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Techno-economical evaluation of dewatered stack tailings concept flow sheet options: a case study

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Abstract

Recent tailings storage facility (TSF) failures and the resulting changing legislation requirements to reduce environmental impact and water consumption are placing emphasis on ensuring that the best available technology is applied when designing a tailings management system.

This has brought about a need for wider evaluation of tailings dewatering technology approaches.

TAKRAF Group was commissioned in July 2023 by Knight Piésold to undertake a conceptual desktop study to evaluate various dewatering tailings technology flow sheets, coupled with materials handling and stacking to the designated dump area, for a copper nickel mine expansion project in Central Africa.

This paper focuses on the technology evaluation and methodology applied in the study. It considers capex, installed power, water recovery, metals recovery and process flexibility for a number of processing options. This was done with the emphasis on different filtration and thickening technologies.

The paper is limited to the evaluation of the process dewatering technologies and has excluded the tailings storage, transportation and geotechnical drivers in its consideration.

Keywords: *dewatering stack tailings, dry stack tailings, DST, filtration, thickening, DST flow sheet selection, fines coarse filtration.*

1 Introduction

Knight Piésold was selected to evaluate the viability of implementing a dewatering stack tailings (DST) facility for a copper nickel mine expansion project in Central Africa. In July 2023 Knight Piésold tasked TAKRAF Group to undertake the DST desktop study for the evaluation of the jointly identified DST flow sheet options inclusive of stacking to a designated dump area.

The desktop study methodology utilised a two-phase approach in its evaluation:

- phase one: high-level concept development, and screening of DST concept flow sheet options
- phase two: basic engineering, capex development and evaluation of DST concept flow sheet options.

Figure 1 shows the two-phase approach.

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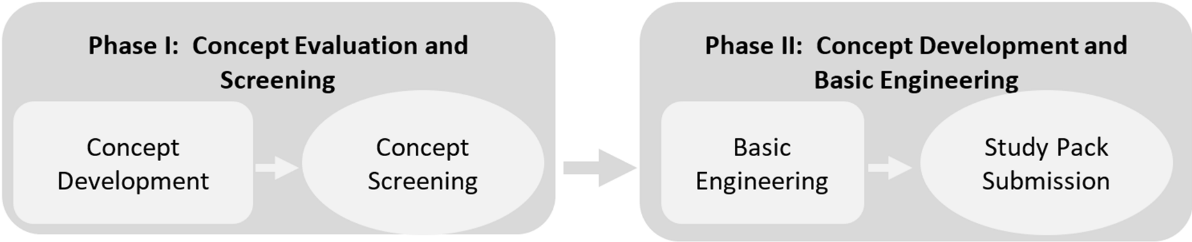

Figure 1 Study methodology representation

Both phases drew on existing orebody knowledge, and TAKRAF, DELKOR's metallurgical experience of the specific orebody from previously undertaken test work for major process equipment selection and sizing to evaluate the viability of each of the DST concept flow sheet options. This paper uses a similar methodology as shown by Zamorano (2020).

2 Methodology

2.1 Overview

The design of the optimal DST circuit is complex and requires evaluation of the various unit processes.

Key determining drivers are (1) the extent to which tailings can be cost-effectively dewatered to achieve a conveyable tailings product, and (2) the client's elected tailings deposition philosophy. For the purposes of the desktop study methodology, the tailings continuum delineation according to Ulrich (2019), were considered.

Figure 2 represents the tailings management continuum considered.

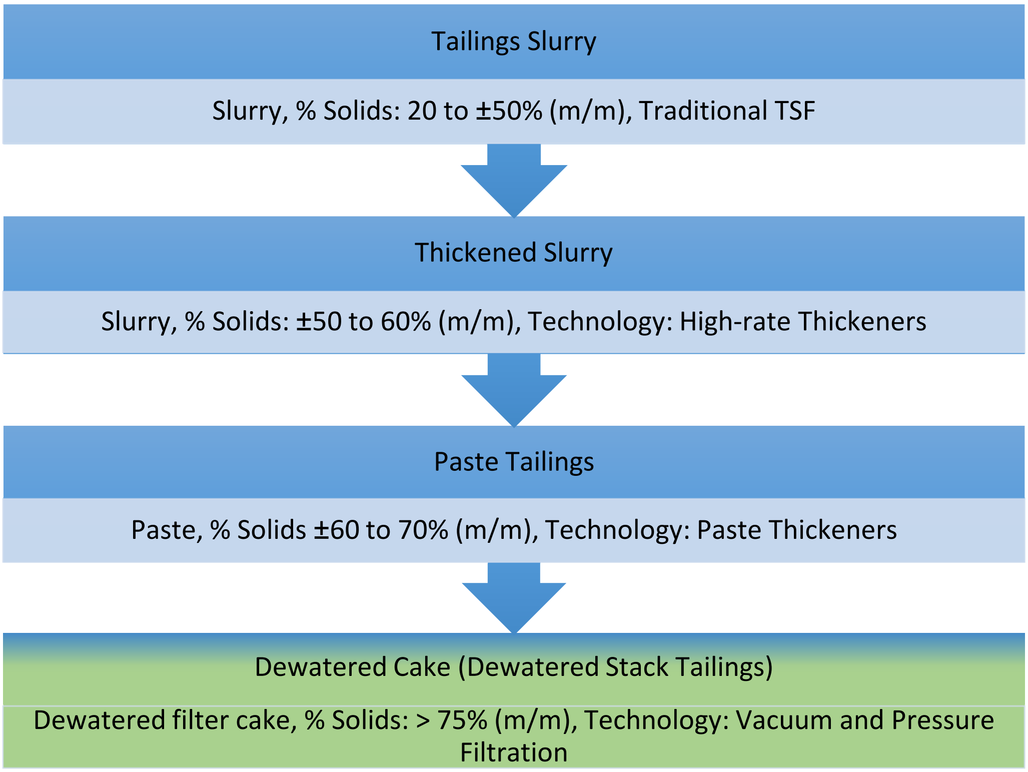

Figure 2 Tailings management continuum

2.2 Plant design criteria

2.2.1 Overview

As a starting point to the development of the respective DST flow sheet options, a basic plant design criteria was developed.

