### Stuart Gula General Manager, Tennessee Mines





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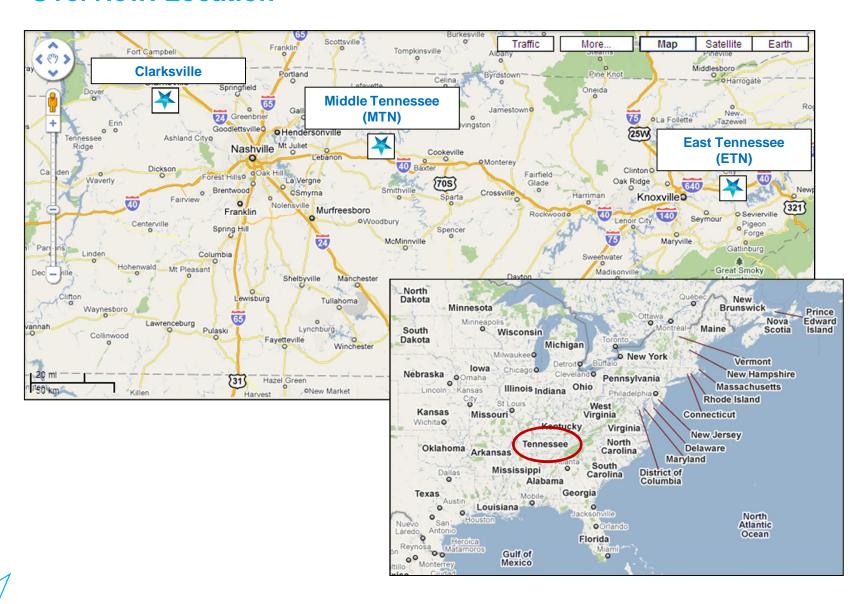
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# **Agenda**

- Overview
- Operations
- Zero Harm
- People & Organization
- Reliability
- Growth
- Summary



