Process Hazard Analysis

Inland Star Distribution Centers, Inc.

2132 E Dominguez Street
Carson, CA 90810

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Study Date: July 12, 2016

Project Number: 2016-29

About this Study

Per the requirements of the Process Safety Management (PSM) and California Accidental Release Prevention (CalARP) regulations, a Process Hazard Analysis (PHA) was performed on the storage of hazardous chemicals. The purpose of a PHA is to reduce and/or eliminate risks that process hazards pose to employees and the public. This PHA for the Inland Star Distribution Centers, Inc. facility was conducted in two parts: 1) table-top discussion to review and discuss "What-If" questions, and 2) on-site walkthrough/facility siting.

This PHA was conducted to identify hazards of the following chemicals:

Chemical	Largest Container	Total On-Site	Location
Methyltrichlorosilane	1,000 lbs	4,000 lbs	Area B
Peracetic Acid	485 lbs	5,000 lbs	Area C
Epichlorohydrin	507 lbs	19,000 lbs	Area B
Cyclohexylamine	386 lbs	14,000 lbs	Area B

Process Hazard Analysis Team

A team was assembled to perform this review, which includes a leader knowledgeable in the methodology used to conduct the study, and personnel familiar with the handling and inventory requirements of the chemical storage. The team members that participated in the study were as follows (screen shot of the conference call attendees & Process Hazard Analysis Team Leader resumes are located in Appendix A):

- Jeanna Emmons, Process Hazard Analysis Leader, PSM RMP Solutions
- Mele Mafi, Intern, PSM RMP Solutions
- Miachel O'Donnell, Sr. Executive Vice President
- Dianne Noguera, Director of Customer Service
- Allen Lewis, Warehouse Coordinator

Objectives

A PHA is a thorough, orderly, systematic approach for identifying, evaluating, and controlling the hazards of processes involving highly hazardous chemicals. The primary objectives of this analysis were to address the following:

- hazards of the process;
- identification of any previous incident that had a potential for catastrophic consequences in the workplace;
- engineering and administrative controls applicable to the hazards;
- consequences of failure of engineering and administrative controls;
- facility siting;
- human factors; and
- a qualitative evaluation of a range of the possible safety and health effects on employees in the workplace if there is a failure of controls.

What-If Analysis

A What –If Analysis includes a review of various pertinent questions associated with the storage of hazardous chemicals (see Appendix B for What-If Worksheets). The PHA Team reviews and answers each question judging the likelihood of the situations occurring.

Facility Siting & Human Factors

In addition to the table top evaluation during the What-If Analysis, a walkthrough was conducted by the PHA Team. Facility Siting & Human Factor issues were discussed and recognized during the walkthrough. In addition, they were also discussed in the What-If Analysis with questions posed, reviewed, and answered as indicated by "HF" within the worksheets.

Frequency, Consequences, and Risk

For each scenario discussed during the What-If Analysis, the overall risk was determined based on its likelihood and the severity of its consequence. The following frequency and consequence categories were used to establish the risk ranking system. As shown in Tables 2 and 3, the likelihood of the event and the severity of the consequence are quantified and respectively designated with letters A-E and roman numerals i-iv. Using the matrix displayed in Table 4, each scenario receives a risk ranking criteria as described in Table 5. For example, a scenario with a frequency of "B" (periodic, occurring within a span of one to ten years) and a consequence of "iv" (minor impact on personnel) would have a risk ranking of "4" (no further action required). This method aids in quantifying potential hazards and assessing the need to implement mitigation measures.

