April 22, 2005

TO: INTERESTED PARTIES

RE: Laurentian Energy Authority, LLC, Biomass Energy Project

Enclosed is the Environmental Assessment Worksheet (EAW) for the proposed Laurentian Energy Authority, LLC, Biomass Energy Project, St. Louis County. The EAW was prepared by the Minnesota Pollution Control Agency (MPCA) and is being distributed for a 30-day review and comment period pursuant to the Environmental Quality Board (EQB) rules. The comment period will begin the day the EAW availability notice is published in the EQB Monitor, which will likely occur in the April 25, 2005, issue. In addition to the EAW, the MPCA’s draft Air Emissions Permit will also be available for public comment concurrently. The contact person for the Air Emission Permit is Jenny Reinertsen at (218) 723-4760.

The public information meetings will be held on May 11 and 12, 2005, from 7:00-9:00 p.m. The meetings will be held at the Virginia City Hall, 2nd Floor City Council Chambers, 327 First Street South, Virginia, Minnesota, on May 11, 2005, and at the Hibbing City Hall, 3rd Floor Council Chambers, 401 East 21st Street, Hibbing, Minnesota, on May 12, 2005.

Comments received on the EAW will be used by the MPCA in evaluating the potential for significant environmental effects from this project and deciding on the need for an Environmental Impact Statement (EIS).

A final decision on the need for an EIS will be made by the MPCA Commissioner after the end of the comment period. If a request for an EIS is received during the comment period, or if the Commissioner recommends the preparation of an EIS, the MPCA Citizens’ Board (Board) will make the final decision. The final EIS need decision will also be made by the Board if so requested by the project proposer, other interested parties or MPCA staff and if this request is agreed to by one or more members of the Board or the MPCA Commissioner. The Board meets once a month, usually the fourth Tuesday of each month, at the MPCA office in St. Paul. Meetings are open to the public and interested persons may offer testimony on Board agenda items. A listing of Board members is available on request by calling (651) 296-7306.

Please note that comment letters submitted to the MPCA do become public documents and will be part of the official public record for this project.

If you have any questions on the EAW, please contact William J. Lynott of my staff at (651) 296-7794.

Sincerely,

Beth G. Lockwood
Supervisor, Environmental Review Unit
Environmental Review and Operations Section
Regional Division

BGL:gs

Enclosure
April 29, 2005

TO: INTERESTED PARTIES

RE: Laurentian Energy Authority, LLC, (LEA) Biomass Energy Project
    Environmental Assessment Worksheet (EAW)

You were recently sent a copy of the above document. After the document was mailed, we discovered an error in EAW Item 23 relating to the prediction of impacts from stack emissions of oxides of nitrogen (NOx).

For emission sources such as the Laurentian Energy Authority project, the Minnesota Pollution Control Agency (MPCA) requires an analysis of air emissions to determine environmental impact potential and whether mitigation is necessary. The MPCA employed computer modeling performed by LEA consultants under MPCA guidance to conduct this analysis, as is the normal procedure. For NOx, the initial round of computer modeling was based on an assumption that 100 percent of NOx emissions are comprised of nitrogen dioxide (NO2), which is the species of greatest concern. This is a conservative assumption, and in this case resulted in a prediction that NO2 emissions would exceed the Significant Impact Level (SIL). NOx normally makes up considerably less than 100 percent of plant emissions in cases such as this one. Usually, the next analytical step is to rerun the modeling assuming a NO2 level of only 75 percent. The MPCA has determined that performing this step would have shown a result less than the SIL, and would have eliminated the need for additional modeling.

However, the consultant instead performed a different modeling exercise to show that the LEA project would not contribute to the violation of an air quality standard. The resulting air concentrations were presented in the top lines of EAW Tables 10 and 11 on page 46. This exercise was unnecessary; the more realistic assumption that NOx is only 75 percent NO2 results in a prediction of no significant NOx impact.

To correct this error, we are attaching page 46 of the EAW with text corrections at the top that make clear that no significant NOx impacts are expected. Additionally, the references to NOx in Tables 10 and 11 have been eliminated, since the analysis that resulted in them was unnecessary.

Please contact me at (651) 296-7794 with any questions you may have about this letter.

Sincerely,

William J. Lynott
Project Manager
Environmental Review and Operations Section
Regional Division

WJL:gs

Enclosure
**ENVIRONMENTAL ASSESSMENT WORKSHEET**

**Note to reviewers:** The Environmental Assessment Worksheet (EAW) provides information about a project that may have the potential for significant environmental effects. This EAW was prepared by the Minnesota Pollution Control Agency (MPCA), acting as the Responsible Governmental Unit (RGU), to determine whether an Environmental Impact Statement (EIS) should be prepared. The project proposer supplied reasonably accessible data for, but did not complete the final worksheet. Comments on the EAW must be submitted to the MPCA during the 30-day comment period which begins with notice of the availability of the EAW in the *Minnesota Environmental Quality Board (EQB) Monitor*. Comments on the EAW should address the accuracy and completeness of information, potential impacts that are reasonably expected to occur that warrant further investigation, and the need for an EIS. A copy of the EAW may be obtained from the MPCA by calling (651) 296-7398. An electronic version of the completed EAW is available at the MPCA Web site http://www.pca.state.mn.us/news/eaw/index.html#open-eaw.

1. **Project Title:**  Laurentian Energy Authority, LLC, Biomass Energy Project

2. **Proposer:**  Laurentian Energy Authority, LLC
   - **Contact Person:** Jim Kochevar, P.E.
   - **Address:** 1902 – 6th Avenue East
   - **Hibbing, Minnesota 55746**
   - **Phone:** (218) 262-7728
   - **Cell:** (218) 969-7410
   - **Fax:** (218) 262-7702
   - **Email:** jimk@hpuc.com

3. **RGU:**  Minnesota Pollution Control Agency
   - **Contact Person:** William J. Lynott
   - **Address:** 520 Lafayette Road North
   - **St. Paul, Minnesota 55155**
   - **Phone:** (651) 296-7794
   - **Fax:** (651) 297-2343

   - **Contact Person:** Terry Leoni
   - **Address:** 618 – 2nd Street South
   - **Virginia, Minnesota 55792**
   - **Phone:** (218) 748-7540
   - **Fax:** (218) 748-7544
   - **Email:** leonit@vpuc.com

4. **Reason for EAW Preparation:**
   - **EIS Scoping**
   - **Mandatory**
   - **X**
   - **Citizen Petition**
   - **RGU Discretion**
   - **Proposer Volunteered**

   If EAW or EIS is mandatory give EQB rule category subpart number and name: 4410.4300, subp. 15 (Air Pollution)

5. **Project Location:**  County  St. Louis  City/Twp  Cities of Virginia and Hibbing
   - **Virginia Plant Site:** NW¼ SW¼ Section 8 Township T58N Range R17W
   - **Hibbing Plant Site:** SW¼ SW¼ Section 7 Township T57N Range R20W
   - **Wood Yard site:** North ½ SE¼ Section 27 Township T57N Range R20W
The following are attached to this EAW:

**Virginia Figures:**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>General Location Map</td>
</tr>
<tr>
<td>V2</td>
<td>Site Location Map (U.S. Geological Survey 7.5 minute, 1:24,000 Scale)</td>
</tr>
<tr>
<td>V3</td>
<td>Site Layout Map</td>
</tr>
<tr>
<td>V4</td>
<td>Stormwater/Wastewater Map</td>
</tr>
<tr>
<td>V5</td>
<td>Truck Haul Route Map</td>
</tr>
<tr>
<td>V6</td>
<td>Site Aerial Photo Map</td>
</tr>
<tr>
<td>V7</td>
<td>Site Sensitive Receptor Map</td>
</tr>
<tr>
<td>V8</td>
<td>Virginia Public Utilities Commission (PUC) Noise Receptor Locations Map</td>
</tr>
</tbody>
</table>

**Hibbing Figures:**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
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<tbody>
<tr>
<td>H1</td>
<td>General Location Map</td>
</tr>
<tr>
<td>H2</td>
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</tr>
<tr>
<td>H3</td>
<td>Site Layout Map</td>
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<td>Stormwater/Wastewater Map</td>
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</tr>
<tr>
<td>H8</td>
<td>Hibbing PUC Noise Receptor Locations Map</td>
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</tbody>
</table>

**Wood Yard Figures:**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>General Location Map</td>
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<tr>
<td>W2</td>
<td>Site Location Map (U.S. Geological Survey 7.5 minute, 1:24,000 Scale)</td>
</tr>
<tr>
<td>W3</td>
<td>Site Layout Map</td>
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<tr>
<td>W4</td>
<td>Watershed Boundary Map</td>
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<tr>
<td>W5</td>
<td>Truck Haul Route Map</td>
</tr>
<tr>
<td>W6</td>
<td>Aerial Photo Map</td>
</tr>
</tbody>
</table>

**Miscellaneous Attachments:**

<table>
<thead>
<tr>
<th>Attachment</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>Virginia Minnesota Department of Natural Resources (DNR) Correspondence</td>
</tr>
<tr>
<td>B</td>
<td>Hibbing DNR Correspondence</td>
</tr>
<tr>
<td>C</td>
<td>Wood Yard DNR Correspondence</td>
</tr>
<tr>
<td>D</td>
<td>Virginia Minnesota Historical Society (MHS) Correspondence</td>
</tr>
<tr>
<td>E</td>
<td>Hibbing MHS Correspondence</td>
</tr>
</tbody>
</table>
6. Description:

a. Provide a project summary of 50 words or less to be published in the EQB Monitor.

Laurentian Energy Authority, LLC, (LEA) proposes to install new wood-fired boilers at two existing utilities located in Virginia and Hibbing, Minnesota. LEA is under contract with Xcel Energy to produce electricity from renewable fuels. A third site will serve as a staging and storage facility for the wood fuel.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

Overview. The LEA Biomass Energy Project is a joint venture formed between the Virginia Department of Public Utilities (VDPU) and Hibbing Public Utilities (HPU) to carry out the terms of a power purchase agreement (PPA) with Xcel Energy of Minneapolis (Xcel). The PPA between LEA and Xcel is pursuant to the latter’s statutory obligation to the state of Minnesota to procure renewably generated electricity. This obligation is codified in Minn. Stat. 2004 § 216B.2424. Xcel agreed to assume this obligation in 1994 in return for the State’s agreement to allow continued storage of spent nuclear fuel at the Xcel Prairie Island power plant. The Laurentian PPA requires the production by LEA of 35 megawatts (MW) of renewably generated electricity for sale to Xcel. Wood (in the form of closed loop biomass and open loop biomass as defined in the statute) has been selected as the renewable fuel.

The municipal utilities of Virginia and Hibbing have, since the early 1900s, operated coal fired cogeneration systems that provide steam heat and electricity to their local residents. The utilities currently operate largely on coal, but do have some capability to burn natural gas. Gas is little used at present, except for backup purposes, due to its much higher price as compared with coal. The Virginia plant currently has three operational boilers, two of which are fired with coal as the primary fuel and the third with natural gas. The natural gas boiler is used for backup to the coal fired boilers. The Hibbing plant operates three boilers at its plant, each of which is currently fired with coal, although two of them have gas firing capability. HPU also operates two natural gas fired boilers located at the Hibbing High School. Both utilities also provide city water and natural gas sales, and are centrally located within the cities in order to facilitate the distribution of water, heat, and power to their customers.

The joint venture between the cities is necessary because, under the statute, the minimum production of electricity allowed as part of a PPA is 35 MW. Neither utility has this capacity alone, so they have joined forces to make the project a reality. Once the project is fully operational, electrical production is expected to be approximately 15 MW at Virginia and 20 MW at Hibbing. These individual production levels may vary at times, but the joint total of 35 MW is a contract requirement and will not change, subject to acceptable availability factors.

This project utilizes existing plant infrastructure and does not require any disruption of previously undeveloped land at the utility sites. Some demolition of existing buildings and construction of new ones will be necessary. Fuel will be processed and stored at a common wood yard and transported from there to the plant sites daily. The proposed wood yard site, which currently is an abandoned farm on
the outskirts of Hibbing near the Chisholm-Hibbing International Airport, will require some site grading and paving. The closed and open loop biomass collection areas, which will be located within 100 miles of the wood storage site, will not be significantly altered by project activities except for minor grading.

**Proposed project.** A wood-fired boiler will be installed at each utility to generate steam to drive each plant’s existing turbines in order to generate electricity for the PPA. Steam produced by the new boilers will be supplemented as necessary with steam produced by each plant’s existing coal-fired boilers.

The current PPA statute (identified above) requires that an average of 50 percent of the fuel for the project be renewable closed loop biomass as defined in the statute. In this scenario (scenario A), the closed loop biomass is hybrid poplars to be grown on agricultural or mining lands that will be dedicated to growing this crop for the 20-year life of the project, and to which some of the wood ash will be returned and landspread. However, for several reasons, including the limited availability of agricultural lands suitable for growing hybrid poplar within a 100-mile radius of the utilities, the legislature is currently considering amendments to the statute that would allow LEA to switch the biomass ratio in their fuel mix to 50 percent open loop and 25 percent closed loop, and would also redefine closed and open loop biomass (scenario B). This legislation, if it passes this year, would add flexibility to LEA’s fuel use plans, and allow them to make use of biomass material not envisioned in the current statute. However, this legislation has not yet passed the legislature, and the assumption at this time must therefore be that the current statute (scenario A) will govern the project.

Open loop biomass (logging waste such as tree tops and limbs left behind after a timber sale, sheared shrubs from native brushlands, and similar material) would make up 25 percent of the project’s fuel feedstock (scenario A) under full operational conditions (this would change to 50 percent--scenario B--if the pending legislation is approved). Coal burned in the existing boilers on each site will produce the remaining 25 percent of the project (PPA) steam production under either scenario.

The PPA will require full power production more or less immediately when the contract is implemented. Therefore, in order to achieve and maintain the generation levels required by the contract during the first five years, consumption of fuel (coal as well as biomass) will increase during those years. As shown in Chart 1 (page 7), coal usage, which at present is relatively low since the plants are not currently generating electricity at the maximum rate possible, will initially increase from an annual rate of approximately 2,810,988 to 4,004,320 Million British Thermal Units (MMBtu). This is approximately a 42 percent increase over current coal consumption for the first year of the PPA. Over the next few years, use of biomass fuel in the new boilers will ramp upward, and coal consumption will decline, so that total plant output from all boilers at each site will reach 5,531,599 MMBtu per year, and remain at or close to that level for the life of the project. The total plant energy consumption is also shown on Chart 1.

After the first year of operation under the PPA, and as biomass fuel use ramps up, coal use will gradually decrease to about 2,500,000 MMBtu per year and remain at about that level for the life of the project. At this level, coal will make up about 25 percent of the total fuel attributed solely to the PPA (“PPA Fuel”). Simultaneously, biomass use will increase to supply the remaining 75 percent of the total “PPA Fuel”. At this point, under scenario A, open loop biomass will be 25 percent of the total “PPA Fuel”, while closed loop biomass will comprise 50 percent of the total “PPA Fuel.” The open

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1 The PPA allows the use of coal fuel exclusively for the production of district heating steam and station auxiliary power. The “PPA Fuel” excludes this coal use and therefore represents only the fuel used in generating the net 35MW required by the PPA.
loop and closed loop percentages will be reversed if the new LEA legislation being considered by the
Minnesota Legislature passes, but the reliance of the project on a 75 percent to 25 percent ratio of
biomass to coal will not change.

Both utility locations currently receive coal by truck from the Midwest Energy terminal in Superior,
Wisconsin. Hibbing additionally receives occasional coal shipments by rail. Coal ash is currently
transported by truck to the Mesaba Landfill near Virginia, Minnesota. This will continue when the
project is operational. Trucks will additionally be used to deliver wood to each of the utilities as well as
to haul away the wood ash, which will be landspread pursuant to a Beneficial Use Determination that
has been approved by MPCA.

Each utility will require some site modifications to accommodate its new boiler and ancillary
equipment. At Virginia, two decommissioned boilers (boilers 5 and 6) will be removed to make space
available for the wood boiler. All major asbestos and other hazardous materials were removed when
boilers 5 and 6 were originally decommissioned some time ago. At Hibbing, the existing maintenance
garages will be demolished to provide space for the wood-fired boiler and wood-handling system.
Installation of the wood-fired boilers will not require changes in HPU’s existing boiler configuration or
in their method of operation.

Installation of a wood-fired boiler at each utility location will in turn require a wood handling system
and a wood ash handling system to be installed at each plant site. The following new infrastructure will
be built at each site as part of the project:

- Enclosed unloading area
- Storage bin
- Conveyor equipment
- Transfer/metering bin
- Ash storage
- Ash load-out

Space at each of the utilities is limited, so wood storage at the utility locations is limited to one day’s
supply. Long-term storage and processing (grinding and screening) of the wood will occur at the wood
yard site. Fuel may also be chipped in the field during harvesting, and thus be delivered to the wood
yard already ground. General location maps of the utilities and the wood yard are attached as Figures
V1, H1, and W1.

The wood yard site will require some site grading and paving. The long-term storage (60 day capacity)
will consist of a large storage pile of ground wood. When material is recovered from long-term storage,
a wheel loader will fill the trucks (approximately 18 tons each), which will in turn transport the material
to each utility.

Only virgin (unadulterated) wood will be used in the boiler. No demolition debris will be used.
Roundwood timber of the type used for lumber and paper making will not be a part of the fuel mix
under either scenario. The wood will be burned without any mechanical drying. Some air drying will
occur while the wood is in transit and in storage.

The wood ash will be stored in a covered bunker at the wood yard until the appropriate time for
landspeeding. The ash utilization/beneficial reuse plan was developed by LEA with the aid of the
Minnesota Extension Service. This plan has been approved by the MPCA.
Environmental issues. Potential total site air emissions at each utility location will increase due to the addition of the wood-fired boilers. Oxides of nitrogen (NOx), particulate matter (PM), and carbon monoxide (CO) emissions will exceed the significant emission thresholds for federal Prevention of Significant Deterioration (PSD) permitting. Best Available Control Technology (BACT) has therefore been proposed for each of these pollutants. The wood boilers will each have an electrostatic precipitator (ESP)\(^2\) for PM emission control, and selective noncatalytic reduction (SNCR)\(^3\) for NOx control.

Because the PPA requires full power production immediately upon project startup, and the full operational volume of biomass will not be available immediately, coal consumption will initially increase and then decline as wood fuel takes on more of the load. As the biomass availability and use ramp up, and the wood boilers come into full operation, the steam contributions from the existing (coal) boilers will decrease. This will actually result in a reduction in coal usage at each plant site over current consumption levels. Coal usage without the project as compared with coal usage with the project is shown in Chart 1. The chart also shows how biomass consumption will increase over a five year period.

If for some reason the LEA Biomass Energy Project does not go forward, the two existing plants will likely see an increase in coal usage over current levels. This increased level of coal consumption is reflected in the “Coal use without LEA” line on Chart 1. The increase in coal usage would be as a result of wholesale power supply agreements between the two plants and Minnesota Power (MP). MP currently supplies most of the electricity consumed locally in the HPU and VDPU service areas, since that power is cheaper than what the local utilities can produce. Without LEA there will be a call for greater periods of interrupted supply from MP, which has the contractual prerogative of demanding that the two utilities produce their own locally consumed electricity for up to 40 days per year. This would increase generation and coal consumption at the two plants. Further, there will likely be increased opportunities for both plants to sell their unused capacity on the open market, which would also increase generation levels, increasing coal consumption.

