



# Supporting Complex Decision Making in Route Selection

## Challenge

Metal recycling requires selective removal of undesired elements either sequentially or in groups to achieve the required purity of the desired product. For complex, multiple step separations there are often many possible routes to the end product. This is exacerbated if several products are to be manufactured from a single feed-stream. Faced with this challenge, Johnson Matthey turned to Britest tools and methodologies to find the optimal process route for separation of platinum group metals.

## Approach

In order to maximise the productive use of a full study team session, a core project group and Britest facilitator prepared scoping and process descriptive documentation in advance, using generic representations to define recurrent similar processes (e.g. solvent extraction) which the full team could simply and rapidly review and amend.

Specialist Britest tools for purification and solvent strategy and multiple criterion based decision making were then employed with customisation to suit the specific nature and circumstances of the JM process environment.

## Benefits

- Good use of team time and focus retained on central issue
- Better insight into problem complexity (>1400 route permutations possible) and factors involved in selection (techno-economic, risk-based etc.)
- Main selection criteria identified—seeing the wood through the trees
- Pragmatic assessment approach gave sufficient discrimination to avoid indecision
- Study enabled future resources to be concentrated onto a few feasible options rather than spread in a wide search

## Key Features:

**Client** - Johnson Matthey

**Industry - Application Area**

Precious metal recycling - manufacturing, route selection

**Challenge**

Finding an optimal process route in a complex system consisting of multiple steps and options

**Solution**

Customised Britest tools applied flexibly and adaptively to suit specific process and project needs

**Outcomes**

Insight into the nature and levels of risks associated with route options

A pragmatic approach to risk assessment supported efficient, decisive and sound decision making

R&D resources directed onto the more commercially attractive options

EXAMPLE 1	H & S	Environmental Sustainability	Capex	Opex	Risk		Robustness	TOTAL SCORE
Benchmark Process	3	3	3	3	1	3	3	2.7
Alternative process	1	2	2	2	3	2	3	2.1
EXAMPLE 2	H & S	Environmental Sustainability	Capex	Opex	Risk		Robustness	TOTAL SCORE
Benchmark Process	3	3	3	3	1	3	3	2.7
Alternative process	1	1	1	2	2	1	2	1.4

Examples of multi-criterion based guidance to decision making

**“ Understanding the key criteria and being able to rank options allowed us to justify the technologies we chose to focus upon. ”**

**PETER ASH, TECHNOLOGY MANAGER**

Johnson Matthey Technology Centre



*Generating value from process understanding*

### Contact

+44 (0)161 327 1579

enquiries@britest.co.uk

www.britest.co.uk