



CONTRACTOR SAFETY MANUAL

LAKE CHARLES, LOUISIANA

November, 1992



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LAKE CHARLES, LOUISIANA

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(SECTIONC.MAN - REVISED 11/92)



CONTRACT SAFETY MANUAL

LAKE CHARLES, LOUISIANA

I. Introduction

This safety manual contains the minimum safety rules and procedures for the performance of work by Contractors and their subcontractors as required by the Chemical Division, PPG Industries, Inc. Contractors assume the full responsibility and liability for the safety of their agents, and employees and for the compliances of its subcontractors. Any exception to the rules set forth herein must have prior written authorization from the Owner. The Owner is established as PPG Industries, Inc.

In addition to the rules set forth herein, Contractors working in or near an existing operating facility must be cognizant of and conform to Owner's safety rules for the area and any federal state, or local laws governing.

Should any procedure set forth herein conflict with applicable federal, state, or local laws, the latter will apply.

Contractors and Contractor's supervision unable or unwilling to secure personnel performance in keeping with these rules will not be acceptable. Contractor's supervisors and employees who exhibit a poor attitude toward safe work and safety procedures will not be acceptable. **EMPLOYEES WHO LEAVE A JOB DUE TO SAFETY VIOLATIONS WILL NOT BE ALLOWED TO RETURN TO OWNER'S WORK WITHOUT PRIOR AUTHORIZATION FROM THE OWNER.**

Contractors and their employees are required as of March 1, 1993, to have successfully completed an eight hour safety awareness and training program on an approved reciprocal program. This program is administered by the Safety Council of Southwest Louisiana for this area.

This training will be waived for those contractors who will be spending less than three days in the PPG plant. Approval of waiver should be secured prior to entry.

A. Contractors' Supervisors

Supervisors are responsible for the action of their workers and are required to insure that all federal, state and Owner's safety

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standards are followed during the duration of work on PPG properties. In addition, they will:

1. Set an example in matters of safety.
2. Personally observe and correct safety violations or any potential work hazards.
3. Take necessary corrective action against employees who violate safety standards.
4. Acquaint employees with safety standards.
5. Personally assist in accident investigations.
6. Report all accidents, near-misses and fires.
7. Correct all hazards or violations observed by Safety Department or Project Engineer in an expeditious manner.
8. Provide employees with material and equipment that are adequate to perform their job safely.
9. Maintain their work sites in an orderly manner by insisting on good housekeeping.
10. Maintain continuous safety planning to cover job where circumstances have changed and new hazards require new controls.
11. Not use or allow to be used any plant system, tools, or equipment without written permission of Safety Department or Project Engineer.
12. Conduct safety meetings.

B. Contractors' Employees

Employees will abide by all safety regulations and be advised that repeated safety violations, accidents, or abuse of PPG properties will be grounds for dismissal. The following will also be adhered to:

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1. No horseplay.
2. No running in plant.
3. Proper dress; no sleeveless shirts (tank tops, etc.).
4. Signs and barricades honored.
5. No unsafe short cuts, such as walking pipelines or cable trays, sliding down pipe stanchion, or jumping from transport vehicle while moving.
6. No loitering or wandering through operating units.
7. Possession or use of drugs or alcohol will mean immediate termination.
8. No sleeping in plant.
9. No modifying of personal safety equipment.
10. Never jump from platform, scaffolds, or other high places.
11. Tools, materials or equipment must not be intentionally dropped or thrown from one level to another.
12. During transport, hard hats, safety glasses and respirators will be worn unless inside an enclosed cab.
13. Attendance to safety meetings is required.

C. PPG Construction Engineers

Enforcing safety regulations is an accepted fact with PPG Construction Engineers. Should there be a difference of opinion between Contractor and Construction Engineer regarding safety, the decision of a PPG Safety Representative will prevail. In addition, the Construction Engineer:

1. Controls the issuing and "pulling" of permits.
2. Approves "Lock and Tag" procedures prior to beginning of work.

3. Assists in accidents, near misses, property damage and fire investigations.
4. Will be the first PPG person Contractors contact for safety variances or use of PPG system.
5. Will be advised of any unscheduled work in areas considered hazardous.

D. PPG Safety Representative

The primary responsibility for job and employee safety rests upon the Contractor. The Owner is represented by the Safety Representative. In matters requiring an interpretation of federal, state, and Owner's safety standards, policies or guidelines, the Owner's Safety Representative will prevail. In addition to monitoring the compliance of the "Construction Safety Section" of the Contractors' accepted bid package, the Safety Representative will:

1. Routinely inspect the job site for safety violations and require needed corrections from Construction Supervisors.
2. Stop any job where an immediate danger exists.
3. Be involved in any deviation from established safety standards or guidelines.
4. Request a review, by Construction Engineering Management, of repeated safety violations or accidents, incurred by Construction Supervision or employees.
5. Provide information or advice as required by supervision.

II. GENERAL INFORMATION

A. Accidents, Fire, and Property Damage

1. The Safety Representative will be notified immediately in the event of any death, occupational disease, disabling injury or potentially significant injury to a Contractor's employee (whether or not it is determined that a "disabling injury" will be involved) while at work on Owner's job.

2. Deaths or disabling injuries will be extensively investigated by the Safety Representative in cooperation with the Construction Engineer and principal Contractor.
3. A written report must be submitted by the Contractor's supervisor on every injury requiring medical treatment of any kind, to the Safety Representative no later than 10:00 AM of the day following the injury. Forms will be supplied by Owner.
4. Employee must report injury to their immediate supervisor even though it may be considered slight. If an employee requires first aid treatment, a "Request for First Aid" slip furnished by the Owner must be filled out by his or her supervisor and presented to Owner's staff at the First Aid Station. Emergency cases will be exempt.
5. All "near misses" involving employees or equipment must be reported and a report filed. Investigation will be made by the principal Contractor's Supervisor and Construction Engineer. Near misses bearing the potential of employee injury or Owner property damage will involve the Safety Representative. Forms will be provided by Owner.
6. All fires must be reported to the Construction Engineer regardless of duration or extent. The Safety Representative will investigate each occurrence with the principal Contractor and file a report.

B. Drugs, Alcohol, and Firearms

1. The possession or use of drugs or alcohol will not be tolerated anywhere on Owner's property, including parking lots.
2. Firearms will not be brought onto Owner's properties, including parking lots.
3. Violators are subject to immediate termination.

C. Employee's Break Areas

1. Areas will be assigned by the Construction Engineer.
2. No sleeping allowed.

3. Employee must remain in assigned area and not wander about operating units.

D. Safety Meetings

1. Contractor's supervisors will hold a documented weekly "gangbox" safety meeting.
2. The topic will be listed and each employee shall sign his or her name and badge number.
3. A completed copy will be submitted to the Safety Representative by 10:00 AM of the following day.

E. Security

1. The Owner bears no responsibility for tools, equipment, vehicles or personal items brought onto Owner's property.
2. All construction employees and vehicles entering or leaving Owner's property are subject to search without notification to Owner's Construction Engineer or the Contractor.
3. Tools and equipment should be marked with Contractors identification.
4. Tools and equipment, including leased items, entering or leaving plant require a gate pass from Owner's Materials Manager.
5. Contractors are responsible for securing their tools and equipment on job site.
6. All losses of tools, equipment or break-ins must be reported immediately to the Construction Engineer.
7. Lay-down areas will be assigned by Construction Engineer.
8. Cameras are not allowed in plant unless written permission is given from Construction Engineer.
9. All Contractor's vehicles must have some type of identification (painted sign, logo, magnetic sign, etc.) attached before entering

Owner's plant. The magnetic hat will be an acceptable substitute for short term visits.

F. Temporary Construction Trailers

1. Location and set-up will be controlled by the Construction Engineer.
2. Safety packet details method for trailer set-up, protection for weather and plant hazards.
3. No flammable or combustible liquids shall be stored in or around trailers.
4. Areas around trailers shall be kept clean and in an orderly manner.
5. Trailers should be locked when unoccupied.

G. Vehicle and Traffic Regulations

1. Automobiles and trucks permitted to enter plant will be limited. Permission will be controlled by Construction Engineer.
2. Transport vehicles or trailers will be equipped with acceptable benches. No employee will stand during transport.
3. No employee shall ride on the sides, running board or tailgate of transport vehicle.
4. No employee shall ride atop equipment or materials being transported.
5. Vehicle routes to and from work site will be assigned by Construction Engineer.
6. Vehicles or equipment shall not be left running while unattended.
7. Speeding or other reckless acts will lead to dismissal.
8. A flagman is required at all intersections for ribbed cranes traveling with boom down.

9. When moving a telescoping boom crane without load, boom must be fully retracted.
10. Hauled materials that overhang the sides or ends of a truck shall be red-flagged at the extent of the overhang.
11. Dragging or skidding material and objects along plant roadways is prohibited.
12. Taglines must be used when moving equipment or materials by mobile crane.
13. No reading material or radios are allowed in crane cabs.
14. No vehicle or equipment will be left in emergency lanes unattended.
15. All plant traffic signs and signals will be obeyed.

