



SUPERVISORS SAFETY TRAINING

ELEMENT II

FALL '82

OPENING REMARKS L. J. STORY

INTRODUCTION TO ELEMENT II. J. O. PHILLEY

TAG-OUT SAFE PRACTICES. R. BRUCE

(BREAK)

FIRE PROTECTION SYSTEMS H. H. SCHAMBACH

(BREAK)

CONFINED SPACE ENTRY. K. KILKENNY

(BREAK)

RECENT CHANGES IN GEISMAR SAFETY:

SCAFFOLD STANDARDS M. SMITH

EMERGENCY MEDICAL SERVICES . . . F. R. DONALDSON

OTHER STANDARDS. J. O. PHILLEY

SUPERVISORS SAFETY TRAINING

ELEMENT II

FALL '82

OBJECTIVES:

1. FOR THE SUPERVISOR TO MORE EFFECTIVELY PREVENT ACCIDENTS INVOLVING EQUIPMENT MAINTENANCE, VESSEL ENTRY, AND SCAFFOLDS BY HAVING A BETTER UNDERSTANDING OF THE HAZARDS, PRECAUTIONS, AND MINIMUM SITE STANDARDS.
2. FOR THE SUPERVISOR TO ACHIEVE MAXIMUM BENEFITS FROM HIS FIRE PROTECTION SYSTEMS AND EQUIPMENT.
3. FOR THE SUPERVISOR TO BE BETTER INFORMED ABOUT SEVERAL RECENT CHANGES IN GEISMAR MEDICAL AND ACCIDENT PREVENTION PROCEDURES.

TAG-OUT/LINE BREAKING

PROCEDURE SUMMARY

1. Operations supervisor authorizes job.
2. Operations prepares equipment.
3. Operations tags, locks, and initiates tag-out sheet.
4. Operations initiates other appropriate permits.
5. Maintenance receives tag-out sheet and appropriate permits.
6. Maintenance checks out job and test start/stop switch.
7. Maintenance applies maintenance tag and lock.
8. Work now begins.
9. At conclusion of work period:
 - A. If job is complete, then
 1. Maintenance signs "final release"; removes maintenance tag and lock.
 2. Operations verifies equipment is safe, removes operations tags and locks and clears the tag-out sheet.
 - B. If job is incomplete, then
 1. Maintenance removes lock, turns in yellow copy of tag-out sheet, unsigned, and leaves yellow maintenance tag in place.
 2. When work resumes, operations re-issues tag-out sheet to maintenance.

OTHER NOTES

10. Multi-crew situations are covered in Section V.
11. Certain 480 volt and above switchgear is covered in Appendix A.
12. Special instrument department tagging instructions are covered in Appendix B.

TAG-OUT PROCEDURE (LINE BREAKING)
Hazard Control - Methods
October, 1982

I. PURPOSE

To protect personnel and equipment resulting from inadequate preparation or inappropriate usage of process lines or equipment.

II. SCOPE

This procedure is to apply in all instances of repair or revision to equipment, and the initial opening of piping and vessels that may have contained hazardous materials or been under pressure. Exceptions to this policy with regards to working on valves which have red tags on them can only be done after mutual agreement of operations and maintenance supervision and duly noted on the tag out sheet.

III. RESPONSIBILITIES

A. Operations

It shall be the responsibility of operations to ascertain that the equipment is in a "safe" condition, i.e., de-energized, isolated, drained, cleaned and properly tagged prior to the job beginning. It is operations responsibility to ensure that the tag-out sheet is properly completed. It is also his responsibility to ascertain that the tags are properly cleared after the job is completed.

B. Maintenance

It shall be the responsibility of maintenance to ascertain that the equipment on which work is to be performed is de-energized, isolated, and properly tagged. One individual in each maintenance crew shall be responsible for the maintenance tag and lock, and to ensure that the maintenance lock, tag and tag-out sheet are properly executed and cleared. If the work is not being performed by maintenance, the group performing the work will assume this maintenance responsibility.

C. Special Notes

1. This procedure should not be considered an assurance the equipment to be worked is in fact "safe". All reasonable steps should be taken by the personnel assigned to do the work, to assure themselves that the job is "safe". This includes, but is not limited to, wearing protective equipment, trying start buttons, taking a defensive position when linebreaking, etc.

Interim Procedure
JOP - 10/82

2. The individual worker is responsible to assure himself that he and his fellow workers are working safely. Any employee or supervisor who operates, works on, or uses any equipment in violation of this procedure may subject himself and his fellow workers to serious hazards. Such action is contrary to plant policy and will subject the individual to disciplinary action.