TABLE 2 Frequency

Probability Category	Likelihood	Quantitative Description
A	Frequent	0 to 1 years
B	Periodic	1 to 10 years
C	Occasional	10 to 100 years
D	Possible	100 to 10,000 years
E	Improbable	10,000 or more years

TABLE 3 Consequence

Consequence Category	Considerations			
	Health/Safety	**Public Disruption**	**Environmental Impact**	**Financial Impact**
i	Fatalities / Serious Impact on Public	Large Community	Major / Extended Duration / Full Scale Response	>$1,000,000
ii	Serious Injury to Personnel / Limited Impact on Public	Small Community	Serious / Significant Resource commitment	>$100,000
III	Medical Treatment for Personnel / No Impact on Public	Minor	Moderate / Limited Response of Short Duration	>$10,000
iv	Minor Impact on Personnel	Minimal to None	Minor / Little or No Response Needed	<$10,000

TABLE 4 Risk Matrix

Consequence	Probability				
	A	**B**	**C**	**D**	**E**
i	1	1	1	2	4
ii	1	2	3	3	4
iii	2	3	4	4	4
iv	4	4	4	4	4

TABLE 5 Risk Categories

Risk Category	Action
1	Mitigate as soon as possible
2	Mitigate within a reasonable time period
3	Mitigate using controls
4	No further action required

Recommendations

The following table contains a summary of the recommendations resulting from this Process Hazard Analysis study. These include mitigation measures generated during the What-If Analysis and the facility walkthrough. It should be noted that the recommendations listed below are numbered according to the order in which they appear in the What-If Worksheets within Appendix B.

Inland Star Distribution Centers, Inc. management will ensure these recommendations are addressed and/or implemented in a timely manner. A schedule for completing these action items will be developed, and resolutions will be documented and maintained for the life of the process, along with this Process Hazard Analysis report.

TABLE 6 Recommendations

Rec #	Recommendation	Responsible Party
2016PHA-01	Ensure an evacuation drill is conducted at the site. All employees need to participate and document the drill.	General Manager, Operations

Appendix A

PHA Sign-In Sheet

Process Hazard Analysis Leader Resume

PROCESS HAZARD ANALYSIS
Initial PHA Study

Conducted for: Inland Star Distribution Centers, Inc.
Regulated Process: Storage of Toxic Chemicals
Performed on: Tuesday, July 12, 2016

Name	Title	Company
Jeanna Emmons	PHA Leader/Scribe	PSM RMP Solutions
Mele Mafi	intern	PSM RMP Solutions
MICHAEL O'DONNELL	SR. EXEC. V.P.	INLAND STAR
Dianne Nugnera	Dir. Cust. Svc.	Inland Star
Allen Lewis	Warehouse coordinator	Inland Star

Jeanna Emmons, Owner / Senior Compliance Specialist

Qualifications & Expertise

The Senior Compliance Specialist obtained a Bachelor of Science degree in Physics from the University of Southern California. For the past twelve years, she has worked as a consultant to assist clients under the requirements surrounding the PSM, RMP, and CalARP regulations.

Her technical capabilities include:

- Hazard Assessments;
- Offsite Consequence Analysis;
- Process Hazard Analysis Revalidations;
- Compliance Audits;
- Implementation Assistance;
- Development of prevention programs;
- Compliance Training; and
- Hazardous Materials Business Plans.

Ms. Emmons has participated on various PSM Committees which meet regularly for clients on the implementation of the PSM/RMP/CalARP programs. The meetings typically include a review of the following:

- recommendations from PHA's, audits, citations MOCs, etc.;
- contractor packages;
- maintenance records; and
- general implementation.

Responsibilities also include staying abreast of the most recent industry standards and guidelines by maintaining on-going involvement in RETA and IIAR. This is accomplished by not only reviewing OSHA, EPA, Cal-OSHA, and Cal-OES websites but in addition, Ms. Emmons has been attending annual RETA Safety Days, annual RETA National Conferences, and annual IIAR Conferences.

<u>Training, Technical Papers, Certifications</u>

Certifications:

- Certified Assistance Refrigeration Operator (CARO)

Authored/Co-Authored several technical paper for the Refrigerating Engineers & Technicians Associates (RETA):

- "Mechanical Integrity - Where Do We Start?" RETA Breeze, 2013 Issue #3 May/June.
- "Joint Valve Day Bring California #2 and Inland Empire Chapters Together – February 22, 2013" RETA Breeze, 2013 Issue #2 March/April.
- "EPA's Incentive for Self Policing" RETA Breeze, 2012 Issue #5 September/October.

