MIDWEST VANADIUM PTY LTD

WINDIMURRA VANADIUM PROJECT
AREA 25 - LEACH CONTROL PHILOSOPHY

PROJECT DOCUMENT NO.: 6033-G-00-F-008

PROTEUS DOCUMENT NO.: 06033-SP-009

NO	DATE	REVISION DESCRIPTION	BY	CHK	APP
2	1/10/08	Revised For Information	MG	PD	BE
1	23/07/08	Revised For Information	MG	PD	BE
0	10/07/08	Issued For Construction	MG	PD	BE

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1.0 PROCESS DESCRIPTION

Ref (6033-25-J-1001, 6033-25-J-1002, 6033-25-J-1003, 6033-25-J-1004)

1.1 Calcine Quench System

The hot, fine, calcine material, which discharges from the bucket elevator, enters the quench vessel feed chute (25CHU502) and is quenched with process liquor, which directs the calcine slurry into the quench vessel (25VSL501). Liquor from the vats is recycled to quench the hot calcine material via the leach vat recycle pump (25PPC513 A/B). The calcine material experiences thermal shock when contacted with the recycle solution and disintegrates to aid leaching of sodium vanadate ($NaVO_3$). The slurry from the quench vessel is discharged via a slewing chute (25CHU501) into one of three leach vats (25TNK506, 507, 508). The recycle pumps (25PPC513 A/B) are fed from the leach vat overflow launders.

The quenching of hot calcine generates significant volumes of steam and dust. These are drawn from the quench vessel discharge hood and through to the quench scrubber (25SBR501). The air/steam/dust mixture is scrubbed of particulates and fine droplets before being discharged to the atmosphere by the quench scrubber ID fan (25FAN501) and stack (25STK501). The scrubber effluent is discharged into a tank (25TNK510) and pumped (25PPC512 A/B) back to the quench vessel.

1.2 Leach Vat Operation

Three leach vats are provided with a capacity of 2,400 tonnes of calcine each. Each vat is 10 metres wide, 25 metres in length, and 5.6 metres deep. The base of each vat is fitted with a network of support steel upon which grid mesh and media are positioned. Filtrate from the vat passes through the media and is channelled through the support structure to the discharge pump suctions. The walls of the vat and the base above the filter membrane are protected by rails.

The vat leaching process commences with the transfer (25PPC502 A/B) of slug dose from the slug dose tank (25TNK502, 503) to the relevant vat overflow launder. The leach vat recycle pumps (25PPC513 A/B) transfers the majority of the slug dose from the launder to the quench vessel and scrubber. The excess slug dose gravitates into the vat taking approximately 4 hours to fill the vat and give a continuous overflow.

The liquor filters through the filter media in the base of the vat and is recirculated by the vat discharge pump (25PPC507 A/B, 508 A/B, 509 A/B) to the vat. All the time, overflow from the vat is continuously recycled to the quench vessel.

As the calcine slurry is discharged into the vat, it must be spread to ensure that a relatively even layer of calcine is attained within the vat. This is achieved by the slewing drive mechanism (25CHU501A) of the transfer sluice, which traverses continuously along the 25 metre length of the vat. As the vat fills with quenched calcine, the level of solution in the vat rises and the excess is bled to the slug dose tank via the leach vat discharge pumps.

The act of quenching the calcine and the continuous recirculation of filtrate results in the dissolution of the water soluble sodium vanadate present in the calcine. By the time the vat has been completely filled with calcine, the recirculating solution

has dissolved the soluble vanadium to give a concentration of approximately 50 grams per litre of V_2O_5.

The leach vat discharge pump (25PPC507, 508, 509) transfers a set volume of liquor to the pregnant liquor storage tank (25TNK505). When the solution level in the vat reaches the calcine level, a preset volume of wash water from the leach wash tank (25TNK501) is pumped (25PPC501) into the vat. This wash water is used to carry out a displacement wash of the calcine. When the liquor transfer to the pregnant liquor tank is complete, the remaining liquor is transferred to the slug dose tank in preparation for the next batch.

The leached and washed calcine, with 8.5% moisture, is dug out of the vat by the excavator and transported to the calcine dump (25DAM501) via dump trucks. Upon the completion of the discharging of calcine tailings, the vat is again available to accept the next batch of calcine.

1.3 Calcine Dump Operation

Barren calcine from the leach vats is discharged by excavator and transported to the calcine tailing dump via dump trucks, in addition to filter cake from the desilication process and FeV slag. The desilication material is stockpiled on the dump separate to the calcine and a bulldozer is utilised to spread the calcine evenly across the dump. A truck wash down pad is provided to facilitate the wash down of any vehicle which has been working with the calcine dump area and needs to move to a clean area. Wash down slurry is pumped (25PPS504) back to the calcine dump.

The calcine tailings dump is constructed with the calcine solids being placed over a HDPE membrane. Low saline water is sprayed over the calcine tailings via the calcine dump dust suppression system (25DSN501). Solution that permeates through the dump is drained out and collected in the calcine dump pond from which it is pumped by a pontoon pump (25PPS505) to the leachate return pond. The continuous drenching of the dump is necessary to avoid wind dispersion of dust. The excess solution is analysed for V_2O_5 and pumped back to the leach wash tank.

The facility has been designed to enable the entire vat wash water requirement to be added to the calcine dump and then transferred to the leach wash tank to maximise the recovery of soluble vanadium in the calcine dump, and render the remaining calcine benign.

2.0 CONTROL PHILOSOPHY

The control philosophy for the Leach Area is described in the following Sections:

- Scrubbing system
- Quench system
- Leach vat operation.
- Calcine dump operation

The quench and scrubbing systems are continuous process whilst the leach vat operation is a batch process.

2.1 Scrubbing System

The quench scrubber consists of an adjustable venturi, gas separator, fan (25FAN501) and stack (25STK501). The quench scrubber fan (25FAN501) draws steam and dust produced in the quench vessel through the quench scrubber (25SBR501) and expels clean gas to the atmosphere via the stack.

The leach vat-recycle pump (25PPC513A/B) transfers leach liquor from the operating vat to the quench vessel (25VSL501) and the scrubber (25SBR501). The leach vat recycle pump is fixed speed and the standby pump provided, automatically starts on the failure of the duty pump. The pump suction and discharge are equipped with actuated valves to enable the operation of the pumps from the PCS. The actuated valves are fail closed, fitted with proximity switches to indicate valve position and are interlocked to the operation of the pumps.

The flow of quench liquor to the venturi is controlled (FIC255124) to an operator input flow rate set point via a flow control valve (FCV255124). The quench liquor saturates the gas stream with respect to water. The acceleration and then deceleration of the saturated gas stream across the venturi throat produces a pressure drop whereby affecting the separation of solids from the gas stream. The pressure drop across the venturi is accomplished by adjustment of the throat blade gap using a position controlled pneumatic cylinder. The pressure drop is measured by a differential pressure meter (PDT255112) positioned across the venturi.

The recovered solids and quench liquor gravitate to the scrubber discharge tank (25TNK510). The temperature of the scrubber discharge tank is monitored (TI255123), the tank is also equipped with continuous level measurement (LE255121) to control (LIC255121) the speed (SC255121A/B) of the scrubber discharge pumps (25PPC512A/B) to maintain a constant level in the tank. The scrubber discharge pumps are variable speed and the standby pump provided, starts automatically on the failure of the duty pump. The pump suction and discharge are equipped with actuated valves to enable the operation of the pumps from the PCS. The actuated valves are fail closed, fitted with proximity switches to indicate valve position and are interlocked to the operation of the operating pump. The scrubber discharge pump transfers the scrubbed slurry to the quench vessel (25VSL501).

