

# INDUSTRIAL HYGIENE QUALITATIVE RISK ASSESSMENT

Dan Drown, CIH, CSP



**DROWN**  
CONSULTING, LLC

Environmental Health and Safety

# Objectives

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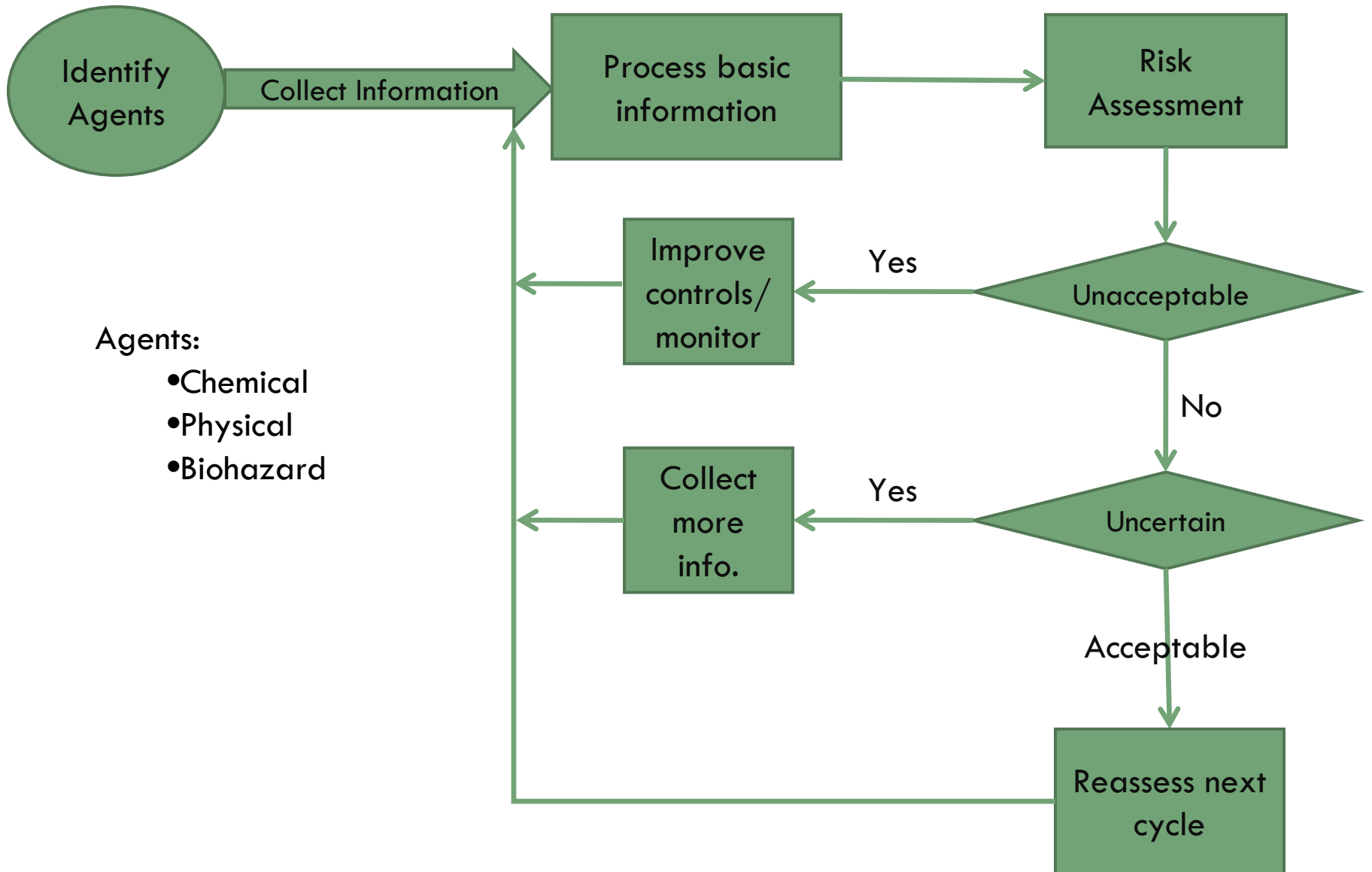
- Define qualitative & quantitative IH assessments
- Purpose of qualitative risk/exposure assessment
- Discuss a process for qualitative IH assessment
- Discuss how qualitative assessment fits into VPP

# VPP Element: Worksite Analysis

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- Job safety analysis (JSA)
- Operating procedure development
- Industrial hygiene
- Hazard recognition/control
- and
- Employee involvement is important