H. Working in an Operating Unit

1. No Contractor's supervisors, employees, agents, or subcontractors shall use or cause to be used any plant systems without written permission from Project Engineer.
2. Contractor assumes full responsibility for preventing the release of any contaminating substance into plant air space, surface drainage, sewers or adjacent waterway by his employees or their actions.
3. Work on or having direct bearing upon operating systems will require full adherence to existing Owner's Safety Regulations in that area (see Lock and Tag Procedures).
4. Contractors shall be aware of chemicals or products existing in a work area and are responsible for advising their employees and providing suitable personal protective equipment. Material safety data sheets are available at controlling control room.
5. No unscheduled work will take place within an operating unit.
6. No equipment, materials or tools will obstruct or create a safety hazard to Owner's operating personnel.

III. SAFETY REQUIREMENTS

A. Housekeeping

1. Contractors shall maintain their work area in an orderly manner.
2. Routine clean-up is required.
 - a. Failure will result in Owner hiring this service done and backcharging the Contractor.
3. Lay-down areas will be kept in order and clear of vehicles or foot traffic.
4. Spills will be immediately cleaned up.
5. Contractor will provide containers for trash and scrap materials.

B. Personal Protective Equipment

Hard hats, safety glasses, and respirators shall be worn correctly and not modified in any manner. Contractor will be backcharged for abuse or loss of Owner issued equipment. Equipment furnished by Contractor shall meet OSHA standards. Hard hats will be orange in color.

1. Head, Eyes, and Face

- a. Hard hat welding is required.
- b. Contact lens shall not be worn unless authorized by Owner. If authorized, chemical splash goggles must be worn at all times.
- c. Owner will not provide prescription safety glasses.
- d. Goggles must be worn when:
 - (1) Working FRP or foam glass.
 - (2) Working on system which contained toxic or corrosive chemicals.
 - (3) Entering designated goggle areas.
 - (4) Handling chemicals.

- e. Safety glasses will be worn under face shields.
- f. Face shields will be worn when chipping, buffing, grinding, handling hot tar or mastic, or using porta-bands.
- g. Persons in close proximity to employees performing work requiring goggles or face shields must also wear them.

2. Ears

- a. Approved ear protection will be worn in all designated areas identified by signs.
- b. Approved ear protection must be worn when operating high noise level equipment.

3. Respiratory

Contractors are responsible for providing acceptable respiratory protection for their employees as outlined in Table E-4, 1926.103 of OSHA Standards for Construction Industry.

4. Hands

- a. Gloves - Suitable gloves are to be worn on all work where hand injuries are likely to occur.
 - (1) Chemical gloves - Coated gloves are for special type work (Example: Solvents, corrosives).
 - (2) Di-electrically tested lineman rubber gloves are to be used on all power line work and when there is possible contact with energized circuits.
 - (3) Leather gloves - Leather or specially treated flame retardant gloves must be used while welding or performing similar flame work. Plastic, cloth or similar gloves of combustible material shall not be worn.
 - (4) Cotton gloves - for general purpose work.
- b. Tool Holders - Use tool holders when driving stakes,

wedges, holding drills, chisels, or similar type tools when more than one person is involved.

c. Tag Lines

- (1) Tag lines are to control loads and keep personnel away on all lifts made by mechanical equipment. **HANDS OFF LOAD!**
- (2) Do not wrap tag line around your hands or body.
- (3) Shall be used on all loads to control swing.
- (4) Suspended loads must be tied off while being moved by a mobile crane.

5. Body

- a. Fire retardant clothing that meets or exceeds NFPA 1975 standard, must be worn in the following areas:
 - (1) Derivatives (Plant B)
 - (2) When performing energized electrical work.
 - (3) Restricted areas.

6. Feet

- a. Safety shoes are strongly recommended.
- b. Canvas shoes, sneakers, sandals or similar type shoes are not allowed.
- c. Safety-toed rubber boots are required for employees working in caustic areas.
- d. Di-electric boots are required in chlorine cell rooms.
- e. For additional foot protection, metatarsal caps will be required on certain operations. (Ex: concrete breakers, tampers, and similar equipment).

7. Safety Belt and Lanyards

- a. Are to be worn by employees when performing work in elevated positions where the use of scaffolds or ladders is impractical and where a slip might result in a serious fall. Lanyards are to be attached, above the employee, to an object of sufficient holding strength. Lanyards should be tied off to result in a minimum fall. Lanyard length will be such that it will permit a fall of no more than 6'.
- b. See "Tank Entry Permit".

8. Safety Nets

- a. Safety nets shall be installed when work places are more than 25 feet above the ground or water surface, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts are impractical.
- b. Where safety net protection is required, no operation shall be undertaken until net is in place and has been tested.
- c. Nets shall extend 8 feet beyond the edge of the work surface where employees are exposed.

9. Working On or Near Water

- a. Personnel must wear Coast Guard approved life jackets, or otherwise be protected by handrails or lifelines, when working near water wherein a drowning hazard exists.

C. Tools

1. Handtools

- a. Contractor shall not issue or permit the use of unsafe handtools.
- b. Wrenches, including adjustable, pipe end and socket, shall not be used when jaws are sprung to the point that slippage occurs.

- c. Impact tools, such as drift pins, wedges and chisels, shall be kept free of mushroomed heads.
- d. Wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.
- e. Uninsulated conductive tools shall not be used in or around live electrical wiring.
- f. Tools shall not be used for other than their designed purpose.

2. Power-Operated Handtools

- a. Contractor shall not use or permit the use of unsafe power-operated handtools.
- b. All manually held pneumatic, electric-power or hydro-blast tools shall be equipped with a "deadman" type control which shall not be locked or secured in the "on" position.
- c. When power-operated tools are designed to accommodate guards, they shall be equipped with such guards when in use. Guards shall not be modified.
- d. All electric powered tools shall be either of the approved double-insulated type or grounded.
 - (1) Use of electric cords for hoisting or lowering of tools shall not be permitted.
- e. Pneumatic power tools shall be secured to hose or whip by some positive means. A cotter pin is best. Sixteen (16) gauge wire is acceptable.
 - (1) Safety clips or retainers shall be securely installed and maintained to prevent attachments from being accidentally expelled.
 - (2) Air pressure must be valved off and bled down before adjusting, changing tools, or disconnecting the hose.

- (3) Manufacturer's safe operating standards for hose, pipes, valves, filters, and other fittings shall not be exceeded.
- f. Fuel powered tools shall be stopped while being refueled, serviced, or maintained.
 - (1) Fuel will be transported, handled and stored according to Owner's standards.
 - (2) When fuel-powered tools are used in enclosed spaces, the applicable requirements for concentrations of toxic gases and use of personal protective equipment are required.
- g. Power-activated fastening guns shall be used only with permission of Construction Engineer.
 - (1) Tools shall be used with the correct shield, guard or attachment recommended by manufacturer.
 - (2) Barricade tape shall be used to isolate the area.
 - (3) Tools shall be used with an Ignition Source Permit in all areas.
 - (4) Only duly qualified and certified personnel with proper JSI (Job Safety Instructions) will use these devices.
 - (5) Gun and cartridges will be stored in construction warehouse when not in use.
- h. Floor stand and bench mounted abrasive grinders shall have acceptable safety guards.
 - (1) Maximum angle of wheel exposure:
 - (a) 90 degree above horizontal plane.
 - (b) 125 degrees below horizontal plane.
 - (2) Work rest shall be rigid and adjustable and kept 1/8-inch from wheel.

(3) Daily inspection shall be made to insure safe conditions of wheel.

(4) Grinder shall be secured to disallow "walking".

D. Equipment

1. Air Compressors

- a. All compressors, Contractor owned or leased, shall enter plant in an acceptable operating condition.
- b. All fueled compressors shall have a "kill switch" in working order.
- c. Location of compressors shall be as near work as possible for reducing hose use.
- d. Noise level will be considered when locating compressor.

2. Concrete and Concrete Forms

- a. Pumpcrete or similar systems using discharge pipes shall be provided with pipe supports designed for 100% overload.
 - (1) Compressed air hose shall have failsafe joint connectors.
- b. Powered and rotating type concrete troweling machines that are manually guided shall be equipped with a "dead man" switch.
- c. Riding of concrete buckets for any purpose shall be prohibited and vibrator crews shall be kept from under concrete buckets suspended from cranes or cableways.
- d. Formwork and shoring shall be designed, erected, supported, braced and maintained so that it will safely support all vertical and lateral loads that may be imposed upon it during placement of concrete.
- e. Heating equipment for freeze protection of concrete must be approved by the Safety Representative prior to use.

3. Earth Moving

- a. The following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment will be equipped with seat belts.
- b. All earthmoving equipment shall have a service braking system capable of stopping and holding the equipment fully loaded.
- c. Pneumatic-tired earthmoving haulage equipment (trucks, scrapers, tractors and trailing units) whose maximum speed exceeds 15 miles per hour, shall be equipped with fenders on all wheels.
- d. All bi-directional machines, such as rollers, compactors, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operative condition.
- e. All rubber-tired, self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler tractors, crawler-type loaders, and motor graders, with or without attachments, that are used in construction work shall be equipped with rollover protection structures meeting minimum performance standards as outlined OSHA 1926.1001.

4. Gas Cylinders

- a. Gas and oxygen cylinders shall be handled with care, properly supported in an upright position away from any source of heat or flame and securely tied off. All cylinders not in use shall have their caps in place.
- b. All cylinder connections shall be checked frequently by users for leaks with a leak detecting solution or soapy water.
- c. Cylinders shall be stored in groups according to the type of gas and a sign will be posted designating each group.

