

Engr Work Order No: 689

DOW CHEMICAL U.S.A.  
TEXAS OPERATIONS  
FREEPORT, TEXAS

JOB SPECIFICATIONS

M102-33747

E-301 REPLACEMENT

OCD

UNIT II

APRIL 2, 1991

PLAINTIFF'S EXHIBIT

DOW-2414

ST0406583

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APPROVED: \_\_\_\_\_  
PROJECT ENGINEER

\_\_\_\_\_  
MANUFACTURING REPRESENTATIVE

ST0406583

APRIL 15, 1991  
JOB SPECIFICATIONS  
M102-33747

MIKE SIMS  
DOW CHEMICAL U.S.A.  
FREEPORT, TEXAS

## 1. BID INFORMATION

NOTE: The Bidders shall submit any questions through Purchasing via Fax or written. Purchasing will then obtain the answer from the Project Engineer and send it to all bidders at the same time, thus insuring fair and equitable treatment.

1.1 Submit a lump-sum proposal to furnish all supervision, labor, materials (except Owner-furnished), tools and equipment to perform the work for the OCD, Unit II Block of the U.S. area of The Dow Chemical Company, Freeport, Texas, ("Owner") as shown and noted on the drawings listed below and as specified herein. The scope of work involves:

The work specifically covered includes but is not limited to the following:

|                        |                  |
|------------------------|------------------|
| Demolition             | Painting         |
| Equipment Installation | Piping           |
| Hauling                | Structural Steel |
|                        | Insulation       |

1.1.1 The proposal shall be based on all work being performed on a straight-time basis, except as noted in Paragraph 1.1.1.36.

1.1.1.1 Hours of work shall be 7:30 a.m. to 4:00 p.m. Monday through Friday (except for Dow holidays). Any exceptions must have prior approval of the Owner's Representative.

1.1.1.2 The bidder shall state the number of days and hours that constitute his normal work week, if different from above.

1.1.1.3 The timing of this project is important and must be completed by September 23, 1991. Bidders shall be prepared to man the job site to ensure completion by this date. The following is a timeline for work to be done on this project:

a) Between the contract award date and September 16, 1991 all work other than replacing E-301 and making piping tie-ins must be completed.

b) Between September 16, 1991 and September 23, 1991 the rest of the project is to be completed. This work will require a scheduled plant shutdown. Work occurring during the shutdown needs to be planned so that there will be a minimum plant outage. Work crews shall be allowed to work 12 hour shifts maximum. The additional cost of this overtime shall be included in the bid. The timing of this portion is important and must be completed by September 23, 1991. Bidders shall be prepared to man the job to ensure completion by this date.

1.1.2 If Dow requires work beyond the scope shown in the bid documents, the cost of such change shall be negotiated with the Contractor before the work is done.

1.1.3 If overtime (other than noted in Paragraph 1.1.1.36) is requested by the Owner, Dow will reimburse the Contractor for wage premium in accordance with Paragraph 4.02 of the contract.

1.1.4 The successful bidder shall break out of his bid the cost of any demolition.

1.1.5 All Contractor-furnished equipment and materials shall be new and free of defects.

1.1.6 The successful bidder shall submit a plan of construction showing, in useful detail and time scale, how he intends to perform the work within the time specified. The plan shall indicate restraints imposed by Contractor-furnished components, and Contractor activities, other Contractors and Dow-furnished components. The plan shall be delivered to the Owner's Representative within 15 days from date of contract.

1.1.7 A job site visit for bidders will be held during the bid period, at which time the following will be discussed:

1.1.7.1 Location of the Contractor parking area, temporary construction office building location, storage area for material and equipment, location and availability of Owner-furnished utilities, and area where safe work permit is not required for cutting and welding operations.

1.1.7.2 The following utilities may be used by the Contractor and will be identified at the job site visit:

120V receptacles  
Telephone  
River water

1.1.7.2.1 The Contractor shall furnish and install, at his own expense, any necessary distribution facilities from the point of attachment to the Owner's existing facility. The Contractor shall also maintain in a safe operating condition, and remove at the completion of the contract, or earlier if so directed by the Owner's Representative.