# Qualitative Risk Assessment Process



# Definitions

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- **Industrial Hygiene** – anticipation, recognition, evaluation, and control of occupational hazards
- **Risk** = Likelihood x Severity
- **Exposure** – Contact with a chemical, physical and/or biological agent
- **Assessment** -- a process of gathering, analyzing, and documenting; evaluation

# Definitions

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- Qualitative Assessment - Evaluation of potential personal exposure to workplace chemicals, physical and/or biological agents based on personal experience and professional judgment
  
- Quantitative Assessment - Evaluation of actual personal workplace exposure to chemical, physical, and/or biological agent using numerical and mathematical analysis

# Purpose of Qualitative Assessment

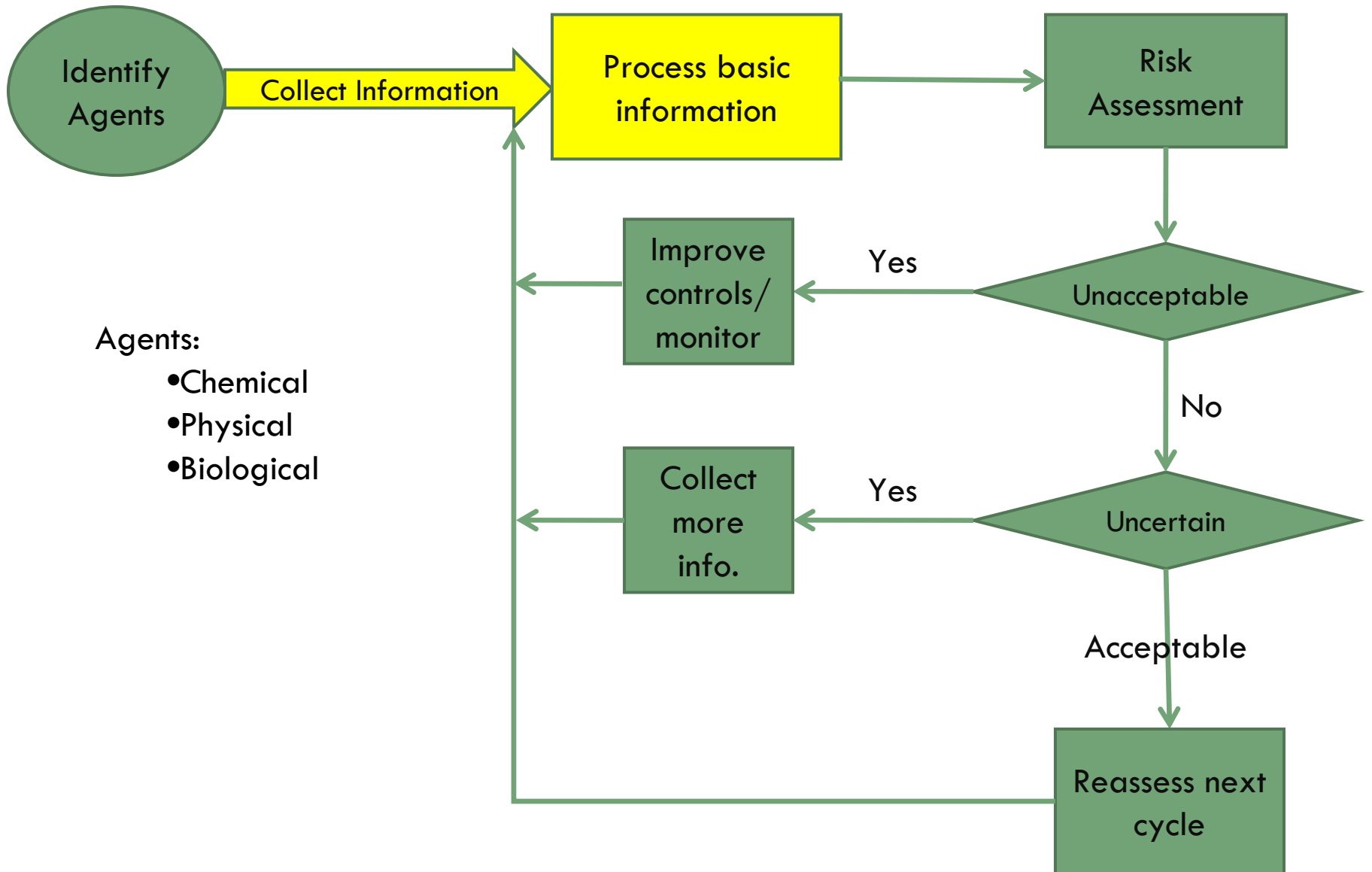
- Assessing and managing occupational exposures to chemical, physical, and biological agents
- Use of a systematic, repeatable approach involving knowledgeable employees
- Make best use of available resources
- A means to target areas or tasks of greater risk for future planning & budgeting
- Help develop IH monitoring plans

