EPA LAWS & DEFINITIONS

CAA Clean Air Act regulates all sources of air emissions. The 1970 CAA authorized the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment

CWA Clean Water Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters

RCRA Resource Conservation and Recovery Act governs the disposal of solid waste and hazardous waste

CERCLA Comprehensive Environmental Response, Compensation & Liability Act gives the EPA the ability to intervene in managing land contaminated with high levels of hazardous materials. And penalize $ the polluting companies

NPDES National Pollutant Discharge Elimination System
The CWA prohibits anybody from discharging "pollutants" through a "point source" into the "water of the USA" unless they have an NPDES permit. The permit contains limits on what you can discharge, monitoring & reporting requirements, and other provisions to ensure that the discharge does not hurt water quality or people's health

POLLUTANTS CAN INCLUDE dredged soil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste

SUPERFUND program is responsible for cleaning up some of the nation's most contaminated land and responding to environmental emergencies, oil spills and natural disasters. To protect public health and the environment, the Superfund program focuses on making a visible and lasting difference

VAPOR INTRUSION

occurs when there is a migration of vapor-forming chemicals from any subsurface source into an overlying building.

VAPOR FORMING CHEMICALS INCLUDE

VOLATILE ORGANIC COMPOUNDS (VOCS)

- Trichloroethylene, Benzene, Naphthalene, Mercury, Pesticides and PCBs

PCBs

- PCBs primarily cause Cancer
- PCBs were often used in dielectric gel in old electrical transformers & fluorescent light ballasts.
- The reason PCBs were banned is that they are highly toxic, cancerous & do not easily degrade.
- PCBs can lay dormant in the soil for several years/decades and affect the health of workers, children playing & pets

POLLUTION PREVENTION ACT

- Pollution prevented or reduced at the source when feasible
- Pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner when feasible
- Disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner

REDUCING POLLUTION & GREENHOUSE GASES

SUSTAINABILITY RECOMMENDED PRACTICES INCLUDE:

- Procurement of sustainable products and services and helping to create a more sustainable marketplace for all
- Encouraging chemical technologies to incorporate principles of green chemistry into chemical design, manufacture & use
- Safer Choices of products that perform & contain ingredients that are safer for human health and the environment

ADDITIONAL EPA TERMS AND ENVIRONMENTAL DEFINITIONS

EPA & CHEMICAL MANAGEMENT

- ❑ **Potential Responsible Party**: An individual or company that may be liable for environmental contamination cleanup.
- ❑ **EPA Waste Generator**: Any business or individual that produces hazardous waste, regulated by the EPA.
- ❑ **Hazardous Materials**: Substances that can harm humans, animals, or the environment when improperly handled.
- ❑ **Hazardous Waste**: Waste that poses risks to health or the environment due to its toxic, corrosive, or reactive nature.
- ❑ **Secondary Containment**: A backup system to contain spills or leaks from primary containment.
- ❑ **Storm Water Run-off**: Rainwater that flows over land, potentially carrying pollutants into water bodies.
- ❑ **Swales**: Shallow, vegetated ditches designed to capture and filter stormwater.
- ❑ **Wetlands**: Ecosystems saturated with water, supporting unique plants and wildlife, and important for biodiversity and flood control.

EPA LEGAL

- ❑ **Superfund**: A federal program for cleaning up hazardous waste sites in the U.S.
- ❑ **CERCLA**: Comprehensive Environmental Response, Compensation, and Liability Act, a law addressing hazardous waste cleanup.
- ❑ **NPDES (National Pollutant Discharge Elimination System)**: A U.S. federal program that regulates the discharge of pollutants into surface waters, requiring facilities to obtain permits to control water pollution.

WORKER HEALTH TERMS

- ❑ **Baseline**: Initial health status used for comparison in medical monitoring.
- ❑ **Bioaccumulate**: The process by which substances (ex., chemical, biological, radiation) build up in an organism over time.
- ❑ **Target Organ**: Primary organ affected by a specific chemical or toxin.