1.1.8 If the Contractor's bid is successful, the job will be awarded under Dow Texas Operations "Construction Contract" form of agreement, a copy of which is available from the Owner.

1.1.9 It shall be the Contractor's responsibility to provide adequate storage facilities on the job site for all materials. This shall include weather protection where required, and necessary cribbing to keep materials out of mud and protect them against inclement weather. All handling, receiving and unloading shall be done by the Contractor. Material shall be stored in a neat and orderly manner.

1.1.10 The Contractor shall separate excess and/or unsuitable material resulting from his operations into the following categories:

1.1.10.1 Metal.

1.1.10.2 Lumber.

1.1.10.3 Other trash.

1.1.10.4 All metal shall be cut in lengths (max. of 20') to fit into a dempster.

1.1.10.5 All rebar and anchor bolts must be cut flush with the concrete rubble.

1.1.10.6 The Contractor must acquire a permit number from the Owner's Representative prior to dumping material.

1.1.10.7 Disposition of excess, salvageable items, and/or unsuitable material by the Contractor shall be as follows:

1.1.10.7.1 The metal shall be hauled to a dempster within Unit II.

1.1.10.7.2 Lumber shall be hauled to a dempster within Unit II.

1.1.10.7.3 Other trash shall be hauled to a dumpster within Unit II.

1.1.10.7.4 Concrete, paint skimmings and solvents shall be hauled to B-5100 Block and unloaded. This is approximately 6 miles from the job site.

1.1.10.7.5 All of the above material should not be unloaded until clearance and designated location is given by the Dow representative of that block.

1.1.10.8 The Contractor shall accumulate excess and/or unsuitable material on a daily basis so the job area is maintained in a clean orderly condition. Flammable material containers shall be covered at all times.

1.1.11 The Contractor shall be responsible for furnishing his own construction office, change rooms, lunch rooms, tool rooms, fabrication and material storage facilities, drinking water and sanitary facilities which must be portable chemical type.

1.1.11.1 All temporary buildings supplied by the Contractor must be tied down per Dow Engineering Specification 33-250. Contractor must obtain excavation permit for screw anchor installation.

1.1.11.2 All Contractor-furnished facilities shall be removed at completion of the job.

1.1.11.3 All comfort heaters required during construction shall be Contractor-furnished. Heating units shall be approved by the Owner's Representative.

1.1.12 The Contractor is advised that other Contractors will be working at the job site during the same period he is performing the work included in this contract.

1.1.13 Should the Contractor, as a result of his operations, disturb any areas not included in his scope of work, he shall restore them to their original state insofar as is practical, at his own expense.

1.1.14 The Contractor shall furnish to the Owner's Representative within two weeks after receipt of material, two copies of mill test reports, vendor's certification papers, or certified laboratory reports on Contractor-furnished pipe.

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## 1.2 Drawings & Specifications

1.2.1 The Dow Standards and/or Engineering Specifications referenced in these drawings and job specifications shall be the current edition in effect at the date of this specification.

1.2.2 A complete set of marked-up "as built" drawings are to be maintained by the Contractor during the job. Upon job completion these drawings are to be turned over to the Project Engineer.

### 1.2.3 Drawing List:

TB3-153-83006 REV "H"  
TB3-230-83006 REV "D"  
B04-200-33747 (Plot plan and general notes)  
B04-201-33747 (Line Schedule)  
B4-200-33747  
B4-201-33747  
B4-305-83006 REV "F"  
B4-305B-83006 REV "E"  
B4-305D-83006 REV "D"  
B4-306-83006 REV "H"  
B4-306A-83006 REV "E"  
B5-1-33747 REV "C"  
B5-1A-33747 REV "B"  
XB4-200-33747  
XB4-305-83006 REV "E"  
XB4-305B-83006 REV "D"  
XB4-305D-83006 REV "C"  
XB4-306-83006 REV "G"  
XB4-306A-83006 REV "D"  
XB5-211-33747 REV "G"

1.2.4 Dow Piping Specifications: "D", "E", "CC"

1.2.5 On revised drawings, only that work scoped and noted for M102-33747 shall be a part of this contract.

1.2.6 The prefix 'X' on a drawing number denotes a demolition drawing.

1.2.7 On revised equipment drawings, the revisions apply to the equipment fabricators unless specifically noted otherwise.

