SPECIFICATION 6797

PRIMARY AND SECONDARY STEEL LINER TANKS
FOR
PROJECT 9S1493

WASTE STORAGE TANKS
200 AREA - BLDG. 241-14F
SAVANNAH RIVER PLANT

APPROVED BY.

E. I. DU PONT DE NEMOURS & CO.
DESIGN DIVISION, ENGINEERING DEPT.

Albert A. Kirkbright 12/6/74
Atomic Energy Division

Wayne F. Peters 8/20/74
Design Division

James Landrum
Engineering Service Division

Specification 6797
Original: 8/20/74
Addendum A: 9/9/74
Addendum B: 11/21/74
Addendum C: 4/28/76

SPECIFICATION NO. 6797, REVISIONS

PROJECT 9S1493

PRIMARY AND SECONDARY STEEL LINER TANKS

Description	Approvals Du Pont Design	Du Pont AED
Rev. 1 April 30, 1976		
Addendum A September 9, 1974		
Addendum B November 21, 1974		
Addendum C April 28, 1976		

TABLE OF CONTENTS

*Addendum C: 4/28/76

1. GENERAL

1.1. INTENT

1.1.1

THIS SPECIFICATION ALONG WITH ALL RELATED DRAWINGS DESCRIBES THE EQUIPMENT, MATERIALS OF CONSTRUCTION, FABRICATION AND ERECTION PROCEDURES, STRESS RELIEVING, INSPECTION, AND TESTING REQUIREMENTS FOR THE CONSTRUCTION OF FOUR 85 FT DIAMETER, 1,300,000 GALLON CAPACITY PRIMARY STEEL TANKS, EACH WITHIN A 90 FT DIAMETER SECONDARY STEEL LINER TANK, ALL DESIGNATED AS PART OF BUILDING 241-14F IN THE 200F AREA OF THE SAVANNAH RIVER PLANT.

1.1.2

THE STEEL TANKS COVERED BY THIS SPECIFICATION WILL BE USED FOR THE STORAGE OF HIGH-LEVEL RADIOACTIVE WASTE SOLUTIONS. THE PREVENTION OF RADIOACTIVE CONTAMINATION AND THE CONTROL OF RADIATION HAZARDS REQUIRES THAT 100% CONTAINMENT INTEGRITY BE MAINTAINED OVER A LONG PERIOD OF TIME. FOR THIS REASON, IT IS IMPERATIVE THAT THESE TANKS BE BUILT WITH HIGHEST REGARD FOR MATERIAL QUALITY, WORKMANSHIP, FABRICATION CONTROL, AND TESTING PROCEDURES WHICH WILL REDUCE TO A MINIMUM ANY POSSIBILITY OF TANK FAILURE OR LEAKAGE WHICH COULD BE ATTRIBUTED TO FABRICATION AND/OR CONSTRUCTION DEFICIENCIES.

1.2. SCOPE

1.2.1

THE SCOPE OF WORK INCLUDED IN THIS SUBCONTRACT CONSISTS OF THE DETAILED DESIGN; SUPPLY OF MATERIALS, LABOR, AND EQUIPMENT; FABRICATION AND ERECTION; RADIOGRAPHIC EXAMINATION OF WELDS AND INTERPRETATION OF EXPOSED FILMS; AND TESTING FOR CONTAINMENT INTEGRITY OF FOUR PRIMARY STEEL TANKS AND FOUR SECONDARY STEEL LINER TANKS.

1.2.2

INCLUDED ALSO IN THIS SUBCONTRACT IS THE SUPPLY OF EQUIPMENT AND THE PERFORMANCE OF ALL WORK NECESSARY TO FULLY STRESS RELIEVE THE FOUR COMPLETELY ERECTED PRIMARY STEEL TANKS.

1.2.3

ALL WORK IS TO BE PERFORMED IN STRICT ACCORDANCE WITH THIS SPECIFICATION AND RELATED DRAWINGS AND IS SUBJECT TO THE TERMS AND CONDITIONS OF THIS SUBCONTRACT.

1.3. APPLICABLE SPECIFICATIONS

1.3.1

SPECIFICATIONS, OTHER THAN THOSE DESCRIBED HEREIN APPLYING TO A SECTION IN THIS SPECIFICATION, ARE NOTED IN THAT SECTION BY SERIAL DESIGNATION AND ARE TO BE THE LATEST REVISION TO DATE.

