QUALITATIVE EXPOSURE ASSESSMENT TOOL

PURPOSE

- Detect Exposure Sources (From Equipment & Tasks)
- Systematic Analysis Tool
- Rank Sources In Terms Of Risk

PRODUCT

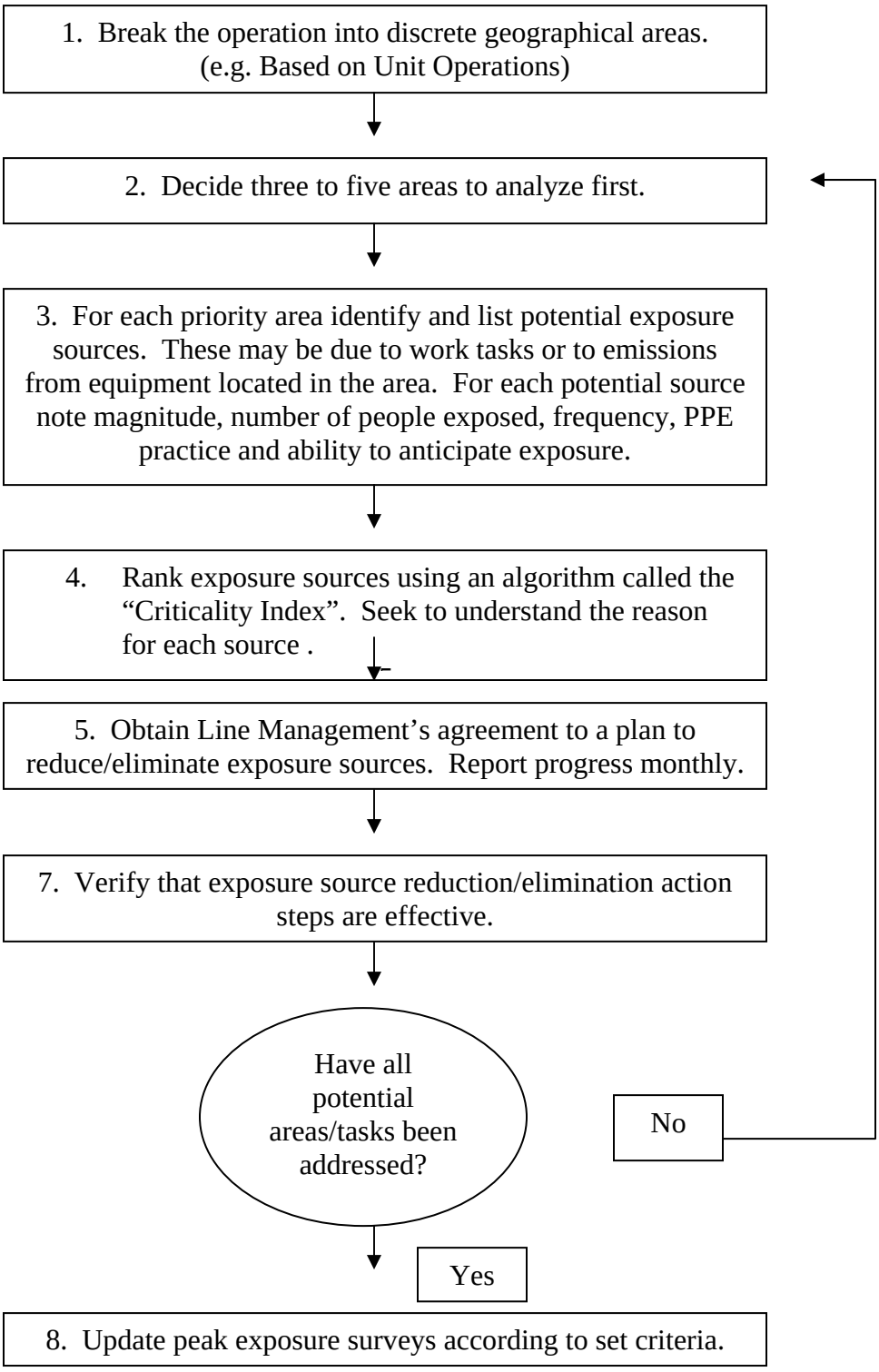
- Source Elimination Plan

Note: This Tool was developed for detection of micron sized dusts derived from a potential respiratory allergen.

