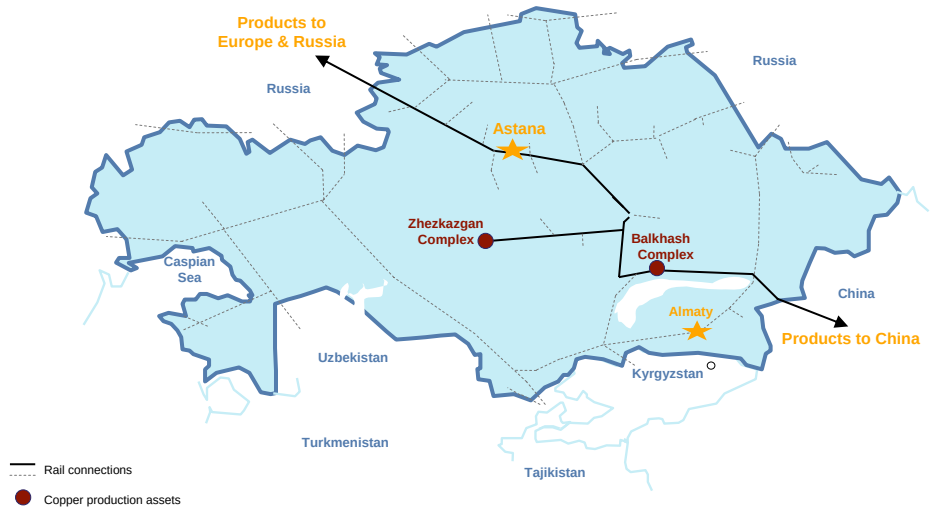
DEVELOPMENT OF THE TECHNOLOGY FOR PRODUCTION OF HIGH-PURITY AMMONIUM PERRHENATE

BALKHASH COPPER SMELTER, REPUBLIC OF KAZAKHSTAN
FSUE GINTSVETMET Institute, RUSSIA

KAZAKHMYS: LARGEST COPPER PRODUCER IN KAZAKHSTAN



BALKHASH PLANT WEAK ACID: POTENTIAL RHENIUM SOURCE

Chemical composition of the weak acid of Balkhash Smelter

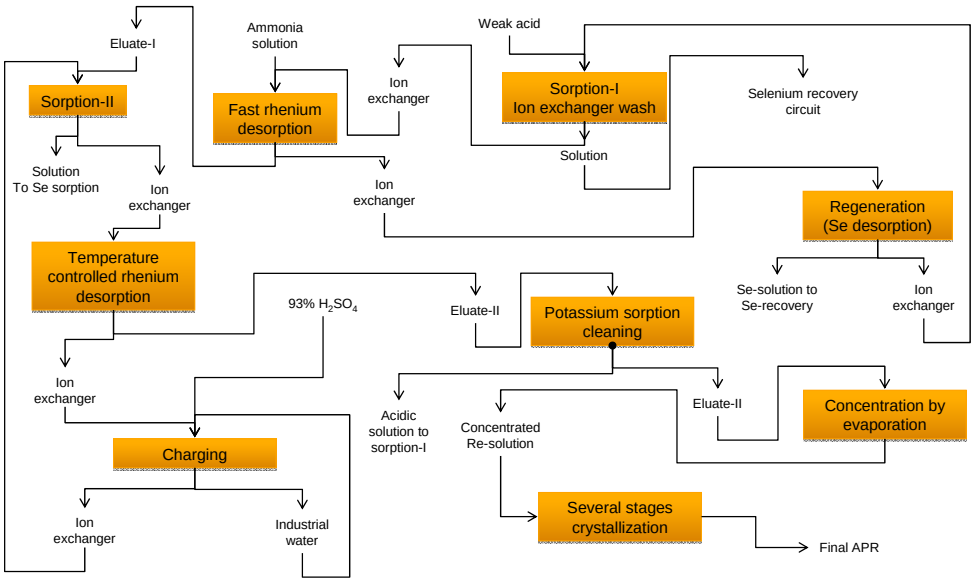
Table 1

Grade, g/l						
H_2SO_4	Re	Mo	Se	Pb	F	As
20-70	0.0083	0.0020	0.042	0.0047	0.361	1.348
Grade, g/l						
Cu	Zn	Cd	Bi	Fe	Cl	
0.0045	0.0490	0.0035	0.0013	0.0057	0.59	

Challenging conditions at Balkhash Smelter:

- Low grade and large volume of solution
- High level of impurities, especially selenium
- Potential production is more than 3000 kg per annum!

