angle through a property being subdivided could result in multiple triangular lots and may create some lots that are too small to build on. On the other hand, a pipeline easement over the same property, but located along one edge of the property, would likely have little effect on how the lots were designed and used.

No prediction of the potential for future development restrictions on individual property parcels resulting from construction of the gas pipeline can be made without more detailed and specific routing information.

Noise

Localized increases in noise would occur from construction of the natural gas pipeline and the compressor station. Due to the assembly-line method of construction of pipelines, construction activities in any one area could last from several weeks to several months on an intermittent basis. Construction equipment would be operated on an as-needed basis during this period. Although individuals in the immediate vicinity of the construction activities would experience an increase in noise, this effect would be local and temporary. Nighttime noise levels normally would be unaffected by construction activities since most construction would occur during daylight hours.

An increase in noise during the operational phase of the project would be primarily limited to areas in the vicinity of the compressor station. Principal noise sources at the compressor station would include the air inlet, exhaust, and casing of the engine or turbine. Secondary noise sources would include cooling fans, yard piping, and valves. Noise from relief valves, blowdown stacks, and emergency electrical generation equipment would be infrequent. The amount of silencing required for the equipment and piping depends on the station's location, size and proximity to noise sensitive areas. Noise impact from compressor units can be reduced by using more building insulation, installing acoustic louvers, improving the inlet and exhaust silencers, or using special oil coolers. The amount of noise reduction depends on the extent of noise mitigation measures installed.

Hearing loss is protected using the OSHA limit of 85 dBA, and the only place where these noise levels would be exceeded would be inside the compressor building or within six feet of the engine or turbine driving the compressors. These areas are not accessible to the general public and the pipeline companies employ hearing protection for exposed personnel.

The FERC has adopted noise standards for licensing new compressor stations that are based on recommendations of the U.S. Environmental Protection Agency (EPA). The EPA determined that in order to protect the public from outdoor activity interference and annoyance, noise levels should not exceed a day-night sound level (L_{dn}) of 55 dBA at residences. ANR will be required to demonstrate that the noise attributable to the new compressor station would not exceed an L_{dn} of 55 dBA at any pre-existing noise sensitive areas, such as schools, hospitals, or residences. In addition, ANR would have to demonstrate that there will not be a perceptible increase in vibrations at any noise sensitive area.

The existing ANR valve station located at the start of the Racine Lateral in the town of Burlington has houses on both sides and across the road. Placing a new compressor station at this location could have an effect on these nearby residences.

There are no adjacent or nearby houses or other noise sensitive sites at the four possible compressor station locations which are located at the junction of the Common ANR segment and the four other gas line segments leading to the power plant sites.

No residences or other noise sensitive sites are located adjacent or close to the two proposed power plant sites. A compressor station on either of the two proposed power plant sites is not expected to have any significant noise impacts.

Recreation

The Common ANR gas line route segment would cross areas used for recreational purposes. The first area, the Brighton Dale County Club, is a golf course. The second, the Bong State Recreation Area, is state property administered by the Department of Natural Resources as a public recreation area.

In both areas, the new gas line is expected to be built next to the existing ANR Racine lateral pipelines. In the Brighton Dale Country Club, the disruption caused by construction of the gas line could remove a portion of the golf course from active use during the year of construction, potentially causing a short-term economic impact on its operations. The golf course is part of a Kenosha County park.

The Bong State Recreation Area is an area of over 4,000 acres that is managed by the Department of Natural Resources for a variety of outdoor recreation activities. Uses of the Bong property include swimming, fishing, picnicing, camping, nature study, cross-country skiing, snowmobiling, off-road motorcycle racing, hunting dog training and hunting. The existing ANR gas lines pass through a northern section of the Bong area for a distance of about one mile. The ANR lines pass through an area that is primarily old field herbaceous vegetation, with small patches of wetland, shrub cover and young second growth woods. Recreational trails cross the existing gas lines. Overall, it is likely that no significant long-term impacts should occur to the recreational use of the Bong State Recreational Area, due to the expected location of the new pipe next to the existing gas lines and the nature of the land use in the vicinity of the route. Short-term impacts that may occur include limits on use of the recreation trails that are affected by construction of the pipeline.

Stream and River Crossings

Pipeline construction and hydrostatic testing could affect surface waters, such as streams and rivers. Clearing and grading of stream banks, in-stream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat, increased sedimentation, turbidity, decreased dissolved oxygen concentrations, increased stream temperature, releases of chemical and nutrient pollutants from sediments, and introduction of chemical contaminants, such as fuels and lubricants.

The greatest potential impact on surface waters could result from suspension of sediments caused by in-stream construction or by erosion of cleared stream banks and right-of-ways. The extent of the impact would depend on sediment loads, stream velocity, turbulence, stream bank composition, and sediment particle size. These factors determine how far downstream the turbid plume of sediment travels during trenching.

The increase in suspended sediments can affect aquatic organisms both directly and indirectly through the degradation of aquatic habitat.

Turbidity resulting from suspension of sediments during in-stream construction or erosion of cleared right-of-way areas could result in reduced light penetration, and in turn reduce photosynthetic oxygen production. Resuspension of deposited organic and inorganic sediments can cause an increase in biological and chemical uptake of oxygen, also resulting in a decrease in dissolved oxygen.

Clearing and grading of the stream banks would expose large areas of soil to erosion forces and would reduce cover for fish along the cleared section of the stream. The use of heavy equipment for construction could cause compaction of near-surface soils, an effect that could result in increased runoff into water bodies. The increased runoff could erode stream banks, resulting in increased turbidity levels and sedimentation rates of the receiving water body. Erosion prior to right-of-way revegetation can be controlled through soil stabilization procedures. Impact on water temperature is generally not significant because of the limited length of stream bank canopy that is cleared for constructing a pipeline crossing.

Refueling of vehicles and storage of fuel, oil, or other hazardous materials near surface waters causes a potential for contamination if a spill were to occur. Immediate downstream users of the water would experience a degradation of water quality. Acute and chronic effects on aquatic organisms could result from such a spill. Similar adverse effects on water quality could result from the resuspension of pollutants from previous contaminated sediments during in-stream construction. The amount of contamination released from the resuspended sediments would depend on the existing concentration and on the sorptive capacity of the surrounding sediments.

Following assembly of the pipelines, hydrostatic testing would be conducted to ensure pipeline integrity. After the test, water would be discharged to the next test section, back into the source, or into an upland area. Potential impact resulting from discharge of hydrostatic test water in streams or upland vegetated areas would be generally limited to erosion of soils and subsequent degradation of water quality from increased turbidity and sedimentation. High velocity flows could cause erosion of the stream banks and stream bottom, resulting in a temporary increase in sediment load. Continued erosion of the discharge area would occur if the discharge area is not properly stabilized.

Interstate pipeline companies, such as ANR, when building new interstate gas pipelines under FERC construction certificates, generally must follow pipeline construction practices contained in the FERC Wetland and Waterbody Construction and Mitigation Procedures (Wetland Procedures). The Wetland Procedures was developed to address the major problems arising from new pipeline construction through surface waters, such as streams and rivers. The Wetland Procedures contains many pipeline construction practices that have been developed to substantially reduce long-term surface water impacts. The Wetland Procedures specifies construction time windows, in-stream

construction duration constraints, sediment control procedures, and various fluming requirements to minimize potential impacts from construction. The use of fuels and other hazardous chemicals near water bodies are also limited. Water bodies classified by the state as sensitive, high quality, or exceptional value due to the presence of endangered or threatened species, scenic or recreational value, or important fisheries may require additional mitigation.

In addition, construction through surface waters is likely to require permits from the DNR. The DNR permits would also contain construction requirements designed to minimize the effect of construction on the surface waters.

The Common ANR segment would cross eight water bodies. Six of these appear to be small streams or ditches. This segment would also have a crossing of the Des Plaines River and a tributary stream to the Des Plaines River, called the Kilbourn Road Ditch. The existing ANR Racine Lateral gas lines cross the Des Plaines River at a location where the river is narrow, appears to have been channelized, and agricultural lands extend up to the banks of the river.

The Sturtevant West segment would cross one small, intermittent stream, while the Sturtevant East segment would cross a total of five small streams or ditches.

The Pleasant Prairie West segment crosses twelve water bodies, all of which appear to be small streams or ditches. The Pleasant Prairie East segment crosses seven water bodies, six of which are small streams or ditches, along with a crossing of the South Branch of the Pike River.

Wetlands

Construction of pipelines through wetlands can result in a temporary alteration of wetland vegetation. This effect would be greatest during and immediately following construction activities and would last until the ROW is successfully revegetated. In emergent wetlands, this impact would generally be short-lived because the herbaceous vegetation tends to regenerate quickly. In scrub-shrub wetlands and forested wetlands, the impact would be of longer duration because of the longer recovery periods for these vegetation types.

Several additional effects are also possible. Compaction and rutting of wetland soils could result from the temporary stockpiling of soil and the movement of heavy construction machinery. Surface drainage patterns and hydrology could be temporarily altered, and the potential for the pipeline trench to function as a drainage channel would increase. Increased siltation could result from activities occurring directly in the wetland or activities occurring in adjacent uplands. Additionally, trenching activities could inadvertently breach a shallow confining soil layer and effectively drain the wetland. Any type of alteration to the soils and hydrology could result in the re-establishment of a different community type within the wetland following construction.