It has not been used for nano sized dusts but should be re-applicable.

OVERVIEW OF THE PROCESS

Note that exposure can occur from a job task (e.g., cleaning a spill; weighing a sample) or due to emission from equipment. Both tasks and equipment sources must be considered.



BREAK THE OPERATION INTO DISCRETE GEOGRAPHICAL AREAS

To Do This:

1. Assemble a Team (eg. HS&E Resource, Medical, Line Manager, Operator.)

2. Follow the flow of raw material receipt from the truck entering the Plant through to the finished product leaving the Plant. Document the flow (e.g. via a flowchart or route map.)

3. Divide the process into discrete areas. These could be based on Unit Operation (e.g. unloading, conveying raw material, mixing, conveying finished product, packing, shipping). Avoid excessive detail at this stage.

DECIDE 3-5 AREAS TO ANALYZE FIRST

- Decide how you will identify sources
  - Eyeball. i.e., visual observation for airborne dust or dust on surfaces or spills on surfaces.
  - Back Lighting. i.e., use a high power flashlight to better see airborne materials. The light is positioned behind the potential source and the beam shone at right angles to the observer.
  - Use of a meter capable of detecting nano sized dusts. e.g. Th P-Trak (ex. TSI Instruments) is hand held and can measure total particle count in the size range 20 – 1000nm. The intent is to detect increases above background when the meter is positioned at a source.
  - Discussion with Operators. What is their view of potential emission sources-both from equipment and from the work tasks? Also ask about infrequent work tasks the team may not observe during a routine tour.

The team should undertake a Plant tour and decide the 3-5 highest risk areas e.g. packing, reclaiming scrap product, mixing.

FOR EACH AREA: INDENTIFY AND LIST POTENTIAL EXPOSURE SOURCES

The Team should undertake a detailed survey of a specific area. Use a worksheet like the one below to record/describe the potential exposure sources in the area. (Note: COLUMNS 6-10 are filled in **after** the survey and will be defined on the next page.)

WORKSHEET: INDENTIFYING EXPOSURE SOURCES

Facility:	**Date:**
Workstation:	**Data Gatherer:**

Exposure location and description (Describe levels of visible dust and spillage)	Is exposure source dust controlled? Yes/No	Exposure occurs during -Normal Operations -Mechanical Maintenance -Brand Changeover -Unplanned Down Time	Detected By -Eye -Backlight -Meter -Talk to Operator	Likely Causes -Work Procedure - Inadequate Maintenance -Inadequate Design	Amount of Exposure	Frequency of Exposure (R2)	# of People exposed within 3 meters	Ability to Anticipate Wearing Respiratory Protection (R4)	Criticality Index = R1 X R2 X R3 X R4	Comments

