4.0 ENVIRONMENTAL ANALYSIS

The environmental consequences of constructing and operating the proposed G-II Project would vary in duration and significance. Four levels of impact duration were considered: temporary, short-term, long-term, and permanent. Temporary impact generally occurs during construction with the resource returning to preconstruction condition immediately after restoration to a few months. Short-term impact could continue for up to 3 years following construction. Impact was considered long-term if the resource would require more than 3 years to recover. A permanent impact could occur as a result of any activity that modifies a resource to the extent that it would not return to preconstruction conditions during the life of the Project, such as the construction of the aboveground facilities. We considered an impact to be significant if it would result in a substantial adverse change in the physical environment.

In this section, we discuss the affected environment, general construction and operational impact, and proposed mitigation for each resource. Guardian, as part of its proposal, agreed to implement certain measures to reduce impact. We evaluated Guardian's proposed mitigation to determine whether additional measures are necessary to reduce impact. These additional measures appear as bold-type paragraphs in the text. We will recommend that these measures be included as specific conditions to authorizations that the Commission may issue to Guardian.

Conclusions in this EIS are based on our analysis of the environmental impact and the following assumptions:

- Guardian would comply with all applicable laws and regulations;
- the proposed facilities would be constructed as described in section 2.0; and
- Guardian would implement the mitigation measures included in the application and supplemental filings to the FERC.

4.1 GEOLOGIC RESOURCES

4.1.1 Geological Setting

The G-II Project would cross the Great Lakes section of the Central Lowland physiographic province. Topographic relief is typically low with gentle rolling hills and low-gradient drainage. Glacial features, such as drumlins (elongated hills oriented in the direction of glacial movement), moraines (ridge-like deposits) and kettle holes with lakes and ponds cover the majority of the pipeline route. Surficial deposits along the pipeline route consist primarily of products of the Wisconsinian Glaciation, including clayey, loamy, and sandy till; glacial lake deposits; outwash sand and gravel; and windblown soil and sand deposits. Table 4.1.1-1 provides a summary of the surficial geology along the proposed pipeline route. Elevations along the proposed pipeline route range from 590 to 1,159 feet above mean sea level (msl). Topography in the Project area range from flat to steep, but approximately 89 percent of the proposed pipeline route crosses soils with slopes of 5 percent or less.

The bedrock underlying Guardian's proposed route consists of Silurian and Ordovician age limestone and dolomite, shale, and sandstone formations (Mudrey et al., 1982). Table 4.1.1-2 provides a summary of the bedrock geology along the proposed pipeline route. Depth to bedrock

TABLE 4.1.1-1

Surficial Geology Along the Proposed Pipeline Route

Milepost a/ Beginning	Ending	Length (Miles)	Description
30-inch-diameter pipeline			
0	1.2	1.2	Loamy till--Ground-moraine deposits
1.2	7.1	5.9	Sand and gravel--Outwash deposits
7.1	20.9	13.8	Loamy till--Ground-moraine deposits
20.9	22.1	1.2	Loamy till--End-moraine deposits
22.1	56.4	34.3	Loamy till--Ground-moraine deposits
56.4	56.9	0.5	Clayey till--End-moraine deposits
56.9	59.1	2.2	Clayey till--Ground-moraine deposits
59.1	61.4	2.3	Clayey till--End-moraine deposits
61.4	67.5	6.2	Loamy till--Ground-moraine deposits
67.5	68.5	1	Loamy till--End-moraine deposits
68.5	70	1.5	Loamy till--Ground-moraine deposits
70	70.8	0.9	Loamy till--End-moraine deposits
70.8	75.7	4.8	Clayey till--Ground-moraine deposits
75.7	78.9	3.2	Sand and gravel--Outwash deposits
78.9	81.4	2.5	Clayey till--Ground-moraine deposits
81.4	83.7	2.3	Clay and silt—Lacustrine deposits
20-inch-diameter pipeline			
83.7	103.9	20.2	Clay and silt—Lacustrine deposits
103.9	108.5	4.6	Loamy till--Ground-moraine deposits
108.5	108.7	0.2	Clay and silt—Lacustrine deposits
108.7	110.9	2.2	Loamy till--Ground-moraine deposits
110.9	112.4	1.4	Clay and silt—Lacustrine deposits
112.4	117.4	5	Loamy till--Ground-moraine deposits
16-inch-diameter Denmark Branch Line			
0	1.4	1.4	Clay and silt—Lacustrine deposits
20-inch-diameter Southwest Green Bay Branch Line			
0	1.8	1.8	Clay and silt—Lacustrine deposits
20-inch-diameter West Green Bay Branch Line			
0	0.8	0.8	Clay and silt—Lacustrine deposits

Source: Fullerton et al., 2004.
a/ The discrepancy between the length of the pipeline (115.2 miles) and the mileposting system is the result of route modifications that were adapted by Guardian after the mileposting system was established.

is generally greater than 10 feet, and the overlying glacial deposits typically range from 0 to 200 feet thick. There are several areas where depth to bedrock would be within 10 feet of the ground surface.

Ordovician-aged bedrock includes the Maquoketa Formation (which consists of shale, dolomitic shale, and dolomite) and the Sinnipee Group (which includes the Galena, Decorah, and Platteville Formations and consists of dolomite with some limestone and shale). The Silurian unit includes the Cayugan, Niagaran, and Alexandrian series and consists of dolomite (Mudrey et al., 1982). The edge of the Silurian rocks is characterized by the Niagara Escarpment, the sloping face of a 650-mile-long sickle-shaped bedrock ridge curving westward from south of Rochester, New York, across southeast Canada, and then southward around the western side of Lake Michigan to southeastern Wisconsin (Anderson et al., 2002).

TABLE 4.1.1-2

Guardian Pipeline Expansion and Extension Project Bedrock Geology Along the Proposed Pipeline Route

Milepost a/ Beginning	Ending	Length (Miles)	Map Unit Name	Period
30-inch-diameter pipeline				
0	1.3	1.3	Maquoketa Formation	Ordovician
1.3	12.7	11.4	Sinnipee Group	Ordovician
12.7	19.2	6.5	Maquoketa Formation	Ordovician
19.2	21.5	2.3	Silurian, undivided	Silurian
21.5	27	5.5	Maquoketa Formation	Ordovician
27	41.4	14.4	Silurian, undivided	Silurian
41.4	43.1	1.7	Maquoketa Formation	Ordovician
43.1	56.4	13.3	Silurian, undivided	Silurian
56.4	60.5	4.1	Maquoketa Formation	Ordovician
60.5	75.9	15.4	Silurian, undivided	Silurian
75.9	83.6	7.6	Maquoketa Formation	Ordovician
83.6	83.6	<0.1	Sinnipee Group	Ordovician
83.6	83.7	0.1	Maquoketa Formation	Ordovician
20-inch-diameter pipeline				
83.7	86.9	3.2	Maquoketa Formation	Ordovician
86.9	111	24.1	Sinnipee Group	Ordovician
111	112.2	1.2	Ancell Group	Ordovician
112.2	117.4	5.2	Sinnipee Group	Ordovician
16-inch-diameter Denmark Branch Line				
0	1.4	1.4	Sinnipee Group	Ordovician
20-inch-diameter Southwest Green Bay Branch Line				
0	1.8	1.8	Sinnipee Group	Ordovician
20-inch-diameter West Green Bay Branch Line				
0	0.8	0.8	Sinnipee Group	Ordovician

Source: Mudrey et al., 1982.
a/ The discrepancy between the length of the pipeline (115.2 miles) and the mileposting system is the result of route modifications that were adapted by Guardian after the mileposting system was established.

The escarpment is typically covered by up to several hundred feet of unconsolidated glacial sediment along its length with isolated vertical and horizontal bedrock outcrops (Anderson et al., 2002). The escarpment underlies four of the counties crossed by the pipeline route including Brown, Dodge, Calumet, and Fond du Lac Counties, Wisconsin. However, the pipeline does not cross any vertical or horizontal exposures of bedrock associated with the escarpment.

In addition to the pipeline, Guardian proposes to construct and operate two compressor stations, the Bluff Creek Compressor Station in Walworth County, Wisconsin, and the Sycamore Compressor Station in DeKalb County, Illinois. Surficial geology at the proposed compressor station sites consists of loamy till-end moraine deposits (Fullerton et al., 2004) and varies between 100 to 200 feet thick in these locations (WGNHS, 1983; Piskin, 1975). Bedrock geology at the Bluff Creek Compressor Station consists of the Sinnipee Group (Mudrey et al., 1982) and bedrock at the Sycamore Compressor Station consists of the Maquoketa Formation (Willman, et al., 1967). All other aboveground facilities associated with the proposed pipeline would be located immediately adjacent to the pipeline and would be underlain by the same geologic resources described above for the pipeline facilities.

The U.S. Department of Agriculture (USDA), National Resources Conservation Service (NRCS) defines shallow bedrock as bedrock occurring in the upper 60 inches of the soil profile (USDA, 2003). The presence of shallow bedrock indicates areas where blasting may be required during construction of the proposed Project. Less than 2 percent (1.8 miles) of the proposed pipeline route crosses areas that meet this definition based on a review of county soils data (USDA, 2003). The majority of this bedrock is considered hard and may require blasting or other special construction techniques during installation of the proposed pipeline. The location of shallow bedrock by MP is listed in table 4.1.1-3.

TABLE 4.1.1-3

Shallow Bedrock Along the Proposed Pipeline Route a/

Pipeline Segment/County	Milepost b/ Beginning	Milepost b/ Ending	Crossing Length (feet)	Depth to Bedrock (inches)	Bedrock Type c/
30-inch-diameter pipeline					
Dodge	21.2	21.4	1,220	24	Hard
	29.2	29.3	909	30	Hard
	29.4	29.6	908	30	Hard
	29.7	29.8	429	30	Hard
	29.8	29.8	304	24	Hard
	29.8	30.2	1,824	30	Hard
	30.2	30.2	202	30	Hard
	30.2	30.3	384	30	Hard
	30.3	30.4	180	30	Hard
	30.4	30.4	181	30	Hard
	31.9	32.2	1,354	30	Hard
Fond du Lac	35.3	35.5	405	30	Hard
	35.5	35.5	105	30	Hard
	41.5	41.6	256	30	Hard
	41.6	41.7	634	30	Hard
	41.7	41.8	111	30	Hard
20-inch-diameter pipeline					
Brown	84.5	84.5	315	15	Hard
Project Total			**9,721**		

a/ Based on soil mapping units that contain bedrock within 60 inches of the soil surface as identified by the USDA-Natural Resources Conservation Service (NRCS).
b/ The discrepancy between the length of the pipeline (115.2 miles) and the mileposting system is the result of route modifications that were adapted by Guardian after the mileposting system was established.
c/ Hard = Potentially requires blasting; Soft = Rippable with standard construction equipment, would not likely require blasting.

When consolidated rock is encountered during construction, Guardian's preferred procedure would be to fracture and excavate the bedrock using standard construction equipment. However, if crystalline bedrock is encountered that is not easily removed by conventional excavation methods, blasting techniques would be utilized in compliance with state and federal regulations governing the use of explosives. Only the minimum explosive charge necessary to fracture bedrock and keep shot-rock from leaving the construction right-of-way would be utilized. The contractor would conduct pre-blasting evaluations of the rock, as needed, to develop specific blasting operations and monitoring plans to limit stresses on existing pipelines, nearby domestic structures, water supply wells, or electrical transmission tower footings that are located near the Project area. Blasting would be conducted during daylight hours and would not begin until

occupants of nearby buildings, stores, residences, places of business, and farms have been notified. To ensure safety and minimize the potential impacts from blasting, **we recommend that:**

- **Prior to construction, Guardian will file with the Secretary for review and approval by the Director of the OEP a blasting plan detailing the procedures to be used during blasting to prevent the introduction of blast rock into agricultural lands and prevent damage to surrounding areas, wells, and/or structures.**

Disposal of rock and rock debris from blasting would be in areas approved by the individual landowners or land management agency in accordance with regulatory requirements (see our Plan in appendix G). Should Guardian have to dispose of excess rock outside of the right-of-way, an approved landfill or alternative upland area would be utilized and the appropriate permits and clearances obtained.

Review of the proposed pipeline route indicates that an unnamed, intermittent stream located at MP 21.4 is underlain by shallow bedrock and would likely require blasting during installation of the crossing.

The primary effect of pipeline construction on geology would consist of disturbances to the existing topography along the construction right-of-way. All areas disturbed during pipeline construction would be finish-graded and restored as closely as possible to preconstruction contours during cleanup and restoration. As indicated above, a limited amount of blasting is anticipated along the pipeline, but geologic conditions at the proposed compressor stations and remaining aboveground facility sites are not expected to require blasting, special equipment, or techniques. For these reasons, construction and operation of the proposed Project would be unlikely to result in significant alterations of the topography or geological resources of the proposed Project area.

4.1.2 Mineral Resources

Mineral resources in Wisconsin include clay, sand, gravel, crushed and dimension stone, limestone, dolomite, copper, zinc, and peat. Sand and gravel and dimensioned stone such as dolomite are the primary exploitable mineral resources and are widely distributed in the vicinity of the Project. Metallic minerals that are mined or have economic potential in the vicinity of the Project include copper, gold, silver, lead, and zinc. Underground mining does not occur in the Project area. WDNR noted that iron deposits associated with the Niagara dolomite were mined, at Neda in Dodge County, Wisconsin approximately 1.0 mile west of MP 19.0. However, the referenced mine has been abandoned for nearly 70 years and no impacts on this mine are anticipated from construction or operation of the proposed pipeline.

Table 4.1.2-1 indicates the mineral resources identified by Guardian within 2,000 feet of the proposed pipeline right-of-way including five quarries and one sand and gravel pit. No mines, quarries, or sand/gravel pits would be crossed directly by the pipeline. There is one inactive sand and/or gravel pit adjacent to the right-of-way near MP 52.9. The Hanke Quarry (MP 21.0) is the closest active quarry operation. Guardian has continued to consult with the operator, but has not received any detailed information regarding current or future operations. Guardian's review of recent aerial photography suggests that further expansion east towards the pipeline route is not possible relative to existing property boundaries.

TABLE 4.1.2-1 **Mineral Resources within 2,000 feet of the Proposed Pipeline Route**			
Pipeline / County	Milepost	Operation	Distance and Direction from Right-of-way
30-inch-diameter pipeline			
Dodge	8.2	Quarry	2,000 feet Northwest
Dodge	21.0	Quarry	400 feet West
Dodge	29.5	Quarry	1,800 feet West
Fond du Lac	41.8	Quarry	500 feet North
20-inch-diameter pipeline			
Outagamie	104.7	Quarry	1,000 feet Southwest
Outagamie	109.4	Sand and Gravel Pit	100 feet West

The eastern boundary of the Eden Stone Company is crossed near MP 41.8. While this part of the property is not actively mined, ongoing operations, including blasting, occur about 500 feet west of the proposed pipeline route. The quarry typically uses low-yield charges to fracture and remove rock. In consultations with the mine owner, Guardian learned that the eastern edge of the property will be used for long-term storage of mine spoil. The landowner has indicated the spoil pile could be as thick as 25 feet above land surface, but would be graded such that the thinnest part of the pile would be located over the proposed pipeline. Guardian is continuing to consult with the mine operator. Placement of the quarry spoil over the pipeline in this area would affect maintenance and visual inspection activities but in-line tools (pigs), similar to those used on HDD crossings, could be used to monitor the condition of the pipe.

The Michels Construction Company operates the Western Lime Quarry, located adjacent to the Eden Stone Quarry. Rock from this area is used as construction aggregate. Current activities are greater than 2,000 feet from the proposed route; however, approximately 60,000 tons of rock are removed from the quarry per month and future operations are expected to expand close to the proposed pipeline route. The proposed Project would not interfere with future quarry operations because setback requirements (property line and residential land use) prohibit mining operations from approaching the proposed pipeline routing. The mine operator also stated that all required blasting is done by a subcontractor and that they understood that Guardian has established conditions and restrictions for blasting in the vicinity of the pipeline.

As part of the right-of-way procurement process, Guardian would negotiate with the affected landowners/operators to obtain an easement agreement that governs mining activities in the immediate vicinity of the permanent pipeline right-of-way and/or establishes an adequate buffer zone between active mining areas and the proposed pipeline. Compensation for any losses or limitations on mining operations (current or future expansion) would be addressed during those easement negotiations.

4.1.3 Paleontological Resources

Paleontological resources are the fossilized remains of prehistoric plants and animals, as well as the impressions left in rock or other materials as indirect evidence of the forms and activities of such organisms. No sensitive paleontological sites were identified along the proposed route. Pleistocene-age vertebrate fossils such as mastodon and mammoth have been discovered in the general area of the proposed route in Wisconsin; however, these finds are very rare. Any vertebrate fossils in the Project area would most likely be found in peat deposits.

The Wisconsin Geological and Natural History Survey (WGNHS) did not identify any specific significant paleontological resources within 3.0 miles of the proposed pipeline route that need protection. Specifically, there are no designated or protected paleontological resources along the pipeline route. In addition, any bedrock that may be trenched through is sufficiently duplicated in areas adjacent to the right-of-way that no significant impacts on paleontological resources would result from the loss of bedrock in the trench (Peters, 2006).

4.1.4 Geologic Hazards

Geologic hazards are defined by the American Geological Institute (Bates and Jackson, 1984) as "geologic conditions or phenomena that present a risk or are a potential danger to life and property, either naturally occurring or man-made." Geologic hazards potentially occurring in the vicinity of the proposed Project area include seismicity and faulting, soil liquefaction, slope failures/landslides, and ground subsidence. Hazards such as volcanism are not relevant to the proposed Project area and are excluded from consideration here.

4.1.4.1 Seismicity and Faulting

Hazards associated with seismicity and faulting include ground shaking, surface rupture of faults, and offset along normal, reverse, or strike-slip faults. These are especially hazardous to linear, rigid structures, such as pipelines, in which the ground is not moving the same distance or direction.

In the Project area, the potential for geologic hazards associated with seismicity, including active faulting, ground shaking and soil liquefaction, is considered very low. The pipeline route lies within areas with low seismic risk. In this zone, the horizontal acceleration in rock would be no greater than 6 percent gravity acceleration, with a 90 percent probability of not being exceeded in 50 years (Algermissen et al., 1982). The expected range of earthquake intensity corresponds to intensities V and VI on the Modified Mercalli Intensity Scale (MMIS). Earthquakes with intensities of V and VI on the MMIS are felt by all, move furniture and other large objects, and can result in minimal to moderate structural damage (Western Michigan University, 1981; Bricker, 1977; and Stover et al., 1979). Based on the Seismic Source Zones Map provided in Algermissen et al. (1982), the majority of the Project area would likely experience about six intensity V earthquakes every 100 years (maximum Richter magnitude of 6.1). No faults active in the last 10,000 years have been documented across any section of the Project area (Howard et al., 1978; National Atlas of the United States, 2006; USGS, 2006b). In summary, historically recorded seismicity in the area traversed by the proposed Project has not been significant.

Consequently, the potential for seismicity and faulting does not represent a significant risk to the proposed Project. While minor earthquake intensity, frequency, and duration of impacts cannot be quantified, maintained pipelines using modern arc-welding techniques have performed well in seismically active areas of the United States, including California (O'Rourke and Palmer, 1996). Only large, abrupt ground displacements have caused serious impacts on pipeline facilities. Because of the very limited potential for large, seismically induced ground movements in the Project area (Algermissen et al., 1982), there is very little risk of earthquake-related impacts on the pipeline and other Project facilities.

4.1.4.2 Soil Liquefaction

Soil liquefaction from severe ground shaking causes cohesionless soil to lose strength. Soil liquefaction can result in surface settlement where the ground surface is flat, or in soil flow/slope

instability (lateral movement) where the ground surface is sloped. Although water-saturated soils subject to liquefaction may exist in isolated areas along the pipeline route, the potential for liquefaction is small because high intensity earthquakes are unlikely in the Project area and the FERC-defined seismic threshold, based on USGS Open File Report 82-1033 (Algermissen et al.,1982), is not met anywhere in the Project area. Further, the linear extent and ductile nature of pipelines generally make them less susceptible than other structures to the effects of soil liquefaction. Existing building codes and standards applicable to the proposed Project facilities should adequately address the low potential for soil liquefaction. The same seismic information also applies to the planned compressor stations. Furthermore, neither of the proposed compressor station sites are in areas underlain by Holocene deposits. Therefore, soil liquefaction is not a significant hazard in the vicinity of the proposed Project.

4.1.4.3 Subsidence

Ground subsidence is a lowering of the land-surface elevation that results from changes that take place underground. Common causes of land subsidence include dissolution of limestone in areas of karst terrain; collapse of underground mines; and pumping of water, oil, and gas from underground reservoirs. There is no active underground mining or pumping of oil and gas from underground reserves along the pipeline route. Consequently, subsidence due to underground mining or resource extraction is not likely to impact the proposed pipeline. Karst terrain is discussed separately in section 4.1.4.4.

4.1.4.4 Karst Terrain

Karst terrain develops in areas that are underlain by carbonate rocks and evaporites. Weathering and erosion produce a high degree of rock solubility in karst topography. Characteristic landforms such as sinkholes and caves are formed from the dissolution of the rock. The potential for karst is greatest where surficial deposits are less than 30 feet thick and the underlying carbonate rocks occur at depths at or just above the water table. In some areas, karst features are known to exist at depths as great as 100 feet below ground surface. A large portion of the proposed pipeline route is located in an area that is considered to have the potential for karst features (Davies et al., 1984; National Atlas of the United States, 2006). Guardian contacted WGNHS to inquire about the development/presence of karst features in the vicinity of the pipeline route. WGNHS staff stated that there is a potential for karst features along the proposed route in areas with shallow carbonate bedrock (portions of Brown, Calumet, and Outagamie Counties). The staff did not identify any karst features along the proposed route and stated that sinkholes and collapse features were rare in the vicinity of the Project area (Bradbury, 2006). Based on the above, karst features are assumed to be minimal along the pipeline route and beneath the compressor stations.

Even though the Project would not be considered susceptible to karst features and underground subsidence impacts (as discussed previously in section 4.1.4.3), the proposed Project facilities would be designed and constructed to meet or exceed the federal safety standards set forth in 49 CFR Part 192. This would ensure integrity of the Project facilities and minimize the potential for any pipe failures due to ground subsidence. Additionally, Guardian would conduct regular patrols of the pipeline right-of-way during operations to identify conditions, including any areas of ground subsidence that might affect the safety or operation of the pipeline. Adherence to these standards and procedures would minimize the potential for any risk to the proposed Project posed by ground subsidence.

4.1.4.5 Landslides

Other ground failures can include landslides, debris flows, and rock falls. Slides, flows, and falls are not anticipated to be of concern to the proposed Project because these phenomena are mainly associated with steep slopes. Topography along the proposed Project is characterized as flat to gently sloping and rolling hills and much of the proposed Project area is in a low landslide incidence area (Godt, 1997). There are several portions of the proposed pipeline route in Calumet and Fond du Lac Counties located in a moderate incidence area (Godt, 1997). Portions of the low incidence areas crossed, mostly in Outagamie and Brown Counties, Wisconsin, are considered to be moderately susceptible to landslides. Guardian analyzed the SSURGO digital soil survey data and found that the majority (96 percent) of the soils crossed in Brown and Outagamie Counties, Wisconsin have slopes less than or equal to 5 percent and are therefore less susceptible to landslides. Overall, 88 percent of the pipeline route crosses soils with slopes of 5 percent or less (USDA, 2003). In general, landslide potential would be limited to small isolated slumps, earthflows, and soil creep in areas of steeper slopes and stream and river banks.

The proposed compressor and meter station sites are in generally flat areas where slope failure is not expected. Slope failures and landslides would represent a potential hazard along portions of the proposed Project route that would traverse areas of side slopes and rolling terrain. Cutting along slopes, the weight of construction equipment, and unusually high precipitation would increase the potential for slope failures along these areas. However, construction of the pipeline would be accomplished in accordance with the requirement in our Plan, which includes measures to control runoff and erosion that would minimize the potential for slope failures.

4.2 SOILS AND SEDIMENTS

4.2.1 Soil Composition

Soil characteristics along the pipeline route and at aboveground facilities were identified and assessed using the Soil Survey Geographic Database (SSURGO; USDA, 2003a) and the Soil Surveys of Brown County (USDA, 1974), Calumet and Manitowoc Counties (USDA, 1980a), Dodge County (USDA, 1980b), Fond du Lac County (USDA, 1973), Jefferson County (USDA, 1979), Outagamie County (USDA, 1978b), and Walworth County (USDA, 1971), Wisconsin and DeKalb County (USDA, 2003b), Illinois. Additional information about the soils was obtained from Official Soil Series Descriptions (Soil Survey Staff, 2004). The mapping scales in the Project area range from 1:15,840 to 1:20,000, with a minimum delineation size of 2.5 to 4.0 acres (USDA, 1995).

The proposed Project facilities would be located in two Major Land Resource Areas (MLRAs): the Northeastern Wisconsin Drift Plain and Southern Wisconsin and Northern Illinois Drift Plain (MLRAs 95A and 95B, respectively). MLRAs are primarily used as farmland for hay and feed-grain production, dairy cattle and other livestock, canning crops, fruit crops, and other specialty crops (USDA, 1978a).

The Northeastern Wisconsin Drift Plain is characterized by nearly level to rolling till plains, nearly level outwash plains and lacustrine basins, low hills, and ridges. Elevations throughout this MLRA range from 650 to 1,300 feet above msl. Soils are moderately deep to deep, medium to fine textured, with mixed mineralogy. Till plains generally comprise well drained and moderately well drained, nearly level to sloping soils of the Kewaunee, Hortonville, Theresa, and

Hocheim series. Also found on the till plains are soils of the Manawa and Symco series, which are characterized as somewhat poorly drained on nearly level to sloping terrain. In the north, moderately deep to deep, medium textured and moderately coarse textured soils, with a frigid temperature regime and mixed mineralogy are dominant. Well drained and moderately well drained, gently undulating to sloping soils are present, as well as somewhat poorly drained, gently undulating to sloping soils on till plains. Clayey and silty drift occupy wet areas at lower elevations. Soils that formed as the result of organic residue from plants are in the deeper depressions (USDA, 1978a).

The Southern Wisconsin and Northern Illinois Drift Plain is characterized by a glaciated plain with belts of morainic hills and ridges, nearly level outwash terraces, and drumlins. Elevations throughout this MLRA range from 650 to 1,000 feet above msl. The dominant soils are moderately deep to deep, medium textured, with mixed mineralogy. Moderately well drained and well drained soils are present on nearly level to sloping relief as well as moderately deep, medium-textured soils. Medium-textured material is found in the lowlands, and silty sediments are found on floodplains (USDA, 1978a).

4.2.2 Soil Limitations

Several soil characteristics have the potential to affect or be affected by construction and operation of the proposed Project. Soil limitations to be considered include erosion potential, prime farmland, hydric soils, revegetation potential, compaction potential, stony soils, and contaminated soils. Soil limitations throughout the proposed Project area are summarized in table 4.2.2-1 and discussed in the following sections.

4.2.2.1 Prime Farmland

The USDA defines prime farmland as “land that is best suited to food, feed, fiber, and oilseed crops” (Soil Survey Division Staff, 1993). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., artificial drainage).

The Project construction would disturb a total of 1,302.4 acres of prime or potentially prime farmland, including 1,296.0 acres of pipeline right-of-way and 6.4 acres for aboveground and ancillary facilities, of which 13.0 acres are associated with the proposed access roads. Potential adverse effects include interference with agricultural drainage, loss of soil through erosion, mixing of topsoil and subsoil (thus reducing soil fertility), and compaction. These effects would result primarily from trench excavation and backfilling, and vehicular traffic along the construction right-of-way.

Guardian would minimize and mitigate potential effects to prime farmlands by implementing the standard requirements for pipeline construction in our Plan, as well as Guardian’s AMP and associated BMPs. These practices have been developed in consultation with the Wisconsin DATCP.

TABLE 4.2.2-1

Acreage of Soil Characteristics Affected by the Proposed Pipeline Route a/

Pipeline/ County	Total Acres in County	Prime Farmland b/	Hydric Soils b/	Compact. Prone c/	Highly Erodible		Reveg. Concerns f/	Stony/ Rocky g/	Shallow to Bedrock h/
					Water d/	Wind e/			
30-inch-diameter pipeline									
Jefferson	28.0	18.4	9.5	16.6	0.0	0.0	0.0	0.0	0.0
Dodge	439.2	333.3	114.6	173.7	44.1	0.1	4.8	13.6	19.9
Fond du Lac	329.5	263.5	67.7	96.9	13.6	0.0	0.0	14.9	3.8
Calumet	300.7	282.6	42.4	122.4	0.5	0.0	0.0	41.4	0.0
Outagamie	3.9	3.9	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Brown	16.0	16.0	0.0	5.8	0.0	0.0	0.0	0.0	0.0
20-inch-diameter pipeline									
Brown	133.2	122.5	1.6	7.1	4.6	0.3	3.4	0.7	0.7
Outagamie	226.1	211.4	19.3	110.2	0.3	0.9	10.2	107.2	0.0
SUBTOTAL	**1476.7**	**1251.6**	**255.1**	**534.0**	**63.2**	**12.1**	**18.4**	**177.8**	**24.4**
16-inch-diameter Denmark Branch Line									
Brown	16.0	16.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
SUBTOTAL	**16.0**	**16.0**	**0.0**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
20-inch-diameter Southwest Green Bay Branch Line									
Brown	20.4	20.4	1.6	1.6	0.0	0.0	0.0	0.0	0.0
SUBTOTAL	**20.4**	**20.4**	**1.6**	**1.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
20-inch-diameter West Green Bay Branch Line									
Outagamie	8.8	8.1	0.0	6.0	0.0	0.0	0.7	8.1	0.0
SUBTOTAL	**8.8**	**8.1**	**0.0**	**6.0**	**0.0**	**0.0**	**0.7**	**8.1**	**0.0**
Pipeline Total	**1521.8**	**1296.0**	**256.7**	**542.0**	**63.2**	**1.3**	**19.1**	**185.9**	**24.4**

a/ Acreage is based on a 110-foot-wide construction right-of-way for the 30-inch diameter pipe and a 95-foot-wide construction right-of-way for the 16-inch-diameter and 20-inch diameter pipe. The area affected does not include access roads, additional temporary workspace, or open water, and does not account for reductions in the width of the right-of-way that Guardian will implement in wetlands and upland forest areas. Values within a row do not add up to the total listed in the total column because soils may occur in more than one characteristic class or may not occur in any class listed in the table.
b/ As designated by the NRCS. Prime farmland includes those soils that are considered prime if a limiting factor is mitigated (e.g., artificial drainage).
c/ Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.
d/ Includes soils designated as highly erodible land (HEL) by the NRCS.
e/ Soil with a WEG (Wind Erodibility Group) classification of two or less that are considered HEL or PHEL. None of the soils with a WEG classification of 1 or 2 were considered HEL and only three map units were considered PHEL.
f/ Soils with a surface texture of sandy loam or coarser and are moderately well to excessively drained.
g/ Soils with a cobbley, stony, bouldery, shaly, very gravelly, or extremely gravelly modifier to the textural class of the surface layer and/or have a surface layer that contains greater than 5 percent by weight stones larger than 3 inches.
h/ Soils identified as containing bedrock at a depth of 5 feet or less from the surface.

Interference with agricultural drainage, both surface and subsurface, would be minimized or avoided by grading contours to pre-existing conditions during restoration. Additionally, any damage to drain tiles would be repaired under consultation with landowners and local drain tile specialists, as needed. Guardian has not identified any irrigation systems along the proposed pipeline route. However, should any irrigation systems be affected during construction, Guardian will restore/repair all damaged irrigation systems in accordance with the standard requirements in our Plan. Construction and restoration procedures that would minimize or mitigate the effects of compaction and erosion are discussed in sections 4.2.2.3 and 4.2.2.4, respectively. To prevent mixing of the soil horizons or incorporation of additional rock into the

topsoil, Guardian would perform full right-of-way topsoil stripping in agricultural lands. The topsoil would be segregated from subsoil and would be replaced in the proper order during backfilling and final grading. Implementation of proper topsoil segregation would help ensure post-construction revegetation success, thereby minimizing loss of crop productivity and the potential for long-term erosion problems.

Along some portions of the proposed pipeline route (i.e., Dodge and Fond du Lac Counties), Guardian expects to encounter soils with medium to fine-textured surface layers underlain by gravelly and cobbly coarse-textured outwash. Trench excavation through these soils could result in additional impacts on crop productivity following construction. To maintain the water holding capacity of the crop-rooting zone over the trench area, Guardian would use three-lift soil handling procedures. Guardian, in consultation with the DATCP, developed BMPs that address three-lift soil handling. Details of these BMPs are included in Guardian's AMP (see appendix E).

Guardian conducted a preliminary assessment of soil map units along the proposed pipeline route using the SSURGO database to determine the presence and extent of potential three-lift soils. Table 4.2.2.1-1 lists by mile post the areas at risk for potential mixing of fine-textured upper subsoil layers with underlying gravelly or cobbly lower subsoil during excavation of the trench. Based on Guardian's analysis, less than 1 percent (0.5 mile) of the proposed route would potentially require three-lift soil handling. The majority of these soils (74 percent) are considered prime farmland, or prime farmland if artificially drained. Guardian would obtain sufficient work space in these areas for placement of the upper subsoil layer pile and the lower, coarser textured materials. To facilitate three-lift soil handling, Guardian would be required to increase the right-of-way by 25 feet in site-specific locations (see table 4.2.2.1-1). The 25-foot increase in right-of-way width in these areas would result in an additional 1.6 acres of temporary impact. We have reviewed these locations and have determined that the requests are acceptable.

TABLE 4.2.2.1-1

Potential Three-Lift Soil Areas Along the Proposed Pipeline Route

County	Milepost		Crossing Length (feet)
	Beginning	Ending	
Dodge	16.1	16.2	439
	16.2	16.3	475
Fond du Lac	42.1	42.2	581
	42.2	42.3	475
	42.6	42.6	369
	56.4	56.4	114
	56.4	56.4	266
	56.5	56.5	121

Two organic farms are located in the vicinity of the Project. The first is located between MPs 73.1 and 73.4 and would be crossed by the proposed pipeline. The second organic farm is located approximately 50 feet from the proposed pipeline centerline between MPs 22.8 and MP 23.3. Potential impacts on organic farms include soil contamination and loss of fertility. Soil National Organic Program standards require that farms that are certified organic (or in the certification process) not be exposed to chemicals found in pesticides, fertilizers, or petroleum products. Pipeline construction could potentially expose these farms to these prohibited substances by way of water runoff from adjacent property, soil erosion from adjacent property,

construction vehicles transporting soil from other properties, or leaks/spills from construction vehicles. Soil fertility on organic farms relies upon a healthy soil structure that develops naturally over time. Restoration of a healthy organic soil profile can take several years to achieve preconstruction conditions.

Guardian recognizes that organic agricultural land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features. To minimize adverse effects on certified organic farm soils, Guardian would implement site-specific construction techniques based on a BMP for organic agricultural land that has been incorporated in Guardian's AMP. Guardian's BMP for organic agricultural land identifies mitigation measures that apply specifically to farms that are Certified Organic or farms that are in active transition to become Certified Organic, and addresses the unique management and certification requirements of these operations. As part of this BMP, Guardian would request a copy of the Organic System Plan for the farms and would work with each producer to develop a site-specific plan to cross the farm in a manner that would minimize the risk of losing certification.

4.2.2.2 Hydric Soils

Hydric soils are defined as "soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (*Federal Register*, July 13, 1994). Soils that are artificially drained or protected from flooding (e.g., by levees) are still considered hydric if the soil in its undisturbed state would meet the definition of a hydric soil. Generally, hydric soils are those soils that are poorly and very poorly drained.

Project construction would disturb a total of 258.7 acres of hydric soils, including 256.7 acres of pipeline right-of-way, and 2.0 acres for aboveground and ancillary facilities, of which 1.4 acres are associated with the proposed access roads.

Because of the extended periods of saturation, hydric soils can be prone to compaction and rutting as discussed in section 4.2.2.3. In addition, high groundwater levels associated with hydric soils could create a buoyancy hazard for the pipeline. Guardian would minimize rutting of hydric soils by using construction mats where hydric soils cannot support equipment and/or by employing low-ground-weight equipment according to our Procedures. Special construction methods such as concrete coating of pipe and other weighting methods would be used to overcome buoyancy hazards during operation of the pipeline.

Approximately 29.8 acres (3 percent) of the proposed pipeline route consists of organic mucks, also known as Histosols (see table 4.2.2.2-1). These soils, commonly found in wetlands, formed from water-logged decomposing plant remains and may be saturated for several months out of the year. The majority (72 percent) of the organic soils crossed by the proposed route are located in active cropland and pasture land. Organic soils pose additional problems during construction and operation due to their poor bearing capacity and low specific gravity. Special crossing techniques, detailed in our Procedures, would be implemented to minimize impacts on these soils. Buoyancy problems resulting from the low specific gravity and high water tables would be mitigated using the same techniques discussed above.

TABLE 4.2.2.2-1 **Organic Soils Along the Proposed Pipeline Route**			
County	**Milepost**		**Acres**
	Beginning	**Ending**	
Dodge	6.5	7.0	6.5
	10.8	10.8	0.5
	11.0	11.1	1.8
	11.8	11.9	0.5
	14.9	15.1	2.3
	15.2	15.2	0.6
Fond du Lac	38.3	38.3	0.3
	38.9	38.9	0.8
	39.0	39.1	1.9
	40.3	40.4	1.7
	40.4	40.6	2.3
	49.3	49.6	4.7
	51.5	51.5	0.6
	52.3	52.4	0.8
	52.9	52.9	0.4
	56.7	56.7	0.4
	56.9	57.0	0.5
Calumet	70.0	70.1	1.4
	70.1	70.2	0.4
	73.4	73.4	0.7
	78.6	78.7	0.7
Pipeline Total			**29.8**

4.2.2.3 Compaction Potential

Soil compaction potential is determined by particle texture and moisture content. Fine-textured soils with poor internal drainage that are moist or saturated during construction are the most susceptible to compaction and rutting. Compaction-prone soils were identified by querying the SSURGO database for component soil series that have both: 1) a surface texture of sandy clay loam or finer; and 2) a drainage class of somewhat poorly drained through very poorly drained.

Project construction would disturb a total of 546.4 acres of compaction-prone soils, including 542.0 acres of pipeline right-of-way and 4.4 acres of access road.

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. As a result, soil productivity and plant growth rates may be reduced, soils may be made more susceptible to erosion, and natural drainage may be altered.

As described in our Plan and Procedures, and Guardian's AMP, measures such as restricting vehicular traffic, reducing loads, employing lower ground-pressure equipment, and rescheduling certain activities may be used when soil moisture is high to avoid and minimize compaction and rutting. In agricultural, residential, and wetland areas, topsoil would be segregated from other materials excavated from the trench and placed in piles that would generally be opposite the

working side of the trench. Therefore, heavy equipment would not travel on the piles, and compaction of excavated topsoils would be minimized.

Because of construction-related activities, some topsoil and subsoil located along the working side of the construction right-of-way would be compacted. Additionally, construction activities may be restricted as recommended by the on-site environmental inspector during unfavorable conditions (e.g., wet weather) to further reduce compaction and rutting. Compaction would also be mitigated through the use of deep tilling during restoration activities using a paraplow or similar implement. In areas where topsoil segregation occurs, plowing to alleviate subsoil compaction would be conducted before replacement of the topsoil.

These measures would ensure that any soil compaction resulting from construction along the right-of-way, temporary access roads, and at the contractor yards would be only temporary, and thus significant or long-term impacts on soil resources associated with compaction are not anticipated.

4.2.2.4 Erosion Potential

Soil susceptibility to erosion, by wind or by water, is a function of variables such as soil type, topography, vegetation, and climate. Soil erodibility was determined using NRCS classifications. The NRCS identified areas of highly erodible land (HEL) and potentially highly erodible land (PHEL). PHEL consists of soils that may be highly erodible based on the slope class of the mapping unit, but cannot be identified as highly erodible without field determinations of the length of the slope class that is crossed. For example, a soil map unit may have a slope class of 2 to 5 percent; if most of the map unit crossed actually has a slope of 2 percent, the soils would most likely not be highly erodible. However, if most of the map unit being crossed had actual slopes of 5 percent, the soils would most likely be considered highly erodible.

Though the majority of soils that would be crossed by the proposed pipeline have only slight erosion potential, some areas of highly erodible soils do occur along the proposed Project route. Approximately 64.5 acres of the soils that would be crossed by the proposed pipeline are considered HEL or PHEL by wind. Approximately 63.2 acres of the soils along the proposed pipeline route are designated as HEL by water, as well as 0.8 acre of soils along the proposed access roads. An additional 1.3 acres of the soils affected by the proposed pipeline route, 5.6 acres affected by the proposed aboveground facilities, and 8.7 acres affected by the proposed access roads are considered PHEL.

Because of the importance of slope in assessing erosion hazards, a separate query was developed to evaluate the slope of soils along the right-of-way (see table 4.2.2.4-1). Based on review of SSURGO data, approximately 89 percent of the soils crossed by the proposed pipeline have a slope of less than or equal to 5 percent; therefore, severe erosion is not anticipated across most of the proposed Project route due to the relatively flat topography.

TABLE 4.2.2.4-1

Topsoil Depths and Slope Classes Along the Proposed Pipeline Route a/

Pipeline / County	Total Acres in County	Topsoil Depth b/ (inches)				Slope Class c/ (%)				
		0-6	>6-12	>12-18	>18	0-5	>5-8	>8-15	>15-30	>30
		Acres								
30-inch-diameter Pipeline										
Jefferson	28.0	0.0	17.3	1.2	9.5	18.4	0.0	9.7	0.0	0.0
Dodge	439.2	111.2	208.5	95.9	23.5	354.4	0.0	79.7	4.9	0.0
Fond du Lac	329.5	51.2	271.9	6.4	0.0	279.3	0.0	43.9	6.3	0.0
Calumet	300.7	221.7	59.1	20.0	0.0	288.4	0.0	11.8	0.5	0.0
Outagamie	3.9	2.7	1.2	0.0	0.0	3.9	0.0	0.0	0.0	0.0
Brown	16.0	16.0	0.0	0.0	0.0	16	0.0	0.0	0.0	0.0
20-inch-diameter Pipeline										
Brown	133.2	127.8	4.7	0.7	0.0	125.9	0.0	2.7	4.4	0.2
Outagamie	226.1	107.6	106.6	11.9	0.0	221.1	0.0	4.2	0.8	0.0
SUBTOTAL	**1476.7**	**638.2**	**669.3**	**136.1**	**33.0**	**1307.4**	0.0	**152.0**	**17.0**	**0.2**
16-inch-diameter Denmark Branch Line										
Brown	16.0	16.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0
SUBTOTAL	**16.0**	**16.0**	**0.0**	**0.0**	**0.0**	**16.0**	**0.0**	**0.0**	**0.0**	**0.0**
20-inch-diameter Southwest Green Bay Branch Line										
Brown	20.4	20.4	0.0	0.0	0.0	20.4	0.0	0.0	0.0	0.0
SUBTOTAL	**20.4**	**20.4**	**0.0**	**0.0**	**0.0**	**20.4**	**0.0**	**0.0**	**0.0**	**0.0**
20-inch-diameter West Green Bay Branch Line										
Outagamie	8.8	2.8	6.0	0.0	0.0	8.8	0.0	0.0	0.0	0.0
SUBTOTAL	**8.8**	**2.8**	**6.0**	**0.0**	**0.0**	**8.8**	**0.0**	**0.0**	**0.0**	**0.0**
Pipeline Total	**1521.8**	**677.3**	**675.3**	**136.1**	**33.0**	**1352.5**	**0.0**	**152.0**	**17.0**	**0.2**

a/ Acreage is based on a 110-foot-wide construction right-of-way for the 30-inch diameter pipeline and a 95-foot-wide construction right-of-way for the 16-inch-diameter and 20-inch diameter pipeline. The area affected does not include access roads, temporary extra workspace, or areas of open water, and does not account for reduced right-of-way widths at wetlands and forested areas.

b/ Topsoil includes all surface horizons with 2 percent or more organic matter content.

c/ Slopes are grouped by the averages of high and low slope ranges provided in the SSURGO database for each component soil series. For example, a component soil with 6 to 12 percent slopes has an average slope of 9 percent and would be placed in the >8 to 15 percent slope category.

Several phases of pipeline construction, including vegetation and pavement clearing/removing, grading, topsoil segregation, open trenching and backfilling, destabilize the soil material and make it susceptible to water and wind erosion. Soils are most susceptible to erosion after vegetation is removed, and before re-establishment of a vegetative cover after the pipeline is installed. Soil erosion would also result from off-road vehicle traffic on the right-of-way following construction. However, a majority of land affected by the Project is used for agriculture, and access to off-road vehicles likely would not be permitted. Therefore, soil erosion resulting from these vehicles would be minimal.