Interstate pipeline companies, such as ANR, when building new interstate gas pipelines under FERC construction certificates, generally must follow pipeline construction practices contained in the FERC Wetland and Waterbody Construction and Mitigation Procedures (Wetland Procedures). The Wetland Procedures was developed to address the major problems arising from new pipeline construction through wetlands. The Wetland Procedures contains many pipeline construction practices that have been developed to substantially reduce long-term wetland impacts. In addition, construction through wetlands may also require permits from the U.S. Army Corps of Engineers. The Corps of Engineers permits, if required, would also contain construction requirements designed to minimize the effect of construction on the wetlands.

The Common ANR segment crosses eight wetland areas. A total of 4,097 feet, or 0.78 miles, of wetland would be crossed with this route segment. Assuming a 75-foot wide construction work area for building the new gas pipeline, about seven acres of wetland could be affected. One wetland was identified as being forested, one a forested/emergent mix and the rest have emergent/wet meadow vegetation.

The Sturtevant West segment crosses one wetland for a distance of 68 feet (0.01 mile). With a 75-foot wide work area, about 0.12 acres could be affected. The wetland type for this wetland is not known.

The Sturtevant East segment crosses three wetland areas. A total of 1,103 feet, or 0.21 miles, of wetland would be crossed. With a 75-foot wide work area, about 1.9 acres could be affected. One wetland area is classified as a emergent/wet meadow wetland type, one as forested and the remaining wetland type is not labeled on the Wisconsin Wetland Inventory maps.

The Pleasant Prairie West segment crosses three wetland areas. A total of 3,327 feet, or 0.63 miles, of wetland would be crossed. With a 75-foot wide work area, about 5.7 acres could be affected. The wetlands along this segment are primarily of the emergent/wet meadow wetland type, with one short stretch of scrub/shrub wetland.

The Pleasant Prairie East segment crosses two wetland areas. A total of 590 feet, or 0.11 miles, of wetland would be crossed. With a 75-foot wide work area, about one acre could be affected. The wetlands are classified as emergent/wet meadow wetlands.

Wildlife

Construction of the gas line along any of the alternate route segments is not expected to have any significant general effects on wildlife or wildlife habitat. In a few limited locations, however, there may be specific impacts to special status species or habitats, which are discussed further in the next section.

The gas line routes are located in a region that is primarily agricultural lands, with lesser amounts of residential and commercial development. The wildlife habitat in agricultural

areas is generally poor quality due to the repeated extensive disturbance of agricultural activities. It supports common species that are adaptable to the repeated disturbances.

Special Status Species and Habitats

The natural gas lines routes contained in the Badger Gen project application were given a preliminary review for potential effect on endangered and threatened species, along with other special concern species or habitats. The applicant, Badger Gen, consulted with the DNR and the U.S Fish and Wildlife Service for this preliminary review. The analysis in this document will only summarize this initial review. In ANR's future project application to FERC for authority to construct the gas line, a more detailed analysis will be conducted.

The peregrine falcon (Falco peredrinus) is a formerly federally listed endangered species that nests on cliffs and tall buildings. It was removed from the federal endangered species list in August 1999, due to a successful recovery process. While the peregrine falcon is known to breed in Racine and Kenosha Counties, it is not expected that the construction of the natural gas line would have any impact on the species or its habitat.

The eastern prairie fringed orchid (Platanthera leucophaea) is a federally listed threatened species and grows in wet grasslands and wet mesic prairies. It is known to occur in the general project area and there is the potential that it is associated with wetlands impacted by the gas line project.

There are two patches of remnant prairie habitat that could be affected by construction of the natural gas lines. Both prairie remnants may contain rare plant species. The first prairie remnant is located along the railroad line west of West Road (CTH H). This prairie is known as the Barnes Prairie remnant. Both natural gas line route alternatives to serve the proposed Sturtevant project site would cross this strip of prairie remnant. The second prairie remnant is located along Bain Station Road. Both alternative gas line routes to the proposed Pleasant Prairie project site could affect this prairie remnant.

The pirate perch (Aphredoderus sayanus) is a state special concern fish species known to occur in some of the low-gradient streams, ditches and marshes in southeastern Wisconsin. State special concern species are those about which some problem of distribution or abundance is suspected, but not yet proven. It is not yet known whether this species occurs in any of the rivers, stream or ditch crossings potentially affected by the natural gas line.

The Karner blue butterfly (Lycaeides melissa samuelis) is a federally listed endangered species and a Wisconsin listed species of special concern. The host plant for this butterfly is the wild lupine, which may occur along portions of the Common ANR gas line segment.

Woodlands and Other Upland Habitats

The existing ANR gas pipelines along the Common ANR route segment pass through or along the edges of four small forest blocks. A total of about 1,739 feet of this route borders these wooded areas.

Construction of a new gas line could affect some of the wooded lands along the Common ANR route segment. The existing ANR gas lines are in a cleared corridor through the wooded lands. If the new gas line could be built within the existing cleared ROW of the existing lines, no additional impact to the wooded areas would occur. The new gas line, however, might require the clearing of additional space workspace for construction. If an additional 25-foot wide workspace needs to be cleared, about one acre of forest in total would be removed from the edges of the four wooded areas.

No woodland areas would be affected by gas pipeline construction along the Sturtevant East or West routes, or along the Pleasant Prairie East or West Routes.

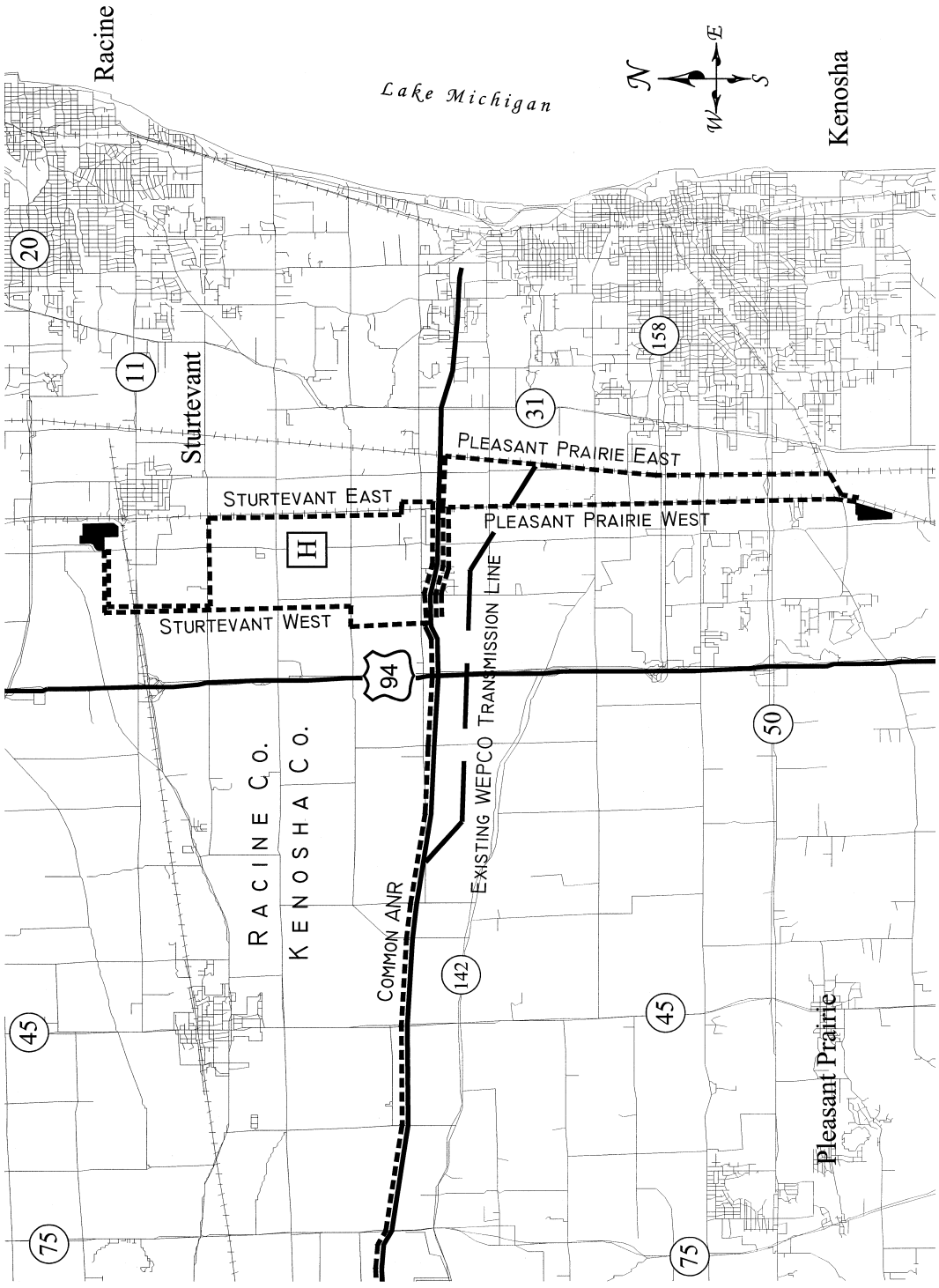
Possible Additional Route Alignments

Staff of the PSC has done an initial evaluation of a possible alternative route segment that is intended to avoid two areas of physical congestion along the gas line routes provided in the Badger Gen application. Neither ANR nor Badger Gen, however, has specifically evaluated this possible route alternative.