IV. FORMS

A. Red Danger Tag (Form F-1429)

Used only by operations for identifying valves, switches and equipment as not to be operated. The installation and removal of Red Tags is restricted to operations personnel and may only be installed by or under the authority of the person having supervision over the equipment being "tagged-out". Operational control tags are used to tag or identify operations equipment for operations activity. Maintenance is not to remove any equipment with a Red Tag attached.

B. Maintenance Yellow Tag (Form F-3072)

Used only by maintenance personnel to indicate that a maintenance crew is working on the tagged out equipment. The installation and removal of this yellow tag is restricted to Maintenance supervision or his designee. The yellow tag cannot be placed on any equipment which does not have an operations Red Tag in place. These yellow tags must be signed and dated prior to installation.

C. Tag-Out Sheet (F-1432)

The purpose of the Tag-Out Sheet is to:

1. Provide a record of all Red Tags used to isolate the equipment.
2. Provide a record of all maintenance tags installed.
3. Provide a positive means of control and communication of Maintenance activity being performed on equipment which is tagged out.
4. Provide for positive communications for special safety precautions, safe work permit requirements; and blinding requirements.

V. PROCEDURE

- A. No person shall perform work on any equipment coming within the scope of this procedure without the prior approval of the operating supervision or other person having jurisdiction over the equipment.

- B. Prior to the performance of any work falling within the scope of this procedure, the operating supervision or other person having jurisdiction over the equipment shall ascertain that:
1. The system or equipment has been shutdown in accordance with prescribed area procedures.
 2. The system or equipment has been isolated with all power steam and process material sources having been secured.
 3. All devices controlling power, steam and process material of the system, or equipment on which work is to be performed, have been placed in a "safe" position and tagged in that position which properly completed red tags.
 4. In all instances, except in the caustic and utilities department, where electrical circuits of 480 volts or less have to be de-energized for electrical or mechanical work to be performed, the switchgear is to be de-energized, locked and tagged. The local start-stop switch must be tried to verify that the circuit is de-energized -- for the caustic and utilities department 480 and above switchgear, (See Appendix A).
 5. In all instances where electrical circuits in excess of 480 volts exists, the operations supervisor or person having immediate jurisdiction over the equipment is to proceed as per Appendix A.
 6. The Tag-Out Sheet shall be properly completed including any special instructions, and where applicable, the Safe Work Permit and Blinding Sheet will be attached to the Tag-Out sheet.
 7. The location of the maintenance yellow tag must be specified on the Tag-Out Sheet.
 8. Prior to the performance of any work involving piping or process equipment which must be opened and may have contained hazardous material or been under pressure, the operating supervisor or designee having jurisdiction over the area and the maintenance supervisor or designee shall ascertain that:
 - a. The lines or equipment have been emptied, purged, flushed, drained, vented, isolated and tagged as applicable to ensure the system is free from recognized hazards.
 - b. The lines and sources of flow or pressure have been traced to verify that lines or equipment are isolated.

- c. Where possible, verification of depressurization of lines or equipment and absence of material will be accomplished by opening vents and drains. Where present, pressure gauges will be checked for pressure. The lines that have contained flammable material will be tested by explosimeters.
 - d. Where work is performed on elevated piping or equipment, the area below the work area will be barricaded and splash pans provided as needed. Signs will be posted warning of overhead work.
 - e. The personnel performing the work have been fully informed of any potential hazards, special safety precautions, location of nearest safety shower/eye wash station and have in use appropriate personal protective equipment.
- C. Prior to the performance of any work falling within the scope of this procedure, the maintenance supervisor or designee shall ascertain that:
- 1. The system and equipment is in a "safe" condition, (drained, purged, etc.), de-energized, isolated and properly red tagged by operations.
 - 2. One person designated by the maintenance supervisor in each work crew will sign, date, and hang the yellow tag at the location specified on the Tag-Out Sheet. The designated individual must place his name and the date on the tag.
- NOTE: When more than one crew works on any piece of equipment, each crew will place its own yellow tag. For most jobs, the yellow tag will be placed on the electrical switchgear. For those jobs not involving switchgear, operations supervision will designate the most appropriate location for the maintenance tag. The location of the maintenance tag must be specified on the Tag-Out Sheet.
- 3. No maintenance yellow tag will be placed on any equipment until after an operations red tag has been placed. In the event that no operations tag has been placed on the location designated for the maintenance tag, no work will be performed until the Tag-Out Procedure has been properly completed.
 - 4. Each maintenance "crew" tag is to be accompanied by a maintenance "crew" lock. The maintenance lock is to

be affixed by maintenance personnel at the same place as the operation lock. The maintenance supervisor is responsible to designate one member of the maintenance "crew" to affix the lock and to ensure that the maintenance lock is in place prior to starting work. The maintenance lock will be painted yellow.

