

Case Study:

Platinum Creek Mine - Alaska  
2008 - 2011



## Summary

- ✓ Over 216,000 cubic meters of alluvial ground processed in Western Alaska during 2010 - 2011 seasons by an AuVert Production 200 plant.
- ✓ Historic jig and sluice systems used on site for 40 years. 2009 season ran over 43,000 cubic meters with a modern jig system averaging a recovery of only 54.5%
- ✓ AuVert system installed starting in 2010. Average recovery of 90.3% of available raw platinum recovered by the AuVert plant over two seasons.
- ✓ AuVert plant would produce an additional 9,560 ounces of raw platinum/gold in year round production in comparison to the jig recovery unit.

<b>Example of Recovery % for AuVert vs. Conventional</b>				
	<b>Average Re-covery %</b>	<b>Grade of Au/Pt per meter</b>	<b>Recovered Grade</b>	<b>Oz per month @ 200 cu/m per hour</b>
Jig System	54.5%	0.60	0.33	1,210.6
AuVert Plant	90.3%	0.60	0.54	2,007.4
<b>Increased ounces per month recovered by AuVert:</b>				<b>796.8</b>
<b>USD per month at \$1,500 per ounce metal price:</b>				<b>\$1,195,154</b>

## Introduction

In April of 2010, James Slade, founder of AuVert Recovery Systems Ltd. was contacted by the owners of XS Platinum Inc. to design and commission a plant for recovery of alluvial platinum & gold at their Platinum Creek Mine in western Alaska. The Platinum Creek Mine is the historic Goodnews Bay Mining Company which had produced over 600,000 ounces of platinum from 1934 to 1977 by traditional dredging with jig and sluice recovery methods.

XSP had purchased the property with the intention of using more modern recovery methods to reprocess the dredge tailings and continue mining in the remaining virgin areas. The initial plant they installed in 2009 was a jig based recovery system, very similar to the old dredge methods. The first phase of the AuVert plant was installed in the summer of 2010, with the next modules delivered and commissioned in 2011.

The company had retained Watts, Griffis and McQuat, Consulting Geologists & Engineers to develop a drill program and monitor the production of the plant for the 2009 and 2010 season. The work was done by John R. Rae, P. Geo and J. M. Rae. The numbers quoted here are taken from their daily reports, spread sheet data and final reports.

The site is very remote and is only accessed by landing craft or airplane. There is no road connection to the rest of Alaska. The mine is operated seasonally with dates from late April to October giving a potential of 5 to 6 months of production. These limitations impacted the delivery and set up of the equipment and further complicated parts and operational supplies. The result was more intermittent operations of the plant than would be expected normally. The management of the company did not budget for these extra costs and subsequently gaps in production occurred while waiting for mundane parts and supplies.

The mine closed in the fall of 2011 because a key part of the AuVert plant design, the water clarifier, was not ordered by XSP's management which caused a violation of the permits. This closure resulted in ownership changes in the company, management shake up and eventually the mine was returned to the original owners. At this time AuVert has been approached to finish the commissioning of the plant for a new operator and it will restart production in the 2014 season.

The jig recovery system used in 2009 averaged a recovery percentage of 54.5% which means it lost nearly half of the platinum present in the feed. The AuVert plant averaged 90.3% recovery with monthly average highs of 97.5%.

## Equipment & Results for 2009 Season

XSP had purchased a used aggregate wash screen which fed the minus 6mm material to a multi-jig recovery system. It consisted of six 42"x42" Duplex IRD Pan American Primary Jigs feeding the concentrate to a secondary 42"x42" Duplex IRD Pan American which again fed a smaller 26"x26" Duplex IRD Pan American Cleaner Jig which produced the final concentrate.

The wash plant plant and jig hutch water consumed over three thousand gallons of water per minute and were not efficient in their recovery. The plant began washing material in September of 2009 and ran into late

October before being shut down for the season. Based on the daily logs maintained by Watt, Griffis the following chart outlines their production and recovery percentages for the 2009 season. The recovery of raw platinum and gold only averaged 54.7% for the entire season. This means that nearly half of the metal was lost to tailings using the modern version of the historic jig recovery systems.

This system was dismantled in spring 2010 and removed from the site.