The Sturtevant East and the Pleasant Prairie East and West routes pass through a residential subdivision on the west edge of the unincorporated community of Somers. As previously discussed, construction of an additional natural gas line adjacent to the existing ANR Racine Lateral gas lines through this subdivision would be difficult, if possible at all. A second area of congestion is located along the Common ANR segment, on the west side of CTH MB in the town of Paris. At this location there are houses in and around the small woods through which the existing ANR gas lines pass. Construction of a new gas line adjacent to the existing lines in this area could also be physically constrained, though not as severely as in the Somers residential area.

A possible route segment could be considered to avoid these two areas of physical congestion. An electric transmission line runs generally east-west about one-quarter mile south of these two congested areas. This electric line crosses the Common ANR route segment along CTH E, about one-half mile east of CTH D. From this point it runs generally east and south, ultimately crossing both the Pleasant Prairie East and West route segments. The general location of this electric transmission line segment is shown in **Figure 6.03.** This electric line segment avoids both congested areas. It passes almost entirely through open farmland and does not appear to cross any major areas of potential environmental concern.

Figure 6.03 Preliminary ANR Pipeline route options showing WEPCO transmission line location where it could become potential "electric line" pipeline route segment.



The electric line segment ties directly into the Pleasant Prairie East and West gas line route segments. A connection of about 0.25 mile would be necessary through an open farm field to tie the electric line segment back into the Sturtevant West route segment. Connecting the electric line segment to the Sturtevant East segment appears more complicated and has not yet been evaluated.

7

Overview of the Proposal and Required Decisions

Approval, Denial, or Modification of Proposed Plant

The Commission has the obligation to approve, deny, or modify Badger Gen's proposal to build the plant, and to issue an order to that effect with appropriate conditions added. Wis. Stat. § 196.491(3) requires the Commission to make the following determinations before approving construction of the Badger Gen project as a wholesale merchant plant:

- Under Wis. Stat. § 196.491(3)(d)(3), the plant must have a design and location that is in the public interest considering:
    - Alternative locations
    - Individual hardships
    - Safety
    - Reliability
    - Environmental factors
- Under Wis. Stat. § 196.491(3)(d)(4), the plant must not have undue adverse impact on other environmental values such as, but not limited to:
    - Ecological balance
    - Public health and welfare
    - Historic sites
    - Geological formations
    - Aesthetics of land and water
    - Recreational use
- Under Wis. Stat. § 196.491(3)(d)(6), the plant must not unreasonably interfere with the orderly land use and development plans for the area involved.
- Under Wis. Stat. § 196.491(3)(d)(7), the plant must not have a material adverse impact on competition in the relevant wholesale electric service market.

All of the above items have been considered and described at least to some extent in this final EIS. Since the proposal is a wholesale merchant plant, the Commission may not

consider the effects of alternative sources of supply, engineering or economic factors, or Badger Gen's profitability. The Commission may need to discuss the potential effects of the project on Wisconsin's energy supply. Economics may need to be considered to determine direct or indirect impacts on safety, reliability, ecological balance, public health and welfare, orderly land use and development, and effects on competition. As such, these direct and indirect impacts have also been discussed in this final EIS.

Alternative Locations

Two alternative locations have been proposed, and the process used by Badger Gen for narrowing its choices from nine original sites to those in Pleasant Prairie and Sturtevant has been described. Both sites address, to varying degrees, the public interest, environmental values, and consistency with orderly local development. However, the Commission must decide whether they do this adequately.

Alternative Technologies or Actions

As discussed in Chapter 3, Wis. Stat. §§ 1.12 and 196.025 require the Commission to give priority to specific methods of meeting energy demands, to the extent these methods are "cost-effective and technically feasible." The Commission must consider options based on the following priorities, in the order listed, for all energy-related decisions:

- Energy conservation and efficiency.
- Noncombustible renewable energy resources.
- Combustible renewable energy resources.
- Nonrenewable combustible energy resources, again in the order listed.
    - Natural gas.
    - Oil or coal with a sulfur content of less than 1 percent.
    - All other carbon-based fuels.

If the Commission identifies an option to the proposed power plant during this review that is cost-effective and technically feasible, it could reject the Badger Gen project as proposed. It could not, however, order Badger Gen to build something else in its place.

Effects on Competition

Wis. Stat. § 196.491(3)(d)7 states that the Commission must find that the Badger Gen project "will not have a material adverse impact on competition in the relevant wholesale electric service market." As discussed in the section on the Potential Impact on Competition in Chapter 2, the Commission will have to consider the situation of Badger Gen as a new entrant into the highly concentrated wholesale market of the WUMS region.

Selection of the Site for the Plant

Commission Site Selection

Two alternative sites for the plant have been proposed. If the Commission determines that both sites are reasonable and viable, it will select one of them as part of any approval of the plant.

The two sites are discussed in detail in Chapters 4 and 5. They are briefly compared in terms of public interest and environmental values in **Table 7.01**.

DNR Air Permit

As discussed in Chapters 1, 4, and 5, an approved air permit is necessary from the DNR before construction may begin at either site. If a site cannot be permitted, the project may not move forward.

Water Supply Construction Authorization

If the Sturtevant site is selected, the RWU must apply to the Commission for a Certificate of Authority (CA) to build the required water main and booster station. Most of the analyses of the water facilities have been done already for this final EIS. Compliance with Section 106 of the National Historic Preservation Act remains to be done, along with an official Commission determination of the local water rate impacts.

If the Pleasant Prairie site is selected, the required water main does not appear to meet the cost threshold required for Commission review. No CA would be needed.

Electric Transmission Line Routes

The project would require connection to the existing electric transmission system by a new 345 kV transmission line. The 345 kV transmission line connection would be over one mile in length on new right-of-way. Therefore, the transmission line requires a CPCN from the Commission. The same determinations must be made under Wis. Stat. § 196.491(3)(d) before the Commission may issue a CPCN approving the transmission connection.

Two underground routes for the electric transmission connection have been proposed at both sites. At the Sturtevant site, the underground routes could connect to either the Racine Substation or the Zion-Arcadian transmission line. The latter could require using an underground route and an 11-mile overhead segment. The former would need only the Sturtevant underground route and overhead lines of less than one mile. The Commission must approve the connection design and select the route to be used to connect the approved site. If the transmission from one site is technically or

Table 7.01 Comparisons between the two proposed power plant sites for public interest and environmental values.

Siting Factor	Pleasant Prairie	Sturtevant
Air	Permittable	Appears Permittable
Land	Relatively flat farmland	Already graded site in business park
Water	Drainage and floodplain can be avoided- environmental corridor passes across south side	Drainage controlled - streams remote
Vegetation	Corn and soybeans plus water-loving non-native plants	Invasive weeds following grading
Land Use	Farmland; compatible with surrounding land use	Business park land awaiting development; compatible with surrounding land use
Municipal Services	Needs short water line; sewer benefits from increased flow; no financial impacts on municipal services	Needs longer water line (two segments) plus booster station; sewer with adequate capacity on site; no financial impacts on municipal services
Roads	Some congestion on CTH H during construction; impacts minimal during operation	Some congestion on West Road/CTH H and intersections with STH 11 and 20 during construction; impacts minimal during operation
Fogging and Icing Potential	Possible in fall/winter on CTH H and Bain Station Rd; only about 3.5 hrs per year predicted; hazard potential during those times	Possible icing in winter on Wisconsin Ave, Renaissance Blvd, West Rd, Park Ct; about 2 hours over five years predicted; hazard potential at those times
Noise Potential	No more than 50 dBA at closest receptors; would comply with local ordinance; no low frequency vibration expected	No more than 50 dBA at closest receptors; would comply with local nuisance ordinance; no low frequency vibration expected
Visual Impacts	Smaller than existing coal plant nearby, but would appear larger from certain places along CTH H; not out of existing landscape character	Largest building in the park, but probably not out of scale with its surroundings and viewed mostly from a distance
Historic Sites	Two small archeological sites, already disrupted; county cemetery adjacent to site	No archeological sites
Economic Effects	Shared revenue payments to Pleasant Prairie and Kenosha County; little impact on jobs or development otherwise	Shared revenue payments to Sturtevant and Racine County; little impact on jobs or development otherwise
Natural Gas Availability	About 14.5 miles common; about 8-8.5 miles to site	About 14.5 miles common; about 6-9 miles to site
Electric Transmission	About 2.5 miles underground (see **Table 7.02** below)	About 1-5 miles underground plus aboveground segment on existing structures (see **Table 7.02** below)
Water Supply	About 1 mile of new main; need to address small wetland and avoid cemetery	About 7.5 miles of new main plus booster station; 2 stream crossings
Sewer	On site connection to the local system	On site connection to the local system

environmentally more favorable than the connection from the other, the transmission may be an important factor in the Commission's power plant site selection.

The four proposed underground transmission routes are described in detail in Chapters 4 and 5. **Table 7.02** briefly compares and contrasts them in terms of public interest and environmental values. Potential impacts of the overhead connections to the Racine Substation or Zion-Arcadian line would be less notable, but must be considered as well and can be found in Chapters 4 and 5.

Natural Gas Pipeline Routes

As discussed in detail in Chapter 6, the natural gas connection for the plant would be proposed, built, and operated by ANR Pipeline Company. Its construction does not fall within the Commission's jurisdiction. ANR has not finalized its routes or made an application to the FERC for certification. The preliminary review done on possible gas line routes did not identify any major potential environmental concerns with any of the possible routes.