THEY ARE TO BE CONSIDERED A PART OF THIS SPECIFICATION AS IF FULLY PRESENTED THEREIN.

1.3.2

SECTION VIII AND SECTION IX OF THE ASME BOILER AND PRESSURE VESSEL CODE, LATEST EDITION AND ADDENDA ARE TO BE CONSIDERED PART OF THIS SPECIFICATION AS IF FULLY PRESENTED ELSEWHERE HEREIN.

*1.4. APPLICABLE DRAWINGS

1.4.1

THE FOLLOWING IS A LIST OF DRAWINGS APPLICABLE TO THIS SPECIFICATION:

W700107 T.C. PLOT PLAN
W449600 STUDY PLOT PLAN SH. 2
W162690 TANK BOTTOM LOWERING FRAME
W162691 TANK BOTTOM LOWERING FRAME
W449824 COOLING SLOTS
W448842 SECONDARY LINER
W448843 PRIMARY LINER
W448846 AIR INLET MANIFOLD
W448847 BASE SLAB REINFORCING
W448849 GENERAL ARRANGEMENT
W448883 LINER PLATE ATTACHMENTS SH. 1
W448884 LINER PLATE ATTACHMENTS SH. 2
W449389 COOLING COIL SUPPORTS
W449796 TOP SLAB PLAN
W449823 COOLING COIL GUIDES
W700014 HEADER SUPPORTS
W449193 H & V DEHUMIDIFICATION
SW449815 INSTR. ARRGT. & DETAILS SH. 1
SW449822 INSTR. ARRGT. & DETAILS SH.2
SW449931 INSTR. MISC. DETAILS

1.5. DEFINITION OF TERMS

1.5.1

THE TERM "DU PONT" MEANS E.I. DU PONT DE NEMOURS & CO. OR ITS DULY AUTHORIZED REPRESENTATIVE.

1.5.2

THE TERM ''SUBCONTRACTOR'' MEANS THE SUBCONTRACTOR ENTERING INTO THIS SUBCONTRACT WITH DU PONT.

1.5.3

THE TERM ''DU PONT INSPECTOR'' MEANS THE DULY AUTHORIZED REPRESENTATIVE OF THE CONSTRUCTION INSPECTION SECTION OF THE E.I. DU PONT DE NEMOURS & CO.

1.5.4

THE TERM ''DU PONT INSPECTION ENGINEER'' MEANS DU PONT'S AUTHORIZED REPRESENTATIVE AT THE SAVANNAH RIVER PLANT IN CHARGE OF INSPECTING AND APPROVING THE FIELD WORK THAT IS PERFORMED UNDER THIS SUBCONTRACT.

1.6. CERTIFICATION OF MATERIALS

#*1.6.1

MATERIALS FOR PLATES, STRUCTURAL SHAPES, AND PIPE SHALL BE CERTIFIED BY MILL TEST REPORTS AS PRESCRIBED BY THE ASTM SPECIFICATIONS APPLICABLE TO EACH MATERIAL (SEE PARAGRAPH 2.1). MILL TEST REPORTS IN QUADRUPLICATE ARE TO BE SUBMITTED TO D.R. ARNOLD, DESIGN DIVISION FOR APPROVAL PRIOR TO THE USE OF THE MATERIAL.

1.6.2

ALL PLATES, SUBASSEMBLIES, KNUCKLE PLATES, ETC. SHALL BE INSPECTED BY THE DU PONT INSPECTOR AFTER FABRICATION AND PRIOR TO SHIPMENT TO THE CONSTRUCTION SITE. FOR GENERAL INSPECTION REQUIREMENTS, SEE ARTICLE VI OF THE GENERAL CONDITIONS.

1.6.3

CERTIFICATION OF ELECTRODES AND FILLER WIRE IS TO BE AS SET FORTH IN PARAGRAPH 2.4.7.

1.7. OUTLINE OF RESPONSIBLITY

1.7.1

THE SUBCONTRACTOR IS TO PROVIDE ALL LABOR, TOOLS, JIGS, FIXTURES, AND EQUIPMENT FOR THE FABRICATION OF FOUR PRIMARY STEEL TANKS AND FOUR SECONDARY STEEL LINER TANKS AS SPECIFIED IN SECTION 2 OF THIS SPECIFICATION.

