vedanta

ZIRA@S
Zinc Excellence • Business Revolving Around SAP

Project

Black Mountain Mining | SAP | Skorpion Zinc

ZIRA@S

Zinc Excellence • Business Revolving Around SAP

SAP Mining and Metals Forum, Darmstadt

SAP Journey at Vedanta Zinc International – A Business Transformation

8th October 2014

Chetan Trivedi – Chief Information Officer

Agenda

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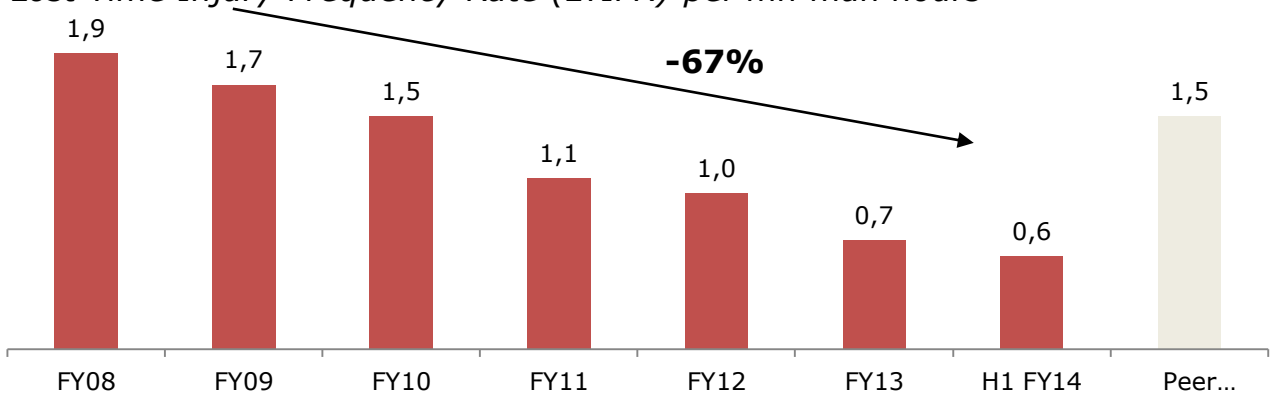
A Global Diversified Natural Resource Company

- **LSE-listed global diversified natural resources company**
- **Portfolio of large, long life, low cost, scalable assets**
  - **Commodities: oil & gas, zinc, lead, silver, copper, iron ore, aluminium and power**
  - **Geographies: India, Africa, Europe, Australia**
- **Well invested asset base delivering strong free cash flows**
  - **Consistent EBITDA margins[1] of 40%+ over last 5 years**
- **Committed to sustainable development**

Financial Snapshot *(in $ billions or as stated)*	**FY2014**
Revenues	**13.0**
EBITDA	**4.5**
Free Cash Flow[2]	**3.0**
Net Debt	7.9
Gearing (%)	*30.6*

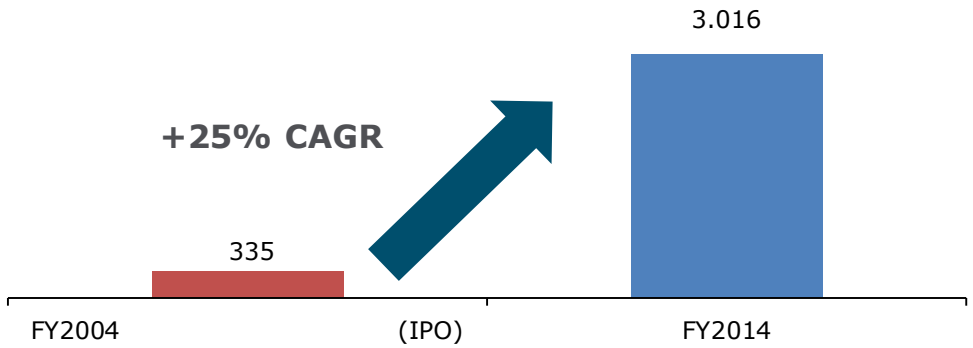
Significant and consistent delivery in HSE performance

Lost Time Injury Frequency Rate (LTIFR) per mn man hours



Delivered strong growth since IPO

Free Cash Flows[2] (in US $millions)