- d. Oxygen and acetylene cylinders, full or empty, shall not be stored together.
- e. Empty cylinders shall be returned to an appropriate storage rack upon being emptied.
- f. While transporting cylinders or cutting rigs with a winch truck, the regulators shall be removed and the protective caps placed on the cylinders.
- g. Cylinder valves must be closed when cylinders are not in use and the hose pressure must be bled down.
- h. Acetylene valves must not be opened more than one and one-half turns.
- i. Oxygen valves must not be opened more than one and one-half turns.
- j. Gas cylinders shall not be placed beneath welding or burning operations.
- k. Cylinders shall not be transported in the bed of a pickup truck unless they are firmly secured in an upright position that will prevent the cylinders from falling.
- l. Under no circumstances shall a gauge be installed on an oxygen line unless the dial is clearly labeled "Oxygen - Use No Oil".

5. Hoist and Hydraulic Cranes

- a. Contractor has the complete responsibility for a safe operation when using hoisting equipment to make lift. The Contractor shall verify weights of loads to be lifted. No load shall be lifted which exceeds the manufacturer's rated capacity of the crane.
- b. All hooks shall have a safety latch or shall be "moused" with material of strength equivalent to a safety latch.
- c. Operator shall not leave his position at the controls while the load is suspended.

- d. Belts, gears, shafts, pulleys, sprockets, spindles, drums or other reciprocating or rotating moving parts shall be guarded if such parts expose employees to a hazard.
- e. A tag line shall be used for controlling all loads.
- f. Machines shall not be refueled with the engine running.
- g. A minimum clearance of 10 feet must be maintained between lines and any part of the crane or load when working or traveling near overhead electrical lines rated 50 KV or below; above 50 KV adhere to 1926.550 (a) (15) (11).
- h. See "Blue Flag" for cranes operating near railroad tracks.
- i. No one shall ride on the load, hook or ball of any crane. If a manbasket is attached to the hook of a crane the crane must be equipped with an anti two-blocking device and a safety belt must be used. This is not a generally acceptable method of work and should be used when no other alternatives are available.
- j. Cranes shall not be used for side pulls unless authorized by the Construction Engineer.
- k. Winch truck drum shall have at least 3 wraps of wire rope on it at all times.
- l. Chainfalls are not to be secured to handrails.
- m. Chainfalls used in caustic or acid shall be washed with fresh water.
- n. Wire rope shall be removed from service when:
 - (1) There is evidence of heat damage.
 - (2) Abrasion, scraping, flattening or pulling causing a loss of more than one third of the original diameter of outside wires occurs.

6. Hoses

- a. Owner's code system:
 - (1) Blue for nitrogen.
 - (2) Red for air and water.
 - (3) Black for steam.
 - (4) Yellow for chemical.
 - b. Contractor shall not:
 - (1) Bring blue hose into plant.
 - (2) Use Owner's hose.
 - (3) Hook up to plant systems without permission from Owner.
 - c. Hose connected by "Kelly" or "Chicago" connection shall be safety clipped or wired.
 - d. Hose strung across roadways shall be protected against damage from vehicles.
 - e. Hose shall not be crimped to reduce or shut-off pressure.
 - f. Only hose in good condition shall be used.
7. Ladders
- a. Unacceptable ladders shall be removed from the Owner's property immediately.
 - b. Ladders obstructing passageways shall be barricaded or adequately protected from sudden jolts.
 - c. When ascending or descending a ladder, the user must face the ladder and use the side rails for hand support.
 - d. All ladders shall be equipped with safety shoes to prevent slipping.
 - e. All ladders must be equipped with a "tie-off" line of 1/4" diameter polypropylene rope or equivalent approximately 6' long.
 - f. The top two (2) rungs of a straight ladder or the top of a

stepladder or platform ladder shall not be used to stand on.

- g. Only one worker shall be allowed to work from a ladder unless it is designed for two people.
- h. Extension ladders shall not be taken apart in order to use the two sections separately.
- i. Extension ladders shall be equipped with a pulley and cord for raising and lowering the top section.
- j. When a job is completed, all ladders shall be removed from the job site and placed at an appropriate ladder storage area.
- k. If a ladder becomes dirty, greasy or had acid, caustic or other chemicals spilled on it while being used, it must be cleaned before re-use.
- l. Do not use ladders as a support for scaffold boards or lay them in a horizontal position to be used as a support for a working platform.
- m. Ladders shall not be placed on boxes, barrels, or other unstable bases to obtain additional height.
- n. Ladders with improvised repair shall not be used.
- o. No ladder should be used to gain access to a roof unless the top of the ladder extends at least three (3) feet above the point of support, at eave, gutter or roof line.
- p. Adjustments to a ladder's position shall not be made while the user is standing on the ladder.
- q. Job-made ladders will not be permitted without approval of Construction Engineer.
- r. All ladders shall be tied in a secure position or held by another worker while they are occupied.
- s. Step ladders and platform ladders must be fully opened and locked while being used.

- t. Short ladders shall not be spliced together to provide long sections.
- u. Ladders made by fastening cleats across a single rail shall not be used.
- v. Metal ladders may not be used in this plant.

8. Aerial Lifts

- a. Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.
- b. Only authorized persons shall operate an aerial lift.
- c. Employees shall always stand firmly on the floor of the basket and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.
- d. A safety belt shall be used and lanyard attached to the basket when working from an aerial lift.
- e. Boom and basket load limits specified by the manufacturer shall not be exceeded.
 - (1) In tandem use of lifts for lifting equipment or material is forbidden.
- f. Cutting rigs shall not be allowed to be carried within lift baskets.
- g. Aerial lifts will not be used for other than their designed purpose.
- h. Baskets will be kept free of accumulated equipment and materials.
- i. Controls shall be clearly marked as to their functions.

9. Painting and Sandblasting

- a. A breathing air-supplied blasting hood shall be worn while sandblasting. Breathing air shall mean a filtered air supply

free of contamination.

- b. All exposed skin shall be covered while sandblasting.
- c. Signs or barricades shall be used to warn employees of sandblasting operation.
- d. Signals used by the sandblaster and pot tender shall be clearly understood before starting the job.
- e. Smoking shall not be permitted around spray painting, mixing paint or while using flammable solvents.
- f. The relief valve on a spray paint pressure pot should be hand operated at least once each day while being used.
- g. Sandblasting shall not be permitted from a ladder except when using a small or "Mitey Mite" blaster.
- h. Respirator protection shall be used when spray painting.
- i. "Dead man" controls shall not be tied off.
- j. An electrician will be required to be on continuous standby at the job site, whenever sandblasting or painting is being accomplished on electrical transformers and high voltage enclosures when energized.

10. Scaffolds

- a. The following rules apply to all scaffolds:
 - (1) Scaffold materials shall be inspected prior to the erection of the scaffold. All scaffolds and parts must be kept in safe condition and any material or parts that have deteriorated or have been damaged shall be removed from the Owner's property.
 - (2) All scaffolds must be plumb and level at all times.
 - (3) All work levels of a scaffold must, if practical, be fully planked. If, of necessity, a work platform is not completely planked, personnel working on that

platform must use properly tied off safety belts.

- (a) Scaffold boards shall be used exclusively for work platforms.
- (4) All scaffolds shall be guyed and tied off at every 18 feet of elevation. Anchor running scaffolds to wall approximately every 28 feet of length. Use additional care when using pulley arms.
- (5) All scaffolds, regardless of height, must be equipped, with an access ladder easily accessible and lined up from top to bottom. Scaffolds higher than 30 feet must have access ladders constructed on the inside unless a ladder cage is provided. Climbing of scaffolds other than by access ladders is prohibited.
- (6) All scaffolds, regardless of height, must be equipped with handrails at a height sufficient to provide maximum personnel safety. Scaffolds over 10 feet in height must also be equipped with midrails whenever some work is to be performed below the height of the handrail. The midrail may be omitted where it would interfere with access to the work platform. If the location of scaffold prohibits the use of handrails or midrails, the Construction Engineer must approve the scaffold prior to use.
- (7) Where one side of a scaffold is left open (without guardrails) to facilitate work being performed (such as against building walls or tank walls), there shall be no gaps greater than 11 inches between the work platform and the adjacent structure.
- (8) All scaffolds over 10 feet in height must be equipped with toe boards at least 4 inches (1" x 4" nominal) in height on all sides. Additionally, if people are working near the base of the scaffold, the area must be barricaded or taped off. Where the circumstances are such that toe boards cannot be installed, the Construction Engineer must approve the scaffold prior to its use.

- (9) Scaffolds must not be used as material hoist towers or for mounting derricks without first determining the load and stresses involved.
 - (10) Scaffolds shall be so erected that any heated pipelines or equipment will not come in contact with scaffold boards or windbreaks.
- b. The following rules apply to all patented metal scaffolds:
- (1) Scaffolds must be erected with proper fixtures made from each type of scaffolding. Scaffolding and associated equipment must not be modified in any manner that reduces the manufacturer's designated performance.
 - (2) Do not force braces to fit. Adjust evenness of scaffold until proper fit can be made with ease.
 - (3) Horizontal diagonal bracing shall be used at bottom and intermediate levels of twenty feet.
 - (4) A minimum of 2 x 2 inch cleats shall be secured under side each end of plank with 2 1/4 inch carriage bolts or acceptable nails. An acceptable substitute must be approved by Construction Engineer.
- c. The following rules apply to rolling tower scaffolds:
- (1) The minimum base for towers shall be 5 x 7 feet.
 - (2) Towers of a height greater than three times the minimum base dimension must be guyed or tied off while being erected, used or dismantled.
 - (3) Caster brakes must be locked while the scaffold is not being moved.
 - (4) Extreme care must be exercised while moving a rolling scaffold.
 - (5) Towers must be free of men, material and

equipment before being moved.