The saturated gas is drawn through the separator where entrained droplets are collected on the demister pads and the liquid gravitates to the scrubber discharge tank. The demister is provided with a bottom wash manifold to spray raw water intermittently onto the face of the demister. The demister wash water supply is controlled by an actuated valve (HV255110) and is to be initiated at preset period of 60 seconds every 5 minutes (to be fine-tuned during commissioning). A differential pressure indicator (PDAH255106) alarms at a high pressure to indicate to the operator that the demister pad is fouled. The CCR operator has the flexibility to adjust the wash timer for the spray system through the OIS. The spray water flow valves are fail closed and fitted with proximity switches to indicate valve position. A flowmeter (FE255111) fitted to the wash system alarms (FAL255111) for a low flow condition to indicate a lack of raw water supply or possibly blocked spray nozzles.

The gas product of the scrubber is drawn out by the discharge fan (25FAN501) and discharged to the atmosphere via the quench scrubber stack (25STK501). Opacity (AE255101), temperature (TI255102) and pressure (PI255103) of the exiting gas is monitored. The discharge fan is equipped with high vibration monitoring (VAH255116) and a temperature indicator (TI255116).

2.2 Quench System

The flow of quench liquor to the scrubber is controlled (FIC255124) to an operator input flow rate set point via a flow control valve (FCV255124). Quench scrubber discharge slurry and drag chain sump material are also added to the calcined material in the feed chute and helps to direct it into the quench vessel. The temperature (TI255126) inside the vessel is monitored.

The quenched slurry from the quench vessel is directed to the operating leach vat (25TNK506, 507, 508) via a slewing chute (25CHU501). The slewing chute is variable speed (SC255145) and the slewing chute position is controlled by a series of proximity switches located in each vat. A higher speed is selected when the chute moves from vat 3 to vat 1.

To avoid stopping the kiln while the slewing chute moves between the vat 1 and 3, a bypass chute (25CHU503) has been provided. A diverter gate (25DBR501) installed in the bottom of the quench vessel diverts the quenched slurry to the bypass chute. The diverter gate is actuated (HV255127) and fitted with proximity switches to indicate position.

2.3 Leach Vat Operation

Two different start-up conditions are envisaged for the leach vat system, namely the first fill and steady state vat operation. The first fill condition will only be encountered after the initial commissioning of the system or when slug dose liquor is not available.

The steady state condition occurs after prolonged operation of the vat system where the slug dose tanks are at the operating capacity and the slug dose liquor has reached an equilibrium concentration.

2.3.1 First Fill

In the absence of slug dose liquor, raw water from the leach wash tank (25TNK501) will be used to fill the selected vat. Activation of the leach wash pump (25PPC501) is a group start, opening the suction valve (HV255326) and selected discharge valve (HV255201 HV255218, HV255301) simultaneously and then starts the pump. The three discharge valves (HV255201 HV255218, HV255301) control the distribution of the raw water to the three vats. The CCR operator nominates the operating vat through the OIS and this sets the open/closed hierarchy for the operation of the valves. All valves are fail closed, fitted with proximity switches to indicate valve position and are interlocked to the operation of the duty pump. Only one vat can be filled at any one time. Should all three valves register a closed signal then the leach wash pump will be interlocked from starting.

The overflow launder for each vat is equipped with continuous level measurement alarmed at low and high level. As the vat fills, a high level alarm warns the operator to stop the leach wash pump. The failure by the operator to stop the leach wash pump will cause the vat to overflow.

The vat discharge pump (25PPC507A/B, 508A/B, 509A/B) transfers the water in the duty leach vat to one of three destinations, namely; recycled back to the duty vat, the slug dose tanks (25TNK502,503) or the pregnant liquor tank (25TNK505). Actuated valves on each of the pumps discharge pipe lines controls the destination of flow. All valves are fitted with proximity switches to indicate valve position and a closed signal from all of these valves will interlock the operation of the leach vat discharge pump.

For the first fill condition, the raw water will be directed to the slug dose tank so that the steady state cycle can be initiated.

2.3.2 Steady State Operation

The leach vat process operates on a batch system with each batch designed to take a total of approximately 52.9 hours to complete. The process comprises of the following steps:

- Slug dose transfer (4 hours)
- Fill vat with calcine (17.6 hours (including 4 hours for slug dose transfer))
- Pump out pregnant liquor and wash calcine (25.3 hours)
- Discharge calcine from vat (10 hours)

The transfer (25PPC502A/B) of slug dose from the slug dose tank (25TNK503) to the relevant leach vat overflow launder commences the leaching process for the selected vat.

The slug dose pump 25PPC502A/B transfers slug dose liquor from the slug dose tank to the overflow launder of the operating vat. A series of actuated valves (HV255227, HV255228 HV255229) on the pump discharge directs the slug dose to the selected vat. Only one valve may be open at any one time. The slug dose pump is fixed speed and the standby pump provided, automatically starts on the

failure of the duty pump. Each pump discharge is equipped with flow indication to give an instantaneous and totalised readout of volumetric flow. The flow indicators are alarmed at low flow and interlock the operation of the respective pump. Local pressure indicators fitted to the pump discharge provide a localised visual display of pump pressure and therefore confirmation of pump operation.

The majority of the slug dose pumped to the overflow launder is transferred (25PPC513A/B) from the launder to the quench vessel and scrubber. Excess slug dose liquor overflows the launder into the vat. The overflow launder for each vat is equipped with continuous level measurement alarmed at low and high level. As the vat fills with quenched calcine and the excess slug dose, the level in the vat activates the high level alarm and interlocks the operation of the slug dose pump. At this point the slug dose transfer is complete, equating to approximately 4 hours of operation.

After the commencement of the slug dose transfer, the leach vat recycle pumps (25PPC513A/B) are initiated to transfer slug dose liquor from the overflow launder to the scrubber and quench system. The leach vat recycle pumps operate continuously, cycling between the operating vats in accordance with the vat operating cycle. The leach vat recycle pumps are fixed speed and the standby pump provided automatically starts on the failure of the duty pump. The pump suction and discharge valves are fail closed, fitted with proximity switches to indicate valve position and are interlocked to the operation of the respective pump.

As the vat begins to fill with quenched calcine, liquor that has filtered down through the calcine slurry and filter media to the base of the vat is recirculated back to operating vat via the vat discharge pumps (25PPC507A/B, 508A/B, 509A/B). Each vat is equipped with a fixed speed duty and standby pump. The standby pump provided automatically starts on the failure of the duty pump. Each vat discharge pump installation is equipped with a flow indication to give an instantaneous and totalised readout of volumetric flow. The flow indicators are alarmed at low flow and, if the alarm is active for a prolonged period, interlock the operation of the respective pump. Local pressure indicators fitted to the pump discharge provide a localised visual display of pump pressure and therefore confirmation of pump operation.

After the slug dose fill sequence is complete, the increasing calcine level in the vat displaces the leach liquor causing the level in the vat to rise. The level indication in the vat overflow launder detects the increasing level and the high level alarm activates the operation of the bleed valve to direct the excess liquor to the selected slug dose tank (25TNK502, 503). A timed sequence will open the valve to the slug dose and shut the recirculating valve for short periods.

After 2,400 tonnes of calcine is added to operating vat, the vat fill sequence is complete and the slewing chute (25CHU501) moves to the next vat to commence a new batch sequence. The movement of the slewing drive from vat 3 to vat 1 requires the quench vessel diverter (25DBR501) to be activated to direct the quenched calcine slurry to the bypass chute (25CHY503). Once the slewing chute has returned to vat 1, the bypass chute is not required and the quench vessel; discharge diverter is retracted (25DBR501).

At this point, the next vat is being filled with slug dose and the suction valves to the leach recycle pump have changed to bring the new vat on line.