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\(^2\) A precipitator is used to remove particulate matter (PM) and prevent it from entering the atmosphere. The particulate is removed by passing a gas containing the particulate past a series of high voltage plates. The particulate is attracted to these plates by the high voltage static charge. Rappers are used to knock the dust off the plates into the hoppers below for collection and disposal.

\(^3\) Selective non-catalytic reduction uses ammonia or urea (which decomposes to ammonia) to reduce NO\(_x\) to nitrogen.
The “potential” emissions from the coal boilers, meaning the maximum output of which they are capable, will remain unchanged, since they will continue to exist. “Actual” emissions with the project will be lower. Odor is not expected to be an issue from the combustion or handling of wood. Water usage and wastewater discharge volumes will increase, but will not require any capacity upgrades to the existing systems.

The wood-fired boiler and associated equipment enclosures will be designed as necessary to ensure that the noise levels attributable to the new plant equipment do not exceed regulatory limits. A noise study has been performed that identifies mitigation necessary to achieve acceptable levels. Once noise mitigation is installed, noise testing will be conducted to demonstrate compliance with the limits.

The wood receiving, transfer, and storage activities will each be served by a filtering system to remove any entrained dust prior to the building air being exhausted to the atmosphere.

**Fuel harvesting.** The bulk of the hybrid poplar farming will be performed by LEA on leased agricultural land within 100 miles of the wood yard, and will utilize typical agricultural methods similar to those traditionally employed on those lands. LEA may also contract with nearby mining companies to establish plantations on taconite tailing basins, thereby making use of what is otherwise waste land and reducing fugitive dust issues on the basins as well. There may also be a limited volume of purchases from third parties who have begun growing biomass for fuel use within the last three years.

A small number of agreements have been completed for fuel acquisition purposes, but many more remain to be done, and this process is likely to go on for several years. LEA plans to limit its fuel mix to some combination of cultivated hybrid poplar, logging residue, and brushland biomass, and will not include roundwood (i.e., sawlogs). The intent is to emphasize use of wood biomass material that is
under- or unutilized by other industrial sectors. LEA has made extensive efforts to consult with other industries that use woody material as feedstock, with the aim of minimizing competition, or the perception thereof, for biomass material.

Planting of the poplar trees began in 2004 on a 600-acre farm site and a 40-acre tree nursery near Aitkin, Minnesota. There are other markets for this material if the project does not go forward. The closed loop plantations will take five years to mature to the point at which the crop can be used as fuel. Since the PPA requires the boilers to be operational before this fuel source is fully available, the closed loop biomass fuel for the wood boilers will initially be supplemented with open loop biomass. This means that waste wood, such as forest industry cuttings (tops, limbs, and unusable species), wood waste generated from storm damage, right of way clearing, United States Department of Agriculture Forest Service thinning, sheared brush, and pulp and paper mill waste will be used until the closed loop crop is available.

When the hybrid poplar is matured to useable size, harvesting will entail cutting the trees to the root. Tree planting is staggered to provide trees for harvesting on an annual basis. The trees do not need to be replanted, since the trees will re-grow via suckering from the roots in the spring.

**Proposed project schedule.** Construction is scheduled to begin in August 2005, with commercial operation of the wood-fired boilers in January 2007.

c. **Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.**

The LEA Biomass Energy Project is being undertaken by the Virginia and Hibbing municipal utilities to sustain their viability, generate revenue, retain existing utility jobs, create new employment opportunities, and reduce the State’s reliance on fossil fuels. In addition, the joint venture will contribute to Xcel Energy’s plan to increase the proportion of renewably generated electricity in its energy sales.

As each of the district heating systems exists today, the cost of providing services has outpaced the ability to charge for services. Hibbing and Virginia are both facing a decision regarding when to cease operation of their district heating systems and electric generation plants. Both cities are reluctant to cease providing steam heat that is highly valued by their customers for its efficiency and reliability. Plant shutdowns would also mean the loss of jobs at each utility, as well as, the economic burden that would be placed on existing customers who would be required to install alternative means (mostly individual home heating systems) to satisfy their heating requirements.

Such individual systems would not be subject to environmental controls and would likely, as a group, be less efficient at delivering heat to customers than the heating districts. The result would likely be an increase in local air emissions from the multiple sources that would be required to provide the heating capacity currently satisfied by the district heating systems. The loss of a centralized steam source in each city would also mean the loss of the ability to use the existing plants to cogenerate electricity on demand for other utilities.

The benefits are highlighted below:

- Maintain district heating systems that offer more efficient heating (as opposed to individual stand-alone units) with the extra benefit of using the same thermal energy to produce electricity.
- Greenhouse gas economies obtained through the carbon sink associated with tree farming, as well as reduced reliance on coal combustion.
- Environmental sustainability of fuel sources – locally grown and renewable.
• Wood ash is typically less than two percent of the weight of wood, easily controlled through standard emission control and modern ash handling devices, and may be used as a soil additive.
• New and extended employment opportunities in the areas of trucking, logging and agriculture.
• Maintain employment at existing utilities in lieu of ceasing operation which would result in the loss of jobs.

<table>
<thead>
<tr>
<th>Are future stages of this development including development on any outlots planned or likely to happen?</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Yes  ☐ No</td>
</tr>
<tr>
<td>If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.</td>
</tr>
</tbody>
</table>

The PPA is a 20-year contract. If the project is successful it is likely that the contract would be extended past the initial 20-year period. If this occurs, environmental review requirements then in effect would control what further review is performed.

<table>
<thead>
<tr>
<th>Is this project a subsequent stage of an earlier project?</th>
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</thead>
<tbody>
<tr>
<td>☒ Yes  ☐ No</td>
</tr>
<tr>
<td>If yes, briefly describe the past development, timeline and any past environmental review.</td>
</tr>
</tbody>
</table>

The VDPU and HPU sites have existed and produced energy since the early 1900s. While some modernization and equipment replacement has taken place over the years, none has triggered environmental review, which has existed as a program only since the 1970s.

### 7. Project Magnitude Data

<table>
<thead>
<tr>
<th>Total Project Area (acres)</th>
<th>Hibbing = ~2 acres</th>
<th>Virginia = ~2 acres</th>
<th>Wood Yard = ~50 acres (to be developed on an 80 acre parcel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>or Length (miles)</td>
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</table>

No new acreage will be acquired or developed at the Hibbing and Virginia utility sites. The LEA Biomass Energy Project will be located entirely within the existing footprints of the HPU and VDPU site properties. Acquisition of land is needed only for the wood yard.

<table>
<thead>
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<th>Number of Residential Units:</th>
<th>Unattached</th>
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<td>Commercial/Industrial/Institutional Building Area (gross floor space):</td>
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<td>14,200 ft²</td>
<td>16,250 ft²</td>
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</table>

**Hibbing**  
Additional proposed square footage (Boiler Building, Generator/Tank Building, Wood Receiving, ESP, and Storage Bin) is estimated to be 14,200 square feet. All project development will take place within the current site footprint.

**Virginia**  
Additional proposed square footage (Wood Receiving, Storage Bin, Generator/Tank Building, and ESP) is estimated to be 8,750 square feet. An additional 7,500 square feet (ft²) will be developed (approximately 16,250 ft²) for the wood-fired boiler. All project development will take place within the current site footprint.
Wood Yard
A planned scale house/office located at the wood yard site is estimated to be 288 total square feet in area. The remainder of the 80-acre wood yard site will contain a portable diesel wood grinder, a wood unloading dust enclosure structure, a wood screening enclosure, and wood storage area. A covered ash storage bunker will be built at this site as well. Some grading and paving will be necessary on this site.

<table>
<thead>
<tr>
<th>Indicate area of specific uses (in square feet):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
</tr>
<tr>
<td>Retail</td>
</tr>
<tr>
<td>Warehouse</td>
</tr>
<tr>
<td>Light Industrial</td>
</tr>
<tr>
<td>Other Commercial (specify)</td>
</tr>
<tr>
<td>Building height</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturing</th>
<th>Other Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>~288 @ Wood Yard</td>
<td></td>
</tr>
<tr>
<td>~16,250 @ Virginia</td>
<td></td>
</tr>
<tr>
<td>~14,200 @ Hibbing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Institutional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
</tr>
<tr>
<td>Existind building structures at the VDPU range from 44 – 92 feet above ground surface, with three active 150-foot boiler stacks. The Virginia plant also has a 100-foot stack that was decommissioned a number of years ago and will not be used in the future. A new 150-foot stack will be built for the wood boiler. Building structures in the area surrounding the VDPU are a mix of industrial, commercial, and residential structures. The structures are generally two or three stories in height. The nearest, tallest building is located approximately 500 yards southwest of the site and is a three story building.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agricultural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hibbing</td>
</tr>
<tr>
<td>Existing building structures at the HPU range from 37 to 100 feet above ground surface, with boiler stacks ranging from 113 to 121 feet above ground surface. The proposed LEA Biomass Energy Project will replace the two existing coal boiler stacks with one, new 155-foot stack, and will add a new 150-foot stack for the new wood boiler. Building structures in the area surrounding the HPU are a mix of industrial, commercial, and residential structures. The structures are generally one or two stories in height. The nearest, tallest building is located approximately two blocks from the site and is a four-story residential building.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wood Yard</th>
</tr>
</thead>
<tbody>
<tr>
<td>The structures to be located on site include: a partially enclosed unloading area dust enclosure (estimated to be 35 to 40 feet in height), a wood screening enclosure (estimated to be 65 feet in height), and a 12-foot by 24-foot, single story scale house/office building for operators and truck scale computer equipment. A portable diesel powered wood grinder will also be located on site. The wood yard will also be used for storage of wood ash until the appropriate time for land application. Ash will be stored in a covered three-sided concrete structure with a concrete floor. All surfaces outside the bunker will be sloped to flow to an engineered stormwater containment area.</td>
</tr>
</tbody>
</table>
### 8. Permits and approvals required.
List all known local, state and federal permits, approvals and financial assistance for the project. Include modifications of any existing permits, governmental review of plans, and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure.

**Virginia:**

<table>
<thead>
<tr>
<th>Unit of government</th>
<th>Type of application</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPCA</td>
<td>Major Air Permit Amendment</td>
<td>Submitted August 31, 2004, Draft on public notice until May 25, 2005</td>
</tr>
<tr>
<td></td>
<td>Stormwater Pollution Prevention Plan</td>
<td>To be obtained</td>
</tr>
<tr>
<td></td>
<td>Above Ground Storage Tank Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td></td>
<td>Beneficial Re-use Approval (for ash land application)</td>
<td>To be obtained</td>
</tr>
<tr>
<td>City of Virginia</td>
<td>Building Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td></td>
<td>Utility/Entrance Permits</td>
<td>To be obtained</td>
</tr>
<tr>
<td></td>
<td>Demolition Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td>Fire Marshall</td>
<td>Plan Review</td>
<td>To be obtained</td>
</tr>
</tbody>
</table>

**Hibbing:**

<table>
<thead>
<tr>
<th>Unit of government</th>
<th>Type of application</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPCA</td>
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</tr>
<tr>
<td></td>
<td>Stormwater Pollution Prevention Plan</td>
<td>To be obtained</td>
</tr>
<tr>
<td></td>
<td>Above Ground Storage Tank Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td></td>
<td>Beneficial Use Approval (for ash land application)</td>
<td>To be obtained</td>
</tr>
<tr>
<td>City of Hibbing</td>
<td>Building Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td>Hibbing Planning Commission</td>
<td>Conditional Use Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td>Fire Marshall</td>
<td>Plan Review</td>
<td>To be obtained</td>
</tr>
</tbody>
</table>

**Wood Yard:**

<table>
<thead>
<tr>
<th>Unit of government</th>
<th>Type of application</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPCA</td>
<td>Stormwater Construction Permit / Stormwater Pollution Prevention Plan</td>
<td>To be obtained</td>
</tr>
<tr>
<td></td>
<td>Stormwater Industrial Permit / Stormwater Pollution Prevention Plan</td>
<td>To be obtained</td>
</tr>
<tr>
<td>City of Hibbing</td>
<td>Building and Zoning Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td>Hibbing Planning</td>
<td>Conditional Use Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td>Commission</td>
<td>Conditional Use Permit</td>
<td>To be obtained</td>
</tr>
<tr>
<td>Fire Marshall</td>
<td>Plan Review</td>
<td>To be obtained</td>
</tr>
</tbody>
</table>
9. **Land use.** Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

**Virginia**

The Virginia site is currently occupied by the existing VDPU plant, which has operated there for over 100 years. The property is bordered on the south by 2nd Street South, on the east by 6th Avenue West, on the north by a bank (former railroad depot), and on the west by Silver Lake. VDPU is centrally located within the city of Virginia. The surrounding area includes a mix of land uses (commercial, residential, and public), a situation that has existed for many years (Figure V2). The plant operator reports that no re-zoning requirements or issues are anticipated.

The LEA Biomass Energy Project will be located within the existing VDPU property and does not require any real expansion of the existing site (Figure V3). New wood handling facilities and a one-day wood storage structure will be built in the southern portion of the property. Building heights will not change significantly with the project. Given the nature of the project, and its history of coexistence with surrounding land uses, no land use compatibility issues are anticipated.

**Hibbing**

The Hibbing site is currently occupied by the HPU, and has been for nearly 100 years. The property is bordered on the south by 19th Street, on the east by 7th Avenue East, on the north by railroad tracks, and on the west by 6th Avenue East. HPU is centrally located on the north side of the city of Hibbing. The surrounding area includes mixed land uses (commercial, residential, and public), a situation that has existed for many years (Figure H2). The plant operator reports that no re-zoning requirements or issues are anticipated.

The LEA Biomass Energy Project will be located within the existing HPU site property and does not involve any real expansion of the existing site (Figure H3). Site modifications will include the demolition of a garage and garage/shop located along the eastern portion of the property. A building will be built to house the wood-fired boiler. Other improvements will include a wood handling system and a one-day wood storage structure. Building heights will not change significantly with the project.

A dry cleaning company (AmeriPride) operated a commercial dry-cleaning operation on property west of the HPU site from 1976 to 1990. Volatile organic compounds (VOCs) associated with petroleum and chlorinated solvent contamination from operations at AmeriPride have been identified in soils and groundwater in the area. A ground-water monitoring program has been established for the impacted ground water (plume) in the area. A sump system beneath the HPU power plant is intercepting the VOC contaminated shallow ground water and directing the impacted ground water to the sanitary sewer. The AmeriPride site has been enrolled in the MPCA Voluntary Investigation and Cleanup (VIC) Program since 1995. Additionally, the Minnesota Department of Health (MDH) has prepared a Public Health Action Plan for the AmeriPride site, addressing air and ground-water monitoring, ground-water collection sump, and public outreach activities. A MPCA VIC Closure Letter has not been issued for the site at this time. The MPCA and MDH routinely consult on the ground-water and vapor monitoring activities at the site.

The impacted shallow ground water and vapors in the area represent a known potential environmental hazard in the vicinity of the HPU site. The proposed project will not affect or be affected by this known hazard, nor interfere with cleanup operations.
Wood Yard
The wood yard site is currently vacant (formerly a farm, but now abandoned) and is owned by the Chisholm-Hibbing International Airport (Figure W2). The property consists of 80 acres and will be leased by LEA for construction of a 50-acre fuel wood storage and processing site (Figure W3). The property is zoned in the A-R Agricultural-Rural Residential District. The city of Hibbing has indicated that there are no rezoning requirements for this use of the property. A Conditional Use Permit must be issued by the Hibbing Planning Commission for site development. Adjacent properties include rural residential properties, undeveloped land, and the airport. The residential property located immediately north of the site is part of an airport buy-out program, and is planned to be acquired by the airport.

10. **Cover Types.** Estimate the acreage of the site with each of the following cover types before and after development:

<table>
<thead>
<tr>
<th>Virginia</th>
<th>Before</th>
<th>After</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types 1-8 wetlands</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>wooded/forest</td>
<td>NA</td>
<td>NA</td>
<td>Impervious surfaces</td>
<td>100 percent 100 percent</td>
</tr>
<tr>
<td>Brush/Grassland</td>
<td>NA</td>
<td>NA</td>
<td>Other (describe)</td>
<td></td>
</tr>
<tr>
<td>Cropland</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100 percent</td>
<td>100 percent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hibbing</th>
<th>Before</th>
<th>After</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types 1-8 wetlands</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>wooded/forest</td>
<td>NA</td>
<td>NA</td>
<td>Impervious surfaces</td>
<td>100 percent 100 percent</td>
</tr>
<tr>
<td>Brush/Grassland</td>
<td>NA</td>
<td>NA</td>
<td>Other (describe)</td>
<td></td>
</tr>
<tr>
<td>Cropland</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100 percent</td>
<td>100 percent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**If before and after totals are not equal, explain why:**

**Hibbing Note:** Some additional blacktopping may be required where the delivery trucks turn, back-up, unload and drive out (approximately 30 feet x 300 feet = 9,000 sq. feet = 0.2 acres). This would replace an existing dirt road.

<table>
<thead>
<tr>
<th>Wood Yard</th>
<th>Before</th>
<th>After</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types 1-8 wetlands</td>
<td>19.4</td>
<td>7.4</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>wooded/forest</td>
<td>22.6</td>
<td>23.6</td>
<td>Impervious surfaces</td>
<td>0 47</td>
</tr>
<tr>
<td>Brush/Grassland</td>
<td>38</td>
<td>1</td>
<td>Other (describe)</td>
<td>0 1 (stormwater ponds)</td>
</tr>
<tr>
<td>Cropland</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>80</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**If before and after totals are not equal, explain why:**

**Wood Yard Note:** LEA completed a wetland delineation for the wood yard site that is summarized in a report dated September 13, 2004. Because the delineation identified the potential for extensive wetland impacts, LEA modified the wood yard layout to impact the least amount of wetland possible. The remaining wetland impacts will be offset by purchasing wetland credits.
11. Fish, Wildlife, and Ecologically Sensitive Resources.

a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

**Virginia**
The Virginia project site is located at a developed industrial site in the center of the city of Virginia. There is no significant wildlife habitat associated with this area, and this will not change with the LEA Biomass Energy Project. The Minnesota DNR Wildlife Manager for this area has stated that there are no concerns for impacts on species and no mitigation is needed for the site.

**Hibbing**
The Hibbing project site is located at a developed industrial site in the center of the City of Hibbing. There is no significant wildlife habitat associated with this area, and this will not change with the LEA Biomass Energy Project. The Minnesota DNR Wildlife Manager for this area stated there are no concerns for impacts on species, and no mitigation is needed for the site.

**Wood Yard**
The wood yard site is an abandoned farmstead located across the road (west) of the Chisholm-Hibbing Airport, in a rural area southeast of the city of Hibbing. Non-special concern wildlife species that may be associated with this type of area include: amphibians (11), mammals (38), reptiles (4), forest birds (98), and open land birds (29). Although the wood yard will likely impact habitat for some non-special concern wildlife species, the Minnesota DNR Wildlife Manager has stated that no mitigation is needed for the site. The site modification performed in light of the initial wetland delineation included saving a significant acreage of forested land from clearing for development. Wetland losses will be mitigated via purchase of wetland credits.

**Fuel Acquisition Lands**
Under fuel use scenario A, current plans call for the planting of approximately 40,000 acres of hybrid poplar in northern Minnesota. Initially, this plan envisioned the use of land currently in row crop agriculture for this purpose, as well as land currently in old field, hayfield or pasture land use. As it happens, some old fields, hayfields and pastures in the northern part of the state are utilized by sharp-tailed grouse for mating and other purposes. Sharp-tails are not a state designated species of special concern, but they are a highly valued game species that requires affirmative management efforts to retain them as a viable species in the state. Accordingly, the state and private groups have expended considerable resources over the last several decades to assure sharp-tails’ continued survival and success as part of Minnesota’s wildlife heritage. These efforts have included burning and shearing of overgrown brushlands, which has the effect of rejuvenating sharp-tail habitat. Planting such areas to hybrid poplar would negatively affect the ability of sharp-tails, which require high quality native brushland areas for survival, to continue to use those areas.