WORKER MEDICAL SURVEILLANCE PROGRAMS INCLUDE:

- ❑ Pre-employment medical screening, annual screenings
- ❑ Exposure related testing
- ❑ Termination testing
- ❑ Emergency and non-emergency medical treatment
- ❑ Employee and potential exposure recordkeeping
- ❑ Program review and improvement.

ASBESTOS

- ❑ **Asbestos**: A fibrous mineral once widely used for insulation and fireproofing, now known to cause respiratory diseases.
- ❑ **ACM (Asbestos-Containing Material)**: Any material with more than 1% asbestos, posing health risks when disturbed.
- ❑ **Asbestosis**: A chronic lung condition caused by inhaling asbestos fibers.
- ❑ **Mesothelioma**: Cancer of the lung lining from asbestos exposure.

SILICA

- ❑ **Silica**: A natural mineral found in sand and rock, hazardous when inhaled as fine dust.
- ❑ **Silicosis**: A lung disease caused by inhaling silica dust over time.

ELECTRICAL PCB

- ❑ **Dielectric**: A material that does not conduct electricity, used as an insulator such as PCBs (previously used) and Mineral Oil blend (now used).
- ❑ **PCBs (Polychlorinated Biphenyls)**: Toxic industrial chemicals formerly used in electrical equipment, now banned due to health risks.
- ❑ **Light Ballast**: A device that regulates the current in fluorescent lights, sometimes containing PCBs

Construction General Permit (CGP) compliance under the

Clean Water Act (CWA) Stormwater Management

The #1 Requirement
Develop & Implement a Stormwater Pollution Prevention Plan
A comprehensive **SWPPP** will be developed, detailing measures to minimize pollution from construction activities.

Install and Maintain Erosion and Sediment Controls: Erosion and sediment controls, such as silt fences, wattles, and sediment basins, will be installed and maintained to prevent soil from washing into storm drains and water bodies.

Stabilize Exposed Soil: Exposed soils will be stabilized with mulch, hydroseeding, or other methods to prevent erosion.

Minimize Disturbed Areas: Disturbed areas will be minimized to reduce soil exposure and the potential for erosion and sedimentation.

Protect Storm Drains: Storm drains will be protected with inlet protection devices to prevent sediment and pollutants from entering the stormwater system.

Manage Waste and Materials: Construction materials, chemicals, and waste will be managed properly to prevent them from contaminating stormwater runoff.

Use Perimeter Controls: Perimeter controls, such as berms and buffer zones, will be established to contain construction site runoff and prevent pollutants from leaving the site.

Inspect Controls Regularly: Erosion and sediment controls will be inspected regularly, especially after rain events, to ensure they are functioning properly and repaired as needed.

Train Employees on Best Management Practices (BMPs): All employees will be trained on stormwater management BMPs and the importance of pollution prevention. This is the best defense against chemical spills, exposures, and incidents.

Reduce Vehicle Tracking of Sediment: Vehicle access points will be stabilized, and track-out controls like wheel wash stations or rock entrances will be used to reduce sediment tracking onto public roads.

Maintain Good Housekeeping Practices: Good housekeeping practices will be maintained on-site, including regular cleanup of debris and proper storage of materials.

Handle and Dispose of Concrete Washout Properly: Concrete washout will be handled in designated areas and disposed of properly to prevent contamination of stormwater.

Monitor Weather Conditions: Weather conditions will be monitored, and additional controls will be deployed before forecasted storms to prevent runoff pollution.

Control Dust: Dust control measures, such as water spraying or covering materials, will be implemented to prevent airborne particles from settling into stormwater.

Manage Stockpiles: Stockpiles will be covered or stabilized to prevent erosion and sediment runoff during storm events.

Ensure Proper Chemical Storage: Chemicals and hazardous materials will be stored in covered, contained areas to prevent spills and leaks into stormwater systems.

Contain and Clean Up Spills Immediately: Any spills or leaks will be contained and cleaned up immediately to prevent pollutants from entering the stormwater system.