- D. Specific procedures for completion of the Tag-Out Sheet and Procedure:
1. All red tags will be recorded on the Tag-Out Sheet according to their number and location.
 2. If two or more Tag-Out Sheets are required, the extra sheets will be attached to the first sheet and a note made on each sheet.
(Example: Sheet 1 of 3, or such notation).
 3. If more than one crew will be working on one system or job, refer to Section VI.
 4. Any special instructions, problems, or precautions will be noted on the Tag-Out Sheet.
 5. The copies will then be separated, yellow copies issued to each maintenance crew and the white original being retained by operations, and work now begins.
 6. At the conclusion of each maintenance shift:
 - A. Maintenance personnel will return their copy of the Tag-Out Sheet with notations as to the present status of the job, (whether or not the job has been completed).
 - B. If the job is completed, proceed to clear the tags as described in Step E.
 - C. If the job is NOT complete, the yellow maintenance tag will remain in place and the maintenance lock will be removed. NOTE: The yellow maintenance tag will remain in place until the job is completed or unless it is otherwise cleared off by maintenance supervision.
 7. In the event that the work requires more than one shift for completion, the Tag-Out Sheet will be re-issued by operations, and the maintenance department will retag and relock.

8. If testing or checking is required during the course of the work, all maintenance tags and locks will be cleared by the appropriate maintenance crews and both copies of the Tag-Out sheet will be signed "for testing" and returned to operations.
 9. If the test is satisfactory and no further work is required, maintenance will sign the "Final Release" portion on both copies of the Tag-Out Sheet.
 10. If the test is unsatisfactory and further work is required, the equipment must be retagged and relocked by maintenance and the Tag-Out Sheet must be re-issued.
- E. At the completion of the work, the maintenance supervisor or designee will ascertain that:
1. The job is complete and the equipment is safe to be cleared.
 2. The designated individual(s) who place the yellow maintenance tag and lock will remove them.
 3. The maintenance supervisor or his designee will inform the operations supervisor that the job is complete; and complete the maintenance portion of the Tag-Out Sheet and return it to the operations supervisor.
 4. In the event the maintenance lock and/or locks is not cleared, the following procedure is to be followed:
 - a) During normal working hours (7:30 a.m. - 4:00 p.m. weekdays), the appropriate maintenance supervisor of the area will be contacted by operations. He will be responsible for clearing the tag and/or lock, after ascertaining that such action is safe and proper.
 - b) During other times, the on-duty operations supervision will first attempt to call out the regular appropriate maintenance supervisor. If unsuccessful, the operations supervisor will then contact the shift maintenance supervisor if he is in the plant. If unsuccessful, the operations supervisor will then call out the on-call maintenance foreman. If all cases, the maintenance supervisor personnel must physically come to the plant, verify beyond a reasonable doubt that it is safe to clear the tag and/or lock. Verbal telephone contact is not sufficient.

F. After maintenance has cleared all their tags, locks and Tag-Out Sheets, the operations supervisor or his delegate will then:

1. Check out the equipment to verify that it is safe to be cleared.
2. Remove the red tags and complete the Tag-Out Sheet.

VI. MULTI-CREW PROCEDURE

The personnel of this portion of the Red-Tag procedure is to afford a method of communication between operations personnel and the personnel performing work within the area of operations responsibility.

"NO PORTION OF THE BASIC RED-TAG PROCEDURE CAN BE SUPERSEDED BY THIS APPENDIX"

A. Responsibilities of Operations

1. Operations personnel shall prepare the equipment in accordance with the applicable safety standards for the work to be performed.
2. If additional tag-out sheets are necessary, each shall be cross-referenced and copies of each issued to each crew. All originals shall be attached together and kept at the designated location.
3. Operations shall issue a copy of the Tag-Out Sheet to each crew prior to the crew beginning work. Changes shall be noted on the original Tag-Out Sheet.
4. Operations shall not untag, test, or in any way operate the equipment until all copies have been returned and released.

B. Responsibilities of the Work Crew

1. The supervisor, or his designee, of each work crew shall receive a copy of the Red-Tag Sheet prior to performing work. (Even if additional crews are necessary after work has begun, all crews shall have a copy issued to them).
2. It shall be the responsibility of the Work Crew supervisor to assure that operations is informed of all crews to be working, including crews added after the initial work has begun.

3. All work crews shall abide by all requirements of the Red-Tag Procedure including placing a lock and tag at the designated locations.

VII. LOCKS

Each operating department will keep, on hand, sufficient padlocks for locking out equipment in its area. Operations padlocks will be painted different colors for identification purposes with padlocks in each operating area keyed alike.

Maintenance will supply their own independently keyed locks. Maintenance master keys are not permitted. Locks are to be removed by the individual who installs them, otherwise they are to be cut off as per Section E-4.

VIII. APPENDIX A

These specific procedures are required for de-energizing electrical switchgear of greater than 480 volts.