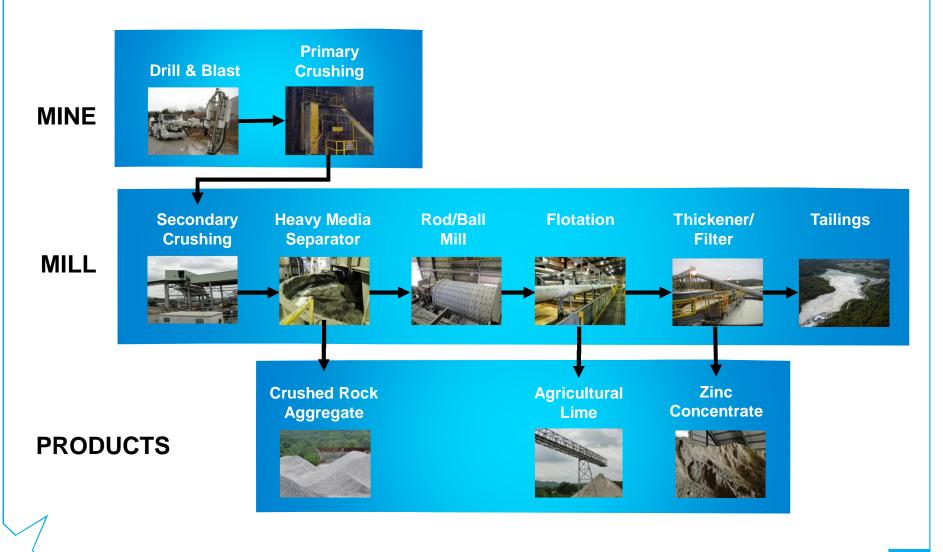
### **Overview: Location**



# **Overview: History of Nyrstar Tennessee Mines**

	Middle Tennessee		East Tennessee		
	1964	New Jersey Zinc Co. (NJZ) commenced exploration near Murfreesboro	1850s	Oxidised zinc ores discovered along Mossy Creek in Jefferson City	
	1968 1974	Discovery hole at Elmwood  NJZ Co. completed Elmwood Mill	1926	Universal Exploration Co. (US Steel) opened the Davis Mine.	
	1975	Union Miniere took 40% interest in NJZ Co. and formed Jersey Miniere Zinc Co.	1953 1963 1988	New Jersey Zinc began operations at Jefferson City Mine after entering the area and 1947	
	1982 1984	Gordonsville Mill commissioned  JMZ acquired remaining NJZ Co.		New Market Mine commenced operations	
	1994	operations formed Union Zinc Inc. (UZI) Savage Resources acquired UZI and commenced development to Horseshoe		ASARCO purchased the assets of Inspiration Development Company including the Jefferson City Mine and Mil and the Beaver Creek Mine	
	1999 2003	Bend Pasminco acquired Savage resources Mossy Creek Mining acquired the assets	1997	Temporary closure the New Market Mine and subsequent permanent closure in 1999	
	2006	operating Ag-Lime business Strategic Resources Corporation acquired the operation and began re-commissioning the operations which ceased in 2008 Nyrstar acquisition	2001	Closure of all ASARCO operations following acquisition by GROUPO Mexico	
	2009		2006	Operations acquired by Glencore and re- commissioning began until 2008 when placed on care & maintenance	
1			2009	Nyrstar acquisition	

# **Milling and Mining Process**



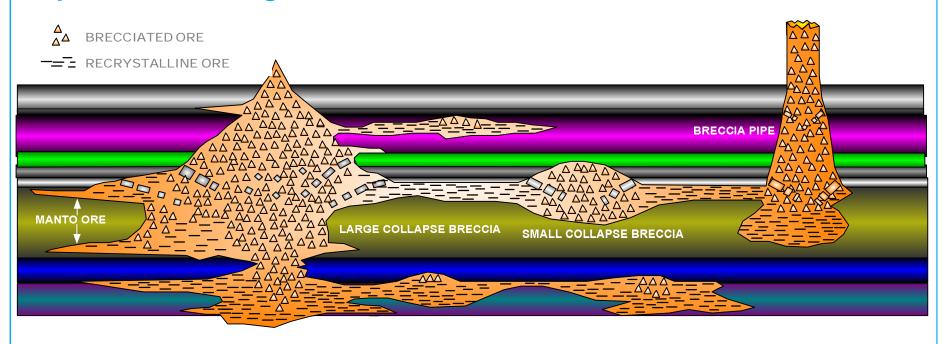
# **Operations: Mining Overview**

- Each complex consists of 3 mines
- ETN Mines
  - Coy
  - Immel
  - Young (includes Mill & Stores)
- MTN Mines
  - Cumberland
  - Elmwood (dewatered, rehabilitation in progress)
  - Gordonsville (includes Mill & Stores)

- Utilising random room & pillar mining approach
  - Hoisting ~5 million tonnes per annum of ore (2.5 million per complex)
- Average ore grade 3.0-4.0% Zn
- Mixed Mobile Equipment Fleet
  - Oldenberg Drills
  - Caterpillar, Sandvik Tamrock and Dux trucks and loaders

