CLIENT ACTION PLAN

Critical Chemical and Process Training for Gold Plant Commissioning Personnel

Consolidated five-day programme | 30 instructional hours

CLIENT	PROGRAMME DETAILS
Client / site	To be confirmed
Delivery period	Five consecutive training days (dates to be agreed)
Training commitment	6 instructional hours per day; breaks additional
Audience	Commissioning, operations, metallurgy, maintenance, instrumentation and safety personnel
Document status	Proposed programme for client review and approval

Purpose

Provide a practical, safety-led training pathway from chemical awareness and process control through cyanide protection, gold smelting and furnace operational improvement. This action plan defines the curriculum, time allocation, preparation actions, assessment outputs and follow-up responsibilities.

Important: This training supports but does not replace site-specific standard operating procedures, formal commissioning permits, emergency-response training or task competency authorisation.

1. Programme structure and allocation

Day	Session allocation	Hours
1	Session 1 (4 h) + Session 2 (2 h)	6
2	Session 2 continuation (6 h)	6
3	Session 3 (6 h)	6
4	Session 3 completion (1 h) + Session 4 (5 h)	6
5	Session 4 completion (0.5 h) + Session 5 (5.5 h)	6
TOTAL	Five sessions delivered across five days	30

Session	Focus	Hours
1	Chemical awareness and chemical management in gold processing	4
2	Acids, alkalis, lime, solid-liquid separation, flocculants and integrated process control	8
3	Cyanide awareness, HCN detection, operating controls and emergency response	7
4	Fluxing, slag chemistry, furnace behaviour and precious metal recovery	5.5
5	Furnace safety, molten material handling, consumption and operational improvement	5.5

Delivery arrangement

Daily delivery is based on six hours of instruction and assessment. A suggested attendance window is 08:00-15:00, allowing an additional 60 minutes for breaks. Session boundaries intentionally cross days to preserve the full curriculum.

DAY 1 | Chemical awareness and acids/alkalis

Day objective: Establish chemical identification, hazard awareness, gold flowsheet understanding and basic acid/alkali controls.

Discussion topic	Minutes
SESSION 1 - Introduction to Chemical Awareness	240
Introduction to chemical awareness	20
Chemical identification and inventory	25
Gold processing flowsheet	35
Chemical functions and points of use	35
Chemical hazards and SDS awareness	30
Chemical storage and handling	20
Chemical monitoring and record ownership	20
Commissioning readiness and data gaps	15
Group workshop and knowledge check	40
SESSION 2 - Module 1: Acids and Alkalis	120
1.1 Introduction to acids and alkalis	15
1.2 Acids used in mineral processing	15
1.3 Alkalis used in mineral processing	15
1.4 Chemical concentration and strength	15
1.5 Chemical storage and segregation	15
1.6 Safe chemical handling and transfer	15
1.7 Chemical dosing and process control	10
1.8 Neutralisation and chemical reactions	10
1.9 Chemical quality and troubleshooting	10
DAILY TOTAL	360

Required output: Chemical inventory and addition-point review; chemical readiness gap list.

DAY 2 | Lime, separation, flocculants and process control

Day objective: Develop chemical dosing and solid-liquid separation troubleshooting competence.

Discussion topic	Minutes
MODULE 2 - Lime Quality, Alkalinity and pH Control	75
2.1 Lime types and quality	10
2.2 Lime preparation and slaking	15
2.3 Alkalinity and pH control	15
2.4 Effects of water chemistry	10
2.5 Lime dosing and consumption	15
2.6 Troubleshooting pH and lime consumption	10
MODULE 3 - Fundamentals of Solid-Liquid Separation	70
3.1 Introduction to solid-liquid separation	10
3.2 Settling and sedimentation principles	10
3.3 Thickening fundamentals	15
3.4 Clarification and water recovery	10
3.5 Filtration and dewatering	10
3.6 Factors affecting separation efficiency	15
MODULE 4 - Flocculants: Preparation, Dosing and Performance	115
4.1 Introduction to flocculation	10
4.2 Flocculant types and selection	15
4.3 Flocculant preparation	20
4.4 Solution concentration and dosing	20
4.5 Water quality and polymer performance	10
4.6 Mixing and polymer condition	10
4.7 Interpreting settling performance	15
4.8 Troubleshooting settling problems	15
MODULE 5 - Integrated Process Monitoring and Troubleshooting	100
5.1 Chemical consumption versus throughput	15
5.2 Instrumentation and measurement reliability	15
5.3 Chemical and separation interactions	15
5.4 Process trend interpretation	15
5.5 Root-cause troubleshooting	15

Discussion topic	Minutes
5.6 Corrective actions and reporting	15
Integrated practical exercise and knowledge check	10
DAILY TOTAL	360

Required output: Lime/flocculant consumption calculations; separation troubleshooting worksheet.

DAY 3 | Cyanide awareness and HCN prevention

Day objective: Recognise cyanide hazards, HCN release conditions, detection-system limitations and protective actions.

Discussion topic	Minutes
3.1 Cyanide awareness and hazards	45
3.2 Hydrogen cyanide (HCN) gas formation	45
3.3 Gas detection systems	55
3.4 Gas detector inspection and verification	55
3.5 Plant operating controls	55
3.6 Gas alarm recognition and response	60
3.7 Personnel safety and exposure prevention	45
DAILY TOTAL	360

Required output: HCN detector verification review and alarm-response knowledge check.