## 1.3 Work Done By Others

1.3.1 Vertical and horizontal control points from which the Contractor shall lay out the work have been established and are shown on Drawing B04-1-33747 (vertical) and B4-305-83006 (center line of E-301) (horizontal).

1.3.2 The following work will be done by others and is not a part of this contract:

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1.3.2.1 All instrumentation work.

1.3.2.2 All electrical work.

1.3.2.3 All radiographs (X-rays) will be done by Dow. Dow will pay for first X-ray only.

#### 1.4 Owner-Furnished Material

1.4.1 Equipment item E-301, approximate weight = 213,331# (empty).

1.4.1.1 The Contractor is to take possession of E-301 in the OCD Unit II Block. It will be brought into the block by others. Upon transfer of possession, all required handling, hauling and unloading shall be done by the Contractor. The Contractor will be given a minimum one week advance notice of arrival of E-301.

1.4.2 Service gaskets for E-301 for manway nozzles "F" and "H".

1.4.3 Acetic acid for cleaning pipe and fittings will be Dow furnished.

1.4.4 All required handling, loading, hauling and unloading of Owner-furnished material shall be done by the Contractor.

1.4.5 All surplus Owner-furnished and removed material shall be reported to the Owner's Representative at the job site and returned to Unit II.

1.4.6 Owner-furnished material lost or damaged after receipt of same by the Contractor shall be repaired or replaced by the Contractor.

1.4.7 Vendor drawings of Owner-furnished material will be made available to the bidders upon request.

1.4.8 The weights of Owner-furnished material given in the specifications or on the drawings represent the Owner's best available information. It shall be the Contractor's responsibility to verify all weights and provide adequate rigging and hoisting equipment to safely handle all equipment. All weight evidence, such as shipping weights, scale weight tickets, calculated figures, or vendor weights will be made available for this purpose. Any extra work necessary to verify Owner-furnished equipment weights will be handled as an extra to the contract with prior authorization from the Owner's Representative.

## 2. SPECIAL CONDITIONS UNIT II

2.1 All Contractor employees will be required to attend the Contractor Safety Council Indoctrination Program, if proof of attendance is not current. There will also be a block or unit safety orientation prior to beginning work and will require approximately 30 minutes. The Owner's Representative will be given one day advanced notice when the orientation is required.

2.1.1 Strict compliance with all Dow and OSHA Safety Rules, Guidelines, Standards, and Policies is mandatory.

2.1.2 All Contractors and sub-contractor personnel shall be familiar with and shall comply with the rules and procedures in the Safety and Loss Prevention Manual for Contractors issued by Dow Chemical U.S.A., Texas Operations, latest edition.

2.1.3 All Contractor and sub-contractor personnel shall be familiar with and comply with the safety rules and policies of the block or unit. Copies of the safety rules and policies will be furnished during the bidding period. The successful bidder shall return all copies at the completion of this contract to the Owner's Representative. All other bidders shall return all copies to the Owner's Representative as soon as this contract is awarded.

2.1.4 A block sticker will be issued and must be affixed to the hard hats of Contractor personnel.

2.1.5 The Contractor shall keep the site in a neat and clean condition at all times.

2.1.6 Barricades will be erected and maintained by the Contractor to protect personnel and will be placed at the discretion of the Owner's Representative.

2.2 The job site is located in an area designated as hazardous. Daily Safe Work Permits will be required, and may be obtained from Unit II Control Room, Dennis Wells, OC-201 Building, Phone 238-9669.

2.2.1 Separate safe work permits are required for:

- a) Welding, cutting or open flame operation.
- b) Spark-producing (non-welding) work.
- c) Critical lifts.

2.2.2 The Contractor shall return completed Safe Work Permits to the Control Center at the end of work each day, or when job is complete. Control Room OC-201.