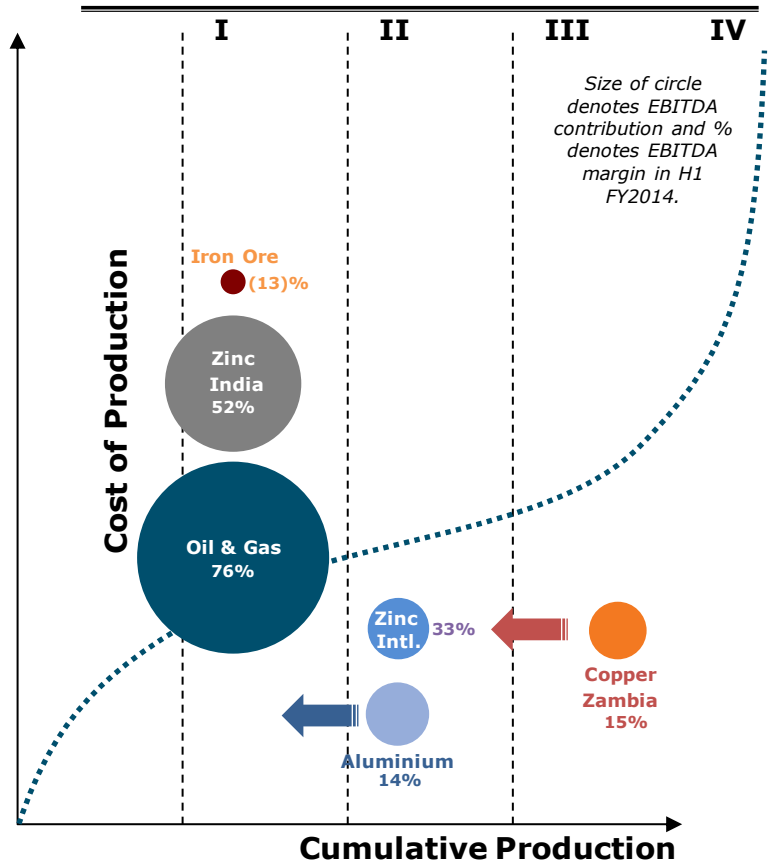


Note: 1. Excludes custom smelting at Copper and Zinc-India operations
2. Free cash flow before Growth Capex
3. Peer median of CY 2012 reported numbers for FTSE-350 metals and mining companies who report LTIFR (11 companies)

Tier 1 Asset Portfolio

Positioning	R&R Life[1]	FY2014 Production	Capacity[2]
Oil & Gas *(Cairn India)* Top 20 global independent E&P; Platts 2013: Fastest growing energy company globally	15	218kboepd	*225+ [3] kboepd*
Zinc India *(HZL)* 2nd largest integrated zinc producer globally	25+	880kt	*1.2mtpa*
Silver *(HZL)* One of the largest silver producers globally	25+	11.2moz	*16mozpa*
Zinc International One of the largest undeveloped zinc deposits	20+	364kt	*400ktpa*
Iron Ore[4] Largest private sector exporter in India; Large deposit in Liberia	20+	1.5mt [5]	*16.8mtpa*
Copper Zambia World class resource	25+	124kt [6]	*400ktpa*[7]
Aluminium Strategically located large-scale assets with integrated power		794kt	*2.3mtpa*

Competitive Position on Cost Curve Quartiles



Notes

1. *Based on FY2014 production and R&R as at 31 March 2014; Iron ore is based on existing capacity; Zinc International includes Gamsberg deposit in R&R*
2. *Includes announced expansions; Iron ore shown at existing EC capacity of 14.5mt in Goa and 2.3mt provisional capacity in Karnataka. Recent SC judgement has imposed an interim state-wide cap of 20 mtpa at Goa.*
3. *Expected capacity for currently producing assets*
4. *Numbers excluding Liberia*
5. *Iron Ore operations affected by mining restrictions in Karnataka and Goa*
6. *Integrated Production*
7. *Shaft capacity, subject to review*

Large, long-life, low-cost, scalable assets

About Vedanta Zinc International

- Taken over from Anglo American Group in year 2011
- It comprises of:
  1. **Black Mountain Mining, South Africa**
  2. **Skorpion Zinc Mine & Refinery, Namibia**
  3. **Lisheen Mine, Ireland**
- Major Extracted Minerals: Zinc, Lead, Copper, Silver
- 20+ years of Reserve & Resources
- Producing: 364 ktpa Metals and MIC
- Gamsberg Prospect: 240 ktpa Metals and MIC
- Direct Employee: 1900+
- Significant employer and contributor to GDP in the regions we operate