# Who is Involved?

- IH/safety professionals
- Employees familiar with tasks
- Supervisors & managers
- Medical professionals
- Safety committee members



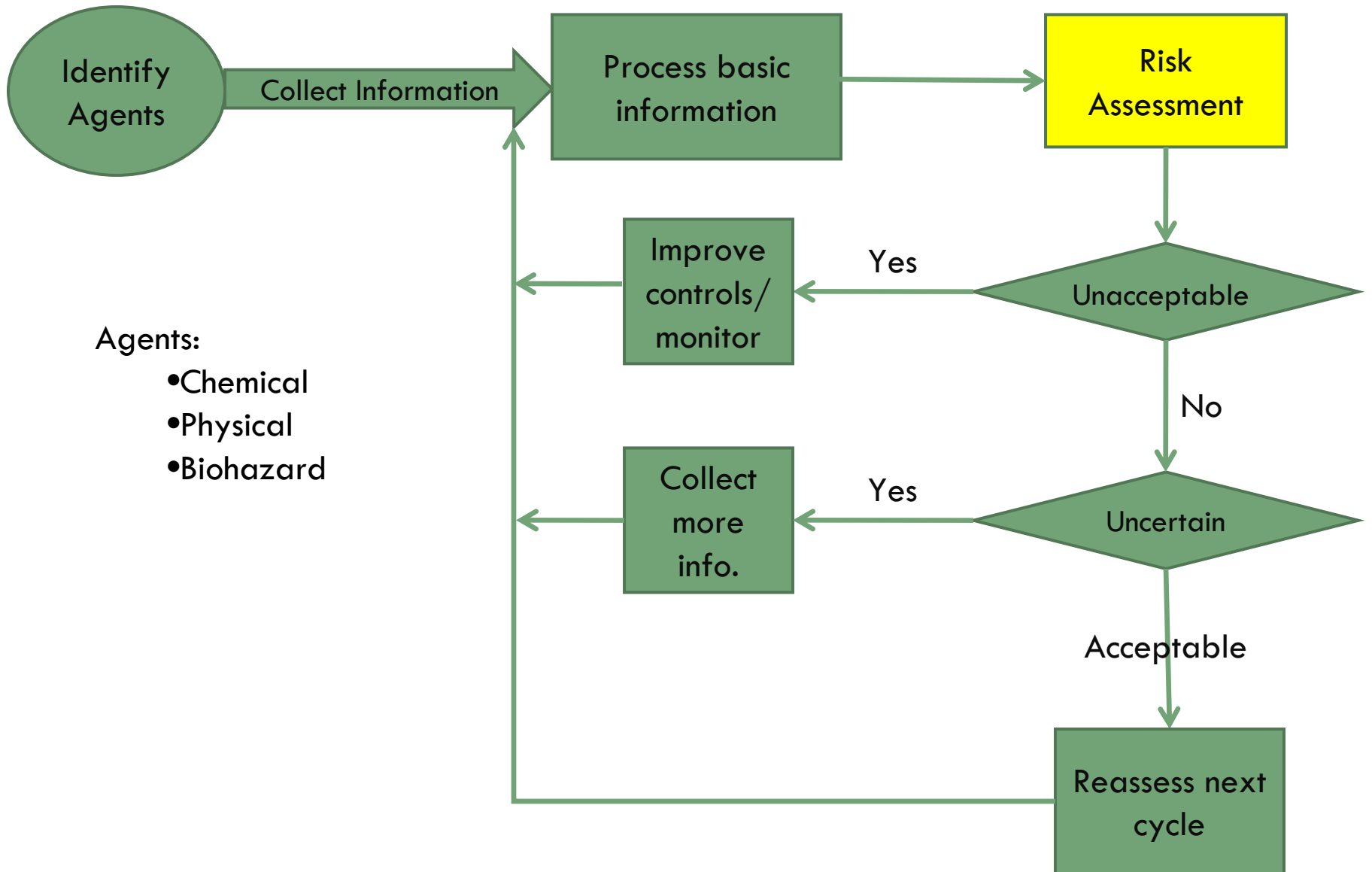
# Qualitative Risk Assessment Process



# Information to Gather/Consider

- **Inventory:** chemicals, biological agents, physical agents (noise, radiation, thermal stressors)
- **Effects:** chronic & acute, local & systemic, toxicity, etc.
- **IH data & exposure monitoring, exposure routes**
- **Injury/illness/incident experience**
- **Inspection/observation findings, process details**
- **Employee concerns, training, behavior**
- **Regulatory requirements (thresholds & action levels)**
- **Normal, upset, startup, & shut down scenarios**
- **Infrequent tasks**

# Qualitative Risk Assessment Process



# Similar Exposure Groups

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- A group of workers having the same general risk profile for the agents being assessed
- Comparable tasks are performed in a like manner with the same materials and processes
- Referred to as SEG

# Designating SEGs



# Consider Unplanned & Infrequent Events



# SEG?



# The Number of SEGs Depends On

- The objective of the assessment
- Diversity of tasks
- Dynamics of the workplace
- Existing data or studies
- Characterization of agent(s)
- Resources available to complete assessment
- Professional judgment



# Assessment

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- Exposure and risk assessment is an art and a science
- Uses existing quantitative data (monitoring)
- Uses existing qualitative data (JSAs, SOPs)
- Considers controls
- Relies on professional judgment
- Relies on employee involvement

# Assessment

- Characterize the agents (A-B-C or 1-2-3)
  - Serious permanent harm, death or repro. hazard
  - Serious but not permanent
  - Other than serious
- Scales used are typically 3-5 levels
- Be conservative in placing the agent into a category
- May use % of Exposure Limits as a rating tool

# Assessment

- Frequency of exposure