- "Operating Procedures Emergency Shutdown" RETA Breeze, 2012 Issue #2 March/April.
- "Operating Procedures – Steps Required to Correct or Avoid Deviation" RETA Breeze, 2012 Issue #1 January/February.
- "A Guide to National Emphasis Program (NEP) Audits in Ammonia Refrigeration Facilities" RETA 103rd Annual Conference, Technical Paper, November 6-9, 2012.
- "Training, Certification, and The Buck Stops Where?" RETA 103rd Annual Conference, Technical Paper, November 6-9, 2012.
- RETA Breeze, 2010 Issue #1 (January), "Employee Participation – Are Your Operators Involved?"

Presentations:

- 15th Annual California Unified Program Conference, February 4, 2013, "Process Safety Information – What Are We Looking For?"
- 103rd Annual Conference, November 6-9, 2012, "Training, Certification, and The Buck Stops Where?"
- 5th Annual Refrigeration Awareness Day, May 23, 2012, "Ammonia Refrigeration Mechanical Integrity"
- 13th Annual California Unified Program Conference, February 3, 2011, "What do All These Documents Really Mean?"

Affiliations:

- Refrigerating Engineers & Technicians Association
    - Treasurer, RETA California LA Chapter 2 (2007 - 2011)
    - President, RETA California LA Chapter 2 (2012)
    - Chairman of the Board, RETA California LA Chapter 2 (2013)
    - Treasurer, RETA California LA Chapter 2 (2014 - present)
    - RETA Conference Committee (2006 - present)
    - RETA Education Committee (2012 - present)
    - RETA Membership Committee (2013 - present)
- Southern California Society of Risk Analysis, Member (2008 - present)
- International Institute of Ammonia Refrigeration
    - Government Relations Committee
    - Compliance Guideline Committee

Training:

- Ammonia Safety & Training Institute (ASTI), 32-Hour Ammonia Technician/Incident Commander Training (September 2009)

Awards:

- RETA, Felix Anderson, September 21, 2011

Appendix B

What-If Worksheets

Company: Inland Star Distribution Centers, Inc.	**Regulated Process:** Chemical Storage
Facility Location: 2132 E Dominguez Street, Carson CA	**P&ID Title:** N/A
PHA Session Type / Date: Initial PHA / July 12, 2016	**Equipment / Activity:** Chemical Storage and Inspections

What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
Process Design Notes				---	---	---	Process Description: Inland Star Distribution Centers, Inc. had previously operated in nearby Rancho Dominguez, CA for over 20 years and selected Carson, CA to relocate and expand their niche warehousing services and employment base. The Chemical Distribution Services operation is one of receiving, storing and shipping of a variety of chemical products in approved DOT/UN containers, including bags, drums, plastic bottles, totes, tanks, and cardboard boxes. Liquid container sizes range from one-half pints to 250 gallon totes to 1,000 pound tanks. All containers are DOT/UN approved. Inland Star Distribution Centers, Inc. performs storage and distribution services only. On-site there is no blending, formulating, repackaging or opening of containers. Product is received on pallets the majority of the time. This product is unloaded, placed in storage, and loaded onto trucks for shipment to the customer using forklifts. Normal Operating Conditions: All chemicals are stored within the warehouse at ambient pressure and temperature. Chemicals are stored on pallets then on racking within the warehouse.

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What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
							Incident History: No incidents associated with the regulated chemicals in the last five years.
1. The chemical inspection program is non-existent or inadequate? [HF]	Chemical inspections are not performed or properly followed. Concealed damage: a bucket in the center of the pallet is compromised and goes unnoticed.	Potential for a leak to occur. Potential to ship compromised material to consignee/end customer.	The facility has a cylinder inspection program that includes: • All chemicals are inspected upon receipt. • An Associate routinely walks the warehouse noting any variances in chemical inventory, assess for damage, and inspection of overall cleanliness. • "Receiving Process" written policy. • "Damaged Inventory Process" includes concealed damage.	iv	B	4	Concealed damaged material will be handled with the customer protocol. The material will be quarantined until removal/disposal can be initiated.