- (6) The surface upon which the tower is rolled must be free of rubble or any material that may cause the tower to tip.
- (7) Do not attempt to move a rolling tower without sufficient help.
- (8) The minimum size for casters shall be 6 inches. Scaffolds higher than 25 feet must be stabilized either with outriggers or hand lines while being moved.
- (9) Do not extend adjusting screws beyond the limits specified by the equipment manufacturer.

d. The following rules apply to suspended scaffolds:

- (1) Chains or 1/4 inch (minimum) steel cable shall be used to support suspended scaffolds. All suspended scaffolds shall be anchored to prevent swinging. Chains so used shall be made of not less than 1/4 inch links* and shall be inspected immediately prior to each use. Chains shall be securely fastened by the use of double wrapped No. 9 wire through the links or fastened with a stove bolt.

* Safe Load Limits for Scaffold Chains:

1/4" proof coil loading chain, proof tested to 2, 350 lbs.

Safe Load - 1,175 lbs.

5/16" proof coil loading chain, proof tested to 3,500 lbs.

Safe Load - 1,750 lbs.

- (2) The suspending support must be insulated when arc welding is to be performed from platform, thus avoiding accidental arcing and subsequent failure.
- (3) Block and falls, if required, shall be a minimum of two sheaves for 3/4" rope and the minimum size

rope shall be used in acid or caustic areas. Tail ropes shall be placed in an open container for protection while used in an acid area or above operating machinery, pumps, etc. All ropes and blocks must be inspected and tested daily prior to use.

e. Scaffold work platforms must meet the following requirements:

- (1) Lumber used in construction of scaffolds shall be of scaffold grade. Planking shall be of No. 2 scaffold grade and shall not be painted all over as this would conceal defects. When wooden handrails are to be used, nothing less than 2 x 4 inch (nominal) material shall be used for this purpose.
- (2) The normal size of planking shall be determined from Table 1. These values are for planks with the wide face up, with the loads concentrated at the center. Loads given in the table are net. Allowance has been made for the weight of the planking. If select structural coast region Douglas Fir or merchantable structural square and sound Southern Pine is use, the loads may be increased 45 percent.
- (3) Planks used for platforms shall be of uniform thickness, laid close together. These planks must extend at least six (6) inches, but no more than twelve (12) inches beyond the end support.
- (4) All nails used in scaffold construction shall be driven full length. If doubleheaded nails are used, they shall be driven to the first head only and may not be used on platforms or walkways. No nail smaller than 8d shall be used in this construction and enough nails must be driven to support the designed loads. The design must be such that no nail is subject to direct pull.
- (5) Where beams are used in scaffolding, the schedule of loads shown in Table II shall be followed.

f. Special Situations

A special situation exists when scaffolds may be a temporary type installation such as the erection of tanks where the scaffolds is of necessity a highly portable scaffold attached to the tank being erected or demolished.

In these cases most tank builders have been granted a variance from OSHA that eliminates the requirement of toe boards (OSHA for Construction Trades 1926.451 Section 4) provided loose tools and equipment are kept in containers and barricades are erected below.

TABLE I
SAFE CENTER LOAD FOR SCAFFOLD
PLANK IN POUNDS

Size of Plank

Span in Feet	2 x 10 Dressed	2 x 12 Dressed	3 x 10 Dressed	3 x 12 Dressed
	to 1-5/8 x 9-1/2	to 1-5/8 x 11-1/2	to 2-5/8 x 9-1/2	to 2-5/8 x 11-1/2
6	256	309	667	807
8	192	232	500	605
10	153	186	400	484
12	128	155	333	404
14	110	133	286	346
16		116	250	303

TABLE II
SAFE CENTER LOADS FOR SCAFFOLD
PLANKS IN POUNDS

Length of Span in Feet

Nominal Timber Size	5	6	8	10	12	14	16	20	24
2 x 4	440	290	210						
4 x 4	725	575	420	330	260	215			
2 x 6	780	650	470	360	290	240	190		
2 x 8	1400	1150	850	660	530	450	370	270	190
2 x 10	2190	1820	1350	1050	860	710	600	450	320
2 x 12	2800	2630	1950	1530	1250	1050	890	670	510
3 x 8	2100	1730	1290	990	810	680	560	410	290
3 x 10	3290	2750	2120	1590	1300	1070	900	670	490
3 x 12	4525	3940	2920	2300	1880	1570	1340	1000	660

11. Slings and Rigging

- a. Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the Contractor. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service and job site.
- b. Temporarily repaired slings are not allowed.
- c. Whenever any sling is used, the following practices shall be observed.

- (1) Slings that are damaged or defective shall not be used.
- (2) Slings shall not be shortened with knots or bolts or other makeshift devices.
- (3) Sling leg shall not be kinked.
- (4) Slings shall not be loaded in excess of their rated capacities.
- (5) Slings used in a basket hitch shall have the loads balanced to prevent slippage.
- (6) Slings shall be securely attached to their loads.
- (7) Slings shall be padded or protected from the sharp edges of their loads.
- (8) Suspended loads shall be kept clear of all obstructions.
- (9) All employees shall be kept clear of loads about to be lifted and of suspended loads.
- (10) Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- (11) Shock loading is prohibited.
- (12) A sling shall not be pulled from under a load when a load is resting on the sling.
- (13) Shackles shall be used where multiple slings are involved.
- (14) Shackles shall be used when two slings have to be "tied" together.
- (15) When using a shackle, the "running" end of the rope or sling shall be over the curve of the shackle and not over the shackle pin.

- (16) Three Crosby clips shall be attached to wire rope eyes so that the curve of the U-bolt is always over the dead-end of the rope.
- (17) All wire rope and chains shall be lubricated according to the manufacturer's specifications.
- d. When synthetic web slings are used, the following precautions shall be taken:
 - (1) Nylon web slings shall not be used where fumes, vapor sprays, mists or liquids of acids or phenolics are present.
- e. Synthetic web slings shall be immediately removed from service if any of the following conditions are present:
 - (1) Acid or caustic burns.
 - (2) Melting or charring of any part of the sling surface.
 - (3) Snags, punctures, tears or cuts.
 - (4) Broken or worn stitches.
 - (5) Distortion of fittings.
- f. Natural or synthetic fiber rope slings require the consent of the Construction Engineer prior to their use.
- g. Natural and synthetic fiber rope slings shall be immediately removed from service if any of the following conditions are present:
 - (1) Abnormal wear.
 - (2) Powdered fiber between strands.
 - (3) Broken or cut fibers.
 - (4) Variations in the size of roundness of strands.
 - (5) Discoloration or rotting.

- (6) Distortion of hardware in the sling.
- h. Persons performing rigging will be qualified.
 - (1) Load in center of hook, never on the point.
 - (2) Never use plate grips, tongs, pipe clamps, etc., as substitute for beam clamps.
 - (3) Hooks, shackles, beam and beam clamps shall be inspected prior to each use.
 - (4) Never allow foot traffic beneath load.
 - (5) Loads shall be "test lifted" for load stability.
 - (6) Workers in area of swing loading shall be warned.
- 12. Welding and Cutting
 - a. Pipelines containing gases or flammable liquids, or conduits containing electrical circuits, shall not be used as a ground return.
 - b. When a structure or pipeline is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks, or heat at any point shall cause rejection of the structures as a ground circuit.
 - c. Cable lugs shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.
 - d. Fire extinguishers shall be kept within reach of all welding, cutting or brazing operations (See Welding, Burning, Open Flame Permit).
 - e. Welding cables should, when possible, be strung overhead, high enough to permit free passage. Welding cables when strung across road, or other areas subjected to vehicular traffic shall be protected to precluded damaging.

- f. Welding cable not in use shall be stored on an appropriate rack or neatly coiled out of walking area.
- g. Electrode holders and welding cables shall not be allowed to contact any compressed gas cylinders.
- h. Do not weld on a suspended load without permission from the Construction Engineer.
- i. Welding rods and electrodes shall not be allowed to accumulate around the job. They shall be picked up as often as necessary to prevent slipping or hazards.
- j. Welding cables shall be spread out (uncoiled) before use to avoid serious overheating and damage to insulation.
- k. Welding cables should be frequently inspected for damage.
- l. Welding cables with damaged insulation or exposed bare conductors shall be repaired or replaced.
 - (1) Repair will be a minimum distance of 10 feet from electrode holder and be of equivalent insulation.
- m. All fire hazards or flammable material near welding operations shall be removed or protected against heat, sparks, and hot slag.
 - (1) Contractor will provide a firewatch as required by Owner in hazardous areas.
- n. After welding operations are completed, the welder shall mark the hot metal or provide some other means of warning other workers.
- o. Torches in use shall be inspected at the beginning of each working shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.
- p. Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.
- q. Do not lay a lighted torch down or attempt to ascend a

ladder with a lighted torch.

