CalARP/RMP
Chlorine/Sulfur Dioxide
Site Visit/Walk-Thru Inspection Checklist

1) <u>Emergency/Security Information</u>:

a) Does the facility have a KNOX box or other location to store emergency response information that is readily accessible to emergency responders?
b) Does facility have adequate access for emergency responders, e.g., the fire department?
c) Does facility have MSDSs and are they readily acessible?
d) Are P&IDs readily available to emergency responders?
e) Are stop (isolation) valves identified on the P&IDs?
f) Does facility have an "A", "B", or "C" Kit to mitigate a cylinder, container or railcar release? Does the kit contain the proper type gaskets?
g) Is emergency response equipment stored outside of the chlorine or sulfur dioxide room in a location that is readily available in the event of a release?
h) Does facility have an adequate fire water supply, e.g., a hydrant?
i) Does the site have adequate security?
   i. Fenced perimeter?
   ii. Security guard?

2) <u>Chlorine/Sulfur Dioxide Storage and/or Dispensing Areas or Rooms</u>

a) Does the chlorine or sulfur dioxide room have a NFPA 704 placard(s) on an exterior wall? Or is the placard(s) located at the entrance gate(s)?
b) Does access to the chlorine or sulfur dioxide area or room have a posted sign restricting entry to authorized personnel only?
c) If chlorine or sulfur dioxide cylinders or containers are stored outside, are they stored in a cool, dry location (and away from standing water) and away from direct sunlight or sources of intense heat (e.g., steam lines)?
d) Do cylinders or containers have easy access in the event of a leak?
e) Are cylinders or containers stored away from areas where heavy objects could fall on them?
f) Are chlorine and sulfur dioxide cylinders or containers stored away from each other? Stored away from other incompatible materials, including ammonia? Isolated from hydrocarbons or other incompatible combustible or flammable materials?
g) Are chlorine or sulfur dioxide cylinders or containers secured from falling or rolling?
h) Are full and empty cylinders and containers stored separately?
i) Are chlorine or sulfur dioxide cylinders that are not in use stored in the upright position with the protective valve caps installed?

j) Are cylinders or containers of chlorine or sulfur dioxide located in a vapor-tight, non-combustible room designed and constructed in accordance with local building and fire codes?
k) Have potential ignition sources been eliminated? If not, the potential for a fire and/or explosion may be increased. Potential ignition sources include non-explosion proof electrical, electric heaters, etc.
l) Are all chlorine or sulfur dioxide room man doors self-closing?
m) Is a detection and alarm system installed for the chlorine or sulfur dioxide area or room? If so,
    i. Are detectors installed low to the ground where chlorine or sulfur dioxide is likely to be present?
    ii. Do the detectors activate visual/audible alarms at least 15dB above ambient?
    iii. Are the detectors calibrated in accordance with the frequency and procedures recommended by the manufacturer?
    iv. What are the alarm thresholds? At the chlorine PEL of 0.5 ppm or the IDLH of 10 ppm? At the sulfur dioxide TLV-TWA of 2 ppm or the TLV-STEL of 5 ppm or IDLH of 100 ppm?
        - Does the alarm system have other, multiple thresholds? If so, what happens at each threshold? Are ventilation fans or the scrubber system controlled by the alarm system?
    v. Who does the alarm system notify? Does the alarm go to a constantly attended, monitored location?
    vi. Is there a back-up power supply for the detection and alarm system?
n) If a roll-up door is installed, does it close manually or electrically? If an electrical roll-up door is installed, does it have an emergency close switch located on an exterior wall of the chlorine/sulfur dioxide room? Or if the roll-up door is in the open position, will it automatically close when the detection and alarm system is activated?
o) Are the cylinders or containers of chlorine or sulfur dioxide equipped with emergency auto-closers (that close the valve on the cylinder or container)? If so,
    i. Is there a clearly labeled emergency stop switch (that is located on the exterior wall of the room)?
    ii. Are the emergency auto-closers activated with a detection and alarm system?
p) Does the chlorine or sulfur dioxide room have a ventilation system? If so:
    i. Is the ventilation intake near floor level?
    ii. Does the ventilation system discharge to the ambient atmosphere?
    iii. Or is the ventilation system connected to a scrubber?
    iv. Or is there a regular ventilation system and a separate scrubber ventilation system?
    v. If there is a regular ventilation system, does it de-activate with the detection and alarm system to prevent positive pressure ventilation of chlorine or sulfur dioxide to the ambient atmosphere during a release incident? Or is there a properly labeled emergency shut-off switch for

the regular ventilation system on the exterior wall of the chlorine/sulfur dioxide room?