DAY 4 | Cyanide response and fluxing fundamentals

Day objective: Complete cyanide emergency-response accountability and understand slag formation and precious metal recovery.

Discussion topic	Minutes
SESSION 3 - Completion	60
3.8 Emergency preparedness and incident reporting	20
3.9 Operational monitoring and accountability	15
3.10 Practical scenario and knowledge assessment	25
SESSION 4 - Fluxing Principles and Slag Behaviour	300
4.1 Purpose of fluxing	25
4.2 Flux components and functions	35
4.3 Flux quality and preparation	25
4.4 Feed characteristics	30
4.5 Slag chemistry	35
4.6 Slag fluidity and melting behaviour	30
4.7 Precious metal collection	30
4.8 Oxidation and reduction	25
4.9 Abnormal slag behaviour	25
4.10 Slag sampling and accounting	20
4.11 Safe preparation and handling	20
DAILY TOTAL	360

Required output: Cyanide scenario record; feed/flux/slag investigation checklist.

DAY 5 | Furnace safety and consumption improvement

Day objective: Apply furnace safety controls, interpret consumption KPIs and agree post-training improvement priorities.

Discussion topic	Minutes
SESSION 4 - Completion	30
4.12 Group discussion and knowledge check	30
SESSION 5 - Furnace Safety and Consumption Improvement	330
5.1 Furnace readiness and pre-start safety	35
5.2 Furnace hazards and safe operation	35
5.3 Molten material hazards and controls	40
5.4 Combustion and temperature control	30
5.5 Gold room flux consumption control	30
5.6 Energy consumption and furnace efficiency	30
5.7 Refractory management and consumption	30
5.8 Operational monitoring and performance indicators	30
5.9 Integrated practical assessment	40
5.10 30-day improvement planning	30
DAILY TOTAL	360

Required output: Furnace readiness review; flux/energy calculation; signed draft 30-day action register.

3. Client preparation and readiness actions

The following actions should be completed before delivery. Named owners and due dates are to be confirmed at the kick-off meeting.

Action	Proposed owner	Evidence / status
Confirm attendee list, roles and training dates	Client training coordinator	Roster / invitation
Supply approved process flowsheets, P&IDs; and chemical register	Process / metallurgy	Controlled documents
Provide current SDS, chemical storage and emergency procedures	HSE / operations	Document pack
Provide cyanide management, detector and alarm procedures	HSE / instrumentation	Approved procedures / test records
Provide lime, flocculant and dosing equipment documentation	Process / maintenance	Equipment and operating data
Provide flux recipes, furnace manuals and smelting procedures	Gold room / metallurgy	Approved documents
Provide anonymised baseline consumption and assay data	Metallurgy / finance	Sample records
Confirm venue, projector, PPE for any approved demonstration	Training coordinator	Venue readiness checklist

Safety and training boundaries

No live cyanide release, HCN exposure or unsafe furnace trial forms part of this programme. Hazardous demonstrations require separate site authorisation, competent supervision and approved procedures. Personnel must not interpret course completion as permission to conduct restricted operations.

4. Assessment and acceptance criteria

Day	Evidence of learning
1	Chemical inventory exercise, hazard recognition and readiness gaps
2	Reagent consumption calculations, process trend interpretation and troubleshooting
3	HCN hazard recognition, detector inspection concepts and alarm response
4	Cyanide emergency scenario, slag chemistry and metal-loss reasoning
5	Furnace safety scenario, consumption KPIs and improvement action plan

Suggested written assessment threshold: 80%, with all designated safety-critical responses correct. Client site standards govern actual pass/fail decisions and any subsequent practical authorisation. Attendance, assessment results and outstanding competence gaps should be recorded.

5. Thirty-day post-training improvement plan

Window	Action / expected evidence	Lead role
Days 1-5	Close safety-critical readiness gaps; confirm data owners and registers	Commissioning / HSE
Days 6-10	Establish baseline flux, lime, flocculant, energy and refractory metrics	Metallurgy / operations
Days 11-15	Investigate abnormal consumption and quality trends	Process / gold room
Days 16-20	Implement approved corrective actions and record change controls	Operations / maintenance
Days 21-25	Verify trend changes, safety controls and product quality	Metallurgy / HSE
Days 26-30	Issue performance review and next-phase action register	Plant management

Baseline KPI examples: flux kg/t dry smelting feed; energy kWh/t or MJ/t dry smelting feed; lime kg/t ore; flocculant g/t dry solids; refractory service life; furnace availability; bullion quality; and precious metal losses in slag. Define consistent mass bases and measurement boundaries before comparing results.

6. Client action register and approvals

No.	Action / decision	Owner	Due date	Status
01	Approve programme scope and timetable	_____	_____	_____
02	Nominate client coordinator and technical facilitators	_____	_____	_____
03	Provide controlled site documents and training data	_____	_____	_____
04	Confirm attendees and assessment requirements	_____	_____	_____
05	Approve safe demonstration / scenario arrangements	_____	_____	_____
06	Review daily assessment results and competence gaps	_____	_____	_____
07	Assign 30-day improvement actions and baseline owners	_____	_____	_____
08	Approve close-out report and follow-up review date	_____	_____	_____

Client sign-off

Role	Name / signature	Date
Client representative	_____	_____
Training coordinator	_____	_____
Commissioning / operations lead	_____	_____

Assumptions: All five original sessions are included, but teaching time has been reallocated to meet the client requirement of exactly 30 instructional hours. The plan is subject to final validation against the plant design, process hazards, operating procedures and site competency framework.