Spire STL Pipeline Project

Resource Report 2
Water Use and Quality

FERC Docket No. CP17-__-__

FERC Application
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Public

RESOURCE REPORT 2 - WATER USE AND QUALITY	
SUMMARY OF FILING INFORMATION	
Information	**Found in**
1. Identify all perennial surface waterbodies crossed by the proposed project and their water quality classification - Title 18 Code of Federal Regulations (CFR) part (§) 380.12(d)(1)	Sections 2.2.1, 2.2.2, and Table 2.2-2
2. Identify all waterbody crossings that may have contaminated waters or sediments - 18 CFR § 380.12(d)(1)	Sections 2.2.2.1, 2.2.2.2, and Table 2.2-2
3. Identify watershed areas, designated surface water protection areas, and sensitive waterbodies crossed by the proposed project - 18 CFR § 380.12(d)(1)	Sections 2.2.2.3, 2.2.2.4, and Table 2.2-3
4. Provide a table (based on National Wetlands Inventory [NWI] maps if delineations have not been done) identifying all wetlands, by milepost and length, crossed by the proposed project (including abandoned pipeline), and the total acreage and acreage of each wetland type that would be affected by construction - 18 CFR § 380.12(d)(1,4)	Section 2.3.1, Table 2.3-1, Table 2.3-2, and Appendix 1-B
5. Discuss construction and restoration methods proposed for crossing wetlands, and compare them to staff's Wetland and Waterbody Construction and Mitigation Procedures - 18 CFR § 380.12(d)(2)	Section 2.3.2.3 and Table 2.3-1
6. Describe the proposed waterbody construction, impact mitigation, and restoration methods to be used to cross surface waters and compare to the staff's Wetland and Waterbody Construction and Mitigation Procedures - 18 CFR § 380.12(d)(2)	Section 2.2.6.1 and Table 2.2-2
7. Provide original NWI maps or the appropriate state wetland maps, if NWI maps are not available, that show all proposed facilities and include milepost locations for proposed pipeline routes - 18 CFR § 380.12(d)(4)	Appendix 2-G
8. Identify all U.S. Environmental Protection Agency - or state-designated aquifers crossed - 18 CFR § 380.12(d)(9)	Section 2.1.1

RESOURCE REPORT 2 - WATER USE AND QUALITY	
INFORMATION RECOMMENDED OR OFTEN MISSING	
Information	**Found in**
1. Identify proposed mitigation for impacts on groundwater resources.	Sections 2.1.3.1 and 2.1.3.2
2. Discuss the potential for blasting to affect water wells, springs, and wetlands, and associated mitigation.	Sections 2.1.2 and 2.2.2.4
3. Identify all sources of water required for construction [e.g. hydrostatic testing, dust suppression, horizontal directional drills (HDD)], the quantity of water required, and methods for withdrawal. Identify the treatment of discharge, discharge volumes, rates, locations, and any waste products generated.	Section 2.2.4
4. Identify operational water requirements for proposed liquefied natural gas facilities, including the operational use, source(s), and volumes	Not Applicable
5. If underground storage of natural gas is proposed, identify how water produced from the storage field will be disposed.	Not Applicable
6. If salt caverns are proposed for storage of natural gas, identify the source locations, the quantity of water required, the method and rate of water withdrawal, and disposal locations and methods.	Not Applicable
7. Provide a site-specific construction plan for each proposed HDD crossing in accordance with section V.B.6.d of the Federal Energy Regulatory Commission's Wetland and Waterbody Construction and Mitigation Procedures.	Appendix 2-D
9. Identify mitigation measures to avoid impacts on springs; especially those used for drinking water or livestock.	Section 2.1.2
10. Identify mitigation measures to ensure that public or private water supplies are returned to their former capacity or replaced in the event of damage resulting from construction.	Sections 2.1.2, 2.1.3.1, 2.1.3.2 and Appendix 2-A
11. In addition to identifying perennial surface waterbodies crossed or affected by the project, also identify intermittent and ephemeral waterbodies.	Section 2.2.1, Table 2.2-2, Appendix 1-B

RESOURCE REPORT 2 - WATER USE AND QUALITY	
INFORMATION RECOMMENDED OR OFTEN MISSING	
Information	**Found in**
12. Show the locations of wetlands and waterbodies relative to the construction and permanent rights-of-way and additional temporary workspaces on mile posted alignment sheets or aerial photography	Appendix 1-B
13. If wetlands would be filled or permanently lost or altered, describe proposed measures to compensate for permanent wetland losses. Include copies of any compensatory mitigation plans and discuss the status of agency consultations/approvals.	Section 2.3.3
14. Describe measures to avoid or minimize impacts on forested wetlands. If impacts are unavoidable, describe proposed measures to restore forested wetlands following construction.	Sections 2.3.2.3 and 2.3.3
15. Describe techniques to be used to minimize turbidity and sedimentation impacts associated with offshore trenching, if applicable.	Not applicable.

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Appendices

Acronyms and Abbreviations

ATWS	Additional temporary workspace
BMP	Best management practices
CFR	Code of Federal Regulations
CWS	Community Water Supply
E&SCP	Erosion and Sediment Control Plan
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FUSRAP	Formerly Utilized Sites Remedial Action Program
gpd	gallons per day
gpm	gallons per minute
HDD	horizontal directional drill
IAWC	Illinois American Water Company
IEPA	Illinois Environmental Protection Agency
ISGS	Illinois State Geological Survey
MDNR	Missouri Department of Natural Resources
MLV	mainline valve
MP	milepost
NHD	National Hydrography Data
NPDES	National Pollutant Discharge Elimination System
NSQS	National Sediment Quality Survey
NWI	National Wetlands Inventory
PEM	palustrine emergent
PFO	palustrine forested
PSS	palustrine scrub shrub
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	FERC's Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures
Project	Spire STL Pipeline Project
REX	Rockies Express Pipeline LLC

SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
Spire	Spire STL Pipeline LLC
WS	temporary workspace
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Water Use and Quality

This resource report provides information on the groundwater, surface water, and wetland resources for the Spire STL Pipeline LLC ("Spire") Spire STL Pipeline Project ("Project") within Illinois and Missouri. Section 2.1 provides information on groundwater resources including aquifers, karst features, and water wells. Section 2.2 provides information on surface water resources including rivers and streams and general surface water use and quality. Section 2.3 provides information on wetland resources. Potential impacts to groundwater, surface water, and wetland resources are discussed as well as various avoidance and mitigation measures aimed to reduce impacts by the Project.

2.1 Groundwater Resources

2.1.1 Existing Resources

Section 2.1.1 describes the general information on aquifers and karst in Illinois and Missouri. No sole-source aquifers are located within one mile of the Project (USEPA 2016), and the Project has been designed to have minimal impacts on groundwater.

2.1.1.1 Illinois Aquifers

There are three principal aquifer types in Illinois. These are generally categorized as sand and gravel aquifers within the unconsolidated geologic materials overlying the bedrock; shallow bedrock aquifers lying within approximately 500 feet of land surface; and deep bedrock aquifers lying at depths greater than 500 feet of land surface (Illinois State Water Survey 2016). The 24-inch pipeline along the Illinois portion of the Project overlies the Pennsylvanian, Mississippian, Silurian-Devonian, and Cambrian-Ordovician Aquifer systems. They consist primarily of consolidated sediments and are under confined conditions. Many surficial aquifer systems overlay the Pennsylvania and Mississippian Aquifer systems, which generally consist of sand and gravel at or near the land surface or surficial deposits generally less than 100 feet thick.

Pennsylvanian Aquifer

The Pennsylvanian Aquifers in western Illinois typically yield from less than one to 100 gallons per minute ("gpm"). The depth to the top of the Pennsylvanian rocks can be less than 100 feet deep within the Project area. The Pennsylvanian aquifers commonly are used for water supplies in areas where they are buried beneath less than 100 feet of Quaternary deposits. Large volumes of water stored in surficial aquifer systems serve to replenish ground water withdrawn from wells completed in the Pennsylvanian aquifers. Near southern parts of Illinois, the depth to saltwater decreases, the Pennsylvania rocks thicken, and only 10 percent of the Pennsylvanian rocks contains freshwater. The reported yields of wells are from less than one to more than 100 gpm (Lloyd et al. 1995).

Fresh ground-water withdrawals from the Pennsylvania aquifers are relatively small, and during 1985 they were less than four percent of the total withdrawals in Illinois. According to the United States Geological Survey ("USGS"), approximately two percent of the groundwater withdrawn in Illinois is used for agricultural purposes,

four percent is used for public and domestic water supply, and one percent is used for commercial, industrial, or energy generation purposes (Maupin et al. 2014).

Mississippian Aquifer

The Mississippian aquifer is overlaid with many surficial aquifers, as well as the Pennsylvanian aquifer. The quality of the ground water in surficial aquifers in Illinois is such that the water is generally adequate or can be treated and made adequate for most uses. However in some places in Illinois, nitrate concentrations are larger than the maximum levels for drinking water and are possibly due to contamination. Almost all the Mississippian rocks are considered to be aquifers in western Illinois and are generally used for water supply where they are less than 200 feet below land surface, where more water can be obtained from them than from the overlying surficial aquifer system. Recharge to the Mississippian aquifers occur primarily by water that percolates downward through the overlying deposits and Pennsylvanian rocks (Lloyd et al. 1995).

Fresh ground-water withdrawals from the Mississippian aquifers during 1985 were less than three percent of the total ground water withdrawn in Illinois. The most prevalent groundwater quality concerns in areas crossed by the proposed Project in Illinois consist of oil, gas, coal, and agricultural activities. Thousands of oil and gas wells are located throughout Illinois, with most being in the southern one-third of the state. Brine waste impoundments have been associated with many of the production wells and salinity has increased in nearby water supply wells. Coal production has resulted in surface-mined areas that may also be a threat to shallow aquifers, and acid mine drainage also may be a threat to groundwater quality. Agriculture is of major economic importance within the state, but the use of fertilizers, herbicides, and insecticides applied over large areas potentially contaminate recharge areas. (Clarke et al. 1986).

Silurian-Devonian Aquifer

In western and northwestern Illinois where the Silurian-Devonian aquifer is covered by Mississippian rocks, the extent of freshwater beneath the younger rocks is greater. The aquifer is most commonly used for water supply where it is overlain by less than 200 feet of Quaternary deposits. It is recharged from the overlying surficial aquifer system in areas where water levels in the surficial aquifer system are higher than those in the Silurian-Devonian aquifer (Lloyd et al. 1995).

The yields of wells completed in the Silurian-Devonian aquifer range from less than five to more than 1,000 gpm. However chloride concentrations might be greater than 250 milligrams per liter where the aquifer is overlain by Devonian, Mississippian, or Pennsylvanian shales in Southwestern Illinois. The withdrawals from the Silurian-Devonian aquifer were about 15 percent of the total ground water withdrawn in Illinois. Public supply was the largest use category in Illinois (Lloyd et al. 1995).

Cambrian-Ordovician Aquifer

The Cambrian-Ordovician aquifer system is buried beneath the Silurian and Devonian rocks. It consists of three principal aquifers, St. Peter-Prairie du Chien-Jordan, Ironton-Galesville, and the Mount Simon, which are of consolidated rocks. The bulk of the Project crosses the St. Peter-Prairie du Chien-Jordan aquifer. The average altitude of the top of the aquifer is about 250 feet above sea level in the area where the aquifer contains fresh

water. The thickness of the aquifer averages 400 feet in areas where the aquifer contains fresh water. Before substantial volumes of groundwater were withdrawn from the Cambrian-Ordovician aquifer system, water levels in the St. Peter-Prairie du Chien-Jordan aquifer are estimated to have ranged about 500 feet above sea level along the Mississippi River in West-central Illinois (Lloyd et al. 1995).

Most of the data on the quality of water from the Cambrian-Ordovician aquifer system is from northern Illinois, where wells are open to more than one aquifer system. Toward southwestern Illinois where the aquifers are deeply buried, the water changes to a sodium bicarbonate chloride type; still further down gradient the water changes to a sodium chloride type, and sulfate is one of the dominant dissolved constituents of the water in the aquifer system. Thus, the Cambrian-Ordovician aquifer system is relied on for large groundwater supplies in northern Illinois (Lloyd et al. 1995).

Sole Source Aquifers

The Mahomet Valley Aquifer is the only United States Environmental Protection Agency ("USEPA") designated Sole Source Aquifer located within Illinois (USEPA 2016). No impacts are anticipated to the aquifer, since the Project area is approximately 30 miles south of the designated boundary. No known state-designated primary aquifers are located in the Project area in Illinois [Illinois Environmental Protection Agency ("IEPA") 2016a].

2.1.1.2 Missouri Aquifers

Within the Project areas in Missouri, groundwater is developed from the surficial aquifer system, the Mississippian Aquifer, and the Ozark Plateaus aquifer system. The uppermost aquifers in the area are unconsolidated sand and gravel of the surficial aquifer system, which is divided into stream-valley alluvial aquifers and glacial-drift aquifers. The Ozark Plateaus aquifer system consists of three aquifers: the Springfield plateau aquifer, the Ozark aquifer, and the St. Francois aquifer, which are in consolidated rocks (Miller et al. 1997).

Surficial Aquifer System

In many places in northern Missouri, bedrock contains slightly saline to saline water, and surficial aquifers are the only sources of fresh ground water. Alluvial deposits along the Mississippi and Missouri Rivers as well as glacial drift deposits form an important stream-valley aquifer system.

- Missouri River Valley: The alluvial material of stream-valley aquifers average about 90 feet in thickness but can be as much as 160 feet thick in the vicinity of the Project. The saturated thickness of the aquifer averages about 80 feet. Reported yields of the wells in the aquifers range from less than 100 to about 3,000 gpm. Millions of gallons per day ("gpd") of water are withdrawn from the stream-valley aquifers. Public supply was the largest use for withdrawal, followed by industrial, mining, thermoelectric power, and agricultural uses. The remainder of the water withdrawn was used for domestic and commercial purposes (Miller et al. 1997).
- Mississippi River Valley: Part of the Mississippi River Valley Alluvial aquifer is located in the bootheel of Missouri and is the principal source of irrigation water. The thickness of the Mississippi River Valley alluvial aquifer ranges from a featheredge along the ridge to more than 250 feet near the Mississippi River and generally increases to the southeast. Wells typically yield 1,000 gpm. The water in the Mississippi River Valley alluvial aquifer is mostly unconfined and aquifer water levels rise and fall in response to changes in stream

water levels. The aquifer discharges to a network of agricultural drainage ditches and into major streams. The chemical quality of the water in the aquifer generally meets the standards recommended for public water supplies by the USEPA; excessive concentration of iron and manganese have been reported. The water can also contain concentrations of pesticides and nutrients as a result of agricultural activities. Withdrawals of freshwater from the Mississippi River Valley alluvial aquifer total million gpd. Agricultural practices were the main use for withdrawal, followed by public supply, industrial, mining, thermoelectric power, domestic, and commercial uses (Miller et al. 1997).

- Glacial Drift Aquifers: In Missouri, the maximum southern extent of glacial ice and glacial drift deposits was about the present location of the Missouri River. Water generally is obtained from sand beds that range from 20 to 40 feet in thickness. Yields of wells in the aquifer are highly variable and range from less than 10 to about 1,000 gpm. Water in the aquifer is suitable for most uses. The water is hard and commonly is a calcium bicarbonate type but in many places in Missouri it is a sodium sulfate type. The source of sulfate is dissolution of gypsum in areas where the high-sulfate water in underlying rock leak upwards (Miller et al. 1997).

Mississippian Aquifer

The Mississippian aquifer is the uppermost aquifer in northern Missouri. The aquifer extends over all of the Missouri River except for small areas near the Mississippi and the Missouri Rivers where the rocks that compose the aquifer have been removed by erosion. The aquifer is thinnest near these areas and averages about 200 feet, but can exceed 400 feet in depth in Northwestern Missouri. Recharge to the aquifer is mostly from precipitation that falls on areas where the aquifer is exposed at the land surface or is overlain by a thin blanket of younger rocks. The aquifer contains freshwater only in the eastern one-third of its extent. The very saline water is thought to have entered the Mississippian aquifer either by upward leakage from the underlying Cambrian-Ordovician aquifer or by the discharge of eastward moving saline water.

Ozark Plateau Aquifer System

The portion of the Project that crosses the Ozark Plateau aquifer system crosses the Ozark aquifer. North of the Missouri River, rocks that are equivalent to the Ozark aquifer are called the Cambrian-Ordovician aquifer. The Cambrian-Ordovician aquifer averages about 1,200 feet deep within the Project area and contains freshwater only in a small area in the southern part of the aquifer (Miller et al. 1997).

Total fresh groundwater withdrawals from the Ozark Plateau aquifer system during 1990 were 330 million gpd. Forty-two percent were withdrawn for agricultural purposes, 27 percent was used for public supply, 16 percent was used for industrial, mining, and thermoelectric power, and 15 percent was withdrawn for domestic and commercial supplies (Miller et al. 1997).

2.1.1.3 Karst

As discussed in Resource Report 6, Section 6.4.4, karst is a landform that develops on or in limestone, dolomite, or gypsum by dissolution, and is characterized by the presence of features such as sinkholes, underground (or internal) drainage through solution-enlarged fractures (joints), and caves. Public data was reviewed for Illinois and Missouri for the possibility of karst features along the proposed Project and are described herein.

A Karst Mitigation Plan is provided in Resource Report 6, Appendix 6-A, and describes the general measures to be implemented by Spire to ensure that correct measures for construction in karst formations are applied during construction of the Project. Section 2.1.3, Groundwater Impacts and Mitigation, and Resource Report 6, Table 6.4-2, also discuss Spire's planned mitigation measures in the event karst features are encountered.

Illinois

Data obtained from The Illinois State Geological Survey ("ISGS") (2015) indicate that there are several karst areas crossed by the pipeline centerline and also located within a one-mile buffer of the pipeline centerline. Discussed in Resource Report 6, Figure 6.4-3 illustrates mapped karst terrain data within the Project area and Table 6.4-2 discusses the possibility of karst (and planned mitigation measures) along the Project route near MP 13.5 and 43.1. Most of the hazards are small karst features (sinkholes) that, if encountered during construction, can either be avoided by small adjustments to the Project right-of-way or can be mitigated as described in the Karst Mitigation Plan.

Spire has proposed locations of workspaces associated with the horizontal directional drill ("HDD") crossing of the Mississippi River and conducted geotechnical boring at these locations to determine the geology and feasibility of the drills. Geotechnical reports can be found in Resource Report 6, Appendix 6-B. The plan and profile of the proposed river crossing is depicted in Appendix 2-D, Site Specific Waterbody Drawings. Geotechnical boring test determined that no karst features were present in the HDD workspaces.

Missouri

The Geosciences Technical Resource Assessment Tool from the Missouri Department of Natural Resources ("MDNR") Missouri Geological Survey indicate sinkholes located within the Project area, specifically south of the Missouri River crossing (MDNR 2016a). Sinkhole areas identified at the Project are associated within areas of an active quarry. These areas show the ability to hold surface water, thus it is not anticipated that karst will be encountered at the depth of the pipeline trench. Resource Report 6, Figure 6.4-3 illustrates mapped karst terrain data identified within the Project area.

Spire has proposed locations of workspaces associated with the HDD crossing of the Missouri River and conducted geotechnical boring at these locations to determine the geology and feasibility of the drills. Geotechnical reports can be found in Resource Report 6, Appendix 6-B. The plan and profile of the proposed river crossings are depicted in Appendix 2-D, Site Specific Waterbody Drawings. Geotechnical boring test determined that no karst features were present in the HDD workspaces.

2.1.2 Public and Private Wells

Spire utilized groundwater data from the IEPA, the ISGS (2015), the MDNR (2008a), and the field to obtain information on public and private wells located within 150 feet of the Project area. Table 2.1-1 provides information on private water supply wells and springs within 150 feet of the Project construction areas. Seven private wells are located within 150 feet of the proposed Project through Greene and Jersey Counties, Illinois. No private wells were located within 150 feet of the proposed Project in Scott County, Illinois, or in St. Charles and St. Louis Counties, Missouri. And, no springs were present at the Project area.

Table 2.1-1. Water Wells and Springs within 150 Feet of the Project Construction Areas

Facility and County, State [1]	Approximate MP	Well Number[2]	Use	Approximate Distance from Temporary Workspace (feet)	Approximate Distance from Pipeline Centerline (feet)
24-inch Pipeline					
Greene County, Illinois	9.0	Unknown[3]	N/A[4]	0	33
Greene County, Illinois	9.0	Unknown[3]	N/A[4]	0	33
Greene County, Illinois	13.9	120612057400	Private Water	117	172
Greene County, Illinois	24.9	120612054900	Private Water	144	430
Greene County, Illinois	28.7	120612043300	Private Water	123	203
Jersey County, Illinois	38.6	120830020800	Private Water	104	184
Access Roads					
Greene County, Illinois	29.4	120612043600	Private Water	68	103

Notes:

1 Facilities not listed in this table do not have water supply wells within 150 feet of the Project. Additional water supply wells and springs may be identified during field survey and discussions with landowners.

2 Public well data from ISGS (2015) and MDNR (2008a).

3 Based on field survey data.

4 N/A - Not Available.

In Illinois, no designated community water supply ("CWS") wells, water supply lakes, or IEPA regulated recharge areas were identified within 150 feet of the 24-inch pipeline Project in Illinois (IEPA 2016b). There were also no protected watersheds or locally zoned aquifer protection areas located within the immediate Project area in Illinois (IEPA 2016b). In Missouri, however, a public drinking water groundwater well was located 1,450 feet from the Project area in St. Charles County, Missouri (MDNR 2008). Section 2.2.2.4, Water Protection Areas, contains information on this public source water area where the proposed route crosses a 0.5-mile radius buffer to the Portage Des Sioux Water Plant.

Spire does not intend to blast in close proximity to private and public water wells. Additional information regarding blasting activities can be found in Resource Report 6, Table 6.2-1, where Spire identified two locations where blasting may be required: MP 44.9 in Jersey County, Illinois, and MP 58.2 to 58.6 in St. Louis County, Missouri. Neither location have wells located within 150 feet of the construction area. Additionally, no municipal water mains were located in the vicinity of these Project areas.

2.1.3 Groundwater Impacts and Mitigation

2.1.3.1 Impacts

Construction, operation, and maintenance of the proposed facilities are not expected to have long-term impacts on groundwater resources. Adherence to the various plans mentioned in Section 2.1.3.2 during construction and restoration is expected to prevent or mitigate impacts to aquifers, wells, and karst features.

As discussed in Resource Report 1, Table 1.3-1, the proposed pipeline will be buried a minimum of three to five feet using standard open trench construction methods. The major groundwater resources are deeper than the trenches and pipeline placement. Trenchless (HDD) crossings will exceed these trench depths; however, these activities are not expected to have an impact on groundwater quality due to the relatively narrow diameter of the boreholes. Long-term aquifer recharge will not be affected by pipeline construction or subsequent operations as a majority of the pipeline right-of-way will revert to pre-existing agricultural conditions.

Pipeline construction activities may have minor, temporary impacts on groundwater resources where shallow aquifers are in proximity of the proposed facilities. These impacts may include increased turbidity, groundwater table fluctuations, short-term disruption of recharge, and localized flow along the pipeline trench or contamination from a spill or leak of hazardous substances. Prior to construction, wells within 150 feet of the construction area are to be staked. While no impacts are anticipated to private wells, should it be necessary, Spire will take measures to protect drinking water wells within 150 feet of the construction area. Spire is continuing to work with landowners regarding private water wells and springs within 150 feet of the Project to help minimize potential impacts.

If karst areas are encountered, stormwater will be diverted upland from the excavated karst areas utilizing approved erosion and control methods. If surface waters are present near the karst excavation, then water will be flumed to minimize the potential for storm water entering the void. Sand bags or similar materials would be utilized to withhold water from entering the excavation, and water levels will be monitored to determine whether it is entering the excavation.

Mitigation measures regarding private wells and karst features are discussed in Section 2.1.3.2.

2.1.3.2 Avoidance and Mitigation

Most potential groundwater impacts will be avoided or minimized due to the use of the standard construction methods and mitigation measures described in the Federal Energy Regulatory Commission's (FERC's) *Upland Erosion Control, Revegetation, and Maintenance Plan* ("Plan") and *Wetland and Waterbody Construction and Mitigation Procedures* ("Procedures") (FERC 2013a and 2013b). Area hydrology will also be preserved with the implementation of the following Plans:

- Karst Mitigation Plan provided in Resource Report 6, Appendix 6-A;
- Spill Prevention, Control, and Countermeasure ("SPCC") Plan in Appendix 2-A; and
- Erosion and Sedimentation Control Plans ("E&SCPs") developed during state and local permitting efforts.

As discussed in Section 2.1.1.3, small karst features, if encountered, can be avoided by small adjustments to the Project right-of-way or can be mitigated as described in the Karst Mitigation Plan. The Karst Mitigation Plan describes preventive measures such as personnel training and awareness, inspection monitoring and surveillance, construction phase procedures, and any remediation and post-construction monitoring processes should karst be found.

The Spill Prevention, Control, and Countermeasure Plan (SPCC Plan) describes preventive measures such as personnel training, equipment inspection, and refueling procedures to reduce the likelihood of spills (e.g., fuel storage areas will be located at least 200 feet from active private water wells and at least 400 feet from community and municipal water wells). It also includes mitigation measures, such as containment and cleanup, to reduce potential impacts should a spill occur.

Project-specific E&SCPs will reduce potential for adverse impacts to stormwater runoff during construction. Erosion control devices will be outlined in E&SCPs which will incorporate FERC's Plan and state and local regulations. When regulations or guidance information from multiple sources apply, the more stringent will be utilized in development of the E&SCPs.

Spire will also offer to landowners to conduct a pre-construction evaluation on active wells within 150 feet of the proposed Project workspaces. If requested by the landowner and feasible at the time of sampling, the well may be tested for yield and water quality. Upon request by a landowner who had a pre-construction test, a post-construction test may be performed. Spire will document any landowner choosing to opt out of pre-construction evaluation. Landowners participating in the testing program will be contacted by a Spire representative, and a qualified independent contractor will perform the testing. To maintain responsiveness to the concerns of affected landowners, Spire will evaluate landowner complaints or damage associated with construction.

If contaminated groundwater is encountered during construction, Spire will notify the affected landowner and coordinate with the appropriate federal and state agencies in accordance with applicable notification requirements. In the unlikely event that private landowner wells are damaged by Spire during construction, Spire will negotiate a settlement with the landowner that may include repair or replacement. Spire plans to provide adequate temporary accommodations or a temporary water supply to affected homeowners while their well is repaired or replaced in the event that no other potable water source is readily available.

While no blasting is anticipated near wells, state-specific Blasting Management Plans will be developed by Spire's Construction Contractor for the Project if it is determined that blasting is necessary, in order to minimize the potential for blasting-related adverse impacts. Specific blasting procedures are provided in Resource Report 1 and 6. Wells within 200 feet of any newly proposed blasting area would be tested for water quantity and quality prior to and after construction by a qualified independent laboratory as granted permission by landowners. And, any property damage as a direct result from blasting will be repaired or replaced.

2.2 Surface Water Resources

The Project crosses four major hydrologic watersheds upon reviewing hydrologic unit codes ("HUC") at the 4th level (United States Department of Agriculture Natural Resources Conservation Service "USDA-NRCS" 2016a):

Lower Illinois (HUC 0713), Upper Mississippi-Salt (HUC 0711), Lower Missouri (HUC 1030), and Upper Mississippi-Kaskaskia-Meramec (HUC 0714).

The 24-inch pipeline route crosses the Lower Illinois watershed from MP 0.0 to MP 42.3, the Upper Mississippi-Salt watershed from MP 42.3 to MP 50.4, and the Lower Missouri watershed from MP 50.4 to its destination at the Laclede/Lange Delivery Station. Line 880 is within the Lower Missouri watershed from MP 0.0 to MP 5.9 and the Upper Mississippi-Kaskaskia-Meramec watershed from MP 5.9 to the interconnect with Enable Mississippi River Transmission, LLC at the MRT Bi-Directional Station.

2.2.1 Existing Resources

Spire performed a desktop review of National Wetland Inventory ("NWI") mapping and National Hydrography Datasets ("NHD") and aerial photography to identify potential waterbodies in the Project area. Field surveys were initiated in September 2016 to identify water resources within the Project study area (an approximate 300 foot corridor) and were completed on accessible properties in 2016. The surveys identified waterbodies and wetlands crossed or otherwise impacted by the Project. Due to continuing survey permission, surveys have not been completed along the entire Project. For the areas not yet field surveyed within the Project areas, desktop inventory is provided from NWI and NHD mapping.

Table 2.2-1 identifies the areas with limited field survey access as of January 2017, either due to denied survey permissions or landowner conditions limiting survey windows due to standing crops or hunting. Appendix 2-C, Incomplete Environmental Survey Status Mapping, provides map sheets corresponding with the table's "Pending Survey" areas, as well as portions of the Project which were field surveyed in December 2016 and are pending field data results (labeled in Appendix 2-C "Survey Complete Pending Delineation Data"). Spire anticipates submitting a Supplemental Filing in first quarter 2017 to include any new field data from December 2016, and 2017.

A list of waterbodies crossed by the Project, based on desktop and field review, can be found in Table 2.2-2. A total of 106 waterbody segments are crossed by the Project area. Of these waterbodies, 31 were classified as perennial streams, 34 as intermittent streams, and 38 as ephemeral streams. Two ponds and one lake adjacent to the Mississippi River are also crossed by the Project. The locations of waterbodies relative to the construction and permanent rights-of-way and additional temporary workspaces ("ATWS") are contained in Construction Alignment Sheets provided in Resource Report 1, Appendix 1-B.

Waterbodies are categorized as perennial, intermittent, or ephemeral classes, depending on the permanence or duration of flow. Perennial waterbodies typically flow or contain standing water year round, and under normal circumstances are capable of supporting populations of fish and macroinvertebrates. Intermittent waterbodies flow or contain standing water seasonally, are typically dry for part of the year, and do not usually support populations of fish or macroinvertebrates which are directly dependent on water. Ephemeral waterbodies generally contain water only in response to precipitation or spring snowmelt and usually do not support populations of fish or macroinvertebrates. Existing stream conditions were recorded on data forms that incorporate Missouri Stream Mitigation Method assessment factors [United States Army Corps of Engineers ("USACE"), et al. 2013].

Table 2.2-1. Incomplete Environmental Survey Status

Facility/County, State	Approximate MP In	Approximate MP Out	Reason for Incomplete Survey[1]	Survey Need
24-Inch Pipeline				
Scott County, Illinois	1.60	1.90	Pending Survey Permission	Centerline
Greene County, Illinois	18.4	18.7	Pending Survey Permission	Centerline
Greene County, Illinois	26.4	27.3	Pending Survey Permission	Centerline
Greene County, Illinois	30.4	31.1	Pending Survey Permission	Centerline
Greene and Jersey Counties, Illinois	32.4	33.8	Pending Survey Permission	Centerline
Jersey County, Illinois	34.4	34.7	Pending Survey	Centerline
Jersey County, Illinois	40.3	41.1	Pending Survey Permission	Centerline, Access Road
Jersey County, Illinois	41.8	43.5	Pending Survey Permission	Centerline
Jersey County, Illinois	44.0	45.1	Pending Survey Permission	Centerline, Access Road
St. Charles County, Missouri	46.6	N/A	Pending Survey Permission	Pullback Section
St. Charles County, Missouri	51.1	51.1	Pending Survey Permission	Centerline (Railroad Right-of-Way)
St. Charles County, Missouri	53.0	53.6	Pending Survey Permission	Centerline (Railroad Right-of-Way)
St. Charles County, Missouri	54.1	54.5	Pending Survey Permission	Centerline
Line 880				
St. Louis County, Missouri	2.1	N/A	Pending Survey	New ATWS
St. Louis County, Missouri	2.3	N/A	Pending Survey	Centerline
MRT Bi-directional Station				
St. Louis County, Missouri	7.0		Pending Survey	New ATWS
Total Survey Remaining (in miles)	8.5			

Note:

[1] Pending Survey Permission - landowners at parcels have not granted survey permission at this time; Pending Survey - not surveyed yet due to new workspace additions or limited access windows.

Four perennial waterbodies equal to or greater than 100 feet wide were identified within the Project area: the Mississippi River, the Missouri River, and an oxbow of the Missouri River. As described in Table 2.2-2, waterbody features greater than 100 feet wide (Feature IDs: NDH-921, SMO-CDK-001, SMO-TMA-001), along with their adjacent waters (Feature IDs: NHD-915, NHD-924/NWI-505/SMO-WJW-001), are proposed to be crossed using the HDD method; therefore, no direct impact to the rivers is anticipated. Site-specific, cross-section drawings of these HDD crossings are depicted in Appendix 2-D. Spire has also provided a HDD Contingency Plan in Appendix 2-B.

Table 2.2-2. Waterbodies Crossed by the Project

Feature ID[1]	MP	Waterbody Name	Flow Regime[2]	Average Bank to Bank (Channel) Width (feet)	Average Water Width (feet)	Pipeline or Access Road Crossing Length (feet)[3]	State Water Quality Classification[4, 5]	County, State	Fishery Type[6]	Impaired Designated Use (Identified Pollutant)[7]	Crossing Method[9]
24-Inch Pipeline											
SIL-JJP-003	1.3	UNT to Little Sandy Creek	IT	10	2	10	GEN, PFPWS	Scott, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-004	1.6	UNT to Little Sandy Creek	E	6	0.5	0	GEN, PFPWS	Scott, Illinois	WWF	No	Workspace Only
NHD-181	1.9	UNT to Little Sandy Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Scott, Illinois	WWF	No	Dry Ditch Flume
NHD-199	2.2	UNT to Little Sandy Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Scott, Illinois	WWF	No	Dry Ditch Flume
NHD-256	2.7	UNT to Little Sandy Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Scott, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-013	3.4	Little Sandy Creek	P	40	15	30	GEN, PFPWS	Scott, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-010	3.5	UNT to Little Sandy Creek	E	6	0	6	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-017	3.6	UNT to Little Sandy Creek	E	2	0	0	GEN, PFPWS	Greene, Illinois	WWF	No	Workspace Only
SIL-TMA-011	3.8	UNT to Little Sandy Creek	IT	8	1.5	8	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-018	4.0	UNT to Little Sandy Creek	P	25	6	19	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-016	4.3	UNT to Little Sandy Creek	IT	8	1	0	GEN, PFPWS	Greene, Illinois	WWF	No	Workspace Only
SIL-TMA-018	4.3	UNT to Little Sandy Creek	P	9	2	9	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-054	4.3	UNT to Little Sandy Creek	E	8	0	0	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-026	5.6	UNT to Hurricane Creek	IT	2.5	0	2.5	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-027/NHD-580	5.7	UNT to Hurricane Creek	IT	4	0	4	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
NHD-599	6.4	Hurricane Creek	P	N/A	N/A	N/A	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-026	8.8	UNT to Seminary Creek	IT	7	2	7	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-031	10.3	UNT to Seminary Creek	E	4	0	0	GEN, PFPWS	Greene, Illinois	WWF	No	Workspace Only
SIL-TMA-021	10.3	UNT to Seminary Creek	P	30	22	28	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-022	10.8	UNT to Seminary Creek	E	4	0	4	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-024	11.3	UNT to Seminary Creek	E	4	0	4	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-031	13.2	UNT to Apple Creek	P	15	12	14	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-033	13.9	Apple Creek	P	67	35	67	GEN, PFPWS	Greene, Illinois	WWF	Aquatic Life (Dissolved Oxygen), Primary Contact Recreation (Fecal Coliform)	Dry Ditch Flume
SIL-TMA-034	14.1	Apple Creek	P	50	35	0	GEN, PFPWS	Greene, Illinois	WWF	Aquatic Life (Dissolved Oxygen), Primary Contact Recreation (Fecal Coliform)	Workspace Only
SIL-TMA-035	17.1	UNT to Coates Creek	P	3	2	0	GEN, PFPWS	Greene, Illinois	WWF	No	Workspace Only
SIL-TMA-036	17.6	UNT to Coates Creek	P	5	3	5	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
NHD-687	18.7	Coates Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-042	19.1	UNT to Coates Creek	P	6	3.5	6	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-100	19.1	UNT to Coates Creek	E	4	0	0	GEN, PFPWS	Greene, Illinois	WWF	No	Workspace Only
SIL-JJP-110	20.8	UNT to Link Branch	P	7	2.5	7	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-111	20.9	UNT to Link Branch	E	5	0	0	GEN, PFPWS	Greene, Illinois	WWF	No	Workspace Only
SIL-TMA-051	20.9	UNT to Link Branch	IT	6	2	6	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-078	22.4	UNT to Link Branch	IT	2	1.5	2	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-CDK-016	23.5	UNT to Macoupin Creek	IT	9	4	9	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-040	24.5	UNT to Macoupin Creek	E	3	0	3	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-038	25.0	UNT to Macoupin Creek	IT	4	2	4	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-039	25.3	Macoupin Creek	P	100	75	99	GEN, PFPWS	Greene, Illinois	WWF	Primary Recreation (Fecal Coliform)	Dry Ditch Flume
SIL-JJP-104	25.8	UNT to Macoupin Creek	P	8	3	8	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
NHD-741	26.7	UNT to Macoupin Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Greene, Illinois	WWF	No	Dry Ditch Flume
SIL-DFW-002	31.6	UNT to Wines Branch	IT	3.5	1	3.5	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-DFW-001	31.6	Wines Branch	P	25	3.5	13	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-761	33.7	UNT to Otter Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume

Table 2.2-2. Waterbodies Crossed by the Project (Continued)

Feature ID[1]	MP	Waterbody Name	Flow Regime[2]	Average Bank to Bank (Channel) Width (feet)	Average Water Width (feet)	Pipeline or Access Road Crossing Length (feet)[3]	State Water Quality Classification[4, 5]	County, State	Fishery Type[6]	Impaired Designated Use (Identified Pollutant)[7]	Crossing Method[8]
24-Inch Pipeline (continued)											
SIL-CDK-012	35.2	UNT to Otter Creek	P	23	12	23	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-118	35.5	UNT to Otter Creek	IT	3	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-TMA-058	35.5	UNT to Otter Creek	P	8	4	8	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-059	35.6	UNT to Otter Creek	E	4	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-JJP-120	35.7	UNT to Otter Creek	E	5	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-TMA-060	35.7	UNT to Otter Creek	IT	8	4	8	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-061	35.7	UNT to Otter Creek	E	4	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-JJP-121	36.0	UNT to Otter Creek	E	10	1	10	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-063	36.1	UNT to Otter Creek	E	8	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-JJP-122	36.3	UNT to Otter Creek	P	4	1	4	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-CDK-022	36.6	Otter Creek	P	50	20	60	GEN, PFPWS	Jersey, Illinois	WWF	Aquatic Life (Dissolved Oxygen)	Dry Ditch Flume
SIL-CDK-018	36.7	UNT to Otter Creek	E	4	0	4	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-136	38.9	UNT to South Fork Otter Creek	E	4	0	4	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-074	39.0	UNT to South Fork Otter Creek	P	5	2.5	5	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-073	39.0	UNT to South Fork Otter Creek	E	4	0	4	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-134	39.2	UNT to South Fork Otter Creek	P	8	1	8	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-JJP-131	39.4	UNT to South Fork Otter Creek	E	4	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-JJP-132	39.4	UNT to South Fork Otter Creek	E	4	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-JJP-130	39.4	UNT to South Fork Otter Creek	P	8	1	8	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-072	39.5	UNT to South Fork Otter Creek	E	3	0	3	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-TMA-070	39.6	UNT to South Fork Otter Creek	E	5	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-JJP-127	39.7	UNT to South Fork Otter Creek	E	4	0	0	GEN, PFPWS	Jersey, Illinois	WWF	No	Workspace Only
SIL-TMA-066/NHD-830	39.8	UNT to South Fork Otter Creek	P	12	6	13	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-849	40.9	UNT to South Fork Otter Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-850	41.0	UNT to South Fork Otter Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-CDK-001	41.5	UNT to South Fork Otter Creek	P	25	3	32	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-CDK-002	41.5	UNT to South Fork Otter Creek	IT	4	2	4	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
SIL-CDK-003	41.6	UNT to South Fork Otter Creek	E	5	0	5	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-869	42.0	UNT to Otter Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-874	42.5	UNT to Mill Creek	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-902	44.2	UNT to Mississippi River	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-908	44.5	UNT to Mississippi River	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-913	45.0	UNT to Mississippi River	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	Dry Ditch Flume
NHD-915	45.1	UNT to Mississippi River	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	HDD
NHD-917	45.2	UNT to Mississippi River	IT	N/A	N/A	N/A	GEN, PFPWS	Jersey, Illinois	WWF	No	HDD
NHD-921	45.3	Mississippi River	P	N/A	3,020*	N/A	Illinois: GEN, PFPWS	Jersey, Illinois	WWF	Illinois: Fish Consumption (Polychlorinated Biphenyls and Mercury), Primary Contact Recreation (Fecal Coliform)	HDD
							Missouri: LWW, AQL, WBC-Category A, SCR, DWS, IND	St. Charles, Missouri	WWF	Missouri: Category B (*E. coli*)	
NHD-924/NWI-505 (SMO-WJW-001)	45.9	Luesse Lake	N/A	N/A	N/A	N/A	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	N/A	HDD
SMO-WJW-001	46.0	UNT to Mississippi River	P	350*	350*	N/A	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	HDD
SMO-TMA-008	46.3	UNT to Mississippi River	E	2	0	2	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-TMA-011	46.7	UNT to Mississippi River	E	2	0	0	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Workspace Only
SMO-JJP-004	47.0	UNT to Mississippi River	E	2	0	2	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-JJP-003	47.7	UNT to Mississippi River	E	4	0	4	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume

Table 2.2-2. Waterbodies Crossed by the Project (Continued)

Feature ID[1]	MP	Waterbody Name	Flow Regime[2]	Average Bank to Bank (Channel) Width (feet)	Average Water Width (feet)	Pipeline or Access Road Crossing Length (feet)[3]	State Water Quality Classification[4, 5]	County, State	Fishery Type[6]	Impaired Designated Use (Identified Pollutant)[7]	Crossing Method[8]
24-Inch Pipeline (continued)											
SMO-TMA-006	47.8	UNT to Mississippi River	P	60	20	68	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-JJP-001	48.5	UNT to Mississippi River	E	4	0	4	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-TMA-009	49.6	UNT to Mississippi River	E	6	0	6	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-TMA-005	52.0	UNT to Missouri River	E	4	0	4	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-TMA-004	52.1	UNT to Missouri River	E	3	0	3	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-TMA-003	52.2	UNT to Missouri River	E	3	0	2	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-TMA-002	52.3	UNT to Missouri River	E	2	0	2	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	Dry Ditch Flume
PMO-TMA-001	54.5	None	POND	N/A	N/A	73	N/A	St. Charles, Missouri	WWF	No	Dry Ditch Flume
SMO-TMA-001	57.9	Missouri River (oxbow)	P	175*	165*	345*	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	HDD
SMO-CDK-001	58.2	Missouri River	P	1335*	1300*	1320*	IRR, LWW, AQL, WBC - Category B, SCR, DWS, IND	St. Louis, Missouri	WWF	WBC-Category B (*E. coli*)	HDD
Line 880 Modifications											
SMO-DFW-001	0.3	UNT to Missouri River	E	4.5	0	4.5	AQL, WBC - Category B, SCR, LWW, IRR	St. Louis, Missouri	WWF	No	Dry Ditch Flume
PMO-DFW-001	0.3		POND	N/A	N/A	0	N/A	St. Louis, Missouri	WWF	No	Workspace Only
SMO-DFW-008	2.2	Coldwater Creek	P	48	45	34	LWW, AQL, WBC - Category B, IND[9]	St. Louis, Missouri	WWF	AQL (Chloride) and WBC - Category B, SCR (*E. coli*)	Dry Ditch Flume
SMO-CDK-004	2.3	UNT to Coldwater Creek	IT	5	2	0	LWW, AQL, WBC - Category B, IND[9]	St. Louis, Missouri	WWF	No	Workspace Only
Laclede/Lange Delivery											
SMO-DFW-002	0.0	UNT to Missouri River	E	6	0	0	N/A	St. Louis, Missouri	WWF	No	Workspace Only[10]
Access Roads											
SIL-TMA-049	24.9	UNT to Macoupin Creek	IT	5	1.5	5	GEN, PFPWS	Greene, Illinois	WWF	No	TAR-012 - Existing Road/Stream Culverted
SIL-JJP-103	26.1	UNT to Macoupin Creek	IT	4	0.5	4	GEN, PFPWS	Greene, Illinois	WWF	No	TAR-014 - Existing Road/Stream Culverted
SIL-TMA-044	26.1	UNT to Macoupin Creek	IT	7	4	7	GEN, PFPWS	Greene, Illinois	WWF	No	TAR-014 - Existing Road/Stream Culverted
SIL-CDK-029	36.4	UNT to Otter Creek	IT	5	3	5	GEN, PFPWS	Jersey, Illinois	WWF	No	TAR-015 - Existing Access/Stream Culverted
NHD-784	36.5	Otter Creek	P	N/A	N/A	90	GEN, PFPWS	Jersey, Illinois	WWF	Aquatic Life (Dissolved Oxygen)	TAR-015 Workspace Only
SMO-TMA-008	46.3	UNT to Mississippi River	E	7	1.25	0	AQL, WBC - Category B, SCR, LWW, IRR	St. Charles, Missouri	WWF	No	PAR-018 Workspace Only
SMO-JJP-002	47.0	UNT to Mississippi River	E	5	0.2	0	GEN, PFPWS	St. Charles, Missouri	WWF	No	PAR-018 Workspace Only

Notes:

1 Map Designation - the unique code designated to the waterbodies identified during the field surveys. A unique identifier was also assigned to NHD data that was used to supplement field delineations on properties without survey permissions or in areas that are pending studies. Project facilities not listed do not impact streams.

2 Flow regime based on USGS topographic mapping and onsite field review. IT - Intermittent; E - Ephemeral; and P - Perennial.

3 Crossing width is the bank-to-bank width of stream at the pipeline or access road centerline crossing unless noted otherwise. N/A-Not applicable indicates that these waterbodies are desktop identified and therefore no crossing lengths are currently known.

4 Water quality standards are contained in 35 IAC Section 302. Water use designation and site-specific water quality standards are contained in 35 IAC Section 303. General Use Waters (GEN) - Except as otherwise specifically provided, all waters of the State (Illinois) must meet the general use standards of Subpart B of Part 302. The General Use standards will protect the State's (Illinois) water for aquatic life (except as provided in Section 302.213), wildlife, agricultural use, secondary contact use and most industrial uses and ensure the aesthetic quality of the State's (Illinois) aquatic environment. Public and Food Processing Water Supplies (PFPWS) - Except as otherwise specifically provided and in addition to the general use standards of Subpart B, Part 302, waters of the State shall meet the public and food processing water supply standards of Subpart C, Part 302, at any point at which water is withdrawn for treatment and distribution as potable supply for food processing.

5 Water quality classifications in Missouri are contained in 10 CSR 20-7.031. Last revised January 29, 2014 (MDNR 2014). Codes for the designated uses are as follows: IRR - Irrigation, LWW - Livestock & Wildlife Watering, AQL - Protection of Warm Water Aquatic Life and Human Health-Fish Consumption, SCR - Secondary Contact Recreation, DWS - Drinking Water Supply, WBC - Whole Body Contact Recreation, IND - Industrial.

6 Initial consultation with the IEPA have indicated that all waters of Illinois are considered general use waters and no waters of the state are designated as cold water fisheries (IEPA 2016d). Water Quality Standards Table C of Missouri 10CSR20.7 lists Waters Designated for Cold-Water Fisheries (MDNR 2014). Luesse Lake is contained within the Mississippi River valley and was designated by the NWI layer as a L1UBHH - Lacustrine, Limnetic, Unconsolidated Bottom.

7 State impaired waters have been defined by the Section 303(d) lists for Illinois (IEPA 2016c) and Missouri (MDNR 2016d).

8 With the exception of those listed as HDD, Spire will assume a dry ditch flume crossing method unless the feature has no discernable flow at the time of construction. Conventional open cut method will be employed, where allowable, if the feature is dry.

9 Classified by the MDNR as a Metropolitan No-Discharge Stream, located in Chapter 7 10 CSR 20-7.031 of the Clean Water Commission created by the MDNR. Last revised January 29, 2014 (MDNR 2014).

10 Feature avoided by final facility design as shown in Resource Report 1, Appendix 1-F.

* Measured using aerial photography (2016).

Macoupin Creek (Feature ID: SIL-TMA-039) is right at 100 feet wide at its banks. The flume method is currently proposed for the crossing of Macoupin Creek. Spire evaluated the use of trenchless crossing methods at Macoupin Creek, and it was determined unfeasible due to location of adjacent wetlands and unsuitable bore sites (e.g., surveyed wetlands in the area, potential need for groundwater pumping at deep bore sites due to the stream's high banks) which could result in additional wetland and water impacts. The site-specific crossing of Macoupin Creek is provided in Appendix 2-D.

General construction methods at waterbodies are discussed in Section 2.2.6.

2.2.2 Water Quality

2.2.2.1 Contaminated Sediments

Spire searched the IEPA, IDNR, and MDNR databases for potential contaminated streams and sites. The primary potential sources of sediment contamination in the Project area are agricultural fields containing fertilizers and pesticides, leachate from feed lots and leeching fields, or natural background geologic sources. The USEPA's National Sediment Quality Survey ("NSQS") was examined to generally characterize potential contamination of aquatic bed sediment found throughout the Project area.

According to the NSQS reports, the Macoupin Watershed (HUC 8 - 07130012) was identified as an area of probable concern for sediment contamination (USEPA 2004a); however, the stream segment within the Project area (Macoupin Creek, HUC 10 - 0713001206) is not present on the IEPA total maximum daily load report (IEPA 2007), nor is segment 0713001206 listed for suspended solids on the current 303(d) list (IEPA 2016c). Thus, no crossing restrictions are anticipated. The Project's crossing of Macoupin Creek will be flumed and trenched, and Spire will minimize downstream sedimentation by utilizing instream construction methods and establishing erosion and sediment controls per FERC's Plan and Procedures, applicable state and local regulations and guidance documents, and Project-specific E&SCPs.

The Project crosses Coldwater Creek within the metropolitan no-discharge stream reach as found in 10CSR 20-7.031, Table F (MDNR 2014). Due to the stream's designation, no direct impacts are permitted without obtaining an Individual 401 water quality certification from the MDNR; Spire obtained the Individual 401 water quality certification for the crossing of Coldwater Creek in November 2016, which is valid through the completion of construction. Spire also coordinated with the USACE Formerly Utilized Sites Remedial Action Program ("FUSRAP") regarding crossing Coldwater Creek with an open cut method. The USACE FUSRAP indicated that their current sampling efforts are revealing the sources of contaminants have been removed upstream and there is an unlikely possibility for contaminants to migrate. The USACE FUSRAP reviewed Spire's current crossing plan and proposed soil disturbance areas and determined that there is not contamination or a pathway for future contamination at the crossing location (Prebianca 2016 and Rankins 2016). The MDNR has also been made aware of Spire's proposed crossing plan. Copies of the correspondence are provided in Resource Report 1, Appendix 1-C.

The USEPA's List of Sediment Sites with Substantial Contamination was also examined for Superfund sites within the Project area. The West Lake Landfill Superfund Site is a USEPA Superfund Site located in Bridgeton, Missouri consisting of several inactive landfills, including the West Lake Landfill and Bridgeton Landfill. The Project is located

approximately 11.5 miles northeast of these landfills and therefore no issues of contamination are expected during construction. No superfund sites are located within one mile of the Project area (USEPA 2004b).

2.2.2.2 Impaired Waters

A review of statewide 303(d) Impaired Waters (IEPA 2016c and MDNR 2016d) identified several waterbodies crossed by the Project in Illinois and Missouri that are designated as impaired. Under Section 303(d) of the 1972 Clean Water Act, states, territories, and authorized tribes are required to develop a list of waters which do not meet or are not expected to meet applicable water quality standards. The proposed Project crosses several streams in Illinois and Missouri listed on the respective 2016 List of Impaired Waterbodies for the 303(d) program as listed in Table 2.2-2, including Apple Creek, Macoupin Creek, and the Mississippi River in Illinois, and the Mississippi River, Missouri River, and Coldwater Creek in Missouri.

In Illinois, Apple Creek is impaired for aquatic life due to dissolved oxygen, Macoupin Creek is impaired for primary contact recreation due to fecal coliform, and the Mississippi River is impaired for primary contact recreation and fish consumption for mercury, polychlorinated biphenyl, and fecal coliform. In Missouri, the Mississippi River is impaired for water body contact recreation for *Escherichia coli* (*E. coli*). Other listed streams in Missouri include the Missouri River, which is impaired for water contact recreation due to the presence of *E. coli,* and Coldwater Creek, whose designated uses are impaired for aquatic life, primary water contact recreation, and secondary contact recreation from the presence of chloride and *E. coli*. Coldwater Creek is also listed by the MDNR as a metropolitan no discharge stream and was previously discussed in Section 2.2.2.1 (Prebianca 2016). The Project does not cross waters impaired by suspended solids, turbidity, or siltation; therefore there are no regulatory restrictions for the crossing of 303(d) listed streams on the Project. Correspondence is provided Resource Report 1, Appendix 1-C.

The IEPA does not specify special requirements for any of the stream crossings in the Project area. However, Missouri will not validate a Section 404 Permit issued on a water that is listed as impaired by inorganic sediment, aquatic habitat alteration, or an unknown impairment. No streams crossed by the Project in Missouri are listed impaired under these designations.

Spire plans to cross all streams in Illinois and in Missouri in accordance with the FERC's Procedures. The potential for impacting the contaminated sediments or creating greater impairment to waterbodies on the Project is minimal. Erosion control devices will be installed to prevent sediment from entering waterbodies from the disturbed Project area. Additional procedures to avoid or mitigate contaminant impacts are provided in the SPCC Plan in Appendix 2-A and state and/or local permitting efforts. Erosion and sediment control best management practices (BMPs), such as flume pipe stream bypass methods, immediate stream bed and bank stabilization, and installation of sediment barriers, will be established in Project-specific E&SCPs as part of the required regulatory approvals.

2.2.2.3 Designated or Sensitive Surface Waters

Sensitive waterbodies include those designated under Section 305(b) or Section 303(d) of the CWA for domestic use; where fish or other listed species are present; and/or outstanding or exceptional quality waterbodies, waters

of recreational importance, protected watershed areas, surface waters that have important riparian areas, and rivers on the designated rivers inventory.