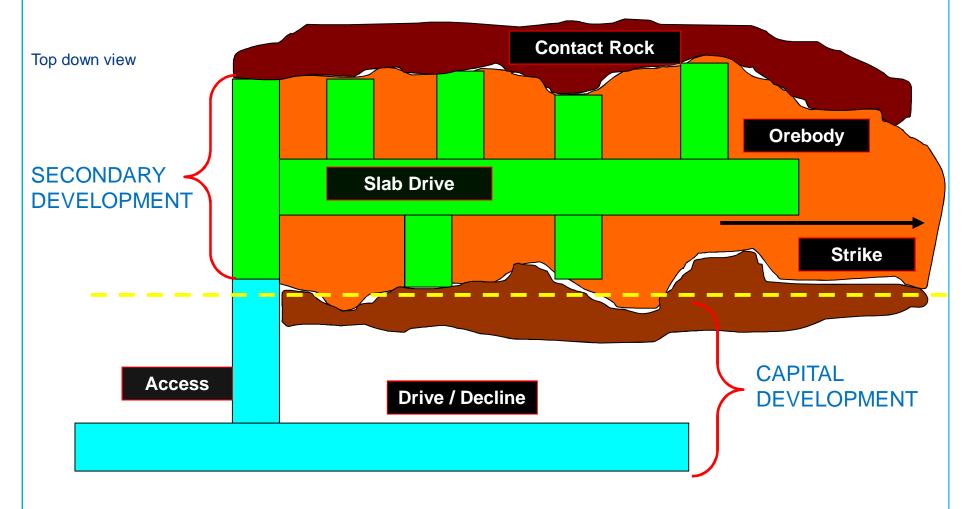


## **Operations: Mining Overview**



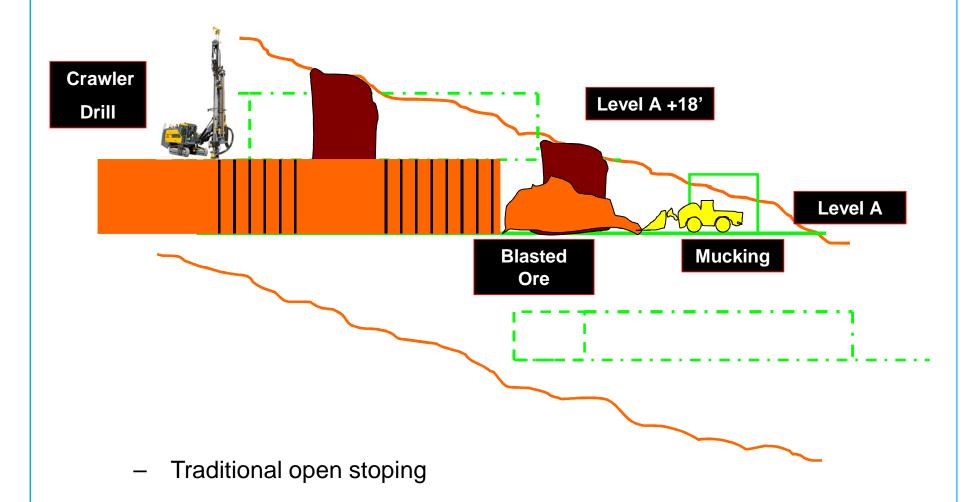
- Zinc ore hosting beds are found in the Middle Mascot and Kingsport formations within favorable zones of interbedded limestones and dolomites
- Mineralization occurs within breccia collapse structures, manto structures, and recrystalline (up to 150 feet high)
  - Breccia ore: Small to large breccia bodies are the results of dissolution and recrystallization of limestone resulting in collapse of overlying dolomite and limestone beds
  - Manto ore: small breccia bodies or "ore shoots" extending off of main breccia bodies
  - Recrystalline ore: mineralization occurring in fine to course crystalline dolomite (recrystalline)

## **Operations: Development Mining**

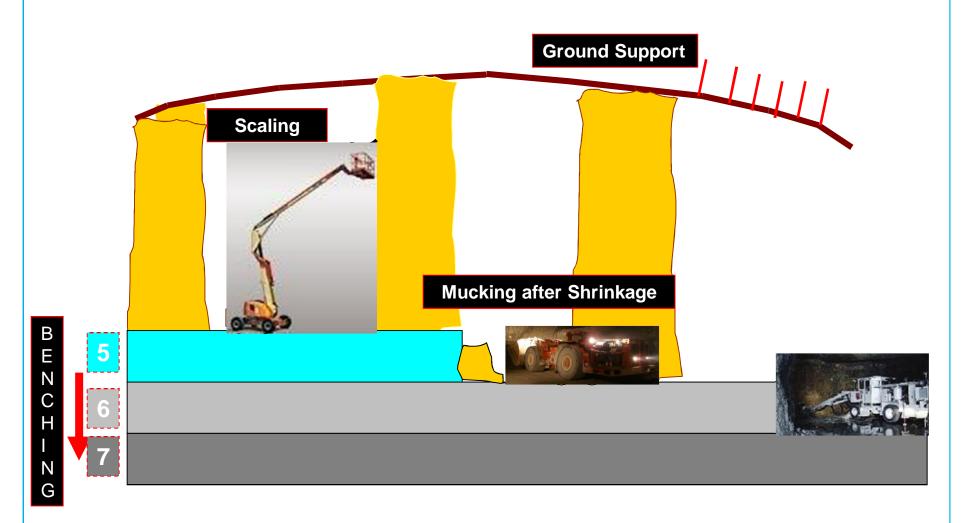


 Random Room and Pillar Development at MTN / Bulk Mining Methods at Immel Mine (ETN)