**Pan American Jig Recovery Unit - Alaska, 2009**

	<b>Tonnage</b>	<b>Feed Rate cu. meters/ hr</b>	<b>Raw Grams</b>	<b>Raw Grams per ton</b>	<b>Raw Grams per meter</b>	<b>Recovery %</b>
<b>September</b>	56,087.0	132.5	4,995.2	0.09	0.18	53.54%
<b>October</b>	30,539.2	96.4	8,648.9	0.28	0.57	55.41%
<b>2009</b>	<b>86,626.2</b>	<b>114.5</b>	<b>13,644.1</b>	<b>0.16</b>	<b>0.32</b>	<b>54.47%</b>

**Production Data from the 2009 Season**

## Equipment & Results for 2010 Season

The AuVert designed plant was installed in Alaska in several phases, beginning with the key components in the spring of 2010. The first phase was to add a Knelson concentrator model XD40 as the main recovery unit to replace the jig system. This was installed in June of 2010. The intent of the 2010 season for XSP was to bulk sample the property in three different areas to get operational data for further expansions. This meant variations in feed, consistency, etc on a daily basis. Those sampling requirements meant reduced operating speed and subsequent reductions in plant performance.

In addition to feed variables, the amount and grade of raw platinum contained in each area was extremely variable. It also held different percentages of heavy black sand which effected the recovery on the Platinum and Squirrel Creek Bulk Sample as the AuVert designed magnetic separator was not yet installed in the circuit.



**Phase 1 Knelson Concentrator & dewatering screen**

	<b>Tonnage</b>	<b>Feed Rate cu. meters/hr</b>	<b>Raw Grams</b>	<b>Raw Grams per ton</b>	<b>Raw Grams per meter</b>	<b>Recovery %</b>
<b>Phase 1 Testing</b>	53,904.7	49.6	32,219.2	0.60	1.20	97.5%
<b>Squirrel Creek Bulk</b>	19,500.3	117.6	5,455.3	0.28	0.56	81.5%
<b>Salmon Bulk Test</b>	18,344.9	117.4	512.1	0.03	0.06	96.1%
<b>Platinum Creek Bulk</b>	30,539.2	105.4	454.6	0.01	0.03	79.7%
<b>Phase 2 Testing</b>	52,266.7	116.4	11,936.4	0.23	0.46	n/a
<b>2010</b>	<b>174,555.8</b>	<b>101.3</b>	<b>50,577.6</b>	<b>0.29</b>	<b>0.58</b>	<b>90.3%</b>

**2010 Production Numbers with recovery percentage**

## Equipment & Results for 2011 Season

The 2011 season for the Platinum Creek Mine was an awful year. It was plagued from the beginning with funding issues and the lack of spare parts, etc affected the performance of the plant. In addition, the



**Phase 2 Plant in 2011**

management of the mine decided to use a contract operator to move the material from the mining face to the plant. This contract was ill-conceived and resulted in over supplying the plant during equipment set up periods. This meant the ore would sit in the rain and become even more difficult to process. End result was a partial year of production starts and stops.

It finally ended in September with a voluntary shut down of the process plant due to high turbidity issues from colloidal clay colored water leaking into the Salmon River. This exceeded the permit limits and required a shut down. XSP's management. Without that key piece of the plant, the water quality reduced to levels which exceeded their permits and the mine was closed. This was the final trigger for changed in the ownership of the company and replacing of the XSP management team.



Due to costs, the owners did not engage Watts, Griffis & McQuat to complete the plant analysis for the 2011 season. During the operating season, internal tests were done to determine recovery percentages. These tests showed numbers that were in line, or better than, the results outlined by Watts, Griffis & McQuat.