- A. Most breakers above 480 in the Works are of conventional design. For these breakers it is only necessary to de-energize the breaker and verify this action by manually testing the start button at the equipment.
- B. In the Utilities and Caustic department, some of the 480 and above switchgear is of unique design. It is possible to start the equipment merely by closing the breaker door. For these breakers, (G.E.A.K. and ITE "draw-out" types), it is necessary that the breaker be inspected by a mechanic with electrical skills before the breaker is jacked backed into position.
- C. The following equipment must be initially "jacked-out" and inspected by a mechanic with electrical skills prior to work beginning.
 - 1) #2 Oxygen compressor.
 - 2) #2 Recycle compressor in Organics
 - 3) All breakers and switchgear in Building 101
 - 4) #6 Utilities plant air compressor and certain breakers in the old oxygen plant.
- D. The following specific procedures are to be followed by maintenance mechanics de-energizing all Allen-Bradley, Clark, G.E. Limit-Amp, G.E. - AK automatic breakers, ITE and any other switchgear equipped with provision for applying padlocks on manual disconnect handle:

1. Place the manual disconnect handle in the "safe" or "open" position
 2. Open cubicle door and make a visual inspection of disconnects to verify mechanical linkage has disengaged circuit.
 3. Close cubicle door and place manual disconnect handle in "lock" position.
 4. Test the local start-stop switch at the equipment.
 5. Apply operations padlock to the disconnect handle.
 6. Apply operations danger tag to disconnect handle.
 7. Apply maintenance crew tag and crew lock.
- E. The following specific procedures are to be followed by maintenance mechanics de-energizing all G.E. and ITI "draw-out" manual or automatic electrical switchgear:
1. De-energize breaker by depressing manual trip on cubicle or depress the "stop" switch at the stop-start station.
CAUTION: Observe the open indicator appears on cubicle front before proceeding.
 2. The individual de-energizing or energizing the equipment will wear face shield, gloves and jacket.
 3. The local start-stop switch will be tested to verify that the circuit is de-energized.
 4. On automatic breakers, apply operations padlock in the manual trip slot on front of the breaker and hand operations red tag.
 5. On G.E. switchgear, open cubicle door and manually jack breaker out to position where operations padlock can be applied on breaker jack-out handle. Apply operations padlock on breaker jack-out handle and hang operations red tag.
 6. On ITE switchgear, manually jack breaker out from front of cubicle. Remove breaker jack-out handle, depress manual trip slot, insert padlock in lock-out slot on front of breaker and hand operation red tag.
 7. Apply maintenance crew tag and crew lock.

Safe Work Permit Req'd No ☐ Yes ☐

[illegible]

SPECIAL INSTRUCTIONS:

[illegible]

Tags Removed by: _____ Date: _____ Time: _____

Inter-Office
Memorandum

BASF Wyandotte Corporation

BASF



To R. T. Bruce - Acetylenics
Extension - 2465

Date

or

Subject Tag Out Procedure

Jack Philley - Safety
Extension - 2492

Reference

FROM:

SUGGESTIONS FOR IMPROVING THE TAG OUT PROCEDURE:

TEST FOR CONFINED SPACE ENTRY

DIRECTIONS: THE FOLLOWING QUESTIONS PERTAIN TO ENTRY INTO CONFINED SPACES. PLEASE CIRCLE THE ANSWER THAT CORRECTLY SATISFIES THE QUESTIONS.

1. TRUE OR FALSE: ENTRY INTO CONFINED SPACES TENDS TO CAUSE MORE SERIOUS INJURIES AND FATALITIES THEN ANY OTHER TYPE OF ACCIDENT IN INDUSTRY.
2. TRUE OR FALSE: A CONFINED SPACE IS CONSIDERED TO BE ANY TANK, VESSEL, PIT OR VAULT WHERE THERE IS A RESTRICTED MEANS OF EGRESS AND HAS UNFAVORABLE NATURAL VENTILATION.
3. TRUE OR FALSE: PLACING THE HEAD OR FEET PAST THE PLANE OF A CONFINED SPACE ENTRY WAY CONSTITUTES AN ENTRY INTO THE CONFINED SPACE.
4. TRUE OR FALSE: THE MOST HAZARDOUS CONDITION IN A CONFINED SPACE ARE A RESULT OF ATMOSPHERE CONDITIONS.
5. THE AIR WE BREATHE NORMALLY CONTAINS AN OXYGEN CONCENTRATION OF 20.9%. WHAT IS THE MINIMUM OXYGEN CONTENT FOR ENTRY INTO A CONFINED SPACE WITHOUT AIR SUPPLIED RESPIRATORS?
 - A. 12.0%
 - B. 16.5%
 - C. 18.0%
 - D. 19.5%
6. THE ATMOSPHERE IN A CONFINED SPACE MUST BE TESTED FOR ONE OR MORE OF THE FOLLOWING BEFORE ENTERING:
 - A. OXYGEN CONCENTRATION
 - B. FLAMMABLE VAPORS
 - C. TOXIC GASES
 - D. ALL OF THE ABOVE
 - E. NONE OF THE ABOVE