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PHA Session Type / Date: Initial PHA / July 12, 2016	**Equipment / Activity:** Chemical Storage and Inspections

What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
2. A leaking chemical container is present?	• Container found to be leaking during an inspection. • Containers falls or is impacted and starts leaking.	Release of chemical to the warehouse. Potential for employee injury and offsite public health effects.	An Associate routinely walks the warehouse noting any variances in chemical inventory, assess for damage, and inspection of overall cleanliness. The segregated storage areas (3 total) within the warehouse are self-contained, each threshold into/out of the area is raised creating a berm/diked area. The EAP would be put into place.	ii	C	3	The facility is non-responding, in the event of a chemical release, employees will evacuate. An Associate would notify the Warehouse Coordinator. The Area would be isolated/mitigated based on SDS information. If necessary, a hazardous waste hauler would be called to remove the waste. The customer would determine disposition of released material.

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What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
3. A container has dents, corrosion, defects, etc.?	• Corrosion is present on a newly delivered chemical. • Cylinder sustains a dent as a result of impact.	Potential for a leak to occur.	The facility has a cylinder inspection program that includes: • All chemicals are inspected upon receipt. • An Associate routinely walks the warehouse noting any variances in chemical inventory, assess for damage, and inspection of overall cleanliness. • "Receiving Process" written policy – customer is notified. • "Damaged Inventory Process" includes concealed damage.	iii	B	3	The facility is non-responding, in the event of a chemical release, employees will evacuate.
4. A container is incorrectly labeled? [HF]	Containers are received with incorrect labels. De-palletizing within warehouse and customer codes applied inadequately.	Associates would not know what product was being stored where. Potential to ship the wrong material with the wrong label to the customer.	Upon receipt, the material is matched with the bill of lading. The materials re put on hold, quarantined and the customer is contacted. Associates are trained on proper labeling of material per customer requirements. Quality Control – 2nd Associate checks the 1st Associate's order.	iv	B	4	This has occurred in the past at an Inland Star facility in another state. The cause was not determined. On the Customer Service side, copies of the labels are maintained. A quality check is conducted on the Warehouse side. Some customers would refuse the entire load or may request the correct codes be sent to the customer.

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What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
5. Container is not sealed? [HF]	Container is delivered open.	Potential for a leak to occur.	"Receiving Process" written policy – customer is notified.	iv	B	4	The facility is non-responding, in the event of a chemical release, employees will evacuate.
6. Containers are not properly secured in the warehouse? [HF]	Failure to follow proper storage policies and procedures.	Container may fall, which could damage the container and cause a release. Potential for employee injury as well.	An Associate routinely walks the warehouse noting any variances in chemical inventory, assess for damage, and inspection of overall cleanliness. The segregated storage areas (3 total) within the warehouse are self-contained, each threshold into/out of the area is raised creating a berm/diked area. Associates are trained on the company material handling equipment.	iv	B	4	The facility is non-responding, in the event of a chemical release, employees will evacuate.
7. What if incompatible materials are stored in close proximity? [HF]	• Failure to properly segregate containers based on chemical hazards. • Failure to follow proper storage policies and procedures.	A leak may result in undesirable chemical reactions. Potential for facility damage and offsite consequences.	Associates are trained on the company material handling equipment. Refresher training occurs every two years.	iv	B	4	

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What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
8. Fire suppression system fails?	• Fire suppression system experiences a mechanical or electrical failure. • Personnel fail to properly maintain the fire suppression system.	A fire would not be mitigated and spread to other areas.	Security provider Redwave monitors the fire suppression system and would alert management team of the failure. If the fire suppression system does not reset immediately, a guard is positioned as a fire watch during off hours. Maintenance: Pump House – Weekly Sprinklers – Quarterly Phone Test - Annual	iii	B	3	
9. Containers are exposed to excessive heat?	Warehouse temperatures exceed ambient.	No consequences. Some chemicals are required to be stored at lower temperatures per manufacturer's recommendations.	Chemicals with a flashpoint below 200°F are stored within the H3 Flammable Room. The room has a specialized suppression system. All material is stored in the warehouse. Only new empty containers are stored outside	iv	A	4	
10. The building ventilation system fails during an emergency (Area D)?	Ventilation system is not maintained.	Chemical concentrations would increase in the event of a release.	The ventilation system is inspected quarterly.	iii	C	4	