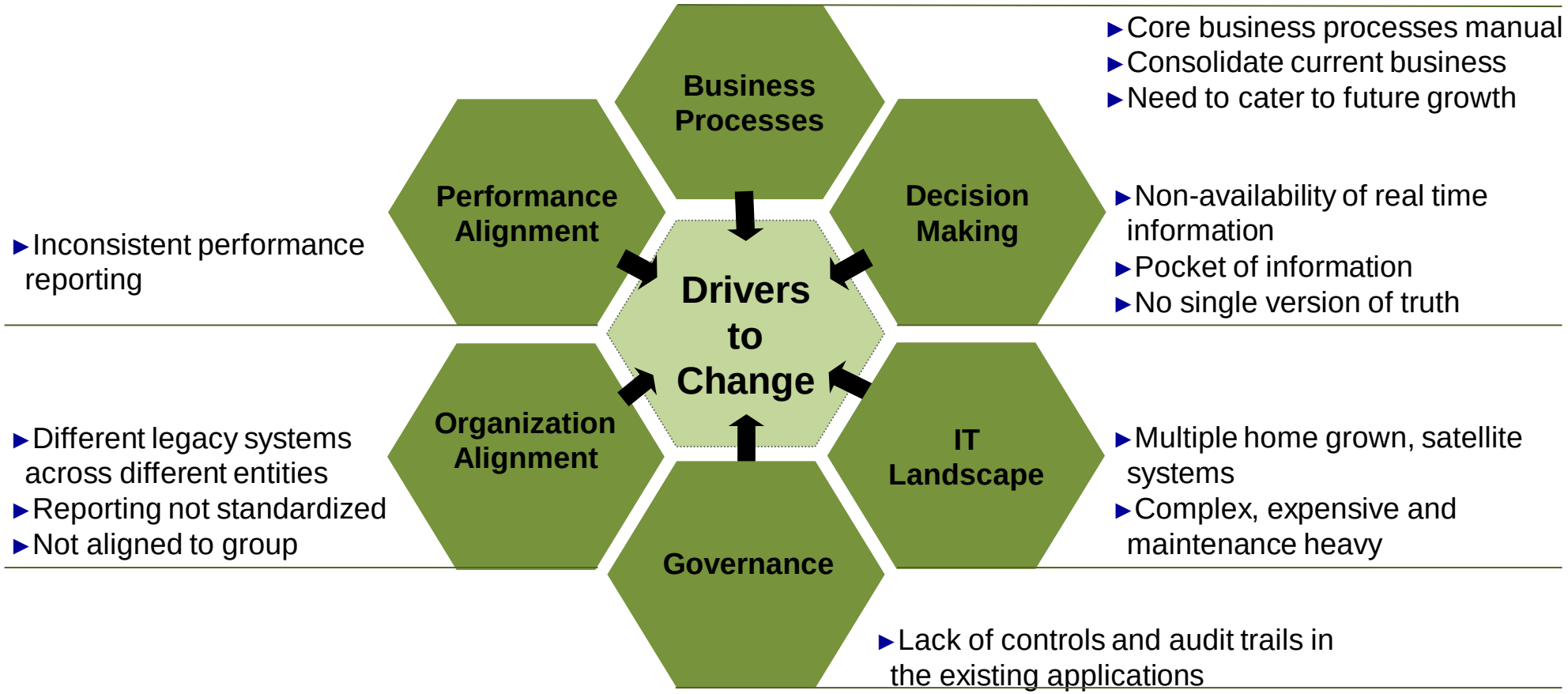
Glimpse of Vedanta Zinc International



Business Environment before Change

- Successful & currently highly profitable operation but:
  - Limited Life of Mine
  - Declining Ore Grade
  - Increasing Cost Base
  - Challenge to remain competitive and profitable
- Aggressive growth plan in pipeline – Organic and Inorganic
- Disciplined, dedicated, empowered workforce
- Production not cost driven
- Core business processes running manual; limited reach of Ellipse ERP; multiple discrete and home-grown systems
- No 'single version of truth'
- Diverse situation on ground
  - Young workforce at one operation
  - High average age at operation level at other operation
  - Limited computer literacy
  - Inherited legacy – set mind set, resistance to change

Drivers Leading to Change



Why SAP !!

Stability with Proven Capability	• Best-in-class solution – Proven Track Record, Embedded Best Practices, Huge customer-base • Undisputed leader in Business Applications Area, addresses all business requirement with built-in industry specific best practices
Group wide adoption	• SAP is the standard adopted by Vedanta Group of companies for Business Application • Group-wide Enterprise License Agreement – Access to all the products required by business
Reliable Support & Scalable	• SAP provides an extensive 24 x 7 support • SAP supports multi GAAP reporting • Pro-active in delivering various solutions with changing business dynamics and scenarios
Customer Centric & Innovation Driven	• Relentless focus on customer value, quality and satisfaction • Agility and speed of change • Future proof – clear long term vision and continuous R&D investment
"One Single Source of Truth"	• SAP solutions deliver comprehensive and integrated end-to-end processes with Mining specific capabilities following industry best practices

Project Deliverables

Organization Vision	Key Business Drivers		Deliverables
Sustainable production volume	Integrated business application platform which provides transactional efficiency and is scalable for future growth	Standardized Platform	Increase operational Efficiency
			Improve FTE Productivity
Cost Leadership: To be in the first quartile range of the global cost curve of metal producers	A platform which provides agile and simple integration in case of organic/ inorganic growth.	Growth Enablement	Decrease operational cost
			Achieve and Sustain SOX, Statutory Compliances
Transformative People Leadership	Cost optimizations across functions such as logistics, procurement and operations	Efficiency Improvement	Eliminate Satellite Business Systems
Key Projects Execution for future growth	Establish vital business controls and effective governance for various compliance framework	Governance	Single system for business processes across value-chain
	Providing real time information for effective decision making	Process Harmonization	Accuracy of information: Single Version of Truth and Visibility across operations
Business Excellence and Sustainability	Simplify IT Landscape and reduce overall TCO		Standardized processes across operations

Key Program Statistics

Geographical Project Scope:

1. Black Mountain Mining Operations, South Africa
2. Skorpion Zinc Mine and Refinery Operations, Namibia
3. Offices and External Points (like Port, Railway Siding etc.) related to these operations

Project Kick-off Date: 8th January, 2013

Project Go-Live Date: 11th October, 2013

Project Duration: 9 Months

SAP User Base: ECC Users – 750+, EP Users – 1700+

Solutions Implemented:

1. SAP ERP – ECC 6.0 EHP 6
2. EP Portal – NW 7.31
3. GRC Access Controls – 10.0
4. MII – 12.2 (For Interfaces)
5. BIBO – 14.0.06
6. Solution Manager – 7.1
7. PCO – 2.3
8. IS Mining and Transporter Scheduler Workbench (TSW)