7. TRUE OR FALSE: ONCE INITIAL ATMOSPHERIC TEST HAVE BEEN MADE AND ARE SATISFACTORY, IT IS NOT NECESSARY TO CONTINUE MONITORING THE CONFINED SPACE DURING ENTRY.
8. TO PROPERLY PREPARE A CONFINED SPACE, ALL ADJOINING PIPING, INCLUDING THE VESSEL JACKETS, MUST BE ISOLATED FROM THE CONFINED SPACE. THIS MAY BE ACCOMPLISHED BY WHICH OF THE FOLLOWING:
- A. BLINDING THE LINE WITH A BLANK OR STOPPER PLATE.
 - B. DISCONNECT THE ADJOINING PIPING AND COVER OPENINGS.
 - C. DOUBLE BLOCK AND BLEED THE LINE, WHERE TWO BLOCK VALVES ARE CLOSED AND THE BLEED IS OPENED.
 - D. ANY OF THE ABOVE
 - E. NONE OF THE ABOVE
9. TRUE OR FALSE: IF A CONFINED SPACE CONTAINS A POWER DRIVEN MECHANISM, SUCH AS AN AGITATOR, THE SWITCH-GEAR FOR THE MECHANISM NEED ONLY BE DE-ENERGIZED AND A TAG INSTALLED.
10. TRUE OR FALSE: THE STANDBY WATCH IS AN IMPORTANT PART OF THE CONFINED SPACE ENTRY PROCEDURES. IT IS HIS JOB TO RESCUE THE INDIVIDUAL(S) SHOULD A MISHAP OCCUR DURING THE ENTRY.

WHAT IS A CONFINED SPACE?

"CONFINED SPACE SHALL MEAN ANY STORAGE TANK, TANK CAR, VESSEL, VAULT, PIT, DITCH, SEWER, MANHOLE, OR ENCLOSED STRUCTURE WITH RESTRICTED MEANS OF EGRESS. VESSEL "SKIRTS" SHALL BE INCLUDED IF THE TOP OF THE SKIRT OPENING IS LESS THAN SIX AND ONE-HALF FEET ABOVE THE WALKING OR WORKING SURFACE."

"A CONFINED SPACE IS ANY PIECE OF EQUIPMENT, SUMP, TRENCH, UNDERGROUND UTILITY VAULT, SEWER, ETC., WHICH MUST BE ENTERED THROUGH A MANHOLE OR RESTRICTED OPENING, HAVING UNFAVORABLE NATURAL VENTILATION WHICH COULD CONTAIN OR PRODUCE DANGEROUS AIR CONTAMINANTS, IS AN AREA IN WHICH EXIT DURING AN EMERGENCY COULD BE DIFFICULT, AND IS AN AREA NOT INTENDED FOR CONTINUOUS OCCUPANCY."

DEFINITION OF ENTRY

ENTRY IS DEFINED AS ANY PART OF THE BODY
ENTERING BEYOND THE OUTSIDE EDGE OF AN ACCESS
POINT.

ISOLATION

A CONFINED SPACE SHALL BE ISOLATED FROM ALL ADJOINING PIPING, INCLUDING RELIEF HEADERS, DRAINS, AND OVERFLOW LINES, IN ORDER TO INSURE THAT LIQUIDS, VAPORS, OR GASES WILL NOT ENTER THE CONFINED AREA. A LINE SHALL BE DEEMED ISOLATED IF ONE OR MORE OF THE FOLLOWING STEPS ARE TAKEN:

1. A BLANK OR STOPPER PLATE HAS BEEN INSERTED IN THE LINE(S) AND REG TAGS ARE AFFIXED TO THE "BLIND". THE REG TAG NUMBERS SHALL BE LISTED ON THE CORRESPONDING TAG-OUT SHEET.
2. THE LINE HAS A DOUBLE BLOCK AND BLEED, WHERE TWO BLOCK VALVES ARE CLOSED, THE BLEED IS OPENED, AND REG DANGER TAGS ARE AFFIXED.

ANY EXCEPTIONS TO THIS MUST HAVE THE WRITTEN APPROVAL OF THE AREA SAFETY COORDINATOR.

OXYGEN DEFICIENT ATMOSPHERE

THE TERM OXYGEN DEFICIENCY DESIGNATES AN ATMOSPHERE HAVING LESS THAN THE PERCENTAGE OF OXYGEN NORMALLY FOUND IN AIR (20.9%). WHEN THE OXYGEN CONCENTRATION IN AIR IS REDUCED TO APPROXIMATELY 16%, MANY INDIVIDUALS, 1) BECOME DIZZY, 2) CAN EXPERIENCE A BUZZING IN THE EARS, 3) HAVE A RAPID HEART BEAT AND 4) OFTEN EXPERIENCE A HEADACHE.