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Facility Location: 2132 E Dominguez Street, Carson CA	**P&ID Title:** N/A
PHA Session Type / Date: Initial PHA / July 12, 2016	**Equipment / Activity:** Container Loading / Unloading

What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
11. Loading / unloading is left unsupervised by facility personnel? [HF]	Normal operations.						
12. There is vehicular or operator traffic during delivery?	Access to the delivery area is blocked by vehicles, personnel, etc.	Potential for accident to occur during delivery.	Truck deliveries are scheduled every 30 minutes. Trucks do not pull into truck yard until assigned a door.	iv	A	4	
13. Container is transported manually rather than by forklift? [HF]	Forklift is unavailable.	Potential to drop and damage the container. Potential for employee injury.	Drum pickers are attached to the forklift, or drum dollies are used.	iv	A	4	
14. Loading / unloading incident occurs, causing loss of control of container? [HF]	Container is not properly secured prior to being moved.	Potential to damage the container and cause a leak. Potential for employee injury.	The containers are DOT certified.	iii	B	3	
15. Container is impacted by a vehicle? [HF]	Container is impacted by a truck, forklift, or cart.	Potential to damage the container and cause a leak. Potential for employee injury.	Associates undergo forklift training. As part of training, employees are instructed to be aware of their surroundings at all times while operating a vehicle. "Damaged Inventory Process" includes concealed damage.	iii	B	3	

Company: Inland Star Centers Distribution, Inc.	**Regulated Process:** Chemical Storage
Facility Location: 2132 E Dominguez Street, Carson CA	**P&ID Title:** N/A
PHA Session Type / Date: Initial PHA / July 12, 2016	**Equipment / Activity:** Other Abnormal Site Events

What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
16. There is a fire in the storage area?	A fire develops in or near the area.	Potential to overpressurize and damage the containers. Potential for a chemical release.	All areas within the warehouse are sprinklered. In the event of a fire, employees evacuate.	ii	C	3	
17. There is a power failure in the storage area?	The facility experiences a power outage.	The fire suppression system would fail.	The facility has backup power for the sprinkler system.	iv	A	4	
18. Hot work is performed without following proper protocols? [HF]	Untrained employee or unqualified contractor performs hot work in the area.	Potential to start a fire and cause a release.	A qualified contractor is used when conducting hot work. All contractors are escorted or monitored at all times when on facility premises. They complete the facility hot work permit and provide their own fire watch.	iii	B	3	Hot work is rarely performed onsite.
19. A worker is incapacitated in the storage area?	Associate becomes incapacitated due to a medical emergency, chemical leak, etc.	Potential for incapacitated employee to go unnoticed if working alone.	The warehouse is monitored by 62 cameras. Live feed 24/7. The management team has remote access to the cameras. The monitors are periodically reviewed.	ii	C	3	An incapacitated Associate could go unnoticed for no more than 2 hours.

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Facility Location: 2132 E Dominguez Street, Carson CA	**P&ID Title:** N/A
PHA Session Type / Date: Initial PHA / July 12, 2016	**Equipment / Activity:** General Safety and Emergency Response Issues

What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
20. PPE for normal operations is non-existent, inadequate, or incorrectly used? [HF]	Employee fails to don proper PPE while performing material handling and inspections.	Potential for employee injury.	Warehouse Associates wear: • Steel toed shoes • Safety vest • Safety glasses (optional) • Gloves	iii	C	4	
21. Emergency response equipment (e.g., eyewash stations/showers, fire extinguishers, etc.) is inadequate or non-existent?	Failure to properly inspect and maintain the emergency response equipment.	Potential for employee injury.	There are seven plumed eyewash/showers throughout the warehouse. Weekly inspection of the eyewash/shower is included in the Sanitation Checklist.	iii	C	4	
22. There is no site security system?	Security alarms fail.	Trespassers cause vandalism, theft, etc. Potential for a chemical release.	Security provider Redwave monitors the intrusion alarms and will alert management team of the failure. If management cannot be reached, security officer will be dispatched.	iii	C	4	
23. The employee communication system is non-existent, inadequate, or inoperable during an emergency situation? [HF]	General Manager, Operations or designated employee fails to notify others of an evacuation.	Failure to properly initiate an evacuation. Potential for employee injury and offsite public health effects.	Pull stations could be used to initiate an evacuation.	iii	C	4	

