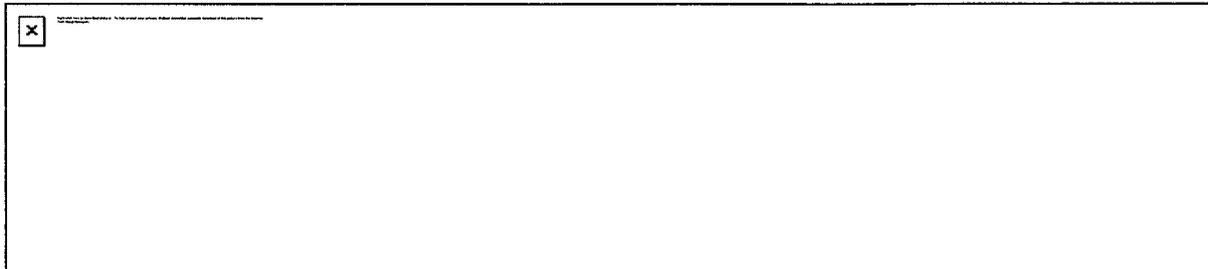


**From:** Twin Metals Minnesota <info=twin-metals.com [REDACTED]> on behalf of Twin Metals Minnesota <info [REDACTED]>  
**Sent:** Tuesday, August 19, 2014 12:24 PM  
**To:** Richards, Jess (DNR)  
**Subject:** Mine Reader: Minnesota's Promising Future in Helping Reduce Automobile Emissions



## Minnesota's Promising Future in Helping Reduce Automobile Emissions

Platinum and palladium, strategic metals proposed to be mined as part of the Twin Metals Minnesota (TMM) Project are two of the six elements collectively known as platinum group metals (PGMs), and are the only two PGMs found in their pure form in nature. Minnesota is fortunate to be home to the Duluth Complex, one of the largest untapped resources – an estimated four billion tons – of copper, nickel, and PGMs in the world.



One of the most common uses for platinum and palladium are in autocatalysts, which are vital to reducing automobile emissions and pollutants. Given Minnesota's abundant PGM resources, the state is poised to play a critical role for decades in supplying key raw materials to the ongoing effort to reduce auto emissions and clean our air.

### ***What is an autocatalyst?***

An autocatalyst is a cylinder, made from ceramic or metal which is formed into a fine honeycomb and coated with a solution of chemicals or platinum group metals. It is mounted inside a stainless steel canister and installed in the exhaust line of vehicles, located between the engine and the muffler.

### ***What do autocatalysts do and why are they important?***

Autocatalysts greatly reduce harmful pollutant emissions, ensuring cleaner air. Vehicle exhaust contains a number of harmful compounds that are controlled by the PGMs in autocatalysts. These major pollutants include:

- Carbon monoxide, a poisonous gas
- Oxides of nitrogen, contributes to acid rain and smog formation
- Hydrocarbons, involved in smog formation and emit an unpleasant odor
- Particulate, contains known cancer-causing compounds

Autocatalysts convert more than 90 percent of hydrocarbons, carbon monoxide and oxides of

nitrogen from gasoline engines into less harmful carbon dioxide, nitrogen and water vapor. These important engine components also significantly reduce the pollutants from diesel engines.

*Sources:*

*Platinum Today*

*Stillwater Palladium*

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