Summary

The Commission has a CPCN application before it for a wholesale merchant electric power plant and for a connecting electric transmission line. Unless granted a time extension by the circuit court, it must issue an order by July 25, 2000 (180 days after the Commission declared the application to be complete) on whether to approve the plant and line, and under what conditions. A time extension has been requested. If the plant is approved, the Commission must also approve either the Pleasant Prairie or Sturtevant site. For whichever site is selected, the Commission must approve a transmission line route, and decide under what conditions it would be built and operated. If the Sturtevant site is selected, the RWU must apply to the Commission for a CA to install the water mains and booster station. A Commission-reviewed analysis of the water project would probably reference this EIS.

Table 7.02 Environmental comparison among the four proposed underground electric transmission routes for public interest and environmental values.

Route Factor	Pleasant Prairie East	West	Sturtevant North	South
Riser substation at the existing line	Farmland	Farmland/wetland	Farmland	Farmland
Length (underground)	About 2.5 miles	About 2.5 miles	About 2.6 miles	About 1.2 miles
Soils	Mostly road right-of-way	Many soils are wetland soils; some prairies	Much is land awaiting development	Much is wetland and farmland
Geology	No effect	No effect	No effect	No effect
Wetlands	About 1.3 acres of right-of-way is wetland	About 3 acres is wetland and floodplain, with railway intrusion	About 1.3 acres of soil with high water table; one intermittent stream crossing; some in floodplain	About 3.68 acres of right-of-way is wetland
Vegetation and wildlife	No significant impact on species although eastern prairie fringed orchid might be in mesic prairies	No significant impact on species although eastern prairie fringed orchid might be in mesic prairies	No significant impact on species	No significant impact on species
Contamination	None	None	None	None
Consistency with land use	Compatible	Compatible east of railway; less so west of railway due to wetland	Compatible	Least compatible of the four routes because disects previously undisturbed lands and potentially affects wetlands
Roads and utility lines	Some traffic disruption; some attention to other utilities needed	Little traffic disruption; tight fit between railway and pond	Some traffic disruption; some attention to other utilities needed	Some traffic disruption; some attention to other utilities needed
Visual landscape	Trees and shrubs not allowed over underground line	Trees and shrubs not allowed over underground line	Trees and shrubs not allowed over underground line	Trees and shrubs not allowed over underground line
Historic properties	Field survey of undisturbed areas needed	Field survey of undisturbed areas needed	Field survey of undisturbed areas needed	Field survey of undisturbed areas needed
Noise	Open area - acceptable	Open area - acceptable	Construction could be annoyance in residential area	Construction could be annoyance in residential area
EMF	Very low levels	Very low levels	Very low levels	Very low levels
Aesthetics	Little impact	Some impact if west of railway	Little impact	Little impact

Note: If a line between the Sturtevant site and the Zion-Arcadian line is selected then, as described in Chapter 5, two underground routes (either the Sturtevant N or S route and either the Pleasant Prairie E or W route) would be used, along with an 11-mile overhead route installed on existing structures.

Appendix A

List of Abbreviations

ABB	Assea Brown Boveri, Inc
Act 204	1997 Wisconsin Act 204, the Electric Reliability Act
ANR	ANR Pipeline Company
Army Corps	Army Corps of Engineers
ATCo	American Transmission Company
BACT	Best Available Control Technology
Badger Gen	Badger Generating LLC
BTU	British Thermal Units
CEM	Continuous Emission Monitors
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
Commission	Public Service Commission of Wisconsin
CPCN	Certificate of Public Convenience and Necessity
CTH	County Trunk Highway
dBA	A-weighted decibels
DNR	Wisconsin Department of Natural Resources
DSM	Demand Side Management
EIS	Environmental Impact Statement
EOH	Equivalent Operation Hours
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
GLARC	Great Lakes Archeological Research Center, Inc
H^+	Hydrogen ions
HCl	Hydrochloric Acid
H_2SO_4	Sulfuric Acid
HHI	Herfindahl-Hirschman Index
HRSG	Heat Recovery Steam Generator
HVAC	Heating, Ventilating and Air Conditioning
IARC	International Agency for Research on Cancer
ISO	Independent System Operator (re: electric transmission)
kV	Kilovolt
kWh	Kilowatt-hour
KWU	Kenosha Water Utility
LAER	Lowest Achievable Emission Rate
LEPC	Local Emergency Planning Committee
MACT	Maximum Available Control Technology
MGD	Million Gallons Per Day
MMBTU	Million (Thousand Thousand) BTU
MSDS	Material Safety Data Sheets
MVA	Mega Volt Amps
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NaOH	Sodium Hydroxide
NGPL	Natural Gas Pipeline Company of America
NHPA	National Historical Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxide
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
OH^-	Hydroxide ions
PG&E Gen	PG&E Generating Company
pH	Amount of Acidity
PM	Particulate Matter
PPM	Parts Per Million
PPWU	Pleasant Prairie Water Utility
PSC	Public Service Commission of Wisconsin

PSD	Prevention of Significant Deterioration
PVC	Polyvinyl Chloride
RAPID	Research and Public Information Dissemination Program
ROW	Right-of-Way
RPM	Revolutions per Minute
RWU	Racine Water Utility
SCR	Selective Catalytic Reduction (of NO_x)
SEWRPC	South East Wisconsin Regional Planning Commission
SHSW	State Historical Society of Wisconsin
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedures
STH	State Highway
SWU	Sturtevant Water Utility
VOC	Volatile Organic Compounds
WEPA	Wisconsin Environmental Policy Act
WEPCO	Wisconsin Electric Power Company
WPDES	Wisconsin Pollution Discharge Elimination System
WUMS	Wisconsin Upper Michigan System

Appendix B

Comments on the Draft EIS

Comment process

The Commission staff issued the draft EIS on the Badger Generating Company LLC project in mid-April 2000. A 45-day comment period followed the issuance of the draft EIS. The comment period ended on May 30, 2000. Five letters were received. They are reproduced in this appendix.

Commission staff considered all of the comments on the draft EIS as it prepared the final EIS. It is hoped that the changes that staff made will help make this final EIS a better document for use by the Commission in making its decisions and a better disclosure document for public use.

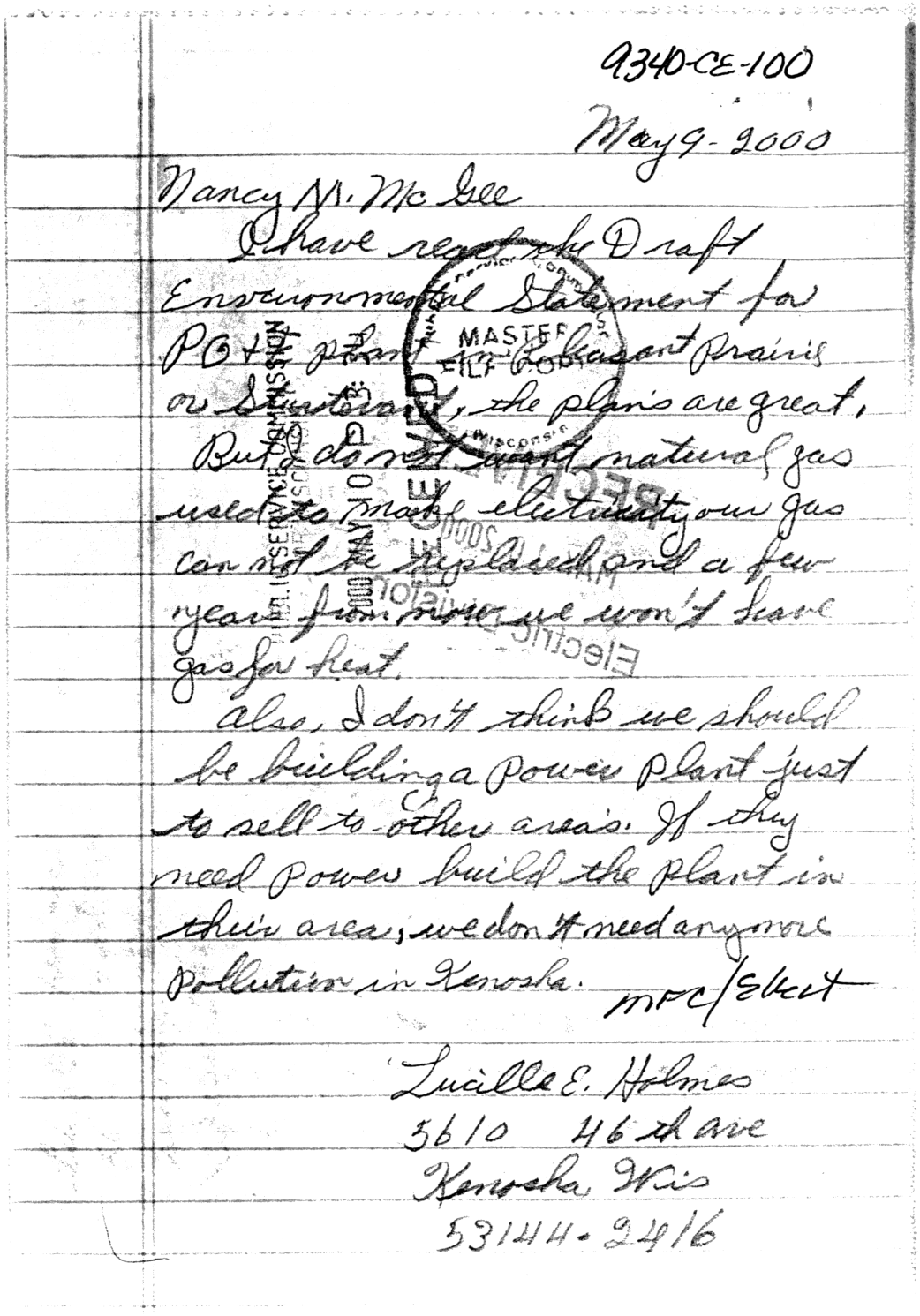
Several of the points made in the comment letters relate to public policy matters, potential changes in law, or the ultimate decision the Commissioners should make. This final EIS does not directly address these comments. Its purpose is to present information on the proposed project and its potential consequences, to inform the decision-makers and the public. There will be an opportunity to comment on policy matters, state law, and the final decisions at the upcoming public hearing on the project.