- r. Neither unlighted oxy-acetylene torches nor valves shall be left or stored in closed pipe, vessels, or tanks at any time.
- s. Hoses shall be kept clear of passageways, ladders and stairs.
- t. For quick closing, valves on gas cylinders shall not be opened more than 1 1/2 turns.
 - (1) At work day end, all torches will be disconnected from leads and stored.
 - (2) Hose shall never be exposed to vehicular traffic.
- u. Boxes used for the storage of gas hose shall be ventilated.

E. Signs and Barricades

- 1. Signs required to be posted by Contractor will meet OSHA standards.
- 2. Barricades with appropriate signs shall be used for guarding temporary hazards and to prevent or warn personnel from entering a hazardous area.
 - a. For a condition that could cause immediate injury, the area shall be guarded by someone until it can be barricaded.
 - b. When temporary road obstructions occur, black and yellow wooden barricades shall be placed at least 25 feet in each direction from the obstruction. They shall be adequately lighted at night.
 - c. When road barricades are use, detour signs shall be placed at appropriate intersections to divert traffic, when required.
 - d. Exterior walkway obstructions should be barricaded with barricade tape and lighted at night, if required.

- e. Barricades around open holes or manholes shall be constructed so that they will physically stop a person from stepping into the opening.
- f. Barricades shall be erected around jobs that present hazards such as falls, falling objects or spilling chemicals.
- g. Only authorized personnel shall enter a barricaded area.
- h. All barricades must be removed when the temporary hazard no longer exists.

F. Walking, Working Surfaces

1. Floors

- a. Floor holes, into which persons can accidentally walk, shall be guarded by either a standard railing with standard toeboard on all exposed sides, or a floor hole cover of standard strength and construction that is secured against accidental displacement. While the cover is not in place, the floor hole shall be protected by a standard railing.

2. Open-sided Floor, Platforms, and Runways

- a. Every open-sided floor or platform 6 feet or more above adjacent floor or ground level shall be guarded by a standard railing on all open sides, except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a standard toeboard wherever, beneath the open sides, persons can pass, or there is moving machinery, or there is equipment with which falling materials could create a hazard.
- b. Runways shall be guarded by a standard railing, on all open sides, 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toeboard shall also be provided on each exposed side.
- c. Where employees entering runways become exposed to machinery, electrical equipment, or other danger, additional guarding shall be provided.

- d. Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment shall be guarded with a standard railing and toeboard.

3. Walls

- a. Wall openings, from which there is a drop of more than 4 feet, and the bottom of the opening is less than 3 feet above the working surface, shall be guarded with a standard rail including an intermediate rail.

(1) If no railing can be erected, see "Safety Belts and Lifelines".

4. Roofs

- a. When work is performed on transite roofs, boards spanning the transite sheets shall be used and secured to span roof members to walk on while on the roof. Do not walk on transite material.

G. Excavation, Trenching, and Shoring

1. Excavation

- a. The walls and faces of all excavations, five feet or more in depth, shall be shored, sheeted, braced, sloped or otherwise supported by means of sufficient strength to protect the employees working within them.
- b. Excavations less than five feet in depth shall also be effectively protected when examination of the ground indicates hazardous ground movement may be expected.
- c. Materials used for sheeting and sheet piling, bracing, shoring and underpinning, shall be in good serviceable condition and timbers used shall be sound and free from large or loose knots.
- d. Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. The trench boxes or shields must be designed,

constructed and maintained in a manner which will provide protection equal to or greater than sheeting or shoring required for the trench.

- e. When employees are required to be in excavations four feet deep or more, ladders, extending from the floor of the excavation to at least three feet above the top of the excavation, shall be provided and so located as to provide means of exit without more than 50 feet of lateral travel.
 - f. Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water shall not be allowed to accumulate in an excavation.
 - g. Each excavation shall be inspected after every rainstorm or other hazard increasing occurrence.
 - h. When mobile equipment is utilized or allowed adjacent to excavations, substantial stop legs or barricades shall be installed.
 - i. An excavation permit must be obtained before beginning any excavation work (See "Structural Change, Drilling and Excavation Permit").
 - j. In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least two feet or more from the edge of the excavation. As an alternative, effective barriers or other effective retaining devices may be used in order to prevent excavated or other materials from falling into excavation.
 - k. Adequate barriers should be provided around all excavations to prevent employees from falling into the excavation. The barrier must have sufficient strength to physically stop an employee from falling into the excavation.
2. Walkways, Runways, and Sidewalks
- a. Walkways, runways, and sidewalks shall be kept clear of

excavated material or other obstructions.

- b. No sidewalk shall be undermined unless it is shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.
- c. Planks used for walkways or runways shall be laid parallel to the length of the walkway or runway and fastened together to prevent displacement.
- d. Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping.
- e. Raised walkways or runways shall be provided with steps. Ramps may be used in lieu of steps provided they have cleats to insure a safe walking surface.
- f. All walkways and runways shall be provided with standard handrails.

3. Shoring and Angle of Repose

- a. The determination of the angle of repose and design of the supporting system for excavations shall be based on Tables 1 and 2 of this specification.
- b. Support systems for excavations not covered by Table 2 shall be planned and designed by a qualified person.
- c. Excavations below the level of the base of a footing of any foundation or retaining wall shall not be permitted, unless the wall is underpinned and all other precautions taken to insure the stability of the adjacent walls for the protection of employees involved in excavation work or in the vicinity thereof.
- d. Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stress in excess of values given by the following formula:

$$S = 1300 - \frac{20L}{D}$$

Maximum Ratio $\frac{L}{D}$ - 50

Where:

L - Length, unsupported, in inches

D - Least side of the timber in inches

S - Allowable stress in pounds per square inch of cross-section

- e. Cross braces or trench jackets shall be placed in true horizontal position and secured to prevent sliding, falling or kickouts.
- f. Additional stringers, ties and bracing shall be provided to allow for any necessary temporary removal of individual support.
- g. Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and in unstable soil, ropes shall be used to pull out the jacks or braces from above after all employees have left the trench.

TABLE I
APPROXIMATE ANGLE OF REPOSE
FOR SLOPING SIDES OF EXCAVATION

Note: Clays, Silts, Loans
or Non-Homogenous
Soils Require Shoring
and Bracing.

Original Ground Line	Solid Rock, Shale, or Cemented Sand and Gravels (90°)
	Compacted Angular Gravels 1 1/2 - 1 (63° 26')
	Recommended Slope For Average Soils 1 - 1 (45°)
	Compacted Sharp Sand 1 1/2 - 1 (33° 41')
	Well Rounded Loose Sand 2 - 1 (26° 34')

TABLE II
TRENCH SHORING
MINIMUM REQUIREMENTS

MINIMUM REQUIREMENTS												
Depth of Trench	Kind or Condition of Earth	Size and Spacing of Members						Cross Braces'		Maximum Spocks		
		Uprights		Stringers								
		Minimum	Maximum	Minimum	Maximum							
		Dimension	Spacing	Dimension	Spacing	Width of Trench						
						up to 3 Feet	3 to 6 Feet	6 to 9 Feet	9 to 12 Feet	12 to 15 Feet	Vertical	Horizontal
Feet		Inches	Feet	Inches	Feet	Inches	Inches	Inches	Inches	Inches	Feet	Feet
5 to 10	Hard, compact	3x4 or 2x6	6	-----	-----	2 x 6	4 x 4	4 x 6	6 x 6	6 x 8	4	6
	Likely to crack	3x4 or 2x6	3	4 x 6	4	2 x 6	4 x 4	4 x 6	6 x 6	6 x 8	4	6
	Soft, sandy or filled	3x4 or 2x6	Close Sheet- ing	4 x 6	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
	Hydrostatic Pr ssure	3x4 or 2x6	Close Sheet- ing	6 x 8	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
10 to 15	Hard-----	3x4 or 2x6	4	4 x 6	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
	Likely to crack	3x4 or 2x6	2	4 x 6	4	4 x 4	4 x 6	6 x 6	6 x 8	8 x 8	4	6
	Soft, sandy or filled	3x4 or 2x4	Close Sheet- ing	4 x 6	4	4 x 6	6 x 6	8 x 8	8 x 8	8 x 10	4	6
	Hydrostatic Pressur	3 x 6	Close Sheet- ing	8 x 10	4	4 x 6	6 x 6	6 x 8	8 x 8	8 x 10	4	6
15 to 20	All conditions	3 x 6	Close Sheet- ing	4 x 12	4	4 x 12	6 x 8	8 x 8	8 x 10	10 x 10	4	6
Over 20	All conditions	3 x 6	Close Sheet- ing	6 x 8	4	4 x 12	8 x 8	8 x 10	10 x 10	10 x 12	4	6

Trench Jacks May Be Used In Lieu Of, Or In Combination With, Cross Braces.