USUALLY THE FIRST PHYSIOLOGICAL SIGNS OF A DEFICIENCY OF OXYGEN ARE INCREASED RATE AND DEPTH OF BREATHING. OXYGEN DEFICIENT ATMOSPHERES MAY CAUSE INABILITY TO MOVE AND A SEMICONSCIOUS LACK OF CONCERN ABOUT THE EMINENCE OF DEATH. IN CASES OF SUDDEN ENTRY INTO ATMOSPHERES OF LITTLE OR NO OXYGEN, THE INDIVIDUAL USUALLY HAS NO WARNING SYMPTOMS, BUT IMMEDIATE LOSS OF CONSCIOUSNESS AND HAS NO RECOLLECTION OF THE INCIDENT IF HE IS RESCUED AND REVIVED.

BELOW 16% OXYGEN, A CANDLE FLAME WILL NOT CONTINUE TO BURN AND WILL GO OUT. BELOW 16% OXYGEN, A PERSON'S BODY FUNCTIONS WILL ALSO GO OUT. THE BRAIN CAN ONLY SURVIVE A SHORT TIME WITHOUT OXYGEN.

ALL CONFINED SPACES MUST BE SUSPECTED OF POTENTIAL OXYGEN DEFICIENCY AND MUST BE TESTED FOR OXYGEN CONCENTRATION. THIS INCLUDES, BUT IS NOT LIMITED TO, SEWER MANHOLES, SUBSURFACE CONDUIT AND VALVE MANHOLES, VESSELS, TANKS, RAIL TANK CARS AND TANK TRUCKS.

RELATIONSHIP OF OXYGEN CONCENTRATIONS,
DURATION OF EXPOSURE AND EFFECT

<u>Concentration %</u>	<u>Duration</u>	<u>Effect*</u>
20.9	Indefinite	Usual oxygen content of air.
19.5	not stated	Recommended minimum oxygen content for entry without air supplied respirators. Also OSHA standard 29CFR 1910.
18.0	not stated	ANSI Z117.1-1977 definition of oxygen deficient atmospheres.
16.0	not stated	Lowest limit of standards reported in literature.
12-16	seconds to min.	Increased pulse and respiration, impaired judgment, some coordination loss.
10-14	seconds to min.	Disturbed respiration, fatigue, faulty judgments, emotional upset, poor circulation.
6-10	seconds	Nausea, vomiting, inability to move freely, loss of consciousness followed by death.
Below 6	seconds	Convulsions, gasping respiration followed by cessation of breathing, cardiac arrest, death in minutes.

**Effect—Warning properties of low oxygen are inadequate except to trained individuals. Most persons fail to recognize danger until too weak to effect self-rescue. Signs include increased rate of respiration and circulation, which accelerates onset of more profound effects, including loss of consciousness, irregular heart action and muscular twitching. Unconsciousness and death can be sudden.*

OXYGEN ENRICHED ATMOSPHERE

FOR ENTRY INTO CONFINED SPACES, THE ACCEPTABLE OXYGEN RANGE IS 19.5% TO 22.0%. AN "OXYGEN ENRICHED ATMOSPHERE" IS GREATER THAN 22% OXYGEN.

THE MOST SIGNIFICANT DANGER OF OXYGEN ENRICHED ATMOSPHERES IS THAT THE EXPLOSIVE LIMITS AND FLASH POINT PROPERTIES CHANGE -- FOR THE WORSE!

HAZARDS OF NITROGEN

NITROGEN IS AN INERT GAS WHICH IS ODORLESS, COLORLESS AND TASTELESS. NORMAL AIR CONTAINS APPROXIMATELY 78% NITROGEN. AN EXCESS OF NITROGEN IN AIR WILL CAUSE AN OXYGEN DEFICIENCY WHICH, IF BREATHED, CAN RESULT IN LOSS OF CONSCIOUSNESS AND PERMANENT BRAIN DAMAGE AND EVEN DEATH.

ONE OF THE SPECIAL HAZARDS OF NITROGEN IS THE TOTAL LACK OF WARNING PROPERTIES. USUALLY, IN NITROGEN ASPHYXIATIONS, THERE IS ABSOLUTELY NO INDICATION OF DISTRESS AND A PERSON IMMEDIATELY LOSES CONSCIOUSNESS. VICTIMS OF NITROGEN ASPHYXIATION, WHO HAVE BEEN SUCCESSFULLY REVIVED, REMEMBER ABSOLUTELY NO DISCOMFORT, DISTRESS, PAIN OR SENSATION OF DANGER.