To minimize or avoid potential impacts due to soil erosion and sedimentation, Guardian would utilize several techniques and devices such as slope breakers, sediment barriers, trench breakers, construction timing, revegetation, and mulching at locations identified in our Plan and the BMPs associated with Guardian's AMP. Temporary erosion controls, including interceptor diversions and sediment filter devices (e.g., hay bales and silt fences), would be installed following initial ground disturbance. As required, temporary trench breakers would be installed following ditch excavation. Temporary erosion control devices would be inspected on a daily basis in areas of

active construction; on a weekly basis in areas with no construction; and within 24 hours of each rainfall event of 0.5 inch or greater to ensure proper functioning.

4.2.2.5 Revegetation Potential

Revegetation potential is a rating of the ability of a soil to support revegetation efforts following construction-related disturbance. Some soils crossed by the proposed Project were identified as having a poor revegetation potential based on the surface texture and drainage class. The drainage class of a soil is the range of its relative wetness under natural conditions. Six classes of drainage, ranging from poorly drained to excessively drained, are used to describe the relative wetness of a soil (NRCS, 1994). Droughty soils which have a coarse surface texture and are moderately well to excessively drained may prove to be difficult to revegetate. Droughty soils along the proposed route were identified by querying the SSURGO database for component soil series that have: (1) a surface texture of sandy loam or coarser, and (2) are moderately well to excessively drained. The drier soils have less water to aid in the germination and eventual establishment of new vegetation. The coarser textured soils also have a lower water holding capacity following precipitation, which could result in moisture deficiencies in the root zone and create unfavorable conditions for many plants.

Pipeline construction would temporarily disturb a total of 19.1 acres of soils that have poor revegetation potential. Aboveground and ancillary facilities would not affect soils with poor revegetation potential.

Revegetation potential may be inhibited by soil erosion, loss of soil productivity through soil compaction, damage to soil structure, loss of soil fertility, damage to drainage systems, and unsuitable seed selection, methods, or planting conditions. To avoid or minimize these conditions, Guardian would return the construction right-of-way and extra work areas to preconstruction contours to the extent feasible; control erosion by implementing the standard requirements in our Plan; segregate and de-compact soils and spread topsoil on the right-of-way during final cleanup; repair any damaged drainage systems; place soil nutrients and lime in upland areas; and seed all disturbed areas. Guardian has consulted with the NRCS and area soil conservation districts to obtain recommendations for seed mixtures to be used during right-of-way restoration.

Guardian would be responsible for successful revegetation of all disturbed areas, and would follow the standard requirements for restoration, as included in our Plan, to ensure all mitigation is sufficient. In accordance with FERC requirements, revegetation would be considered successful if the density and cover of non-nuisance vegetation were similar in density and cover to adjacent undisturbed lands. If vegetation cover and density were not similar or there were excessive noxious weeds after two full growing seasons, a professional agronomist would determine the need for additional restoration measurements. In agricultural areas, Guardian would monitor crop yields to ensure that those yields in areas affected by construction were similar to adjacent, undisturbed areas.

Heavy equipment traffic and trenching along the construction right-of-way could damage existing drainage systems or affect existing drainage patterns, thereby affecting revegetation potential. Effects on drainage and irrigation systems are discussed in section 4.2.2.1.

4.2.2.6 Depth to Bedrock and Stony/Rocky Soils

The presence of shallow bedrock is often used as an indicator of the potential for introductions of rock to surface layers of soils. Locations where shallow bedrock was identified are discussed in section 4.1. Soils with significant quantities of stones in the surface were identified by querying the SSURGO database for component soil series that have either: (1) a cobbly, stony, bouldery, shaly, very gravelly, or extremely gravelly modifier to the textural class of the surface layer; or (2) have a surface layer that contains greater than 5 percent (weight basis) stones larger than 3 inches.

Pipeline construction would temporarily disturb a total of 185.9 acres of stony or rocky soils. Construction of aboveground and ancillary facilities would not affect any soils of this type.

Introducing stones or rocks to surface soil layers may reduce soil moisture-holding capacity, resulting in a reduction of soil productivity. Additionally, some agricultural equipment may be damaged by contact with large rocks and stones. Rock fragments and stones may be introduced to the surface layer during grading, trenching, and backfilling.

The introduction of subsoil rocks/stones into agricultural topsoil would be minimized by segregating topsoil from trench spoil and replacing topsoil in agricultural areas after cleanup. This practice would prevent subsoil rocks from being brought to the surface and incorporated with topsoil. To the extent possible, Guardian would remove excess rock/stone greater than 4 inches in size from the top 12 inches of disturbed soils in cultivated and rotated croplands, hayfields, pastures, residential areas, and at the landowner's request in other areas. Guardian would also remove excess rock/stone from surface soils disturbed by construction such that the size, density, and distribution of rock on the construction right-of-way would be similar to adjacent non-right-of-way areas. Guardian would not necessarily remove rocks from backfilled areas if the rocks/stones in the backfill are consistent with pre-construction conditions. If bedrock is encountered, Guardian would take necessary precautions to minimize the mixing of excavated bedrock with backfill and would replace rock in the trench to a level that is not higher than the original bedrock profile (blasting is discussed in section 4.1). Thus, no significant impacts are anticipated as a result of pipeline construction through areas of shallow bedrock.

4.2.2.7 Topsoil Depth

Topsoil is the uppermost layer of soil and contains organic matter, microorganisms, moisture, nutrients, and a seed bank essential to support plant growth. Topsoil depths along the proposed pipeline route were quantified by examining the organic matter content of the surface horizons. Near-surface soils with 2 percent or more organic matter were considered topsoil. Topsoil thicknesses were then assigned to one of four classes: 0 to 6 inches, greater than (>) 6 to 12 inches, >12 to 18 inches, >18 inches. As shown in table 4.2.2.4-1, about 45 percent of the soils that would be crossed have 6 inches of topsoil or less. Another 44 percent of the soils crossed have between 6 and 12 inches of topsoil. Only about 9 percent of the soils crossed have greater than 12 inches of topsoil. Guardian would avoid impacts on topsoil by implementing the standard requirements for topsoil segregation in our Plan.

4.2.2.8 Contaminated Soils

Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. Several databases were reviewed for information regarding potential soil and groundwater contamination within or near the Project area (see section 4.3.1). The proposed pipeline route would cross one site on the EPA's National Priorities List (NPL), the Fox River. Guardian proposes to cross the Fox River using the HDD technique (see section 4.3.2.4 for more information about this crossing). Use of this crossing method should prevent interaction with any contaminated sediments within the river. Another 10 sites within 0.5 mile of the pipeline were identified from information maintained by the WDNR. Each of these sites has been remediated and closed. One site with petroleum-contaminated soils is still undergoing remediation. This site is located about 0.4 mile southeast of the pipeline route, and would not likely present a problem for construction.

Review of the NPL indicates there are no contaminated sites located within 0.5 mile of the pipe storage/contractor yard. However, a review of the WDNR's Remediation and Redevelopment Program identified two Environmental Repair Program (ERP) sites on an adjacent property to the north of the pipe storage/contractor yard (Charter Steel). These sites have been closed since 2003 and Guardian's use of the pipe/contractor yard would not be affected by this adjacent property. No contaminated sites were identified within 0.5 mile of the proposed compressor stations, access roads, or other aboveground facilities.

Other potential impacts during construction would include accidental spills or leaks of fuels, lubricants, and coolant from construction equipment; accidental release of petroleum hydrocarbons or other hazardous materials; and/or the discovery of contaminated soils during trench excavation and grading activities. Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. The effects of contamination are typically minor because of the low frequency and volumes of spills and leaks. Guardian's SPCC Plan specifies cleanup procedures in the event of soil contamination from spills or leaks of fuel, lubricants, coolants, or solvents. Guardian and its contractors would use the SPCC Plan to prevent and contain, if necessary, accidental spills of any material that may contaminate soils, and to ensure that inadvertent spills of fuels, lubricants, or solvents are contained, cleaned up, and disposed of in an appropriate manner. We believe the use of the SPCC Plan would minimize spills and the impact if a spill were to occur.

To mitigate for the discovery of contaminated soils during construction activities, Guardian has developed an Unanticipated Discovery of Hazardous Wastes or Contaminated Soils Plan (see appendix I).

4.3 WATER RESOURCES

4.3.1 Groundwater

4.3.1.1 Existing Groundwater Conditions

Groundwater basins tend to follow the outlines of surface water drainage in most areas. The proposed G-II Pipeline would begin in the Mississippi River drainage and enter the Lake Michigan drainage near the Dodge County-Fond du Lac County line. The portion of the route within the Mississippi River drainage lies in the Upper Rock Watershed Management Unit (WMU). Within the Lake Michigan drainage, the route would cross portions of the Upper Fox,

Sheboygan, Manitowoc, and Lower Fox WMUs, before terminating just inside the Green Bay WMU at the northeast corner of Outagamie County (WDNR, 2006a).

Except for the Green Bay urban area, the areas that would be crossed by the G-II Project use groundwater for all purposes. In rural areas, which include most of the G-II route, private groundwater wells supply all of the drinking water (USGS, 1986, 1988). Groundwater resources along the G-II route come from three aquifers: the surficial (sand and gravel) aquifer, the Silurian-Devonian bedrock aquifer, and the Cambrian-Ordovician bedrock aquifer (Iowa DNR, 1989).

Additional information on the aquifer systems that occur along the proposed Project route, as well as sole-source aquifers, wellhead protection areas, public and private supply wells and springs, and contaminated groundwater is presented in the following subsections.

Surficial Aquifer System

The surficial aquifer system is the uppermost and most widespread aquifer in the Project area. It is derived from material deposited during multiple advances of continental glaciers from the north, which picked up soil and rock material during advances and redistributed these materials on the eroded land surface as water- and/or ice-laid deposits during retreats (Olcott, 1992). Though most important regionally, the surficial aquifer system is the least used of the three aquifer systems within the Project area, because most of the route crosses deposits of glacial-lake sediments and ground-moraine deposits of unsorted and unstratified till that are far less permeable than glaciofluvial (meltwater stream) deposits. The G-II route only crosses substantial surficial deposits of permeable sand and gravel in small areas of northern Jefferson County and Dodge County, Wisconsin and just northwest of the Fox River (Olcott, 1992). Where they occur, the more productive surficial aquifers range from 50 to 300 feet in thickness and can produce 200 to 300 gallons per minute (gpm) on average.

Silurian-Devonian Bedrock Aquifer

The Silurian-Devonian[1] aquifer consists mostly of dolomite and limestone in which fracture permeability has been increased by solution and extensive karst development. The aquifer follows the bedrock surface throughout most of the counties of eastern Wisconsin and runs from Door County to the Wisconsin-Illinois border. It consists of Niagara dolomite underlain by Maquoketa shale, a less permeable layer that partly isolates this system from deeper layers. The average thickness of the carbonate rocks that compose most of the Silurian-Devonian aquifer is 300 to 400 feet (Olcott, 1992).

In Wisconsin, the Silurian-Devonian aquifer is recharged by water percolating through the variable thickness of the overlying surficial aquifer system and commonly yields from 100 to about 500 gpm to wells, depending on the thickness of the aquifer and the number of fractures the well intercepts. In such areas, permeability has been enhanced by solution openings, and water circulates readily through the aquifer. The water in these areas has a variety of dissolved ions, and contains dissolved solids in concentrations of less than 500 milligrams per liter (Olcott, 1992). Along the Niagara Escarpment from Door County until Dodge County, much of the Niagara formation is exposed, forming a generally distinct bluff line. Numerous springs occur at the base of the bluff.

[1] The Devonian-age rocks do not occur under the pipeline corridor.

The Maquoketa shale layer beneath the Silurian-Devonian aquifer is composed of clay and stone that does not transmit water easily (an aquaclude). Therefore, it is not a major water source, but rather a division between the eastern dolomite aquifer and the sandstone and dolomite layers that form the uppermost bedrock aquifer to the west (Iowa DNR, 1989).

Cambrian-Ordovician Bedrock Aquifer

The Cambrian-Ordovician aquifer system is a 300- to 400-foot-thick multi-aquifer system consisting of an upper sandstone unit of Ordovician age (St. Peter Sandstone), a middle dolomite unit of Ordovician age (Prairie du Chien Group), and a lower sandstone unit of Cambrian age (Jordan Formation). These units are separated by leaky confining layers and capped by the Maquoketa shale formation (where it exists). In the Project area, the Cambrian-Ordovician aquifer system lies below the Silurian-Devonian aquifer east of a line winding from western Waukesha County north to Fond du Lac then northeast to De Pere, Wisconsin. West of this line, the Silurian-Devonian formation is largely absent (except for a few outliers far to the west, such as Blue Mounds), and the Cambrian-Ordovician formation is found under the surficial glacial deposits (Olcott, 1992).

Sole Source Aquifers and Wellhead Protection Areas

The EPA defines sole or principal source aquifers as those that supply at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s), which could physically, legally, and/or economically be supplied to those who depend upon the aquifer for drinking water. There are no sole source aquifers as defined by the EPA located within or adjacent to the G-II Project area (EPA, 2006). Wisconsin has elected not to identify sole source aquifers but rather has elected to protect all aquifers within the state.

The EPA defines wellhead protection areas as those surface or subsurface areas surrounding a water well or well field that supplies a public water system (EPA, 1987). Guardian contacted the WDNR Groundwater Section to identify any municipal wells or wellhead protection areas designated pursuant to NR 811.16(5) of the Wisconsin Administrative Code that may exist in the vicinity of the pipeline or associated facilities. The WDNR indicated that there are no municipal wells or wellhead protection areas within 250 feet of the pipeline or associated facilities.

Public and Private Supply Wells and Springs

Guardian consulted the WDNR to identify the location of known public water supply wells and springs within 150 feet of the proposed construction work space. The WDNR found that no public water supply wells occurred within 150 feet of the proposed construction work space.

To identify private water supply wells and springs located within 150 feet of the construction area, Guardian interviewed landowners during its right-of-way activities. Three private wells and three springs are located within 150 feet of the proposed construction work spaces (see table 4.3.1.1-1).

In the unlikely event that construction activities adversely affect a water supply, Guardian would make the necessary repairs and/or replacements to restore the water supply system to its pre-construction capacity by re-working the existing well or installing a comparable replacement. In the interim, Guardian would provide a temporary source of water, such as contracting with a local water supply firm to deliver potable water.

TABLE 4.3.1.1-1 List of Private Wells and Springs Located Within 150 Feet of the Construction Right-of-Way				
Approximate Pipeline MP	**County, State**	**Approximate Distance (ft)**	**Direction**	**Type**
39.9	Fond du Lac, Wisconsin	100	West	Well
41.7	Fond du Lac, Wisconsin	0	NA	Spring
51.1	Fond du Lac, Wisconsin	100	West	Spring
66.2	Calumet, Wisconsin	150	East	Spring
67.5	Calumet, Wisconsin	120	West	Well

Contaminated Groundwater

Guardian evaluated the documented occurrence of, and potential for, contaminated groundwater along the proposed pipeline route (e.g., Leaking Underground Storage Tank [LUST] sites, and closed or open ERP sites) by examining information available from the WDNR Remediation and Redevelopment Internet site (WDNR, 2006c). Eight contaminated sites were identified within 0.5 mile of the pipeline route (table 4.3.1.1-2).

Based on consultations with the State of Wisconsin Department of Commerce, the open ERP site, located 0.36 mile to the southeast of the proposed pipeline route at MP 41.8, once contained aboveground petroleum storage tanks and now exhibits low-level soil contamination but no groundwater contamination.

TABLE 4.3.1.1-2 List of Contaminated Sites Located Within 0.5 Mile of the Construction Right-of-Way				
Approximate Pipeline MP	**County, State**	**Approximate Distance (miles)**	**Direction**	**Type**
41.7	Fond du Lac, Wisconsin	0.21	Southeast	Remediated ERP Sites
41.7	Fond du Lac, Wisconsin	0.46	Southeast	Remediated ERP Sites
41.8	Fond du Lac, Wisconsin	0.23	Southeast	Remediated LUST Site
41.8	Fond du Lac, Wisconsin	0.36	Southeast	ERP Sites
46.0	Fond du Lac, Wisconsin	0.37	West	Remediated LUST
54.0	Fond du Lac, Wisconsin	0.48	Southeast	Remediated LUST
93.9	Brown County, Wisconsin	0.02	South	Remediated LUST
93.9	Brown County, Wisconsin	0.11	South	Remediated LUST
95.3	Outagamie, Wisconsin	0.17	Southwest	Remediated LUST
104.4	Outagamie, Wisconsin	0.11	West	Remediated ERP Sites
106.0	Outagamie, Wisconsin	0.28	West	Remediated ERP Sites

Elevated levels of arsenic have also been found in the vicinity of the Saint Peter Sandstone Formation in Outagamie and Brown Counties, Wisconsin. Increased groundwater use from development in Outagamie and Brown Counties has drawn down the water table, causing an increase in oxidation of the arsenic containing sulfides (WDNR, 2006). Concern has been raised that that the construction of the Project in Outagamie and Brown Counties would cause an increase in sulfide oxidation that would result in an increase of arsenic concentrations in both well water and soils.

Given that the pipeline trench would only be open for a short period of time during construction, we do not believe pipeline construction would cause an increase in arsenic concentrations in well water. However to ensure impacts to groundwater are minimized, **we recommend that:**

- **Prior to construction, due to landowner concerns, Guardian should consult the WDNR, Bureau of Drinking Water & Groundwater to determine if the G-II Project could affect arsenic levels in groundwater in Outagamie and Brown Counties, Wisconsin. If there is a potential effect, Guardian shall develop mitigation measures that would minimize oxidation of arsenic containing sulfides in consultation with the WDNR, Bureau of Drinking Water & Groundwater and file documentation of the consultation and any mitigation plans with the Secretary.**

4.3.1.2 General Groundwater Impacts and Mitigation

Project-related construction and operational activities could affect groundwater resources; however, most potential impacts are avoided or minimized by the use of both standard and specialized construction techniques. Impacts and mitigation measures are discussed in further detail in the following sections.

Construction

Shallow and perched aquifers could sustain minor impacts from changes in overland water flow and recharge due to clearing and grading of the Project rights-of-way. In forested areas, water infiltration, which is normally enhanced by vegetation, would be reduced until vegetation is re-established. The permanent cleared area would have less vegetation layers to reduce the energy of falling water, and retain it to allow it to percolate. In addition, permanent effects would also occur to groundwater recharge as a result of the development of impervious surfaces and structures at the proposed aboveground facility sites and/or near-surface soil compaction caused by heavy construction vehicles, which could reduce the soil's ability to absorb water. These impacts would be minor and temporary, and because they affect a very small portion of each aquifer's total recharge area, they would not significantly affect groundwater resources.

The pipeline trench could also alter the quantity of groundwater that flows to specific points of discharge, such as a well or spring, by altering shallow groundwater flow paths. A disturbed linear corridor may have higher transmissivity (ease of groundwater movement) than the intact soil layers. Altered flow paths can result in changes to the quality of groundwater at specific locations by exposing the groundwater to different soil constituents or contaminants. These impacts would most likely occur in shallow and perched aquifers. The proposed pipeline would not, however, change the regional flow paths because these are determined by larger-scale geologic features that form the hydrogeologic setting. Also, deeper aquifers that are hydrologically connected to the surficial aquifer would not be directly affected by trenching and construction activities because of their depth below the pipeline trench. Based upon these factors, the proposed Project is not expected to affect regional groundwater discharge conditions or quality.

Construction of the pipeline generally requires excavating a 6- to 8-foot-deep trench. Dewatering may be necessary where the trench encounters shallow groundwater within the excavation zone. Localized lowering of groundwater due to dewatering is likely, and would affect a small area along the route, and be of short duration. The water pumped from the excavation would be discharged in accordance with FERC-approved Procedures, and subject to

applicable discharge regulations. The potential impact of dewatering would be minimized by discharging the pumped water to well-vegetated upland areas, or into hay bale structures or filter bags if vegetation is insufficient, or where water is discharged to wetland areas to promote infiltration and minimize or eliminate runoff. Dewatering could temporarily depress groundwater levels right along the trench. However, because trenching typically proceeds at a relatively rapid rate, the depressed water table around the trench would be expected to recover rapidly once dewatering ends, and the trench is backfilled. Therefore, this activity is most likely to only temporarily affect flow patterns in nearby springs and shallow wells.

Occasionally, secondary changes in the physical condition of the aquifer due to pumping and "rerouting" may cause longer-lasting disruptions. These cannot be predicted because they are so site-specific. Guardian's plans to re-supply well users would apply to the extent that those impacts occur; however, impacts on natural systems such as springs may require other responses.

Material placed to backfill the pipeline trench is generally more permeable than the surrounding soil and rock units, and the trench would provide an easier pathway for groundwater flow in areas where it intersects the water table. Thus, the pipeline trench would potentially alter the existing groundwater flow patterns within shallow saturated zones. In general, however, most wells located along the pipeline take water from deeper formations whose flow paths would not be affected by the trench. Additionally, Guardian would install trench breakers at specified intervals, as specified in our Plan and Procedures, to reduce the potential for the trench to act as an easier groundwater flow path, and no long-term impacts on the water table or groundwater movement patterns would be anticipated as a result of the proposed Project. Conversely, if construction and operation of heavy machinery compact soils along the proposed Project route, water infiltration and recharge of aquifers along the trench or right-of-way would be reduced. However, Guardian would implement the measures identified in our Plan, which includes testing, and as applicable, mitigation for compacted soils (see section 4.2.2.3).

Blasting could cause temporary changes in water levels and turbidity may affect groundwater quality; however, the use of controlled blasting techniques should mitigate impacts of blasting. Guardian's analysis of county soils data determined that less than 2 percent (1.8 miles) of the pipeline route would cross areas with bedrock at depths of less than 60 inches that may require blasting to construct portions of the pipeline facilities. These areas are reported to be located in northeastern Dodge, central Fond du Lac, and isolated parts of Brown Counties, Wisconsin.

Eleven contaminated sites have been identified within 0.5 mile of the proposed pipeline route including six LUST sites and five ERP sites (see table 4.3.1.1-2). Of these areas, all but one (an ERP site) have been remediated and closed by the WDNR. None of these sites involved contaminated groundwater and, therefore, do not pose a risk to groundwater resources. Thus, excavating near these areas should not result in adverse impacts on groundwater quality in the Project area. The active ERP site is located about 0.36 mile southeast of the proposed pipeline route and separated from the route by a low area containing two streams. Given the distance from the proposed route, the absence of groundwater contamination, and the site's assumed hydraulic separation from the route, it is reasonable to conclude that this site would not be disturbed during construction activities and therefore poses no risk to groundwater resources in the area.

It is possible that unknown contaminated sites could be encountered along the pipeline route during construction. If contaminated soils or water are discovered, Guardian would notify the

landowner(s) and, if required, the appropriate regulatory agencies. Guardian would also follow the procedures outlined in its plan for the Unanticipated Discovery of Hazardous Wastes or Contaminated Soils (see appendix I to this EIS).

The greatest potential for impacts on groundwater would be an accidental release of a hazardous substance, such as fuel, lubricant, or coolant, during construction or operation. Spills or leaks of hazardous liquids could contaminate groundwater, making it unsafe to use, and adversely affect the health of its users. These impacts can be avoided or minimized by confining refueling and storage facilities to locations less likely to allow spills to spread, and by requiring their immediate cleanup. Guardian has agreed to prohibit refueling or the storage of fuel or other hazardous liquids within 200 feet of private drinking-water wells or springs, and within 400 feet of public or community drinking-water wells or springs. Guardian will also have to implement Spill Prevention and Response Procedures that meet state and federal requirements. Guardian will also develop an SPCC Plan to implement during construction of the facilities. This SPCC Plan would address potential spills of fuel, lubricants, and other hazardous materials and outline spill prevention practices, spill handling and emergency notification procedures, and training requirements. It also prescribes mitigation measures, including containment and cleanup, to minimize potential impacts should a spill occur. These measures should minimize or eliminate the potential for adverse impacts on groundwater resources.

Operation

Operation of the G-II Project would not be expected to result in impacts on groundwater, unless maintenance activities involving pipe excavation and repair are required. For maintenance activities, Guardian would employ protective measures substantially the same as those used during construction. As a result, any impacts from maintenance would be short-term in nature and similar to those discussed above for the initial pipeline construction.

4.3.1.3 Site-Specific Groundwater Impacts and Mitigation

Construction

Sole source aquifers and wellhead protection areas do not occur in the vicinity of the proposed Project and would therefore not be affected by the proposed construction and operation activities. During construction, Environmental Inspectors would monitor the construction work areas for any previously unidentified wells, springs, and seeps. If any such features are encountered during construction, Guardian would treat them as waterbodies and avoid or minimize effects by implementing the measures identified in our Plan and Procedures.

As indicated previously, blasting is not likely to occur along most of the route. However, if any blasting is required, it could adversely affect wells located within 150 feet of the proposed construction right-of-way. Effects could include decreased yields and/or water quality (i.e., increased turbidity or odor), interference with well operation, or disruption of well function. Guardian has consulted with the WDNR, and has not identified public water supply wells within 150 feet of the construction right-of-way. Private water supply wells have been identified within 150 feet of the construction right-of-way, but none are located in areas of shallow bedrock. Therefore, no impacts on public or private drinking water wells due to blasting are anticipated. However, if any blasting is required within 150 feet of a water well, Guardian would use controlled blasting techniques to minimize the potential for impacts on water supply wells. Additionally, Guardian would conduct pre- and post-construction well testing to ensure there

would be no loss of productivity and quality. Guardian would also conduct all blasting in accordance with all applicable federal, state, and local laws, permits, and authorizations.

Operation

There are no known sole source aquifers and wellhead protection areas in the vicinity of the Project area; therefore, operation of the G-II Project would not result in impacts on these features.

4.3.2 Surface Water

4.3.2.1 Existing Surface Water Resources

Guardian identified waterbodies crossed by the proposed Project, including rivers, streams, and ponds using USGS topographic maps, WDNR hydrographic geographic information system (GIS) data layers, aerial photography, and through field surveys of about 90 percent of the proposed Project route, where survey permission was granted. The proposed Project would cross 114 surface waterbodies, including 27 perennial streams, 86 intermittent streams, and one constructed pond. A list of the waterbodies crossed by the route is included as appendix J and shows the location by waterbody name, MP, type, crossing width, water quality classification, flow regime, and proposed crossing method.

Guardian completed field surveys at all of the proposed aboveground facility sites, which showed that no waterbodies occur at these locations. Consistent with our Procedures, Guardian has proposed that all extra workspace areas would be located at least 50 feet away from waterbodies except in two locations (west branch of the Milwaukee River [MP 37.9] and an unnamed tributary to the south branch of the Manitowoc River [MP 65.0]), where Guardian would require additional temporary workspace within 50 feet of the waterbody (see section 4.3.2.2 for further details).

Sensitive Waterbodies

Sensitive waterbodies include those that are designated as National Wild and Scenic Rivers; are state-designated high quality or outstanding natural resource waters; provide habitat for threatened and/or endangered species or critical habitat; have potable surface water intakes located within 3.0 miles downstream of the pipeline crossing; and/or do not currently support designated uses.

None of the waterbodies crossed are designated as National Wild and Scenic Rivers (NPS, 2005). Based on review of WDNR surface water data (WDNR, 2006a) and consultations with WDNR water resources staff (Schmidt, 2006), Guardian concluded that none of the streams that would be crossed by the proposed pipeline are designated as either high quality or outstanding natural resource waters.

Guardian searched for surface water intake areas within 3.0 miles downstream of the proposed Project using records provided by the WDNR. This showed that no surface water intakes for public water supply systems occur within 3.0 miles downstream of any of the proposed surface water crossings.

Seven waterbody segments that would be crossed by the pipeline are included on the list of impaired waterbodies under Section 303(d) of the CWA, or have concerns resulting from

contaminated sediments. Section 303(d) of the CWA requires states to identify waters that are not attaining their designated use(s) and develop total maximum daily loads (TMDLs), which represent the maximum amount of a given pollutant that a waterbody can assimilate and still meet its designated use(s). The six waterbodies include the Rock River, Kummel Creek, Kankapot Creek, Plum Creek, Fox River, and Duck Creek. The two listed pollutants common to all six streams are mercury (from atmospheric deposition) and sediments (elevated suspended solids concentrations from non-point sources such as agricultural runoff). Duck Creek is listed as containing excessive levels of total phosphorus (also likely to be from agricultural sources). The Fox River is listed as containing polychlorinated biphenyl (PCB)-contaminated sediments in addition to mercury and elevated suspended sediments.

Watershed Protection Areas

The proposed pipeline would cross one WDNR-owned conservation easement located at MP 57.7 along Pipe Creek. This non-point source easement is intended to provide a vegetative buffer to prevent agricultural runoff from entering a priority watershed. A portion of the easement consists of upland buffer covered with herbaceous vegetation and a few scattered shrubs. The remainder coincides with the emergent wetland located adjacent to Pipe Creek. About 0.61 acre of the easement would be temporarily affected by construction of the G-II Project.

Flood Plains

Based upon a review of Federal Emergency Management Agency (FEMA) flood hazard designation maps conducted by Guardian, none of the aboveground facilities were found to be located within 1,000 feet of a designated flood plain.

4.3.2.2 General Surface Water Impacts and Mitigation

Guardian's proposed methods for pipeline installation across each identified waterbody are listed in appendix J. Waterbody crossings would be installed using open cut-wet trench methods, dry crossing methods, or HDD methods, as described in the following sections. With the exception of the crossing of the East Branch of the Rock River (MP 25.4), which is proposed using the open cut method, Guardian has proposed to cross waterbodies that contain perceptible flow at the time of crossing using a dry crossing method such as a flume or dam and pump. Crossings of waterbodies with low flow or no flow would use the open cut method. Based on field surveys conducted by Guardian, Guardian anticipates that most of the waterbodies would be crossed during a low-flow period using the open cut method. Three crossings would be implemented using HDD.

General impacts on waterbodies, including sensitive waterbodies and watershed protection areas, that could result from pipeline construction, accidental spills, and construction of aboveground facilities, as well as operational impacts, are discussed in more detail in the following sections.

Construction

Construction of the G-II Pipeline could impact surface waters in a variety of ways. Clearing and grading of stream banks, in-water trenching, trench dewatering, and backfilling could alter aquatic habitat, increase sedimentation and turbidity, decrease dissolved oxygen levels, increase stream warming, release chemical and nutrient pollutants from sediments, and accidentally release chemical contaminants such as fuels and lubricants.

The primary impacts at the waterbody crossings would result from suspension of sediments during an open cut crossing of a flowing waterbody. The extent of the impact would depend on sediment loads, stream velocity, and sediment particle size distribution at the time of construction. These factors would determine the density, downstream extent, and persistence of the sediment plume. The presence of more fine materials, such as sand and silt, increases the likelihood of elevated turbidity and suspended sediments. Coarser materials such as pebble, gravel, and cobble do not contribute to this impact. In general, impacts on the in-stream aquatic life (biota) and the habitat value of the waterbody would be temporary and short-term during construction. After the completion of in-stream work, backfilling, restoration, and recruitment of aquatic biota from upstream sources would allow these resources to return to preconstruction conditions within a few years.

Increased turbidity can reduce light penetration into the water, which reduces photosynthetic activity and levels of dissolved oxygen in the water column. This is generally more of a problem in standing waters than flowing waters. Organic materials suspended in the water can further reduce dissolved oxygen by increasing the biochemical oxygen demand (BOD). Resuspension of sediments can also introduce contaminants, metals, and nutrients bound to the sediments into the water column. Contaminated soils could also be encountered during construction activities along the proposed construction right-of-way or extra work areas. If this happened during construction, Guardian would implement procedures to identify and properly manage the contamination.

Removing vegetation from riparian areas would increase surface runoff and erosion from the pipeline corridor. Guardian would use temporary and permanent sediment controls (e.g., silt fence and slope breakers), as outlined in our Procedures, to minimize this impact by directing surface runoff to well-vegetated areas along the sides of the construction right-of-way. Removal of riparian vegetation at waterbody crossings, and loss of associated shading, would increase water temperatures; however, this impact is not expected to be significant in most cases because of the limited amount of streambank canopy that would be cleared relative to the existing riparian vegetation. Following construction, trees and shrubs would also be allowed to re-establish themselves on waterbody banks except for a 10-foot-wide corridor centered over the pipeline.

To minimize impacts during construction, Guardian has adopted our Procedures for construction related to waterbody crossings. The Procedures are designed to minimize impacts associated with waterbody crossings. These measures include, but are not limited to:

- obtaining all necessary permits from the COE and state agencies prior to construction and notifying applicable state agencies at least 48 hours before commencing instream trenching;
- using environmental inspectors during construction;
- routing the proposed pipeline as close to perpendicular to the waterbody as practicable and minimizing the number of individual crossings where waterbodies meander or have multiple channels;
- limiting the use of equipment within the waterbody to that necessary to construct the crossing, and utilizing equipment bridges for other construction equipment;

- placing spoil at least 10 feet away from the water's edge with installation of sediment barriers to prevent the flow of spoil or silt-laden water to the waterbody;
- locating all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land;
- completing all instream construction activity, including stabilization and re-contouring of banks, within 24 hours for minor waterbody crossings and 48 hours for intermediate waterbody crossings;
- using temporary erosion and sediment control measures such as sediment barriers and trench plugs; and
- implementing restoration activities including preconstruction bank contours, installation of slope breakers, and revegetation of disturbed riparian areas.

Guardian has identified two of its proposed additional temporary workspaces (ATWS) that it believes must be located within 50 feet of the water's edge in site-specific locations. These sites are near MP 37.9, where the pipeline is proposed to cross the West Branch of the Milwaukee River, and at MP 65.0 where the pipeline would cross an ditch to the south branch of the Manitowoc River. We have reviewed these locations and have determined that the requests are acceptable due to the constraints of the surrounding habitats (i.e., forest, wetland and riparian habitat).

To further minimize impacts Guardian has planned construction during the summer months (summer 2008), which according to long-term USGS gauging records in and near the Project area, is typically a low-flow period. Guardian's construction contractor would monitor weather conditions prior to the installation of stream crossings, and may, if necessary, delay installation of a crossing if construction is scheduled to occur following a rainfall event substantial enough to create a high-flow condition. As stated above, Guardian would employ a dry crossing technique in streams that contain perceptible flow at the time of the crossing.

Blasting can have adverse effects on aquatic organisms. Guardian has identified one area associated with an unnamed intermittent stream, located at MP 21.4, that is underlain by shallow bedrock and is likely to require blasting to excavate the trench and install the crossing section. To minimize impacts on this stream, Guardian would conduct this crossing during a period of low or no flow.

Other areas that could require blasting may be identified during Guardian's geotechnical investigations. In general, where blasting is required, preparation of the rock for blasting (e.g., drilling shot holes) causes enough disturbance to displace most mobile aquatic organisms from the immediate vicinity of the blast. To further reduce the potential for impacts on aquatic organisms, Guardian would use techniques such as scare charges or banging on a submerged piece of pipe before the blast to displace mobile aquatic organisms before the blast is conducted. Immediately following blasting, Guardian would remove shot rock that impedes stream flow. Guardian would also conduct blasting in accordance with all applicable federal, state, and local laws, permits, and authorizations.

Aboveground facilities such as compressor stations, meter and regulator stations, and mainline valves would be located in upland areas away from waterbodies. Guardian would implement the

measures included in our Plan to prevent or minimize erosion in upland areas, thereby limiting impacts on waterbodies. Some of the mitigation measures identified in the Plan include installing erosion controls (e.g., slope breakers, silt fencing, and mulch) during construction to control runoff, reducing the duration of soil disturbance, and re-establishing contours and vegetative cover as soon as practicable (see section 4.4).

Given these factors and protective measures, any effects to waterbodies associated with construction and operation of the proposed aboveground facilities should be effectively minimized.

Accidental Spills and Releases

To minimize potential impacts associated with accidental spills and releases, Guardian would use its SPCC Plan prepared under Docket No. CP00-36-000 (with appropriate updates). The SPCC Plan describes measures that Guardian personnel and contractors would implement to prevent and, if necessary, control any inadvertent spill of fuels, lubricants, solvents, and other hazardous materials that could affect water quality. A copy of the SPCC Plan is included as appendix D to this EIS. This SPCC Plan would be updated with site-specific information prior to the initiation of construction activities.

Guardian has also adopted our standard measures regarding spill prevention, containment, and minimization near waterbodies. These measures include, but are not limited to:

- managing operations to reduce the risk of accidental spills or exposure of fuels or other hazardous materials into the environment;
- conducting proper training of employees handling fuels and other hazardous materials;
- conducting regular inspection of all equipment to ensure it is in good operating order;
- ensuring hazardous materials are stored and equipment refueled at least 100 feet from any waterbody or in an upland area at least 100 feet from any wetland;
- prohibiting concrete-coating activities within 100 feet of a waterbody or wetland;
- ensuring that provisions are made for the necessary tools, equipment, and supplies to be on hand to contain and recover spilled materials at the job site; and
- ensuring prompt reporting of any spills to the appropriate agencies.

When refueling activities must be conducted within 100 feet of a waterbody, Guardian would employ monitors to supervise refueling activities and take additional precautions such as spill kit readiness and containment for pumps.

Given the adoption of the measures outlined in our Procedures and these additional measures, the risk of accidental spills or other introductions of hazardous materials to waterbodies would be effectively minimized.

Operation

Operation of the G-II Project would not impact any surface waters, unless maintenance activities involving pipe excavation and repair are required in or near streams or wetlands. For maintenance activities, Guardian would employ essentially the same protective measures used

during construction. As a result, any impacts from maintenance would be short-term and similar to those discussed above for initial construction.

4.3.2.3 Site-Specific Surface Water Impacts and Mitigation

Construction

Sensitive Waterbodies

There are no waterbodies designated as National Wild and Scenic Rivers in the Project area nor are any of the streams along the proposed route designated as either high quality or outstanding natural resource waters. Further, there are no surface water intakes for public water supply systems within 3.0 miles of any of the proposed surface water crossing locations. Therefore, no impacts on specially designated areas are anticipated.

Guardian proposes to cross six waterbody segments that have been listed as impaired waterbodies under Section 303(d) of the CWA and/or contain contaminated sediments. Contaminants in all seven streams are the result of atmospheric deposition and non-point sources such as agricultural runoff. Six of these streams would be crossed using the open-cut method, and the Fox River would be crossed using the HDD method (see the section on HDD below). Installation activities are not likely to affect water quality in regard to the pre-existing contamination of these streams; however, it could result in short-term, local increases in suspended sediment levels as discussed in section 4.3.2.1.

There are three waterbody crossings that are 100 feet or more in length, including the Fox River (500 feet), the Rock River (120 feet), and the East Branch of the Rock River (100 feet). As indicated above, Guardian proposes to cross the Fox River using the HDD method. Guardian also proposes to use this method to cross the Rock River (see section on HDD below). Guardian proposes to cross the East Branch of the Rock River using the open-cut wet trench method. Protective measures for crossing the Rock, East Branch of the Rock, and Fox Rivers would follow the guidelines established in our Procedures. Accordingly, for these major waterbody crossings Guardian would file with the Secretary site-specific detailed construction plans for review and approval by the Director of the OEP. Guardian has also developed a Horizontal Directional Drill Contingency Plan (see appendix K) to address potential impacts associated with an inadvertent release of drilling fluid while conducting HDD crossings (see section on HDD below).

Watershed Protection Areas

Guardian proposes to cross one WDNR-owned conservation easement located at MP 57.7 along Pipe Creek that would temporarily disturb about 0.61 acre of the easement. The proposed route through Pipe Creek would be collocated with an existing ATC electric powerline. To minimize impacts on the easement, Pipe Creek, and associated wetlands, Guardian would reduce its construction right-of-way width to 75-feet through the easement. Additional temporary work space (totaling about 0.6 acre) would be located just outside the easement in active agricultural land to facilitate crossing the easement and stream.

Guardian would construct the pipeline on either side of the easement using conventional pipeline construction techniques for agricultural lands in accordance with our Plan and Guardian's AMP. In wetland areas and near Pipe Creek, Guardian would employ the measures outlined in our

Procedures with minor site-specific variation to minimize impacts on both the easement and the wetland (see sections 4.3.2.2 and 4.4.1.3). During construction, erosion and sedimentation control measures would be used to temporarily replace the functions of the easement buffer within the construction right-of-way and to ensure that soil would not migrate off construction areas and into Pipe Creek.

Following construction, Guardian would restore the construction right-of-way within agricultural land in accordance with the standard requirements in our Plan and Procedures to stabilize the right-of-way and prevent soil erosion and sedimentation into the wetlands and stream within the easement. The current easement consists of a combination of old field successional plant species, two areas of reed canary grass-dominated emergent wetland, and an area currently in alfalfa production. Guardian would revegetate the easement with an appropriate seed mix, based on recommendations received from the WDNR, if different from our Plan and Procedures.

Guardian would retain a 50-foot-wide permanent easement for operation of the pipeline, which would not eliminate the WDNR easement, but would limit construction of structures over the pipeline and preclude the planting of trees within Guardian's easement. Guardian would also conduct periodic vegetation clearing along the permanent easement to facilitate pipeline safety inspections. Guardian would cooperate with the WDNR in managing the corridor to protect the resources associated with Pipe Creek, as intended by the state's conservation easement.

Given the construction, operation, and maintenance measures to be employed by Guardian at Pipe Creek and the fact that this portion of the easement is already subject to routine vegetation maintenance as part of the existing ATC powerline operations, we do not believe the conservation easement would be adversely affected by the Project. Guardian would, however, continue consultations with the WDNR regarding any additional requirements associated with the construction, operation, and maintenance of the Project within the easement.

Horizontal Directional Drill Crossings

Guardian proposes to use HDD to install the pipeline across three waterbodies, the Rock River at MP 9.8, the Fox River at MP 90.9, and Apple Creek at MP 91.1. The Fox River is the only waterbody that would be crossed that has contaminated sediments (see section 4.3.2.1). The Fox River and Apple Creek would be crossed simultaneously in one HDD.

HDD is a trenchless crossing method that may be used to avoid direct impacts on sensitive resources, such as waterbodies, by directionally drilling beneath them. A successful HDD would result in little or no impact to the waterbody being crossed.

Geotechnical investigations conducted by Guardian and filed with the FERC on September 7, 2007 for the Fox River/Apple Creek crossing indicate very favorable conditions for installing the pipeline using the HDD method. At this time, Guardian does not anticipate the need for an alternative method for the Fox River/Apple Creek crossing. However, in the event the planned HDD crossing fails, Guardian would have to report the failure and take steps to minimize any leakage of drilling fluids or other adverse impacts. Guardian would also be required to develop an alternative crossing plan in consultation with the COE, EPA Region 5 Remedial Manager, and WDNR Project Coordinator and file the final plan with the Secretary for review and for written approval from the Director of the OEP prior to conducting any such alternative crossing.

The feasibility of the proposed Rock River HDD crossing would also be evaluated based on site-specific geotechnical data to be collected at the proposed HDD site and filed with the FERC for review prior to construction. However, should the proposed HDD crossing of the Rock River fail, Guardian proposes to install the crossing using a dry-crossing method. The crossing would be located to the southeast of the currently proposed HDD crossing. Detailed plans for the alternative crossing would require consultation with the COE, EPA Region 5 Remedial Manager, and WDNR Project Coordinator. Guardian would also be required to file the final alternative crossing plan with the Secretary for review and for written approval from the Director of the OEP prior to conducting any such alternative crossing.

Guardian would only employ alternative crossing techniques if the planned HDD crossings of the Fox and/or Rock Rivers are unsuccessful. **We recommend that:**

- **In the event the planned HDD crossing of the Fox River, Apple Creek, and/or the Rock River fail, Guardian should develop final alternative crossing plans in consultation with the COE, EPA Region 5 Remedial Manager, and WDNR Project Coordinator. The final alternative crossing plans should be filed with the Secretary for review and for written approval from the Director of the OEP prior to conducting any such alternative crossing.**

A successful HDD is a preferred method for crossing sensitive habitats because it eliminates stream bottom disruption and subsequent impacts. With the HDD method, drilling fluid, primarily consisting of fresh water and bentonite, is pumped into the borehole, and serves to lubricate the drill bit, maintain the borehole, and remove cuttings. At the drill entry or exit holes, drilling fluid normally returns to the surface pits and is collected for re-use after cleaning. The pits also hold the drilling fluid far from the water's edge to prevent it from entering the water.

The use of the HDD crossing method is not without risk, because inadvertent drilling fluid releases could result if the drilling fluid escapes containment at the pits or if a "frac-out" occurs. A frac-out occurs when drilling fluids migrate unpredictably to the surface through fractures, fissures, or other conduits in the underlying rock or unconsolidated sediments. A frac-out would cause turbidity and sedimentation with the impacts described previously. As suspended materials settle out of the water column, sedimentation would partially or entirely cover the waterbody substrate and any sessile benthic organisms. Temporary displacement of fish species and their prey items, as well as the potential for the smothering or burying of prey items, and the clogging of fishes' gills could also occur.

To minimize the potential impacts from frac-outs, Guardian has prepared an HDD Contingency Plan for Inadvertent Releases of Drilling Fluid (see appendix K). This plan describes standard drill monitoring and sampling procedures, clean-up practices such as the use of straw bales, silt fencing, or turbidity curtains to contain the mud and cuttings, followed by mechanically or manually removing the drilling mud. The plan also addresses procedures to contain and clean up inadvertent releases of drilling mud into waterbodies.

