Problem Statement for Monalco Mining Case Study

1. Context
   1. S - Monalco Mining has increasingly invested into their mining operations in response to worldwide demand of iron which has increased to $110 per ton. With the increased market supply of iron due to an increased investment in operations to satiate the demand, the market has become saturated, and the price of iron has decreased to $55 per ton.
   2. M – Initial calculations indicate that if Monalco can shave off 20% of costs over the year, it will be enough to weather future shifts in pricing. The aim is to adopt a model to expenditures and costs that can determine where the costs can be shaved off.
   3. A – This is an achievable goal, as initial areas of cost reduction have already been identified (general maintenance on the crushers would help to prevent excess wear, which currently eats into profits).
   4. R – The outcome of reducing operating costs is relevant given the decreasing demand of iron, if Monalco is unable to accommodate for this then it is possible that their ability to process the ore efficiently will not be able to be done within budget
   5. T – Complete analysis 3 months prior to 2019. The price of maintaining ore crushers is slated to increase from 30 million to 45 million, so providing enough time to determine the course of action prior to the price increase would be preferrable.
2. Criteria for Success
   1. The aim of Monalco Mining is to exhibit spending discipline and reduce operating costs until they are back to acceptable levels. The current price of iron is $55 per ton, and the breakeven price of Monalco Mining is at $50 per ton, so the goal is to not go below that threshold.
3. Scope of solution space
   1. Main focus of cost reduction will be to more efficiently and effectively maintain the equipment used to perform the mining operations. Currently, the machinery is being inspected too often, but is also being used in excess wear in comparison to the rates it should be used.
4. Constrains within solution space
   1. Work orders for the ore crusher maintenance are projected to rise to $45 million from $30 million
   2. Maintenance logs are indicating that excess wear is responsible for at least 80% of the work order requests
   3. Maintenance for the crushers is meant to be performed once every three years instead of once every year like is currently being done.
5. Stakeholders to provide key insight
   1. Chanel Adams – Reliability Engineer
      1. Would provide information on mechanisms and machinery
   2. Jonas Richards – Asset Integrity Manager
   3. Bruce Banner – Maintenance SME
   4. Jane Steere – Principal Maintenance
   5. Fargo Williams – Change Manager
   6. Tara Starr – Maintenance SME
6. Required key data sources
   1. Data historian
      1. Includes information on tonnes of Ore that has been processed
      2. Time series data
   2. Ellipse
      1. Information on old work orders used to maintain old equipment
      2. Financial data, can be used to compare with current work orders to see if cost cutting can be identified based on previous work orders and equipment maintenance
   3. SAP
      1. Information on equipment logs and work orders that have been raised for maintenance work for current ore crushers and other current equipment
      2. Financial data, can be used to compare with old work orders to see if cost cutting can be identified
   4. T3000 DCS
      1. Sends raw data on vibrations, temperature, and humidity of the ore crushed
      2. Can be used to identify situations that may cause additional wear on the machinery, resulting in the need to replace it more frequently
   5. Ore Crusher system
      1. High-level process map outlining how the system works for individual models
      2. Can be used to compare to other models of the equipment to see if a different version would be appropriate for either upscaling or downscaling the operation to better suit the demand of ore