An extract of the plant design criteria is shown in Table 1.

Table 1 Plant design criteria

Item no	Location and environmental	Unit	Maximum (design)
1	Site Location	–	Democratic Republic of Congo
2	Altitude	m	1,350
3	Temperature (min)	°C	16
4	Temperature (max)	°C	30
5	Temperature (avg)	°C	22
6	Rainfall per annum	mm	1,170–1,220
Item no	**Throughput capacity**	**Unit**	**Design value**
1	Nameplate capacity	mtpa	3,50
2	Slurry description	–	Plant tailings
3	Feed solids mass flow (dry tonnes)	t/hr	550
4	Solids SG	–	2.80
5	Feed % solids (by mass)	m/m	25–40
6	Life of mine	Years	23
Item no	**Particle size distribution**	**Unit**	**% passing**
1	425	µm	90
2	300	µm	89
3	212	µm	88
4	150	µm	85
5	106	µm	79
6	75	µm	72
7	53	µm	63
8	37	µm	54
9	26	*u*m	45
10	19	µm	37

2.2.2 Baseline assumptions

The baseline assumptions were put forward by TAKRAF, DELKOR based on experience of the orebody (Table 2) and the tailings continuum delineation according to Ulrich (2019)

Table 2 Baseline assumptions

Item no	Baseline assumptions	Yield stress range (Pa)	% solids range (m/m)
1	Conventional slurry tailings	5–20	20–50
2	Thickened tailings	20–100	50–60
3	Paste tailings	100–800	60–75
4	Filtered tailings	>800	>75

2.2.3 Client preferred technology

The client identified high-rate thickening and vacuum filtration as the preferred technologies as these were already deployed at the existing operation.

2.3 Concept evaluation criteria

The criteria considered in the evaluation of the DST concept flow sheets were:

- capex
- installed power
- system water recovery
- soluble metals recovery
- circuit process flexibility
- dewatering extent.

2.4 Standardised scoring

2.4.1 Step 1: Scoring

Following the development and basic engineering of each of the DST flow sheets, a score out of 10 was assigned to each flow sheet option, with 0 being poor and 10 being the best, for each the respective evaluation criteria.

2.4.2 Step 2: Criteria weighting

A weighting % was then assigned to each evaluation criteria.

2.4.3 Step 3: Adjustment

The initial score (from step 1) was then multiplied by the respective criteria weighting for each of the concept flow sheet options.

2.4.4 Standardised score

The sum of the evaluation criteria adjusted scores then provided a standardised score for each of the respective concept flow sheet options.

3 Phase one concept development

3.1 Dewatering stack tailings concept flow sheets overview

Table 3 represents the range of DST flow sheet matrix options considered for the desktop study.

These options were broadly categorised in terms of their main classification, being conventional tailings deposition, upfront processing, thickening and filtration.

Table 3 Dewatering stack tailings flow sheets categorisation matrix

Item no	Classification description	Conventional tailings dam	Screens, cyclones	High-rate thickening	Paste thickening	Pressure filtration (filter press)	Vacuum filtration (horizontal belt filter)
1	Conventional tailings deposition	X	–	–	–	–	–
2	Thickening	–	X	X	X	X	X
3	Filtration	–	–	–	–	X	X

Within the main classification variants, there exists further subgroup classification iterations representing the 12 concept flow sheets identified at the study initiation phase (Table 4).

Table 4 Dewatering stack tailings concept flow sheet schedule

Main classification	Description	No	Flow sheet designation
Conventional TSF	Baseline traditional TSF (Opt_0001)	1	0001
Thickening with upstream de-grit cyclones	Upfront de-grit cyclones, high-rate thickening with TSF (Opt_002A)	2	002A
	Upfront de-grit cyclones, paste thickening with TSF (Opt_002B)	3	002B
Thickening with TSF	High-rate thickening with traditional TSF	4	003A
	Paste thickening with TSF	5	003B
Filtration	Pressure filtration	6	004A
	Vacuum filtration with DST	7	004B
Thickening with filtration	High-rate thickener with pressure filtration	8	005A
	High-rate thickener with vacuum filtration with DST	9	005B
Hybrid: upfront de-grit cyclones, thickening with filtration with TSF	Upfront de-grit cyclones, high-rate thickener with pressure filtration with TSF	10	006A
	Upfront de-grit cyclones, high-rate thickener with vacuum filtration with TSF and DST	11	006B
	Upfront de-grit cyclones, high-rate thickener with vacuum filtration, pressure filtration and DST	12	006C

3.2 Concept evaluation and screening

Following phase I's basic development of each of the concepts identified (Table 4), the following DST concept flow sheets were excluded from further engineering development based on the client's preferred dewatering technologies and tailings deposition philosophy:

1. upfront de-grit cyclones with paste-thickening (002B)
2. paste-thickening (003B)
3. pressure filtration (004A)
4. high-rate thickening with pressure filtration (005A)
5. upfront de-grit cyclones, high-rate thickening with pressure filtration (006A).

4 Phase two basic engineering development

4.1 Overview

The following concepts were selected for further engineering development:

1. upfront de-grit cyclones with high-rate thickening (002A)
2. high-rate thickening with tailings storage facility (TSF) (003A)
3. vacuum filtration (004B)
4. high-rate thickening with pressure filtration (005B)
5. upfront de-grit cyclones with high-rate thickening and vacuum filtration (006B)
6. upfront de-grit cyclones with high-rate thickening, pressure filtration and vacuum filtration (006C).

4.2 Upfront cyclone separation with high-rate thickening

4.2.1 Process description

This DST concept comprises two circuits (Figure 3):

- upfront cyclone cluster
- thickening and water recovery.