If a frac-out occurred in the Fox or Rock Rivers, Guardian would work with its HDD contractor to minimize the volume of drilling fluid released, and implement additional measures to prevent further releases of drilling fluids while it worked to complete the HDD crossing. HDD drilling fluid consists of water and bentonite, which is a mixture of mainly inert and non-toxic clays and rock particles consisting of about 85 percent montmorillonite clay, 10 percent quartz and

feldspars, and 5 percent accessory materials, such as calcite and gypsum. The release of these materials should not pollute the river waters or sediments, although it may temporarily increase turbidity.

Contaminated Sites

The Fox River is the only waterbody with known contaminated sediments that would be crossed. Crossing this waterbody using the HDD method should make adverse effects resulting from resuspension of contaminants unlikely.

Operation

Operation of the G-II Project would not cause impacts on any surface waters, unless maintenance activities involving pipe excavation and repair in or near streams or wetlands are required. For maintenance activities, Guardian would employ protective measures substantially the same as those used during construction. As a result, any impacts derived from maintenance would be short-term in nature and similar to those discussed above for the initial pipeline construction.

4.3.2.4 Hydrostatic Testing

Before being placed into service, the proposed pipeline and compressor stations would be hydrostatically tested to DOT standards, as listed in 49 CFR 192, to ensure structural integrity. Guardian proposes to hydrostatically test the pipeline and pipeline lateral using water from rivers and streams along the proposed pipeline route. Test water would be withdrawn through a screened intake to prevent fish entrainment, used for testing, and then discharged back to the waterbodies from which it was withdrawn, or to well-vegetated upland areas. Discharges of hydrostatic test water would comply with permit conditions and follow the guidelines outlined in our Procedures. In agricultural lands, discharges would follow measures described in Guardian's AMP.

Guardian would also use diffusers to minimize the potential for stream scour from water discharged into waterbodies, sediment control devices, and other energy dissipating devices to prevent erosion from discharges that do not go directly back into waterbodies. Guardian would not add chemicals to the water or otherwise treat it for use. Therefore, the chemistry of the water discharged following testing should not differ from the chemistry of the source water.

Guardian anticipates hydrostatically testing the pipeline in 16 segments and minimizing water withdrawals by cascading water between segments to reuse as much water as possible. However, Guardian cannot provide a specific water volume estimate until its final Hydrostatic Testing Plan is completed. Assuming that no water would be reused during testing and that new water withdrawals are made for each segment provides a conservative estimate. In this case, Guardian would need about 18.4 million gallons of water. The actual amount should be substantially less.

Hydrostatic testing of the pipeline would be conducted as follows:

- MP 0.0 to MP 40.99 – Three test sections using about 7.6 million gallons from the Rock River. The discharge points for each of these sections are unknown at this time because a hydrostatic test plan has not been finalized.

- MP 40.99 to MP 117.35 – Five test sections using about 10.4 million gallons from the Fox River. It is likely that most of this water would not be discharged back into the river, but rather at upland locations and other approved waterbodies along the pipeline route, which are capable of receiving such large volumes of water.
- West Green Bay Branch Line – One test segment of 0.76 miles using 25,000 gallons of water from municipal sources. The water will likely be discharged back into the drainage ditch of Highway VV.
- Southwest Green Bay Branch Line – One test segment of 1.77 miles using 145,000 gallons of water from the Fox River. The water will likely be discharged back to the Fox River or a tributary of the Fox River.
- Denmark Branch Line – One test segment of 1.6 miles using 83,000 gallons of water from the Fox River. The water is anticipated to be discharged into the Fox River or a tributary of the Fox River.

Hydrostatic testing of the compressor station facilities would use water obtained from municipal sources. Guardian anticipates using 98,500 gallons of water for hydrostatic testing of the Sycamore Compressor Station and 103,000 gallons for the Bluff Creek Compressor Station. As a contingency plan, Guardian has proposed to use water from wells it proposes to install at each compressor station location to support routine operations (e.g., potable water and toilet facilities) to hydrostatically test the compressor station piping only. The EPA has expressed concern for groundwater resources as a result of this proposed contingency plan; however, given the relatively small volume of water that would be required to support such hydrostatic testing of facility piping it is unlikely to have an adverse affect on local groundwater resources.

Discharges of all hydrostatic test water at each of the compressor stations would be conducted in accordance with the standard requirements outlined in our Procedures and Guardian's AMP, as appropriate.

Guardian would comply with any permit conditions necessary for the use of municipal water sources, as well as follow the guidelines regarding the use and discharge of hydrostatic test waters pursuant to the requirements of the General Permit to Discharge under the Wisconsin Pollutant Discharge Elimination System (WPDES).

4.4 VEGETATION

4.4.1 Wetlands

The COE defines wetlands as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (Environmental Laboratory, 1987). Wetlands perform a number of valuable functions. Among these are flood flow attenuation, sediment retention, nutrient retention, provision of wildlife habitat, groundwater recharge and discharge, recreation, and erosion control.

Section 404 of the CWA of 1972 established standards to minimize impacts on wetlands under the regulatory jurisdiction of the COE. These standards require avoidance of wetlands, where possible, and minimization of disturbance where impacts are unavoidable, to the degree

practicable. Any unavoidable impacts must be mitigated, and any remaining impacts may require compensatory mitigation. All wetland crossings would be subject to review and approval by the St. Paul District of the COE and the WDNR. Guardian would comply with the conditions of the permits issued by the COE and WDNR, including the provisions of any required wetland compensatory mitigation.

4.4.1.1 Existing Wetland Resources

Guardian conducted wetland investigations in areas along the proposed pipeline route where landowners had granted access, as well as at the proposed aboveground facility sites (compressor stations, meter stations, and MLVs), and at all extra work areas (extra workspaces, access roads, and pipe storage/contractor yard) through review of available NRCS, National Wetland Inventory (NWI), and WWI maps and soil surveys. From June 2006 through September 2006, Guardian conducted wetland field surveys to delineate wetland boundaries in accordance with the requirements of the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987), the NRCS approach for evaluating remote sensing data (Woodward, 1997), and the WWI. The properties investigated contained 90 percent of the areas identified in the off-site evaluation as potential wetlands. Wetlands along the Guardian pipeline were classified using the FWS classification system (Cowardin et al., 1979) and the WWI classification system (WDNR, 1993).

Based on the off-site analysis and field investigations, the pipeline route would cross a total of 99 wetlands. Table 4.4.1.1-1 identifies the NWI classification, length of crossing, and temporary and long-term impacts on the wetlands crossed by the G-II Pipeline. A listing of the wetlands crossed by milepost is also provided in appendix L.

Palustrine (freshwater) wetlands are nontidally influenced freshwater wetlands that are generally dominated by persistent emergents, emergent mosses, lichens, scrub-shrubs, or trees. They are found in all water regimes, except subtidal and irregularly exposed systems. Emergent wetlands consist of erect, rooted, herbaceous wetland plants that generally persist for most of the growing season. Scrub-shrub wetlands include areas dominated by woody vegetation less than 20 feet tall and are vegetated with true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. Forested wetlands contain woody vegetation that is 20 feet or taller.

As indicated above, the pipeline would affect palustrine emergent, scrub-shrub, and forested wetlands. Representative palustrine emergent and scrub-shrub wetland plant species found within the pipeline right-of-way include reed canary grass (*Phalaris arundinacea*), cattails (*Typha angustifolia*), red-osier dogwood (*Cornus sericea*), corn (*Zea mais*), jewelweed (*Impatiens capensis*), sandbar willow (*Salix interior*), umbrella sedge (*Cyprus eragrostis*), rough common buttonbush (*Cephalanthus occidentalis*), quack grass (*Agropyron repens*), black ash (*Fraxinus nigra*), common sneezeweed (*Helenium autumnale*), eastern cottonwood (*Populous deltoids*), and black willow (*Salix nigra*).

Representative forested wetland plant species found along the pipeline right-of-way include green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), red maple (*Acer rubrum*), box elder (*Acer negundo*), black ash (*Fraxinus nigra*), and quaking aspen (*Populous tremuloides*) with an herbaceous and scrub-shrub understory that contains many of the species described above.

TABLE 4.4.1.1-1

Wetlands Affected by the G-II Pipeline Project a/

Facility	NWI Classification b/	Length of Crossing (feet)	Temporary Impact (acres) c/	Long-Term Operational Impact (acres) d/
G-II Pipeline	*Forested*			
	PFO	3,287	5.09	2.16
	PEM/PFO	1,310	3.43	0.33
	PFO/PSS	1,091	1.9	0.43
	PFO/PEM	2,546	2.41 e/	0.24 e/
	PSS/PEM/PFO	0	0.05	0.01
	PEM/PSS/PFO	821	1.84	<0.01
	Subtotal	**9,055**	**14.7**	**3.18**
	Non-forested			
	PEM	7,042	14.32	0
	PEM – farmed	9,503	26.59	0
	PSS	16	0.06	0
	PEM/PSS	2,482	5.75	0.18
	PSS/PEM	n/a	n/a	n/a
	Subtotal	**19,043**	**46.72**	**1.8**
	Project Total	**28,098**	**61.44**	**3.36**

a/ There are no wetland impacts associated with any of the permanent or temporary aboveground facilities including meter stations, compressor stations, pipe storage areas, contractor yards, and access roads.
b/ NWI Classification:
PEM = Palustrine Emergent
PSS = Palustrine Scrub-shrub
PFO = Palustrine Forested
c/ Temporary construction impact is based on a 75-foot-wide construction right-of-way.
d/ A permanent impact due to pipeline operation would include 30 feet of forested wetland that would be permanently converted either to scrub-shrub or emergent cover types, or 10 feet of scrub-shrub wetland that would be permanently converted to emergent cover type. A permanent impact indicates the amount of forest that would be within new permanent right-of-way and permanently converted to scrub-shrub or emergent cover types. Scrub-shrub and emergent cover types would be allowed to revert to their original conditions.
e/ Pipeline segment, at MP 9.8, is crossed using the HDD technique. Impacts on the forested portion of the wetland (2.5 acres) associated with the Rock River would be avoided by using HDD.

Guardian's off-site analysis and field investigations did not identify wetlands associated with the temporary or permanent facilities necessary for construction or operation of the Project. This includes compressor stations, meter stations, pipe storage/contractor yard, and access roads.

4.4.1.2 General Construction and Operational Impacts

Construction and operation may affect the three parameters that define a wetland: vegetation, soils, and hydrology. During construction, the removal of vegetation (trees, shrubs, and herbaceous plants) would occur within the construction right-of-way. After pipeline construction, the trench would be backfilled and restored to the maximum extent possible to pre-construction contours, and both wetland substrate and hydrology would be restored as well, followed by the restoration of vegetation through natural successional processes. Forested and scrub-shrub wetlands would regenerate at much slower rates than emergent wetlands. Regeneration rates of forested and scrub-shrub wetlands would be dependent on site-specific conditions, but generally could be measured in tens of years for the vegetation structure to return to a pre-construction state. A permanent 10-foot-wide corridor over the pipeline would be maintained in an herbaceous state. Trees greater than 15 feet high, and within 15 feet of the pipeline center (totaling 30 feet across), may be selectively cut in accordance with our Procedures for right-of-way maintenance.

The primary impact of G-II Pipeline construction and right-of-way maintenance on wetlands would be the temporary alteration of wetland vegetation. There were no wetlands identified within the temporary or permanent rights-of-way associated with any of the proposed aboveground facilities. The aboveground facilities include compressor stations, meter stations, pipe storage/contractor yard, and access roads. Along the proposed pipeline route, approximately 5.3 miles of wetlands would be crossed (see table 4.4.1.1-1). Construction of the pipeline would affect about 61.4 acres of wetlands, based on a 75-foot-wide construction corridor in wetland areas. Of this amount, about 14.7 acres (24 percent) of the total wetland acres within the construction corridor are forested wetlands and 5.81 acres (9.5 percent) are scrub-shrub wetlands. About 2.5 acres of forested wetland clearing would be avoided by the use of HDD to cross the Rock River.

Following construction, a total of 3.4 acres of wetlands would be retained for operation and maintenance of the pipeline. Of this amount, 3.2 acres (95 percent) of previously forested wetlands would be maintained as emergent and scrub-shrub wetlands as a result of routine vegetation clearing along the pipeline. An additional 0.2 acre (5.4 percent) of emergent and scrub-shrub wetlands would be affected by routine vegetation maintenance. The acreages of each wetland affected and the amount of forested wetland clearing that would be required for the pipeline are listed in appendix L.

4.4.1.3 Wetland Construction and Mitigation Procedures

To minimize impacts on wetlands during construction, Guardian would implement the construction measures in our Procedures. These measures include, but are not limited to, the following:

- limit the width of the construction right-of-way to 75 feet in all wetlands;
- limit the amount of equipment and extra workspace in and adjacent to wetlands;
- in saturated wetlands where soils are unstable, use temporary work surfaces, such as timber mats or travel pads within wetlands to prevent soil compaction;
- limit the amount of grading in wetlands;
- segregate topsoil over the trench line when passing through unsaturated wetlands;
- restore wetland contours;
- install silt fencing and/or hay bales at the edges of the construction right-of-way in wetlands to prevent trench spoil from flowing into undisturbed areas;
- if the pipeline trench contains water, leave trench plugs in the trench where the trench enters and exits a wetland, until the trench is dewatered, which would be immediately before the pipe is installed;
- install permanent trench breakers, when necessary, where the trench enters and exits wetlands to maintain the hydrologic integrity of the wetland;
- locate ATWS areas at a minimum of 50 feet away from wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land;

- implement Guardian's SPCC Plan (see appendix D) to minimize the potential for spills, and any impacts from spills, because inadvertent spills of fluids used during construction, such as fuels, lubricants, and solvents, could contaminate wetland soils and vegetation; and
- conduct follow-up monitoring to ensure each wetland becomes re-established successfully in accordance with Guardian's standard conditions and/or in accordance with protocols specified by the applicable permitting agencies.

Additionally, in farmed wetlands Guardian would construct the pipeline using standard upland methods. Most seasonally saturated farmed wetlands are used for crop production and topsoil would be segregated in the same manner as topsoil in upland agricultural lands. Pipe stringing and fabrication may occur within the farmed wetland adjacent to the trench, or adjacent to the farmed wetland in a designated ATWS.

In wetlands that are unsaturated at the time of construction, Guardian would also segregate topsoil from the trench line in order to protect its integrity and help preserve the seed bank. Segregating the topsoil should preserve the potential for natural revegetation of the right-of-way to its pre-construction plant community.

Guardian proposes to locate 11 ATWS closer than 50 feet of wetlands, in site-specific locations (see table 4.4.1.3-1 for list of all ATWS variances requested along the pipeline route in wetland areas and their justifications). We have reviewed these locations and have determined that the requests are acceptable.

Guardian proposes to use the HDD technique at the Rock River (MP 9.8). This technique would avoid impacts on a forested wetland, but impacts on the emergent component of the wetland (2.5 acres) are expected.

TABLE 4.4.1.3-1

Additional Temporary Work Spaces Within 50 Feet of Wetlands

Facility MP	Wetland Identification	Reason/Justification
12.3	011W3	Rubicon River and wetland crossing, constraints associated with surrounding wetland, riparian, and forest land habitat.
12.4 a/	011W3/OS-WO1	Road crossing at State Highway 60 and wetland crossing, space limitations presented by configuration of road, forested land, and wetland habitat.
32.3 b/	032W1	Kummel Creek crossing, constraints associated with adjacent riparian habitat.
37.9 c/	037W1	West Branch of the Milwaukee River crossing, constraints associated with surrounding wetland, riparian, and forest land habitat.
65.0	064W1	Unnamed ditch crossing, space limitations associated with the surrounding habitat.
69.8	069W2	Wetland crossing, constraints associated with surrounding wetland habitat.
70.1	069W2	Wetland crossing, constraints associated with the surrounding wetland habitat.
72.0	072W1	Unnamed ditch crossing, space limitations associated with the surrounding habitat.
95.3 d/	OS-W24	Road Crossing at County Line Road, space limitations presented by configuration of road and wetland habitat.

a/ Construction activities at MP 12.4 would require that three ATWS be located within 50 feet of a wetland (two within 50 feet of wetland 011W3 and one within 50 feet of wetland OS-WO1. Refer to appendix C for further details.

b/ Construction activities at MP 32.3 would require that one ATWS be located within 50 feet of a wetland. Refer to appendix C for further details.

c/ Construction activities at MP 37.9 would require that two ATWS be located within 50 feet of a wetland. Refer to appendix C for further details.

d/ Construction activities at MP 95.3 would require that one ATWS be located within 50 feet of a wetland. Refer to appendix C for further details.

Jurisdictional wetland crossings would require pre-construction authorization from the WDNR and the COE. Guardian would coordinate with the WDNR and COE throughout the permitting processes to further refine crossing plans if necessary. Guardian submitted a Section 404 permit application to the COE St. Paul District on April 30, 2007 with an amendment to the Application on June 18, 2007. Once the COE has reviewed the application and verified the wetland impacts, a jurisdictional determination for wetland impacts for the Project would be issued. Guardian would file a complete wetland delineation report before starting any construction in wetland areas.

Following construction and restoration to all the impacted wetlands, a wetland monitoring program would be conducted by Guardian in accordance with our Procedures, and/or in accordance with protocols specified by the applicable permitting agencies. We believe that this post-construction monitoring will facilitate the re-establishment of natural wetland communities, wherever possible, and would minimize the extent, magnitude, and duration of construction impacts.

Guardian is currently in discussions with the WDNR and COE regarding mitigation for wetland impacts and the extent of function and value analysis that may be necessary to develop a mitigation plan. Based on these discussions, Guardian anticipates being required to mitigate for the permanent impacts on forested wetlands and plans to file with the Secretary of the Commission a copy of its wetland mitigation plan once available.

4.4.2 Upland Vegetation

Historically, the dominant vegetation in the vicinity of the proposed G-II Pipeline Route consisted of southern broadleaf forests in the southern portion of the state and northern mixed forests in the northern half of the state. These two forest regions are separated by an area referred to as the Tension Zone. Forested areas within the Tension Zone consist of plant species that are found in both the northern and southern forests (WDNR, 2000). Currently, the vegetative cover types found along the G-II Pipeline Route reflect the intensive historical tree-clearing and agricultural activities and present-day agricultural practices in this part of the upper Midwest (WDNR, 2000). In recent years, residential and commercial developments have also become more widespread in the region. The southern broadleaf forest and northern mixed forest along the pipeline route have virtually been eliminated by conversion to cropland or other agricultural purposes. A few narrow strips and/or tracts of forested land may still be found along the proposed right-of-way, primarily on ridges and slopes; along property lines, roads and railroads; along streams, rivers and lakes; and in some wetland areas. Despite the loss of forest cover within the Tension Zone, the amount of forested lands in Wisconsin increased by 4.5 percent between 1983 and 2004 (table 4.4.2-1) (WDNR, 2006), and as of 2005, 16.1 million acres of forests were identified (Perry and Brand, 2006).

4.4.2.1 Existing Vegetation Resources

Vegetative communities along the proposed G-II Pipeline Route were determined through review of aerial photography and field observation during wetland and waterbody surveys. The upland vegetative communities crossed by the proposed pipeline route and located at the proposed aboveground facilities consist of three primary types including agriculture, forest lands, and developed lands; the remaining vegetation types include non-forested wetlands and forested wetlands.

TABLE 4.4.2-1

Forested Land Use in the Project Area

Locale	Wisconsin				Proposed Project		
	Total Forested Acreage 1983	Total Forested Acreage 1996	Total Forested Acreage 2004	Change Since 1983	Percent of Project that Crosses Forest	Construction Impacts (ac) to Forested Lands a/	Operation Impacts (ac) to Forested Lands a/
Wisconsin	15,351,300	15,963,026	16,037,233	4.5%			
Brown County	49,100	46,914	52,896	7.7%	0.3%	3.1	2.0
Calumet County	25,100	17,618	27,807	10.8%	1.7%	18.2	12.3
Dodge County	27,800	39,713	22,879	-17.7%	1.4%	14.0	8.5
Fond du Lac County	35,100	33,194	29,705	-15.4%	0.6%	6.3	4.1
Jefferson County	29,300	47,335	46,069	57.2%	0.3%	2.7	1.8
Outagamie County	70,700	67,284	54,023	-23.6%	0.7%	7.3	4.8
Project Totals					**4.6%**	**51.6**	**33.5**

a/ Forested lands include upland and wetland forests.
Source: WDNR, 2006

Agricultural areas include row crops (mainly corn, soybeans, and wheat), as well as hay and alfalfa fields, pasturelands, fallow fields, and uncultivated grasslands. Wooded areas along the pipeline route primarily consist of floodplain forests, wooded hedgerows, and small to medium tracts of upland forest, with hardwood tree species dominating both the southern broadleaf and northern mixed forest regions. Developed lands consist of maintained lawns and other lands associated with residential and commercial/industrial developments. The upland vegetative cover types crossed by the proposed Project, as well as a listing of representative species, are described in table 4.4.2.1-1. Vegetation occurring in wetland habitat types that would be crossed by the proposed Project is discussed in section 4.4.1.1, and potential Project effects on agricultural areas are discussed in section 4.7.

TABLE 4.4.2.1-1

Upland Vegetation Cover Types Occurring Along the Proposed G-II Pipeline

Vegetation Cover Type	General Description	Common Species
Agricultural	Row crops, small grains, alfalfa hay, uncultivated grasslands, idle and old fields and pastures.	Crops – Corn, soybeans, wheat, hay, alfalfa, small grains. Uncultivated lands – smooth brome, timothy grass, red clover, Canada thistle, quackgrass, reed canary grass, goldenrods, milkweeds, fescues, blackberry, raspberry, honeysuckle, dogwoods, and willows. Old fields – smooth brome, birdsfoot-trefoil, goldenrods, chicory, ragweed, wild carrot, and asters. Common woody shrub and young tree species include black raspberry, dogwoods, honeysuckle, sumacs, boxelder, mulberry, and silver maple. Scattered mature white oak or black oak are common in southern Wisconsin, while scattered red oak, pines and maples are common tree species in northern Wisconsin. Pasture – foxtails, orchard grass, brome grasses, legumes.
Upland Forest	Small to medium tracts of hardwood tree species of the southern broadleaf and northern mixed forest regions.	Canopy species include American basswood, bur oak, and red oak; understory consists of Morrow's honeysuckle, black raspberry, and northern prickley ash; vines include Virginia creeper and poison ivy.
Developed Land	Lawns and planted landscaping species associated with residential and commercial/industrial developments.	Lawn – Kentucky bluegrass, red fescue, and perennial rye. Landscaped areas – planted tree and shrub species such as green and blue spruce, white cedar, ash, juniper, taxus, potentilla, spirea, and lilac.

4.4.2.2 Vegetative Communities of Special Concern or Value

Vegetative Resources of Cultural Significance to the Oneida Nation

The Oneida Nation identified several vegetative species that have cultural significance, including wild bergamot, black ash, northern white cedar, and sweet flag. During wetland surveys, sweet flag and black ash were observed on tribal property within a wetland just north of Duck Creek. However, as a result of the April 24, 2007 and July 2, 2007 amendments to the proposed pipeline route, the pipeline will no longer cross reservation lands; therefore, construction and operation of the pipeline will have no effect on any vegetative species of special significance on Reservation lands.

Unique, Sensitive and Protected Vegetation Communities

The Wisconsin Natural Heritage Inventory (NHI) did not identify any protected vegetative communities in the general vicinity of the G-II Pipeline. However, the proposed pipeline route would be located in proximity to a unique geologic feature known as the Niagara Escarpment (see section 4.7.5).

Noxious Weeds and Other Invasive Plants

Consultations with the FWS and WDNR identified a number of invasive plant species that could potentially occur in wetlands along the proposed G-II Pipeline Route. These species include purple loosestrife, common reed, reed canary grass, glossy buckthorn, and common buckthorn.

According to invasive plant species regulations at Wisconsin Statutes Chapter 23.22, invasive species are defined as non-indigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Under this statutory scheme, the WDNR has established and implemented a statewide management program for the control of invasive species in the state. Nuisance weeds such as purple loosestrife, or hybrids thereof, and multiflora rose are regulated under Chapter 23.235 of the Wisconsin statutes. This regulation prohibits the sale, distribution, or cultivation of these species. Noxious weed regulations occur at Wisconsin Statute 66.0407 and define noxious weeds as Canada thistle, leafy spurge, and field bindweed, and any other weed a governing body of a municipality or county board declares to be noxious within its respective jurisdiction.

Based on consultations with townships, counties, and municipalities along the proposed pipeline route, it was determined that no township or county lists additional noxious weed species beyond those that are deemed noxious or invasive under the regulations described above. These consultations also indicated that in the absence of local, township, or county ordinances, the control and management of noxious weeds and invasive plants defaults to the state regulations described above.

Within Illinois, noxious weed laws occur at 8 Illinois Administrative Code 220 and Illinois Compiled Statutes, Chapter 50, Part 100/1 et seq. The governing body of each county is the Control Authority, and it is the duty of the Control Authority to carry out the duties and responsibilities set forth in these regulations. The Control Authority is responsible for enforcing the state regulations, as well as developing a program for the control and eradication of noxious weeds within its county boundaries.

Within DeKalb County, Illinois the Department of Environmental Health handles noxious weeds and other invasive plant species on a "complaint basis" only within the county. Because of the absence of local and/or county ordinances, DeKalb County defers to the state regulations identified above.

4.4.2.3 General Impacts and Mitigation

The primary impact of the proposed Project on vegetative cover types would be the clearing and removal of vegetation that occurs along the proposed route or at the aboveground facility sites during construction. The duration and severity of these impacts depend on the type and amount of vegetation that would be affected, the rate at which the vegetation would regenerate after construction, and the frequency of vegetation maintenance that would be conducted during operation of the proposed Project facilities.

Most impacts would be short-term, such as temporary loss of plants on the construction right-of-way and other work areas from the cutting, clearing, and/or removal of existing vegetation. Because the Project proposes to actively revegetate disturbed areas (except those covered by active row cropping), annual and perennial herbaceous species would be expected to rapidly re-establish on or colonize the construction right-of-way. Thus, it is anticipated that herbaceous vegetative cover would typically return to areas disturbed by construction within one growing season after restoration is completed.

Clearing of forest and/or woodland vegetation within the construction right-of-way would result in long-term environmental change. As indicated in table 4.4.2-1, forest cover as a whole increased in Wisconsin from 1983 to 2004; however, individual counties experienced gains or losses of forest cover (WDNR, 2006) during that time. Clearing would result in increased soil erosion, elevated soil temperatures, and permanent or temporary loss and alteration of wildlife habitat. Clearing would also affect existing forest vegetation growing along the edges of the cleared areas. By exposing some edge trees to elevated levels of sunlight and wind, evaporation rates and the probability of wind throws would increase. Because of the increased light levels penetrating the previously shaded interior, shade intolerant species will be able to grow, resulting in a change in species composition of the newly created forest edge. The proposed clearing would also temporarily reduce local competition for available soil moisture and light and may allow some early successional species to become established and persist on the edge of newly cleared areas adjacent to the right-of-way.

To minimize construction-related effects, Guardian would implement the standard measures for pipeline construction in our Plan. The intent of the measures in our Plan is to identify baseline mitigation measures for minimizing erosion and enhancing revegetation in upland areas. Implementation of these measures would aid vegetative restoration and prevent or minimize sedimentation and turbidity in streams and wetlands. Some of the restoration and BMPs identified in our Plan include the following:

- use of at least one environmental inspector per construction spread, who will ensure compliance with our Plan and Procedures, and other required conditions;
- segregation of topsoil;
- installation of temporary erosion control measures such as slope breakers, sediment barriers, and mulch;

- commencement of cleanup immediately after backfilling, and completion of restoration within 20 days;
- installation of permanent erosion control devices such as trench breakers and slope breakers;
- testing and mitigation for soil compaction;
- revegetation in accordance with the recommendations of the local soil conservation authority, other land management agencies, or the affected owner;
- provision of barriers to control off-road vehicle activities; and
- post-construction monitoring and maintenance of revegetated areas.

In the absence of other specific requirements, Guardian would employ industry standards and proven technology to revegetate disturbed areas as recommended in our Plan and Procedures. Timely restoration of the construction right-of-way and reseeding with an appropriate seed mix would minimize the duration of vegetative disturbance.

To maximize the revegetation potential, Guardian would implement general and, where necessary, site-specific restoration measures which include:

- preservation of topsoil, native seed sources, and root stock;
- preparation of an adequate seedbed, including decompaction;
- use of seed mixes compatible with the native vegetation community and soil conditions;
- careful monitoring of the seeding rate; and
- mulching high erosion potential areas.

4.4.2.4 Site-Specific Impacts and Mitigation

Guardian's proposed pipeline installation, access roads, and extra work spaces would affect a total area of 1,766.9 acres of upland vegetation during construction and 786.6 acres during operation (see table 4.4.2.4-1). Approximately 1,639.5 acres of agricultural lands would be affected during construction, and 692 acres would be affected during operation of the proposed Project. Construction and operation of the proposed Project would affect 60.1 and 32.6 acres, respectively, of open lands. Approximately 51.6 acres of forested lands would be affected by construction and 33.5 acres would be affected by operation of the proposed Project. Of the remaining vegetated uplands, about 15.7 and 9.3 acres of developed land would be affected by construction and operation, respectively. As discussed, most areas would be revegetated in one growing season, but impacts on forest and areas associated with aboveground facilities would result in permanent loss or conversion of vegetation community types.

In order to minimize the extent of disturbance on woody vegetation, Guardian has proposed to locate the proposed pipeline primarily in open land and agricultural areas where woody vegetation is not present. Additionally, to the extent practicable, the pipeline route would be located adjacent to existing pipeline and utility corridors to reduce the amount of woody vegetation that would need to be cleared for construction. To further reduce impacts on forested areas, Guardian would limit the width of the construction corridor to 75 feet in upland forest areas

TABLE 4.4.2.4-1

Acres of Upland Vegetation Affected by Construction and Operation of the Proposed G-II Project

Facility	Agriculture		Open Land c/		Forest Land d/		Developed Land e/	
	Con. a/	Op b/	Con. a/	Op. b/	Con. a/	Op. b/	Con. a/	Op. b/
Pipeline Totals f/	1,415.1	692	52.3	32.6	50.1	33.5	15.7	9.3
Additional Temporary Workspace Areas Total	182.4	0.0	7.8	0.0	1.4	0.0	0.0	0.0
Pipe Storage and Contractor Yard Totals	27.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Access Road Totals g/	14.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Project Totals	**1,639.5**	**692**	**60.1**	**32.6**	**51.6**	**33.5**	**15.7**	**9.3**

a/ Con. = Construction. Op. = Operation. Based on a 110-foot construction right-of-way for the 30-inch pipe and a 95-foot-wide construction right-of-way for the 16-inch-diameter and 20-inch diameter pipe except for a 75-foot right-of-way in wetlands and upland forests. Does not include developed, commercial land, open water, or other areas that do not exhibit vegetative characteristics. Does not include aboveground facilities.
b/ No permanent impacts will occur as part of pipeline construction as vegetation will be allowed to revert to pre-construction conditions with the exception of areas required for permanent aboveground facilities, forested areas will be maintained in accordance with Guardian's Plan and Procedures.
c/ Open Land includes non-forested wetlands, emergent marshes, scrub-shrub wetlands and other non-agricultural open land.
d/ Non-agricultural wooded uplands and wetlands.
e/ Residential, Industrial and Commercial land uses.
f/ Pipeline Totals include Aboveground Facilities which would affect 15.1 of agricultural lands acres during construction and 45.4 acres during operations.
g/ Operation-related impacts from access roads are listed in section 2.2.3.2 in table 2.2.3.2-1.

Routine vegetation maintenance following construction would be performed in accordance with our Plan. Of the 51.6 acres of forested lands that would be affected by construction of the proposed pipeline, 18.1 acres would be allowed to revegetate to pre-construction conditions, and the remaining 33.5 acres would be permanently converted to non-forested lands.

The forest patches along the proposed G-II Pipeline Route are relatively small and generally not large enough to support many forest-interior bird species. The majority of forested land along the G-II Pipeline Route consists of small- to medium-sized woodlots, hedgerows, and floodplain forests, most of which are not connected to larger forested areas and are well dispersed along the G-II Pipeline Route. Guardian routed the pipeline, to the maximum extent practicable, to avoid forested areas and collocated with existing utility and road corridors to further reduce impacts on forested lands. The four largest areas of forest land crossed by the pipeline route include:

- the Rock River floodplain (MP 9.8);
- an area along a powerline corridor (MP 74);
- along an existing ANR pipeline corridor (MP 80.5); and
- Plum Creek corridor (MP 85.4).

Impacts on the forested floodplain along the Rock River would be avoided by using HDD technology to cross this area. Impacts on the remaining forested areas would be minimized because the pipeline would be adjacent to an existing utility right-of-way where it would cross the forested areas at MPs 74.0 and 80.5, and would cross Plum Creek at its narrowest location.

Although Guardian does not plan to replace trees removed from upland areas during construction, Guardian would compensate landowners for the loss of merchantable timber. Following construction, non-cropland disturbed by construction would be revegetated with appropriate seed mixes, and/or stabilized with temporary cover and allowed to revert naturally to

pre-construction conditions. It is anticipated that trees removed from the temporary right-of-way would rapidly re-establish through natural regeneration.

The construction of Guardian's proposed aboveground facilities would involve the removal of 48.0 acres of non-forested vegetation (agricultural fields, row crops, and pasture vegetation), resulting in the permanent loss of 38.6 acres of vegetative communities. No forested areas would be permanently replaced by aboveground facilities. The compressor station sites, meter stations, and MLVs would be fenced and converted to graveled and/or paved areas, or buildings, thereby permanently displacing the existing vegetative cover. Impacts on vegetation from construction and operation of the proposed aboveground facilities are summarized in table 4.4.2.4-1.

Guardian proposes to use 26 access roads. A total of 14.4 acres of agricultural lands and 0.1 acres of forest lands would be affected by construction of access roads (see table 4.4.2.4-1). Of this total, about 4.6 acres would be retained as permanent access roads (this acreage of converted land for permanent access roads has been included in the total acreage impact for the associated aboveground facility).

4.4.2.5 Vegetation Communities of Special Concern or Value

Unique, Sensitive, and Protected Vegetation Communities

The WDNR NHI did not identify any protected vegetative communities that occur in the general vicinity of the G-II Pipeline. In addition, field investigations conducted by Guardian and consultations with the WDNR and FWS indicate that the construction and operation of the Project would not affect the unique vegetation communities known to be associated with the Niagara Escarpment.

Noxious Weeds and Other Invasive Plants

Vegetation removal and soil disturbance during construction could create optimal conditions for the establishment of invasive, non-native plant and noxious weed species. Construction equipment traveling from weed- and invasive plant-infested areas into weed-free areas could disperse invasive plant and noxious weed seeds and propagates, resulting in the establishment of undesirable vegetation in previously weed-free areas.

Guardian has included the potential invasive wetland plants in its plant species lists during wetland delineations. The presence and relative abundance of these plants has been recorded and would be used to assess the potential for spreading these invasive plants from wetlands containing a high abundance of invasive species to wetlands with low abundance or no invasive plant species. In addition, Guardian is consulting with the NRCS to determine whether upland weed species, other than those listed in Wisconsin state statutes, should be included in Guardian's weed management planning.

Guardian would prepare a Noxious Weed Management Plan that incorporates details regarding known occurrences of noxious weeds along the proposed pipeline alignment, current treatment of known noxious weed areas, and mitigation measures that Guardian would implement to minimize the spread and establishment of noxious weed species. Guardian would file its Noxious Weed Management Plan with the FERC prior to construction.

In Illinois, the spread of noxious weeds and other invasive plants as a result of construction of the Sycamore Compressor Station is unlikely because the compressor station would be built in a single location and would not involve the movement of construction vehicles from one location to another along a construction right-of-way, which could potentially spread noxious weeds and invasive plants to non-infested areas.

4.5 WILDLIFE AND AQUATIC RESOURCES

4.5.1 Wildlife

There are several general habitat types affected by the G-II Pipeline, including agricultural land, open land, forested land, open water, and developed areas. The following subsections describe each of these habitat types and the potential effects of the Project on the associated terrestrial wildlife species. Sensitive wildlife habitats and wildlife management areas and wildlife resources of cultural significance to the Oneida Nation are also described. Table 4.5.1-1 lists the representative species along the pipeline route by habitat type.

4.5.1.1 Existing Wildlife Resources

Agricultural Land

The majority of the proposed pipeline route would cross agricultural land and pasture/rangeland (approximately 106.8 miles or 89.7 percent). These habitats have generally been significantly altered from their original vegetation community structures and replaced with crop production and livestock grazing. Typically, large croplands tend to support relatively low wildlife diversity. Croplands do, however, play an important role in providing cover and a source of food for a variety of game species such as white-tailed deer, ring-necked pheasant, and migrating waterfowl such as ducks and geese (see table 4.5.1-1). Other species, generally those that are tolerant of disturbances, and habitat generalists are also common in these landscapes, which supply some of their life requirements.

Other open areas such as uncultivated grasslands, pasture, hayfields, and old fields support a greater diversity of herbaceous and low-growing woody vegetation, which offers more suitable habitat for wildlife. These open areas can sustain populations of small mammals, including mice and meadow vole; larger herbivorous mammals including deer, woodchuck, and eastern cottontail rabbit; several larger omnivorous and carnivorous mammals such as raccoon, Virginia opossum, striped skunk, and red fox; as well as a variety of birds, including American goldfinch, European starling, eastern meadowlark, dickcissel, red-winged blackbird, and various sparrow species (both native and introduced). Open areas, both cultivated and uncultivated, that are bordered by woodland habitat or that contain fence or hedge rows, tend to have a greater species diversity because these provide cover, food sources, and other features, which provide foraging, nesting, and roosting opportunities.

TABLE 4.5.1-1

Representative Wildlife Species within Existing Vegetation Types a/

Habitat Type	Representative Species	Habitat Type	Representative Species
Agricultural Land	Deer mouse (*Peromyscus manicula*) Meadow vole (*Microtus pennsylvanicus*) Woodchuck (*Marmota monax*) Eastern cottontail rabbit (*Sylvilagus floridanus*) Virginia opossum (*Didelphis virginiana*) Striped skunk (*Mephitis mephitis*) Red fox (*Vulpes vulpes*) Coyote (*Canis latrans*) White-tailed deer (*Odocoileus virginianus*) American goldfinch (*Carduelis tristis*) Eastern meadowlark (*Sturnella magna*) Dickcissel (*Spiza americana*) Red-winged blackbird (*Agelaius phoeniceus*) Ring-necked pheasant (*Phasianus colchicus*) Snow goose (*Chen caerulescens*)	Open Water/Aquatic Habitats	Great blue heron (*Ardia herodias*) Common muskrat (*Ondatra zibethicus*) Great egret (*Ardea alba*) Mink (*Mustela vison*) Snapping turtle (*Chelydra serpentine*) Green frog (*Rana clamitans*) Canada goose (*Branta canadensis*) Beaver (*Castor canadensis*) Green heron (*Butorides virescens*) American bittern (*Botaurus lentiginosus*) Mallard (*Anas platyrhynchos*) Northern shoveler (*Anas clypeata*) Greater yellowlegs (*Tringa melanoleuca*) Black-bellied plover (*Pluvialis squatarola*)
Non-forested Wetland/ Open Land	Common snipe (*Gallinago gallinago*) Sedge wren (*Cistothorus platensis*) Mink (*Mustela vison*) Northern harrier (*Circus cyaneus*) Mallard (*Anas platyrhynchos*) Green frog (*Rana clamitans*) Sora (*Porzana carolina*) Common muskrat (*Ondatra zibethicus*) Raccoon (*Procyon lotor*)	Forested Wetlands/ Floodplain Forests	Wood duck (*Aix sponsa*) Beaver (*Castor canadensis*) River otter (*Lutra canadensis*) Wood thrush (*Hylocichla mustelina*) Barred owl (*Strix varia*) White-tailed deer (*Odocoileus virginianus*) Mink (*Mustela vison*) Yellow warbler (*Dendroica petechia*)
Southern Broadleaf Forest	White-tailed deer (*Odocoileus virginianus*) Raccoon (*Procyon lotor*) Gray squirrel (*Sciurus carolinensis*) Wild turkey (*Meleagris gallopavo*) American toad (*Bufo americanus*) Tiger salamander (*Ambystoma tigrinum*) Eastern garter snake (*Thamnophis sirtalis sirtalis*) Red fox (*Vulpes vulpes*) Red squirrel (*Tamiasciurus hudsonicus*) Sharp-shinned hawk (*Accipiter striatus*)	Developed Land	Raccoon (*Procyon lotor*) Gray squirrel (*Sciurus carolinensis*) Blue jay (*Cyanocitta cristata*) Mourning dove (*Zenaida macroura*) European starling (*Sturnus vulgaris*) American robin (*Turdus migratorius*) Chipping sparrow (*Spizella passerine*) Common grackle (*Quiscalus quiscula*) American crow (*Corvus brachyrhynchos*)
Northern Mixed Forests	Ruffed grouse (*Bonasa umbellus*) Black bear (*Ursus americanus*) American beaver (*Castor canadensis*) Eastern chipmunk (*Tamias striatus*) Broad-winged hawk (*Buteo platypterus*) Veery (*Catharus fuscescens*) Red-eyed vireo (*Vireo olivaceus*) Leopard frog (*Rana pipiens*) Pileated woodpecker (*Dryocopus pileatus*) Raccoon (*Procyon lotor*) Red squirrel (*Tamiasciurus hudsonicus*) Black-capped chickadee (*Poecile atricapilla*)		

a/ Sources: WDNR, 2000; Kurta, 1995; Wisconsin Breeding Bird Atlas, 2002

Open Land

Open lands include non-agricultural open and scrub-shrub fields and wetlands, emergent wetlands, and Conservation Reserve Program (CRP) lands. The Project would impact a total of 5.3 miles (4.4 percent) of open land. For a detailed description and discussion of wetlands, see section 4.4.1. Non-forested wetlands and marshes are associated with perennial and intermittent streams and isolated, depressional, and often perched wetlands that are seasonally flooded. These wetland areas may provide more abundant plant seeds and invertebrates that make them attractive feeding and resting areas for migrating waterfowl and shorebirds. In the spring, when

seasonal flooding occurs, depressional wetlands are used as pairing ponds by ducks, and provide an abundant food source of invertebrates for egg-laying hens. In addition, the lack of fish and other predators in seasonally flooded areas improves breeding success for a variety of reptile and amphibian species (Harding, 1997). Non-forested wetlands also support a diversity of herbaceous and low growing woody vegetation, well suited to provide habitat for species such as common snipe, sedge wren, white-tailed deer, eastern cottontail, mink, and waterfowl. Marshes, which are characterized by emergent aquatic plants growing in permanent to seasonal shallow water, attract waterfowl, shorebirds, rails, and wading birds, as well as reptiles and amphibians. These birds use marshes for breeding and feeding. Raptors, such as the northern harrier, also favor marshes when searching for prey.

Forested Land

Approximately 5.5 miles (4.6 percent) of the pipeline would cross forested habitat, which include uplands and forested wetlands. Upland forests along the pipeline route include both southern broadleaf and northern mixed forests. The nuts from trees such as oaks and hickories provide food for deer, turkeys, mice, and squirrels. Berries from understory shrubs and woody vines may also provide an important source of food for wildlife. Secondary canopy shrubs and saplings, brush piles, and fallen logs provide cover for various small to medium-sized mammals. Large standing dead trees with cavities and peeling bark provide nesting or roosting sites for a variety of birds, bats, and mammal species, as well as foraging opportunities for birds such as woodpeckers, brown creepers, and nuthatches. Forested areas provide important habitat for warblers and other migrating and nesting neo-tropical migrant songbirds.

Forested wetland areas are typically dominated by mature lowland deciduous hardwood species and, generally, they are associated with ancient lake basins, glacial melt water features (such as kettles), and former river channels and oxbow lakes. Wooded swamps and forested wetlands retain storm and floodwaters and provide important wildlife habitat for many species including game mammals and birds, furbearing animals, neo-tropical migrant songbirds, ruffed grouse, wood duck, barred owl, as well as reptiles and amphibians. Floodplain forest wetlands can support wildlife species that may not typically be found in adjacent wooded upland habitat, although some species use both wetland and upland habitats at different times of the year. They provide nesting/denning spaces, food, cover, and water for a variety of wildlife including deer, furbearing mammals, songbirds, herons, owls, reptiles, and amphibians. Several native songbird species, such as the yellow warbler and wood thrush, prefer swamp wetlands and floodplain forests. Typically, floodplain forests also have a greater seasonal diversity of plant and animal species because they serve as migration corridors for many wildlife species.

Open Water

Open water habitats include streams, rivers, and ponds. Only a small portion of the pipeline route approximately 0.1 miles (less than 0.1 percent) would cross open water habitats. Some mammal and bird species are dependent on open water habitats for food and cover including beaver, muskrat, egrets, and herons, as are fish, amphibians, and some reptiles, as well as invertebrates.

Developed Land

Developed lands, which include residential, commercial, and industrial areas, are not considered high quality habitat for wildlife. However, they do provide supplemental habitat for many adaptable species, such as Canada geese, depending on their management. Approximately 1.5

miles (1.2 percent) of the land that would be crossed by the pipeline is classified as developed land. Typical wildlife species found in developed lands are summarized on table 4.5.1-1. Many of these animals are adaptable, opportunistic species, which may inhabit many of the other habitat types described, but have thrived in developed lands.