Document Inspections and Maintenance: All inspections, maintenance activities, and corrective actions taken will be documented to ensure compliance with stormwater regulations.

Comply with Local Regulations: All stormwater management practices will comply with local, state, and federal regulations to ensure environmental protection.

Minimize Soil Compaction: Soil compaction will be minimized in areas where stormwater infiltration is necessary to reduce runoff and enhance natural filtration.

DECONTAMINATION FOR HAZWOPER & LABORATORY SAFETY

HAZARDOUS WASTE DECONTAMINATION PLAN

A decontamination plan should be developed (as part of the Site Safety Plan) and set up before any personnel or equipment may enter areas where the potential for exposure to hazardous substances exists. The decontamination plan should:

•Determine the number and layout of decontamination stations.

•Determine the decontamination equipment needed.

•Determine appropriate decontamination methods.

•Establish procedures to prevent contamination of clean areas.

•Establish methods and procedures to minimize worker contact with contaminants during the removal of PPE

•Establish methods for disposing of clothing and equipment that are not completely decontaminated.

The plan should be revised whenever the type of personal protective clothing or equipment changes, the site conditions change, or the site hazards are reassessed based on new information.

PREVENTION OF CONTAMINATION

The first step in decontamination is to establish Standard Operating Procedures that minimize contact with waste and thus the potential for contamination. For example:

•Stress work practices that minimize contact with hazardous substances (e.g., do not walk through areas of obvious contamination, do not directly touch potentially hazardous substances).

•Use remote sampling, handling, and container-opening techniques (e.g., drum grapplers, pneumatic impact wrenches).

•Protect monitoring and sampling instruments by bagging. Make openings in the bags for sample ports and sensors that must contact site materials.

•Wear disposable outer garments and use disposable equipment where appropriate.

•Cover equipment and tools with a strippable coating which can be removed during decontamination.

•Encase the source of contaminants, e.g., with plastic sheeting or overpacks.

RISK EQUALS

Probability/Likelihood – The chance that a given event will occur

Consequences – The results of an action, condition, or event

Exposure – The amount of time and the degree to which someone or something is exposed to an unsafe condition, material, or environment

This formula helps prioritize risks:

Probability + Consequences + Exposure = Risk

LEVELS OF SEVERITY

1. Negligible – An injury is not likely.
2. Marginal – Minor illness, injury, or property damage are likely.
3. Critical – Severe illness, injury, or property damage are likely.
4. Catastrophic – Death or permanent disability are likely.