This potential impact must be evaluated in light of other factors that pertain to the project, such as the project’s part in the legislature’s strategy to move the state in the direction of producing more of its energy with renewable fuels. Although relatively small, the intended reductions in greenhouse gas emissions, as well as mercury emission reductions, will be realized with the project. Further, and as noted elsewhere, the project allows VDPU and HPU to continue producing steam for their heating districts, eliminating the need for their customers to install individual (and unregulated) heating units. Also, LEA has stated that, in light of the concern about sharp-tails, and if scenario A remains the reality, it will emphasize the use, in its fuel mix, of sheared brush for fuel, which would have the effect of rejuvenating sharp-tailed grouse habitat on overgrown brushlands. It is also true that LEA’s efforts to pass the legislation authorizing scenario B were in part the result of being alerted to this concern. Under scenario B, impacts to sharp-tails would be greatly reduced in comparison to
scenario A. Nonetheless, scenario A remains a possibility until the new legislation passes, and the potential impact to sharp-tailed grouse remains as well until and unless that happens.

In order to minimize this potential, the DNR is preparing information on the locations where sharp-tails would be particularly vulnerable to hybrid poplar planting, and will share and discuss this information with LEA. For its part, LEA has agreed to review this information and discuss this issue with appropriate DNR personnel, with an eye toward avoiding those areas wherever possible. While LEA’s ability to avoid such impacts will depend on a number of factors, it and DNR have agreed in principle to collaborate in efforts to minimize them.

<table>
<thead>
<tr>
<th>b.</th>
<th>Are any state (endangered or threatened) species, rare plant communities or other sensitive ecological resources such as native prairie habitat, colonial waterbird nesting colonies or regionally rare plant communities on or near the site?</th>
<th>☒ Yes for Virginia, Hibbing, and Wood Yard</th>
<th>☐ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, describe the resource and how it would be affected by the project. Indicate if a site survey of the resources has been conducted and describe the results. If the DNR Natural Heritage and Nongame Research program has been contacted give the correspondence reference number.</td>
<td>Virginia</td>
<td>The Minnesota Natural Heritage database has been reviewed to determine if any rare plant or animal species or other significant natural features are known to occur within an approximate one-mile radius of the VDPU. The result of this review, which was conducted by the Natural Heritage and Nongame Research Program, a unit of the Section of Ecological Services, DNR, indicated there is one known occurrence of a rare species in the search area. The DNR identified <em>Falco peregrinus</em> (Peregrine Falcon) nesting area (#51), located at Rouchleau Mine Cliff, approximately one-half mile southeast of the site. However, based on the nature and location of the proposed project, the DNR sees no potential for impacts on species of special concern and no mitigation is indicated for them. The DNR letter (Cite: ERDB 20040896) is attached as Attachment A.</td>
<td>Hibbing</td>
</tr>
</tbody>
</table>
Describe measures to minimize or avoid adverse impacts.

Since the DNR sees no potential for impacts on species of special concern, no mitigation is needed for them.

12. **Physical Impacts on Water Resources.** Will the project involve the physical or hydrologic alteration (dredging, filling, stream diversion, outfall structure, diking, and impoundment) of any surface waters such as a lake, pond, wetland, stream or drainage ditch?

<table>
<thead>
<tr>
<th>Location</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hibbing</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Wood Yard</td>
<td>☑</td>
<td></td>
</tr>
</tbody>
</table>

If yes, identify water resource affected. Describe alternatives considered and proposed mitigation measures to minimize impacts. Give the DNR Protected Waters Inventory (PWI) number(s) if the water resources affected are on the PWI.

Approximately twelve acres of wetland will be filled to construct the wood yard. Wetland credits will be purchased to offset the filled wetland areas.

**Alternatives Considered:**
The wood yard layout has been modified to reduce the wetland impact from 19.4 to 12 acres. Reducing the impact further would involve clearing existing woodland. The woodland provides wildlife habitat as well as a visual and noise barrier, so that alternative was dismissed.

13. **Water Use.** Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)?

<table>
<thead>
<tr>
<th>Location</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Hibbing</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Wood Yard</td>
<td>☑</td>
<td></td>
</tr>
</tbody>
</table>

If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

At both Hibbing and Virginia, makeup water is required to replace water lost through a variety of plant processes, including the following:

- Process steam condensate losses
- Boiler blowdown losses
- Boiler sootblower steam use
- Boiler makeup water treatment reject losses
- Miscellaneous equipment drains and service water uses
- Miscellaneous steam vent losses
- Cooling tower losses (Hibbing only)
The LEA Biomass Energy Project will involve the addition of a new wood-fired steam boiler to each existing plant, and continued operation of the existing plant boilers and turbines. While the overall plant load under project operation will be higher than current levels, the load on existing boilers is expected to be lower than currently maintained. The new makeup water requirements associated with the additional wood boiler steam generation capacity are estimated to not exceed 20 gallons per minute (gpm), except for cooling tower makeup water requirements for Hibbing—(see below). Since no significant changes other than the new boiler and related fuel handling equipment are planned at either plant, the makeup water requirements not associated with boiler steam generation will not change with the project. On average, to meet the LEA Biomass Energy Project PPA requirements, the wood boilers only need to be operated at about 80 percent load. At any given time, one plant’s boiler may be operated at 100 percent, with the other at 60 percent, or any other combination. Since the load on the existing boilers will be reduced, the actual operating increase in water consumption for the project compared to current use is expected to be less than the maximum 20 gpm.

Process Steam Condensate Losses
At both the Hibbing and Virginia plants, steam is supplied from the plant to customers for district heating and other thermal energy processes. As the energy in the steam is extracted by the end users’ processes, the steam cools and reverts to liquid water (condensate). To minimize system water consumption, this condensate would ideally be returned to the plant for reuse. And in fact, at Hibbing, approximately 40 percent of the steam delivered from the plant is returned to the plant as condensate for reuse; the rest is lost in leakage from the distribution system, and must be replaced. At Virginia, on the other hand, all process condensate is discharged to the sanitary sewer, and must also be replaced.

Boiler Blowdown Losses
At both plants, to maintain adequate water and steam quality (i.e., minimal mineral content) within the boiler and downstream plant equipment (to minimize component corrosion and erosion), a fraction of the boiler feedwater is continuously discharged and replaced with clean water. This hot, pressurized blowdown water is delivered to a low pressure tank, where some of the water flashes to steam in the lower pressure environment and is either vented to the atmosphere or piped to other locations within the plant for reuse. The liquid water remaining in the blowdown tank is discharged to the sanitary sewer. Blowdown losses must be replaced with clean makeup water. Because of the higher boiler steam production rates required for project operation, blowdown losses will be proportionately higher than they are currently.

Boiler Sootblower Steam Use
To remove ash deposits from boiler heat transfer surfaces (to maintain maximum efficiency), steam is periodically blown at high velocity onto the outside surface of selected boiler tubes. This steam mixes with the boiler flue gas and exits out the main stack into the atmosphere. The water is thus lost from the system and must be replaced. Similar to blowdown losses, sootblower steam losses will also increase as a result of the LEA Biomass Energy Project operation.

Boiler Makeup Water Treatment Reject Losses
The Virginia and Hibbing plants both use similar hot-lime softener (HLS) systems to treat the makeup water supplied to the boiler cycle to replace the various plant losses. The HLS system consists of a hot process vessel and carbon filters, followed by a zeolite softener vessel. For the ongoing operation of the treatment process, impurities removed from the makeup water must be either continuously or periodically purged from the system via a reject water stream. This reject water is discharged directly to the sanitary sewer and must therefore be replaced. Under the LEA Biomass Energy Project operation, because of the higher makeup water requirements to support increased boiler steam generation, water treatment reject losses are expected to be higher than current losses, and water replacement must increase as well.
Miscellaneous Equipment Drains and Service Water Uses
Normal operation of various equipment items within the plant results in small sidestreams of process water being lost or used either continuously (e.g. pump seal leakage) or intermittently (such as equipment washing) and discharged via floor drains to the sanitary sewer. No significant change in these losses is expected with the LEA Biomass Energy Project operation.

Miscellaneous Steam Vent Losses
At various points in the plant cycle, steam is either continuously or intermittently vented during normal operation. Examples include the deaerator, where oxygen is continuously removed from the boiler feedwater and vented (as a steam/air mixture) to the atmosphere, and the steam jet air ejectors, which remove non-condensable gas from the condensers to maintain turbine exhaust vacuum. Additionally, miscellaneous steam leaks from piping and equipment add to the water lost from the cycle. With the LEA Biomass Energy Project operation, these losses are expected to increase over current levels due to the higher plant operating load level.

Cooling Tower Losses (Hibbing Only)
At the Hibbing plant, exhaust steam from the condensing turbine generators is cooled by rejecting heat to the atmosphere via a wet cooling tower. The cooling process in the tower involves evaporation of liquid water, which must continually be replaced. In addition to evaporation losses, a lesser amount of cooling water is discharged directly to the sewer system and replaced with fresh water to keep overall cooling system water quality at an acceptable level.

Because the addition of the wood-fired boiler for the LEA Biomass Energy Project will not require any modification of the existing cooling tower, the overall makeup water capacity for the Hibbing cooling system remains unchanged. However, on average, the Hibbing plant currently operates well below its cooling system capacity. The addition of the wood-fired boiler will require a significant increase in operating load for the cooling system, but the increase is within its design capacity.

This type of water loss does not occur at the Virginia site, where excess heat is rejected to Silver Lake instead of the atmosphere. Cooling water flow rate from Silver Lake will not be increased. However, heat load to the lake will increase above the historical average (see below).

Virginia
The proposed LEA Biomass Energy Project does not require the installation or abandonment of water wells. The wood-fired boiler and ancillary equipment to be added to the VDPU will be connected to the existing water and wastewater systems at the VDPU. No infrastructure changes are needed. The city of Virginia’s potable water supply is the Missabe Mountain Mine Pit, which is an abandoned iron ore mine located just northeast of the city (Shown on Figure V2). VDPU withdraws water from this source for use at the plant and distribution of potable water to city residents.

Silver Lake is the source used by the plant for non-contact cooling water and the boiler feed water. The intake from Silver Lake is located near the southwest corner of the facility. The non-contact cooling water is returned to Silver Lake. Nothing is added to the water used for non-contact cooling other than a thermal load (heat), which is regulated by the facility’s National Pollutant Discharge Elimination System (NPDES) Permit. If needed, the permit allows water from the Missabe Mountain Mine Pit to be added to the non-contact cooling water in order to reduce the temperature prior to returning the non-contact cooling water to Silver Lake. No other plant wastewater is discharged to Silver Lake. All other wastewater goes either to the sanitary sewer or the storm drain.
The boiler feed water is ultimately discharged as various kinds of blowdown to the municipal wastewater treatment plant south of the city (see Item 18). For the existing plant, the current average makeup water rate for those losses associated with boiler steam production is approximately 20 gpm. Under anticipated project operation, the average makeup water replacement rate is expected to increase to approximately 35 gpm, which is within the capacity of the existing system.

**Hibbing**

The proposed LEA Biomass Energy Project at Hibbing similarly does not require the installation or abandonment of water wells. As at Virginia, the wood-fired boiler and ancillary equipment to be added to the plant will be connected to the existing water and wastewater systems currently at the utility. No infrastructure changes are needed. HPU boiler feed and cooling water comes from the municipal water system, which depends on groundwater sources. The municipal water system capacity is 4 million gallons per day, but current municipal usage is only about 2.5 millions gallons per day. The municipal water system, therefore, has more than enough capacity for the LEA Biomass Energy Project. HPU has cooling towers that provide the cooling necessary for plant operations, as discussed elsewhere. For the Hibbing plant, the current average makeup water rate for those losses associated with boiler steam production (exclusive of cooling tower losses) is approximately 20 gpm. Under anticipated LEA Biomass Energy Project operation, the average makeup water replacement rate is expected to increase to approximately 28 gpm.

For the cooling tower, the average increase in makeup water requirements associated with the LEA Biomass Energy Project – compared to the average requirements of the existing plant under its current operating protocol – is approximately 135 gpm, with an associated wastewater discharge increase of approximately 35 gpm. Current tower makeup and blowdown rates average only about 25-50 gpm and 10 gpm, respectively, due to minimum condensing load on the existing steam turbines. The makeup rate would thus increase to an estimated maximum of 185 gpm, with blowdown increasing to 45 gpm. These figures are still well within the maximum tower capacity.

**Wood Yard**

Plans for development of the wood yard site include connecting to the Hibbing city water supply line located along Highway 37 north of the site. A non-operating well (from the abandoned farmstead) will be abandoned in accordance with state and local requirements, as part of the site development activities.

Given the minimal quantities involved and the ability of current infrastructure to handle the increased appropriations, the potential for significant cumulative water appropriation impacts is low.

### 14. Water-related land use management districts. Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district?

**Virginia:** ☒ Yes ☐ No

**Shoreland Management.** The main purpose of the DNR Shoreland Management Program is to regulate new construction within specified setbacks from the water’s edge, in order to protect lake and stream water quality. The program functions by prohibiting new construction, except by variance or as provided in the rules, within prescribed setbacks that vary depending on lake classification. It was created in the early 1970s and offers local units of government who wish to regulate shoreland development within their borders the opportunity to adopt the state program.
The city of Virginia has not adopted the State or County (St. Louis) Shoreland Management Programs and does not have specific shoreland management provisions in its zoning ordinances. St. Louis County has shoreland management standards in its Zoning Ordinance No. 46, but the county does not have jurisdiction within the city limits of Virginia. Lake classifications in the vicinity of the VDPU plant site are thus by default those contained in DNR’s Bulletin 25, the original shoreland classification guide from the late 1960s. Silver Lake and Virginia (also known as Bailey) Lake, which lie within the city of Virginia, are classified GD (General Development) in that document.

Manganyika (also known as Three-Mile) and Mashkinode (also known as Four-Mile) Lakes lie within the city of Mountain Iron. Mountain Iron has adopted minimum State Shoreland Management rules, which assigns the shoreland management classification NE (Natural Environment) to both lakes.

For NE lakes, the prescribed setback is 200 feet. No project related construction will affect the prescribed setback at these lakes.

For GD lakes, the required setback for new construction is 50 feet. While no project related construction will affect the prescribed setback at Lake Virginia, the VPU plant does lie within the setback on the southeast shore of Silver Lake. However, the plant predates the establishment of the Shoreland Management Program by about 70 years, and the only environmental release from the plant to the lake is noncontact cooling water that is regulated by state permit. This situation will not change with the LEA Biomass Energy Project.

**Floodplain Management.** The city of Virginia does not participate in the Flood Hazard Boundary Map program since it was rescinded on June 27, 1984. There is no delineated 100-year floodplain in the city of Virginia.

**Ecological Lake Classification.** The DNR Fisheries Division classifies Silver and Virginia Lakes as Ecological Lake Class 11. Manganiika and Mashkenode lakes are in Ecological Lake Class 19.

The Ecological Lake Class system classifies Minnesota’s lakes into 43 lake classes statewide by physical, chemical, and fish population characteristics. The physical and chemical characteristics used to classify lakes are: 1) surface acres, 2) maximum depth, 3) percent of littoral area (area of the lake shallower than 15 feet), 4) total alkalinity, 5) Secchi water clarity, 6) Shoreline Development Factor (length of the developed shoreline compared to what the shoreline length would be if the lake shape was a perfect circle), and 7) the length of the summer growing season.

Lake classes 1-19 occur only in northeast Minnesota, and lake classes 20-43 occur elsewhere in the State. Silver and Virginia (Bailey) Lakes are in Lake Class 11, which consists of 49 lakes in northeast Minnesota with the following average characteristics: 162 acres, 30 feet deep, 62 percent littoral area, 62 parts per million (ppm) total alkalinity, 7.3 feet Secchi water clarity, 1.76 Shoreline Development Factor. Compared to other lakes statewide, these lakes tend to be small and have a high proportion of littoral area. Silver and Virginia Lakes are typical of lakes in this lake class, except that they are smaller and have higher total alkalinitities. Fish populations in Lake Class 11 lakes tend to be average and dominated by bluegills, sunfish, black bullhead, northern pike, yellow perch, and walleye.

Manganyika and Mashkenode lakes are in Lake Class 19, which consists of 66 lakes in northeast Minnesota with the following average characteristics: 142 acres, 15 feet deep, 98 percent littoral area, 61 ppm total alkalinity, 5.0 feet Secchi water clarity, and 1.59 Shoreline Development Factor. Compared to other lakes statewide, these lakes tend to be small, shallow, have a very high proportion of littoral area, and have turbid water. Manganyika and Mashkenode Lakes are typical of lakes in this lake class, except that they
have higher total alkalinitities and Manganika Lake has a very low Secchi water clarity (two feet) due to algae growth presumably encouraged by sewage treatment effluent and stormwater runoff from the city of Virginia. Fish populations in Lake Class 19 lakes tend to be very high and dominated by bullhead, northern pike, white sucker, and yellow perch.

There is no indication that the above lakes would be significantly impacted by the construction and operation of the LEA Biomass Energy Project.

Hibbing: □ Yes ☒ No

Shoreland Management. There are no known classified lakes in the vicinity of the HPU plant site.

Floodplain Management. Based on review of the Federal Emergency Management Agency (FEMA) flood insurance rate map (1991), panel #270577, there is no 100-year flood plain in the vicinity of the HPU facility. The LEA Biomass Energy Project will be constructed within the footprint of the existing HPU property.

Wood Yard: □ Yes ☒ No

Shoreland Management. There are no classified lakes in the vicinity of the proposed wood yard.

Floodplain Management. Based on the city of Hibbing’s review of the FEMA flood insurance rate map for this area, the site is located outside of any 100-year flood plain shown on the FEMA map. Additionally, the city of Hibbing has stated that there are no other “special” designations for the property.

If yes, identify the district and discuss project compatibility with district land use restrictions.

Virginia
The LEA Biomass Energy Project will be constructed within the footprint of the existing VDPU property. Although this property lies within the Shoreland Management Program’s General Development setback, the setback was imposed well after the plant was constructed and placed in operation. The program does not require compliance with the setback in that instance.

15. Water Surface Use. Will the project change the number or type of watercraft on any water body?

Virginia: □ Yes ☒ No
Hibbing: □ Yes ☒ No
Wood Yard: □ Yes ☒ No

If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

16. Erosion and Sedimentation. Give the acreage to be graded or excavated and the cubic yards of soil to be moved: ________ acres; ________ cubic yards.

Virginia
A small amount of grading and excavating will be needed for preparation for the new buildings (wood receiving, wood storage, electrical building, ESP building) and associated conveyor towers. The area to be graded is estimated to be one-third to one-half acre. The soil to be excavated for the new structures at Virginia is approximately 1,600 cubic yards, unless the existing foundations for decommissioned boilers 5 and 6 cannot be re-used for the wood-fired boiler. If new foundations are necessary, the amount of soil disturbed will be approximately 80,000 cubic yards.
Hibbing
Based on estimates of the square footage of the areas required for the new buildings (wood receiving, wood storage, electrical building, ESP building) and associated conveyor towers, the acreage to be graded is one-third to one-half acre. The soil to be excavated for the new structures is approximately 80,800 cubic yards.