Sensitive Wildlife Habitats and Wildlife Management Areas

No designated sensitive wildlife habitats or designated Wildlife Management Areas would be crossed by the proposed G-II Pipeline Route. However, the proposed G-II Pipeline Route is near the Niagara Escarpment, a unique geologic feature that provides habitat for a number of wildlife and plant species (see additional discussion in section 4.7.5.1).

Wildlife Resources of Cultural Significance to the Oneida Nation of Wisconsin

The Oneida Nation regards the black bear and the wolf as wildlife species that have strong cultural significance. Black bears are most common in the northern forests of Wisconsin and only occasionally found within the Oneida Reservation, which is located outside of the Project area (WDNR, 2004a). The black bear requires large tracts of forested land with suitable vegetation, cover, and denning trees for breeding. As a result of the April 24, 2007 and July 2, 2007 amendments to the proposed Project, the pipeline no longer crosses Reservation lands and does not cross any large expanses of forested land, but rather is sited, to the extent practicable, through non-forested areas and along powerlines and roads with existing cleared rights-of-way, thus reducing the amount of tree clearing necessary to install the pipeline. As such it is unlikely that the construction and/or operation of the Project would impact the black bear.

There have been unconfirmed sightings of the wolf within the Oneida Reservation; however, according to the WDNR's Timber Wolf Distribution Map, known wolf pack territories are generally found only in the extreme northern areas of Wisconsin, and a small area of north-central Wisconsin (WDNR, 2006d). Both of these areas are far away from the pipeline route. As such, the construction and operation of the proposed pipeline would not affect the timber wolf packs because of this distance.

In 2006, Guardian conducted field surveys along the pipeline route evaluated in the draft EIS through Oneida Reservation land and reported no sightings of the black bear or timber wolf.

4.5.1.2 Potential Project Impacts and Mitigation Measures

Wildlife Resources

The impact on wildlife and wildlife habitats resulting from construction of the proposed Project would vary depending on the location, time of year, and type of construction. The particular species present within the Project area during the time of construction would also contribute to the expected Project impacts. In general, impacts on terrestrial wildlife would be short-term and minimal because most terrestrial species would be able to temporarily relocate to similar, or at least suitable, habitats if these are available near the disturbed area. Some of the smaller, less mobile species, such as small mammals, amphibians and reptiles, would be killed by clearing, grading, and trenching activities.

A potential long-term impact on wildlife results from the clearing of forest vegetation. Approximately 51.6 acres of forested land (2.9 percent) would be affected during construction. A total of 33.5 acres (2.0 percent) would be retained as permanent right-of-way following construction. The remaining 18.1 acres of forest within the right-of-way would be allowed to

revegetate, and is likely to eventually return to its preconstruction forest composition (which may be accelerated by active management). Guardian has routed the pipeline to avoid or minimize clearing existing forested areas by following forest edges or previously cleared rights-of-way to the maximum extent practicable. In addition, Guardian would limit its construction workspace in upland and wetland forest areas to 75 feet.

Forest clearing in riparian areas may favor the establishment of scrub-shrub swamp, marsh, and open land habitats that would otherwise be forested. Because riparian areas tend to be more dynamic and variable due to seasonal flooding, channel shifts, and beaver activity, the effect of tree clearing on wildlife would likely be less than in a more stable ecosystem. Tree clearing in these riparian areas within the right-of-way may affect wildlife diversity by creating and maintaining a different type of non-cultivated vegetative community (i.e., marsh and scrub-shrub habitats) that may support other wildlife species in a landscape that is dominated by cultivated row crops. However, this could still reduce the overall quality of the landscape by reducing the total amount of woodland habitat available, and reducing the quality of the remaining habitat by increasing the amount of edge. In addition, clearing of forested land in riparian areas may reduce or cut off wildlife corridors that provide a link to neighboring forests. Many wildlife species use riparian habitats for food and cover as they move from location to location, and clearing of these areas may cause wildlife to abandon them in order to locate to undisturbed areas.

Avian Resources

The clearing of forest habitat for the pipeline right-of-way may contribute to forest fragmentation. Forest fragmentation has been shown to reduce neotropical migrant bird use of forests adjacent to corridors 50 to 75 feet in width (Rich et al., 1994). However, much of the woodland habitat in the Project area, however, has already been fragmented by agriculture, existing utility corridors, and other developments. Very few species occurring in the Project area prefer large tracts of unbroken forests. Nearly all of them are well adapted to edge or open habitats; therefore, although right-of-way clearing would have a long-term impact on forest vegetation, the effect on wildlife would be incremental and is not expected to be significant in most locations along the route.

Construction of the pipeline would occur during the nesting season of some migratory birds, which may have an impact on nesting success during the period of construction and restoration. A list of the more common migratory bird species that may potentially nest in forested or grassland habitats along the pipeline route are summarized in table 4.5.1.1-1.

The potential impacts on nesting migratory birds include forest fragmentation, which could lead to the loss of forest habitat, and increase the area of habitats preferred by edge species, which include nest parasites; temporary removal of vegetation in grassland habitats, which could cause grassland nesting bird species to relocate to other suitable habitat; and the noise and vibrations during construction that may disturb nesting birds. Guardian proposes to use HDD to cross the riparian floodplain habitats of the Rock River at MP 9.8, the Fox River at MP 90.9, and the Apple Creek at MP 91.1. The use of this method would reduce the possible impacts on nesting birds, by avoiding the need to cut down trees that may be used by forest-dwelling species for nesting; however, the activity and noise of construction can still be a potential impact on nesting birds when using this method. Woody vegetation on the west side of the Fox River had recently been cleared, most likely for power-line right-of-way maintenance in late 2006. Grasslands affected by construction would generally be restored to pre-construction conditions following construction.

TABLE 4.5.1.1-1 **Subset of Migratory Nesting Bird Species that Could Potentially be Affected by the Proposed Project**			
Species	**Scientific Name**	**Species**	**Scientific Name**
Wood Duck	*Aix sponsa*	Blue-gray Gnatcatcher	*Polioptila caerulea*
Mallard	*Anas platyrhynchos*	Wood Thrush	*Hylocichla mustelina*
Great Blue Heron	*Ardea herodias*	American Robin	*Turdus migratorius*
Great Egret	*Ardea alba*	Gray Catbird	*Dumatella carolinensis*
Bald Eagle	*Haliaeetus leucocephalus*	Cedar Waxwing	*Bombycilla cedrorum*
Northern Harrier	*Circus cyaneus*	Blue-winged Warbler	*Vermivora pinus*
Cooper's Hawk	*Accipiter cooperii*	Yellow Warbler	*Dendroica petechia*
Red-tailed Hawk	*Buteo jamaicensis*	Black-throated Blue Warbler	*Dendroica caerulescens*
American Kestrel	*Falco sparverius*	Cerulean Warbler	*Dendroica caerulea*
Sora	*Porzana carolina*	Prothonotary Warbler	*Protonotaria citrea*
Yellow-billed Cuckoo	*Coccyzus americanus*	Ovenbird	*Seiurus aurocapillus*
Mourning Dove	*Zenaida macroura*	Common Yellowthroat	*Geothlypis trichas*
Belted Kingfisher	*Ceryle alcyon*	Scarlet Tanager	*Piranga olivacea*
Easter Wood-Pewee	*Contopus virens*	Eastern Towhee	*Pipilo erythrophthalmus*
Eastern Phoebe	*Sayornis phoebe*	Chipping Sparrow	*Spizella passerina*
Great-crested Flycatcher	*Myiarchus crinitus*	Vesper Sparrow	*Pooecetes gramineus*
Eastern Kingbird	*Tyrannus tyrannus*	Savannah Sparrow	*Passerculus sandwichensis*
Warbling Vireo	*Vireo gilvus*	Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Red-eyed Vireo	*Vireo olivaceous*	Indigo Bunting	*Passerina cyaneus*
House Wren	*Troglodytes troglodytes*	Dickcissel	*Spiza americana*
Sedge Wren	*Cistothorus platensis*	Eastern Meadowlark	*Sturnella magna*
Eastern Bluebird	*Sialia sialis*	Baltimore Oriole	*Icterus galbula*

Project construction, specifically the clearing of vegetation, could impact approximately 1,766.9 acres of land classified as agricultural, open land, forested land, developed land, and open water. During operation of the Project, approximately 768.6 acres of these land classes would be affected (for a more detailed analysis of land use classifications, see section 4.7). These impacts affect habitat suitable for use by migratory birds protected under the Migratory Bird Treaty Act of 1918. The Migratory Bird Treaty Act implements various treaties and conventions for the protection of migratory birds, and makes taking, killing, or possessing migratory birds unlawful. In order to minimize impacts on migratory birds during operation of the Project, in accordance with our Plan, Guardian would not conduct routine vegetation maintenance more frequently than once every 3 years (with the exception of a 10-foot-wide corridor centered over the pipeline that may be maintained annually if necessary), and that routine vegetation maintenance would not occur between April 15 and August 1 of any year.

Aboveground Facilities

There are no anticipated pipeline-related impacts on wildlife from the construction of the Sycamore Compressor Station in DeKalb County, Illinois. Construction of the Bluff Creek Compressor Station in Wisconsin is expected to have minimal impacts on wildlife. A relatively small amount of land would be permanently converted from agricultural to industrial land use at these facilities; approximate impacts for these compressor stations are 16.4 acres and 20 acres (including access roads), respectively. Both compressor station sites are in active agricultural fields, with very little habitat quality. The two compressor station sites are surrounded by large

(1.0 square mile or more) areas of similar agricultural habitat. Existing wildlife can readily move to other, nearby locations with suitable similar habitat during construction. Neither of the proposed compressor station sites have been designated as sensitive wildlife habitats by the WDNR or the Illinois Department of Natural Resources (IDNR). Guardian received concurrence of "no effect" from the FWS, Rock Island, Illinois District as well as from the IDNR regarding the proposed Sycamore Compressor Station location. There are no occurrences of listed species from the NHI database at the Bluff Creek Compressor Station in Wisconsin. Based on these factors, construction and operation of the proposed aboveground facilities would result in minimal impact to wildlife. In addition, there are seven other aboveground facilities, with construction impacts ranging from 1.2 to 1.4 acres and operation impacts (including permanent access roads) ranging from 0.3 to 2.0 acres. All of these aboveground facilities are sited in areas of agricultural land use. Construction and operation of these aboveground facilities would also result in minimal impact to wildlife.

4.5.2 Aquatic Resources

4.5.2.1 Existing Aquatic Resources

The proposed G-II Project would cross 114 waterbodies, including 27 perennial streams, 86 intermittent streams, and one artificially created pond. Appendix J to this EIS identifies the waterbodies crossed by the proposed Project, as well as their width, location along the proposed route, state waterbody classification, and proposed crossing method. Waterbodies crossed by the proposed Project are discussed in more detail in section 4.3.2.

The majority of the perennial waterbodies crossed by the G-II Project provide habitat for a variety of warm water fish communities composed of sport fish, rough fish, and forage minnows. One waterbody, Stony Brook (MP 66.8), provides habitat for a coldwater trout community that was stocked with wild trout during the 1990s. Table 4.5.2.1-1 provides a list of commonly occurring fish species in the streams along the proposed Project route.

TABLE 4.5.2.1-1

Representative Fish Species in Warm Water and Cold Water Fisheries Along the G-II Pipeline Route

Sport Fish		Rough Fish		Forage Minnows	
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**	**Common Name**	**Scientific Name**
Black Crappie	*Pomoxis nigromaculatus*	Bowfin	*Amia calva*	Brassy Minnow	*Hybognathus hankinsoni*
Bluegill	*Lepomis macrochirus*	Black Bullhead	*Ameiurus melas*	Johnny Darter	*Etheostoma nigrum*
Longear sunfish	*Lepomis megalotis*	Carp	*Cyprinus carpio*	Stoneroller	*Campostoma anomalum*
Orange spotted sunfish	*Lepomis humilis*	Longnose Gar	*Lepisosteus osseus*	Mottled Sculpin	*Cottus bairdii*
Pumpkinseed	*Lepomis gibbosus*	White Sucker	*Catostomus commersoni*	Spotfin Shiner	*Cyprinella spiloptera*
Walleye	*Stizostedion vitreum*			Brook Stickleback	*Culaea inconstans*
Channel Catfish	*Ictalurus punctatus*				
Largemouth Bass	*Micropterus salmoides*				
Smallmouth Bass	*Micropterus dolomieu*				
Northern Pike	*Esox lucius*				

TABLE 4.5.2.1-1

Representative Fish Species in Warm Water and Cold Water Fisheries Along the G-II Pipeline Route

Sport Fish		Rough Fish		Forage Minnows	
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**	**Common Name**	**Scientific Name**
Rock Bass	*Ambloplites rupestris*				
Brook Trout	*Salvelinus fontinalis*				
Rainbow Trout	*Oncorhynchus mykiss*				

Source: Becker, 1983

Waterbodies in the Project area are classified into one of the following fishery types (WDNR, 2004b):

- **Cold Water Communities (CW):** includes surface waters capable of supporting a community of cold water fish and other aquatic life or serving as a spawning area for cold water fish species. For management purposes, cold water communities are further assigned to one of three classes (WDNR, 2002a; 2004b):
  - Class I—Waters having sufficient natural reproduction to sustain populations of wild trout, at or near carrying capacity. These streams require no stocking of hatchery trout;
  - Class II—Waters having some natural trout reproduction but not enough to utilize available food and space. Stocking is required to maintain a desirable sport fishery; and
  - Class III—Waters that are marginal trout habitat with no natural reproduction occurring. These streams require annual stocking of trout to provide trout fishing.
- **Warm Water Sport Fish Communities (WWSF)**: includes surface waters capable of supporting a community of warm water sport fish or serving as a spawning area for warm water sport fish.
- **Warm Water Forage Fish Communities (WWFF):** includes surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life.
- **Limited Forage Fish Communities (LFF)**: includes surface waters of limited capacity because of low flow, naturally poor water quality, or poor habitat. These surface waters are capable of supporting only a limited community of forage fish and aquatic life.
- **Limited Aquatic Life (LAL)**: includes surface waters severely limited because of very low or intermittent flow and naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of aquatic life.
- **Fish and Aquatic Life (FAL)**: this is a default use designation that applies to surface waters when the WDNR has not completed a formal site visit of a stream segment. This designation is equivalent to a WWSF Community classification. Surface waters assigned this use designation support a diverse community of game fish, forage fish, and other aquatic life that are not tolerant of organic pollution.

Of the 114 waterbodies crossed by the proposed pipeline, 98 streams are classified as FAL (of which one is proposed to be classified as LAL); 12 are classified as LFF; and three are classified as LAL. The remaining unnamed artificial pond crossed by the proposed pipeline (MP 60.3) is unclassified by the WDNR.

In the vicinity of the proposed pipeline route are two unnamed ponds (MP 41.2 and MP 41.8). Each of these ponds is a privately owned, man-made waterbody that are not managed by WDNR, and do not have a fisheries classification. These ponds would not be crossed by the pipeline, but could be affected by the construction right-of-way. An additional unnamed pond serving as a wastewater treatment pond, is located near MP 42.0, approximately 100 feet east of the G-II Pipeline. This pond is on an adjacent property not crossed by the pipeline alignment, and would therefore not be affected by construction or operation of the G-II Pipeline.

Outstanding and Exceptional Resource Waters

Outstanding and Exceptional Resource Waters (OERW) are defined by the WDNR as waters of the highest water quality and fisheries in the state and are therefore deserving of special protection (WDNR, 2006e). None of the waterbodies that would be crossed by the Project are designated as OERW (WDNR, 2006e). While Jefferson, Fond du Lac, and Outagamie Counties, Wisconsin contain OERWs, none of the OERW streams within these counties are within 1.0 mile of the proposed pipeline route, nor would any of the tributaries to these waterbodies be crossed by the G-II Project.

4.5.2.2 General Impacts and Mitigation

Construction

Guardian's proposed construction method for crossing each waterbody is listed in appendix J. Depending on the construction method used, direct impacts on aquatic habitats and species would either be avoided (e.g., through HDD) or would be confined to localized areas. Application of the WDNR's permitting standards for waterbody crossings would ensure that the impacts were adequately evaluated and controlled. Waterbody crossings would be implemented using "wet" or "dry" construction techniques, as described in section 2.3.1.2. As proposed, 111 of the proposed 114 waterbody crossings would be achieved using open-cut methods; three would be achieved using HDD. Other dry crossing techniques, including flume or dam and pump, would be conducted as required by state permits at site-specific locations.

Generally, impacts from open-cut crossings would affect aquatic life such as plankton, aquatic vegetation, amphibians, fish, and aquatic invertebrates. Impacts on water quality and associated aquatic habitats would include sedimentation, turbidity, altered water temperatures, dissolved oxygen levels, and introduction of contaminants; all of which can affect the ability of aquatic life to survive and reproduce. Impacts would also include the physical disturbance or destruction of instream cover due to trenching and removal of riparian vegetation. Construction activities could also block fish migrations, interrupt spawning activities, and entrain fish or reduce stream flows during withdrawals for hydrostatic testing. These potential impacts are discussed below in more detail.

Pipeline construction using the dry crossing, dam and pump, or flume techniques would also produce in-stream disturbances; however, downstream flow of water would not be interrupted and the release of sediment to the waterbody would be generally less and of shorter duration than with the wet-trench open-cut crossing method.

Sedimentation and Turbidity

Pipeline construction using the wet-trench open-cut method would result in sedimentation and turbidity in surface waters and aquatic habitats through clearing and grading of stream banks, in-stream trenching, trench dewatering, and backfilling of the in-stream trench.

Turbidity resulting from suspension of sediments during in-stream construction or erosion of cleared right-of-way areas would reduce light penetration and photosynthetic oxygen production (resulting in decreased levels of dissolved oxygen), increase invertebrate drift, reduce fish feeding for brief periods, and affect the benthic community. Benthic macroinvertebrates, which typically provide a key food source for fish, would also be removed with the trenched material, and/or become buried under accumulated sediments, along with fish-nesting sites containing eggs or larvae (if disturbance occurs during periods when eggs or larvae are present) as a result of increased turbidity from construction activities. Removal of vegetation from riparian areas could also cause an increase in surface runoff and soil erosion.

Turbidity from in-stream trenching and backfilling activities could also affect fish by obstructing their gills and inhibiting their sight. Such impacts could disrupt feeding patterns and/or spawning activities. Sedimentation may also affect survival of fish eggs and juveniles, as well as benthic community diversity and health, spawning habitat, and the ability of fish and other aquatic wildlife to see and capture prey. Organic materials suspended in the water can further reduce dissolved oxygen by increasing the biochemical oxygen demand. Reduced levels of dissolved oxygen can result in stress, displacement, and mortality to aquatic organisms, particularly during periods of low flows or high water temperatures.

Guardian has agreed to implement the standard requirements for pipeline construction in our Plan and Procedures. To contain disturbed soils in upland areas and minimize the potential for sediment loss to waterbodies, temporary and permanent sediment controls (e.g., silt fence and slope breakers) would be used to direct surface runoff to well-vegetated areas along the sides of the construction right-of-way. Guardian has also stated its intent to construct during the summer months, a typically low-flow period in the Project area to further minimize impacts. The rapid pace of construction (typically less than 24 hours for minor streams and less than 48 hours for intermittent streams) would reduce the impacts of sedimentation and turbidity on aquatic life. Overall, the impact to aquatic species in any particular waterbody, and at any specific crossing, resulting from construction of the proposed Project would be minor, localized, and short-term, because most of the habitat in each waterbody would remain undisturbed. Additionally, occasional turbid conditions are common in many of the waterbodies in this region, mainly due to land use conditions.

Loss of Cover

Overhanging vegetation in riparian and adjacent wetland areas, undercut banks, logs, and other streamside features provide cover for fish. These types of cover and in-stream habitats would be disturbed by clearing and open-cut trenching during construction, resulting in decreased shading, increased water temperatures, and displacement of fish from disturbed areas. Long-term streamside clearing would be limited to a 30-foot-wide corridor centered on the pipeline, a portion of which (20 feet) would be allowed to re-establish to shrubby vegetation that would provide some shade. The remaining 10-foot-wide strip, centered over the pipeline, would be maintained as herbaceous vegetation. Given the limited amount of streambank canopy that would be cleared relative to the existing riparian vegetation and total length of stream reach to be affected, potential impacts on water temperature would be minor.

Introduction of Water Pollutants

Introduction of pollutants into waterbodies and aquatic habitats could occur through disturbance of contaminated soils or sediments, accidental spills, and inadvertent releases of drilling fluids during HDD operations. Pollutants could affect fishes and other aquatic life through acute or chronic toxicity, and sub-lethal effects that could affect reproduction, growth, and recruitment. As noted above, herbicides or pesticides would not be used within 100 feet of any waterbody.

Pollutants can also be released during discharge of hydrostatic test waters. However, Guardian has stated that biocides and other potentially toxic hydrostatic test water additives would not be used during hydrostatic testing.

The proposed HDD drilling fluid would consist of water and bentonite, which is a mixture of non-toxic clays and rock particles which, if released in small quantities, is unlikely to be detrimental to fisheries or water quality. However, the release of large quantities into a waterbody could result in adverse impacts on fisheries. To minimize the potential impacts on fisheries and water quality, Guardian has prepared an HDD Contingency Plan for Inadvertent Releases of Drilling Fluid (see appendix K). The plan describes standard drill monitoring and sampling procedures; clean-up practices such as the use of straw bales, silt fencing, or turbidity curtains to contain the mud and cuttings; followed by mechanical or manual removal of the drilling mud. The plan also addresses procedures to contain and clean up inadvertent releases of drilling mud into waterbodies.

Operation of heavy equipment or other vehicles in and near surface waterbodies could also introduce chemical contaminants, such as fuels and lubricants, or result in accidental spills during construction. Guardian has adopted our recommendations regarding spill prevention, containment, and minimization into their procedures for construction in waterbodies and wetlands. Guardian has also developed an SPCC Plan for the Project (see appendix D). Given these measures, the risk of accidental spills or the introduction of other hazardous materials to waterbodies, and their effects on aquatic life would be effectively minimized.

Entrainment and Reduction of Flows during Hydrostatic Testing

Hydrostatic testing of the pipeline would be conducted using water withdrawn from selected source waterbodies in the vicinity of the Project (see section 4.3.2.4). However, hydrostatic testing of the compressor stations would be conducted using groundwater wells or municipal sources and therefore would not affect adjacent aquatic resources. Entrainment of fish and other aquatic organisms would occur during withdrawals of hydrostatic test water from the selected source waterbodies. These waterbodies include the Rock River and the Fox River. Guardian would prevent or adequately limit impacts from hydrostatic testing by implementing the requirements for hydrostatic testing in our Procedures. No chemicals would be added to the test water and water would likely be discharged back to the waterbodies from which water was withdrawn, associated tributary, or to well-vegetated upland areas. Guardian would use diffusers to minimize the potential for stream scour from water discharged into waterbodies, or use filter bags and other energy-dissipating devices to prevent erosion in upland areas and other locations. Guardian would also regulate the timing, rate, and volume of hydrostatic test water withdrawals to ensure a stable and sufficient downstream flow within the waterbodies from which hydrostatic test water would be withdrawn.

4.5.2.3 Site-Specific Impacts and Mitigation

Guardian proposes to use HDD to cross three waterbodies, the Rock River, the Fox River, and Apple Creek (the Fox River and Apple Creek will be crossed simultaneously in one HDD). As described in section 4.3.2.3, a pipeline crossing by HDD would avoid stream bottom disruption and subsequent impacts on aquatic habitats along that portion of the pipeline route. However, HDD methods are not without risk, because inadvertent drilling fluid releases could result if the drilling fluid escapes containment at pits or tanks at the HDD entrance and exit points, or if a "frac-out" occurs. A frac-out occurs when drilling fluids migrate unpredictably to the surface through fractures, fissures, or other conduits in the underlying rock or unconsolidated sediments. Typically, frac-outs are more likely to occur closer to entry and exit points where the hole is closer to the surface. During HDD operations, a frac-out would cause turbidity and sedimentation. If a frac-out were to occur in a waterbody, potential impacts from increased turbidity would include decreased water quality and compromised aquatic habitat integrity. As suspended materials settle out of the water column, sedimentation would partially or entirely cover the waterbody substrate and any sessile, benthic organisms. Temporary displacement of fish species and their prey items, as well as the potential for the smothering or burying of prey items, and the clogging of fish gills could also occur.

Geotechnical investigations conducted by Guardian and filed with FERC on September 7. 2007 for the Fox River/Apple Creek crossing indicate very favorable conditions for installing the pipeline using the HDD method. However, to ensure that impacts are minimized in the unlikely event that a frac-out occurs, Guardian has prepared an HDD Contingency Plan for the Inadvertent Releases of Drilling Fluid (see appendix K). The plan describes standard drill monitoring and sampling procedures, clean-up practices such as the use of straw bales, silt fencing, or turbidity curtains to contain the mud and cuttings, followed by mechanical or manual means to remove the drilling mud. The plan also addresses procedures to contain and cleanup inadvertent releases of drilling mud into waterbodies.

Guardian has not yet completed its geotechnical investigation of the proposed HDD crossing location at the Rock River, and therefore cannot yet fully assess the potential for a frac-out to occur at this location. Geotechnical investigations will, however, be conducted at the proposed Rock River crossing location, and the results filed with the Secretary prior to construction (see section 4.3.2.3).

Construction of the proposed Project could affect two ponds located at MPs 41.2 and 41.8 along the pipeline route. In accordance with our Procedures, Guardian would offset its construction right-of-way to maintain a minimum of 15 feet of vegetative cover between the ponds and the construction right-of-way. It would also employ appropriate erosion control measures to minimize potential sedimentation impacts on these waterbodies. Given these proposed mitigation measures, we do not anticipate any impacts on the ponds from construction activities.

Operation

Operation of the G-II Project would not have a permanent impact on fishery resources. The pipeline would be buried below the bed of waterbodies, and the bed and banks of the streams would be stabilized and restored. If maintenance activities were required, Guardian would employ protective measures substantially the same as those used during construction. As a result, any impacts derived from maintenance would be short-term in nature and similar to those discussed above for the initial pipeline construction.

4.6 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. For the purposes of this EIS, included in this category are species federally listed as endangered or threatened, or are considered as candidates for such listing by the FWS, and those species that are state-listed as threatened or endangered or designated as a state species of concern.

In accordance with Section 7 of the ESA, the lead agency (in this case, the FERC) in coordination with the FWS must ensure that any action authorized, funded, or carried out does not jeopardize the continued existence of a federally listed threatened or endangered species, or result in the adverse modification of the designated critical habitat of a federally listed species. For actions involving major construction activities with the potential to affect listed species or designated critical habitats, the federal agency must prepare a biological assessment (BA) for those species that may be affected. The action agency must submit its BA to the FWS and, if it is determined that the action may adversely affect a listed species, the federal agency must submit a request for formal consultation to comply with Section 7 of the ESA. In response, the FWS would issue a biological opinion as to whether or not the federal action would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

Our analysis of the G-II Project resulted in a determination that the Project does not have a potential to affect listed species. The FWS concurred, and therefore consultation under Section 7 of the ESA is complete.

Our analysis of special status plant and wildlife species originally focused on those species that were identified as potentially occurring in the Project area, as derived from species lists, agency consultations, and references. Our subsequent evaluation of potential impacts of the G-II Project indicated that some of these species are highly unlikely to occur in the Project area or would otherwise not be affected by the Applicant's proposed action. These species have been identified in table 4.6-1 and will not be discussed further in this EIS.

TABLE 4.6-1

Federal and State-Listed Endangered and Threatened Species Eliminated from Further Consideration for the G-II Project

Species	Federal Status a/	State Status b/	Reason for Elimination from Further Consideration b/	Determination
Whooping crane (*Grus Americana*)	Experimental Population		Indicated by FWS in June 22, 2006, May 15, 2007, and June 13, 2007 letters that species is not likely to be found in the proposed Project area.	No Effect
Eastern massasauga (*Sistrurus catenatus catenatus*)	F – C	WI - E	Indicated by FWS in June 22, 2006, May 15, 2007, and June 13, 2007 letters that species is not likely to be found in the proposed Project area.	No Effect
Karner blue butterfly (*Lycaeides Melissa samuelis*)	F – E	WI - SC	Indicated by FWS in June 22, 2006, May 15, 2007, and June 13, 2007 letters that species is not likely to be found in the proposed Project area.	No Effect
Dwarf lake iris (*Iris lacustris*)	F – T	WI - T	Indicated by FWS in June 22, 2006, May 15, 2007, and June 13, 2007 letters that species is not likely to be found in the proposed Project area.	No Effect

TABLE 4.6-1

Federal and State-Listed Endangered and Threatened Species Eliminated from Further Consideration for the G-II Project

Species	Federal Status a/	State Status b/	Reason for Elimination from Further Consideration b/	Determination
Indiana bat (*Myotis sodalis*)	F – E	WI - SC IL - E	Indicated by FWS in June 22, 2006, August 31, 2006, and April 2, 2007 letters that suitable habitat is not present within proposed Sycamore Compressor Station or along the proposed pipeline route.	No Effect
Prairie bush clover (*Lespedeza leptostachya*)	F – T	WI - E IL - T	Indicated by FWS in June 22, 2006, August 31, 2006, and April 2, 2007 letters that suitable habitat is not present within proposed Sycamore Compressor Station or along the proposed pipeline route.	No Effect
Small white lady's-slipper (*Cypripedium candidum*)	--	WI - T	Suitable habitat not present within 1 mile of the proposed pipeline facilities.	No Effect
Prairie parsley (*Polytaenia nuttallii*)	--	WI - T	Suitable habitat not present within 1 mile of the proposed pipeline facilities.	No Effect
Northern yellow lady's-slipper (*Cypripedium parviflorum* var. *makasir*)	--	WI - SC	Suitable habitat not present within 1 mile of the proposed pipeline facilities.	No Effect
A land snail (*Catinella gelida*)	--	WI - SC/N	Project does not cross suitable habitats (i.e., rock outcroppings or ledges).	No Effect
Honey vertigo (*Vertigo tridentata*)	--	WI - SC/N	Project does not cross suitable habitats (i.e., rock outcroppings or ledges).	No Effect
Thin-lip vallonia (*Vallonia perspectiva*)	--	WI - SC/N	Project does not cross suitable habitats (i.e., rock outcroppings or ledges).	No Effect
Side-swimmer (*Crangonyx gracilis*)	--	WI - SC/N	Rivers and streams crossed by Project do not exhibit preferred habitat characteristics.	No Effect
Redside dace (*Clinostomus elongatus*)	--	WI - SC/N	Rivers and streams crossed by Project do not exhibit preferred habitat characteristics.	No Effect
Two-spotted skipper (*Euphyes bimacula*)	--	WI - SC/N	Preferred habitats may occur within Project area; however, this species has a limited distribution and no known occurrences exist from counties crossed by the Project.	No Effect
Slippershell (*Alasmidonta viridis*)	--	IL - T	Project does not cross suitable habitat (i.e., sand or fine gravel in shallow water or small streams).	No Effect
Wooly milkweed (*Asclepias lanuginosa*)	--	IL - E	Project does not cross suitable habitat (i.e., native oak and sand prairies, oak barrens, or rocky soils).	No Effect
Gravel chub (*Erimystax x-punctatus*)	--	IL - T	Project does not cross suitable habitat (i.e., deep, swift waters of medium- to large-sized rivers over a pea-gravel bottom).	No Effect
Iowa darter (*Etheostoma exile*)	--	IL - T	Project does not cross suitable habitat (i.e., slow-moving waters of medium to small lakes, bog ponds, streams, or cool, slow rivers that tend to have clear to moderately turbid waters).	No Effect
Loggerhead shrike (*Lanius ludovicianus*)	--	IL - T	Project does not cross suitable habitat (i.e., edge habitat such as hedgerows in agricultural areas and along roadsides).	No Effect
Red-berried elder (*Sambucus racemosa* ssp. *pubens*)	--	IL - E	Project does not cross suitable habitat (i.e., upland forests, swamps, or cool drainages).	No Effect
Dog violet (*Viola conspersa*)	--	IL - T	Project does not cross suitable habitat (i.e., moist woods, damp fields, or swamps).	No Effect

a/ F = Federal, E = Endangered species, T = Threatened species, C = Candidate species
b/ WI = Wisconsin, E = Endangered species, T = Threatened species, SC = special concern species, IL = Illinois, SC/N = no laws regulating use, possession, or harvesting

4.6.1 Federally Listed or Proposed Threatened and Endangered Species

After reviewing information about the proposed route (sent by Guardian in a letter to the FWS Ecological Services Branch in Green Bay, Wisconsin on June 22, 2006), the FWS concluded that two federally listed species potentially occur in the Project area, including the bald eagle and the eastern prairie fringed orchid. In its written response on July 1, 2006, the FWS identified records of bald eagle nests within about 0.5 mile of the Fox River crossing location evaluated in the draft EIS, and the eastern prairie fringed orchid was identified in the vicinity of the proposed G-II Pipeline Route in Jefferson County, Wisconsin (table 4.6.1-1). These species are discussed in further detail below. However, as a result of the proposed pipeline amendments filed with the FERC on April 24, 2007 and July 2, 2007, Guardian conducted additional consultations with the FWS (sent by letter to the FWS Ecological Services Branch in Green, Bay Wisconsin on May 2, 2007 and May 25, 2007). In response to Guardian's inquiry along the proposed route amendment, the FWS concluded in letters dated May 15, 2007 and June 13, 2007 that the proposed Project would have "no effect" on the bald eagle or other federally listed species due to lack of federally listed species and the lack of suitable habitat in the area of the proposed route amendment.

In a letter dated June 22, 2006 to the FWS, Green Bay Field Office, Guardian requested additional information about listed species that could potentially occur in the vicinity of the two alternative Bluff Creek compressor station sites in Walworth County, Wisconsin. The FWS indicated that no federally listed species would be affected at either of these alternative compressor station sites (FWS, 2006).

TABLE 4.6.1-1

Federal and State-Listed Endangered and Threatened Species Potentially Occurring in the Vicinity of the Proposed Project

Species	Federal Status a/	State Status b/	Notes
Bald eagle (*Haliaeetus leucocephalus*)	F – T	WI – T	
Eastern prairie fringed orchid (*Platanthera leucophaea*)	F – T	WI – E IL – T	This species may be found in moist soil wetlands and wet prairies.
Blanchard's cricket frog (*Acris crepitans blanchardi*)	--	WI – E	Historically, the range of this species in Wisconsin is limited to the southern half of the state. Mud flats and stream banks with abundant, low emergent vegetation are preferred habitats. Also inhabit marshes, fens, and wet prairies near permanent and flowing water.
Foamflower (*Tiarella cordifolia*)		WI – E	Rich deciduous woods.
Blanding's Turtle (*Emydoidea blandingii*)	--	WI – T	Found throughout the state, except the extreme north-central. Concentrated in the vast marshes along the Wisconsin River. Primarily inhabit marshes and the shallow bays of lakes, but also utilize shallow, slow-moving rivers and streams.
Wood turtle (*Clemmys insculpta*)	--	WI – T	Primarily found along the Black, Wisconsin, St. Croix, Brule, and Baraboo Rivers. Forage in deciduous forests and open meadows adjacent to these rivers during the summer. Some individuals may inhabit rivers year-round.
Handsome sedge (*Carex Formosa*)	--	WI – T	Difficult to identify in the field. Only two known sites in Wisconsin. This specie range in Wisconsin includes Door, Brown, Milwaukee, Outagamie, and Ozaukee Counties.

TABLE 4.6.1-1

Federal and State-Listed Endangered and Threatened Species Potentially Occurring in the Vicinity of the Proposed Project

Species	Federal Status a/	State Status b/	Notes
Cerulean warbler (*Dendroica cerulea*)	--	WI – T	Found in mature mesic deciduous woodlands; prefers forest tracts > 40 acres in size. Uncommon to rare migrant and summer resident.
Red-shouldered hawk (*Buteo lineatus*)	--	WI – T	Suitable habitat in Wisconsin found in unfragmented mature floodplain forests along major rivers.
Yellow gentian (*Gentiana alba*)	--	WI – T	Found in mesic prairie, dry mesic prairie, or oak openings. Found in Brown, Calumet, Dodge, Fond du Lac, Jefferson, and Outagamie Counties, among others.
Forked aster (*Aster furcatus*)	--	WI – T	Prefers dry to mesic hardwoods on streamsides or slopes with dolomite near the surface.
Great egret (*Ardea alba*)		WI – T	Open, muddy or marshy edges of permanent ponds, lakes, bogs, floodplain ponds, and slow-moving streams and rivers.
Northern harrier (*Circus cyaneus*)	--	WI – SC/M	Marshes, wet meadows, sloughs, swamps, open fields. Requires open country for hunting. Nests on the ground, typically in tall grasses or under shrubs near wetlands.
Yellow-billed cuckoo (*Coccyzus americanus*)	--	WI – SC/M	Open woodlands with clearing and a dense shrub layer, including abandoned farmland, old fruit orchards, successional shrubland and dense thickets, often along water.
Black-throated blue warbler (*Dendroica caerulescens*)	--	WI – SC/M	Interior understory of deciduous and mixed woodland, second growth, partially cleared forest. Nests in small trees, saplings, or shrubs in dense undergrowth within 1 meter of the ground.
Prothonotary warbler (*Protonotaria citrea*)	--	WI – SC/M	Secondary cavity nester, preferring areas with stagnant or slow-moving water, especially those that only flood intermittently, such as swamps, ponds, wet forested bottomlands, flooded river valleys, and streams with willows.
Western meadowlark (*Sturnella neglecta*)	--	WI – SC/M	Open country, including native grasslands, pastures, agricultural fields, roadsides, and desert grassland. Prefers high forb and grass cover, low to moderate litter cover, and little or no woody cover.

a/ F = Federal, T = Threatened species
b/ WI = Wisconsin, E = Endangered species, T = Threatened species, SC = Special concern species, SC/M = fully protected by federal and state laws under the Migratory Bird Treaty Act

Guardian consulted with FWS, Rock Island, Illinois, Ecological Services Field Office regarding threatened and endangered species that could occur within or near the Sycamore Compressor Station location evaluated in the draft EIS and the amended compressor station location in De Kalb County, Illinois (sent by Guardian in letters dated August 8, 2006 and April 23, 2007). Only three species, the eastern prairie fringed orchid, the Indiana bat, and the prairie bush clover were identified by FWS from within the Illinois portion of the Project, as listed in table 4.6-1. In letters dated August 31 , 2006 and April 2, 2007, the FWS concluded that the proposed Project would have "no effect" on federally listed species due to lack of suitable habitat in the area of the proposed compressor station.

The two species identified as potentially occurring in the vicinity of the proposed pipeline route are discussed in further detail in the following paragraphs.

4.6.1.1 Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is found only in North America where they historically inhabited the entire continent wherever there were adequate nest sites and an abundant supply of fish. However, due to human activities, bald eagle populations have declined dramatically throughout most of the species' range. Small numbers of eagles currently nest in many regions of North America, with the largest breeding populations being found in Canada and Alaska. In Wisconsin, bald eagles nest primarily along the shores of inland lakes and rivers in the northern-third of the state (WDNR, 2005).

Bald eagle distribution varies seasonally. Individuals that breed in the northern part of the species' range will migrate south in the winter as northern waters freeze. They will often congregate and share communal roosting and feeding grounds. In Wisconsin, bald eagles are suspected to move south where there is open water, generally concentrating along the Mississippi and Lower Wisconsin Rivers (WDNR, 2005). During the breeding season, eagles establish and defend territories, with mated pairs generally returning to the same breeding territory each year.

Preferred breeding habitat in Wisconsin consists of suitable nesting sites (large trees) located near waters with an adequate supply of fish (WDNR, 2005). Bald eagles also require isolated areas, where they are less likely to be disturbed by human activities. In February or March, eagles that breed in Wisconsin begin building a nest or repairing one they occupied the previous year, generally in a tall tree, such as a live white pine (WDNR, 2005).

Until the 1800s, bald eagles bred throughout the state of Wisconsin, but as the state was settled, eagle populations began to decline due to factors such as habitat disturbance and destruction and shooting (WDNR, 2005). With the passage of the Migratory Bird Treaty Act of 1916 and the Bald Eagle Protection Act in 1940, it became illegal to shoot bald eagles. By 1950, eagles no longer were found in the southern two-thirds of the state. Eagle populations remained stable in northern Wisconsin until the 1950s, when the use of pesticides such as DDT became common, which reduced the viability of eagle eggs (WDNR, 2005).

In 1972, the bald eagle was placed on the Wisconsin Endangered Species List and the federal government banned the use of DDT. However, bald eagle populations were slow to recover with a gradual increase from 82 breeding pairs in 1970 to 414 breeding pairs in 1991 (WDNR, 2005). More recently, the number of bald eagle breeding pairs within Wisconsin was estimated at 880, 994, and 1,020 occupied breeding territories in 2003, 2004, and 2005, respectively (WDNR, 2005). Similarly, the bald eagle was placed on the Federal Endangered Species List in 1973. However, because Wisconsin's eagle population is higher and more stable than that of most other states, the federal government listed Wisconsin's eagles as threatened, rather than endangered in 1978 (WDNR, 2005). On June 28, 2007, given the recovery of this species, the bald eagle was removed from the Endangered Species List, and as a result, consultation with the FWS regarding this species is no longer necessary. However, the bald eagle is still protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

The Project could affect breeding bald eagles if nest trees are removed, if trees used for roosting near feeding areas are removed, or if construction occurs near an active nest when eagles are breeding and/or rearing their young. Reduced reproductive success and nest abandonment could also occur as a result of Project activities.

Prior to its delisting, Guardian consulted with the FWS regarding the presence of this species in the proposed project area. The FWS noted two recorded bald eagle nesting locations near the proposed G-II Pipeline Route in the Fox River Valley. However, as a result of the proposed pipeline amendments filed with the FERC on April 24, 2007 and July 2, 2007, the FWS concluded the proposed Project would have *no effect* on the bald eagles (FWS, 2007).

Despite the determination of no effect, the FWS has advised Guardian to plan construction activities to avoid adversely affecting the species. Specifically, in Wisconsin no construction activities should occur within 300 feet of an active nest, but the FWS recommended considering a more conservative distance of 0.25 mile. If any bald eagle nest is found within 0.25 mile of the Project corridor, the FWS recommended that Guardian schedule construction to avoid the most critical, moderately critical, and low critical periods (generally February 1 to July 1, or when the chicks leave the nest) as described in the Northern States Bald Eagle Recovery Plan (FWS Northern States Bald Eagle Recovery Team, 1983).

Based on the FWS determination and the construction time period, we believe the Project would have *no effect* on the bald eagle.

4.6.1.2 Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)

The eastern prairie fringed orchid is a federally threatened species limited to fewer than 60 sites located within Illinois, Iowa, Maine, Michigan, Virginia, and Wisconsin. This species is generally found in areas with moist soils in mesic to wet, unplowed tallgrass prairies and wet prairies, but has also been found in old fields, roadside ditches, bogs, fens, and sedge meadows. Although the greatest threat to this orchid is habitat loss, this species is also threatened by conversion of its habitat to cropland, competition with invasive plants and noxious weeds, filling of wetlands, intensive hay mowing, fire suppression, and overgrazing (FWS, 1988; 1999).

The FWS recommended that Guardian screen the Project corridor for suitable habitat for this species, which includes moist soil wetlands and wet prairies, and then conduct surveys for the species within any identified suitable habitat prior to construction. Guardian has been conducting this screening for the eastern prairie fringed orchid during its wetland delineation field surveys. No suitable habitat for this species has been identified. If suitable habitat or individuals of the species are identified during construction, Guardian would consult with the FWS, and would implement any measures recommended by the FWS to avoid, minimize, or mitigate potential impacts on the eastern prairie fringed orchid.

Based on review of aerial photography, topographic mapping, and habitat requirements, Guardian determined, and the FWS concurred, that suitable habitat was not present within or adjacent to the proposed compressor station in De Kalb County, Illinois and, therefore, construction at the proposed compressor station site would not affect the eastern fringed prairie orchid.

In an e-mail from the FWS on March 8, 2007, the FWS indicated that no suitable habitat was present in the Project corridor in Jefferson County and that they believe the determination that the eastern prairie fringed orchid would not be affected by the Project is appropriate.

Based on the lack of suitable habitat and consultation with the FWS, we conclude that the Project would have *no effect* on the eastern prairie fringed orchid.

4.6.2 State-Listed Threatened or Endangered Species

4.6.2.1 Wisconsin

To investigate the presence of state-listed species in the vicinity of the Project area, Guardian used the Wisconsin NHI data obtained through a license agreement with the WDNR's Bureau of Endangered Resources. Guardian generated data regarding known occurrences of individual species using a 2-mile-wide buffer. The 2-mile-wide buffer was used because: (1) the NHI database is incomplete, especially in areas dominated by private lands; and (2) if reroutes were made during Project development these areas would already have been considered.

Guardian also consulted directly with the WDNR Bureau of Endangered Resources to develop a list of special concern species that could be affected by the proposed Project. This screening entailed a three-phase analysis of (1) identifying species listed in the NHI database; (2) conducting a habitat assessment to determine what additional species could reasonably occur along the proposed pipeline but had not yet been observed during field surveys; and (3) compiling a site-specific Threatened and Endangered Species Work Plan and Habitat Assessment (TES Work Plan) to determine survey locations for the species identified in earlier phases.