The next stage of the batch sequence is to recover the pregnant liquor and wash the calcine. The leach vat recycle pump continues to circulate leach liquor around

the vat until such time the CCR operator initiates the pregnant solution sequence. The pregnant solution sequence automatically opens the pregnant liquor tank valve and then closes the vat recycle valve to direct the leach liquor to the pregnant liquor storage tank (25TNK505). The volume of pregnant liquor directed to the pregnant liquor tank is an operator input at the OIS.

The magnetic flow meter provides an instantaneous readout of volumetric flow and totalised volume of leach liquor to the pregnant liquor tank. When the required volume of leach liquor has been transferred to the pregnant liquor tank, the flow controller opens the slug dose valve and then closes the pregnant liquor tank valve and the leach liquor is directed to the slug dose tank.

During the pregnant liquor transfer sequence, the level of liquor in the vat falls and when the calcine becomes uncovered, this signals the commencement of the wash sequence.

The leach wash pump (25PPC501) transfers raw water from the leach wash tank to the selected vat. A series of actuated valves (HV255201, HV255218 HV255301) on the pump discharge distributes the raw water between the three vats. Only one valve may be open at any one time. The leach wash pump is fixed speed and the pump suction is fitted with an actuated valve. Activation of the leach wash pump is a group start, opening the suction and selected discharge valves simultaneously and then starts the pump provided the valve open position switches are energised. The suction and discharge valves are fail closed and fitted with proximity switches to indicate valve position and are interlocked to the operation of the duty pump. The pump discharge is equipped with flow indication to give an instantaneous and totalised readout of volumetric flow. Local pressure indicators fitted to the pump discharge provide a localised visual display of pump pressure and therefore confirmation of pump operation.

The volume of wash water directed to the vat is an operator input at the OIS. Rather than the wash water being added as single volume, the wash water addition may be added in three equal and separate volumes to better simulate displacement washing. This sequence is time based with the operator having the ability to adjust the time sequences to accommodate different filtration rates.

When the calcine has been washed and the vat drained via the vat discharge pumps to the slug dose tanks, the calcine residue is excavated from the leach vat and transported via dump trucks to the calcine dump.

Three sump pumps are provided to keep the area free from spillage. Drag chain spillage pumps (25PPS501, 502) are utilised around the quench vessel area to pump spillage back to the quench vessel. A leach sump pump (25PPS503) is used to divert spillage to a slug dose tank. Each of the sumps is fitted with level measurement and high and low level switches to start and stop the pump respectively.

2.4 Calcine Dump Operation

The calcine residue is deposited on the calcine dump (25DAM501) along with filter cake from the desilication process and slag material from FeV production. All the material is spread over the dump with a front end loader. The desilication material

is stockpiled separately on the dump and a bulldozer is employed to spread the calcine material evenly over the dump.

Low saline water is sprayed over the calcine tailings via the calcine dump dust suppression system (25DSN501) with flow to the sprays controlled by manual valves. The resulting solution permeates through the dump and is drained to the calcine dump pond. Solution collected in the pond is pumped by a pontoon pump (25PPS505) to the leachate return pond. The pond is fitted with level indication which is interlocked at low and high level with the pump operation.

Solution collected in the leachate return pond is then pumped by a pontoon pump (25PPS506) to the leachate return tank (25TNK509). The leachate return pond is fitted with level indication, which is interlocked at low and high level with the operation of the pontoon pump. The pump is also interlocked with the high level alarm on the leachate return tank and will automatically start when the low level alarm is energised on the tank (as long as the low level alarm on the pond is not active).

The leachate return tank is fitted with level indication, high and low level alarms and is controlled by the leachate tank return pump (25PPC514). This pump transfers the leachate solution to the leach wash tank (25TNK501) as required. The operation of the pump is controlled to maintain a set point level in the leach wash tank.

A truck wash down pad is provided to wash down any mobile equipment involved in calcine residue handling. A sump pump (25PPS504) collects this slurry and pumps it to the calcine dump. The sump pump is fitted with level indication and high and low level switches which are interlocked with the pump operation.

3.0 EQUIPMENT

The following are the drives in this area:

Drive Name	Leach Slurry Distribution Chute Drive
Equipment Number	25CHU501A
Drive Type	VSD
P&ID Number	6033-25-J-1001
Modes	Auto or Manual
Alarms	Standard Variable Speed Drive
Trend	R, I, MO, Moderate
Process Interlocks	Nil
Extra	Also a Reversible Drive

Drive Name	Scrubber Discharge Tank Agitator
Equipment Number	25AGT501
Drive Type	DOL
P&ID Number	6033-25-J-1001
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	Quench Scrubber Fan
Equipment Number	25FAN501
Drive Type	Soft Starter
P&ID Number	6033-25-J-1001
Modes	Auto or Manual
Alarms	Standard Drive with soft starter
Trend	R, I, Slow
Process Interlocks	Will trip 20BE501 when Stopped

Drive Name	Leach Wash Pump
Equipment Number	25PPC501A/B
Drive Type	DOL
P&ID Number	6033-25-J-1003
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	Slug Dose Tank Pump
Equipment Number	25PPC502A/B
Drive Type	DOL
P&ID Number	6033-25-J-1002
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	Pregnant Liquor Transfer Pump
Equipment Number	25PPC505A/B
Drive Type	VSD
P&ID Number	6033-25-J-1003
Modes	Auto or Manual
Alarms	Standard Variable Speed Drive
Trend	R, I, MO, Fast
Process Interlocks	Nil

Drive Name	No. 1 Leach Vat Discharge Pump
Equipment Number	25PPC507A/B
Drive Type	DOL
P&ID Number	6033-25-J-1002
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	No. 2 Leach Vat Discharge Pump
Equipment Number	25PPC508A/B
Drive Type	DOL
P&ID Number	6033-25-J-1002
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	No. 3 Leach Vat Discharge Pump
Equipment Number	25PPC509A/B
Drive Type	DOL
P&ID Number	6033-25-J-1003
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	Scrubber Discharge Pump
Equipment Number	25PPC512A/B
Drive Type	VSD
P&ID Number	6033-25-J-1001
Modes	Auto or Manual
Alarms	Standard Variable Speed Drive
Trend	R, I, MO, Fast
Process Interlocks	Nil

Drive Name	Leach Vat Recycle Pump
Equipment Number	25PPC513A/B
Drive Type	DOL
P&ID Number	6033-25-J-1002
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Will trip 20BE501 if both 25PPC513A&B are Stopped for >30secs

Drive Name	Leachate Tank Return Pump
Equipment Number	25PPC514
Drive Type	DOL
P&ID Number	6033-25-J-1004
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	Drag Chain Spillage Pump
Equipment Number	25PPS501
Drive Type	DOL
P&ID Number	6033-25-J-1001
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, Slow
Process Interlocks	Nil

Drive Name	Drag Chain Spillage Pump
Equipment Number	25PPS502
Drive Type	DOL
P&ID Number	6033-25-J-1001
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, Slow
Process Interlocks	Nil

Drive Name	Leach Spillage Pump
Equipment Number	25PPS503
Drive Type	DOL
P&ID Number	6033-25-J-1003
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, Slow
Process Interlocks	Nil

Drive Name	Truck Washdown Sump Pump
Equipment Number	25PPS504
Drive Type	DOL
P&ID Number	6033-25-J-1004
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, Slow
Process Interlocks	Nil

Drive Name	Calcine Dump Pond Pump
Equipment Number	25PPS505
Drive Type	DOL
P&ID Number	6033-25-J-1004
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

Drive Name	Leachate Return Pump
Equipment Number	25PPS506
Drive Type	DOL
P&ID Number	6033-25-J-1004
Modes	Auto or Manual
Alarms	Standard Drive
Trend	R, I, Slow
Process Interlocks	Nil