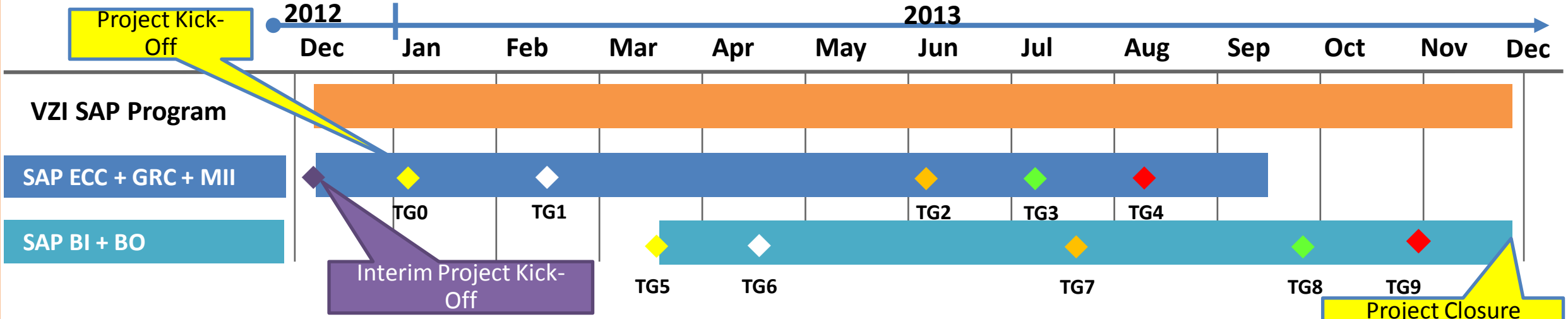
Project Scope

Financial and Controlling
General Ledger, Accounts Receivable and Payables
Parallel Ledger / New GL Accounting
Product Costing and Profitability Analysis
Profit Center Accounting and Overhead Cost Controlling
Bank and Cash Management
Asset Management
Procurement and Inventory Management
Procurement and Logistics Invoice Verification
Inventory Management and Valuation
External Service Management
Procurement and Inventory Management
Inbound Logistics
Core Mining and Sales & Distribution
Contracts to Cash
Mine Planning and Execution
IS Mining (F&A Pricing)
Supply Chain (Bulk Transportation, TSW)
Governance Risk and Compliance
Access control



Operations
Production Planning and Metal Accounting
Plant Maintenance
Quality Management (In-bound, In-process, Out-bound)
Human Capital Management
Organization Management and Personal Administration
Time, Leave and Travel Management
Performance Management System
Training and Event Management
Recruitment
Succession Planning
Compensation Management
Interfaces
SCADA, Historian and Plant Systems
Weigh Bridges, Biometric System
Laboratory Management System
Bank EFT, Bar Code System
Fuel Management System
Others
Business Intelligence and Dashboards (BIBO)
Solution Manager

Program Milestones and Timelines



SAP ECC+GRC+MII

Toll gates	Major Milestones	Target Date
✓ TG0	Project Kick-off	7th Jan 2013
✓ TG1	Business Blueprint Sign-off	15th Feb 2013
✓ TG2	Build Sign-off	4th June 2013
✓ TG3	UAT Sign-off	4th July 2013
✓ TG4	Go-live	9th Aug 2013

SAP BIBO

Toll gates	Major Milestones	Target Date
✓ TG5	Project Kick-off	11th Mar 2013
✓ TG6	Business Blueprint Sign-off	5th Apr 2013
✓ TG7	Build Sign-off	6th Aug 2013
✓ TG8	UAT Sign-off	18th Sep 2013
✓ TG9	Go-live	16th Oct 2013

Approach and Methodology

- **System Landscape**
  - Single Instance for multiple locations
  - 3 Tier Landscape
- **Deployment**
  - Start with a baseline Blue Print
  - Harvest Accenture's Mining Best Practice Templates
  - Leverage Group's earlier implementation experience and expertise
  - Benchmark with other Mining Companies for critical processes
  - UAT with actual data
  - Two phased UAT – One manual and one with interfaces
- **Quality Assurance**
  - Specialized third-party PMO and review all project mile stones
- **Master Data Management**
  - Material / Services – Standardization, Enrichment, De-duplication, Verification
  - Assets – Physical verification and tie up with Equipment Hierarchy
  - Vendors / Customers – Rationalization, Verification, Cleansing
  - CoA / Cost Centres – Redefine, In line with Group CoA
  - Equipment – Hierarchy review and redefine
  - Employees – Physical verification, Enrichment

Approach and Methodology (Contd…)

- **Change Management**
  - Different Methodology for different level of employees
  - Awareness Program
  - Communication – Department Talks, Communication Screens, Mailers
  - Monthly Magazine
  - Quiz Program, Banners and Hoardings, Posters
  - Multi-layered Hands-on Training
  - Incentive Scheme
- **Training**
  - "Train-the-Trainer" Approach
  - CTM training on Sandbox before Blue Print
  - First Level of Training to CMT – With completion of configuration of each business process
  - Upon completion of Build – Integrated hands-on training to CTM / PC
  - End User Training – Based on job profile, provided by CTM / PC
- **Post Go-Live Review**
  - Two quarterly review on Utilization and Effectiveness
  - Business Controls Metric and Assessment

Key Business Benefits

Plan-to-Produce Process

- ✓ Real-time Metal Accounting Reporting
- ✓ Capturing of KPIs at each sub-process and visibility of specifics
- ✓ Product Costing and Hierarchical Cost Center Reporting
- ✓ Automation of Process – Interfaces to SCADA/MES/LIMS

Contracts-to-Cash Process

- ✓ Formulae and Average (F & A) pricing
- ✓ End-to-End Supply Chain Integration – Tighter integration with Finance, Costing, Inventory and Transportation
- ✓ Mine Logistics – 3 Way Pegging, Automatic Shipment Cost & Freight Provisioning, Tracking of Shipment
- ✓ Barcoding and hand-held device based finished goods dispatch and stock-take process – Automated process with improved productivity

Plant Maintenance Process

- ✓ Availability Model – Visibility about availability of all critical equipment and OEE
- ✓ Maintenance Planning and Cost Visibility for specific jobs
- ✓ Automatic generation of notification through SCADA integration for values deviating from the range of optimal performance

Key Business Benefits (Contd…)

