

## Development & Expansion of the Langer Heinrich Operation in Namibia

June 2009



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# Project Location- Namibia

- Location - South West Africa Region
- Capital City - Windhoek
- Population - 2 million
- Stable, democratic republic. Independence since 1990
- Economy - mining 20% of GDP (U, Zn, Diamonds, Cu, Au)
- Nam \$ pegged to South African Rand
- Climate - dry, sub-tropical



# Project History

## Gencor (1973-1987)

1973:- Langer Heinrich deposit discovered

1974-1976:- 25,00m percussion & 2,000m diamond drilling

1977-1979:- Mining, metallurgical & hydrological studies

Pilot plant trial for 18 months

1981-1987:- Extended drilling

## Acclaim (1998-2002)

1998:- Acclaim acquired project

1999-2002:- Infill RC drilling completed. Positive PFS completed

**PROJECT MOTHBALLED**



# Project History

## Paladin Resources (2002 to date)

**August 2002:- Paladin acquires project for \$15,000**

**January 2003:- PFS revised, BFS development proposal compiled**

**February 2004:- Commence BFS**

**April 2005:- BFS successfully completed by GRD Minproc**

**September 2005:- Site works commenced**

**September 2006:- Primary crusher and front end commissioned**

**December 2006:- Mechanical completion**

**March 2007:- Official mine opening**

**December 2007:- Nameplate production achieved**

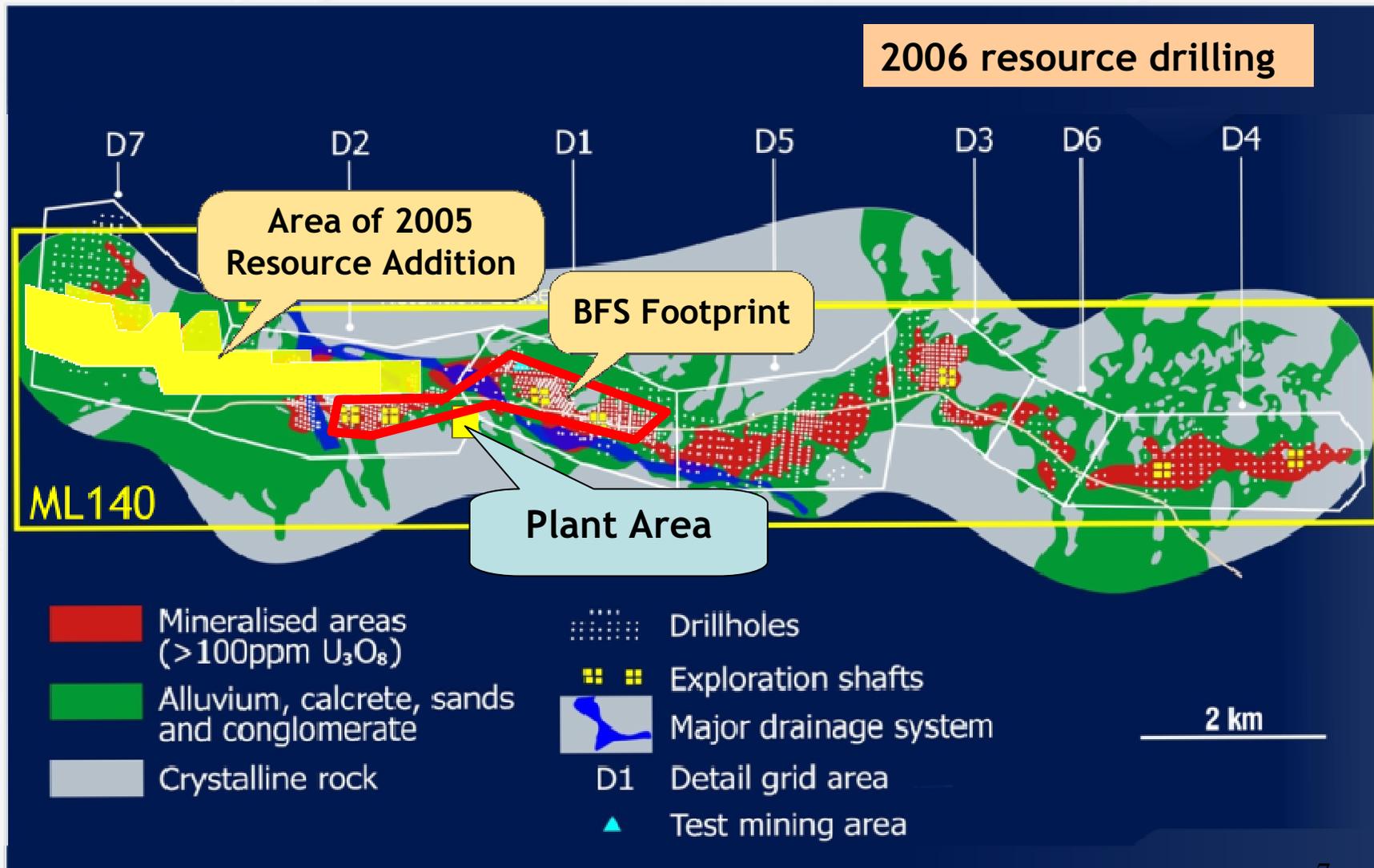


# Mineralogy

- Mineralization associated with calcretisation of valley fill fluvial sediments in palaeodrainage system
- Calcrete is a secondary, chemically precipitated limestone
- Uranium mineralization is as carnotite (an oxidized U & V secondary mineral)
- Carnotite occurs as thin films lining grains, cavities & fracture planes
- Deposit occurs over 15km in 7 main pods “Details”
- Mineralization is near surface, 1-30m thick & 50-1,100m wide



# Geology and Mineralisation



# Mineralogy



# Current Resources & Reserves

<u>Mineral Resources (250ppm)</u>	<u>Mt</u>	<u>Grade</u>	<u>Tonnes</u>
<u>250ppm Cut off Grade</u>		%U <sub>3</sub> O <sub>8</sub>	U <sub>3</sub> O <sub>8</sub>
Measured & Indicated	56.4	0.06	32,858
Inferred	70.7	0.06	43,557
<u>TOTALS</u>	<u>127.1</u>	<u>0.06</u>	<u>76,415</u>
		%U <sub>3</sub> O <sub>8</sub>	U <sub>3</sub> O <sub>8</sub>
<u>Mining Reserves (@\$30/lb)</u>	<u>Mt</u>	<u>Grade</u>	<u>Tonnes</u>
<u>250ppm Cut off Grade</u>		%U <sub>3</sub> O <sub>8</sub>	U <sub>3</sub> O <sub>8</sub>
Proven	30.0	0.06	17,924
Probable	20.6	0.06	11,950
<u>TOTALS</u>	<u>50.6</u>	<u>0.06</u>	<u>29,874</u>