2.3 Smoking within the jobsite will not be permitted.

2.3.1 Smoking shall be confined to an area which will be designated at the time of the job site visit.

2.3.2 Smoking on roadways and in vehicles between plant gate and jobsite will not be permitted.

2.4 Safety equipment required:

Hard Hat, Chemical Goggles, Mouth Bit Respirator (American Optical R-97 with R-722 cartridge or other NIOSH approved), Electrical Tested Rubber Boots and hearing protection.

2.4.1 Respirator cartridge is to be dated with employee name and changed every 6 (six) months or after each use.

2.4.2 Contractor-furnished safety harness will be required when working in elevated positions more than 3' off the ground.

2.4.3 Eye protection for using cutting torch or acetylene welding will be required. No one should perform these operations without wearing cutting glasses with shaded lenses.

2.4.4 All cutting torches must be provided with back flow check valves on both the oxygen and acetylene hoses.

2.4.5 As a minimum, welders must wear side shield safety glasses under their welding helmets while welding or slagging. If helmets are raised for more than a quick inspection of the weld, monogoggles must be worn if work is in a designated monogoggle area.

2.5 The Contractor is to confine his people to the work area, access areas and designated break areas. The Contractor employees are not to wander through the plant.

2.6 Fire lanes, access roads, safety showers, stairways and ladders shall not be blocked by the Contractor's equipment after working hours. During working hours, the Contractor must be able to clear fire lanes, access roads, safety showers, stairways and ladders at any time. They shall not be modified during construction.

2.7 The Contractor is not, under any circumstances, to use firewater from fire hydrants and/or fire monitors except to put out fires or for other emergencies.

2.8 Protective Enclosures for Welding:

2.8.1 All welding, burning, grinding or other spark producing operations shall be contained or extinguished as follows:

2.8.1.1 TYPE C: Sparks will not be allowed to fall through pipeways, on equipment, wire, cable or other apparatus. All sparks must be extinguished by falling into running water on paved areas or into running water on tarpaulins in grassy areas. Above grade, sparks shall fall into running water on tarpaulins placed over piping, equipment, wire, cable or other apparatus.

2.9 A pre-job safety conference will be conducted and the Unit or Contractor pre-job safety check sheet shall be completed prior to starting any field work.

2.9.1 The successful bidder shall hold weekly safety meetings for their personnel and any sub's personnel. A copy of the minutes of the meeting shall be given to the Owner's Representative who may attend the meeting as required.

2.10 A short safety meeting shall be conducted each day by the foreman of each crew on the job prior to commencing work. This meeting will, as a minimum, detail the tasks to be performed that day, emphasizing the possible hazards involved and safe methods to perform those tasks. Reference is hereby made to the "Safety and Loss Prevention Manual for Contractors" for guidance.

2.11 The Contractor shall provide and maintain adequate barricades and warning lights. All barricades shall be marked with a sign or green tag explaining the hazards and the sign or green tag shall be placed where it will be visible from all directions.

2.12 A weekly head count of Contractor personnel will be taken and recorded on forms supplied by the Owner's Representative.

2.13 Parking for Contractor personnel shall be outside the gate. The Contractor shall provide transportation from the gate to the jobsite.

2.13.1 Where parking is allowed within the Unit, cars and trucks must be parked in designated areas and left unlocked with the key in the ignition. This includes company-owned vehicles such as pickups, trucks and heavy equipment.

2.13.2 No gasoline or diesel powered vehicle will be allowed in the Unit without an I.C.E. permit from Unit personnel. Operation of this equipment, including cranes and backhoe machines, under pipeways is prohibited.

2.13.3 Jump starting of heavy equipment is prohibited under any circumstance. When jump starting is required to move heavy equipment, the equipment shall be jumped with a Dow-furnished battery cart. The use of the cart shall be limited for the sole purpose of getting the vehicle to the place it needs to be repaired (new battery or charged battery).

**NO MOTOR VEHICLE IS TO BE LEFT VACANT WITH THE ENGINE RUNNING.**

2.14 Sandblasting within the jobsite will be permitted only by a Safe Work Permit from the Owner's Representative.

2.15 All cranes shall be inspected as stipulated in paragraph H.6 of the S&LP Manual for Contractors. In addition, a daily safety inspections shall be made during the time the equipment is on the jobsite.