Comment letters received

Letters were received from the following persons:

- Lucille E. Holmes
- Cynthia Pederson and Art Zeratsky, representing Somers Against Violating the Environment (SAVE)
- Gustav Hauser
- Nazre G. Adum, representing the PG&E Generating Badger Generating Project (Badger Gen)
- Roman A. Draba, representing Wisconsin Electric Power Company (WEPCO)

Figure AB.01 Comment letter from Lucille E. Holmes



9340-CE-100

May 9- 2000

Nancy M. McGee

I have read the Draft Environmental Statement for PC+E plan for Pleasant Prairie or Sturtevant, the plans are great, But I do not want natural gas used to make electricity our gas can not be replaced and a few years from now we won't have gas for heat.

also, I don't think we should be building a Power Plant just to sell to other area's. If they need Power build the plant in their area, we don't need any more Pollution in Kenosha.

NO/Elect

Lucille E. Holmes
3610 46th Ave
Kenosha Wis
53144-2416

Figure AB.02 Comment letter from Cynthia Pederson and Art Zeratsky, representing Somers Against Violating the Environment (SAVE)

9340-CE-100

May 23, 2000

Ms. Nancy McGee
Public Service commission
P.O. Box 7854
Madison, WI 53707

Re: Public Comment to DEIS for PG&E plant

In this day and age everyone must be acutely aware of how the companies that move into their communities impact their environment. Here in Southeast Wisconsin we already live with the impacts of industrial environmental harm in the form of ozone alerts every summer and the running debate over whether or not it is safe to eat fish from Lake Michigan.

PG&E touts that its electric generating plant operates on natural gas and is clean. While it may be the case that the technology is clean, PG&E's history of pollution is far from clean. PG&E has a history of polluting the environment. Not only is PG&E a polluter, but PG&E's history also shows the company will mislead and omit information required by law about their impact on the environment.

PG&E inflicts environmental harm in a variety of ways. For example, an attorney who specializes in asbestos exposure cases lists 9 PG&E sites as "asbestos exposure sites". Also the Massachusetts Public Interest Research Group lists US Generating, (what PG&E called itself when first coming to Wisconsin), on their "Filthy 5". In 1998, MPIRG also credited US Generating's Brayton Point Power Plant for creating 20% of all of Massachusetts' air pollution.

Proof of PG&E's disregard for environmental safety goes farther. A check of the EPA's Superfund list shows 5 active PG&E Superfund sites as of March 31, 2000. In addition, PG&E has been a potentially responsible party to at least 24 state and/or federal Superfund sites since 1996, with liability in the millions of dollars. With such a deplorable history of environmental damage PG&E cannot be allowed to locate anywhere in Wisconsin.

Environmental harm is not the only problem that PG&E would bring to Wisconsin if allowed to locate here. PG&E's past conduct shows that no one would be able to depend on what PG&E reports about their impact on the environment. In 1997, PG&E paid $14,000,000.00 to settle what the United States Department of Justice, The United States Environmental Protection Agency, and the California Attorney General called, "one of the largest environmental cases in California History". The government had charged that for years PG&E had deliberately violated federal and state Clean Water laws by incomplete and misleading reporting to environmental regulators.

PG&E poses too big a threat to the health and safety of Wisconsin citizens. Wisconsin does not need PG&E anywhere in the state. Because of PG&E's deplorable

MFC/ellc

Figure AB.02 (con't.) Comment letter from Cynthia Pederson and Art Zeratsky, representing Somers Against Violating the Environment (SAVE), page 2

environmental history, and because of PG&E's history of deceit and omission in environmental reporting, PG&E cannot be allowed to locate in Wisconsin and bring with them the tragic consequences that follow such a total disregard for environmental safety.

These comments submitted by SAVE, Somers Against Violating the Environment.

Cynthia Pederson
10708 38 St
Kenosha, Wi 53144
Co-leader SAVE

Art Zeratsky
3503 96th Ave
Kenosha Wis. 53144
Co-leader S.A.V.E.

Figure AB.03 Comment letter from Gustav Hauser

9340-CE-100

May 26, 2000

Gustav Hauser
143 - 113th Street
Pleasant Prairie, WI 53158

Nancy M. McGee
Public Service Commission
P.O. Box 7854
Madison, WI 53707-7854

Comments regarding draft EIS for Badger Generating Company, LLC

Dear Ms. McGee

After reading the Application for Certificate of Public Convenience and Necessity and the draft EIS, I would like to add the following comments and questions.

1.a) Southeast Wisconsin is one of 17 Metropolitan areas that must use reformulated gasoline to cut down on air pollution. Gasoline prices are already $0.20 higher than elsewhere in Wisconsin. Does it make sense to add a major pollution source ?

b.) The air shed should be improved by protecting open green spaces and not degraded any further by locating more power plants, industry, housing and traffic.

2.a.) The project is considered "Qualified Wholesale Electric Company" under Wisc. Statutes Chapter 76 and exempt from local property taxes. Was Chapter 76 written for regulated companies **and** for merchant plants ?

b.) The project was touted to provide reliable, competitively priced electricity for Southeast Wisconsin. Hook-up into the power grid was to go to the Pleasant Prairie Substation. The lines are now proposed to go parallel to existing lines into the Zion-Arcadian grid in Illinois.

c.) Illinois has a severe power deficit since the 2000 Megawatt Power plant in Zion was shut down. The utility price in Illinois is higher than in Wisconsin and it is highly unlikely Southeast Wisconsin will benefit from this plant. Illinois will get the power and we will get the air pollution.

3.a.) Kenosha County is designated as attainment area for all criteria pollutants with the exception of ozone. This is questionable with the presence of the WEPCO power plant and the rapid conversion of green spaces into industrial parks, shopping malls and residential units in the eastern portion. It should be verified by placing monitoring stations in the southeastern corner of Wisconsin, closer to the existing pollution sources.

b.) NOX exemption granted to Wisconsin should not be used to allow pollution levels to be increased significantly and create a localized hot spot of pollution. Even with BACT applied to the process, this plant still is a major pollution source and should not be approved. The residents of the Kenosha area got already once burned when the WEPCO power plant was approved and we were promised cheap and abundant electricity for our area. Then WEPCO applied political muscles and got the State Law changed to allow the formation of a Holding

MFC
ELEC/NKM

Figure AB.03 (Cont'd) Comment letter from Gustav Hauser, page 2

Company to build and market the Lakeview Industrial Park. This in turn created the need to accommodate the newly imported work force and their families with housing, shopping malls, etc. We always hear the common mis-conception our air gets polluted from far away sources, but the truth is, we are doing a splendid job by our self.

4.a.) According to WEPCO's internal analysis, the shortages in Southeast Wisconsin were more the result of poor planning to shut down powerplants for scheduled and unscheduled maintenance during the peak of the summer and can be remedied without new generating capacity and has already proposed a solution. There is a projected uncommitted capacity for the year 2002 of 587 MW and with Badger Generating 937 MW. Adding capacity will only invite the creation of more users in our area, stressing the air quality even more.

4.b.) Does Badger Generating have a committed capacity and if, where is it located ?

c .) If both the Pleasant Prairie and the Sturtevant site have equal standing as required, why was no Air Permit Application filed for the Sturtevant site ?

5.a.) Is the projected stack height of 120 feet enough to in the immediate neighborhood of a much taller plant to keep ambient pollution levels low ? How far will the plume travel under different weather conditions ? Will there be continuous **stack** monitoring to verify BACT is actually achieving projected emission levels ? Are other plants with the same size, technology and pollution control in production and have verifiable emission data available ?

6.a.) The proposed water use is projected to be between 6.3 MGD and 7.0 MGD and the return of water to its source between 1.3 MGD and 2.0 MGD. The rest will be converted into steam. Does this conversion constitute a diversion from the Great Lakes since this plant lies on the other side of the Subcontinental Divide and does not return the water to it ? Will it need approval to remove water from the Great Lakes ? The Great Lakes are already at a historic low level.

b.) In the steam plume and road icing modeling, was the existing power plant included and the height of it ? Why was Mitchell Field data from 1982 to 1986 used ? Is there more recent data from Kenosha Airport, which is much closer, available and should be used ?

c.) There is already a giant steam plume visible for miles and miles from the existing power plant. The addition of the new source will make this condition much worse.

d.) If the wet / dry cooling towers work so great, then why is the loss of water that high and why are dry /dry closed loop cooling towers without loss of water to the atmosphere not considered or required ? This technology would not require massive loss of water and continuos treatment with chemicals. Sodium hydroxide and sulphuric acid will be released with the steam plume and should be listed as air discharge.

7.a.) Will the projected ammonia injection rate of 27.3 LB / HR per generator be enough to lower the NOX concentrations to the predicted levels or are problems foreseen ? With this injection rate and a storage capacity of 14 000 GAL for each generator, there would be a 6 month supply of 20% ammonia on hand. Will the so- called ammonia slip produce noticeable odor problems and should ammonia be listed in the emission inventory ?