1.7.2

THE SUBCONTRACTOR IS TO PROVIDE ALL LABOR, TOOLS, DUNNAGE, CRATING, SCAFFOLDING, TEMPORARY SUPPORTS, HANDLING RIGS, LIFTING CRANES, TRANSPORTATION AND ALL OTHER MATERIALS AND EQUIPMENT REQUIRED FOR ALL PHASES OF ERECTION OF THE TANKS AS SPECIFIED IN SECTION 2 OF THIS SPECIFICATION.

1.7.3

THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING, INSTALLING, AND REMOVING, AFTER INSTALLATION OF THE CONCRETE ROOF, TEMPORARY ROOF SUPPORTS. TEMPORARY ROOF SUPPORTS BECOME THE PROPERTY OF DU PONT.

*1.7.3.1

THE TEMPORARY ROOF SUPPORTS SHALL BE OF ADEQUATE STRENGTH AND CONFIGURATION TO PERMIT THE HORIZONTAL ROOF PLATES TO BE USED AS THE SUPPORTING FORM FOR POURING THE CONCRETE ROOF. THE MINIMUM UNIFORM DEAD LOAD AND LIVE LOAD ON THE HORIZONTAL ROOF PLATES SHALL BE TAKEN AS 800 POUNDS PER SQUARE FOOT.

1.7.3.2

THE SUBCONTRACTOR SHALL SUBMIT HIS DESIGN FOR THE TEMPORARY ROOF SUPPORTS TO DU PONT FOR APPROVAL PRIOR TO FABRICATION. TEMPORARY ROOF SUPPORTS SHOULD BE WOOD TO MINIMIZE POSSIBLE DAMAGE TO TANK PLATES DURING PLACING AND REMOVAL.

1.7.3.3

THE SUBCONTRACTOR SHALL SUPPLY A SUFFICIENT NUMBER OF COMPLETE TEMPORARY ROOF SUPPORTS TO ALLOW THE SUPPORTS TO REMAIN IN PLACE UNTIL THE CONCRETE ROOF HAS ATTAINED SUFFICIENT STRENGTH TO ALLOW REMOVAL OF THE SUPPORTS.

1.7.3.4

THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO THE TANK PLATES RESULTING FROM REMOVAL OF THE TEMPORARY ROOF SUPPORTS. ALL DAMAGE RESULTING SHALL BE REPAIRED ACCORDING TO PARAGRAPH 2.4.14 AND THE REPAIRED AREA STRESS RELIEVED ACCORDING TO PARAGRAPH 2.6.8.

1.7.4

IT WILL BE THE RESPONSIBILITY OF THE SUBCONTRACTOR TO SUBMIT SIX (6) COPIES OF A DETAILED ''CONSTRUCTION SCHEDULE'' TO DU PONT'S CONSTRUCTION CONTRACT SUPERVISOR AT THE JOB SITE WITHIN TWO (2) WEEKS AFTER THE AWARD OF THIS CONTRACT. THIS ''CONSTRUCTION SCHEDULE'' SHALL INCLUDE THE PROCUREMENT, FABRICATION, ERECTION PROCEDURE, INSPECTION, STRESS RELIEVING AND TESTING OF THE FOUR PRIMARY STEEL TANKS AND FOUR SECONDARY STEEL LINER TANKS ACCORDING TO THE INTENT OF THIS SPECIFICATION. SEE BID FORMS FOR TENTATIVE CONSTRUCTION SCHEDULE REQUIRED AT BID SUBMISSION.

1.7.5

RADIOGRAPHY SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL BUREAU OF STANDARDS AND/OR USAEC RULES AND REGULATIONS TITLE 10, WHICHEVER IS APPLICABLE. THE BIDDER SHALL SUBMIT IN WRITING, ATTACHED TO OR INCLUDED IN HIS QUOTATION, AN AGREEMENT THAT HE IS FULLY AWARE OF THIS REQUIREMENT, AND WILL COMPLY WITH IT THROUGHOUT THE TERM OF THE SUBCONTRACT.

*1.7.6

THE SUBCONTRACTOR IS TO PROVIDE ALL LABOR, EQUIPMENT, INSULATION, CONTROLS, ETC., NECESSARY TO COMPLETELY STRESS RELIEVE THE FOUR ERECTED PRIMARY STEEL TANKS IN ACCORDANCE WITH THE REQUIREMENTS OF THIS SPECIFICATION AS SET FORTH IN SECTION 2.6 - STRESS RELIEVING.