Wood Yard
The areas to be graded and paved in the wood yard are estimated to total 50 acres. The soil to be excavated for the truck scale, truck dump and screen house is approximately 1,000 cubic yards. Soils will not be removed from the site during site grading/development activities.

Virginia
There are no steep slopes or highly erodible soils on site. The site is a highly developed and hardened industrial property and has been so for many years. Based on preliminary designs, a small amount of grading and excavation will be required for the addition of project structures. Since the area being redeveloped within the VDPU is less than one acre, neither an NPDES Construction Stormwater Permit nor a Stormwater Pollution Prevention Plan (SWPPP) is required. However, Best Management Practices (BMPs) will be developed by the operator and implemented during construction, including items such as silt fence, straw bales or a comparable barrier to minimize sediment leaving the site.

Hibbing
There are no steep slopes or highly erodible soils on site. The site is a highly developed and hardened industrial property and has been so for many years. Based on preliminary designs, a small amount of grading and excavation will be required for the addition of project structures. The equipment and processes associated with the LEA Biomass Energy Project will be located in a relatively flat area, currently occupied by maintenance garage/office facilities. The maintenance garage/office facilities will be removed for construction of the LEA Biomass Energy Project. Since the area being redeveloped at Hibbing is less than 1 acre, neither an NPDES Construction Stormwater Permit nor a SWPPP is needed. However, BMPs will be developed by the operator and implemented on the construction site, including items such as silt fence, straw bales or a comparable barrier to minimize sediment leaving the site.

Wood Yard
There are no steep slopes or highly erodible soils identified on the site. Based on preliminary information and the design plan, minimal grading will be required for the wood yard site. The property is relatively flat and will largely consist of rows of wood chips, for eventual delivery to either plant location. Given that the area being developed will be greater than one acre, an NPDES Construction Stormwater Permit will be obtained and a SWPPP will be completed for the construction activities. BMPs will be developed and implemented on the construction site, including items such as silt fence, straw bales or a comparable barrier to minimize sediment leaving the site. BMPs will be implemented according to permit requirements to prevent sediment from impacting surrounding wetland areas during construction activities.

After construction, a NPDES Industrial Stormwater Permit/SWPPP will be completed for the operation activities at the wood yard site. BMPs will be developed and implemented for operations at the site. BMPs will be implemented according to permit requirements to prevent sediment from impacting surrounding areas.
Given the limited areas and minimal earth moving involved, the potential for significant cumulative erosion and sedimentation impacts is low.

### 17. Water Quality – Surface-water Runoff.

a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

**Virginia**

The overall quantity and quality of site runoff following the addition of the wood-fired boiler and ancillary equipment will not differ significantly from what it was before the LEA Biomass Energy Project. The area being developed is currently covered by building/asphalt and will remain building/asphalt upon completion of the project. Dust and litter associated with the new wood chip handling facilities will be controlled by covering and air filtration.

The VDPU currently operates under a NPDES/State Disposal System (SDS) Permit (Permit Number MN0003379) and a General Stormwater Permit for Industrial Activity (Permit Number MNG610000). These permits will be modified appropriately once construction has been completed.

**Hibbing**

The overall quantity and quality of site runoff following the addition of the wood-fired boiler will not differ significantly from what it was before the LEA Biomass Energy Project. The area being developed is currently covered by building/asphalt and will remain building/asphalt upon completion of the project. Dust and litter associated with the new wood chip handling facilities will be controlled by covering and air filtration. If an existing dirt road that may be used for wood delivery trucks to facilitate backing up and turning around is paved, the existing SWPPP will be amended to address this change in site characteristics.

Until last year, HPU operated under a NPDES/SDS Permit for stormwater management (Permit No. MN 0045900) since 1994. On January 29, 2004, the MPCA indicated that this individual permit coverage was no longer required since cooling water blowdown was rerouted from the storm sewer to the sanitary sewer; there is no discharge or potential for discharge from the coal pile, the coal pile storage area is covered and it has its own sump/drainage collection system; and HPU has general permit coverage for stormwater discharges associated with an industrial activity. The installation of the wood-fired boiler will not change the status of the permit coverage, thus not require an individual permit for stormwater management.

The HPU now operates under the General Stormwater Permit for Industrial Activity (Permit No. MNG611000). These permits will be modified accordingly once construction has been completed.

**Wood Yard**

The overall quantity and quality of site runoff following the construction of the wood yard site will be different from what currently exists on the site. The proposed site is currently a vacant abandoned farm. The majority of the property, 50 acres of the 80 acres, will be developed as part of the project.

A large portion (approximately 47 acres) of the existing site will be paved to accommodate biomass storage and truck traffic. Development of the site must therefore include provisions for control of stormwater runoff.
The paved area of the wood yard will be constructed to slope to a collection area. Runoff will be collected through surface collection methods and routed to a pond located in the southwest portion of the developed portion of the site (Figure W3). The pond would be sized with the dead storage volume equivalent to the runoff from a 2.5 inch rainfall and live storage sufficient to contain the runoff from a 5.2 inch rainfall (i.e., the 100-year 24-hour return period storm event) with at least one foot of freeboard. The pond outlet will be designed with a skimmer structure to prevent the discharge of floatables (including wood chips) downstream. The outlet will discharge to a wetland through riprap to dissipate energy and minimize erosion.

Runoff will then flow south through a series of wetlands to Barber Creek (see map, Figure W4). With the presence of a properly designed stormwater pond, there is minimal potential for significant impacts to downstream water quality from the wood handling portion of the site.

A separate, similar stormwater runoff control system would be provided for the ash storage area with the pond discharging to the same wetland complex. The ash storage bunker will be covered, thus reducing the potential for downstream impacts.

A NPDES Industrial Stormwater Permit/SWPPP will be completed for the operational activities at the site, and will include BMPs to control erosion and sedimentation.

b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

Virginia
VDPU stormwater discharges go to a storm drain that conveys stormwater away from the site in a southerly direction. The route follows the former DW&P railroad grade to 8½ Street South, then flows southwest along Rogerville Road to 13th Street South. From 13th Street South the storm drain proceeds south across unplatted lands to Southern Drive in Ridgewood, and from there to its outfall to Manganika Creek just east of the Virginia Wastewater Treatment Facility. Manganika Creek flows to Manganika Lake. Ultimately, this drainage goes to Lake Superior. A stormwater flow diagram showing the route from the site is attached as Figure V4.

Hibbing
Stormwater discharge from the Hibbing site flows into a nine-foot concrete pipe. The stormwater pipe discharges to Penobscott Creek, which in turn flows into the St. Louis River and eventually Lake Superior. A stormwater flow diagram showing the route from the site is attached as Figure H4.

Wood Yard
Based on contour maps for the wood yard, runoff from the site appears to flow towards the south-southwest, following site contours. The receiving water body for runoff is Barber Creek, located west of the site. Barber Creek flows south to the East Swan River, which flows to the St. Louis River and enters Lake Superior. The stormwater ponds will discharge using the same route as the current surface water flowage route for this site (Figure W4).

In light of the minimal additions to stormwater quantity and limited additional potential for contamination of runoff with the project, the potential for significant cumulative stormwater impacts is low.

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

At both Hibbing and Virginia, water is discharged to the sanitary sewer from a number of points in the plant boiler systems, including:

- Steam distribution system condensate
- Boiler blowdown disposal
- Water treatment reject discharges
- Miscellaneous equipment drains and service water uses
- Cooling tower blowdown disposal

**Steam Distribution System Condensate**
At both Hibbing and Virginia, steam is supplied from the plant to various city end users for district heating and other thermal energy processes. As the energy in the steam is extracted by the end users’ processes, the steam cools and reverts to liquid form (condensate).

At Hibbing, approximately 40 percent of the steam delivered from the plant is returned to the plant as condensate for reuse; the rest is lost as leakage from the distribution system. At Virginia, all process condensate is discharged to the sanitary sewer.

No change in condensate losses is expected with the LEA Biomass Energy Project.

**Boiler Blowdown Disposal**
To maintain adequate water and steam quality within the boiler and downstream plant equipment (to minimize component corrosion and erosion), a fraction of the boiler feedwater is continuously discharged and replaced with clean makeup water. Because of the higher boiler steam production rates required for LEA Biomass Energy Project operation, the blowdown discharge will be proportionately higher than the current situation.

**Water Treatment Reject Discharges**
At both sites, plant makeup water must be treated in order to be suitable for use, and the treatment involves the removal of impurities, consisting largely of minerals, from the raw water. These impurities must be purged from the system via a reject water stream. This reject water is discharged directly to the sanitary sewer.

Under LEA Biomass Energy Project operation, because of the higher makeup water requirements to support increased boiler steam generation, softener system discharges are expected to be higher than they are currently.

**Miscellaneous Equipment Drains and Service Water Uses**
Normal operation of various equipment items within the plants results in small side streams of process water being lost either continuously (e.g. pump seal leakage) or intermittently (such as floor and equipment washing) and discharged via floor drains to the sanitary sewer. No significant change in these losses is expected with project operation.
**Cooling Tower Losses (Hibbing Only)**
At Hibbing, exhaust steam from the condensing turbine generators is cooled by rejecting heat to the atmosphere via a wet cooling tower. The cooling process in the tower involves evaporation of liquid water, in addition to which a lesser amount of cooling water is discharged to the sewer system to keep overall cooling system water quality at an acceptable level. On average, the existing plant currently operates well below cooling system capacity, and the addition of the wood boiler will require a significant increase in this operating load, thereby increasing cooling tower evaporation and wastewater disposal volumes.

**Summary of Project Water/Wastewater Quantities:**

**Virginia**
For the existing plant, the current average makeup water rate for those losses associated with boiler steam production is approximately 20 gpm, with an associated wastewater discharge rate of approximately 15 gpm. Under anticipated LEA Biomass Energy Project operation, these average makeup water and wastewater disposal rates are expected to increase to approximately 35 gpm and 26 gpm, respectively. The latter value refers to sewer discharges only, because there will be no change in the cooling water flow to and from Silver Lake, except that it may carry more reject heat.

There are no additional wastewater treatment requirements for VDPU that stem from the LEA Biomass Energy Project.

Thermal discharges to Silver Lake will increase for the same basic reasons that Hibbing cooling tower water use increases (i.e. more heat to dispose of since the plants will be operating at a higher level of production). However, the thermal discharge will still be within the current NPDES Permit limit. The NPDES Permit will not need to be modified because the design maintains the same cooling water flow and temperature (< 90 F) to Silver Lake.

The NPDES Permit that allows non-contact cooling water to be discharged to Silver Lake will not require modification.

**Hibbing**
For the existing plant, the current average makeup water rate for those losses associated with boiler steam production (exclusive of cooling tower losses) is approximately 20 gpm, with an associated wastewater discharge rate of approximately 15 gpm. Under anticipated LEA Biomass Energy Project operation, these average makeup water and wastewater rates are expected to increase to approximately 28 gpm and 21 gpm, respectively.

For the cooling tower, the approximate project increase in makeup water requirements over current needs is approximately 135 gpm, with an associated wastewater discharge increase of approximately 35 gpm. This results in an increase from 25 to 50 gpm to an estimated maximum of 185 gpm of makeup water, and from 10 gpm to 45 gpm of wastewater.

**Wood Yard**
There are no plans to generate wastewater at the wood yard site, other than domestic wastewater from personnel facilities. The city of Hibbing sanitary sewer services are currently not present at the site. An on-site septic system is planned for the site and will be sized to treat wastewater generated by site personnel. The system will be installed in accordance with local and state requirements.
b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies, and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

Wastewaters described above will not be treated on site before discharge, nor is this necessary under current permits. See following.

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility’s ability to handle the volume and composition of wastes, identifying any improvements necessary.

At Virginia, sanitary wastewater will be discharged to the Virginia Municipal Wastewater Treatment facility, which discharges treated wastewater to Manganyika Creek, which in turn discharges to Manganyika Lake. The additional load is minimal and will not require changes at the treatment plant.

At Hibbing, sanitary wastewater is currently discharged to the city’s North Plant, which discharges to Penobscot Creek. This plant is in the process of being closed, after which sanitary wastewater will go to the South Plant, which discharges to the East Swan River watershed. The additional load is minimal, and will not require changes at either plant.

d. If the project requires disposal of liquid animal manure, describe disposal technique and location and discuss capacity to handle the volume and composition of manure. Identify any improvements necessary. Describe any required setbacks for land disposal systems.

Not Applicable.

19. **Geologic hazards and soil conditions.**

a. Approximate depth (in feet) to Ground water: minimum; average.

**Virginia**

Ground water: VDPU does not have a well on site. VDPU is located on the southeastern bank of Silver Lake and a shallow water table exists in the area. Estimated shallow ground water is less than five feet below ground surface.

Bedrock: There was no depth to bedrock data identified for the VDPU property. However, the DNR has indicated that boring data in the vicinity of the area (an adjacent section: 8-58-17) shows depth to bedrock ranging from 45 to 60 feet below ground surface.

**Hibbing**

Ground water: 10 feet minimum, 10 to 20 feet average
Bedrock: 50 feet minimum, 50 to 100 feet average

The above information is based on environmental investigations conducted in the area (adjacent AmeriPride cleanup site—see Item 9).
Wood Yard

Ground water: No depth to ground-water data were found for the proposed site. A DNR observation well located in an adjacent section, Section 28, shows a shallow water table at approximately two feet below ground surface.

Bedrock: No bedrock data were found for the proposed site. The DNR provided an estimate of the depth to bedrock of between 140 to 200 feet below ground surface, based on a drill hole four miles north of the site, elevations at the adjacent airport, and the Minnesota Geological Survey Depth to Bedrock Map.

Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

There are no known geologic hazards at any of the sites.

b. Describe the soils on the site, giving SCS classifications, if known. Discuss soil granularity and potential for ground-water contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

Virginia
The area surrounding the site is classified as “Urban Land” and consists of fill mixed with native soils in the area. The two native soils that are predominantly located in this area are the Buhl series and the Hibbing series.

The Buhl series consists of very deep, somewhat poorly drained soils formed in a thin mantle of loess and underlying fine, dense glacial till on till plains and moraines. Slopes range from one to five percent and permeability is very slow. The Hibbing series consists of very deep, moderately well drained soils that formed in a thin mantle of loess and underlying fine, dense glacial till on till plains and moraines. Slopes range from 4 to 45 percent and permeability is very slow. This soil type is simultaneously moderately well drained and relatively impermeable because it is a heavy clay soil whose well-developed structure is characterized by numerous subsurface macropores. The somewhat poorly drained Buhl, poorly drained McQuade, and the very poorly drained Fayal soils, form a hydrosequence with Hibbing soils.

The VDPU has an established Emergency Plan to address potential contamination associated with hazardous waste or spills that may occur at the site. The Emergency Plan will be amended to include equipment/activities associated with the LEA Biomass Energy Project.

Hibbing
Similar to the situation at Virginia, the area surrounding the Hibbing site is classified as “Urban Land” and consists of fill mixed with native soils in the area. The two native soils that are predominantly located in this area are the Buhl series and the Hibbing series. The Buhl series consists of very deep, somewhat poorly drained soils formed in a thin mantle of loess and underlying fine, dense glacial till on till plains and moraines. Slopes range from one to five percent and permeability is very slow. The Hibbing series consists of very deep, moderately well drained soils that formed in a thin mantle of loess and underlying fine, dense glacial till on till plains and moraines. Slopes range from 4 to 45 percent and permeability is very slow. This soil type is simultaneously moderately well drained and relatively impermeable because it is a heavy clay soil whose well-developed structure is characterized by numerous subsurface macropores. The somewhat poorly drained Buhl, poorly drained McQuade, and the very poorly drained Fayal soils, form a hydrosequence with Hibbing soils.
Since an environmental cleanup is in progress adjacent to the HPU site, more site-specific data is available for that area than is true at the other two LEA Biomass Energy Project sites. Environmental investigations conducted in connection with the cleanup report that the site is underlain by glacial drift over the Cretaceous Virginia Argillite Formation. The drift consists of Quaternary till and sand, with some gravel. The till mainly consists of reddish brown clayey silt. The Virginia Argillite consists of thinly bedded gray to black argillite.

Based on previous soil boring investigations in and around the HPU, the site appears to be underlain by a mixture of unconsolidated sedimentary deposits (sand, silt, and clay with gravel and cobbles) and fill. The unconsolidated material exists to approximately 5 to 15 feet below ground surface. A thick (ranging from 15 to 30 feet) gray, fat clay appears below the unconsolidated sediments and is reportedly continuous across the area. Various poorly graded sands, silty sands, and sandy silts occur beneath the clay layer. Shallow “perched” ground water is found in the unconsolidated deposits, above the clay layer, and generally flows toward the north–northeast. The shallow ground-water flow is apparently influenced by a foundation drain and sump system at the HPU. Regional ground-water flow (beneath the clay) is the drinking water source for the area and is thought to flow to the south-southeast, based on published information. Ground-water movement throughout the area is reportedly influenced by the iron mining operations in the area.

As previously noted, volatile organic compounds (VOCs), associated with cleaning operations west of the HPU, have been identified in soils and ground water in the area. A ground-water monitoring program has been established for the impacted ground-water plume in this vicinity. The shallow impacted ground water in the area is a known potential environmental hazard in the vicinity of the HPU site. However, the LEA Biomass Energy project will have no effect on that hazard, nor will it affect the AmeriPride cleanup.

The HPU has an established Emergency Plan to address potential contamination associated with hazardous waste or spills that may occur at the site. The Emergency Plan will be amended to include equipment/activities associated with the LEA Biomass Energy Project.

Wood Yard
Four soil types exist in the area and include: McQuade-Fayal complex, Majestic-Hibbing complex, the McQuade-Buhl complex and the Mooseline-Turpela complex. The soils consist of clay, silt and sand loams, and reddish brown or brown clay.

Potential ground-water contamination from refueling of machinery and trucks and leaks of motor oil and lubricating oils will be minimized by the design of an asphalt pad for wood yard operations. Refueling will occur using a portable tanker truck that will be brought on-site as needed to fill the diesel grinder, front-end loader, and trucks.

The LEA Biomass Energy Project will also be storing wood ash on-site, until it can be land applied as a supplement to soils. Storage will be in accordance with Minn. R. 7035.2855, subp. 7: Storage of Solid Waste Prior to Beneficial Use. The storage facility will consist of a covered bunker with three concrete walls and a concrete floor. The site will be sloped so stormwater will not run into the storage bunker.

A NPDES Industrial Stormwater Permit/SWPPP will be completed for the operation activities at the site, which will include BMPs, and minimize potential contamination.
20. **Solid Wastes, Hazardous Wastes, Storage Tanks.**

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

**Construction:**
It is anticipated that minor amounts of construction debris will be generated as part of the construction. The LEA Biomass Energy Project construction contractor will be responsible for proper disposal of the generated waste.

The LEA Biomass Energy Project will involve the removal of boilers 5 and 6 at VDPU. Outer asbestos material has already been removed from the boilers when they were decommissioned. However, there is potential for asbestos in boiler brick and mortar materials. Prior to demolition of the boilers, the brick and mortar will be sampled for asbestos content in order to determine the proper handling and disposal requirements for these materials. Any asbestos containing materials will be disposed of in accordance with MPCA requirements.

**Operation:**
Fly ash and bottom ash will be generated as a byproduct of wood combustion. The properties of ash generated from wood combustion make it suitable for land application. LEA has worked with the Minnesota Extension office to develop a beneficial wood ash re-use plan that provides for land application of the wood ash as a soil conditioner, and this plan has been filed with the MPCA. The plan will include storage of ash at the wood yard and controls to assure the minimization of contamination impacts at the site. The MPCA has approved this plan.