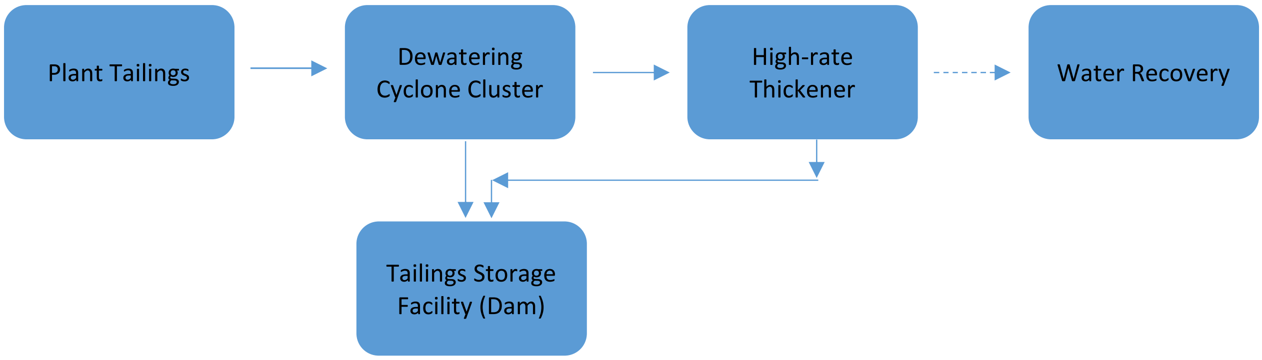

Figure 3 Block flow diagram 002A

Main plant tailings slurry is pumped to a de-grit cyclone cluster feed system comprising a cyclone feed sump and pump. Here tailings are pumped at a controlled flow and pressure to the cyclone cluster. The cyclone cluster nominally separates the slurry into a fines fraction, cyclone overflow, –70 µm, and coarse fraction, cyclone underflow, +70 µm.

Cyclone underflow discharges to a traditional TSF.

Cyclone overflow reports by gravity to the high-rate thickener. The thickener, with the addition of flocculant (polymer), settles and thickens slurry fines by gravity to the thickener discharge cone. Thickener underflow, at the increased slurry density, is pumped to the TSF.

Thickener overflow reports by gravity to the process water tank for re-use in the main processing plant (Figure 3).

4.2.2 Salient aspects of the concept flow sheet

The main objective of this concept flow sheet is solely to increase the main plant tailings slurry density. Doing so improves the overall plant water recovery and decreases the slurry tailings deposition.

4.3 High-rate thickening and paste thickening

4.3.1 Process description

This DST concept comprises a high-rate thickener (Figure 4).

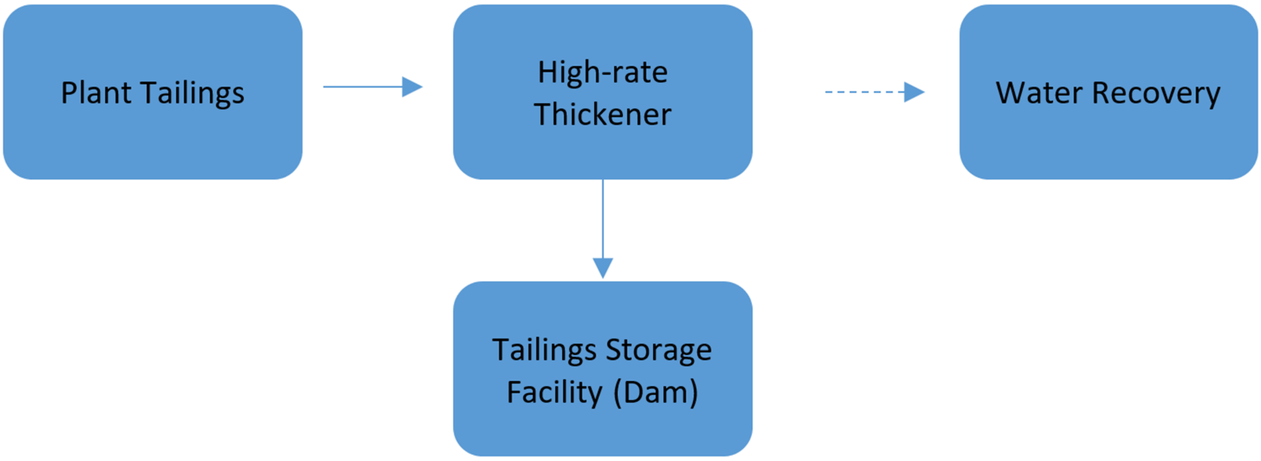

Figure 4 Block flow diagram 003A

Main plant tailings slurry is pumped to a high-rate thickener or paste thickener. The thickener, with the addition of flocculant (polymer), settles and thickens slurry fines by gravity to the thickener discharge cone. Thickener underflow, at the increased slurry density, is pumped to the TSF (Figure 4).

Thickener overflow reports by gravity to the process water tank for re-use in the main processing plant.

Flocculant is prepared in batches in the flocculant make-up module.

4.3.2 Salient aspects of the concept flow sheet

The main objective of this concept flow sheet is solely to increase the main plant tailings slurry density, thereby improving the overall plant water recovery and decreasing the slurry tailings deposition.

4.4 Vacuum filtration

Main plant tailings slurry is pumped to the vacuum filtration splitter box. From the vacuum filtration splitter box, the slurry is distributed at a controlled rate to the vacuum filtration units.
Dewatered filter cake discharges onto the tailings collection conveyor and is transferred onto the tailings stockpile conveyor.
Filtrate from each of the vacuum filtration units is collected into the filtrate collection sump and pumped to the main plant for re-use (Figure 5).