*1.7.7

AS PART OF BIDDER'S PROPOSAL, THE BIDDERS ARE REQUIRED TO SUBMIT TO DU PONT AN OUTLINE OF THEIR PROPOSED STRESS RELIEF PROCEDURE. THE SUBCONTRACTOR IS REQUIRED TO FURNISH SIX (6) COPIES OF A COMPLETE AND DETAILED ''STRESS RELIEVING PROCEDURE'' (SEE PARAGRAPH 2.6.2) TO DU PONT'S CONSTRUCTION CONTRACT SUPERVISOR AT THE JOB SITE WITHIN 60 DAYS AFTER THE AWARD OF THIS CONTRACT. DU PONT WILL CONSIDER THIS INFORMATION CONFIDENTIAL IF SO REQUESTED. THE STRESS RELIEVING PROCEDURE WILL BE SUBJECT TO DU PONT APPROVAL AND THE STRESS RELIEF OPERATION MUST BE WITNESSED IN ITS ENTIRETY BY DU PONT.

1.7.8

THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE RADIOGRAPHIC EXAMINATION OF WELDS AND THE INTERPRETATION OF THE RADIOGRAPHS FOR WELD INTEGRITY IN ACCORDANCE WITH THE PROCEDURE AS SPECIFIED IN SECTION 3 - INSPECTION & TESTING, OF THIS SPECIFICATION.

1.7.9

THE SUBCONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, AND ALL OTHER ITEMS NECESSARY TO VACUUM LEAK TEST WELDS AS SET FORTH IN SECTION 3 - INSPECTION & TESTING, OF THIS SPECIFICATION. VACUUM LEAK TESTING SHALL BE DONE ONLY IN THE PRESENCE OF THE DU PONT INSPECTOR.

1.7.10

THE SUBCONTRACTOR SHALL PROVIDE ALL LABOR, PUMPS, HOSES, AND ALL OTHER ITEMS NECESSARY TO PERFORM HYDROSTATIC TESTS OF THE PRIMARY STEEL TANKS AS SET FORTH IN SECTION 3.3 OF THIS SPECIFICATION. DU PONT WILL FURNISH WATER FOR THESE TESTS WHEN REQUIRED.

1.7.11

THE SUBCONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, ETC., NECESSARY TO INSTALL THE INSULATING LAYER BETWEEN THE BOTTOM OF THE SECONDARY STEEL LINER TANKS AND BOTTOM OF THE PRIMARY STEEL TANKS. THE SUBCONTRACTOR SHALL VERIFY THE MATERIAL AND THE THICKNESS USED PROVIDES THE REQUIRED INSULATION PROTECTION FOR THE STRUCTURAL BASE SLAB CONCRETE DURING THE STRESS RELIEF OPERATION. (SEE SECTION 2.6)

1.7.12

THE SUBCONTRACTOR WILL BE RESPONSIBLE FOR PERFORMING ALL OPERATIONS IN CONNECTION WITH RAISING AND LOWERING THE TANK BOTTOM AND KNUCKLE ASSEMBLY TO PERMIT RADIOGRAPHIC INSPECTION OF WELDS FOR ALL PRIMARY STEEL TANKS AND SECONDARY LINER TANKS. HE SHALL SUBMIT TO DU PONT FOR APPROVAL INCLUDED IN "CONSTRUCTION SCHEDULE" PER PARAGRAPH 1.7.4, HIS PROPOSED METHOD FOR RAISING, SHORING, PROTECTION OF THE INSULATING LAYER, LOWERING AND FINAL ALIGNMENT OF BOTH PRIMARY AND SECONDARY BOTTOM AND KNUCKLE ASSEMBLIES.

1.7.13

IF THE SUBCONTRACTOR ELECTS TO RAISE AND LOWER THE TANK BOTTOMS WITH A LIFTING FRAME, DU PONT WILL SUPPLY AT THE CONSTRUCTION SITE, A STEEL RAISING AND LOWERING FRAME AND HYDRAULIC EQUIPMENT WHICH HAS BEEN USED IN CONSTRUCTION OF PREVIOUS TANKS OF THE SAME SIZE.