No known wild trout streams, high quality waters, waterbodies listed as outstanding or exceptional quality, or state or federal wilds and scenic rivers occur within the Project area [IEPA 2016d, MDNR 2016b, MDNR 2014, and the United States Fish and Wildlife Service ("USFWS") 2016].

The Mississippi River is listed by the USACE as a Section 10 federally navigable water, a state fish and wildlife designated area, and also contains federally-listed and state-listed threatened and endangered species (IEPA 2016b, USACE 2016a, and USFWS 2013). The Missouri River is also designated as a critical resource for federally-listed and state-listed threatened and endangered species and as a Section 10 federally navigable water (USACE 2016b and USFWS 2013).

Spire is crossing both rivers by the HDD method to protect these sensitive waters. Although trenchless methods are adopted to avoid impacts on water quality with no disturbance to streams' bank, channel, and bottom, a potential for an inadvertent return of drilling mud may occur, and the release could result in a plume extending from the discharge point downstream. Sections 2.2.6.3 and 2.2.6.5, discusses the HDD crossing method and Spire's action plans for inadvertent releases.

2.2.2.4 Water Protection Areas

Mississippi River

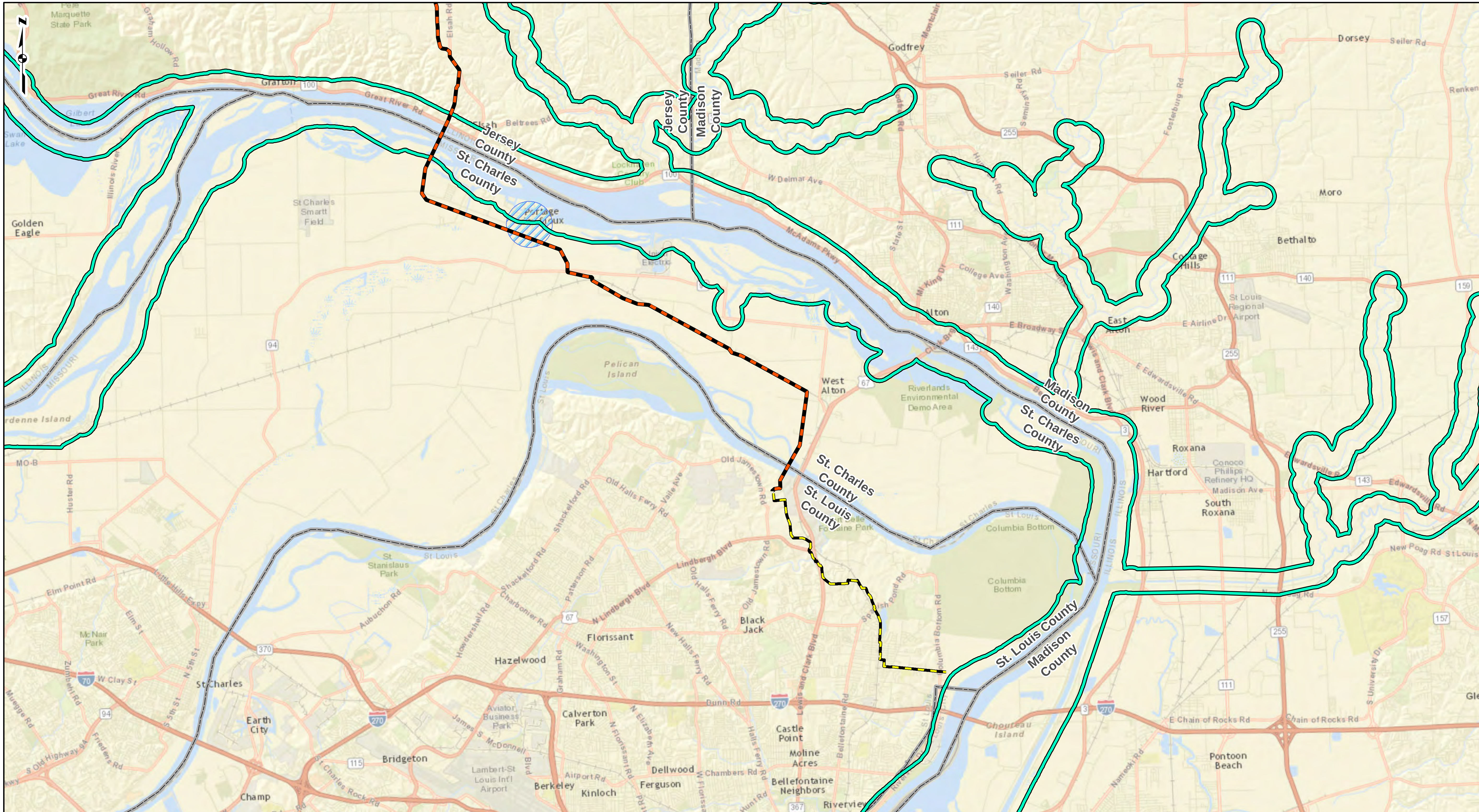
The Mississippi River is designated by Illinois and Missouri's respective 303(d) lists as a drinking or public water supply (IEPA 2016c) (MDNR 2016d). Table 2.2-3 identifies two public water protection areas in the vicinity of the Project near the Mississippi River: the Mississippi River Water Supply Intake Protection Area (IEPA 2016b) and the Portage Des Sioux Water Plant (MDNR 2008a) source water area. Figure 2.2-1 identifies the location of the public water protection areas.

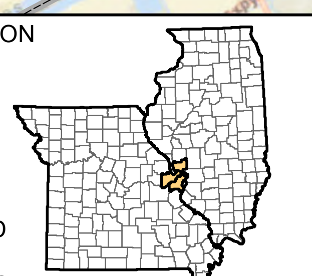
Table 2.2-3. Public Water Supply Protection Areas Crossed by the Project

City/County, State	Approximate MPs	Public Water Supply	Distance/Direction of Water Supply from Project Facilities (miles)	Project Facilities Upstream/Downstream of Withdrawals
24-Inch Pipeline				
Granite City and Alton City, Illinois	44.8 to 45.9	Mississippi River Water Supply Intake Protection Area, operated by Illinois American Water Company	9.0 miles downstream of HDD	Mississippi River HDD Crossing Upstream of Intake
St. Charles County, Missouri	N of 49.2	Portage Des Sioux Water Plant (Public Water Supply Well, Water Treatment, and Water Tank)	2.5 miles downstream of HDD; 0.2 miles north of construction right-of-way	Mississippi River HDD Crossing Upstream of the Public Water Well

Note:

[1] Facilities not listed do not impact public water supplies.





PROJECT LOCATION

JERSEY COUNTY, ILLINOIS AND ST. CHARLES AND ST. LOUIS COUNTIES, MISSOURI

REFERENCE: WORLD STREET MAP, 2016, ESRI, HERE, DELORME, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI (THAILAND), MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ACCESSED 01/2017.

LEGEND

- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- COUNTY BOUNDARY
- MISSISSIPPI RIVER WATER INTAKE PROTECTION AREA
- PORTAGE DES SIOUX PUBLIC WATER PLANT 0.5 MILE BUFFER

0 1 2 4 Miles

FIGURE 2.2-1
SOURCE WATER PROTECTION AREAS MAP

gai consultants

SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH
DATE: 1/11/2017
CHECKED: EFJ
APPROVED: LMF

Z:\Energy\2016\E160438.00 - Spire - STL Pipeline Proj\GIS\MXD\Resource_Reports\RR_2_Source_Water_Protection_Areas_2017_01_11.mxd

Missouri River

According to the MDNR's Section 305(b) list, the Missouri River is listed as a drinking water supply (MDNR 2016d). No public drinking water pumping and booster station, tanks, active water wells, water intakes or springs, supply districts, or intake watersheds for lakes or rivers were identified within the immediate Project area or three miles downstream of the waters in Missouri (MDNR 2016a).

The Mississippi River Water Supply Intake Protection Area, designated by the IEPA, is sourced from the Illinois American Water Company ("IAWC") divisions in Granite City and Alton City. No water supply intakes were located three miles downstream of the Mississippi River crossing in Illinois (IEPA 2016b). No adverse impacts are anticipated for the Mississippi River Water Supply Intake Protection Area as the IAWC intake location is located approximately nine miles downstream of the Project's HDD location. Copies of correspondence are provided in Resource Report 1, Appendix 1-C.

MDNR (2008b) uses a 0.5-mile radius to initially assess source water areas around public wells. The proposed centerline for the 24-inch pipeline in St. Charles County, Missouri crosses within their established buffer for the Portage Des Sioux Water Plant. According to MDNR (2008a) data layers, the Portage Des Sioux Public Water Plant contains a public drinking water well, water treatment plant, and water tank (tower). The water well was drilled in 1967 to a depth of 116 feet in the alluvium layer of the Mississippi River. While the well is located 2.5 miles downstream of the HDD crossing of the Mississippi River, construction workspace associated with the 24-inch pipeline is located approximately 1,450 feet south of the well. Upland pipeline construction is proposed through this area south of Portage Des Sioux in which the pipe is buried a minimum of five feet below surface at agricultural fields or seven feet below surface at floodplains, and no blasting is proposed within the county. Recharge to alluvium layers of the river can be received from infiltration from the river, from bedrock adjacent to and underlying the alluvium, from precipitation falling upon the floodplain, and from downward leakage of water from streams flowing across the alluvium; however, recharge typically occurs during high flow stages of the river with groundwater movement from bedrock to the alluvium (MDNR 2016c). The Web Soil Survey (USDA-NRCS 2016b) identifies soils ranging from silty clay loam to clay textures within the source water buffer area; clays or silt cap overlying the more permeable sands and gravels will restrict or retard infiltration of surface water to alluvial aquifers (MDNR 2016c). No adverse impacts are anticipated given the distance from the well; depth of the well; and pipeline construction methods, depths, and soils proposed in the buffer area. Spire has consulted with the MDNR Wellhead Protection Program and MDNR Public Drinking Water Branch to see if any restrictions occur at the 0.5-mile radius source protection buffer area. The Wellhead Protection Program stated their program does not have restrictions for pipeline/utility development in regards to public source waters/wells as they only handle domestic wells and give guidance to contact the Public Drinking Water Branch at MDNR (Rollins 2016). Spire has communicated general project information to the MDNR Public Drinking Water Branch (Baker and Jaafari 2017) and will continue to discuss the proposed Project plans with their department regarding the Portage Des Sioux Water Plant buffer area and the two HDD crossings. Copies of correspondence are provided in Resource 1, Appendix 1-C.

Spire developed a HDD Contingency Plan for the crossing of the Mississippi and Missouri Rivers as a FERC requirement in accordance with Section V.B.6.d of the FERC's Procedures (IEPA 2016b). Spire consulted the IEPA

regarding the Mississippi River Water Protection Area intake protection area; IEPA confirmed that there are no crossing restrictions associated with the area (Cook 2016); and as mentioned previously, Spire will follow up with the MDNR Public Drinking Water Branch to address specifics of the crossing. Copies of correspondence are provided in Resource 1, Appendix 1-C.

2.2.3 Floodplains

Table 2.2-4 lists the 100-Year Federal Emergency Management Agency ("FEMA") flood zones crossed by the Project with corresponding mapping provided in Appendix 2-E. Crossing methods to be used within each flood zone is provided in the table, and additional details are provided as site-specific cross-section drawings in Appendix 2-D. Spire is proposing to provide a minimum depth of cover of seven feet at floodplains; the HDD crossings at floodplains, as discussed in Section 2.2.6.3, are at depths much greater and well below river bottoms. The proposed cover will generally provide adequate scour protection from high flows and flooding. Prior to construction, field observations will be conducted to determine stability of the banks and appropriate bank stabilization techniques.

Table 2.2-4. 100-Year Flood Zones Crossed by the Project

Flood Zone Crossed (by MP)	Waterbody Associated with Flood Zone	County, State	Crossing Method	Permanent Above Ground Structures in Flood Zone
24-Inch Pipeline				
13.8 - 14.4	Apple Creek	Greene County, Illinois	Proposed upland and wetland open trenching; Dry Ditch Flume of stream	No
25.0 - 25.1	UNT to Macoupin Creek	Greene County, Illinois	Dry Ditch Flume	No
25.2 - 25.6	Macoupin Creek	Greene County, Illinois	Proposed upland and wetland open trenching; Dry Ditch Flume of stream	No
36.5 - 36.6	Otter Creek	Jersey County, Illinois	Proposed upland and wetland open trenching; Dry Ditch Flume of stream	No
45.0 - 47.1	Mississippi River[1]	Jersey County, Illinois and St. Charles County, Missouri	Proposed upland and wetland open trenching; HDD of river and adjacent wetlands/waters	Yes, MLV at MP 46.2
47.4 - 57.8[2]	Mississippi and Missouri Rivers	St. Charles, Missouri	Proposed upland and wetland open trenching; Dry Ditch Flume of streams crossed within this portion	No
57.8 - 58.3	Missouri River[1]	St. Charles and St. Louis Counties, Missouri	HDD of river and adjacent wetlands/waters	No
Line 880 Modifications				
2.2	Coldwater Creek[1]	St. Louis County, Missouri	Dry Ditch Flume	No
MRT Bi-directional Station				
6.9 - 7.0	Mississippi River	St. Louis County, Missouri	N/A[3]	Yes, at MP 7.0

Notes:

[1] Regulated floodway also crossed.

[2] Milepost range provided for large floodplain between the two rivers.

[3] N/A - Not Applicable as a crossing; station design is discussed in Section 2.2.3.2.

2.2.3.1 Illinois

Portions of the 24-inch pipeline will be located within the FEMA 100-year flood zones of Apple Creek and Macoupin Creek in Greene County, Illinois, and Otter Creek and the Mississippi River in Jersey County, Illinois. Temporary impacts within the FEMA 100-year flood zones are unavoidable due to the long linear nature of the floodplain and the proposed Project route. Construction of the pipeline throughout these areas will not result in placement of any permanent fill above existing grade within the flood zones.

Spire will prepare and submit required documentation for County Floodplain Development Permits for the portions of the proposed pipeline and associated construction right-of-way, access roads, and ATWS located within the FEMA 100-year flood zones in Jersey County and Greene County, Illinois. Spire anticipates to submit applications for floodplain permits in early October 2017.

2.2.3.2 Missouri

A portion of the 24-inch pipeline will be located within the FEMA 100-year flood zone and FEMA regulatory floodway of the Mississippi River, Missouri River, and tributaries to the Missouri River, including Coldwater Creek. This includes the crossing of the Mississippi River and the crossing of the Missouri River, as well as the proposed 24-inch pipeline alignment across the floodplain from approximately MP 45.0 through MP 58.1. Construction of the pipeline through these floodplains and floodway areas will be crossed using HDD, where feasible. However elsewhere, temporary impacts within the FEMA flood zones are unavoidable due to the long linear nature of the floodplain and the route of the Project.

As currently proposed along the 24-inch pipeline route, the HDD workspaces for the Mississippi River HDD crossing are within the FEMA 100-year flood zone, and the HDD workspace on the south side of the river in St. Charles County is also partially within the regulated floodway. The permanent aboveground mainline valve ("MLV") also at this HDD workspace area (at approximately MP 46.2) is just outside of the regulated floodway, though still within the FEMA 100-year flood zone. At the Missouri River HDD crossing, the HDD workspace on the north side of the river in St. Charles County is within the FEMA 100-year flood zone and the regulated floodway, however, the HDD workspace on the south side of the river is outside of both the 100-year flood zone and floodway.

A permanent aboveground facility, the MRT Bi-directional Station at the southern end of Line 880 in St. Louis County, is currently proposed to be located within the limits of the Mississippi River FEMA 100-year flood zone, though not within the regulated floodway. Spire is currently developing a detailed design of this station. The design will consider a combination of several options for reducing potential for flood water to come into contact with sensitive equipment or hazardous material: 1) use of platforms or raising earth elevation higher than flood elevation, 2) use of structures that surround sensitive equipment for water proofing, and/or 3) inclusion of physical barriers around the site to block flood waters (less feasible for site accessibility).

Spire will prepare and submit required documentation for Floodplain Development Permits for the portions of the proposed pipeline (and associated construction right-of-way, valve and meter sites, access roads, and ATWS) located within the FEMA 100-year flood zones and a No-Rise Certification (for regulatory floodway crossings) to St. Louis County, St. Charles County, and the City of West Alton. Spire anticipates to submit applications for

floodplain permits in early October 2017. If necessary, Spire will perform a hydrologic and hydraulic analysis as part of the permit submittals.

2.2.4 Water Use

2.2.4.1 Hydrostatic Testing Water Use

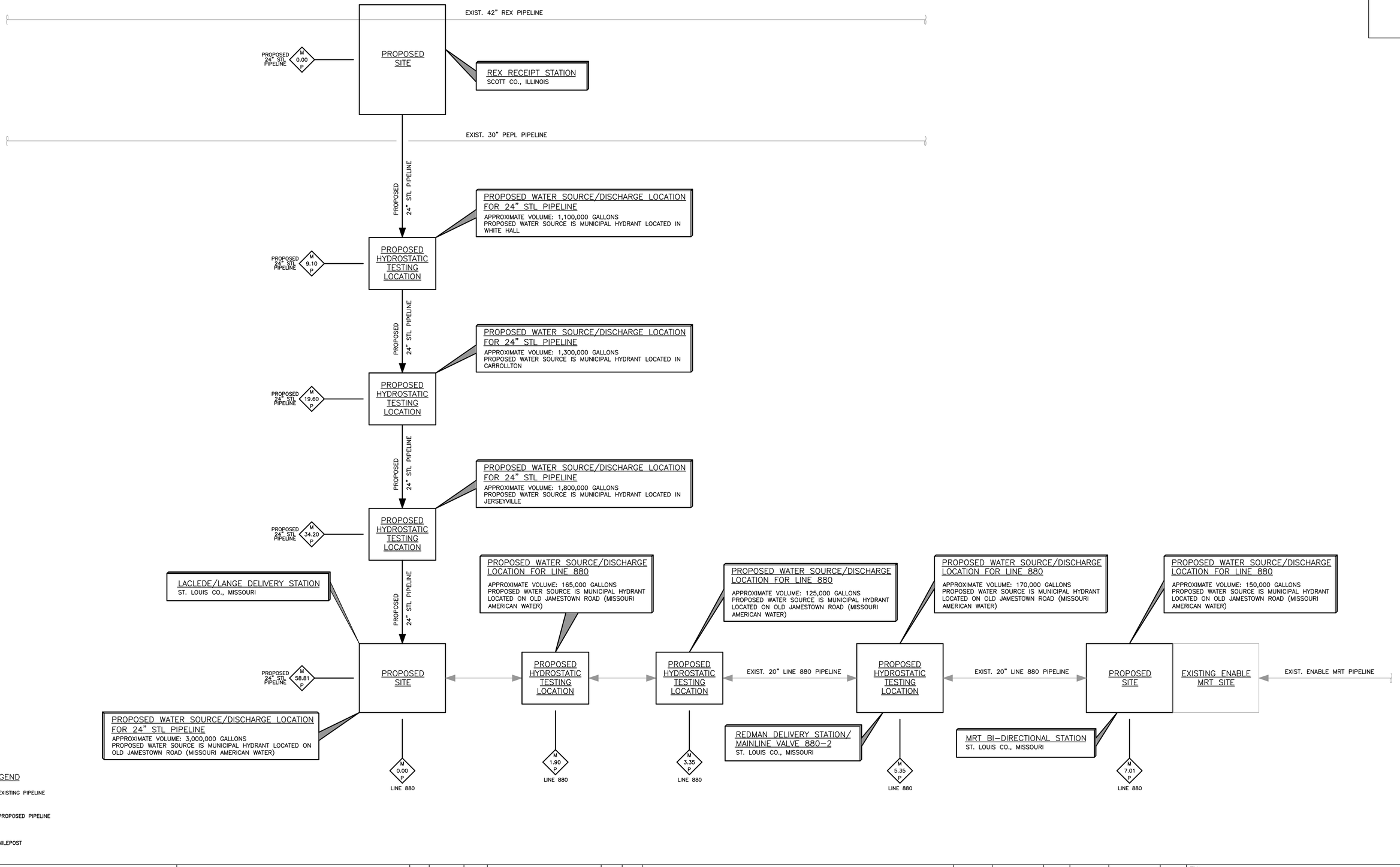
The Project will be hydrostatically tested to ensure that it is capable of safely operating at the design pressure. Spire plans to source water necessary for hydrostatic testing from municipal water supply. Table 2.2-5 and Figure 2.2-2 display the anticipated water quantities for hydrostatic testing per pipeline test segment as well as the proposed discharge location. Spire is working out agreements with local municipalities to identify specific municipal water withdrawal locations, rates, and amounts. No water treatment (chemicals or inhibitors) are necessary during or after the hydrostatic testing.

Table 2.2-5. Hydrostatic Test Water Segments, Volumes, Sources, and Discharge Locations

Pipeline Test Segments		Approximate Volume (gallons)	Water Source	Discharge Location (MP)
Begin MP	End MP			
24-Inch Pipeline				
0.00	9.10	1,100,000	Municipal Hydrant	9.10
9.10	19.60	1,300,000	Municipal Hydrant	19.60
19.60	34.20	1,800,000	Municipal Hydrant	34.20
34.20	58.81	3,000,000	Municipal Hydrant	58.81
REX Receipt Station				
0.00		30,000	Municipal Hydrant	0.00
Laclede/Lange Delivery Station				
58.81		30,000	Municipal Hydrant	58.81
Line 880 Modifications				
0.00	1.90	165,000	Municipal Hydrant	TBD[1]
1.90	3.35	125,000	Municipal Hydrant	TBD[1]
3.35	5.35	170,000	Municipal Hydrant	TBD[1]
5.35	7.01	150,000	Municipal Hydrant	TBD[1]
Redman Delivery Station				
5.35		30,000	Municipal Hydrant	5.35
MRT Bi-directional Station				
7.01		30,000	Municipal Hydrant	7.01

Note:

[1] TBD - To be determined as discussed in Section 2.2.4.1.



Prepared By

MOTT MACDONALD

Prepared For

Spire STL Pipeline

Rev	Date	Drawn	Description	Ch'k'd	App'd

Project Number: 372453

B/O

Total

Designed	MAP		Eng check	MAP	
Drawn	MAP		Coordination	MAP	
Dwg check	DGG		Approved	JEW	
Scale at ARCH D: NONE	Status		Rev: 0	Security	

Drawing Number: HYDRO-001

Title

SPIRE STL PIPELINE PROJECT
SPIRE 24" STL PIPELINE AND 20" LINE 880 PIPELINE
HYDROSTATIC TEST PLAN
OVERALL SCHEMATIC

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Hydrostatic testing will occur at test segments by milepost. In accordance with Pipeline and Hazardous Materials Safety Administration ("PHMSA") requirements, each segment will be capped and filled with water and pressurized for a minimum of eight hours prior to the pipeline being placed in service. Any leaks or unexplained pressure losses detected during this process are subsequently repaired and retested. As hydrostatic testing completes at a segment, the test water may be pumped to the next segment for testing or the water may be discharged in accordance with state permitting requirements. Test water will be discharged through an energy-dissipating device. Once a pipeline segment has been successfully tested and dried, the test cap and manifold will be removed and the pipe will be connected to the remainder of the pipeline.

Line 880 hydrostatic test water will be treated and discharged in accordance with state regulations at the end of each test segment, whether that be onsite discharge or discharge to frac tanks for offsite disposal.

2.2.4.2 HDD Drilling Water Use

As previously discussed, the HDD crossing method is proposed at the Mississippi River and Missouri River. Potential water sources and estimated volumes necessary for each HDD installation are identified in Table 2.2-6. In sum, approximately 4.4 million gallons of water are estimated for HDD drilling at the Project. Spire's water withdrawals are being developed to ensure quantities do not surpass allowable quantities as permitted. Spire will apply for the appropriate water withdrawal and water disposal permits using a preliminary plan based on estimated water volumes and withdrawal timing needs for construction.

HDD waste water disposal locations will identified by a Spire HDD contractor prior to construction; disposal of all fluids and cuttings will be transported and disposed of at an appropriate disposal facility approved by Spire.

Table 2.2-6. HDD Water Usage Estimates

HDD Location	Estimated Water Usage (gallons)[1]	Water Source
24-Inch Pipeline		
Mississippi River	2,800,000	Mississippi River or Municipal Water
Missouri River	1,600,000	Missouri River or Municipal Water

Note:

[1] Approximate water volume required for executing the drill (pilot bore, reaming, swab, and pull-back operations) and for buoyancy control during construction. The listed quantities are conservative estimates and may vary based on site-specific conditions.

2.2.4.3 Dust Suppression Water Use

Water required for dust suppression will be obtained from municipal sources. As previously mentioned, Spire is working out agreements with local municipalities regarding water use.

2.2.5 Construction Permits

Spire will obtain the necessary federal and state permits for water usage and construction at regulated waters and will conduct waterbody crossings in accordance with FERC Procedures, the USACE, and state requirements. A summary of permits and approvals associated with the proposed construction and operation of the Project is provided in Resource Report 1, Table 1.6-1. In addition, Spire anticipates obtaining permits to conduct the HDD crossings of the Mississippi and Missouri Rivers.

Floodplain development permits from Greene County, Illinois; Jersey County, Illinois; St. Louis County, Missouri; St. Charles County, Missouri; and the City of West Alton, Missouri will also be obtained.

Spire will obtain a state-issued Missouri National Pollutant Discharge Elimination System (NPDES) general permit(s) for construction and trench dewatering and hydrostatic test water discharge, as applicable, prior to construction. In the State of Illinois, oil and gas activities are exempt from submitting for NPDES Construction Stormwater Permit provided that FERC Plan and Procedures and BMPs are incorporated into construction activities. As previously mentioned, Project-specific E&SCPs will be developed using the more stringent of state and local regulations and/or FERC procedures.

Copies of correspondence are provided in Resource Report 1, Appendix 1-C.

2.2.6 Waterbody Construction and Mitigation Procedures

2.2.6.1 Construction

The Project, as proposed, will not cause permanent impacts on any surface waterbodies. Construction at waterbodies will be conducted in accordance with applicable state and local regulations and guidance manuals and the FERC's Procedures, unless variances are requested by Spire and approved by the FERC. Spire intends to implement the FERC's Procedures as a minimum standard for crossing and restoring waterbodies affected by the Project. Construction methods at waterbodies will vary with the characteristics of the waterbody encountered and will be consistent with permit conditions that will be outlined in the regulatory permit approvals as well as the Plan and Procedures which contain BMPs intended to reduce ground disturbance, minimize erosion and sediment runoff, and promote revegetation within the construction area.

Spire plans to utilize the dry ditch flume method at stream crossings, and the HDD method at river crossings. In accordance with FERC Procedures, waterbody flow will be maintained at all times during construction; where allowable, any crossings that are dry or frozen and not flowing may utilize open cut/conventional lay construction methods. Construction methods are described in Sections 2.2.6.1 to 2.2.6.3.

Spire proposes to limit waterbody impacts by reducing the construction right-of-way width to 75 feet at the waterbody crossings as displayed in Resource Report 8, Appendix 8-A.

Per the USACE Nationwide Permit for Missouri, the permittee must not excavate from or discharge into the listed waters on the Missouri Combined Stream Spawning List during the specified seasonal restrictions. No streams crossed by the Project within St. Charles or St. Louis Counties, Missouri, are listed on the spawning list and no streams crossed by the Project are designated within the one mile buffer receiving waters for the listed streams

(USACE 2012). Spire has been in communication with the IEPA (Twait 2016a and 2016b), MDNR (Irwin 2016), and Missouri Department of Conservation (Beres 2017) regarding instream construction timing restrictions for warmwater fisheries; the state agencies have indicated there are no timing restrictions in Illinois and Missouri for the Project's waterbody crossings. Communications are provided in Resource Report 1, Appendix 1-C. Timing restrictions that differ from the FERC Procedures developed in consultation with the applicable state agencies is allowed under Section V of the FERC Procedures. Therefore, Spire anticipates that construction can occur at any time of year on the waterbodies crossed by the Project.

2.2.6.2 Dry Ditch Flume Crossing Method

Intermediate waterbodies (between 10 and 100 feet wide) and minor waterbodies (less than 10 feet wide) will be crossed by the dry ditch flume crossing method. Dry ditch flume is an alternative to the open cut method in which water flow is temporarily directed through one or more flume pipes placed over the excavation area. Temporary dams consisting of sand bags, bladders, or other impervious materials are installed upstream and downstream of the proposed crossing and are used to divert water into the flume(s). The use of the flume(s) allows trenching and pipeline installation to occur primarily in dry conditions without significant disruption of water flow.

In waterbodies less than 100 feet wide, pipe will be installed to provide a minimum of five feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required. In waterbodies more than 100 feet wide, pipeline depth of cover will be at least five feet with the exception of a two-foot minimum depth of cover in consolidated rock. Trench spoil will be placed on the bank above the high water mark for use as backfill. Excavated material not required for backfill will be disposed of at an upland site within the Project's limits of disturbance or otherwise disposed of at a commercial disposal facility. Waterbody banks will be returned to pre-construction grade.

2.2.6.3 HDD

The HDD crossing method is typically utilized at wide or sensitive waterbodies to avoid direct impacts on sensitive resources and/or to avoid areas in which constructability by conventional means is not feasible. The HDD method allows for construction across wetland without the excavation of a trench, by drilling a hole significantly below conventional pipeline depth and pulling the pipe through the pre-drilled hole. Waterbodies proposed to be crossed by HDD are associated with the Mississippi and Missouri River crossings. Spire conducted geotechnical boring at the HDD locations to determine the geology and feasibility of the drills.

The HDDs will allow for trenchless construction across the waterbodies and will eliminate planned impacts from construction activities within the waterbodies. Site-specific cross-section drawings of the HDD crossings are depicted in Appendix 2-D. The HDD of the Mississippi River crossing will include an entry/exit locations north of the Mississippi River, and an entry/exit location south of the Mississippi River; the crossing depth will extend to a minimum depth of 80 feet below the river bed. The Missouri River crossing will include an entry/exit location north of the Missouri River and an entry/exit location south of the Missouri River; the crossing depth will extend to a minimum depth of 80 feet below the river bed.

2.2.6.4 Open Cut/Conventional Lay

Where a dry ditch crossing method is not specifically required by the Procedures, the waterbody may be crossed using the open cut/conventional lay crossing method should the waterbody have no discernable flow at the time of construction. The process is the same as upland trenching described in Resource Report 1, Section 1.3.1.1, with FERC Procedures, the SPCC Plan, and the E&SCP implemented for excavation placement and proper setbacks.

2.2.6.5 Impacts and Mitigation

Impacts to waterbodies will be minimized through the implementation of measures outlined in the FERC Procedures as well as other federal and state requirements identified during the permitting process.

Measures to avoid and minimize impacts to waters include:

- requiring temporary erosion and sediment control measures installed and maintained along the construction right-of-way;
- installing erosion and sediment control BMPs with the flume pipe stream bypass, immediate stream bed and bank stabilization, and installation of sediment barriers;
- implementing the E&SCP as part of the Missouri NPDES and Local Land Disturbance permitting processes;
- installing erosion and sediment control BMPs (e.g., flume pipe stream bypass, immediate stream bed and bank stabilization, and installation of sediment barriers)
- maintaining appropriate water flow downstream of the crossing;
- requiring construction to be completed within specified hourly time frames based on crossing lengths;
- adherence to the state guidelines as opposed to the guidelines found in the FERC's Procedures;
- routinely inspecting construction equipment for leaks and storing fuel and hazardous materials in upland areas at least 100 feet from waterbodies;
- implementing the SPCC Plan to respond quickly to leaks and spills; and
- implementing the HDD Contingency Plan related to inadvertent returns.

At stream crossings, the trench will be excavated immediately prior to pipe installation to limit the duration of construction within the waterbody to 24 hours for crossings less than 10 feet, and 48 hours for crossings between 10 feet and 100 feet. Excavated materials will be stored no less than 10 feet from the edge of the waterbody and temporary erosion control devices will be utilized to prevent the sediment from reentering the waterbody. If a release occurs into the environment, fuels, lubricants or other potentially hazardous materials used during routine construction can temporarily impact aquatic habitats and resources. To minimize these potential impacts, Spire will restrict the storage location and use of hazardous materials according to FERC Procedures. Spire's SPCC Plan incorporates these restrictions to minimize potential for impacts during construction and contains measures to mitigate releases should they occur. Refueling and lubricating of vehicles and/or equipment will occur no closer than 100 feet from a waterbody unless no feasible alternative exists or a greater setback is stipulated by a

permitting agency. Spire will also locate ATWS a minimum of 50 feet from waterbody and wetland boundaries unless a reduced setback is requested on a site-specific basis and a modification is approved in accordance with FERC's Procedures. Proposed exceptions to FERC's Plan and Procedures are provided in Resource Report 1, Appendix 1-F.

At HDD crossings, Spire does will not clear in between the entry and exit locations of each crossing, which would also minimize disturbance to the ground surface in these areas. Pipe sections long enough to span each HDD crossing will be staged and welded in the construction workspaces. Spire has determined that conditions at planned HDD locations are feasible for the crossing method after reviewing geotechnical reports. While HDDs are preferred to avoid certain sensitive features, there are still circumstances in which an HDD cannot be successfully completed. The most probable modes of failure during the HDD process include: pilot hole drilling failure, pilot hole enlargement failure, and failure during pipe pullback. A successful HDD crossing will result in no planned impacts on the banks, bed, or water quality of the waterbodies being crossed.

There also exists the possibility for drilling mud to reach the surface as an inadvertent return. To address the unlikely event of an inadvertent return of drilling fluids (water, bentonite clay, and/or polymers) to surface waters or wetlands, Spire will adhere to the HDD Contingency Plan provided in Appendix 2-B to reduce impacts. Spire will temporarily cease drilling operations so the pressure in the hole will reduce and the surface seepage will stop. If seepage occurs in a waterbody, there may be a visible plume whereas minor seepage may be difficult to detect in waterbodies due to possible turbidity of the water and the high specific gravity of bentonite clay drilling fluid. There will be very little drilling fluid pressure to disturb sediments due to the distance that the drilling fluid must travel to reach the surface. In general, it is not environmentally beneficial to try and contain and collect drilling fluid returns in a waterway. Placement of containment structures and attempting to collect drilling fluid within a waterway often result in greater environmental impact than allowing the drilling fluids to dissipate naturally. If seepage is detected in a wetland, corrective measures, if any, will be taken to try to minimize the seepage and it will be monitored and documented. However, drilling activities will not be suspended unless returns create a threat to public health and safety. In the event that the drill head or another portion of the bore hole makes inadvertent contact with the surface in a location not anticipated by the drilling contractor, there is the potential for drilling fluid discharge to surface waters or wetlands, which could result in the smothering of macroinvertebrates and herbaceous plants, reduce food availability to aquatic food webs, and interfere with hydrology.

There is greatest potential for inadvertent returns of drilling fluid at the HDD entry and exit locations. In the contingency planning for the HDD crossing, drilling fluid seepage at the entry and exit locations has been considered and preventative actions have been developed. The entry and exit locations at all HDD crossings have dry land segments where drilling fluid seepage can be easily detected and contained. To contain and control drilling fluid seepage on the land area, Spire's contractor will use typical containment measures (i.e., hay bales, silt fence, sand bags, pumps, and vacuum trucks). It will then be immediately cleaned up from the area and hauled or pumped to one of the storage locations at the closest drilling site.

Spire has conducted geotechnical investigations at the Mississippi and Missouri River crossings to determine the feasibility of conducting an HDD of these rivers. Based on these primary evaluations, the proposed Mississippi River and Missouri River are determined to be feasible with a high probability of successful completion.

The HDD installation on the rivers is anticipated to encounter a sequence of soils consisting of layers of soft to medium stiff clayey silt, loose rock fragments (gravel), medium dense silty sand, and silt overlying bedrock materials consisting of predominantly limestone and shale with various layers of mudstone, siltstone and sandstone. To avoid potential risks associate with loss of drilling fluids through the soft soils identified on either drill location, temporary conductor casing has been incorporated into the design. It is the intent of this casing pipe to be installed from the ground surface and seated into the bedrock below eliminating risks associated with loss of drilling fluids to the soil environment. The bedrock materials observed on both drills are ideally suited for an HDD installation, having rock quality designations characterized as fair to excellent. No zones of poor to very poor rock quality, that can give rise to excess loss of drilling fluids through fracture and joint networks, were observed in any of the boreholes.

To further alleviate concerns associated with the potential loss of drilling fluids to the overlying environments, drilling fluid pressure calculations were completed in accordance with the USACE's "Guidelines for Installation of Utilities Beneath Corps of Engineers Levees Using Horizontal Directional Drilling." In completing this evaluation, conservative strength parameters (deemed to be lower than actual strengths for individual layers) were assigned to replicate the sequence/layering of soil and bedrock materials. A factor of safety of two, consistent with that required by USACE was applied to the values calculated based on the cavity expansion values to derive the allowable drilling fluid pressures for this crossing. This allowable drilling fluid pressure was then compared with the drilling fluid pressure required to facilitate the HDD processes. For both river crossings, the allowable drilling fluid pressure was found to be significantly higher than the required drilling fluid pressure for the installation suggesting that hydrofracture or loss of drilling fluids is not anticipated to be an issue with a high degree of certainty for the HDD installations at the Mississippi and Missouri Rivers.

While not anticipated, if an attempted HDD installation is unsuccessful, the proposed HDD alignment could be modified beneath the rivers using the same general location to accommodate an additional HDD attempt, depending on the condition/cause contributing to the original HDD failure. Prior to attempting a second HDD crossing, a risk mitigation workshop shall be held with all parties to determine the cause of the initial failure and any mitigation measures that could be adopted to reduce the risk(s) during the second HDD attempt.

These investigations have been summarized in a Geotechnical Investigation Report, which will be filed with the FERC in January 2017 as Appendix 6-B.

In the State of Illinois, there are no mitigation requirements for stream impacts, whereas the State of Missouri does mitigate these impacts. Section 2.3.3 discusses the current status of permitting for wetland and waterbody impacts as well as mitigation planning.

Operation of the pipeline facilities is not anticipated to impact groundwater, surface water, or sensitive surface waters and federally-listed and state-listed threatened and endangered species and their habitats.

2.3 Wetlands

As previously mentioned in Section 2.2.1, field surveys were initiated in September 2016 to identify wetlands within the Project study area and were completed on accessible properties in 2016; Table 2.2-1 identifies the areas with limited field survey access. Wetland delineations were conducted in accordance with the *1987 USACE Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region Version 2.0 (USACE 2012)*. Agricultural land uses have extensively modified local hydrology and land cover at much of the proposed Project area; and due to concerns regarding atypical conditions encountered within agricultural fields, the USACE recommends utilizing the conditions for atypical situations outlined in the Midwest Regional Supplement. These conditions outline the procedure for making a wetland determination when one or more wetland indicators are not present due to natural or human influenced disturbance.

A comprehensive Wetland Delineation and Stream Identification Report is provided in Appendix 2-F with the methods briefly discussed here. Prior to field investigations, Spire performed a desktop review of NWI mapping (provided in Appendix 2-G), USDA-NRCS soil surveys, and aerial photography to identify potential wetlands in the Project area. These areas were generally identified around areas of persistent inundation, irregular shapes of visible saturation in agricultural fields ("wet signatures"), drain-tile outlets, and floodplains.

Field observations were supplemented with an intensive review of existing NWI mapping, USDA-NRCS soils, historical aerial photography (Google Earth), and local landscape topography/morphology to provide a determination of potential wetlands present within the Project study area. Professional judgment was used to determine wetland status in problematic areas identified during the field investigation. Additional soil test pits were also recorded at the areas identified during desktop review as potentially wet. Many of these areas were later confirmed as wetland or upland following the onsite delineations.

Wetlands are classified according to the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979), and the National Wetland Plant list (Lichvar 2016) was utilized to assign vegetation a wetland indicator status.

2.3.1 Existing Resources

Table 2.3-1 details the wetlands identified at the Project area. This includes field data where surveys are completed as well as supplemental NWI data where surveys are still pending. Eleven palustrine forested wetlands ("PFO"), two palustrine scrub shrub ("PSS"), four palustrine unconsolidated bottom ("PUB"), and 54 palustrine emergent ("PEM") wetlands are impacted by the Project. Four of the total 71 wetlands were sourced from NWI mapping where survey may be pending. Three PFO wetlands (Feature IDs: WMO-WJW-001, WMO-TMA-001A, NWI-105), adjacent to the Mississippi and Missouri Rivers, are proposed to be crossed using the HDD method; therefore, no direct impact to these wetlands is anticipated.

Table 2.3-1. Wetlands Crossed by the Project

Wetland ID[1]	Approximate MP	NWI/Cowardin Classification[2]	Source[3]	Approximate Crossing Length (feet)[4]	Area at the Permanent Easement (acres)[5]	Area Affected by Construction (acres)[6]	Area Affected by Operation (acres)[7]	Crossing Method[8]
24-Inch Pipeline								
Scott County, Illinois								
WIL-JJP-002	1.1	PEM	FD	0	< 0.01	< 0.01	0	Workspace Only
WIL-TMA-002	3.4	PFO	FD	0	< 0.01	< 0.01	0	Workspace Only
WIL-JJP-005	3.4	PFO	FD	39	0.04	0.07	0.03	Open Cut
Greene County, Illinois								
WIL-JJP-009	4.4	PEM	FD	0	0.00	< 0.01	0	Workspace Only
WIL-JJP-010	5.1	PEM	FD	0	0.00	< 0.01	0	Workspace Only
WIL-JJP-012A	5.6	PEM	FD	47	0.04	0.11	0	Open Cut
WIL-JJP-012	5.6	PFO	FD	4	< 0.01	0.03	< 0.01	Open Cut
WIL-TMA-005	5.7	PEM	FD	11	0.02	0.02	0	Open Cut
WIL-JJP-015B	10.8	PEM	FD	6	0.03	0.03	0	Open Cut
WIL-JJP-015	10.8	PSS	FD	39	0.04	0.05	0.01	Open Cut
WIL-JJP-015A	10.8	PEM	FD	22	0.03	0.05	0	Open Cut
WIL-JJP-107	13	PEM	FD	0	0.01	0.01	0	Workspace Only
WIL-JJP-100A	13.8	PEM	FD	0	0	< 0.01	0	Workspace Only
WIL-JJP-100	13.8	PFO	FD	0	0	< 0.01	0	Workspace Only
WIL-JJP-101	13.9	PEM	FD	195	0.22	0.33	0	Open Cut
WIL-JJP-101A	13.9	PFO	FD	42	0.05	0.07	0.03	Open Cut
WIL-JJP-001	13.9	PEM	FD	46	0.06	0.07	0	Open Cut
WIL-TMA-006	14.1	PEM	FD	72	0.06	0.25	0	Open Cut
WIL-TMA-007	14.3	PEM	FD	22	0.03	0.04	0	Open Cut
WIL-TMA-008	14.4	PEM	FD	307	0.33	0.49	0	Open Cut
WIL-TMA-007	14.4	PEM	FD	29	0.03	0.05	0	Open Cut
WIL-TMA-009	17.1	PEM	FD	62	0.07	0.11	0	Open Cut
NWI-051	18.7	PFO1A	NWI	20	0.02	0.03	0.01	Open Cut
WIL-TMA-014	25	PEM	FD	45	0.04	0.08	0	Open Cut
WIL-TMA-015	25	PSS	FD	0	0	0.01	0	Workspace Only
WIL-TMA-010	25	PEM	FD	20	< 0.01	< 0.01	0	Open Cut
WIL-TMA-013	25.2	PFO	FD	0	0.01	0.01	0.01	Workspace Only
WIL-TMA-023	25.3	PFO	FD	20	0.02	0.03	0.01	Open Cut
WIL-TMA-022	25.3	PEM	FD	75	0.08	0.13	0	Open Cut

Table 2.3-1. Wetlands Crossed by the Project (Continued)

Wetland ID[1]	Approximate MP	NWI/Cowardin Classification[2]	Source[3]	Approximate Crossing Length (feet)[4]	Area at Permanent Easement (acres)[5]	Area Affected by Construction (acres)[6]	Area Affected by Operation (acres)[7]	Crossing Method[8]
24-Inch Pipeline (continued)								
WIL-JJP-105	25.4	PEM	FD	266	0.30	0.46	0	Open Cut
WIL-JJP-104	25.7	PEM	FD	131	0.15	0.22	0	Open Cut
WIL-TMA-021	25.9	PEM	FD	0	0	0.01	0	Workspace Only
WIL-TMA-020	25.9	PEM	FD	0	0.01	0.01	0	Workspace Only
WIL-TMA-018	26.1	PEM	FD	11	0.01	0.01	0	Open Cut
NWI-172	27	PUBGh	NWI	0	0.01	0.01	0.01	Workspace Only
Jersey County, Illinois								
WIL-CDK-010	31.9	PEM	FD	70	0.08	0.12	0	Open Cut
WIL-CDK-008	35.2	PEM	FD	25	0.03	0.04	0	Open Cut
WIL-JJP-109	35.5	PEM	FD	12	0.01	0.03	0	Open Cut
WIL-JJP-110	35.8	PEM	FD	96	0.10	0.16	0	Open Cut
WIL-CDK-012	36.6	PEM	FD	0	< 0.01	0.01	0	Workspace Only
WIL-JJP-115	37.2	PEM	FD	28	0.03	0.05	0	Open Cut
WIL-JJP-116	37.2	PEM	FD	9	0.01	0.03	0	Open Cut
WIL-JJP-112	39.1	PEM	FD	0	0	< 0.01	0	Workspace Only
WIL-JJP-113	41.1	PEM	FD	7	0.01	0.02	0	Open Cut
WIL-JJP-114	41.2	PEM	FD	28	0.03	0.05	0	Open Cut
WIL-TMA-028	41.3	PEM	FD	42	0.05	0.07	0	Open Cut
WIL-DFW-002	43.8	PEM	FD	50	0.03	0.11	0	Open Cut
NWI-007	43.8	PUBh	NWI	0	0	0	0	N/A - Feature no longer in workspace
St. Charles County, Missouri								
NWI-105	45.7	PFO1Ah	NWI	377	0.43	0	0	HDD[9]
WMO-WJW-001	46.1	PFO	FD	330	0.37	0	0	HDD[9]
WMO-TMA-011	48	PEM	FD	8	0.02	0.02	0	Open Cut
WMO-JJP-012	49.7	PEM	FD	1491	1.72	3.38	0	Open Cut
WMO-TMA-010	49.9	PEM	FD	359	0.25	0.26	0	Open Cut
WMO-JJP-010	50.2	PEM	FD	67	0.07	0.11	0	Open Cut
WMO-JJP-007	53.9	PEM	FD	555	0.47	0.6	0	Open Cut
WMO-TMA-006	54.8	PEM	FD	235	0.20	0.55	0	Open Cut
WMO-TMA-005A	55.7	PEM	FD	131	0.16	0.22	0	Open Cut
WMO-TMA-005	55.8	PUB	FD	378	0.43	0.61	0.43	Open Cut

Table 2.3-1. Wetlands Crossed by the Project (Continued)

Wetland ID[1]	Approximate MP	NWI/Cowardin Classification[2]	Source[3]	Approximate Crossing Length (feet)[4]	Area at Permanent Easement (acres)[5]	Area Affected by Construction (acres)[6]	Area Affected by Operation (acres)[7]	Crossing Method[8]
24-Inch Pipeline (continued)								
WMO-TMA-005A	55.8	PEM	FD	40	0.02	0.08	0	Open Cut
WMO-TMA-005A	55.8	PEM	FD	28	0.05	0.07	0	Open Cut
WMO-JJP-002	56	PEM	FD	0	0.10	0.10	0	Workspace Only
WMO-JJP-005	56.8	PEM	FD	62	0.07	0.11	0	Open Cut
WMO-TMA-004	57.2	PEM	FD	39	0.05	0.07	0	Open Cut
WMO-TMA-003A	57.2	PEM	FD	0	0	0.09	0	Workspace Only
WMO-TMA-003	57.2	PUB	FD	0	0	0.15	0	Workspace Only
WMO-TMA-002	57.4	PEM	FD	0	0	0.13	0	Workspace Only
WMO-TMA-001A	57.9	PFO	FD	142	0.16	0	0	HDD[9]
WMO-TMA-001	57.9	PEM	FD	36	0.04	0	0	HDD[9]
St. Louis County, Missouri								
WMO-CDK-005	58.3	PEM	FD	0	0	0.01	0	Workspace Only
WMO-CDK-004	58.4	PEM	FD	60	0.04	0.04	0	Open Cut
WMO-CDK-003	58.4	PEM	FD	0	0	0.02	0	Workspace Only

Notes:

1 Map Designation - the unique code designated to the wetlands identified during the field surveys. A unique identifier was also assigned to National Wetland Inventory (“NWI”) data that was used to supplement field delineations on properties that lack access permission or in areas that are pending delineation data. Facilities not listed do not impact wetlands.

2 Cowardin classification: PEM - Palustrine Emergent; PFO - Palustrine Forested; PSS - Palustrine Scrub-Shrub; and PUB - Palustrine Unconsolidated Bottom.

3 FD - Field Delineation. NWI used where field surveys have not been conducted due to lack of access.

4 Length of Crossing is representative of the centerline crossing length. Where the crossing length is zero, the wetland is crossed by workspace but not the pipeline.

5 Area at permanent right-of-way is the area of wetland identified at the 50-foot-wide permanent easement. For example, acreages at HDDs would be visible here but not in the Construction or Operation column where impacts are avoided by the HDD.

6 Area affected by construction is the total area of wetland within the construction right-of-way.

7 Area affected by operation on PEM wetlands are 0.0 acres as these wetlands will revert back to the same type following construction. Operational impacts on PSS wetlands in this column are based on a 10-foot-wide operational impact that will be converted to herbaceous wetlands due to pipeline maintenance. Operational impacts on PFO wetlands in this column reflect potential for selective thinning of trees within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating.

8 Timber mats will be utilized at saturated wetlands for equipment crossings within the construction right-of-way and access roads. Pipeline crossings will be open cut or trenchless (HDD). "Workspace Only" designates those wetlands within the construction workspace though not crossed by centerline and will be avoided where possible or matted for equipment crossing.

9 Wetland is crossed by the HDD. Spire does not intend to clear vegetation within the permanent right-of-way above the HDD path; therefore impacts to this wetland are not anticipated.

PFO wetlands throughout the Project area included species such as silver maple (*Acer saccharinum*), American sycamore (*Platanus occidentalis*), eastern cottonwood (*Populus deltoides*), southern hackberry (*Celtis laevigata*), common hackberry (*Celtis occidentalis*), American elm (*Ulmus americana*), and smooth hedge nettle (*Stachys tenuifolia*).

PSS wetlands throughout the Project area included species such as silver maple, sandbar willow (*Salix interior*), black willow (*Salix nigra*), and American elm.

PEM wetlands throughout the Project area included primarily herbaceous species, such as water hemp (*Amaranthus rudis*), valley redstem (*Ammannia coccinea*), Frank's sedge (*Carex frankii*), *Carex* spp., barnyard grass (*Echinochloa crus-galli*), yerba-de-tajo (*Eclipta prostrata*), rice cut grass (*Leersia oryzoides*), fall panic grass (*Panicum dichotomiflorum*), *Persicaria* spp., reed canary grass (*Phalaris arundinacea*), rough cockleburr (*Xanthium strumarium*), yellow bristlegrass (*Setaria pumila*), and white panicled American aster (*Symphyotrichum lanceolatum*).

2.3.2 Wetland Construction and Operation Impacts

Spire will utilize two methods to cross wetlands at the Project: open cut/conventional lay and HDD. As described in Section 2.3.1, the HDD crossing method avoids impacts to PFO wetland resources adjacent to the Mississippi River and Missouri River.

With the exception of the two HDD crossings, wetland crossing methods will be determined based on site-specific conditions at the time of construction. Wetlands with soils that can support construction equipment may be crossed using the conventional lay method, whereas at saturated wetlands, Spire will utilize timber mats to preserve the soil structure at wetlands.

2.3.2.1 Open Cut/Conventional Lay

Spire plans to cross wetlands with the open cut/conventional lay method in accordance with all applicable permits and the FERC Procedures. Construction techniques for this method are similar to the open cut method in upland areas, however topsoil segregation techniques will be utilized to facilitate revegetation following the completion of construction activities. In some cases, site-specific conditions may not support construction equipment, but the area will still be crossed using the open cut method. In these instances, timber mats will be used to minimize disturbances to wetland hydrology and maintain soil structure. Pipeline depth of cover will be at least five feet at wetlands.

2.3.2.2 HDD

As discussed in Section 2.2.6.3., Spire plans to use the HDD crossing method for the two river crossings, the Mississippi and Missouri Rivers, which includes their adjacent and/or abutting wetland resources. Spire conducted geotechnical boring at the HDD locations to determine the geology and feasibility of the drills. HDDs, while the preferred method to avoid impacts to wetlands, still have risks which are thoroughly discussed in Section 2.2.6.5.

2.3.2.3 Wetland Construction and Operation Impacts

Wetlands that are open cut may experience temporary construction impacts such as loss of herbaceous and scrub-shrub vegetation; soil disturbance associated with grading, trenching, and stump removal; sedimentation and turbidity increases; and hydrological profile changes. Impacts to forested wetlands may include long-term conversion to emergent and/or scrub-shrub wetland types through tree removal. No permanent loss of wetlands are expected to occur from the construction of the Project though functional changes to the wetland community may result. Upon the completion of construction, topsoil, contour elevations, and hydrologic patterns will be restored and disturbed areas will be reseeded to promote the re-establishment of native hydrophytic vegetation. Temporary workspace ("TWS") and ATWS will be restored to preconstruction grades and contours reseeded. TWS and ATWS areas will not be maintained for operation of the Project and will be allowed to revert to their preconstruction land use and vegetation cover types. Wetlands that are encompassed as part of a HDD crossing are not anticipated to be directly impacted from construction activities as these features will be avoided.

Spire will protect and minimize potential adverse impacts on wetlands by complying with the applicable permit conditions issued by appropriate regulatory agencies with respect to construction and operation of the Project facilities within wetlands and through implementation of FERC's Procedures. Spire has reduced its construction right-of-way in and around wetlands during construction to 75 feet in accordance with FERC's Procedures; this is depicted in the construction right-of-way typical drawings provided in Resource Report 8, Appendix 8-A. Site-specific exceptions to the FERC Procedures where greater than 75 feet of construction workspace is needed in wetlands are identified in Resource Report 1, Appendix 1-D.