8.a.) The proposed 345 KV underground transmission lines are a new cabling technology to North America and have a projected failure rate of less than 5%. They will be crossing thru poorly drained soils with high water levels. Does the failure rate change under this soil condition ?

b.) The magnetic field produced by the underground lines were projected by the application to

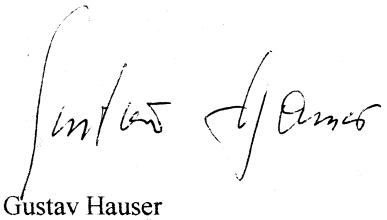
Figure AB.03 (Cont'd) Comment letter from Gustav Hauser, page 3

be up to 450 mG, but by the Draft EIS to be only 34 mG. Will the lines under worst case scenario create dangerous levels of E.M.F. radiation ? Will the corridor be off limits and cordoned off ?

9.a.) **With PG & E's dismal environmental record, do we want to take a chance ?**

b.) **Do we need the political arm twisting and threats of PG & E not to build the power plant if it does not get a favorable tax break, which will cost the Public in lost revenues ? Their profit should not be an over riding concern.**

Sincerely,



Gustav Hauser

Figure AB.04 Comment letter from Nazre G. Adum, representing the PG&E Generating Badger Generating Project (Badger Gen)

9340-CE-100

PG&E Generating ™
Badger Generating Project
Owner: Badger Generating Co., LLC

7500 Old Georgetown
Road
Suite 1300
Bethesda, MD 20814-
6161

301.280.6800
Fax: 301.280.6900
Internet: www.gen.pge.com

May 30, 2000

Ms. Nancy McGee
Public Service Commission of Wisconsin
610 North Whitney Way
Madison, Wisconsin 53707

Re: Badger Generating Company, LLC
Comments on Draft Environmental Impact Statement
Docket 9340-CE-100

Dear Ms. McGee:

Badger Generating Company, LLC ("Badger") congratulates the Commission staff on a job very well done on the draft environmental impact statement for Badger's proposed power plant ("DEIS"). The overall completeness and professional quality of the DEIS is commendable and Badger looks forward to working with the Commission and its staff to further advance the project's development.

Badger offers the enclosed table of limited comments on the DEIS. Most of our comments are in the nature of clarifications, and in most cases we offer specific language for your consideration. We of course welcome any questions or further discussion on any of our comments.

We understand that Wisconsin Electric Power Company ("WEPCo") is filing comments on the DEIS which include a suggested transmission interconnection alternative for the Pleasant Prairie site. Badger is not opposed to evaluating this alternative, which may have some merit, but is very concerned with its potential impact on the current schedule for the Commission's action on our CPCN application. We therefore request that the Commission evaluate Badger's CPCN application based on the alternatives set forth in the DEIS and not change the current schedule. If the Commission desires, Badger would be amenable to working with WEPCo to evaluate this new interconnection alternative and, if Badger and WEPCo conclude that it is superior, to present the results of their evaluation as an amendment to the CPCN.

Sincerely,

Nazre G. Adum

Nazre G. Adum, P.E.
Manager, Project Development

Figure AB.04 (Cont'd.) Comment letter from Nazre G. Adum, representing the PG&E Generating Badger Generating Project (Badger Gen), page 2

BADGER GENERATING COMPANY, LLC
ELECTRIC GENERATION AND TRANSMISSION FACILITY
COMMENTS TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page No.	TEXT	COMMENTS
General Comment on Transmission Line and Interconnect	Page xv "This impact [effects on the existing electric transmission system] would be addressed partly through the connection to the Zion-Arcadian line to the south, and partly through an agreement with WEPCo to cover needed upgrades of other effected transmission facilities." Page 29 "Although BadgerGen proposes to build the line, it expects to turn the line over to WEPCO, the utility that owns the transmission system around the proposed sites and that serves the surrounding area, before the plant begins operation. WEPCO would then operate and maintain the line." Page 31 "This includes paying for reinforcement that is required to accommodate the output of the new power plant." Page 96-98 generally	In several areas of the DEIS, the PSCW states that BadgerGen is responsible for the costs related to upgrades to WEPCO's transmission facilities. BadgerGen would like to clarify that such costs should include only costs which are clearly attributable to BadgerGen and are related to interconnecting BadgerGen to WEPCO's system. In addition, BadgerGen's ultimate obligations with respect to interconnection costs will be established in an agreement to be negotiated between BadgerGen. BadgerGen and WEPCO are discussing (i) the level of contingency planning that is necessary and customary for WEPCO to conduct in order to adequately maintain its system's integrity and (ii) whether there are alternative solutions to any system integrity issues ultimately identified by WEPCO that are less costly than those recommended by WEPCO. As a result of such discussions, BadgerGen understands that there will be no significant impacts to WEPCo's system as a result of BadgerGen's interconnection, and BadgerGen will not be responsible for any system, upgrades as a result of such interconnect. Finally, the parties' obligations with respect to such matters will be established in an interconnection agreement to be negotiated consistent with FERC requirements. With respect to the language quoted from page 29, BadgerGen notes that is currently discussing construction, ownership, operational and maintenance matters related to the transmission line with WEPCO and, until a final interconnection agreement is reached, BadgerGen cannot definitively predict whether it or WEPCO will be responsible for each such matter.
5	"Also prior to filing, BadgerGen hosted four public information meetings near the two proposed power plant sites. Their direct mail invitation to the first two meetings was sent to all landowners in the villages of Pleasant Prairie and Sturtevant, plus those within a half mile of the Sturtevant site but west of the village."	BadgerGen did not mail to everyone in the respective villages. The Pleasant Prairie mailing was within a one mile radius of the site. With respect to Sturtevant, BadgerGen did mail to almost everyone in the Village as well as several residents living in Mt. Pleasant.
7	List of permits needed: "Transfer of Interconnection Facilities under Section 203 of the Federal Power Act."	BadgerGen suggests adding "if necessary" to the end of this sentence. **Transfer of Interconnection Facilities under Section 203 of the Federal Power Act, if necessary.**
13	Second sentence "One of the two steam turbines, operating at a higher pressure and 3600 RPM, would be connected via a gearbox to the lower speed, low pressure turbine."	BadgerGen suggests striking the second sentence and replacing it with: **The steam turbine is a double casing design. The IP/LP turbine is connected to the generator via self-shifting clutch and rotates at 3600 rpm. The HP turbine is**

003.234164

Figure AB.04 (Cont'd.) Comment letter from Nazre G. Adum, representing the PG&E Generating Badger Generating Project (Badger Gen), page 3

BADGER GENERATING COMPANY, LLC
ELECTRIC GENERATION AND TRANSMISSION FACILITY
COMMENTS TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page No.	TEXT	COMMENTS
		connected to the IP/LP turbine via a gear reducer and rotates at approximately 8950 rpm.
18	Section on "Steam Generator (HRSG)"	In a combined cycle plant there typically isn't a heat exchanger called a feedwater heater with a steam turbine extraction. In BadgerGen's proposed configuration there are steam jet air ejectors that evacuate air from the condenser and also heat the condensate being pumped to the HRSG LP economizer. BadgerGen only points this out to clarify that the facility will not have a device called a feedwater heater or a dedicated steam turbine extraction.
23	"However, as of the date of this document, BadgerGen has chosen to file an air permit application with the DNR only for the Pleasant Prairie site."	BadgerGen suggests replacing the sentence with: **At WDNR's request, Badger submitted an air permit application only for Badger's preferred alternative.**
37	"Extrapolation from historical performance data suggests that the chance of a failure in the proposed line is likely to be less than 5 percent in any given year."	BadgerGen does not understand how the Commission extrapolated from historical performance data to arrive at the less than 5 percent chance of failure. Nonetheless, BadgerGen expects, based on its analysis of the information it provided the Commission, that the chance of failure would be lower than the suggested by the Commission.
49	Figure 4.02 "Commercial/Residential."	BadgerGen suggests replacing this label in the legend with: **Commercial/Industrial.**
51	"The area of the state that includes the Pleasant Prairie site is presently classified as severe non-attainment for ozone . . . ozone non-attainment New Source Review."	The proposed project is subject to the Prevention of Significant Deterioration (PSD) program for two reasons, neither of which is explained in the DEIS. First, this area of the state is classified as attainment, and thus subject to PSD, for all criteria pollutants except ozone. Second, potential emissions from the proposed project trigger PSD requirements for these pollutants. Accordingly, BadgerGen suggests replacing this language with the following: **The area of the state that includes the Pleasant Prairie site is presently classified as severe non-attainment for ozone. The area is also presently classified as attainment for all other criteria pollutants. Because of these designations and the proposed project's potential emissions (see discussion below), the proposed project is subject to Prevention of Significant Deterioration (PSD) Review for PM, NOx, CO and SO2, and to Volatile Organic Compound (VOC) non-attainment New Source Review.**
53	The draft EIS states that actual emissions of formaldehyde will be determined during the initial compliance testing	BadgerGen suggests replacing this sentence with:

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Figure AB.04 (Cont'd.) Comment letter from Nazre G. Adum, representing the PG&E Generating Badger Generating Project (Badger Gen), page 4