1.7.13.1

THIS EQUIPMENT HAS HYDRAULIC SYSTEMS, FOR EACH FRAME, CONSISTING OF 4 HANNIFIN MODEL HJ2N JACKS, 8" BORE X 48" STROKE (MANUFACTURER:S DESIGN CAPACITY 1500 PSI)

WHICH WILL BE CHECKED AND PLACED IN GOOD OPERATING CONDITION BY DU PONT. HYDRAULIC PUMPS, TOGETHER WITH PIPING WITH CAPACITY FOR THE WORK INTENDED (1500 PSI MIN.), WILL BE FURNISHED BY DU PONT. HYDRAULIC JACKS AND HYDRAULIC SYSTEMS WILL BE DELIVERED WITH THE UNASSEMBLED RAISING-LOWERING FRAMES TO A STORAGE SITE IN THE VICINITY OF THE TANK WORKING AREA. THE SUBCONTRACTOR SHALL ASSEMBLE AND CHECK THE FRAMES AND COMPLETE HYDRAULIC SYSTEMS FOR STRENGTH, CAPACITY, ADEQUACY FOR THE PURPOSE AND CONDITION, AND SHALL BE RESPONSIBLE FOR THEIR USE IN ALL OPERATIONS DURING ERECTION, RAISING, LOWERING, AND DISMANTLING. DU PONT SHALL NOT BE LIABLE FOR ANY DAMAGE OR LOSS INCURRED BY THE SUBCONTRACTOR BY REASON OF HIS USE OF THE RAISING-LOWERING FRAME AND ASSOCIATED FACILITIES.

1.7.13.2

UPON COMPLETION OF THE WORK, THE SUBCONTRACTOR SHALL REMOVE THE FRAMES AND HYDRAULIC EQUIPMENT TO THE DESIGNATED STORAGE SITE, IN THE SAME CONDITION AS RECEIVED, LESS NORMAL WEAR AND TEAR.

1.7.13.3

THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPERATIONS CONNECTED WITH RAISING AND LOWERING THE TANK BOTTOM, INCLUDING THE MAINTENANCE AND ADJUSTMENT OF THE RAISING-LOWERING FRAME, IF USED.

1.7.14

DU PONT SHALL FURNISH ELECTRIC POWER AT A CENTRAL SOURCE ON THE SITE. ALL ELECTRIC FACILITIES REQUIRED IN THE PERFORMANCE OF THE WORK SPECIFIED IN THIS CONTRACT SHALL BE SUPPLIED BY THE SUBCONTRACTOR. DU PONT WILL MAKE EVERY EFFORT TO INSURE CONTINUOUS ELECTRIC SERVICE; HOWEVER, POWER FAILURE SHALL NOT BE A BASIS OF CLAIM FOR DAMAGES.

1.8. GENERAL DRAWING REQUIREMENTS

1.8.1

THE SUBCONTRACTOR SHALL SUBMIT TO DU PONT ONE MONTH PRIOR TO USE, COMPLETE DRAWING DETAILS AND WELDING PROCEDURES IN ACCORDANCE WITH SECTION IX OF THE ASME BOILER AND PRESSURE VESSEL CODE, LATEST EDITION, COVERING ALL SHELL CLOSURE WELDS, STRUCTURAL WELDS AND TYPICAL FILLET WELDS.

1.8.2

THE SUBCONTRACTOR SHALL SUBMIT TO DU PONT FOR APPROVAL DETAILED SHOP DRAWINGS OF ALL COMPONENT PARTS OF THE PRIMARY AND SECONDARY STEEL TANKS TO BE FURNISHED, INCLUDING ALL ATTACHMENTS TO THE TANK LINERS COVERED BY THE CONTRACT. UPON REQUEST TO DU PONT AND AFTER SUITABLE CHANGES BY DU PONT HAVE BEEN MADE, DU PONT DRAWINGS MAY BE USED AS PART OF THE SUBCONTRACTOR'S APPROVAL DRAWINGS. REPRODUCIBLE COPIES WILL BE SUPPLIED BY DU PONT WITHOUT CHARGE.

1.8.3

THE SUBCONTRACTOR SHALL SUBMIT TO DU PONT FOR APPROVAL COMPLETE FIELD ERECTION DRAWINGS DETAILING THE EXACT LOCATION AND LAYOUT OF ALL TANK LINER WELD SEAMS. THE LOCATION OF A VERTICAL WELD SEAM NEAREST THE NORTH POINT ON EACH TANK SHALL BE USED AS A REFERENCE POINT FOR LOCATING ALL WELDS. ANY OFFSET OF THESE BASE POINTS FROM NORTH SHALL BE ESTABLISHED WITH LINEAR DIMENSIONS. THE FINAL POSITION OF THE WELDS ON THE COMPLETED TANKS SHALL BE WITHIN THE TOLERANCE ALLOWANCE SHOWN ON APPROVED SHOP DRAWINGS.