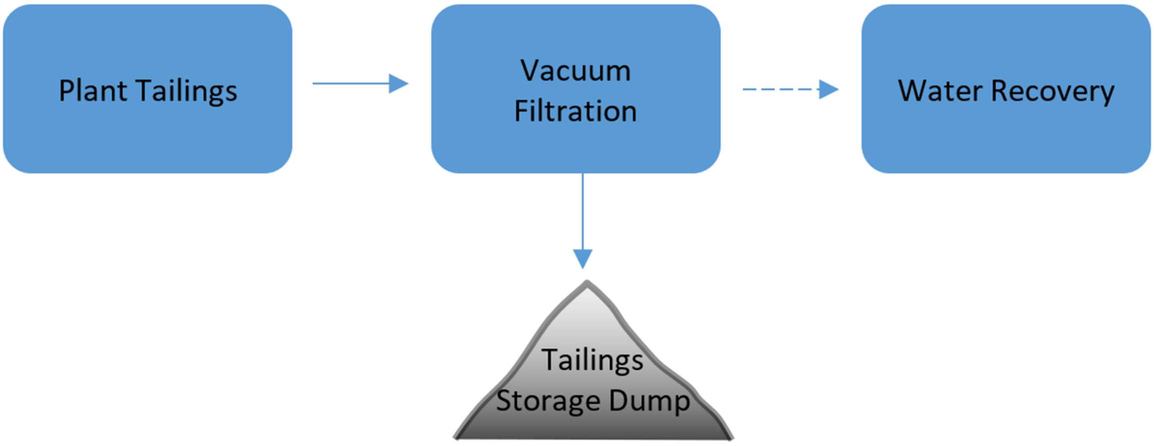

Figure 5 Block flow diagram 004B

4.4.1 Salient aspects of the concept flow sheet

The main objective of this concept flow sheet is to produce a conveyable filter cake through filtration.

4.5 High-rate thickener with vacuum filtration

4.5.1 Process description

This DST concept comprises two circuits (Figure 6):

- thickening and water recovery
- vacuum filtration.

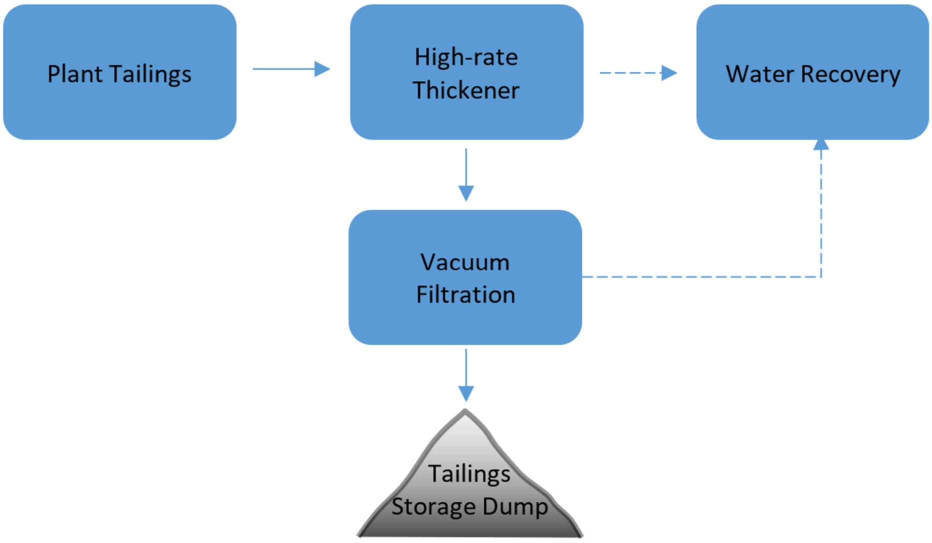

Figure 6 Block flow diagram 005B

Main plant tailings slurry is pumped to the high-rate thickener. The thickener, with the addition of flocculant (polymer), settles and thickens slurry fines by gravity to the thickener discharge cone. Thickener underflow, at the increased slurry density, is pumped to the vacuum filtration circuit feed splitter box.

Thickener overflow reports by gravity to the process water tank for re-use in the main processing plant.

From the vacuum filtration splitter box, the slurry is distributed at a controlled rate to the vacuum filtration units.

Dewatered filter cake discharges onto the tailings collection conveyor and is then transferred onto the tailings stockpile conveyor.

Filtrate from each of the vacuum filtration units is collected into the filtrate collection sump and pumped to the DST thickener.

4.5.2 Salient aspects of the concept flow sheet

The main objective of this concept flow sheet is to produce a conveyable filter cake through filtration.

4.6 Upfront cyclone separation, high-rate thickener with vacuum filtration

4.6.1 Process description

This DST concept comprises three circuits (Figure 7):

- upfront cyclone cluster
- thickening and water recovery
- vacuum filtration.