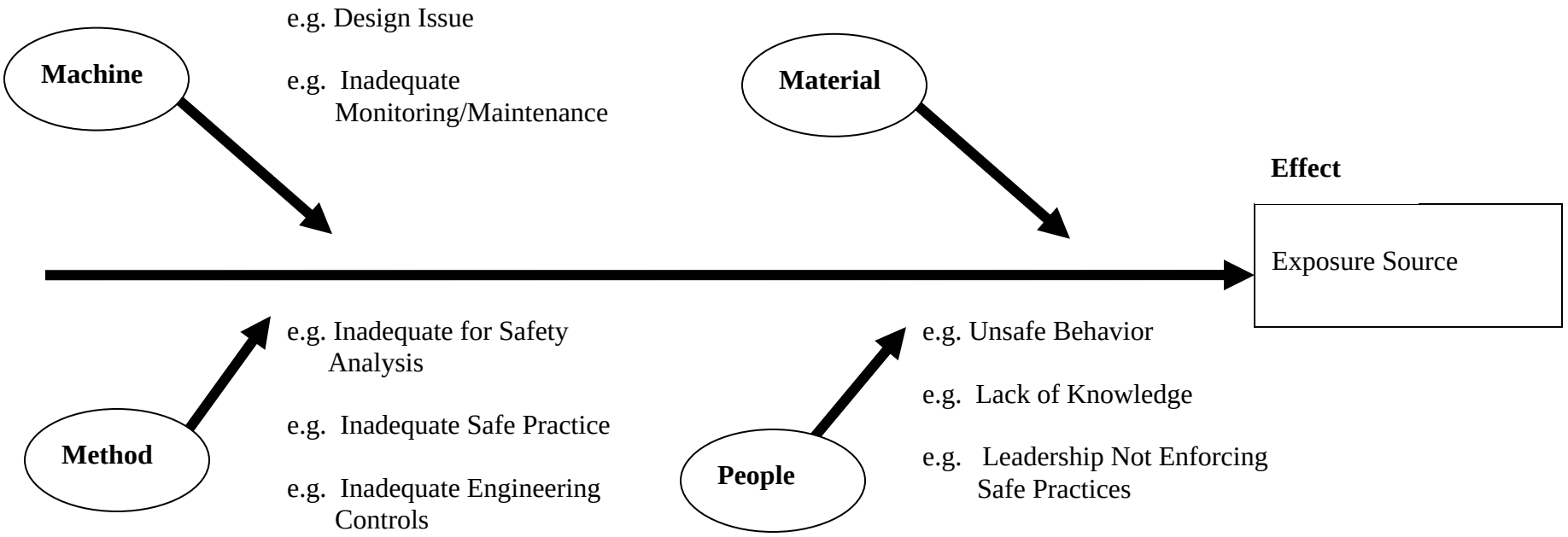
Rate each individual exposure source on a 1-4 scale for amount of exposure, #of events, average # of people exposed, ability to anticipate.

Rating ➡	1	2	3	4
Amount of Exposure R_1	No Airborne dust/liquid either visibly or via backlighting. No "Spike" above background detected by the meter.	Intermittent leak or spill outside breathing zone may be observed visibly or via backlighting. Detect an increases in background meter reading of ≤ 10%	Intermittent spillage overhead or in breathing zone. Meter registers an increase of ≤ 50% versus background.	Continuous leak/spill **Or** Visible dust in air or on surface **Or** Dust/liquid observed continuously in air via backlighting **Or** Background level on meter increases > 50%
# of Events R_2	< 1 per Shift	1-4 per Shift	5-8 per Shift	≥ 9 per Shift
Average # of People Exposed Per Event (people within 3m or 10 ft.) R_3	1	2	3	>3
Ability To Anticipate And Get Respirator On In Time R_4	Scheduled maintenance. (e.g., enter bag house)	Could expose adjacent workers. (e.g.. changeover)	Repetitive task with exposure potential. (e.g., repetitive clean up)	Production pressures for immediate response. (e.g., jam)

$R_1 \times R_2 \times R_3 \times R_4$ (could be 1-256)

The next page can be used to help understand the underlying reason for the sources.

DETERMINE REASON FOR SOURCES AND DEVISE COUNTER MEASURES



ACTIONS	OWNER	COMP. DATE	% COMP.
1.			
2.			
3.			
4.			

OBTAIN LINE MANAGEMENT AGREEMENT TO REDUCE/ELIMINATE EXPOSURE SOURCES

- The Criticality Index helps to prioritize sources, but ultimately you have to link the numbers back to professional judgment.
  What is Acceptable VS. Unacceptable

- At a minimum the tool helps you identify sources and helps you to think about the underlying reason. It will also help guide location of quantitative source sampling or area sampling.

UPDATING THE QUALITATIVE EXPOSURE ASSESSMENT

You need to set criteria for updating the survey…e.g.

- If the process changes
- If the raw material receipt changes
- If level in product or throughput increases
- If these are exposure concerns or health concerns