NOTE: for trends letters indicate the following trends

R = Running status
I = Amps
MO = Motor output (for VSD and reversible drives)

4.0 INSTRUMENTS

4.1 Analogue Indicators

The following are the analogue indicators in this area:

Indicator Name	25SBR501 Spray Water Flow			
Indicator Number	FI-25-5111			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 - 50 m3/hr			
Normal	30			
Alarms	HH	H	L	LL
Values	45	40	10	5
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Fast			
Extras	Phase - Liquid / SG - 1.05			
Cascaded Loop	Nil			

Indicator Name	25TNK506 Discharge Flow			
Indicator Number	FI-25-5209			
P&ID Number	6033-25-J-1002			
Indicator Type	Field Indicator			
Range	0 - 130 m3/hr			
Normal	100			
Alarms	HH	H	L	LL
Values	120	110	30	15
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Totaliser required (FQ255209)			
Cascaded Loop	Nil			

Indicator Name	25PPC502A Discharge Flow			
Indicator Number	FI-25-5210			
P&ID Number	6033-25-J-1002			
Indicator Type	Field Indicator			
Range	0 - 340 m3/hr			
Normal	300			
Alarms	HH	H	L	LL
Values	335	320	80	50
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Totaliser required (FQ255210)			
Cascaded Loop	Nil			

Indicator Name	25TNK507 Discharge Flow			
Indicator Number	FI-25-5226			
P&ID Number	6033-25-J-1002			
Indicator Type	Field Indicator			
Range	0 - 130 m3/hr			
Normal	100			
Alarms	HH	H	L	LL
Values	120	110	30	15
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Totaliser required (FQ255226)			
Cascaded Loop	Nil			

Indicator Name	25PPC502B Discharge Flow			
Indicator Number	FI-25-5232			
P&ID Number	6033-25-J-1002			
Indicator Type	Field Indicator			
Range	0 - 340 m3/hr			
Normal	300			
Alarms	HH	H	L	LL
Values	335	320	80	50
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Totaliser required (FQ255232)			
Cascaded Loop	Nil			

Indicator Name	25TNK508 Discharge Flow			
Indicator Number	FI-25-5309			
P&ID Number	6033-25-J-1003			
Indicator Type	Field Indicator			
Range	0 - 130 m3/hr			
Normal	100			
Alarms	HH	H	L	LL
Values	120	110	30	15
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Totaliser required (FQ255309)			
Cascaded Loop	Nil			

Indicator Name	25TNK501 Discharge Flow			
Indicator Number	FI-25-5327			
P&ID Number	6033-25-J-1003			
Indicator Type	Field Indicator			
Range	0 - 165 m3/hr			
Normal	150			
Alarms	HH	H	L	LL
Values	163	158	35	20
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Totaliser required (FQ255327)			
Cascaded Loop	Nil			

Indicator Name	25-AGT-501 Motor Current Indicator			
Indicator Number	II-25-5146			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 – 1.5			
Normal	0.80			
Alarms	HH	H	L	LL
Values	1.2	1.05	0.3	0.15
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	IAHH will trip 25AGT501			
Trend	Slow			
Extras	Nil			
Cascaded Loop	Nil			

Indicator Name	25-FAN-501 Motor Current Indicator			
Indicator Number	II-25-5147			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 – 800			
Normal	460			
Alarms	HH	H	L	LL
Values	700	610	150	80
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	IAHH will trip 25FAN501			
Trend	Slow			
Extras	Nil			
Cascaded Loop	Nil			

Indicator Name	25TNK502 Level			
Indicator Number	LI-25-5212			
P&ID Number	6033-25-J-1002			
Indicator Type	Field Indicator			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LAL will trip 25PPC502A&B			
Trend	Slow			
Extras	Phase - Liquid / SG - 1.15			
Cascaded Loop	Nil			

Indicator Name	Calcine Dump Pond Level			
Indicator Number	LI-25-5401			
P&ID Number	6033-25-J-1004			
Indicator Type	Field Indicator			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LAH will start 25PPS505, LAL will stop 25PPS505			
Trend	Slow			
Extras	Nil			
Cascaded Loop	Nil			

Indicator Name	Leachate Return Pond Level			
Indicator Number	LI-25-5402			
P&ID Number	6033-25-J-1004			
Indicator Type	Field Indicator			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LAH will start 25PPS506, LAL will stop 25PPS506			
Trend	Slow			
Extras	Nil			
Cascaded Loop	Nil			

Indicator Name	25TNK509 Level			
Indicator Number	LI-25-5403			
P&ID Number	6033-25-J-1004			
Indicator Type	Field Indicator			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	At LALL will trip 25PPC514			
Trend	Moderate			
Extras	Phase - Liquid / SG - 1.1			
Cascaded Loop	Nil			

Indicator Name	25SBR501 Tower Pressure Differential			
Indicator Number	PDI-25-5105			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 - 15 kPag			
Normal	7			
Alarms	HH	H	L	LL
Values	14	12	3	1
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Nil			
Cascaded Loop	Nil			

Indicator Name	25SBR501 Venturi Pressure Differential			
Indicator Number	PDI-25-5112			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 - 12 kPag			
Normal	7			
Alarms	HH	H	L	LL
Values	11	9	3	1
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Nil			
Cascaded Loop	Nil			

Indicator Name	25DU502 Gas Pressure			
Indicator Number	PI-25-5103			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	-15 - 0 kPag			
Normal	-9			
Alarms	HH	H	L	LL
Values	-1	-3	-12	-14
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Phase - Gas			
Cascaded Loop	Nil			

Indicator Name	25DU501 Gas Pressure			
Indicator Number	PI-25-5135			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	-5 - 0 kPag			
Normal	-2			
Alarms	HH	H	L	LL
Values	-0.5	-1	-4	-4.5
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Moderate			
Extras	Phase - Gas			
Cascaded Loop	Nil			

Indicator Name	25DU502 Gas Temperature			
Indicator Number	TI-25-5102			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 - 100°C			
Normal	75			
Alarms	HH	H	L	LL
Values	95	85	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Slow			
Extras	Phase - Gas			
Cascaded Loop	Nil			

Indicator Name	25FAN501 Bearing Temperature			
Indicator Number	TI-25-5117			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 - 80°C			
Normal	60			
Alarms	HH	H	L	LL
Values	72	64	16	8
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	TAHH will trip 25FAN501			
Trend	Slow			
Extras	Nil			
Cascaded Loop	Nil			

Indicator Name	25TNK510 Slurry Temperature			
Indicator Number	TI-25-5123			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 - 100°C			
Normal	75			
Alarms	HH	H	L	LL
Values	95	85	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Slow			
Extras	Phase - Slurry			
Cascaded Loop	Nil			

Indicator Name	25VSL501 Gas Temperature			
Indicator Number	TI-25-5126			
P&ID Number	6033-25-J-1001			
Indicator Type	Field Indicator			
Range	0 - 130°C			
Normal	100			
Alarms	HH	H	L	LL
Values	125	115	30	15
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	Slow			
Extras	Phase - Gas			
Cascaded Loop	Nil			

4.2 Status Indicators

The following are the status indicators in this area:

Status Name	Scrubber Discharge Pump Selection
Status Number	HS-25-5121
P&ID Number	6033-25-J-1001
States	1 = 25PPC512B, 0 = 25PPC512A
Indication	HS-25-5121 and selection to be visible on DCS
Process Interlocks	Will send Start/Stop signal and controller outputs to selected pump
Extras	Nil

Status Name	Slug Dose Tank Selection
Status Number	HS-25-5202
P&ID Number	6033-25-J-1002
States	1 = LV-25-5213, 0 = LV-25-5243
Indication	HS-25-5202 and selection to be visible on DCS
Process Interlocks	Will send Open/Close signal and controller outputs to selected valve
Extras	Nil