vi. If there is a scrubber ventilation system, does it activate with the detection and alarm system?

vii. Does the ventilation system have back-draft dampers (including on make-up air vents) that prevent the release of chlorine or sulfur dioxide when the ventilation system is not activated?

q) Does the facility implement good housekeeping practices in the chlorine or sulfur dioxide room?

r) Are fire extinguishers located in the chlorine or sulfur dioxide room room?

s) Are floor drains located in the chlorine or sulfur dioxide room and if so, where do they go?

3) <u>Protection of Containers, Cylinders, Railcars from Impact:</u>

a) Are all chlorine or sulfur dioxide cylinders, containers, railcars and other vulnerable system components (e.g., piping) protected from a vehicle collision (e.g., forklift), e.g., with guard posts?

4) <u>Delivery/Unloading</u>:

a) Are unloading or transfer areas adequately illuminated if operations are conducted at night?

b) Do procedures call for the valve protective caps and/or housings to be in place before unloading?

c) Do procedures call for shutting off the truck engine, setting the tank truck or railcar brakes and chocking the wheels before unloading?

d) Are caution signs (blue flags or lights) placed in the vicinity of transfer areas? At the open end of the siding to warn persons approaching a railcar?

e) For railcars, are protective devices (e.g., derails) located at least 50 feet from the chlorine or sulfur dioxide car (unless the railcar is protected by a closed and locked switch)?

f) Do procedures call for personnel to stay unwind during delivery?

g) Do employees have 2-way radios or other communicating devices (e.g., cell phones) on-hand during delivery?

h) Is emergency equipment (e.g., SCBAs, emergency kits and eye wash fountains) readily available and operational during delivery/unloading? Is there a check to ensure that required approved respiratory equipment is on the transport vehicle (tank truck)?

i) Is there a check to ensure that an emergency “C” kit is on the tank truck?

j) Are cylinders or containers inspected for general condition, leakage, for valve protective cap, last hydrostatic test before shipment is accepted?

k) Do delivery, unloading or transfer operations incorporate an emergency shutoff system?

l) If cylinders are unloaded by using a hand truck, does the hand truck have a clamp or chain two-thirds of the way up to hold the cylinder in place?

m) Does the facility have a hoist (crane) and lifting beam for one-ton containers?
n) If a forklift is used to unload one-ton containers, is a container adequately restrained to prevent it from falling off? Is the forklift properly rated to handle the gross weight of the container (3300-3650 lbs.)?
o) Are curbs, sumps or diking that minimize the surface of potential spills provided?
p) Are containers placed in the 6 o'clock/12 o'clock position for storage to reduce the chance of a liquid leak through the valve?
q) For tank trucks or railcars, is a suitable flexible connector used for transfer operations?
r) For tank trucks or railcars, after the connections are tight, is a small amount of chlorine added to the system by a slight opening of the valve for a second or two to pressurize the piping and then is it checked for leaks?
s) For railcars, is a suitable operating platform provided at the transfer station for easy access and rapid escape per Chlorine Institute Pamphlet 66?
t) For tank trucks or railcars, is padding air from a dedicated, flow-limited, dry and oil-free source per Chlorine Institute Pamphlet 66 used? Air for padding should be supplied by a separate compressor which is not used for any other purpose. To minimize the potential for a chlorine-hydrocarbon oil reaction, either a non-lubricated compressor or a compressor lubricated with a non-reactive synthetic oil should be used. Filters ahead of the dryers are required to ensure oil free dry air if a lubricated compressor is used. The air pad system should be designed to prevent the backflow of chlorine vapors from the tank truck or railcar. Lack of a positive backflow protection with a hydrocarbon lubricated compressor may result in a violent reaction of chlorine and oil. A check valve alone should not be considered adequate to prevent back flow.
u) For tank truck or railcars, is the car attended as long as the car is connected in accordance with DOT regulations and Chlorine Institute Pamphlet 66? There may be exceptions to this rule.
v) For tank trucks or railcars, are lines purged with dry air or non-reactive gas to an absorption system before disconnecting?
w) For tank trucks or railcars, after the chlorine transfer lines have been disconnected, are valve outlet plugs installed immediately to prevent corrosion of the threads by atmospheric moisture? Are the open end of the chlorine transfer lines also protected from atmospheric moisture with suitable closures?

