PROCEDURE

GOLD RECOVERY AUDIT

Revision 3 | 27 June, 2022

It is well understood that gold recovery rates are linked to particle size and shape – however not measured in most placer gold operations.

Field studies in the late 80s and early 90s using radioactive gold tracers suggested that Yukon gold recoveries were very high (> 90%) and that no economically recoverable gold below 100 micron was present. To note: The tracers used were originally caught in a sluice box. However, in other parts of the world, alluvial gold finer than 100 micron can make for a relevant portion of a resource.

This Macon Recovery Audit aims at determining actual recovery rates as a function of (1) sluice profiles, geometry and feed conditions and (2) gold particle size. The analytical approach is supported by adopting industry standard procedures from the hard rock industry (i.e. Bulk Gravity Assays). Establishing a standard audit procedure allows for results to be entered into a database for comparing the recovery rates of operations. The data so generated can be used for informed equipment optimization and case studies.

An audit should be scheduled for a dedicated day processing representative pay material and at the end of which the sluice runs are cleaned out. Some minor production impact is expected due to coordinated start and stop of the audit run and extra diligent cleanouts and cleanups.

Prior to starting the audit, a Macon representative will inspect the plant and record relevant parameters such screen apertures, sluice configuration and inclination. The start time is recorded and feed tonnage to the plant is measured as a function of weighted excavator buckets. Oversize tonnage must also be recorded as weighted excavator or loader buckets. Slurry conditions on the sluice runs are measured multiple times throughout the audit day.

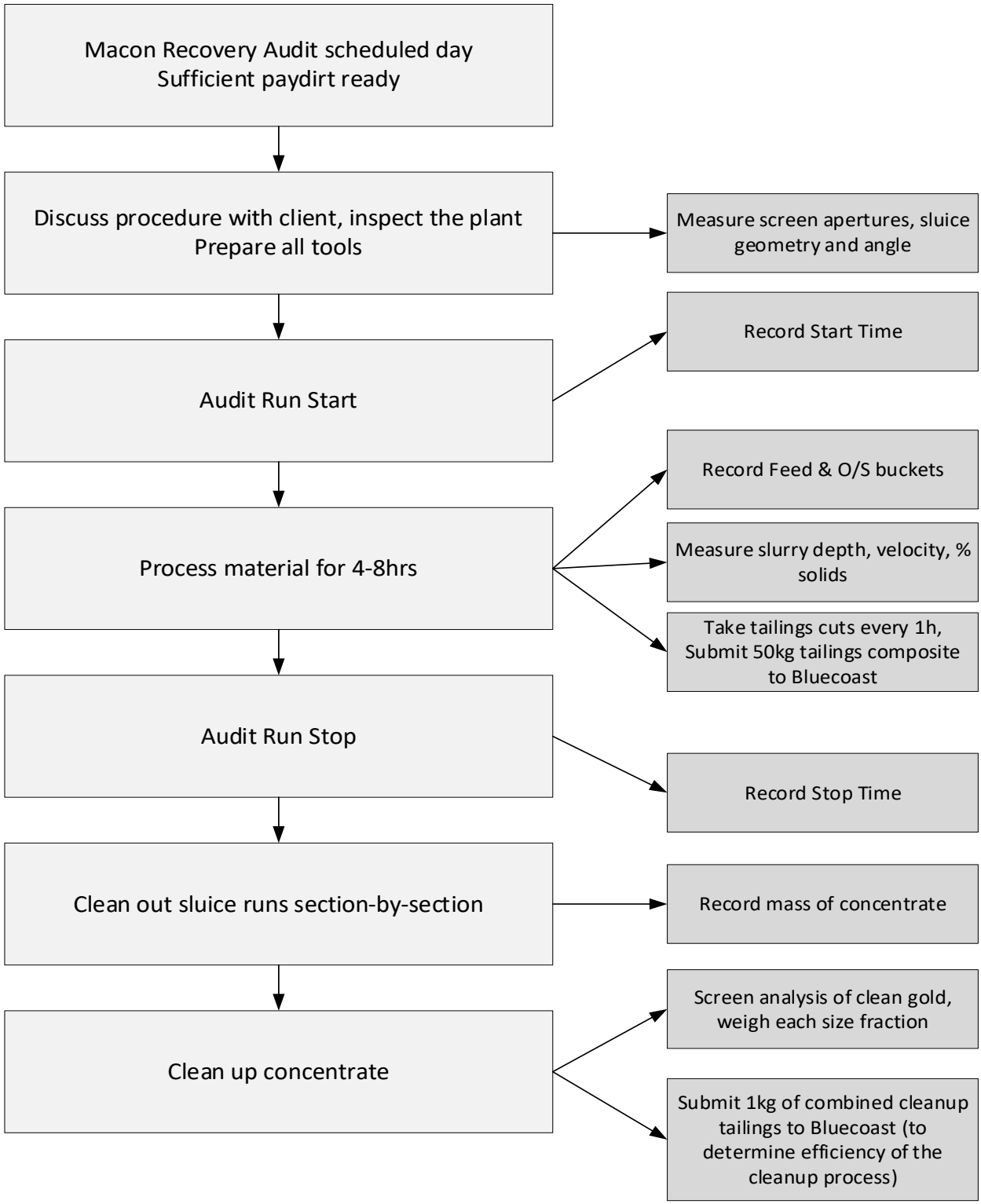
Samples of the sluice tailings are taken in 1h intervals and the samples are then combined to a composite total weight of approximately 50kg for submission to Macon's affiliated metallurgical laboratory.