ATWS may also be required in and around wetland areas to facilitate certain crossings. The size of ATWS adjacent to wetlands varies along the length of the Project. ATWS size was dictated by the corresponding adjacent topography and both wetland-related and unrelated Project needs given the limited viable staging options along the Project's route. Where possible, ATWS has been located at least 50 feet from wetlands. Locating ATWS within 50 feet of wetlands is necessary in certain locations to facilitate road crossings, provide additional spoil storage area, and topsoil segregation. Areas where ATWS has been proposed within 50 feet of a wetland is provided in Resource Report 1, Appendix 1-D.

Construction equipment in wetlands will be limited to that essential for clearing the right-of-way, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the right-of-way. Prior to grading activities, erosion controls will be placed as required along the downslope edge of the construction right-of-way and around ATWS to minimize impacts to adjacent wetlands. Erosion and sediment controls will be properly installed and maintained throughout construction to protect wetlands from sediment that may migrate from disturbed areas during construction. Where there is no reasonable access except through wetlands, non-essential equipment would be allowed if the ground is firm or is stabilized with timber mats to avoid rutting. In order to preserve the existing seedbank and promote revegetation of the wetlands, Spire will segregate the top 12 inches of soil from the area disturbed by trenching activities except in saturated wetlands. Topsoil will be restored back to its original location immediately after backfilling is complete. Seed mixes spread on the restored topsoil for temporary stabilization will include annual rye grass at a rate of 40 pounds per acre (unless standing water is present) or appropriate mixes recommended by permitting agencies. To minimize inadvertent spills of

fluids used during construction, any lubricating oils and fuels will be stored in upland areas at least 100 feet from wetland boundaries, whenever possible, or additional materials (such as spill kits) or secondary containment structures will be employed.

The majority of the wetlands impacted by the Project will be restored and will revert to pre-existing conditions after construction has been completed. In accordance with FERC's Procedures, Spire will maintain a mowed corridor through wetlands; keeping this portion of each feature in an herbaceous state to allow for periodic pipeline patrols and operational surveys. PEM wetlands will be restored to pre-construction conditions and no permanent impacts are anticipated to these features. For PSS wetlands, the maintained corridor will be up to 10 feet centered on the pipeline, converting this portion of each feature to PEM wetland types. For PFO wetlands, trees within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating will be selectively removed. Therefore converting a 30-foot corridor in PFO wetlands to PSS or PEM wetland types. Wetlands that are encompassed between HDD entry and exits locations will not be routinely maintained; therefore, long-term impacts to these features are not anticipated. Table 2.3-2 summarizes the types and acreages of wetlands affected by construction and operation of the Project.

2.3.3 Wetland Mitigation Procedures

Following restoration, wetlands will be monitored in accordance with FERC's Procedures and/or in accordance with protocols specified by the applicable permitting agencies. Revegetation of impacted wetlands will be monitored periodically for the first three years following construction. Revegetation will be considered successful when the native vegetation cover is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction.

Spire has identified all necessary permits and approvals that will be required for construction of the Project through wetlands. These permits, as well as anticipated submittal and receipt dates, are outlined in Resource Report 1. The USACE St. Louis District is the regulating federal agency for impacts to wetlands and the Project. Construction associated with the Project will impact wetlands and waterbodies and is subject to Section 404 of the CWA, therefore Spire has prepared a pre-construction notification package for the USACE for coverage under Nationwide Permit 12-Utility Lines concurrently with the FERC application. In compliance with federal and state regulatory permitting frameworks relative to wetland protection, Spire is developing a Project-specific wetland mitigation plan prior to construction in consultation with the USACE St. Louis District and other regulatory agencies. The mitigation plan will provide measures to compensate for permanent wetland conversion in Illinois and Missouri, and stream-related impacts in Missouri. Spire is coordinating with the USACE and applicable state regulatory agencies for guidance during the development of the proposed mitigation measures and plans. Spire is in communication with mitigation banks in Illinois and Missouri and currently plans to mitigate impacts through the use of mitigation bank credits.

Table 2.3-2. Summary of Wetlands Affected by Construction and Operations

Cowardin and NWI Classification[1]	Length of Each Type Crossed (feet)[2]	Area at Permanent Easement (acres)[3]	Area Affected During Construction (acres)[4]	Area Affected During Operation (acres)[5]
24-Inch Pipeline				
PFO	972	1.11	0.24	0.09
PSS	39	0.04	0.06	0.01
PEM	4844	5.17	8.14	0.00
PUB	378	0.44	0.62	0.44
Subtotal	**6,233**	**6.76**	**9.05**	**0.54**
ATWS				
PFO	0	0.00	0.00	0.00
PSS	0	0.00	0.00	0.00
PEM	0	0.00	0.90	0.00
PUB	0	0.00	0.15	0.00
Subtotal	**0**	**0.00**	**1.05**	**0.00**
Totals				
Subtotal PFO	**972**	**1.11**	**0.24**	**0.09**
Subtotal PSS	**39**	**0.04**	**0.05**	**0.01**
Subtotal PEM	**4,844**	**5.17**	**9.04**	**0.00**
Subtotal PUB	**378**	**0.44**	**0.77**	**0.44**
Total	**6,233**	**6.76**	**10.10**	**0.54**

Notes:

1 NWI Wetland Type: PFO - Palustrine Forested; PSS - Palustrine Scrub-Shrub; PEM - Palustrine Emergent; and PUB - Palustrine Unconsolidated Bottom. Facilities not listed do not impact wetlands.

2 The length of the crossing was calculated from field delineated or NWI polygons, rounded to the nearest foot. These do not equal the sum of this column due to rounding.

3 Area at permanent right-of-way is the area of wetland identified at the 50-foot-wide permanent easement.

4 Area affected by construction is the total area of wetland within the construction right-of-way. These may not equal the sum of this column due to rounding.

5 Area affected by operation on PEM wetlands are 0.0 as these wetlands will revert back to the same type following construction. Operational impacts on PSS wetlands in this column are based on a 10-foot-wide operational impact that will be converted to herbaceous wetlands due to pipeline maintenance. Operational impacts on PFO wetlands in this column reflect potential for selective thinning of trees within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating.

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APPENDIX 2-A

Spill Prevention, Control, and Countermeasure Plan

Spire STL Pipeline Project

Spill Prevention, Control, and Countermeasure Plan

FERC Docket No. CP17-__-__

January 2017

Public

Table of Contents

Acronyms and Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
FERC	Federal Energy Regulatory Commission
IEMA	Illinois Emergency Management Agency
LEPC	Local Emergency Planning Committees
MDNR	Missouri Department of Natural Resources
Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
Spire	Spire STL Pipeline LLC
USEPA	United States Environmental Protection Agency

Spill Prevention, Control, and Countermeasure Plan

Construction activities related to natural gas pipelines and aboveground facilities often require storage of hazardous and non-hazardous products and wastes. All efforts will be made to prevent spills of any amount of these products. The scope of this Spill Prevention, Control, and Countermeasure ("SPCC") Plan describes the planning and prevention control measures that will be implemented by Spire STL Pipeline LLC ("Spire") and its contractors to minimize impacts resulting from spills of fuels, petroleum products or other controlled substances during the construction of the Spire STL Pipeline Project. This Spill Prevention, Control, and Countermeasure Plan ("SPCC Plan") was developed in accordance with the Federal Energy Regulation Commission's ("FERC's") *Wetland and Waterbody Construction and Mitigation Procedures* ("Procedures") and federal, state, and local regulations.

1.0 Spill Prevention

The following practices will be implemented with the goal of preventing spills and minimizing the impact of spills which may unintentionally occur:

- All employees and contractors handling fuels and other hazardous materials or involved in the operation and maintenance of equipment will be properly trained in the prevention of spills, rules and regulations applicable to their work, proper containment and cleanup of spills, and reporting responsibilities;
- All equipment shall be in good operating condition and inspected on a regular basis;
- Fuel trucks transporting fuel to on-site equipment are to travel only on approved access roads;
- Concrete coating activities shall not occur within 100 feet of a wetland or waterbody boundary, unless the location is a pre-approved site for such use (i.e., an existing industrial site);
- Bulk quantities of both diesel fuel and gasoline may be stored at the work area in aboveground tanks, which will be diked or be of double-wall secondary containment design, or smaller containers. No underground tanks will be used. A Material Safety Data Sheet for each hazardous material will be maintained on-site;
- Fuel will be stored at the Contractor Storage yard within secondary containment and, as much as practical, all equipment will be refueled there. Any equipment that must be refueled in the field will be fueled from tanks carried to the work area and returned to secondary containment when refueling is complete;
- Lesser quantities of fuel, solvents, and lubricants (i.e., motor oils, hydraulic fluid) may be stored at the work area as necessary to service equipment provided that this storage does not conflict with other parts of this SPCC Plan. Secondary containment will be provided for these storage areas;
- All fuel storage areas will be located at least 200 feet from active private water wells and at least 400 feet from community and municipal water wells. Equipment servicing, lubricating, and refueling will also be in accordance with these requirements whenever possible;

- Use of hazardous materials for vehicle maintenance will follow the same requirements mentioned above for equipment refueling. Impervious or sorbent materials will be placed under the work area before the work begins. Additional sorbent materials will also be readily available. Waste materials created during maintenance (i.e., used oil) will be collected for proper disposal. The work site and the vehicle will be inspected after the maintenance work is complete to ensure that all hazardous materials are properly contained. All waste material, including partially used or empty containers, discarded parts, dirty rags, and used sorbent material, as well as discarded hazardous materials containers (i.e., oil cans, grease tubes) will be collected and placed in open-top drums for proper disposal;
- All motor fuel, lube oil, chemicals, and other polluting substances will be tightly sealed and clearly labeled during transportation and storage;
- Fuel trucks, pumps, mechanics' vehicles, and contractor personnel vehicles will be equipped with spill kits containing absorbent materials approved for petroleum products;
- Runoff resulting from construction equipment washing operations will not be permitted to directly enter any waterbody or wetland area; and
- Construction equipment, vehicles, materials, hazardous materials, chemicals, fuels, lubricating oils, and petroleum products will be parked, stored, or serviced 100 feet from all waterbodies and wetlands when not in use and when possible.

1.1 Spill Response

In the event of a spill, the following will occur:

- the source will be immediately stopped;
- the spill will be contained by placing sorbent booms or constructing dikes;
- the spill will be collected with sorbent materials, skimmed off water surfaces with booms, and/or contaminated soil will be excavated;
- the waste materials will be properly disposed at agency-approved facilities, as required, selected by the Contractor; and
- after completing the cleanup, as coordinated with the necessary contacts, the affected areas will be restored as close as possible to their previous conditions.

1.2 Responsibilities

All spills, regardless of size, must be reported immediately to Spire's Lead Environmental Inspector and the Contractor's Spill Coordinator.

Name	Office	Evenings and Weekends
TBD, Lead Environmental Inspector	TBD	TBD
TBD, Contractor Spill Coordinator	TBD	TBD
TBD, Field Construction Manager (contacted by Spill Coordinator)	TBD	TBD
TBD, Environmental Manager (contacted by Lead Environmental Inspector)	TBD	TBD

A Spire representative will report the spill to the federal, state, and local agencies (if applicable). The agencies' contact information is provided in Section 1.3.

The following roles and responsibilities have been established in regards to spill reporting and cleanup.

1.2.1 Environmental Manager

Spire will designate an Environmental Manager to serve as the liaison who promptly reports spills to appropriate federal, state, and local agencies as required; directs cleanup and waste disposal; and facilitates agencies requests and reporting procedures. The Environmental Manager will be in daily communication with the Lead Environmental Inspector who is at construction sites.

1.2.2 Lead Environmental Inspector

Spire will designate a Lead Environmental Inspector with responsibilities set forth by the Environmental Manager. The Lead Environmental Inspector monitors the Contractor's compliance with the SPCC Plan, immediately notifies to the Spill Coordinator of a spill, and works directly with the Spill Coordinator and Field Construction Manager to accurately record specifics of any spill (according to Section 1.3.1). The Lead Environmental Inspector also conducts follow up inspections until the spill is properly cleaned up.

1.2.3 Field Construction Manager

Spire will designate a Field Construction Manager to manage construction activities, work with the Spill Coordinator and Lead Environmental Inspector in the event of a spill, determine proper containment measures, and ensure cleanup is completed in accordance with the SPCC Plan. The Field Construction Manager should also document the following types of information in the event of a spill: work stoppages, injuries, fires, and/or extent of exposure to workers at the site.

1.2.4 Contractor Spill Coordinator

Designated and employed by the Contractor, the Spill Coordinator documents every spill using a spill report form regardless of the size/volume of the spill and immediately notifies the Field Construction Manager and Lead Environmental Inspector. The Spill Coordinator coordinates personnel, equipment, and materials needed for containment appropriate for the size of the spill. The Spill Coordinator will immediately communicate to the Environmental Manager and/or Lead Environmental Inspector if reportable quantities are released during the spill, in which the Environmental Manager notifies appropriate agencies. Other duties of the Spill Coordinator include: ensure proper transport and disposal of contaminated materials at an agency-approved disposal facility and monitor containment structures for compliance with the SPCC Plan.

1.2.5 All Personnel

Spire and Contractor personnel are responsible for dialing 911 during an emergency, life-threatening event. In the event of a spill, regardless of size, any Spire or Contractor personnel to witness the event should immediately contact the Spill Coordinator and Lead Environmental Inspector.

Only Contractor's Authorized Personnel trained to handle fuel, lubricants, or other hazardous substances and trained on this SPCC Plan, notification procedures, and non-compliance consequences should be handling such materials.

1.3 Federal and State Agency Contacts

1.3.1 Federal

The National Response Center and state and local authorities must be notified by phone for any spill of hazardous material meeting or exceeding reportable quantities. Reportable quantities of hazardous substances, established by the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") Section 102(a), are provided in Attachment A. The United States Environmental Protection Agency ("USEPA") (2016) handles spills/releases to inland lands and inland waters while the United States Coast Guard handles those at the Mississippi River, coastal waters, the Great Lakes, and ports and harbors. Contact the National Response Center at 800-424-8802.

The following information should be obtained when a release or spill occurs (USEPA, 2015):

- your name, location, organization, and telephone number;
- name and address of the party responsible for the incident; or name of the carrier or vessel, the railcar/truck number, or other identifying information;
- date and time of the incident;
- location of the incident;
- source and cause of the release or spill;

- types of material(s) released or spilled;
- quantity of materials released or spilled;
- medium (e.g., land, water) affected by release or spill;
- danger or threat posed by the release or spill;
- number and types of injuries or fatalities (if any);
- weather conditions at the incident location;
- whether an evacuation has occurred;
- other agencies notified or about to be notified; and
- any other information that may help emergency personnel respond to the incident.

1.3.2 Illinois

According to the Illinois Emergency Management Agency's ("IEMA") (2016a) Emergency Release Notification Factsheet (Attachment B), releases of extremely hazardous substances equal to or exceeding reportable quantities require immediate notification to the following Illinois agencies:

- IEMA at 217-782-7860 or 800-782-7860; and
- Illinois Environmental Management Protection Agency at 217-782-3637.

At the county level, the following contacts are listed as the IEMA (2016b) Local Emergency Planning Committees' ("LEPC") release reporting contacts.

1.3.2.1 Scott County

- Scott County Emergency Services Disaster Agency, Ms. Lorrie Koch: 217-742-5751.

1.3.2.2 Greene County

- Sheriff's Office, Mr. Cale Hoesman: 217-942-6901.

1.3.2.3 Jersey County

- Jersey County Emergency Management Agency, Mr. Larry Mead: 618-498-6881.

1.3.3 Missouri

According to the Missouri Department of Natural Resources ("MDNR") (2016), the Environmental Emergency Response Section should be notified of a release of hazardous substance equal to or exceeding reportable quantities. Missouri's emergency notification procedures are provided in Attachment C.

- MDNR, Environmental Emergency Response: 573-634-2436.

The following county level LEPC contacts are also to be contacted.

1.3.3.1 St. Charles County

- Office of Emergency Management/LEPC, Ms. Kelly Bobeen or Mr. Justin Hendee: 636-9494-3023.

1.3.3.2 St. Louis County

- Office of Emergency Management/LEPC, Mr. Mark Diedrich: 314-615-9500.

1.4 References

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ATTACHMENT A

Environmental Protection Agency - List of Hazardous Substances and Reportable Quantities

the United States and is located in, on, or under any other waters, other than a vessel or a public vessel;

Onshore facility means any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under, any land or non-navigable waters within the United States;

Person means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, United States Government, State, municipality, commission, political subdivision of a State, or any interstate body;

Release means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but excludes:

(1) Any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons;

(2) Emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;

(3) Release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954, if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under section 170 of such Act, or for the purposes of section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act or any other response action, any release of source, byproduct, or special nuclear material from any processing site designated under section 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978; and

(4) The normal application of fertilizer;

Reportable quantity (''RQ'') means that quantity, as set forth in this part, the release of which requires notification pursuant to this part;

United States include the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Commonwealth of the Northern Marianas, and any other territory or possession over which the United States has jurisdiction; and

Vessel means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.

[50 FR 13474, Apr. 4, 1985, as amended at 67 FR 45321, July 9, 2002; 73 FR 76959, Dec. 18, 2008]

§ 302.4 Designation of hazardous substances.

(a) *Listed hazardous substances.* The elements and compounds and hazardous wastes appearing in table 302.4 are designated as hazardous substances under section 102(a) of the Act.

(b) *Unlisted hazardous substances.* A solid waste, as defined in 40 CFR 261.2, which is not excluded from regulation as a hazardous waste under 40 CFR 261.4(b), is a hazardous substance under section 101(14) of the Act if it exhibits any of the characteristics identified in 40 CFR 261.20 through 261.24.

NOTE: The numbers under the column headed ''CASRN'' are the Chemical Abstracts Service Registry Numbers for each hazardous substance. The ''Statutory Code'' column indicates the statutory source for designating each substance as a CERCLA hazardous substance: ''1'' indicates that the statutory source is section 311(b)(2) of the Clean Water Act, ''2'' indicates that the source is section 307(a) of the Clean Water Act, ''3'' indicates that the source is section 112 of the Clean Air Act, and ''4'' indicates that the source is section 3001 of the Resource Conservation and Recovery Act (RCRA). The ''RCRA Waste Number'' column provides the waste identification numbers assigned to various substances by RCRA regulations. The ''Pounds (kg)'' column provides the reportable quantity adjustment for each hazardous substance in pounds and kilograms. Appendix A to §302.4, which lists CERCLA hazardous substances in sequential order by CASRN, provides a per-substance grouping of regulatory synonyms (*i.e.*, names by which each hazardous substance is identified in other statutes and their implementing regulations).

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
A2213	30558431	4	U394	5000 (2270)
Acenaphthene	83–32–9	2		100 (45.4)
Acenaphthylene	208–96–8	2		5000 (2270)
Acetaldehyde	75–07–0	1,3,4	U001	1000 (454)
Acetaldehyde, chloro-	107–20–0	4	P023	1000 (454)
Acetaldehyde, trichloro-	75–87–6	4	U034	5000 (2270)
Acetamide	60–35–5	3		100 (45.4)
Acetamide, N-(aminothioxomethyl)-	591–08–2	4	P002	1000 (454)
Acetamide, N-(4-ethoxyphenyl)-	62–44–2	4	U187	100 (45.4)
Acetamide, N-9H-fluoren-2-yl-	53–96–3	3,4	U005	1 (0.454)
Acetamide, 2-fluoro-	640–19–7	4	P057	100 (45.4)
Acetic acid	64–19–7	1		5000 (2270)
Acetic acid, (2,4-dichlorophenoxy)-, salts & esters	94–75–7	1,3,4	U240	100 (45.4)
Acetic acid, ethyl ester	141–78–6	4	U112	5000 (2270)
Acetic acid, fluoro-, sodium salt	62–74–8	4	P058	10 (4.54)
Acetic acid, lead(2+) salt	301–04–2	1,4	U144	10 (4.54)
Acetic acid, thallium(1+) salt	563–68–8	4	U214	100 (45.4)
Acetic acid, (2,4,5-trichlorophenoxy)-	93–76–5	1,4	See F027	1000 (454)
Acetic anhydride	108–24–7	1		5000 (2270)
Acetone	67–64–1	4	U002	5000 (2270)
Acetone cyanohydrin	75–86–5	1,4	P069	10 (4.54)
Acetonitrile	75–05–8	3,4	U003	5000 (2270)
Acetophenone	98–86–2	3,4	U004	5000 (2270)
2-Acetylaminofluorene	53–96–3	3,4	U005	1 (0.454)
Acetyl bromide	506–96–7	1		5000 (2270)
Acetyl chloride	75–36–5	1,4	U006	5000 (2270)
1-Acetyl-2-thiourea	591–08–2	4	P002	1000 (454)
Acrolein	107–02–8	1,2,3,4	P003	1 (0.454)
Acrylamide	79–06–1	3,4	U007	5000 (2270)
Acrylic acid	79–10–7	3,4	U008	5000 (2270)
Acrylonitrile	107–13–1	1,2,3,4	U009	100 (45.4)
Adipic acid	124–04–9	1		5000 (2270)
Aldicarb	116–06–3	4	P070	1 (0.454)
Aldicarb sulfone	1646884	4	P203	100 (45.4)
Aldrin	309–00–2	1,2,4	P004	1 (0.454)
Allyl alcohol	107–18–6	1,4	P005	100 (45.4)
Allyl chloride	107–05–1	1,3		1000 (454)
Aluminum phosphide	20859–73–8	4	P006	100 (45.4)
Aluminum sulfate	10043–01–3	1		5000 (2270)
4-Aminobiphenyl	92–67–1	3		1 (0.454)
5-(Aminomethyl)-3-isoxazolol	2763–96–4	4	P007	1000 (454)
4-Aminopyridine	504–24–5	4	P008	1000 (454)
Amitrole	61–82–5	4	U011	10 (4.54)
Ammonia	7664–41–7	1		100 (45.4)
Ammonium acetate	631–61–8	1		5000 (2270)
Ammonium benzoate	1863–63–4	1		5000 (2270)
Ammonium bicarbonate	1066–33–7	1		5000 (2270)
Ammonium bichromate	7789–09–5	1		10 (4.54)
Ammonium bifluoride	1341–49–7	1		100 (45.4)
Ammonium bisulfilte	10192–30–0	1		5000 (2270)
Ammonium carbamate	1111–78–0	1		5000 (2270)
Ammonium carbonate	506–87–6	1		5000 (2270)
Ammonium chloride	12125–02–9	1		5000 (2270)
Ammonium chromate	7788–98–9	1		10 (4.54)
Ammonium citrate, dibasic	3012–65–5	1		5000 (2270)
Ammonium fluoborate	13826–83–0	1		5000 (2270)
Ammonium fluoride	12125–01–8	1		100 (45.4)
Ammonium hydroxide	1336–21–6	1		1000 (454)
Ammonium oxalate	6009–70–7 5972–73–6 14258–49–2	1		5000 (2270)
Ammonium picrate	131–74–8	4	P009	10 (4.54)
Ammonium silicofluoride	16919–19–0	1		1000 (454)
Ammonium sulfamate	7773–06–0	1		5000 (2270)
Ammonium sulfide	12135–76–1	1		100 (45.4)
Ammonium sulfite	10196–04–0	1		5000 (2270)
Ammonium tartrate	14307–43–8 3164–29–2	1		5000 (2270)
Ammonium thiocyanate	1762–95–4	1		5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Ammonium vanadate	7803–55–6	4	P119	1000 (454)
Amyl acetate	628–63–7	1		5000 (2270)
iso-Amyl acetate	123–92–2			
sec-Amyl acetate	626–38–0			
tert-Amyl acetate	625–16–1			
Aniline	62–53–3	1,3,4	U012	5000 (2270)
o-Anisidine	90–04–0	3		100 (45.4)
Anthracene	120–12–7	2		5000 (2270)
Antimony††	7440–36–0	2		5000 (2270)
ANTIMONY AND COMPOUNDS	N.A.	2,3		**
Antimony Compounds	N.A.	2,3		**
Antimony pentachloride	7647–18–9	1		1000 (454)
Antimony potassium tartrate	28300–74–5	1		100 (45.4)
Antimony tribromide	7789–61–9	1		1000 (454)
Antimony trichloride	10025–91–9	1		1000 (454)
Antimony trifluoride	7783–56–4	1		1000 (454)
Antimony trioxide	1309–64–4	1		1000 (454)
Argentate(1-), bis(cyano-C)-, potassium	506–61–6	4	P099	1 (0.454)
Aroclor 1016	12674–11–2	1,2,3		1 (0.454)
Aroclor 1221	11104–28–2	1,2,3		1 (0.454)
Aroclor 1232	11141–16–5	1,2,3		1 (0.454)
Aroclor 1242	53469–21–9	1,2,3		1 (0.454)
Aroclor 1248	12672–29–6	1,2,3		1 (0.454)
Aroclor 1254	11097–69–1	1,2,3		1 (0.454)
Aroclor 1260	11096–82–5	1,2,3		1 (0.454)
Aroclors	1336–36–3	1,2,3		1 (0.454)
Arsenic††	7440–38–2	2,3		1 (0.454)
Arsenic acid H3AsO4	7778–39–4	4	P010	1 (0.454)
ARSENIC AND COMPOUNDS	N.A.	2,3		**
Arsenic Compounds (inorganic including arsine)	N.A.	2,3		**
Arsenic disulfide	1303–32–8	1		1 (0.454)
Arsenic oxide As2O3	1327–53–3	1,4	P012	1 (0.454)
Arsenic oxide As2O5	1303–28–2	1,4	P011	1 (0.454)
Arsenic pentoxide	1303–28–2	1,4	P011	1 (0.454)
Arsenic trichloride	7784–34–1	1		1 (0.454)
Arsenic trioxide	1327–53–3	1,4	P012	1 (0.454)
Arsenic trisulfide	1303–33–9	1		1 (0.454)
Arsine, diethyl-	692–42–2	4	P038	1 (0.454)
Arsinic acid, dimethyl-	75–60–5	4	U136	1 (0.454)
Arsonous dichloride, phenyl-	696–28–6	4	P036	1 (0.454)
Asbestos†††	1332–21–4	2,3		1 (0.454)
Auramine	492–80–8	4	U014	100 (45.4)
Azaserine	115–02–6	4	U015	1 (0.454)
Aziridine	151–56–4	3,4	P054	1 (0.454)
Aziridine, 2-methyl-	75–55–8	3,4	P067	1 (0.454)
Azirino[2',3':3,4]pyrrolo[1,2–a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5- methyl-,[1aS-(1aalpha,8beta,8aalpha, 8balpha)]-.	50–07–7	4	U010	10 (4.54)
Barban	101279	4	U280	10 (4.54)
Barium cyanide	542–62–1	1,4	P013	10 (4.54)
Bendiocarb	22781233	4	U278	100 (45.4)
Bendiocarb phenol	22961826	4	U364	1000 (454)
Benomyl	17804352	4	U271	10 (4.54)
Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	56–49–5	4	U157	10 (4.54)
Benz[c]acridine	225–51–4	4	U016	100 (45.4)
Benzal chloride	98–87–3	4	U017	5000 (2270)
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2propynyl)-	23950–58–5	4	U192	5000 (2270)
Benz[a]anthracene	56–55–3	2,4	U018	10 (4.54)
1,2-Benzanthracene	56–55–3	2,4	U018	10 (4.54)
Benz[a]anthracene, 7,12-dimethyl-	57–97–6	4	U094	1 (0.454)
Benzenamine	62–53–3	1,3,4	U012	5000 (2270)
Benzenamine, 4,4′-carbonimidoylbis (N,N dimethyl-	492–80–8	4	U014	100 (45.4)
Benzenamine, 4-chloro-	106–47–8	4	P024	1000 (454)
Benzenamine, 4-chloro-2-methyl-, hydrochloride	3165–93–3	4	U049	100 (45.4)
Benzenamine, N,N-dimethyl-4-(phenylazo)-	60–11–7	3,4	U093	10 (4.54)
Benzenamine, 2-methyl-	95–53–4	3,4	U328	100 (45.4)
Benzenamine, 4-methyl-	106–49–0	4	U353	100 (45.4)
Benzenamine, 4,4′-methylenebis [2-chloro-	101–14–4	3,4	U158	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Benzenamine, 2-methyl-,hydrochloride	636–21–5	4	U222	100 (45.4)
Benzenamine, 2-methyl-5-nitro-	99–55–8	4	U181	100 (45.4)
Benzenamine, 4-nitro-	100–01–6	4	P077	5000 (2270)
Benzene[a]	71–43–2	1,2,3,4	U019	10 (4.54)
Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl)-α-hydroxy-, ethyl ester.	510–15–6	3,4	U038	10 (4.54)
Benzene, 1-bromo-4-phenoxy-	101–55–3	2,4	U030	100 (45.4)
Benzenebutanoic acid, 4-[bis(2- chloroethyl)amino]-	305–03–3	4	U035	10 (4.54)
Benzene, chloro-	108–90–7	1,2,3,4	U037	100 (45.4)
Benzene, (chloromethyl)-	100–44–7	1,3,4	P028	100 (45.4)
Benzenediamine, ar-methyl-	95–80–7 496–72–0 823–40–5 25376–45–8	3,4	U221	10 (4.54)
1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	117–81–7	2,3,4	U028	100 (45.4)
1,2-Benzenedicarboxylic acid, dibutyl ester	84–74–2	1,2,3,4	U069	10 (4.54)
1,2-Benzenedicarboxylic acid, diethyl ester	84–66–2	2,4	U088	1000 (454)
1,2-Benzenedicarboxylic acid, dimethyl ester	131–11–3	2,3,4	U102	5000 (2270)
1,2-Benzenedicarboxylic acid, dioctyl ester	117–84–0	2,4	U107	5000 (2270)
Benzene, 1,2-dichloro-	95–50–1	1,2,4	U070	100 (45.4)
Benzene, 1,3-dichloro-	541–73–1	2,4	U071	100 (45.4)
Benzene, 1,4-dichloro-	106–46–7	1,2,3,4	U072	100 (45.4)
Benzene, 1,1′-(2,2-dichloroethylidene) bis[4-chloro-	72–54–8	1,2,4	U060	1 (0.454)
Benzene, (dichloromethyl)-	98–87–3	4	U017	5000 (2270)
Benzene, 1,3-diisocyanatomethyl-	91–08–7 584–84–9 26471–62–5	3,4	U223	100 (45.4)
Benzene, dimethyl-	1330–20–7	1,3,4	U239	100 (45.4)
1,3-Benzenediol	108–46–3	1,4	U201	5000 (2270)
1,2-Benzenediol,4-[1-hydroxy-2-(methyl amino)ethyl]-	51–43–4	4	P042	1000 (454)
Benzeneethanamine, alpha,alpha-dimethyl-	122–09–8	4	P046	5000 (2270)
Benzene, hexachloro-	118–74–1	2,3,4	U127	10 (4.54)
Benzene, hexahydro-	110–82–7	1,4	U056	1000 (454)
Benzene, methyl-	108–88–3	1,2,3,4	U220	1000 (454)
Benzene, 1-methyl-2,4-dinitro-	121–14–2	1,2,3,4	U105	10 (4.54)
Benzene, 2-methyl-1,3-dinitro-	606–20–2	1,2,4	U106	100 (45.4)
Benzene, (1-methylethyl)-	98–82–8	3,4	U055	5000 (2270)
Benzene, nitro-	98–95–3	1,2,3,4	U169	1000 (454)
Benzene, pentachloro-	608–93–5	4	U183	10 (4.54)
Benzene, pentachloronitro-	82–68–8	3,4	U185	100 (45.4)
Benzenesulfonic acid chloride	98–09–9	4	U020	100 (45.4)
Benzenesulfonyl chloride	98–09–9	4	U020	100 (45.4)
Benzene,1,2,4,5-tetrachloro-	95–94–3	4	U207	5000 (2270)
Benzenethiol	108–98–5	4	P014	100 (45.4)
Benzene,1,1′-(2,2,2-trichloroethylidene) bis[4-chloro-	50–29–3	1,2,4	U061	1 (0.454)
Benzene,1,1′-(2,2,2-trichloroethylidene) bis[4-methoxy-	72–43–5	1,3,4	U247	1 (0.454)
Benzene, (trichloromethyl)-	98–07–7	3,4	U023	10 (4.54)
Benzene, 1,3,5-trinitro-	99–35–4	4	U234	10 (4.54)
Benzidine	92–87–5	2,3,4	U021	1 (0.454)
Benzo[a]anthracene	56–55–3	2,4	U018	10 (4.54)
1,3-Benzodioxole, 5-(1-propenyl)-1	120–58–1	4	U141	100 (45.4)
1,3-Benzodioxole, 5-(2-propenyl)-	94–59–7	4	U203	100 (45.4)
1,3-Benzodioxole, 5-propyl-	94–58–6	4	U090	10 (4.54)
1,3-Benzodioxol-4-ol, 2,2-dimethyl-	22961826	4	U364	1000 (454)
1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate	22781233	4	U278	100 (45.4)
Benzo[b]fluoranthene	205–99–2	2		1 (0.454)
Benzo(k)fluoranthene	207–08–9	2		5000 (2270)
7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-	1563388	4	U367	10 (4.54)
7-Benzofuranol, 2,3-dihydro-2,2- dimethyl-, methylcarbamate.	1563–66–2	1,4	P127	10 (4.54)
Benzoic acid	65–85–0	1		5000 (2270)
Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1).	57647	4	P188	100 (45.4)
Benzonitrile	100–47–0	1		5000 (2270)
Benzo[rst]pentaphene	189–55–9	4	U064	10 (4.54)
Benzo[ghi]perylene	191–24–2	2		5000 (2270)
2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts.	81–81–2	4	P001 U248	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Benzo[a]pyrene	50–32–8	2,4	U022	1 (0.454)
3,4-Benzopyrene	50–32–8	2,4	U022	1 (0.454)
ρ-Benzoquinone	106–51–4	3,4	U197	10 (4.54)
Benzotrichloride	98–07–7	3,4	U023	10 (4.54)
Benzoyl chloride	98–88–4	1		1000 (454)
Benzyl chloride	100–44–7	1,3,4	P028	100 (45.4)
Beryllium ††	7440–41–7	2,3,4	P015	10 (4.54)
BERYLLIUM AND COMPOUNDS	N.A.	2,3		**
Beryllium chloride	7787–47–5	1		1 (0.454)
Beryllium compounds	N.A.	2,3		**
Beryllium fluoride	7787–49–7	1		1 (0.454)
Beryllium nitrate	13597–99–4 7787–55–5	1		1 (0.454)
Beryllium powder ††	7440–41–7	2,3,4	P015	10 (4.54)
alpha-BHC	319–84–6	2		10 (4.54)
beta-BHC	319–85–7	2		1 (0.454)
delta-BHC	319–86–8	2		1 (0.454)
gamma-BHC	58–89–9	1,2,3,4	U129	1 (0.454)
2,2′-Bioxirane	1464–53–5	4	U085	10 (4.54)
Biphenyl	92–52–4	3		100 (45.4)
[1,1′-Biphenyl]-4,4′-diamine	92–87–5	2,3,4	U021	1 (0.454)
[1,1′-Biphenyl]-4,4′-diamine,3,3′-dichloro-	91–94–1	2,3,4	U073	1 (0.454)
[1,1′-Biphenyl]-4,4′-diamine,3,3′-dimethoxy-	119–90–4	3,4	U091	100 (45.4)
[1,1′-Biphenyl]-4,4′-diamine,3,3′-dimethyl-	119–93–7	3,4	U095	10 (4.54)
Bis(2-chloroethoxy) methane	111–91–1	2,4	U024	1000 (454)
Bis(2-chloroethyl) ether	111–44–4	2,3,4	U025	10 (4.54)
Bis(chloromethyl) ether	542–88–1	2,3,4	P016	10 (4.54)
Bis(2-ethylhexyl) phthalate	117–81–7	3,4	U028	100 (45.4)
Bromoacetone	598–31–2	4	P017	1000 (454)
Bromoform	75–25–2	2,3,4	U225	100 (45.4)
Bromomethane	74–83–9	2,3,4	U029	1000 (454)
4-Bromophenyl phenyl ether	101–55–3	2,4	U030	100 (45.4)
Brucine	357–57–3	4	P018	100 (45.4)
1,3-Butadiene	106–99–0	3		10 (4.54)
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87–68–3	2,3,4	U128	1 (0.454)
1-Butanamine, N-butyl-N-nitroso-	924–16–3	4	U172	10 (4.54)
1-Butanol	71–36–3	4	U031	5000 (2270)
2-Butanone	78–93–3	3,4	U159	5000 (2270)
2-Butanone, 3,3-dimethyl-1(methylthio)-, O-[(methylamino)carbonyl] oxime.	39196–18–4	4	P045	100 (45.4)
2-Butanone peroxide	1338–23–4	4	U160	10 (4.54)
2-Butenal	123–73–9 4170–30–3	1,4	U053	100 (45.4)
2-Butene, 1,4-dichloro-	764–41–0	4	U074	1 (0.454)
2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3- methyl-1-oxobutoxy] methyl]-2,3, 5,7a-tetrahydro- 1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z), 7(2S*,3R*),7aalpha]]-.	303–34–4	4	U143	10 (4.54)
Butyl acetate	123–86–4	1		5000 (2270)
iso-Butyl acetate	110–19–0			
sec-Butyl acetate	105–46–4			
tert-Butyl acetate	540–88–5			
n-Butyl alcohol	71–36–3	4	U031	5000 (2270)
Butylamine	109–73–9	1		1000 (454)
iso-Butylamine	78–81–9			
sec-Butylamine	513–49–5 13952–84–6			
tert-Butylamine	75–64–9			
Butyl benzyl phthalate	85–68–7	2		100 (45.4)
n-Butyl phthalate	84–74–2	1,2,3,4	U069	10 (4.54)
Butyric acid	107–92–6	1		5000 (2270)
iso-Butyric acid	79–31–2			
Cacodylic acid	75–60–5	4	U136	1 (0.454)
Cadmium ††	7440–43–9	2		10 (4.54)
Cadmium acetate	543–90–8	1		10 (4.54)
CADMIUM AND COMPOUNDS	N.A.	2,3		**
Cadmium bromide	7789–42–6	1		10 (4.54)
Cadmium chloride	10108–64–2	1		10 (4.54)
Cadmium compounds	N.A.	2,3		**

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Calcium arsenate	7778–44–1	1		1 (0.454)
Calcium arsenite	52740–16–6	1		1 (0.454)
Calcium carbide	75–20–7	1		10 (4.54)
Calcium chromate	13765–19–0	1,4	U032	10 (4.54)
Calcium cyanamide	156–62–7	3		1000 (454)
Calcium cyanide Ca(CN)2	592–01–8	1,4	P021	10 (4.54)
Calcium dodecylbenzenesulfonate	26264–06–2	1		1000 (454)
Calcium hypochlorite	7778–54–3	1		10 (4.54)
Captan	133–06–2	1,3		10 (4.54)
Carbamic acid, 1H-benzimidazol-2-yl, methyl ester	10605217	4	U372	10 (4.54)
Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-,methyl ester.	17804352	4	U271	10 (4.54)
Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester	101279	4	U280	10 (4.54)
Carbamic acid, [(dibutylamino)-thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester.	55285148	4	P189	1000 (454)
Carbamic acid, dimethyl-,1-[(dimethyl-amino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester.	644644	4	P191	1 (0.454)
Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazol-5-yl ester.	119380	4	P192	100 (45.4)
Carbamic acid, ethyl ester	51–79–6	3,4	U238	100 (45.4)
Carbamic acid, methyl-, 3-methylphenyl ester	1129415	4	P190	1000 (454)
Carbamic acid, methylnitroso-, ethyl ester	615–53–2	4	U178	1 (0.454)
Carbamic acid, [1,2-phenylenebis(iminocarbonothioyl)]bis-, dimethyl ester.	23564058	4	U409	10 (4.54)
Carbamic acid, phenyl-, 1-methylethyl ester	122429	4	U373	1000 (454)
Carbamic chloride, dimethyl-	79–44–7	3,4	U097	1 (0.454)
Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters	111–54–6	4	U114	5000 (2270)
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester.	2303–16–4	4	U062	100 (45.4)
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester.	2303175	4	U389	100 (45.4)
Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester	52888809	4	U387	5000 (2270)
Carbaryl	63–25–2	1,3,4	U279	100 (45.4)
Carbendazim	10605217	4	U372	10 (4.54)
Carbofuran	1563–66–2	1,4	P127	10 (4.54)
Carbofuran phenol	1563388	4	U367	10 (4.54)
Carbon disulfide	75–15–0	1,3,4	P022	100 (45.4)
Carbonic acid, dithallium(1+) salt	6533–73–9	4	U215	100 (45.4)
Carbonic dichloride	75–44–5	1,3,4	P095	10 (4.54)
Carbonic difluoride	353–50–4	4	U033	1000 (454)
Carbonochloridic acid, methyl ester	79–22–1	4	U156	1000 (454)
Carbon oxyfluoride	353–50–4	4	U033	1000 (454)
Carbon tetrachloride	56–23–5	1,2,3,4	U211	10 (4.54)
Carbonyl sulfide	463–58–1	3		100 (45.4)
Carbosulfan	55285148	4	P189	1000 (454)
Catechol	120–80–9	3		100 (45.4)
Chloral	75–87–6	4	U034	5000 (2270)
Chloramben	133–90–4	3		100 (45.4)
Chlorambucil	305–03–3	4	U035	10 (4.54)
Chlordane	57–74–9	1,2,3,4	U036	1 (0.454)
Chlordane, alpha & gamma isomers	57–74–9	1,2,3,4	U036	1 (0.454)
CHLORDANE (TECHNICAL MIXTURE AND METABOLITES).	57–74–9	1,2,3,4	U036	1 (0.454)
CHLORINATED BENZENES	N.A.	2		**
Chlorinated camphene	8001–35–2	1,2,3,4	P123	1 (0.454)
CHLORINATED ETHANES	N.A.	2		**
CHLORINATED NAPHTHALENE	N.A.	2		**
CHLORINATED PHENOLS	N.A.	2		**
Chlorine	7782–50–5	1,3		10 (4.54)
Chlornaphazine	494–03–1	4	U026	100 (45.4)
Chloroacetaldehyde	107–20–0	4	P023	1000 (454)
Chloroacetic acid	79–11–8	3		100 (45.4)
2-Chloroacetophenone	532–27–4	3		100 (45.4)
CHLOROALKYL ETHERS	N.A.	2		**
p-Chloroaniline	106–47–8	4	P024	1000 (454)
Chlorobenzene	108–90–7	1,2,3,4	U037	100 (45.4)
Chlorobenzilate	510–15–6	3,4	U038	10 (4.54)
p-Chloro-m-cresol	59–50–7	2,4	U039	5000 (2270)
Chlorodibromomethane	124–48–1	2		100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
1-Chloro-2,3-epoxypropane	106–89–8	1,3,4	U041	100 (45.4)
Chloroethane	75–00–3	2,3		100 (45.4)
2-Chloroethyl vinyl ether	110–75–8	2,4	U042	1000 (454)
Chloroform	67–66–3	1,2,3,4	U044	10 (4.54)
Chloromethane	74–87–3	2,3,4	U045	100 (45.4)
Chloromethyl methyl ether	107–30–2	3,4	U046	10 (4.54)
beta-Chloronaphthalene	91–58–7	2,4	U047	5000 (2270)
2-Chloronaphthalene	91–58–7	2,4	U047	5000 (2270)
2-Chlorophenol	95–57–8	2,4	U048	100 (45.4)
o-Chlorophenol	95–57–8	2,4	U048	100 (45.4)
4-Chlorophenyl phenyl ether	7005–72–3	2		5000 (2270)
1-(o-Chlorophenyl)thiourea	5344–82–1	4	P026	100 (45.4)
Chloroprene	126–99–8	3		100 (45.4)
3-Chloropropionitrile	542–76–7	4	P027	1000 (454)
Chlorosulfonic acid	7790–94–5	1		1000 (454)
4-Chloro-o-toluidine, hydrochloride	3165–93–3	4	U049	100 (45.4)
Chlorpyrifos	2921–88–2	1		1 (0.454)
Chromic acetate	1066–30–4	1		1000 (454)
Chromic acid	11115–74–5 7738–94–5	1		10 (4.54)
Chromic acid H2CrO4, calcium salt	13765–19–0	1,4	U032	10 (4.54)
Chromic sulfate	10101–53–8	1		1000 (454)
Chromium ††	7440–47–3	2		5000 (2270)
CHROMIUM AND COMPOUNDS	N.A.	2,3		**
Chromium Compounds	N.A.	2,3		**
Chromous chloride	10049–05–5	1		1000 (454)
Chrysene	218–01–9	2,4	U050	100 (45.4)
Cobalt Compounds	N.A.	3		**
Cobaltous bromide	7789–43–7	1		1000 (454)
Cobaltous formate	544–18–3	1		1000 (454)
Cobaltous sulfamate	14017–41–5	1		1000 (454)
Coke Oven Emissions	N.A.	3		1 (0.454)
Copper ††	7440–50–8	2		5000 (2270)
COPPER AND COMPOUNDS	N.A.	2		**
Copper cyanide Cu(CN)	544–92–3	4	P029	10 (4.54)
Coumaphos	56–72–4	1		10 (4.54)
Creosote	N.A.	4	U051	1 (0.454)
Cresol (cresylic acid)	1319–77–3	1,3,4	U052	100 (45.4)
m-Cresol	108–39–4	3		100 (45.4)
o-Cresol	95–48–7	3		100 (45.4)
p-Cresol	106–44–5	3		100 (45.4)
Cresols (isomers and mixture)	1319–77–3	1,3,4	U052	100 (45.4)
Cresylic acid (isomers and mixture)	1319–77–3	1,3,4	U052	100 (45.4)
Crotonaldehyde	123–73–9 4170–30–3	1,4	U053	100 (45.4)
Cumene	98–82–8	3,4	U055	5000 (2270)
m-Cumenyl methylcarbamate	64006	4	P202	10 (4.54)
Cupric acetate	142–71–2	1		100 (45.4)
Cupric acetoarsenite	12002–03–8	1		1 (0.454)
Cupric chloride	7447–39–4	1		10 (4.54)
Cupric nitrate	3251–23–8	1		100 (45.4)
Cupric oxalate	5893–66–3	1		100 (45.4)
Cupric sulfate	7758–98–7	1		10 (4.54)
Cupric sulfate, ammoniated	10380–29–7	1		100 (45.4)
Cupric tartrate	815–82–7	1		100 (45.4)
Cyanide Compounds	N.A.	2,3		**
CYANIDES	N.A.	2,3		**
Cyanides (soluble salts and complexes) not otherwise specified.	N.A.	4	P030	10 (4.54)
Cyanogen	460–19–5	4	P031	100 (45.4)
Cyanogen bromide (CN)Br	506–68–3	4	U246	1000 (454)
Cyanogen chloride (CN)Cl	506–77–4	1,4	P033	10 (4.54)
2,5-Cyclohexadiene-1,4-dione	106–51–4	3,4	U197	10 (4.54)
Cyclohexane	110–82–7	1,4	U056	1000 (454)
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α, 2α, 3β–, 4α, 5α, 6β).	58–89–9	1,2,3,4	U129	1 (0.454)
Cyclohexanone	108–94–1	4	U057	5000 (2270)
2-Cyclohexyl-4,6-dinitrophenol	131–89–5	4	P034	100 (45.4)
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77–47–4	1,2,3,4	U130	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Cyclophosphamide	50–18–0	4	U058	10 (4.54)
2,4-D Acid	94–75–7	1,3,4	U240	100 (45.4)
2,4-D Ester	94–11–1	1		100 (45.4)
	94–79–1			
	94–80–4			
	1320–18–9			
	1928–38–7			
	1928–61–6			
	1929–73–3			
	2971–38–2			
	25168–26–7			
	53467–11–1			
2,4-D, salts and esters	94–75–7	1,3,4	U240	100 (45.4)
Daunomycin	20830–81–3	4	U059	10 (4.54)
DDD	72–54–8	1,2,4	U060	1 (0.454)
4,4′-DDD	72–54–8	1,2,4	U060	1 (0.454)
DDE [b]	72–55–9	2		1 (0.454)
DDE [b]	3547–04–4	3		5000 (2270)
4,4′-DDE	72–55–9	2		1 (0.454)
DDT	50–29–3	1,2,4	U061	1 (0.454)
4,4′-DDT	50–29–3	1,2,4	U061	1 (0.454)
DDT AND METABOLITES	N.A.	2		**
DEHP	117–81–7	2,3,4	U028	100 (45.4)
Diallate	2303–16–4	4	U062	100 (45.4)
Diazinon	333–41–5	1		1 (0.454)
Diazomethane	334–88–3	3		100 (45.4)
Dibenz[a,h]anthracene	53–70–3	2,4	U063	1 (0.454)
1,2:5,6-Dibenzanthracene	53–70–3	2,4	U063	1 (0.454)
Dibenzo[a,h]anthracene	53–70–3	2,4	U063	1 (0.454)
Dibenzofuran	132–64–9	3		100 (45.4)
Dibenzo[a,i]pyrene	189–55–9	4	U064	10 (4.54)
1,2-Dibromo-3-chloropropane	96–12–8	3,4	U066	1 (0.454)
Dibromoethane	106–93–4	1,3,4	U067	1 (0.454)
Dibutyl phthalate	84–74–2	1,2,3,4	U069	10 (4.54)
Di-n-butyl phthalate	84–74–2	1,2,3,4	U069	10 (4.54)
Dicamba	1918–00–9	1		1000 (454)
Dichlobenil	1194–65–6	1		100 (45.4)
Dichlone	117–80–6	1		1 (0.454)
Dichlorobenzene	25321–22–6	1		100 (45.4)
1,2-Dichlorobenzene	95–50–1	1,2,4	U070	100 (45.4)
1,3-Dichlorobenzene	541–73–1	2,4	U071	100 (45.4)
1,4-Dichlorobenzene	106–46–7	1,2,3,4	U072	100 (45.4)
m-Dichlorobenzene	541–73–1	2,4	U071	100 (45.4)
o-Dichlorobenzene	95–50–1	1,2,4	U070	100 (45.4)
p-Dichlorobenzene	106–46–7	1,2,3,4	U072	100 (45.4)
DICHLOROBENZIDINE	N.A.	2		**
3,3′-Dichlorobenzidine	91–94–1	2,3,4	U073	1 (0.454)
Dichlorobromomethane	75–27–4	2		5000 (2270)
1,4-Dichloro-2-butene	764–41–0	4	U074	1 (0.454)
Dichlorodifluoromethane	75–71–8	4	U075	5000 (2270)
1,1-Dichloroethane	75–34–3	2,3,4	U076	1000 (454)
1,2-Dichloroethane	107–06–2	1,2,3,4	U077	100 (45.4)
1,1-Dichloroethylene	75–35–4	1,2,3,4	U078	100 (45.4)
1,2-Dichloroethylene	156–60–5	2,4	U079	1000 (454)
Dichloroethyl ether	111–44–4	2,3,4	U025	10 (4.54)
Dichloroisopropyl ether	108–60–1	2,4	U027	1000 (454)
Dichloromethane	75–09–2	2,3,4	U080	1000 (454)
Dichloromethoxyethane	111–91–1	2,4	U024	1000 (454)
Dichloromethyl ether	542–88–1	2,3,4	P016	10 (4.54)
2,4-Dichlorophenol	120–83–2	2,4	U081	100 (45.4)
2,6-Dichlorophenol	87–65–0	4	U082	100 (45.4)
Dichlorophenylarsine	696–28–6	4	P036	1 (0.454)
Dichloropropane	26638–19–7	1		1000 (454)
1,1-Dichloropropane	78–99–9			
1,3-Dichloropropane	142–28–9			
1,2-Dichloropropane	78–87–5	1,2,3,4	U083	1000 (454)
Dichloropropane—Dichloropropene (mixture)	8003–19–8	1		100 (45.4)
Dichloropropene	26952–23–8	1		100 (45.4)
2,3-Dichloropropene	78–88–6			