Results of the investigations produced 12 listed species occurrences, of which two are also federally listed. An additional five species are designated as species of special concern (see table 4.6.1-1).

State species of special concern are those for which a problem of abundance or distribution is suspected, but not yet proven. The main purpose of this classification is to focus attention on certain species before they become threatened or endangered. Guardian has identified five species of special concern that may occur in the proposed Project area. Within Wisconsin, regulations regarding special concern species afford a range of classifications, varying from full protection to no protection. The current categories for special concern species and their respective level of protection are as follows:

1. SC/P – fully protected;
2. SC/H – take regulated by establishment of open/closed seasons;
3. SC/F – federally protected as endangered or threatened, but not so designated by WDNR;
4. SC/M – fully protected by federal and state laws under the Migratory Bird Treaty Act; and
5. SC/N – no laws regulating use, possession, or harvesting.

Because of the lack of protection afforded to these five special concern species, they are not described further in this EIS. However, Guardian is continuing its consultation with the WDNR to identify appropriate survey requirements and, if necessary, measures to avoid and/or minimize potential impacts on state-listed special concern species. Guardian has specifically agreed to conduct surveys for the northern harrier and western meadowlark in suitable habitat prior to construction. If identified within the proposed Project area, Guardian would consult with WDNR regarding appropriate mitigation that would protect the habitat for these species.

Wisconsin state-listed species are discussed in the following paragraphs. The bald eagle and eastern prairie fringed orchid are discussed in section 4.6.1.

Blanchard's Cricket Frog (*Acris crepitans blanchardi*)

The Blanchard's cricket frog has been listed as a state-endangered species since 1982. Its historical range was limited to the southern half of the state (WDNR, 2006f). Cricket frogs require fairly permanent water in open country and prefer open mud flats and stream banks with abundant, low emergent vegetation (WDNR, 2006f). They inhabit marshes, fens, and low prairies near permanent or flowing water (WDNR, 1997; 2006f). In the Great Lakes region, populations have declined sharply and are currently restricted to small, localized populations. Loss of wetland habitat, as well as poor water quality due to contamination from pesticides, fertilizers, highway salts, and other pollutants have reduced the number of frogs in this region (WNDR, 2006f).

The proposed Project could result in mortality and reduced habitat quality for this species if areas they occupy are disturbed during construction. Guardian has agreed to conduct aural (calling) surveys for Blanchard's cricket frog in suitable habitat identified by WDNR prior to construction. If suitable habitat or presence of this species is verified, Guardian would consult with WDNR to develop appropriate mitigation measures, such as timing restrictions, to avoid impacts on this species and its habitat.

Blanding's Turtle (*Emydoidea blandingii*)

The Blanding's turtle has been listed as a state-threatened species since 1979. It may be found throughout the state, with the exception of the extreme north-central counties, as well as in suitable habitat throughout much of the Great Lakes region (WDNR, 2006g). This species is generally found in marshes and the shallow bays of lakes, but may also be found in shallow, weedy waters of slow-moving rivers, streams, and some northern bogs (WDNR, 2006g). This species may also inhabit rivers, where they concentrate their activities in backwaters, embayments, and sloughs, but they are considered only transient in portions of streams with more than a sluggish current (Harding, 1997). Primarily limited to aquatic habitats, this species hibernates underwater from late October or early November until late March or early April. Blanding's turtles may be found in terrestrial habitats during the spring and, to a lesser extent, in fall when adults travel to find mates or suitable nest sites (WDNR, 2006g). During the nesting season (primarily June), female turtles may travel more than 0.5 mile from water to find open, sunny spots with moist but well-drained sandy or loamy soils to dig their nests (WDNR, 2006g). Road-kill mortality associated with construction of roads that separate aquatic habitats and available upland nesting sites has greatly reduced local turtle populations. This species has also been eliminated from many places through the destruction and degradation of wetland and adjacent upland habitats (WDNR, 2006g).

The proposed Project could result in mortality and reduced habitat quality for this species if areas they occupy are disturbed during construction. Guardian has agreed to conduct surveys for the Blanding's turtle prior to construction. Guardian will continue its consultation with the WDNR regarding survey requirements and measures to avoid impacts on this species if suitable habitat is identified during surveys. Avoidance measures generally include timing restriction or installation of exclusion fencing.

Wood Turtle (*Clemmys insculpta*)

The wood turtle has been listed as a state-threatened species since 1975 and was once found throughout all but the southwestern-most portion of Wisconsin (WDNR, 2006h). Currently, only small, scattered populations exist in isolated habitats. This species is a semi-aquatic turtle that inhabits rivers and streams mainly along the Black, Wisconsin, St. Croix, Brule, and Baraboo Rivers (WDNR, 2006h). From April to November, this species is active by day, and are omnivorous feeding on insects, mussels, carrion, berries, dandelions, and other succulent herbs. During the fall, wood turtles inhabit stream banks and hibernate over winter in large community burrows. Wood turtles mate in spring and fall and females dig nests in June on communal gravel sites along stream banks or railroad beds. Eggs are laid in June and hatch in September (WDNR, 2006h). Water pollution, irrigation, and forest erosion are the primary causes for loss of suitable habitat for this species.

The proposed Project could result in mortality and reduced habitat quality for this species if areas they occupy are disturbed during construction. Guardian has agreed to conduct surveys for the wood turtle prior to construction. Avoidance measures generally include timing restrictions or installation of exclusion fencing.

Cerulean Warbler (*Dendroica cerulea*)

The cerulean warbler is a state-threatened bird found in mature mesic deciduous woodlands, including maple, basswood, and especially oak in both uplands and lowlands or floodplain forests. Often found near small canopy openings in large continuous forest tracts, they prefer medium and large tracts over small tracts (less than 40 acres). Within the state, this species is considered an uncommon migrant in the south and central areas, a rare migrant in the north, an uncommon summer resident in the south and central areas, and rare summer resident in the north (WDNR, 2006i).

Project clearing may directly affect nesting cerulean warblers or may disturb breeding or nesting birds adjacent to the pipeline route. Although this species may be present in forested areas within or adjacent to the pipeline route; it is less likely to nest there because most of the affected forested patches are smaller than its preferred habitats. Guardian has agreed to conduct surveys for the cerulean warbler in suitable habitat prior to construction; if identified within the proposed Project area, Guardian would consult with WDNR regarding appropriate mitigation that would protect the habitat for this species.

Red-shouldered Hawk (*Buteo lineatus*)

The red-shouldered hawk is a state-threatened species. Its preferred breeding habitat includes bottomland hardwoods, mesic deciduous or mixed deciduous-conifer forests, and wooded margins of marshes. They prefer to nest in oaks, pines, and other large trees, 20 to 70 feet high in a closed canopy. Nest building may begin as early as March. Suitable habitat in Wisconsin has been found in unfragmented, mature floodplain forests along major rivers, including the Mississippi River, St. Croix River north to St. Croix Falls, the Chippewa River to Chippewa Falls, the Wisconsin River to Wausau, and the Wolf River to Shawano (WDNR, 2006i).

Project clearing may directly affect nesting red-shouldered hawks or may disturb breeding or nesting birds adjacent to the pipeline route. Although this species may be present in forested areas within or adjacent to the pipeline route, it is less likely to nest there because most of the

affected forested patches is small. Guardian has agreed to conduct nest searches and raptor call-response surveys for the red-shouldered hawk as part of its TES Work Plan.

Handsome Sedge (*Carex formosa*)

The handsome sedge is a state-threatened species that is primarily found in forests, forest edges, road sides, and less frequently in open meadows (NYNHP, 2006). This species may be found in soils ranging from fairly dry to moderately wet, and may be found adjacent to areas of fairly wet soils. This species also occurs where there is limestone bedrock or calcareous soils. It occurs from New England to Southern Ontario, and North Dakota to New Jersey, a range that includes Wisconsin (NYNHP, 2006). Within Wisconsin, it has been recorded in Jefferson, Outagamie, and Brown Counties along the route (WDNR, 2006k). The handsome sedge is often associated with canopy species such as red and sugar maples, hickory, and white ash, as well as understory species such as cinnamon fern and other Carex species. Threats to this species include residential development, invasive and noxious weeds, and logging activities that have changed the hydrology of suitable habitat.

Guardian has agreed to conduct surveys for this species as part of its TES Work Plan.

Yellow Gentian (*Gentiana alba*)

The yellow gentian is a state-threatened plant that is found in clay soils in wooded ravines, thin soil and sand fields, dry woods, open woodlands and edges, ridges and bluffs, wet sandy prairies, railroad rights-of-way, and roadside ditches. These communities are often classified as mesic prairie, dry mesic prairie, or oak openings. Yellow gentian has been found in Brown, Calumet, Dodge, Fond du Lac, Jefferson, Outagamie, Rock, Walworth, and Waukesha Counties along the route. It flowers from late August through early October (WDNR, 2006l).

Guardian conducted surveys for the yellow gentian in Fall 2006 and did not find individuals within the proposed Project area; therefore, this species is unlikely to be affected by the proposed Project.

Forked Aster (*Aster furcatus*)

The forked aster is a state-threatened species. It prefers dry to mesic hardwoods, and is often found on streamsides or slopes with dolomite near the surface. Blooming occurs from early August to mid-October. The optimum identification period is from mid-August to late September (WDNR, 2006m). Guardian conducted surveys for the forked aster in Fall 2006 and did not find individuals within the proposed Project area; therefore, this species is unlikely to be affected by the proposed Project.

4.6.2.2 Illinois

Review of the IDNR online information identified seven species in DeKalb County, including slippershell, wooly milkweed, gravel chub, Iowa darter, loggerhead shrike, red-berried elder, dog violet, eastern prairie fringed orchid, prairie bush clover, and Indiana bat, that could potentially occur in or near the proposed compressor station; however, further communication from IDNR (2006) indicated no records of state-protected species or their habitats, or specially designated lands (preserves, natural areas, etc.) within the proposed Project area. Therefore, we determined that the Project would not affect these species.

4.6.3 Conclusions on Threatened and Endangered Species

We have determined that with the implementation of Guardian's proposed construction and mitigation measures, the Project would have *no effect* on federally listed species. Habitat availability is believed to be the primary limiting factor for some threatened, endangered, and special-status species. The distribution and abundance of threatened, endangered, and special-status species is limited; therefore, any impact on these species may affect the size or viability of the existing populations. Those species with habitat that could potentially occur in the Project area such as the Blanchard's cricket frog, wood turtle, Blanding's turtle, and rare plant species could experience reduced habitat quality or mortality (e.g., crushing or trapping) if areas they occupy are disturbed during construction. Other species such as cerulean warbler, red-shouldered hawk, and other bird species could experience nest failure in the year of construction, or long-term loss of nesting and breeding habitats if areas they occupy are disturbed during construction.

During operation of the proposed Project, routine vegetation maintenance has the potential to affect threatened and endangered species. Where vegetation maintenance would be required, impacts on these species using the right-of-way would be minimized by limiting vegetation maintenance to no more than once every 3 years and by employing seasonal mowing restrictions, typically between April 15 and August 1 of any year.

Guardian has completed initial consultations with the WDNR to identify the specific state-listed species and/or species of special concern that should be included in the threatened and endangered species surveys for the G-II Project. Guardian is also working with the WDNR to identify measures to avoid and/or minimize potential impacts on these species if suitable habitat is identified during surveys. Because Guardian has yet to complete surveys for state-listed species, **we recommend that:**

- **If a state-protected species or its habitat are found within the proposed construction right-of-way or construction work areas, Guardian should consult with WDNR regarding survey methodology, and develop mitigation plans, if necessary, to avoid or minimize impacts to that species. Guardian should file the results of any state-threatened and endangered species surveys (including survey methodology) and mitigation plans with the Secretary prior to construction.**

4.7 LAND USE, RECREATION, AND VISUAL RESOURCES

Several potential land use effects may result from construction and operation of the G-II Project. Many of these potential impacts are related to construction and include disturbance of existing land uses within construction work areas along the rights-of-way, creation of new permanent rights-of-way for operation and maintenance of the facilities, and short-term disruption to land uses, primarily agricultural land. Recreational and visual impacts could occur because of operation of the aboveground facilities associated with the Project.

A discussion of the effects of the Project on land use, residences and structures, recreation and special interest areas, visual resources, and hazardous waste sites is provided below.

4.7.1 Land Use

The land use/land cover types crossed by the proposed pipeline route and located at the proposed aboveground facility sites are comprised of six primary cover types: agricultural, open land, forest land, open water, commercial/industrial, and residential. Impacts associated with each land use are discussed in further detail below. Residential lands are discussed in further detail in section 4.7.4.

Construction of the proposed Project would affect a total of about 1,766.9 acres of land: 1,482 acres for the pipelines; 51.1 acres for the aboveground facilities (including the seven meter stations, two compressor stations, associated mainline valves, and launcher receiver facilities); 14.5 acres for access roads; 191.7 acres for additional temporary workspace; and 27.6 acres for a pipe storage/contractor yard. Operation of the Project would affect about 768.6 acres of land, of which 46.0 acres would be permanently converted for operation of the aboveground facilities, and the remaining 722.6 acres which would be permanently converted to maintain the pipelines, aboveground facilities, and permanent access roads. Table 4.7.1-1 summarizes the acres of each land use category that would be affected by both the construction and operation of the proposed Project.

The majority of land that would be crossed by the proposed Project would be agricultural land (106.8 miles or 89.7 percent). Of the remaining land uses 5.3 miles or 4.4 percent of open land, 5.5 miles or 4.6 percent of forest land, 1.0 mile or 0.8 percent of commercial/industrial land, 0.1 mile or less than 0.1 percent of open water, and 0.5 mile or 0.4 percent of residential land would be affected (see table 4.7.1-2).

Guardian proposes to use a 110-foot-wide construction right-of-way to fabricate and install the 30-inch-diameter pipeline and a 95-foot-wide construction right-of-way to fabricate and install the 20-inch-diameter pipeline and the 16-inch-diameter branch lines. In non-farmed wetlands and upland forested areas, the construction right-of-way would be reduced to 75 feet wide for all diameter pipes (16-, 20-, and 30-inch-diameter pipeline). The construction right-of-way would comprise 1,482.0 acres for the pipeline. Following construction, a 50-foot-wide permanent right-of-way would be maintained for operation of the respective pipeline (722.6 acres for the pipeline).

Guardian would obtain easements from the landowners in order to construct the pipeline. An easement would be used to convey both temporary (for construction) and permanent (for operation) rights-of-way to Guardian. The easement would give Guardian the right to construct, operate, and maintain the pipeline, and establish a permanent right-of-way. In return, Guardian would compensate the landowner for use of the land. The easement agreement between the company and the landowner typically specifies compensation for the loss of use during construction, loss of nonrenewable or other resources, and allowable uses and restrictions on the permanent right-of-way after construction. These restrictions can include prohibition of construction of aboveground structures, including house additions, garages, patios, pools, or any other object not easily removable; roads or driveways over the pipeline; or the planting and cultivating of trees or orchards within the permanent easement. The areas used as temporary construction right-of-way and additional temporary workspaces would be allowed to revert to pre-construction uses with no restrictions.

TABLE 4.7.1-1

Acres of Land Affected by Construction and Operation of the Proposed G-II Pipeline Project

Facility	Agricultural Land d/		Open Land e/		Forest Land f/		Open Water g/		Commercial/ Industrial h/		Residential i/		Total	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
30-inch-diameter pipeline a/	995.7	452.6	40.2	26.3	39.8	26.7	0	0.1	0	0.8	3.8	1.8	1,079.50	508.3
20-inch-diameter pipeline b/	331.4	174.5	12.1	6.3	10.3	6.8	0	0.6	0	0.6	2.5	1.3	356.3	190.1
Subtotal Pipeline	**1,327.10**	**627.1**	**52.3**	**32.6**	**50.1**	**33.5**	0	**0.7**	**0**	**1.4**	**6.3**	**3.1**	**1,435.80**	**698.4**
16-inch Denmark Branch Line														
Brown County	16.1	8.5	0	0	0	0	0	0	0	0	0	0	16.1	8.5
SUBTOTAL	**16.1**	**8.5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16.1**	**8.5**
20-inch Southwest Green Bay Branch Line														
Brown County	19.6	10.3	0	0	0	0	0	0	1.2	0.6	0	0	20.8	10.9
SUBTOTAL	**19.6**	**10.3**	**0**	**0**	**0**	**0**	**0**	**0**	**1.2**	**0.6**	**0**	**0**	**20.8**	**10.9**
20-inch West Green Bay Branch Line														
Outagamie County	1.2	0.6	0	0	0	0	0	0	8.1	4.2	0	0	9.3	4.8
SUBTOTAL	**1.2**	**0.6**	**0**	**0**	**0**	**0**	**0**	**0**	**8.1**	**4.2**	**0**	**0**	**9.3**	**4.8**
Sycamore Compressor Station	22.3	16.4 j/	--	--	--	--	--	--	--	--	--	--	22.3	16.4
Bluff Creek Compressor Station	20	20	--	--	--	--	--	--	--	--	--	--	20	20
Ixonia Meter Station c/	0	0 c/	--	--	--	--	--	--	--	--	--	--	0	0
Rubicon Meter Station	1.2	1.2 j/	--	--	--	--	--	--	--	--	--	--	1.2	1.2
Sheboygan Meter Station	1.3	1.7 j/	--	--	--	--	--	--	--	--	--	--	1.3	1.7
Chilton Meter Station	1.4	0.9	--	--	--	--	--	--	--	--	--	--	1.4	0.9
Fox Valley Meter Station	1.2	2.1 j/	--	--	--	--	--	--	--	--	--	--	1.2	2.7
Denmark Meter Station	1.3	1.3 j/	--	--	--	--	--	--	--	--	--	--	1.3	1.3
Southwest Green Bay Meter Station	1.2	0.9	--	--	--	--	--	--	--	--	--	--	1.2	0.9
West Green Bay Meter Station	1.2	0.9	--	--	--	--	--	--	--	--	--	--	1.2	0.9
Subtotal Aboveground Facilities	**51.1**	**45.4**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**51.1**	**46.0**
Contractor Yards	27.6	0	0	0	0	0	0	0	0	0	0	0	27.6	0
Additional Temporary Workspace	182.4	0	7.8	0	1.4	0	0	0	0.1	0	0	0	191.7	0
Access Roads	14.4	0	0	0	0.1	0	0	0	0	0	0	0	14.5	0
Project Total	**1,639.50**	**691.90**	**60.1**	**32.6**	**51.6**	**33.5**	**0**	**0.7**	**9.4**	**6.2**	**6.3**	**3.1**	**1,766.90**	**768.60**

a/ Includes nominal 110- and 75-foot-wide construction rights-of-way, respectively, and a 50-foot-wide operation right-of-way.
b/ Includes nominal 95- and 75-foot-wide construction rights-of-way for the pipeline, respectively, and a 50-foot-wide operational right-of-way.
c/ The Ixonia Meter Station would be located in Guardian's existing pipeline facilities; all new construction would occur within the fence line.
d/ Agricultural – actively cultivated uplands, farmed wetlands, hay fields, pastures, tree farms, orchards, and nurseries. Also includes fence lines, windbreaks, and shelter belts.
e/ Open – non-agricultural open and scrub-shrub fields and wetlands, emergent wetlands, fallow croplands, and CRP and Conservation Reserve Enhancement Program (CREP) lands.
f/ Forest – non-agricultural wooded uplands and wetlands.
g/ Open Water – surface water crossings greater than 100 feet.
h/ Com./Ind. – existing and planned commercial and industrial developments including retail stores, office buildings, manufacturing plants, utility stations, rock quarries, and landfills. Also includes existing access roads, railroad crossings, and road crossings greater than 50 feet wide with four or more lanes.
i/ Residential – existing and planned rural, suburban, and urban residential developments.
j/ Acreage affected during operation of these facilities includes new permanent access roads.
Notes: The totals of some columns differ slightly from the sum of each row in the column due to rounding.
Open Water and Commercial/Industrial Land would be crossed using either HDD technique or by conventional road bore, which would not generate surface disturbance during construction.

TABLE 4.7.1-2

Land Uses Crossed by Pipeline Facilities (in miles)

Facility/County	Agricultural a/		Open b/		Forest c/		Open Water d/		Com./Ind. e/		Residential f/		Total	
	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)
30-inch-diameter Pipeline														
Jefferson County	1.7	1.5	0.1	0.1	0.3	0.3	0	0	0	0	0	0	2.1	1.8
Dodge County	30.4	26.4	0.9	0.8	1.4	1.2	<0.1	<0.1	0	0	0.3	0.3	33	28.6
Fond du Lac County	22	19.1	1.5	1.3	0.7	0.6	0	0	0	0	0	0	24.2	21
Calumet County	19.1	16.6	1.8	1.6	2	1.7	0	0	0.1	0.1	0	0	23	20
Outagamie County	0.3	0.3	0	0	0	0	0	0	0	0	0	0	0.3	0.3
Brown County	1.3	1.1	0	0	0	0	0	0	0	0	0	0	1.3	1.1
20-inch-diameter Pipeline														
Brown County	11	9.5	0.2	0.2	0.3	0.3	0.1	0.1	0.1	0.1	<0.1	<0.1	11.7	10.2
Outagamie County	17.8	15.5	0.8	0.7	0.8	0.7	0	0	0	0	0.2	0.2	19.6	17
SUBTOTAL	**103.6**	**89.8**	**5.3**	**4.6**	**5.5**	**4.6**	**0.1**	**0.1**	**0.2**	**0.2**	**0.5**	**0.5**	**115.2**	**100**
16-inch-diameter Denmark Branch Line														
Brown County	1.4	100	0	0	0	0	0	0	0	0	0	0	1.4	100
SUBTOTAL	**1.4**	**100**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.4**	**100**
20-inch-diameter Southwest Green Bay Branch Line														
Brown County	1.7	94.4	0	0	0	0	0	0	0.1	5.6	0	0	1.8	100
SUBTOTAL	**1.7**	**94.4**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**5.6**	**0**	**0**	**1.8**	**100**
20-inch-diameter West Green Bay Branch Line														
Outagamie County	0.1	12.5	0	0	0	0	0	0	0.7	88	0	0	0.8	100
SUBTOTAL	**0.1**	**12.5**	**0**	**0**	**0**	**0**	**0**	**0**	**0.7**	**88**	**0**	**0**	**0.8**	**100**
PROJECT TOTAL	**106.8**	**89.7**	**5.3**	**4.4**	**5.5**	**4.6**	**0.1**	**0.1**	**1.0**	**0.8**	**0.5**	**0.4**	**119.2**	**100**

a/ Agricultural – actively cultivated uplands, farmed wetlands, hay fields, pastures, tree farms, orchards, and nurseries. Also includes fence lines, windbreaks, and shelter belts.
b/ Open – non-agricultural open and scrub-shrub fields and wetlands, emergent wetlands, fallow croplands, and CRP and CREP lands.
c/ Forest – non-agricultural wooded uplands and wetlands.
d/ Open Water – surface water crossings greater than 100 feet.
e/ Com./Ind. – existing and planned commercial and industrial developments including retail stores, office buildings, manufacturing plants, utility stations, rock quarries, and landfills. Also includes existing access roads, railroad crossings, and road crossings greater than 50 feet wide with four or more lanes.
f/ Residential – existing and planned rural, suburban, and urban residential developments.
Note: the totals of some columns differ slightly from the sum of each row in the column due to rounding.

The acquisition of an easement is a negotiable process that would be carried out between Guardian and individual landowners. These negotiations are a private business concern that are not regulated or tracked by the FERC. If the necessary land cannot be obtained through good faith negotiations with property owners and the Project has been certificated by the Commission, Guardian may use the right of eminent domain granted under Section 7(h) of the Natural Gas Act and the Federal Rules of Civil Procedure (Rule 71A) to obtain easements. Guardian would still be required to compensate the landowner for the right-of-way and damages incurred during construction; however, according to state or federal law a court would determine the level of compensation.

4.7.1.1 Agricultural Land

Agricultural land in the Project area consists of actively cultivated croplands, hay fields, and pastures, including intervening fence lines, windbreaks, and shelterbelts. The proposed pipeline would cross 106.8 miles of agricultural land and would disturb a total of 1,639.5 acres of agricultural land during construction of the pipeline, aboveground facilities, and associated ancillary facilities. Of this total, the agricultural land required for the construction of the Bluff Creek and Sycamore Compressor Stations (42.3 acres) is considered prime farmland. Several alternative compressor station locations were evaluated to minimize impacts on prime farmland and are discussed in further detail in section 3.3.6.2. Additional information regarding prime farmland soils can be found in section 4.2.

Most cultivated areas in Wisconsin are used to grow corn, soybeans, or wheat. Other crops include hay, sorghum, oats, rye, and specialty crops including sweet corn, green beans, peas, carrots, potatoes, horseradish, mint, cranberries, pumpkins, apples, and nursery products (USDA, 1999). Corn, soybeans, wheat, and other row crops are grown in the Project area, including hay and alfalfa. No special crops or orchards were identified along the pipeline route that would require unique construction techniques. Guardian will continue to actively consult with landowners affected by the proposed Project to identify any specialty crops along the route.

Guardian's proposed route would cross one certified organic farm (Midlakes Organic Farm) between MP 73.1 and MP 73.4 in Calumet County. The center of the proposed pipeline would pass within 50 feet of a second certified organic farm (operated by Mr. Arthur Steinbach) located in Dodge County between MP 22.8 and MP 23.3. Guardian received several comments about crossing certified organic farming operations. Regulation of organic farming was authorized in 1990 under the Organic Foods Production Act. After a 12-year comment and discussion period the National Organic Program (NOP) was fully implemented on October 21, 2002. Pipeline construction-related concerns of certified organic farmers and farmers transitioning from conventional to a certified organic operation would include maintaining certification, ensuring that impacts on the current certified organic crop within the affected field(s) (but outside of the construction right-of-way) are minimized, receiving adequate compensation, and proper restoration of the soil to be consistent with organic farming principles.

Guardian also received a comment from the owner of a private nursery business along the proposed pipeline route. This landowner was concerned that the pipeline and permanent easement restrictions would preclude the future planting of nursery stock. During further route refinements, Guardian adopted a route variation that would place the pipeline approximately 0.25 mile west of this area to avoid the nursery.

Guardian has consulted with each town and county along the proposed route to identify both lands enrolled in the Farm and Ranch Lands Protection Program (FRPP) and lands enrolled in the Wisconsin Farmland Preservation Program (FPP) that would be crossed by the Project. Based on the results of Guardian's inquiries, the Project would not cross any FRPP areas. Some of the lands crossed would be enrolled in the FPP. However, the existence of the pipeline would not prevent either the county or individual landowners from participating in the FPP or receiving state income tax credits for the preservation of their land under this program.

A total of 691.9 acres of agricultural land would be retained as permanent right-of-way following construction to facilitate pipeline monitoring and maintenance and for aboveground facilities. Of this total, about 45.4 acres of prime farmland would be permanently converted to commercial/industrial land use to support the two compressor stations, meter stations, and six MLV locations. In all other areas along the pipeline route, agricultural land use would not be affected during operation because routine brushing and clearing would not be required in agricultural areas and the land would return to routine farming uses once construction was completed.

4.7.1.2 Open Land

The Project would cross 5.3 miles of open land and would disturb approximately 60.1 acres of open land during construction of the pipeline. Open land is defined as non-agricultural, open and scrub-shrub uplands and wetlands, emergent wetlands, fallow croplands, and CRP and Conservation Reserve Enhancement Program (CREP) lands. Within the Project area, open land occurs most commonly as narrow strips at waterbodies, floodplains, roads, and railroad crossings.

Guardian consulted with the USDA, Farm Service Agency (FSA) in each county, the agricultural land manager for the Oneida Nation, and landowners to obtain information regarding lands enrolled in the CRP that could be crossed by the Project. The FSA in each county indicated that the Wisconsin State FSA Office reviewed Guardian's request and determined that the CRP land information is protected by the Freedom of Information Act, exemption 6, 5 United States Code 552(b) (6), because the disclosure of the requested information would constitute an unwarranted invasion of the personal privacy of any contract holders. However, during landowner negotiations Guardian determined that the Project would cross nine parcels that contain CRP easements. Guardian will continue to coordinate with these landowners to identify the exact location of these areas.

Guardian consulted with the Land and Water Conservation Department (LWCD) in each county, the agricultural land manager for the Oneida Nation, and landowners to obtain information regarding lands enrolled in the CREP that could be crossed by the Project. As of October 2006, Guardian received responses from four of the six county LWCDs (Jefferson, Calumet, Fond du Lac, and Brown Counties, Wisconsin). Responses indicated that the Project would not cross any CREP lands in these counties. Guardian would file with the FERC Secretary copies of all future correspondence regarding CREP lands received from the remaining three county LWCDs.

Guardian consulted with the NRCS in each county and landowners to obtain information regarding lands enrolled in the Wetland Reserve Program (WRP) that could be crossed by the Project. Based on responses as of April 2007, Guardian determined that the Project would not cross any WRP areas.

Guardian identified a WDNR conservation easement at MP 57.7 near Pipe Creek. The purpose of this non-point source easement would be to provide a vegetative buffer to minimize impacts from agricultural runoff to a priority watershed. About 0.61 acre of the easement would be temporarily affected by construction of the Project. A detailed discussion of the construction and operation impacts associated with the crossing of this conservation easement and the proposed mitigation measures are provided in section 4.3.2.3.

In all open lands, Guardian would retain a 50-foot-wide permanent easement for operation of the pipeline and to facilitate pipeline monitoring and maintenance. About 32.6 acres of open land would be retained as permanent right-of-way for this purpose. The remaining 27.5 acres of land used during construction would be allowed to revert to its preconstruction condition.

4.7.1.3 Forest Land

Forest land consists of non-agricultural wooded uplands and wetlands. Forest areas crossed by the Project would be dominated by riparian, oak-hickory, and maple-basswood communities. The Project would cross about 5.5 miles of forest land and approximately 51.6 acres of forest land would be affected during construction. A total of 33.5 acres would be retained as permanent right-of-way following construction. The remaining 18.1 acres would be allowed to revert to its preconstruction condition.

4.7.1.4 Open Water

Open water consists of surface water crossings (e.g., rivers, lakes, and ponds) greater than 100 feet wide. The Project would cross about 0.1 mile of open water at the Rock and Fox Rivers. Because these areas would be crossed utilizing the HDD crossing technique, no areas classified as open water would be affected during construction. A total of 0.7 acres would be retained as permanent right-of-way following construction.

Operation of the pipeline would not affect open waters because routine brushing and clearing would not occur in these areas.

None of the waterbodies that would be crossed by the Project are listed on the Nationwide Rivers Inventory or are classified as National Wild and Scenic Rivers or Wisconsin Exceptional Resource Waters. However, a portion of the pipeline and the three meter stations to be located in Brown County, Wisconsin (including the Fox Valley, Denmark, and Southwest Green Bay Meter Stations) would be located within a coastal zone management area. Guardian will be required to obtain a federal consistency determination for this portion of its pipeline and the meter stations located in Brown County. No other Project facilities in Wisconsin or Illinois are located in designated coastal zone management areas and therefore would not be subject to Coastal Zone Consistency review.

4.7.1.5 Commercial/Industrial Land

Commercial and industrial land includes existing commercial and industrial developments including retail stores, office buildings, manufacturing plants, utility stations, rock quarries, and landfills. Railroad crossings and road crossings greater than 50 feet wide with four or more lanes were included as commercial and industrial land uses; new access roads and smaller road crossings were included as part of their surrounding land use.

The Project would affect about 10.4 miles of commercial and industrial land. All of the commercial and industrial land crossed would consist of existing and planned commercial and industrial developments (e.g., retail stores, office buildings, manufacturing plants, utility stations, rock quarries, and landfills). They would also include existing access roads, railroads, and four- or more-lane divided highways. Guardian proposes to bore all railroad and major roadway (four or more lane highways) crossings, minimizing impacts to commercial/industrial lands affected during construction.

The presence of commercial and industrial buildings within 50 feet of the proposed Project was also considered. There are three commercial or industrial buildings within 50 feet of the construction work area. To ensure impacts to these buildings are minimized, Guardian would prepare site-specific construction mitigation plans to minimize disruption and maintain access to these areas. Guardian would file these plans with the Commission Secretary prior to construction (see also section 4.7.4.1).

Following construction, a total of 6.2 acres would be retained as permanent right-of-way. Commercial/industrial land use would not be affected during operation because routine brushing and clearing would not be required in commercial/industrial areas.

4.7.2 General Land Use Impacts and Mitigation

The general impacts on land cover associated with construction of the proposed Project would be a function of the construction methods employed, the restoration actions implemented once construction has been completed, and the nature of the land cover type affected. Section 2.0 provides a detailed discussion of the proposed construction methods and post-construction restoration.

Permanent land cover changes would occur to those lands contained within the permanent pipeline right-of-way where restoration to the preconstruction cover type would not be compatible with operation of the proposed Project facilities. Land uses not allowed in the permanent pipeline right-of-way would include aboveground construction, below ground construction, and the growth, planting, or cultivation of trees. Forest land cover would therefore be precluded from the permanent pipeline right-of-way. Allowable land uses generally permitted within the permanent right-of-way would include row crops and pastureland. Permanent changes would also be associated with the proposed aboveground facilities and those access roads maintained during operations, because acreage required for these facilities would be converted to a commercial/industrial cover type for the life of the Project. Although these impacts would be permanent, lasting for the life of the Project, the overall impact would not be significant given the limited acreage involved.

4.7.3 Site-Specific Land Use Impacts and Mitigation

4.7.3.1 Agricultural Land

Construction could affect the productivity of agricultural land in the construction and permanent rights-of-way. Most cultivated areas would be taken out of production for one season, whereas hay and alfalfa fields, and pastures may take an additional year or two to return to previous production levels. To minimize potential effects, Guardian would compensate landowners for crop loss and other damages, and would take steps to minimize the loss of future crop

production. Guardian has also agreed to employ a third-party AM for the Project to monitor all construction activities in the agricultural lands (see section 2.5 for further details).

Croplands and FPP land, except those within the operational areas of aboveground facilities, would return to agricultural use after construction. According to the requirements in our Plan and Guardian's AMP, restoration of the right-of-way would be monitored after construction to determine whether the crops have returned to expected productivity. After the monitoring period, landowners who believe they have a pipeline-related crop deficiency would be requested to notify Guardian prior to harvest for individual crop inspections and evaluations. Information regarding the potential causes of future loss of crop production and mitigation measures to minimize such losses is discussed in our Plan and section 4.2.

Additional construction effects would include inconveniences to some farmers whose pastures are used for livestock grazing, resulting from the removal of livestock fences in the construction work area. Guardian identified five livestock farms and one horse farm where grazing was occurring on the proposed pipeline route during the summer of 2006 and all of the fences were of a temporary nature (i.e., single-strand electric barbed wire). To minimize impacts, Guardian would arrange with landowners or tenants to relocate livestock away from the right-of-way during construction in accordance with our Plan and Guardian's AMP. If relocation of livestock were not possible, temporary fencing would be installed. These fences would typically remain in place until vegetation is re-established. Where livestock would be grazed on adjacent lands, Guardian would consult with the landowner prior to construction regarding how and where temporary fences should be installed to maintain appropriate access to pastures. Additionally, Guardian's contractors would be responsible to close any gates to pastures after working hours. Permanent fences that are removed during construction would be repaired to their preconstruction condition or better.

In agricultural areas, the pipeline trench would be excavated to a sufficient depth to generally allow a minimum of 4 feet of soil cover between the top of the pipeline and the final land surface after backfilling. One exception to this would be in areas containing shallow bedrock, which may have less than 4 feet of cover (e.g., 24 inches in consolidated rock). At least 4 feet of cover would be achieved at waterbodies, railroads, and road crossings.

Generally, Guardian would remove excess rock from the full construction right-of-way, either manually or using a mechanical rock picker, until the size and distribution of rocks on the right-of-way corresponds to rock in the adjacent areas that would not be disturbed by construction.

Topsoil would be segregated from the entire construction right-of-way on agricultural land. Topsoil and subsoil removed from the pipeline trench would be stored separately during construction and would not be allowed to mix. Following construction, subsoil would be returned to the trench and topsoil would be returned to those areas from where it was removed. See section 4.2 for further discussion of topsoil management during construction.

Guardian would work with landowners to identify drain tile systems in advance of construction and would mark the locations of any tile broken during pipeline trenching operations. Guardian would implement temporary tile line repairs to maintain the functionality of tile drainage systems during construction. Before the trench would be backfilled, Guardian would ensure that permanent tile repairs have been implemented. Guardian has also committed to have a qualified tile contractor conduct all tile repairs. Following completion of construction and restoration,

Guardian would work with landowners to repair or correct tile drainage problems as long as the damage was directly caused by construction of the pipeline.

To minimize impacts on the Midlakes Organic Farm and other certified organic farms, Guardian would implement site-specific construction techniques as described in section 2.3.1.2. These construction practices would be based on Guardian's BMPs for organic agricultural land as defined in its AMP. To support its BMPs, Guardian would request a copy of the Organic System Plan for the farm and would work with the producer to develop a site-specific plan to cross the farm in a manner that would minimize the risk of losing certification.

At the Steinbach organic farm property located between MP 22.8 and MP 23.3, the construction workspace would be located within about 15 feet from the edge of the property boundary. Standard procedures for organic farmers outlined in the NOP require the installation and maintenance of a buffer between the crop production portion of a certified organic field and neighboring, non-organic land uses. Because the Project would not cross the Steinbach Farm, Guardian would not be able to review the Organic System Plan for the farm because Organic System Plans are proprietary documents. As a result, the actual width of the buffer between the organic production area and the adjacent property boundary would not be known. Guardian would install erosion and sedimentation control devices along the edge of the workspace consistent with the standard requirements for pipeline construction in our Plan, and would ensure that construction personnel and materials (including soil and stormwater runoff from the adjacent property) would not penetrate the buffer. Guardian's upland construction techniques are not appreciably different from the tillage, planting, and other standard farming practices conducted by the farm operation bordering the Steinbach Farm. As such, we believe the existing buffer would be adequate to protect the certified organic status of the Steinbach property.

There is no evidence to suggest that the presence of a pipeline would prohibit landowners from applying for organic certification of their lands in the future. However, if the presence of the pipeline were to prohibit organic certification of a landowner's property, it is likely the prohibition would be limited to the 50-foot permanent easement plus an additional buffer zone on either side of the easement.

4.7.3.2 Open Land

Construction impacts on open land would be minor and short-term. Some vegetative cover would be re-established within a few growing seasons of disturbance, comprising primarily fast-growing species planted to stabilize the open ground. More diverse vegetation, including shrubby species similar to those removed, would take longer to establish. To minimize impacts, Guardian would work with landowners, the FSA, and DATCP to reseed any CRP lands crossed by the Project with appropriate seed mixes to ensure continued eligibility for enrollment in the CRP program. Open land uses, including CRP, would continue in the permanent right-of-way after construction.

4.7.3.3 Forest Land

The primary effect of construction on forest areas would be the removal of trees and shrubs from the construction work area. In addition, approximately 1.4 acres of forested land would be temporarily disturbed for the purpose of additional temporary workspaces. The impacts associated with temporary additional workspaces are the result of site-specific constraints at

road, wetland, and/or waterbody crossings that would inhibit construction engineering and equipment maneuverability requirements.

Following construction, trees and shrubs would be allowed to regenerate in the areas not retained as permanent right-of-way, and the permanent right-of-way would be maintained in accordance with the standard requirements for pipeline operation in our Plan and Procedures. The rate of forest regrowth would depend on the type of vegetation cleared and the fertility of the soils. Early successional species would begin colonizing the right-of-way within a few years of construction, followed by the establishment of later successional species. Additionally, to minimize impacts on affected forest land, Guardian would limit the width of the construction right-of-way to 75 feet in forest areas.

The creation of new forest fragments, and the expansion of edge habitats, would be minimized in the Project area to the extent possible by avoiding large forest areas and sharing existing utility corridors where feasible. The majority of forest land crossed would be located along the existing ATC right-of-way. In addition, Guardian has limited the width of the construction right-of-way in all forested areas to 75 feet (minimizing tree clearing by 20 to 35 feet for the 16-inch, 20-inch, and 30-inch pipeline segments, respectively). Guardian is also avoiding some areas of forest land at two significant riparian areas at the Rock River (3.82 acres) and Apple Creek (0.91 acre) through use of HDD techniques to install the pipeline. Areas of new forest clearing located along portions of Guardian's amended route could not be collocated with any existing rights-of-way. These areas account for about 7.2 acres of forest land. Impacts on these areas have been reduced by limiting the width of the construction right-of-way to 75 feet. A more detailed discussion of the impacts of forest fragmentation on vegetation and wildlife is provided in section 4.5.1.

4.7.3.4 Open Water

The Rock River and Fox River are the only two surface waters in the Project area that meet the criteria of open water and may be affected during construction of the Project. To minimize impacts, Guardian proposes to cross the Rock and Fox Rivers using the HDD crossing technique, which would avoid direct impacts on the water, beds, and banks of these rivers. Guardian proposes to cross the other streams and creeks using an open-cut method. Contingency open-cut construction plans would be prepared for each HDD if the crossings prove unsuccessful. The effects of construction on surface waters are discussed further in section 4.3.2.

4.7.3.5 Commercial/Industrial Land

Guardian proposes to bore both paved roads and all operating railroads, which would avoid most direct impacts on the road or the vehicles using the roads or railways. However, motorists may encounter slow moving vehicles and road closures during construction. Unpaved roads would be crossed either by boring or by using the open-cut method. The open-cut method could temporarily disrupt road traffic. If necessary, to minimize traffic delays at roads that are open-cut, Guardian would establish detours before excavating the roadbed. If no reasonable detours were feasible, at least one traffic lane of the road would be maintained open, except for brief periods when road closure would be essential to lay the pipeline. Guardian would minimize the duration of open-cut crossings and, in most cases, would complete these road crossings in one day or less. Prior to closing roads, Guardian would notify law enforcement agencies and would arrange a road closure schedule with any residents or businesses within the immediate area,

which may be affected by the closure. Driveways would be kept open by horizontally boring the drive or by placing steel plates across the trench during construction.

Short-term construction impacts would occur as a result of heavy equipment tracking soil and mud onto roadways. To minimize impacts, Guardian would monitor roads crossed by construction. If excess soil or mud were tracked onto roadways, it would be removed as soon as practicable and placed back in the construction work area. Sediment barriers would be installed at the base of slopes adjacent to roads to prevent sediment from the construction right-of-way from being washed onto roads during rain events. Guardian proposes to cross paved roads on a combination of rubber mats, tires, and/or plywood sheets to minimize impacts. Guardian would also coordinate with the appropriate transportation authority regarding the need for road repair following construction.

As indicated in section 4.1.2, there are five quarries located within 2,000 feet of the pipeline route. The pipeline would cross the closest of these quarries, Eden Stone Company, at MP 41.8. Information on the effects of blasting operations from surrounding quarries and mitigation measures to minimize such effects are also discussed in section 4.1.2.

4.7.4 Existing and Planned Residences and Structures

4.7.4.1 Existing Residences and Structures

Residential land consists of existing rural, suburban, and urban residential developments. The proposed Project would cross 0.5 mile of residential land, and 6.3 acres of residential land would be affected by construction.

Two residences, four barns, three commercial buildings, and two garages would be located within 50 feet of the pipeline construction work area. Table 4.7.4.1-1 lists these residences and structures by MP and indicates the distance of each from the proposed construction work area.

TABLE 4.7.4.1-1

Structures Within 50 Feet of the Proposed Construction Work Areas of the Proposed G-II Pipeline Project

Facility/County, State	MP a/	Feature	Distance from Edge of Construction Work Area
30-inch-diameter Pipeline			
Fond du Lac	41.7	House	40 feet
Calumet County	71.9	Barn	24 feet
20-inch-diameter Pipeline			
Brown County	88.9	Garage	34 feet
Brown County	89.9	Barn	29 feet
Brown County	93.7	Commercial Building	40 feet
Brown County	93.8	Commercial Building	3 feet
Brown County	94.5	Barn	37 feet
Outagamie County	116.4	House	48 feet
Outagamie County	116.4	Garage	7 feet
20-inch-diameter Southwest Green Bay Branch Line			
Brown County	1.5	Commercial Building	25 feet
20-inch-diameter West Green Bay Branch Line			
Outagamie County	117.8	Barn	26 feet

b/ The discrepancy between the length of the pipeline (115.2 miles) and the mileposting system is the result of route modifications that were adapted by Guardian after the mileposting system was established.

In residential areas, the two most significant impacts associated with construction and operation of the pipeline is disturbance during construction and encumbrance of property for future uses (e.g., the limitation on future permanent structures within the permanent pipeline right-of-way).

Residences within 50 feet of construction work areas are considered to be the most likely to experience the effects of pipeline construction. Temporary construction impacts on residential areas could include inconvenience caused by noise and dust generated by construction equipment (see sections 4.11.1 and 4.11.2 for further details); trenching through roads or driveways; ground disturbance of lawns; removal of landscaping or natural vegetative screening; potential damage to existing septic systems or wells; and removal of aboveground structures, such as sheds or trailers, from within the right-of-way. For residences and other structures located within 50 feet of the construction work area, Guardian would prepare site-specific construction mitigation plans to minimize disruption and maintain access to these areas. Guardian would file these plans with the Commission Secretary prior to construction.