Status Name	Slug Dose Tank Selection
Status Number	HS-25-5219
P&ID Number	6033-25-J-1002
States	1 = LV-25-5230, 0 = LV-25-5246
Indication	HS-25-5219 and selection to be visible on DCS
Process Interlocks	Will send Open/Close signal and controller outputs to selected valve
Extras	Nil

Status Name	Leach Vat Discharge Pump Selection
Status Number	HS-25-5260
P&ID Number	6033-25-J-1002
States	1 = 25PPC508B, 0 = 25PPC508A
Indication	HS-25-5260 and selection to be visible on DCS
Process Interlocks	Will send Start/Stop signal and controller outputs to selected pump
Extras	Nil

Status Name	Slug Dose Pump Selection
Status Number	HS-25-5261
P&ID Number	6033-25-J-1002
States	1 = 25PPC502B, 0 = 25PPC502A
Indication	HS-25-5261 and selection to be visible on DCS
Process Interlocks	Will send Start/Stop signal and controller outputs to selected pump
Extras	Nil

Status Name	Slug Dose Tank Selection
Status Number	HS-25-5302
P&ID Number	6033-25-J-1002
States	1 = LV-25-5205, 0 = LV-25-5242
Indication	HS-25-5302 and selection to be visible on DCS
Process Interlocks	Will send Open/Close signal and controller outputs to selected valve
Extras	Nil

Status Name	25CHU501 Leach Vat Position
Status Number	ZS-25-5216B/C
P&ID Number	6033-25-J-1002
States	1 = Position Indicated, 0 = Not Active
Indication	ZI-25-5216
Process Interlocks	Will initiate change direction of 25CHU501A
Extras	Nil

Status Name	25CHU501 Leach Vat Position
Status Number	ZS-25-5216A/D
P&ID Number	6033-25-J-1002
States	1 = Position Alarm, 0 = Not Active
Indication	ZA-25-5216
Process Interlocks	Will initiate change direction of 25CHU501A
Extras	Nil

Status Name	25CHU501 Leach Vat Position
Status Number	ZS-25-5233B/C
P&ID Number	6033-25-J-1002
States	1 = Position Indicated, 0 = Not Active
Indication	ZI-25-5233
Process Interlocks	Will initiate change direction of 25CHU501A
Extras	Nil

Status Name	25CHU501 Leach Vat Position
Status Number	ZS-25-5233A/D
P&ID Number	6033-25-J-1002
States	1 = Position Alarm, 0 = Not Active
Indication	ZA-25-5233
Process Interlocks	Will initiate change direction of 25CHU501A
Extras	Nil

Status Name	25CHU501 Leach Vat Position
Status Number	ZS-25-5316B/C
P&ID Number	6033-25-J-1003
States	1 = Position Indicated, 0 = Not Active
Indication	ZI-25-5316
Process Interlocks	Will initiate change direction of 25CHU501A
Extras	Nil

Status Name	25CHU501 Leach Vat Position
Status Number	ZS-25-5316A/D
P&ID Number	6033-25-J-1003
States	1 = Position Alarm, 0 = Not Active
Indication	ZA-25-5316
Process Interlocks	Will initiate change direction of 25CHU501A
Extras	Nil

Status Name	Preg Liquor Transfer Pump Selection
Status Number	HS-25-5318
P&ID Number	6033-25-J-1003
States	1 = 25PPC505B, 0 = 25PPC505A
Indication	HS-25-5318 and selection to be visible on DCS
Process Interlocks	Will send Start/Stop signal and controller outputs to selected pump
Extras	Nil

Status Name	Leach Vat Discharge Pump Selection
Status Number	HS-25-5305
P&ID Number	6033-25-J-1003
States	1 = 25PPC509B, 0 = 25PPC509A
Indication	HS-25-5305 and selection to be visible on DCS
Process Interlocks	Will send Start/Stop signal and controller outputs to selected pump
Extras	Nil

Status Name	Leach Wash Water Source Selection
Status Number	HS-25-5324
P&ID Number	6033-25-J-1003
States	1 = LV-25-5324B, 0 = LV-25-5324A
Indication	HS-25-5324 and selection to be visible on DCS
Process Interlocks	Will send Open/Close signal and controller outputs to selected valve
Extras	Nil

Status Name	25DA504 Position
Status Number	ZC-25-5136
P&ID Number	6033-25-J-1001
States	Range 0 - 100%
Indication	Input position to be shown on DCS
Process Interlocks	Nil
Extras	Operator input to control venturi throat position

Status Name	25DA503 Position
Status Number	ZC-25-5137
P&ID Number	6033-25-J-1001
States	Range 0 - 100%
Indication	Input position to be shown on DCS
Process Interlocks	Nil
Extras	Operator input to control venturi throat position

Status Name	Leachate Return Water Selection
Status Number	HS-25-5403
P&ID Number	6033-20-J-1004
States	1 = HS-25-5324, 0 = LI-25-5403
Indication	HS-25-5403 and selection to be visible on DCS
Process Interlocks	Nil
Extras	Nil

5.0 AUTOMATIC VALVES

The following are the automatic (ON/OFF service) valves in this area:

Valve Name	25SBR501 Pad Spray Water Valve
Valve Number	HV-255110
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1001
Process Interlocks	Nil
Fail Position	Last
Indication	Open, Closed
Extras	Timed operation ~ open 30sec every 6hrs