BALKHASH RHENIUM SORPTION PROCESS FLOWSHEET

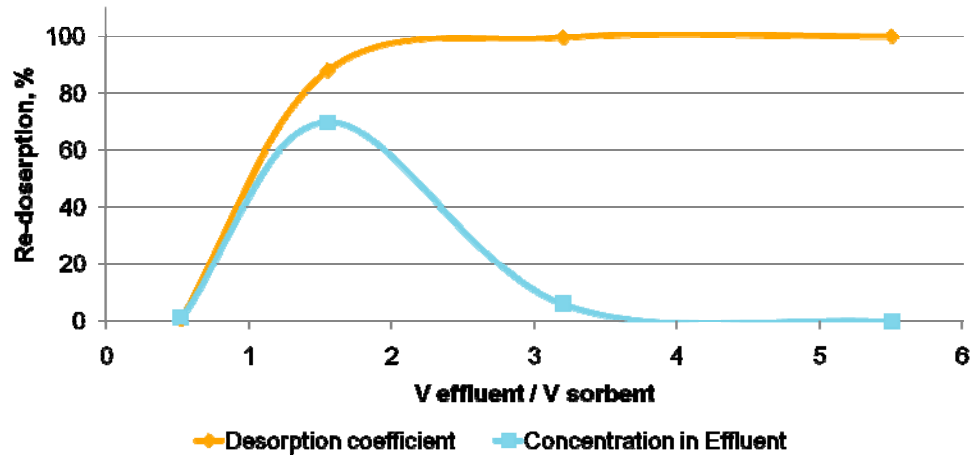


MAIN OPERETIONS OF THE FLOWSHEET

Flowsheet includes several sorption processes as follows:

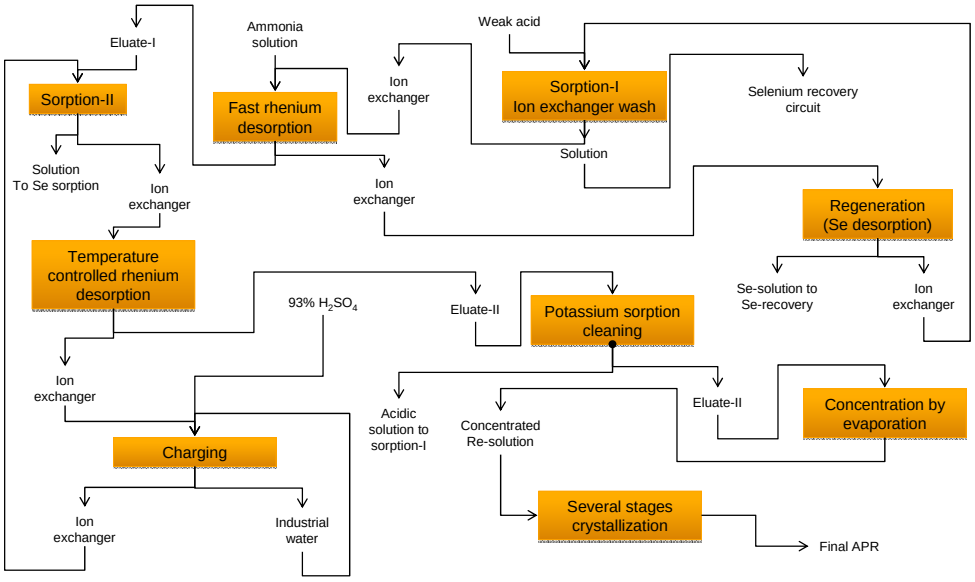
- Main sorption and sorption concentration of rhenium in weak-basic macroporous anion exchangers. The equipment for both processes is filled with the same type of resin;
- Sorption cleaning of effluents fed for final production from potassium (in sulfuric cation exchanger) and micro particles of elemental selenium (in non-ionogenic porous adsorbent);
- Stand-alone sorption unit for extraction of selenium from solutions removed from the ammonium perrhenate circuit;
- Stand-alone ion exchange water treatment at the stationary unit that allows using the water in high-grade ammonium perrhenate production circuit

DESORPTION CURVE: Commercial fraction – 2 specific volumes



Desorption process must be fast to prevent Re precipitation. Limit of 25-30 g/l of Re concentration in the solution should not be exceeded

BALKHASH RHENIUM SORPTION PROCESS FLOWSHEET



PRODUCING HIGH-QUALITY PRODUCT

Chemical composition of final APR, ppm

	Al	Fe	K	Cu	Mo	Na	S	Si
Standard TU48-7-1-90	5	5	50	0.5	5	10	20	10
APR sample	0.5	1	3	0.5	0.5	0.5	4	2


KAZAKHMYS
Thank you for attention