BADGER GENERATING COMPANY, LLC
ELECTRIC GENERATION AND TRANSMISSION FACILITY
COMMENTS TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page No.	TEXT	COMMENTS
	"before the proposed power plant begins commercial operation."	**As required by the expected terms of the WDNR air permit, compliance testing for formaldehyde will be conducted in the first 90 days of operation of the facility.**
55	"For one pollutant, ozone over one hour, modeling has yet to be completed."	The results of the air modeling were submitted to WDNR as part of the Authority to Construct Permit Application. BadgerGen suggests replacing this sentence with: **At the time the DEIS was issued, WDNR had not verified the air modeling results. As expected, all of the predicted impacts from BadgerGen were below the NAAQS.**
68	Section on "Water Main Construction", 1st sentence	The size of the new water main to be installed is 16", not 24".
93	Regarding gross receipts taxes, "Payments begin during construction and continue during operation."	Badger does not believe that gross receipts taxes will be assessed on the project during construction and prior to commercial operation. The gross receipts tax is assessed based on gross revenues of the preceding year. § 76.28(2), Stats. Until the project achieves commercial operation and begins generating revenues, there will be no basis for the assessment of the gross receipt tax. Badger suggests replacing this sentence with the following: **"Payments begin upon commercial operation."**
99	"The CTH H right-of-way ranges from 80 to 140 feet wide and is usually 90 to 100 feet wide, but the company's filing says the transmission line might have a 200-foot wide right-of-way along CTH H. The railroad right-of-way is 100 feet wide, but the company's filing says the proposed transmission line right-of-way along the railroad might vary from 150 to 200 feet (150 feet in the first mile, 150 to 200 in the second mile and 200 in the last 0.4 miles)."	Badger will need a 50-75 foot corridor for construction and permanent right-of-way. Because the final alignment is still undetermined, Badger examined a 200 foot wide corridor, to insure that all possible impacts were identified.
99	Figure 4.18 and "300-foot by 200-foot."	Figure 4.18 shows the views of the riser structure for the tie-in station to the WEPCO line only, not the plant switchyard. Also, "300-foot by 200-foot" should be "360-foot by 200-foot".
100	Figure 4.17	The label for the triangular-shaped polygon to the south of the site and to the south of the wetland complex is currently shown as residential. The actual land use is a vocational/technical school. The Government/Industrial category depicted on Figure 5.02 for the Sturtevant site would be an appropriate land use code.

Figure AB.05 Comment letter from Roman A. Draba, representing Wisconsin Electric Power Company (WEPCO)

9340-CE-100

Wisconsin Electric
A WISCONSIN ENERGY COMPANY

Wisconsin Electric
231 W. Michigan
P.O. Box 2046
Milwaukee, WI 53201-2046
Phone 414 221-2345

MASTER FILE COPY

RECEIVED
2000 MAY 30 P 3:09
PUBLIC SERVICE COMMISSION OF WISCONSIN

Hand Delivered

May 30, 2000

Nancy M. McGee
Electric Division
Public Service Commission of Wisconsin
P. O. Box 7854
Madison, WI 53707-7854

SUBJECT: Badger Generating Company, LLC 9340-CE-100
Draft Environmental Impact Statement

Dear Ms. McGee:

Wisconsin Electric Power Company (the Company) submits this letter in response to the invitation to comment on the Draft Environmental Impact Statement (DEIS) prepared for the Badger Generating Company, LLC Electric Generation and Transmission facilities. At the outset the Company desires to express its appreciation for this opportunity to comment on the DEIS.

The proposed facility will, if constructed, be connected to what is now the Wisconsin Electric transmission system. The Company believes that several areas of the DEIS regarding the manner of interconnection and interconnection facilities require clarification and its comments are, with one exception, confined to these matters. The interconnection facilities, specifically the 345 kV underground line proposed, is a generator outlet lead for the exclusive use of Badger and, as such, the Company will not accept ownership or the operating responsibility for them. Support for our position is set out below. The references which follow are to page numbers in the DEIS.

Page 25, second paragraph. This paragraph requires clarification as the proposed plant provides increased transfer capability into Wisconsin only if its principal sales market is south. Transfer capability from Illinois decreases if the sales from the proposed facility are to the north.

Page 29, "The Proposed Transmission Line Connection." To this point Wisconsin Electric has had limited input into the type of facilities necessary to interconnect the proposed plant to the Wisconsin Electric transmission system and any such interconnection will require agreement between the parties and an interconnection agreement. At various places the DEIS seems to assume that WE will accept whatever is built. That is not the case.

MRD
Elec

Figure AB.05 (Cont'd.)Comment letter from Roman A. Draba, representing Wisconsin Electric Power Company (WEPCO), page 2

The DEIS characterizes the lines from the proposed plant to the existing Wisconsin Electric transmission systems as a "transmission line." Wisconsin Electric does not believe that characterization is correct. The line as proposed instead is a generator lead, exclusively for the use of the proposed facility, not a part of the transmission system. As such Wisconsin Electric would not accept ownership and the attendant obligations of operation, maintenance and repair. The line as proposed is of a unique, single circuit, solid dielectric design with no counterpart in operation in the United States. Wisconsin Electric has no interest in accepting the responsibility and risks attendant upon operating such a radial generator outlet lead tying a merchant plant to its system. If the project proponents proceed with the line as proposed, Wisconsin Electric will therefore not accept ownership.

Wisconsin Electric believes a preferable interconnection with the existing transmission system would be an overhead double circuit 345 kV line from the Pleasant Prairie site south to the existing transmission line, directly connected to and splitting the Arcadian-Zion line into two transmission lines. Such construction would further eliminate the requirement for a switching station at the junction point. Wisconsin Electric has so advised the project proponent.

Page 96, Second Paragraph. The power systems in the corridor between Milwaukee and Chicago have substantial power transfer capability. The Impact Statement questions the ability of this network to withstand the sudden loss of 1000 MW. We believe, based on experience with the Zion Nuclear Plant located just South of this proposed facility, that it can. Zion was operated with two 1100 MW units for many years without difficulty associated with the sudden loss of a unit. Additionally, MAIN requires the carrying of sufficient operating reserves to cover for loss of the single largest generating unit within MAIN, currently 1200 MW. Loss of the entire Badger plant at approximately 1000 MW fits within this current reliability criteria.

Page 96, Steady State Analysis. The language in the DEIS suggests some confusion about Wisconsin Electric's contingency planning methodology. Wisconsin Electric's planning starts with single contingency planning—Wisconsin Electric must be able to take any system element out at any time and still have a system that is within emergency current and voltage ratings. This was done, and Wisconsin Electric discerned no apparent problems with the proposed plant. Wisconsin Electric also analyzes selected double contingency outages to determine if the addition of generation will degrade the ability of the Wisconsin Electric transmission system to function under more extreme conditions. Under this analysis, the Company expects to find problems under multiple contingencies, and tries to determine if the problem is worsened by the presence of the additional generation. As concerns the proposed project, Wisconsin Electric did find problems in a couple of areas but concluded that the presence of the Badger Plant did not exacerbate conditions to the extent that the Company would request a contribution from the project proponent. It should also be noted that the project proponent has stated its willingness to accept necessary operating restrictions should the identified contingency situation warrant them.

Figure AB.05 (Cont'd.) Comment letter from Roman A. Draba, representing Wisconsin Electric Power Company (WEPCO), page 3

Page 99, top of page. While the DEIS correctly states that a circuit between Badger and Racine can be obtained with minimal environment or capital cost, such a circuit with generation attached would have very negative effects on Wisconsin Electric's transmission system. This is exactly the reason for connecting the proposed plant to the Arcadian – Zion 345 kV line: to electrically isolate the plant sufficiently from the rest of the power generation facilities in the areas to avoid degradation of the transmission system.

Thank you for this opportunity to comment.

Sincerely,

Roman A. Draba (RAD)

Roman A. Draba
Assistant Vice President –
State Regulatory Affairs

Responses to comments

The comments of all respondents are appreciated and were taken into consideration in the preparation of this document. Answers to specific questions and concerns follow here.

Letter from Lucille E. Holmes

The concerns about using natural gas to produce electricity and about locating a power plant in the Kenosha area that could sell its product elsewhere have both been noted.

Letter from Cynthia Pederson and Art Zeratsky for Somers Against Violating the Environment (SAVE)

The description of PGE Generating's environmental record has been noted. The Commission will judge the merits of the proposed project based on the upcoming hearing record, which will include the project application, this final EIS, and testimony from staff, the applicant, and members of the public.

Letter from Gustav Hauser

Staff responses to Mr. Hauser's itemized comments are listed according to Mr. Hauser's item numbering system.

1.a. Air permitting reviews take into account existing sources of air pollution, and the interactions of the emissions from the facility with existing pollution levels. For a non-attainment area, the applicant must obtain emissions offsets at a

ratio of 1.3:1 in order to reduce net emissions in the area. Existing efforts to address other sources of ozone precursors are also in progress, including the use of reformulated gasoline. Gasoline prices are not a factor in considering whether a proposed air pollution source can be approved, and under what conditions.

1.b. The comment has been noted. Area sources are included in the modeling and implementation plans for the state.

2.a. Wis. Stat. ch. 76 was recently modified to apply to power plants built by independent power producers. It applies to merchant plants.

2.b. The comment has been noted.

2.c. The comment has been noted.

3.a. The DNR, under the authority of federal and state clean air laws, has done the classification of the local area. The classification is based on appropriate and accepted monitoring and modeling methods. An ozone monitoring station is located at the Chiwaukee Prairie in Southeastern Kenosha County.

3.b. Badger Generating would be a major source for NO_x emissions and as such will be required to meet all the major source permitting requirements including installation of the BACT. The potential emissions from Badger Gen and all the other facilities located in the area will be modeled prior to making any final decision on the air permit application to ensure that, at the allowable emissions from these facilities, the ambient air quality standards are protected.