Following construction, approximately 3.1 acres of the 6.3 acres of residential land affected by construction would be retained as permanent right-of-way. The remaining 3.2 acres of residential land affected during construction would be restored to preconstruction conditions and existing use. In general, residential land use would not be affected during operation because typical routine vegetation maintenance would not be conducted in residential areas. The establishment of permanent structures or trees, however, on the permanent right-of-way would be prohibited. To ensure pipeline safety, Guardian would work with landowners and developers to develop encroachment agreements to allow roads and utilities to cross the right-of-way. Guardian routinely participates in the planning of developments to accommodate the developer's needs while protecting pipeline safety. To further ensure safety and minimize impacts to residences and commercial buildings, **we recommend that:**

- **For all residences and commercial buildings within 50 feet of the construction work area Guardian should:**

  a. **leave mature trees and landscaping within the edge of the construction work area, unless necessary for safe operation;**
  b. **restore all lawn areas and landscaping within the construction work area consistent with the requirements of our Plan immediately after backfilling the trench; and**
  c. **fence the edge of the construction work area adjacent to the residence for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials including the spoil pile remain within the construction work area.**

- **For all commercial buildings closer than 25 feet to the construction work area, prior to construction Guardian should file with the Secretary for review and approval of the Director of OEP a site-specific plan that includes:**

  a. **a description of construction techniques to be used (such as reduced pipeline separation, centerline adjustments, use of stove-pipe or drag-section techniques, working over existing pipelines, pipeline crossover, bore, etc.), and include a site plan that shows:**

(1) the location of the commercial building in relation to the new pipeline and, where appropriate, the existing pipelines;
(2) the edge of the construction work area;
(3) the edge of the new permanent right-of-way; and
(4) other nearby residences, structures, roads, or waterbodies.

b. a description of how Guardian will ensure that the trench is not excavated until the pipe is ready for installation and that the trench is backfilled immediately after installation.

4.7.4.2 Planned Residences and Structures

Four planned residential developments are currently proposed within 0.25 mile of the proposed pipeline route and associated branch lines. Consultations with the Brown County Planning Department indicate that two of the four planned residential developments would not be crossed by the proposed route, but would be located 200 feet to the southeast of the proposed Southwest Green Bay Branch Line near Branch Line MPs 1.3 and 1.6. The remaining two developments, a Certified Survey Map (CSM) (residential land subdivision with less than five lots), and a proposed subdivision would be crossed by the proposed route at MPs 88.3 and 90.3, respectively. Guardian is currently consulting with the developers to identify any potential conflicts between the proposed pipeline route and specific plans for developing these areas.

In addition to coming within 0.25 mile or crossing four known planned developments, the pipeline route would cross or come within 0.25 mile of two planned wind farms (Forward Wind Energy Center project and Blue Sky Green Field Wind project) at MPs 31.5 to 35.9 and MPs 59.4 to 55.3, respectively, and more than 0.5 mile from a third proposed wind farm (Cedar Ridge Project). However, due to the Project's distance from the Cedar Ridge Project no impacts are anticipated. The pipeline would also come within 0.25 mile or cross one dairy operation under construction at MP 72.9, and a sewer expansion project in the Town of Holland.

Guardian has identified four subdivision plats (Brookside Estates Second Addition, Carpenter's Crossing, Fox River Meadows First Addition, and Holland Heights II) that were proposed over the past 3 to 4 years and located near the proposed pipeline route in Brown County, Wisconsin. All four of these subdivisions have been completed and have been avoided by the pipeline and therefore would have no adverse effects on these existing developments.

Guardian has received comments indicating that the pipeline route would traverse areas that have the potential for development in the future or were identified in Smart Growth Plans as possible building areas. However, as of October 2006, there have been no specific plans or plats proposed for development in these areas. In the event plans to develop these areas are proposed and/or realized prior to construction of the Project, Guardian would consult with the appropriate individuals and organizations to minimize potential impacts, as necessary.

In September 2004, Forward Energy L.L.C. (Forward) submitted its application for a Certificate of Public Convenience and Necessity (CPCN) to the PSC pursuant to Wisconsin Statutes §196.491(3) and Chapter PSC 111, Wisconsin Administrative Code for authorization to construct the proposed Forward Wind Energy Center project. The proposed project would be situated within approximately 32,400 acres of predominantly agricultural land near Brownsville, Wisconsin, in the towns of Oakfield, Byron, Leroy, and Lomira in southern Fond du Lac and

northern Dodge Counties. The project proposal included 150 potential wind turbine tower locations. Forward would use up to 135 wind turbine locations for construction of the project. Based on a project semi-annual progress report, dated March 3, 2006, Forward is obtaining required permits and approvals. Construction of the wind farm is anticipated to begin after Forward completes the final turbine and collection system layout, resolves outstanding issues pursuant to the CPCN Order, and receives all of the necessary permits or approvals. The anticipated in-service date of the proposed project is expected within 8 to 12 months after the commencement of construction.

On March 17, 2006, We Energies filed a CPCN with the PSC pursuant to Wisconsin Statutes §196.491(3) and Chapter PSC 111, Wisconsin Administrative Code, for authorization to construct the Blue Sky Green Field Wind project. The proposed project would be located in an area covering 10,600 acres in the Towns of Calumet and Mansfield in Fond du Lac County, Wisconsin. The proposed project would use 88 wind turbines and associated auxiliary facilities, with a total capacity of up to 203 MW of electric generation. We Energies is obtaining required permits and approvals and commercial operation is anticipated to begin in 2008 or 2009.

Construction-related impacts associated with these two wind farms would occur if both projects are constructed simultaneously, or if the pipeline were constructed before the wind farms are in operation. Based on preliminary maps of the Forward Wind Energy Center project, the proposed pipeline would cross within 100 feet of the preliminary location of turbine 101 and within 300 feet of the preliminary locations of turbines 107, 109, and 110. Based on preliminary maps of the Blue Sky Green Field Wind project, the closest proposed turbine would be located about 400 feet from the proposed Project. Additionally, the Project would, in some cases, cross underground collection system cable lines associated with both projects. Based on both wind energy applications to the PSC, Guardian understands that not all of the turbine sites would be developed. Additionally, Guardian should be able to route the pipeline around individual turbines and install the pipeline beneath cable lines for the underground collection system if necessary. If either of these planned wind projects go to construction, Guardian would coordinate with both wind energy companies to identify any conflicts that may arise to minimize potential impacts. If any conflicts were identified, Guardian would work with both companies to minimize potential impacts, as necessary. No operational impacts are anticipated.

A large dairy operation is under construction at MP 72.9 in Calumet County, Wisconsin. The proposed pipeline would be constructed along an existing ATC powerline corridor through the planned dairy operation. By following the ATC corridor, Guardian would be able to install the pipeline 15 feet inside the powerline easement. This increases the degree of overlap between Guardian's permanent easement and the powerline easement, placing all but 10 feet of Guardian's permanent easement inside the powerline corridor. Guardian has and would continue to coordinate with the developer to minimize impacts on the proposed development and ensure safe construction and operation of the development and the proposed pipeline. No construction or operation impacts are anticipated in regards to the proposed dairy operation.

Members of the Town of Holland have expressed concern regarding the potential of the proposed pipeline crossing a planned municipal sewer expansion. Guardian has requested information from the Planning Chair, the Board Chair, and the Holland Sanitation District. As of October 2006, Guardian has not received a response to these inquiries. Guardian will continue to coordinate with the Town of Holland to determine the potential impact of the proposed pipeline on the sewer expansion.

4.7.5 Recreation and Special Interest Areas

Three special interest areas have been identified along the proposed pipeline route. The pipeline route would cross or come within 0.25 mile of the Niagara Escarpment (MPs 18 to 90.8), and the Kettle Moraine Scenic Drive. The pipeline would also come within 0.4 miles of the Oneida Reservation. No other recreation or special interest areas such as developed recreational facilities, parks, forests, wildlife management areas, wilderness areas, trails, or registered natural landmarks have been identified in the vicinity of the proposed Project.

4.7.5.1 Niagara Escarpment

The Niagara Escarpment underlies four of the counties that are crossed by the proposed pipeline route: Brown, Dodge, Calumet, and Fond du Lac, Wisconsin. From MPs 18 to 90.8, the pipeline would traverse 73 miles of public and private land along the Niagara Escarpment in these counties.

The Niagara Escarpment is a 650-mile-long sickle-shaped bedrock ridge that runs south of Rochester, New York, across portions of southeastern Canada, and southward around the western side of Lake Michigan to southeastern Wisconsin. During the last half of the nineteenth century, much of the pre-settlement forest was cut and much of the land was cleared for agriculture, especially fruit orchards. Farming along the escarpment was difficult due to the shallow soils and steep slopes, and settlement patterns were affected by the bedrock-controlled topography. At one time the dolomite bedrock was used for foundation material and/or burned to produce lime. Today, a number of counties along the escarpment operate or privately own quarries that supply crushed stone primarily for road base, concrete aggregate, and riprap (WDNR, 2002b).

In recent years, the Niagara Escarpment has emerged as a statewide critical natural resource area due to its geology and other unique ecological characteristics that support rare plants and animals threatened by growing development pressures. As such, the escarpment has become a priority study area for the WDNR Bureau of Endangered Resources, as well as other regional and state agencies and private conservation organizations in Wisconsin. It was also identified as a priority area for conservation and recreation in the state's Land Legacy Report published in 2006.

The WDNR NHI Program, Bureau of Endangered Resources, conducted a study from 1999 to 2001 to collect and compile information about the biodiversity of the Niagara Escarpment and to identify elements of biodiversity that are most closely related with the escarpment (Anderson et al., 2002; WDNR, 2006n). This WDNR study identified several classes of rare threatened and endangered wildlife and plant species within Brown, Dodge, Calumet, and Fond du Lac Counties, Wisconsin. As proposed, the G-II Pipeline does not directly cross any vertical exposure, rock face or outcropping associated with the escarpment, but rather the route traverses the top of the escarpment from southwest to northeast. Field investigations conducted by Guardian and consultations with the WDNR and FWS indicate that the construction and operation of the Project would not affect the unique species known to be associated with the Niagara Escarpment.

4.7.5.2 Oneida Nation of Indians of Wisconsin

The Oneida Nation is a member of the Iroquois Confederacy, indigenous to central New York State. The Oneida Nation is a federally recognized Indian Nation of 14,533 members, one-third

of whom live on or near the 65,000-acre semi-rural reservation. The Oneida Nation was established by the Oneida Treaty of 1838 (7 Stat. 566, Feb. 3, 1838). The Oneida Nation is located southwest of the City of Green Bay and west of the Fox River. It straddles the boundary between Brown and Outagamie Counties and includes all or portions of the City of Green Bay, Villages of Ashwaubenon and Howard, and the Towns of Hobart, Oneida, and Pittsfield. The Oneida tribal members own nearly 22 percent of the total land acreage within the Oneida Reservation. This percentage is expected to increase as the Oneida Nation continues to implement a policy of reacquiring title to all land within the boundaries of the reservation set by the 1838 Treaty (EPA, 2006).

Guardian met with representatives of the Oneida Nation on March 11, 2006; April 4, 2006; April 17, 2006; May 18, 2006; and June 2, 2006 to discuss the Project. Despite these ongoing negotiations, Guardian was unable to reach an easement agreement with the Oneida Nation and therefore amended the pipeline route as described in the draft EIS to avoid the Reservation in Brown and Outagamie Counties, Wisconsin (see section 3.3.3.6, Outagamie Alternatives A and B, for a detailed discussion). As a result, the Project would have no effect on Reservation lands.

4.7.5.3 Kettle Moraine Drive

The Bluff Creek Compressor Station would be located on Guardian's existing pipeline route along Kettle Moraine Drive, which is part of the Kettle Moraine Scenic Drive in Walworth County, Wisconsin. The portion of the scenic drive along Kettle Moraine Drive is 2.8 miles long and is located outside of the Kettle Moraine State Forest in an area that is surrounded by agricultural land. The Kettle Moraine Scenic Drive is a 115-mile-long scenic byway developed under the direction of the Kettle Moraine State Forest. A number of interesting historic and geologic features can be observed along this scenic roadway, including the Sylvanus Wade House, Lapham Peak, kames, eskers, drumlins, kettles, and interlobate moraine (WDNR, 2006o). This drive traverses six counties in Wisconsin, running from the Whitewater Lake Region in Walworth County north to Broughton Sheboygan Marsh Park and Wildlife Area in Sheboygan County.

The closest point of interest along the drive, The Heart Prairie Glacial Outwash Plain, would be located approximately 0.5 mile to the east of the Bluff Creek Compressor Station. This outwash plain was formed when glacial meltwater deposited large amounts of sand and gravel across this area. No remnants of this prairie are known to exist and the area is now agricultural land (Kettle Moraine Natural History Association, 2003). The Bluff Creek Compressor Station would be visible to motorists traveling along the drive for approximately 0.8 mile (0.7 percent) of the total length of the drive. A more detailed assessment of the potential visual impacts of the compressor station on motorists traveling along the scenic drive is located in section 4.7.6.

4.7.6 Visual Resources

Visual resources refer to the composite of basic terrain, geologic features, hydrologic features, vegetative patterns, and anthropogenic features that influence the visual appeal an area may have for residents or visitors. The proposed Project could alter existing visual resources in three ways: (1) construction activity and equipment may temporarily alter viewscapes; (2) vegetation clearing for the pipeline construction right-of-way and routine right-of-way maintenance would alter existing vegetation patterns; and (3) aboveground facilities would represent permanent alterations to the viewscape. The significance of these visual impacts would be primarily

dependent upon the quality of the current viewshed, the degree of alteration of that view, the number of potential viewers, and the perspective of the viewer.

4.7.6.1 Current Viewshed

The degree of visual impact that may result from the proposed Project is typically determined by considering the general character of the existing landscape and the visually prominent features of the proposed facilities. The proposed pipeline would be constructed primarily on rural agricultural land, interspersed with forested areas, open land, human development, and open water. The most prominent visual feature of the proposed Project would be its aboveground facilities, two compressor stations, and seven meter stations.

4.7.6.2 Impacts and Mitigation Measures

No designated scenic features would be crossed by the proposed Project. Public viewing opportunities occur primarily where the Project would intersect streams, roads, developments, and special interest areas. Construction and operation of the proposed pipeline may affect visual resources by altering the terrain and vegetation patterns during construction or right-of-way maintenance and from the presence of new aboveground facilities. The landscape setting along the proposed pipeline route is generally rolling topography and irregular plains featuring morainal areas and outwash and drumlin fields. Impacts on visual resources due to the pipeline would be primarily temporary and short-term, occurring during construction. During construction, the cleared and graded right-of-way, as well as the construction equipment could be visible from any surrounding residences and local roads. The clearing and grading would result in color changes to the landscape, and the construction equipment would create tracks, compress vegetation, and expose soils. Because the terrain over much of the Project area is gently rolling, views of the construction activities may extend for some distance. Following construction, the right-of-way would be restored to pre-existing conditions and the farmers would be allowed to grow crops over the pipeline on agricultural lands. Construction work areas would normally be difficult to distinguish from surrounding areas. Therefore, no long-term visual impacts would result from construction and operation of the pipeline in non-forested areas (95.4 percent of the Project route).

Clearing of forested areas (4.6 percent of the Project route) would produce longer-term impacts. Clearing of trees within the construction right-of-way (51.6 acres) would convert existing forested areas to open areas and would result in a visually conspicuous corridor. Over time, trees and shrubs would regenerate outside of the permanently maintained right-of-way of 18.1 acres and the effects of clearing would become less obvious. Operational impacts on existing land uses would be limited to forested areas where periodic routine brushing and clearing would be conducted on the permanent right-of-way in accordance with our Plan and Procedures.

Guardian would minimize impacts associated with creating a new pipeline right-of-way and clearing forest areas by installing 25.7 miles (21.6 percent) of the pipeline parallel to existing rights-of-way. Where the pipeline parallels another right-of-way, the effects of construction would be less significant because no new lines or forms would be introduced to the landscape. Guardian would further reduce impacts on forest areas by limiting the width of the construction right-of-way to 75 feet in forested uplands and to the maximum extent possible in wetlands.

Guardian proposes to install several aboveground facilities associated with the pipeline, including two compressor stations (including aboveground piping, buildings, perimeter fencing, and pavement); seven meter stations (including regulators, launchers, and receiver facilities); and six MLV sites. Because some of the facilities would be collocated, aboveground facilities would be constructed at nine separate locations along the pipeline.

The aboveground facilities would be the most visible features constructed as part of the Project and would result in long-term visual impacts on the landscape. The degree of impact depends on several factors, including the existing landscape, number of viewpoints from which to observe the structures, the type of viewers who would view the structures, and the remoteness of the location. Of the new facilities, the compressor stations would be the largest and most visually intrusive. Construction of the meter stations, receiver and launcher facility, and MLVs would have visual impacts, but these facilities would be significantly smaller in size and less intrusive than the compressor stations. All aboveground facilities would be constructed in rural agricultural areas, with relatively few potential viewers.

As proposed, the aboveground facilities would be located on private land surrounded by a combination of agricultural and residential land uses. The landscape along the proposed pipeline route and the location of each compressor station and metering station would be dominated by agricultural land use with some residential areas ranging from 150 to 2,000 feet near the compressor stations. Sensitive visual resources, including residential subdivisions and adjacent roads, were identified in the vicinity of these aboveground facilities.

The Sycamore Compressor Station located at MP 57.8 along Guardian's existing pipeline route in De Kalb County, Illinois, would be located approximately 1,650 feet south of Baseline Road and 1,700 feet north of Story Road, and could be visible by motorists traveling along these roads. This facility would be constructed on agricultural land surrounded by a combination of agricultural and residential land uses; however, the nearest residence would be approximately 2,000 feet from the proposed site. A site-specific screening plan has not yet been finalized by Guardian for the Sycamore Compressor Station site; however, to minimize the visual impact of the facility, Guardian has indicated it would enclose the compressor equipment in a building that would be similar in appearance to a modern farm building. Guardian would also consider vegetative screening that would, over time, create an appearance that is more typical of farmstead sites in the vicinity. Guardian is also committed to appropriately maintaining the grounds of the compressor station (e.g., mowing and maintenance of any trees and/or shrubbery) to ensure both safety and the "kept" appearance of the overall site. Although the architecture and grounds of the site would help the facility blend in with the surrounding landscape, it would introduce a new structure to the existing setting. However, by implementing Guardian's proposed screening methods, the visual impact of the aboveground facility would not have a significant effect on the aesthetics of the landscape along the proposed pipeline route.

The Bluff Creek Compressor Station would be located at MP 110.2 along Guardian's existing pipeline route in Walworth County, Wisconsin, and would be visible from nearby residences and motorists traveling along Kettle Moraine Drive, McCabe Road, and County Road O. This facility would be constructed on agricultural land surrounded by a combination of agricultural and residential land uses. The nearest residence would be 150 feet north of the property. The section of Kettle Moraine Road near the compressor facility is part of the Kettle Moraine Scenic Drive. The compressor station would be visible to travelers on this road for about 0.8 mile (0.7 percent) of the total length of the 115-mile route. The closest point of interest along the drive,

The Heart Prairie Glacial Outwash Plain, would be located approximately 0.5 mile east of the compressor station facility. No remnants of this prairie are known to exist and the area is now agricultural land (Kettle Moraine Natural History Association, 2003). In addition, the stretch of the Kettle Moraine Scenic Drive viewshed that would be affected by the presence of the compressor station has already been altered by views of agricultural fields. To date, a site-specific screening plan has not yet been finalized by Guardian for the Bluff Creek Compressor Station; however, as described above Guardian would enclose the compressor equipment in a building that would be similar in appearance to a modern farm building, consider vegetative screening, and properly maintain the grounds associated with the site to ensure visual impacts are minimized. As such, the visual impact of the proposed compressor station would not have a significant effect on the aesthetics of the landscape along the proposed pipeline route.

To ensure that site-specific screening plans are developed and implemented at the Sycamore and Bluff Creek Compressor Stations and that the visual impacts are not significant, **we recommend that:**

- **Prior to construction Guardian should file site-specific screening plans for the Sycamore and Bluff Creek Compressor Stations with the Secretary for review and approval of the Director of OEP.**

The Rubicon, Sheboygan, Chilton, Fox Valley, Denmark, Southwest Green Bay, and West Green Bay meter stations would be constructed in agricultural fields at MPs 13.8, 43.9, 66.4, 83.7, 90.7, 92.7, and 117.4, respectively. Only one of the proposed seven meter stations (West Green Bay Meter Station), would be located within 150 feet of existing residences. The six MLVs and the proposed launcher/receiver facilities would be located either within the compressor station sites, some of the meter station properties, or along the permanent right-of-way. Valves would also be located at the end of each branch line. MLVs within the permanent right-of-way would be located in agricultural, powerline rights-of-way, or open areas. Given their location in agricultural fields, most of these facilities would be conspicuous in the landscape.

The Rubicon, Fox Valley, and Denmark Meter Station locations and MLV-11 are presently screened by natural forest vegetation, residential landscaping, distance, and by topographical location from nearby residences and roads. The Sheboygan, Chilton, Southwest Greenbay, and West Green Bay Meter Stations and MLVs 12, 13, and 14, and the valve at the end of the Denmark Branch Line are located in more open areas and would be visible by nearby residences and from roads. The valve at the end of the Southwest Green Bay Branch Line would be located at the intersection of three ATC powerlines and would not have a significant impact to the aesthetics at this location. Also, the valve at the end of the West Green Bay Branch Line would be located near an existing meter station and would not have a significant impact on the aesthetics at this location. To ensure that significant impacts to the aesthetics surrounding the Sheboygan, Chilton, Southwest Green Bay, and West Green Bay Meter Stations and MLVs 12, 13, and 14, and the valve at the end of the Denmark Branch Line do not occur, **we recommend that:**

- **Prior to construction Guardian should file a site-specific screening plan for the Sheboygan, Chilton, Southwest Green Bay, and West Green Bay Meter Stations and MLVs 12, 13, and 14, and the valve at the end of the Denmark Branch Line with the Secretary for review and approval of the Director of OEP.**

4.7.7 Hazardous Waste Sites

Guardian conducted a search of available environmental database records within 0.25 mile of the pipeline route. The G-II Project crosses one site on the EPA's NPL, the Fox River, which contains sediments contaminated with PCBs. Guardian would install the pipeline beneath the Fox River using the HDD technique, and therefore does not anticipate any impacts on the contaminated sediments, or impacts on the pipeline from interactions with PCB-contaminated sediment.

Additionally, both closed and open LUST and ERP sites were identified within 0.5 mile of the Project. These sites would be located at the following MPs along the pipeline route:

- MP 41.7, 0.21 mile southeast of the proposed pipeline;
- MP 41.7, 0.46 mile southeast of the proposed pipeline;
- MP 41.8, 0.23 mile southeast of the proposed pipeline;
- MP 41.8, 0.36 mile southeast of the proposed pipeline;
- MP 46.0, 0.37 mile west of the proposed pipeline;
- MP 54.0, 0.48 mile southeast of the proposed pipeline;
- MP 93.9, 0.02 mile south of the proposed pipeline;
- MP 93.9, 0.11 mile south of the proposed pipeline;
- MP 95.3, 0.17 mile southwest of the proposed pipeline;
- MP 104.4, 0.15 mile south of the proposed pipeline; and
- MP 106.0, 0.28 mile east of the proposed pipeline.

Of the sites identified six are closed LUST sites, four are closed ERP sites, and one is an open ERP site. The open ERP site contains petroleum-contaminated soils and is located 0.36 mile southeast of the proposed pipeline route at MP 41.8 in Fond du Lac County, Wisconsin. Based on consultation with the Wisconsin Department of Commerce, this site is a former bulk storage facility that once contained numerous aboveground petroleum storage tanks that have since been removed. The facility has low-level soil contamination but no groundwater contamination. However, because the site is located approximately 0.36 mile from the proposed pipeline, it is not likely that contaminated soils or water would be encountered during construction (Weis, 2006).

Guardian would implement the procedures outlined in its plan for the Unanticipated Discovery of Hazardous Wastes or Contaminated Soils should contaminated soils be encountered along the pipeline construction right-of-way. In addition, Guardian has developed a SPCC Plan that would describe spill prevention practices, spill handling, and emergency notification procedures, and training requirements. Implementation of its Unanticipated Discovery of Hazardous Wastes or Contaminated Soils Plan would address steps that would be taken should soil contamination be encountered, and includes cleanup procedures and reporting guidelines. Using the measures detailed in this plan would minimize spread of contaminated soils.

4.8 SOCIOECONOMICS

Several potential socioeconomic effects may result from construction and operation of the G-II Project. Many of these potential impacts are related to construction and include the number of local and non-local construction workers who would work on the Project, their income and local expenditures, and their impact on population, public services, and temporary housing during construction. The proposed Project may also have construction and operation impacts on property values and crop values. Potential economic benefits associated with operation of the Project include increased property tax revenue and increased job opportunities and income.

A discussion of the effects of the Project on local population (including environmental justice), economy and employment, housing, public services, and property values is provided below.

4.8.1 Population

Table 4.8.1-1 provides a summary of selected population and socioeconomic statistics for the state of Illinois and DeKalb County, and Wisconsin and its associated counties: Brown, Calumet, Dodge, Fond du Lac, Jefferson, Outagamie, and Walworth. Both states and all associated counties had population increases ranging from 2 percent to 10 percent between 2000 and 2005. The 2005 population density in DeKalb County, Illinois and Dodge County, Wisconsin continued to be lower than their respective state densities. The remaining counties in Wisconsin were higher than the state population density (102 persons per square mile), ranging from 137 to 452 persons per square mile.

TABLE 4.8.1-1

Existing Socioeconomic Conditions in the Vicinity of the Proposed G-II Pipeline Project

State/County	Population			Population Density (person/ sq. mi.)	Per Capita Income	Civilian Labor Force	Unemployment Rate
	2000 Census	2005 Estimate	Percent Change	2005	2002	2000	2006
Illinois	**12,419,293**	**12,763,371**	**2.8%**	**229.6**	**$33,404**	**6,208,597**	**4.7%**
DeKalb County	88,969	97,665	9.8%	150.6	$26,208	48,878	3.7%
Wisconsin	**5,363,675**	**5,536,201**	**3.2%**	**101.9**	**$29,923**	**2,869,236**	**4.2%**
Brown County	226,778	238,987	5.4%	451.8	$31,095	125,304	4.1%
Calumet County	40,631	44,137	8.6%	137.9	$30,050	22,747	3.6%
Dodge County	85,897	88,103	2.6%	99.8	$25,684	44,684	5.0%
Fond du Lac County	97,296	99,337	2.1%	137.4	$29,487	53,683	4.7%
Jefferson County	74,021	79,328	4.7%	142.4	$28,805	41,555	3.6%
Outagamie County	160,971	171,006	6.2%	267.2	$29,850	88,426	4.9%
Walworth County	93,759	99,844	8.5%	179.9	$27,364	51,861	3.6%

Sources: U.S. Census Bureau, 2006; U.S. Census Bureau, 2000; Wisconsin Department of Workforce Development, 2006; Illinois Department of Employment Security, 2006.

Project area population impacts are expected to be temporary and relatively minor. The total population change would equal the total number of non-local construction workers, plus any family members accompanying them. The Project would be located near small communities and the Milwaukee, Green Bay, and Chicago metropolitan areas. It is assumed that workers could find housing in these communities. As discussed further in section 4.8.2, Guardian expects to employ between 36 to 46 percent of its workers from the local area. Therefore, the estimated

number of people who would temporarily relocate to the area during construction would not constitute a major impact on the local population. Once completed, operation of the proposed pipeline would require approximately eight full-time positions, three of which would be existing Guardian employees. This small staff could be comprised of existing residents or non-local personnel, but would not have a significant impact on the local population.

4.8.1.1 Environmental Justice

United States Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 CFR 7629, 16 February 1994) directs federal agencies to "make…achieving environmental justice part of its mission" and to identify and address "…disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations." This section identifies any minority and low-income populations that may be affected by the proposed Project.

Minority Populations

Minority populations are persons of Hispanic or Latino origin, Blacks or African Americans, American Indians or Alaska Natives, Asians, and Native Hawaiian and other Pacific Islanders. Minority populations for 2004 are identified in table 4.8.1.1-1. The CEQ identifies these groups as minority populations when either (1) the minority population of the affected area exceeds 50 percent, or (2) the minority population percentage in the affected area is meaningfully greater than the minority population percentage in the general population or appropriate unit of geographical analysis (CEQ, 1997a).

The two largest minority groups reported in DeKalb County, Illinois in 2004 were Black or African American persons (15 percent) and persons of Hispanic or Latino origin (14 percent). DeKalb County had the highest proportion of total minority groups (16 percent), but is less than the state average of 34 percent (table 4.8.1.1-1). Brown (5 percent), Jefferson (5 percent), and Walworth (8 percent) Counties have a higher proportion of Hispanic or Latino persons than the

TABLE 4.8.1.1-1

2004 Minority Populations for the Proposed G-II Pipeline Project

State/ County	White	Percent Minority Composition a/	Hispanic or Latino	American Indian and Alaska Native	Black or African American	Asian	Native Hawaiian and Other Pacific Islander
Illinois	**66.2%**	**33.5%**	**14.0%**	**0.3%**	**15.1%**	**4.0%**	**0.1%**
DeKalb County	83.6%	**15.7%**	7.9%	0.3%	4.9%	2.5%	0.1%
Wisconsin	**86.2%**	**13.0%**	**4.3%**	**0.9%**	**5.9%**	**1.9%**	**0.0%**
Brown County	87.6%	**11.7%**	5.2%	2.5%	1.6%	2.4%	0.0%
Calumet County	94.8%	**4.6%**	1.9%	0.4%	0.6%	1.7%	0.0%
Dodge County	93.3%	**6.5%**	2.9%	0.4%	2.8%	0.4%	0.0%
Fond du Lac County	94.4%	**5.1%**	2.7%	0.5%	1.1%	0.8%	0.0%
Jefferson County	93.1%	**6.6%**	5.1%	0.4%	0.5%	0.6%	0.0%
Outagamie County	92.2%	**7.1%**	2.3%	1.6%	0.7%	2.5%	0.0%
Walworth County	89.8%	**9.9%**	8.1%	0.3%	0.8%	0.7%	0.0%

Source: U.S. Census Bureau, 2006
a/ Totals may not add to Percent Minority because of reporting classifications and/or the value is greater than zero but less than one-half unit of measurement.

Wisconsin state average of 4 percent. Brown and Outagamie Counties have a higher proportion of Native Americans (3 and 2 percent, respectively) than the Wisconsin state average of 1 percent, presumably because the Oneida Nation's Reservation is located in both counties.

Calumet and Outagamie Counties have a higher proportion of Asian persons (2 and 3 percent, respectively) than the Wisconsin state average of less than 2 percent.

As shown in table 4.8.1.1-1, the proposed Project is not expected to create disproportionately high or adverse human health or environmental effects on the minority population. Because none of the counties crossed by the Project have higher total percentages of minorities than the state that they are located, the potential adverse impacts that may be associated with the proposed Project would not disproportionately affect minorities. In addition, local communities would benefit from the payroll salaries paid to construction workers and the state sales tax on materials purchased within each county's jurisdiction. Although these benefits would be short-term, they may provide significant revenues to the affected counties.

Low-Income Populations

According to the Department of Housing and Urban Development, low-income neighborhoods are those where more than 50 percent of the population has an income less than 50 percent of the median per capita income for the whole community. Low-income populations for 2003 are illustrated in table 4.8.1.1-2.

Low-income populations are defined by environmental justice guidance by using the statistical poverty threshold of the U.S. Census Bureau. In 2003, the poverty-weighted average threshold for a family of four was $18,810 and $9,393 for an unrelated individual (U.S. Census Bureau, 2006). The national poverty level was over 12 percent. To be classified meaningfully greater, CEQ recommends a formula describing the environmental justice low-income threshold as being 10 percent above the national rate (or 22.5 percent) as applied to local poverty rates (CEQ, 1997a). As shown in table 4.8.1.1-2, the proposed Project is not expected to create disproportionately high or adverse human health or environmental effects on the low-income population.

TABLE 4.8.1.1-2

2003 Low-Income Populations for the Proposed G-II Pipeline Project

Jurisdiction	Percent Below Poverty Level
United States	12.5%
State of Illinois	**11.4%**
DeKalb County	9.3%
State of Wisconsin	**8.9%**
Brown County	8.0%
Calumet County	4.8%
Dodge County	6.7%
Fond du Lac County	6.9%
Jefferson County	5.7%
Outagamie County	5.6%
Walworth County	8.0%

Source: U.S. Census Bureau, 2006

4.8.2 Economy and Employment

The G-II Project will establish a second interstate natural gas pipeline serving eastern Wisconsin, which will benefit consumers through increased competition and increased reliability in gas transportation services to the region. Additionally, the construction of the Project would provide employment opportunities, as well as contribute to local community businesses and provide additional service opportunities. Currently, Guardian has received 117 comment letters from local unions, businesses, colleges, universities, and hospitals indicating their support for the proposed Project.

Educational services, health care, and social assistance; manufacturing; and retail trade are the largest economic sectors in both states and the Project area. The 2002 per capita income in Brown ($31,095) and Calumet ($30,050) Counties were slightly more than the 2002 Wisconsin per capita income. The per capita income in all other counties was lower than Illinois' average of $33,404 and Wisconsin's average of $29,923. The 2006 unemployment rate in Dodge (5 percent), Fond du Lac (4.7 percent), and Outagamie (4.9 percent) Counties was higher than the Wisconsin average of 4.2 percent. The unemployment rate in all other counties was lower than the state averages (table 4.8.1-1).

Construction of the proposed 115.2-mile 30-inch and 20-inch-diameter pipeline, the three branch lines including the 1.4 mile 16-inch-diameter Denmark Branch Line, the 1.8 mile 20-inch diameter Southwest Green Bay Branch Line, and the 0.8 mile 20-inch-diameter West Green Bay Branch Line, and associated aboveground facilities would be performed using a single spread over a 7-month timeframe (likely March through October 2008). During construction of the pipeline, Guardian estimated it would employ approximately 294 to 364 construction workers and an additional 47 inspectors (341 and 411 workers total), with a peak of 420 to 520 workers. Of this number, up to approximately 420 to 520 workers would construct the pipeline and associated meter stations in Wisconsin; up to 80 construction workers would build the Sycamore Compressor Station in DeKalb, Illinois; and up to 80 workers would construct the Bluff Creek Compressor Station in Walworth County, Wisconsin. It is estimated that 30 inspectors would be employed during construction of the pipeline and associated meter stations in Wisconsin, and 7 inspectors would be employed during construction of each compressor station in Illinois and Wisconsin.

Guardian expects to employ local construction workers where the local workforce possesses the required skills, and hire workers who reside within a reasonable distance from the Project. Based on previous construction experience, Guardian anticipates that local hires would account for approximately 136 (36 percent) to 173 (46 percent) workers for the pipeline and associated meter stations, and up to 40 workers for the construction of each compressor station (50 percent each). All inspectors are estimated to be non-local because of the specialized knowledge required for the position. Additional construction personnel hired from outside of the Project area would include highly skilled mechanical, electrical, and instrumentation and control tradesmen who would temporarily relocate to site.

During the proposed 7-month construction period, Guardian estimates that the total Project payroll would amount to about $3 to $4 million in Illinois and $19 to $21 million in Wisconsin. During this period, some portion of the construction payroll would be spent locally for the purchase of housing, food, gasoline, entertainment, and luxury items. The dollar amount would depend on the number of construction workers in a given area and the duration of their stay.

Sales tax would be paid on any construction materials as well as any goods and services purchased with payroll monies. Guardian estimates that about $600,000 to $700,000 would be spent on materials and services during construction of the Project in Illinois; $2.5 to $2.7 million would be spent on materials and services during construction of the Project in Wisconsin. Direct payroll and materials expenditures would have a positive impact on local economies and would stimulate indirect expenditures within the Project area.

During operation of the Project, Guardian expects to employ up to eight full-time positions, three of which would be existing Guardian employees. The salary range for each employee would be between $30,000 and $60,000 annually and estimated state taxes would be $2,000 to $4,000 per employee. The employees are not anticipated to significantly affect existing housing supplies, or local government expenditures for public services or facilities.

Indirect sales, jobs, and salaries would be created in new or existing businesses and organizations such as construction companies, parts and equipment suppliers, and other businesses that supply goods and services to the facility during construction and operation. In addition, jobs and salaries would be created in establishments that would supply goods and services to the Project's employees and their families, such as restaurants, retail stores, grocery stores, and banks.

In Wisconsin, natural gas transmission lines are centrally assessed for property taxes, meaning they are appraised by the state. Property taxes on pipelines are paid directly to the state and the revenue goes into the State General Fund. Currently, local taxing authorities do not receive property taxes directly from the pipelines in Wisconsin. Property taxes are estimated at $2 to $3 million per year for the facilities constructed in the G-II Project.

In Illinois, generally natural gas pipeline machinery and equipment are exempt from property taxes. Local taxing authorities only tax land and improvements (real estate). Taxes are paid to the county treasurer or collector and are estimated to be $15,000 to $50,000 per year for the facilities constructed in the G-II Project.

4.8.3 Housing

Housing statistics are presented in table 4.8.3-1. The median value of owner-occupied units in DeKalb County is $5,100 more than the Illinois' median value of $130,800. The median value of owner-occupied units in Brown, Jefferson, and Walworth Counties are between $3,900 and $16,200 more than Wisconsin's median value of $112,200. Walworth County had a higher percentage of vacant housing units (21 percent) than Wisconsin (10 percent) at 9,261 units. The relatively large number of units in Walworth County suggests that the total number of people may significantly increase during portions of the year, particularly in the summer months (Walworth County, 2001).

Temporary housing is available in the form of daily, weekly, and monthly rentals in numerous motels, hotels, campgrounds, and RV parks located within commuting distance of the Project. Because the Project is located near small communities and the Milwaukee, Green Bay, and Chicago metropolitan areas, it is assumed that workers could find nearby housing in each county. In 2000, all counties had a combined vacant housing unit rate of 22,893. Of the total combined county vacant housing units, 10,679 seasonal, recreational, and occasional use housing units were available (table 4.8.3-1).

TABLE 4.8.3-1

2000 Housing Characteristics for the Proposed G-II Pipeline Project

State/ County	Total Housing Units	Vacant Housing Units	Seasonal, Recreational, or Occasional Use	Median Value, Owner-Occupied Units	Median Contract Monthly Rent	Vacancy Rate
Illinois	**4,885,615**	**293,836**	**29,712**	**$130,800**	**$605**	**6.0%**
DeKalb County	32,988	1,314	111	$135,900	$577	4.0%
Wisconsin	**2,321,144**	**236,600**	**142,313**	**$112,200**	**$540**	**10.2%**
Brown County	90,199	2,904	414	$116,100	$520	3.2%
Calumet County	15,758	848	287	$109,300	$491	5.4%
Dodge County	33,672	2,255	815	$105,800	$528	6.7%
Fond du Lac County	39,271	2,340	573	$101,100	$500	6.0%
Jefferson County	30,092	1,887	784	$123,800	$564	6.3%
Outagamie County	62,614	2,084	237	$106,000	$534	3.3%
Walworth County	43,783	9,261	7,458	$128,400	$588	21.2%

Source: U.S. Census Bureau, 2005

On average, approximately 36 to 46 percent of the construction workers would come from within the Project area and would not require temporary housing. The remaining 54 to 64 percent of the workers for the pipeline would require temporary housing in the Project vicinity during construction. The average number of non-local workers for the pipeline would be 203 to 240 in any given month, and possibly 254 to 301 at peak construction. Assuming double occupancy, these workers would require an average of 127 to 150 hotel and/or motel rooms or other housing units per month. This number could be lower because some workers may provide their own housing units (e.g., travel trailers or campers).

Based on the information above, there is an adequate supply of local housing and temporary accommodations in all counties for the expected Project demand. In addition, nearly half of the employees are expected to be hired locally and therefore already have housing, which would reduce the overall demand from the Project workforce. Because the proposed Project is scheduled to be constructed during summer months, this could coincide with other demands for housing and temporary accommodations from tourism and other unrelated construction projects. Because the demand (in both number and time) from these other users could be influenced by factors such as weather and economic conditions, such demand would be unpredictable. At present, it is reasonable to assume that the facilities available near the Project area would be able to accommodate the expected workforce. Eight permanent employees, three of whom would be existing Guardian employees, would be anticipated for operation of the pipeline and associated facilities, but this number is minor; therefore, no long-term major impacts on local housing are anticipated.

4.8.4 Public Services

Table 4.8.4-1 provides additional information about the existing infrastructure, revenues, and communities within 1 mile of the pipeline facilities. The Project area has well-developed infrastructure to provide health, police, fire, emergency, and social services near the Project site. Public health infrastructure in the eight-county Project area includes 30 hospitals, 90 sheriff/police departments, and 121 fire/emergency departments. Police, ambulance, fire, and hazardous materials services are provided by county and/or municipal jurisdictions, as well as volunteer organizations, and private hospitals.

TABLE 4.8.4-1

Public Services for the Proposed G-II Pipeline Project

State/County	Medical Services	Sheriff/Police Departments	Fire/Ambulance Departments	County Tax Levy (millions)	Communities within 1 Mile of the Pipeline Facilities
Illinois					
DeKalb County	4	15	11	$15	Sycamore and Genoa
Wisconsin					
Brown County	5	8	19	$71	Holland, Wrightstown, and Little Rapids
Calumet County	1	4	9	$13	Jericho, St. John, and Dundas
Dodge County	6	13	23	$110	Lebanon, Woodland, Iron Ridge, Knowles, Nasbro, Brownsville, and Lomira
Fond du Lac County	3	7	17	$29	Byron, Eden, Marblehead, St. Peter, Malone, Johnsburg, and Garnet
Jefferson County	4	9	12	$23	None
Outagamie County	5	13	19	$50	Oneida
Walworth County	2	21	11	$49	None
Project Total	**30**	**90**	**121**	**$360**	**--**

Sources: Hometown Locator, 2006; Firehouse Network, 2006.

There are many communities within 1 mile of the pipeline facilities in Illinois and Wisconsin and some of these communities are located in the metropolitan areas of Milwaukee, Green Bay, and Chicago (table 4.8.4-1). Most of these communities support government and public services such as police protection, fire protection, and medical services.

The eight-county Project area includes a combined total of 30 hospitals, where two hospitals in DeKalb County are located in the nearby community of Sycamore. Other nearby communities along the proposed Project do not have hospitals, but these facilities are located between 5 and 30 miles from the nearby communities. The Project area includes a combined total of 90 sheriff and police departments. Each county has a sheriff's department, and both communities in DeKalb County (Sycamore and Genoa) have local police departments. Sheriff departments in the other communities range from 8 to 25 miles away. The Project area includes a combined total of 121 fire and emergency departments. Most nearby communities have local fire departments with volunteer firefighters.

Project demands on local agencies during construction could include increased enforcement activities associated with issuing permits for vehicle load and width limits, local police assistance during construction to facilitate traffic flow, and emergency medical services to treat any injuries resulting from construction accidents. There are adequate providers of professional and commercial services near the Project area in the nearby communities, capable of meeting the needs of the Project workforce. Because the non-local workforce would be small relative to the current population of the area, the Project would not have a significant impact on local infrastructure and public services.

Personnel associated with operating and maintaining the pipeline typically would reside in communities near the permanent facilities (i.e., Sycamore and Bluff Creek compressor stations, Chilton meter station). These employees are not anticipated to significantly affect local government expenditures for public services or facilities.

4.8.5 Property Values

The proposed pipeline may have an impact on the property values of the surrounding area. This valuation would depend on many factors, including the size of the parcel, the values of adjacent properties, the presence of other utilities, the current value of the land, and the current land use. The majority of land use crossed by the pipeline route is agricultural.

Guardian would acquire an easement for both temporary (construction) and permanent (operational) rights-of-way. This easement would give Guardian the right to construct, operate, and maintain the pipeline, and establish a permanent right-of-way. Guardian would purchase outright any land that would be permanently occupied by a major aboveground facility (e.g., compressor stations, meter stations). Land required for smaller aboveground appurtenances, such as the MLV sites, would be acquired by easement.

Landowners would be compensated for agricultural-related losses according to agreements negotiated between each landowner and Guardian. Property value guidelines would be determined by a professional experienced in Wisconsin valuation and Guardian would offer the landowners fair compensation for the temporary and permanent rights-of-way, and any damages due to crop or other loss. The easement would detail the allowable uses and restricted uses of the permanent right-of-way. If an easement cannot be negotiated with the landowner and the Project becomes certificated, the easement may be acquired by eminent domain proceedings. In this case, Guardian would compensate the property owner, but the courts would determine the amount of compensation. Guardian would make every effort to negotiate in good faith to minimize the need to use the eminent domain process. These negotiations of financial agreements between Guardian and the landowners as well as the process of eminent domain are private business and legal concerns that are not regulated or tracked by the FERC.