IF THE NITROGEN CONCENTRATION IS HIGH ENOUGH, 85-95%, ONE BREATH RESULTS IN IMMEDIATE UNCONSCIOUSNESS. SEVERAL FATALITIES HAVE BEEN DOCUMENTED WHERE A PERSON MERELY LEANED INTO A MANWAY WHILE STANDING OUTSIDE AND PASSED OUT. APPARENTLY THE VICTIM DID NOT DETECT ANY TROUBLE PRIOR TO LOSING CONSCIOUSNESS.

ALL NITROGEN STATIONS IN THE GEISMAR WORKS MUST BE IDENTIFIED BY A LABELED TAG AND BY A WHITE COLOR CODE.

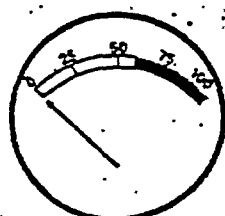
MSA 260 TRICKS AND LIMITATIONS

1. DEPENDENT ON THE OXYGEN IN THE AIR FOR A PROPER READING. IF YOU SNIFF AN ULTRA RICH MIXTURE, THE METER WILL READ "ZERO" BECAUSE YOU ARE ABOVE THE UEL.
2. CANNOT TOLERATE ANY LIQUID GETTING INTO THE INLET SAMPLE. LIQUID WIPES OUT THE DETECTOR HEAD.
3. THE INSTRUMENT SHOULD NOT BE MODIFIED. SEVERAL YEARS AGO TWO FIRES OCCURRED IN THE TDI PLANT AFTER AN APPARENTLY "O.K." SNIFF CHECK. SOMEONE HAD REPLACED THE INLET SAMPLE TUBE WITH "TYGON" TUBING, WHICH ABSORBED THE EXPLOSIVE VAPORS BEFORE THEY REACHED THE DETECTOR. THUS, THE METER READ "ZERO" AND GAVE A FALSE READING.
4. MUST HAVE REGULAR PM AND CALIBRATION FOR PROPER FUNCTION (SEE LOCATION STANDARD #28).
5. NOT DESIGNED OR APPROVED FOR OXYGEN ENRICHED ATMOSPHERES (EXCESS OF 22% OXYGEN).

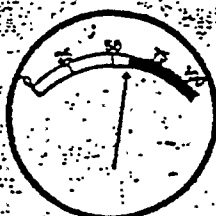
RESPONSE TO METHANE

LEL 5.3%

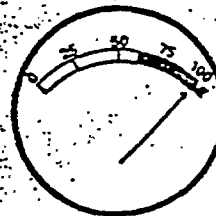
UEL 14.0%



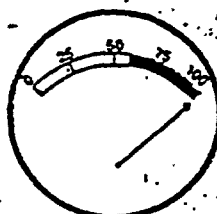
NO METHANE
0%



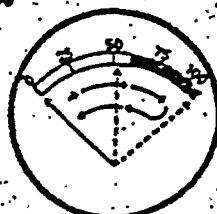
BELOW LEL
0-5.3%



AT LEL
5.3%



IN EXPLOSIVE RANGE
5.3 TO 14%



ABOVE UEL
OVER 14%

Figure 10 shows meter reading at various methane in air concentrations.

I. SUMMARY OF RESPONSIBILITIES

A. Area Supervision

It shall be the sole responsibility of operating supervision to:

1. Authorize entry into any confined space.
2. Assure that adequate preparations have been made prior to entry, including Tag-Out Procedure.
3. Assure that the required tests have been made.
4. Assure that the required personal protective and rescue equipment is provided and in good condition.
5. Assure proper ladder is available, if required.
6. Provide personnel for initial entry and outside attendant, if required.
7. Assure adequate, approved illumination is provided.

B. Person Making the Initial Entry:

1. To carefully check and inspect his respiratory protection, harness and rescue lifeline, and to ensure that all procedures required are completed prior to initial entry.
2. Test for minimum required oxygen concentration (19.5% minimum) at the hatchway and by lowering the probe only into the manway as far as practical.
3. Test for presence of any explosive gas mixture at the manway and by lowering the probe of the explosimeter as far into the vessel as practical. Meter results must show 0% explosive.
4. Upon initial reentry, the oxygen and explosive gas tests, (toxic gas tests where appropriate, chlorine for example), must be repeated at the base of the ladder and each end of the area.
5. Prior to entry, an air hose must be present for emergency use. If plant air stations are not available, bottled breathing air with hose shall be used.
6. Initial entry must be made using the respiratory and rescue equipment as specified.

7. No person shall be required to make a confined space entry until:
 - a. He has been trained on the proper use and inspection of the respiratory protective equipment provided.
 - b. Been properly indoctrinated as to the specific hazards of oxygen deficient atmosphere, the hazards of nitrogen, and the hazards of the specific chemical which was contained in the confined spaces.