- H. Pre-planning - Contractors or subcontractors directly involved with electrical work, or work adjacent to electrical hazards shall do so only after details of said work has been pre-planned and accepted by the Construction Engineering staff.
1. All electrical work shall comply with NEC, NFPA 70-1971; ANSI C1-1971, and include the following general safety standards:
 - a. All electric tools and equipment used in the plant shall be grounded.
 - b. Six (6) volt, or twelve (12) volt extension cords, equipped with vapor-proof hand lamp with a fully guarded bulb, must be used when a light is required in tanks, boilers or vessels or when a light is required in wet places such as ditches, excavations, or sewers, etc. Lights of 110 volts may be used in tanks that are dry and have a non-flammable atmosphere provided they are placed or hung in a stationary position with protective guards on the lights and are protected with a ground fault interrupter.
 - c. All portable lights shall have guards to protect the bulb.
 - d. Worn or frayed electric cables shall not be used.
 - e. Flexible electric cords shall be used only in continuous length without splice or tape.
 - f. Electric cords shall not be strung across wet ground or wet floors.
 - g. Electric cords or cable strung across roads or walkways shall be protected against damage.
 - h. Before working on a de-energized circuit, it shall be tested with a voltage measuring device to see that it has been properly cleared. Probe the instrument on a live circuit before and after testing the circuit to be worked on.
 - i. A fuse puller shall be used when pulling or replacing fuses.
 - j. Electric cords not in use shall be neatly coiled and stored.

- k. All lighting circuits in areas classified as "Hazardous Locations" for National Electric Code purposes must be off and tagged out before relamping of the area.
- l. Before work begins on overhead lines, the lines must be cleared.
- m. Before work begins on all high voltage overhead lines, all phases must be grounded on them.
- n. Single phase grounding is prohibited.
- o. The Construction Engineer in charge shall be consulted before the grounds are removed.
- p. Hot sticks shall be used to remove fuse cut-outs.
- q. Prior to grounding both ends on an overhead line, approval must be obtained from the Construction Engineer in charge. This is due to the possibility of circulating currents.

2. Tagging and Lockout of Circuits

- a. Prior to start of any job that directly or indirectly has electrical hazards, the responsible Construction supervisors shall attend a documented training class given by the Safety Representative (see "Lock and Tag Procedures").

3. Ground-Fault Protection

- a. Contractors shall use either ground-fault circuit interrupters or an assured equipment grounding conductor program.
 - (1) Ground-fault circuit interrupters - All 120-volt, single-phase, 15 and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator are insulated from the generator frame and all other grounded surfaces, need not be protected with

ground-fault circuit interrupters.

- (2) Assured equipment grounding conductor program - The employer shall establish and implement an assured equipment grounding conductor program on construction sites covering all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug which are available for use or used by employees. This program shall comply with the minimum requirements as outlined in OSHA 1926.400 (n) (3).

4. Eight-pack Grounding

- a. Unit shall be properly grounded with a 4-0 wire (minimum).
- b. All unit grounds to be left plugged into unit and properly grounded.

(1) Unit shall never be used as welding ground.

- c. Each unit shall be posted with an OSHA approved "Danger High Voltage" sign on either side.
- d. Each unit exposed to weather shall:

(1) Have a wood porch fronting working side and extending a minimum of 4 feet from unit-plywood, lumber or plastic lying on the ground is not acceptable.

5. Temporary Wiring

- a. All temporary wiring shall be effectively grounded in accordance with the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of C1-1968), Articles 305 and 310.
- b. Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except that guards are not required when the construction of the reflector is such that the bulb is deeply recessed.
- c. Temporary lights shall be equipped with heavy duty electric cords with connections and insulation maintained in safe

condition. Temporary lights shall not be suspended by their electric cords.

- d. Each disconnecting means for motors and appliances, and each service feeder or branch circuit at the point where it originates, shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident.
- e. Disconnecting means shall be located or shielded so that employees will not be injured.
- f. Boxes for disconnecting means shall be securely and rigidly fastened to the surface upon which they are mounted and fitted with covers.
- g. Boxes for disconnecting means installed in damp or wet locations shall be waterproof to the extent that water does not enter or accumulate.

I. Fire Prevention and Protection

1. Fuel Storage Tanks

- a. Diked for tank capacity plus 25%.
- b. Dispensing nozzle to be of an approved automatic-closing type with a latch-open device-ground bond cable attached.
- c. 1 1/2 or 2 inch I.D. vent pipe.
- d. 6 inch lettering, in red, on sides and front "Flammable --No Open Flame".
- e. Contractor's name on side.
- f. Area posted with acceptable "No Smoking" signs.
- g. A 30 lb. ABC fire extinguisher no nearer than 10 feet or further than 50 feet from dike.

2. Storage and Use of Flammable and Combustible Liquids

- a. Approved storage cabinets limited to 60 gallons, marked,

accessible fire extinguisher and area posted with approved "No Smoking" signs.

- b. Ground-bond cables shall be used when transferring all liquids.
- c. Safety cans for 5 gallons or less (no open containers).
- d. Acetone limited to 55 gallons in plant: drums marked with bung vents and spring-loaded spigots.
- e. Acetone for cleaning FRP tools shall be carried in safety can with spring-loaded, foot-operated lids and limited to 1 gallon carried to work site.
- f. Approved container for waste acetone located at storage site.
- g. All containers having acetone will be marked.
- h. Extreme safety precautions must be taken by employees wearing paper overalls and handling flammable or combustible liquids.
- i. When using kerosene, acetone, varsol, MEK, Trichlor, Triethane, adequate ventilation shall be provided.
- j. Gasoline shall never be used for any purpose other than a motor fuel.
- k. A special container will be located within the flammable storage area for all empty cans, used rags, or tools that contact flammable liquids.

3. Temporary Heating Devices

- a. All temporary heating devices shall be inspected by the Safety Representative prior to their use.
- b. There will be no open flame or fires used for heating.
- c. All heating units for offices, shops, work areas, change rooms, etc., must be in good working order and periodically inspected. Gas units must be provided with "flame-out"

protective devices, and electrical units must be grounded. Gas units shall not be connected by means of rubber hose. All heating units must be turned off at the end of each work day.

- d. Fresh air shall be supplied in sufficient quantities to maintain the health and safety of workmen. Where natural means of fresh air supply is inadequate, mechanical ventilation shall be provided.
- e. Heaters not suitable for use on wood floors shall not be set directly upon them or other combustible materials. When such heaters are used, they shall rest on suitable heat insulating material or at least 1-inch concrete, or equivalent. The insulating material shall extend beyond the heater 2 feet or more in all directions.
- f. Heaters, when in use, shall be set horizontally level, unless otherwise permitted by the manufacturer's markings.
- g. Heaters used in the vicinity of combustible tarpaulins, canvas, or similar coverings shall be located at least 10 feet from the covering. The coverings shall be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.
- h. Flammable liquid-fired heaters shall be equipped with a primary safety control to stop the flow of fuel in the event of flame failure. Barometric or gravity oil feed shall not be considered a primary safety control.
- i. Heaters designed for barometric or gravity oil feed shall be used only with integral tanks.
- j. Heaters specifically designed and approved for use with separate supply tanks may be directly connected for gravity feed, or an automatic pump, from a supply tank.
- k. Solid fuel salamanders are prohibited in buildings and on scaffolds and generally within PPG's Lake Charles Plant.
 - (1) Salamanders must be shut down before they are moved or refueled.

- (2) Salamanders must be temporarily braced while in use.
- (3) A fire extinguisher should be kept near all salamanders.
- (4) Salamanders shall be cleaned regularly and the fuel carbon deposit shall be checked for heat before refueling.
- I. Welding rod cabinets presenting a fire or safety hazard will not be permitted. Cabinets or fireproof materials equipped with strip heaters are recommended. If light bulbs are used, they must be securely guarded with adequate spacing in relation to the cabinet.

J. Demolition

1. Pre-Demo

- a. Prior to permitting employees to start demolition operations, an engineering survey shall be made, by Contractor and Construction Engineering, of the structure to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The Contractor shall have in writing evidence that such a survey has been performed as required by OSHA.
- b. When employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion, or other cause, the walls or floor shall be shored or braced.
- c. All electric, gas, water, steam, sewer and other service lines shall be shut off, capped, or otherwise controlled, outside the building line before demolition work is started.
- d. If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary, and protected.
- e. It shall also be determined if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous

substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

- f. Where a hazard exists from fragmentation of glass, such hazards shall be removed.
- g. Where a hazard exists to employees falling through wall or floor openings, the opening shall be guarded (see "Walking, Working Surfaces").
- h. Any object having the potential of falling from the outside of the structure during demolition will be removed.
- i. No employee shall be allowed to work above rebar protruding from broken concrete areas.

2. Area Protection

- a. Contractor will provide the materials necessary, to contain debris within area zoned for demolition.
 - 1. Appropriate signs will be posted around perimeter of demolition.
- b. Pressure type water cans, 2 gallon minimum, will be stationed close to employees cutting rebar, structural steel or piping.
- c. Any debris falling outside perimeter protection shall be removed immediately.
- d. Entrances into structure shall be barricaded when Contractor's employees are absent from area.
- e. No unauthorized persons shall be allowed within perimeter guarding.

3. Material Removal

- a. Routes for removal of debris from plant will be assigned by Construction Engineer. Contractors are responsible for

keeping these routes free of debris.

- b. Trucks will not be overloaded. Debris shall be loaded securely before trucks are allowed to move.
- c. Debris shall not be allowed to accumulate in a hazardous manner.
- d. No wall section, which is more than one story in height, shall be permitted to stand alone without lateral bracing unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting. All walls shall be left in a stable condition at the end of each shift.