The stop time is recorded after approx. 4-8 hrs of continued operation. The sluice runs are cleaned out section-by-section. Concentrate contained in each section is weighed and then cleaned separately (if time and effort permits) using the existing cleanup system at the mine. Clean gold is then screened (dry or wet) into 6 size fractions (+4mm, 1-4mm, 300micron-1mm, 150-300 micron, 75-150micron, -75 micron). Gold in each size fraction gets weighed at site. No gold loss will occur. A 1kg sample of the cleanup tailings should be collected and submitted to Macon for additional analysis which helps determine the efficiency of the cleanup process.

Macon has developed a repeatable test protocol: The +1mm material is excluded from all laboratory tests because it is expected that any gold coarser than 1mm was recovered on the sluice runs. Bulk gravity assays (BGA) are performed on the 0-1mm material. This involves extracting gravity recoverable gold (GRG) through a GRG test to eliminate the potential nugget effect. Tailings and concentrate from the GRG test are sized into four fractions (+300 micron, 150-300 micron, 75-150 micron, - 75 micron) for fire assays. Concentrate is assayed to extinction.

The measurements from the field (concentrates) and those from laboratory (tailings) will be compiled into a detailed report and submitted to the client.

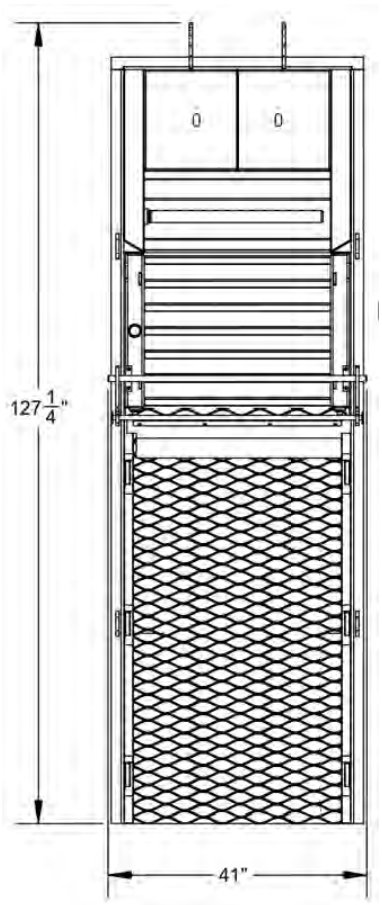
The field audit procedure is outlined in the following flowchart:



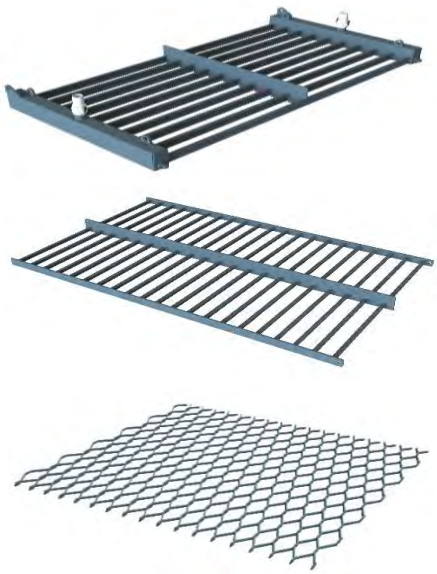
1) SLUICE PROFILES, GEOMETRY AND FEED CONDITIONS

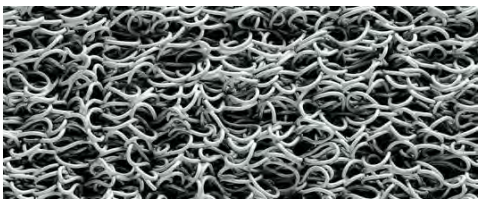
This part of the audit requires a good documentation of the existing sluice run configuration and measuring feed and slurry flow conditions. Width, length, slurry depth, slurry velocity of each sluice section is measured and recorded. We also measure and record the tonnage feed to the plant, % oversize in feed and/or % fines in feed, screen aperture (mm), total wash water volume (flow meter) and the resulting %-solids of the slurry on the sluice runs (Marcy scale). This will allow confirming the equipment is operated within best practice parameters.

At the end of the audit run each sluice section is cleaned separately to determine gold deportment.



Boil Box
Hydraulic Riffles
Angled Riffles
Expanded Metal over Nomad
Nomad only





REQUIRED TOOLS:

- Tape Measure
- Timer, Camera
- Marcy Scale
- Flow Meter

2) GOLD PARTICLE SIZES

<100 micron	very fine gold
100-1000 micron	moderately fine gold
> 1000 micron	medium/coarse gold

A pilot scale study by UBC (1988) suggests that recovery rates for 1-10H expanded over Nomad can be 99+% for gold coarser than 150 micron, tapering off towards finer sizes. No recovery information exists about gold finer than 100 micron. Macon's audit results can be presented graphically and compared to the UBC benchmark.

The recovery curve is constructed from gold in concentrate (measured in the field) and gold in tailings (measured by laboratory).

REQUIRED TOOLS:

- Sample Cutter
- 5x sealed 20gal pails for sample submission
- Small Sieves 75 micron, 150 micron, 300 micron, 1mm, 4mm
- Digital scale (0.1g accuracy)
- Optical gold analyzer (HiGrade DPI tool)