JORC & NI 43 101 Compliant

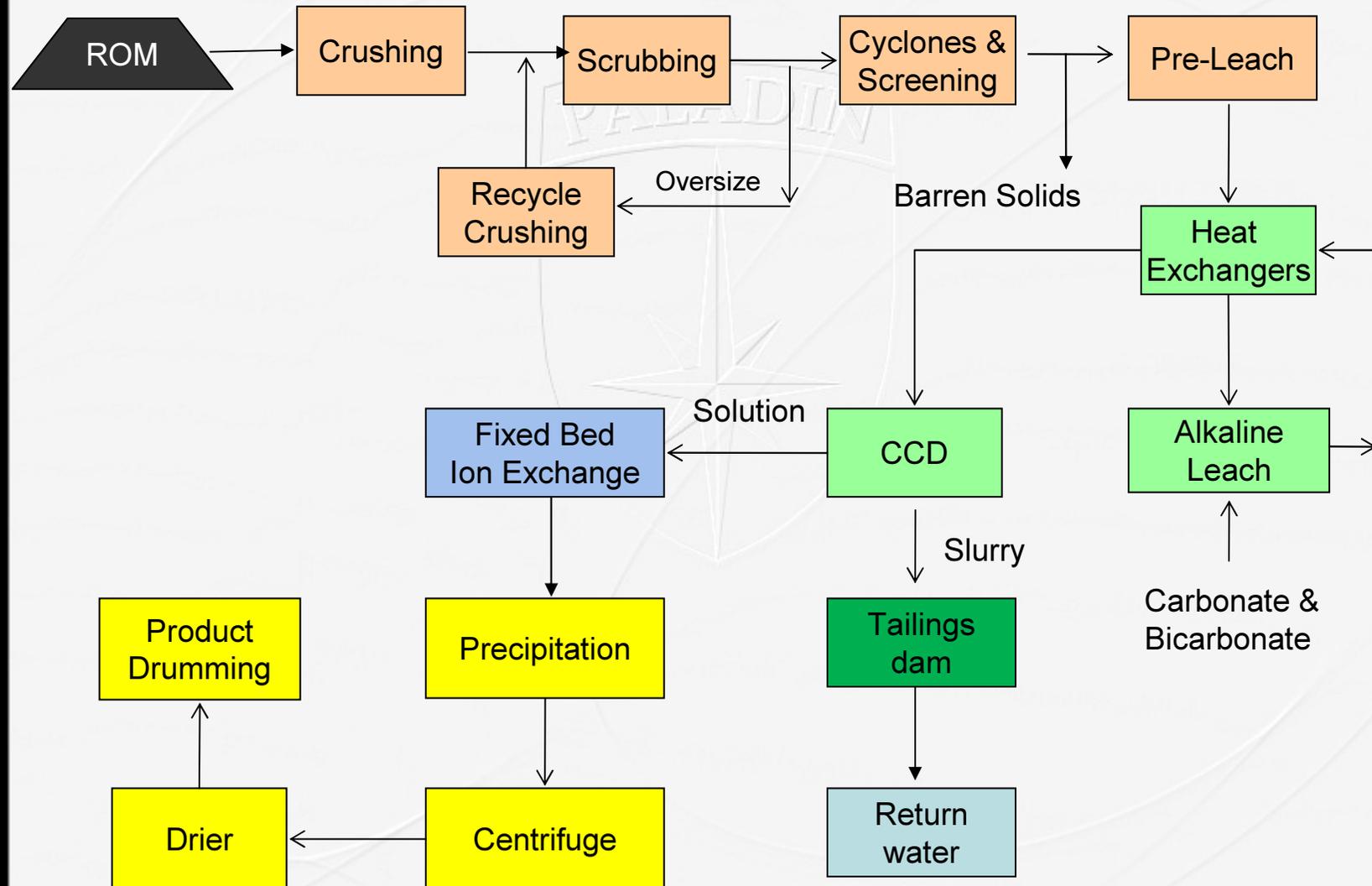


# BFS Plant Operating Criteria

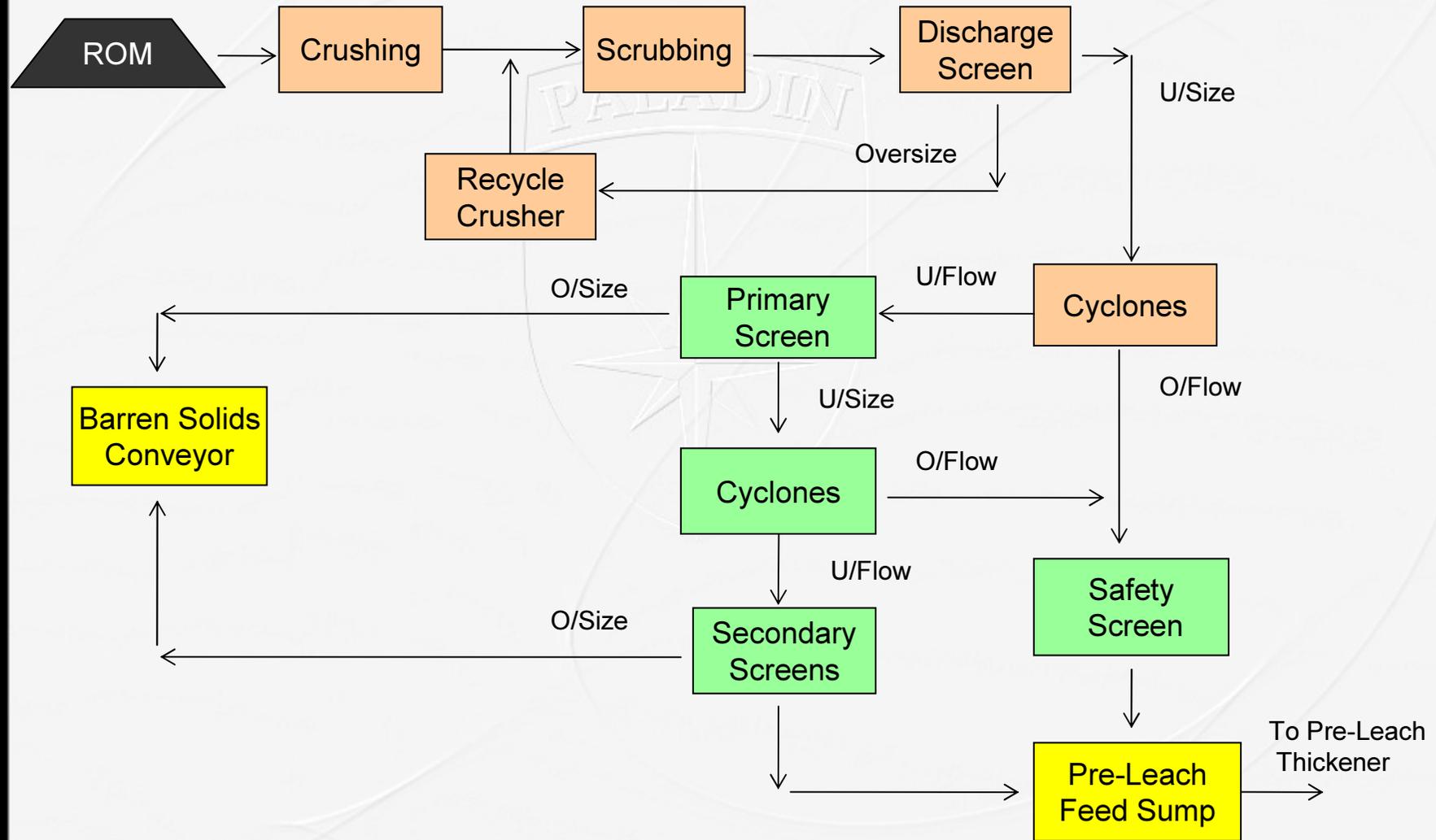
<u>Operating Criteria</u>	<u>Units</u>	<u>Value</u>
Ore Treatment Rate	t/a	1,500,000
	t/hr	190.2
Water Consumption	m <sup>3</sup> /a	1,300,000
Annual Production	t/a U <sub>3</sub> O <sub>8</sub>	1,180
Availability	%	95
Utilization	%	95
ROM Grade	ppm U <sub>3</sub> O <sub>8</sub>	875
“Barren” cut size	mm	0.5
Mass Split to Barren	%	55
Leach Temperature	Degrees C	>75



