

*Recovery and refining of  
PGMs from nitric acid  
catalysts and process plants*

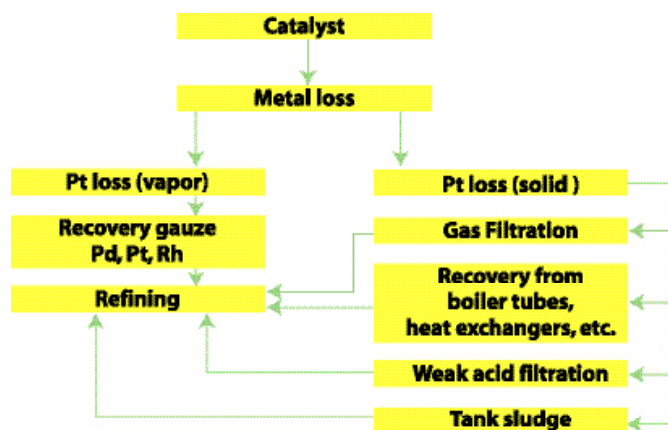
**Platinum  
Palladium  
Rhodium**

 **sabin**  
METAL CORPORATION  
Nitric Acid Group

# Introducing *total capability* PGM recovery products and refining services – *from mesh to machinery!*

- Installation and recovery of palladium recovery gauzes
- Platinum filters
- Mobile in-plant PGM recovery services –
  - Ultrasonic/mechanical techniques for removing and recovering PGM-containing layers on screens, tube bundles, heat exchanger surfaces, storage tanks, air pre-heaters, tail gas heaters, cooler/condensers, other process equipment
  - On-site acid solution immersion and high pressure water jet cleaning/recovery

**F**or nitric acid producers the “pot of gold” at the end of the rainbow (or the end of a campaign) isn’t gold but platinum, palladium, or rhodium – or some combination. We’ve been recovering and refining these and other precious metals for 60 years. Sabin’s integrated services and products for nitric acid catalysts and process equipment will enhance your profits, speed production, and add peace of mind with advanced sampling, refining, and environmental conservation methods. We’ll recover maximum values of PGM catalysts from your recovery gauzes and process equipment.



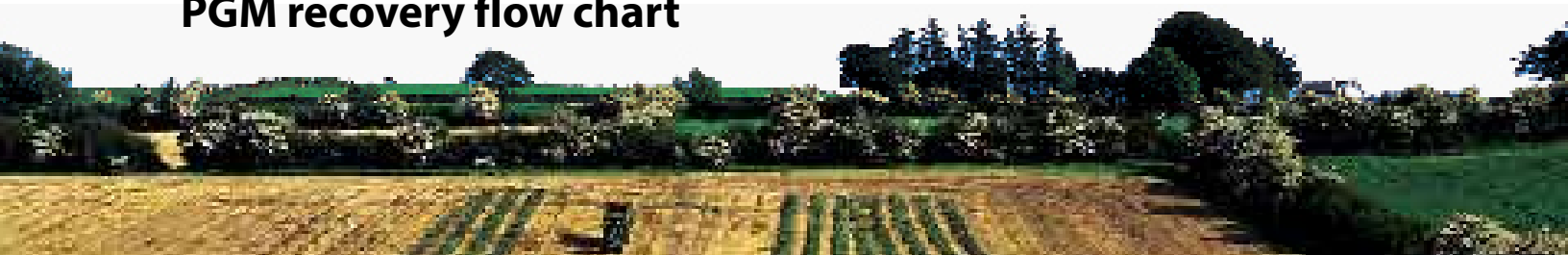
**PGM recovery flow chart**

**Palladium recovery system based on a daily nitric acid production of 500 short tons/day. Four campaigns of 90 days each.**

**Pt recovery rate: 60%**

Pd investment:	\$79,900
<b>Annual profit:</b>	<b>\$507,300</b>
Annual ROI on Pd (An average of 2.0 packs held):	322%
Annual Pd loss:*	\$99,600
* Most of this Pd is later recovered downstream	