K. Explosives

1. General Information

- a. Prior to explosives, blasting agents, or blasting supplies being carried onto Owner's property, all aspects of their use, storage and persons responsible, shall be established through a joint meeting between Contractor and Construction Engineering staff. Any variance will require written consent from Construction Engineer. OSHA standards will be followed.

L. Hazardous Materials

1. General Information

- a. Owner shall provide Contractor and subcontractor with data concerning any known hazardous material existing within the Contractor's work area.
- b. Contractors and subcontractors are responsible for the safety training, education and record keeping of employees exposed to hazardous materials as outlined in the related Federal Standards.

2. Safety Showers and Body Wash

- a. Contractors are responsible for providing their employees with

adequate training in the use of safety showers and/or body wash while employees are exposed to hazardous material.

b. Do not put "Body Wash" in or near eyes.

3. Removal

a. Removal, storing or transfer of any hazardous materials by a Contractor or subcontractor requires the authorization of the Construction and Safety Representative.

IV. JOB REQUIREMENTS

A. Permits

Should area, unit, or plant alarm(s) sound, permits are cancelled and must be re-issued when the emergency is terminated.

1. Welding, Burning, and Open Flame

a. WBOF permits shall be issued prior to start of "hot work" by the Field Engineer and Operations Supervisor.

(1) Permits shall not be issued until work is ready to begin.

b. Areas exempt from WBOF shall be so agreed upon by Construction Engineer, Safety Representative, and Operations Supervisor. Exemptions shall be in writing describing the area and affixing its perimeter.

c. A permit shall be required when "hot work" is performed on piping, vessels, pumps or equipment which contains or may have contained flammable, combustible or explosive process or utility liquids or gases, or corrosive material capable of producing accumulations of hydrogen or other explosive gases. There are no exemptions under these conditions.

d. WBOF permits are valid only:

- (1) During life of permits, 5 hours.
- (2) Properly completed.
- (3) Within area described on permit.
- (4) For worker or Contractor listed on permit.

- e. Any change in the condition under which the permit was issued shall require a new permit.
 - f. Fire extinguisher shall be accessible. Fire blankets, full face air line mask or breathing air cylinders w/regulators, and a life line may be required.
 - g. Grounds shall be clamped directly to the metal being welded or as close as possible.
 - h. Hard hat welding is required.
2. Structural Change, Drilling, and Excavation
- a. If a construction job requires the use of power equipment for excavating purposes, or requires drilling into floors and walls where there is a risk of hitting concealed conduits or pipes, or requires alterations to load bearing structural members, which could significantly affect their load carrying capabilities, a "Structural Change, Drilling and Excavation Permit" will be required.
 - b. The Construction Engineer will be responsible for clearing all jobs through the area operating personnel involved.
 - c. If the job cannot be carried out as originally planned, the Construction Engineer will initiate the proper changes to be made. A revised permit is required.
3. Tank Entry
- a. As used in this text, the term "tank" includes tanks, vessels, sumps, mixers, sewer manholes, condenser waterboxes, heaters, boilers, electric manholes, fume tunnels, large pipelines, small vaults, basements and similar confined areas where any of the following hazards could be encountered: toxic gases or vapors; mechanical hazards, such as moving agitator blades; acids or caustics; plant inert gas; oxygen deficiency; or difficult egress/rescue.
 - b. A Tank Entry Permit will be issued any time anyone enters for inspection or work is to be done inside a "tank". The permit will be signed by the Operation Supervisor and the Field

Engineer.

- (1) Tanks under construction and not connected to process lines or other operating equipment are generally excepted from these rules. However, Contractors are responsible for providing their employees with acceptable personal protective equipment and safe procedures for accomplishing the job. Contractor's safety standards will be monitored by the Safety Engineer.
- c. The Construction Engineer and the Construction Supervisor in charge of the work will be responsible for the observance of the safety rules listed below:
- (1) Clean Tank - Purge with inert gas or wash and/or steam tank to clear it of flammable or toxic materials. Ground hose if applicable.
 - (2) Remove or Blind off All Pipes (Outlet and Inlet) - All process lines leading to and from a tank should be removed or blinded. The exception to this is the case when, in the judgment of the Field Engineer, past practice has proven this unnecessary (example: condenser water boxes, boilers). Water and air lines in general need not be blinded. They may be blinded to avoid possible error when all other lines are blinded.
 - (3) Test Tank - Test the tank atmosphere for flammable vapor and oxygen where the process is such that these tests are necessary. The temperature of the tank air space and wall metal should be considered.
 - (4) Use Approved Safety Harness - When a person enters a tank, he must be properly fitted with a safety harness or belt. The safety harness would be eliminated if it could not contribute to the safety of the job (example: entering a distillation column or open vessel with bottom manways).
 - (5) Emergency Breathing Air and Ventilation - Persons working in tanks or confined areas subject to being suddenly surrounded by gas shall be equipped with escape masks and a supply of emergency breathing

air. When escape masks are supplied with air through tank, the hose must be pressurized and ready for instant use.

- (a) When air is introduced into a tank for either ventilation or cooling, it should be accomplished by creating a draft through the tank with either an air mover or external blower. If at all possible, the draft air should enter the top of the tank and exit at the bottom to avoid heavier than air gases.
- (b) Plant compressed air shall not be used for either direct ventilation or emergency breathing air.
- (6) Ladders - a ladder must be used where entering or leaving a tank involves a drop or climb of more than four feet, or if otherwise required by the Construction Engineer.
- (7) Companion - A man must always be on hand to tend the air line and/or life line if such equipment is provided or, if in the judgement of the Construction Engineer he is needed for other reasons. This man must be able to know how to operate the safety apparatus (see "Respiratory Protection") and summon help if needed. Under no circumstances will a "Safety Watchman" leave his post to do other work, etc., while persons are still in the tank.
- (8) Electrical Equipment - Low voltage light and cord sets will be used. Electric light extension cords must have fully insulated lampholders, fully guarded bulbs, and must be grounded. Explosion-proof cord and light sets are recommended. Stationary 110-volt light sets are permissible on certain jobs with a ground fault interrupter at the power source, if approved by the Construction Engineer and Safety Representative. (This should be noted under Item 4 of the permit.)
- (9) Welding precautions - Before any welding or cutting is down in a tank, a Burning and Welding Permit must be obtained. The cylinders must not be put into the tank, and all torches and hoses must be removed from the tank when not in used.

- (10) Disconnecting Power Sources - Power sources to tanks equipped with agitators will be shut off and tagged and motor disconnected.
- (11) Time Duration of Permit-Daily - A new permit will be issued anytime if, in the judgement of the Construction Engineer, conditions could have changed. An oxygen test will be required in the case of a job interruption, i.e., plant evacuation, lunch period, etc., unless past practice prior to initiation of the permit system has shown that this is not necessary.

4. Ignition Source

- a. Ignition Source permits are designed to control the use of tools and devices having the potential to provide a spark or source of ignition in areas of the plant where this is a concern.
 - (1) All equipment must have an operable "Kill Switch".
 - (2) Fire extinguishers must be accessible.
 - (3) Fire blankets may be necessary to cover sewer openings.
- b. An inclusive list of devices covered by this permit are:
 - (1) Spark ignition vehicles (Vehicle Entry Permit is only intended for quick-in/quick-out use.)
 - (2) Gasoline powered equipment.
 - (3) Electrical powered equipment.
 - (4) Heat lamps.
 - (5) Hot air blowers.
 - (6) Sandblasting nozzles.
 - (7) Jack hammers, chipping guns, and similar spark producing tools.
 - (8) Electronic transmitters and similar devices having spark

potential when being calibrated.

- c. Field Engineers are responsible for initiating a permit request.
- d. Maximum duration of a period is 10 hours, provided, the permit is revalidated by an Operations Supervisor following a lunch break or shift change.

5. Vehicle Entry

- a. Certain areas or sections of a plant are restricted to vehicular traffic. Roads entering these areas are normally barricaded and a permit is required.
- b. Contractor personnel shall obtain clearance, from the appropriate control room, for the vehicle to enter the designated area. After clearance has been established, a Vehicle Entry Permit will be issued. The permit shall be signed by the Operations Supervisor or Lead Operator.
 - (1) Vehicles shall be driven only in the area designated on the permit.
 - (2) The name of the Contractor and driver shall be written on the permit.
 - (3) A new permit shall be issued upon each and every entry.

B. Lock and Tag Procedures

1. General Information

- a. Lock and tag procedure is a safety system used to prevent accidents and injuries. Its purpose is to establish and maintain safe conditions for a particular job or situation, and to clearly determine the end of the job or situation.
- b. Construction Engineer and the Owner's representative control all lock and tags.
- c. All Construction Supervisors whose employees will directly or indirectly be affected by this system shall attend a concise training class covering this procedure.

d. Under no conditions shall a Contractor or subcontractor:

- (1) Remove or alter locks or tags.
- (2) Operate a tagged or locked control point.
- (3) Use or cause to be used a tagged or locked system.