# Stage I Flowsheet



# Crushing, Scrubbing & Screening



# Crushing Circuit



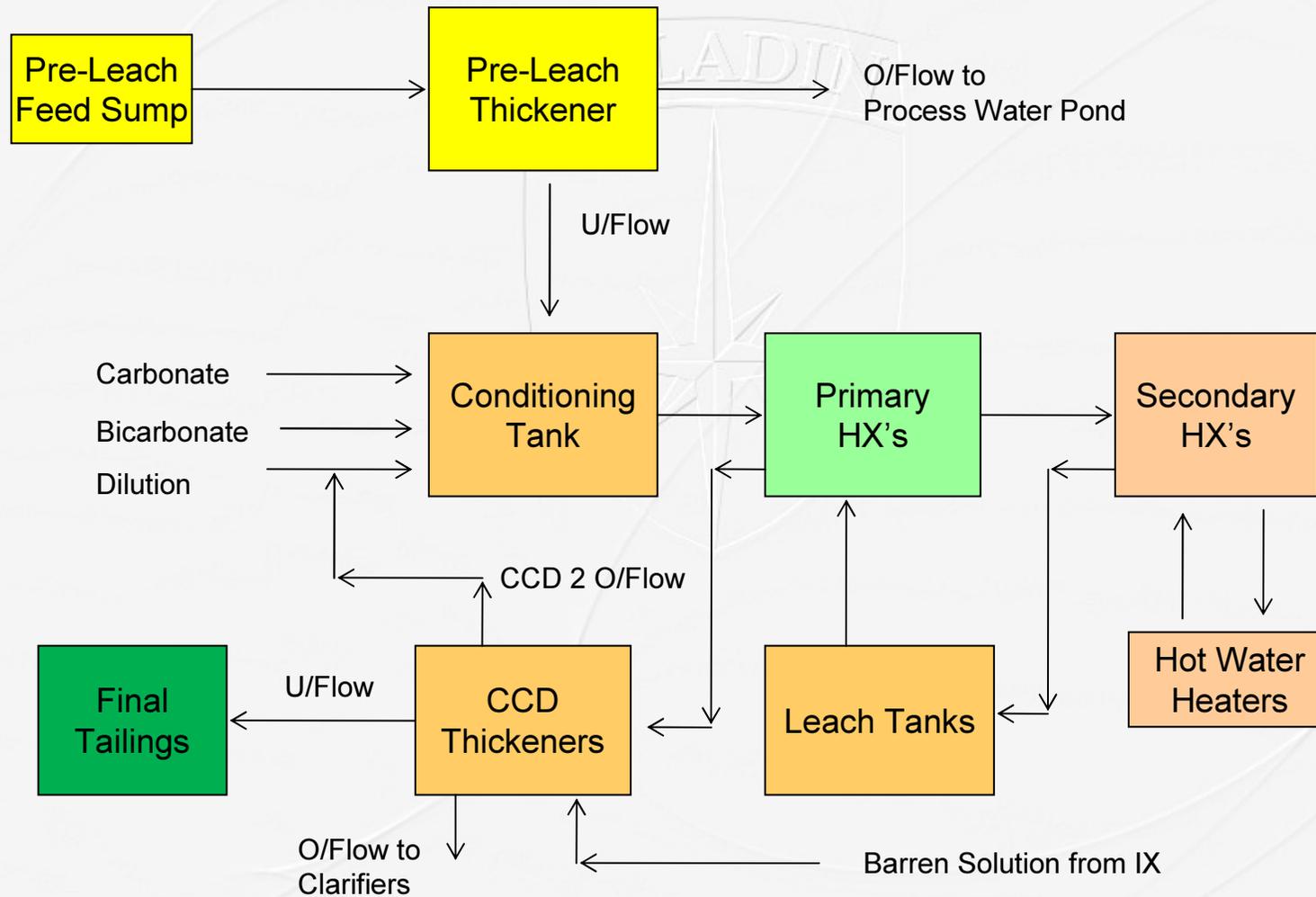
# Scrubbing & Screening



2006/11/27



# Leach & CCD Circuits



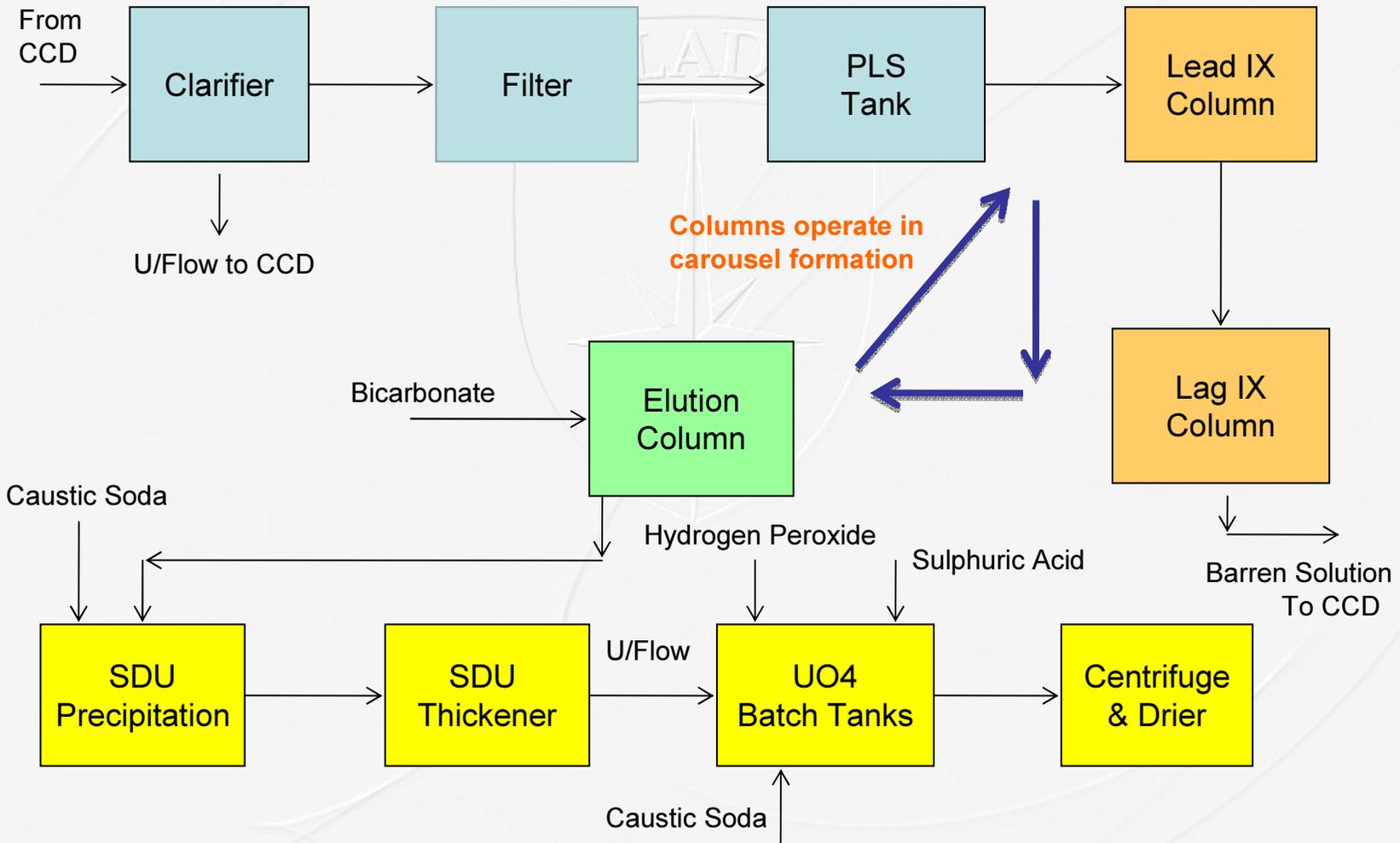