Procure-to-Pay Process

- ✓ Standardized Material and Service Codification
- ✓ Streamlined procurement process – Contracts, Scheduling Agreement, Delivery Schedules
- ✓ MRP based Material Planning and Inventory Management
- ✓ Automatic triggering of Delivery Schedules, email notifications, delivery monitoring and vendor evaluation
- ✓ Returnable and Non-Returnable Gape Pass – Tracking and Accounting of goods being sent outside
- ✓ Tracking of Returnable Packaging and structured refurbishment process (repairs items sent to vendors)
- ✓ Unique Reservation Request and Approval process leading to automatic generation of Reservations
- ✓ Barcoding and Warehouse Automation using hand-held devices

Financial Management Process

- ✓ IFRS, IGAAP and Local GAAP reporting
- ✓ Established Vital Business Controls - SOX compliance framework, Statutory Compliances
- ✓ Budgeting, Planning and Variance Analysis – GL Level and Cost Center Level
- ✓ Real-time Cost Visibility – Cost Hierarchy and Cost Calculation Methods as per Mining Industry
- ✓ Product Costing – Accurate profitability analysis and fact-based decision making
- ✓ Multi-currency reporting
- ✓ Automated Bank Transactions, Reconciliation and Electronic Funds Transfer
- ✓ Real-time Management Reporting.

Key Business Benefits (Contd…)

Quality Management Process

- ✓ Quality inspections and certification at in-coming, in-process and out-going points
- ✓ Automatic grading of finished goods in interface with MES and LIMS

Hire-to-Retire Process

- ✓ Decentralization of HR services through ESS/MSS portal
- ✓ Transparent Performance Appraisal process
- ✓ Employee life cycle completely automated
- ✓ Training and Event Management to scale up capability of resources with complete training plan
- ✓ Integrated Recruitment process

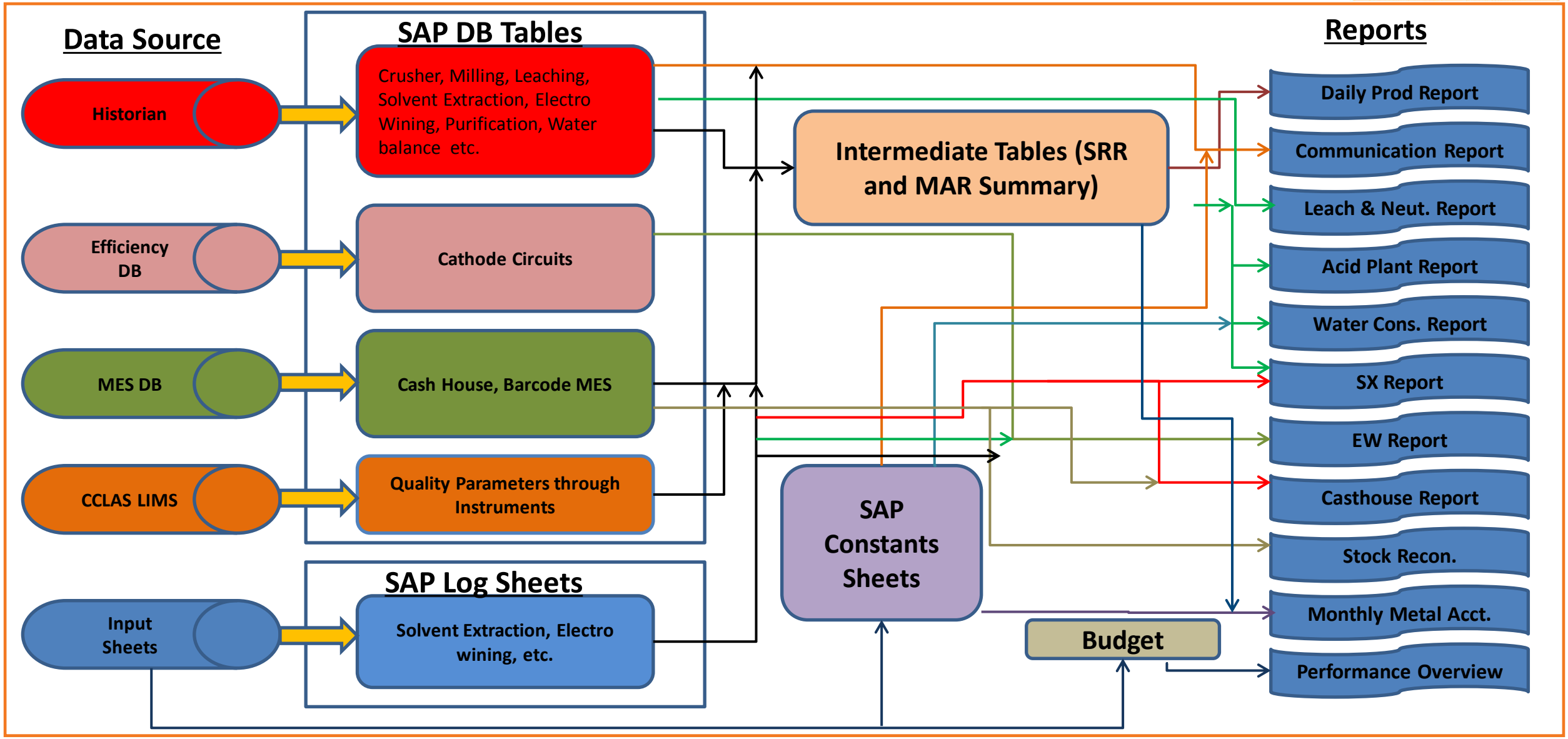
Access Controls Management

- ✓ Job profile based access to employees based on Business Rules and Segregation of Duties (SoD)
- ✓ Workflow based access approval with real-time checks on conflicts and related mitigation controls
- ✓ Risk mitigation – Fire Fighter Access