Guardian's proposed route would cross one certified organic farm. If construction activities were to result in decertification, this would be limited to the right-of-way and additional buffer areas, but the remainder of the field would retain its certification. Decertification of the right-of-way would temporarily reduce the amount of organic production available for the local market, but Guardian anticipates that the reduction would be relatively small in relation to the total organic production in the area, and that other organic producers in the area could make up any deficit. Guardian would implement measures to minimize the potential for construction activities to result in loss of organic certification. In the event that a portion of an organic farm loses its certification as a result of pipeline construction, there would be a reduction of income from the affected areas. In addition, the presence of a strip of non-certified land through an otherwise certified field could interfere with some field operations. These losses would have to be determined on a case-by-case basis, but Guardian would fully compensate the organic producer for the income loss to the extent due to construction of the pipeline. In most cases, Guardian anticipates the area could be recertified within a period of 3 years.

Property taxes are generally based on the actual use of the land. Construction of the pipeline would not change the general use of the land, but would preclude construction of aboveground structures on the permanent right-of-way. If a landowner feels that the presence of a pipeline easement reduces the value of his or her land, resulting in an overpayment of property taxes, he or she may appeal the issue of the assessment and subsequent property taxation to the local property tax agency. This issue is beyond the scope of this EIS.

4.9 TRANSPORTATION AND TRAFFIC

Several potential transportation effects may result from construction of the G-II Project. These potential impacts are short-term and include daily commuting of the construction workforce to the work site and pipeline right-of-way, the movement of construction equipment and material to and from the work areas, and construction of the pipeline across roads.

A discussion of the effects of the Project on transportation and traffic is provided below, including mitigation measures.

4.9.1 Existing Transportation, Impacts, and Mitigation Measures

The local road and highway system in the Project area is well developed, consisting of U.S. highways, state highways, county highways, and local streets. The pipeline would cross approximately 5 U.S. highways, 12 state highways, 43 county highways, as well as other paved and unpaved roads in Wisconsin.

Three railway systems, the Union Pacific Railroad (UP), the Wisconsin and Southern Railroad Company (WSOR) and the Canadian National Railway (CN), also operate in the Project area. The pipeline would cross the UP at MP 6.2, the WSOR once at MP 16.9 and the CN four times at MPs 35.9, 42.1, 76.8, and 92.1.

To avoid or minimize direct impacts on roads and railways or the vehicles using the roads or railways, prior to construction Guardian would acquire any necessary permits for all roads and railroad. In addition, to ensure the integrity of the roads and/or railways, Guardian proposes to bore paved roads and all operating railroads. However, motorists may encounter slow moving vehicles and road closures during construction. Unpaved roads would be crossed either by boring or by using the open-cut method. The open-cut method could temporarily disrupt road traffic.

To maintain safe conditions, Guardian would direct its construction contractors to comply with applicable vehicle weight and width restrictions, and to remove soil that is left on the road surface by the crossing of construction equipment. In addition, when it is necessary for equipment to move across paved roads, mats or other appropriate measures would be used to prevent damage to the road surface.

4.9.2 Traffic, Impacts, and Mitigation Measures

Construction of the pipeline and associated facilities would increase traffic on local roadways for the delivery of equipment and materials, and for construction worker transportation. These roads are primarily two-lane local roads that cross mostly rural agricultural land. Guardian would use 183 existing public roads and 15 existing private roads, as well as 11 new access roads (6 temporary and 5 permanent) related to support construction and/or operation of its proposed pipeline and aboveground facilities.

Travelers would experience some minor inconveniences for local traffic on lightly traveled and unimproved county roads that would be crossed by the pipeline using the open-cut method. To minimize traffic delays at roads that are open-cut, Guardian would establish detours before excavating the roadbed. In the absence of reasonable detours, construction across the roadway would be staged to allow at least one lane of traffic to remain open, except for brief periods when

road closure is essential to lay the pipeline. Guardian would minimize the duration of open-cut crossings and, in most cases, would complete these road crossings in one day or less. Efforts would be made to schedule lane closures outside of peak traffic periods.

The movement of construction equipment and materials from the pipe storage/contractor yard to the construction work area would also result in an additional short-term impact on the transportation network. Guardian estimates that about 58 heavy truck deliveries and 286 general truck deliveries would occur per day to the Project site. This level of traffic would occur throughout the day. In general, these delivery trucks would be distributed along the length of the construction spread, which would tend to reduce the impact on traffic at any one location. As such, the Project should not add significantly to road congestion.

Construction workers commuting to the Project area are expected to add an average of between 341 and 411 vehicle trips per day (to and from the work site). This level of traffic would remain fairly constant throughout the construction period, and would typically occur at early morning hours and evening hours. Road congestion caused by construction workers commuting to work would be significant only if each of the several hundred workers used a personal vehicle to travel to the work site, and if most of this travel took place during peak traffic hours. Pipeline construction work, however, is generally scheduled to take advantage of daylight hours so that most workers commute to and from the sites in off-peak hours. Construction workers would typically leave a number of personal vehicles at the pipe storage/contractor yard and share rides to the construction right-of-way with other workers, thereby reducing overall traffic.

Furthermore, workers would be distributed along the length of the construction spread, which tends to reduce the impact on traffic at any one location. Given these reasons, the Project should not add significantly to road congestion.

Detours or obstructions in traffic flow due to the large vehicles or construction of pipeline road crossings may require short-term assistance from local police in limited instances. Project-related demands on local police workloads are not expected to be significant.

4.10 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires the FERC to take into account the effect of its undertakings (including the issuance of Certificates) on any properties listed in, or eligible for listing in, the NRHP and to provide the ACHP an opportunity to comment. Guardian, as a non-federal party, is assisting the FERC in meeting its obligation under Section 106 by conducting the field surveys and evaluations required by ACHP regulations in 36 CFR 800.

The FERC is responsible for consulting with the appropriate SHPO prior to making determinations of NRHP eligibility and Project effects. In addition, the views of other consulting parties and interested Indian tribes will be considered if any historic properties or sites of religious or cultural importance to a tribe would be adversely affected by the Project.

4.10.1 Results of Cultural Resource Surveys

4.10.1.1 Wisconsin

Guardian had a contractor (Public Service Archaeology Program of the University of Illinois [PSAP]) conduct a Phase I cultural resource survey for all accessible portions of the Project. In a June 6, 2007 filing, Guardian claimed that about 92.3 miles of the proposed pipeline route were

inspected for cultural resources. At least 27 miles of the proposed pipeline route have not yet been surveyed, including areas along the April 24, 2007 and July 2, 2007 amended pipeline route and/or facility locations and areas where access was denied. The width of the archaeological survey corridor was 200 feet except at stream and road crossings where it was 400 feet to accommodate ATWSs. In addition, surveys were conducted at 18 of the proposed access road locations, the proposed Fond du Lac County pipe storage/contractor yard, and the proposed Bluff Creek Compressor Station location.

PSAP's survey report for Wisconsin identified four new archaeological resources and relocated one previously recorded archaeological site along the proposed pipeline route. Two of the newly recorded resources are prehistoric isolated finds, one is a prehistoric lithic scatter, and one is a historic debris scatter. PSAP suggested that the four newly recorded resources be considered not eligible for the NRHP, while the relocated previously recorded site (47DO657) is potentially eligible. However, 47DO657 is situated outside of the proposed construction right-of-way for the pipeline, and should be avoided by the Project. PSAP recommended that site 47DO657 should be fenced and protected during construction activities in its vicinity (Waltz et al. 2006).

Guardian submitted copies of the survey reports to the Wisconsin SHPO and interested Indian tribes on October 9, 2006. In a letter dated November 9, 2006, the SHPO accepted PSAP's report of its summer 2006 cultural resources survey, and agreed with the report's recommendations. We concur that for the parcels surveyed in 2006, the PSAP report did not identify any historic properties within the area of potential effect (APE) along the inventoried portions of the proposed route.

4.10.1.2 Illinois

On April 7, 2007, Guardian informed the Illinois SHPO of an amendment to the proposed location for the Sycamore Compressor Station. In response, the SHPO stated, in a letter dated April 18, 2007, that it had no objections to the undertaking, because no historic properties would be affected at that location (see appendix M, table M-4 for a record of consultations with the Illinois SHPO). We agree that no additional investigations are necessary at the proposed Sycamore Compressor Station because it is not likely that historic properties would be found or would be adversely affected at that location.

4.10.2 Unanticipated Discoveries Plan

Guardian filed draft Unanticipated Discoveries Plans to handle cultural resources or human remains encountered during construction of the proposed Project. Unfortunately, these draft plans were formulated for the original Guardian Project in 1999, and are considered by staff to be out-of-date. We requested that Guardian provide updated state-specific plans, developed in consultation with the SHPOs and interested tribes that adhere to Section III of OEP's Guidelines for Reporting on Cultural Resources Investigations for Pipeline Projects (December 2002 version).

Guardian provided a revised Unanticipated Discovery Plan to the Illinois SHPO on November 3, 2006. In a letter dated November 16, 2006, the Illinois SHPO accepted that revised plan. Both the revised plan and correspondence with the SHPOs were filed with the FERC on February 1, 2007. A copy of the revised plan for Wisconsin was also provided to the Oneida Nation on January 25, 2007. The revised Unanticipated Discovery Plan for Wisconsin was appended to

PSAP's survey report that the Wisconsin SHPO accepted on November 9, 2006. We agree with the Illinois and Wisconsin SHPOs that the revised discovery plans are acceptable.

4.10.3 Native American Consultations

Consistent with 36 CFR 800.2(a)(3), we used the services of the applicant to prepare information and analyses for compliance with Section 106 of the NHPA. Guardian also acted as our non-federal representative in consultations with Indian tribes and other Native Americans that may have historically used or occupied the Project area, or have an interest in the cultural resources of the region.

Guardian, or its consultants, contacted 22 Indian tribes or Native American organizations regarding its proposed Project. The tribes contacted include the Oneida Nation, Bad River Band of Lake Superior Chippewa Indians of Wisconsin, Forest County Potawatomi Community, Ho-Chunk Nation, Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin, Lac du Flambeau Band of Lake Superior Chippewa Indians, Menominee Indian Tribe of Wisconsin, Red Cliff Band of Lake Superior Chippewa, Sokoagon Chippewa Community, St. Croix Chippewa Tribe of Wisconsin, Stockbridge-Munsee Band of Mohican Indians, Sac and Fox Nation of Missouri in Kansas and Nebraska, Sac and Fox Nation of Mississippi in Iowa, Iowa Tribe of Oklahoma, Winnebago Tribe of Nebraska, Kickapoo Tribe of Kansas, Kickapoo Traditional Tribe of Texas, Kickapoo Tribe of Oklahoma, the Prairie Band of Potawatomi Nation, Citizen Potawatomi, and the Hannahville Indian Community.

4.10.3.1 Consultations with the Oneida Nation

The FERC initiated direct consultations with the Oneida Nation by sending copies of our original project NOI to various tribal offices and representatives, including the Tribal Chair. In response, we received a letter from the Tribe's Director of the Environmental Health and Safety Division, dated June 22, 2006. While that letter addressed a number of environmental issues, it did not raise any concerns about potential Project impacts on cultural resources. We also sent our July 10, 2007 NOI to various representatives of the Oneida Nation, to inform the Tribe about the proposed Project amendments. Nothing has been filed with the FERC from the Oneida Nation in response to our amended NOI.

Appendix M, table 2-M, summarizes consultations between Guardian and their consultants and representatives of the Oneida Nation about the proposed Project.

On April 24, 2007 and May 31, 2007, Guardian sent Project consultation letters to the Oneida Nation notifying the Tribe of changes to the proposed Project that would relocate all Project facilities outside of Oneida Reservation boundaries. No responses from the Tribe regarding these Project changes have been filed with the Commission.

4.10.3.2 Consultations with Other Interested Indian Tribes

Consultations with interested Indian tribes, other than the Oneida Nation, are summarized in appendix M, table 3-M. The Sac and Fox Nation of Missouri in Kansas and Nebraska, Sac and Fox Tribe of the Mississippi in Iowa, Lac du Flambeau Band of Lake Superior Chippewa Indians, Stockbridge-Munsee Band of Mohican Indians, Winnebago Tribe of Nebraska, Sac and Fox Nation of Oklahoma, Ho-Chunk Nation, Menominee Indian Tribe of Wisconsin, Kickapoo Traditional Tribe of Texas, Bad River Band of Lake Superior Chippewa Indians of Wisconsin,

Forest County Potawatomi Community, and Prairie Band Potawatomi Nation responded to Guardian's consultation request letters sent to them in March 2006 or to follow-up correspondence, e-mails from Guardian's consultants, and telephone calls.

As a result of Guardian's contact program, the Sac and Fox Nation of Missouri in Kansas and Nebraska, Sac and Fox Tribe of the Mississippi in Iowa, Lac du Flambeau Band of Lake Superior Chippewa Indians, Ho-Chunk Nation, Winnebago Tribe of Nebraska, Citizen Potawatomi Nation, Forest County Potawatomi, Citizen Potawatomi Nation, Menominee Indian Tribe of Wisconsin, and Prairie Band Potawatomi Nation requested that they be notified if burial sites or other cultural resources are discovered.

The Lac du Flambeau Band of Lake Superior Chippewa Indians indicated to Guardian that its THPO would be available to conduct archival research to identify cultural, archaeological, and historical resources. Likewise, the Ho-Chunk Nation Heritage Preservation Office indicated that it could assist in the identification of cultural, archaeological, and historical resources, and that tribal records may include sites significant to the Ho-Chunk Nation that may not be listed in SHPO databases. However, no information has been provided by the Ho-Chunk Nation in response to PSAP's request for information about culturally significant sites or locations that may be affected by the Project.

The THPO of the Stockbridge-Munsee Band of Mohican Indians indicated that it has information on archaeological sites, burial mounds and cemeteries, and traditional cultural properties from oral and written traditions from tribal members. The THPO for the Stockbridge-Munsee Band of Mohican Indians participated in a meeting held on July 27, 2006, with Guardian and its cultural resources consultant, and the Oneida THPO. In an August 8, 2006 conversation with PSAP, the THPO for the Stockbridge-Munsee Band of Mohican Indians stated that she no longer had concerns about the Project's potential impact on cultural or religious sites of importance to the Tribe because of the Project's distance away from Lake Winnebago.

The Lac du Flambeau Band of Lake Superior Chippewa Indians requested copies of the archaeological survey reports, and indicated that the Tribe should be consulted by the FERC in the event that a historic property would be adversely affected by the Project. Copies of cultural resources survey reports were also requested by the Ho-Chunk Nation. Guardian documented that it sent copies of the survey reports to the Oneida Nation, Bad River Band of Lake Superior Chippewa Indians of Wisconsin, Lac de Flambeau Band of Lake Superior Chippewa Indians, Ho-Chunk Nation, Menominee Indian Tribe of Wisconsin, and Stockbridge-Munsee Band of Mohican Indians on October 9, 2006.

Letters with maps were sent by Guardian on April 24, 2007 and on May 31, 2007 to inform interested Indian tribes about amendments to the Project. On May 9, 2007, the Prairie Band Potawatomi Nation expressed no objection to the Project as planned and reiterated their request to be notified of any unanticipated discoveries. The Winnebago Tribe of Nebraska sent an e-mail to Guardian's consultant on May 29, 2007 expressing no objection to the Project.

4.10.4 Compliance with NHPA

We have fulfilled our responsibilities with regards to section 101(d)(6) of the NHPA, 36 CFR 800.2(c)(2), and the American Indian Religious Freedom Act. Guardian, as our non-federal representative, contacted Indian tribes that may attach religious or cultural significance to sites in

the Project area. In previous consultations with Guardian, the Oneida Nation indicated concerns about potential impacts on Duck Creek and on bears and wolves. The Oneida Nation has also expressed concern for two vegetative species of cultural significance, sweet flag and black ash. However, as a result of the proposed Project amendments filed by Guardian on April 24, 2007 and July 2, 2007, these species of special concern would no longer be affected by the construction and/or operation of the proposed Project within the Oneida Reservation.

No other Indian tribes have identified traditional cultural properties that may be adversely affected by this Project, nor have any specific sites of religious or cultural importance to Indian tribes within the APE been identified by Guardian's cultural resources consultants, or the SHPOs.

We have not yet completed the process for complying with Section 106 of the NHPA. At least 27 miles of pipeline route have not yet been surveyed for cultural resources. Guardian indicated that it would perform additional cultural surveys for tracts that were not accessible in 2006, and for the amended pipeline route, new access roads, and alternative or new locations for other facilities, such as meter stations.

We cannot make determinations about NRHP eligibility or Project effects until the additional data have been provided. If any historic property would be adversely affected, the FERC would consult with the appropriate parties, including the SHPO and interested Indian tribes, to resolve adverse effects, and would inquire if the ACHP would like to participate in accordance with 36 CFR 800.6(a)(1). Guardian, in consultation with the SHPO and other interested parties, would then explore ways to avoid, minimize, or mitigate the adverse effects. They may be required to produce site avoidance and protection plans, or site-specific treatment plans for the mitigation of adverse effects to historic properties that cannot be avoided. These treatment plans would then be included as part of a Memorandum of Agreement (MOA) between the FERC, SHPO, other consulting parties, and the ACHP (if it chooses to participate). Once an MOA is executed, Guardian would implement the specified treatment measures, after the Commission issues an Order authorizing the Project. The FERC would ensure that treatment is carried out according to the terms of the MOA before construction is allowed in any given area where a historic property would be affected.

To ensure that the FERC's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

- **Guardian defer construction and use of facilities, including staging, storage, and temporary work areas and new or to be improved access roads <u>until:</u>**

  a. Guardian files with the Secretary all additional required cultural resource inventory and evaluation reports, and necessary avoidance or treatment plans;
  b. Guardian files copies of comments from the Wisconsin SHPO and interested Indian tribes on all reports and plans;
  d. the ACHP has been provided an opportunity to comment if any historic properties would be adversely affected; and
  e. the Director of OEP reviews and approves all reports and plans and notifies Guardian in writing that it may proceed with treatment or construction.

All material filed with the Commission that <u>contains location, character, and ownership</u> information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "<u>CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE.</u>"

4.11 AIR QUALITY AND NOISE

4.11.1 Air Quality

4.11.1.1 Regional Climate

The climate in the Project area is predominantly continental results in with some modification by the influence of Lake Michigan. The area is characterized by cold, snowy winters and warm summers. The moderating effect of Lake Michigan results in temperatures that are somewhat higher during cold weather conditions and lower during warm weather conditions, when compared with temperatures of areas at similar latitudes. Annual average temperatures range from approximately 49°F, for the southern portion of the Project area, to approximately 44°F for the northern portion of the Project area. The long-term mean annual precipitation ranges from about 28 to 39 inches, and thunderstorms are a typical summer phenomenon. Average annual wind speeds range from approximately 10.3 miles per hour (mph) in the southern portion of the Project area to approximately 9.8 mph in the northern portion of the Project area.

4.11.1.2 Existing Air Quality

Ambient Air Quality Standards and Attainment Status

Ambient air quality is protected by federal and state regulations. The EPA has established National Ambient Air Quality Standards (NAAQS) for criteria pollutants for the purpose of protecting human health (primary standards) and welfare (secondary standards). The NAAQS set limits for ambient (outdoor) levels of the following criteria pollutants: nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), sulfur dioxide (SO_2), lead (Pb), and particulate matter (PM_{10} and $PM_{2.5}$). The NAAQS are codified in 40 CFR 50 and summarized in table 4.11.1.2-1. The EPA used results of clinical and epidemiological studies to establish the primary NAAQS to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The secondary NAAQS protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The WDNR and Illinois Environmental Protection Agency (IEPA) have adopted the NAAQS as the ambient air quality standards for their states.

Air Quality Monitoring and Existing Air Quality

The WDNR and IEPA maintain an extensive network of air quality monitors located throughout their states for a variety of purposes. Air quality monitoring data were reviewed to characterize the background air quality for criteria pollutants in the Project area. Data were reviewed for monitoring stations located in Dodge County, Wisconsin and Winnebago County, Illinois. If data were unavailable from these counties, data were reviewed from Milwaukee County, Wisconsin. The maximum background concentrations for all monitoring data reviewed are also presented in table 4.11.1.2-1.

TABLE 4.11.1.2-1

National Ambient Air Quality Standards and Ambient Background Concentrations

Pollutant	Averaging Time	NAAQS ($\mu g/m^3$)	Ambient Background ($\mu g/m^3$)
SO_2	Annual a/	80 (0.030 ppm)	NA
	24-Hour b/, d/	365 (0.14 ppm)	0.012 ppm
	3-Hour c/, d/	1,300 (0.5 ppm)	0.003 ppm
PM_{10}	Annual a/, e/	50	21
	24-Hour b/, d/	150	55
$PM_{2.5}$	Annual a/, f/	15	16
	24-Hour b/, g/	65	47
CO	8-Hour b/, d/	10,000 (9 ppm)	4.5 ppm
	1-Hour b/, d/	40,000 (35 ppm)	9.5 ppm
Ozone	8-Hour c/, h/	157 (0.08 ppm)	0.082 ppm i/
	1-Hour b/	235 (0.12 ppm)	0.098 ppm
NO_2	Annual a/	100 (0.05 ppm)	0.017 ppm
Lead	Quarter a/	1.5	

a/ Arithmetic mean.
b/ Block average.
c/ Rolling average.
d/ Not to be exceeded more than once per year.
e/ To attain this standard, the 3-year average of the weighted annual mean PM_{10} concentration at each monitor within an area must not exceed 50 $\mu g/m^3$.
f/ To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$.
g/ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 $\mu g/m^3$.
h/ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
i/ Due to rounding, the background ozone concentration of 0.082 ppm complies with the 8-hour standard.
$\mu g/m^3$ = micrograms per cubic meter.
ppm = parts per million.

The entire United States has been classified by the EPA as being in "attainment," "non-attainment," or "un-classified" with respect to ambient air quality standards. The EPA has designated all parts of the G-II Project area as in attainment for all criteria pollutants.

4.11.1.3 Regulatory Requirements for Air Quality

The proposed G-II Project would generate air pollutant emissions through both short-term construction activities and long-term operation of the stationary emission units at the compressor stations. Emissions from all phases of construction and operation of the emission units would be subject to applicable state and federal air regulations. The compressors would be electric motor-driven; therefore, the only long-term source of air pollutants would be the emergency diesel-fuel-fired backup generators. However, because these emergency generators would be limited to 500 hours per year, potential emissions are also limited. The significant equipment to be located at the compressor stations are as follows:

Bluff Creek Compressor Station

- one 39,000 hp electric-motor-driven compressor; and
- one 350 hp diesel-fired emergency backup generator.

Sycamore Compressor Station

- one 39,000 hp electric-motor-driven compressor; and
- one 350 hp diesel-fired emergency backup generator.

The CAA of 1970, 42 United States Code 7401 et seq., as amended in 1977 and 1990, and 40 CFR 50-99 are the basic federal statutes and regulations governing air pollution in the United States. We have reviewed the following federal requirements to determine their applicability to the proposed G-II Project. The provisions of the CAA that are potentially applicable to the Project include:

- New Source Review/Prevention of Significant Deterioration;
- New Source Performance Standards;
- Title V Operating Permit;
- National Emission Standards for Hazardous Air Pollutants;
- Maximum Achievable Control Technology;
- General Conformity; and
- State Regulations.

New Source Review (NSR)

Separate procedures have been established for federal pre-construction review of certain large proposed projects in either attainment areas or non-attainment areas. The federal pre-construction review for new or modified sources located in attainment areas is Prevention of Significant Deterioration (PSD). The review process is intended to prevent the new source from degrading existing air quality below acceptable levels. The federal pre-construction review for new or modified major sources located in non-attainment areas is commonly called Non-Attainment New Source Review (NNSR). NNSR only applies to new sources of these pollutants or their precursors within areas that are classified as non-attainment. A new facility can undergo both PSD and NNSR review, depending on the emissions of various pollutants and the attainment status of the area. The entire G-II Project area is classified as attainment for all criteria pollutants. Therefore, the proposed Project area is not subject to NNSR permitting.

Prevention of Significant Deterioration

One of the factors considered in the PSD permit review is potential impacts on protected Class I airsheds located throughout the country. Class I areas are specifically designated as pristine wilderness areas. The G-II Project would not be located in a Class I area, nor would it be located within 100 kilometers (62 miles) of a Class I area; therefore, a full Class I analysis would not be required to be included in the permit application. The closest Class I areas to the G-II Project is Rainbow Lake, Wisconsin, which is approximately 250 miles northwest of the proposed Bluff Creek Compressor Station. Therefore, the Federal Class I Area requirements do not apply to this Project.

“Major sources” that produce a significant emissions increase are reviewed for compliance with the PSD regulations. PSD review for major stationary sources includes an assessment of the existing air quality; the use of analytic dispersion models to demonstrate compliance with the

NAAQS and applicable PSD increments; a demonstration that control of emissions through use of best available control technology (BACT) has been applied to the subject emission sources; and an assessment of the impact of new emissions on the environmental resources such as soils and vegetation.

The emission threshold for "major stationary sources" varies under PSD according to the type of facility. As defined by 40 CFR 52.21 (b)(1)(i), a facility is considered major under PSD if it emits or has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant or 100 tpy for specified source categories. There are no processes at any of the proposed Project facilities that are included as a specified source category; therefore, the PSD threshold for the proposed facilities is 250 tpy. As shown in table 4.11.1.3-1, potential annual emissions from the proposed G-II Project would not exceed the 250 tpy threshold for any criteria pollutant and would not be considered a "major stationary source." Therefore, the proposed Project would not be subject to PSD permitting requirements.

TABLE 4.11.1.3-1

Potential Emissions for Proposed G-II Compressor Stations (in tons per year) a/

Emission Source	NO_2 (tpy)	CO (tpy)	SO_2 (tpy)	$PM_{10}/PM_{2.5}$ (tpy)	VOC (tpy)	Pb (tpy)
Bluff Creek Compressor Station - Emergency Generator	1.0	0.3	0.2	0.04	0.04	Negligible
Sycamore Compressor Station - Emergency Generator	1.0	0.3	0.2	0.04	0.04	Negligible

a/ Potential emissions based on 500 hours per year operation of the emergency generators.

New Source Performance Standards

New Source Performance Standards (NSPS), codified at 40 CFR 60, establish emission limits and associated requirements for monitoring, reporting, and recordkeeping for specific emission source categories. NSPS apply to new, modified, or reconstructed sources. The federal NSPS have been incorporated into Wisconsin (Administrative Code NR440) and Illinois (Title 35, Subtitle B, Chapter 1, Subchapter e, Part 230) state regulations. The following NSPS requirements were identified as potentially applicable to the specified sources at the facility.

Subpart IIII of 40 CFR Part 60, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, applies to stationary compression ignition (i.e., diesel-fueled) internal combustion engines that were ordered after July 11, 2005 and manufactured after April 1, 2006. The proposed emergency generators at the Bluff Creek and Sycamore Compressor Stations would be subject to Subpart IIII regulations. Guardian would purchase emergency generators from a manufacturer certifying that the generators meet model year 2007 emission limits. Guardian would also comply with requirements applicable to owners and operators of emergency generators. These requirements include:

- operating each generator only during 1) emergencies, and 2) up to 100 hours per year for maintenance and readiness checks;
- installing a non-resettable hour meter on each generator;
- maintaining records of operating time;
- operating and maintaining the generators according to manufacturer instructions and approved procedures; and

- meeting low-sulfur diesel fuel requirements that become effective on October 1, 2007 and on October 1, 2010.

Subpart Kb of 40 CFR Part 60, Standards of Performance for Volatile Organic Liquid Storage Vessels for which Construction, Reconstruction, or Modification Commenced After July 23, 1984, applies to storage vessels with a capacity greater than or equal to 75 cubic meters (m^3) (19,813 gallons) that is used to store volatile organic liquids (VOL). This subpart does not apply to storage vessels with a capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa. Therefore, Subpart Kb potentially could be applicable. However, because the storage tanks at the Bluff Creek and Sycamore Compressor Stations will be 1,000 gallons in capacity or less, Subpart Kb does not apply.

Subpart GG of 40 CFR Part 60, Standards of Performance for Stationary Gas Turbines, applies to stationary gas turbines that have a heat input at peak load equal to or greater than 10 MMBtu/hr. The compressors at the Bluff Creek and Sycamore Compressor Stations are electric motor-driven and, therefore, are not subject to Subpart GG.

Subpart LLL of 40 CFR Part 60, Standards of Performance for Onshore Natural Gas Processing: SO_2, applies to onshore facilities that process natural gas: each sweetening unit, and each sweetening unit followed by a sulfur recovery unit. A sweetening unit is defined as a process device that separates the hydrogen sulfide (H_2S) and carbon dioxide (CO_2) contents from the sour natural gas stream. The Project will not install equipment to remove H_2S or CO_2 from the gas; therefore, Subpart LLL does not apply.

Title V Operating Permit

The Title V Operating Permit Program, as described in 40 CFR 70, requires major sources of air pollutant emissions and certain affected non-major sources to obtain a federal operating permit. Authority to issue Title V operating permits has been delegated by EPA to the states of Wisconsin and Illinois. The major source emissions thresholds for determining the need for a Title V operating permit are 100 tpy of any regulated air pollutant, 10 tpy of any individual hazardous air pollutant (HAP), or 25 tpy for all HAPs. As shown in table 4.11.1.3-1, potential emissions from the proposed G-II Project are below the major source emissions thresholds. Therefore, a Title V Operating Permit is not required for either compressor station.

National Emissions Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs), codified in 40 CFR Parts 61 and 63, regulate HAP emissions. Part 61 was promulgated prior to the 1990 Clean Air Act Amendments (CAAA) and regulates only eight types of hazardous substances (asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride). Natural gas transmission, compression, and storage do not fall under one of the source categories regulated by Part 61; therefore, the requirements of Part 61 are not applicable.

Maximum Achievable Control Technology

The 1990 CAAA established a list of 189 HAPs, resulting in the promulgation of Part 63. Part 63, also known as the Maximum Achievable Control Technology (MACT) standards, regulates HAP emissions from major sources of HAP emissions and specific source categories

that emit HAPs. Part 63 defines a major source of HAPs as any source that has the potential to emit 10 tpy of any single HAP or 25 tpy of HAPs in aggregate. Emissions of HAPs from the proposed Project would not exceed the associated major source thresholds; therefore, no MACT standards apply to the proposed facility.

General Conformity

A conformity determination must be conducted by the lead federal agency if a federal action would generate emission that would exceed the conformity threshold levels (*de minimis*) of the pollutant(s) for which an air basin is in non-attainment. According to Section 176(c)(1) of the CAA (40 CFR 51.853), a federal agency cannot approve or support any activity that does not conform to an approved State Implementation Plan. Conforming activities or actions should not, through additional air pollutant emissions, cause or contribute to new violations of the NAAQS in any area; increase the frequency or severity of any existing violation of any NAAQS; or delay timely attainment of any NAAQS or interim emission reductions. Emissions from sources subject to NSR or PSD requirements are exempt and are deemed to have conformed. The requirements for a conformity determination are listed in 40 CFR Parts 6, 51, and 93, and became effective March 15, 1994. Because the Project area is classified as in attainment for all criteria pollutants, a General Conformity Determination is not required.

Portions of the laterals are within EPA nonattainment areas. We Energies' Hartford-West Bend pipeline is located in Dodge and Washington Counties and its Fox Valley pipeline routes are located in Brown, Calumet and Outagamie Counties. Washington County, Wisconsin is within the Milwaukee-Racine Consolidated Metropolitan Statistical Areas and is designated as nonattainment for the 8-hour ozone standard. The Governor of Wisconsin has petitioned EPA for ozone attainment redesignation of Washington County. At this time, however, Washington County is considered a nonattainment area for ozone with regards to General Conformity and must be evaluated as such if it is a "Federal Project." The laterals are nonjurisdictional facilities and FERC does not have approval authority over the laterals. In addition, the laterals, being a total of 10 to 12 miles, should not have emission increases in excess of the conformity thresholds; therefore, a General Conformity Determination is not required.

Applicable State Air Quality Requirements

The proposed Bluff Creek and Sycamore Compressor Stations would be classified as stationary air emission sources under both Wisconsin and Illinois regulations. They incorporate the federal program requirements listed in 40 CFR 50-99 and establish permit review procedures for all facilities that can emit pollutants to the ambient air. Any new facility is required to obtain an air quality permit prior to initiating construction. Facilities can trigger additional review by EPA if emissions exceed the major source thresholds listed in 40 CFR Section 52.21(b)(1)(i). However, because the compressors would be electric motor-driven, the only source of air pollutants would be the emergency backup generators, and the compressor stations would be exempt from most state air quality regulations.

Potentially applicable Wisconsin air quality regulations are found in the following Chapters of the WDNR air pollution control rules:

- NR 406 – Construction Permit. A construction permit is required for stationary sources that are not otherwise exempted and whose maximum potential allowable emissions

exceed specified thresholds given in NR 406.04(2)(b-f). The Bluff Creek Compressor Station's maximum potential allowable emissions are below the specified thresholds.

- NR 407 – State Non-part 70 Operating Permit. The Bluff Creek Compressor Station would not be subject to a non-part 70 operating permit because the maximum potential emissions would be below the emissions threshold.
- NR 415.03 – Control of Particulate Emissions. Particulate emissions from both the construction and operation of Bluff Creek Compressor Station would be controlled in a manner that meets the regulatory requirements of this regulation.
- NR 415.04 – Fugitive Dust. The Bluff Creek Compressor Station would be required to take precautions to prevent particulate matter from becoming airborne. Dust-prevention measures may include sprinkling work areas with water and/or reducing the maximum travel speed of vehicles on non-paved surfaces.
- NR 417.03 – Control of Sulfur Emissions. The operation of the emergency generators would emit sulfur compound emissions. Because of the low emissions of sulfur, the Bluff Creek Compressor Station would comply with this requirement.
- NR 419.03 – Control of Organic Compound Emissions. Although the Bluff Creek Compressor Station is not subject to specific volatile organic compound (VOC) emission limits, it must limit VOC emissions from transfer operations. The Bluff Creek Compressor Station would comply with requirements in NR 419.03(2). The facility would use good operating practices and take reasonable precautions to prevent spills and emissions of organic compounds, such as VOC emissions from diesel fuel transfers for use in the backup generator.
- NR 428.03 – Control of Nitrogen Compound Emissions. The operation of the emergency generators would emit nitrogen compound emissions. Because of the low emissions of nitrogen compounds, Bluff Creek Compressor Station would comply with this requirement.
- NR 431.05 – Control of Visible Emissions. Visible emissions of shade or density greater than Ringlemann Chart 1 or 20 percent opacity are prohibited with certain exceptions. The Bluff Creek Compressor Station would comply with all visible emissions limits.
- NR 445.09 – Control of Hazardous Pollutants. This regulation limits the emissions of hazardous pollutants. The diesel generator at Bluff Creek Compressor Station would be exempt due to its use as an emergency generator.

The potentially applicable Illinois air quality regulations are found in Title 35 of the Illinois Administrative Code (IAC), Subtitle B, Chapter 1 in the following sections:

- Section 201.141 – Prohibition of Air Pollution. This rule prohibits the discharge or emission of any contaminant that 1) would cause air pollution in Illinois, 2) violate the provisions of Chapter 1, or 3) prevent the attainment or maintenance of any ambient air quality standard.
- Section 201.146 – Permits and General Provisions. The Sycamore Compressor Station would be exempt from both construction and operating permit requirements. Stationary internal combustion engines less than 1,500 hp and organic liquid storage of less than

10,000 gallons are exempt. The emergency generator would be 349 hp and the diesel storage tank is 1,000 gallons.

- Section 212.123 – Visible Emissions Limitations for All Other Emission Units. This rule prohibits the emission of smoke or other particulates with an opacity greater than 30 percent. The generators at Sycamore Compressor Station would comply with this limit.
- Section 212.301 – Fugitive Particulate Matter. This rule prohibits the emission of fugitive particulate matter from any process, including any material handling or storage activity that is visible by an observer looking generally toward the zenith at a point beyond the property line of the source. The Sycamore Compressor Station would comply with this rule. Dust-prevention measures may include sprinkling work areas with water and/or reducing the maximum travel speed of vehicles on non-paved surfaces.
- Section 212.206 – Emission Units Using Liquid Fuel Exclusively. This rule prohibits particulate matter emissions in any 1-hour period that exceed 0.15 kg of particulate matter per MW-hr of actual heat input from any fuel combustion emission unit using liquid fuel exclusively (0.10 lbs/MMbtu). The emergency generator at Sycamore Compressor Station would not emit particulate matter at a rate that exceeds the limit.
- Section 214.122 – New Fuel Combustion Emission Sources. This rule prohibits the emission of sulfur dioxide in any 1-hour period from any new fuel combustion source with actual heat input smaller than, or equal to, 73.2 MW (250 MMbtu/hr), in excess of 0.46 kg of sulfur dioxide per MW-hr of actual heat input when distillate fuel oil is burned (0.3 lbs/MMbtu/hr).

4.11.1.4 Air Quality Impacts and Mitigation

Construction and operation of the G-II Project would result in two types of air pollutant sources: 1) those related to the construction of the Project, and 2) those related to the operation of the compressor stations. Construction emissions would only be generated during the estimated 7-month construction period. Operational emissions from the compressor stations would be long-term and result from the operation of the emergency generators that would be located at the compressor stations.

There are no nearby Wilderness Areas or National Parks classified as Class I areas. This fact, combined with the low level of emissions from the compressor stations, means that there would be no impacts on any Class I areas.

Construction emissions for the G-II Project are summarized in table 4.11.1.4-1. The primary emissions during construction activities would be particulate matter in the form of dust generated by mechanical disturbance of soil by construction equipment. On cultivated land, the generation of dust by construction equipment would be comparable to that generated by farm equipment. The emissions from construction vehicles and equipment should have an insignificant impact on the air quality of the region, because this equipment must meet current EPA standards for mobile sources. During construction, dust emissions would be minor and of short duration. As pipeline construction proceeds, equipment movement and site preparation would generate dust. However, because construction in a single location would only occur for a short time, the impact of these emissions at any single location would be minor. Conditions most likely to cause an air quality standard violation occur during daylight hours, when construction equipment would be

operating; however, emissions from construction are not expected to cause or significantly contribute to a violation of an ambient air quality standard because the construction equipment would be operated on an as-needed basis.

TABLE 4.11.1.4-1

G-II Construction Emissions a/

	lb/hr	tons
NO_x	327.79	120.77
VOC	33.12	20.69
CO	150.27	53.62
SO_2	213.96	124.51
PM_{10}	155.51	1043.37
$PM_{2.5}$	55.78	880.46

a/ Emissions include equipment exhaust, fugitive dust, delivery vehicle exhaust, site support vehicle exhaust, unpaved road travel, commuter travel, and paved travel during the estimated 7-month construction timeline.

Estimated emissions for criteria pollutants and HAPs have been calculated for the construction of both compressor facilities. As shown in table 4.11.1.4-2, emissions from construction would not cause or significantly contribute to a violation of an ambient air quality standard because the construction equipment would be operated on an as-needed basis during daylight hours only. Guardian will also implement dust control measures, as needed, to minimize dust generated during certain construction activities such as excavation, grading, and use of access roads. These measures may include spraying the work areas with water and/or reducing the maximum travel speed of vehicles on non-paved surfaces.

TABLE 4.11.1.4-2

Compressor Station Construction Emissions a/

Compressor Station	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	Total HAPs
Bluff Creek	2.5	0.2	4.8	0.14	6.4	1.2	0.03
Sycamore	3.3	0.35	5.9	0.14	6.38	1.2	0.04

a/ During the estimated 7-month construction timeline.

Because the compressors would be electric motor-driven, the only source of air pollutants during operation of the compressor stations would be the diesel fuel-fired emergency backup generators. However, because these emergency generators would be limited to 500 hours per year, potential emissions from these units would also be limited. As shown in table 4.11.1.3-1, maximum potential annual emissions for these units are well below major source emission thresholds.

With these controls and the low level of emissions, there would be no significant permanent impacts on air quality in the region.

4.11.2 Noise

Noise would affect the local environment during both the construction and operation of the proposed G-II Project. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of the day and throughout the week. This variation is caused in part by changing weather conditions and the effects of seasonal vegetative cover. Two measures used by federal agencies to relate the time-varying quality of environmental noise

to its known effect on people are the 24-hour equivalent sound level ($L_{eq(24)}$) and the day-night sound level (L_{dn}). The $L_{eq(24)}$ is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The L_{dn} is the $L_{eq(24)}$ with 10 decibels on the A-weighted scale (dBA) added to the nighttime sound levels between the hours of 10 p.m. and 7 a.m. to account for the greater sensitivity of people to sound during the nighttime hours.

In 1974, the EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA, 1974). This publication evaluates the effects of environmental noise with respect to health and safety. The document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has determined that in order to protect the public from activity interference and annoyance outdoors in residential areas, noise levels should not exceed an L_{dn} of 55 dBA. The FERC has adopted this criterion for new compression and associated pipeline facilities. An L_{dn} of 55 dBA is equivalent to a continuous noise level of 48.6 dBA for facilities that operate at a constant level of noise.

The State of Illinois noise regulations (Title 35: Environmental Protection; Subtitle H: Noise; Chapter I: Pollution Control Board; Part 901: Sound Emission Standards and Limitations for Property Line-Noise-Sources) limit sound levels from industrial facilities to Noise Sensitive Areas (NSAs). The regulations are set forth in terms of octave-band limits and are equivalent to the A-weighted values of L_{eq} 61 dBA during daytime hours, and L_{eq} 51 dBA at night for the level of noise allowed at a residential area from an industrial source. These limits translate to an L_{dn} of 61 dBA, which is less restrictive than the FERC L_{dn} noise limit of 55 dBA.

Wisconsin does not have any pertinent noise regulations regarding the proposed compressor station. The state regulates noise from recreational vehicles (e.g., water craft or all-terrain vehicles), but does not impose NSA property-line noise limits for new facilities.

4.11.2.1 Existing Noise Levels

The nearest NSA to the proposed Sycamore Compressor Station is an isolated single-family residence located about 1,999 feet northwest of the acoustic center of the station off Story Road (MP 57.8). The intervening area is relatively flat with no trees or other obstructions. There are a total of 16 isolated rural residences within a 1-mile radius of the proposed compressor station site.

The site of the proposed Bluff Creek Compressor Station is in a similarly remote rural area with only 17 residences within a 1-mile radius. The nearest NSA is 1,160 feet north of the acoustic center of the station (MP 110.0). This area is also relatively flat with no trees or other obstructions between the NSA and the station.

There are no fixed sources of noise near either of the proposed compressor station sites. Farming activities and traffic on local roads are the only regular sources of man-made noise. Consequently, the ambient noise level was assumed to be an L_{dn} of 45 dBA (38.6 dBA L_{eq}) at the NSAs at both sites in accordance with guidance provided by the EPA for rural areas (EPA, 1974). An ambient noise survey was not conducted.

4.11.2.2 General Impacts and Mitigation

Construction Noise

During construction of the G-II Pipeline, neighbors in the vicinity of the construction right-of-way would hear construction noise. Traffic and farm machinery are the primary sources of ambient noise. Pipeline construction would proceed at rates of from several hundred feet to 1 mile per day. However, due to the assembly line nature of construction, activities in any area could last from several weeks to several months on an intermittent basis.

Construction equipment would be operated on an as-needed basis. Exact noise levels cannot be determined; however, estimates of noise levels as a function of the distance of the receptor from the equipment can be made. Assuming the operation of a piece of equipment results in a typical noise level of 88 dBA at 50 feet, the noise impact of that equipment would be 82 dBA at 100 feet, 76 dBA at 200 feet and 70 dBA at 400 feet from the equipment. Noise would diminish rapidly as the distance from the noise source increases. While individual receptors in the immediate vicinity would experience an increase in noise, the effect would be temporary and local.

Normally, there would be no nighttime noise from construction because most construction would be limited to daytime hours. A typical exception is HDD operations, which are typically sometimes 24-hour per day operations requiring up to 2 weeks for completion.

Guardian is proposing to use the HDD method at two locations, the Rock River crossing near MP 9.8, and the Fox River and Apple Creek crossing between MPs 90.9 and MP 91.1. The equipment would be set up at locations relatively close to NSAs (760 feet at Rock River and 415 feet at the Fox River and Apple Creek entrance hole and 910 feet at the exit hole). Guardian estimates that it would take 5 weeks to complete the Rock River crossing and 3 weeks to complete the Fox River crossing. However, Guardian is proposing to limit HDD activities to six 10-hour shifts per week with activities shutdown at night. The only nighttime construction would occur during the HDD pull-back, when the drill rig could operate 24 hours a day. However, this is a short-duration activity lasting only a few days. Although Guardian has proposed only drilling during daytime hours, this is very atypical for HDD operations. Typical HDD operations operate on a continuous 24-hour basis to ensure that the drill hole does not collapse, or drill binding occurs.

Guardian has conducted a modeling analysis of the noise and determined that the impact from the HDD drilling would be below 55 dBA at the closest NSA to the entry hole. Guardian did not perform a modeling analysis of the noise from the exit hole. While noise typically is lower at the exit locations, this effect can be nullified by NSAs close to the exit location. In table 4.11.2.2-1, Guardian estimated that the maximum noise increase at the NSA is 4.1 decibels. While 3 decibels is the threshold of the human noise change perceptibility, 6 decibels is clearly noticeable, and 10 decibels is a significant increase to a human listener.