# Leach & CCD



2006/11/27



# Ion Exchange & Precipitation



# IX Columns



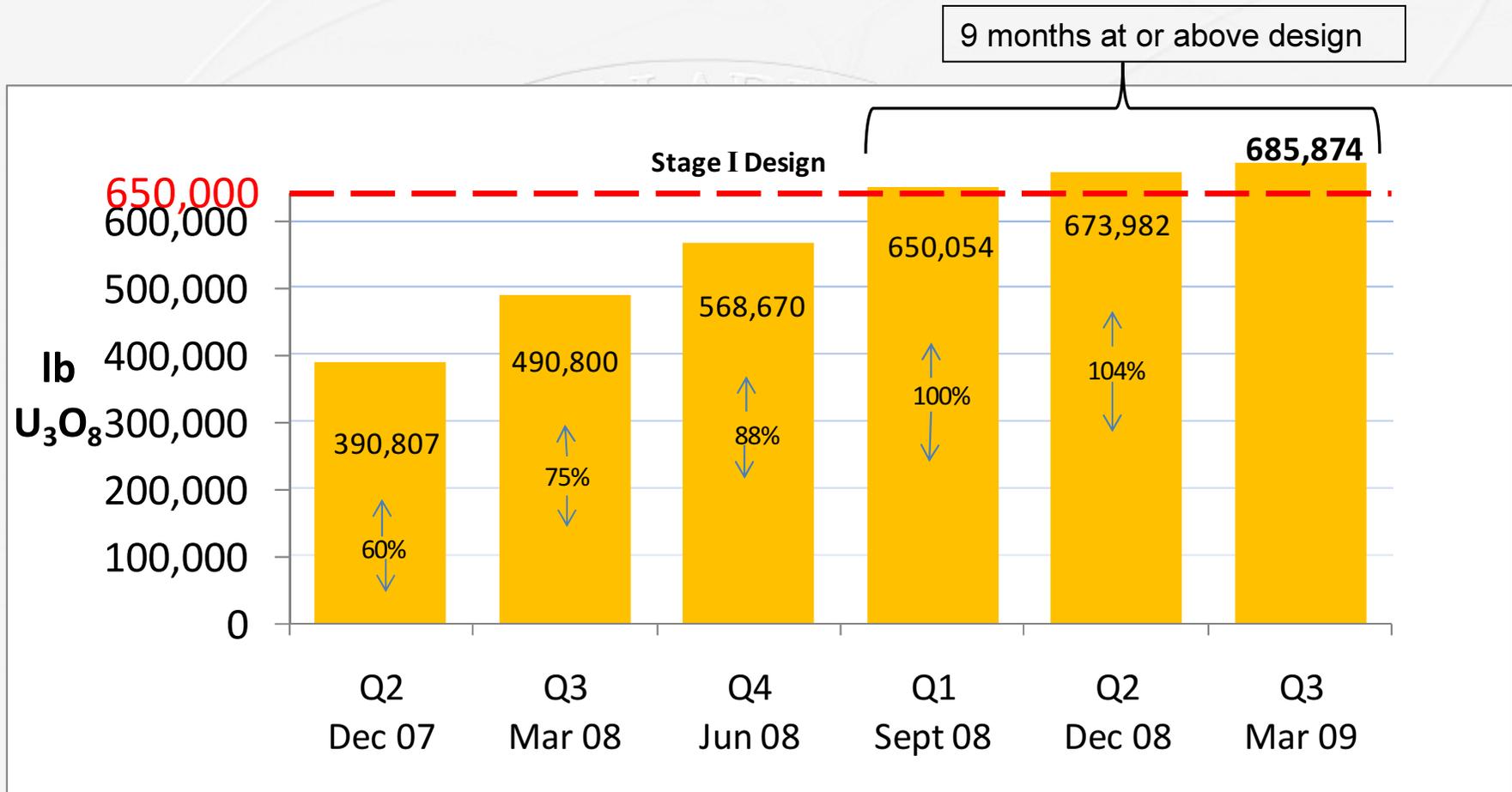
# Ramp-up Lessons Learnt

- **Handling Wet Material**
- **Mass Split to Barren**
- **Slurry Viscosity & Leach Agitators**
- **Leach Tank Lining & Heat Exchangers**
- **Leach Temperature**
- **Thickener & Clarifier Performance**
- **IX Column Design & Throughput**
- **Precipitation Chemistry**



