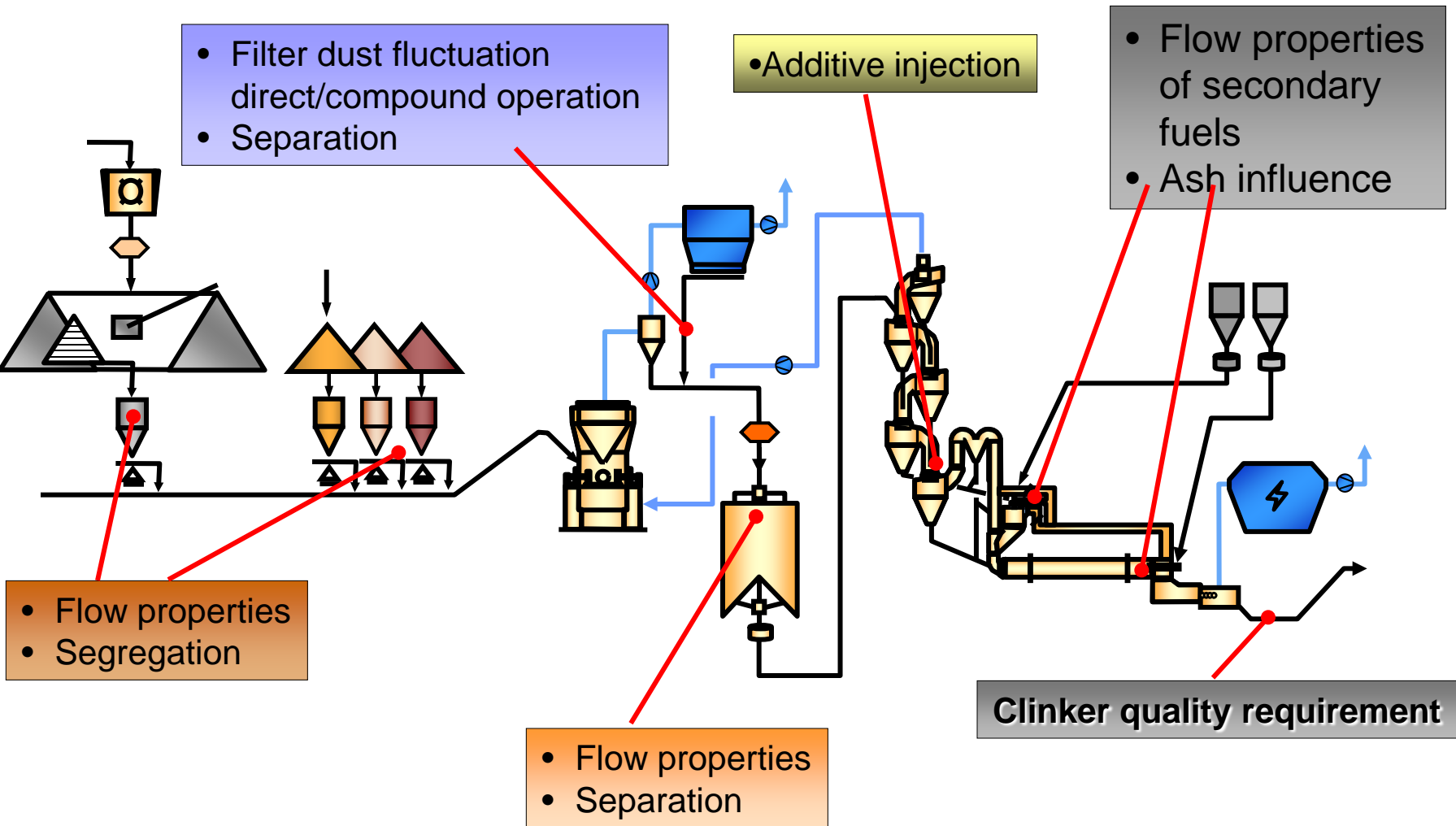


Alan Gee
Lehigh Hanson/Heidelberg Cement Group

Quality Control in the Cement Plant