4.a. The comment has been noted.

4.b. Badger Gen, as a merchant plant applicant, does not have to demonstrate commitments from potential customers to buy the power it produces. Under Wis. Stat. § 196.491, the Commission cannot consider economic factors in making its final decision on the project.

4.c. Badger Gen has indicated that it was at the DNR's request that it submit only the Pleasant Prairie site air permit application. However, the DNR processes any application that arrives in the appropriate form with the appropriate fee paid. By submitting only an application for the Pleasant Prairie site, Badger Gen has reduced its costs and saved the time required to prepare and review a second application. The company has indicated that if the Commission selected the Sturtevant site, the air permit application for that site could be prepared and submitted rapidly because it would be very similar to the Pleasant Prairie site air permit application. DNR staff agrees and indicates that it would review a Sturtevant site application if and when one is submitted.

5.a. The facility would install and operate the following Continuous Emission Monitors (CEM):

CEM for O_2

CEM for BACT for nitrogen oxides emissions
CEM for BACT for carbon monoxide emissions

Badger Generating will be required to verify the emission rates established in any permit issued by the department.

There is no way to predict how far any plume would travel under different weather conditions. The air quality modeling analysis shows that all ambient air quality standards are expected to be met with the 120-foot stack height.

6.a. Commission and DNR staff do not consider the plume from the Badger Gen cooling towers to be a diversion of water from the Great Lakes. If the plume were considered a diversion, the exact amount would not be known until the facility were operational because the amount of water consumed would vary according to whether the plant is operated as a base or intermediate load facility. The plume could also travel eastward or southward and its moisture be deposited in the Lake Michigan watershed. Regardless, it is the utility that would draw the water. If the diversion of water by KWU or RWU exceeded its authorized base level of loss from the Great Lakes basin, KWU or RWU and the DNR would address the situation as required by Wis. Admin. Code § 142.07.

6.b. Badger Gen states in its application that it attempted to keep the model "conservative" by ignoring the plume rise enhancement that can result when individual, nearby plumes merge as they rise. Staff also believes that including the Pleasant Prairie Power Plant plume could mask the effects of the Badger Gen plume. The Badger Gen plume is expected to be smaller than that produced now by the WEPCO Pleasant Prairie Power Plant.

Data from Mitchell field was used in the model because the required data was not available from local airports, such as the Kenosha airport. The years 1982 to 1986 were used because that was the data set supplied by DNR to Badger Gen.

6.c. Badger Gen would attempt to mitigate the impact of the plume from its facility by using the combination wet/dry cooling tower design described in the EIS. The plume resulting from the wet/dry cooling tower design would not be expected to add substantially to the visual impact of the plume from the existing power plant.

6.d. All dry cooling towers are typically not used because the initial cost is much greater than that for a wet/dry or wet cooling tower. The percentage of the wet/dry cooling tower that has dry heat transfer is established by the amount of plume mitigation required and the typical cold weather conditions of the plant site.

As indicated in the EIS, the sodium hydroxide and sulfuric acid have a role in producing demineralized water. Demineralized water is produced by the ion exchange process, where polymer resin beads are constructed to provide either positively or negatively charged fixed groups that attract and remove certain contaminant ions from the water. Cationic resins remove positively charged ions

such as calcium, magnesium and sodium, replacing them with hydrogen (H^+) ions. Anionic resins remove negatively charged ions such as chloride, nitrate and silica, replacing them with hydroxide (OH^-) ions. The hydrogen and hydroxide ions then combine to form more water. If the water to be treated passes through a tank containing both cation and anion exchange resins, the process is called mixed-bed ion exchange. Mixed-bed systems can produce very high-quality water. Over time the resin beads become filled with contaminant ions and become less effective at treating the water. The exhausted resins must be chemically regenerated before reuse. This regeneration is done off-line, away from the power production processes and cooling tower processes. During regeneration, the cation resin beads are typically treated with hydrochloric acid (HCl) or sulfuric acid (H_2SO_4). The anion resin beads are typically treated with sodium hydroxide (NaOH).

7.a. The proposed injection rate for the ammonia is based on the design specification from the SCR vendor. This ammonia injection rate would be adequate enough to meet the allowable NO_x emission limit. The amount of ammonia emitted from the stack would be regulated under s. NR 445, Wis. Adm. Code. Badger Gen would be required to report ammonia emissions from the stacks on an annual basis on the emission inventory.

8.a. Wet or poorly drained soils should not lead to increased incidence of cable failure. The cables would be installed in watertight conduits encased in concrete. High soil water content is actually desirable as it improves heat dissipation from the underground transmission line.

8.b. The proposed transmission line would have two separate conductors for each of the three phases as shown in figure 2.09. The original information on EMF values in Badger Gen's application was for an arrangement with both "phase-A" conductors in the top two conduits, both "phase-B" conductors in the middle two conduits, and both "phase-C" conductors in the bottom two conduits. When the arrangement of conductors in the second set of three conduits is CBA instead of ABC, there is significant cancellation of magnetic fields. The lower EMF values in the EIS reflect this cancellation. Badger Gen now proposes to use this low-EMF conductor configuration.

The lines would not create dangerous EMF levels. Although magnetic fields of 1 gauss can be dangerous to someone with a pacemaker, the expected magnetic fields from the proposed transmission line are much smaller. There would be little or no electric field outside of the cable.

The corridor would not be off limits or cordoned off during operation. If a cable fails, there would be no effect in the area of the failure because the cable is in a conduit and the conduits are surrounded by concrete. See Figures 2.09 and 2.10. The areas where cable splices are made would be in a concrete vault.

9.a. The concern about PGE Generating's environmental record has been noted. The Commission will judge the merits of the proposed project based on

the upcoming hearing record, which will include the project application, this final EIS, and testimony from staff, the applicant, and members of the public.

9.b. The concern has been noted. The legislature would make any decision regarding a change in Wis. Stats. § 76.28 (License fee for light, heat and power companies.) The shared revenue payments to the municipality and county in which the power plant is located are made from general state revenues, not from a segregated account of the fees paid under Wis. Stats. § 76.28.

Letter from PGE Generating (Badger Gen)

PGE Generating's comments on the draft EIS are listed in tabulated form and identified by draft EIS page number. Staff considered the 16 comments in order, and they follow in that order from 1 - 16 according to the rows of the comment table.

1. The EIS has been revised to clarify that Badger Gen would be responsible for system upgrades only to the extent that they become necessary as a consequence of the presence of the Badger Gen plant, and that allocation of interconnection and upgrade costs is a subject of ongoing discussions between WEPCO and Badger Gen, as is ultimate ownership of and responsibility for the interconnection. Staff has not yet received any detailed information on the outcome of these discussions.

2. The EIS has been revised to clarify who received Badger Gen mailings for public information meetings.

3. This suggested change has been made.

4. A change similar to that suggested has been made.

5. The Badger Gen facility would not have a dedicated feedwater heater or steam turbine extraction. The appropriate changes have been made in the description of the heat removal steam generator originally found on page 18 of the draft EIS.

6. This suggested change has not been made. See response to Mr. Hauser's item 4.c.

7. Review of failure rate information supplied earlier by applicants in response to a data request suggests that it is appropriate to revise "less than 5 percent in any given year" to "less than 3 percent in any given year." The final EIS has been modified accordingly.

8. This suggested change has been made.

9. This suggested change has been made.

10. This suggested change has been made.

11. The air permit review will indicate that there are no USEPA-approved ozone models, so the impact from ozone is not predicted for the proposed Badger Gen plant. Staff has elected to delete the reference to 1-hour ozone modeling from the final EIS.

12. The change has been made. This change does not affect staff's water rate impact review.

13. The EIS has been revised showing that the fee paid is not actually the money disbursed. Badger Gen's proposed change has not been made.

14. The EIS has been revised to clarify the differences among right-of-way widths.

15. Changes have been made to clarify the diagram and the dimensions.

16. The suggested change has been made.

Letter from Wisconsin Electric Power Company (WEPCO)

WEPCO's comments were largely devoted to the proposed transmission interconnection between its system and the proposed Badger Gen power plant. The comments were not itemized but are referenced by page number in the draft EIS. Staff's responses are in order of appearance of the page references in WEPCO's letter.

1. Staff disagrees that it is necessarily true that transfer capability from Illinois will decrease as a consequence of a Badger Gen power injection that is part of a sale to the north. This may or may not occur, depending on the precise nature of the change in system dispatch and the pertinent system limit. Nonetheless, the EIS has been revised so that the comment regarding increases in import capability from Illinois appears in the context of sales to the south.

2. The EIS has been revised to reflect that WEPCO does not desire to take possession of a radial transmission line that employs solid-dielectric cable technology, and that the ultimate disposition of the line is the subject of ongoing discussion between WEPCO and Badger Gen.

At this time, the Commission has not been provided the supporting information needed to analyze the proposed overhead transmission line connection that WEPCO would endorse.

3. The EIS merely states that the Wisconsin utilities should address the question of whether the system impact of a sudden loss of 1,000 MW is acceptably small. WEPCO will have an opportunity to present its views on this issue at an appropriate stage of the proceeding.

4. Commission staff believes that the characterization in the draft EIS of WEPCO's steady-state analysis is accurate, based on the document shared with Commission staff in March that describes this analysis and discussion at that time with WEPCO personnel. These documents provide the most accurate and up-to-

date information available to Commission staff, as no details of any subsequent agreement between the applicants and WEPCO have been shared with Commission staff.

5. The comment has been noted.