# Langer Heinrich Production

## Quarter by Quarter



# Stage II Expansion

## Objectives:

- Design, construct and commission an expansion to the existing plant to increase design capacity of  $U_3O_8$  production by 1.1Mlb/y to 3.7Mlb/y
- Short ramp-up to expanded capacity (308,333lb/month)
- Complete the project within the budget (US\$50M)
- Have consideration for Stage III expansion requirements as part of this expansion project
- Minimise the operations interference due to brown-fields nature of project
- Consider use of RIP technology



# Stage II Expansion

The following areas are addressed:

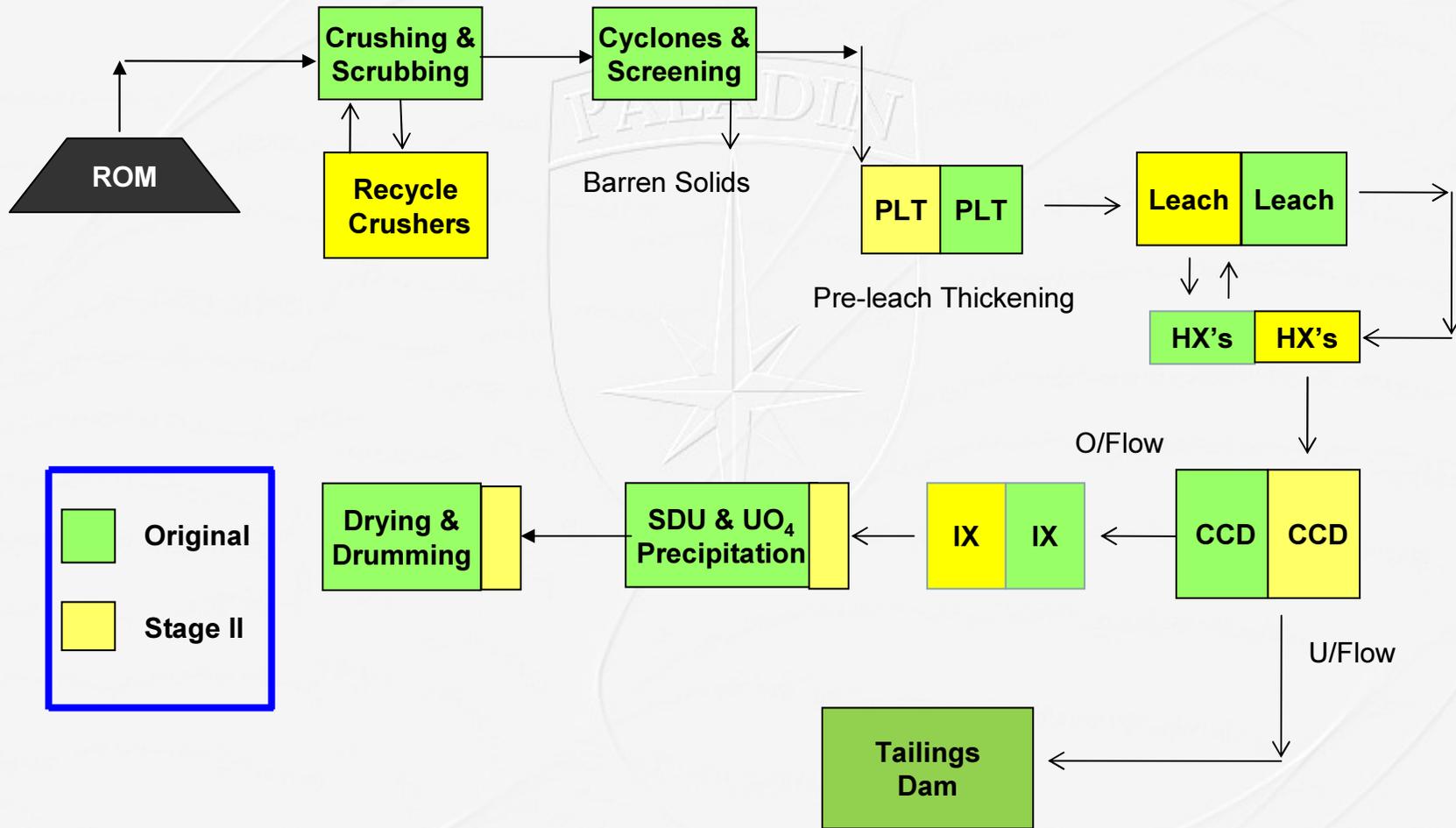
- **Recycle Crushing Circuit & Feed Conveyor being up-graded**
- **Cyclone Circuit being expanded**
- **New Pre-Leach Thickener<sup>\*1</sup>**
- **Additional Leach capacity inc. HX's, Heaters etc**
- **Additional High Density Thickeners<sup>\*1</sup>**
- **Additional IX Columns**
- **New Drier inc. feed arrangement & building extension<sup>\*1</sup>**
- **Increased reagent dosing capacity**
- **Additional MCC buildings etc**
- **Tailings Disposal up-grade**