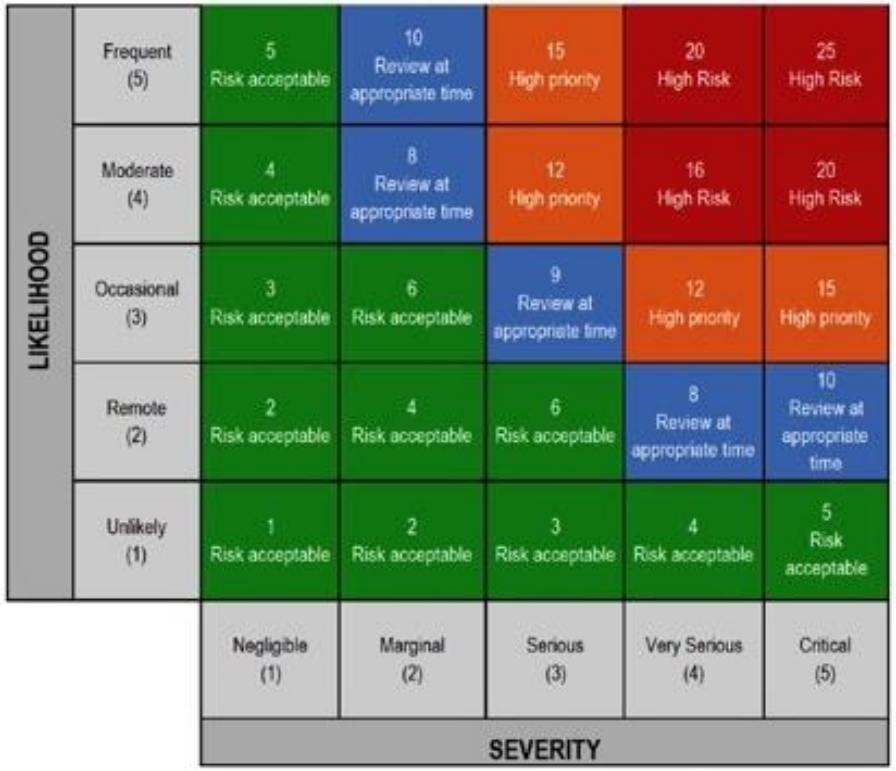
Risk = Probability x severity

Risk = Probability + severity + exposure

Probability = Likelihood if an event happening

Severity = Consequence or impact

SAMPLE



LIKELIHOOD	Negligible (1)	Marginal (2)	Serious (3)	Very Serious (4)	Critical (5)
Frequent (5)	5 Risk acceptable	10 Review at appropriate time	15 High priority	20 High Risk	25 High Risk
Moderate (4)	4 Risk acceptable	8 Review at appropriate time	12 High priority	16 High Risk	20 High Risk
Occasional (3)	3 Risk acceptable	6 Risk acceptable	9 Review at appropriate time	12 High priority	15 High priority
Remote (2)	2 Risk acceptable	4 Risk acceptable	6 Risk acceptable	8 Review at appropriate time	10 Review at appropriate time
Unlikely (1)	1 Risk acceptable	2 Risk acceptable	3 Risk acceptable	4 Risk acceptable	5 Risk acceptable

SEVERITY

SAMPLE

Risk Assessment Matrix

SEVERITY / Effect of Hazard		PROBABILITY: A Likely	B Probable	C May	D Unlikely
I	Loss of Mission Capability, Unit Readiness or Asset; Death	1	1	2	3
II	Significantly Degraded Mission Capability or Unit Readiness; Severe Injury or Damage	1	2	3	4
III	Degraded Mission Capability or Unit Readiness; Minor injury or Damage	2	3	4	5
IV	Little or No Impact to Mission Capability or Unit Readiness; Minimal Injury or Damage.	3	4	5	5

Risk Assessment Codes

1 – Critical 2 – Serious 3 – Moderate 4 – Minor 5 – Negligible

ACCIDENT AND INCIDENT INVESTIGATIONS

- ❑ 85-95% of all Accidents and Incidents are Behavioral-Based
- ❑ Accidents, incidents, and near misses must be investigated to determine their direct, indirect, and root causes
- ❑ Root causes must be corrected to prevent similar events
- ❑ Investigations may identify from 10 to 27 contributing factors that must also be addressed and corrected, although they may not been a cause of the accident, incident or near-miss being investigated
- ❑ Safety should consult and help facilitate the investigation
- ❑ Frontline supervisors should perform the investigation or if it involves 2 or more groups by the next-level supervisor
- ❑ Investigations are fact-finding missions and shouldn't be bias
- ❑ Investigations identify problems and shouldn't seek blame
- ❑ Personnel should be trained/retrained and not punished since most root causes are management level deficiencies
- ❑ Asking open-ended questions in essential similar to 5 Whys and Sequence of Events. Avoid closed-ended questions like answering yes or no when possible.
- ❑ Interview 1 witness at a time, where the conversation is private, and in a cooperative environment such as an open space, vehicle, or even when the event occurred.
- ❑ The best place for interviews is where the event occurred
- ❑ An investigation is completed when your report is submitted

5 WHYS METHOD AND SEQUENCE OF EVENTS

A simple yet effective tool used in accident investigations to identify the root cause of an incident by asking "Why?" multiple times until the underlying cause is revealed.

Example Scenario: A Worker Slipped on a Wet Floor

Q1. Why did the worker slip on the floor?
A1. Because the floor was wet.