2.16 Scaffold boards are to have painted ends.

2.17 All Contractors, or foremen with total head count of Contractor employees, must sign in and out daily in the OC-201 Control Center and notify the area technician before entering an area. Personnel, required by their specific job assignments to wear mouth-nose respirators, Scott air packs or equivalent, or any other device that depends on an unbroken seal between the mask and the face for protection, must be clean shaven on all skin areas under the seal. This rule applies equally for routine and emergency response situations.

2.18 Only synthetic rope such as polypropylene is to be used.

2.19 Wearing of contact lens is prohibited.

2.20 Gloves shall not be worn when using portable grinders.

2.21 All Contractors' and Subcontractors' personnel shall be trained in the use of Texas Operations Safety Standard M-75, Lockout/Tagout Requirements, latest revision.

2.21.1 Any person who places lockout/tagout devices or performs work requiring lockout/tagout shall be trained in the recognition of applicable hazardous energy sources and type magnitude of the energy available in the plant and the methods and means necessary for energy isolation and control. All personnel who meets this criteria will be classified as "Users."

2.21.2 All other persons performing tasks that will not require the placement of lockout/tagout devices or who will not perform work requiring lockout/tagout will be trained in the utilization of restraining devices and Red Danger Tags. All personnel who meet this criteria will be classified as "Non-Users."

2.21.3 All "Users" and "Non-Users" shall be able to speak, read and understand English and be able to sign his/her name.

2.21.4 Retraining for all personnel is required annually.

2.22 Contractor shall provide a qualified safety observer who shall intervene to correct unsafe conditions and procedures so that accidents and injuries can be prevented. This safety observer shall spend at least ten (10) hours per week (approx. 2 hours per day) observing/intervening for unsafe acts and conditions. This safety observer/expert should especially be present during critical phases of the construction such as the times critical lifts are made. The successful bidder shall break this cost out of the bid.

2.22.1 A qualified safety observer is a person who has experience in and has been trained in the techniques of observing for unsafe acts and conditions such as a Contractor Safety Director or an expert in the field of activity being observed. This person should not be the working foreman or under the supervision of the working foreman.

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### 3. CIVIL

3.1 The only civil work on this project consists of removing and replacing platforms necessary to replace Exchanger E-301. All work shall be in accordance with Dow Spec 38-010.

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#### 4. PIPING

4.1 The term "piping", as used herein and on the piping drawings, is intended to include pipe, valves, fittings, strainers, traps, support elements, and other appurtenances.

4.1.1 Piping shall be fabricated and installed per Dow Engineering Specification 47-110.

4.2 Piping shall be tested as noted on Drawing B04-201-33747.

4.3 The Contractor shall not install any flanges other than those shown on the piping drawings without permission from the Owner's Representative's.

4.4 Screwed nipples shall be as specified in the piping specs and complying with the following:

4.4.1 Do not use all-thread or close nipples.

4.4.2 Nipples on insulated lines shall be a minimum of 3" long.

4.4.3 All nipples shall be Schedule 80 minimum.

4.5 The Contractor shall lubricate valve bushings and stems. The Contractor shall also lubricate and tighten valve packing gland bolts.

4.6 Piping general notes appear on Drawing B04-200-33747.

4.7 Plant water for testing and general construction purposes will be made available to the Contractor without cost but it will be his responsibility to furnish his own distribution facilities and remove them at job completion.

4.7.1 After testing, leaks and other defects detected after piping is placed in service, shall be repaired by the Contractor at no additional cost to the Owner. Before making repair, contact Owner's Representative to ascertain line is safe.

4.8 New gaskets shall be used for every flanged joint unless such assembly is intended solely for fit-up.

4.9 The specified bolt thread lubricant shall be applied to the full length of the threads.

4.10 Burned or otherwise damaged galvanized surfaces shall be repaired in accordance with Dow Engineering Specification 57-271.