1.8.4

SUBCONTRACTOR'S DRAWINGS WILL BE CHECKED FOR GENERAL CONFORMITY TO DIMENSIONS AND MATERIAL SPECIFICATIONS ONLY.

2. FABRICATION & ERECTION

2.1. MATERIAL SPECIFICATIONS

#*2.1.1

ALL STEEL PLATE MATERIAL FOR THE CONSTRUCTION OF THE PRIMARY AND SECONDARY STEEL TANKS COVERED BY THIS SPECIFICATION SHALL BE ASTM A516, GRADE 70. MILL TEST REPORTS ARE REQUIRED AS PER SECTION 1.6 OF THIS SPECIFICATION. STEEL PLATE MATERIAL FOR EACH PRIMARY TANK SHALL BE ASTM A516, GRADE 70, NORMALIZED.

** 2.1.2

ALL STEEL MATERIAL USED FOR TEMPORARY ATTACHMENTS, CLIPS, ETC., SHALL BE ASTM A36 OR ASTM A516.

** 2.1.3

ALL STEEL PLATE MATERIAL USED FOR ROOF RISERS AND OTHER PERMANENT PLATE ATTACHMENTS SHALL BE ASTM A36. MILL TEST REPORTS ARE REQUIRED PER SECTION 1.6.

2.1.4

ALL STEEL PIPE MATERIAL USED FOR INLETS AND COOLING COIL RISERS SHALL BE ASTM A53, TYPE S, GRADE B. MILL TEST REPORTS ARE REQUIRED PER SECTION 1.6.

2.1.5

ALL STRUCTURAL STEEL SHAPES REQUIRED SHALL BE ASTM A36.

2.1.6

ELECTRODES AND FILLER WIRE (ASTM-AWS DESIGNATIONS) TO BE USED SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF SECTION 2.4 OF THIS SPECIFICATION.

2.1.7

ALL PLATE HEREIN SPECIFIED SHALL BE FURNISHED TO THICKNESS REQUIREMENTS AND NOT TO WEIGHT. THE THICKNESS SHALL BE WITHIN THE TOLERANCE SPECIFIED IN ASTM A20.

2.1.8

ROOF PLATE ANCHOR STUDS ON PRIMARY LINER TANKS AS SHOWN ON APPROVED DRAWINGS ARE TO BE AS MANUFACTURED BY THE NELSON STUD WELDING DIVISION OF GREGORY INDUSTRIES, INC. OR AN APPROVED EQUAL.

**Addendum C: 4/28/76

2.1.9

THE MATERIAL SPECIFICATIONS FOR THE INSULATING LAYER ARE TO BE SELECTED BY THE SUBCONTRACTOR AND SUBMITTED TO DU PONT FOR APPROVAL PRIOR TO THEIR USE. (SEE SECTION 2.5)

*2.1.10

DUCTWORK AS SHOWN ON THE DRAWINGS SHALL BE PROVIDED BY THE SUBCONTRACTOR. DUCT MATERIAL SHALL BE CARBON STEEL IN ACCORDANCE WITH SPECIFICATION SH1A AND SHALL CONFROM TO ASTM A526 OR A527. FABRICATION SHALL BE IN ACCORDANCE WITH STANDARDS H18J AND H34J TABLE 5. STIFFENERS SHALL BE APPLIED TO THREE EXPOSED SIDES OF DUCTWORK.

2.2. ERECTION SEQUENCE

2.2.1

THE FOLLOWING LIST OF OPERATIONS IS INTENDED ONLY AS A GENERAL OUTLINE OF THE ERECTION SEQUENCE FOR ANY ONE TANK. THIS LISTED SEQUENCE WILL EVENTUALLY BE SUPERSEDED BY THE MORE DETAILED "CONSTRUCTION SCHEDULE" FOR THE FOUR TANKS WHICH IS TO BE SUBMITTED TO DU PONT BY THE SUBCONTRACTOR IN ACCORDANCE WITH PARAGRAPH 1.7.4 OF THIS SPECIFICATION.

2.2.2 GENERAL OUTLINE OF ERECTION SEQUENCE

2.2.2.1

CONSTRUCTION OF THE SECONDARY STEEL LINER BOTTOM ASSEMBLY INCLUDING ENTIRE BOTTOM, KNUCKLE PLATES, AND THE LOWER FOUR FEET (4') OF THE COLUMN FORM PLATES.

2.2.2.2

LIFTING OF THE SECONDARY STEEL LINER BOTTOM ASSEMBLY FOR RADIOGRAPHIC EXAMINATION.