Q2. Why was the floor wet?
A2. Because water was spilled and not cleaned up.

Q3. Why was the water spill not cleaned up?
A3. Because there were no signs or procedures in place to address
spills immediately.

Q4. Why were there no signs or spill-cleaning procedures?
A4. Because the safety protocols did not include specific guidelines for spill management.

Q5. Why was there no spill procedure?
A5. Because there was no comprehensive review or update of safety procedures to include such scenarios.

Conclusion:
By repeatedly asking "Why?",
The investigation reveals that the root cause is the lack of a safety procedure that includes spill management. The organization can then address this root cause by updating the safety policies and procedures and training employees to prevent similar incidents in the future.

Root Cause Analysis (RCA)

LEVEL 1 - DIRECT CAUSE – EXAMPLES

How did the employee get injured or become ill?

- ❑ Cuts, strains, burns, poisonings, falls, electrocutions, etc.

LEVEL 2 – INDIRECT CAUSE – EXAMPLES

What was the employee(s) doing wrong at the time?
What at-risk behavior was the employee performing?

- ❑ Unsafe/At-Risk acts performed by the workers
- ❑ Using equipment or tools with missing guards or are broken
- ❑ Using equipment or tools that have not been inspected
- ❑ Workers running, horseplaying, or ignoring rules
- ❑ Working in areas with slip, trip, or fall hazards
- ❑ Elevated work without guardrails or personal fall arrest
- ❑ Working on electrical that is energized or without LOTO

LEVEL 3 – ROOT CAUSE – EXAMPLES

The underlying issue is normally a management deficiency

- ❑ Outdated or no policies, procedures, processes, permits, etc.
- ❑ Inadequate or no training programs or requirements to attend
- ❑ No accountability, discipline, interventions, retraining, etc.
- ❑ Lack of inspections, audits, observations, or investigations

WHY IS A ROOT CAUSE ANALYSIS (RCA) SO IMPORTANT?

A root cause analysis allows an employer to discover the underlying or systemic deficiency rather than the generalized or immediate causes of an incident. Correcting only an immediate cause may eliminate a symptom of a problem, but not the problem itself.

Example 1

Level 1	Punched in the face and broken nose
Level 2	Workers were horseplaying
Level 3	No policy or training against horseplay

Example 2

Level 1	Cut off a finger
Level 2	Worker was using a saw with a broken or missing guard or improper hand placement
Level 3	No inspection or equipment removal procedure or lack of training

Example 3

Level 1	Electrocution while working on an electrical panel
Level 2	Worker(s) did not use LOTO
Level 3	Lack of training or supervision or no policy or procedure

JSA/JHA
is one approach to hazard recognition. In a JSA, the task is broken down into its individual parts or steps, and then each step is analyzed for its potential hazards. Once a hazard is identified, it must be corrected through elimination or control.

PRE-TASK PLANNING
a pre-printed, fill-in-the-blank checklist is used to document any hazard found during analysis.

Pre-Task Planning and JSA both require workers to identify potential hazards and needed safeguards associated with a job they are about to do. The difference is the form that is used to report the

RCA
Controls Engineering, Admin, PPE

PCBs

CWA/ CAA
Secondary Containment
Collection Basins & Swales
NPDES

Waste Generator – EPA #
Waste Transporter – EPA & DOT #s

DEFINITIONS

Acceptable level of risk: The level of risk that is reasonable when working in hazardous conditions.

Ambient noise levels: Background noise that is related to the jobs done on a work site.

Audible: When a noise or sound is heard or capable of being heard.

Consequences: Something that happens as a result of a set of conditions or actions.

Cross-training: Training workers to do multiple jobs.

Flaw: A part of the design of equipment, parts, or a process that creates a hazard or operational or maintenance difficulties.

Probability: The chance that something will happen

Noise Dosimeter: a specialized sound level meter intended specifically to measure the noise exposure of a person integrated over a period of time.