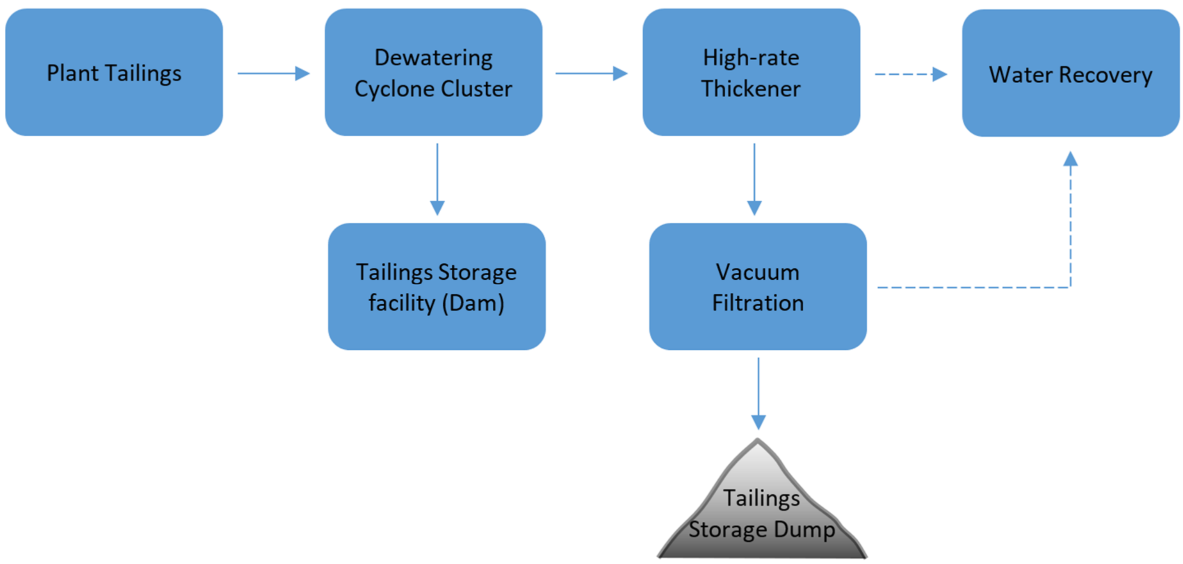

Figure 7 Block flow diagram 006B

Main plant tailings slurry is pumped to a de-grit cyclone cluster feed system, comprising a cyclone feed sump and pump. Here tailings are pumped at a controlled flow and pressure to the cyclone cluster. The cyclone cluster nominally separates the slurry into:

- a fines fraction (cyclone overflow) of -70 µm
- a coarse fraction (cyclone underflow) of +70 µm.

Cyclone underflow discharges to a traditional TSF. Cyclone overflow discharges by gravity to the thickener.

The thickener, with the addition of flocculant (polymer), settles and thickens slurry fines by gravity to the thickener discharge cone. Thickener underflow, at the increased slurry density, is pumped to a vacuum filtration circuit feed splitter box.

Thickener overflow reports by gravity to the process water tank for re-use in the main processing plant.

From the vacuum filtration splitter box, the slurry is distributed at a controlled rate to the vacuum filtration units.

Dewatered filter cake discharges onto the tailings collection conveyor and is transferred onto the tailings stockpile conveyor.

Filtrate from each of the vacuum filtration units is collected into the filtrate collection sump and pumped to the DST thickener.

4.6.2 Salient aspects of the concept flow sheet

The main objective of this concept flow sheet is to produce a conveyable filter cake through filtration of only part of the tailings stream (cyclone overflow).

4.7 Upfront cyclone separation, high-rate thickener with vacuum and pressure filtration

4.7.1 Overview

This DST concept comprises four circuits (Figure 8):

- upfront cyclone cluster
- thickening and water recovery
- pressure (fines) filtration
- vacuum (coarse) filtration.

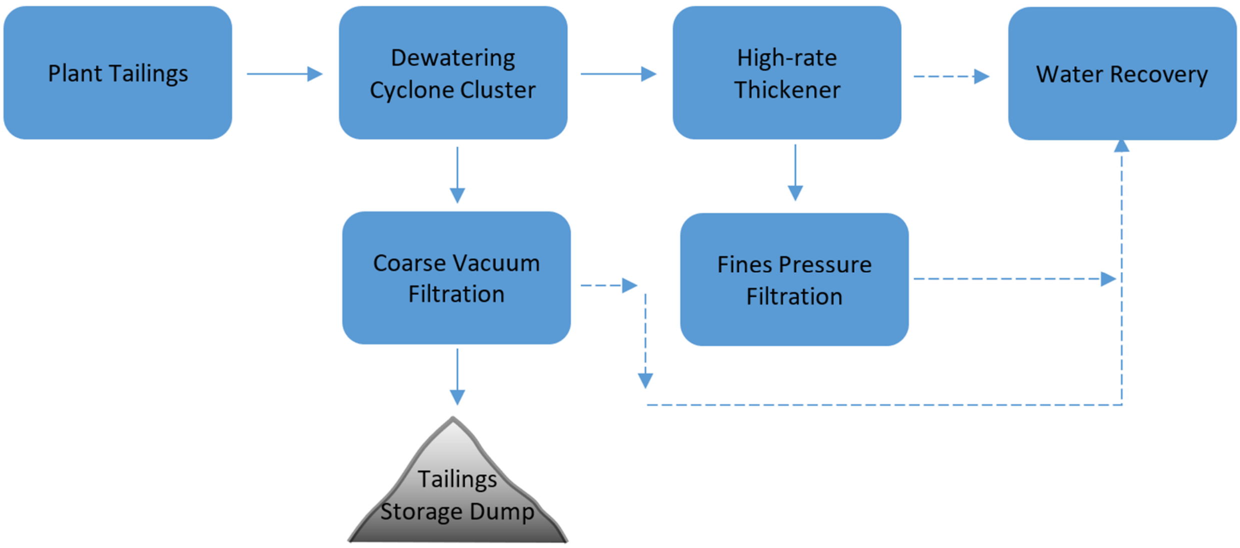

Figure 8 Block flow diagram 006C

Main plant tailings slurry is pumped to a de-grit cyclone cluster feed system, comprising a cyclone feed sump and pump. Here tailings are pumped at a controlled flow and pressure to the cyclone cluster. The cyclone cluster nominally separates the slurry into:

- a fines fraction (cyclone overflow) of -70 µm
- a coarse fraction (cyclone underflow) of +70 µm.

Cyclone underflow (coarse fraction) discharges to the vacuum filtration circuit splitter box. Cyclone overflow (fines fraction) discharges by gravity to the thickener.

From the vacuum filtration splitter box, the slurry is distributed at a controlled rate to the vacuum filtration units.

Dewatered filter cake from the vacuum filtration circuit discharges onto the tailings collection conveyor and is transferred onto the tailings stockpile conveyor.

Filtrate from each of the vacuum filtration units is collected into the filtrate collection sump and pumped to the DST thickener.

The thickener, with the addition of flocculant (polymer), settles and thickens slurry fines by gravity into the thickener discharge cone. Thickener underflow, at the increased slurry density, is pumped to the pressure filtration circuit feed splitter box.

Thickener overflow reports by gravity to the process water tank for re-use in the main processing plant.

Dewatered filter cake from the pressure filtration circuit discharges onto the tailings collection conveyor and is transferred onto the tailings stockpile conveyor.

4.7.2 Salient aspects of the concept flow sheet

The main objective of this concept flow sheet is to produce a conveyable filter cake through filtration.