4.11 Exposed threads on galvanized pipe connections shall be coated in accordance with Dow Engineering Specification 57-271 on the same day the connection is made.

4.12 Protect flange faces and pipe threads during storage and erection. flange faces and piping shall be clean and free from foreign matter before assembly.

#### 4.13 Miscellaneous

4.13.1 Tie-in connections to existing piping or equipment shall be made on this contract. These connections are identified on the drawings at tie points and noted:

I.E. TP-1.

4.13.1.1 Field check and correct dimensions and elevations of tie points before fabricating pipe that connects to these tie points. The dimensions are approximate and are sufficient for bidding purposes only.

4.14 Remove existing blind flanges or weld caps at tie points as necessary.

4.15 All piping tie-ins require a permit.

4.16 When/if existing Asbestos gaskets are encountered while making piping tie-ins (or during removal of existing piping) at flanged connections, the following action shall be taken:

4.16.1 If the gasket freely comes loose from it's mating surfaces it shall be removed by the Contractor, placed in a plastic bag, and given to the Owner's Representative for disposal.

4.16.2 If the gasket is stuck to the mating surfaces, or during gasket removal a portion of the gasket sticks to a mating surface, the Contractor is to notify the Owner's Representative who will in turn notify the Manufacturing Representative who will obtain trained personnel to remove the gasket material and dispose of it.

4.17 The welding procedure and technique shall be the responsibility of the Contractor and shall be submitted to Owner's Representative for approval before any welding is performed. Welding procedures and techniques, unless otherwise specified, shall be optional with the Contractor within code limitations.

4.18 All welders shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code. Welder qualification records will be submitted to Dow prior to any welding.

4.19 Modifications to 30" carbon steel steam line LS-506-30"-D.

4.19.1 The 30" welds, made during the modifications, shall be stress relieved. (Stress relief, with torches or rosebuds, shall not be permitted). Note: Stress relief for this modification is a process requirement, stress relief according to the latest edition ASME/ANSI B31.3, Table 331.1.1, carbon steel for nominal wall thickness greater than 3/4" (actual wall thickness is standard weight pipe).

4.19.2 Welding procedures, which specify post weld heat treatment, shall include methods and techniques to be used for heating and cooling and shall also include monitoring and recording methods that will be used. The PWHT procedure shall be approved prior to start of fabrication. (Recording charts shall be given to Owner's Representative upon completion of PWHT).

4.19.3 Fabricator shall be responsible for the post weld heat treatment.

4.19.4 Welds shall require 100% radiography, with acceptance criteria according to ANSI B31.3, for normal service conditions.

4.19.5 Radiography will be performed both before and after post weld heat treatment has been completed. Dow will pay for "each" first X-ray only.

4.19.6 If assistance is required concerning the PWHT, the welding technology group should be consulted at one of the following Phone Numbers: Moffett, Phone 7712; McDuff, Phone 9449; Korenek, Phone 3482; Barber, Phone 3519 or Ross, Phone 5353.

4.20 Welders and welding procedures for nickel 200 to nickel 200, shall be qualified per the requirements of ASME Section 9 and shall be submitted to Owner's Representative for approval prior to start of fabrication.

4.21 Welders and welding procedures for nickel clad to nickel clad and nickel 200 to nickel clad shall be qualified per the requirements of ASME Section 9 for corrosion resistant overlay and shall be submitted to Owner's Representative for approval prior to start of fabrication.

4.21.1 Backwelding: Unless otherwise specified, the final weld overlay surface and adjacent 1/16" deep layer below the surface, shall have a chemical composition conforming to the specification of the alloy base material that it is to replace. The final surface shall be the exposed surface after final cleaning.

4.21.2 The final surface, exposed to process fluids shall be welded with the GTAW process.

4.21.3 Final surface of overlay welds shall be cleaned with a PG wheel. No grinding shall be permitted.

4.22 ARC strikes to any surfaces exposed to process fluids shall not be permitted.

4.23 Existing base materials which have been exposed to process fluids shall be cleaned with acetic acid and buffed with a PG wheel prior to heating or welding.