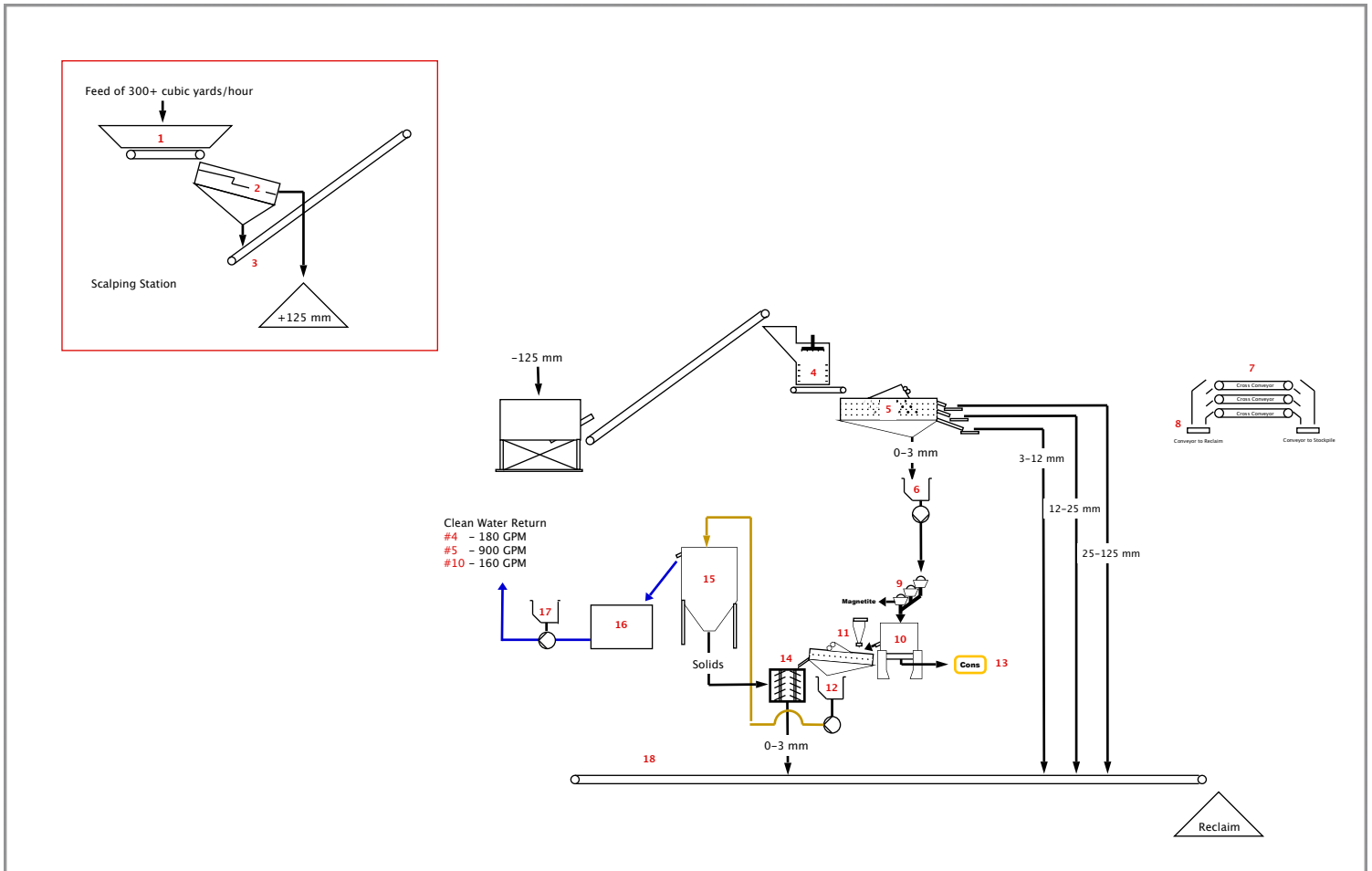
	<b>Tonnage</b>	<b>Feed Rate cu. meters/ hr</b>	<b>Raw Grams</b>	<b>Raw Grams per ton</b>	<b>Raw Grams per meter</b>	<b>Recovery %</b>
<b>June</b>	38,117.5	172.4	5,079.0	0.13	0.27	n/a
<b>July</b>	62,342.7	201.2	7,823.5	0.13	0.25	n/a
<b>August</b>	125,578.0	147.7	12,902.6	0.10	0.21	n/a
<b>September</b>	31,749.0	190.1	14,049.1	0.44	0.89	n/a
<b>2011</b>	<b>257,787.1</b>	<b>177.9</b>	<b>39,854.2</b>	<b>0.15</b>	<b>0.31</b>	<b>n/a</b>