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PHA Session Type / Date: Initial PHA / July 12, 2016	**Equipment / Activity:** General Safety and Emergency Response Issues

What If…	Causes	Consequences/Hazards	E/A Controls	C	F	R	Recommendations / Comments
24. There are no assigned responsibilities in the event of an emergency situation? [HF]	• Emergency procedures fail to indicate employee responsibilities. • Lack of training in emergency procedures.	Panic, confusion, inaction, or wrong actions occur. Potential for employee injury.	The facility has an Emergency Action Plan in place. Facility management plans to conduct an evacuation drill within the next 60 days.	iii	C	4	2016PHA-01: Ensure an evacuation drill is conducted at the site. All employees need to participate and document the drill.
25. Evacuation routes are blocked? [HF]	Failure to follow housekeeping policies.	Employees are unable to evacuate. Potential for employee injury.	An Associate routinely walks the warehouse noting any variances in chemical inventory, assess for damage, and inspection of overall cleanliness.	iii	C	4	

Appendix C

External Events

Company: Inland Star Distribution Centers, inc.	External Events
Facility Location: 2132 E Dominguez Street, Carson CA	
PHA Session Date / Type: Initial PHA / July 12, 2016	

Event	Likelihood	Consequences	Safeguards	Recommendations / Comments
Airplane Impact	Not likely.	Long Beach airport is the nearest airport. An airplane crashing into the facility could cause a fire and/or chemical release.	The building was constructed per building codes.	
Avalanche	Impossible.			
Coastal Erosion	Impossible.			
Drought	Possible.	No effect to the storage of chemicals.		
Extreme Winds, Hurricane, Tornadoes	Impossible.			
Fire: On-Site	Possible.	Potential for a chemical release.	Fire suppression system in place at the facility. The system is monitored 24/7, management is notified in the event of a failure to the system.	
Fire: Brush Fire, Wildfire	Impossible.			
Flooding: External	Impossible.			
Internal Flooding	Possible.	No effect to the storage of chemicals.		
Fog	Common / seasonal.	No effect to the storage of chemicals.		
Frost, Snow, Ice Cover	Impossible.			
Hail	Possible.	No effect to the storage of chemicals.	All chemicals are stored within the warehouse.	
High Summer Temperature	Common / seasonal.	No effect to the storage of chemicals. Slight temperature increase within the warehouse.	Chemicals are not stored outside.	
Industrial or Military Facility Accident	Impossible.			
Landslide	Impossible.			
Lightning	Common / seasonal.	Lightning could cause a fire or power outage.	Fire – There is a fire suppression system throughout the facility. Power Outage – There is backup power for the fire suppression system.	
Low Winter Temperature	Impossible.			
Meteorite Impact	Possible.	Potential for a chemical release.		
Missile Impact	Possible.	Potential for a chemical release.		

Event	Likelihood	Consequences	Safeguards	Recommendations / Comments
Nearby Pipeline Accident	Impossible.			
Release of Chemicals from Storage	Impossible.			
River Diversion	Impossible.			
Sabotage	Possible.	Outside or internal disgruntled personnel wishing to do damage could cause a chemical release.	There are 63 motion activated cameras throughout the facility. The cameras only record if activated.	
Sandstorm	Impossible.			
Seismic Activity	Possible.	Potential for a chemical release.	The racking within the warehouse has undergone seismic analysis. See Seismic Report.	
Terrorist Attack / War	Possible.	Potential for a chemical release.	The facility is not of national security.	
Theft	Impossible.			
Transportation Accidents: Highway	Potential for a chemical release.	The facility and storage of the chemicals sits off Dominguez Street. An accident on the street would not impact the chemicals in storage.		
Transportation Accidents: On-Site	Possible.	Potential for a chemical release from a forklift impact.	Only trained Associates can operate a forklift. Training occurs initially with a refresher every three years.	
Volcanic Activity	Impossible.			