Valve Name	25PPC512B Suction Valve
Valve Number	HV-255118
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1001
Process Interlocks	Will trip 25PPC512B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC512A Suction Valve
Valve Number	HV-255122
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1001
Process Interlocks	Will trip 25PPC512A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK506 Wash Water Inlet Valve
Valve Number	HV-255201
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC501A/B when Closed if HV255218 and HV255301 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC507B Suction Valve
Valve Number	HV-255203
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC507A Suction Valve
Valve Number	HV-255204
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK506 to 25TNK503 Transfer Valve
Valve Number	LV-255205
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC509A/B when Closed if HV255242, HV255307 and HV255314 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK506 Recycle Valve
Valve Number	HV-255207
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507A/B when Closed if HV255243, HV255213 and HV255214 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK506 to 25TNK503 Transfer Valve
Valve Number	LV-255213
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507A/B when Closed if HV255243, HV255207 and HV255214 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK506 to 25TNK505 Transfer Valve
Valve Number	HV-255214
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507A/B when Closed if HV255243, HV255207 and HV255213 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC502A Suction Valve
Valve Number	HV-255215
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC502A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25LDR501 Overflow Valve
Valve Number	HV-255217
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC513A/B when Closed if HV255234 and HV255236 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK507 Wash Water Inlet Valve
Valve Number	HV-255218
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC501A/B when Closed if HV255201 and HV255301 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC508B Suction Valve
Valve Number	HV-255220
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC508A Suction Valve
Valve Number	HV-255221
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK507 Recycle Valve
Valve Number	HV-255224
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508A/B when Closed if HV255246, HV255230 and HV255231 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC502A/B to 25TNK506 Transfer Valve
Valve Number	HV-255227
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC502A/B when Closed if HV255228 and HV255229 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC502A/B to 25TNK507 Transfer Valve
Valve Number	HV-255228
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC502A/B when Closed if HV255227 and HV255229 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC502A/B to 25TNK508 Transfer Valve
Valve Number	HV-255229
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC502A/B when Closed if HV255227 and HV255228 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK507 to 25TNK503 Transfer Valve
Valve Number	LV-255230
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508A/B when Closed if LV255246, HV255224 and HV255231 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK507 to 25TNK505 Transfer Valve
Valve Number	HV-255231
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508A/B when Closed if LV255246, LV255230 and HV255224 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25LDR502 Overflow Valve
Valve Number	HV-255234
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC513A/B when Closed if HV255217 and HV255236 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25LDR503 Overflow Valve
Valve Number	HV-255236
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC513A/B when Closed if HV255217 and HV255234 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC502B Suction Valve
Valve Number	HV-255238
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC502B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC507A Discharge Valve
Valve Number	HV-255240
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC507B Discharge Valve
Valve Number	HV-255241
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK508 to 25TNK502 Transfer Valve
Valve Number	LV-255242
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC509A/B when Closed if LV255205, HV255307 and HV255314 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK506 to 25TNK502 Transfer Valve
Valve Number	LV-255243
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC507A/B when Closed if LV255213, HV255207 and HV255214 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC502A Discharge Valve
Valve Number	HV-255244
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC502A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC502B Discharge Valve
Valve Number	HV-255245
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC502B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK507 to 25TNK502 Transfer Valve
Valve Number	LV-255246
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508A/B when Closed if LV255230, HV255224 and HV255231 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC508B Discharge Valve
Valve Number	HV-255247
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC508A Discharge Valve
Valve Number	HV-255248
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC508A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC513A Discharge Valve
Valve Number	HV-255249
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC513A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC513A Suction Valve
Valve Number	HV-255250
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC513A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC513B Suction Valve
Valve Number	HV-255251
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC513B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC513B Discharge Valve
Valve Number	HV-255252
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1002
Process Interlocks	Will trip 25PPC513B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK508 Wash Water Inlet Valve
Valve Number	HV-255301
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC501A/B when Closed if HV255201 and HV255218 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC509B Suction Valve
Valve Number	HV-255303
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC509B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC509A Suction Valve
Valve Number	HV-255304
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC509A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK508 Recycle Valve
Valve Number	HV-255307
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC509A/B when Closed if LV255205, HV255242 and HV255314 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC509B Discharge Valve
Valve Number	HV-255310
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC509B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC509A Discharge Valve
Valve Number	HV-255311
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC509A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK508 to 25TNK505 Transfer Valve
Valve Number	HV-255314
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC509A/B when Closed if LV255205, HV255242 and HV255307 are Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC505A Suction Valve
Valve Number	HV-255319
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC505A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC505B Suction Valve
Valve Number	HV-255320
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC505B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC505A Discharge Valve
Valve Number	HV-255321
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC505A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC505A Discharge Valve
Valve Number	HV-255322
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC505B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK501 Raw Water Inlet Valve
Valve Number	LV-255324A
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Nil
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25TNK501 Low Saline Water Inlet Valve
Valve Number	LV-255324B
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Nil
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC501A Suction Valve
Valve Number	HV-255326
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC501B when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	25PPC501B Suction Valve
Valve Number	HV-255331
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1003
Process Interlocks	Will trip 25PPC501A when Closed
Fail Position	Closed
Indication	Open, Closed
Extras	Nil

Valve Name	Quench Discharge Diverter
Valve Number	HV-255127
Valve Modes	Auto or Manual
P&ID Number	6033-25-J-1001
Process Interlocks	Nil
Fail Position	Last
Indication	Open, Closed
Extras	2 x Pneumatic ram - Open position directs quench slurry to 25CHU501

6.0 CONTROL LOOPS

The following are the Control Loops in this area:

Loop Name	25VSL501 Recycle Solution Flow			
Loop Input	FT-25-5107			
P&ID Number	6033-25-J-1001			
Loop Type	STD PID Loop			
Modes	Auto & Manual			
Range	0 - 280 m3/hr			
Normal	250			
Alarms	HH	H	L	LL
Values	275	265	60	30
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	FALL for >60s will trip 20BE501			
Trend	PV, SP & OP, Fast			
Loop Output	0 - 100 %	FCV-25-5107		
Action	Reverse			
Loop Tuning	Fast			
Extras	Nil			
Cascaded Loop	Nil			

Loop Name	25SBR501 Recycle Solution Flow			
Loop Input	FI-25-5124			
P&ID Number	6033-25-J-1001			
Loop Type	STD PID Loop			
Modes	Auto & Manual			
Range	0 - 80 m3/hr			
Normal	65			
Alarms	HH	H	L	LL
Values	75	70	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	FALL for >60s will trip 20FAN501			
Trend	PV, SP & OP, Fast			
Loop Output	0 - 100 %	FCV-25-5124		
Action	Reverse			
Loop Tuning	Fast			
Extras	Totaliser required (FQ255124)			
Cascaded Loop	Nil			

Loop Name	25TNK505 Preg Liquor Flow			
Loop Input	FT-25-5323			
P&ID Number	6033-25-J-1003			
Loop Type	STD PID Loop			
Modes	Auto & Manual			
Range	0 - 40 m3/hr			
Normal	28			
Alarms	HH	H	L	LL
Values	38	35	10	5
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	PV, SP & OP, Fast			
Loop Output	0 - 25 m3/h	FIC-25-5227		
Action	Reverse			
Loop Tuning	Fast			
Extras	Provides setpoint for FIC-25-5227, Totaliser required (FQ255323)			
Cascaded Loop	Nil			

Loop Name	25TNK510 Level			
Loop Input	LT-25-5121			
P&ID Number	6033-25-J-1001			
Loop Type	STD PID Loop			
Modes	Auto & Manual			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LALL will trip 25PPC512A/B			
Trend	PV, SP & OP, Fast			
Loop Output	0 - 100 %	SC-25-5121A/B		
Action	Direct			
Loop Tuning	Fast			
Extras	Output via HS-25-5121 for selection of duty pump			
Cascaded Loop	Nil			

Loop Name	25LDR501 Level			
Loop Input	LT-25-5202			
P&ID Number	6033-25-J-1002			
Loop Type	Digital Outputs			
Modes	Auto & Manual			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LALL255202/219/302 will trip 25PPC513A/B			
Trend	PV, SP & OP, Fast			
Loop Output	Open or Closed	LV-25-5243 or LV-25-213		
Action	On/Off			
Loop Tuning	Fast			
Extras	HS to select which of 25TNK502 & 503 to transfer to			
Cascaded Loop	Nil			

Loop Name	25LDR502 Level			
Loop Input	LT-25-5219			
P&ID Number	6033-25-J-1002			
Loop Type	Digital Outputs			
Modes	Auto & Manual			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LALL255202/219/302 will trip 25PPC513A/B			
Trend	PV, SP & OP, Fast			
Loop Output	Open or Closed	LV-25-5246 or LV-25-230		
Action	On/Off			
Loop Tuning	Fast			
Extras	HS to select which of 25TNK502 & 503 to transfer to			
Cascaded Loop	Nil			

Loop Name	25LDR503 Level			
Loop Input	LT-25-5302			
P&ID Number	6033-25-J-1003			
Loop Type	Digital Outputs			
Modes	Auto & Manual			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LALL255202/219/302 will trip 25PPC513A/B			
Trend	PV, SP & OP, Fast			
Loop Output	Open or Closed	LV-25-5242 or LV-25-205		
Action	On/Off			
Loop Tuning	Fast			
Extras	HS to select which of 25TNK502 & 503 to transfer to			
Cascaded Loop	Nil			

Loop Name	25TNK505 Level			
Loop Input	LT-25-5318			
P&ID Number	6033-25-J-1003			
Loop Type	STD PID Loop			
Modes	Auto & Manual			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LALL will trip 25PPC505A/B			
Trend	PV, SP & OP, Fast			
Loop Output	0 - 100 %	SC-25-5318A/B		
Action	Direct			
Loop Tuning	Fast			
Extras	HS to select which pump (25PPC505A/B) to use			
Cascaded Loop	Nil			