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
1,3-Dichloropropene	542–75–6	1,2,3,4	U084	100 (45.4)
2,2-Dichloropropionic acid	75–99–0	1		5000 (2270)
Dichlorvos	62–73–7	1,3		10 (4.54)
Dicofol	115–32–2	1		10 (4.54)
Dieldrin	60–57–1	1,2,4	P037	1 (0.454)
1,2:3,4-Diepoxybutane	1464–53–5	4	U085	10 (4.54)
Diethanolamine	111–42–2	3		100 (45.4)
Diethylamine	109–89–7	1		100 (45.4)
N,N-Diethylaniline	91–66–7	3		1000 (454)
Diethylarsine	692–42–2	4	P038	1 (0.454)
1,4-Diethyleneoxide	123–91–1	3,4	U108	100 (45.4)
Diethylene glycol, dicarbamate	5952261	4	U395	5000 (2270)
Diethylhexyl phthalate	117–81–7	2,3,4	U028	100 (45.4)
N,N′-Diethylhydrazine	1615–80–1	4	U086	10 (4.54)
O,O-Diethyl S-methyl dithiophosphate	3288–58–2	4	U087	5000 (2270)
Diethyl-p-nitrophenyl phosphate	311–45–5	4	P041	100 (45.4)
Diethyl phthalate	84–66–2	2,4	U088	1000 (454)
O,O-Diethyl O-pyrazinyl phosphorothioate	297–97–2	4	P040	100 (45.4)
Diethylstilbestrol	56–53–1	4	U089	1 (0.454)
Diethyl sulfate	64–67–5	3		10 (4.54)
Dihydrosafrole	94–58–6	4	U090	10 (4.54)
Diisopropylfluorophosphate (DFP)	55–91–4	4	P043	100 (45.4)
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha, 8alpha,8abeta)-.	309–00–2	1,2,4	P004	1 (0.454)
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta, 5beta,8beta,8abeta)-.	465–73–6	4	P060	1 (0.454)
2,7:3,6-Dimethanonaphth[2,3-b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1aalpha,2beta, 2aalpha,3beta,6beta,6aalpha, 7beta,7aalpha)-.	60–57–1	1,2,4	P037	1 (0.454)
2,7:3,6-Dimethanonaphth[2, 3-b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1aalpha,2beta, 2abeta,3alpha,6alpha, 6abeta,7beta,7aalpha)-, & metabolites.	72–20–8	1,2,4	P051	1 (0.454)
Dimethoate	60–51–5	4	P044	10 (4.54)
3,3′-Dimethoxybenzidine	119–90–4	3,4	U091	100 (45.4)
Dimethylamine	124–40–3	1,4	U092	1000 (454)
Dimethyl aminoazobenzene	60–11–7	3,4	U093	10 (4.54)
p-Dimethylaminoazobenzene	60–11–7	3,4	U093	10 (4.54)
N,N-Dimethylaniline	121–69–7	3		100 (45.4)
7,12-Dimethylbenz[a]anthracene	57–97–6	4	U094	1 (0.454)
3,3′-Dimethylbenzidine	119–93–7	3,4	U095	10 (4.54)
alpha,alpha-Dimethylbenzylhydroperoxide	80–15–9	4	U096	10 (4.54)
Dimethylcarbamoyl chloride	79–44–7	3,4	U097	1 (0.454)
Dimethylformamide	68–12–2	3		100 (45.4)
1,1-Dimethylhydrazine	57–14–7	3,4	U098	10 (4.54)
1,2-Dimethylhydrazine	540–73–8	4	U099	1 (0.454)
alpha,alpha-Dimethylphenethylamine	122–09–8	4	P046	5000 (2270)
2,4-Dimethylphenol	105–67–9	2,4	U101	100 (45.4)
Dimethyl phthalate	131–11–3	2,3,4	U102	5000 (2270)
Dimethyl sulfate	77–78–1	3,4	U103	100 (45.4)
Dimetilan	644644	4	P191	1 (0.454)
Dinitrobenzene (mixed)	25154–54–5	1		100 (45.4)
m-Dinitrobenzene	99–65–0			
o-Dinitrobenzene	528–29–0			
p-Dinitrobenzene	100–25–4			
4,6-Dinitro-o-cresol, and salts	534–52–1	2,3,4	P047	10 (4.54)
Dinitrophenol	25550–58–7	1		10 (4.54)
2,5-Dinitrophenol	329–71–5			
2,6-Dinitrophenol	573–56–8			
2,4-Dinitrophenol	51–28–5	1,2,3,4	P048	10 (4.54)
Dinitrotoluene	25321–14–6	1,2		10 (4.54)
3,4-Dinitrotoluene	610–39–9			
2,4-Dinitrotoluene	121–14–2	1,2,3,4	U105	10 (4.54)
2,6-Dinitrotoluene	606–20–2	1,2,4	U106	100 (45.4)
Dinoseb	88–85–7	4	P020	1000 (454)
Di-n-octyl phthalate	117–84–0	2,4	U107	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
1,4-Dioxane	123–91–1	3,4	U108	100 (45.4)
DIPHENYLHYDRAZINE	N.A.	2		**
1,2-Diphenylhydrazine	122–66–7	2,3,4	U109	10 (4.54)
Diphosphoramide, octamethyl-	152–16–9	4	P085	100 (45.4)
Diphosphoric acid, tetraethyl ester	107–49–3	1,4	P111	10 (4.54)
Dipropylamine	142–84–7	4	U110	5000 (2270)
Di-n-propylnitrosamine	621–64–7	2,4	U111	10 (4.54)
Diquat	85–00–7	1		1000 (454)
	2764–72–9			
Disulfoton	298–04–4	1,4	P039	1 (0.454)
Dithiobiuret	541–53–7	4	P049	100 (45.4)
1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime.	26419738	4	P185	100 (45.4)
Diuron	330–54–1	1		100 (45.4)
Dodecylbenzenesulfonic acid	27176–87–0	1		1000 (454)
Endosulfan	115–29–7	1,2,4	P050	1 (0.454)
alpha-Endosulfan	959–98–8	2		1 (0.454)
beta-Endosulfan	33213–65–9	2		1 (0.454)
ENDOSULFAN AND METABOLITES	N.A.	2		**
Endosulfan sulfate	1031–07–8	2		1 (0.454)
Endothall	145–73–3	4	P088	1000 (454)
Endrin	72–20–8	1,2,4	P051	1 (0.454)
Endrin aldehyde	7421–93–4	2		1 (0.454)
ENDRIN AND METABOLITES	N.A.	2		**
Endrin, & metabolites	72–20–8	1,2,4	P051	1 (0.454)
Epichlorohydrin	106–89–8	1,3,4	U041	100 (45.4)
Epinephrine	51–43–4	4	P042	1000 (454)
1,2-Epoxybutane	106–88–7	3		100 (45.4)
Ethanal	75–07–0	1,3,4	U001	1000 (454)
Ethanamine, N,N-diethyl-	121–44–8	1,3,4	U404	5000 (2270)
Ethanamine, N-ethyl-N-nitroso-	55–18–5	4	U174	1 (0.454)
1,2-Ethanediamine, N,N-dimethyl-N′-2- pyridinyl-N′-(2-thienylmethyl)-.	91–80–5	4	U155	5000 (2270)
Ethane, 1,2-dibromo-	106–93–4	1,3,4	U067	1 (0.454)
Ethane, 1,1-dichloro-	75–34–3	2,3,4	U076	1000 (454)
Ethane, 1,2-dichloro-	107–06–2	1,2,3,4	U077	100 (45.4)
Ethanedinitrile	460–19–5	4	P031	100 (45.4)
Ethane, hexachloro-	67–72–1	2,3,4	U131	100 (45.4)
Ethane, 1,1′-[methylenebis(oxy)]bis[2- chloro-	111–91–1	2,4	U024	1000 (454)
Ethane, 1,1′-oxybis-	60–29–7	4	U117	100 (45.4)
Ethane, 1,1′-oxybis[2-chloro-	111–44–4	2,3,4	U025	10 (4.54)
Ethane, pentachloro-	76–01–7	4	U184	10 (4.54)
Ethane, 1,1,1,2-tetrachloro-	630–20–6	4	U208	100 (45.4)
Ethane, 1,1,2,2-tetrachloro-	79–34–5	2,3,4	U209	100 (45.4)
Ethanethioamide	62–55–5	4	U218	10 (4.54)
Ethane, 1,1,1-trichloro-	71–55–6	2,3,4	U226	1000 (454)
Ethane, 1,1,2-trichloro-	79–00–5	2,3,4	U227	100 (45.4)
Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester.	30558431	4	U394	5000 (2270)
Ethanimidothioic acid, 2-(dimethylamino)-N-[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester.	23135220	4	P194	100 (45.4)
Ethanimidothioic acid, N-[[(methylamino) carbonyl]oxy]-, methyl ester.	16752–77–5	4	P066	100 (45.4)
Ethanimidothioic acid, N,N'- [thiobis[(methylimino) carbonyloxy]]bis-, dimethyl ester.	59669260	4	U410	100 (45.4)
Ethanol, 2-ethoxy-	110–80–5	4	U359	1000 (454)
Ethanol, 2,2′-(nitrosoimino)bis-	1116–54–7	4	U173	1 (0.454)
Ethanol, 2,2'-oxybis-, dicarbamate	5952261	4	U395	5000 (2270)
Ethanone, 1-phenyl-	98–86–2	3,4	U004	5000 (2270)
Ethene, chloro-	75–01–4	2,3,4	U043	1 (0.454)
Ethene, (2-chloroethoxy)-	110–75–8	2,4	U042	1000 (454)
Ethene, 1,1-dichloro-	75–35–4	1,2,3,4	U078	100 (45.4)
Ethene, 1,2-dichloro-(E)	156–60–5	2,4	U079	1000 (454)
Ethene, tetrachloro-	127–18–4	2,3,4	U210	100 (45.4)
Ethene, trichloro-	79–01–6	1,2,3,4	U228	100 (45.4)
Ethion	563–12–2	1		10 (4.54)
Ethyl acetate	141–78–6	4	U112	5000 (2270)
Ethyl acrylate	140–88–5	3,4	U113	1000 (454)
Ethylbenzene	100–41–4	1,2,3		1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Ethyl carbamate	51–79–6	3,4	U238	100 (45.4)
Ethyl chloride	75–00–3	2,3		100 (45.4)
Ethyl cyanide	107–12–0	4	P101	10 (4.54)
Ethylenebisdithiocarbamic acid, salts & esters	111–54–6	4	U114	5000 (2270)
Ethylenediamine	107–15–3	1		5000 (2270)
Ethylenediamine-tetraacetic acid (EDTA)	60–00–4	1		5000 (2270)
Ethylene dibromide	106–93–4	1,3,4	U067	1 (0.454)
Ethylene dichloride	107–06–2	1,2,3,4	U077	100 (45.4)
Ethylene glycol	107–21–1	3		5000 (2270)
Ethylene glycol monoethyl ether	110–80–5	4	U359	1000 (454)
Ethylene oxide	75–21–8	3,4	U115	10 (4.54)
Ethylenethiourea	96–45–7	3,4	U116	10 (4.54)
Ethylenimine	151–56–4	3,4	P054	1 (0.454)
Ethyl ether	60–29–7	4	U117	100 (45.4)
Ethylidene dichloride	75–34–3	2,3,4	U076	1000 (454)
Ethyl methacrylate	97–63–2	4	U118	1000 (454)
Ethyl methanesulfonate	62–50–0	4	U119	1 (0.454)
Famphur	52–85–7	4	P097	1000 (454)
Ferric ammonium citrate	1185–57–5	1		1000 (454)
Ferric ammonium oxalate	2944–67–4 55488–87–4	1		1000 (454)
Ferric chloride	7705–08–0	1		1000 (454)
Ferric fluoride	7783–50–8	1		100 (45.4)
Ferric nitrate	10421–48–4	1		1000 (454)
Ferric sulfate	10028–22–5	1		1000 (454)
Ferrous ammonium sulfate	10045–89–3	1		1000 (454)
Ferrous chloride	7758–94–3	1		100 (45.4)
Ferrous sulfate	7720–78–7 7782– 63–0	1		1000 (454)
Fine mineral fibers[c]	N.A.	3		**
Fluoranthene	206–44–0	2,4	U120	100 (45.4)
Fluorene	86–73–7	2		5000 (2270)
Fluorine	7782–41–4	4	P056	10 (4.54)
Fluoroacetamide	640–19–7	4	P057	100 (45.4)
Fluoroacetic acid, sodium salt	62–74–8	4	P058	10 (4.54)
Formaldehyde	50–00–0	1,3,4	U122	100 (45.4)
Formetanate hydrochloride	23422539	4	P198	100 (45.4)
Formic acid	64–18–6	1,4	U123	5000 (2270)
Formparanate	17702577	4	P197	100 (45.4)
Fulminic acid, mercury(2+)salt	628–86–4	4	P065	10 (4.54)
Fumaric acid	110–17–8	1		5000 (2270)
Furan	110–00–9	4	U124	100 (45.4)
2-Furancarboxaldehyde	98–01–1	1,4	U125	5000 (2270)
2,5-Furandione	108–31–6	1,3,4	U147	5000 (2270)
Furan, tetrahydro-	109–99–9	4	U213	1000 (454)
Furfural	98–01–1	1,4	U125	5000 (2270)
Furfuran	110–00–9	4	U124	100 (45.4)
Glucopyranose, 2-deoxy-2–(3-methyl-3-nitrosoureido)-,D-	18883–66–4	4	U206	1 (0.454)
D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-.	18883–66–4	4	U206	1 (0.454)
Glycidylaldehyde	765–34–4	4	U126	10 (4.54)
Glycol ethers[d]	N.A.	3		**
Guanidine, N-methyl-N′-nitro-N-nitroso-	70–25–7	4	U163	10 (4.54)
Guthion	86–50–0	1		1 (0.454)
HALOETHERS	N.A.	2		**
HALOMETHANES	N.A.	2		**
Heptachlor	76–44–8	1,2,3,4	P059	1 (0.454)
HEPTACHLOR AND METABOLITES	N.A.	2		**
Heptachlor epoxide	1024–57–3	2		1 (0.454)
Hexachlorobenzene	118–74–1	2,3,4	U127	10 (4.54)
Hexachlorobutadiene	87–68–3	2,3,4	U128	1 (0.454)
HEXACHLOROCYCLOHEXANE (all isomers)	608–73–1	2		**
Hexachlorocyclopentadiene	77–47–4	1,2,3,4	U130	10 (4.54)
Hexachloroethane	67–72–1	2,3,4	U131	100 (45.4)
Hexachlorophene	70–30–4	4	U132	100 (45.4)
Hexachloropropene	1888–71–7	4	U243	1000 (454)
Hexaethyl tetraphosphate	757–58–4	4	P062	100 (45.4)
Hexamethylene-1,6–diisocyanate	822–06–0	3		100 (45.4)
Hexamethylphosphoramide	680–31–9	3		1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Hexane	110–54–3	3		5000 (2270)
Hexone	108–10–1	3,4	U161	5000 (2270)
Hydrazine	302–01–2	3,4	U133	1 (0.454)
Hydrazinecarbothioamide	79–19–6	4	P116	100 (45.4)
Hydrazine, 1,2-diethyl-	1615–80–1	4	U086	10 (4.54)
Hydrazine, 1,1-dimethyl-	57–14–7	3,4	U098	10 (4.54)
Hydrazine, 1,2-dimethyl-	540–73–8	4	U099	1 (0.454)
Hydrazine, 1,2-diphenyl-	122–66–7	2,3,4	U109	10 (4.54)
Hydrazine, methyl-	60–34–4	3,4	P068	10 (4.54)
Hydrochloric acid	7647–01–0	1,3		5000 (2270)
Hydrocyanic acid	74–90–8	1,4	P063	10 (4.54)
Hydrofluoric acid	7664–39–3	1,3,4	U134	100 (45.4)
Hydrogen chloride	7647–01–0	1,3		5000 (2270)
Hydrogen cyanide	74–90–8	1,4	P063	10 (4.54)
Hydrogen fluoride	7664–39–3	1,3,4	U134	100 (45.4)
Hydrogen phosphide	7803–51–2	3,4	P096	100 (45.4)
Hydrogen sulfide H2S	7783–06–4	1,4	U135	100 (45.4)
Hydroperoxide, 1-methyl-1-phenylethyl-	80–15–9	4	U096	10 (4.54)
Hydroquinone	123–31–9	3		100 (45.4)
2-Imidazolidinethione	96–45–7	3,4	U116	10 (4.54)
Indeno(1,2,3-cd)pyrene	193–39–5	2,4	U137	100 (45.4)
Iodomethane	74–88–4	3,4	U138	100 (45.4)
1,3-Isobenzofurandione	85–44–9	3,4	U190	5000 (2270)
Isobutyl alcohol	78–83–1	4	U140	5000 (2270)
Isodrin	465–73–6	4	P060	1 (0.454)
Isolan	119380	4	P192	100 (45.4)
Isophorone	78–59–1	2,3		5000 (2270)
Isoprene	78–79–5	1		100 (45.4)
Isopropanolamine dodecylbenzenesulfonate	42504–46–1	1		1000 (454)
3-Isopropylphenyl N-methylcarbamate	64006	4	P202	10 (4.54)
Isosafrole	120–58–1	4	U141	100 (45.4)
3(2H)-Isoxazolone, 5–(aminomethyl)-	2763–96–4	4	P007	1000 (454)
Kepone	143–50–0	1,4	U142	1 (0.454)
Lasiocarpine	303–34–4	4	U143	10 (4.54)
Lead††	7439–92–1	2		10 (4.54)
Lead acetate	301–04–2	1,4	U144	10 (4.54)
LEAD AND COMPOUNDS	N.A.	2,3		**
Lead arsenate	7784–40–9	1		1 (0.454)
	7645–25–2			
	10102–48–4			
Lead, bis(acetato-O)tetrahydroxytri-	1335–32–6	4	U146	10 (4.54)
Lead chloride	7758–95–4	1		10 (4.54)
Lead compounds	N.A.	2,3		**
Lead fluoborate	13814–96–5	1		10 (4.54)
Lead fluoride	7783–46–2	1		10 (4.54)
Lead iodide	10101–63–0	1		10 (4.54)
Lead nitrate	10099–74–8	1		10 (4.54)
Lead phosphate	7446–27–7	4	U145	10 (4.54)
Lead stearate	1072–35–1	1		10 (4.54)
	7428–48–0			
	52652–59–2			
	56189–09–4			
Lead subacetate	1335–32–6	4	U146	10 (4.54)
Lead sulfate	7446–14–2	1		10 (4.54)
	15739–80–7			
Lead sulfide	1314–87–0	1		10 (4.54)
Lead thiocyanate	592–87–0	1		10 (4.54)
Lindane	58–89–9	1,2,3,4	U129	1 (0.454)
Lindane (all isomers)	58–89–9	1,2,3,4	U129	1 (0.454)
Lithium chromate	14307–35–8	1		10 (4.54)
Malathion	121–75–5	1		100 (45.4)
Maleic acid	110–16–7	1		5000 (2270)
Maleic anhydride	108–31–6	1,3,4	U147	5000 (2270)
Maleic hydrazide	123–33–1	4	U148	5000 (2270)
Malononitrile	109–77–3	4	U149	1000 (454)
Manganese, bis (dimethylcarbamodithioato-S,S')-	15339363	4	P196	10 (4.54)
Manganese Compounds	N.A.	3		**
Manganese dimethyldithiocarbamate	15339363	4	P196	10 (4.54)
MDI	101–68–8	3		5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
MEK	78–93–3	3,4	U159	5000 (2270)
Melphalan	148–82–3	4	U150	1 (0.454)
Mercaptodimethur	2032–65–7	1,4	P199	10 (4.54)
Mercuric cyanide	592–04–1	1		1(0.454)
Mercuric nitrate	10045–94–0	1		10 (4.54)
Mercuric sulfate	7783–35–9	1		10 (4.54)
Mercuric thiocyanate	592–85–8	1		10 (4.54)
Mercurous nitrate	10415–75–5	1	10 (4.54)	7782–86–7
Mercury	7439–97–6	2,3,4	U151	1 (0.454)
MERCURY AND COMPOUNDS	N.A.	2,3		**
Mercury, (acetato-O)phenyl-	62–38–4	4	P092	100 (45.4)
Mercury Compounds	N.A.	2,3		**
Mercury fulminate	628–86–4	4	P065	10 (4.54)
Methacrylonitrile	126–98–7	4	U152	1000 (454)
Methanamine, N-methyl-	124–40–3	1,4	U092	1000 (454)
Methanamine, N-methyl-N-nitroso-	62–75–9	2,3,4	P082	10 (4.54)
Methane, bromo-	74–83–9	2,3,4	U029	1000 (454)
Methane, chloro-	74–87–3	2,3,4	U045	100 (45.4)
Methane, chloromethoxy-	107–30–2	3,4	U046	10 (4.54)
Methane, dibromo-	74–95–3	4	U068	1000 (454)
Methane, dichloro-	75–09–2	2,3,4	U080	1000 (454)
Methane, dichlorodifluoro-	75–71–8	4	U075	5000 (2270)
Methane, iodo-	74–88–4	3,4	U138	100 (45.4)
Methane, isocyanato-	624–83–9	3,4	P064	10 (4.54)
Methane, oxybis(chloro-	542–88–1	2,3,4	P016	10 (4.54)
Methanesulfenyl chloride, trichloro-	594–42–3	4	P118	100 (45.4)
Methanesulfonic acid, ethyl ester	62–50–0	4	U119	1 (0.454)
Methane, tetrachloro-	56–23–5	1,2,3,4	U211	10 (4.54)
Methane, tetranitro-	509–14–8	4	P112	10 (4.54)
Methanethiol	74–93–1	1,4	U153	100 (45.4)
Methane, tribromo-	75–25–2	2,3,4	U225	100 (45.4)
Methane, trichloro-	67–66–3	1,2,3,4	U044	10 (4.54)
Methane, trichlorofluoro-	75–69–4	4	U121	5000 (2270)
Methanimidamide, N,N-dimethyl-N'-[3-[[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride.	23422539	4	P198	100 (45.4)
Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[(methylamino) carbonyl]oxy]phenyl]-.	17702577	4	P197	100 (45.4)
6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide.	115–29–7	1,2,4	P050	1 (0.454)
4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-.	76–44–8	1,2,3,4	P059	1 (0.454)
4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-—.	57–74–9	1,2,3,4	U036	1 (0.454)
Methanol	67–56–1	3,4	U154	5000 (2270)
Methapyrilene	91–80–5	4	U155	5000 (2270)
1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-.	143–50–0	1,4	U142	1 (0.454)
Methiocarb	2032–65–7	1,4	P199	10 (4.54)
Methomyl	16752–77–5	4	P066	100 (45.4)
Methoxychlor	72–43–5	1,3,4	U247	1 (0.454)
Methyl alcohol	67–56–1	3,4	U154	5000 (2270)
2-Methyl aziridine	75–55–8	3,4	P067	1 (0.454)
Methyl bromide	74–83–9	2,3,4	U029	1000 (454)
1-Methylbutadiene	504–60–9	4	U186	100 (45.4)
Methyl chloride	74–87–3	2,3,4	U045	100 (45.4)
Methyl chlorocarbonate	79–22–1	4	U156	1000 (454)
Methyl chloroform	71–55–6	2,3,4	U226	1000 (454)
3-Methylcholanthrene	56–49–5	4	U157	10 (4.54)
4,4′-Methylenebis(2-chloroaniline)	101–14–4	3,4	U158	10 (4.54)
Methylene bromide	74–95–3	4	U068	1000 (454)
Methylene chloride	75–09–2	2,3,4	U080	1000 (454)
4,4′-Methylenedianiline	101–77–9	3		10 (4.54)
Methylene diphenyl diisocyanate	101–68–8	3		5000 (2270)
Methyl ethyl ketone	78–93–3	3,4	U159	5000 (2270)
Methyl ethyl ketone peroxide	1338–23–4	4	U160	10 (4.54)
Methyl hydrazine	60–34–4	3,4	P068	10 (4.54)
Methyl iodide	74–88–4	3,4	U138	100 (45.4)
Methyl isobutyl ketone	108–10–1	3,4	U161	5000 (2270)
Methyl isocyanate	624–83–9	3,4	P064	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
2-Methyllactonitrile	75–86–5	1,4	P069	10 (4.54)
Methyl mercaptan	74–93–1	1,4	U153	100 (45.4)
Methyl methacrylate	80–62–6	1,3,4	U162	1000 (454)
Methyl parathion	298–00–0	1,4	P071	100 (45.4)
4-Methyl-2-pentanone	108–10–1	3,4	U161	5000 (2270)
Methyl tert-butyl ether	1634–04–4	3		1000 (454)
Methylthiouracil	56–04–2	4	U164	10 (4.54)
Metolcarb	1129415	4	P190	1000 (454)
Mevinphos	7786–34–7	1		10 (4.54)
Mexacarbate	315–18–4	1,4	P128	1000 (454)
Mitomycin C	50–07–7	4	U010	10 (4.54)
MNNG	70–25–7	4	U163	10 (4.54)
Monoethylamine	75–04–7	1		100 (45.4)
Monomethylamine	74–89–5	1		100 (45.4)
Naled	300–76–5	1		10 (4.54)
5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-.	20830–81–3	4	U059	10 (4.54)
1-Naphthalenamine	134–32–7	4	U167	100 (45.4)
2-Naphthalenamine	91–59–8	4	U168	10 (4.54)
Naphthalenamine, N,N′-bis(2-chloroethyl)-	494–03–1	4	U026	100 (45.4)
Naphthalene	91–20–3	1,2,3,4	U165	100 (45.4)
Naphthalene, 2-chloro-	91–58–7	2,4	U047	5000 (2270)
1,4-Naphthalenedione	130–15–4	4	U166	5000 (2270)
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethyl-(1,1′-biphenyl)-4,4′-diyl)-bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt.	72–57–1	4	U236	10 (4.54)
1-Naphthalenol, methylcarbamate	63–25–2	1,3,4	U279	100 (45.4)
Naphthenic acid	1338–24–5	1		100 (45.4)
1,4-Naphthoquinone	130–15–4	4	U166	5000 (2270)
alpha-Naphthylamine	134–32–7	4	U167	100 (45.4)
beta-Naphthylamine	91–59–8	4	U168	10 (4.54)
alpha-Naphthylthiourea	86–88–4	4	P072	100 (45.4)
Nickel††	7440–02–0	2		100 (45.4)
Nickel ammonium sulfate	15699–18–0	1		100 (45.4)
NICKEL AND COMPOUNDS	N.A.	2,3		**
Nickel carbonyl Ni(CO)4, (T-4)-	13463–39–3	4	P073	10 (4.54)
Nickel chloride	7718–54–9	1		100 (45.4)
	37211–05–5			
Nickel compounds	N.A.	2,3		**
Nickel cyanide Ni(CN)2	557–19–7	4	P074	10 (4.54)
Nickel hydroxide	12054–48–7	1		10 (4.54)
Nickel nitrate	14216–75–2	1		100 (45.4)
Nickel sulfate	7786–81–4	1		100 (45.4)
Nicotine, & salts	54–11–5	4	P075	100 (45.4)
Nitric acid	7697–37–2	1		1000 (454)
Nitric acid, thallium (1+) salt	10102–45–1	4	U217	100 (45.4)
Nitric oxide	10102–43–9	4	P076	10 (4.54)
p-Nitroaniline	100–01–6	4	P077	5000 (2270)
Nitrobenzene	98–95–3	1,2,3,4	U169	1000 (454)
4-Nitrobiphenyl	92–93–3	3		10 (4.54)
Nitrogen dioxide	10102–44–0	1,4	P078	10 (4.54)
	10544–72–6			
Nitrogen oxide NO	10102–43–9	4	P076	10 (4.54)
Nitrogen oxide NO2	10102–44–0	1,4	P078	10 (4.54)
	10544–72–6			
Nitroglycerine	55–63–0	4	P081	10 (4.54)
Nitrophenol (mixed)	25154–55–6	1		100 (45.4)
m-Nitrophenol	554–84–7	.....		.....
o-Nitrophenol	88–75–5	1,2		100 (45.4)
p-Nitrophenol	100–02–7	1,2,3,4	U170	100 (45.4)
2-Nitrophenol	88–75–5	1,2		100 (45.4)
4-Nitrophenol	100–02–7	1,2,3,4	U170	100 (45.4)
NITROPHENOLS	N.A.	2		**
2-Nitropropane	79–46–9	3,4	U171	10 (4.54)
NITROSAMINES	N.A.	2		**
N-Nitrosodi-n-butylamine	924–16–3	4	U172	10 (4.54)
N-Nitrosodiethanolamine	1116–54–7	4	U173	1 (0.454)
N-Nitrosodiethylamine	55–18–5	4	U174	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
N-Nitrosodimethylamine	62–75–9	2,3,4	P082	10 (4.54)
N-Nitrosodiphenylamine	86–30–6	2		100 (45.4)
N-Nitroso-N-ethylurea	759–73–9	4	U176	1 (0.454)
N-Nitroso-N-methylurea	684–93–5	3,4	U177	1 (0.454)
N-Nitroso-N-methylurethane	615–53–2	4	U178	1 (0.454)
N-Nitrosomethylvinylamine	4549–40–0	4	P084	10 (4.54)
N-Nitrosomorpholine	59–89–2	3		1 (0.454)
N-Nitrosopiperidine	100–75–4	4	U179	10 (4.54)
N-Nitrosopyrrolidine	930–55–2	4	U180	1 (0.454)
Nitrotoluene	1321–12–6	1		1000 (454)
m-Nitrotoluene	99–08–1	.....		.....
o-Nitrotoluene	88–72–2	.....		.....
p-Nitrotoluene	99–99–0	.....		.....
5-Nitro-o-toluidine	99–55–8	4	U181	100 (45.4)
Octamethylpyrophosphoramide	152–16–9	4	P085	100 (45.4)
Osmium oxide OsO4, (T–4)–	20816–12–0	4	P087	1000 (454)
Osmium tetroxide	20816–12–0	4	P087	1000 (454)
7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	145–73–3	4	P088	1000 (454)
Oxamyl	23135220	4	P194	100 (45.4)
1,2-Oxathiolane, 2,2-dioxide	1120–71–4	3,4	U193	10 (4.54)
2H-1,3,2-Oxazaphosphorin-2–amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide.	50–18–0	4	U058	10 (4.54)
Oxirane	75–21–8	3,4	U115	10 (4.54)
Oxiranecarboxyaldehyde	765–34–4	4	U126	10 (4.54)
Oxirane, (chloromethyl)-	106–89–8	1,3,4	U041	100 (45.4)
Paraformaldehyde	30525–89–4	1		1000 (454)
Paraldehyde	123–63–7	4	U182	1000 (454)
Parathion	56–38–2	1,3,4	P089	10 (4.54)
PCBs	1336–36–3	1,2,3		1 (0.454)
PCNB	82–68–8	3,4	U185	100 (45.4)
Pentachlorobenzene	608–93–5	4	U183	10 (4.54)
Pentachloroethane	76–01–7	4	U184	10 (4.54)
Pentachloronitrobenzene	82–68–8	3,4	U185	100 (45.4)
Pentachlorophenol	87–86–5	1,2,3,4	See F027	10 (4.54)
1,3-Pentadiene	504–60–9	4	U186	100 (45.4)
Perchloroethylene	127–18–4	2,3,4	U210	100 (45.4)
Phenacetin	62–44–2	4	U187	100 (45.4)
Phenanthrene	85–01–8	2		5000 (2270)
Phenol	108–95–2	1,2,3,4	U188	1000 (454)
Phenol, 2-chloro-	95–57–8	2,4	U048	100 (45.4)
Phenol, 4-chloro-3-methyl-	59–50–7	2,4	U039	5000 (2270)
Phenol, 2-cyclohexyl-4,6-dinitro-	131–89–5	4	P034	100 (45.4)
Phenol, 2,4-dichloro-	120–83–2	2,4	U081	100 (45.4)
Phenol, 2,6-dichloro-	87–65–0	4	U082	100 (45.4)
Phenol, 4,4′-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	56–53–1	4	U089	1 (0.454)
Phenol, 2,4-dimethyl-	105–67–9	2,4	U101	100 (45.4)
Phenol, 4-(dimethylamino)-3,5-dimethyl-, 4 methylcarbamate (ester).	315–18–4	1,4	P128	1000 (454)
Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate	2032–65–7	1,4	P199	10 (4.54)
Phenol, 2,4-dinitro-	51–28–5	1,2,3,4	P048	10 (4.54)
Phenol, methyl-	1319–77–3	1,3,4	U052	100 (45.4)
Phenol, 2-methyl-4,6-dinitro-, & salts	534–52–1	2,3,4	P047	10 (4.54)
Phenol, 2,2′-methylenebis[3,4,6- trichloro-	70–30–4	4	U132	100 (45.4)
Phenol, 2-(1-methylethoxy)-, methylcarbamate	114–26–1	3,4	U411	100 (45.4)
Phenol, 3-(1-methylethyl)-, methyl carbamate	64006	4	P202	10 (4.54)
Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate	2631370	4	P201	1000 (454)
Phenol, 2-(1-methylpropyl)-4,6-dinitro-	88–85–7	4	P020	1000 (454)
Phenol, 4-nitro-	100–02–7	1,2,3,4	U170	100 (45.4)
Phenol, pentachloro-	87–86–5	1,2,3,4	See F027	10 (4.54)
Phenol, 2,3,4,6-tetrachloro-	58–90–2	4	See F027	10 (4.54)
Phenol, 2,4,5-trichloro-	95–95–4	1,3,4	See F027	10 (4.54)
Phenol, 2,4,6-trichloro-	88–06–2	1,2,3,4	See F027	10 (4.54)
Phenol, 2,4,6-trinitro-, ammonium salt	131–74–8	4	P009	10 (4.54)
L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-	148–82–3	4	U150	1 (0.454)
p-Phenylenediamine	106–50–3	3		5000 (2270)
Phenylmercury acetate	62–38–4	4	P092	100 (45.4)
Phenylthiourea	103–85–5	4	P093	100 (45.4)
Phorate	298–02–2	4	P094	10 (4.54)
Phosgene	75–44–5	1,3,4	P095	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Phosphine	7803–51–2	3,4	P096	100 (45.4)
Phosphoric acid	7664–38–2	1		5000 (2270)
Phosphoric acid, diethyl 4-nitrophenyl ester	311–45–5	4	P041	100 (45.4)
Phosphoric acid, lead(2+) salt (2:3)	7446–27–7	4	U145	10 (4.54)
Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester.	298–04–4	1,4	P039	1 (0.454)
Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester.	298–02–2	4	P094	10 (4.54)
Phosphorodithioic acid, O,O-diethyl S-methyl ester	3288-58–2	4	U087	5000 (2270)
Phosphorodithioic acid, O,O-dimethyl S-[2(methylamino)-2-oxoethyl] ester.	60–51–5	4	P044	10 (4.54)
Phosphorofluoridic acid, bis(1-methylethyl) ester	55–91–4	4	P043	100 (45.4)
Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56–38–2	1,3,4	P089	10 (4.54)
Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	297–97–2	4	P040	100 (45.4)
Phosphorothioic acid, O-[4-[(dimethylamino) sulfonyl]phenyl] O,O-dimethyl ester.	52–85–7	4	P097	1000 (454)
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester.	298–00–0	1,4	P071	100 (45.4)
Phosphorus	7723–14–0	1,3		1 (0.454)
Phosphorus oxychloride	10025–87–3	1		1000 (454)
Phosphorus pentasulfide	1314–80–3	1,4	U189	100 (45.4)
Phosphorus sulfide	1314–80–3	1,4	U189	100 (45.4)
Phosphorus trichloride	7719–12–2	1		1000 (454)
Physostigmine	57476	4	P204	100 (45.4)
Physostigmine salicylate	57647	4	P188	100 (45.4)
PHTHALATE ESTERS	N.A.	2		**
Phthalic anhydride	85–44–9	3,4	U190	5000 (2270)
2-Picoline	109–06–8	4	U191	5000 (2270)
Piperidine, 1-nitroso-	100–75–4	4	U179	10 (4.54)
Plumbane, tetraethyl-	78–00–2	1,4	P110	10 (4.54)
POLYCHLORINATED BIPHENYLS	1336–36–3	1,2,3		1 (0.454)
Polycyclic Organic Matter[e]	N.A.	3		**
POLYNUCLEAR AROMATIC HYDROCARBONS	N.A.	2		**
Potassium arsenate	7784–41–0	1		1 (0.454)
Potassium arsenite	10124–50–2	1		1 (0.454)
Potassium bichromate	7778–50–9	1		10 (4.54)
Potassium chromate	7789–00–6	1		10 (4.54)
Potassium cyanide K(CN)	151–50–8	1,4	P098	10 (4.54)
Potassium hydroxide	1310–58–3	1		1000 (454)
Potassium permanganate	7722–64–7	1		100 (45.4)
Potassium silver cyanide	506–61–6	4	P099	1 (0.454)
Promecarb	2631370	4	P201	1000 (454)
Pronamide	23950–58–5	4	U192	5000 (2270)
Propanal, 2-methyl-2-(methyl- sulfonyl)-, O-[(methylamino)carbonyl] oxime.	1646884	4	P203	100 (45.4)
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime.	116–06–3	4	P070	1 (0.454)
1-Propanamine	107–10–8	4	U194	5000 (2270)
1-Propanamine, N-propyl-	142–84–7	4	U110	5000 (2270)
1-Propanamine, N-nitroso-N-propyl-	621–64–7	2,4	U111	10 (4.54)
Propane, 1,2-dibromo-3-chloro-	96–12–8	3,4	U066	1 (0.454)
Propane, 1,2-dichloro-	78–87–5	1,2,3,4	U083	1000 (454)
Propanedinitrile	109–77–3	4	U149	1000 (454)
Propanenitrile	107–12–0	4	P101	10 (4.54)
Propanenitrile, 3-chloro-	542–76–7	4	P027	1000 (454)
Propanenitrile, 2-hydroxy-2-methyl-	75–86–5	1,4	P069	10 (4.54)
Propane, 2-nitro-	79–46–9	3,4	U171	10 (4.54)
Propane, 2,2′-oxybis[2-chloro-	108–60–1	2,4	U027	1000 (454)
1,3-Propane sultone	1120–71–4	3,4	U193	10 (4.54)
1,2,3-Propanetriol, trinitrate	55–63–0	4	P081	10 (4.54)
Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	93–72–1	1,4	See F027	100 (45.4)
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126–72–7	4	U235	10 (4.54)
1-Propanol, 2-methyl-	78–83–1	4	U140	5000 (2270)
2-Propanone	67–64–1	4	U002	5000 (2270)
2-Propanone, 1-bromo-	598–31–2	4	P017	1000 (454)
Propargite	2312–35–8	1		10 (4.54)
Propargyl alcohol	107–19–7	4	P102	1000 (454)
2-Propenal	107–02–8	1,2,3,4	P003	1 (0.454)
2-Propenamide	79–06–1	3,4	U007	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
1-Propene, 1,3-dichloro-	542–75–6	1,2,3,4	U084	100 (45.4)
1-Propene, 1,1,2,3,3,3-hexachloro-	1888–71–7	4	U243	1000 (454)
2-Propenenitrile	107–13–1	1,2,3,4	U009	100 (45.4)
2-Propenenitrile, 2-methyl-	126–98–7	4	U152	1000 (454)
2-Propenoic acid	79–10–7	3,4	U008	5000 (2270)
2-Propenoic acid, ethyl ester	140–88–5	3,4	U113	1000 (454)
2-Propenoic acid, 2-methyl-, ethyl ester	97–63–2	4	U118	1000 (454)
2-Propenoic acid, 2-methyl-, methyl ester	80–62–6	1,3,4	U162	1000 (454)
2-Propen-1-ol	107–18–6	1,4	P005	100 (45.4)
Propham	122429	4	U373	1000 (454)
beta-Propiolactone	57–57–8	3		10 (4.54)
Propionaldehyde	123–38–6	3	1000 (454)	
Propionic acid	79–09–4	1		5000 (2270)
Propionic anhydride	123–62–6	1		5000 (2270)
Propoxur (Baygon)	114–26–1	3,4	U411	100 (45.4)
n-Propylamine	107–10–8	4	U194	5000 (2270)
Propylene dichloride	78–87–5	1,2,3,4	U083	1000 (454)
Propylene oxide	75–56–9	1,3		100 (45.4)
1,2-Propylenimine	75–55–8	3,4	P067	1 (0.454)
2-Propyn-1-ol	107–19–7	4	P102	1000 (454)
Prosulfocarb	52888809	4	U387	5000 (2270)
Pyrene	129–00–0	2		5000 (2270)
Pyrethrins	121–29–9 121–21–1 8003–34–7	1		1 (0.454)
3,6-Pyridazinedione, 1,2-dihydro-	123–33–1	4	U148	5000 (2270)
4-Pyridinamine	504–24–5	4	P008	1000 (454)
Pyridine	110–86–1	4	U196	1000 (454)
Pyridine, 2-methyl-	109–06–8	4	U191	5000 (2270)
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts	54–11–5	4	P075	100 (45.4)
2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2- chloroethyl)amino]-	66–75–1	4	U237	10 (4.54)
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56–04–2	4	U164	10 (4.54)
Pyrrolidine, 1-nitroso-	930–55–2	4	U180	1 (0.454)
Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a- hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-.	57476	4	P204	100 (45.4)
Quinoline	91–22–5	1,3		5000 (2270)
Quinone	106–51–4	3,4	U197	10 (4.54)
Quintobenzene	82–68–8	3,4	U185	100 (45.4)
Radionuclides (including radon)	N.A.	3		§
Reserpine	50–55–5	4	U200	5000 (2270)
Resorcinol	108–46–3	1,4	U201	5000 (2270)
Safrole	94–59–7	4	U203	100 (45.4)
Selenious acid	7783–00–8	4	U204	10 (4.54)
Selenious acid, dithallium (1+) salt	12039–52–0	4	P114	1000 (454)
Selenium††	7782–49–2	2		100 (45.4)
SELENIUM AND COMPOUNDS	N.A.	2,3		**
Selenium Compounds	N.A.	2,3		**
Selenium dioxide	7446–08–4	1,4	U204	10 (4.54)
Selenium oxide	7446–08–4	1,4	U204	10 (4.54)
Selenium sulfide SeS2	7488–56–4	4	U205	10 (4.54)
Selenourea	630–10–4	4	P103	1000 (454)
L-Serine, diazoacetate (ester)	115–02–6	4	U015	1 (0.454)
Silver††	7440–22–4	2		1000 (454)
SILVER AND COMPOUNDS	N.A.	2		**
Silver cyanide Ag(CN)	506–64–9	4	P104	1 (0.454)
Silver nitrate	7761–88–8	1		1 (0.454)
Silvex (2,4,5-TP)	93–72–1	1,4	See F027	100 (45.4)
Sodium	7440–23–5	1		10 (4.54)
Sodium arsenate	7631–89–2	1		1 (0.454)
Sodium arsenite	7784–46–5	1		1 (0.454)
Sodium azide	26628–22–8	4	P105	1000 (454)
Sodium bichromate	10588–01–9	1		10 (4.54)
Sodium bifluoride	1333–83–1	1		100 (45.4)
Sodium bisulfite	7631–90–5	1		5000 (2270)
Sodium chromate	7775–11–3	1		10 (4.54)
Sodium cyanide Na(CN)	143–33–9	1,4	P106	10 (4.54)
Sodium dodecylbenzenesulfonate	25155–30–0	1		1000 (454)
Sodium fluoride	7681–49–4	1		1000 (454)
Sodium hydrosulfide	16721–80–5	1		5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Sodium hydroxide	1310–73–2	1		1000 (454)
Sodium hypochlorite	7681–52–9	1		100 (45.4)
	10022–70–5			
Sodium methylate	124–41–4	1		1000 (454)
Sodium nitrite	7632–00–0	1		100 (45.4)
Sodium phosphate, dibasic	7558–79–4	1		5000 (2270)
	10039–32–4			
	10140–65–5			
Sodium phosphate, tribasic	7601–54–9	1		5000 (2270)
	7758–29–4			
	7785–84–4			
	10101–89–0			
	10124–56–8			
	10361–89–4			
Sodium selenite	7782–82–3	1		100 (45.4)
	10102–18–8			
Streptozotocin	18883–66–4	4	U206	1 (0.454)
Strontium chromate	7789–06–2	1		10 (4.54)
Strychnidin-10-one, & salts	57–24–9	1,4	P108	10 (4.54)
Strychnidin-10-one, 2,3-dimethoxy-	357–57–3	4	P018	100 (45.4)
Strychnine, & salts	57–24–9	1,4	P108	10 (4.54)
Styrene	100–42–5	1,3		1000 (454)
Styrene oxide	96–09–3	3		100 (45.4)
Sulfuric acid	7664–93–9	1		1000 (454)
	8014–95–7			
Sulfuric acid, dimethyl ester	77–78–1	3,4	U103	100 (45.4)
Sulfuric acid, dithallium (1+) salt	7446–18–6	1,4	P115	100 (45.4)
	10031–59–1			
Sulfur monochloride	12771–08–3	1		1000 (454)
Sulfur phosphide	1314–80–3	1,4	U189	100 (45.4)
2,4,5-T	93–76–5	1,4	See F027	1000 (454)
2,4,5-T acid	93–76–5	1,4	See F027	1000 (454)
2,4,5-T amines	2008–46–0	1		5000 (2270)
	1319–72–8			
	3813–14–7			
	6369–96–6			
	6369–97–7			
2,4,5-T esters	93–79–8	1		1000 (454)
	1928–47–8			
	2545–59–7			
	25168–15–4			
	61792–07–2			
2,4,5-T salts	13560–99–1	1		1000 (454)
TCDD	1746–01–6	2,3		1 (0.454)
TDE	72–54–8	1,2,4	U060	1 (0.454)
1,2,4,5-Tetrachlorobenzene	95–94–3	4	U207	5000 (2270)
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746–01–6	2,3		1 (0.454)
1,1,1,2-Tetrachloroethane	630–20–6	4	U208	100 (45.4)
1,1,2,2-Tetrachloroethane	79–34–5	2,3,4	U209	100 (45.4)
Tetrachloroethylene	127–18–4	2,3,4	U210	100 (45.4)
2,3,4,6-Tetrachlorophenol	58–90–2	4	See F027	10 (4.54)
Tetraethyl pyrophosphate	107–49–3	1,4	P111	10 (4.54)
Tetraethyl lead	78–00–2	1,4	P110	10 (4.54)
Tetraethyldithiopyrophosphate	3689–24–5	4	P109	100 (45.4)
Tetrahydrofuran	109–99–9	4	U213	1000 (454)
Tetranitromethane	509–14–8	4	P112	10 (4.54)
Tetraphosphoric acid, hexaethyl ester	757–58–4	4	P062	100 (45.4)
Thallic oxide	1314–32–5	4	P113	100 (45.4)
Thallium ††	7440–28–0	2		1000 (454)
THALLIUM AND COMPOUNDS	N.A.	2		**
Thallium (I) acetate	563–68–8	4	U214	100 (45.4)
Thallium (I) carbonate	6533–73–9	4	U215	100 (45.4)
Thallium chloride TlCl	7791–12–0	4	U216	100 (45.4)
Thallium (I) nitrate	10102–45–1	4	U217	100 (45.4)
Thallium oxide Tl2O3	1314–32–5	4	P113	100 (45.4)
Thallium (I) selenite	12039–52–0	4	P114	1000 (454)
Thallium (I) sulfate	7446–18–6	1,4	P115	100 (45.4)
	10031–59–1			
Thioacetamide	62–55–5	4	U218	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Thiodicarb	59669260	4	U410	100 (45.4)
Thiodiphosphoric acid, tetraethyl ester	3689–24–5	4	P109	100 (45.4)
Thiofanox	39196–18–4	4	P045	100 (45.4)
Thioimidodicarbonic diamide [(H2N)C(S)] 2NH	541–53–7	4	P049	100 (45.4)
Thiomethanol	74–93–1	1,4	U153	100 (45.4)
Thioperoxydicarbonic diamide [(H2N)C(S)] 2S2, tetramethyl-.	137–26–8	4	U244	10 (4.54)
Thiophanate-methyl	23564058	4	U409	10 (4.54)
Thiophenol	108–98–5	4	P014	100 (45.4)
Thiosemicarbazide	79–19–6	4	P116	100 (45.4)
Thiourea	62–56–6	4	U219	10 (4.54)
Thiourea, (2-chlorophenyl)-	5344–82–1	4	P026	100 (45.4)
Thiourea, 1-naphthalenyl-	86–88–4	4	P072	100 (45.4)
Thiourea, phenyl-	103–85–5	4	P093	100 (45.4)
Thiram	137–26–8	4	U244	10 (4.54)
Tirpate	26419738	4	P185	100 (45.4)
Titanium tetrachloride	7550–45–0	3		1,2,41000 (454)
Toluene	108–88–3	1,2,3,4	U220	1000 (454)
Toluenediamine	95–80–7 496–72–0 823–40–5 25376–45–8	3,4	U221	10 (4.54)
2,4-Toluene diamine	95–80–7 496–72–0 823–40–5 25376–45–8	3,4	U221	10 (4.54)
Toluene diisocyanate	91–08–7 584–84–9 26471–62–5	3,4	U223	100 (45.4)
2,4-Toluene diisocyanate	91–08–7 584–84–9 26471–62–5	3,4	U223	100 (45.4)
o-Toluidine	95–53–4	3,4	U328	100 (45.4)
p-Toluidine	106–49–0	4	U353	100 (45.4)
o-Toluidine hydrochloride	636–21–5	4	U222	100 (45.4)
Toxaphene	8001–35–2	1,2,3,4	P123	1 (0.454)
2,4,5-TP acid	93–72–1	1,4	See F027	100 (45.4)
2,4,5-TP esters	32534–95–5	1		100 (45.4)
Triallate	2303175	4	U389	100 (45.4)
1H-1,2,4-Triazol-3-amine	61–82–5	4	U011	10 (4.54)
Trichlorfon	52–68–6	1		100 (45.4)
1,2,4-Trichlorobenzene	120–82–1	2,3		100 (45.4)
1,1,1-Trichloroethane	71–55–6	2,3,4	U226	1000 (454)
1,1,2-Trichloroethane	79–00–5	2,3,4	U227	100 (45.4)
Trichloroethylene	79–01–6	1,2,3,4	U228	100 (45.4)
Trichloromethanesulfenyl chloride	594–42–3	4	P118	100 (45.4)
Trichloromonofluoromethane	75–69–4	4	U121	5000 (2270)
Trichlorophenol	25167–82–2	1		10 (4.54)
2,3,4-Trichlorophenol	15950–66–0			
2,3,5-Trichlorophenol	933–78–8			
2,3,6-Trichlorophenol	933–75–5			
3,4,5-Trichlorophenol	609–19–8			
2,4,5-Trichlorophenol	95–95–4	1,3,4	See F027	10 (4.54)
2,4,6-Trichlorophenol	88–06–2	1,2,3,4	See F027	10 (4.54)
Triethanolamine dodecylbenzenesulfonate	27323–41–7	1		1000 (454)
Triethylamine	121–44–8	1,3,4	U404	5000 (2270)
Trifluralin	1582–09–8	3		10 (4.54)
Trimethylamine	75–50–3	1		100 (45.4)
2,2,4-Trimethylpentane	540–84–1	3		1000 (454)
1,3,5-Trinitrobenzene	99–35–4	4	U234	10 (4.54)
1,3,5-Trioxane, 2,4,6-trimethyl-	123–63–7	4	U182	1000 (454)
Tris(2,3-dibromopropyl) phosphate	126–72–7	4	U235	10 (4.54)
Trypan blue	72–57–1	4	U236	10 (4.54)
Unlisted Hazardous Wastes Characteristic of Corrosivity	N.A.	4	D002	100 (45.4)
Unlisted Hazardous Wastes Characteristic of Ignitability	N.A.	4	D001	100 (45.4)
Unlisted Hazardous Wastes Characteristic of Reactivity	N.A.	4	D003	100 (45.4)
Unlisted Hazardous Wastes Characteristic of Toxicity:				
Arsenic (D004)	N.A.	4	D004	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Barium (D005)	N.A.	4	D005	1000 (454)
Benzene (D018)	N.A.	1,2,3,4	D018	10 (4.54)
Cadmium (D006)	N.A.	4	D006	10 (4.54)
Carbon tetrachloride (D019)	N.A.	1,2,4	D019	10 (4.54)
Chlordane (D020)	N.A.	1,2,4	D020	1 (0.454)
Chlorobenzene (D021)	N.A.	1,2,4	D021	100 (45.4)
Chloroform (D022)	N.A.	1,2,4	D022	10 (4.54)
Chromium (D007)	N.A.	4	D007	10 (4.54)
o-Cresol (D023)	N.A.	4	D023	100 (45.4)
m-Cresol (D024)	N.A.	4	D024	100 (45.4)
p-Cresol (D025)	N.A.	4	D025	100 (45.4)
Cresol (D026)	N.A.	4	D026	100 (45.4)
2,4-D (D016)	N.A.	1,4	D016	100 (45.4)
1,4-Dichlorobenzene (D027)	N.A.	1,2,4	D027	100 (45.4)
1,2-Dichloroethane (D028)	N.A.	1,2,4	D028	100 (45.4)
1,1-Dichloroethylene (D029)	N.A.	1,2,4	D029	100 (45.4)
2,4-Dinitrotoluene (D030)	N.A.	1,2,4	D030	10 (4.54)
Endrin (D012)	N.A.	1,4	D012	1 (0.454)
Heptachlor (and epoxide) (D031)	N.A.	1,2,4	D031	1 (0.454)
Hexachlorobenzene (D032)	N.A.	2,4	D032	10 (4.54)
Hexachlorobutadiene (D033)	N.A.	2,4	D033	1 (0.454)
Hexachloroethane (D034)	N.A.	2,4	D034	100 (45.4)
Lead (D008)	N.A.	4	D008	10 (4.54)
Lindane (D013)	N.A.	1,4	D013	1 (0.454)
Mercury (D009)	N.A.	4	D009	1 (0.454)
Methoxychlor (D014)	N.A.	1,4	D014	1 (0.454)
Methyl ethyl ketone (D035)	N.A.	4	D035	5000 (2270)
Nitrobenzene (D036)	N.A.	1,2,4	D036	1000 (454)
Pentachlorophenol (D037)	N.A.	1,2,4	D037	10 (4.54)
Pyridine (D038)	N.A.	4	D038	1000 (454)
Selenium (D010)	N.A.	4	D010	10 (4.54)
Silver (D011)	N.A.	4	D011	1 (0.454)
Tetrachloroethylene (D039)	N.A.	2,4	D039	100 (45.4)
Toxaphene (D015)	N.A.	1,4	D015	1 (0.454)
Trichloroethylene (D040)	N.A.	1,2,4	D040	100 (45.4)
2,4,5-Trichlorophenol (D041)	N.A.	1,4	D041	10 (4.54)
2,4,6-Trichlorophenol (D042)	N.A.	1,2,4	D042	10 (4.54)
2,4,5-TP (D017)	N.A.	1,4	D017	100 (45.4)
Vinyl chloride (D043)	N.A.	2,3,4	D043	1 (0.454)
Uracil mustard	66–75–1	4	U237	10 (4.54)
Uranyl acetate	541–09–3	1		100 (45.4)
Uranyl nitrate	10102–06–4 36478–76–9	1		100 (45.4)
Urea, N-ethyl-N-nitroso-	759–73–9	4	U176	1 (0.454)
Urea, N-methyl-N-nitroso-	684–93–5	3,4	U177	1 (0.454)
Urethane	51–79–6	3,4	U238	100 (45.4)
Vanadic acid, ammonium salt	7803–55–6	4	P119	1000 (454)
Vanadium oxide V2O5	1314–62–1	1,4	P120	1000 (454)
Vanadium pentoxide	1314–62–1	1,4	P120	1000 (454)
Vanadyl sulfate	27774–13–6	1		1000 (454)
Vinyl acetate	108–05–4	1,3		5000 (2270)
Vinyl acetate monomer	108–05–4	1,3		5000 (2270)
Vinylamine, N-methyl-N-nitroso-	4549–40–0	4	P084	10 (4.54)
Vinyl bromide	593–60–2	3		100 (45.4)
Vinyl chloride	75–01–4	2,3,4	U043	1 (0.454)
Vinylidene chloride	75–35–4	1,2,3,4	U078	100 (45.4)
Warfarin, & salts	81–81–2	4	P001, U248	100 (45.4)
Xylene	1330–20–7	1,3,4	U239	100 (45.4)
m-Xylene	108–38–3	3		1000 (454)
o-Xylene	95–47–6	3		1000 (454)
p-Xylene	106–42–3	3		100 (45.4)
Xylene (mixed)	1330–20–7	1,3,4	U239	100 (45.4)
Xylenes (isomers and mixture)	1330–20–7	1,3,4	U239	100 (45.4)
Xylenol	1300–71–6	1		1000 (454)
Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester (3beta,16beta,17alpha, 18beta,20alpha).	50–55–54	4	U200	5000 (2270)
Zinc††	7440–66–6	2		1000 (454)
ZINC AND COMPOUNDS	N.A.	2		**