Twenty-five percent of the electricity generated to satisfy the PPA will be produced by burning coal. Currently, all coal ash from both plants is landfilled. This will continue with the project.

No significant solid waste material will be generated at the wood yard site. The wood yard site will be used to grind biomass material and screen and store wood chips for fuel to operate the wood-fired boilers. The wood yard will receive whole biomass as well as already ground wood chips. Prior to screening, the material will pass by an electromagnet to remove any metal material. Any such material found will be transported to metal recyclers. During the screening process, oversized materials will be separated from the stockpiled material and re-ground to meet size requirements prior to stockpiling.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating ground water. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

No hazardous waste will be generated as part of the operations of the wood-fired boilers.

Each plant site will require a 1,000-gallon above ground storage tank (AST) to support an emergency generator being permitted as part of this project. The double-walled AST will store diesel fuel and meet local, state, and federal requirements for installation, operation, and spill prevention.

The selective non-catalytic reduction systems will use a urea source for ammonia. Urea is not regulated by U.S. Environmental Protection Agency’s (USEPA) Risk Management Program [40
As discussed in (20a.) above, if asbestos is identified in the brick and mortar materials for Virginia boilers 5 and 6, which will be demolished to make room for the wood-fired boiler, the materials will be properly handled and disposed of in accordance with MPCA requirements.

The wood yard site is not expected to generate any hazardous waste from the grinding, screening, and stockpiling of the wood. Wood ash from the utilities’ boilers will be delivered to the wood yard, and then stored temporarily for subsequent land application. The storage facility will be designed in accordance with Minn. R. 7035.2855 Solid Waste Storage Standards. The storage facility will consist of a covered bunker with three concrete walls and a concrete floor. The storage facility will include stormwater management designed to keep runoff and the ash separated, and to collect and control runoff. A barrier consisting of trees will be established around three sides of the storage bunker to minimize wind effects on the ash storage.

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

**Virginia**
Four underground storage tanks (USTs), including two 20,000-gallon fuel oil tanks, one 4,000-gallon gasoline tank, and one 1,500-gallon diesel tank, were removed from the VDPU site in accordance with MPCA requirements. The fuel oil tanks were removed in 1989 and the gasoline and diesel tanks were removed in 1998. Additionally, a gasoline tank at the property was abandoned in place (filled with sand).

**Hibbing**
Two underground storage tanks (USTs), one 560 gallons and one 1,800 gallons, were removed from the site in September 1996, in accordance with MPCA requirements. The USTs contained gasoline and were used for fueling maintenance vehicles. The pump island and associated piping for the USTs were removed at the same time. In January 1998, soil borings and temporary monitoring wells were completed in and around the former tank basin and environmental samples were collected for analysis. Analytical results were below the established Health Risk Limits and a Petroleum Leak Site Closure Letter was issued by the MPCA in October 1998.

**Proposed**
Each plant site will require an AST for diesel fuel. The AST will be double-walled and meet local, state, and federal requirements for installation, operation, and spill prevention. The existing Emergency Plans for the HPU and VDPU will be amended to include the additional tanks.

**Wood Yard**
There are no known buried fuel oil tanks at the wood yard. None will be added as part of the project.

21. **Traffic.** Parking spaces added: __________ Existing spaces (if project involves expansion): __________

**Virginia:** None

Existing spaces (if project involves expansion): There are approximately 30 parking spaces currently at the VDPU property. There are no plans to increase the number of spaces.

**Hibbing:** None

Existing spaces (if project involves expansion): There are approximately 15 parking spaces currently at the HPU property. There are no plans to increase the number of spaces.
Wood Yard:  12

A minimal number of parking spaces will be needed for facility personnel personal vehicles and LEA owned end dump trucks (trucks used to deliver wood chips and ash). Space will also be provided for trucks delivering wood chips, in order to wait in line for dumping their loads.

Existing spaces (if project involves expansion): None. The site is currently undeveloped.

<table>
<thead>
<tr>
<th>Estimated total average daily traffic generated:</th>
</tr>
</thead>
</table>

Virginia and Hibbing
The LEA wood-fired boilers will be operated by the existing municipal utility staff, so employee traffic to each facility will not change. The bulk of traffic to and from each plant is and will continue to be trucks delivering fuel and hauling ash away. This traffic will increase with the project. The amount of traffic increase is proportional to the rise in generation, since more fuel will then be consumed and more ash will be produced with the project.

The PPA will require full power production more or less immediately when the contract is implemented. Therefore, in order to achieve and maintain the generation levels required by the contract during the first five years, consumption of fuel (coal as well as biomass) will increase during those years. As shown in Chart 1 (located in Item 6, page 7), coal usage, which at present is relatively low since the plants are not currently generating electricity at the maximum rate possible, will initially increase from an annual rate of approximately 2,810,988 to 4,004,320 MMBtu. This is approximately a 42 percent increase over current coal consumption for the first year of the PPA. Over the next few years, use of biomass fuel in the new boilers will ramp upward, so that total plant output from all boilers at each site will reach 5,531,599 MMBtu per year, and remain at or close to that level for the life of the project.

Truck traffic will increase over current levels to reflect the greater fuel usage represented by the LEA Biomass Energy Project. The current daily maximum truck traffic for the delivery of coal and removal of coal ash at Hibbing is 21 trucks (21 inbound and 21 outbound) and 17 trucks at Virginia (17 inbound and 17 outbound) during the peak-heating season. Since coal use will spike up in the initial stages of the project, coal and ash truck traffic will initially increase as well, and then decline after year two as biomass takes up more of the load.

As the biomass component ramps up during the first five years, trucks hauling wood chips to the plant sites will increase in number. The maximum design truck traffic level at the five-year point is 40 trucks per day (inbound and outbound) to Hibbing and 30 (inbound and outbound) to Virginia. However, these levels represent a situation that will occur infrequently, based on the possibility that there may be a need from time to time to substitute a five-day delivery schedule for the normal seven-day schedule. Most of the time, expected wood truck traffic level will be 22 inbound and outbound trucks at Virginia and 29 inbound and outbound trucks at Hibbing.

By the five-year point, since the need for coal will have decreased by approximately 12.4 percent from current levels and 38 percent from the initial peak (first year of operation under the PPA), coal and coal ash truck traffic will have decreased as well, to a maximum (under the infrequent five-day delivery schedule) of 13 truck trips per day to Hibbing and 10 to Virginia during the peak heating season. Most of the time, the actual coal and coal ash truck traffic after five years will be seven trucks per day at Virginia and ten trucks per day at Hibbing. Importantly, the same trucks delivering wood chips will be used to

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4 The PPA allows the use of coal fuel exclusively for the production of district heating steam and station auxiliary power. The “PPA Fuel” excludes this coal use and therefore represents only the fuel used in generating the net 35MW required by the PPA.
haul away wood ash for later beneficial re-use (discussed elsewhere in the EAW), meaning that there will not be a need for additional truck traffic for wood ash hauling. In fact, the amount of ash that will need to be hauled is much less than the amount of wood being brought to the site, so not every truck leaving the site will carry ash.

Thus, at the five-year point and going forward, the total expected Virginia truck traffic will be 29 (consisting of 22 wood/wood ash trucks and seven coal/coal ash trucks, as outlined above). At Hibbing, the expected truck traffic will be 39 (consisting of 29 wood/wood ash and 10 coal/coal ash trucks, as outlined above).

The estimated hourly wood delivery traffic from collection sites to the wood yard is expected to range from four to eight trucks per hour. The estimated hourly fuel delivery traffic from the wood yard to the utilities is approximately four trucks per site per hour. The routes to be followed by the truck traffic are discussed below.

**Truck Routes**

Within the city of Virginia, the route for all future coal and wood truck deliveries will be the same as currently used by the coal delivery trucks. That route requires that all coal and wood trucks enter and exit the city of Virginia at the intersection of 9th Street North and Highway 53. From Highway 53 all trucks going to the plant will proceed east along 9th Street North to its intersection with 6th Avenue West. The trucks will then proceed south on 6th Avenue West to the east entrance of the plant, which is located between 1st Street South and 2nd Street South. Trucks leaving the plant will simply reverse this route. A map of the Virginia truck route is shown in Figure V5.

All coal trucks will arrive at the junction of 9th Street North and Highway 53 by traveling north on Highway 53 from Superior, Wisconsin. This route will not change as a result of the LEA Biomass Energy Project. All wood trucks will arrive at the junction of 9th Street North and Highway 53 by taking either Highway 37 or Highway 169 from the wood yard to Highway 53 and then proceeding north on Highway 53 to the junction.

The only variation to the truck route in Virginia would be during construction or emergency detours. All of the identified routes within the city of Virginia are State Aid Roads built to 10-ton/All Weather Road specifications.

In Hibbing, the wood trucks will leave the wood yard site near the Hibbing airport and travel west on Highway 37 to Highway 169, then north on Highway 169 to Howard Street, then west on Howard Street to 6th Avenue and then north to enter the plant. The wood trucks will leave the site using the same route (exit onto 6th Avenue). The wood truck route is virtually the same route as followed by the coal trucks for Hibbing except that the coal trucks turn north on 7th Avenue, from which they enter and leave the plant. A map of the Hibbing truck haul route is shown in Figure H5.

Wood trucks to and from the wood yard site will travel along Highway 37, exiting and entering onto Dublin Road and Haley Road (site entrance). A map of the wood yard truck route is shown in Figure W5.
Estimated maximum peak hour traffic generated (if known) and its timing:

**Virginia**
Plant site design capacity is eight trucks per hour, but expected actual traffic is four trucks per hour. The VDPU is operated 24 hours a day, seven days a week. Delivery operations will generally be consistent with existing operations and operate 12 hours per day.

**Hibbing**
Design capacity is eight trucks per hour but expected actual traffic is four trucks per hour. The HPU is operated 24 hours a day seven days a week. Delivery operations will generally be consistent with existing operations and operate 12 hours per day.

**Wood Yard**
It is expected that four trucks per site per hour will leave the wood yard to deliver to the utility locations. About the same number will be returning to the wood yard either empty or with a load of wood ash. The wood yard site will operate 12 hours per day, seven days a week, typically dawn to dusk.

Provide an estimate of the impact on traffic congestion affected roads and describe any traffic improvements necessary. If the project is within the Twin Cities metropolitan area, discuss its impact on the regional transportation system.

**Virginia**
The LEA Biomass Energy Project will be located at the existing VDPU. Traffic associated with the operation of the project will be consistent with the type of traffic already experienced at the utility and will follow the established haul route. Although there will be an increase in truck traffic, no new road improvements are planned to support the biomass project.

**Hibbing**
The LEA Biomass Energy Project will be located at the existing Hibbing PUC. Traffic associated with the operation of the project will be consistent with the type of traffic already experienced at the utility and will follow the established haul route. Although there will be an increase in truck traffic, no new road improvements are planned to support the biomass project.

**Wood Yard**
The wood yard site is located at an undeveloped area in the southeast portion of the city of Hibbing. Traffic associated with the operations at the wood yard will require improvements to the existing infrastructure in the area. Haley Road (entrance to the site) will be upgraded to accommodate at least two lanes of truck traffic. Dublin Road may be upgraded to an all season road, as it currently has load limitations from early April to late May or June. Highway 37 will likely need to have a left turn lane added and a lengthening of the existing right turn lane.
22. **Vehicle-related Air Emissions.** Estimate the effect of the project’s traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts. Note: If the project involves 500 or more parking spaces, consult *EAW Guidelines* about whether a detailed air quality analysis is needed.

**Fugitive Dust**

When trucks drive on roadways they create the potential for disturbing any dirt that lies on the roadway surface, thus creating dust. The fugitive dust (particulate matter or PM) created by the project truck traffic is calculated to be 1.564 tons per year at Virginia and 0.367 tons per year at Hibbing. The amount of dust created by traffic is dependent on vehicle miles traveled. The driving distances vary depending on destination, so the fugitive dust emissions are not identical for each site.

Both plant sites are required to periodically sweep their drive areas in order to minimize fugitive dust from fuel and ash truck traffic. The sweeping schedule is a legal requirement of the air-operating permit.

Since the HPU site meets Particulate Matter less than 10 um in size (PM$_{10}$) air quality standards at the fenceline, its current sweeping schedule is adequate. However, the VDPU site cannot meet standards at its fenceline if the default modeling input value for PM$_{10}$ is used to predict the impact. Therefore, silt load sampling must be performed on the drive areas at the Virginia site in order to determine the actual amount of dust material available for air entrainment by truck traffic. The sampling cannot be conducted during winter months due to the presence of snow and ice, but will be completed as soon as the weather allows. Once this testing is performed, an analysis will be performed to determine what the sweeping schedule must be to achieve compliance with standards. Currently, trial-and-error with various modeling inputs indicates that a PM$_{10}$ level on the VDPU drive area surface of 2.5 micrograms per square meter or less must be maintained in order to assure fenceline compliance, and VDPU has agreed to be bound by this lower value until actual sampling can be performed. It is not known at this time what the sweeping schedule must be in order to assure that this level is not exceeded; the sweeping schedule will be determined after sampling.

The estimated hourly traffic generated by trucks hauling wood to the wood yard is expected to range from four to eight trucks per hour. The estimated hourly traffic generated from trucks hauling fuel from the wood yard to the utilities is approximately four trucks per site per hour. The wood yard will be open for shipping and delivery 12 hours a day, seven days a week. The fugitive dust thus created at the wood yard is estimated to be 12.89 tons per year.

**Carbon Monoxide**

In addition to fugitive dust caused by driving on paved surfaces, vehicles are a source of mobile air emissions from engine exhaust. Because truck traffic will increase in the area, emissions from engine exhaust will also increase. The increase in truck exhaust at each utility location will about double over current levels. Based on the expected levels of delivery activities at each site and reasonable assumptions about trucks to be used and their emission rates, the expected carbon monoxide emissions will total between 49 and 59 tons per year, about half of which will be emitted at each site.

Wood yard carbon monoxide emissions are estimated at about 38.5 tons per year. The wood yard site is currently vacant land, so current levels attributable to the site are zero. Truck loading and unloading will occur as quickly as safely practical in order to reduce onsite idling, thus minimizing CO and other emissions from the truck engines.

These are not regarded as significant increases.
Overall Effect
To satisfy the demand of the wood-fired boilers, truck traffic will increase at each utility location as outlined above. To compare this to existing traffic levels on the roadways to be used by the wood delivery trucks, daily traffic counts on selected roadways were obtained from the cities of Virginia and Hibbing. The trucks per day attributable to the LEA Biomass Energy Project were doubled to obtain the traffic count because the traffic count would include the trip to and from each plant site.

Current traffic counts (2003 traffic count information) for the roads to be used by the wood trucks are presented in the following Tables 1 and 2.

### Table 1
#### Hibbing Current Traffic Levels Compared to Increase after LEA

<table>
<thead>
<tr>
<th>Road Identification</th>
<th>Current Daily Traffic Count</th>
<th>Daily Increase after LEA (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway 37</td>
<td>6,400</td>
<td>0.9%</td>
</tr>
<tr>
<td>Highway 169</td>
<td>14,500</td>
<td>0.4%</td>
</tr>
<tr>
<td>Off Ramp from 169 to Howard Street</td>
<td>5,400</td>
<td>1.1%</td>
</tr>
<tr>
<td>Howard Street</td>
<td>6,600</td>
<td>0.88%</td>
</tr>
<tr>
<td>North on 6th Avenue (off of Howard Street)</td>
<td>350</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

*No data specifically for 6th Avenue so the traffic count for this road segment is estimated based on traffic counts on nearby roadways.

### Table 2
#### Virginia Current Traffic Levels Compared to Increase after LEA

<table>
<thead>
<tr>
<th>Road Identification</th>
<th>Current Daily Traffic Count</th>
<th>Daily Increase after LEA (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway 169 &amp; 53 (section just north of Highway 169 turnoff)</td>
<td>11,900</td>
<td>0.4%</td>
</tr>
<tr>
<td>9th Street North</td>
<td>5700 and 8200 (depends on roadway section)</td>
<td>0.71% to 0.77%</td>
</tr>
<tr>
<td>Sixth Avenue West</td>
<td>4,500</td>
<td>0.98%</td>
</tr>
</tbody>
</table>

Based on this analysis, cumulative traffic and related impacts associated with the project appear minimal.

**23. Stationary Source Air Emissions.** Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult EAW Guidelines for a listing), any greenhouse gases (such as carbon dioxide, methane, and nitrous oxides), and ozone-depleting chemicals (chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

Each site associated with the LEA Biomass Energy Project will have several sources of air emissions. These sources are as described below.
PLANT SITE EMISSION SOURCES
The air emission sources at each of the utilities that are associated with this project are listed below.

- Wood-fired stoker boiler
- Wood receiving, transfer and storage
- Ash storage and load-out
- Truck traffic
- Emergency diesel generator
- Diesel storage tank

Wood-fired Stoker Boiler. A wood-fired boiler will be installed at each utility to generate steam to drive each plant’s existing turbines in order to generate electricity for the PPA. The wood boilers will be nominally sized for a production capacity of 230 MMBtu per hour each. NOX, PM, and CO emissions will exceed the significant emission threshold for federal PSD permitting. BACT has therefore been proposed for each of these pollutants. The wood boilers will each have an ESP\(^5\) for PM emission control and SNCR\(^6\) for NOx control. Good combustion practices will be used as a method for maintaining low CO emissions. Good combustion practices are considered BACT for these types of sources according to EPA guidance.

Wood Receiving, Transfer, and Storage. In addition to wood-fired boilers, the LEA Biomass Energy Project will require wood chip handling equipment as well as onsite storage facilities for the wood chips. Both are potential sources of dust and noise emissions. These potential impacts, and the potential for odor emissions from each plant site, are addressed in the tables below and in Item 24 of this EAW.

Ash Storage and Load-out. Equipment for collection, storage, and load out of coal ash already exists at each plant site. For the project, wood ash handling equipment will be needed as well. Dust and noise can also be generated by these sources. This potential is addressed in Item 24 and in the tables below.

Truck Traffic. Truck traffic to each of the utilities will also increase to supply the wood-fired boilers. Tailpipe emissions attributable to the project will about double based on the percent increase in truck traffic expected when the project is in full operation. Additional dust and noise will also be generated by project truck traffic. This potential is addressed in Item 24 and in the tables below.

Emergency Diesel Generator. An emergency generator, powered by distillate fuel, will also be installed at each of the utility locations for the purpose of allowing continued plant operation to maintain services in the event of a power outage. The plan to do this actually predated the LEA project. This unit will be tested for a total of 102 hours annually (two hours per week). Emergency generators are limited by definition to operating less than 500 hours per year. The emissions in the tables below are based on worst-case operation of the generator at 500 hours per year.

Diesel Storage Tank. Each of the utilities will have an above ground diesel storage tank to store fuel for the emergency generator. The above ground tank capacity will be 1,000 gallons. Some emissions of volatile organic compounds will be emitted from the storage tank from standing and loading losses. However, the emissions will be less than one pound per year, which is considered insignificant by the MPCA.

\(^5\) An ESP is used to remove particulate matter (PM) from the flue gas and prevent it from entering the atmosphere. The particulate is removed by passing exhaust gas containing the particulate past a series of high voltage plates. The particulate is attracted to these plates by the high voltage static charge. Rappers are used to knock the dust off the plates into the hoppers below for collection and disposal.