# **Operations: Vertical Bench Mining**



# **Operations: Horizontal Bench Mining**



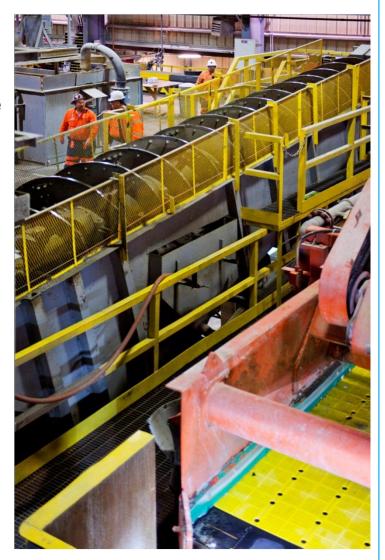
Multiple pass shrink stoping

# **Operations: Longhole Stope Mining**

#### **Cross Section View** Plan View Upper Drift Fan of Rings-Upper Drift Level A +60' → Level A Lower Drift Lower Drift **Blasted** Remote Longhole Ore Mucking Longhole Drill Drill

# **Operations: Milling Overview**

- ETN & MTN planned ore throughput per plant
  - Crushing/ Heavy Media Separation ~350tph ore
  - Grinding/Flotation ~150tph ore
- Concentrate production
  - Approximately 100-110ktpa zinc concentrate production per complex
  - Concentrate grade ~62% zinc
- By-Products
  - Crushed rock aggregate
  - Agricultural lime
- Delivery to Clarksville
  - Barge transport from ETN
  - Truck transport from MTN



# Our Strategic Framework Nyrstar's *Strategy into Action at Tennessee Mines*



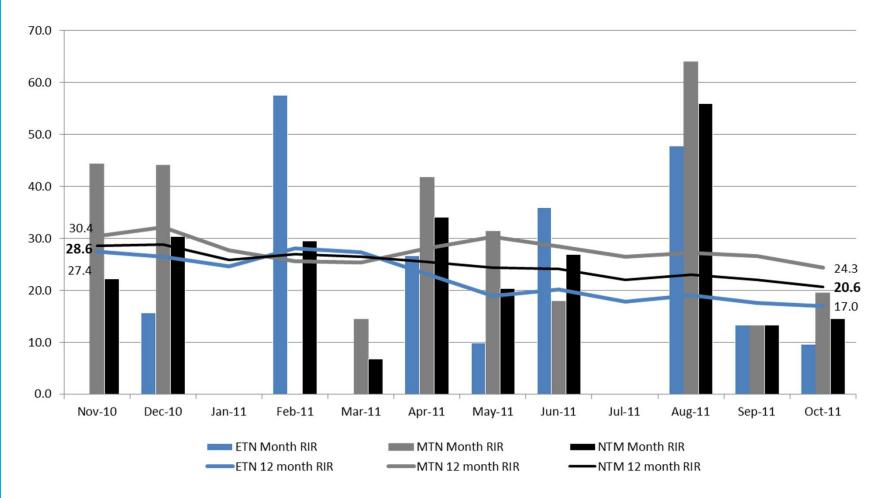
\* Some actions are completed as part of Nyrstar's capital allocation process, while others are still in progress

- Living the Nyrstar Way
  - Zero harm
- Achieving excellence in everything we do
  - Right person, right role
  - Operational Excellence
  - Minimizing operating costs
  - Increasing mobile equipment availability
- Delivering sustainable growth
  - Delineation of reserves and building a robust life of mine model
  - Grade improvements
  - Mining more zinc and less Tennessee