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Zinc acetate	557–34–6	1		1000 (454)
Zinc ammonium chloride	52628–25–8 14639–97–5 14639–98–6	1		1000 (454)
Zinc, bis(dimethylcarbamodithioato-S,S')-	137304	4	P205	10 (4.54)
Zinc borate	1332–07–6	1		1000 (454)
Zinc bromide	7699–45–8	1		1000 (454)
Zinc carbonate	3486–35–9	1		1000 (454)
Zinc chloride	7646–85–7	1		1000 (454)
Zinc cyanide Zn(CN)2	557–21–1	1,4	P121	10 (4.54)
Zinc fluoride	7783–49–5	1		1000 (454)
Zinc formate	557–41–5	1		1000 (454)
Zinc hydrosulfite	7779–86–4	1		1000 (454)
Zinc nitrate	7779–88–6	1		1000 (454)
Zinc phenolsulfonate	127–82–2	1		5000 (2270)
Zinc phosphide Zn3P2	1314–84–7	1,4	P122, U249	100 (45.4)
Zinc silicofluoride	16871–71–9	1		5000 (2270)
Zinc sulfate	7733–02–0	1		1000 (454)
Ziram	137304	4	P205	10 (4.54)
Zirconium nitrate	13746–89–9	1		5000 (2270)
Zirconium potassium fluoride	16923–95–8	1		1000 (454)
Zirconium sulfate	14644–61–2	1		5000 (2270)
Zirconium tetrachloride	10026–11–6	1		5000 (2270)
F001		4	F001	10 (4.54)
The following spent halogenated solvents used in degreasing; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the halogenated solvents listed below or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127–18–4	2,3,4	U210	100 (45.4)
(b) Trichloroethylene	79–01–6	1,2,3,4	U228	100 (45.4)
(c) Methylene chloride	75–09–2	2,3,4	U080	1000 (454)
(d) 1,1,1-Trichloroethane	71–55–6	2,3,4	U226	1000 (454)
(e) Carbon tetrachloride	56–23–5	1,2,3,4	U211	10 (4.54)
(f) Chlorinated fluorocarbons	N.A.			5000 (2270)
F002		4	F002	10 (4.54)
The following spent halogenated solvents; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the halogenated solvents listed below or those solvents listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127–18–4	2,3,4	U210	100 (45.4)
(b) Methylene chloride	75–09–2	2,3,4	U080	1000 (454)
(c) Trichloroethylene	79–01–6	1,2,3,4	U228	100 (45.4)
(d) 1,1,1-Trichloroethane	71–55–6	2,3,4	U226	1000 (454)
(e) Chlorobenzene	108–90–7	1,2,3,4	U037	100 (45.4)
(f) 1,1,2-Trichloro-1,2,2-trifluoroethane	76–13–1			5000 (2270)
(g) o-Dichlorobenzene	95–50–1	1,2,4	U070	100 (45.4)
(h) Trichlorofluoromethane	75–69–4	4	U121	5000 (2270)
(i) 1,1,2-Trichloroethane	79–00–5	2,3,4	U227	100 (45.4)
F003		4	F003	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents.				
(a) Xylene	1330-20–7			1000 (454)
(b) Acetone	67–64–1			5000 (2270)
(c) Ethyl acetate	141–78–6			5000 (2270)
(d) Ethylbenzene	100–41–4			1000 (454)
(e) Ethyl ether	60–29–7			100 (45.4)
(f) Methyl isobutyl ketone	108–10–1			5000 (2270)
(g) n-Butyl alcohol	71–36–3			5000 (2270)
(h) Cyclohexanone	108–94–1			5000 (2270)
(i) Methanol	67–56–1			5000 (2270)
F004		4	F004	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Cresols/Cresylic acid	1319–77–3	1,3,4	U052	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
(b) Nitrobenzene	98–95–3	1,2,3,4	U169	1000 (454)
F005		4	F005	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Toluene	108–88–3	1,2,3,4	U220	1000 (454)
(b) Methyl ethyl ketone	78–93–3	3,4	U159	5000 (2270)
(c) Carbon disulfide	75–15–0	1,3,4	P022	100 (45.4)
(d) Isobutanol	78–83–1	4	U140	5000 (2270)
(e) Pyridine	110–86–1	4	U196	1000 (454)
F006		4	F006	10 (4.54)
Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum, (2) tin plating on carbon steel, (3) zinc plating (segregated basis) on carbon steel, (4) aluminum or zinc-aluminum plating on carbon steel, (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel, and (6) chemical etching and milling of aluminum.				
F007		4	F007	10 (4.54)
Spent cyanide plating bath solutions from electroplating operations.				
F008		4	F008	10 (4.54)
Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.				
F009		4	F009	10 (4.54)
Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.				
F010		4	F010	10 (4.54)
Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.				
F011		4	F011	10 (4.54)
Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.				
F012		4	F012	10 (4.54)
Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.				
F019		4	F019	10 (4.54)
Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process. Wastewater treatment sludges from the manufacturing of motor vehicles using a zinc phosphating process will not be subject to this listing at the point of generation if the wastes are not placed outside on the land prior to shipment to a landfill for disposal and are either: disposed in a Subtitle D municipal or industrial landfill unit that is equipped with a single clay liner and is permitted, licensed or otherwise authorized by the state; or disposed in a landfill unit subject to, or otherwise meeting, the landfill requirements in § 258.40, § 264.301 or § 265.301. For the purposes of this listing, motor vehicle manufacturing is defined in § 261.31(b)(4)(i) and § 261.31(b)(4)(ii) describes the recordkeeping requirements for motor vehicle manufacturing facilities				
F020		4	F020	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)				
F021		4	F021	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol or of intermediates used to produce its derivatives.				
F022	.....	4	F022	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.				
F023	.....	4	F023	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or a component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.)				
F024	.....	4	F024	1 (0.454)
Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in 40 CFR 261.31 or 261.32.)				
F025	.....	4	F025	1 (0.454)
Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.				
F026	.....	4	F026	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.				
F027	.....	4	F027	1 (0.454)
Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5- trichlorophenol as the sole component.)				
F028	.....	4	F028	1 (0.454)
Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.				
F032	.....	4	F032	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with § 261.35 of this chapter or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (*i.e.*, F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F034	.....	4	F034	1 (0.454)
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F035	.....	4	F035	1 (0.454)
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F037	.....	4	F037	1 (0.454)
Petroleum refinery primary oil/water/solids separation sludge-Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing. This listing does include residuals generated from processing or recycling oil-bearing hazardous secondary materials excluded under § 261.4(a)(12)(i), if those residuals are to be disposed of.				
F038	.....	4	F038	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Petroleum refinery secondary (emulsified) oil/water/solids separation sludge-Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.				
F039	.....	4	F039	1 (0.454)
Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under subpart D of 40 CFR part 261. (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other hazardous wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028.)				
K001	.....	4	K001	1 (0.454)
Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.				
K002	.....	4	K002	10 (4.54)
Wastewater treatment sludge from the production of chrome yellow and orange pigments.				
K003	.....	4	K003	10 (4.54)
Wastewater treatment sludge from the production of molybdate orange pigments.				
K004	.....	4	K004	10 (4.54)
Wastewater treatment sludge from the production of zinc yellow pigments.				
K005	.....	4	K005	10 (4.54)
Wastewater treatment sludge from the production of chrome green pigments.				
K006	.....	4	K006	10 (4.54)
Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).				
K007	.....	4	K007	10 (4.54)
Wastewater treatment sludge from the production of iron blue pigments.				
K008	.....	4	K008	10 (4.54)
Oven residue from the production of chrome oxide green pigments.				
K009	.....	4	K009	10 (4.54)
Distillation bottoms from the production of acetaldehyde from ethylene.				
K010	.....	4	K010	10 (4.54)
Distillation side cuts from the production of acetaldehyde from ethylene.				
K011	.....	4	K011	10 (4.54)
Bottom stream from the wastewater stripper in the production of acrylonitrile.				
K013	.....	4	K013	10 (4.54)
Bottom stream from the acetonitrile column in the production of acrylonitrile.				
K014	.....	4	K014	5000 (2270)
Bottoms from the acetonitrile purification column in the production of acrylonitrile.				
K015	.....	4	K015	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Still bottoms from the distillation of benzyl chloride.				
K016	.....	4	K016	1 (0.454)
Heavy ends or distillation residues from the production of carbon tetrachloride.				
K017	.....	4	K017	10 (4.54)
Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.				
K018	.....	4	K018	1 (0.454)
Heavy ends from the fractionation column in ethyl chloride production.				
K019	.....	4	K019	1 (0.454)
Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.				
K020	.....	4	K020	1 (0.454)
Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.				
K021	.....	4	K021	10 (4.54)
Aqueous spent antimony catalyst waste from fluoromethanes production.				
K022	.....	4	K022	1 (0.454)
Distillation bottom tars from the production of phenol/acetone from cumene.				
K023	.....	4	K023	5000 (2270)
Distillation light ends from the production of phthalic anhydride from naphthalene.				
K024	.....	4	K024	5000 (2270)
Distillation bottoms from the production of phthalic anhydride from naphthalene.				
K025	.....	4	K025	10 (4.54)
Distillation bottoms from the production of nitrobenzene by the nitration of benzene.				
K026	.....	4	K026	1000 (454)
Stripping still tails from the production of methyl ethyl pyridines.				
K027	.....	4	K027	10 (4.54)
Centrifuge and distillation residues from toluene diisocyanate production.				
K028	.....	4	K028	1 (0.454)
Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.				
K029	.....	4	K029	1 (0.454)
Waste from the product steam stripper in the production of 1,1,1- trichloroethane.				
K030	.....	4	K030	1 (0.454)
Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.				
K031	.....	4	K031	1 (0.454)
By-product salts generated in the production of MSMA and cacodylic acid.				
K032	.....	4	K032	10 (4.54)
Wastewater treatment sludge from the production of chlordane.				
K033	.....	4	K033	10 (4.54)
Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.				
K034	.....	4	K034	10 (4.54)
Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.				
K035	.....	4	K035	1 (0.454)
Wastewater treatment sludges generated in the production of creosote.				
K036	.....	4	K036	1 (0.454)
Still bottoms from toluene reclamation distillation in the production of disulfoton.				
K037	.....	4	K037	1 (0.454)
Wastewater treatment sludges from the production of disulfoton.				
K038	.....	4	K038	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Wastewater from the washing and stripping of phorate production.				
K039		4	K039	10 (4.54)
Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.				
K040		4	K040	10 (4.54)
Wastewater treatment sludge from the production of phorate.				
K041		4	K041	1 (0.454)
Wastewater treatment sludge from the production of toxaphene.				
K042		4	K042	10 (4.54)
Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.				
K043		4	K043	10 (4.54)
2,6-Dichlorophenol waste from the production of 2,4-D.				
K044		4	K044	10 (4.54)
Wastewater treatment sludges from the manufacturing and processing of explosives.				
K045		4	K045	10 (4.54)
Spent carbon from the treatment of wastewater containing explosives.				
K046		4	K046	10 (4.54)
Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.				
K047		4	K047	10 (4.54)
Pink/red water from TNT operations.				
K048		4	K048	10 (4.54)
Dissolved air flotation (DAF) float from the petroleum refining industry.				
K049		4	K049	10 (4.54)
Slop oil emulsion solids from the petroleum refining industry.				
K050		4	K050	10 (4.54)
Heat exchanger bundle cleaning sludge from the petroleum refining industry.				
K051		4	K051	10 (4.54)
API separator sludge from the petroleum refining industry.				
K052		4	K052	10 (4.54)
Tank bottoms (leaded) from the petroleum refining industry.				
K060		4	K060	1 (0.454)
Ammonia still lime sludge from coking operations.				
K061		4	K061	10 (4.54)
Emission control dust/sludge from the primary production of steel in electric furnaces.				
K062		4	K062	10 (4.54)
Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).				
K064		4	K064	10 (4.54)
Acid plant blowdown slurry/sludge resulting from the thickening of blowdown slurry from primary copper production.				
K065		4	K065	10 (4.54)
Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.				
K066		4	K066	10 (4.54)
Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.				
K069		4	K069	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Emission control dust/sludge from secondary lead smelting. (Note: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action effecting the stay, EPA will publish a notice of the action in the FEDERAL REGISTER.)				
K071	.....	4	K071	1 (0.454)
Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.				
K073	.....	4	K073	10 (4.54)
Chlorinated hydrocarbon waste from the purification step of the diaphragm cellprocess using graphite anodes in chlorine production.				
K083	.....	4	K083	100 (45.4)
Distillation bottoms from aniline production.				
K084	.....	4	K084	1 (0.454)
Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K085	.....	4	K085	10 (4.54)
Distillation or fractionation column bottoms from the production of chlorobenzenes.				
K086	.....	4	K086	10 (4.54)
Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.				
K087	.....	4	K087	100 (45.4)
Decanter tank tar sludge from coking operations.				
K088	.....	4	K088	10 (4.54)
Spent potliners from primary aluminum reduction.				
K090	.....	4	K090	10 (4.54)
Emission control dust or sludge from ferrochromiumsilicon production.				
K091	.....	4	K091	10 (4.54)
Emission control dust or sludge from ferrochromium production.				
K093	.....	4	K093	5000 (2270)
Distillation light ends from the production of phthalic anhydride from ortho-xylene.				
K094	.....	4	K094	5000 (2270)
Distillation bottoms from the production of phthalic anhydride from ortho-xylene.				
K095	.....	4	K095	100 (45.4)
Distillation bottoms from the production of 1,1,1-trichloroethane.				
K096	.....	4	K096	100 (45.4)
Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.				
K097	.....	4	K097	1 (0.454)
Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.				
K098	.....	4	K098	1 (0.454)
Untreated process wastewater from the production of toxaphene.				
K099	.....	4	K099	10 (4.54)
Untreated wastewater from the production of 2,4-D.				
K100	.....	4	K100	10 (4.54)
Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.				
K101	.....	4	K101	1 (0.454)
Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K102	.....	4	K102	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K103		4	K103	100 (45.4)
Process residues from aniline extraction from the production of aniline.				
K104		4	K104	10 (4.54)
Combined wastewater streams generated from nitrobenzene/aniline production.				
K105		4	K105	10 (4.54)
Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.				
K106		4	K106	1 (0.454)
Wastewater treatment sludge from the mercury cell process in chlorine production.				
K107		4	K107	10 (4.54)
Column bottoms from product separation from the production of 1,1- dimethylhydrazine (UDMH) from carboxylic acid hydrazines.				
K108		4	K108	10 (4.54)
Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1- dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K109		4	K109	10 (4.54)
Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K110		4	K110	10 (4.54)
Condensed column overheads from intermediate separation from the production of 1,1- dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K111		4	K111	10 (4.54)
Product washwaters from the production of dinitrotoluene via nitration of toluene.				
K112		4	K112	10 (4.54)
Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K113		4	K113	10 (4.54)
Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K114		4	K114	10 (4.54)
Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K115		4	K115	10 (4.54)
Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K116		4	K116	10 (4.54)
Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.				
K117		4	K117	1 (0.454)
Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene.				
K118		4	K118	1 (0.454)
Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.				
K123		4	K123	10 (4.54)
Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.				
K124		4	K124	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.				
K125		4	K125	10 (4.54)
Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.				
K126		4	K126	10 (4.54)
Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts.				
K131		4	K131	100 (45.4)
Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.				
K132		4	K132	1000 (454)
Spent absorbent and wastewater separator solids from the production of methyl bromide.				
K136		4	K136	1 (0.454)
Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.				
K141		4	K141	1 (0.454)
Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations).				
K142		4	K142	1 (0.454)
Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.				
K143		4	K143	1 (0.454)
Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by- products produced from coal.				
K144		4	K144	1 (0.454)
Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.				
K145		4	K145	1 (0.454)
Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.				
K147		4	K147	1 (0.454)
Tar storage tank residues from coal tar refining.				
K148		4	K148	1 (0.454)
Residues from coal tar distillation, including, but not limited to, still bottoms.				
K149		4	K149	10 (4.54)
Distillation bottoms from the production of alpha-(or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. [This waste does not include still bottoms from the distillation of benzyl chloride.]				
K150		4	K150	10 (4.54)
Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.				
K151		4	K151	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of waste-waters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.				
K156		4	K156	10 (4.54)
Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)				
K157		4	K157	10 (4.54)
Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)				
K158		4	K158	10 (4.54)
Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)				
K159		4	K159	10 (4.54)
Organics from the treatment of thiocarbamate wastes.				
K161		4	K161	1 (0.454)
Purification solids (including filtration, evaporation, and centrifugation solids), bag-house dust and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126).				
K169[f]		4	K169	10 (4.54)
Crude oil storage tank sediment from petroleum refining operations.				
K170[f]		4	K170	1 (0.454)
Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations.				
K171[f]		4	K171	1 (0.454)
Spent hydrotreating catalyst from petroleum refining operations. (This listing does not include inert support media.)				
K172[f]		4	K172	1 (0.454)
Spent hydrorefining catalyst from petroleum refining operations. (This listing does not include inert support media.)				
K174[f]		4	K174	1 (0.454)
K175[f]		4	K175	1 (0.454)
K176.				
Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide)		4	K176	1 (0.454)
K177.				
Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide)		4	K177	5,000 (2270)
K178		4	K178	1000 (454)
Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process.				
K181		4	K181	##

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Nonwastewaters from the production of dyes and/or pigments (including nonwastewaters commingled at the point of generation with nonwastewaters from other processes) that, at the point of generation, contain mass loadings of any of the constituents identified in paragraph (c) of section 261.32 that are equal to or greater than the corresponding paragraph (c) levels, as determined on a calendar year basis				

† Indicates the statutory source defined by 1, 2, 3, and 4, as described in the note preceding Table 302.4.
† Indicates the statutory source defined by 1,2,3, and 4, as described in the note preceding Table 302.4.
†† No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers (0.004 inches).
††† The RQ for asbestos is limited to friable forms only.
The Agency may adjust the statutory RQ for this hazardous substance in a future rulemaking; until then the statutory one-pound RQ applies.
§ The adjusted RQs for radionuclides may be found in Appendix B to this table.
** Indicates that no RQ is being assigned to the generic or broad class.
[a] Benzene was already a CERCLA hazardous substance prior to the CAA Amendments of 1990 and received an adjusted 10-pound RQ based on potential carcinogenicity in an August 14, 1989, final rule (54 FR 33418). The CAA Amendments specify that ''benzene (including benzene from gasoline)'' is a hazardous air pollutant and, thus, a CERCLA hazardous substance.
[b] The CAA Amendments of 1990 list DDE (3547–04–4) as a CAA hazardous air pollutant. The CAS number, 3547–04–4, is for the chemical, p,p'dichlorodiphenylethane. DDE or p,p′-dichlorodiphenyldichloroethylene, CAS number 72–55–9, is already listed in Table 302.4 with a final RQ of 1 pound. The substance identified by the CAS number 3547–04–4 has been evaluated and listed as DDE to be consistent with the CAA section 112 listing, as amended.
[c] Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.
[d] Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH2CH2)n-OR′ where:
n = 1, 2, or 3;
R = alkyl C7 or less; or
R = phenyl or alkyl substituted phenyl;
R' = H or alkyl C7 or less; or
OR′ consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.
[e] Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 °C.
[f] See 40 CFR 302.6(b)(1) for application of the mixture rule to this hazardous waste.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES

CASRN	Hazardous substance
50000	Formaldehyde.
50077	Azirino[2′,3′:3,4]pyrrolo[1,2-a]indole-4,7-dione,6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a, 8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta,8aalpha,8balpha)]-
	Mitomycin C.
50180	Cyclophosphamide.
	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide.
50293	Benzene, 1,1′-(2,2,2- trichloroethylidene)bis[4-chloro-.
	DDT.
	4,4′-DDT.
50328	Benzo[a]pyrene.
	3,4-Benzopyrene.
50555	Reserpine.
	Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3 ,4,5-trimethoxybenzoyl)oxy]-, methyl ester (3beta, 16beta,17alpha,18beta,20alpha)- .
51285	Phenol, 2,4-dinitro-.
	2,4-Dinitrophenol.
51434	Epinephrine.
	1,2-Benzenediol,4-[1-hydroxy-2-(methylamino) ethyl]-.
51796	Carbamic acid, ethyl ester.
	Ethyl carbamate.
	Urethane.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
52686	Trichlorfon.
52857	Famphur.
	Phosphorothioic acid, O-[4-[(dimethylamino) sulfonyl]phenyl] O,O-dimethyl ester.
53703	Dibenz[a,h]anthracene.
	Dibenzo[a,h]anthracene.
	1,2:5,6-Dibenzanthracene.
53963	Acetamide, N-9H-fluoren-2-yl-.
	2-Acetylaminofluorene.
54115	Nicotine, & salts.
	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts.
55185	Ethanamine, N-ethyl-N-nitroso-.
	N-Nitrosodiethylamine.
55630	Nitroglycerine.
	1,2,3-Propanetriol, trinitrate.
55914	Diisopropylfluorophosphate (DFP).
	Phosphorofluororidic acid, bis(1-methylethyl) ester.
56042	Methylthiouracil.
	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-.
56235	Carbon tetrachloride.
	Methane, tetrachloro-.
56382	Parathion.
	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester.
56495	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-.
	3-Methylcholanthrene.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
56531	Diethylstilbestrol.
	Phenol, 4,4′-(1,2-diethyl-1,2-ethenediyl)bis-, (E).
56553	Benz[a]anthracene.
	Benzo[a]anthracene.
	1,2-Benzanthracene.
56724	Coumaphos.
57147	Hydrazine, 1,1-dimethyl-.
	1,1-Dimethylhydrazine.
57249	Strychnidin-10-one, & salts.
	Strychnine, & salts.
57476	Physostigmine.
	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-.
57578	beta-Propiolactone.
57647	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1).
	Physostigmine salicylate.
57749	Chlordane.
	Chlordane, alpha & gamma isomers.
	CHLORDANE (TECHNICAL MIXTURE AND METABOLITES).
	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-.
57976	Benz[a]anthracene, 7,12-dimethyl-.
	7,12-Dimethylbenz[a]anthracene.
58899	γ-BHC.
	Cyclohexane, 1,2,3,4,5,6-hexachloro-(1α,2α,3β,4α,5α,6β)-.
	Lindane.
	Lindane (all isomers).
58902	Phenol, 2,3,4,6-tetrachloro-.
	2,3,4,6-Tetrachlorophenol.
59507	p-Chloro-m-cresol.
	Phenol, 4-chloro-3-methyl-.
59892	N-Nitrosomorpholine.
60004	Ethylenediamine-tetraacetic acid (EDTA).
60117	Benzenamine, N,N-dimethyl-4-(phenylazo)-.
	Dimethyl aminoazobenzene.
	p-Dimethylaminoazobenzene.
60297	Ethane, 1,1′-oxybis-.
	Ethyl ether.
60344	Hydrazine, methyl-.
	Methyl hydrazine.
60355	Acetamide.
60515	Dimethoate.
	Phosphorodithioic acid, O,O-dimethyl S-[2(methylamino)-2-oxoethyl] ester.
60571	Dieldrin.
	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2, 2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta, 6aalpha,7beta, 7aalpha)-.
61825	Amitrole.
	1H-1,2,4-Triazol-3-amine.
62384	Mercury, (acetato-O)phenyl-.
	Phenylmercury acetate.
62442	Acetamide, N-(4-ethoxyphenyl)-.
	Phenacetin.
62500	Ethyl methanesulfonate.
	Methanesulfonic acid, ethyl ester.
62533	Aniline.
	Benzenamine.
62555	Ethanethioamide.
	Thioacetamide.
62566	Thiourea.
62737	Dichlorvos.
62748	Acetic acid, fluoro-, sodium salt.
	Fluoroacetic acid, sodium salt.
62759	Methanamine, N-methyl-N-nitroso-.
	N-Nitrosodimethylamine.
63252	Carbaryl.
	1-Naphthalenol, methylcarbamate.
64006	m-Cumenyl methylcarbamate.
	3-Isopropylphenyl N-methylcarbamate.
	Phenol, 3-(1-methylethyl)-, methyl carbamate.
64006	Phenol, 3-(1-methylethyl)-, methyl carbamate (m-Cumenyl methylcarbamate).
64186	Formic acid.
64197	Acetic acid.
64675	Diethyl sulfate.
65850	Benzoic acid.
66751	Uracil mustard.
	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl) amino]-.
67561	Methanol.
	Methyl alcohol.
67641	Acetone.
	2-Propanone.
67663	Chloroform.
	Methane, trichloro-.
67721	Ethane, hexachloro-.
	Hexachloroethane.
68122	Dimethylformamide.
70257	Guanidine, N-methyl-N′-nitro-N-nitroso-.
	MNNG.
70304	Hexachlorophene.
	Phenol, 2,2′-methylenebis[3,4,6-tri- chloro-.
71363	n-Butyl alcohol.
	1-Butanol.
71432	Benzene.
71556	Ethane, 1,1,1-trichloro-.
	Methyl chloroform.
	1,1,1-Trichloroethane.
72208	Endrin.
	Endrin, & metabolites.
	2,7:3.6-Dimethanonaphth[2,3-b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha, 6alpha,6abeta,7beta,7aalpha)-, & metabolites.
72435	Benzene, 1,1′-(2,2,2-trichloroethylidene)bis[4-methoxy-.
	Methoxychlor.
72548	Benzene, 1,1′-(2,2-dichloroethylidene)bis[4-chloro-.
	DDD.
	TDE.
	4,4′-DDD.
72559	DDE
	4,4′-DDE.
72571	Trypan blue.
	2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethyl-(l,1′-biphenyl)-4,4′-diyl)-bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt.
74839	Bromomethane.
	Methane, bromo-.
	Methyl bromide.
74873	Chloromethane.
	Methane, chloro-.
	Methyl chloride.
74884	Iodomethane
	Methane, iodo-.
	Methyl iodide.
74895	Monomethylamine.
74908	Hydrocyanic acid.
	Hydrogen cyanide.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
74931	Methanethiol.
	Methyl mercaptan.
	Thiomethanol.
74953	Methane, dibromo-.
	Methylene bromide.
75003	Chloroethane.
	Ethyl chloride.
75014	Ethene, chloro-.
	Vinyl chloride.
75047	Monoethylamine.
75058	Acetonitrile.
75070	Acetaldehyde.
	Ethanal.
75092	Dichloromethane.
	Methane, dichloro-.
	Methylene chloride.
75150	Carbon disulfide.
75207	Calcium carbide.
75218	Ethylene oxide.
	Oxirane.
75252	Bromoform.
	Methane, tribromo-.
75274	Dichlorobromomethane.
75343	Ethane, 1,1-dichloro-.
	Ethylidene dichloride.
	1,1-Dichloroethane.
75354	Ethene, 1,1-dichloro-.
	Vinylidene chloride.
	1,1-Dichloroethylene.
75365	Acetyl chloride.
75445	Carbonic dichloride.
	Phosgene.
75503	Trimethylamine.
75558	Aziridine, 2-methyl-.
	2-Methyl aziridine.
	1,2-Propylenimine.
75569	Propylene oxide.
75605	Arsinic acid, dimethyl-.
	Cacodylic acid.
75649	tert-Butylamine.
75694	Methane, trichlorofluoro-.
	Trichloromonofluoromethane.
75718	Dichlorodifluoromethane.
	Methane, dichlorodifluoro-.
75865	Acetone cyanohydrin.
	Propanenitrile, 2-hydroxy-2-methyl-.
	2-Methyllactonitrile.
75876	Acetaldehyde, trichloro-.
	Chloral.
75990	2,2-Dichloropropionic acid.
76017	Ethane, pentachloro-.
	Pentachloroethane.
76448	Heptachlor.
	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-.
77474	Hexachlorocyclopentadiene.
	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexa- chloro-.
77781	Dimethyl sulfate.
	Sulfuric acid, dimethyl ester.
78002	Plumbane, tetraethyl-.
	Tetraethyl lead.
78591	Isophorone.
78795	Isoprene.
78819	iso-Butylamine.
78831	Isobutyl alcohol.
	1-Propanol, 2-methyl-.
78875	Propane, 1,2-dichloro-.
	Propylene dichloride.
	1,2-Dichloropropane.
78886	2,3-Dichloropropene.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
78933	2-Butanone.
	MEK.
	Methyl ethyl ketone.
78999	1,1-Dichloropropane.
79005	Ethane, 1,1,2-trichloro-.
	1,1,2-Trichloroethane.
79016	Ethene, trichloro-.
	Trichloroethylene.
79061	Acrylamide.
	2-Propenamide.
79094	Propionic acid.
79107	Acrylic acid.
	2-Propenoic acid.
79118	Chloroacetic acid.
79196	Hydrazinecarbothioamide.
	Thiosemicarbazide.
79221	Carbonochloridic acid, methyl ester.
	Methyl chlorocarbonate.
79312	iso-Butyric acid.
79345	Ethane, 1,1,2,2-tetrachloro-.
	1,1,2,2-Tetrachloroethane.
79447	Carbamic chloride, dimethyl-.
	Dimethylcarbamoyl chloride.
79469	Propane, 2-nitro-.
	2-Nitropropane.
80159	alpha,alpha-Dimethylbenzylhydroperoxide.
	Hydroperoxide, 1-methyl-1-phenylethyl-.
80626	Methyl methacrylate.
	2-Propenoic acid, 2-methyl-, methyl ester.
81812	Warfarin, & salts.
	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts.
82688	Benzene, pentachloronitro-.
	PCNB.
	Pentachloronitrobenzene.
	Quintobenzene.
83329	Acenaphthene.
84662	Diethyl phthalate.
	1,2-Benzenedicarboxylic acid, diethyl ester.
84742	Di-n-butyl phthalate.
	Dibutyl phthalate.
	n-Butyl phthalate.
	1,2-Benzenedicarboxylic acid, dibutyl ester.
85007	Diquat.
85018	Phenanthrene.
85449	Phthalic anhydride.
	1,3-Isobenzofurandione.
85687	Butyl benzyl phthalate.
86306	N-Nitrosodiphenylamine.
86500	Guthion.
86737	Fluorene.
86884	alpha-Naphthylthiourea.
	Thiourea, 1-naphthalenyl-.
87650	Phenol, 2,6-dichloro-.
	2,6-Dichlorophenol.
87683	Hexachlorobutadiene.
	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-.
87865	Pentachlorophenol.
	Phenol, pentachloro-.
88062	Phenol, 2,4,6-trichloro-.
	2,4,6-Trichlorophenol.
88722	o-Nitrotoluene.
88755	o-Nitrophenol.
	2-Nitrophenol.
88857	Dinoseb.
	Phenol, 2-(1-methylpropyl)-4,6-dinitro-.
90040	o-Anisidine.
91087	Benzene, 1,3-diisocyanatomethyl-.
	Toluene diisocyanate.
	2,4-Toluene diisocyanate.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
91203	Naphthalene.
91225	Quinoline.
91587	beta-Chloronaphthalene.
	Naphthalene, 2-chloro-.
	2-Chloronaphthalene.
91598	beta-Naphthylamine.
	2-Naphthalenamine.
91667	N,N-Diethylaniline.
91805	Methapyrilene.
	1,2-Ethanediamine, N,N-dimethyl-N′-2-pyridinyl-N′- (2-thienylmethyl)-.
91941	[1,1′-Biphenyl]-4,4′-diamine,3,3′-dichloro-.
	3,3′-Dichlorobenzidine.
92524	Biphenyl.
92671	4-Aminobiphenyl.
92875	Benzidine.
	[1,1′-Biphenyl]-4,4′-diamine.
92933	4-Nitrobiphenyl.
	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-.
	Silvex (2,4,5-TP).
	2,4,5-TP acid.
93765	Acetic acid, (2,4,5-trichlorophenoxy)-.
93721	2,4,5-T.
	2,4,5-T acid.
93798	2,4,5-T esters.
94111	2,4-D Ester.
94586	Dihydrosafrole.
	1,3-Benzodioxole, 5-propyl-.
94597	Safrole.
	1,3-Benzodioxole, 5-(2-propenyl)-.
94791	2,4-D Ester.
94804	2,4-D Ester.
95476	o-Xylene.
95487	o-Cresol.
95501	Benzene, 1,2-dichloro-.
	o-Dichlorobenzene.
	1,2-Dichlorobenzene.
95534	Benzenamine, 2-methyl-.
	o-Toluidine.
95578	o-Chlorophenol.
	Phenol, 2-chloro-.
	2-Chlorophenol.
95807	Benzenediamine, ar-methyl-.
	Toluenediamine.
	2,4-Toluene diamine.
95943	Benzene, 1,2,4,5-tetrachloro-.
	1,2,4,5-Tetrachlorobenzene.
95954	Phenol, 2,4,5-trichloro-.
	2,4,5-Trichlorophenol.
96093	Styrene oxide.
96128	Propane, 1,2-dibromo-3-chloro-.
	1,2-Dibromo-3-chloropropane.
96457	Ethylenethiourea.
	2-Imidazolidinethione.
97632	Ethyl methacrylate.
	2-Propenoic acid, 2-methyl-, ethyl ester.
98011	Furfural.
	2-Furancarboxaldehyde.
98077	Benzene, (trichloromethyl)-.
	Benzotrichloride.
98099	Benzenesulfonic acid chloride.
	Benzenesulfonyl chloride.
98828	Benzene, (1-methylethyl)-.
	Cumene.
98862	Acetophenone.
	Ethanone, 1-phenyl-.
98873	Benzal chloride.
	Benzene, (dichloromethyl)-.
98884	Benzoyl chloride.
98953	Benzene, nitro-.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
	Nitrobenzene.
99081	m-Nitrotoluene.
99354	Benzene, 1,3,5-trinitro-.
	1,3,5-Trinitrobenzene.
99558	Benzenamine, 2-methyl-5-nitro-.
	5-Nitro-o-toluidine.
99650	m-Dinitrobenzene.
99990	p-Nitrotoluene.
100016	Benzenamine, 4-nitro-.
	p-Nitroaniline.
100027	p-Nitrophenol.
	Phenol, 4-nitro-.
	4-Nitrophenol.
100254	p-Dinitrobenzene.
100414	Ethylbenzene.
100425	Styrene.
100447	Benzene, (chloromethyl)-.
	Benzyl chloride.
100470	Benzonitrile.
100754	N-Nitrosopiperidine.
	Piperidine, 1-nitroso-.
101144	Benzenamine, 4,4′-methylenebis[2-chloro-.
	4,4′-Methylenebis(2-chloroaniline).
101279	Barban.
	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester.
101553	Benzene, 1-bromo-4-phenoxy-.
	4-Bromophenyl phenyl ether.
101688	MDI.
	Methylene diphenyl diisocyanate.
101779	4,4′-Methylenedianiline.
103855	Phenylthiourea.
	Thiourea, phenyl-.
105464	sec-Butyl acetate.
105679	Phenol, 2,4-dimethyl-.
	2,4-Dimethylphenol.
106423	p-Xylene.
106445	p-Cresol.
106467	Benzene, 1,4-dichloro-.
	p-Dichlorobenzene.
	1,4-Dichlorobenzene.
106478	Benzenamine, 4-chloro-.
	p-Chloroaniline.
106490	Benzenamine, 4-methyl-.
	p-Toluidine.
106503	p-Phenylenediamine.
106514	p-Benzoquinone.
	2,5-Cyclohexadiene-1,4-dione.
	Quinone.
106887	1,2-Epoxybutane.
106898	1-Chloro-2,3-epoxypropane.
	Epichlorohydrin.
	Oxirane, (chloromethyl)-.
106934	Dibromoethane.
	Ethane, 1,2-dibromo-.
	Ethylene dibromide.
106990	1,3-Butadiene.
107028	Acrolein.
	2-Propenal.
107051	Allyl chloride.
107062	Ethane, 1,2-dichloro-.
	Ethylene dichloride.
	1,2-Dichloroethane.
107108	n-Propylamine.
	1-Propanamine.
107120	Ethyl cyanide.
	Propanenitrile.
107131	Acrylonitrile.
	2-Propenenitrile.
107153	Ethylenediamine.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
107186	Allyl alcohol.
	2-Propen-1-ol.
107197	Propargyl alcohol.
	2-Propyn-1-ol.
107200	Acetaldehyde, chloro-.
	Chloroacetaldehyde.
107211	Ethylene glycol.
107302	Chloromethyl methyl ether.
	Methane, chloromethoxy-.
107493	Diphosphoric acid, tetraethyl ester.
	Tetraethyl pyrophosphate.
107926	Butyric acid.
108054	Vinyl acetate.
	Vinyl acetate monomer.
108101	Hexone.
	Methyl isobutyl ketone.
	4-Methyl-2-pentanone.
108247	Acetic anhydride.
108316	Maleic anhydride.
	2,5-Furandione.
108383	m-Xylene.
108394	m-Cresol.
108463	Resorcinol.
	1,3-Benzenediol.
108601	Dichloroisopropyl ether.
	Propane, 2,2″-oxybis[2-chloro-.
108883	Benzene, methyl-.
	Toluene.
108907	Benzene, chloro-.
	Chlorobenzene.
108941	Cyclohexanone.
108952	Phenol.
108985	Benzenethiol.
	Thiophenol.
109068	Pyridine, 2-methyl-.
	2-Picoline.
109739	Butylamine.
109773	Malononitrile.
	Propanedinitrile.
109897	Diethylamine.
109999	Furan, tetrahydro-.
	Tetrahydrofuran.
110009	Furan.
	Furfuran.
110167	Maleic acid.
110178	Fumaric acid.
110190	iso-Butyl acetate.
110543	Hexane.
110758	Ethene, (2-chloroethoxy)-.
	2-Chloroethyl vinyl ether.
110805	Ethanol, 2-ethoxy-.
	Ethylene glycol monoethyl ether.
110827	Benzene, hexahydro-.
	Cyclohexane.
110861	Pyridine.
111422	Diethanolamine.
111444	Bis(2-chloroethyl) ether.
	Dichloroethyl ether.
	Ethane, 1,1′-oxybis[2-chloro-.
111546	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters.
	Ethylenebisdithiocarbamic acid, salts & esters.
111911	Bis(2-chloroethoxy) methane.
	Dichloromethoxyethane.
	Ethane, 1,1′-[methylenebis(oxy)]bis(2-chloro-.
114261	Phenol, 2-(1-methylethoxy)-, methylcarbamate.
	Propoxur (Baygon).
115026	Azaserine.
	L-Serine, diazoacetate (ester).
115297	Endosulfan.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide.
115322	Dicofol.
116063	Aldicarb.
	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime.
117806	Dichlone.
117817	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester.
	Bis(2-ethylhexyl)phthalate.
	DEHP.
	Diethylhexyl phthalate.
117840	Di-n-octyl phthalate.
	1,2-Benzenedicarboxylic acid, dioctyl ester.
118741	Benzene, hexachloro-.
	Hexachlorobenzene.
119380	Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazol-5-yl ester.
	Isolan.
119904	[1,1′-Biphenyl]-4,4′-diamine,3,3′-dimethoxy-.
	3,3′-Dimethoxybenzidine.
119937	[1,1′-Biphenyl]-4,4′-diamine,3,3′- dimethyl-.
	3,3′-Dimethylbenzidine.
120127	Anthracene.
120581	Isosafrole.
	1,3-Benzodioxole, 5-(1-propenyl)-.
120809	Catechol.
120821	1,2,4-Trichlorobenzene.
120832	Phenol, 2,4-dichloro-.
	2,4-Dichlorophenol.
121142	Benzene, 1-methyl-2,4-dinitro-.
	2,4-Dinitrotoluene.
121211	Pyrethrins.
121299	Pyrethrins.
121448	Ethanamine, N,N-diethyl-.
	Triethylamine.
121697	N,N-Dimethylaniline.
121755	Malathion.
122098	alpha,alpha-Dimethylphenethylamine.
	Benzeneethanamine, alpha,alpha-dimethyl-.
122429	Carbamic acid, phenyl-, 1-methylethyl ester.
	Propham.
122667	Hydrazine, 1,2-diphenyl-.
	1,2-Diphenylhydrazine.
123319	Hydroquinone.
123331	Maleic hydrazide.
	3,6-Pyridazinedione, 1,2-dihydro-.
123386	Propionaldehyde.
123626	Propionic anhydride.
123637	Paraldehyde.
	1,3,5-Trioxane, 2,4,6-trimethyl-.
123739	Crotonaldehyde.
	2-Butenal.
123864	Butyl acetate.
123911	1,4-Diethyleneoxide.
	1,4-Dioxane.
123922	iso-Amyl acetate.
124049	Adipic acid.
124403	Dimethylamine.
	Methanamine, N-methyl-.
124414	Sodium methylate.
124481	Chlorodibromomethane.
126727	Tris(2,3-dibromopropyl) phosphate.
	1-Propanol, 2,3-dibromo-, phosphate (3:1).
126987	Methacrylonitrile.
	2-Propenenitrile, 2-methyl-.
126998	Chloroprene.
127184	Ethene, tertrachloro-.
	Perchloroethylene.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
	Tetrachloroethylene.
127822	Zinc phenolsulfonate.
129000	Pyrene.
130154	1,4-Naphthalenedione.
	1,4-Naphthoquinone.
131113	Dimethyl phthalate.
	1,2-Benzenedicarboxylic acid, dimethyl ester.
131748	Ammonium picrate.
	Phenol, 2,4,6-trinitro-, ammonium salt.
131895	Phenol, 2-cyclohexyl-4,6-dinitro-.
	2-Cyclohexyl-4,6-dinitrophenol.
132649	Dibenzofuran.
133062	Captan.
133904	Chloramben.
134327	alpha-Naphthylamine.
	1-Naphthalenamine.
137268	Thioperoxydicarbonic diamide ([H2N)C(S)]2S2, tetramethyl-.
	Thiram.
137304	Zinc, bis(dimethylcarbamodithioato-S,S')-.
	Ziram.
140885	Ethyl acrylate.
	2-Propenoic acid, ethyl ester.
141786	Acetic acid, ethyl ester.
	Ethyl acetate.
142289	1,3-Dichloropropane.
142712	Cupric acetate.
142847	Dipropylamine.
	1-Propanamine, N-propyl-.
143339	Sodium cyanide Na(CN).
143500	Kepone.
	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one,1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-.
145733	Endothall.
	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid.
148823	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-.
	Melphalan.
151508	Potassium cyanide K(CN).
151564	Aziridine.
	Ethylenimine.
152169	Diphosphoramide, octamethyl-.
	Octamethylpyrophosphoramide.
156605	Ethene, 1,2-dichloro- (E).
	1,2-Dichloroethylene.
156627	Calcium cyanamide.
189559	Benzo[rst]pentaphene.
	Dibenzo[a,i]pyrene.
191242	Benzo[ghi]perylene.
193395	Indeno(1,2,3-cd)pyrene.
205992	Benzo[b]fluoranthene.
206440	Fluoranthene.
207089	Benzo(k)fluoranthene.
208968	Acenaphthylene.
218019	Chrysene.
225514	Benz[c]acridine.
297972	O,O-Diethyl O-pyrazinyl phosphorothioate.
	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester.
298000	Methyl parathion.
	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester.
298022	Phorate.
	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio) methyl] ester.
298044	Disulfoton.
	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
300765	Naled.
301042	Acetic acid, lead(2+) salt.
	Lead acetate.
302012	Hydrazine.
303344	Lasiocarpine.
	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*), 7aalpha]]-.
305033	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-.
	Chlorambucil.
309002	Aldrin.
	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha, 8abeta)-.
311455	Diethyl-p-nitrophenyl phosphate.
	Phosphoric acid, diethyl 4-nitrophenyl ester.
315184	Mexacarbate.
	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester).
319846	alpha—BHC.
319857	beta—BHC.
319868	delta—BHC.
329715	2,5-Dinitrophenol.
330541	Diuron.
333415	Diazinon.
334883	Diazomethane.
353504	Carbon oxyfluoride.
	Carbonic difluoride.
357573	Brucine.
	Strychnidin-10-one, 2,3-dimethoxy-.
460195	Cyanogen.
	Ethanedinitrile.
463581	Carbonyl sulfide.
465736	Isodrin.
	1,4:5,8-Dimethanonaphthalene,1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta, 8abeta)-.
492808	Auramine.
	Benzenamine, 4,4′-carbonimidoylbis[N,N-dimethyl-.
494031	Chlornaphazine.
	Naphthalenamine, N,N′-bis(2-chloroethyl)-.
496720	Benzenediamine, ar-methyl-.
	Toluenediamine.
	2,4-Toluene diamine.
504245	4-Aminopyridine.
	4-Pyridinamine.
504609	1-Methylbutadiene.
	1,3-Pentadiene.
506616	Argentate(1-), bis(cyano-C)-, potassium.
	Potassium silver cyanide.
506649	Silver cyanide Ag(CN).
506683	Cyanogen bromide (CN)Br.
506774	Cyanogen chloride (CN)Cl.
506876	Ammonium carbonate.
506967	Acetyl bromide.
509148	Methane, tetranitro-.
	Tetranitromethane.
510156	Benzeneacetic acid, 4-chloro-α- (4-chlorophenyl)-α-hydroxy-, ethyl ester.
	Chlorobenzilate.
513495	sec-Butylamine.
528290	o-Dinitrobenzene.
532274	2-Chloroacetophenone.
534521	4,6-Dinitro-o-cresol, and salts.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
	Phenol, 2-methyl-4,6-dinitro-, & salts.
540738	Hydrazine, 1,2-dimethyl-.
	1,2-Dimethylhydrazine.
540841	2,2,4-Trimethylpentane.
540885	tert-Butyl acetate.
541093	Uranyl acetate.
541537	Dithiobiuret.
	Thioimidodicarbonic diamide [(H2N)C(S)]2NH.
541731	Benzene, 1,3-dichloro-.
	m-Dichlorobenzene.
	1,3-Dichlorobenzene.
542621	Barium cyanide.
542756	1-Propene, 1,3-dichloro-.
	1,3-Dichloropropene.
542767	Propanenitrile, 3-chloro-.
	3-Chloropropionitrile.
542881	Bis(chloromethyl)ether.
	Dichloromethyl ether.
	Methane, oxybis(chloro-.
543908	Cadmium acetate.
544183	Cobaltous formate.
544923	Copper cyanide Cu(CN).
554847	m-Nitrophenol.
557197	Nickel cyanide $Ni(CN)_2$.
557211	Zinc cyanide $Zn(CN)_2$.
	Zinc cyanide Zn(CN)2.
557346	Zinc acetate.
557415	Zinc formate.
563122	Ethion.
563688	Acetic acid, thallium(1+) salt.
	Thallium(I) acetate.
573568	2,6-Dinitrophenol.
584849	Benzene, 1,3-diisocyanatomethyl-.
	Toluene diisocyanate.
	2,4-Toluene diisocyanate.
591082	Acetamide, N-(aminothioxomethyl)-.
	1-Acetyl-2-thiourea.
592018	Calcium cyanide $Ca(CN)_2$.
592041	Mercuric cyanide.
592858	Mercuric thiocyanate.
592870	Lead thiocyanate.
593602	Vinyl bromide.
594423	Methanesulfenyl chloride, trichloro-.
	Trichloromethanesulfenyl chloride.
598312	Bromoacetone.
	2-Propanone, 1-bromo-.
606202	Benzene, 2-methyl-1,3-dinitro-.
	2,6-Dinitrotoluene.
608731	HEXACHLOROCYCLOHEXANE (all isomers).
608935	Benzene, pentachloro-.
	Pentachlorobenzene.
609198	3,4,5-Trichlorophenol.
610399	3,4-Dinitrotoluene.
615532	Carbamic acid, methylnitroso-, ethyl ester.
	N-Nitroso-N-methylurethane.
621647	Di-n-propylnitrosamine.
	1-Propanamine, N-nitroso-N-propyl-.
624839	Methane, isocyanato-.
	Methyl isocyanate.
625161	tert-Amyl acetate.
626380	sec-Amyl acetate.
628637	Amyl acetate.
628864	Fulminic acid, mercury(2+)salt.
	Mercury fulminate.
630104	Selenourea.
630206	Ethane, 1,1,1,2-tetrachloro-.
	1,1,1,2-Tetrachloroethane.
631618	Ammonium acetate.
636215	Benzenamine, 2-methyl-, hydrochloride.
	o-Toluidine hydrochloride.
640197	Acetamide, 2-fluoro-.
	Fluoroacetamide.
644644	Carbamic acid, dimethyl-,1-[(dimethylamino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester.
	Dimetilan.
680319	Hexamethylphosphoramide.
684935	N-Nitroso-N-methylurea.
	Urea, N-methyl-N-nitroso-.
692422	Arsine, diethyl-.
	Diethylarsine.
696286	Arsonous dichloride, phenyl-.
	Dichlorophenylarsine.
757584	Hexaethyl tetraphosphate.
	Tetraphosphoric acid, hexaethyl ester.
759739	N-Nitroso-N-ethylurea.
	Urea, N-ethyl-N-nitroso-.
764410	1,4-Dichloro-2-butene.
	2-Butene, 1,4-dichloro-.
765344	Glycidylaldehyde.
	Oxiranecarboxyaldehyde.
815827	Cupric tartrate.
822060	Hexamethylene-1,6-diisocyanate.
823405	Benzenediamine, ar-methyl-.
	Toluenediamine.
	2,4-Toluene diamine.
924163	N-Nitrosodi-n-butylamine.
	1-Butanamine, N-butyl-N-nitroso-.
930552	N-Nitrosopyrrolidine.
	Pyrrolidine, 1-nitroso-.
933755	2,3,6-Trichlorophenol.
933788	2,3,5-Trichlorophenol.
959988	alpha-Endosulfan.
1024573	Heptachlor epoxide.
1031078	Endosulfan sulfate.
1066304	Chromic acetate.
1066337	Ammonium bicarbonate.
1072351	Lead stearate.
1111780	Ammonium carbamate.
1116547	Ethanol, 2,2′-(nitrosoimino)bis-.
	N-Nitrosodiethanolamine.
1120714	1,2-Oxathiolane, 2,2-dioxide.
	1,3-Propane sultone.
1129415	Carbamic acid, methyl-, 3-methylphenyl ester.
	Metolcarb.
1185575	Ferric ammonium citrate.
1194656	Dichlobenil.
1300716	Xylenol.
1303282	Arsenic oxide As2O5.
	Arsenic pentoxide.
1303328	Arsenic disulfide.
1303339	Arsenic trisulfide.
1309644	Antimony trioxide.
1310583	Potassium hydroxide.
1310732	Sodium hydroxide.
1314325	Thallic oxide.
	Thallium oxide Tl2O3.
1314621	Vanadium oxide V2O5.
	Vanadium pentoxide.
1314803	Phosphorus pentasulfide.
	Phosphorus sulfide.
	Sulfur phosphide.
1314847	Zinc phosphide Zn_3P_2.
1314870	Lead sulfide.
1319728	2,4,5-T amines.
1319773	Cresol (cresylic acid).
	Cresols (isomers and mixture).
	Cresylic acid (isomers and mixture).
	Phenol, methyl-.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
1320189	2,4-D Ester.
1321126	Nitrotoluene.
1327533	Arsenic oxide As2O3.
	Arsenic trioxide.
1330207	Benzene, dimethyl-.
	Xylene.
	Xylene (mixed).
	Xylenes (isomers and mixture).
1332076	Zinc borate.
1332214	Asbestos.
1333831	Sodium bifluoride.
1335326	Lead subacetate.
	Lead, bis(acetato-O)tetrahydroxytri.
1336216	Ammonium hydroxide.
1336363	Aroclors.
	PCBs.
	POLYCHLORINATED BIPHENYLS.
1338234	Methyl ethyl ketone peroxide.
	2-Butanone peroxide.
1338245	Naphthenic acid.
1341497	Ammonium bifluoride.
1464535	1,2:3,4-Diepoxybutane.
	2,2′-Bioxirane.
1563388	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-.
	Carbofuran phenol.
1563662	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
	Carbofuran.
1582098	Trifluralin.
1615801	Hydrazine, 1,2-diethyl-.
	N,N′-Diethylhydrazine.
1634044	Methyl tert-butyl ether.
1646884	Aldicarb sulfone.
	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime.
1746016	TCDD.
	2,3,7,8-Tetrachlorodibenzo-p-dioxin.
1762954	Ammonium thiocyanate.
1863634	Ammonium benzoate.
1888717	Hexachloropropene.
	1-Propene, 1,1,2,3,3,3-hexachloro-.
1918009	Dicamba.
1928387	2,4-D Ester.
1928478	2,4,5-T esters.
1928616	2,4-D Ester.
1929733	2,4-D Ester.
2008460	2,4,5-T amines.
2032657	Mercaptodimethur.
	Methiocarb.
	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate.
2303164	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester.
	Diallate.
2303175	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester.
	Triallate.
2312358	Propargite.
2545597	2,4,5-T esters.
2631370	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate.
	Promecarb.
2763964	3(2H)-Isoxazolone, 5-(aminomethyl)-.
	5-(Aminomethyl)-3-isoxazolol.
2764729	Diquat
2921882	Chlorpyrifos.
2944674	Ferric ammonium oxalate.
2971382	2,4-D Ester.
3012655	Ammonium citrate, dibasic.
3164292	Ammonium tartrate.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
3165933	Benzenamine, 4-chloro-2-methyl-, hydrochloride.
	4-Chloro-o-toluidine, hydrochloride.
3251238	Cupric nitrate.
3288582	O,O-Diethyl S-methyl dithiophosphate.
	Phosphorodithioic acid, O,O-diethyl S-methyl ester.
3486359	Zinc carbonate.
3547044	DDE.
3689245	Tetraethyldithiopyrophosphate.
	Thiodiphosphoric acid, tetraethyl ester.
3813147	2,4,5-T amines.
4170303	Crotonaldehyde.
	2-Butenal.
4549400	N-Nitrosomethylvinylamine.
	Vinylamine, N-methyl-N-nitroso-.
5344821	Thiourea, (2-chlorophenyl)-.
	1-(o-Chlorophenyl)thiourea.
5893663	Cupric oxalate.
5952261	Ethanol, 2,2′-oxybis-, dicarbamate.
	Diethylene glycol, dicarbamate.
5972736	Ammonium oxalate.
6009707	Ammonium oxalate.
6369966	2,4,5-T amines.
6369977	2,4,5-T amines.
6533739	Carbonic acid, dithallium(1+) salt.
	Thallium(I) carbonate.
7005723	4-Chlorophenyl phenyl ether.
7421934	Endrin aldehyde.
7428480	Lead stearate.
7439921	Lead.
7439976	Mercury.
7440020	Nickel.
7440224	Silver.
7440235	Sodium.
7440280	Thallium.
7440360	Antimony.
7440382	Arsenic.
7440417	Beryllium.
	Beryllium powder.
7440439	Cadmium.
7440473	Chromium.
7440508	Copper.
7440666	Zinc.
7446084	Selenium dioxide.
	Selenium oxide.
7446142	Lead sulfate.
7446186	Sulfuric acid, dithallium(1+) salt.
	Thallium(I) sulfate.
7446277	Lead phosphate.
	Phosphoric acid, lead(2+) salt (2:3).
7447394	Cupric chloride.
7488564	Selenium sulfide SeS_2.
7550450	Titanium tetrachloride.
7558794	Sodium phosphate, dibasic.
7601549	Sodium phosphate, tribasic.
7631892	Sodium arsenate.
7631905	Sodium bisulfite.
7632000	Sodium nitrite.
7645252	Lead arsenate.
7646857	Zinc chloride.
7647010	Hydrochloric acid.
	Hydrogen chloride.
7647189	Antimony pentachloride.
7664382	Phosphoric acid.
7664393	Hydrofluoric acid.
	Hydrogen fluoride.
7664417	Ammonia.
7664939	Sulfuric acid.
7681494	Sodium fluoride.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
7681529	Sodium hypochlorite.
7697372	Nitric acid.
7699458	Zinc bromide.
7705080	Ferric chloride.
7718549	Nickel chloride.
7719122	Phosphorus trichloride.
7720787	Ferrous sulfate.
7722647	Potassium permanganate.
7723140	Phosphorus.
7733020	Zinc sulfate.
7738945	Chromic acid.
7758294	Sodium phosphate, tribasic.
7758943	Ferrous chloride.
7758954	Lead chloride.
7758987	Cupric sulfate.
7761888	Silver nitrate.
7773060	Ammonium sulfamate.
7775113	Sodium chromate.
7778394	Arsenic acid H_3AsO_4.
7778441	Calcium arsenate.
7778509	Potassium bichromate.
7778543	Calcium hypochlorite.
7779864	Zinc hydrosulfite.
7779886	Zinc nitrate.
7782414	Fluorine.
7782492	Selenium.
7782505	Chlorine.
7782630	Ferrous sulfate.
7782823	Sodium selenite.
7782867	Mercurous nitrate.
7783008	Selenious acid.
7783064	Hydrogen sulfide H_2S.
7783359	Mercuric sulfate.
7783462	Lead fluoride.
7783495	Zinc fluoride.
7783508	Ferric fluoride.
7783564	Antimony trifluoride.
7784341	Arsenic trichloride.
7784409	Lead arsenate.
7784410	Potassium arsenate.
7784465	Sodium arsenite.
7785844	Sodium phosphate, tribasic.
7786347	Mevinphos.
7786814	Nickel sulfate.
7787475	Beryllium chloride.
7787497	Beryllium fluoride.
7787555	Beryllium nitrate.
7788989	Ammonium chromate.
7789006	Potassium chromate.
7789062	Strontium chromate.
7789095	Ammonium bichromate.
7789426	Cadmium bromide.
7789437	Cobaltous bromide.
7789619	Antimony tribromide.
7790945	Chlorosulfonic acid.
7791120	Thallium chloride TlCl.
7803512	Hydrogen phosphide. Phosphine.
7803556	Ammonium vanadate. Vanadic acid, ammonium salt.
8001352	Chlorinated camphene. Toxaphene.
8003198	Dichloropropane—Dichloropropene (mixture).
8003347	Pyrethrins.
8014957	Sulfuric acid.
10022705	Sodium hypochlorite.
10025873	Phosphorus oxychloride.
10025919	Antimony trichloride.
10026116	Zirconium tetrachloride.
10028225	Ferric sulfate.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
10031591	Sulfuric acid, dithallium(1+) salt. Thallium(I) sulfate.
10039324	Sodium phosphate, dibasic.
10043013	Aluminum sulfate.
10045893	Ferrous ammonium sulfate.
10045940	Mercuric nitrate.
10049055	Chromous chloride.
10099748	Lead nitrate.
10101538	Chromic sulfate.
10101630	Lead iodide.
10101890	Sodium phosphate, tribasic.
10102064	Uranyl nitrate.
10102188	Sodium selenite.
10102439	Nitric oxide. Nitrogen oxide NO.
10102440	Nitrogen dioxide. Nitrogen oxide NO2.
10102451	Nitric acid, thallium(1+) salt. Thallium(I) nitrate.
10102484	Lead arsenate.
10108642	Cadmium chloride.
10124502	Potassium arsenite.
10124568	Sodium phosphate, tribasic.
10140655	Sodium phosphate, dibasic.
10192300	Ammonium bisulfite.
10196040	Ammonium sulfite.
10361894	Sodium phosphate, tribasic.
10380297	Cupric sulfate, ammoniated.
10415755	Mercurous nitrate.
10421484	Ferric nitrate.
10544726	Nitrogen dioxide. Nitrogen oxide NO2.
10588019	Sodium bichromate.
10605217	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester. Carbendazim.
11096825	Aroclor 1260.
11097691	Aroclor 1254.
11104282	Aroclor 1221.
11115745	Chromic acid.
11141165	Aroclor 1232.
12002038	Cupric acetoarsenite.
12039520	Selenious acid, dithallium(1+) salt. Thallium (I) selenite.
12054487	Nickel hydroxide.
12125018	Ammonium fluoride.
12125029	Ammonium chloride.
12135761	Ammonium sulfide.
12672296	Aroclor 1248.
12674112	Aroclor 1016.
12771083	Sulfur monochloride.
13463393	Nickel carbonyl $Ni(CO)_4$, (T–4)-.
13560991	2,4,5-T salts.
13597994	Beryllium nitrate.
13746899	Zirconium nitrate.
13765190	Calcium chromate. Chromic acid H2CrO4, calcium salt.
13814965	Lead fluoborate.
13826830	Ammonium fluoborate.
13952846	sec-Butylamine.
14017415	Cobaltous sulfamate.
14216752	Nickel nitrate.
14258492	Ammonium oxalate.
14307358	Lithium chromate.
14307438	Ammonium tartrate.
14639975	Zinc ammonium chloride.
14639986	Zinc ammonium chloride.
14644612	Zirconium sulfate.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous substance
15339363	Manganese, bis(dimethylcarbamodithioato-S,S')-.
	Manganese dimethyldithiocarbamate.
15699180	Nickel ammonium sulfate.
15739807	Lead sulfate.
15950660	2,3,4-Trichlorophenol.
16721805	Sodium hydrosulfide.
16752775	Ethanimidothioic acid, N-[[(methylamino)carbonyl] oxy]-, methyl ester.
	Methomyl.
16871719	Zinc silicofluoride.
16919190	Ammonium silicofluoride.
16923958	Zirconium potassium fluoride.
17702577	Formparanate.
	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[(methylamino)carbonyl]oxy]phenyl]-.
17804352	Benomyl.
	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester.
18883664	D-Glucose, 2-deoxy-2[[(methylnitrosoamino)-carbonyl]amino]-.
	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-.
	Streptozotocin.
20816120	Osmium oxide OsO_4, (T–4)-.
	Osmium tetroxide.
20830813	Daunomycin.
	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-.
20859738	Aluminum phosphide.
22781233	Bendiocarb.
	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate.
22961826	Bendiocarb phenol.
	1,3-Benzodioxol-4-ol, 2,2-dimethyl-.
23135220	Ethanimidothioic acid, 2-(dimethylamino)-N-[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester.
	Oxamyl.
23422539	Methanimidamide, N,N-dimethyl-N'-[3-[[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride.
	Formetanate hydrochloride.
23564058	Carbamic acid, [1,2-phenylenebis(iminocarbonothioyl)]bis-, dimethyl ester.
	Thiophanate-methyl.
23950585	Benzamide, 3,5-dichloro-N-(1,1- dimethyl-2-propynyl)-.
	Pronamide.
25154545	Dinitrobenzene (mixed).
25154556	Nitrophenol (mixed).
25155300	Sodium dodecylbenzenesulfonate.
25167822	Trichlorophenol.
25168154	2,4,5-T esters.
25168267	2,4-D Ester.
25321146	Dinitrotoluene.
25321226	Dichlorobenzene.
25376458	Benzenediamine, ar-methyl-.
	Toluenediamine.
	2,4-Toluene diamine.
25550587	Dinitrophenol.
26264062	Calcium dodecylbenzenesulfonate.
26419738	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime.
	Tirpate.
26471625	Benzene, 1,3-diisocyanatomethyl-.
	Toluene diisocyanate.
	2,4-Toluene diisocyanate.
26628228	Sodium azide.
26638197	Dichloropropane.
26952238	Dichloropropene.
27176870	Dodecylbenzenesulfonic acid.
27323417	Triethanolamine dodecylbenzene sulfonate.
27774136	Vanadyl sulfate.
28300745	Antimony potassium tartrate.
30525894	Paraformaldehyde.
30558431	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester.
	A2213.
32534955	2,4,5-TP esters.
33213659	beta - Endosulfan.
36478769	Uranyl nitrate.
37211055	Nickel chloride.
39196184	Thiofanox.
	2-Butanone, 3,3-dimethyl-1-(methylthio)-,O-[(methylamino)carbonyl] oxime.
42504461	Isopropanolamine dodecylbenzenesulfonate.
52628258	Zinc ammonium chloride.
52652592	Lead stearate.
52740166	Calcium arsenite.
52888809	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester.
	Prosulfocarb.
53467111	2,4-D Ester.
53469219	Aroclor 1242.
55285148	Carbamic acid, [(dibutylamino)-thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester.
	Carbosulfan.
55488874	Ferric ammonium oxalate.
56189094	Lead stearate.
59669260	Ethanimidothioic acid, N,N'-[thiobis[(methylimino)carbonyloxy]]bis-, dimethyl ester.
	Thiodicarb.
61792072	2,4,5-T esters.