Key Initiatives

1. Metal Accounting with Interface to Plant Systems
2. Availability Model
3. Bar Code / Hand-held device based Mobile Solution for FG Dispatch and Warehouse Automation
4. Dynamic Inventory Modeling

Metal Accounting Flow Diagram



Metal Accounting Sample Screen Shots

CastHouse Daily Production Report

Metal Production | Cathode and WIP stocks | Casthouse Downtime

Month: September Year: 2014 Internal Target in MT: Rate required: 863.705-

Date	InSql	Input sheet	Assays	Cast Line		Manual	25 Kg Repacks			Remelts
Date	Ingots Cast in MT	Jumbos Cast (MT)	Ave Pb in g/t	Daily SHG	Saleable 25 kg	Production	Daily Produced	Daily weighed out	Delta Stock	Daily 25kg
01. September 2014	229	0.000	27	234.978	234.978	47.592	31.148	0.000	31.148	0.000
02. September 2014	229	0.000	27	189.688	189.688	31.614	28.195	37.372	9.177-	0.000
03. September 2014	235	0.000	31	235.633	235.633	0.978	26.018	72.199	46.181-	0.000
04. September 2014	217	0.000	27	177.370	177.370	0.000	26.995	61.155	34.160-	0.000
05. September 2014	206	0.000	30	209.374	209.374	0.000	19.779	92.136	72.357-	0.000
06. September 2014	376	0.000	38	74.244	74.244	14.230	24.267	2.008	22.259	0.000
07. September 2014	272	0.000	35	211.739	211.739	47.668	33.280	8.142	25.138	0.000
08. September 2014	145	0.000	29	154.774	686.875	47.732	13.974	62.651	48.677-	0.000
09. September 2014	115	0.000	30	59.695	266.916	13.290	7.326	1.034	6.292	0.000
10. September 2014	249	0.000	31	149.904	168.658	0.000	14.995	20.080	5.085-	0.000
11. September 2014	404	0.000	38	217.668	485.675	16.016	31.265	46.456	15.191-	0.000
12. September 2014	414	0.000	41	234.760	417.494	0.000	17.581	71.652	54.071-	0.000
13. September 2014	444	0.000	29	401.465	404.543	5.201	26.307	70.528	44.221-	0.000
14. September 2014	364	0.000	31	283.687	283.687	48.830	20.344	22.520	2.176-	0.000
15. September 2014	279	0.000	25	265.197	265.197	56.778	17.163	31.789	14.626-	0.000
16. September 2014	476	0.000	29	427.112	427.112	54.236	34.092	19.616	14.476	0.000
17. September 2014	309	0.000	36	139.799	228.585	10.172	21.188	0.000	21.188	0.000
18. September 2014	388	0.000	36	239.082	392.691	10.998	19.953	45.083	25.130-	0.000
19. September 2014	343	0.000	27	335.298	436.441	11.490	21.349	41.264	19.915-	0.000
20. September 2014	373	0.000	31	311.252	375.481	5.016	30.619	102.962	72.343-	0.000
21. September 2014	394	0.000	35	289.408	378.999	40.864	24.380	1.088	23.292	0.000
22. September 2014	429	0.000	39	279.319	358.259	13.432	39.153	50.219	11.066-	0.000
23. September 2014	0	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum	6,890	0.000	702	5,121.446	6,909.639	476.137	529.371	859.954	330.583-	0.000
Average	313	0.000	32	232.793	314.075	21.643	24.062	39.089	15.027-	0.000

Comm & Tails Daily Report

Export | Print

Production Date: 22.09.2014

Ore

Crushing

	Dayshift	Nightshift	Total	Target
Tons Crushed (MT)	2233	1823	4056	7000
	Dayshift	Nightshift	Average	Target
Zn Grade (SRF) (%)	8.24		8.24	10
Size +8 mm (SRF) (%)	30.44	15.64	26.74	<10
Moisture (SRF)	6.73	1.99	5.54	<2

Milling & Thickening

	Dayshift	Nightshift	Average	Target
TK104 U/F Density (kg/l)	1.42	1.46	1.44	1.4
Zn Grade (SRD) (%)	8.04	8.25	8.12	10
MTU D08 (µm)	281	160	221	180
Mill KW (kW)	897	874	886	1900
	Dayshift	Nightshift	Total	Target
Tons Milled (MT)	2570	2421	4991	4652
Mill Runtime (hr)	11.36	10.75	22.11	
	Dayshift	Nightshift		Target
TK101 Level (%)	52	49		>85
TK102 Level (%)	55	52		>85

Tailings

Runtimes

	Dayshift	Nightshift	Total	Target
CV017 (hr)	10.58	11.06	21.64	24
CV014 (hr)	1.77	0.92	2.69	

LimeStone

Crushing

	Dayshift	Nightshift		Target
Silo level (%)	91	86		>70
	Dayshift	Nightshift	Average	Target
Zn Grade (SRF) (%)				< 5
Ca Grade (%)				>28

Milling & Thickening

	Dayshift	Nightshift	Average	Target
Mill KW (kW)	1002	1013	1008	>1600
Cluster 1 Pressure (kPa)	152	182	167	190
Cluster 2 Pressure (kPa)				190
LCO D09 (µm)		101	51	<45
NAS D09 (µm)				<60
Mill Runtime	1.46	9.93	11.39	