Loop Name	25TNK501 Level			
Loop Input	LT-25-5324			
P&ID Number	6033-25-J-1003			
Loop Type	Digital Outputs			
Modes	Auto & Manual			
Range	0 - 100 %			
Normal	60			
Alarms	HH	H	L	LL
Values	90	80	20	10
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	LALL will trip 25PPC501A/B, LAL opens LV255324A/B, LAHH closes LV255324A/B			
Trend	PV, SP & OP, Fast			
Loop Output	Open or Closed	LV-25-5324A/B		
Action	Reverse			
Loop Tuning	Slow			
Extras	HS to select water source (LV255324A/B) or calcine dump solution			
Cascaded Loop	Nil			

Loop Name	25SBR501 Pressure Differential			
Loop Input	PDT-25-5112			
P&ID Number	6033-25-J-1001			
Loop Type	STD PID Loop			
Modes	Auto & Manual			
Range	0 – 10 kPa			
Normal	5			
Alarms	HH	H	L	LL
Values	9	8	2	1
Priorities	Urgent	Control	Control	Urgent
Process Interlocks	Nil			
Trend	PV, SP & OP, Fast			
Loop Output	0 – 100%	PDCV-25-5112		
Action	Direct			
Loop Tuning	Slow			
Extras	Nil			
Cascaded Loop	Nil			

7.0 CALCULATION BLOCKS

There are no calculation blocks in this area of the process facility.

8.0 FUNCTIONAL PREREQUISITES

The operation of the Areas described in section 2.0 requires the listed upstream areas of the plant to be operational:

Area	System	Associated Drawing	Associated Control Philosophy
20	Roasting	6033-20-J-1004	06033-G-00-F-007

9.0 STARTUP/SHUTDOWN

9.1 Start Sequence

The following are the sequences in this area:

9.1.1 Quench System

Prerequisites

No.	TAG No.	Equip. No.	Description	Status
1			Plant services available	HEALTHY
2			All drives in start sequence	HEALTHY

Start Sequence

Prerequisite	Step No.	Description
	1	Select first vat in sequence
Step 1	2	Set flow control (FIC255107) to AUTO and input flow set point
	3	Set flow control (FIC255124) to AUTO and input flow set point
	4	Ensure Quench Vessel discharge diverter is in the closed position (ZSC255127 Energised)
Step 4	5	Set 25CHU501A to AUTO and Start

Stop Sequence

Prerequisite	Step No.	Description
Leach Vat Recycle Pumps Stopped	1	Stop leach slurry distribution chute slewing mechanism (25CHU501A)

9.1.2 Scrubbing System

Prerequisites

No.	TAG No.	Equip. No.	Description	Status
1			Plant services available	HEALTHY
2			All drives in start sequence	HEALTHY
3			All actuated valves in sequence	HEALTHY

Start Sequence

Prerequisite	Step No.	Description
	1	Ensure the following valves are closed (ZSC Energised); HV255122, HV255118, HV255110
Step 1	2	Group Start duty leach vat recycle pump (25PPC513A/B) – Open suction and discharge valves, Set duty pump to AUTO and Start
	3	Open HV255110
LIC255121 PV ≥ 50%	4	Set scrubber discharge tank agitator (25AGT501) to AUTO and Start
	5	Set quench scrubber fan (25FAN501) to AUTO and Start
Step 4	6	Group Start duty scrubber discharge pump (25PPC512A/B) – Open suction valve (*discharge - manual*), set pump to AUTO and Start
Step 4	7	Set level control (LIC255121) to AUTO and Input set point

Stop Sequence

Prerequisite	Step No.	Description
	1	Stop quench scrubber fan (25FAN501)
	2	Group Stop duty leach vat recycle pump (25PPC513A/B) – Close suction and discharge valves and Stop pump
	3	Close HV255110 (ZSC Energised)
LAL255121	4	Group Stop duty scrubber discharge pump (25PPC512A/B) – Close suction valve and Stop pump
	5	Stop scrubber discharge tank agitator (25AGT501)

9.1.3 Leach Vat Operation – First Fill

Prerequisites

No.	TAG No.	Equip. No.	Description	Status
1			Services available	HEALTHY
2			Drive in sequence	HEALTHY
3			All actuated valves in sequence	HEALTHY

Start/Stop Sequence

Prerequisite	Step No.	Description
	1	Select water source (HS255324)
Step 1	2	Set level control (LIC255324) to AUTO
	3	Open HV255201 (ZSO energised)
Step 1-3 + LIC255324 ≥ 20%	4	Group Start duty leach wash pump (25PPC501A/B) – Open suction valve, Set pump to AUTO and Start
Step 4 + LAH255202	5	Group Stop duty leach wash pump – Stop pump and Close suction valve
Step 5	6	Close HV255201
Step 5	7	Close LV255324A/B
Step 5	8	Select slug dose tank (HS255202) and Open associated transfer valve (LV255213/43)
Step 8	9	Group Start duty leach vat discharge pump (25PPC507A/B) – Open suction and discharge valves, Set pump to AUTO and Start
Step 9 + time delay	10	Group Stop duty leach vat discharge pump – Stop pump and Close suction and discharge valves
Step 10	11	Close selected slug dose transfer valve (LV255213/43)

9.1.4 Leach Vat Operation – Steady State

Prerequisites

No.	TAG No.	Equip. No.	Description	Status
1			Plant services	HEALTHY
2			Drives in sequence	HEALTHY
3			All actuated valves in sequence	HEALTHY
4			Slug dose balance line valve	OPEN
5	25TNK501/2/3		Check that vat is empty	EMPTY

Start Sequence – Vat 1

Prerequisite	Step No.	Description
	1	Open HV255227 (ZSO energised)
LI255212 PV > 50%	2	Group Start slug dose pump (25PPC502A/B) – Select pump, Open suction and discharge valves, Set pump to AUTO and Start
Step 1-2	3	Open HV255217 (ZSO energised)
Step 3	4	Ensure duty leach vat recycle pump (25PPC513A/B) is running
	5	Open HV255207 (ZSO energised)
Step 5 + quench sequence initiated	6	Group Start duty leach vat discharge pump (25PPC507A/B) - Open suction and discharge valves, Set pump to AUTO and Start
Step 6 + LAH255202 activated	7	Group Stop duty slug dose pump (25PPC502A/B) – Stop pump and Close suction and discharge valves
Step 7	8	Close HV255227 (ZSC energised)
Step 8 + LAH255202	9	Select slug dose tank (HS255202), Open associated valve (LV255213/43) and Close recycle valve HV255207
Step 9 + LAL255202	10	Open HV255207 and Close slug dose transfer valve (LV255213/43)
Step 10	11	Repeat steps 9 & 10 until vat change-over sequence is initiated
	12	Input pregnant liquor volume set point
Step 11-12 + Vat change-over sequence initiated	13	Open HV255214 and Close valves LV255213/43 and HV255207
Step 13 + FQ255209 PV = SP	14	Select slug dose tank (HS255202), Open associated valve (LV255213/43) and Close pregnant liquor valve (HV255214)
	15	Input wash water volume set point
	16	Open HV255201 (ZSO energised)
Step 14-16	17	Group Start duty leach wash pump (25PPC501A/B) – Open suction valve, Set pump to AUTO and Start
Step 17 FQ255327 PV = SP	18	Group Stop duty leach wash pump (25PPC501A/B) – Stop pump and Close suction valve
Step 18	19	Close HV255201 (ZSC energised)

Step 19 + time delay	20	Repeat steps 16-19
Step 20 + time delay	21	Repeat steps 16-19
Step 21 + time delay	22	Group Stop duty leach vat discharge pump (25PPC507A/B) – Stop pump and Close suction and discharge valves