2.2.2.3

COMPLETE RADIOGRAPHIC EXAMINATION OF WELDS ON THE SECONDARY LINER BOTTOM ASSEMBLY. REPAIR AND RE-EXAMINATION AS REQUIRED.

2.2.2.4

LOWERING, FLATTENING, ALIGNMENT, AND REMOVAL OF CLIPS, LUGS, ETC., EXAMINATION AND REPAIR OF DAMAGE AS REQUIRED FOR THE SECONDARY STEEL LINER BOTTOM ASSEMBLY. MAGNAFLUX REPAIRED AREAS.

2.2.2.5

VACUUM LEAK TESTING OF WELDS ON THE SECONDARY STEEL LINER BOTTOM ASSEMBLY, REPAIR AND RETESTING AS REQUIRED. (THE SUBCONTRACTOR IN ADDITION, MAY CHOOSE TO VACUUM LEAK TEST THE BOTTOM ASSEMBLY BEFORE LOWERING; HOWEVER, THE VACUUM LEAK TEST IN TH FINAL LOWERED POSITION IS REQUIRED.)

2.2.2.6

PLACEMENT OF THE INSULATING LAYER INSIDE THE BOTTOM OF THE SECONDARY STEEL LINER.

2.2.2.7

REPEAT OPERATIONS 2.2.2.1 THRU 2.2.2.6 ABOVE FOR THE PRIMARY LINER BOTTOM ASSEMBLY INCLUDING KNUCKLE PLATES AND LOWER FIVE FEET OF COLUMN SECTION.

2.2.2.8

COMPLETE ERECTION OF PRIMARY STEEL TANK INCLUDING WALL, ROOF, COLUMN AND CAPITAL SECTIONS, AND LOCATE AND PLACE ALL RISERS, PIPES, ANCHORS, ETC. INSTALLATION OF TEMPORARY ROOF SUPPORT STEEL.

2.2.2.9

RADIOGRAPHIC EXAMINATION OF WELDS ON ERECTED PRIMARY STEEL TANK. REPAIR AND RE-EXAMINATION AS REQUIRED.

2.2.2.10
REMOVAL OF ALL TEMPORARY CLIPS, LUGS, ETC., AND REPAIR. MAGNAFLUX ALL REPAIRED AREAS.

2.2.2.11

OPTIONAL HYDROSTATIC TEST PER SECTION 3.3.2.

2.2.2.12

ERECTION OF SECONDARY LINER COLUMN AND CAPITAL PLATES. REPEAT ITEM 2.2.2.9 FOR SECONDARY LINER COLUMN AND CAPITAL

PLATES.

2.2.2.13

VACUUM LEAK TEST OF SECONDARY LINER COLUMN AND CAPITAL PLATES AND REPAIR AND RETEST AS REQUIRED.

2.2.2.14

ERECTION OF SECONDARY STEEL LINER WALLS.

2.2.2.15

RADIOGRAPHIC EXAMINATION OF WELDS ON SECONDARY STEEL LINER WALL.

2.2.2.16

PREPARATION FOR STRESS RELIEF OPERATION, REVIEW OF PROCEDURES AND INSPECTION BY DU PONT. CORRECTION OF ANY DEFECTS REVEALED IN INSPECTION.

2.2.2.17

STRESS RELIEF OF PRIMARY STEEL TANK.

2.2.2.18

REMOVAL OF STRESS RELIEF EQUIPMENT.

2.2.2.19

REMOVAL OF TEMPORARY CLIPS, LUGS, ETC., FROM INSIDE SECONDARY STEEL LINER WALLS. EXAMINE AND REPAIR ALL DAMAGE AS REQUIRED. MAGNAFLUX REPAIRED AREAS. ERECT FORM PLATE BRACKETS, ANCHOR BOLTS, ANNULUS FORM PLATES, AND ANNULUS RISERS ON TOP OF SECONDARY LINER TANK WALLS.

2.2.2.20

SCALE REMOVAL AND CLEAN INSIDE PRIMARY STEEL TANK.

2.2.2.21

VACUUM LEAK TEST BOTTOM ASSEMBLY, WALLS AND COLUMN AND CAPITAL SECTION OF PRIMARY STEEL TANK.

2.2.2.22

VACUUM LEAK TEST WALLS OF SECONDARY STEEL LINER.

2.2.2.23

PERFORM FULL HYDROSTATIC TEST ON PRIMARY STEEL TANK.