APPENDIX B TO § 302.4—RADIONUCLIDES

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Radionuclides@	.....	1&(3.7E 10)
Actinium-224	89	100 (3.7E 12)
Actinium-225	89	1 (3.7E 10)
Actinium-226	89	10 (3.7E 11)
Actinium-227	89	0.001 (3.7E 7)
Actinium-228	89	10 (3.7E 11)
Aluminum-26	13	10 (3.7E 11)
Americium-237	95	1000 (3.7E 13)
Americium-238	95	100 (3.7E 12)
Americium-239	95	100 (3.7E 12)
Americium-240	95	10 (3.7E 11)
Americium-241	95	0.01 (3.7E 8)
Americium-242m	95	0.01 (3.7E 8)
Americium-242	95	100 (3.7E 12)
Americium-243	95	0.01 (3.7E 8)
Americium-244m	95	1000 (3.7E 13)
Americium-244	95	10 (3.7E 11)
Americium-245	95	1000 (3.7E 13)
Americium-246m	95	1000 (3.7E 13)
Americium-246	95	1000 (3.7E 13)
Antimony-115	51	1000 (3.7E 13)
Antimony-116m	51	100 (3.7E 12)
Antimony-116	51	1000 (3.7E 13)
Antimony-117	51	1000 (3.7E 13)
Antimony-118m	51	10 (3.7E 11)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Antimony-119	51	1000 (3.7E 13)
Antimony-120 (16 min)	51	1000 (3.7E 13)
Antimony-120 (5.76 day)	51	10 (3.7E 11)
Antimony-122	51	10 (3.7E 11)
Antimony-124m	51	1000 (3.7E 13)
Antimony-124	51	10 (3.7E 11)
Antimony-125	51	10 (3.7E 11)
Antimony-126m	51	1000 (3.7E 13)
Antimony-126	51	10 (3.7E 11)
Antimony-127	51	10 (3.7E 11)
Antimony-128 (10.4 min)	51	1000 (3.7E 13)
Antimony-128 (9.01 hr)	51	10 (3.7E 11)
Antimony-129	51	100 (3.7E 12)
Antimony-130	51	100 (3.7E 12)
Antimony-131	51	1000 (3.7E 13)
Argon-39	18	1000 (3.7E 13)
Argon-41	18	10 (3.7E 11)
Arsenic-69	33	1000 (3.7E 13)
Arsenic-70	33	100 (3.7E 12)
Arsenic-71	33	100 (3.7E 12)
Arsenic-72	33	10 (3.7E 11)
Arsenic-73	33	100 (3.7E 12)
Arsenic-74	33	10 (3.7E 11)
Arsenic-76	33	100 (3.7E 12)
Arsenic-77	33	1000 (3.7E 13)
Arsenic-78	33	100 (3.7E 12)
Astatine-207	85	100 (3.7E 12)
Astatine-211	85	100 (3.7E 12)
Barium-126	56	1000 (3.7E 13)
Barium-128	56	10 (3.7E 11)
Barium-131m	56	1000 (3.7E 13)
Barium-131	56	10 (3.7E 11)
Barium-133m	56	100 (3.7E 12)
Barium-133	56	10 (3.7E 11)
Barium-135m	56	1000 (3.7E 13)
Barium-139	56	1000 (3.7E 13)
Barium-140	56	10 (3.7E 11)
Barium-141	56	1000 (3.7E 13)
Barium-142	56	1000 (3.7E 13)
Berkelium-245	97	100 (3.7E 12)
Berkelium-246	97	10 (3.7E 11)
Berkelium-247	97	0.01 (3.7E 8)
Berkelium-249	97	1 (3.7E 10)
Berkelium-250	97	100 (3.7E 12)
Beryllium-7	4	100 (3.7E 12)
Beryllium-10	4	1 (3.7E 10)
Bismuth-200	83	100 (3.7E 12)
Bismuth-201	83	100 (3.7E 12)
Bismuth-202	83	1000 (3.7E 13)
Bismuth-203	83	10 (3.7E 11)
Bismuth-205	83	10 (3.7E 11)
Bismuth-206	83	10 (3.7E 11)
Bismuth-207	83	10 (3.7E 11)
Bismuth-210m	83	0.1 (3.7E 9)
Bismuth-210	83	10 (3.7E 11)
Bismuth-212	83	100 (3.7E 12)
Bismuth-213	83	100 (3.7E 12)
Bismuth-214	83	100 (3.7E 12)
Bromine-74m	35	100 (3.7E 12)
Bromine-74	35	100 (3.7E 12)
Bromine-75	35	100 (3.7E 12)
Bromine-76	35	10 (3.7E 11)
Bromine-77	35	100 (3.7E 12)
Bromine-80m	35	1000 (3.7E 13)
Bromine-80	35	1000 (3.7E 13)
Bromine-82	35	10 (3.7E 11)
Bromine-83	35	1000 (3.7E 13)
Bromine-84	35	100 (3.7E 12)
Cadmium-104	48	1000 (3.7E 13)
Cadmium-107	48	1000 (3.7E 13)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Cadmium-109	48	1 (3.7E 10)
Cadmium-113m	48	0.1 (3.7E 9)
Cadmium-113	48	0.1 (3.7E 9)
Cadmium-115m	48	10 (3.7E 11)
Cadmium-115	48	100 (3.7E 12)
Cadmium-117m	48	10 (3.7E 11)
Cadmium-117	48	100 (3.7E 12)
Calcium-41	20	10 (3.7E 11)
Calcium-45	20	10 (3.7E 11)
Calcium-47	20	10 (3.7E 11)
Californium-244	98	1000 (3.7E 13)
Californium-246	98	10 (3.7E 11)
Californium-248	98	0.1 (3.7E 9)
Californium-249	98	0.01 (3.7E 8)
Californium-250	98	0.01 (3.7E 8)
Californium-251	98	0.01 (3.7E 8)
Californium-252	98	0.1 (3.7E 9)
Californium-253	98	10 (3.7E 11)
Californium-254	98	0.1 (3.7E 9)
Carbon-11	6	1000 (3.7E 13)
Carbon-14	6	10 (3.7E 11)
Cerium-134	58	10 (3.7E 11)
Cerium-135	58	10 (3.7E 11)
Cerium-137m	58	100 (3.7E 12)
Cerium-137	58	1000 (3.7E 13)
Cerium-139	58	100 (3.7E 12)
Cerium-141	58	10 (3.7E 11)
Cerium-143	58	100 (3.7E 12)
Cerium-144	58	1 (3.7E 10)
Cesium-125	55	1000 (3.7E 13)
Cesium-127	55	100 (3.7E 12)
Cesium-129	55	100 (3.7E 12)
Cesium-130	55	1000 (3.7E 13)
Cesium-131	55	1000 (3.7E 13)
Cesium-132	55	10 (3.7E 11)
Cesium-134m	55	1000 (3.7E 13)
Cesium-134	55	1 (3.7E 10)
Cesium-135m	55	100 (3.7E 12)
Cesium-135	55	10 (3.7E 11)
Cesium-136	55	10 (3.7E 11)
Cesium-137	55	1 (3.7E 10)
Cesium-138	55	100 (3.7E 12)
Chlorine-36	17	10 (3.7E 11)
Chlorine-38	17	100 (3.7E 12)
Chlorine-39	17	100 (3.7E 12)
Chromium-48	24	100 (3.7E 12)
Chromium-49	24	1000 (3.7E 13)
Chromium-51	24	1000 (3.7E 13)
Cobalt-55	27	10 (3.7E 11)
Cobalt-56	27	10 (3.7E 11)
Cobalt-57	27	100 (3.7E 12)
Cobalt-58m	27	1000 (3.7E 13)
Cobalt-58	27	10 (3.7E 11)
Cobalt-60m	27	1000 (3.7E 13)
Cobalt-60	27	10 (3.7E 11)
Cobalt-61	27	1000 (3.7E 13)
Cobalt-62m	27	1000 (3.7E 13)
Copper-60	29	100 (3.7E 12)
Copper-61	29	100 (3.7E 12)
Copper-64	29	1000 (3.7E 13)
Copper-67	29	100 (3.7E 12)
Curium-238	96	1000 (3.7E 13)
Curium-240	96	1 (3.7E 10)
Curium-241	96	10 (3.7E 11)
Curium-242	96	1 (3.7E 10)
Curium-243	96	0.01 (3.7E 8)
Curium-244	96	0.01 (3.7E 8)
Curium-245	96	0.01 (3.7E 8)
Curium-246	96	0.01 (3.7E 8)
Curium-247	96	0.01 (3.7E 8)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Curium-248	96	0.001 (3.7E 7)
Curium-249	96	1000 (3.7E 13)
Dysprosium-155	66	100 (3.7E 12)
Dysprosium-157	66	100 (3.7E 12)
Dysprosium-159	66	100 (3.7E 12)
Dysprosium-165	66	1000 (3.7E 13)
Dysprosium-166	66	10 (3.7E 11)
Einsteinium-250	99	10 (3.7E 11)
Einsteinium-251	99	1000 (3.7E 13)
Einsteinium-253	99	10 (3.7E 11)
Einsteinium-254m	99	1 (3.7E 10)
Einsteinium-254	99	0.1 (3.7E 9)
Erbium-161	68	100 (3.7E 12)
Erbium-165	68	1000 (3.7E 13)
Erbium-169	68	100 (3.7E 12)
Erbium-171	68	100 (3.7E 12)
Erbium-172	68	10 (3.7E 11)
Europium-145	63	10 (3.7E 11)
Europium-146	63	10 (3.7E 11)
Europium-147	63	10 (3.7E 11)
Europium-148	63	10 (3.7E 11)
Europium-149	63	100 (3.7E 12)
Europium-150 (12.6 hr)	63	1000 (3.7E 13)
Europium-150 (34.2 yr)	63	10 (3.7E 11)
Europium-152m	63	100 (3.7E 12)
Europium-152	63	10 (3.7E 11)
Europium-154	63	10 (3.7E 11)
Europium-155	63	10 (3.7E 11)
Europium-156	63	10 (3.7E 11)
Europium-157	63	10 (3.7E 11)
Europium-158	63	1000 (3.7E 13)
Fermium-252	100	10 (3.7E 11)
Fermium-253	100	10 (3.7E 11)
Fermium-254	100	100 (3.7E 12)
Fermium-255	100	100 (3.7E 12)
Fermium-257	100	1 (3.7E 10)
Fluorine-18	9	1000 (3.7E 13)
Francium-222	87	100 (3.7E 12)
Francium-223	87	100 (3.7E 12)
Gadolinium-145	64	100 (3.7E 12)
Gadolinium-146	64	10 (3.7E 11)
Gadolinium-147	64	10 (3.7E 11)
Gadolinium-148	64	0.001 (3.7E7)
Gadolinium-149	64	100 (3.7E 12)
Gadolinium-151	64	100 (3.7E 12)
Gadolinium-152	64	0.001 (3.7E 7)
Gadolinium-153	64	10 (3.7E 11)
Gadolinium-159	64	1000 (3.7E 13)
Gallium-65	31	1000 (3.7E 13)
Gallium-66	31	10 (3.7E 11)
Gallium-67	31	100 (3.7E 12)
Gallium-68	31	1000 (3.7E 13)
Gallium-70	31	1000 (3.7E 13)
Gallium-72	31	10 (3.7E 11)
Gallium-73	31	100 (3.7E 12)
Germanium-66	32	100 (3.7E 12)
Germanium-67	32	1000 (3.7E 13)
Germanium-68	32	10 (3.7E 11)
Germanium-69	32	10 (3.7E 11)
Germanium-71	32	1000 (3.7E 13)
Germanium-75	32	1000 (3.7E 13)
Germanium-77	32	10 (3.7E 11)
Germanium-78	32	1000 (3.7E 13)
Gold-193	79	100 (3.7E 12)
Gold-194	79	10 (3.7E 11)
Gold-195	79	100 (3.7E 12)
Gold-198m	79	10 (3.7E 11)
Gold-198	79	100 (3.7E 12)
Gold-199	79	100 (3.7E 12)
Gold-200m	79	10 (3.7E 11)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Gold-200	79	1000 (3.7E 13)
Gold-201	79	1000 (3.7E 13)
Hafnium-170	72	100 (3.7E 12)
Hafnium-172	72	1 (3.7E 10)
Hafnium-173	72	100 (3.7E 12)
Hafnium-175	72	100 (3.7E 12)
Hafnium-177m	72	1000 (3.7E 13)
Hafnium-178m	72	0.1 (3.7E 9)
Hafnium-179m	72	100 (3.7E 12)
Hafnium-180m	72	100 (3.7E 12)
Hafnium-181	72	10 (3.7E 11)
Hafnium-182m	72	100 (3.7E 12)
Hafnium-182	72	0.1 (3.7E 9)
Hafnium-183	72	100 (3.7E 12)
Hafnium-184	72	100 (3.7E 12)
Holmium-155	67	1000 (3.7E 13)
Holmium-157	67	1000 (3.7E 13)
Holmium-159	67	1000 (3.7E 13)
Holmium-161	67	1000 (3.7E 13)
Holmium-162m	67	1000 (3.7E 13)
Holmium-162	67	1000 (3.7E 13)
Holmium-164m	67	1000 (3.7E 13)
Holmium-164	67	1000 (3.7E 13)
Holmium-166m	67	1 (3.7E 10)
Holmium-166	67	100 (3.7E 12)
Holmium-167	67	100 (3.7E 12)
Hydrogen-3	1	100 (3.7E 12)
Indium-109	49	100 (3.7E 12)
Indium-110 (69.1 min)	49	100 (3.7E 12)
Indium-110 (4.9 hr)	49	10 (3.7E 11)
Indium-111	49	100 (3.7E 12)
Indium-112	49	1000 (3.7E 13)
Indium-113m	49	1000 (3.7E 13)
Indium-114m	49	10 (3.7E 11)
Indium-115m	49	100 (3.7E 12)
Indium-115	49	0.1 (3.7E 9)
Indium-116m	49	100 (3.7E 12)
Indium-117m	49	100 (3.7E 12)
Indium-117	49	1000 (3.7E 13)
Indium-119m	49	1000 (3.7E 13)
Iodine-120m	53	100 (3.7E 12)
Iodine-120	53	10 (3.7E 11)
Iodine-121	53	100 (3.7E 12)
Iodine-123	53	10 (3.7E 11)
Iodine-124	53	0.1 (3.7E 9)
Iodine-125	53	0.01 (3.7E 8)
Iodine-126	53	0.01 (3.7E 8)
Iodine-128	53	1000 (3.7E 13)
Iodine-129	53	0.001 (3.7E 7)
Iodine-130	53	1 (3.7E 10)
Iodine-131	53	0.01 (3.7E 8)
Iodine-132m	53	10 (3.7E 11)
Iodine-132	53	10 (3.7E 11)
Iodine-133	53	0.1 (3.7E 9)
Iodine-134	53	100 (3.7E 12)
Iodine-135	53	10 (3.7E 11)
Iridium-182	77	1000 (3.7E 13)
Iridium-184	77	100 (3.7E 12)
Iridium-185	77	100 (3.7E 12)
Iridium-186	77	10 (3.7E 11)
Iridium-187	77	100 (3.7E 12)
Iridium-188	77	10 (3.7E 11)
Iridium-189	77	100 (3.7E 12)
Iridium-190m	77	1000 (3.7E 13)
Iridium-190	77	10 (3.7E 11)
Iridium-192m	77	100 (3.7E 12)
Iridium-192	77	10 (3.7E 11)
Iridium-194m	77	10 (3.7E 11)
Iridium-194	77	100 (3.7E 12)
Iridium-195m	77	100 (3.7E 12)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Iridium-195	77	1000 (3.7E 13)
Iron-52	26	100 (3.7E 12)
Iron-55	26	100 (3.7E 12)
Iron-59	26	10 (3.7E 11)
Iron-60	26	0.1 (3.7E 9)
Krypton-74	36	10 (3.7E 11)
Krypton-76	36	10 (3.7E 11)
Krypton-77	36	10 (3.7E 11)
Krypton-79	36	100 (3.7E 12)
Krypton-81	36	1000 (3.7E 13)
Krypton-83m	36	1000 (3.7E 13)
Krypton-85m	36	100 (3.7E 12)
Krypton-85	36	1000 (3.7E 13)
Krypton-87	36	10 (3.7E 11)
Krypton-88	36	10 (3.7E 11)
Lanthanum-131	57	1000 (3.7E 13)
Lanthanum-132	57	100 (3.7E 12)
Lanthanum-135	57	1000 (3.7E 13)
Lanthanum-137	57	10 (3.7E 11)
Lanthanum-138	57	1 (3.7E 10)
Lanthanum-140	57	10 (3.7E 11)
Lanthanum-141	57	1000 (3.7E 13)
Lanthanum-142	57	100 (3.7E 12)
Lanthanum-143	57	1000 (3.7E 13)
Lead-195m	82	1000 (3.7E 13)
Lead-198	82	100 (3.7E 12)
Lead-199	82	100 (3.7E 12)
Lead-200	82	100 (3.7E 12)
Lead-201	82	100 (3.7E 12)
Lead-202m	82	10 (3.7E 11)
Lead-202	82	1 (3.7E 10)
Lead-203	82	100 (3.7E 12)
Lead-205	82	100 (3.7E 12)
Lead-209	82	1000 (3.7E 13)
Lead-210	82	0.01 (3.7E 8)
Lead-211	82	100 (3.7E 12)
Lead-212	82	10 (3.7E 11)
Lead-214	82	100 (3.7E 12)
Lutetium-169	71	10 (3.7E 11)
Lutetium-170	71	10 (3.7E 11)
Lutetium-171	71	10 (3.7E 11)
Lutetium-172	71	10 (3.7E 11)
Lutetium-173	71	100 (3.7E 12)
Lutetium-174m	71	10 (3.7E 11)
Lutetium-174	71	10 (3.7E 11)
Lutetium-176m	71	1000 (3.7E 13)
Lutetium-176	71	1 (3.7E 10)
Lutetium-177m	71	10 (3.7E 11)
Lutetium-177	71	100 (3.7E 12)
Lutetium-178m	71	1000 (3.7E 13)
Lutetium-178	71	1000 (3.7E 13)
Lutetium-179	71	1000 (3.7E 13)
Magnesium-28	12	10 (3.7E 11)
Manganese-51	25	1000 (3.7E 13)
Manganese-52m	25	1000 (3.7E 13)
Manganese-52	25	10 (3.7E 11)
Manganese-53	25	1000 (3.7E 13)
Manganese-54	25	10 (3.7E 11)
Manganese-56	25	100 (3.7E 12)
Mendelevium-257	101	100 (3.7E 12)
Mendelevium-258	101	1 (3.7E 10)
Mercury-193m	80	10 (3.7E 11)
Mercury-193	80	100 (3.7E 12)
Mercury-194	80	0.1 (3.7E 9)
Mercury-195m	80	100 (3.7E 12)
Mercury-195	80	100 (3.7E 12)
Mercury-197m	80	1000 (3.7E 13)
Mercury-197	80	1000 (3.7E 13)
Mercury-199m	80	1000 (3.7E 13)
Mercury-203	80	10 (3.7E 11)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Molybdenum-90	42	100 (3.7E 12)
Molybdenum-93m	42	10 (3.7E 11)
Molybdenum-93	42	100 (3.7E 12)
Molybdenum-99	42	100 (3.7E 12)
Molybdenum-101	42	1000 (3.7E 13)
Neodymium-136	60	1000 (3.7E 13)
Neodymium-138	60	1000 (3.7E 13)
Neodymium-139m	60	100 (3.7E 12)
Neodymium-139	60	1000 (3.7E 13)
Neodymium-141	60	1000 (3.7E 13)
Neodymium-147	60	10 (3.7E 11)
Neodymium-149	60	100 (3.7E 12)
Neodymium-151	60	1000 (3.7E 13)
Neptunium-232	93	1000 (3.7E 13)
Neptunium-233	93	1000 (3.7E 13)
Neptunium-234	93	10 (3.7E 11)
Neptunium-235	93	1000 (3.7E 13)
Neptunium-236 (1.2 E 5 yr)	93	0.1 (3.7E 9)
Neptunium-236 (22.5 hr)	93	100 (3.7E 12)
Neptunium-237	93	0.01 (3.7E 8)
Neptunium-238	93	10 (3.7E 11)
Neptunium-239	93	100 (3.7E 12)
Neptunium-240	93	100 (3.7E 12)
Nickel-56	28	10 (3.7E 11)
Nickel-57	28	10 (3.7E 11)
Nickel-59	28	100 (3.7E 12)
Nickel-63	28	100 (3.7E 12)
Nickel-65	28	100 (3.7E 12)
Nickel-66	28	10 (3.7E 11)
Niobium-88	41	100 (3.7E 12)
Niobium-89 (66 min)	41	100 (3.7E 12)
Niobium-89 (122 min)	41	100 (3.7E 12)
Niobium-90	41	10 (3.7E 11)
Niobium-93m	41	100 (3.7E 12)
Niobium-94	41	10 (3.7E 11)
Niobium-95m	41	100 (3.7E 12)
Niobium-95	41	10 (3.7E 11)
Niobium-96	41	10 (3.7E 11)
Niobium-97	41	100 (3.7E 12)
Niobium-98	41	1000 (3.7E 13)
Osmium-180	76	1000 (3.7E 13)
Osmium-181	76	100 (3.7E 12)
Osmium-182	76	100 (3.7E 12)
Osmium-185	76	10 (3.7E 11)
Osmium-189m	76	1000 (3.7E 13)
Osmium-191m	76	1000 (3.7E 13)
Osmium-191	76	100 (3.7E 12)
Osmium-193	76	100 (3.7E 12)
Osmium-194	76	1 (3.7E 10)
Palladium-100	46	100 (3.7E 12)
Palladium-101	46	100 (3.7E 12)
Palladium-103	46	100 (3.7E 12)
Palladium-107	46	100 (3.7E 12)
Palladium-109	46	1000 (3.7E 13)
Phosphorus-32	15	0.1 (3.7E 9)
Phosphorus-33	15	1 (3.7E 10)
Platinum-186	78	100 (3.7E 12)
Platinum-188	78	100 (3.7E 12)
Platinum-189	78	100 (3.7E 12)
Platinum-191	78	100 (3.7E 12)
Platinum-193m	78	100 (3.7E 12)
Platinum-193	78	1000 (3.7E 13)
Platinum-195m	78	100 (3.7E 12)
Platinum-197m	78	1000 (3.7E 13)
Platinum-197	78	1000 (3.7E 13)
Platinum-199	78	1000 (3.7E 13)
Platinum-200	78	100 (3.7E 12)
Plutonium-234	94	1000 (3.7E 13)
Plutonium-235	94	1000 (3.7E 13)
Plutonium-236	94	0.1 (3.7E 9)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Plutonium-237	94	1000 (3.7E 13)
Plutonium-238	94	0.01 (3.7E 8)
Plutonium-239	94	0.01 (3.7E 8)
Plutonium-240	94	0.01 (3.7E 8)
Plutonium-241	94	1 (3.7E 10)
Plutonium-242	94	0.01 (3.7E 8)
Plutonium-243	94	1000 (3.7E 13)
Plutonium-244	94	0.01 (3.7E 8)
Plutonium-245	94	100 (3.7E 12)
Polonium-203	84	100 (3.7E 12)
Polonium-205	84	100 (3.7E 12)
Polonium-207	84	10 (3.7E 11)
Polonium-210	84	0.01 (3.7E 8)
Potassium-40	19	1 (3.7E 10)
Potassium-42	19	100 (3.7E 12)
Potassium-43	19	10 (3.7E 11)
Potassium-44	19	100 (3.7E 12)
Potassium-45	19	1000 (3.7E 13)
Praseodymium-136	59	1000 (3.7E 13)
Praseodymium-137	59	1000 (3.7E 13)
Praseodymium-138m	59	100 (3.7E 12)
Praseodymium-139	59	1000 (3.7E 13)
Praseodymium-142m	59	1000 (3.7E 13)
Praseodymium-142	59	100 (3.7E 12)
Praseodymium-143	59	10 (3.7E 11)
Praseodymium-144	59	1000 (3.7E 13)
Praseodymium-145	59	1000 (3.7E 13)
Praseodymium-147	59	1000 (3.7E 13)
Promethium-141	61	1000 (3.7E 13)
Promethium-143	61	100 (3.7E 12)
Promethium-144	61	10 (3.7E 11)
Promethium-145	61	100 (3.7E 12)
Promethium-146	61	10 (3.7E 11)
Promethium-147	61	10 (3.7E 11)
Promethium-148m	61	10 (3.7E 11)
Promethium-148	61	10 (3.7E 11)
Promethium-149	61	100 (3.7E 12)
Promethium-150	61	100 (3.7E 12)
Promethium-151	61	100 (3.7E 12)
Protactinium-227	91	100 (3.7E 12)
Protactinium-228	91	10 (3.7E 11)
Protactinium-230	91	10 (3.7E 11)
Protactinium-231	91	0.01 (3.7E 8)
Protactinium-232	91	10 (3.7E 11)
Protactinium-233	91	100 (3.7E 12)
Protactinium-234	91	10 (3.7E 11)
Radium-223	88	1 (3.7E 10)
Radium-224	88	10 (3.7E 11)
Radium-225	88	1 (3.7E 10)
Radium-226Φ	88	0.1 (3.7E 9)
Radium-227	88	1000 (3.7E 13)
Radium-228	88	0.1 (3.7E 9)
Radon-220	86	0.1 (3.7E 9)
Radon-222	86	0.1 (3.7E 9)
Rhenium-177	75	1000 (3.7E 13)
Rhenium-178	75	1000 (3.7E 13)
Rhenium-181	75	100 (3.7E 12)
Rhenium-182 (12.7 hr)	75	10 (3.7E 11)
Rhenium-182 (64.0 hr)	75	10 (3.7E 11)
Rhenium-184m	75	10 (3.7E 11)
Rhenium-184	75	10 (3.7E 11)
Rhenium-186m	75	10 (3.7E 11)
Rhenium-186	75	100 (3.7E 12)
Rhenium-187	75	1000 (3.7E 13)
Rhenium-188m	75	1000 (3.7E 13)
Rhenium-188	75	1000 (3.7E 13)
Rhenium-189	75	1000 (3.7E 13)
Rhodium-99m	45	100 (3.7E 12)
Rhodium-99	45	10 (3.7E 11)
Rhodium-100	45	10 (3.7E 11)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Rhodium-101m	45	100 (3.7E 12)
Rhodium-101	45	10 (3.7E 11)
Rhodium-102m	45	10 (3.7E 11)
Rhodium-102	45	10 (3.7E 11)
Rhodium-103m	45	1000 (3.7E 13)
Rhodium-105	45	100 (3.7E 12)
Rhodium-106m	45	10 (3.7E 11)
Rhodium-107	45	1000 (3.7E 13)
Rubidium-79	37	1000 (3.7E 13)
Rubidium-81m	37	1000 (3.7E 13)
Rubidium-81	37	100 (3.7E 12)
Rubidium-82m	37	10 (3.7E 11)
Rubidium-83	37	10 (3.7E 11)
Rubidium-84	37	10 (3.7E 11)
Rubidium-86	37	10 (3.7E 11)
Rubidium-88	37	1000 (3.7E 13)
Rubidium-89	37	1000 (3.7E 13)
Rubidium-87	37	10 (3.7E 11)
Ruthenium-94	44	1000 (3.7E 13)
Ruthenium-97	44	100 (3.7E 12)
Ruthenium-103	44	10 (3.7E 11)
Ruthenium-105	44	100 (3.7E 12)
Ruthenium-106	44	1 (3.7E 10)
Samarium-141m	62	1000 (3.7E 13)
Samarium-141	62	1000 (3.7E 13)
Samarium-142	62	1000 (3.7E 13)
Samarium-145	62	100 (3.7E 12)
Samarium-146	62	0.01 (3.7E 8)
Samarium-147	62	0.01 (3.7E 8)
Samarium-151	62	10 (3.7E 11)
Samarium-153	62	100 (3.7E 12)
Samarium-155	62	1000 (3.7E 13)
Samarium-156	62	100 (3.7E 12)
Scandium-43	21	1000 (3.7E 13)
Scandium-44m	21	10 (3.7E 11)
Scandium-44	21	100 (3.7E 12)
Scandium-46	21	10 (3.7E 11)
Scandium-47	21	100 (3.7E 12)
Scandium-48	21	10 (3.7E 11)
Scandium-49	21	1000 (3.7E 13)
Selenium-70	34	1000 (3.7E 13)
Selenium-73m	34	100 (3.7E 12)
Selenium-73	34	10 (3.7E 11)
Selenium-75	34	10 (3.7E 11)
Selenium-79	34	10 (3.7E 11)
Selenium-81m	34	1000 (3.7E 13)
Selenium-81	34	1000 (3.7E 13)
Selenium-83	34	1000 (3.7E 13)
Silicon-31	14	1000 (3.7E 13)
Silicon-32	14	1 (3.7E 10)
Silver-102	47	100 (3.7E 12)
Silver-103	47	1000 (3.7E 13)
Silver-104m	47	1000 (3.7E 13)
Silver-104	47	1000 (3.7E 13)
Silver-105	47	10 (3.7E 11)
Silver-106m	47	10 (3.7E 11)
Silver-106	47	1000 (3.7E 13)
Silver-108m	47	10 (3.7E 11)
Silver-110m	47	10 (3.7E 11)
Silver-111	47	10 (3.7E 11)
Silver-112	47	100 (3.7E 12)
Silver-115	47	1000 (3.7E 13)
Sodium-22	11	10 (3.7E 11)
Sodium-24	11	10 (3.7E 11)
Strontium-80	38	100 (3.7E 12)
Strontium-81	38	1000 (3.7E 13)
Strontium-83	38	100 (3.7E 12)
Strontium-85m	38	1000 (3.7E 13)
Strontium-85	38	10 (3.7E 11)
Strontium-87m	38	100 (3.7E 12)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Strontium-89	38	10 (3.7E 11)
Strontium-90	38	0.1 (3.7E 9)
Strontium-91	38	10 (3.7E 11)
Strontium-92	38	100 (3.7E 12)
Sulfur-35	16	1 (3.7E 10)
Tantalum-172	73	100 (3.7E 12)
Tantalum-173	73	100 (3.7E 12)
Tantalum-174	73	100 (3.7E 12)
Tantalum-175	73	100 (3.7E 12)
Tantalum-176	73	10 (3.7E 11)
Tantalum-177	73	1000 (3.7E 13)
Tantalum-178	73	1000 (3.7E 13)
Tantalum-179	73	1000 (3.7E 13)
Tantalum-180m	73	1000 (3.7E 13)
Tantalum-180	73	100 (3.7E 12)
Tantalum-182m	73	1000 (3.7E 13)
Tantalum-182	73	10 (3.7E 11)
Tantalum-183	73	100 (3.7E 12)
Tantalum-184	73	10 (3.7E 11)
Tantalum-185	73	1000 (3.7E 13)
Tantalum-186	73	1000 (3.7E 13)
Technetium-93m	43	1000 (3.7E 13)
Technetium-93	43	100 (3.7E 12)
Technetium-94m	43	100 (3.7E 12)
Technetium-94	43	10 (3.7E 11)
Technetium-96m	43	1000 (3.7E 13)
Technetium-96	43	10 (3.7E 11)
Technetium-97m	43	100 (3.7E 12)
Technetium-97	43	100 (3.7E 12)
Technetium-98	43	10 (3.7E 11)
Technetium-99m	43	100 (3.7E 12)
Technetium-99	43	10 (3.7E 11)
Technetium-101	43	1000 (3.7E 13)
Technetium-104	43	1000 (3.7E 13)
Tellurium-116	52	1000 (3.7E 13)
Tellurium-121m	52	10 (3.7E 11)
Tellurium-121	52	10 (3.7E 11)
Tellurium-123m	52	10 (3.7E 11)
Tellurium-123	52	10 (3.7E 11)
Tellurium-125m	52	10 (3.7E 11)
Tellurium-127m	52	10 (3.7E 11)
Tellurium-127	52	1000 (3.7E 13)
Tellurium-129m	52	10 (3.7E 11)
Tellurium-129	52	1000 (3.7E 13)
Tellurium-131m	52	10 (3.7E 11)
Tellurium-131	52	1000 (3.7E 13)
Tellurium-132	52	10 (3.7E 11)
Tellurium-133m	52	1000 (3.7E 13)
Tellurium-133	52	1000 (3.7E 13)
Tellurium-134	52	1000 (3.7E 13)
Terbium-147	65	100 (3.7E 12)
Terbium-149	65	100 (3.7E 12)
Terbium-150	65	100 (3.7E 12)
Terbium-151	65	10 (3.7E 11)
Terbium-153	65	100 (3.7E 12)
Terbium-154	65	10 (3.7E 11)
Terbium-155	65	100 (3.7E 12)
Terbium-156m (5.0 hr)	65	1000 (3.7E 13)
Terbium-156m (24.4 hr)	65	1000 (3.7E 13)
Terbium-156	65	10 (3.7E 11)
Terbium-157	65	100 (3.7E 12)
Terbium-158	65	10 (3.7E 11)
Terbium-160	65	10 (3.7E 11)
Terbium-161	65	100 (3.7E 12)
Thallium-194m	81	100 (3.7E 12)
Thallium-194	81	1000 (3.7E 13)
Thallium-195	81	100 (3.7E 12)
Thallium-197	81	100 (3.7E 12)
Thallium-198m	81	100 (3.7E 12)
Thallium-198	81	10 (3.7E 11)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Thallium-199	81	100 (3.7E 12)
Thallium-200	81	10 (3.7E 11)
Thallium-201	81	1000 (3.7E 13)
Thallium-202	81	10 (3.7E 11)
Thallium-204	81	10 (3.7E 11)
Thorium-226	90	100 (3.7E 12)
Thorium-227	90	1 (3.7E 10)
Thorium-228	90	0.01 (3.7E 8)
Thorium-229	90	0.001 (3.7E 7)
Thorium-230	90	0.01 (3.7E 8)
Thorium-231	90	100 (3.7E 12)
Thorium-232Φ	90	0.001 (3.7E 7)
Thorium-234	90	100 (3.7E 12)
Thulium-162	69	1000 (3.7E 13)
Thulium-166	69	10 (3.7E 11)
Thulium-167	69	100 (3.7E 12)
Thulium-170	69	10 (3.7E 11)
Thulium-171	69	100 (3.7E 12)
Thulium-172	69	100 (3.7E 12)
Thulium-173	69	100 (3.7E 12)
Thulium-175	69	1000 (3.7E 13)
Tin-110	50	100 (3.7E 12)
Tin-111	50	1000 (3.7E 13)
Tin-113	50	10 (3.7E 11)
Tin-117m	50	100 (3.7E 12)
Tin-119m	50	10 (3.7E 11)
Tin-121m	50	10 (3.7E 11)
Tin-121	50	1000 (3.7E 13)
Tin-123m	50	1000 (3.7E 13)
Tin-123	50	10 (3.7E 11)
Tin-125	50	10 (3.7E 11)
Tin-126	50	1 (3.7E 10)
Tin-127	50	100 (3.7E 12)
Tin-128	50	1000 (3.7E 13)
Titanium-44	22	1 (3.7E 10)
Titanium-45	22	1000 (3.7E 13)
Tungsten-176	74	1000 (3.7E 13)
Tungsten-177	74	100 (3.7E 12)
Tungsten-178	74	100 (3.7E 12)
Tungsten-179	74	1000 (3.7E 13)
Tungsten-181	74	100 (3.7E 12)
Tungsten-185	74	10 (3.7E 11)
Tungsten-187	74	100 (3.7E 12)
Tungsten-188	74	10 (3.7E 11)
Uranium-230	92	1 (3.7E 10)
Uranium-231	92	1000 (3.7E 13)
Uranium-232	92	0.01 (3.7E 8)
Uranium-233	92	0.1 (3.7E 9)
Uranium-234φ	92	0.1 (3.7E 9)
Uranium-235φ	92	0.1 (3.7E 9)
Uranium-236	92	0.1 (3.7E 9)
Uranium-237	92	100 (3.7E 12)
Uranium-238φ	92	0.1& (3.7E 9)
Uranium-239	92	1000 (3.7E 13)
Uranium-240	92	1000 (3.7E 13)
Vanadium-47	23	1000 (3.7E 13)
Vanadium-48	23	10 (3.7E 11)
Vanadium-49	23	1000 (3.7E 13)
Xenon-120	54	100 (3.7E 12)
Xenon-121	54	10 (3.7E 11)
Xenon-122	54	100 (3.7E 12)
Xenon-123	54	10 (3.7E 11)
Xenon-125	54	100 (3.7E 12)
Xenon-127	54	100 (3.7E 12)
Xenon-129m	54	1000 (3.7E 13)
Xenon-131m	54	1000 (3.7E 13)
Xenon-133m	54	1000 (3.7E 13)
Xenon-133	54	1000 (3.7E 13)
Xenon-135m	54	10 (3.7E 11)
Xenon-135	54	100 (3.7E 12)

APPENDIX B TO § 302.4—RADIONUCLIDES—Continued

Radionuclide	Atomic Number	Final RQ Ci (Bq)
Xenon-138	54	10 (3.7E 11)
Ytterbium-162	70	1000 (3.7E 13)
Ytterbium-166	70	10 (3.7E 11)
Ytterbium-167	70	1000 (3.7E 13)
Ytterbium-169	70	10 (3.7E 11)
Ytterbium-175	70	100 (3.7E 12)
Ytterbium-177	70	1000 (3.7E 13)
Ytterbium-178	70	1000 (3.7E 13)
Yttrium-86m	39	1000 (3.7E 13)
Yttrium-86	39	10 (3.7E 11)
Yttrium-87	39	10 (3.7E 11)
Yttrium-88	39	10 (3.7E 11)
Yttrium-90m	39	100 (3.7E 12)
Yttrium-90	39	10 (3.7E 11)
Yttrium-91m	39	1000 (3.7E 13)
Yttrium-91	39	10 (3.7E 11)
Yttrium-92	39	100 (3.7E 12)
Yttrium-93	39	100 (3.7E 12)
Yttrium-94	39	1000 (3.7E 13)
Yttrium-95	39	1000 (3.7E 13)
Zinc-62	30	100 (3.7E 12)
Zinc-63	30	1000 (3.7E 13)
Zinc-65	30	10 (3.7E 11)
Zinc-69m	30	100 (3.7E 12)
Zinc-69	30	1000 (3.7E 13)
Zinc-71m	30	100 (3.7E 12)
Zinc-72	30	100 (3.7E 12)
Zirconium-86	40	100 (3.7E 12)
Zirconium-88	40	10 (3.7E 11)
Zirconium-89	40	100 (3.7E 12)
Zirconium-93	40	1 (3.7E 10)
Zirconium-95	40	10 (3.7E 11)
Zirconium-97	40	10 (3.7E 11)

Ci—Curie. The curie represents a rate of radioactive decay. One curie is the quantity of any radioactive nuclide which undergoes 3.7E 10 disintegrations per second.

Bq—Becquerel. The becquerel represents a rate of radioactive decay. One becquerel is the quantity of any radioactive nuclide which undergoes one disintegration per second. One curie is equal to 3.7E 10 becquerel.

@—Final RQs for all radionuclides apply to chemical compounds containing the radionuclides and elemental forms regardless of the diameter of pieces of solid material.

&—The adjusted RQ of one curie applies to all radionuclides not otherwise listed. Whenever the RQs in table 302.4 and this appendix to the table are in conflict, the lowest RQ shall apply. For example, uranyl acetate and uranyl nitrate have adjusted RQs shown in table 302.4 of 100 pounds, equivalent to about one-tenth the RQ level for uranium-238 listed in this appendix.

E—Exponent to the base 10. For example, 1.3E 2 is equal to 130 while 1.3E 3 is equal to 1300.

m—Signifies a nuclear isomer which is a radionuclide in a higher energy metastable state relative to the parent isotope.

φ—Notification requirements for releases of mixtures or solutions of radionuclides can be found in § 302.6(b) of this rule. Final RQs for the following four common radionuclide mixtures are provided: radium-226 in secular equilibrium with its daughters (0.053 curie); natural uranium (0.1 curie); natural uranium in secular equilibrium with its daughters (0.052 curie); and natural thorium in secular equilibrium with its daughters (0.011 curie).

[54 FR 33449, Aug. 14, 1989]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 302.4, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.fdsys.gov.

§ 302.5 Determination of reportable quantities.

(a) *Listed hazardous substances.* The quantity listed in the column ''Final RQ'' for each substance in table 302.4, or in appendix B to table 302.4, is the reportable quantity (RQ) for that substance. The RQs in table 302.4 are in units of pounds based on chemical toxicity, while the RQs in appendix B to table 302.4 are in units of curies based on radiation hazard. Whenever the RQs in table 302.4 and appendix B to the table are in conflict, the lowest RQ shall apply.

(b) *Unlisted hazardous substances.* Unlisted hazardous substances designated by 40 CFR 302.4(b) have the reportable quantity of 100 pounds, except for those unlisted hazardous wastes which exhibit toxicity identified in 40 CFR 261.24. Unlisted hazardous wastes which exhibit toxicity have the reportable quantities listed in Table 302.4 for the contaminant on which the characteristic of toxicity is based. The reportable quantity applies to the waste itself, not merely to the toxic contaminant. If an unlisted hazardous waste exhibits toxicity on the basis of more than one contaminant, the reportable quantity for that waste shall be the lowest of the reportable quantities listed in Table 302.4 for those contaminants. If an unlisted hazardous waste exhibits the characteristic of toxicity and one or more of the other characteristics referenced in 40 CFR 302.4(b), the reportable quantity for that waste shall be the lowest of the applicable reportable quantities.

[51 FR 34547, Sept. 29, 1986, as amended at 54 FR 22538, May 24, 1989; 67 FR 45356, July 9, 2002]

§ 302.6 Notification requirements.

(a) Any person in charge of a vessel or an offshore or an onshore facility shall, as soon as he or she has knowledge of any release (other than a federally permitted release or application of a pesticide) of a hazardous substance from such vessel or facility in a quantity equal to or exceeding the reportable quantity determined by this part in any 24-hour period, immediately notify the National Response Center (1–800–424–8802; in Washington, DC 202–267–

ATTACHMENT B

Illinois Emergency Release Notification

ILLINOIS EMERGENCY MANAGEMENT AGENCY

Bruce Rauner
Governor

James K. Joseph
Director

EMERGENCY RELEASE NOTIFICATION FACT SHEET

A. **Immediate telephone notification shall be given by the owner or operator of a facility when a release equal to or exceeding the reportable quantity of an extremely hazardous substance[1] or a CERCLA hazardous substance[2] occurs at the facility.**

In such incidents, notifications are to be made to the following:

1. **Illinois Emergency Management Agency (IEMA)/State Emergency Response Commission (SERC)** at **1-800-782-7860** (within state) or **(217) 782-7860** (when calling from out-of-state);
2. **Local Emergency Planning Committee (LEPC)** that is likely to be affected by the release. The LEPC telephone number(s) may be obtained from the IEMA Website at http://www.illinois.gov/iema/Preparedness/SERC/Pages/default.aspx.
3. **National Response Center (NRC)** at **1-800-424-8802** (if the substance is a CERCLA hazardous substance).

Please Note: ***Transportation-related incidents only require 9-1-1 notification.***

B. **Immediate telephone notification is also required if an incident or accident involving a hazardous material[3] occurs which results in:**

1) a member of the general public is killed;
2) a member of the general public receives injuries requiring hospitalization;
3) an authorized official of an emergency agency recommends an evacuation of an area by the general public;
4) a motor vehicle has overturned on a public highway;
5) Fire, breakage, release or suspected contamination occurs involving an etiologic agent;
6) Any release of petroleum (or oil) that produces a sheen on nearby surface water[4] and/or threatens navigable waters;
7) Any spill or overfill of petroleum that results in a release to the environment that exceeds 25 gallons (25-gallon reporting threshold for USTs only).[4] ASTs are not subject to the 25-gallon spill reporting threshold in 41 IAC 176.340 but are subject to 29 IAC 430.

In such incidents, notification shall be made as noted in Paragraph A, above, except no notification is required to the NRC, except items 6 and 7 (oil that impacts water and overfills emanating from underground storage tanks).

At a minimum, notification shall include:

1) the chemical name or identity of any substance involved in the release;
2) an indication of whether the substance is an extremely hazardous substance;
3) an estimate of the quantity in pounds of any such substance that was released into the environment;
4) the time and duration of the release;
5) the specific location of the release;
6) the medium or media (air, land, water) into which the release occurred;
7) any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for exposed individuals;
8) proper precautions to take as a result of the release, including evacuations;
9) the name and telephone number of the person or persons to be contacted for further information.