C. Outside Attendant

It shall be the responsibility of the outside attendant to:

1. Be familiar with emergency procedures, equipment, alarms and rescue procedures.
2. Check his rescue gear for proper operation prior to any entry.
3. Maintain constant surveillance at manway at all times while entry is in progress.
4. Immediately sound the alarm and summon help should an emergency occur.
5. Initiate rescue operations as specified in Number 6.
6. If an emergency occurs inside the tank, the attendant is responsible to immediately call for assistance and must NOT UNDER ANY CIRCUMSTANCES, attempt a rescue without assistance and using Scott Air Pak or air line equipment.

TEST KEY

1. TRUE - ACCORDING TO A REPORT BY SAFETY SOURCES PREPARED FOR NIOSH (NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH), FATALITIES OCCUR MORE OFTEN IN CONFINED SPACES.
2. TRUE - A CONFINED SPACE ACCORDING TO BWC SAFETY STANDARD INCLUDES ANY STORAGE TANK, TANK CAR, VESSEL, VAULT, PIT, DITCH, SEWER, MANHOLE, OR ENCLOSED STRUCTURE WITH RESTRICTED MEANS OF EGRESS. VESSEL "SKIRTS" ARE INCLUDED OF THE TOP OF THE SKIRT OPENING IS LESS THAN SIX AND ONE-HALF FEET ABOVE THE WALKING OR WORKING SURFACE.
3. TRUE - PER BWC SAFETY STANDARD FOR CONFINED SPACES.
4. TRUE - REPORT BY NIOSH CONCLUDED THAT ATMOSPHERIC CONDITIONS ARE RESPONSIBLE FOR MOST OF THE INJURIES AND FATALITIES INVOLVED IN AN ENTRY INTO A CONFINED SPACE.
5. D - ACCORDING TO OSHA STANDARD 29CFR1910.
6. D - ACCORDING TO BWC SAFETY STANDARD
7. FALSE - NIOSH STUDY INDICATES THAT A HIGH PERCENTAGE OF CONFINED SPACE RELATED DEATHS AND INJURIES WERE THE RESULT OF ATMOSPHERIC CONDITIONS HAVING CHANGED AFTER THE INITIAL MONITORING. OFTEN THE WORK ITSELF MAY CHANGE THE CONDITIONS (I.E. WELDING).
8. D - ALL THREE ARE ACCEPTABLE MEANS OF ISOLATING THE CONFINED SPACE.
9. FALSE - ACCORDING TO BWC SAFETY STANDARDS, THE FUSES OR SAFETY JACKS MUST FIRST BE PULLED FROM THE SWITCHGEAR, TAGGED OUT, AND LOCKED OUT. THE KEY FOR THE LOCK ON THE SWITCHGEAR SHOULD BE KEPT BY THE PERSON WITHIN THE CONFINED SPACE.
10. FALSE - ACCORDING TO BWC SAFETY STANDARDS, THE STANDBY MUST NOT UNDER ANY CIRCUMSTANCES ATTEMPT A RESCUE WITHOUT ASSISTANCE AND USING FRESH AIR EQUIPMENT. IT IS THE STANDBY'S RESPONSIBILITY TO FIRST CALL FOR ASSISTANCE.

SUPERVISOR'S SAFETY TRAINING

Emergency Medical Facilities and Personnel

A. Medical Department

Two-bed ward with capability to handle multiple burns, injuries and/or inhalations. Staffed by two registered nurses. Hours of operation - 6:30 a.m. - 4 p.m., Monday thru Friday. Located in east end of Administration Building. Phone: Ext. 2200 or in emergency Ext. 444.

B. Ambulance

One stretcher vehicle with capability to handle one incapacitated person. Stocked with supplies to handle burns, injuries and inhalations. Ambulance driver is TDI/MDI Lab Technician. The Lab Technicians are qualified in Red Cross and First Aid. Ambulance is available 24 hours per day. It is located on the north side of the MDI control room. The Lab Tech is located in the northeast section of the MDI administration building. Call Ext. 2700 or Ext. 444.

C. Auxiliary Medical Facilities

To be used only in case of major disaster if it is impossible to get to the Medical Department. Location: Metal locker in Polyol Office Building and storage closet in east Conference Room of the Engineering Building. Stocked to handle burns, injuries and inhalations.

D. Emergency Response Team

Thirty-eight (38) employees volunteered to be members of the Emergency Response Team. These employees are widely distributed throughout the Works. All team members are State certified First Responders - 3 members are EMT's. All team members are provided stocked emergency bags for treatment of injuries in the field. There are a minimum of 3 responders on shift 24 hours per day. The Primary Responder is provided a red pager and a stand-by vehicle. Call individual number from roster or Ext. 444.