# **Zero Harm - Recordable Injury Frequency Rate**

per million hours work

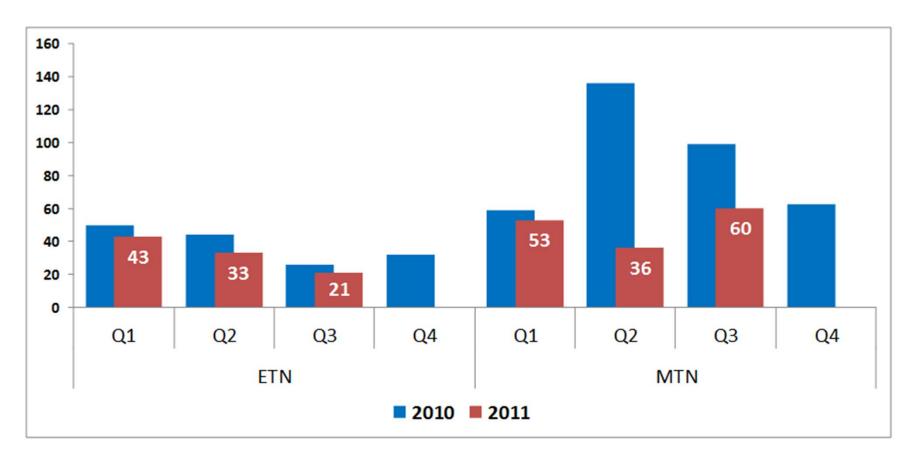




- Focus been on development of Nyrstar safety culture & eliminating hazards
- Current focus on unsafe acts & risk management

# **Zero Harm – MSHA Citation Quarterly Comparison**

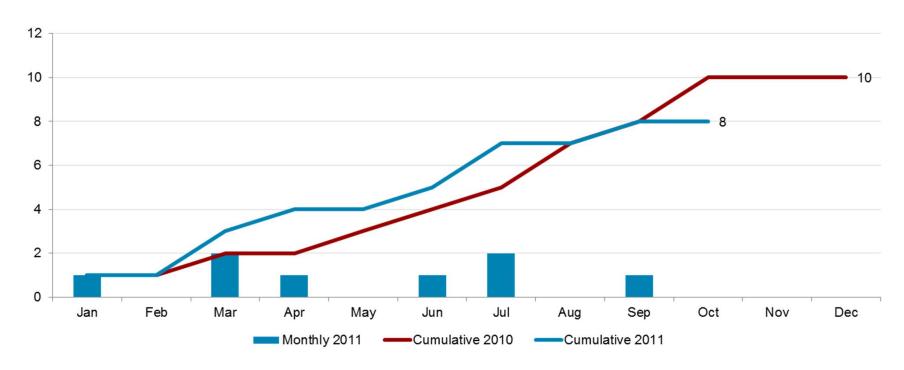




- Building a positive image & relationship with MSHA
- Identification and rectification of hazards through Nyrstar's recordable incident management system (RIMS) is generating positive results

### **Zero Harm – Environment**



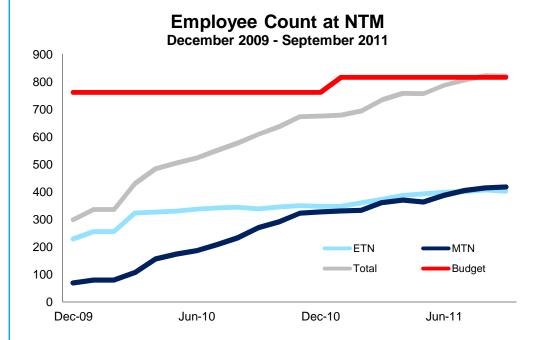


- Renewing NPDES and other Statutory permitting and associated systems
- Environment awareness program underway
- Working towards integrated SHEC management systems (ISO14001/OSHAS18000)



# **Building a sustainable effective operation: People & Organization**

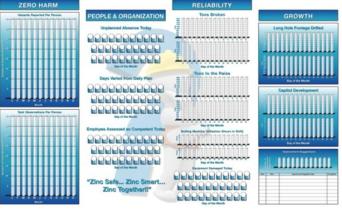












#### Strategic alignment & communication

- Right person in the right role (~70 to >800 employees)
- Balanced business strategy & plan, and "What's the Score"

#### Strengthening the competency of our workforce

- Competency based training framework
- Front line leadership development



## Reliability – Elmwood/Cumberland Rehabilitation

# **Elmwood & Cumberland Mines dewatering complete**

- Mines under water for approximately
   10 years
- We have pumped out approximately
   4.6 billion litres of water
- More than 35km (approximately 250 tonnes) of electrical cables installed
- Approximately 25 electrical substations installed