This concept flow sheet optimises utilisation of filtration unit capacity by means of a fines/coarse filtration circuit, ultimately reducing the overall filtration area required. A 3D rendering of the concept is shown in Figure 9.

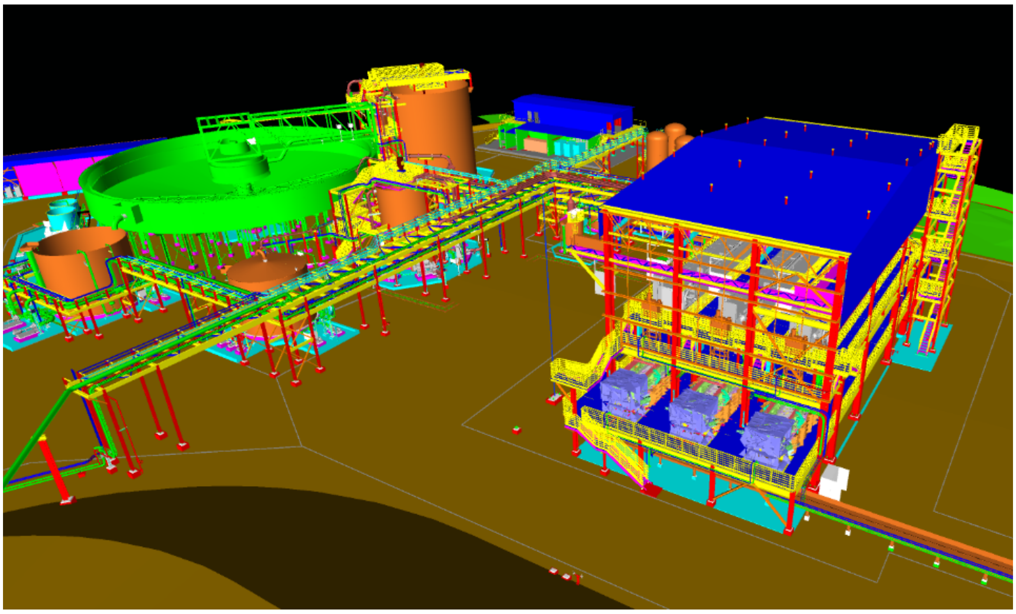

Figure 9 High-rate thickener with vacuum and pressure filtration conceptual layout

4.8 High-level mass balance

Mass balances for each of the DST flow sheet options were developed.

The summary shows the throughput for the key streams of the DST project and the operating parameters for the respective concept flow sheets (Table 5).

Flux rate data for major equipment sizing is based on TAKRAF, DELKOR's metallurgical experience of the specific orebody from previously undertaken test work.

Table 5 High-level mass balance

Item/criteria	Upfront de-grit cyclones, high-rate thickening with TSF (Opt_002A) 002A	High-rate thickening with traditional TSF (Opt_003A) 003A	Vacuum filtration with DST (Opt_004B) 004B	High-rate thickener with vacuum filtration with DST (Opt_005B) 005B	Upfront de-grit cyclones, high-rate thickener with vacuum Filtration with TSF and DST (Opt_006B) 006B	Upfront de-grit cyclones, high-rate thickener with vacuum and pressure filtration and DST (Opt_006C) 006C
Cyclone classification						
Dry solids feed, t/hr	550	–	–	–	550	550
Feed % solids by mass	40	–	–	–	40	40
% solids feed to underflow, by mass	43	–	–	–	43	43
Cyclone cut point (D_{50}), µm	70	–	–	–	70	70
Underflow % solids by mass	74				74	74
Underflow solids rate, t/hr	237	–	–	–	237	237
Thickening						
Dry solids feed, t/hr	313	550	–	550	313	313
Underflow % solids by mass	55	55	–	55	55	55
Underflow yield stress, Pa	40–80	40–80	–	40–80	40–80	40–80
Solids loading, t/m^2.hr	0.3	0.4		0.4	0.3	0.3
Pressure filtration						
Dry solids feed, t/hr	–	–	–	–	–	313
Feed % solids by mass	–	–	–	–	–	55
Cake moisture, % by mass	–	–	–	–	–	80
Filtration flux rate, t/m^2.hr						0.55
Vacuum filtration						
Dry solids feed, t/hr	–	–	550	550	313	237
Feed % solids by mass	–	–	40	55	55	55
Cake moisture, % by mass	–	–	80	80	80	75
Filtration flux rate, t/m^2.hr			0.5	0.9	0.9	1.4

4.9 Major equipment sizing

Based on the values given in Table 5 we can estimate the sizes of the major dewatering equipment as shown in Table 6.

Table 6 Major equipment sizing

Item/criteria	Upfront de-grit cyclones, high-rate thickening with TSF (Opt_002A) 002A	High-rate thickening with traditional TSF (Opt_003A) 003A	Vacuum filtration with DST (Opt_004B) 004B	High-rate thickener with vacuum filtration with DST (Opt_005B) 005B	Upfront de-grit cyclones, high-rate thickener with vacuum filtration with TSF and DST (Opt_006B) 006B	Upfront de-grit cyclones, high-rate thickener with vacuum and pressure filtration and DST (Opt_006C) 006C
Thickener						
Area requirement, m^2	1,043	1,375	–	1,375	1,043	1,043
Thickener diameter, m	36	42	–	42	36	36
Pressure filtration						
Area requirement	–	–	–	–	–	569
Unit area, m^2	–	–	–	–	–	640
No of units	–	–	–	–	–	1
Vacuum filtration						
Area requirement	–	–	1,100	611	348	169
Unit area, m^2	–	–	160	160	160	180
No of units	–	–	7	4	3	1

5 Results

5.1 Dewatering stack tailings concept flow sheets score

Table 7 represents the unadjusted criteria scoring of each of the DST flow sheet options.