**Production Data from the 2011 Season**

<b>2011 Season</b>	<b>Tons</b>	<b>Load #</b>	<b>Flushes</b>	<b>Run Time</b>	<b>Cu. Me- ters</b>	<b>LCM/Hr</b>	<b>Tons/Hr</b>
<b>August 24, 2011</b>	3,703	2,116	14	9.00	1,841	204.5	411.4
<b>August 26, 2011</b>	5,308	3,033	17	11.00	2,639	239.9	482.5
<b>August 27, 2011</b>	3,798	2,170	12	9.00	1,888	209.8	422.0
<b>August 28, 2011</b>	5,806	3,318	19	11.00	2,886	262.4	527.8
<b>August 29, 2011</b>	3,419	1,954	14	8.00	1,700	212.5	427.4
<b>August 30, 2011</b>	4,332	2,475	15	8.00	2,154	269.2	541.5
<b>August 31, 2011</b>	3,056	1,746	11	10.50	1,519	144.7	291.0
<b>September 1, 2011</b>	2,868	1,639	16	9.00	1,426	158.4	318.7
<b>September 2, 2011</b>	3,399	1,942	10	10.00	1,690	169.0	339.9
<b>September 3, 2011</b>	1,778	1,016	5	4.00	884	221.0	444.5
<b>September 4, 2011</b>	4,147	2,370	16	10.35	2,062	199.2	400.7
<b>September 5, 2011</b>	2,584	1,477	9	4.00	1,285	321.2	646.0
<b>September 6, 2011</b>	3,514	2,008	13	6.00	1,747	291.2	585.7
<i>Extraction from Daily Production Sheets for Platinum Creek Mine</i>							

**This excerpt from the production database shows the production levels of the plant varied with the amount of clay content. Levels as high as 262.4 cubic meters per hour were achieved with feed of average clay content.**

## Process Flow Sheet for 2011



- |                                    |   |
|------------------------------------|---|
| 1 - Feed Hopper                    | 10 - Knelson concentrator                           |
| 2 - Dry Scalper for oversize rocks | 11 - De-Watering screen for sand removal            |
| 3 - Stacking Conveyor              | 12 - Sump and pump to clarifier                     |
| 4 - Hydroclean Wash Units          | 13 - Pump to Metal Recovery Room                    |
| 5 - Triple deck rinse screen       | 14 - Pug Mill to blend sand and clarifier discharge |
| 6 - Fines sump and pump            | 15 - Clarifier/Thickener                            |
| 7 - Cross conveyors                | 16 - Fresh water tank                               |
| 8 - Reclaim/Stacking conveyors     | 17 - Clean water supply pumps for plant             |
| 9 - Triple drum magnetic separator | 18 - Radial stacker for reclamation                 |

## Appendix

### **XSP - Platinum Creek Mine Documentation**

- 1) **Daily Logs XS Program Updated W Assay Results.xlsx**, 2009 results log prepared by Watts Griffis, McQuat's representative Johnson Rae.
- 2) **XS Monthly Production Report FINAL.xls**, summary of daily reports for 2009 on PCM production numbers, internal report.
- 3) **Pre-Sampling Report**, prepared by Johnson Rae, Alex Rae, Assistant Geological Technicians, on behalf of Watts, Griffis and McQuat, Consulting Geologists & Engineers. Dated June 25, 2010
- 4) **Pre-Sampling Report**, prepared by John R. Rae, P. Geo and Johnson M. Rae, on behalf of Watts, Griffis and McQuat, Consulting Geologists & Engineers. Dated August 24th, 2009
- 5) **Platinum Mining in Alaska**, by Charles Johnston, Goodnews Bay Mining Company, published in Platinum Metals Review, 1962, 6, (2)
- 6) **Phase 1 Production PCM**, internal spreadsheet summarizing the daily production reports from July of 2010. These numbers include the loss calculations made by Watts, Griffis, & McQuat.
- 7) **Production Sheets.xls**, internal spreadsheet with complete shift production numbers for the PCM from 2010 and 2011.

### **General Reference Documents for the AuVert methods**

- 1) **Recovery of Placer Gold Using the Knelson Concentrator**, Luis A. Meza, Willy Hartman, Carlos A. Escobar, Universidad Nacional de Columbia, Facultad de Minas - CIMEX. A report on the recovery efficiencies of the Knelson.
- 2) **Sand and Gravel Plants as Potential Sources of Gold Production in the European Union**, M. Viladevall, J.A. Pacheco and J. L. Cadena. A well researched report which compares sluice box recovery of <12% to the Knelson at 85% recovery.