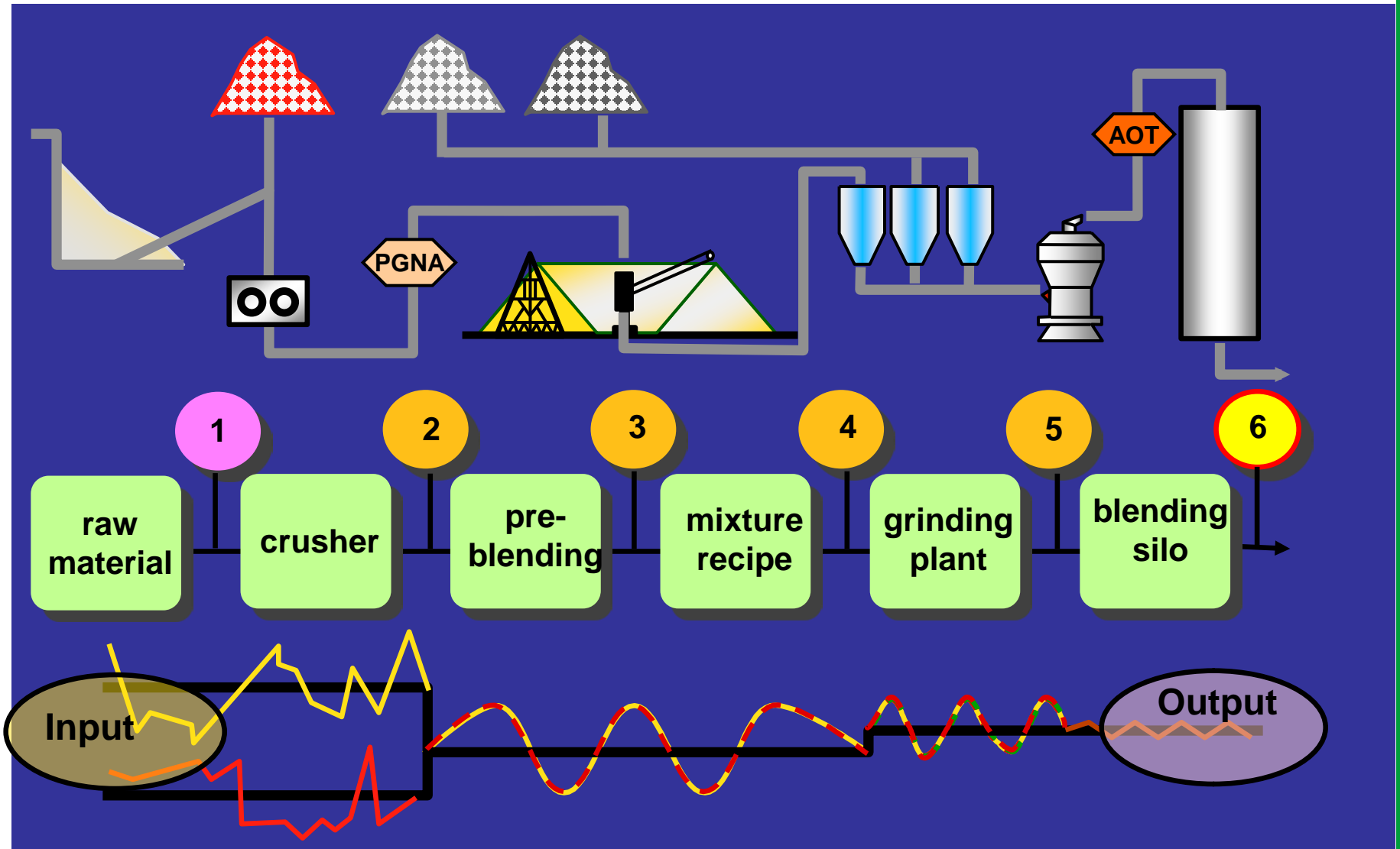
Disturbances & Challenges for Quality Control in Clinker Production