**\*1 Includes provision for Stage III requirements**

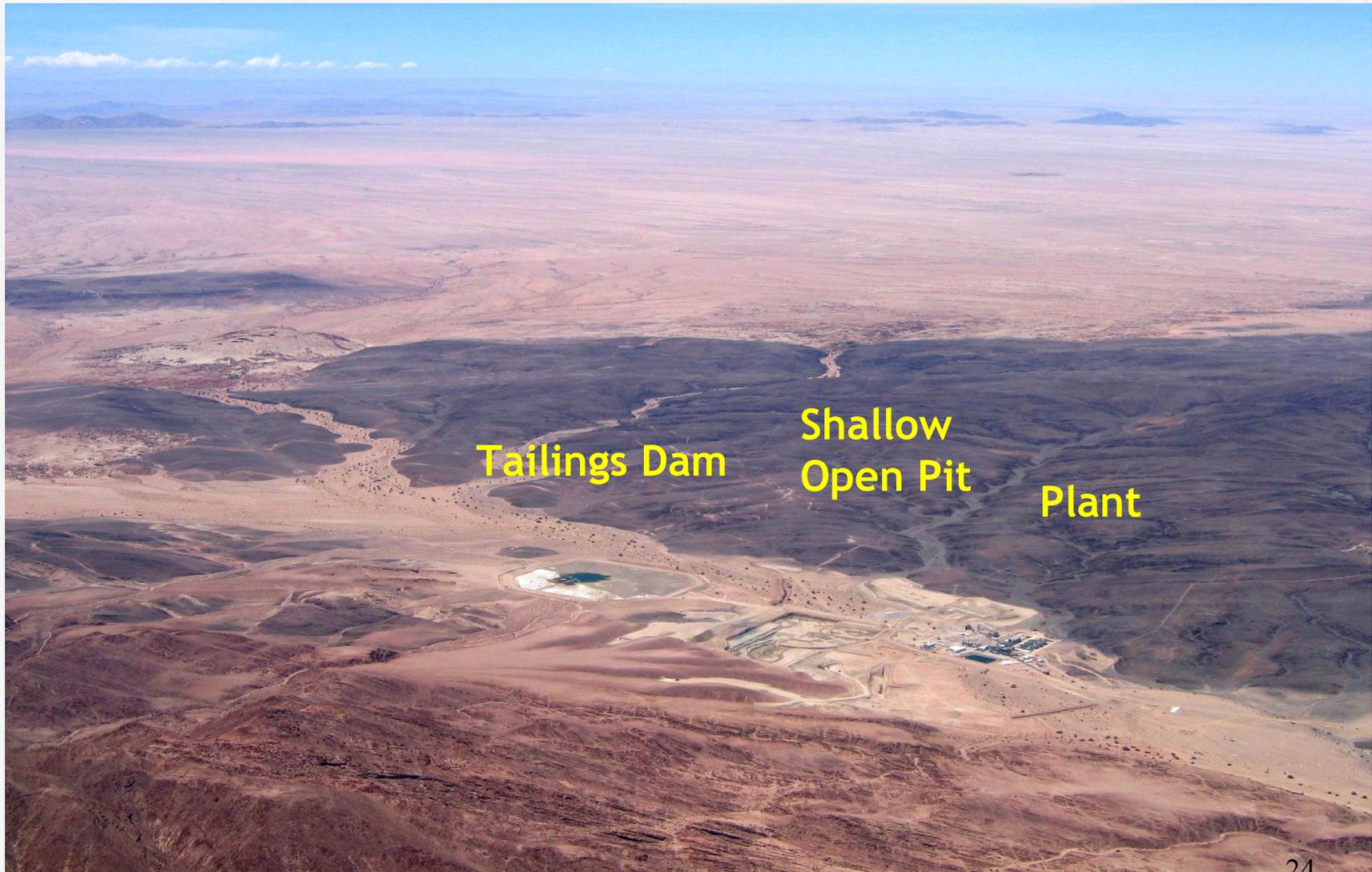
**Construction +/- complete & production ramp-up in progress**



# Stage II Expansion Flowsheet



# Site Aerial View



# Paladin Energy



**QUESTIONS?**