WRITTEN FOLLOW-UP NOTICE IS REQUIRED WITH RESPECT TO INCIDENTS AS DESCRIBED IN PARAGRAPH A, ABOVE. As soon as practicable after such release (within 30 days), the owner or operator shall provide a written follow-up emergency notice (or notices, as more information becomes available) to the SERC and the LEPC, updating the information provided in the immediate notification and including additional information with respect to:

1) Actions taken to respond to and contain the release;
2) Any known or anticipated acute or chronic health risks associated with the release;
3) Where appropriate, advice regarding medical attention necessary for exposed individuals.

[1] See 40 CFR 355 for a listing of extremely hazardous substances (EHS)
[2] See 40 CFR 302.4 for a listing of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances
[3] See 49 CFR 172.101 for a list of hazardous materials
[4] See 41 IAC 176.340 Reporting and Cleanup of Spills and Overfills (USTs).

(These rules are compiled in 29 IAC 430 and 29 IAC 620) *Last updated 4/2016*

ATTACHMENT C

Missouri Emergency Release Notification

Rules of
Department of Natural Resources
Division 24—Hazardous Substance Emergency Response Office
Chapter 3—Emergency Notification Procedures

Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 24—Hazardous Substance Emergency Response Office
Chapter 3—Emergency Notification Procedures

10 CSR 24-3.010 Notification Procedures for Hazardous Substance Emergencies and for Emergency Notification of Releases of Hazardous Substances and Extremely Hazardous Substances

PURPOSE: This rule establishes a statewide emergency telephone number to notify Missouri whenever a hazardous substance emergency occurs and specifies the requirements for emergency notification and follow-up written notices in the event of a hazardous substance emergency, the release of a reportable quantity of a hazardous substance and the release of a reportable quantity of an extremely hazardous substance.

PUBLISHER'S NOTE: The publication of the full text of the material that the adopting agency has incorporated by reference in this rule would be unduly cumbersome or expensive. Therefore, the full text of that material will be made available to any interested person at both the Office of the Secretary of State and the office of the adopting agency, pursuant to section 536.031.4, RSMo. Such material will be provided at the cost established by state law.

(1) Any person having control over a hazardous substance shall contact Missouri by telephone at (573) 634-2436 or the National Response Center at (800) 424-8802 at the earliest practical moment upon discovery of an emergency involving a hazardous substance under his/her control. Information to be provided to Missouri to the best ability of the person having control over the hazardous substance includes: substance(s) involved, an indication of whether the substance is an extremely hazardous substance; the medium or media into which the release occurred; any known or anticipated acute or chronic health risks associated with the release and, where appropriate, advice regarding medical attention necessary for exposed individuals; proper precautions to take as a result of the release, including evacuation; amount of the substance(s) released or in danger of being released; location of the hazardous substance emergency and directions to the site; names, addresses and phone numbers of persons that may have information on the substances involved; when the hazardous substance emergency occurred, duration of the release and when it was discovered; actions taken to cleanup the hazardous substance and to end the hazardous substance emergency and when those actions will be taken; and any other pertinent information requested by Missouri, or as specified in the Missouri hazardous waste management commission regulations at 10 CSR 25-7.264(2)(D) and (E) and 10 CSR 25-7.265(2)(D) and (E). Federal reporting requirements for releases of hazardous substances can be found in 40 CFR parts 302 and 355. In addition, state reporting requirements contained in 11 CSR 40-4.030 reference these regulations, and require that certain information be provided to Local Emergency Planning Committees (LEPCs) for reportable releases of hazardous substances and extremely hazardous substances.

(2) The person monitoring the statewide emergency telephone shall notify appropriate agencies of the hazardous substance emergency as designated in the Hazardous Substance Emergency Response Plan.

(3) Upon request, written follow-up notifications are required for releases of hazardous substances and extremely hazardous substances as listed in 40 CFR parts 302 and 355. If requested, the person having control of the hazardous substance or extremely hazardous substance shall provide a written follow-up emergency notice (or notices, as more information becomes available) to the department setting forth and updating the information with respect to—

(A) Information required in section (1);

(B) Actions taken to respond to and contain the release;

(C) Any known or anticipated acute or chronic health risks associated with the release; and

(D) Where appropriate, advice regarding medical attention necessary for exposed individuals.

(4) If requested, a written report shall be provided to the department for any other hazardous substance emergency. The requested reports shall contain the information as specified in sections (1) and (3) of this rule and any other pertinent information as requested by the department. In addition, state reporting requirements in 11 CSR 40-4.030 require that written follow-up reports be provided to the Department of Public Safety and appropriate LEPCs for any reportable releases of hazardous substances or extremely hazardous substances.

AUTHORITY: section 260.520, RSMo (Supp. 1995). Original rule filed Nov. 30, 1983, effective April 12, 1984. Emergency amendment filed Dec. 2, 1992, effective Jan. 1, 1993, expired April 30, 1993. Amended: Filed Oct. 5, 1992, effective April 8, 1993. Amended: Filed June 14, 1994, effective Jan. 29, 1995. Amended: Filed July 22, 1996, effective Feb. 28, 1997.*

**Original authority 1983, amended 1993, 1995.*

APPENDIX 2-B

HDD Contingency Plan

Spire STL Pipeline Project

Horizontal Directional Drill Contingency Plan

FERC Docket No. CP17-__-__

January 2017

Public

Table of Contents

Acronyms and Abbreviations

FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
Project	Spire STL Pipeline Project
Spire	Spire STL Pipeline LLC

Horizontal Directional Drill Contingency Plan

The following discussions summarize the minimum requirements for dealing with an inadvertent return during horizontal directional drill ("HDD") installations beneath the Mississippi and Missouri Rivers. It also presents a contingency plan in the event of a failed HDD installation. A detailed hydraulic fracture / inadvertent return plan will be developed by the HDD contractor and reviewed by Spire STL Pipeline LLC ("Spire") prior to commencing drilling operations.

1.0 Background Information

Spire is seeking authorization from the Federal Energy Regulatory Commission ("FERC") to construct and operate the proposed Spire STL Pipeline Project ("Project") located in Scott, Greene, and Jersey Counties, Illinois, and St. Charles and St. Louis Counties, Missouri. The Project as proposed will consist of approximately 59 miles of new, greenfield, 24-inch diameter steel pipeline originating at an interconnection with the Rockies Express Pipeline LLC pipeline in Scott County, Illinois; extending down through Greene and Jersey Counties in Illinois before crossing the Mississippi River and extending east in St. Charles County, Missouri. The 24-inch pipeline then crosses the Missouri River and ties into an existing pipeline in St. Louis County, Missouri that is currently owned and operated by Laclede Gas Company. Spire proposes to use the HDD method to install the pipeline under the Mississippi and Missouri Rivers.

A traditional single drill rig operation is anticipated to be used to complete the Missouri River HDD installation. For the Mississippi River, it is anticipated that the HDD Contractor will use the drill and intersect method to complete the installation due to the need for temporary conductor casings on each end of the HDD alignment (casings will be removed upon completion of pullback operations). The intersect method involves drilling individual pilot bores from each end of the HDD installation and intersecting in a target intersection location established in the bottom horizontal tangent of the HDD profile. Use of the drill and intersect method decreases the flow pathway length for each individual pilot bore. One advantage of this method is a lower required drilling fluid pressure necessary to complete each pilot bore operation.

1.1 HDD Construction Method

HDD is a surface-to-surface installation technique that is comprised of three primary stages including pilot bore, reaming, and product pipe installation. This method of construction is typically used to install pipelines in areas not amenable for open cut construction, including water bodies, highways, railroads, runways, environmentally sensitive areas and urban environments. Assuming proper design and good HDD construction practices, the HDD method allows for the installation of pipelines with minimal impacts to the crossing feature(s).

The first stage of the installation process consists of advancing a steerable, rotary drill bit along the design alignment from the drill rig entry location to the exit location. The downhole tooling is matched to the anticipated ground conditions. Soil tooling is typically used in soils and bedrock tooling is used to drill through bedrock

materials. As the pilot bore is advanced, a tracking system is used to locate the position and orientation of the assembly to allow for steering inputs required to maintain the design profile and alignment.

The second stage of the installation process is referred to as the reaming stage. This process consists of enlarging the pilot bore to a final diameter necessary to accommodate the product pipe. Depending upon the outer diameter of the product pipe, multiple reaming passes of increasing diameter are typically used to incrementally increase the size of the bore to the final required diameter. The acceptable HDD industry standard for the final bore diameter is generally 1.5 times the outer diameter of the pipe being installed for product pipe diameters less than or equal to 24 inches and 12 inches larger than the outer diameter of the product pipe for product pipe diameters greater than 24 inches. Hence, for the anticipated NPS24 pipeline, the final bore diameter is expected to be 36 inches.

Upon completion of the reaming pass(es), the condition of the HDD bore is assessed by pushing or pulling a barrel or ball reamer with a slightly larger diameter than the product pipe (but less than the final diameter of the bore) through the fully reamed bore from start to finish. This proving step is referred to as a swab pass. The observed drill rig effort during this installation step allows the HDD contractor to evaluate if the bore has been conditioned sufficiently to receive the product pipe.

The final stage of the installation process consists of pulling/installing the fabricated product pipe from the pipe entry location towards the drill rig. A reamer and swivel is placed between the drill pipe within the reamed bore and the pulling head connected to the product pipe. The swivel is used to isolate the torsional stresses from the rotating drill pipe and reamer assembly and prevent rotation of the product pipe during its installation. The reamer used in the pulling assembly is slightly larger than the pipe diameter, but smaller than the final bore diameter. The reamer assembly is used to clear any cuttings that may remain in the bore, reducing installation risks during the product pipe pullback phase of the installation process.

The use of the reamer also allows for fluids to be pumped downhole during pullback to assist with cuttings removal and lubrication of the product pipe string. Large diameter product pipes are typically buoyant when pulled into a drilling fluid filled bore and tend to float to the top of the bore. To counter buoyancy conditions and increased frictional forces, water is often added to the back end of the product pipe to increase the net weight of the product pipe string. Without the use of buoyancy counter measures, risks associated with overstressing of the product pipe and excessive damage to abrasion resistant coatings and corrosion protection due to the increased frictional forces will increase.

Pipe rollers and additional heavy equipment (i.e., cranes, excavators, and/or side booms) are required to assist the pullback process. The rollers and slings on the equipment provide support for the fully fabricated pipe string, help to reduce the amount of friction acting on the tail string (thus reducing the overall amount of force required to pull the pipe into the bore) and also help to position the pipe such that the angle that the pipe enters the bore matches the exit angle of the bore itself. All of these features reduce the bending and tensional stresses applied to the product pipe at the break-over location during installation.

Drilling fluids, consisting of a mixture of water, bentonite, and/or polymers are pumped into the bore during the entire HDD installation process. The exact mixture of fluids is typically determined by the HDD contractor based

on the anticipated and actual geotechnical materials encountered within the bore and the performance of the drilling equipment as the drilling process progresses. Polymers are commonly used to modify specific drilling fluid properties that bentonite alone is incapable of providing. The drilling fluids are typically a mixture of freshwater and bentonite (sodium montmorillonite). Bentonite is natural clay usually mined in Wyoming. Bentonite is extremely hydrophilic and can absorb up to ten times its weight in water. Typically, the drilling fluid contains no more than five percent bentonite (95 percent freshwater).

Drilling fluids perform several functions integral to the success of the installation. These primary functions include:

- Cooling, lubricating, and cleaning drilling tools, drill pipe and the product pipe during its installation;
- Suspension of cuttings within the drilling fluid to facilitate their removal;
- Transport soil/bedrock cuttings from the bore during each phase of the installation process;
- Stabilization of the bore against collapse and minimization of raveling of the surrounding soil materials;
- Provide a bentonite filter cake along the bore walls to help maintain fluid flow within the drilled bore;
- Provide a hydrostatic fluid pressure within the bore to offset ground formation/groundwater pressure; and
- Drive downhole tooling (mud motor assemblies) for drilling in bedrock materials.

The HDD contractor maintains drilling fluid performance through sampling, testing, and recording the fluid properties during drilling operations. The HDD contractor also analyzes, adjusts, and maintains the fluids as necessary to afford the most efficient drilling fluid rheology to adapt to various geological conditions.

The drilling fluid is pumped into the bore through the drill pipe. As the drilling fluid exits the down-hole tooling within the bore, it mixes with the soil and/or rock cuttings generated by the down-hole tooling to create “flowable” slurry. This mixture flows through the HDD bore under an induced fluid pressure gradient generated by the injection of additional drilling fluids into the bore.

When the drilling fluids reach the ground surface at either the HDD entry or exit locations, these fluids are either transferred to a separation plant for processing or removed from the site with vacuum trucks (or other means). Separation plants are commonly used on installations where the cost to dispose of the drilling mud and cuttings exceeds the costs to recycle and re-use the fluids.

Controlling and maintaining fluid flow within the HDD bore during all installation stages is critical to the success of an HDD installation. While the HDD method is a proven technology, there are certain impacts that could occur as a result of the drilling such as the inadvertent release of drilling fluid, which is a slurry of bentonite clay and water which is classified as nontoxic to the aquatic environment and is a non-hazardous substance. Drilling fluids that are released typically contain a lower concentration of bentonite when they surface because the bentonite is filtered out as its passes through existing sediments of varying types. All drilling fluid components will be approved by the Owner prior to transportation and use on each HDD installation.

The following sections provide the process of HDD and procedures to be implemented in the case of an inadvertent release of drilling fluid.

1.2 Inadvertent Release Procedures/Contingency Plan

Prior to drilling operations, site-specific HDD procedures will be prepared by the HDD contractor and submitted to Spire for review and approval. Drilling fluid returns (flow of drilling fluids to the HDD entry/exit location) will be continuously monitored visually during the installation.

Lost circulation materials may be introduced to the drilling fluid to help seal off a flow pathway that is allowing for drilling fluid migration away from the HDD bore. All mud products will be approved by the Owner prior to use on-site. Lost circulation materials can include, but are not limited to, sawdust, bentonite chips, ground corn, magma fiber, and/or other manufactured materials.

As a minimum, the HDD Procedures will address the following:

1.2.1 Inadvertent Return Prevention

The drill rig operator will monitor the downhole annular pressure at all times. If the bore pressure is observed to be abnormally high or fluid loss is apparent and a release has occurred, the driller has the following options (or any combination of these options):

- Temporarily cease drilling operations and shut down mud pump delivering drilling fluids downhole;
- Notify Spire representatives immediately;
- Dispatch experienced company personnel to monitor the area in the vicinity of the drilled path;
- Re-start pump and stroke bore hole in 30 foot (+/-) lengths to restore circulation (“swab” the hole) as many as six times but no fewer than two times;
- Introduce additional flow along the borehole starting at the entry/exit using “weeper” subs; and
- Modify the drilling mud with a change in viscosity and/or lost circulation additives.

1.2.2 Monitoring of Inadvertent Returns

1.2.2.1 Personnel and Responsibilities

The actions in this Plan are to be implemented by the following personnel:

- Chief Inspector – Spire will designate an HDD Chief Inspector for the Project. The Chief Inspector will have overall authority for construction activities that occur on the Project.
- Environmental Inspector – At least one Environmental Inspector will be designated by Spire to monitor the HDD activities. The Environmental Inspector will have status over all other activity inspectors and will report directly to the HDD Chief Inspector who has overall authority. The Environmental Inspector will have the authority to stop activities that violate the environmental conditions of the FERC Certificate (if applicable), other federal and state permits, or landowner requirements, and to order corrective action.

- HDD Superintendent – The HDD Superintendent will be the senior on-site representative of the HDD contractor and will have the overall responsibility for implementing this Plan on behalf of the HDD Contractor. The HDD Superintendent will be familiar with all aspects of the drilling activities, the contents of the Plan, and the conditions of approval under which the activity is permitted to take place. The HDD Superintendent will make a copy of this Plan available at the drill site and will distribute it to the appropriate construction personnel. The HDD Superintendent will ensure that workers are properly trained and familiar with the necessary procedures for response to an inadvertent release.
- HDD Operator – The HDD Operator will be responsible for operating the drilling rig and mud pumps, monitoring circulation back to the entry and exit locations, and monitoring annular pressures during pilot hole drilling. In the event of loss of circulation or higher than expected annular pressures, the HDD Operator must communicate the event to the HDD Superintendent and HDD contractor field crews, as well as the on-site Spire inspection staff. The HDD Operator is responsible for stoppage or changes to the drilling program in the event of observed or anticipated inadvertent returns.
- HDD Contractor Personnel – During HDD installation, field crews will be responsible for monitoring the HDD alignment along with the Spire's field representatives. Field crews, in coordination with the Environmental Inspector, will be responsible for timely notifications and responses to observed releases in accordance with this Plan. The Environmental Inspector ultimately must sign-off on the action plan for mitigating the release.

Prior to drilling, the HDD Superintendent, Chief Inspector, and Spire's Environmental Inspector will verify that the HDD Operator and field crew receive, at minimum, the following site-specific training:

- Project specific safety training;
- Review provisions of this Plan and site-specific permit requirements;
- Review location of sensitive environmental resources at the site;
- Review drilling procedures for release prevention;
- Review the site-specific monitoring requirements;
- Review the location and operation of release control equipment and materials; and
- Review protocols for reporting observed inadvertent returns.

1.2.2.2 Monitoring and Reporting

Appropriate monitoring and reporting actions will be as follows:

- If the HDD Operator observes an increase in annular fluid pressure or loss of circulation, the Operator will notify the HDD Superintendent and field crews of the event and approximate position of the tooling;
- Where practical, a member of the field crew will visually inspect the ground surface near the position of the cutting head;
- If an inadvertent release is observed:

- Field crew will notify (via hand-held radio or cell phone) the HDD Operator;
- The HDD Operator will temporarily cease pumping of the drilling fluid and notify the HDD Superintendent and Chief Inspector;
- The Chief Inspector will notify and coordinate a response with the Environmental Inspector;
- The Environmental Inspector will notify appropriate permit authorities, as necessary, of the event and proposed response and provide required documentation within 24 hours; and
- The Chief Inspector will prepare a report that summarizes the incident.

1.2.3 Response to Inadvertent Returns

Typically, inadvertent releases are most often detected in an area near the entry or exit locations of the drill alignment when the pilot bore is at shallow depths, above bedrock, and in permeable/porous soils. In these occurrences, the release will be assessed by the HDD Superintendent, Environmental Inspector, and Chief Inspector to determine an estimated volume and footprint of the release. The potential of the release to reach adjacent waterbodies, wetlands, or other types of infrastructure will also be assessed.

The HDD Superintendent will assess the drilling parameters (depth, annular pressures, fluid flow rate, and drill fluid characteristics) and incorporate appropriate changes.

The HDD Superintendent, Environmental Inspector, and Chief Inspector will implement installation of appropriate containment structures and additional response measures. Access for personnel and equipment to the release site is a major factor in determining the methods used for containment and disposal. Typically, containment is achieved by excavating a small sump pit (five cubic yards) at the site of the release and to surround the release with hay bales, silt fence, and/or sand bags. Once contained, the drilling fluid is either collected by vacuum trucks or pumped back to the mud recycle unit or to a location accessible to vacuum trucks. The fluids are then transported either back to the HDD drilling rig or to a disposal site.

If the release is mitigated and controlled, forward progress of the drilling will be approved by the Environmental Inspector in coordination with the HDD Superintendent and Chief Inspector.

The site-specific response will follow the guidelines presented below.

1.2.3.1 Inadvertent Fluid Release at Inaccessible Location

If inadvertent returns are observed surfacing on the ground surface at a location that is inaccessible, the following procedures will be followed:

- Contractor will ensure all reasonable measures within the limitations of current technology have been taken to re-establish circulation; and
- Continue drilling utilizing a minimal amount of drilling fluid as required to penetrate the formation or to maintain a successful product pull back.

1.2.3.2 Upland Location

- Evaluate the amount of release to determine if containment structures are warranted and will effectively contain the release;
- Promptly implement appropriate containment measures as needed to contain and recover the slurry;
- If the release is within 50 feet of a wetland or waterbody, silt fence and/or hay bales will be installed between the release site and the wetland or waterbody;
- If the release cannot be contained, then the HDD Operator will suspend drilling operations until appropriate containment is in place;
- Remove the fluids using either a vacuum truck or by pumping to a location accessible to a vacuum truck; and
- After the HDD installation is complete, perform final clean-up;

1.2.3.3 Wetland Location

Spire's proposed HDD installations are designed to minimize the potential for inadvertent releases to the HDD crossing locations. Although final design is still in progress, Spire expects that the Mississippi and Missouri River crossings will be in soils in the vicinity of the HDD entry and exit locations transitioning to bedrock materials. The bedrock materials are capable of resisting higher drilling fluid pressures than the soils. To further minimize the potential for inadvertent returns, casing will be installed through overburden soils at both ends of the HDD for the Mississippi River. Casing is anticipated at the HDD entry location only for the Missouri River crossing.

Even with these controls in place, if a release of drilling fluids does occur, the following steps will be taken:

- Evaluate the amount of release to determine if containment structures are warranted and will effectively contain the release;
- Promptly implement appropriate containment measures to contain and recover the slurry;
- Efforts to contain and recover slurry in wetlands may result in further disturbance by equipment and personnel and possibly offset the benefit gained in removing the slurry;
- If the amount of the slurry is too small to allow the practical collection from the affected area, the fluid will be diluted with freshwater or allowed to dry and dissipate naturally;
- If the release cannot be controlled or contained, drilling operations will be suspended immediately until appropriate containment is in place;
- Remove the fluids using either a vacuum truck or by pumping to a location accessible to a vacuum truck; and
- After the HDD installation is complete, perform final clean-up.

1.2.3.4 Final Clean-Up

After completion of the HDD installation, site-specific clean-up measures will be developed by the Chief Inspector and HDD Superintendent for approval by the Environmental Inspector. Potential for secondary impact from the clean-up process will be evaluated, along with the benefits of clean-up activities.

The following measures are considered appropriate:

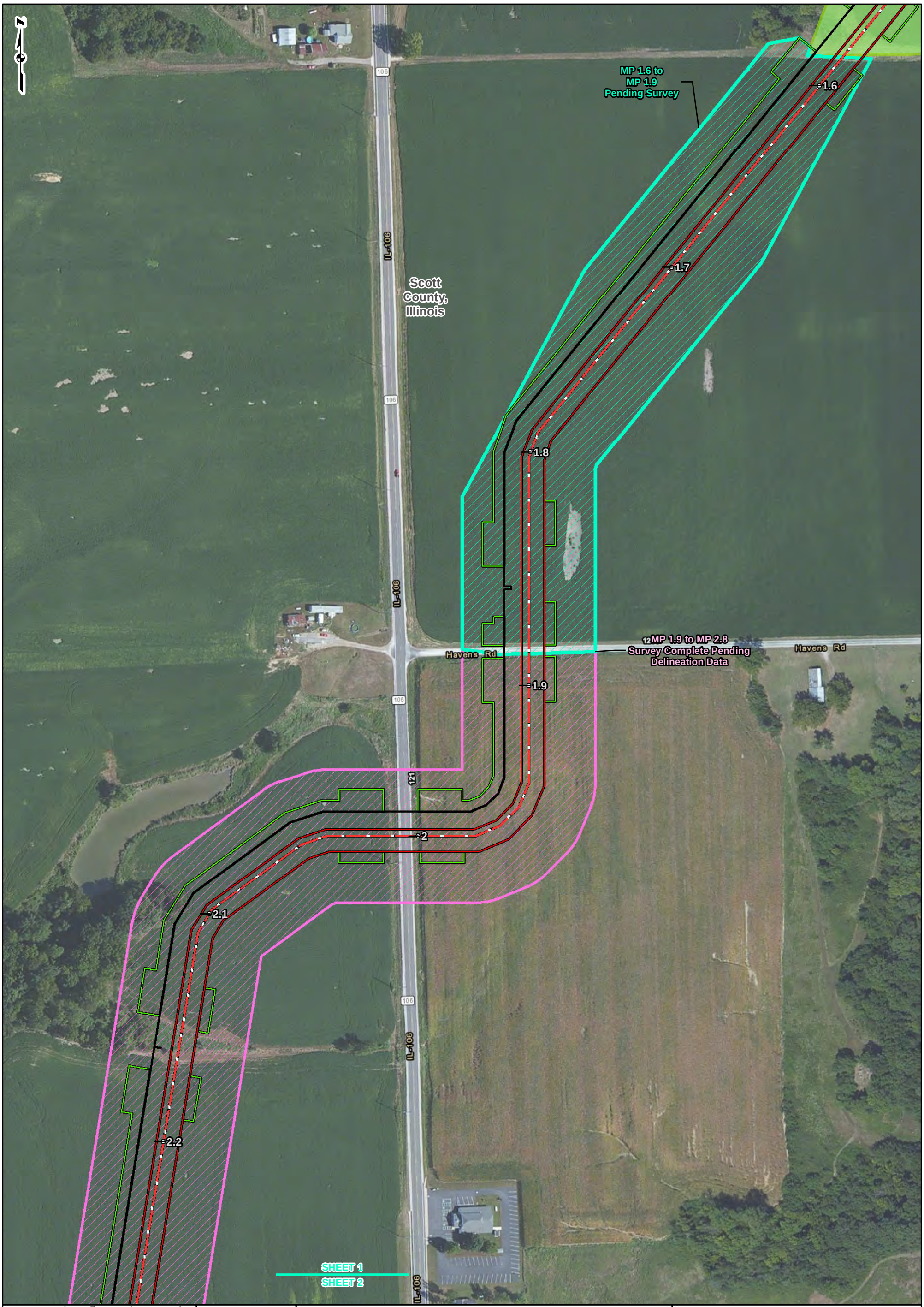
- Drilling mud will be removed by hand using shovels, buckets, and soft bristled brooms to minimize damage to existing vegetation;
- Freshwater washes may be employed if deemed beneficial and feasible;
- Containment structures will be pumped out and the ground surface scraped to bare topsoil, thereby minimizing loss of topsoil or damage to adjacent vegetation;
- The recovered drilling fluid will be recycled or disposed of at an approved upland location or disposal facility. No recovered drilling fluid will be disposed of in streams or storm drains;
- All containment structures will be removed; and
- Recovered materials will be collected in containers for temporary storage prior to removal from the site.

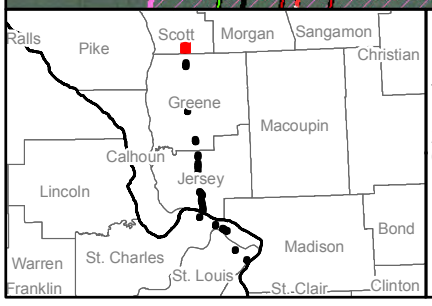
1.3 Failed HDD Installation

While not anticipated, if an attempted HDD installation is unsuccessful, the proposed HDD alignment could be modified beneath the River using the same general location to accommodate an additional HDD attempt, depending on the condition that resulted in the HDD failure. Prior to attempting a second HDD crossing, a risk mitigation workshop should be held with all parties to determine the cause of the initial failure and any mitigation measures that could be adopted to reduce the risk(s) during the second HDD attempt.

APPENDIX 2-C

Incomplete Environmental Survey Status Mapping





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- PERMANENT EASEMENT
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- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

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INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 1 OF 34

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SPIRE STL PIPELINE PROJECT

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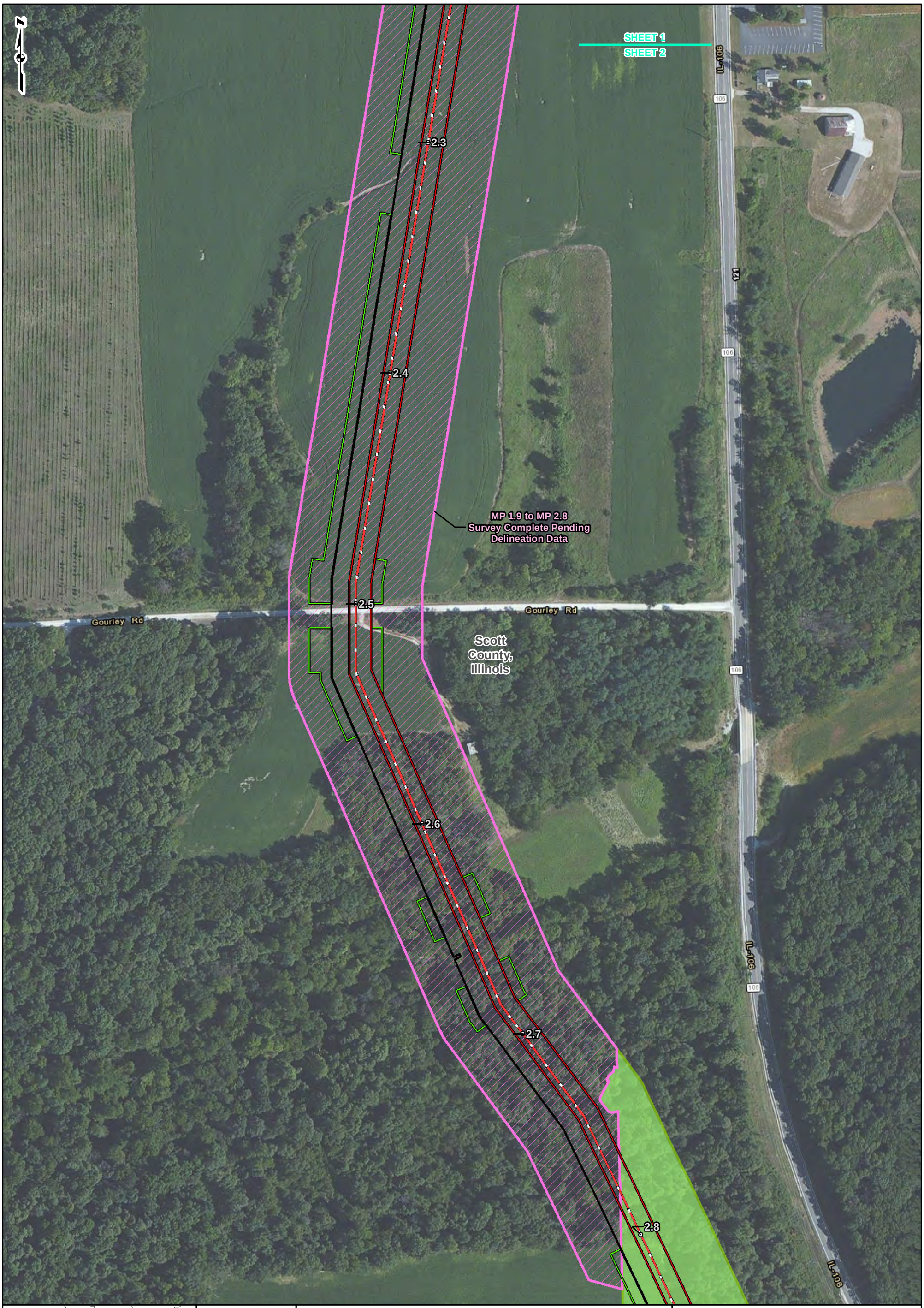

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INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 2 OF 34

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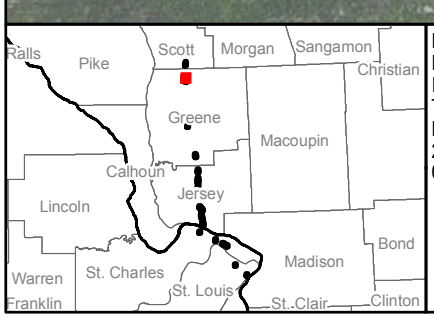

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INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 3 OF 34

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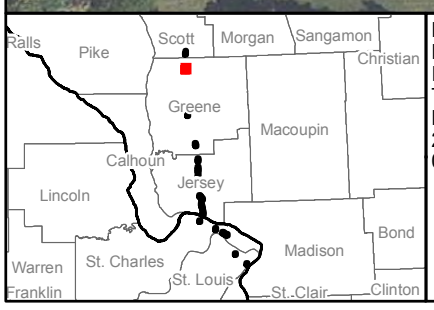

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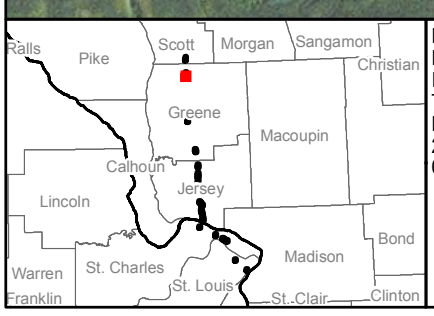

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INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP
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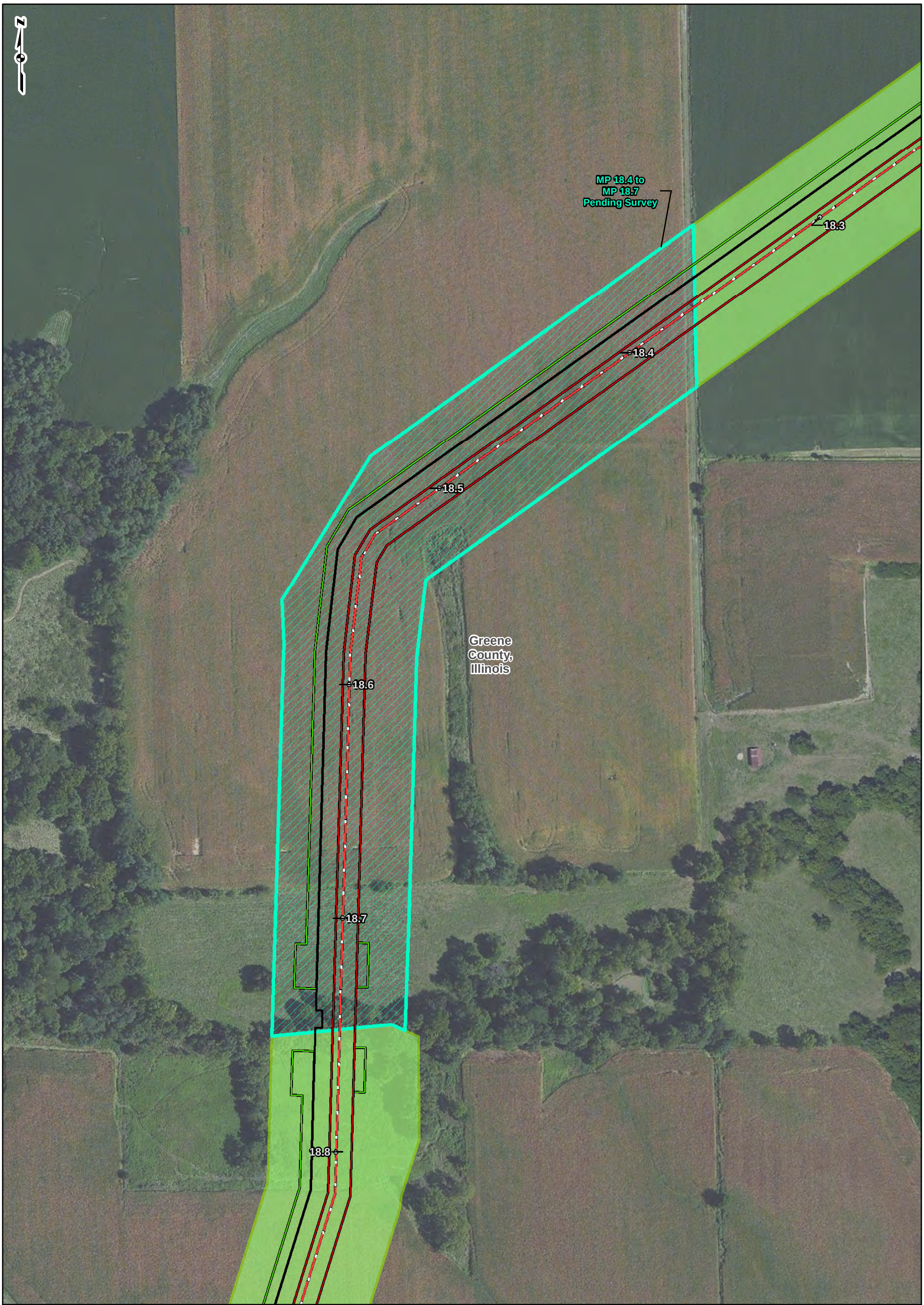

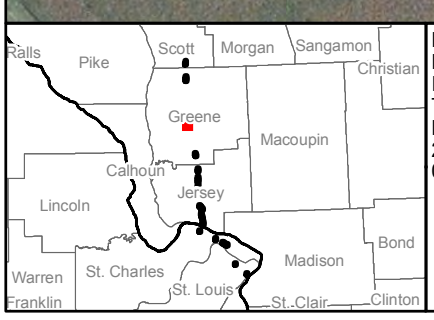

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INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 6 OF 34

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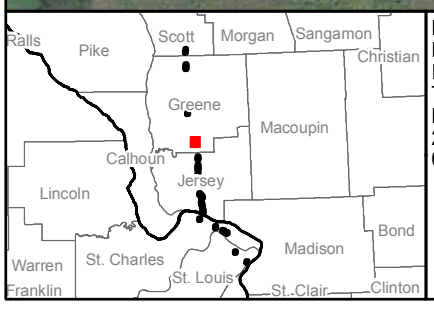

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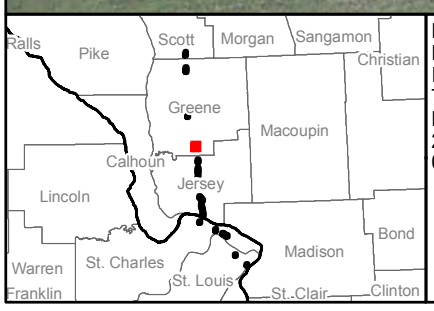

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- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 8 OF 34

gai consultants

SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
CHECKED: SWW APPROVED: LMF

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N

Grafton Ln 25691

30.3

30.4

30.5

MP 30.4 to
MP 31.1
Pending Survey

30.6

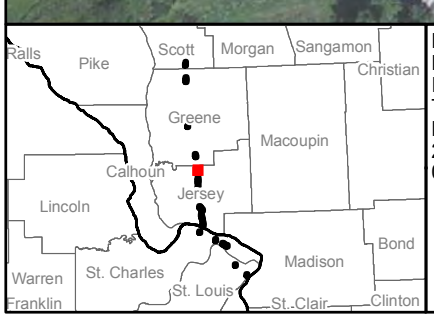
Jersey
County,
Illinois

30.7

SHEET 9
SHEET 10

30.8

Grafton Ln



REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 9 OF 34

gai consultants

SPIRE STL PIPELINE PROJECT

spire

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CHECKED: SWW APPROVED: LMF

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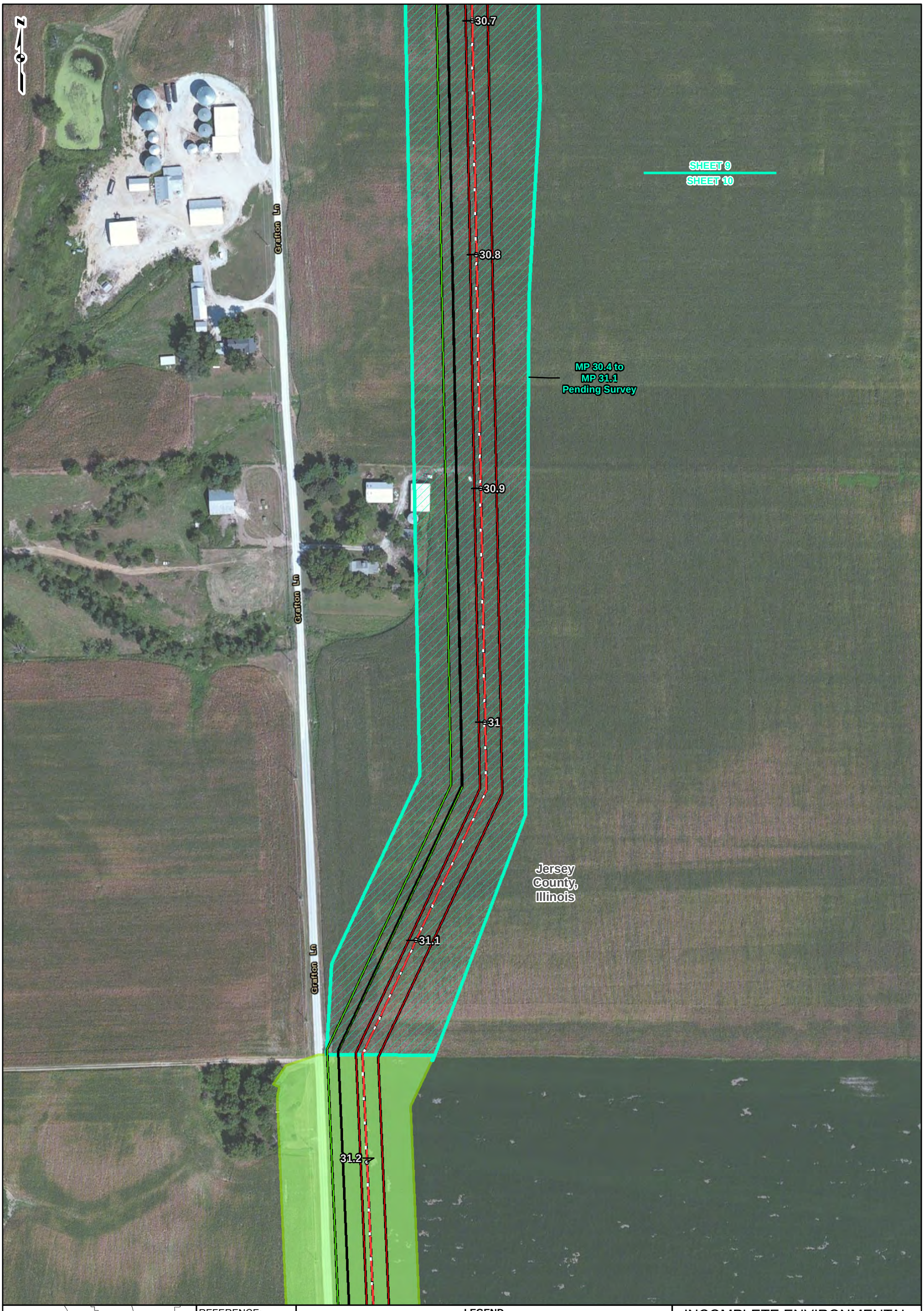

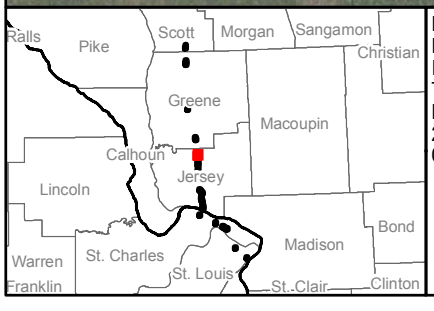

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 10 OF 34

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SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
CHECKED: SWW APPROVED: LMF

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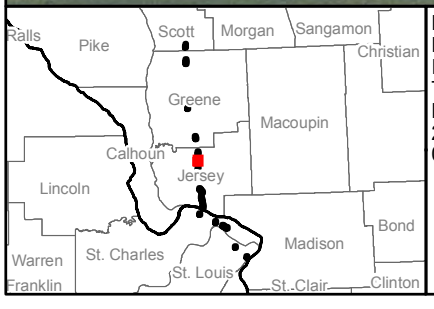

REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 11 OF 34

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SPIRE STL PIPELINE PROJECT

spire

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CHECKED: SWW APPROVED: LMF

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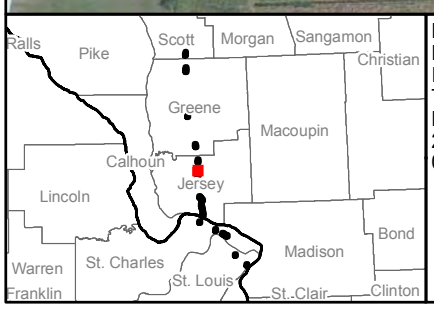

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 12 OF 34

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SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
CHECKED: SWW APPROVED: LMF

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N

SHEET 12
SHEET 13

33.4

MLV 2

21998

16

16

16

22001

Otterville Rd

Jersey
County,
Illinois

33.5

MP 32.4 to
MP 33.8
Pending Survey

33.6

Otterville Rd

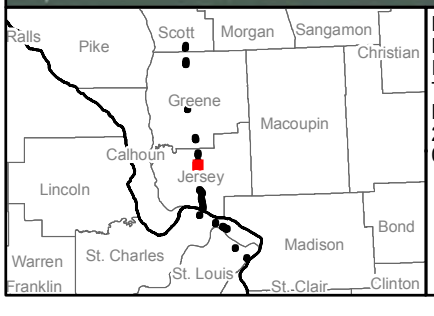
33.7

Otterville Rd

33.8

17801

W County Rd



REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 13 OF 34

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SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
CHECKED: SWW APPROVED: LMF

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N

34.3

34.4

34.5

34.6

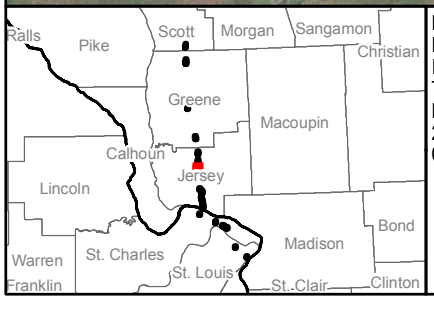
34.7

34.8

Otterville Rd

MP 34.4 to
MP 34.7
Pending Survey

Jersey
County,
Illinois



REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 14 OF 34

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SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
CHECKED: SWW APPROVED: LMF

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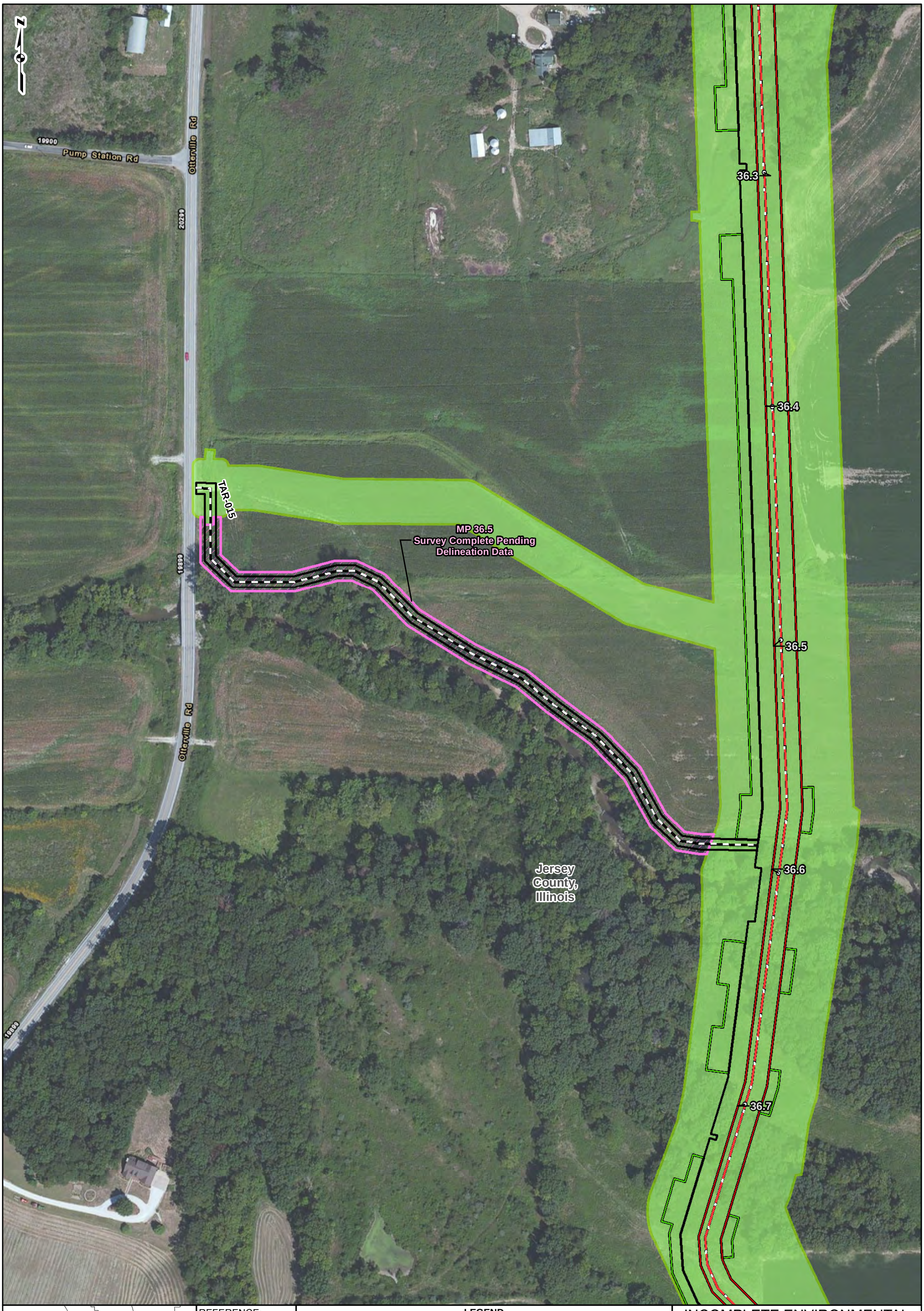

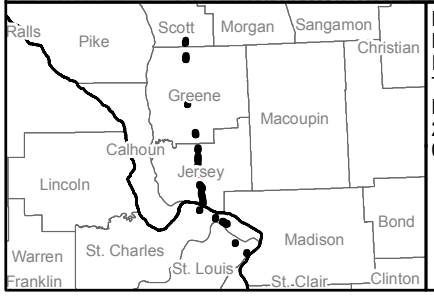

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 15 OF 34

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SPIRE STL PIPELINE PROJECT

spire

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CHECKED: SWW APPROVED: LMF

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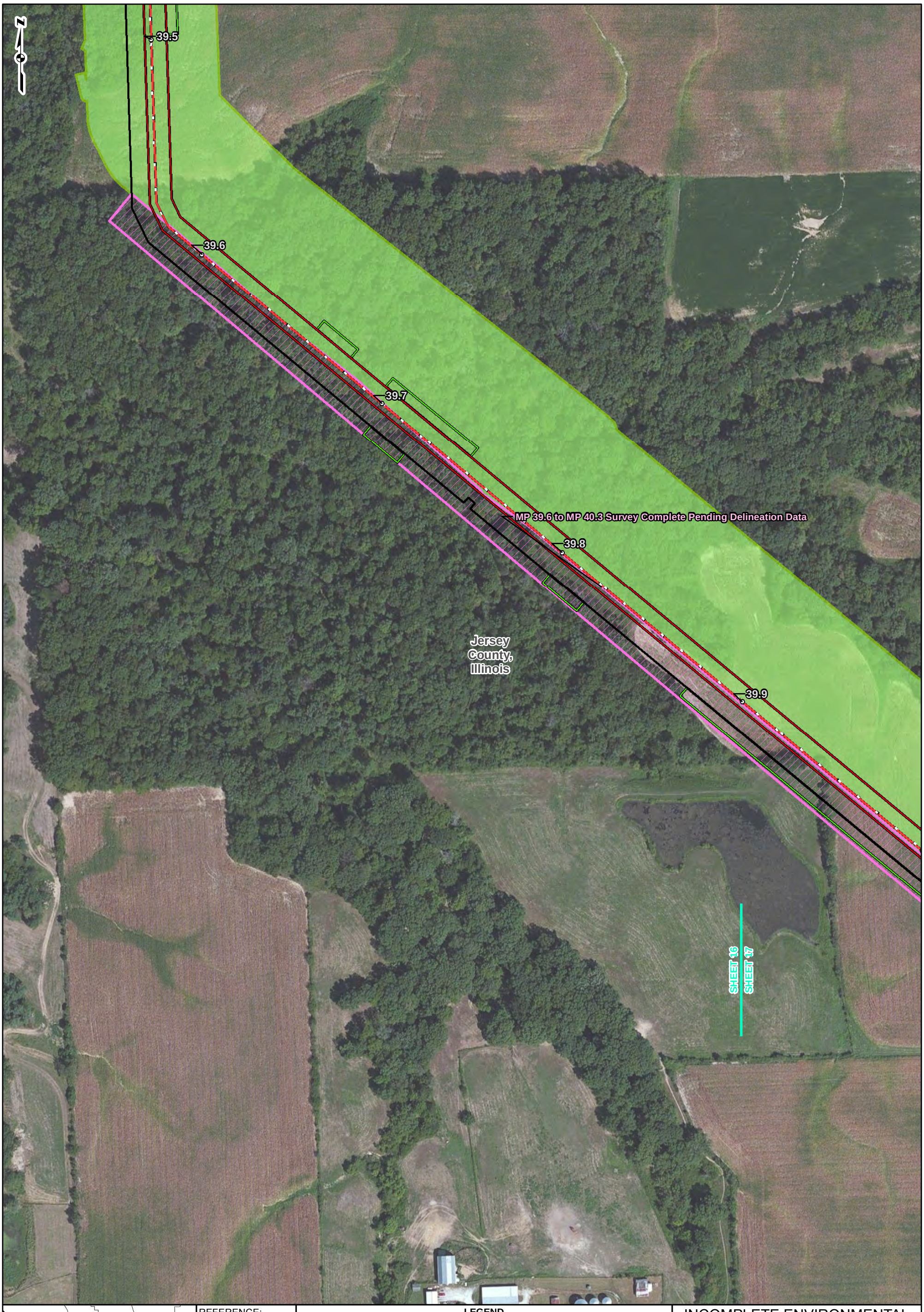

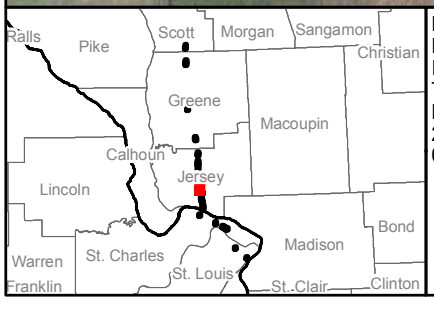

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 16 OF 34

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SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
CHECKED: SWW APPROVED: LMF