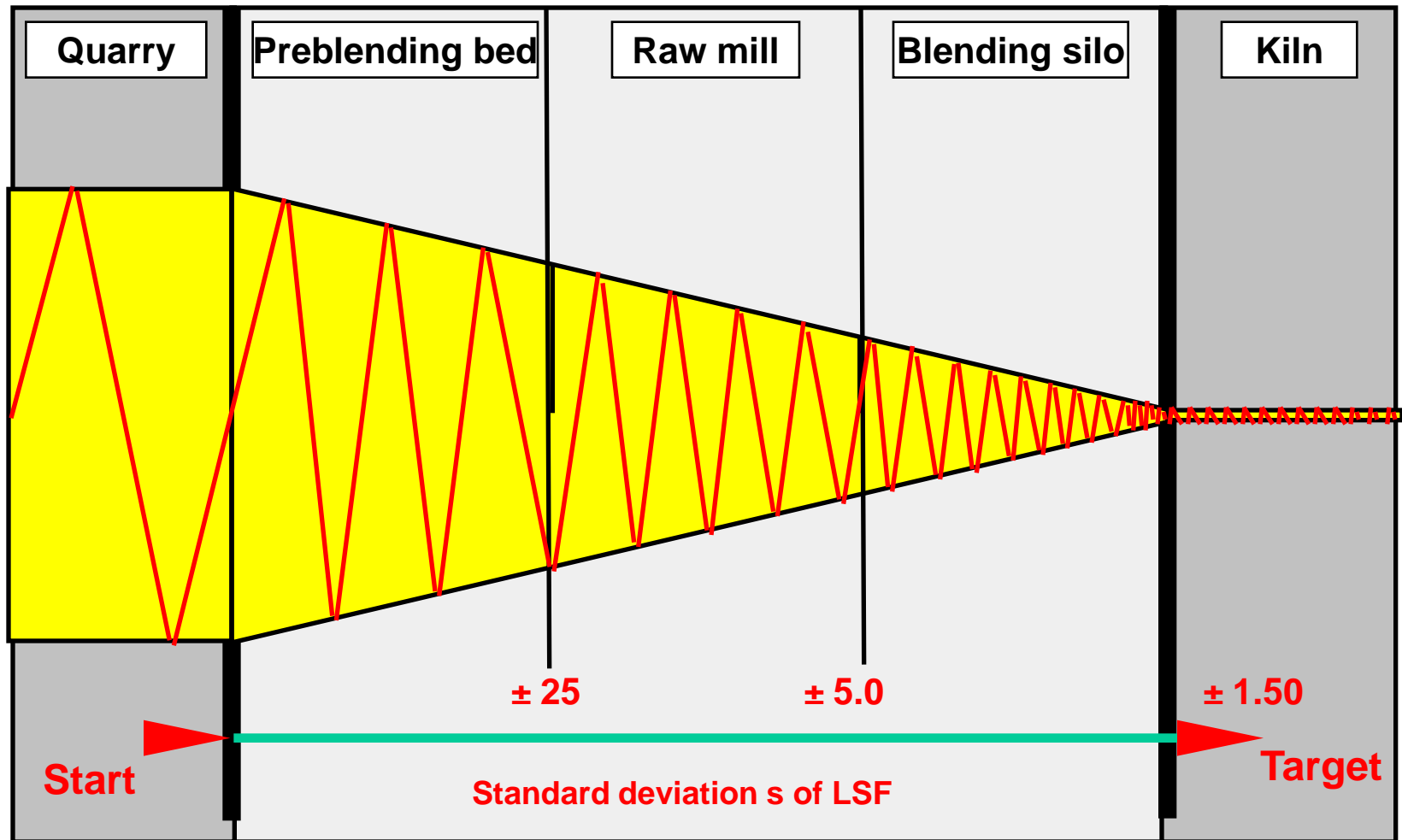
Quality Control

- **QC “Services” entire cement operation**
- **Sampling analytical testing**
- **QC of QC**
 - **Internal QC, external QC, internal motive, external motive**

Process Technology



Deviation and Blending Factor from Quarry to Kiln Inlet



Quality Control

- **Sampling and analysis**
 - **Raw Materials/Fuels**
 - **daily, hourly, minutes**
 - **Chemistry, fineness**
 - **Clinker**
 - **Hourly**
 - **Chemistry**
 - **Cement (clinker, sulfate, PA,)**
 - **Minutes, hourly, daily**
 - **Chemistry, Physical**
- **QC of QC**
 - **hourly, daily**

Quality Control Material	Sampling Type		Test Performed	Test Procedure (ASTM)
	Sampling Location	Frequency		
Raw Mix	Composite Sample			
	Prior to blend silo	min. every 2 hours ¹⁾	XRF	C-114
		Daily	90um/200um	Air Jet
Kiln Feed	Composite Sample			
	Discharge Blend Silo	min every 4 hours	XRF	C-114
Hot Meal (pre-heater kiln only)	Grab Sample	min every 8 hours	calcination	HTC Method
	After lowest cyclone		S, Cl, Na, K	C-114
Clinker	state if composite or grab		XRF	C-114
	Cooler Discharge	min. every 2 hours ²⁾	Free Lime	C-114
Bulk Cement (major type)	Composite Sample		XRF	C-114
	Daily /Silo Composite of shift samples	Daily	Free Lime	C-114
			Blaine	C-204
			Chemical	C114
			Physical Tests	C 150
			30um/45um	Air Jet/C-430
Cement Shipments-Released Cement (ASTM C-917)	Grab Sample Truck	Bulkloader 10 per month	XRF	C114
			7 & 28 d cubes	C-917
			Blaine	C-204

Questions?