  - Daily, weekly, monthly
- Duration of exposure
  - <15 min
  - 15 min - 1 hour
  - 1- 2 hours
  - > 2 hours or continuous
- Route of exposure: inhalation, dermal, inhalation/dermal, physical, other

# Assessment

- Using frequency and duration determine:
  - Long, frequent exposure
  - Medium frequency, medium duration
  - Short, infrequent exposure
- Characterize exposure (professional judgment)
  - Serious and permanent physical harm, death or reproductive effects
  - Serious but likely not permanent physical harm
  - Other than serious effect

# Documentation

Similar Exposure Group 1	Level 2 Operator	24 Operators (8 hour shifts, occasional OT of 4 hours)							
Hazardous Agent	Task/Activity	Freq. of Exposure	Exposure Duration	Primary Exposure	# of Workers Exposed	Charact. of Risk	Charact. of Exposure	Control Method	Concerns or Problems
noise over 85 dBA	DCS monitor	Daily	<15 minutes	Physical	1	3	B	Engineering	
	case packer	Daily	>2 hours	Physical	3	1	B	PPE	
	forklift operation	Daily	>2 hours	Physical	1	1	B	PPE	
	clean up	Daily	15 min-1 hr	Physical	8	2	B	Admin./proc.	
	filler	Daily	>2 hours	Physical	3	1	B	Engineering	
	sampling	Daily	<15 minutes	Physical	6	3	B	PPE	
	assist maintenance	Weekly	>2 hours	Physical	2	2	B	PPE	Grinder
Isopropanol	DCS monitor	Daily	<15 minutes	Inhalation	1	3	C	Engineering	
	case packer	Daily	>2 hours	Inhalation	3	2	C	Admin./proc.	Freq. leaks
	forklift operation	Daily	>2 hours	Inhalation	1	3	C	Admin./proc.	
	clean up	Daily	15 min-1 hr	inhl/derm	8	2	C	Admin./proc.	Open encl.
	filler	Daily	15 min-1 hr	inhl/derm	3	2	C	Admin./proc.	
	sampling	Daily	<15 minutes	inhl/derm	6	3	C	PPE	
	assist maintenance	Weekly	>2 hours	inhl/derm	2	2	B	PPE	
hexavalent Cr	spill	Monthly	>2 hours	inhl/derm	4	2	A		
	assist maintenance	Monthly	15 min-1 hr	Inhalation	1	3	A	Engineering	welding

A	Serious and permanent physical harm, death or reproductive effects
B	Serious but likely not permanent physical harm
C	Other than serious effect

1	long frequent exposure
2	medium frequency, medium duration
3	short infrequent exposure