\(^6\) SNCR uses ammonia or urea (which decomposes to ammonia) to reduce NOx to nitrogen.
Each of the plant site potential emission sources is discussed in detail in the air permit application that was filed with the MPCA, and additional information is available in the draft MPCA permit(s) for the project, which has been co-noticed with the EAW. This information, including emission calculations, assumptions, plans and engineering specifications, and details on regulatory considerations, is available on request from the MPCA.

HAZARDOUS AIR POLLUTANTS

The process of combustion produces emissions of pollutants that are considered hazardous air pollutants (HAPs) by USEPA. Each of the wood-fired boilers will therefore be subject to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters that became effective on November 12, 2004. This NESHAP is more commonly referred to as Boiler MACT because the emission limits in the standard are based on application of maximum achievable control technology that is currently being achieved. This regulation requires demonstrating compliance with standards for the primary HAPs of concern associated with combustion of solid fuels, specifically hydrogen chloride, mercury, and certain other metals. The boilers and their emission control equipment will be designed for MACT compliance. In other words, compliance with the emission limits contained in the MACT standard is a design specification and meeting the emission limits is a required performance guarantee from the boiler vendor.

Air Emission Risk Analysis

Toxic emissions were evaluated using the Air Emission Risk Analysis (AERA) Screening Spreadsheet. The AERA process has been developed by the MPCA to screen air emissions from facilities for the potential to pose unacceptable risks to the public. The AERA compiled for the LEA Biomass Energy Project included reviewing the proposed emission sources as well as the existing emission sources for each facility. The results of this analysis are presented below.

Hibbing:

After consideration of all of the information provided in the AERA, the MPCA concluded that the facility air risk analysis is adequate to assess the impacts. The new project as assessed shows that impacts from the wood-fired boiler are below health benchmarks except for farmer cancer risk, but the information provided by the facility indicates that no or very limited farming occurs within three kilometers of the facility.

The AERA conducted for the total facility indicates that the health benchmarks are exceeded in several areas. However, based on the following factors, a decision has been made that the facility as proposed will not have significant environmental or health impacts and will provide other social benefits to the area.

- To comply with Sulfur Dioxide (SO2) standards, the stack height will be increased by 42 feet or a combination of activities directed at reduction of the SO2 emissions will be required in the permit. This will also reduce the modeled concentrations of air toxics around the facility;
- The models used were screening models, which generate a higher impact assessment than is actually anticipated to result from the facility;
- The emission calculations used the two-hour peak capacity rather than the continuous maximum rating of the boilers, so annual impacts will be somewhat overestimated;
- Use of surrogate toxicity values for chromium compounds, arsenic compounds, and dioxins and furans (which are some of the key risk drivers), overstate the impact;
- The analysis assumed that 100 percent of the NOX coming from the stack is Nitrogen Dioxide. This is a conservative assumption and the primary driver for the acute risk;
- Limited or no farming occurs within three kilometers of the facility, eliminating the concern about farmer risk;
- The existing facility fulfills electrical and steam heat needs within the community, which is valued by local residents;
- There will be a reduction in total mercury from the two facilities in the LEA project as a whole; and
The project fulfills the objectives set forth by the Legislature to increase the use of alternative fuels with a focus on renewable energy.

Virginia:
After consideration of all of the information provided in the AERA, the MPCA concluded that the facility air risk analysis is complete and that the impacts associated with the air emissions that are reasonably expected to be generated from this facility with the addition of the wood-fired boiler, do not have the potential for significant environmental or health impacts.

The facility as proposed increases some toxic emissions, but using a conservative analysis and taking into account the current and anticipated demographics of the area (limited or no farming occurring within a three kilometer radius of the facility), health risk values for the known air toxics are not exceeded. With the installation of the wood-fired boilers, mercury emissions will be reduced from the Laurentian project as a whole. This project also aids in attaining the objectives set forth by the Legislature to increase the use of alternative fuels with a focus on renewable energy.

Mercury Emissions
Over the 20 year life of the PPA, the decrease in coal usage results in a reduction of approximately 15.7 pounds of mercury. This decrease does not occur without the LEA Biomass Energy Project.

WOOD YARD
SITE EMISSION SOURCES
Space at each of the utilities is limited, so wood storage at the utility locations will be limited to a one day supply of fuel. For this reason, the project includes a remote wood staging and storage yard site to which harvested fuel will be transported for processing and long term storage, and from which wood chips will be transported to the plant sites. The wood yard is located on the outskirts of Hibbing near the airport.

Sources of emissions from the wood yard will include trucks delivering wood (fugitive dust and tailpipe emissions), wood grinding, wood screening, and storage of wood in piles (wood dust, odors). The wood will be received on site either as whole biomass that requires grinding or as chips that were ground in the field at the time of harvest. The grinder will either be electric or diesel and will be portable. Since a diesel grinder will produce local emissions that an electric grinder will not, for purposes of completing the environmental review, a diesel engine grinder was used to simulate worst-case emission levels. Based on the calculations of fugitive and point source emissions from the wood yard, a state air operating permit is not required for this site.

SITE BY SITE EMISSION SUMMARIES

Plant Sites. Tables 3.0 and 4.0 present the emissions from the wood boiler and ancillary equipment that will be located at each municipal utility. These will be the expected emissions after controls are applied. Table 3.0 presents Virginia information and Table 4.0 presents the information for Hibbing.

The tables show that predicted fugitive emissions (road dust) from truck traffic are different for each utility site. This is because the drive distances are different at each location; calculation of fugitive dust emissions from traffic are dependent on the vehicles miles traveled and these distances are not the same for Hibbing and Virginia.
The plant site wood handling equipment will all be enclosed to reduce noise and fugitive dust. The emissions from the various activities involved with storing and conveying wood are vented through fabric filters, which are considered BACT, to minimize any dust (particulate matter) emissions to the atmosphere.

Table 3.0

<table>
<thead>
<tr>
<th>Emission Unit/Activity</th>
<th>NOx Tons/year</th>
<th>SOx Tons/year</th>
<th>CO Tons/year</th>
<th>PM Tons/year</th>
<th>PM10 Tons/year</th>
<th>VOC Tons/year</th>
<th>Lead Tons/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Boiler</td>
<td>151.11</td>
<td>25.19</td>
<td>402.96</td>
<td>25.19</td>
<td>25.19</td>
<td>17.13</td>
<td>0.003</td>
</tr>
<tr>
<td>Wood Transfer/Storage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4.15</td>
<td>4.15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ash Storage Silo</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0074</td>
<td>0.0074</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ash Load-out (fugitive)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0022</td>
<td>0.0010</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Truck Traffic (fugitive)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.564</td>
<td>0.2131</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Emergency Generator</td>
<td>10.26</td>
<td>1.80</td>
<td>3.03</td>
<td>0.36</td>
<td>0.36</td>
<td>0.32</td>
<td>-</td>
</tr>
<tr>
<td>Diesel Storage Tank</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Neg.</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>161.37</strong></td>
<td><strong>26.99</strong></td>
<td><strong>405.99</strong></td>
<td><strong>31.27</strong></td>
<td><strong>29.92</strong></td>
<td><strong>17.45</strong></td>
<td><strong>0.003</strong></td>
</tr>
</tbody>
</table>

PM emissions for wood handling and ash storage is based on the requested limit which is grain loading based.

Table 4.0

<table>
<thead>
<tr>
<th>Emission Unit/Activity</th>
<th>NOx Tons/year</th>
<th>SOx Tons/year</th>
<th>CO Tons/year</th>
<th>PM Tons/year</th>
<th>PM10 Tons/year</th>
<th>VOC Tons/year</th>
<th>Lead Tons/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Boiler</td>
<td>151.11</td>
<td>25.19</td>
<td>402.96</td>
<td>25.19</td>
<td>25.19</td>
<td>17.13</td>
<td>0.0032</td>
</tr>
<tr>
<td>Wood Transfer/Storage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4.15</td>
<td>4.15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ash Storage Silo</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0074</td>
<td>0.0074</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ash Load-out (fugitive)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0022</td>
<td>0.0010</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Truck Traffic (fugitive)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.367</td>
<td>0.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Emergency Generator</td>
<td>10.26</td>
<td>1.80</td>
<td>3.03</td>
<td>0.36</td>
<td>0.36</td>
<td>0.32</td>
<td>-</td>
</tr>
<tr>
<td>Diesel Storage Tank</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Neg.</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>161.37</strong></td>
<td><strong>26.99</strong></td>
<td><strong>405.99</strong></td>
<td><strong>30.08</strong></td>
<td><strong>29.76</strong></td>
<td><strong>17.45</strong></td>
<td><strong>0.0005</strong></td>
</tr>
</tbody>
</table>

PM emissions for wood handling and ash storage are based on the requested limit, which is grain loading based.

**Wood Yard.** The potential emissions associated with the wood yard site are presented in Table 5.0. All the emissions at the wood yard site are fugitive with the exception of those from the diesel engine that will power the portable wood grinder.
Table 5.0
Potential Tons/Year Emissions
Laurentian Energy Authority Biomass Energy Project Wood Yard

<table>
<thead>
<tr>
<th>Emission Unit/Activity</th>
<th>NOx Tons/year</th>
<th>SOx Tons/year</th>
<th>CO Tons/year</th>
<th>PM Tons/year</th>
<th>PM10 Tons/year</th>
<th>VOC Tons/year</th>
<th>Lead Tons/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Unloading</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.02</td>
<td>0.009</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wood Grinding</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.88</td>
<td>0.88</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wood Conveying</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.75</td>
<td>6.75</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wood Chip Screening</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.25</td>
<td>2.25</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Truck Traffic</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>66.09</td>
<td>12.89</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wood Grinder Diesel Engine</td>
<td>35.6</td>
<td>5.6</td>
<td>9.5</td>
<td>1.1</td>
<td>1.1</td>
<td>1.0</td>
<td>-</td>
</tr>
<tr>
<td>Diesel Storage Tank</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Neg.</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>35.6</td>
<td>5.6</td>
<td>9.5</td>
<td>77.09</td>
<td>23.87</td>
<td>1.0</td>
<td>-</td>
</tr>
</tbody>
</table>

GREENHOUSE GAS EMISSIONS
The LEA project is projected to result in a net reduction in atmospheric greenhouse gas loading over the life of the project. This is the purpose of the original legislature and the reason the PPA exists.

Greenhouse gas emissions are chemicals that, when released to the atmosphere, retain heat near the earth and contribute to global warming. The LEA project will emit such chemicals as an inevitable result of burning fuel. However, the intent behind the project, as embodied in the legislation, is to reduce future atmospheric loads of greenhouse gases by using “renewable fuels.” This is feasible because the renewable biomass fuel is assumed to absorb from the atmosphere, as it grows, an amount of carbon dioxide (the primary greenhouse gas) equal to the amount released when the fuel is burned. In theory, this process is then assumed to “close the loop” as carbon dioxide is continually cycled between the atmosphere and the growing fuel. This is unlike the situation with emissions from coal combustion, in which the carbon dioxide does not cycle back to the fuel source, but remains in the atmosphere indefinitely and, thus, continually builds up as more coal is burned. Although the LEA project will produce greenhouse emissions, a net reduction will result from the facts that: (a) coal use at the power plants will decline with the project, and (b) use of biomass in producing the majority of the contract requirements will supplant some of the future need to build coal fired generation capacity to meet the region’s growing demand for electricity. This was the legislative intent in creating the biomass energy program.

For ease of discussion, greenhouse gas emissions are defined either in terms of actual carbon dioxide emissions or of carbon dioxide equivalents. For example, one unit of methane, another (and more potent) greenhouse gas, is the equivalent, in global warming ability, of 23 units of carbon dioxide on a weight basis. Discussing emissions in terms of carbon dioxide equivalents permits direct comparisons among different emissions, emission sources, and fuels.

In projecting the potential greenhouse emission impacts of a project, it is important also to distinguish between direct emissions (from the LEA plants themselves) and indirect emissions (from other sources, but connected in some way to the LEA project). Examples of the latter include emissions from another power plant that will not occur because the LEA project has eliminated the need for the future generating capacity that would produce them.

In evaluating the greenhouse emission impacts of the LEA project, several different sources of greenhouse gas must be considered. There are currently two options for providing biomass fuels to the LEA project, scenario A and scenario B. As noted in more detail in Item 6 of this EAW, under scenario A 50 percent of the LEA project’s total energy would come from closed loop biomass, and 25 percent would come from open loop biomass. Scenario B models the greenhouse gas impacts for a reversed scenario; 25 percent of biomass from closed loop sources and 50 percent from open loop sources. The greenhouse gas emission mechanisms discussed below are the same for both scenarios; however, those mechanisms produce lower
greenhouse gas benefits under scenario B. Evaluation of scenario A is presented in detailed text form here; evaluation of scenario B relative to scenario A is presented at the end of this section.

Changes in Direct (On-site) Emissions with the Project
Increases or decreases in LEA direct emissions are determined by comparing current greenhouse gas emission levels with net levels that will occur when the project is in full operation. This assumes that current levels will continue indefinitely if the LEA project does not move forward. Because 75 percent of the fuel at full project operation will be biomass, and because the assumption is that biomass greenhouse emissions will be cycled back into biomass, most of the full operation emissions are assumed to cause no net increase in atmospheric greenhouse gas loading. Only the coal portion (25 percent) of emissions must be counted, and coal combustion decreases with the project when compared to past operations. Therefore, net project greenhouse emissions decrease as well, by about 179,000 metric tons as compared with current levels.

New Direct Emissions from Growing and Transporting the Biomass Fuel Crop
Growing biomass fuel means that ‘farming’ activities will take place. To the extent that hybrid poplar is a part of the fuel mix, farming activities will consume energy in the form of diesel fuel expended by tractors and other farm equipment. In addition, the use of nitrogen fertilizers means that farm fields will emit nitrous oxide, another greenhouse gas. Based on the anticipated farming activities and anticipated nitrogen application rates, closed loop biomass farms will emit about 34,000 metric tons of carbon dioxide equivalent greenhouse gas over the 21 years that encompass the life of the LEA PPA. The diesel trucks that transport biomass to the LEA facilities will emit another 54,000 metric tons of greenhouse gas.

Sequestration of Carbon by the Bioenergy Crop
Carbon that is incorporated into soil or otherwise immobilized in the earth is said to be sequestered. Carbon that is sequestered is carbon that is not available to be oxidized to carbon dioxide and contribute to global warming. Sequestration of carbon will occur in a number of ways in the LEA project. As the biomass grows, carbon is worked into the soil profile in the root zone as root secretions, called exudates, feed microorganisms that build carbon into the soil profile. Harvesting of biomass leaves a stump and roots in the ground, along with the carbon bound in that material. Carbon that exists in various forms in the atmosphere is washed out of the air by precipitation and deposited in the soil.

Unharvested plant mass, including stumps and roots, account for about 20 percent of the mass of the harvested portion of the tree. This equates to plant matter sequestration of approximately 167,000 metric tons of carbon dioxide equivalent over the life of the project.

Quantifying the amount of carbon change in the soil profiles beneath the crop is more difficult because it depends in large part on the existing conditions of the land that will be put into biomass production. Use of existing agricultural lands for fuel biomass production could lead to soil carbon sequestration, while use of other types of land such as long-term pasture or wooded pasture for fuel cropping could actually lead to a loss of soil carbon. At this point, the locations where biomass will be harvested are not completely known, and therefore no estimate of carbon sequestration in soil is possible at this time.

Open Loop Biomass Impacts
Unlike farmed closed loop biomass, which is produced exclusively for energy production, open loop biomass would have an alternative fate if not used for LEA fuel. The open loop biomass that LEA proposes to utilize consists of logging wastes, including tree tops, limbs, and unwanted species, as well as other, similar wastes, such as storm damaged trees. However, the net change in greenhouse gas (GHG) emissions for the LEA project will vary depending on the ultimate destination for these wastes. Current practice for this material is to either burn it or leave it behind to decompose in place. If the former, essentially all the carbon is oxidized into carbon dioxide and returned to the atmosphere from whence it originally came. If the latter, approximately 80 percent of the carbon stored in the material is released to the atmosphere, and the remaining 20 percent is worked by decay processes into the soil profile where the carbon is sequestered.
Thus, LEA combustion of open loop biomass achieves less in terms of global warming reduction than would occur if the residues were simply left in the woods. The project will therefore increase greenhouse emissions associated with open loop biomass, by about 241,000 metric tons of carbon dioxide equivalent that would not be generated if the open loop biomass were simply left behind to decompose. On the other hand, to the extent that logging waste is piled and burned, LEA’s plan to use it as fuel merely results in the same greenhouse gas release by different means.

**Indirect Greenhouse Impacts Associated with the LEA Project**

The LEA project will produce 6.44 million megawatt-hours (MWh) of electricity over the life of the project. This electricity will be fed into the regional electric grid where it will eliminate the need to generate electricity elsewhere (probably by burning coal) to meet the region’s electric demand. Currently, power production in the Upper Midwest produces an average emission of 1.84 pounds of greenhouse gas for every kilowatt hour generated. Since some future coal-based generation will be supplanted by the LEA-produced electricity, those emissions are avoided. For the LEA project, it is estimated that more than 4.63 million metric tons of greenhouse gas will be avoided in this manner.

A second indirect impact related to electricity production arises because the Hibbing and Virginia Public Utilities’ ability to generate electricity for use within their communities may be curtailed due to PPA commitments. Historically, the utilities have generated electricity for local consumption and for sale to the regional grid. Their ability to fulfill this generation will be maintained, but most likely at lesser levels. It is projected that the utilities will generate non-LEA electricity of 29,400 MWh per year. This is reduced from their historical generation of 88,742 MWh per year. This deficit in electric generation means that other utilities must generate to fill the deficit, and will burn fuels to do so, creating an additional greenhouse gas burden on the environment. Calculating this impact is based on the assumption that the average electric generation by HPU and VDPU over the past two years would continue at the same level into the future if LEA were not to occur, and subtracting from this value the amount of local use generation projected to occur after LEA is operational. Over the 21-year period that encompasses the life of the LEA power purchase agreement, this would lead to additional greenhouse gas emission (by other utilities in the region) of about 1.04 millions metric tons of carbon dioxide equivalent.

Table 6 summarizes the greenhouse gas impact of the LEA Biomass Energy Project.

<table>
<thead>
<tr>
<th>LEA GHG Emission Activity</th>
<th>Metric tons CO₂-eq over 21-year PPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline GHG Emissions Avoided</td>
<td>-5,946,570</td>
</tr>
<tr>
<td>LEA GHG Emission</td>
<td>5,767,233</td>
</tr>
<tr>
<td>Offset of Electric Generation Emissions</td>
<td>-4,631,109</td>
</tr>
<tr>
<td>Import of Electricity for local consumption</td>
<td>1,042,270</td>
</tr>
<tr>
<td>Closed-Loop Biomass GHG Sequestration</td>
<td>-167,400</td>
</tr>
<tr>
<td>Open-Loop Biomass GHG Emission from Lost Sequestration into Forest Soils</td>
<td>241,277</td>
</tr>
<tr>
<td>GHG Emission from Farming Activities</td>
<td>33,592</td>
</tr>
<tr>
<td>GHG Emission from Fuel Transport</td>
<td>54,308</td>
</tr>
<tr>
<td>Net GHG Emissions over 21-Year PPA</td>
<td>-3,606,399</td>
</tr>
<tr>
<td>Average Annual Change in GHG Emissions</td>
<td>-171,733</td>
</tr>
</tbody>
</table>
The LEA Biomass Energy Project would provide a net greenhouse gas reduction of more than 3.6 million metric tons of carbon dioxide over the 21-year period encompassing the life of the PPA. This equates to an average reduction of more than 171,000 metric tons of carbon dioxide annually. To put these figures into perspective, in 2000 the state of Minnesota is estimated to have emitted 138 million metric tons of carbon dioxide equivalent. The reductions that will occur from the LEA would represent a decrease of just over 0.1 percent of total Minnesota emissions.

