

# **THE PERILS OF EFFICIENCY: AN ANALYSIS OF AN UNEXPECTED CLOSURE OF THE POE LOCK AND ITS IMPACT**

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**NATIONAL PROTECTION AND PROGRAMS DIRECTORATE  
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# EXECUTIVE SUMMARY

One of the Nation's most economically vital systems, the iron mining - integrated steel production - manufacturing supply chain is potentially one of the least resilient to disruption. The Poe Lock at the Soo Locks connecting Lakes Huron and Superior is a potential single point of failure in this supply chain. An unexpected 6-month closure of the locks would have devastating consequences for industries dependent on this supply chain, particularly the automobile manufacturing industry, and the National economy.

The iron ore extracted from mines located in Minnesota and Michigan is used by steel mills along the Great Lakes to make steel for the appliance, automobile, construction, farm, and mining equipment manufacturers, railcar production and other industries. These steel mills make various grades of steel to supply different markets and different categories within markets. Almost every steel mill makes some type of steel for the automotive industry, the market that dominates the steel industry.

The iron ore shipped from Lake Superior to the Great Lakes steel mills transits the Soo Locks, a set of locks owned and operated by the United States Army Corps of Engineers (USACE). An unanticipated closure of the Poe Lock, the only lock large enough at the Soo Locks to allow passage of the Lake Carriers carrying iron ore, would be catastrophic for the Nation. Depending on what time of year the closure occurred, approximately 75 percent of the U.S. integrated steel production would cease within 2–6 weeks after the closure of the Poe Lock. Approximately 80 percent of iron ore mining operations, and nearly 100 percent of the North American appliances, automobile, construction equipment, farm equipment, mining equipment, and railcar production would shut down. The shutdowns in production of these products would begin slowly and then increase quickly as the stress grows in the iron mining – integrated steel production – manufacturing supply chains. Almost 11 million people in the United States and potentially millions more in Canada and Mexico would become unemployed due to the production stoppage, and the economy would enter a severe recession. There are no plans or solutions that could mitigate the damage to the manufacturing industries dependent on this supply chain.

This report, developed by the Office of Cyber and Infrastructure Analysis' (OCIA) National Infrastructure Simulation and Analysis Center (NISAC) describes the iron mining – integrated steel production – manufacturing supply chain and its history and presents analysis of the impacts of an unanticipated closure and the challenges facing various potential mitigation strategies. OCIA stresses that there is no plan for closing the Soo Locks and no specific reason to believe that the Soo Locks would close. The intent of this report is to highlight the dependency of the North American economy on this set of locks, particularly the Poe Lock. The Poe Lock has been called the Achilles' heel of the Great Lakes navigation system, though it more aptly may be described as the Achilles' heel of the North American industrial economy. The report concludes with some potential mitigation strategies for further analysis, but no single strategy is sufficient to mitigate the disruption.

## KEY FINDINGS

- **One the Nation's most economically vital systems, the iron mining - integrated steel production - manufacturing supply chain, is also potentially the least resilient.**
- **A disruption of the Poe Lock likely will cause an almost complete shutdown of Great Lakes steel production.**
- **A shutdown of Great Lakes steel production likely will cause almost all North American appliances, automobile, construction equipment, farm equipment, mining equipment, and railcar production to cease within weeks.**
- **The disruption would likely result in widespread bankruptcies and dislocations throughout the economy. Almost 11 million people would likely be unemployed because of the impact and the North American economies would likely enter a severe recession.**