2. Personal Protective Equipment

a. Work on or adjacent to systems with exposure to acid or caustic requires:

- (1) Slicker suits.
- (2) Rubber boots.
- (3) Chemical gloves.
- (4) Chemical splash goggles.
- (5) Full face shields.

b. Work on or adjacent to systems with exposure to chlorine or other chemicals requires:

- (1) Full face air line mask.
- (2) Breathing air cylinders with proper regulators.
- (3) In cell rooms di-electric boots are required.

3. Definitions

a. Owner - Signifies the department which controls and operates the equipment, device or system in question.

b. Control point - The device which controls energy source or product routing through the system.

c. Safety lock - A padlock used by Owner to lock our switches and electrical control points.

d. Construction safety locks - Padlocks used and maintained by the Construction Engineer to lock out switches and/or control points in areas under construction. These locks will all be keyed alike but different from the safety lock and are painted orange.

- e. Locking bar - A device that fits in the lockout hole of a switch through which a lock is placed.
- f. DO NOT OPERATE TAG - Used by Owner only to clear and isolate control points.
- g. PERSONAL TAG (White) - Used by Owner only
- h. PERSONAL TAG (Red) - Used by Owner's supervisors only.
- i. INSTRUMENT SHUT-OFF TAG (White) - Owner's tag to indicate that an instrument is out-of-service.
- j. MAINTENANCE SUPERVISOR'S CLEARANCE TAG (Blue) - Owner's supervisors tag placed at control points with Owners DO NOT OPERATE TAG.
- k. FIELD ENGINEER'S CLEARANCE TAG (Orange) - An orange tag with black letters used by Field Engineer to protect construction personnel. When work is done in an operating unit, this tag must be attached after Owner's log and tag.
- l. UNIT CLEARANCE TAG (Yellow) - Owner's tag to isolate and clear specific sections of a unit or train of equipment.
- m. BOIL OUT TAG (Yellow) - Owner's tag to show a boilout checklist has been completed.

C. Blue Flag

- 1. A metal sign attached to the rail which is universally accepted as a railroad warning device. A blue flag shall be set any time an obstruction to normal rail traffic is present and personnel are working in the immediate area.
 - a. An obstruction can be defined as an object placed or projected intermittently within 8'6" of the centerline of a track or less than 22' above the top of a rail.
 - b. Short term blockage or restricted clearance (thirty minutes or less) requires a man to be posted at the switch to the track or a Blue Flag installed and tagged by a Field Engineer.

c. Long term blockage or restricted clearance requires:

1. The switch to the track to be locked and tagged by Owner and tagged with a FIELD ENGINEER'S CLEARANCE TAG.
2. A Temporary derail installed, locked and tagged by Owner and tagged with a FIELD ENGINEER'S CLEARANCE TAG.
3. A permanent barricade across the track.

D. Asbestos

1. All Federal Standards shall be observed by Contractors and subcontractors handling asbestos.
2. The Owner requires:
 - a. Asbestos tear-down guidelines for contracted projects to be read by Contractor's supervisory personnel prior to pre-construction meeting.
 - b. A guideline review with Contractor's supervisors, Construction Engineering, and the Safety Representative prior to beginning work.
 - c. Contractor will furnish:
 - (1) Employee training as detailed in guidelines.
 - (2) Employee protective equipment and clothing.
 - (3) Employee respiratory protection.
 - (4) Satisfactory control measures to prevent airborne asbestos.
 - (5) Satisfactory arrangements for asbestos disposal.



CONSTRUCTION SERVICES AGREEMENT

(Lump Sum)

THIS AGREEMENT is made as of this _____ day of _____, 19____, by and between PPG INDUSTRIES, INC., a Pennsylvania corporation ("Owner") and _____, a _____ corporation ("Contractor").

WITNESSETH:

The purpose of this Agreement, as more particularly set forth below, is to provide for the furnishing by Contractor of labor, equipment, materials, tools, supplies, services and supervision necessary and incidental to _____

Therefore, the parties hereto, intending to be legally bound hereby, agree as follows:

ARTICLE I - SCOPE OF WORK:

The work to be performed and furnished by Contractor shall be as described in and required by the following document(s), which document(s) is attached hereto and incorporated herein by reference (the "Work"):

The Contractor shall perform the Work in accordance with the terms of this Agreement and the documents listed below, which documents are attached hereto and incorporated herein by reference:

- A. General Terms and Conditions For Construction Services Agreement Form 3649 Rev. 1-86.
- B. PPG Purchase Order No. _____, dated _____.

ARTICLE II - TIME OF PERFORMANCE:

Contractor shall commence the Work _____ and shall substantially complete the Work by _____, proceeding in conformity with a schedule for completion to be satisfactory to and approved of by Owner.

ARTICLE III - PAYMENT FOR PERFORMANCE:

Owner shall pay Contractor, subject to additions and deductions as provided below, in current funds, the sum of _____ Dollars (\$ _____), which shall be paid as provided for in Section 16. of the General Terms and Conditions referred to hereabove. The aforesaid sum includes all Federal, state and local taxes of any nature whatsoever related to or arising from the Work.

If Owner desires to make any change in the Work, Contractor shall, upon Owner's request, provide Owner with a written statement setting forth the lump sum cost for the performance of additional work or the deletion or reduction of a portion of the Work, including an itemization of the costs therefore into the following categories: (a) material costs; (b) labor costs; (c) rental equipment costs; (d) subcontractor costs; (e) overhead and profit; and (f) the aggregate of (a), (b), (c), (d) and (e).

If Owner elects to proceed with a change which constitutes additional work, Owner shall pay Contractor therefore, at Owner's option, either (a) the lump sum price contained in Contractor's statement submitted with respect to such work, or (b) the costs determined by taking the actual quantities of additional work as agreed to by Owner and extending same by unit rates set forth in applicable unit rate schedules agreed to by Owner, or (c) Contractor's costs for providing the additional work based upon the following items:

- (i) Direct labor costs consisting of reasonable travel expense where applicable, overtime standard costs, fringe benefits and statutory benefits (but only to the extent such benefits are legislated) and wages plus _____ % of such costs to cover all overheads (including consumables and small tools) and profit. Overtime premium costs shall be reimbursable at cost without any markup. Hourly wage rates shall be no higher than the standard paid in the locality of the Work and compensation shall be permitted only through the general foreman level.
- (ii) Actual costs of permanent materials including applicable taxes, but excluding small tools and consumable supplies, plus _____ % of such costs for all overheads and profit. Small tools having an initial net purchase price of \$500.00 or less and consumable supplies shall not be separately reimbursed, compensation therefore being a part of direct labor overheads markup. Such small tools and consumable supplies shall be the property of the Contractor.
- (iii) Rental of Contractor owned equipment at _____ % of the applicable rental rate specified in the AED Rental Rates Compilation, current edition. The aforesaid percentage includes fuel and normal maintenance. Rental of third party owned equipment will be reimbursed at invoice costs including appropriate taxes plus _____ % of such costs for all fuel, maintenance, overheads, and profit.
- (iv) Actual subcontract costs defined as the subcontractor's cost for labor, materials and rental of equipment plus markups for all overheads and profit not to exceed those percentages stipulated above for the Contractor (without Owner's prior approval) less discount, plus _____ % of such costs for all overheads and profit.

If Owner elects to proceed with a change which constitutes a deletion of or a reduction in a portion of the Work, the Contract Sum provided for above, as it may be changed, shall be reduced by, at Owner's option, either (a) the lump sum price contained in Contractor's statement submitted with respect to such deleted or reduced work, or (b) the costs determined by taking the actual quantities of deleted or reduced work and extending same by unit prices set forth in applicable unit rate schedules agreed to by Owner, or (c) the fair and reasonable value of such deleted or reduced work as mutually agreed to by the parties.

ARTICLE IV - NOTICES:

All notices required or permitted by any provision of this Agreement shall be in writing and shall be delivered personally or sent by registered or certified mail, return receipt requested, and addressed as follows:

To Owner: **PPG INDUSTRIES, INC.**

Attn.: _____

To Contractor: _____

Attn.: _____

or to such other or additional address and/or designee(s) as either party may hereafter specify by notice in writing to the other. Any notice shall: (i) if delivered in person, be deemed to have been given or made at the time of delivery, or (ii) if mailed as aforesaid and properly addressed, be deemed to have been given or made when deposited in the United States Mail, first class postage prepaid.

ARTICLE V - ASSIGNMENT:

Contractor shall not assign this Agreement, in whole or in part, nor assign any monies due or to become due to it hereunder without the prior written consent of Owner. Any such assignment by Contractor, in violation of this Article, whether by operation of law or otherwise, shall be void. Subject to the foregoing, this Agreement shall be binding upon and inure to the benefit of the parties hereto, their respective successors and assigns.

ARTICLE VI - ENTIRE AGREEMENT:

This Agreement and all documents incorporated herein constitute the entire agreement between the parties hereto with respect to the subject matter hereof, and shall supersede all previous negotiations, conversations, writings and agreements by the parties with respect to the subject matter hereof. The provisions of this Agreement, as aforesaid, and including, without limitation, the terms of the various documents attached hereto and incorporated herein by reference, shall be changed only by a written agreement signed by the parties. No oral agreement or conversation with any officer, agent or employee of Contractor or Owner, either before or after the execution of this Agreement, shall affect, alter or modify the obligations of the parties.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first above written.

WITNESS:

PPG INDUSTRIES, INC. (Owner)

By _____

Title _____

WITNESS:

(Contractor)

By _____

Title _____