**Equivalency of Emission Reductions**

It can be difficult to put greenhouse gas emission figures into an understandable perspective. The table below lists some common activities and provides an estimate of the levels of those activities that would compare to the emission reduction generated by the project. For example, the GHG emission reduction from the project, 171,733 metric tons of carbon dioxide equivalent per year, would equate to removing more than 37,000 cars from use for a year. A total annual greenhouse gas reduction of 171,733 metric tons of carbon dioxide equivalent is equivalent to one of the following:

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Metric tons CO₂-eq per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger cars not driven for one year</td>
<td>37,172</td>
</tr>
<tr>
<td>Passenger cars and light trucks not driven for one year</td>
<td>30,171</td>
</tr>
<tr>
<td>Gallons of gasoline</td>
<td>19,599,567</td>
</tr>
<tr>
<td>Barrels of oil</td>
<td>399,379</td>
</tr>
<tr>
<td>Tanker trucks filled with gasoline</td>
<td>2,302</td>
</tr>
<tr>
<td>Household electricity use for one year (number of households)</td>
<td>22,045</td>
</tr>
<tr>
<td>Number of tree seedlings grown for ten years</td>
<td>4,403,410</td>
</tr>
<tr>
<td>Acres of pine or fir forests storing carbon for one year</td>
<td>143,111</td>
</tr>
<tr>
<td>Acres of forest preserved from deforestation</td>
<td>1,408</td>
</tr>
<tr>
<td>Propane cylinders used for home barbecues</td>
<td>7,155,542</td>
</tr>
<tr>
<td>Railcars of coal burned</td>
<td>873</td>
</tr>
<tr>
<td>Tons of waste recycled instead of landfilled</td>
<td>57,823</td>
</tr>
</tbody>
</table>

**Greenhouse Gas Impacts of Fuel Use Scenario B**

The Minnesota Legislature is currently considering amendments to the original statute that defines the fuel selection alternatives for the LEA project. If the amendments pass, the project will be able to alter its mix of biomass fuels to use more open loop biomass, and require less growing of dedicated energy crops. This has the potential to alter the net balance of greenhouse gas emissions for the project. Table 7.0 presents the scenario B summary for GHG impacts.

<table>
<thead>
<tr>
<th>LEA GHG Emission Activity</th>
<th>Metric tons CO₂-eq over 21-year PPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline GHG Emissions Avoided</td>
<td>-5,946,570</td>
</tr>
<tr>
<td>LEA GHG Emission</td>
<td>5,767,233</td>
</tr>
<tr>
<td>Offset of Electric Generation Emissions</td>
<td>-4,631,109</td>
</tr>
<tr>
<td>Import of Electricity for Home Use</td>
<td>1,042,270</td>
</tr>
<tr>
<td>Closed-Loop Biomass GHG Sequestration</td>
<td>-38,040</td>
</tr>
<tr>
<td>Open-Loop Biomass GHG Emission from Lost Sequestration into Forest Soils</td>
<td>679,159</td>
</tr>
<tr>
<td>GHG Emission from Farming Activities</td>
<td>4,534</td>
</tr>
<tr>
<td>GHG Emission from Fuel Transport</td>
<td>54,308</td>
</tr>
<tr>
<td>Net GHG Emissions over 21-Year PPA</td>
<td>-3,068,215</td>
</tr>
<tr>
<td>Average Annual Change in GHG Emissions</td>
<td>-146,105</td>
</tr>
</tbody>
</table>

Scenario B differs from Scenario A only in the mix of biomass energy sources employed to fulfill the PPA. All of the GHG emission mechanisms described above remain applicable. Scenario B results in somewhat
lower net GHG benefits than Scenario A because the legislation would lead to higher utilization of open loop biomass, and lower utilization of closed loop biomass. Higher utilization of open loop biomass leads to less sequestration of carbon into soils where the biomass is harvested. Lower utilization of closed loop biomass leads to less sequestration beneath managed crop lands. This is only partially offset by a decrease in emissions that arise from ‘farming’ activities, which are also reduced since less crop is being grown.

There would still be greenhouse gas benefits, however. Under Scenario B, the LEA Bioenergy Project would provide a net greenhouse gas reduction of nearly 3.1 million metric tons of carbon dioxide over the 21 year period encompassing the life of the PPA. This equates to an average reduction of more than 146,000 metric tons of carbon dioxide annually.

IMPACT ON AIR QUALITY

The installation of the wood-fired boilers is considered a major modification to each of the existing utilities, which currently have Clean Air Act Amendment Title V operating permits. The wood-fired boiler and associated emission sources will be added to the existing permits for each municipal utility. The LEA Biomass Energy Project does not modify or change the method of operation of any currently existing emission units.

The proposed boilers will be constructed in an area that is attaining the National Ambient Air Quality Standards (NAAQS)\(^7\), or is not designated. This means that federal New Source Review PSD rules must be evaluated for applicability. PSD is the permitting process by which USEPA, through MPCA, ensures that areas with good air quality are not degraded due to new development. Based upon total project potential emissions, PSD review is required for PM, PM\(_{10}\), NO\(_x\), and CO. PSD permitting requires employment of BACT, demonstration of compliance with NAAQS based on refined air dispersion modeling, analysis of additional impacts such as growth, and a Class I area impact analysis. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which the PSD regulations are intended to provide special protection. Two Class I areas are within the review area for this project, Voyageurs National Park, and the Boundary Waters Canoe Area Wilderness.

The results of the impact analysis for the Class I areas are presented in Tables 8.0 and 9.0. The LEA Biomass Energy Project was shown to not have a significant impact to either Class I area.

<table>
<thead>
<tr>
<th>Predicted Impact to Class I Areas for LEA Biomass Energy Project Virginia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollutant</td>
</tr>
<tr>
<td>PM(_{10}) - 24-hr standard</td>
</tr>
<tr>
<td>PM(_{10}) - Annual standard</td>
</tr>
<tr>
<td>NO(_x) - annual standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predicted Impact to Class I Areas for LEA Biomass Energy Project Hibbing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollutant</td>
</tr>
<tr>
<td>PM(_{10}) - 24-hr standard</td>
</tr>
<tr>
<td>PM(_{10}) - Annual standard</td>
</tr>
<tr>
<td>NO(_x) - annual standard</td>
</tr>
</tbody>
</table>

The PSD review completed for this project and the detail of the analysis can be found in the air permit

\(^7\) EPA sets the National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. There are primary and secondary standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.
application submitted to the MPCA. In summary, the project will be employing SNCR as BACT for NOx, an electrostatic precipitator as BACT for PM and PM10, and good combustion practices as BACT for CO. The modeling indicated there are no significant impacts for CO or NOx, so additional modeling for these pollutants did not need to be performed. PM10 did have predicted impacts over USEPA significance thresholds, so air dispersion modeling was performed to demonstrate that the additional emissions of PM10 from this project, combined with all other major sources in the area (50 kilometer radius), did not contribute to an exceedance of a NAAQS standard or PSD increment allowance.

The impacts from all facilities have been evaluated for their cumulative impacts by means of the prescribed EPA model, and the total impact is compared to PSD increment and NAAQS standards. Table 10 presents a summary of the NAAQS compliance analysis. Table 11 summarizes PSD increment consumption. The predicted impacts are all below the NAAQS standards and PSD increment standards.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>NAAQS ug/m³</th>
<th>Hibbing and ALL Known Contributors ug/m³</th>
<th>Virginia and ALL Known Contributors ug/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM10 - annual</td>
<td>50</td>
<td>45.99353</td>
<td>31.64045</td>
</tr>
<tr>
<td>PM10 – 24 hour</td>
<td>150</td>
<td>130.82701</td>
<td>126.99362</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Class II PSD Increment Standard ug/m³</th>
<th>Hibbing and ALL Known Contributors ug/m³</th>
<th>Virginia and ALL Known Contributors ug/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM10 - annual</td>
<td>17</td>
<td>6.06523</td>
<td>4.09146</td>
</tr>
<tr>
<td>PM10 – 24 hour</td>
<td>30</td>
<td>18.07928</td>
<td>24.63900</td>
</tr>
</tbody>
</table>

Air Impact Summary
The analysis competed as part of this assessment indicates that the proposed LEA Biomass Energy Project will not adversely affect the ambient air quality in the area.

However, during the review for the LEA Biomass Energy Project it was discovered that the historical SO2 limits at Hibbing might not have been as protective of ambient air quality as would be desired for the existing coal-fired boilers. To address this, the following actions will be undertaken:

1. **Reduced SO2 emissions limit.** The Hibbing Public Utility has requested an SO2 emission limit of 1.58 lb/MMBtu per boiler under any and all combinations of boiler operation. This emission limit is reduced from historical limits when the facility is operating only one or two of the coal-fired boilers. This limit is identical to historical limits when all three coal-fired boilers are operating.

2. **New stack configuration.** The exhaust from boilers 1A and 2A will be combined into a single (42-foot taller) stack that will provide for lower concentrations of SO2. This provides for improved stack gas dispersion and exit velocities, which in turn will lead to lower concentrations of SO2 in the outside air.
3. **Complete up-to-date modeling.** The SO$_2$ emissions from the facility have been modeled to current USEPA and MPCA standards in order to demonstrate the effectiveness of the proposed changes. Dispersion modeling also has been completed for PM$_{10}$, NOx, and CO with the facility’s existing configuration. The permit will require remodeling based on the new stack configuration for those three pollutants. SO$_2$ model results are summarized in Table 12.

4. **Create a permit condition.** The changes described above will be placed into the permit for the Hibbing facility as a legally binding condition. The changes must be completed prior to startup of the LEA Biomass Energy Project.

### Table 12

**Hibbing Public Utility SO$_2$, NAAQS and MAAQS Compliance Summary***

<table>
<thead>
<tr>
<th>Averaging Period</th>
<th>NAAQS and MAAQS ($\mu g/m^3$)</th>
<th>Hibbing and All Other Sources** ($\mu g/m^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Hour</td>
<td>1300</td>
<td>1169</td>
</tr>
<tr>
<td>3-Hour</td>
<td>915</td>
<td>866</td>
</tr>
<tr>
<td>24-Hour</td>
<td>365</td>
<td>350</td>
</tr>
<tr>
<td>Annual</td>
<td>60</td>
<td>21</td>
</tr>
</tbody>
</table>

*for SO$_2$, facilities must meet both National Ambient Air Quality Standards and the Minnesota Ambient Air Quality Standard (1-hour average)

**impacts of all other sources are included through use of MPCA background concentrations that represent their contributions

24. **Odors, noise, and dust.** Will the project generate odors, noise or dust during construction or during operation?

<table>
<thead>
<tr>
<th>Location</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Hibbing</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Wood Yard</td>
<td>☒</td>
<td>☐</td>
</tr>
</tbody>
</table>

If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

**Odors:**
While most people are familiar with the odors that accompany wood fires, combustion of wood in a boiler differs from that in a fireplace, campfire, or stove. An industrial boiler is a controlled combustion unit where factors necessary for efficient combustion (such as oxygen) can be monitored and optimized as necessary. This is generally not the case for residential type wood combustion, and the latter can produce typical wood burning odors as a result. The engineered residence time, temperature and turbulence in an industrial boiler are such that many organic compounds that would cause an odor to occur are destroyed in such a system.

It is anticipated that the remaining areas for odor concern are the ammonia injection system for the SNCR, (a phenomenon known as “ammonia slip”), and from the wood storage silo.
Ammonia slip is a phenomenon that occurs when ammonia is injected into a flue gas stream to reduce NOx emissions to nitrogen gas. While this process is desirable in that it reduces NOx emissions, some ammonia “slips” through without reacting with the NOx and is therefore emitted to the atmosphere with the treated flue gas. This is controllable by means of a restriction on the allowable concentration of ammonia used in the SNCR. A restriction was therefore proposed and is included in the permit amendment applications submitted for the project. Ammonia odors are therefore expected to be minimal.

Fermentation of the wood in storage can be another source of odor. This is not an issue under normal operating conditions because wood turnover is so frequent, but it can be an issue if a shutdown leaves the storage silo stagnant for an extended period. The boiler maintenance is pre-scheduled to allow for the wood bin to be emptied prior to maintenance. If an unplanned shutdown makes this impossible, the fact that the wood handling facilities are totally enclosed may make it feasible to release any airborne odors during the night time hours when their impact would likely be reduced. Only one day of wood storage is planned for Hibbing and Virginia, and the wood is handled as “first in-first out” so as to prevent stagnation which could lead to fermentation. As part of the wood handling design, the final design of the conveying system will allow the silo to be emptied if an extended shutdown were to occur. Once emptied, the wood would be returned to the wood yard for storage. Fermentation odors should therefore be minimal except in emergency situations, and then for short periods only.

Wood will be stored at the wood yard site for a longer period than at the utility locations. However, the wood storage piles are designed so as to allow “first in-first out” removal of wood. In addition, loggers that have provided recommendations on the design of the wood yard indicate that decomposition of the wood should not be an issue if it is stored less than one year.

The wood storage will be on a paved pad and front-end loaders will be used to reclaim the pile. BMPs will be used to prevent wood from becoming stagnant and biodegrading, thus reducing potential odors from the wood storage. Decomposition decreases the energy value of the wood, so the wood storage will be managed so as to minimize the process. In addition, the wood yard site is a rural location, which minimizes the potential for impact.

Noise:
Minnesota has noise standards that are designed to be consistent with sleep, speech, annoyance, and hearing conservation requirements for receivers within areas grouped according to land use activities.

The Minnesota standards are presented in Table 13:

<table>
<thead>
<tr>
<th>Site</th>
<th>7:00 AM to 10:00 PM</th>
<th>10:00 PM to 7:00 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( L_{50} )</td>
<td>( L_{50} )</td>
</tr>
<tr>
<td>NAC-1 (“Residential”)</td>
<td>65 60</td>
<td>55 50</td>
</tr>
<tr>
<td>NAC-2 (“Commercial”)</td>
<td>70 65</td>
<td>70 65</td>
</tr>
<tr>
<td>NAC-3 (“Industrial”)</td>
<td>80 75</td>
<td>80 75</td>
</tr>
</tbody>
</table>

\( L_{10} \) means the sound level that is exceeded for 10 percent of the time for a one-hour period. \( L_{50} \) means the sound level that is exceeded 50 percent of the time for a one-hour period. Sound levels are expressed in decibels, as a time weighted average (dBA). A dBA is a unit of sound level expressed in decibels and weighted for the purpose of approximating the human response to sound.
Virginia Noise
In Virginia, the key sensitive noise receptors are three residences located to the north, east, and west of the facility property. Figure V6 shows the location of each of these areas. Existing noise levels and impacts of the proposed facility have been analyzed at each of these locations.

Existing Noise Levels
SBP Associates, Inc. (SBP) conducted noise monitoring in each of the three residential areas near the facility. The locations are shown in Figure V8.

Results of the monitoring are presented in Table 14:

Table 14
Virginia Monitored Noise Levels

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Monitored Noise Levels</th>
<th>Plant Contribution to Noise Levels.*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$L_{10}$</td>
<td>$L_{50}$</td>
</tr>
<tr>
<td>1</td>
<td>West of Facility</td>
<td>54.5</td>
<td>47.0</td>
</tr>
<tr>
<td>2</td>
<td>East of Facility</td>
<td>60.5</td>
<td>52.0</td>
</tr>
<tr>
<td>3</td>
<td>North of Facility</td>
<td>74.5</td>
<td>70.0</td>
</tr>
</tbody>
</table>

* Heavy traffic near sites 2 and 3 impacted these results. Vehicles idling near the noise monitor affected the $L_{10}$ at site 1. The facility contributions were determined by further analyzing the data and examining readings taken when traffic noise was not present.

The plant contribution to noise levels at Site 3 is above the State nighttime standards. This was apparently due to a malfunctioning silencer on a steam vent associated with the ash handling system. VDPU is investigating this issue and will remediate it, and then demonstrate compliance with Minnesota Standards.

New Noise Sources and Impacts
The most significant potential noise sources associated with the proposed project will be the following:

- Combustion Air Fans
- Conveyors
- ESP Operation (vibrators and rappers)
- Mobile Equipment (Fuel delivery trucks and front end loader operations.)
- Soot Blowing Operations
- Stack noise
- Steam Vents

All combustion air fans, the ESP vibrators and rappers, and the soot blowing equipment associated with the development of the added biomass equipment will be located in sound insulated structures. The buildings will be designed to assure noise reduction adequate to assure compliance with Minnesota noise standards. Stack noise will be evaluated and a silencer will be employed if necessary. Steam vents will only be used for emergency purposes and for “steam blowing” to remove welding fragments during the start up of the facility. The remaining significant sources of noise are three combustion air fan intakes, the fuel conveyors, and the mobile equipment.

Preliminary data indicate these sources will produce the following noise levels:
Using the above data and the proposed site plan, SBP estimated the impact of the new facility at each of the three residential locations. The following table shows the predicted impact along with the existing noise levels and the total anticipated impact at each receptor location. The analysis assumes the remediation of the steam vent silencer impacting Site 3 will result in existing facility related noise level impacts that are the same as the impact at Site 2. Table 15 presents the noise impact of the Virginia LEA Biomass Energy Project.

<table>
<thead>
<tr>
<th>Source</th>
<th>Noise Level (dBA at 100 feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L\text{\textsubscript{10}}</td>
</tr>
<tr>
<td>Combustion Air Fan Intakes (with proposed silencers)</td>
<td>57</td>
</tr>
<tr>
<td>Conveyors</td>
<td>57</td>
</tr>
<tr>
<td>Fuel Delivery Trucks</td>
<td>74*</td>
</tr>
<tr>
<td>Front End Loader Operations</td>
<td>76.0**</td>
</tr>
</tbody>
</table>

* The L\text{\textsubscript{10}} truck data is based on Minnesota noise rules for maximum noise levels for trucks over 10,000 lbs. The L\text{\textsubscript{50}} assumes an idling truck. ** The front end loader data is based on monitoring data collected at the Virginia Public Utilities facility.

Based on this preliminary noise analysis, the above table shows post-construction noise levels will be within State nighttime standards for the steady facility noise sources. The facility design will incorporate proper shielding from the residential areas by utilizing the existing and proposed structures as barriers.

The preliminary analysis also indicates that the front end loader operations will need to be limited during nighttime (10:00 pm to 7:00 am) operations to assure compliance with Minnesota Standards. Specifically, outdoor use of the front end loader would need to be limited to brief periods of less than six minutes in any hour to assure compliance with the standards.

Hibbing Noise
The Hibbing facility is also located within a residential area. Homes are located adjacent to the facility to the east, southwest, and north (across the adjacent railroad tracks). Figure H6 shows the location of these areas. Impacts of the proposed facility have been analyzed at each of these locations.

Existing Noise Levels
A preliminary noise study at the Hibbing Public Utilities has indicated that the existing facility, operating at full load, may exceed Minnesota night time standards for noise emissions. The monitoring locations for the noise study are shown in Figure H8.
Table 16 presents the following maximum facility-related noise impacts based on monitoring data.