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N

39.9

40

40.1

40.2

40.3

40.4

40.5

SHEET 16
SHEET 17

Jersey
County,
Illinois

Opossum Trot Ln

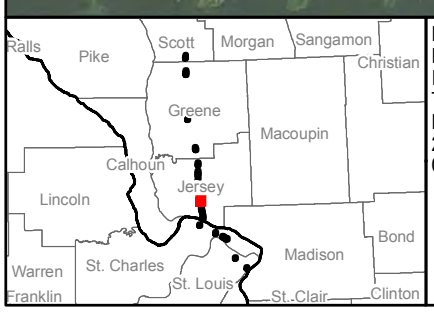
Opossum Trot Ln

Opossum Trot Ln

MP 39.6 to MP 40.3
Survey Complete
Pending Delineation Data

MP 40.3 to
MP 41.1
Pending Survey

SHEET 17
SHEET 18



REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP
SHEET 17 OF 34

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SPIRE STL PIPELINE PROJECT

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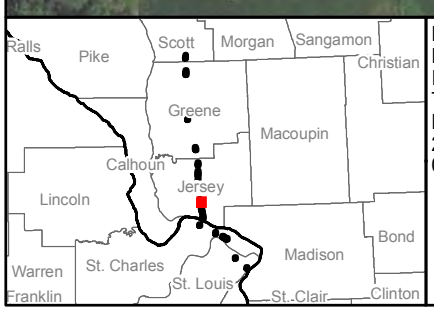

REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 18 OF 34

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SPIRE STL PIPELINE PROJECT

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N

40.7

MP 40.3 to
MP 41.1
Pending Survey

SHEET 18
SHEET 19

40.8

TAR-016

SHEET 19
SHEET 20

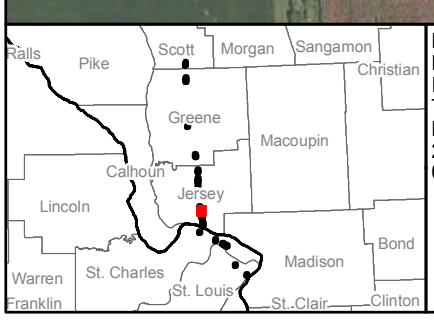
40.9

Jersey
County,
Illinois

41

41.1

41.2



REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 19 OF 34

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SPIRE STL PIPELINE PROJECT

spire

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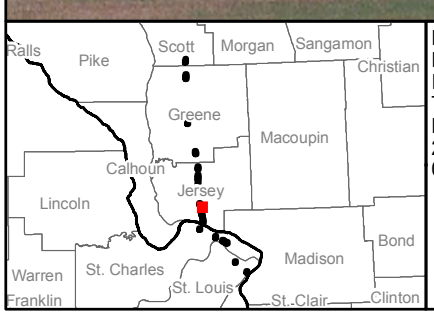

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 20 OF 34

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SPIRE STL PIPELINE PROJECT

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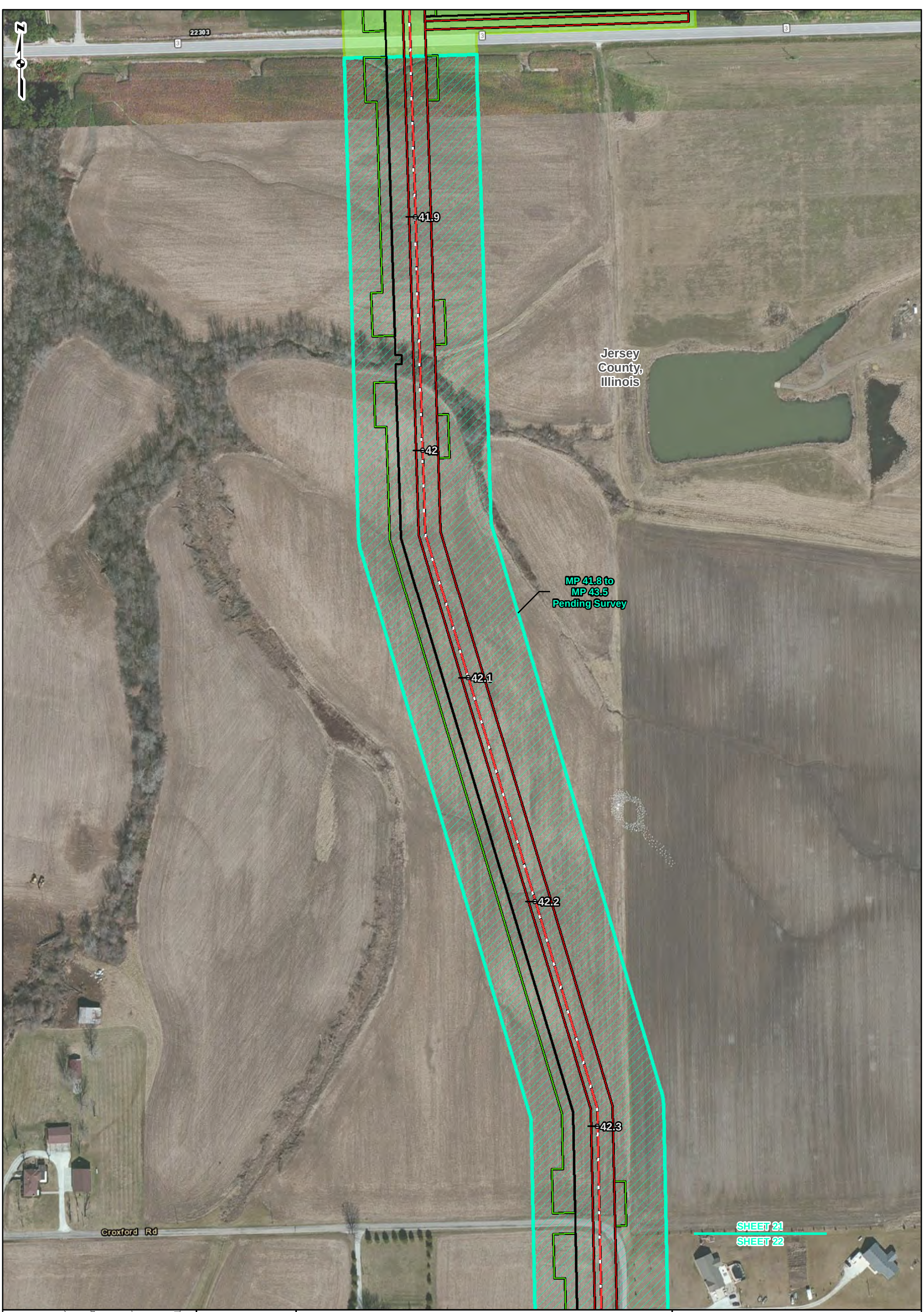

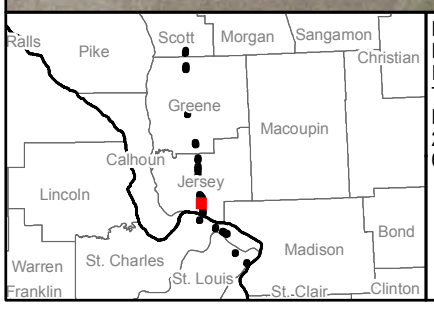

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 21 OF 34

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SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
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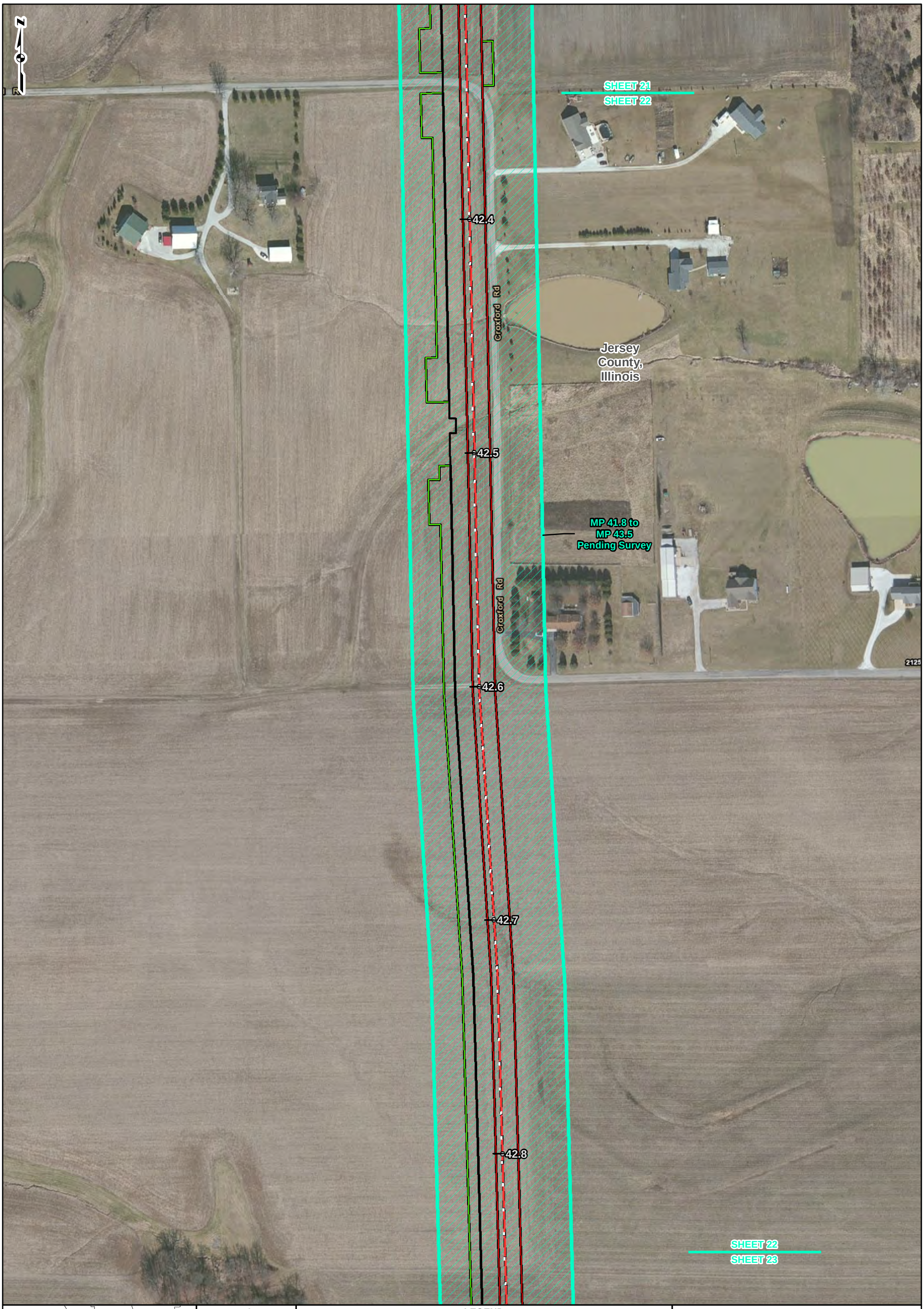

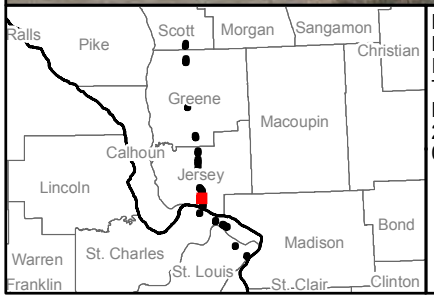

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 22 OF 34

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SPIRE STL PIPELINE PROJECT

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N

SHEET 22
SHEET 23

42.9

MP 41.8 to
MP 43.5
Pending Survey

43

43.1

Jersey
County,
Illinois

43.2

43.3

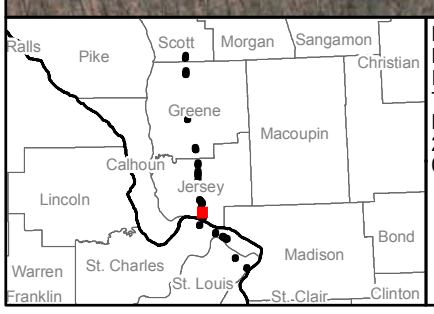
43.4

43.5

Elsah Rd

Elsah Rd

13503



REFERENCE:
ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 23 OF 34

gai consultants

SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH DATE: 1/11/2017
CHECKED: SWW APPROVED: LMF

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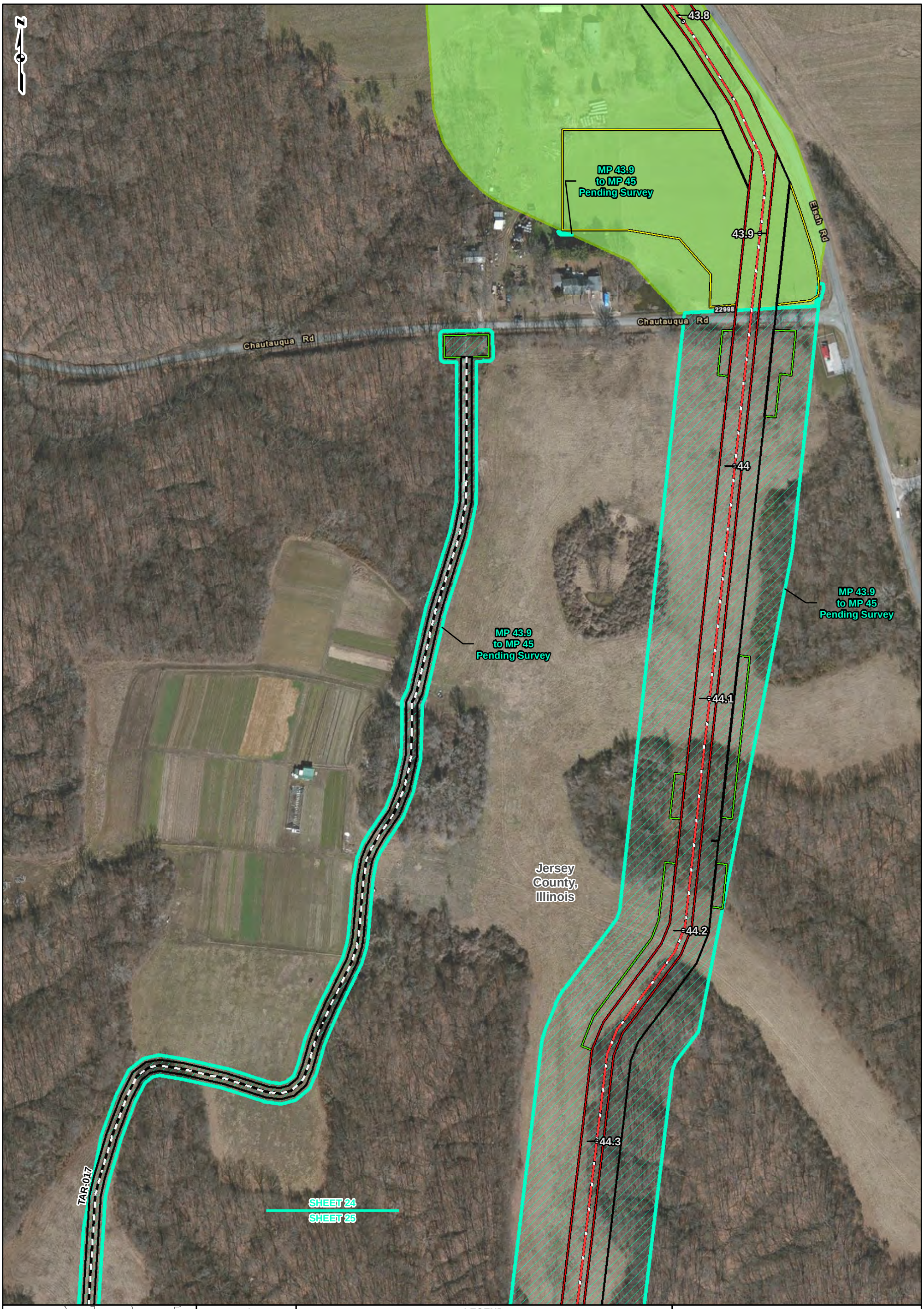

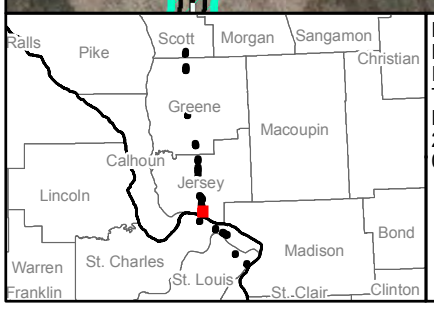

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017.

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 24 OF 34

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N

SHEET 24
SHEET 25

44.3

44.4

MP 43.9
to MP 45
Pending Survey

TAR-017

44.5

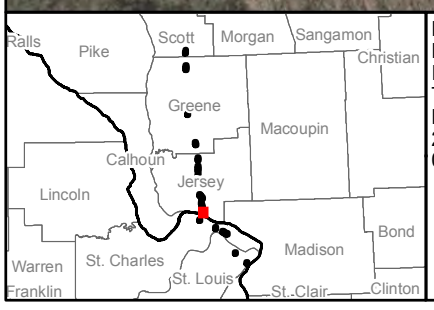
44.6

Jersey
County,
Illinois

44.7

SHEET 25
SHEET 26

44.8



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LEGEND

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- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 25 OF 34

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N

TAR-017

44.6

MP 43.9
to MP 45
Pending Survey

44.7

SHEET 25
SHEET 26

44.8

44.9

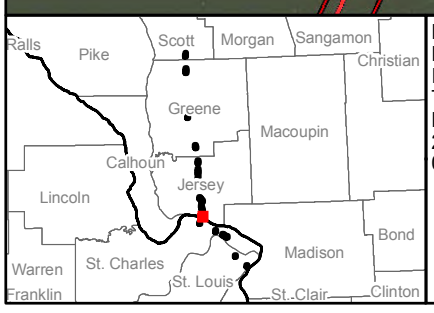
Jersey
County,
Illinois

45

100 Great River Rd Meeting of the Great Rivers Rte

45.1

100 Great River Rd Meeting of



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0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 26 OF 34

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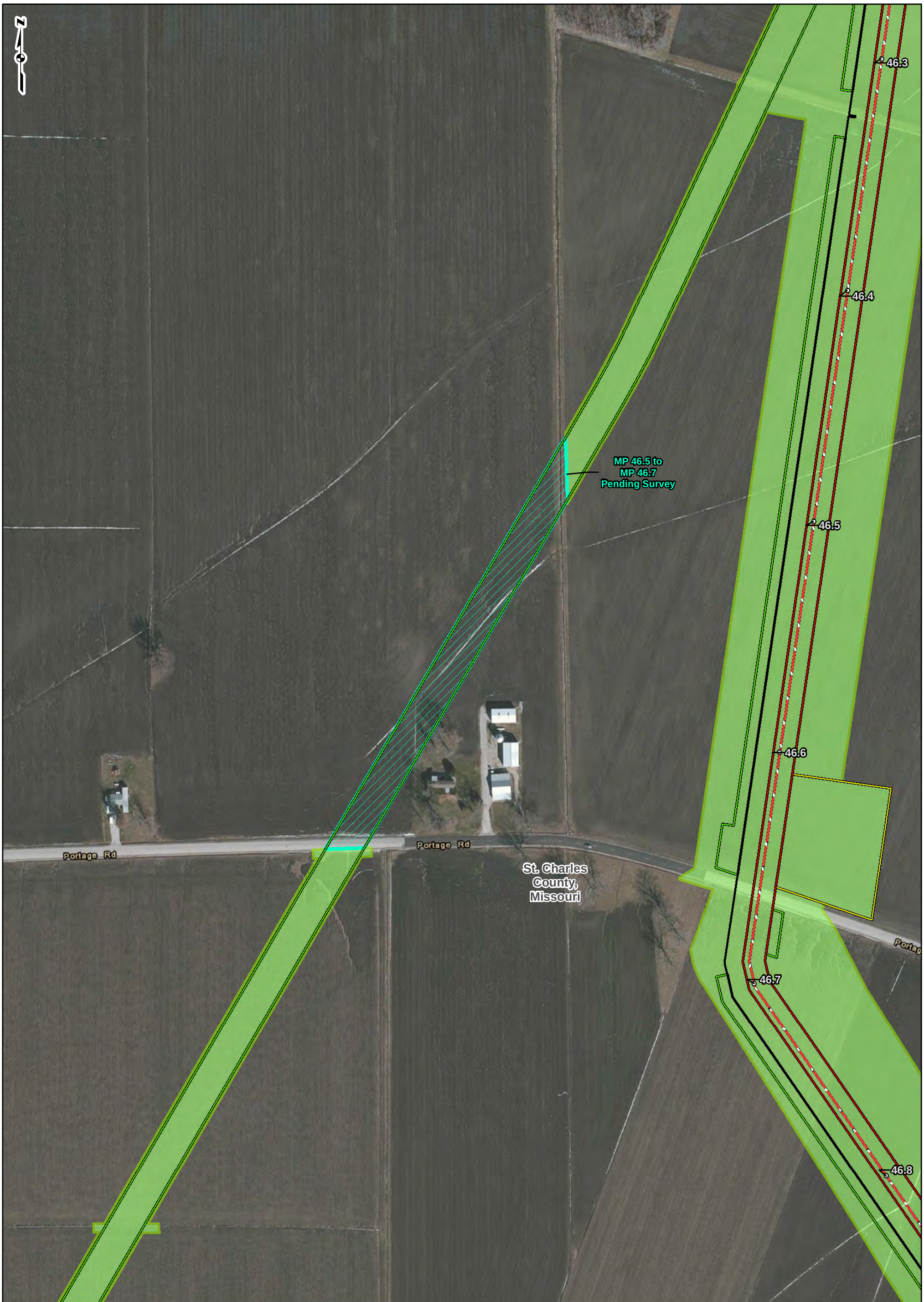

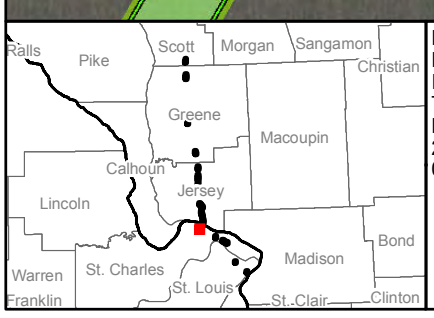

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- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 27 OF 34

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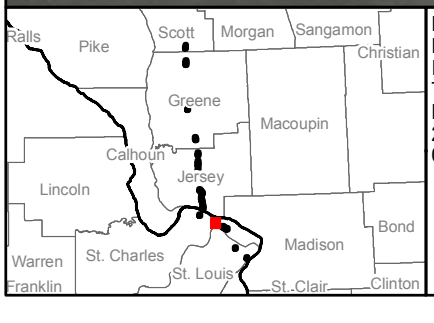

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- FACILITY
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- LINE 880 MODIFICATIONS
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- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 28 OF 34

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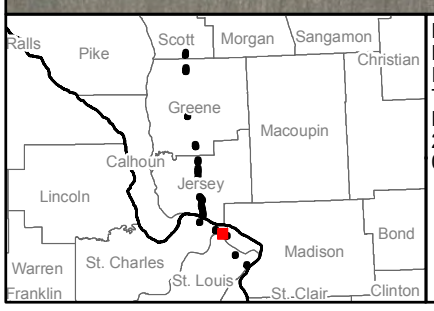

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LEGEND

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- EXISTING EASEMENT
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- PENDING SURVEY
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- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 29 OF 34

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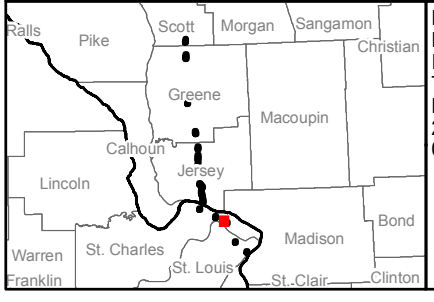

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- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 30 OF 34

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N

53.7

Burlington Northern

53.8

St. Charles
County,
Missouri

SHEET 30
SHEET 31

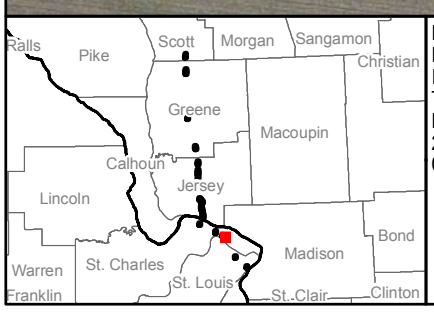
53.9

MP 53 to
MP 53.6
Pending Survey

54

54.1

SHEET 31
SHEET 32



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LEGEND

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- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 31 OF 34

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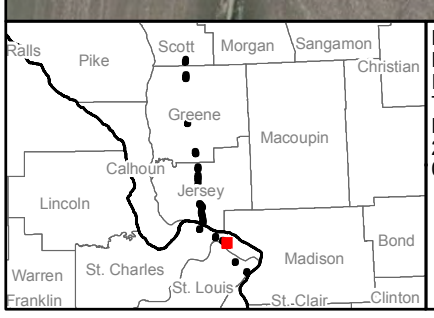

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- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 32 OF 34

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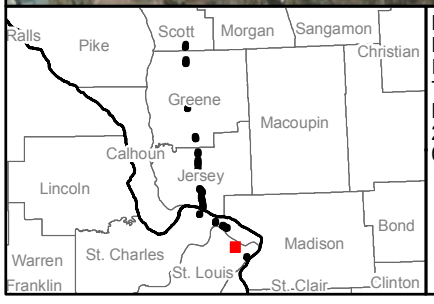

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LEGEND

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- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
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- ATWS
- STAGING AREA
- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 33 OF 34

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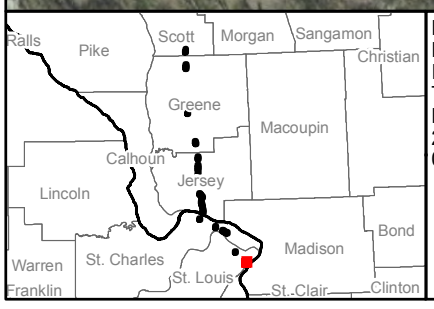

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LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
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- CONSTRUCTION WORK AREA
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- PENDING SURVEY
- SURVEY COMPLETE PENDING DELINEATION DATA
- SURVEY COMPLETED
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

INCOMPLETE ENVIRONMENTAL SURVEY STATUS MAP SHEET 34 OF 34

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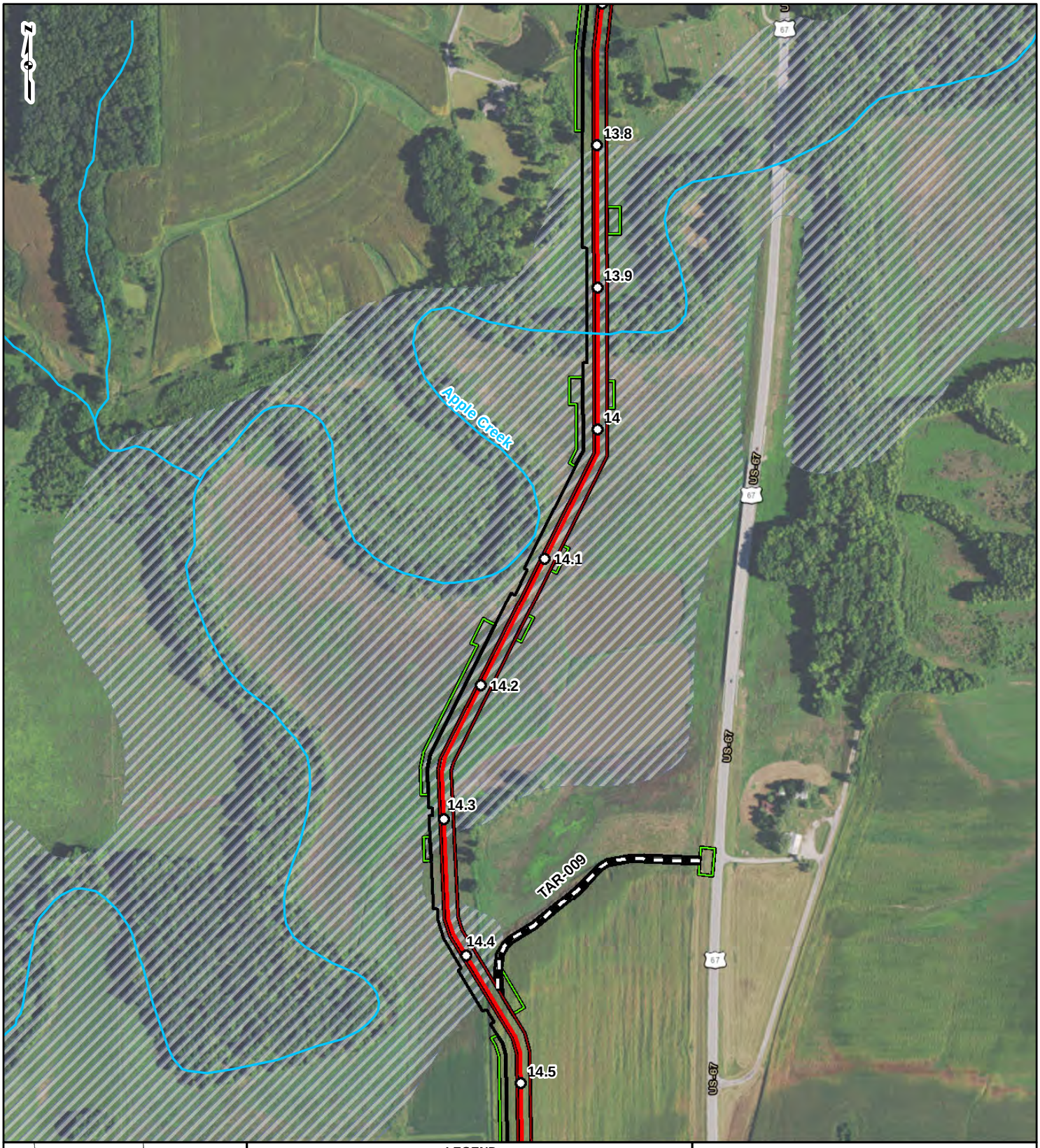
APPENDIX 2-D

Site-Specific Waterbody Drawings

APPENDIX 2-E

100-Year Flood Zones Crossed by the Project



LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- NHD FLOWLINE
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 250 500 1,000 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 1 OF 9

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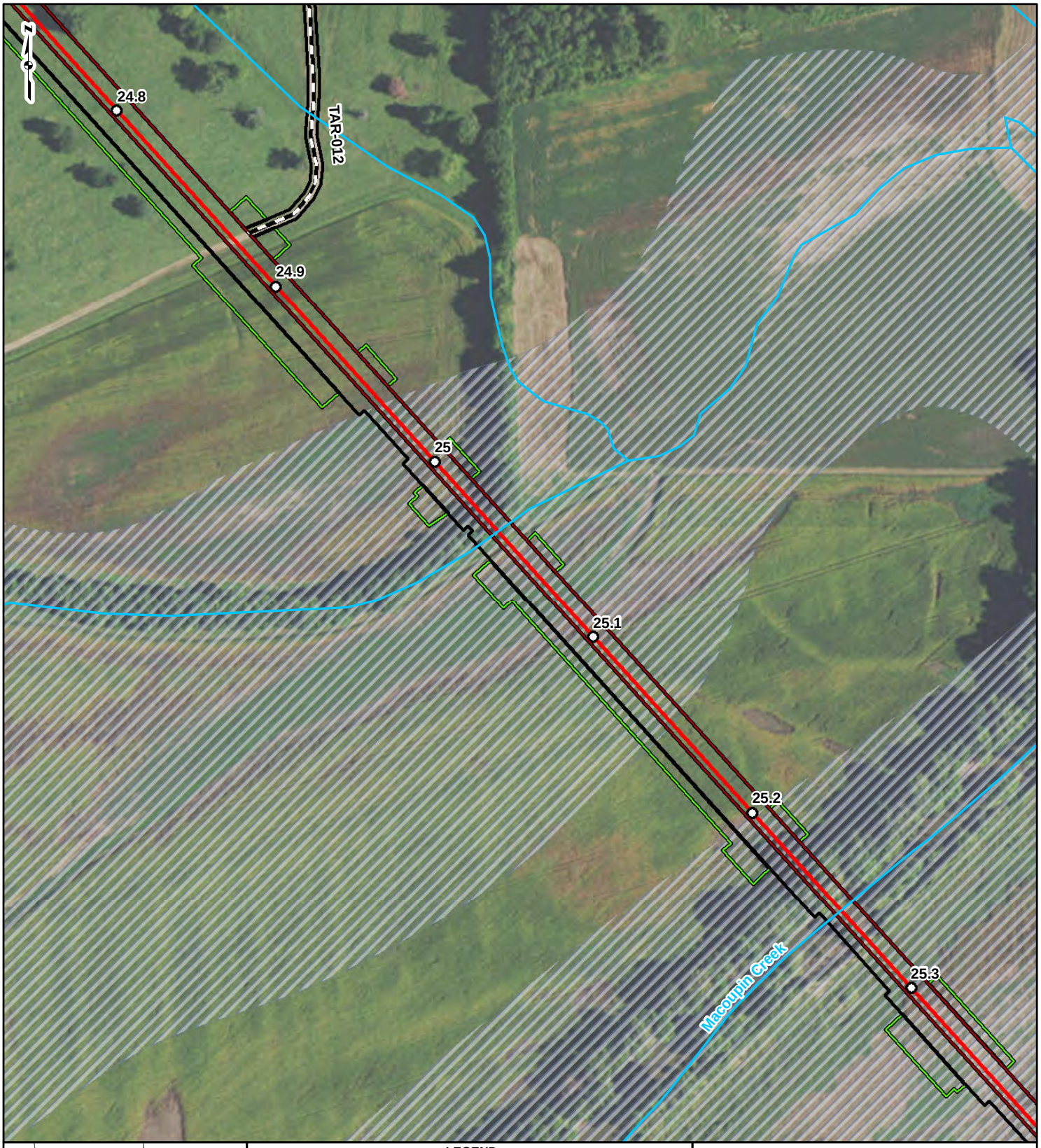

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- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- NHD FLOWLINE
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 150 300 600 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 2 OF 9

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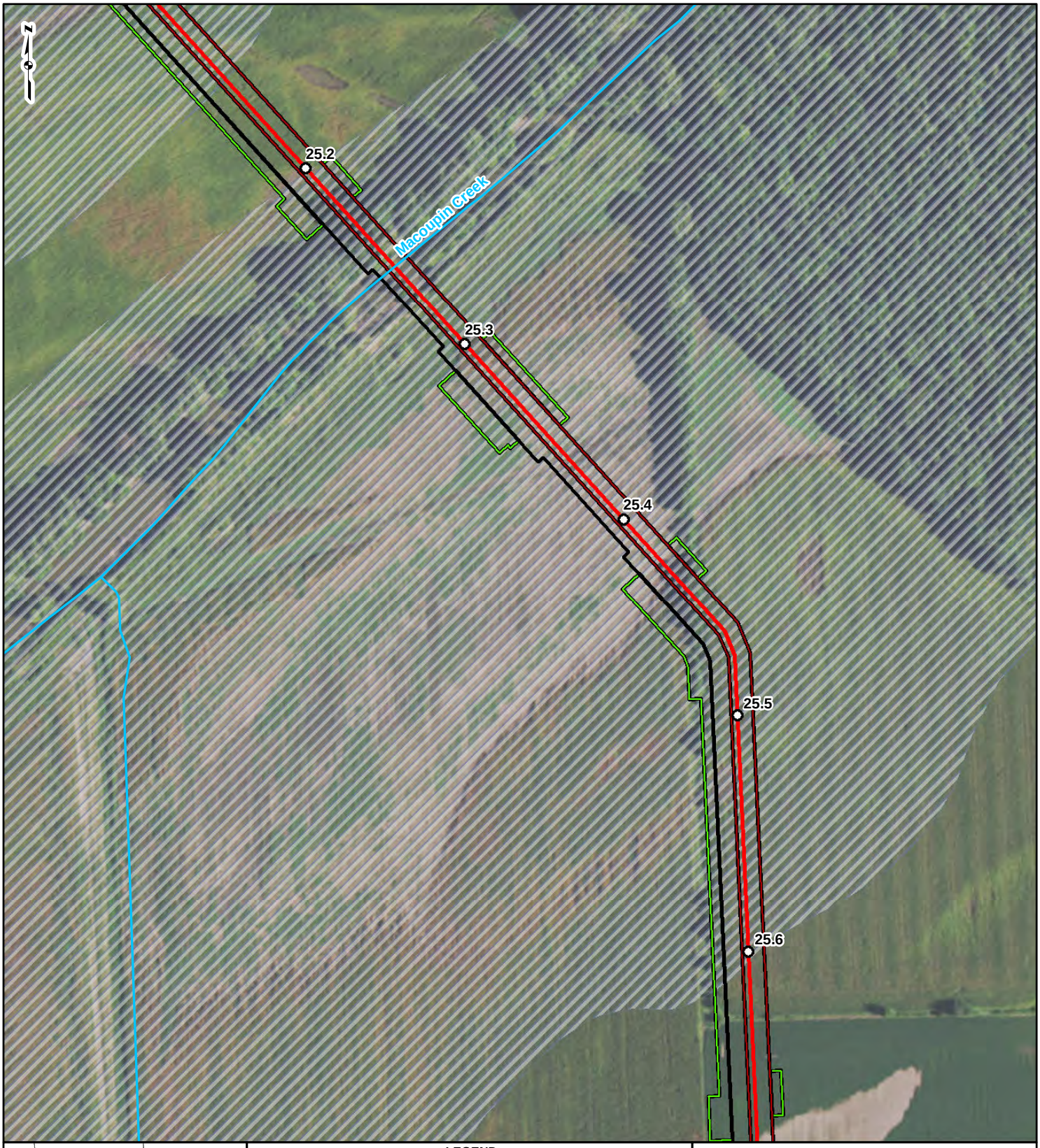

LEGEND

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- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 150 300 600 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 3 OF 9

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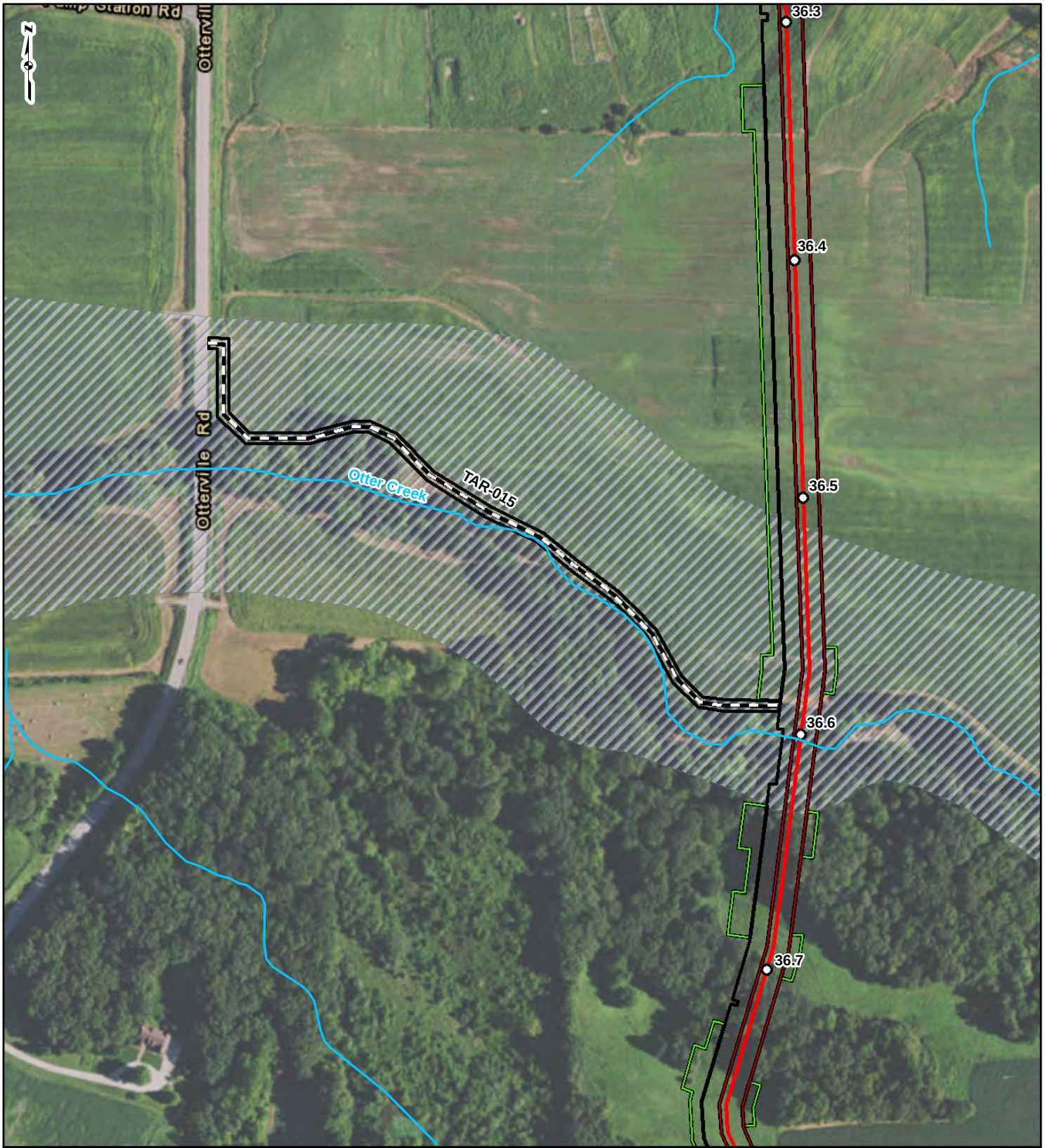

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- NHD FLOWLINE
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 150 300 600 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 4 OF 9

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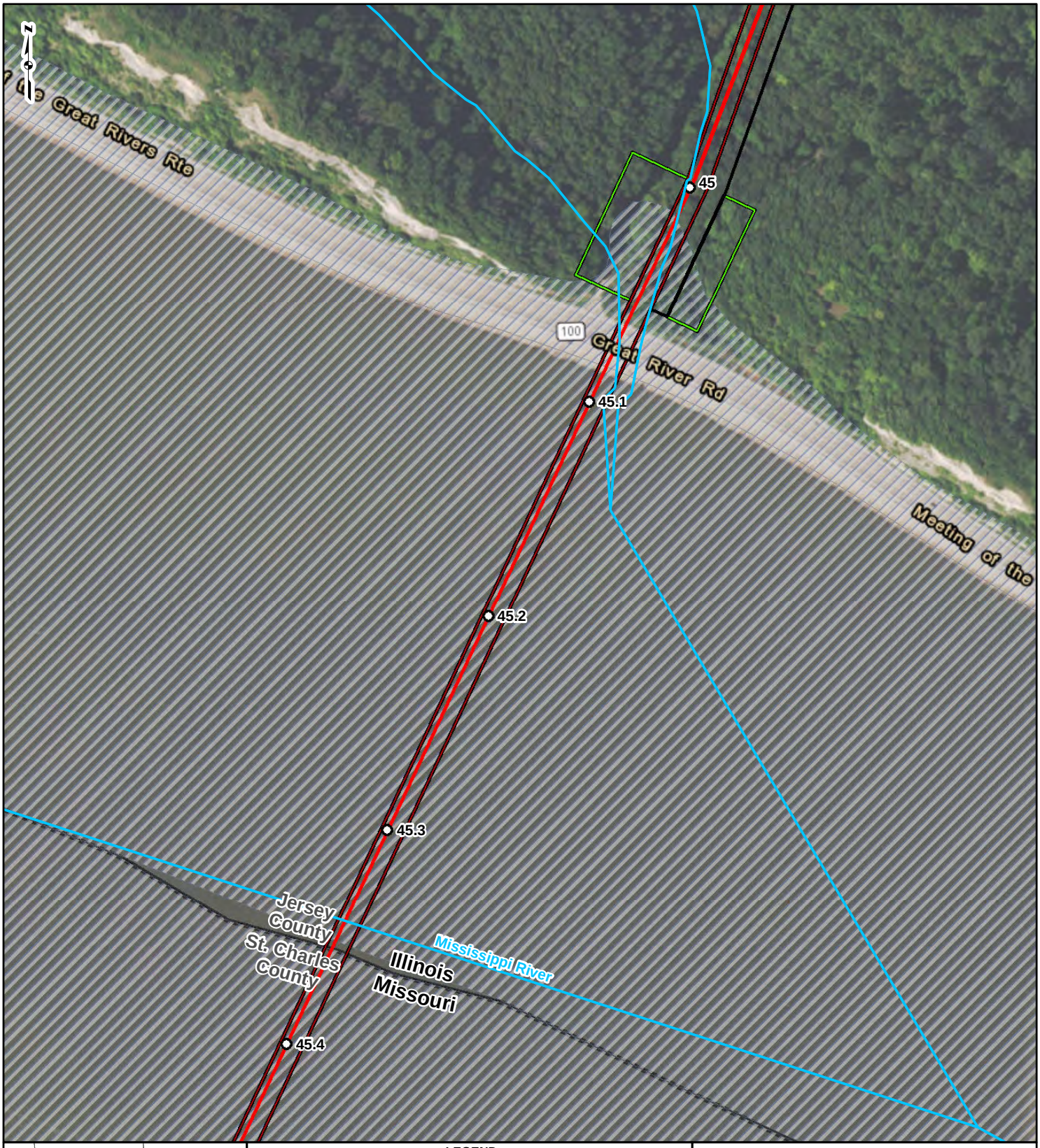

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- NHD FLOWLINE
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 150 300 600 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 5 OF 9

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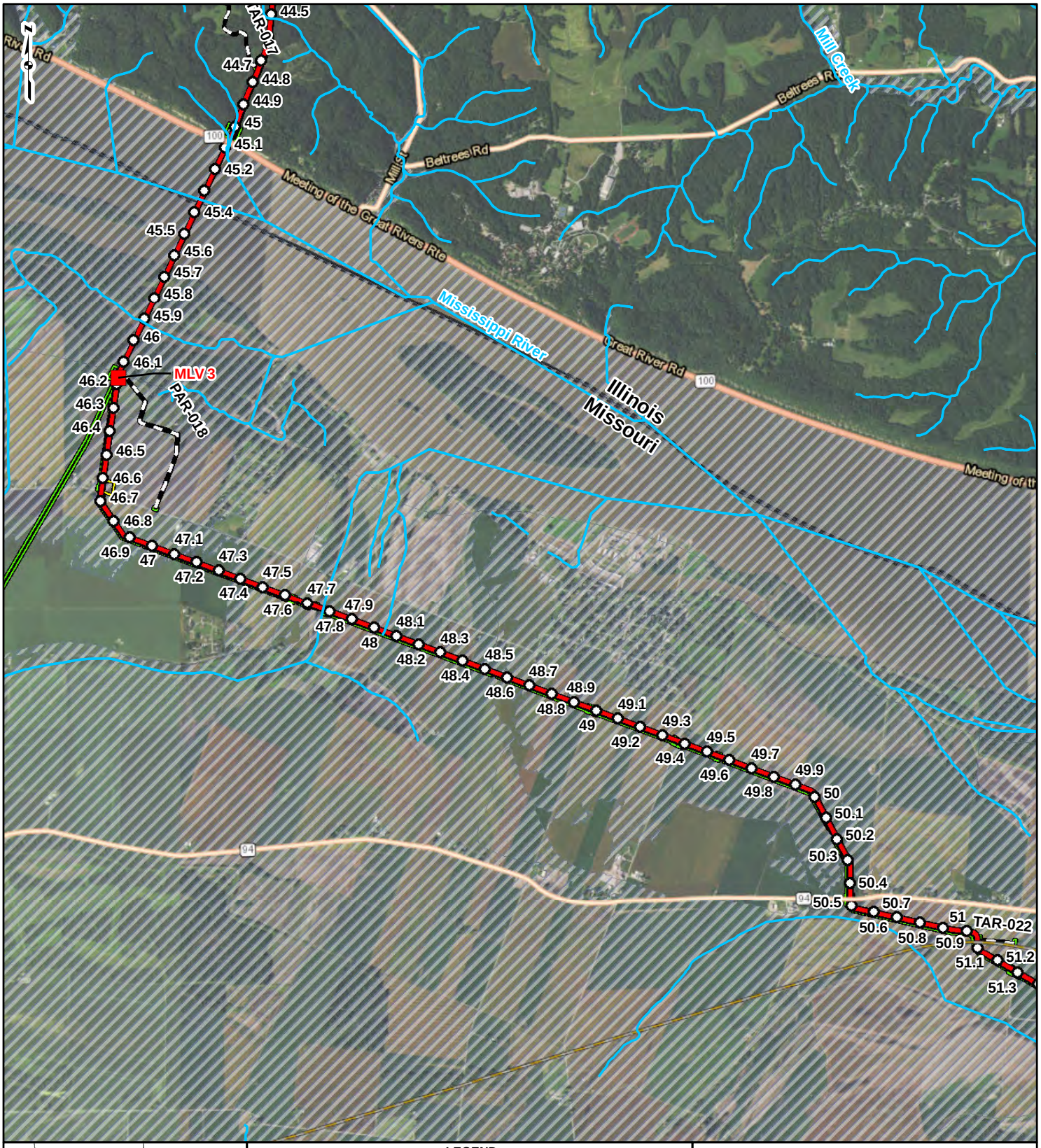

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- NHD FLOWLINE
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 1,500 3,000 6,000 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 6 OF 9

SPIRE STL PIPELINE PROJECT

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spire

DRAWN BY: PMH DATE: 1/11/2017

CHECKED: SWW APPROVED: LMF

REFERENCE: ESRI WORLD IMAGERY AND TRANSPORTATION, NAIP, USDA FSA, 2014, ACCESSED 01/2017. NATIONAL FLOOD HAZARD LAYER, FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ILLINOIS (2015) AND MISSOURI (2016).

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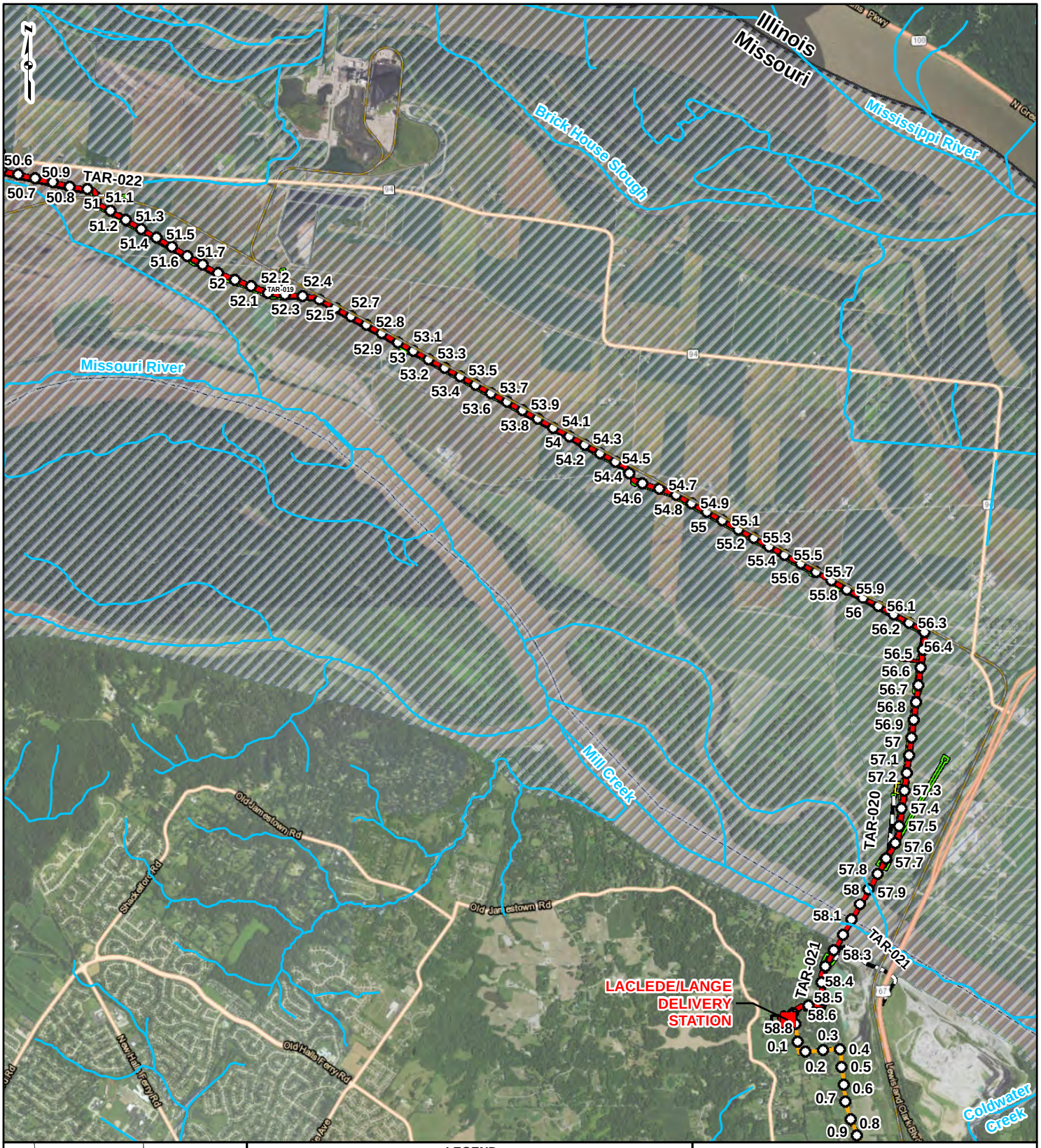

LEGEND

- FACILITY
- MILEPOST
- ACCESS ROAD
- 24-INCH PIPELINE
- LINE 880 MODIFICATIONS
- NHD FLOWLINE
- PERMANENT EASEMENT
- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 2,000 4,000 8,000 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT
SHEET 7 OF 9

gai consultants

SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PMH	DATE: 1/11/2017
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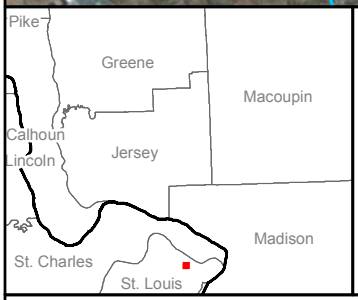

LEGEND

- FACILITY
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- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 8 OF 9

SPIRE STL PIPELINE PROJECT

gai consultants

spire

DRAWN BY: PMH DATE: 1/11/2017

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LEGEND

- FACILITY
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- EXISTING EASEMENT
- CONSTRUCTION WORK AREA
- ATWS
- STAGING AREA
- FEMA 100-YEAR FLOOD ZONE
- COUNTY BOUNDARY
- STATE BOUNDARY

0 100 200 400 Feet

100-YEAR FLOOD ZONES CROSSED BY THE PROJECT SHEET 9 OF 9

SPIRE STL PIPELINE PROJECT

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APPENDIX 2-F

Wetland Delineation and Stream Identification Report

APPENDIX 2-G

NWI Mapping