1. **Problem**

   - **What**: Problem(s)
     - Oil spill, pipeline damage
   - **When**: Date
     - June 7, 2012
   - **Where**: State, city
     - Alberta, Canada
   - **Impact to the Goals**: Frequency
     - Potential impact to drinking water for 90,000
     - Spill of up to 480,000 litres of sour crude oil
     - Impact to area residents
     - Damage to pipeline
   - **Problem**: Pipeline buried less deeply
   - **Annualized Cost**

2. **Analysis**

   - **Basic Level Cause Map**: Start with simple Why questions.
   - **Safety Goal Impacted**: Spill near drinking water source
   - **Environmental Goal Impacted**: Spill in populated area
   - **Labor Goal Impacted**: Response, cleanup
   - **Customer Service Goal Impacted**: Impact to area residents
   - **Production Goal Impacted**: Shutdown of 10 km section of line
   - **Property Goal Impacted**: Damage to pipeline
   - **Possible Solutions**: Spill cleanup
     - Spill of up to 480,000 litres of sour crude oil
   - **Possible Solutions**: Monitoring, inspecting, testing process
   - **Possible Solutions**: Repair damage to pipeline
   - **Possible Solutions**: Isolate damaged area with valves

3. **Solutions**

   - **No.**
     - 1
     - 2
     - 3
     - 4
     - 5
   - **Action Item**
     - Bring in bottled water
     - Monitoring, inspecting, testing process
     - Spill cleanup
     - Isolate damaged area with valves
     - Repair damage to pipeline
   - **Cause**
     - Spill near drinking water source
     - Time before spill stopped
     - Spill of up to 480,000 litres of sour crude oil
     - Damage to pipeline
   - **Impact**
     - Potential impact to drinking water for 90,000
     - Spill of up to 480,000 litres of sour crude oil
     - Impact to area residents
     - Damage to pipeline
   - **Frequency**
     - 3.4 million litres of hydrocarbons leaked per year since 2005
     - Annualized Cost

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