### Table 16

**Hibbing Monitored Noise Levels**

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Monitored Noise Levels (dBA)</th>
<th>(L_{10})</th>
<th>(L_{50})</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Residence SW of Facility</td>
<td></td>
<td>58.5</td>
<td>57.0</td>
</tr>
<tr>
<td>2</td>
<td>Residences East of Facility</td>
<td></td>
<td>59.0-61.0</td>
<td>57.5-59.5</td>
</tr>
<tr>
<td>3</td>
<td>Residences North of Facility</td>
<td></td>
<td>61.5</td>
<td>60.0</td>
</tr>
</tbody>
</table>

HPU has taken steps to insure that the facility will be in compliance with Minnesota noise standards. LEA has engaged its owners’ engineering consultant, Harris Group, Inc. (HGI), to begin engineering activities to reduce noise emitted from the existing facility. The majority of the noise is from the plant’s cooling towers. HGI has contacted the manufacturer of the cooling towers and is investigating methods for noise remediation, including analysis of inlet air noise attenuation baffles, low noise fans, and noise barrier walls.

Upon selection of remediation means, SBP will be contracted to perform site noise monitoring and/or modeling, incorporating this remediation overlaid on the existing plant and intended new biomass equipment, to demonstrate compliance with Minnesota Standards.

### New Noise Sources and Impacts

The most significant potential noise sources associated with the proposed project will be the following:

- Combustion Air Fans
- Conveyors
- Electrostatic Precipitator Operation (vibrators and rappers)
- Mobile Equipment (Fuel delivery trucks and front end loader operations.)
- Soot Blowing Operations
- Stack noise
- Steam Vents

All combustion air fans, the ESP vibrators and rappers, and the soot blowing equipment associated with the development of the added biomass equipment will be located in sound insulated structures. The buildings will be designed to assure noise reduction adequate to assure compliance with Minnesota noise standards. Stack noise will be evaluated and a silencer will be employed if necessary. Steam vents will only be used for emergency purposes and for “steam blowing” to remove welding fragments during the start up of the facility. The remaining significant sources of noise are the three combustion air fan intakes, the conveyors, and the mobile equipment. Table 17 summarizes source noise levels.

### Table 17

**Hibbing Biomass Energy Facility Noise Source Levels**

<table>
<thead>
<tr>
<th>Source</th>
<th>Noise Level (dBA at 100 feet)</th>
<th>(L_{10})</th>
<th>(L_{50})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustion Air Fan Intakes (with proposed silencers)</td>
<td></td>
<td>57</td>
<td>55</td>
</tr>
<tr>
<td>Conveyors</td>
<td></td>
<td>57</td>
<td>55</td>
</tr>
<tr>
<td>Fuel Delivery Trucks</td>
<td></td>
<td>74*</td>
<td>&lt; 60*</td>
</tr>
<tr>
<td>Front End Loader Operations</td>
<td></td>
<td>76.0**</td>
<td>72.0**</td>
</tr>
</tbody>
</table>

\* The \(L_{10}\) truck data is based on Minnesota noise rules for maximum noise levels for trucks over 10,000 lbs. The \(L_{50}\) assumes an idling truck. \** The front end loader data is based on monitoring data collected at the Virginia Public Utilities facility.
Based on a preliminary noise analysis conducted by SBP, the proposed fan intakes (with silencers) and conveyors will operate within Minnesota standards. Design will incorporate proper shielding from the neighborhood to the east of the facility by utilizing the existing and proposed structures as barriers. Table 18 shows the preliminary estimated impact at each of the three analyzed residential locations.

<table>
<thead>
<tr>
<th>Location</th>
<th>Site 1</th>
<th>Site 2</th>
<th>Site 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L_{10}</strong></td>
<td><strong>L_{50}</strong></td>
<td><strong>L_{10}</strong></td>
<td><strong>L_{50}</strong></td>
</tr>
<tr>
<td>Background Noise Levels</td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td>New Facility Impact</td>
<td>44.5</td>
<td>43.0</td>
<td>49.0</td>
</tr>
<tr>
<td>Total Post Construction Impact</td>
<td>&lt;55.0</td>
<td>&lt;50.0</td>
<td>&lt;55.0</td>
</tr>
</tbody>
</table>

**Existing background noise levels will be determined after remediation of the existing cooling tower noise levels.**

The preliminary analysis also indicates that the front end loader operations will need to be limited during nighttime (10:00 pm to 7:00 am) operations to assure compliance with Minnesota standards. Specifically, outdoor use of the front end loader would likely need to be limited to brief periods of less than six minutes in any hour to assure compliance with the standards.

**Wood Yard Noise**

Significant noise levels to the surrounding neighbors are not anticipated. The nearest neighbor to the wood yard site is currently a residence located north of the site, across Haley Road. The residential property is to be acquired by the Chisholm-Hibbing International Airport, as part of a five-year buyout plan. The airport is located east of the site, directly across Dublin Road (eastern border of site). Rural properties are located southeast (across Dublin Road) and south (off Wegener Road) of the wood yard site. The residential properties south of the proposed site are adjacent to the southwest portion of the site. The area west of the site is undeveloped. The nearest neighbors are the ones to the south at a distance of approximately 670 feet to the wood yard property boundary. These areas are shown in Figure W6.

Sources of noise for the wood yard site include wood receiving/distributing, handling and storage activities. The main source of noise from the wood yard will be the portable grinder.

Wood will be either brought to the wood yard site already chipped or the grinding will occur on-site. Sound data were obtained from a manufacturer of portable wood grinders. According to the manufacture, at a distance of 20 feet the sound level was below 102 decibels. On the non-drive side of the machine the sound levels were 90-95 decibels. The noise is very low frequency. If needed, the manufacturer can provide sound deadening panels, curtains, etc. to reduce the noise. None of the grinding would occur at night so the daytime noise standards would apply.

The nearest receptor is a residence and MPCA rules designate residential property as a Class 1 Noise Area. In order to meet the state noise standards for a Class 1 Noise Area, the following noise levels must not be exceeded for the nearest receiver:

<table>
<thead>
<tr>
<th><strong>Minnesota Noise Standards</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L_{50}</strong> (DBA)</td>
</tr>
<tr>
<td><strong>Daytime</strong></td>
</tr>
<tr>
<td><strong>Nighttime</strong></td>
</tr>
</tbody>
</table>
The wood yard will only be operated during daylight hours, so only the daytime standard applies. The nearest residences are estimated to be about 1,670 feet to the south and west of where the grinder will be located in the wood yard. Since the manufacturer indicated the sound level was below 102 decibels at 20 feet, the attenuation of the noise based on distance will start with this value. According to state noise control guidance, when the distance is doubled from a point source, the sound level decreases by six decibels.

Starting with 102 decibels at 20 feet, the attenuation would be as follows:

- 102 decibels at 20 feet
- 96 decibels at 40 feet
- 90 decibels at 80 feet
- 84 decibels at 160 feet
- 78 decibels at 320 feet
- 72 decibels at 640 feet
- 66 decibels at 880 feet
- 60 decibels at 1,760 feet

Therefore, a residence at 1,670 feet would expect to experience approximately 63 decibels from the grinder.

Additionally, a stand of trees about 670 feet in width lies between the grinder and the residences. There is some attenuation of noise due to foliage. Foliage based attenuation of a noise at a frequency of 31.5 Hz would be 0.02 decibels per meter, up to a maximum of 650 feet of foliage path length. Higher frequencies attenuate more quickly. The frequency of the grinder is not known other than it is a low frequency noise, so the lowest attenuation level available (4 decibels) was assumed for calculation purposes. This reduces the 63 decibels expected after distance attenuation to 59 decibels.

The trucks will also be another source of noise. Heavy truck traffic reaches about 80 decibels at a distance of 50 feet. The trucks will be used to deliver wood chips and whole biomass for grinding, and to pick up wood chips for distribution to the plant sites. Truck traffic would be expected to get no closer to the southern property boundary than about 150 feet. This would put the distance between routine wood yard truck traffic and the nearest residence at about 850 feet. The truck traffic would only be a periodic noise and not constant, and would only occur in day time. In addition, the noise information for trucks is based on highway speeds, whereas speed levels at the wood yard will be approximately ten miles per hour.

Starting with 80 decibels at 50 feet, the attenuation would be as follows:

- 80 decibels at 50 feet
- 74 decibels at 100 feet
- 68 decibels at 200 feet
- 62 decibels at 400 feet
- 56 decibels at 800 feet
- 50 decibels at 1600 feet

Trees will also help attenuate the noise from trucks driving on the wood yard site, to the same extent as with the grinder:

56 decibels – 4 decibels = 52 decibels

The noise impact from the truck traffic will, therefore, be about 52 decibels at the nearest residence.
Addition of Decibel Levels
When a sound energy is doubled the actual measurable increase in the decibel level is 3dB because of the logarithmic characteristic of noise. The grinder noise added to the truck noise less than doubles the expected noise level. The expected decibel increase, instead of 3dB, would be 2.8dB. This brings the noise level to 61.8 dB at the nearest residence. Since the trucks will not be a constant noise, the grinder by itself should be compared to the L50 and the combined noise level (grinder and trucks) should be compared to the L10. Table 20 presents the results of the noise review for the wood yard.

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Noise Threshold (decibels)</th>
<th>Standard (decibels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinder</td>
<td>59</td>
<td>60</td>
</tr>
<tr>
<td>Grinder/Truck Traffic</td>
<td>61.8</td>
<td>65</td>
</tr>
</tbody>
</table>

State noise standards will therefore not be exceeded.

Dust:
The wood receiving, handling and storage components of the project are all potential dust sources. Dust collection and vented enclosures will be utilized for pollution control. The control equipment for storage silos will be a baghouse, and bin vent filters will be used for transfer points in conveyors and related equipment. These control systems will minimize fugitive dust emissions from the material handling processes.

Some dust will be generated during the construction activities. However, impacts should be minimal due to the relatively limited area that will be disturbed. Dust will be managed as needed through the use of water or other similar methods. Some dust may be generated from truck traffic associated with the project; however, since the truck route is an existing, paved route, fugitive dust emissions are expected to be minimal. Detailed information regarding truck traffic dust impacts is provided in Item 23 above.

At the wood yard, dust will be minimized by paving the driving areas. A dust enclosure will be constructed for unloading trucks, and an enclosure will be constructed for the screening operations. The ash storage bunker will be covered and have three sides. Trees will be planted around the ash storage bunker to help reduce the impact of wind.

Some dust will be generated during the construction activities at the wood yard site. Dust will be managed as needed through the use of water or other similar methods. Some dust may be generated from truck traffic associated with the project; however, the truck drive area will be paved in order to reduce fugitive dust emissions.

25. Nearby resources. Are any of the following resources on or in proximity to the site?
   Virginia:
   a. Archaeological, historical, or architectural resources? ☒ Yes ☐ No
   b. Prime or unique farmlands or land within an agricultural preserve? ☐ Yes ☒ No
   c. Designated parks, recreation areas, or trails? ☐ Yes ☒ No
   d. Scenic views and vistas? ☒ Yes ☐ No
   e. Other unique resources? ☒ Yes ☐ No
   Hibbing:
   a. Archaeological, historical, or architectural resources? ☒ Yes ☐ No
   b. Prime or unique farmlands or land within an agricultural preserve? ☐ Yes ☒ No
   c. Designated parks, recreation areas, or trails? ☒ Yes ☐ No
   d. Scenic views and vistas? ☒ Yes ☐ No
   e. Other unique resources? ☒ Yes ☐ No
Wood Yard:

a. Archaeological, historical, or architectural resources? ☒ Yes ☐ No
b. Prime or unique farmlands or land within an agricultural preserve? ☒ Yes ☐ No
c. Designated parks, recreation areas, or trails? ☒ Yes ☐ No
d. Scenic views and vistas? ☒ Yes ☐ No
e. Other unique resources? ☒ Yes ☐ No

If yes, describe the resource and identify any project-related impacts on the resources. Describe any measures to minimize or avoid adverse impacts.

Virginia
The VDPU is centrally located in the City of Virginia. Olcott (city) Park is located a half mile northwest of the utility and there are several athletic fields within several blocks west. The LEA Biomass Energy Project will be located within the existing VDPU site property and does not involve the expansion of the existing site area. The project will be consistent with the current zoning at the property, and will not physically encroach on recreation areas, wildlife refuges, or trails.

The MHS was contacted to review the LEA Biomass Energy Project location and identify properties listed on the National or State Registers of Historic Places and known or suspected archaeological properties affected by the project. No archaeological sites were identified for the project location. An area north and east of the VDPU site is identified as the Chestnut Street Commercial Historic District and has multiple buildings identified in the MHS inventory report. Additionally, there are several other buildings located in downtown Virginia (east of the property) that are identified in the MHS inventory. As previously noted, the LEA Biomass Energy Project will be constructed within the existing utility property and is not anticipated to impact historical structures in the area. An MHS correspondence for the surrounding Virginia area is attached as Attachment D.

Hibbing
The HPU is located on the north side of the city of Hibbing. Two parks (Bennett and Frank Hibbing) are located within three to four blocks of the utility. The LEA Biomass Energy Project will be located within the existing HPU site property and does not involve the expansion of the existing site area. The project will be consistent with the current zoning at the property, and will not encroach on recreation areas, wildlife refuges, or trails.

The MHS was contacted to review the LEA Biomass Energy Project location and identify properties listed on the National or State Registers of Historic Places and known or suspected archaeological properties affected by the project. No archaeological sites were identified for the project location. The original HPU building structure, referred to as ‘Municipal Power Plant’, is listed on the MHS inventory. New project construction will be located at the opposite end of the HPU property, thereby not altering the original structure. There are several buildings located in downtown Hibbing (south of the property) that are identified in the MHS inventory. As previously noted, the LEA Biomass Energy Project will be constructed within the existing HPU property and is not anticipated to impact historical structures in the area. MHS correspondence for the surrounding Hibbing area is attached as Attachment E.

Wood Yard
The MHS was contacted to review the wood yard site location and identify properties listed on the National or State Registers of Historic Places and known or suspected archaeological properties affected by the project. No archaeological sites or historic structures were identified in the Minnesota State Historic Preservation Office cultural resources databases for the wood yard site location. The MHS database search did not identify any sites on the surrounding area.

Additionally, the city of Hibbing was contacted to determine if there were any special land designations.
associated with the wood yard site location. The city indicated that there are no special designations for this area.

26. **Visual impacts.** Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks?

<table>
<thead>
<tr>
<th></th>
<th>Virginia</th>
<th>Hibbing</th>
<th>Wood Yard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If yes, explain.

**Virginia**
The exhaust from the wood-fired boiler will be emitted through a 150-foot stack. The stack’s water vapor plume will be visible from varying distances, depending on the weather conditions and ambient temperatures. The stack will be very similar, both in size and exhaust characteristics, to the existing utility facility. The LEA Biomass Energy Project will be consistent with the current zoning at the property.

**Hibbing**
The exhaust from the wood-fired boiler will be emitted through a 150-foot stack. The stack’s water vapor plume will be visible from varying distances, depending on the weather conditions and ambient temperatures. The stack will be very similar, both in size and exhaust characteristics, to the existing utility facility. The LEA Biomass Energy Project will be consistent with the current zoning at the property.

**Wood Yard**
The wood yard site will be designed to minimize visual impacts to the surrounding area. Structures (dust and screening enclosures, and scale house/office) and lighting will be constructed at the site. There are currently no structures or lighting at the site. Construction activities are not anticipated to create adverse visual impacts. Operations at the wood yard site are planned to occur during the daytime (12 hour period), limiting visual impacts associated with the operations at the site. The wood yard site will be fully illuminated during operating hours, and at least partially lit during the night time hours. The airport is aware of the lighting needs and has indicated it will not adversely affect operation of the airport.

27. **Compatibility with plans and land use regulations.** Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency?

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<th>Virginia</th>
<th>Hibbing</th>
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If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

**Virginia**
The city of Virginia has indicated that the LEA Biomass Energy Project construction planned for the VDPU property is not in the Comprehensive Plan (circa 1997), but is consistent with current zoning and is not subject to any further review at the local level.

**Hibbing**
The city of Hibbing has indicated that the LEA Biomass Energy Project construction planned for the HPU property is consistent with the zoning for the area (Light Industrial) and is not subject to a Comprehensive Plan. The city of Hibbing has also indicated that all public utility projects, including the LEA Biomass Energy Project, are subject to a Conditional Use Permit that must be issued by the Hibbing Planning Commission.

**Wood Yard**
The city of Hibbing has indicated that the construction of the wood yard site does not require rezoning, but a Conditional Use Permit is required for the facility from the Hibbing Planning Commission.

28. **Impact on infrastructure and public services.** Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project?

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<td>Virginia</td>
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<tr>
<td>Hibbing</td>
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<tr>
<td>Wood Yard</td>
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If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

**Wood Yard**
Existing infrastructure in the area will require upgrades or extensions for the wood yard site. Electrical services are located at the site, but will likely need to be upgraded for facility requirements. City water services will need to be extended to the property from the Highway 37 right of way, approximately one-half mile north of the property. In addition, road upgrades will be required, as discussed in Item Number 21.

29. **Cumulative impacts.** Minn. R. 4410.1700, subp. 7, item B requires that the RGU consider the “cumulative potential effects of related or anticipated future projects” when determining the need for an environmental impact statement. Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative impacts. Describe the nature of the cumulative impacts and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to cumulative impacts (or discuss each cumulative impact under appropriate item(s) elsewhere on this form).

The PPA between Xcel and LEA is for a period of 20 years. If this project is successful, more than likely the wood-fired boilers will continue to operate past the initial PPA timeframe. No other future projects are currently being considered at either of the utilities.
The air permitting associated with obtaining approval to install and operate the wood-fired boilers required evaluation of the impacts from all facilities in the region using the prescribed USEPA model. The total impacts are then compared to PSD increment and NAAQS standards. Summary tables comparing the impacts to the standards were presented in the answer to Item 23 Table 7.0 and Table 8.0. The predicted impacts are all below the NAAQS standards and PSD increment standards.

As part of the evaluation of cumulative effects related to the LEA Biomass Energy Project, LEA commissioned three studies related to forest harvesting. The studies focused on:

- availability of forest residues, including a discussion on harvesting brushland;
- update information on nutrient depletion associated with removal of tops and limbs; and
- potential impact of forest harvest residue removal on wildlife.

The studies are detailed in three separate reports. Copies of the reports are available from MPCA on request.

In general, the reports concluded that the LEA Biomass Energy Project would require approximately 18 percent of the available forestry residues within a 100-mile radius, and sufficient biomass is available to accommodate this need. Because only 18 percent of the available resource will be potentially used under scenario A, (considerably less under scenario B, since brush and other waste woody material would be emphasized), use of logging residues will not have an appreciable affect on wildlife habitat. Scenario B would be beneficial to wildlife, in that the emphasis on sheared brush for fuel would reinvigorate habitat for sharp-tailed grouse. In addition, the nutrient capital for most mineral soils is sufficient to tolerate forest rotation such as what would occur from tree farming of the LEA closed loop biomass.

LEA is not aware of any other planned projects in the vicinity of the existing utilities that would utilize the types of biomass to be used as fuel for the project. Therefore, there are no significant cumulative effects from additional demand on forest residuals.

### 30. Other Potential Environmental Impacts

If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

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<td>Virginia</td>
<td>None</td>
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<tr>
<td>Hibbing</td>
<td>None</td>
</tr>
<tr>
<td>Wood Yard</td>
<td>None</td>
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### 31. Summary of issues

List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

None.
RGU CERTIFICATION.

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minn. R. 4410.0200, subps. 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Name and Title of Signer:

Beth G. Lockwood, Supervisor, Environmental Review Unit
Environmental Review and Operations Section
Regional Division

Date:

The format of the Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at Minnesota Planning. For additional information, worksheets or for EAW Guidelines, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-296-8253, or at their Web site http://www.eqb.state.mn.us/review.html.