

Acid Leaching System
Mining & Metals Industry



Southern Peru Copper Tacna, Toquepala, Peru Platinum Pipe Award Winner - Correlation to Test/Field Data

The Toquepala copper mine operation includes an acid leaching system for copper extraction where ore is sprayed with a sulfuric acid solution. This acid and copper rich solution, called Pond Liquid Solution (PLS) is collected in ponds and then pumped back to the leaching plant. Beginning in 2007, Southern Peru Copper undertook a project to improve extraction of the PLS fluid, evaluate alternate system configurations and improve pumping efficiency.

Referred to as the Área 823 Sistema de Bombeo de PLS, the pumping system utilizes three pumping

“AFT Fathom reduced the amount of time needed for the analysis and provided a clean description of the pressure and flow results.”

stations in series over the pipeline measuring 7-km (4.65 mi). Each pumping station is equipped with three pumps, two normally operating, rated at 1,100 m³/hr (11,341 gpm). Design head is varied according to the pumping station location along the pipeline to achieve high pumping efficiency, and ranges from 360-760 meters (1,181-2,493 feet). Pumps are equipped with variable speed drives for efficient capacity control.

System testing was conducted under a variety of operating scenarios to verify the design. Arturo Saenz, mechanical design engineer at Southern Peru Copper's Central Project Office, compared the measured flow

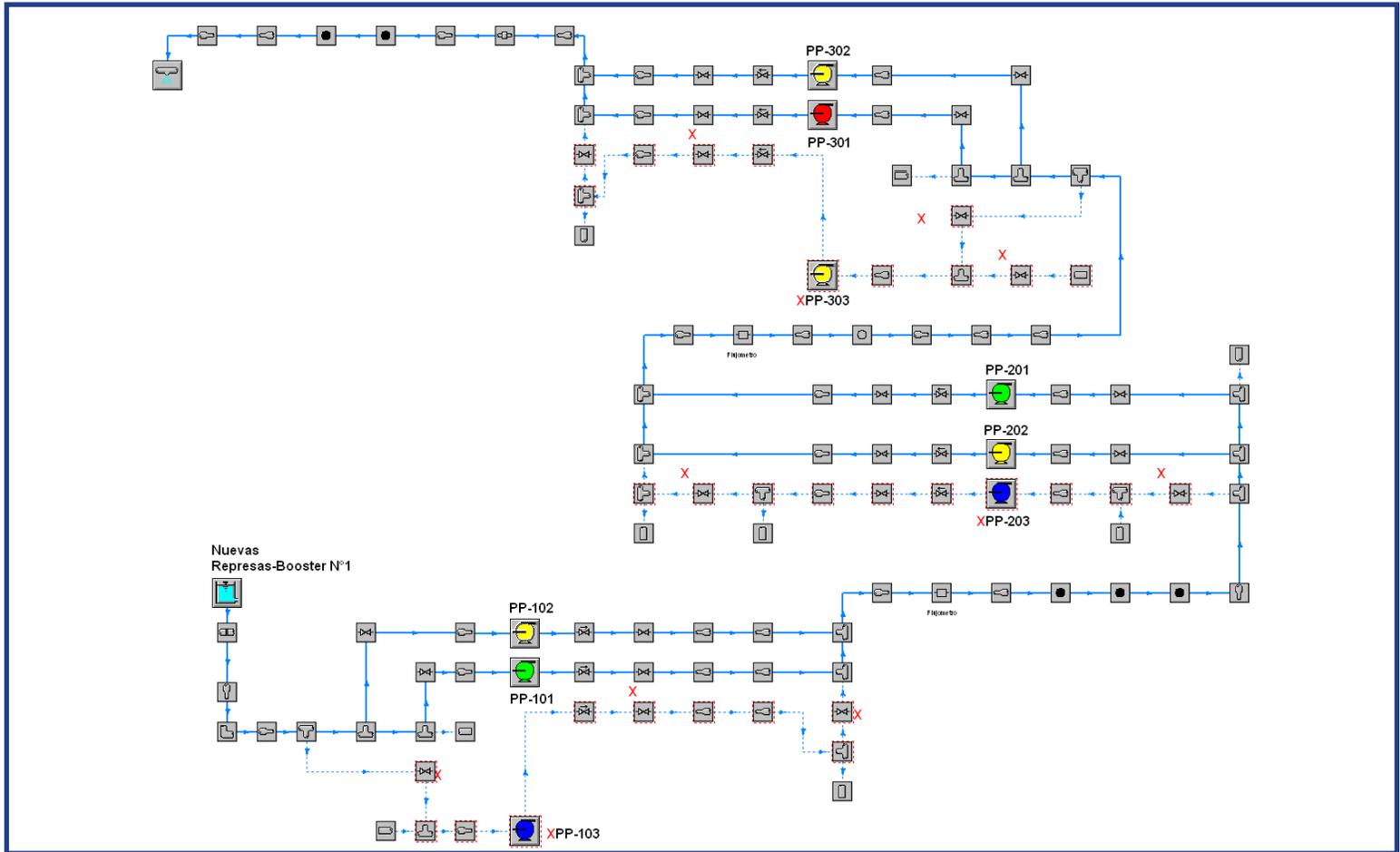
over 14 tests to that predicted by their AFT Fathom model and found they agreed within 1%.

Asked about the advantages obtained modeling the system with AFT Fathom, Arturo commented that it reduced the time required for design analysis, provided clear results and confirmed a good design approach that saved money.



Toquepala Copper Mine electrical wiring frame and excavations for pipelines and bank boxes

Southern Peru Copper's Toquepala copper mine is one of four mining operations in Peru and Mexico within the SCC group (with associated metallurgical complexes). It is an integrated copper producer and was named the 'Best Managed Metals and Mining Company' in Latin America by Euromoney.



Model diagram for Southern Peru Copper's Área 823 Sistema de Bombeo


SOUTHERN PERU
12:18:35 PM

NUEVAS REPRESAS DE LIXIVIACION

NIVEL EN %



REPRESA PLS 64.99 %



General		Warnings		Pump Summary		Valve Summary		Reservoir Summary	
Jct	Name	Vol. Flow (m3/hr)	dP (psid)	dH (feet)	Overall Efficiency (Percent)	Overall Power (kW)	BEP (gal/min)	% of BEP (Percent)	
101	PP-101	1,083	268.4	584.4	84.20	660.7	5,915	80.60	
102	PP-102	1,499	271.0	590.1	87.40	889.6	6,500	101.52	
201	PP-201	1,729	164.1	357.3	85.86	413.1	5,460	91.07	
202	PP-202	1,452	166.5	362.4	86.61	534.2	6,000	106.57	
301	PP-310	1,007	348.1	757.8	78.73	852.2	6,825	64.97	
302	PP-320	1,575	351.9	766.1	87.43	1,212.8	7,500	92.43	

FLUJO m3h **2576.0**

% POSIC VALV.	99.50	99.50	99.50	99.50
PRE SUCC PSI	30.62	29.69	16.36	16.39
PRE DESC PSI	304.86	305.88	193.52	191.47
VELOCIDAD VFD	RPM	1638		1638
	%	91.00		91.00
AMP. VFD	144 A	85 A		
% DE AMP.				
KW VFD	771KW	494KW		
AMP. PLACA	187 A	100 A		

AFT Fathom Results

PP-101 = 1,083 m³/hr (4,768 gpm)

PP-102 = 1,499 m³/hr (6,599 gpm)

Total **2,582 m³/hr (11,367 gpm)**

Measured Flow

Total **2,576 m³/hr (11,341 gpm)**