Table 7 Concept flow sheet unadjusted score

Item	002A	003A	004B	005B	006B	006C
Capex	10	7	5	3	7	7
Installed power	7	10	5	3	5	5
Water recovery	7	6	8	8	9	9
Process flexibility	3	7	5	7	7	10
Dewatering extent	3	5	10	10	5	10
Soluble metals recovery	0	0	10	10	5	10

Table 8 represents the assignment of dewatering extent scoring.

Table 8 Dewatering extent scoring

Item/criteria	% (m/m) Solids range	Dewatering extent score
Tailings	0–50	3
Thickened tailings	50–60	5
Paste tailings	60–70	7
Dewatered tailings	>70	10

Figure 10 qualitatively represents the unadjusted criteria score for the respective DST concept flow sheets.

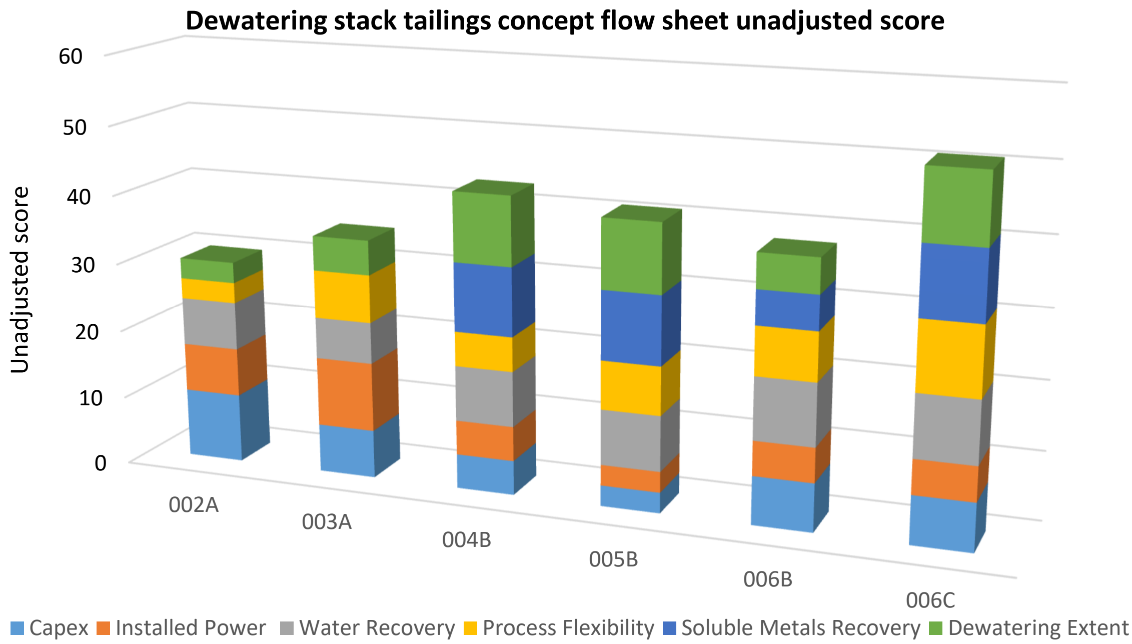

Figure 10 Dewatering stack tailings concept flow sheet unadjusted criteria score

5.2 Adjusted score

Table 9 represents the adjusted scoring for each of the criteria for the respective DST flow sheet options.

Table 9 Concept flow sheets adjusted score

Item/criteria	Weighting	002A	003A	004B	005B	006B	006C
Capex	40%	4.0	2.8	2.0	1.2	2.8	2.8
Installed power	10%	0.7	1.0	0.5	0.3	0.5	0.5
Water recovery	10%	0.7	0.6	0.8	0.8	0.9	0.9
Process flexibility	10%	0.3	0.7	0.5	0.7	0.7	1.0
Dewatering extent	20%	0.6	1.0	2.0	2.0	1.0	2.0
Soluble metals recovery	10%	0.0	0.0	1.0	1.0	0.5	1.0
Total, adjusted score	**100%**	**6.3**	**6.1**	**6.8**	**6.0**	**6.4**	**8.2**

The criteria weighting is viewed as specific to each client's priorities and preferences.

Figure 11 represents the standardised score for each of the respective DST flow sheet options.

The green colour represents the dewatering extent for conveyable product with % solids by mass greater than 75% for the entire tailings stream, for tailings deposition to the dump area.

The blue colour represents dewatering tailings slurry to % solids of 60 to 80%, with deposition to a traditional tailings storage dam.

A score of 10 represents the best outcome, with 0 representing the poorest outcome (worst).