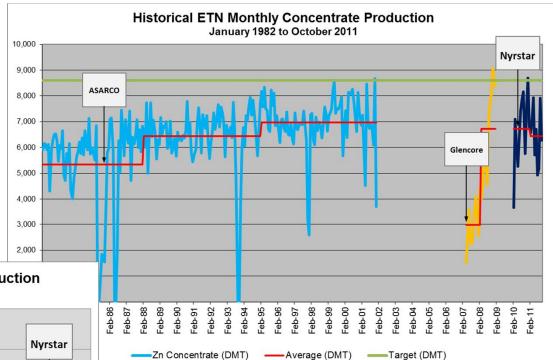
Cumberland now operating at 80% of intended capacity



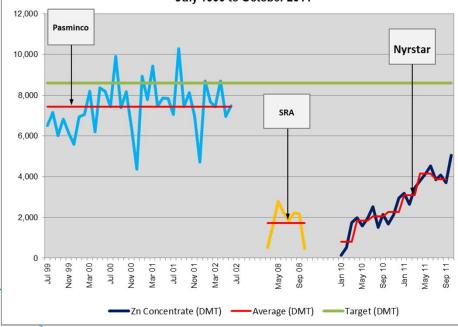
# Highest production levels for a decade

There have been issues

- Production variability at all mine
- Volume of water to be pumped out greater than expected
- Fixed & Mobile equipment availability and reliability issues







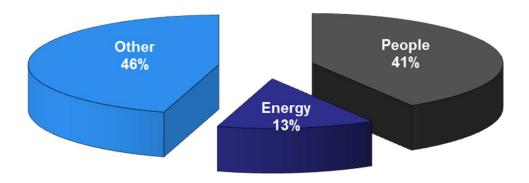
We have learnt from these and made significant progress

- All mines dewatered
- Improvement in zinc head grades
- MTN Ball Mill operational at full production rates
- Reliability programs being implemented

On track to deliver all operations to full capacity by end 2011

## **Reliability – Direct Operating Costs**

#### **Composition of operating costs**



#### Opportunity to improve cash costs further through

- More robust mine planning and eliminating rework & waste
- Improving asset reliability and minimizing damage
- Operational Excellence implementation through 'lean manufacturing' techniques
- Building a "can do" attitude and cost conscious culture

## **Operations: Resources**

#### Middle Tennessee Resources (2010)

Category	Mt	Zn %
Indicated/Measured	1.7	3.14
Inferred	10.5	3.47
Total	12.2	3.42

#### **East Tennessee Resources (2010)**

Category	Mt	Zn %
Indicated/Measured	3.4	3.38
Inferred	13.8	3.90
Total	17.2	3.80

- Updated JORC compliant resource statements expected in H1 2011
- Updated reserve statement dependent on finalisation of life of mine planning

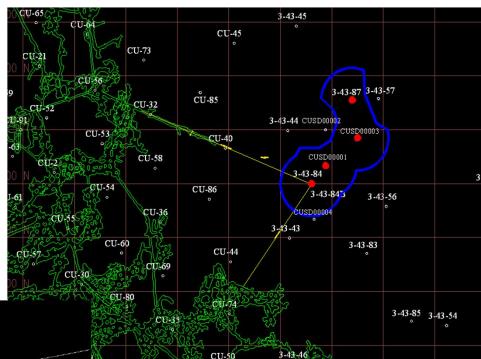
## **Growth opportunities Resources & Reserves**

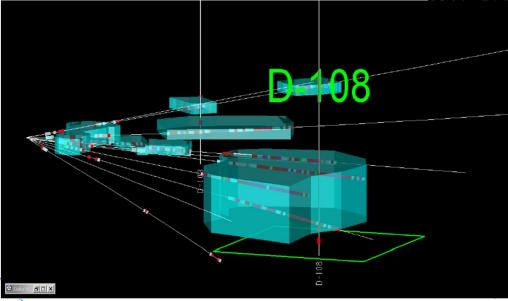
## Diamond drilling continues to replace ore consumed

Surface Drilling at Cumberland

Underground Drilling at Coy, Young

and Gordonsville





growth opportunities

**Updated Resource/Reserve** statements completion expected H1 2012

## **Summary**

- Continue safety culture development through eliminating unsafe acts and focus on risk management
- Environmental awareness under development
- Strengthening the competency of our workforce
- Reduce variability, minimize downtime and damage, establishing a cost conscious culture
- Resource/Reserve drilling continues to replace consumed ore and build confidence