Storage

	Dayshift	Nightshift	Total	Target
TK111A Level (%)	69	15		>75
TK111B Level (%)	73	68		>75
TK112 Level (%)	84	81		>75
Tons Milled (MT)	51	299	350	630

	Dayshift	Nightshift	Average	Target
TK109 U/F Density (kg/l)	1.122	1.121	1.12	1.25

Thickener Overflow TSS

	Dayshift	Target
TK104	71	<50
TK109		

Electrowinning Daily Report

Print | Export

Electrowinning Daily Report

Date : 22.09.2014

1. Power		4. Stripping		6. Anode Cleaning			
Actual current (kAh)	2931	MWh/t Stripped		Anode Cleaning	Day	Night	Total
Target (kAh)	3960	MWh/t (Target:)	3.290	Anode Lifts Cleaned			
Utilisation (%)	74.02			Number of Anodes replaced:			
Actual power (MWh (AC))	946			Number of cells cleaned:			
2. Current		**4.1 Dayshift**		**7. Average flow for the day**			
Current (kA)	122	Total (lifts)					
Voltage (V)	309	Auto (lifts)	18	LE to EW (CT1) (m³/h)	180		
Power (MW (AC))	39.42	Manual (%)		Total (m³)	4488		
Power (MW (DC))	37.67	Strip rate (lifts/h)		LE from SX (m³/h)	238		
Rectifier Efficiency (%)	97.50	Cathodes replaced		SE to SX (m³/h)	277		
CE (%)	87.8			CP Acid (m³/h)	2.01		
Energy cons (MWh/t)	3.018	**4.2 Nightshift**		Total (m³)	27		
Current density (A/m²)	297	Total (lifts)		Demin (m³/h)	24		
Rate (t/h)	13.06	Auto (lifts)	43	Total (m³)	395		
Rate (t/day)	313	Manual (%)		Demin to C/T (m³)	465		
Target Plated (t)	434	Strip rate (lifts/h)		Demin to SE launder (m³)	61		
		Cathodes replaced		Demin to CC & EQ (m³)	131-		
3. Electrolyte							
Effective LE (m³)		Most recent weight (kg)	69.0	**8. Total sulphate balance**			
Effective SE (m³)		Ave cathode mass (D/S) (kg)					
Total LE (m³)		Ave cathode mass (N/S) (kg)		RSE1	240		
Total SE (m³)		Total zinc stripped (MT)		RLEL	264		
Total LE & SE (m³)							
% LE (%)		Incubation Period (ave) (hrs)	64.0				