4.24 All nickel and nickel clad welds shall be examined with liquid dye penetrant and shall be witnessed by Dow Pressure Vessel Inspector. No indications will be permitted on the process side.

4.25 For weld sizes 30" and larger, a Dow Pressure Vessel inspector shall witness all fit-ups and all required testing. (Tommy Peters, Phone 238-1219).

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## 5. EQUIPMENT

5.1 Contractor shall inspect all equipment when received and notify the Owner's Representative in writing of any shortages or damaged equipment. Thereafter, the completeness and condition of equipment shall be the Contractor's responsibility.

5.2 Approximate weight of equipment is noted in the Owner-furnished material section of this specification. However, it shall be the Contractor's responsibility to verify weight prior to handling equipment.

### 5.3 Equipment Setting

5.3.1 Mechanical equipment shall be installed in accordance with Dow Engineering Specification 55-200.

5.3.2 Experienced personnel and adequate handling equipment shall be used for setting equipment.

5.3.3 Elevations of equipment shall be set using the control point shown on Drawing B04-200-33747.

5.3.4 Equipment shall be set level, true to line, at correct elevation and in proper orientation as shown and noted on the installation drawings noted on equipment schedules and as specified herein.

5.3.5 Shims shall be furnished by the Contractor.

5.4 Equipment to be installed is listed in the Owner-furnished material section of this specification.

5.5 Equipment shall be inspected by the Owner's Representative prior to final piping connection. New gaskets shall be used when final piping connection or cover replacement is made.

5.6 Equipment openings shall be weather protected at all times.

5.7 The existing (old) exchanger E-301 is to be hauled by the Contractor to the Unit II lay down yard and unloaded.

## 8. INSULATION

8.1 All insulation shall be in accordance with Dow Engineering Specification 56-501.

8.2 Piping insulation and insulation jackets shall be as noted on Drawing B04-201-33747.

8.2.1 All banding material shall be monel.

8.3 Valves, flanges and in-line instruments are not to be insulated.

8.4 The Contractor is to replace the existing insulation removed for making tie-ins with new insulation as specified.

8.5 Typical insulation details are given by Dow Engineering Specifications 56-001 through 56-101. No attempt has been made to cover all conditions. Insulation shall be applied in conformance to these specifications, resulting in a complete and finished job, whether or not specific details are shown. Should there be any question concerning insulation application, they should be brought to the attention of the Owner's Representative for clarification prior to installation.

8.6 Prior to the shutdown, the insulation on the existing (old) exchanger E-301 is to be removed by the Contractor. Existing insulation is calcium silicate type approximately 3 1/2" thick.

8.7 After approved testing, the new E-301 exchanger is to be insulated and finished in accordance with the Dow Spec's and notes on Drawing B5-1-33747.

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## 9. PAINTING

9.1 All painting shall be in accordance with Dow Engineering Specifications 57-201 and the following:

9.1.1 Piping shall be painted as specified on Drawing B04-201-33747.

9.2 All damaged galvanizing (including exposed threads on pipe connections and structural steel) shall be repaired in accordance with Dow Engineering Specification 57-271.

9.3 All damaged painted surfaces (pipe, structural steel, equipment, etc.) shall be prepared in accordance with Dow Engineering Specification 57-204 (power tool cleaning--no hand cleaning allowed) and painted according to the coating system that was specified for that item.

9.4 All steel valves shall be painted according to the coating system of the pipe they are in.

9.5 Finish colors shall be light gray.

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## 10. DEMOLITION

10.1 The Contractor shall keep the site in a neat and clean condition at all times.

10.2 Barricades will be erected and maintained by the Contractor to protect personnel and will be placed at the discretion of the Owner's Representative.

10.3 Fire lanes and access roads shall not be blocked by Contractor's equipment after working hours. During working hours, Contractor must be able to clear fire lanes and access roads at any time.

10.4 Successful bidder will secure the field representative's approval on techniques he is planning to use before proceeding with the work.

10.5 All rigging will comply with Dow's Rigging and Critical Lift Standards; specifically but not limited to Dow's Safety Standard #21.

10.6 Rig booms are to be lowered at night and over weekends.

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