*(Values based on Pt pricing September 2004)*



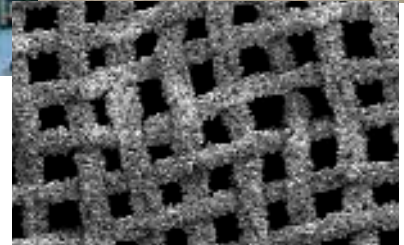
# Mobile in-plant PGM recovery services – *anywhere, anytime!*

## Sabin recovers and refines PGMs from nitric acid process equipment and systems

No matter where your facility is located, our mobile on-site recovery service assures rapid PGM recovery from process equipment and systems. A nationwide fleet of specially equipped vehicles travels to your plant for on-site PGM recovery with absolutely minimal campaign downtime. Mobile cleaning/recovery vehicles are equipped for ultrasonic and mechanical techniques

**Filters, screens, tube bundles, heat exchanger surfaces, storage tanks, air pre-heaters, tail gas heaters, cooler/condensers, other process equipment**

that remove and recover PGM-containing oxide layers on process equipment and systems, and also provide on-site acid solution immersion and high pressure water jet cleaning/recovery capabilities. In short, if there's any remaining precious metals on any process equipment, we'll recover it and return its value to you quickly.



SEM photo of used palladium recovery gauze

# Introducing palladium recovery gauzes for nitric acid processing

## Now maximize your platinum recovery from the catalyst

Sabin's new palladium recovery gauzes represent an important breakthrough in nitric acid production efficiency. Our recovery gauze screen layers are custom-configured and installed on-site to reduce downtime and improve production



and minimize costs. As a world class refiner of PGMs, Sabin platinum and palladium is accepted on the NYMEX/COMEX and for delivery on the London, Zurich and Tokyo metal exchanges.



# Experience the Sabin difference...

## Highest possible returns for PGMs from catalytic processes and process equipment

- Advanced analytical and processing methods help maximize precious metals recovery
- Comprehensive sampling procedures include solution and melt techniques for accurate determination of precious metals content
- Returns provided as product, metals, or cash

# Experience the Sabin difference...

## For recovering maximum value from your precious metal bearing materials

- Sabin Metal is the largest privately owned precious metals refinery in the United States, and a world class refiner of platinum, palladium, rhodium, ruthenium, rhenium, gold, silver, and other noble metals
- Sabin platinum and palladium is accepted on the NYMEX/COMEX and for delivery on the London, Zurich and Tokyo metal exchanges
- Total environmental compliance for assured peace of mind
- Sixty years of success built upon technology, reliability, and trust

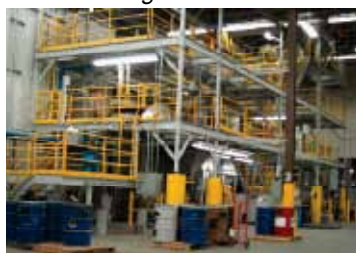
Advanced filtration systems eliminate harmful discharges



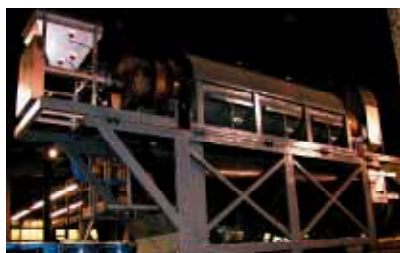
Smelting precious metals



Pollution free processing/refining



Automated sampling system



Contamination removal



ICP emission spectroscopy

# How to get more information...

Tell us about your nitric acid products and PGM recovery requirements. We'll be pleased to discuss your application in detail. Chances are we can offer you practical and

profitable options for maximizing returns of remaining precious metals from your production processes and equipment. Let us hear from you today.



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