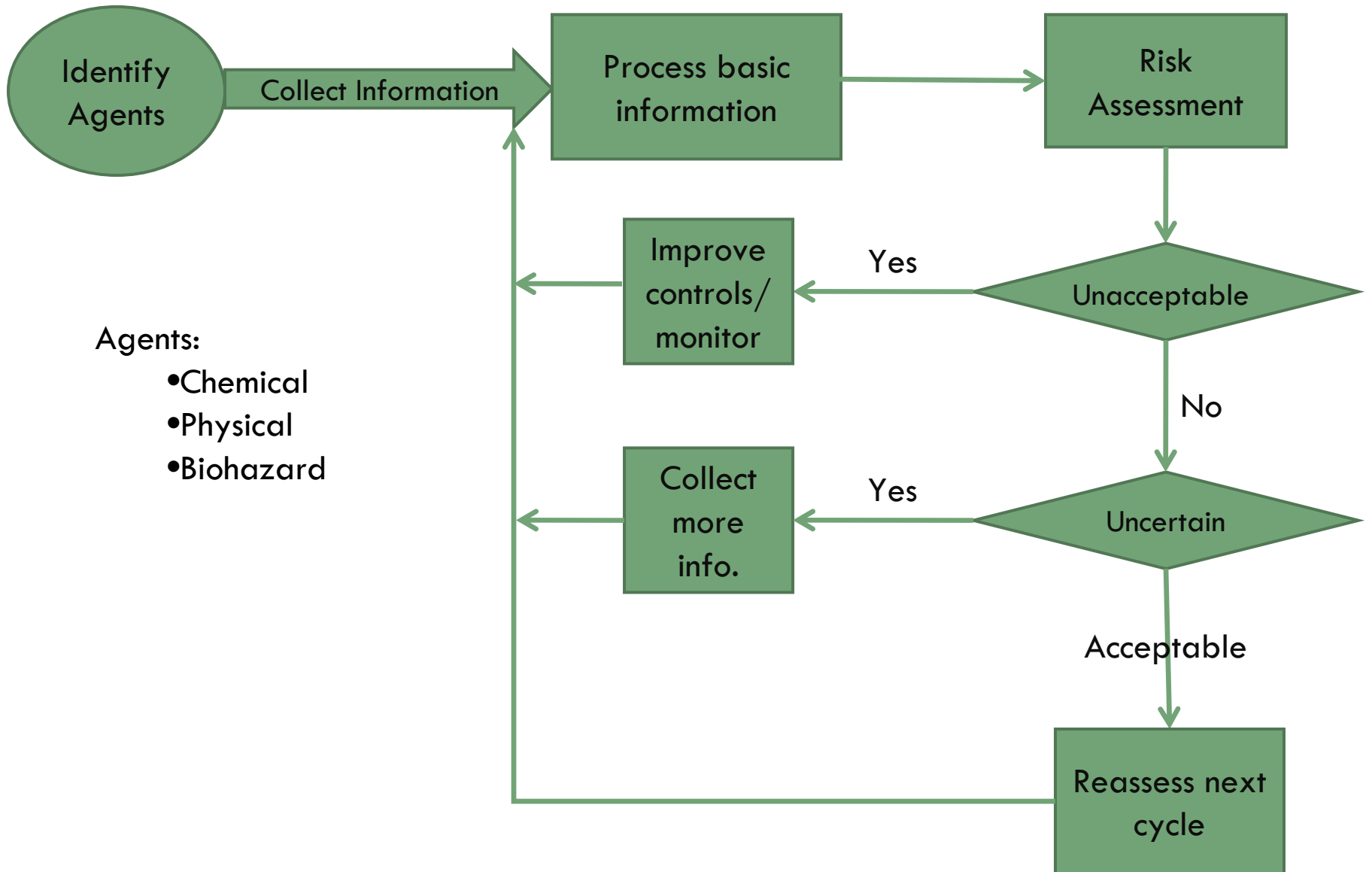
A1	A2	A3
B1	B2	B3
C1	C2	C3

Priority:	
	HIGH
	MEDIUM
	LOW

# Planning, Controls & Monitoring

- Use hierarchy of controls
  - ▣ Engineering
  - ▣ Administrative
  - ▣ PPE
- Plan for necessary resources
  - ▣ Capital, shutdowns, turnarounds
  - ▣ Procedure development & training
  - ▣ Substitution/elimination
  - ▣ Monitoring plans & resources

# Qualitative Risk Assessment Process



# Questions?

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