Guardian has stated that it would implement temporary noise mitigation measures if the 55 dBA L_{dn} level is exceeded, or if the noise becomes an issue at either location. Erecting a barrier using hay bales is one approach suggested by Guardian. Such a barrier could potentially be more effective than a commercially available product because of the thickness and sound-absorptive characteristics of hay bales. They may also be readily available in rural areas at very low cost.

TABLE 4.11.2.2-1

Estimated Noise at NSAs due to HDD Operations

HDD Location	Existing Ambient (L_{dn}, dBA)	HDD Noise a/ (L_{dn}, dBA)	Total Noise (L_{dn}, dBA)	Noise Increase at Closest NSA
Rock River (Entry)	45 b/	46.9	49.1	4.1
Rock River (Exit)	45 b/	42.5	46.9	1.9
Fox River and Apple Creek (Entry)	45 b/	46.0	48.5	3.5
Fox River and Apple Creek (Exit)	45 b/	45.2	48.1	3.1

a/ Determined via the Power Acoustics, Inc. SPM9613 noise modeling software.
b/ Estimate of rural noise, EPA 1974, Information on Levels of Environmental Noise Requisites to Protect Public Health and Welfare with an Adequate Margin of Safety.

Construction of the two compressor stations would occur over a period of about 7 months. The highest levels of noise would occur during the foundation preparation and concrete pouring where levels of about 85 dBA at 50 feet would be expected from earth-moving equipment and trucks. The noise would be very noticeable at the nearest NSAs, but it would not produce significant permanent impacts because the impacts would be limited to the 7-month timeframe and construction of activity would occur only during the day.

Operational Noise

The proposed equipment at the two compressor stations would be identical and the corresponding predicted sound levels are the same at 64 dBA at a reference distance of 50 feet.

This low level would be achieved through the use of electrically driven compressors instead of combustion-turbine-driven compressors. The compressors and electric motors would be enclosed in acoustically designed buildings. The outside sources of noise would include the compressor building ventilators, gas aftercoolers, and aboveground gas piping. The gas aftercoolers would be specified to produce a noise level of no more than 61 dBA at 50 feet. The aboveground piping would be insulated to significantly reduce noise. Expected levels at the NSAs were calculated from the total 64 dBA level at 50 feet using geometric spreading of the sound wave only, providing a conservative result. The results of the analysis are presented in table 4.11.2.2-2.

TABLE 4.11.2.2-2

Noise Impact Analysis at the Nearest Noise Sensitive Areas

Compressor Station	NSA Distance and Direction from Acoustic Center	Estimated Ambient L_{dn} for Rural Areas (dBA)	Calculated L_{dn} of Compressor Station (dBA)	Estimated Total L_{dn} (dBA)	Potential Noise Increase (dBA)
Sycamore	NSA 1 1,999 feet Northwest	45	38.6	45.9	0.9
Bluff Creek	NSA 1 1,160 feet North	45	43.1	47.2	2.2

The calculated operational noise levels of both stations are less than the estimated ambient level L_{dn} of 45 dBA. The addition of the two compressor stations to the existing environment would raise the ambient noise levels by an estimated 0.9 dBA at the Sycamore Station and 2.2 dBA at the Bluff Creek Station. An increase of 3 dBA is generally considered to be the smallest increase that is perceptible. In addition, the predicted station L_{dn} levels of 38.6 and 43.1 dBA are

significantly below the 55 dBA level required by the FERC. Thus, noise from operation of the Sycamore and Bluff Creek Compressor Stations should not create a significant noise impact at the nearest NSAs. However, should noise reach 55 dBA, considering the rural nature of the area and the estimated noise level of 45 dBA, there could be a significant increase in noise at the nearest NSAs. Expected levels at the more distant NSAs would be even lower. To ensure that there would be no excessive impacts on noise quality at the nearest NSAs as a result of compressor station operations, **we recommend that:**

- **Guardian should make all reasonable efforts to assure its predicted noise levels from the compressor stations are not exceeded at NSAs and file noise surveys showing this with the Secretary <u>no later than 60 days</u> after placing the compressor stations in service. If the noise attributable to the operation of compressor stations exceeds 55 dBA L_{dn} at an NSA, Guardian should file a report on what changes are needed and should install additional noise controls to meet the level <u>within one year</u> of the in-service date. Guardian should confirm compliance with these requirements by filing a second noise survey with the Secretary <u>no later than 60 days</u> after it installs the additional noise controls.**

4.12 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

Methane has an ignition temperature of 1,000°F and is flammable at concentrations between 5.0 percent and 15.0 percent in air. Unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

4.12.1 Safety Standards

The DOT is mandated to provide pipeline safety under Title 49, United States Code Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards, which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards, while Section 5(b) permits a state agency that does not qualify under Section 5(a) to perform certain inspection and monitoring functions. A state may also act as DOT's agent to inspect interstate facilities within

its boundaries; however, the DOT is responsible for enforcement action. The majority of the states have either 5(a) certifications or 5(b) agreements, while nine states act as interstate agents.

The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993 between the DOT and the FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a certificate is requested in accordance with federal safety standards and plans for maintenance and inspection, or shall certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with Section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert DOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipeline under the Commission's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the G-II Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Part 192 also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined as follows:

Class 1 Location with 10 or fewer buildings intended for human occupancy.

Class 2 Location with more than 10 but less than 46 buildings intended for human occupancy.

Class 3 Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people during normal use.

Class 4 Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in

consolidated rock. Guardian proposes to meet or exceed these requirements and install the proposed pipeline with 48 inches of cover in soils and 24 inches or more in consolidated rock along the entire route. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. The majority (91 percent) of the proposed pipeline route, including interconnecting branch pipeline locations, would cross Class 1 locations. The remainder of the proposed route, including interconnecting branch pipeline locations, would cross Class 2 (9.6 miles) and Class 3 (1.0 mile) locations. No Class 4 locations will be crossed by the proposed pipeline route.

If a subsequent increase in population density adjacent to the right-of-way indicates a change in class location above the existing design for the pipeline, Guardian would reduce the maximum allowable operating pressure or replace the segment with pipe of sufficient grade and wall thickness, if required to comply with the DOT code of regulations for the new class location.

In 2002, Congress passed an act to strengthen the nation's pipeline safety laws. The pipeline Safety Improvement Act of 2002 (HR 3609) was passed by Congress on November 15, 2002, and signed into law by the President in December 2002. Since December 17, 2004, gas transmission operators are required to develop and follow a written integrity management program that contains all the elements described in Section 192.911 and addresses the risks on each covered transmission pipeline segment. Specifically, the law establishes an integrity management program which applies to all high consequence areas (HCAs). The DOT (68 FR 69778, 69 FR 18228, and 69 FR 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in Section 192.903 of the DOT regulations.

OPS published a series of rules from August 6, 2002 to May 26, 2004 (69 FR 29903) that defines HCAs as locations where a gas pipeline accident could do considerable harm to people and their property, and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate in 49 United States Code 60109 for OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCA may be defined in one of two ways. In the first method an HCA includes:

- current Class 3 and 4 locations;
- any area in Class 1 or 2 where the potential impact radius[2] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle;[3] or
- any area in Class 1 or 2 where the potential impact circle includes an identified site.[4]

[2] The potential impact radius is calculated as the product of 0.69 and the square root of the maximum allowable operating pressure of the pipeline in psi multiplied by the pipeline diameter in inches.
[3] The potential impact circle is a circle of radius equal to the potential impact radius.

In the second method, an HCA includes any area within a potential impact circle which contains:

- 20 or more buildings intended for human occupancy; or
- an identified site.

Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within the HCAs. The DOT regulations specify the requirements for the integrity management plan at Section 192.911. The HCAs are determined based on the relationship of the pipeline centerline to other nearby structures and identified sites. The pipeline integrity management rule for HCAs requires inspection of the entire pipeline in HCAs every 7 years.

Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Guardian has stated that it will operate and maintain the proposed pipeline in a manner that meets or exceeds the requirements of Part 192. Guardian operators would establish public awareness and damage prevention programs and would perform regular pipeline patrols, leak surveys, pipeline marking and other surveillance activities to promote pipeline safety. The staff would be fully trained in pipeline operations, maintenance, and normal, abnormal, and emergency procedures.

The pipeline would be patrolled and inspected by aircraft and on the ground on a periodic basis. These inspections would identify conditions indicative of pipeline leaks, evidence of pipeline damage or deterioration, damage to erosion controls, loss of cover, third-party activities, or conditions that may currently or in the future affect pipeline integrity, safety, or operation of the pipeline. The pipeline system fully participates in the Wisconsin's Diggers Hotline one-call system that provides contractors, highway workers, farmers, and anyone digging along a pipeline right-of way with the ability to call a single number to have all underground utilities located prior to excavation activities.

Under Section 192.615, each pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- implementing emergency shutdown of system and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

[4] An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

Part 192 requires that each operator must establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. Guardian would provide the appropriate training to local emergency service personnel before the pipeline is placed in service. No additional specialized local fire protection equipment would be required to handle pipeline emergencies.

4.12.2 Pipeline Accident Data

Since February 9, 1970, 49 CFR 191 has required all operators of transmission and gathering systems to notify the DOT of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization;
- required taking any segment of transmission line out of service;
- resulted in gas ignition;
- caused estimated damage to the property of the operator, or others, or both, of a total of $5,000 or more;
- required immediate repair on a transmission line;
- occurred while testing with gas or another medium; or
- in the judgment of the operator was significant, even though it did not meet the above criteria.

The DOT changed reporting requirements after June 1984 to reduce the amount of data collected. Since that date, operators must only report incidents that involve property damage of more than $50,000, injury, death, release of gas, or that are otherwise considered significant by the operator. Table 4.12.2-1 presents a summary of incident data for the 1970 to 1984 period, as well as more recent incident data for 1986 through 2005, recognizing the difference in reporting requirements. The 14.5-year period from 1970 through June 1984, which provides a larger universe of data and more basic report information than subsequent years, has been subject to detailed analysis, as discussed in the following sections.[5]

During the 14.5-year period, 5,862 service incidents were reported over the more than 300,000 total miles of natural gas transmission and gathering systems nationwide. Service incidents, defined as failures that occur during pipeline operation, have remained fairly constant over this period with no clear upward or downward trend in annual totals. In addition, 2,013 test failures were reported. Correction of test failures removed defects from the pipeline before operation (Jones et al., 1986).

[5] Jones, D.J., G.S. Kramer, D.N. Gideon, and R.J. Eiber, 1986. "An Analysis of Reportable Incidents for Natural Gas Transportation and Gathering Lines 1970 Through June 1984." NG-18 Report No. 158, Pipeline Research Committee of the American Gas Association.

TABLE 4.12.2-1 **Natural Gas Service Incidents by Cause**		
Cause	**Incidents per 1,000 Miles of Pipeline (percentage)**	
	1970-1984	**1986-2005**
Outside Force	0.70 (53.8)	0.10 (38.5)
Corrosion	0.22 (16.9)	0.06 (23.1)
Construction or Material Defect	0.27 (20.8)	0.04 (15.4)
Other	0.11 (8.5)	0.06 (23.1)
Total	**1.30**	**0.26**

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 4.12.2-1 provides a percentage distribution of the causal factors as well as the annual frequency of each factor per 1,000 miles of pipeline in service.

The dominant incident cause is outside forces, constituting 53.8 percent of all service incidents. Outside forces incidents result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 4.12.2-2 shows that human error in equipment usage was responsible for approximately 75 percent of outside forces incidents. Since April 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. The 1986 through 2005 data (as shown on table 4.12.2-1) show that the portion of incidents caused by outside forces has decreased to 38.5 percent.

TABLE 4.12.2-2 **Outside Forces Incidents by Cause (1970-1984)**	
Cause	**Percent**
Equipment Operated by Outside Party	67.1
Equipment Operated by or for Operator	7.3
Earth Movement	13.3
Weather	10.8
Other	1.5

The pipelines included in the dataset in table 4.12.2-2 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents because corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller diameter pipelines, which have a greater rate of

outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

Table 4.12.2-3 clearly demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure compared to unprotected or partially protected pipe. The data show that bare, cathodically protected pipe actually has a higher corrosion rate than unprotected pipe. This anomaly reflects the retrofitting of cathodic protection to actively corroding spots on pipes.

TABLE 4.12.2-3

External Corrosion by Level of Control (1970-1984)

Corrosion Control	Incidents per 1,000 Miles per Year
None-bare Pipe	0.42
Cathodic Protection Only	0.97
Coated Only	0.40
Coated and Cathodic Protection	0.11

4.12.3 Impacts on Public Safety

The service incident data summarized in table 4.12.2-1 include pipeline failures of all magnitudes with widely varying consequences. Approximately two-thirds of the incidents were classified as leaks, and the remaining third classified as ruptures, implying a more serious failure.

Table 4.12.3-1 presents the average annual fatalities that occurred on natural gas transmission and gathering lines from 1970 to 2005. Fatalities between 1970 and June 1984 have been separated into employees and non-employees to better identify a fatality rate experienced by the general public. Of the total 5.0 nationwide average, fatalities among the public averaged 2.6 per year over this period. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and non-employees. However, the data show that the total annual average for the period 1984 through 2005 decreased to 3.6 fatalities per year. Subtracting two major offshore incidents in 1989, which do not reflect the risk to the onshore public, yields a total annual rate of 2.8 fatalities per year for this period.

TABLE 4.12.3-1

Annual Average Fatalities—Natural Gas Transmission and Gathering Systems a/, b/

Year	Employees	Non-employees	Total
1970-June 1984	2.4	2.6	5.0
1984-2005 c/	-	-	3.6
1984-2005 c/	-	-	2.8 d/

a/ 1970 through June 1984 - American Gas Association, 1986.
b/ DOT Hazardous Materials Information System.
c/ Employee/non-employee breakdown not available after June 1984.
d/ Without 18 offshore fatalities occurring in 1989 – 11 fatalities resulted from a fishing vessel striking an offshore pipeline and seven fatalities resulted from explosion on an offshore production platform.

The nationwide totals of accidental fatalities from various man-made and natural hazards are listed in table 4.12.3-2 in order to provide a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all

TABLE 4.12.3-2

Nationwide Accidental Deaths a/

Type of Accident	Fatalities
All Accidents	90,523
Motor Vehicles	43,649
Falls	14,985
Poisoning	9,510
Fires and Burns	3,791
Drowning	3,488
Suffocation by Ingested Object	3,206
Tornado, Flood, Earthquake, etc. (1984-93 average)	181
All Liquid and Gas Pipelines (1986-2003 average) b/	22
Gas Transmission and Gathering Lines, Non-employees Only (1970-84 average) c/	2.6

a/ All data, unless otherwise noted, reflects 1996 statistics from the U.S. Department of Commerce, Bureau of the Census, "Statistical Abstract of the United States 118th Edition."
b/ U.S. Department of Transportation, Office of Pipeline Safety, www.ops.dot.gov/stats.
c/ American Gas Association, 1986.

categories. Nevertheless, the average 2.6 public fatalities per year is relatively small considering the more than 300,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is approximately two orders of magnitude (100 times) lower than the fatalities from natural hazards such as lightning, tornadoes, floods, earthquakes, etc.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on approximately 301,000 miles in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per 1,000 miles of pipeline. Using this rate, the G-II Project might result in a public fatality every 913 years. This would represent a slight increase in risk to the nearby public.

4.13 CUMULATIVE IMPACTS

In accordance with NEPA and FERC policy, we considered the cumulative impacts of the proposed G-II Project and other projects in the general Project area. Cumulative impacts represent the incremental effects of the proposed action when added to other past, present, or reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a given period of time. The direct and indirect impacts of the proposed Project are discussed in other sections of this EIS.

The purpose of this cumulative impact analysis is to identify and describe cumulative impacts that would potentially result from implementation of the proposed Project. This cumulative impact analysis generally follows the methodology set forth in relevant guidance (CEQ, 1997b; EPA, 1999). Under these guidelines, inclusion of other projects within the analysis is based on identifying commonalities of impacts from other projects to potential impacts that would result from the proposed Project. An action must meet the following three criteria to be included in the cumulative impacts analysis:

- impact a resource area potentially affected by the proposed Project;
- cause this impact within all, or part of, the proposed Project area; and

- cause this impact within all, or part of, the time span for the potential impact from the proposed Project.

For the purposes of this cumulative impact analysis, we considered the Project area to be the counties traversed by the proposed Project.

The actions considered in the cumulative impact analysis may vary from the proposed Project in nature, magnitude, and duration. These actions are included based on the likelihood of completion, and only projects with either ongoing impacts or that are "reasonably foreseeable" future actions were evaluated. Existing or reasonably foreseeable actions that would be expected to affect similar resources during similar time periods as the proposed Project were considered further. The anticipated cumulative impacts of the proposed Project and these other actions are discussed below, as well as any pertinent mitigation actions. The anticipated cumulative impacts were based on NEPA documentation, agency and public input, and best professional judgment.

We identified three types of past, present, and reasonably foreseeable future projects that would potentially result in a cumulative impact when considered with the proposed Project. These are: (1) other natural gas pipeline projects; (2) facilities that would be associated with construction of the proposed Project but that are not under the FERC's jurisdiction; and (3) unrelated projects that are either in place, are under construction in the vicinity of the proposed Project, or are proposed (table 4.13-1).

The identified projects consist of one existing and one proposed natural gas transmission pipeline, seven nonjurisdictional pipeline projects that would extend from the proposed G-II Project and two nonjurisdictional electric utility projects required for the two proposed new compressor stations, and eight unrelated projects. We identified these projects through scoping and independent research, as well as information provided by Guardian and the PSC. While we did not specifically contact each county, community, or other entity regarding new projects or plans for expansion, we did request information on other projects in the NOI. We have identified the tentative construction schedules of these projects, as available, but the actual construction schedules would depend on factors such as issuance of permits, economic conditions, the availability of funds, and political considerations.

TABLE 4.13-1

Existing or Planned Projects that Could Result in Cumulative Impact on Environmental Resources in the G-II Project Area

Project	Description	Anticipated Construction Date	Counties
Natural Gas Pipelines			
G-II Project	115.2 miles of 30-inch, 20-inch-diameter pipeline, two 20-inch and one 16-inch-diameter branch line, two new 39,000 hp electric motor-driven compressor stations, and aboveground appurtenances.	2008	Jefferson, Dodge, Fond du Lac, Calumet, Brown, Outagamie, and Walworth, WI; DeKalb, IL.
Guardian Pipeline Project	150 miles of 36-inch, 30-inch, 24-inch, and 16-inch-diameter pipeline, one 22,000 natural-gas-driven compressor station, and aboveground appurtenances.	2002-2003	Walworth, WI; DeKalb, IL. a/
Nonjurisdictional Facilities			
We Energies – Hartford/ West Bend Project	14.1 miles of 12-inch-diameter pipeline and appurtenant aboveground facilities.	2008	Dodge and Washington, WI.
We Energies-Fox Valley Project	14.0 miles of 20-inch, 16-inch, 12-inch, and 8-inch-diameter pipeline and appurtenant aboveground facilities.	2008	Brown and Outagamie, WI.

TABLE 4.13-1

Existing or Planned Projects that Could Result in Cumulative Impact on Environmental Resources in the G-II Project Area

Project	Description	Anticipated Construction Date	Counties
WPS Sheboygan Project	33.0 miles of 16-inch, 14-inch, and 12-inch-diameter pipeline and appurtenant aboveground facilities.	2008	Fond du Lac and Sheboygan, WI.
WPS Chilton Project	1.7 miles of 4-inch-diameter pipeline and appurtenant aboveground facilities.	2008	Calumet, WI.
WPS Denmark Project	14.2 miles of 12-inch-diameter pipeline and appurtenant aboveground facilities.	2008	Brown, WI.
WPS SW Green Bay Project	8.0 miles of 20-inch and 12-inch-diameter pipeline and appurtenant aboveground facilities.	2008	Brown, WI.
WPS West Green Bay Project	Flow control and odorization facilities and regulator station modifications.	2008	Outagamie, WI.
ComEd Sycamore Powerline and Substation	2.7 miles of 138-kV electric transmission line and transformer/substation.	2008	DeKalb, IL.
ATC Bluff Creek Substation	Transformer/substation.	2008	Walworth, WI.
Unrelated Projects			
Forward Wind Energy Center	About 133 wind energy turbines, access roads, and electrical gathering and transmission facilities.	2007	Dodge and Fond du Lac, WI.
Green Field Blue Sky Wind Energy Project	Up to about 88 wind energy turbines, access roads, and electrical gathering and transmission facilities.	2007 - 2009	Fond du Lac, WI.
Holsum Elm Dairy	New 6,060-animal dairy operation.	2006 - 2007	Calumet, WI.
Cedar Ridge Wind Farm	About 41 wind energy turbines, access roads, and electrical gathering and transmission facilities.	2008	Fond du Lac, WI.
WIS 32, Claude Allouez Bridge Replacement	Construction of a new bridge over the Fox River and associated approach lanes in De Pere, Wisconsin and removal of the existing bridge.	2006 - 2008	Brown County, WI
US 151	Construction of a four-lane divided highway with controlled access on a new alignment, interchanges at Hickory Street and WIS 175 grade separated crossings with the Canadian National Railroad, and a box culvert for the Wild Goose State Trail to pass under US 151	2006-2008	Fond du Lac County, WI
ATC Rubicon-Hustisford-Hubbard Project	About 14 miles of 138-kV electric transmission line and related substations	2007-2008	Dodge, WI
ATC Gardner Park/Central Wisconsin/Morgan/Werner West Project	About 100 miles of 345-kV and 20 miles of 138-kV electric transmission line and related substations	2007-2009	Outagamie, Marathon, Shawano, Oconto, and Waupaca, WI
ATC Jefferson Reliability Project	About 17 miles of 138-kV electric transmission line and related substations	2008	Jefferson, WI

a/ For purpose of this cumulative impacts analysis, only those counties that are shared with the G-II Project area are included for the original Guardian Pipeline.

The potential impacts associated with these projects that are most likely to be cumulative are related to wetlands and waterbodies, vegetation and wildlife (including federally and state-listed endangered and threatened species), land use, air quality, and noise.

4.13.1 Other Natural Gas Pipeline Projects

One other major natural gas pipeline project has been constructed recently in the same general area as the proposed G-II Project.

Guardian Pipeline Project (Phase I)

The Guardian Pipeline was reviewed and approved by the FERC in 2002 and was constructed in 2002 and 2003. The Guardian Pipeline includes about 150 miles of 36-inch, 30-inch, 24-inch, and 16-inch-diameter natural gas transmission pipeline from Joliet, Illinois to Ixonia, Wisconsin; one compressor station in Joliet, Illinois; and seven meter stations. The Guardian Pipeline is located in seven counties in Illinois and Wisconsin, of which three would also include portions of the proposed G-II Project. Facilities located in the same counties include 24.1 miles of the existing Guardian Pipeline and 2.1 miles of the proposed G-II Project pipeline in Jefferson County, Wisconsin; 35.5 miles of the existing Guardian Pipeline and the G-II Project's proposed Sycamore Compressor Station in DeKalb County, Illinois; and 34.3 miles of the existing Guardian Pipeline (including a pipeline lateral) and the G-II Project's proposed Bluff Creek Compressor Station in Walworth County, Wisconsin.

The FERC (1989) concluded that the general impact of building more than one pipeline would be primarily additive, and the cumulative impact may be calculated by adding together the impact of each individual project.

4.13.2 Nonjurisdictional Facilities

As described in sections 1.5 and 2.9, nonjurisdictional facilities for the G-II Project would include seven intrastate natural gas pipeline laterals and associated appurtenances, and two electric utility projects associated with the two proposed new compressor stations, as described below.

4.13.2.1 We Energies – Hartford/West Bend Project

A 14-mile two-segment (Hartford Segment 1 and West Bend Segment 2) 12-inch-diameter pipeline lateral to be constructed and operated within the counties of Dodge and Washington, Wisconsin. The pipeline lateral would interconnect with the G-II Pipeline at the proposed Rubicon Meter Station. Additional facilities would include the construction and operation of the Hartford/West Bend Gate Station, two 12-inch-diameter valves, and a new regulator station.

4.13.2.2 We Energies – Fox Valley Project

A 14-mile four-segment pipeline lateral comprised of 20-inch-diameter (Segment 1), 8-inch-diameter (Segment 2), 16-inch-diameter (Segment 3), and 12-inch-diameter (Segment 4) lateral to be constructed and operated within the counties of Brown and Outagamie, Wisconsin. The pipeline lateral would interconnect with the G-II Pipeline at the proposed Fox Valley Meter Station. Additional facilities would include the construction and operation of the Fox Valley Gate Station, Kaukauna Regulator Station, Kimberly Regulator Station, WPPI Delivery Point Customer Metering Facility, Appleton Regulator/Metering Station, and the Kaukauna and Little Chute Valve Assembly.

4.13.2.3 WPS Sheboygan Project

A 31.0-mile 14-inch and 12-inch-diameter pipeline lateral to be constructed and operated within the counties of Fond du Lac and Sheboygan. The pipeline lateral would interconnect with the G-II Pipeline at the proposed Sheboygan Meter Station. A 2.07-mile 16-inch-diameter distribution pipeline would also be constructed and operated in Sheboygan, Wisconsin. Additional facilities would include the construction and operation of odorization and pigging facilities, the New West

Sheboygan Regulator Station, and the New Plymouth Regulator Station. Modifications would also be made to the existing Sheboygan ANR Meter/WPS Regulator Station and the Plymouth ANR Meter/WPS Regulator Station.

4.13.2.4 WPS Chilton Project

A 1.7-mile 4-inch-diameter pipeline lateral to be constructed and operated in Calumet County, Wisconsin. The pipeline lateral would interconnect with the G-II Pipeline at the proposed Chilton Meter Station. Additional facilities would include the construction and operation of odorization, pigging, and valve facilities and the New Chilton Regulator Station. Modifications would also be made to the existing Chilton ANR Meter/WPS Regulator Station and distribution system connection facilities.

4.13.2.5 WPS Denmark Project

A 14.2-mile 12-inch-diameter pipeline lateral to be constructed and operated in Brown County, Wisconsin. The pipeline lateral would interconnect with the G-II Pipeline at the proposed Denmark Meter Station via the G-II proposed Denmark Branch Line. Additional facilities would include the construction and operation of odorization and pigging facilities and modifications would be made to the existing Denmark ANR Meter/WPS Regulator Station.

4.13.2.6 WPS Southwest Green Bay Project

A 1.4-mile 12-inch-diameter and a 6.8-mile 20-inch-diameter pipeline lateral that would be constructed and operated in Brown County, Wisconsin. The pipeline lateral would interconnect with the G-II Pipeline at the proposed Southwest Green Bay Meter Station via the G-II proposed southwest Green Bay Branch Lines. Additional facilities would include the construction and operation of odorization, pigging, and valve facilities and the Southwest Green Bay Regulator Station. Modification would also be made to the existing ANR Green Bay Meter/WPS Broadway Regulator Station.

4.13.2.7 WPS West Green Bay Project

Facilities and modifications would include the construction and operation of flow control and odorization facilities, and modifications to the West Green Bay Regulator Station. The G-II Pipeline would interconnect with this facility via the G-II proposed West Green Bay Branch Line.

4.13.2.8 ATC Bluff Creek Substation

Facilities would consist of the construction and operation of the Bluff Creek Transformer/Substation in Walworth County, Wisconsin.

4.13.2.9 ComEd Sycamore Powerline and Substation

Facilities would include the construction and operation of 2.7 miles of new Sycamore Compressor Station Powerline and the Sycamore Transformer/Substation in DeKalb County, Illinois.

4.13.3 Unrelated Projects

4.13.3.1 Forward Wind Energy Center

The Forward Wind Energy Center is proposed by Forward Energy LLC, and would be situated within approximately 32,400 acres of predominantly agricultural land near Brownsville, Wisconsin, within the Towns of Oakfield, Byron, Leroy, and Lomira in southern Fond du Lac and northern Dodge Counties (WPS, 2005). The project would include about 133 wind turbines. Forward Energy received project approval from the PSC in July 2005, and is currently in the process of obtaining required remaining permits and approvals. Construction of the wind farm would begin after Forward Energy completes the final turbine and collection system layout and receives all of the necessary permits or approvals. The project would be in-service an estimated 8 to 12 months after the start of construction.

4.13.3.2 Blue Sky Green Field Wind Project

The Blue Sky Green Field Wind Project is proposed by We Energies, and would be located within an area covering about 10,600 acres in the Towns of Calumet and Marshfield in Fond du Lac County, Wisconsin. The project would include 88 wind turbines and associated auxiliary facilities, with a total capacity of up to 203 MW of electric generation. The wind farm would be connected to an existing 345-kV electric transmission line that traverses the project area via a new substation called the Cypress Substation. The PSC issued a final decision approving the project on February 1, 2007. We Energies hopes to begin commercial operation in 2008 or 2009.

4.13.3.3 Holsum Elm Dairy

Holsum Elm Dairy is currently constructing a new large farm dairy operation with a capacity for 6,060 animals in the Town of Chilton, in Calumet County, at MP 72.9 of the G-II Pipeline.

4.13.3.4 Cedar Ridge Wind Farm

The Cedar Ridge Wind Farm is proposed by Wisconsin Power and Light, an Alliant Energy Company, and would consist of about 41 wind turbines spread across about 7,800 acres in the Townships of Eden and Empire in Fond du Lac County (Alliant Energy, 2006). The project has been under development since 2004. Preliminary permits, including zoning, land use agreements, and environmental studies have been completed, with some permitting and engineering ongoing. Wisconsin Power and Light received PSC approval on May 9, 2007, and expects the project will be in operation by the end of 2008.

4.13.3.5 WIS 32, Claude Allouez Bridge Replacement

The Claude Allouez Bridge Replacement Project is currently being constructed by the Wisconsin DOT in the Town of De Pere in Brown County, Wisconsin. The project is located along State Highway WIS 32 just upstream of the Fox River Dam in De Pere, Wisconsin. Project components consist of the construction of a new pre-stressed concrete girder bridge along with the reconstruction of the approach roadways and intersections terminating at both ends of the bridge and the removal of the existing steel truss bridge. The project began construction in 2006 and is anticipated to be completed by summer 2008 (Wisconsin DOT, 2007).

4.13.3.6 US 151

The US 151 Project is currently underway in Fond du Lac County, Wisconsin. The project is located on US 151 from County D to State Highway WIS 175. Project activities include the construction of a four-lane divided highway, interchanges at Hickory Street and State Highway WIS 175 grade separated crossings with the CN Railroad, and a box culvert for the Wild Goose State Trail to pass under US 151. The project began construction in 2006 and is anticipated to be completed by fall of 2008 (Wisconsin DOT, 2007).

4.13.3.7 ATC Rubicon-Hustisford-Hubbard Project

The ATC Rubicon-Hustisford-Hubbard Project is currently underway in Dodge County, Wisconsin. The project consists of the construction of about 14 miles of 138-kV electric transmission line. Construction began in 2007 and is anticipated to be completed by 2008.

4.13.3.8 ATC Gardner Park/Central Wisconsin/Morgan/Werner West Project

The ATC Gardner Park/Central Wisconsin/Morgan/Werner West Project is currently underway in Outagamie, Marathon, Shawano, Oconto, and Waupaca Counties, Wisconsin. The project consists of about 100 miles of 345-kV and 20 miles of 138-kV electric transmission line and related substations. Construction began in 2007 and is anticipated to be completed by 2009.

4.13.3.9 ATC Jefferson Reliability Project

The ATC Jefferson Reliability Project is to be constructed in Jefferson County, Wisconsin. The project would consist of the construction and operation of about 17 miles of 138-kV electric transmission line and related substations. Construction of the project is anticipated to begin in 2008.

4.13.4 Potential Cumulative Impacts of the Proposed Action

Potential cumulative impacts are grouped by resource area in this section. The most likely cumulative impacts would be to wetlands and waterbodies, vegetation and wildlife, land use, and air quality and noise.

Except for the Guardian Project (Phase 1), the FERC has no authority over the permitting, licensing, funding, construction, or operation of the projects included in our analysis. Federal, state, and local agencies must review these projects for compliance with requirements for construction of facilities at sites or places where a governmental license or permit may be required. The expansion or construction of intrastate pipelines would require state or federal permits and approvals to ensure compliance with Section 7 of the ESA; Sections 401, 402, and 404 of the CWA; and the CAA. Where appropriate, environmental conditions designed to minimize or avoid impacts would be attached to the necessary permits and approvals.

4.13.4.1 Wetlands and Waterbodies

Construction and operation of the proposed G-II Project would result in both short-term and long-term impacts on waterbodies and wetlands. The short-term impacts such as soil or sediment disturbance would dissipate over a period of weeks, while longer-term impacts, such as regrowth of forested wetlands within the temporary construction rights-of-way, would persist for months or years. The primary impacts on wetlands and waterbodies during operation of the

proposed pipeline would be associated with routine right-of-way maintenance. All maintenance activities would comply with applicable federal regulations, but would continue throughout the life of the proposed Project.

If approved and constructed, the G-II Project and other past and reasonably foreseeable future projects would affect wetlands, and would include the permanent loss or conversion of some existing wetlands. Construction of the Wisconsin portion of the original Guardian pipeline affected about 33 acres of wetlands. Construction of the proposed nonjurisdictional pipeline laterals would affect about 40 acres of wetlands. Available information for the other projects (see table 4.13-1) indicates these projects would affect about 5 acres of wetlands. Elements of these projects that have the potential to affect wetlands and waterbodies would be subject to review and approval under Section 404 of the CWA, as administered by the COE, as well as state and local wetland regulations. Any permanent or long-term impacts on wetlands and waterbodies would require appropriate mitigation. Construction of the G-II Project would affect about 61.4 acres of wetlands, including about 14.7 acres of forested wetland. Section 4.4.1 discusses Project- or site-specific mitigation measures for this impact. Further, discharges to wetlands and other surface waters associated with construction and operation would require review, approval, and mitigation (if necessary) under the state's stormwater discharge programs. During operation of the Project, about 3.2 acres of previously forested wetland would be maintained as scrub-shrub or emergent wetland as a result of vegetation maintenance on the pipeline right-of-way.

Construction of the G-II Project would result in 114 waterbody crossings. As described in section 4.3.2.3, Guardian proposes to use HDD techniques to cross three waterbodies. The use of HDD would avoid direct impacts on waterbodies and minimize impacts on riparian and in-stream vegetation at those crossings. Though impacts on surface waters could occur during HDD crossings, either through an inadvertent release of drilling fluids (frac-out) or through accidental fuel and chemical spills, the likelihood and potential damage associated with such events would be greatly reduced by the implementation of HDD and SPCC Plans.

Because most of the projects listed in table 4.13-1 are located within the same major watersheds crossed by the G-II Project, and because some of these projects would likely involve direct and indirect waterbody impacts, the G-II Project and other past and reasonably foreseeable future projects would result in some cumulative impacts on waterbodies. The original Guardian pipeline included 19 waterbody crossings in Walworth County. The proposed nonjurisdictional pipeline laterals would involve 63 waterbody crossings. Available information for the other projects listed in table 4.13-1 indicates these projects would involve about 60 waterbody crossings, mostly by access roads and buried electrical cables associated with the wind energy projects. Because the G-II Project would not involve construction of permanent diversions or dams, impacts on surface water quality from this Project would be temporary. These temporary impacts would include runoff from construction areas, temporary and localized increases in turbidity and sedimentation associated with in-water construction, and withdrawal and discharge of surface waters for hydrostatic testing of the pipeline. As described in section 4.3.2.2, these effects would be relatively minor and would be further minimized with the implementation of our Procedures.

We believe the cumulative impacts of the G-II Project and the projects listed in table 4.13-1 on wetlands and waterbodies would not be significant.

4.13.4.2 Vegetation and Wildlife

Construction of the proposed Project and other reasonably foreseeable future projects would have a cumulative impact on vegetation and associated wildlife. These cumulative impacts would be most significant if 1) the projects were constructed at or near the same time and within proximity of one another, and 2) the affected vegetative communities would take a long time to recover. The G-II Project, if approved, would impact approximately 51.6 acres of forest habitat, 61.0 acres of open land, and 1,639.5 acres of agricultural habitats. Construction of the Wisconsin portion of the original Guardian pipeline resulted in clearing about 30 acres of forest habitat, 75 acres of open land, and 714 acres of agricultural habitat. Of this, about 20 acres of land that was forested prior to construction is maintained as non-forest habitat within the operational pipeline right-of-way. Construction of the proposed nonjurisdictional pipeline laterals would impact about 20 acres of forested habitat, approximately 290 acres of open land, and 560 acres of agricultural habitat. Available information for the other projects listed in table 4.13-1 indicates these projects would impact about 42 acres of forested habitat and about 360 acres of agricultural habitat. These impacts would likely have a cumulative effect on vegetation and wildlife when considered in conjunction with the G-II Project.

Cumulative impacts such as lost acreage of forest land within a region are additive. Further, many wildlife species depend on mature contiguous tracts of forest to sustain their migratory and reproduction cycles. These species include many species of migratory songbirds and terrestrial mammals that are not migratory, but that require large tracts of forest to support their home ranges. The impacts of fragmentation of forest habitat on some of these species can be immediate.

The extent and duration of habitat fragmentation and other cumulative impacts on wildlife habitat associated with construction of the proposed Project and other reasonably foreseeable future projects would be minimized by siting these projects to the greatest extent practicable through existing maintained rights-of-way and other disturbed areas. About 25.7 miles (21.6 percent) of Guardian's proposed route would be adjacent to existing utility rights-of-way, which would minimize impacts on previously undisturbed vegetation. Additionally, approximately 94 percent of the proposed pipeline route would traverse agricultural and open lands that would typically experience rapid revegetation, and where fragmentation of forest habitat would not occur. About 61.8 miles (78.4 percent) of the route of the proposed nonjurisdictional pipeline laterals would be collocated with existing utility corridors or within existing rights-of-way.

Two federally listed threatened species, and eleven state-listed endangered, threatened, or special concern species could be potentially affected by construction of the G-II Project. The two federally listed species were not known to occur in the vicinity of the Wisconsin portion of the original Guardian pipeline. As described in section 4.6.1, we believe that the proposed Project would not affect, or would not be likely to adversely affect any federally listed species. Habitat for some state-listed species (Blanchard's cricket frog, wood turtle, Blanding's turtle, and handsome sedge) could potentially occur along the proposed pipeline, and these species could potentially be affected by pipeline construction and operation. Guardian is continuing consultations with the WDNR to identify the specific state-listed species and/or species of special concern that should be included in the species surveys for the G-II Project. Guardian is also working with the WDNR to identify measures to avoid and/or minimize potential impacts on this species if suitable habitat is identified during surveys. A number of listed species potentially occur in the vicinity of the proposed nonjurisdictional pipeline laterals; however,

based on review of potentially affected habitats, We Energies and WPS report that none of these species would likely be affected by construction and operation of the laterals.

There is also the potential for both federal and state-listed species to occur within the areas of the proposed highway and transmission line projects. However, given the lack of suitable habitat for listed species in the G-II Project area and the ongoing coordination with the WDNR to minimize and avoid potential impact to threatened and endangered species, it is not likely that cumulative effects would result from the construction and operation of the highway or transmission line projects.

The wind energy projects could potentially affect several bird species protected under the federal Migratory Bird Treaty Act, and bats, as a result of potential impact from turbine blades during operation. Because this potential impact is specific to operation of the wind turbines, no cumulative impact on these species would be expected from the G-II Project and the wind energy projects.

4.13.4.3 Land Use

Construction of the G-II Project and other reasonably foreseeable future projects would result in temporary and permanent changes in land use within the Project area. The G-II Project would affect about 1,766.9 acres of land during construction. While impacts on most land uses would be temporary in nature, occurring only during construction, operation of the Project would result in long-term impacts during operation to about 33.5 acres of forest land.

Construction of the Wisconsin portion of the original Guardian pipeline affected about 825 acres of land, of which about 356 acres are maintained in a herbaceous condition within the operational right-of-way, including about 20 acres of land that was forested prior to construction. Construction of the nonjurisdictional pipeline laterals would affect about 997 acres of land, of which about 490 acres would be maintained in a herbaceous condition within the operational right-of-way following construction, including about 20 acres of land that is currently forested. Available and estimated information on the other projects listed in table 4.13-1 indicates that about 2,565 acres would be affected during construction, and about 265 acres would be permanently affected during operation, primarily agricultural lands. Land use impacts associated with those projects would likely have a cumulative effect when considered in conjunction with the G-II Project.

4.13.4.4 Air Quality

Air quality would be affected by construction and operation of the G-II Project and other reasonably foreseeable future projects. Construction of these projects would temporarily affect air quality by 1) generating emissions from operation of fossil-fueled construction equipment, and 2) fugitive dust from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. Some impacts would occur during operation as well. The existing Guardian pipeline generates ongoing air pollutants from operation of the Joliet Compressor Station. Air pollutant emissions that would be generated from operation of the dairy farm in Calumet County are unknown. The G-II Project, as well as the three planned wind projects, two planned highway projects, and three planned transmission line projects would not generate air pollutant emissions during operation. None of the proposed nonjurisdictional pipeline laterals or electric utility projects would include compressor stations or other facilities that would produce emissions during operation.

Because construction-related air pollutant emissions would be temporary and localized in nature, they would be unlikely to contribute significantly to cumulative air quality impacts.

Operation of the proposed Project and the wind energy projects listed in table 4.13-1 could reduce air pollutant emissions by providing a competitively priced source of energy that could replace the dirtier forms of energy that are currently being used. Natural gas is a relatively clean and efficient form of energy compared to other fossil fuels. By burning natural gas rather than other fossil fuels such as coal and fuel oil, it could be possible to reduce the emissions of regulated pollutants (e.g., mercury, NO_X, SO_2, and PM_{10}) or unregulated greenhouse gases (e.g., CO_2). Similarly, energy generated by the wind energy projects and the replacement of the coal-powered electric generation plant with a gas-fired electric generation plant could replace energy currently generated by coal-fueled plants. As such, it is possible that the G-II Project and the regional wind energy projects could cumulatively improve air quality in the region.

4.13.4.5 Noise

Potential noise impacts associated with the G-II Project and those projects listed in table 4.13-1 would occur during construction and operation. Because of the linear nature of the G-II Project and the nonjurisdictional pipeline laterals, construction-related noise impacts for these projects would be of short duration in a given area. Some noise impacts would occur during construction of the three wind power projects, but these impacts would also be of short duration in any particular location, occurring during installation of tower foundations, towers, and electrical interconnects. Most construction activities would be limited to daylight hours, so construction-related noise impacts would not occur at night for the most part. Potential noise-related impacts during operation of the G-II Project and the other pipeline projects listed in table 4.13-1 would primarily be limited to the vicinity of the associated compressor stations. As described in section 4.11, the estimated noise that would be generated by the proposed Sycamore and Bluff Creek Compressor Stations would meet acceptable levels at the nearest NSA. Noise would also be generated from each turbine within the three wind energy projects, as well as from the new dairy operation. During operation, turbines within the wind energy projects would generate up to about 50 dBA of noise within the zone immediately surrounding each turbine depending on wind speed, with noise decreasing with distance from the turbines.

Noise emissions from compressor station operations may be additive with noise-generating elements of other reasonably foreseeable future projects if they are located near a common NSA. However, no other compressor station, or other noise-generating source for the identified projects would be located within 1 mile of the G-II Project's proposed Sycamore or Bluff Creek Compressor Stations. Therefore, the cumulative impact of the proposed Project and other projects in the region on the noise environment would be negligible.

4.13.5 Conclusions on Cumulative Impact

If the G-II Project were approved by the Commission and the Project proceeded to construction, several other projects could also be constructed within the same general area and same general time span. Additionally, the type of project, construction methods, and impacts would be similar. Though the nonjurisdictional projects identified in our analysis would also be constructed within a similar time span using similar construction methods, any potential contribution to cumulative impacts of the proposed Project would be negligible due to the small scope of those projects. The unrelated projects identified in our cumulative impact analysis would be of a different nature than the proposed Project, but would affect similar resources.

Each of these unrelated projects would result in temporary and minor effects during construction, but each project would be designed to avoid or minimize impacts on the human environment and to wetlands, waterbodies, protected and special status species, and other sensitive resources. Additionally, significant unavoidable impacts on sensitive resources resulting from these projects would be mitigated. Mitigation generally leads to the avoidance or minimization of cumulative impacts. We therefore consider that the potential cumulative impacts of the two pipeline projects under our review have been or would be minimized.

Because natural gas is a relatively clean and efficient form of energy compared to other fossil fuels such as coal and fuel oil, burning natural gas rather than other fossil fuels may reduce emissions of regulated pollutants or unregulated greenhouse gases. Similarly, energy generated by the wind energy projects could replace energy currently generated by fossil fuel plants and result in less emissions. As such, it is possible that the G-II Project and the regional wind energy projects could cumulatively improve air quality in the region.

We believe that impacts associated with the proposed Project would be relatively minor, and we have included recommendations in this EIS to further reduce the environmental impacts associated with the Project. The environmental impacts associated with the G-II Project would be minimized by project routing, avoidance, and utilization of HDD techniques to avoid and minimize impacts on some sensitive resources, and implementation of appropriate mitigation measures. Consequently, only a small cumulative effect is anticipated when the impacts of the proposed Project are added to past, present, or reasonably foreseeable future projects in the area.