Start Sequence – Vat 2

Prerequisite	Step No.	Description
	1	Open HV255228 (ZSO energised)
LI255212 PV > 50%	2	Group Start slug dose pump (25PPC502A/B) – Select pump, Open suction and discharge valves, Set pump to AUTO and Start
Step 1-2	3	Open HV255234 (ZSO energised)
Step 3	4	Ensure duty leach vat recycle pump (25PPC513A/B) is running
	5	Open HV255224 (ZSO energised)
Step 5 + quench sequence initiated	6	Group Start duty leach vat discharge pump (25PPC508A/B) - Open suction and discharge valves, Set pump to AUTO and Start
Step 6 + LAH255219 activated	7	Group Stop duty slug dose pump (25PPC502A/B) – Stop pump and Close suction and discharge valves
Step 7	8	Close HV255228 (ZSC energised)
Step 8 + LAH255219	9	Select slug dose tank (HS255219), Open associated valve (LV255230/46) and Close recycle valve HV255224
Step 9 + LAL255219	10	Open HV255224 and Close slug dose transfer valve (LV255230/46)
Step 10	11	Repeat steps 9 & 10 until vat change-over sequence is initiated
	12	Input pregnant liquor volume set point
Step 11-12 + Vat change-over sequence initiated	13	Open HV255231 and Close valves LV255230/46 and HV255224
Step 13 + FQ255226 PV = SP	14	Select slug dose tank (HS255219), Open associated valve (LV255230/46) and Close pregnant liquor valve (HV255231)
	15	Input wash water volume set point
	16	Open HV255218 (ZSO energised)
Step 14-16	17	Group Start duty leach wash pump (25PPC501A/B) – Open suction valve, Set pump to AUTO and Start
Step 17 FQ255327 PV = SP	18	Group Stop duty leach wash pump (25PPC501A/B) – Stop pump and Close suction valve
Step 18	19	Close HV255218 (ZSC energised)
Step 19 + time delay	20	Repeat steps 16-19
Step 20 + time delay	21	Repeat steps 16-19
Step 21 + time delay	22	Group Stop duty leach vat discharge pump (25PPC508A/B) – Stop pump and Close suction and discharge valves

Start Sequence – Vat 3

Prerequisite	Step No.	Description
	1	Open HV255229 (ZSO energised)
LI255302 PV > 50%	2	Group Start slug dose pump (25PPC502A/B) – Select pump, Open suction and discharge valves, Set pump to AUTO and Start
Step 1-2	3	Open HV255236 (ZSO energised)
Step 3	4	Ensure duty leach vat recycle pump (25PPC513A/B) is running
	5	Open HV255307 (ZSO energised)
Step 5 + quench sequence initiated	6	Group Start duty leach vat discharge pump (25PPC509A/B) - Open suction and discharge valves, Set pump to AUTO and Start
Step 6 + LAH255302 activated	7	Group Stop duty slug dose pump (25PPC502A/B) – Stop pump and Close suction and discharge valves
Step 7	8	Close HV255229 (ZSC energised)
Step 8 + LAH255302	9	Select slug dose tank (HS255302), Open associated valve (LV255205/42) and Close recycle valve HV255307
Step 9 + LAL255302	10	Open HV255307 and Close slug dose transfer valve (LV255205/42)
Step 10	11	Repeat steps 9 & 10 until vat change-over sequence is initiated
	12	Input pregnant liquor volume set point
Step 11-12 + Vat change-over sequence initiated	13	Open HV255314 and Close valves LV255305/42 and HV255307
Step 13 + FQ255309 PV = SP	14	Select slug dose tank (HS255302), Open associated valve (LV255205/42) and Close pregnant liquor valve (HV255231)
	15	Input wash water volume set point
	16	Open HV255301 (ZSO energised)
Step 14-16	17	Group Start duty leach wash pump (25PPC501A/B) – Open suction valve, Set pump to AUTO and Start
Step 17 FQ255327 PV = SP	18	Group Stop duty leach wash pump (25PPC501A/B) – Stop pump and Close suction valve
Step 18	19	Close HV255301 (ZSC energised)
Step 19 + time delay	20	Repeat steps 16-19
Step 20 + time delay	21	Repeat steps 16-19
Step 21 + time delay	22	Group Stop duty leach vat discharge pump (25PPC508A/B) – Stop pump and Close suction and discharge valves

Transfer Sequence – Vat 1 – 2

Prerequisite	Step No.	Description
	1	Select Vat 2
Step 1	2	Ensure 25CHU501A is in Forward direction
Step 2	3	Increase 25CHU501A drive speed to 100%
Step 3	4	Allow 25CHU501 to pass over ZS255216C/D and ZS255233A/B without interlocks being activated
Step 4	5	Once 25CHU501 hits ZS255233C Reverse drive direction and decrease speed to 30%
Step 5	6	Ensure ZS255233A/B interlocks are active again
Step 5	7	Open HV255228 (ZSO energised) and Close HV255227 (ZSC energised)
Step 5	8	Open HV255234 (ZSO energised) and Close HV255217 (ZSC energised)

Transfer Sequence – Vat 2 – 3

Prerequisite	Step No.	Description
	1	Select Vat 3
Step 1	2	Ensure 25CHU501A is in Forward direction
Step 2	3	Increase 25CHU501A drive speed to 100%
Step 3	4	Allow 25CHU501 to pass over ZS255233C/D and ZS255316A/B without interlocks being activated
Step 4	5	Once 25CHU501 hits ZS255316C Reverse drive direction and decrease speed to 30%
Step 5	6	Ensure ZS255316A/B interlocks are active again
Step 5	7	Open HV255229 (ZSO energised) and Close HV255228 (ZSC energised)
Step 5	8	Open HV255236 (ZSO energised) and Close HV255234 (ZSC energised)

Transfer Sequence – Vat 3 – 1

Prerequisite	Step No.	Description
	1	Select Vat 1
Step 1	2	Open HV255127 (ZSO Energised)
Step 2	3	Ensure 25CHU501A is in Reverse direction
Step 3	4	Increase 25CHU501A drive speed to 100%
Step 4	5	Allow 25CHU501 to pass over ZS255316A/B, ZS255233A/B/C/D and ZS255216C/D without interlocks being activated
Step 5	6	Once 25CHU501 hits ZS255216B change drive direction to Forward and decrease speed to 30%
Step 6	7	Ensure ZS255216C/D interlocks are active again
Step 6	8	Close HV255127 (ZSC Energised)
Step 6	9	Open HV255227 (ZSO energised) and Close HV255229 (ZSC energised)
Step 6	10	Open HV255217 (ZSO energised) and Close HV255236 (ZSC energised)

Note: Forward direction of 25CHU501A is the anticlockwise direction (i.e. travelling from vat 1 to 2 to 3).

9.1.5 Calcine Dump System

Prerequisites

No.	TAG No.	Equip. No.	Description	Status
1		LAL255403	Dust suppression tank low level	NOT ENERGISED
2			Sprinkler valves 25V1301	OPEN
3			Drain valve 80V1122	CLOSED

Start Sequence

Prerequisite	Step No.	Description
	1	*Open low saline water valve for 25DSN501*
Level in pond	2	Start calcine dump pond pump (25PPS505)
Step 2 + time delay	3	Start leachate return pump (25PPS506)
LAH255403	4	Start leachate tank return pump (25PPC514)
LAH255324	5	Stop leachate tank return pump (25PPC514)

Stop Sequence

Prerequisite	Step No.	Description
	1	Stop leachate tank return pump (25PPC514)
LAH255403	2	Stop leachate return pump (25PPS506)
Step 2	3	Stop calcine dump pond pump (25PPS505)
Step 3	*4*	*Close low saline water valve*

Note: Steps written in *Italics* are manual steps and can not be controlled through the PCS.