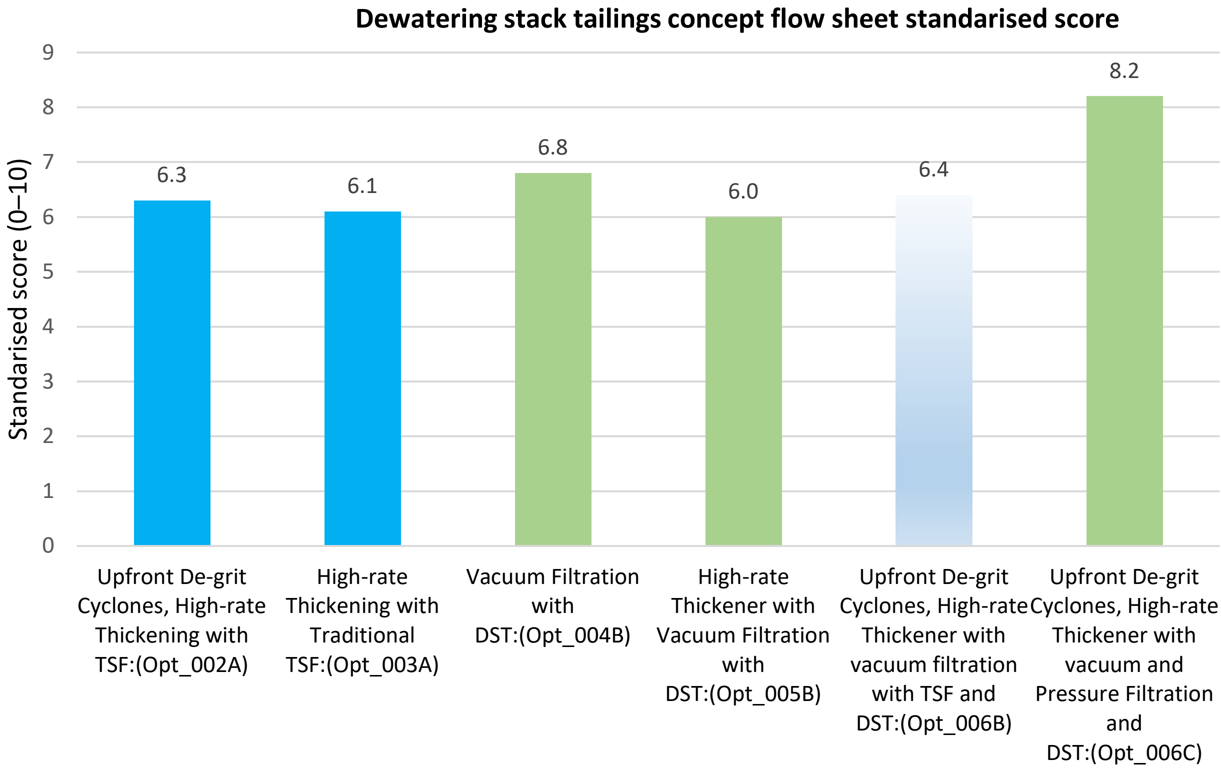

Figure 11 Dewatering stack tailings concept flow sheet standardised score

5.2.1 Comparison between full tailings stream dewatering stack tailings flow sheets

All three DST concept flow sheets – 004B,005B and 006C – offer relatively higher water recovery (> 75%) and the benefit of additional soluble metals recovery filtered cake washing.

A comparison between the flow sheet for vacuum filtration (004B) and high-rate thickener with vacuum filtration (005B) shows the trade-off between direct tailings slurry filtration of the tailings stream and increasing the slurry density before filtration. Here the filtration area is significantly reduced, however, this reduction is not enough to offset the increase for the additional process equipment (Table 8).

A comparison between the flow sheet for upfront de-grit cyclones, high-rate thickener with vacuum and pressure filtration (006C) shows the benefit of upfront classification with increasing the slurry density. Here the overall vacuum filtration area is reduced significantly enough to offset the capex increase for the additional process equipment. This is largely due to the separate filtration of the fines and the coarse fractions, resulting in significantly increased vacuum filtration flux rates.

Table 10 shows the expected number of units and equipment sizing required for the different options.

Table 10 Concept flow sheet for major equipment

Item/criteria	Vacuum filtration with DST (Opt_004B)	High-rate thickener with vacuum filtration with DST (Opt_005B)	Upfront de-grit cyclones, high-rate thickener with vacuum and pressure filtration and DST (Opt_006C)
Thickener			
Thickener diameter, m	–	42	36
Pressure filtration			
No of units, (unit area, m^2)	–	–	3 (640 m^2)
Vacuum filtration			
No of units, (unit area, m^2)	7 (160 m^2)	4 (160 m^2)	1 (180 m^2)
Major equipment			
No of major equipment pieces	7	5	6
Capex score	5	3	7

5.3 Discussion

As can be seen from the DST concept flow sheet score matrix, the high-scoring DST flow sheet options for capex are:

- upfront de-grit cyclones, high-rate thickening with TSF (002a)
- high-rate thickening with traditional TSF (003a)
- upfront de-grit cyclones, high-rate thickener with vacuum filtration with TSF and DST (006b)
- upfront de-grit cyclones, high-rate thickener with vacuum filtration, pressure filtration and DST (006c).

The capex in each case is largely driven by the selection and number of major equipment pieces in each circuit. This, in turn, is determined by the respective equipment's performance or flux rates with respect to orebody geometallurgical characterisation.

The highest capex scoring (that is, the lowest capex) flow sheet—the upfront de-grit cyclones, high-rate thickening with TSF (002A)—achieves a capex score of ten as the number of major equipment pieces is relatively lower compared to the other flow sheets. However, the higher dewatering extent to conveyable cake (% solids by mass greater than 80%) is not achieved in this option.

The second highest capex scoring flow sheet—upfront de-grit cyclones, high-rate thickener with vacuum filtration and pressure filtration (006C)—with a capex score of seven, achieves the lowest capex while also achieving a high dewatering extent for a conveyable product, with a dewatering extent score of 10.

5.4 Process design features of the viable flow sheet option

The flow sheet for upfront de-grit cyclones, high-rate thickener with vacuum filtration, pressure filtration and DST (Opt_006C) achieves the highest overall score for the evaluation criteria.

Given the orebody's characterisation, specifically the tailings stream particle size distribution (0–400 µm), this flow sheet offers capability to efficiently process and dewater both the fine and coarse particle size range of the tailings stream.

This flow sheet achieves comparatively higher flux rates through the separate filtration of fines and coarse streams from the upfront cyclone cluster classification.

The higher flux rates achieved, in turn, reduce the filtration area significantly to offset the capex increase for the additional process equipment.

This flow sheet also offers additional process flexibility in that the upfront cyclone classification can be adjusted by means of changing the cyclone cut point to suit and optimise the overall and process unit mass balance to accommodate variations in the feed ore.

6 Conclusion

Often during project study phases, DST systems are discarded due to large filtration area requirements for high throughput mines.

The study demonstrates that with adequate referenced metallurgical test work data: (1) clear patterns of the most viable techno-economical DST solutions come to the forefront; and (2), that with innovative approaches to DST flow sheet development the capex can be significantly reduced compared to traditional DST flow sheets.

In this case study the fines/coarse fraction split approach is exploited to reduce the DST filtration area requirement and, in doing so, the DST system capex. Similar methodologies can be adopted to orebodies with a high clay and/or high mica content.

Ultimately, the viable techno-economical DST flow sheet development must be guided by the geometallurgical characterisation of the orebody.

References

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