5) <u>System Piping:</u>

a) Is gaseous or liquid chlorine or sulfur dioxide fed from the storage container?
b) Is the piping delivery system a pressure or vacuum system?
c) Is the piping system compatible with chlorine or sulfur dioxide?

d) Does the facility require suppliers of all piping and appurtenances to demonstrate that the equipment has been certified for chlorine (or sulfur dioxide) by the manufacturer?
e) Is there an appropriate flexible connector between the cylinder or container and the piping system?
f) Is a new gasket used each time a connection is made?
g) Is a valve wrench left in place so that the valve can be closed quickly in an emergency?
h) Once a connection has been made, is the system pressurized with a small amount of chlorine or sulfur dioxide and checked for leaks?
i) In disconnecting, is there a means of removing the chlorine or sulfur dioxide trapped in the lines?
j) Are any open piping ends capped promptly to keep atmospheric moisture from entering the system?
k) Are automatic shutoff valves provided on the feed lines?
l) Is the piping system corroded?
m) Are controls accessible and easily understood?
n) Are labels adequate on instruments and controls?
o) Are all major components, valves, and piping clearly labeled?
p) Are piping systems properly supported?
q) Is all piping protected from all risks of excessive heat or fire?
r) Is an appropriate liquid expansion device or vapor pressure relief provided on every line segment or device that can be isolated?
s) Are curbs, sumps or diking that minimize the surface of potential spills provided?

6) <u>Others</u>:

a) Are chlorine or sulfur dioxide storage, use and transfer areas located up hill from adjacent operations? Chlorine is about two and one-half times as heavy as air and will tend to seek the lowest level in a building or area if a leak occurs.
b) Are storage, use and transfer areas located away from sewer openings and other underground structures?
c) Are storage, use and transfer areas located downwind from other operations?
d) Are storage, use and transfer areas located away from residences and facility boundaries?
e) Is there a need to develop training documents, emergency information, etc. in a language other than English?
f) Are exit doors in the chlorine or sulfur dioxide room adequate, properly marked and illuminated?
g) Is there a windsock visible from every outside location of the facility? Has the use of windsocks been incorporated into the facility emergency response plan?
h) Does the facility have a method to detect leaks, e.g.,
    i. Portable monitor;

ii. Spray bottle of ammonia (for chlorine).

7) Emergency Response:

a) Is there emergency response equipment, including:
   i. Deluge shower and eye-wash fountain (should be located not less than approx. 20 feet nor more than 100 feet from a potential release location), and
   ii. First aid kit.
b) Is the PPE described in the RMP maintained on-site? APRs? SCBAs?

8) Maintenance Program:

a) Are equipment, cylinders, containers and railcars inspected daily?
b) Are detectors calibrated in accordance with manufacturer's recommendations?
c) Are preventative maintenance, inspections and testing performed as recommended by the manufacturer or industry groups and is it documented?

9) Training:

a) Are personnel properly trained on the operating procedures?
b) Do the operators understand the applicable operating limits on temperature, pressure, flow and level?
c) Are personnel properly trained in use of emergency response equipment, including the A, B or C kits? In the use of PPE, APRs or SCBAs?
d) Have operators been trained on the correct response to alarms and conditions that exceed the operating limits of the system?
e) Do employees understand the consequences of confining liquid chlorine or sulfur dioxide without a thermal expansion device?
f) Do employees understand the effect of moisture on the corrosive potential of chlorine?
g) Has the facility conducted an emergency response drill with the local fire department? With the Haz Mat team?

10) Operating Procedures:

a) Has the facility established:
   i. Written emergency procedures and instructions on what to do in the event of a release?
   ii. Emergency shutdown procedures and instructions on what to do during and after a power failure?
   iii. Other operating procedures in accordance with CalARP/RMP requirements?