Planning-Budget Report for SZ Mine

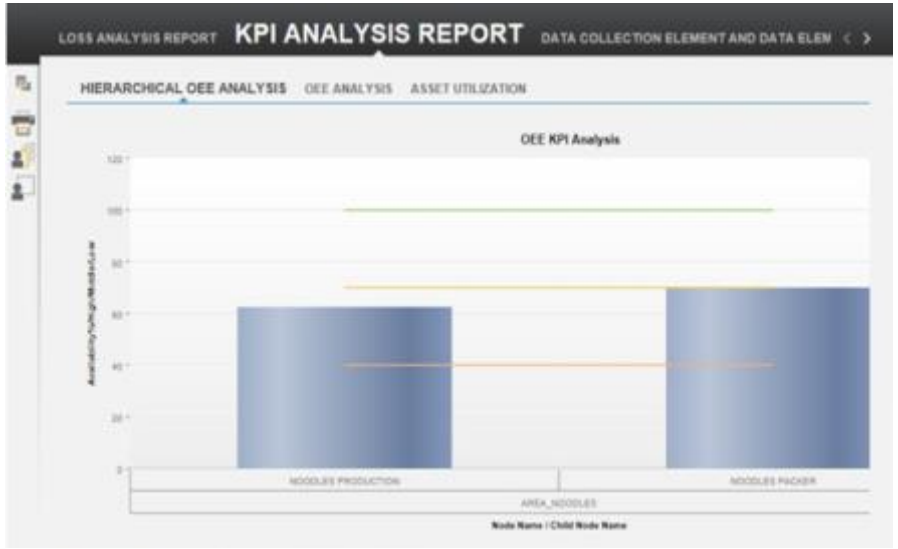
Planning-Budget Report for SZ Mine

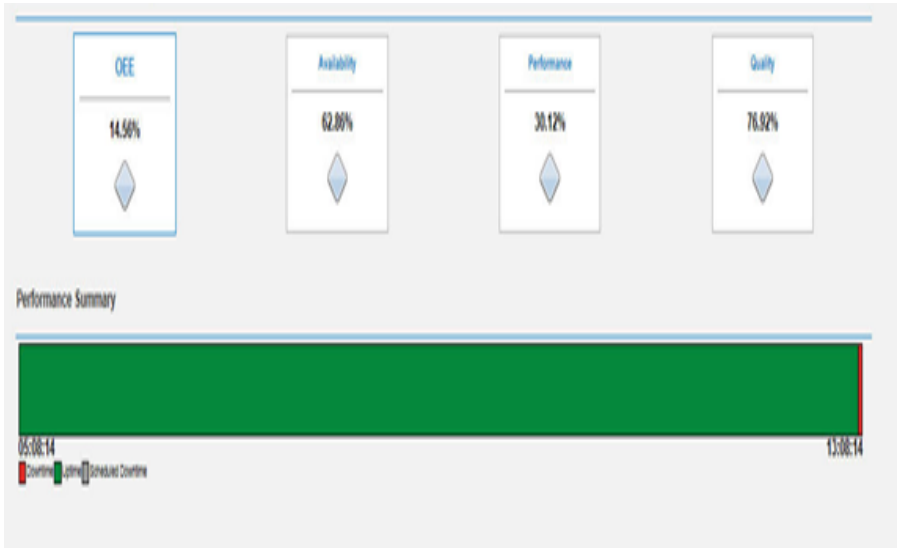
Fiscal Year	Month	Expit Zinc ...	Expit Zinc ...	Expit High ...	Expit High ...	Expit Lime...	Expit Lime...	Expit Wast...	Total Expit...	Total Prod...	Stripping R...	Ex-STK Zin...	Ex-STK Zin...	Ex-STK Li...
2015	APR	110958	9.00			21294		2017181	2149433		18.00	133151	9.00	21294
2015	MAY	135753	9.00			22004		1991676	2149433		15.00	137589	9.00	22004
2015	JUN	119292	9.00			21294		2315909	2456495		19.00	131151	9.00	21294
2015	JUL	136278	10.00			22004		2815449	2973731		21.00	137589	9.00	22004
2015	AUG	145913	10.00			22004		2767854	2935771		19.00	137589	9.00	22004
2015	SEP	146607	8.00			21294		2753023	2920924		19.00	133151	9.00	21294
2015	OCT	151503	7.00			22004		2799684	2973191		18.00	137589	9.00	22004
2015	NOV	83842	9.00			21294		2818388	2923525		34.00	133131	9.00	21294
2015	DEC	145246	9.00			22004		2795835	2963086		19.00	137589	9.00	22004
2015	JAN	112445	9.00			22004		2855700	2990149		25.00	137589	9.00	22004
2015	FEB	194046	9.00			19875		2529210	2743131		13.00	124274	9.00	19875
2015	MAR	178429	8.00			22004		2783382	2983814		16.00	137589	9.00	22004

Plant Availability Model

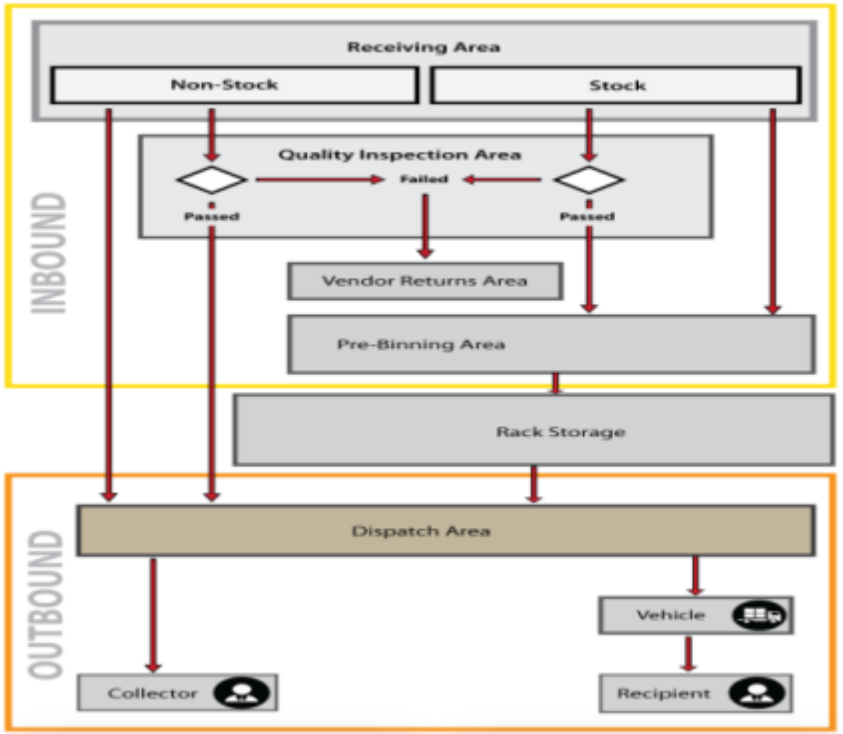








Warehouse Automation Using Mobile Devices



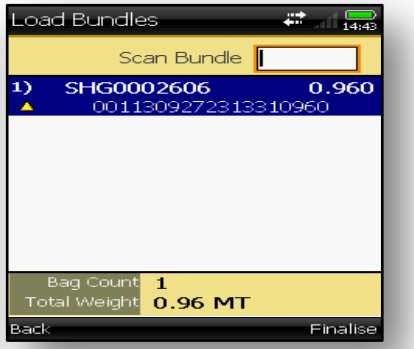
















Major Challenges and Learning

- ✓ ***Aggressive Time Lines*** – Resulted into revising Go-Live Date
- ✓ ***Too big a Scope !!*** – Take only Business is willing to own, had to phase it out
- ✓ ***Stakeholder Involvement*** – Involve all concerned from the beginning and at an appropriate time
- ✓ ***Process Maturity*** – Assess first and if required, "Process Standardization" should precede ERP implementation
- ✓ ***Centralized Project Location*** – Full ownership and awareness was a challenge
- ✓ ***Stabilization*** – Huge Change in the business, took time to stabilize
- ✓ ***Change Management*** – Key to success, it's a project within project
- ✓ ***Training to End Users*** – Spend enough time and plan thoroughly
- ✓ ***Master Data Cleansing*** – Start early, never under estimate
- ✓ ***Post Go-Live Review*** – Review project deliverables, defined structured Utilization and Effectiveness review

Thank You