2.2.2.24
MAKE ALL NECESSARY REPAIRS AND PERFORM LOCAL OR FULL STRESS RELIEF ON REPAIRED AREAS AS REQUIRED TO OBTAIN THE 100% INTEGRITY OF THE PRIMARY AND SECONDARY LINER.

2.2.2.25

REMOVAL OF TEMPORARY ROOF SUPPORTS.

2.2.2.26

INSPECTION AND APPROVAL BY DU PONT.

2.3. FABRICATION & ERECTION

2.3.1

THE SHOP FABRICATION AND WELDING OF PRIMARY AND SECONDARY LINER TANK PLATES TO FORM SUBASSEMBLIES IF ANY, MAY BE MADE AT THE OPTION OF THE SUBCONTRACTOR.

2.3.2

THE SUBCONTRACTOR WILL BE RESPONSIBLE FOR ESTABLISHING WELD SHRINKAGE ALLOWANCES WHICH RESULT IN COMPLETED VESSELS THAT ARE WITHIN THE TOLERANCES AS SPECIFIED IN SECTION 2.3.4 AND SECTION 2.3.5.

2.3.3

THE SUBCONTRACTOR WILL BE RESPONSIBLE FOR ESTABLISHING MATERIAL CONTROL AND HANDLING PROCEDURES WHICH MINIMIZE THE POSSIBILITY OF MECHANICAL DAMAGE TO PLATES AND KNUCKLES AND INSURE ONLY THE USE OF APPROVED MATERIALS IN THE FABRICATION OF THE TANKS AND LINERS. PRACTICES USED IN HANDLING PLATES OR SUBASSEMBLIES SHALL BE SUCH AS TO PREVENT STRESSING BEYOND THE YIELD POINT.

* 2.3.4

DIMENSIONAL TOLERANCES SHOWN ON APPROVED SHOP DRAWINGS SHALL BE MAINTAINED. ANY DEVIATION FROM THE NOMINAL DIAMETER OF THE TANK

AS SHOWN ON APPROVED SHOP DRAWINGS SHALL BE LIMITED TO PLUS OR MINUS TWO (2) INCHES. THE DEVIATION FROM THE TRUE CIRCLE SHALL NOT EXCEED ONE (1) INCH IN EIGHTY (80) INCH ARC LENGTH. THIS TOLERANCE SHALL APPLY TO BOTH SECONDARY LINER AND PRIMARY STEEL TANKS. THE KNUCKLE RADIUS OF THE TANK BETWEEN THE BOTTOM AND THE SIDE WALL IS TO CONSIST OF TWELVE 12 OR LESS SUBASSEMBLIES OF INDIVIDUAL KNUCKLE PLATES. THE KNUCKLE PLATES SHALL BE CAREFULLY CURVED IN TWO DIRECTIONS BY FORMING TO THE RADII SHOWN ON THE DRAWINGS. THE KNUCKLE PLATES MAY BE FORMED BY HOT OR COLD FORMING. IF COLD FORMED, THEY MUST BE STRESS RELIEVED AFTER FORMING AND BEFORE FIELD ASSEMBLY. THE METHOD SELECTED SHALL BE STATED IN BID. DEFORMATION IN CURVATURE SHALL BE CONTROLLED TO THE EXTENT THAT THE DEVIATION ON THE HORIZONTAL CIRCUMFERENCE IN A TWO 2 FOOT LONG ARC SHALL NOT EXCEED 5/16'' AS FORMED AND BEFORE WELDING TO OTHER SECTIONS. THE VERTICAL DIMENSION OF THE KNUCKLE PLATE FROM THE TANGENT POINT MUST HOLD. A JOINT IS PERMISSIBLE IN THE HORIZONTAL PORTION OF THE PLATE 15'' FROM THE TANGENT POINT BUT THE PLATE THICKNESS MUST BE RETAINED FOR A DISTANCE OF 3'-0'' FROM THE TANGENT POINT ON THE PRIMARY TANK BOTTOM. A JOINT IS PERMISSIBLE IN THE VERTICAL PORTION OF THE PLATE NO CLOSER THAN 15'' FROM THE KNUCKLE TANGENT POINT OF THE PRIMARY TANK.

2.3.5

THE TANK BOTTOMS SHALL BE FLATTENED AFTER LOWERING AND PRIOR TO TRIMMING SO THAT THE MAXIMUM HEIGHT OF ANY DISTORTION SHALL NOT EXCEED 3''. THIS HEIGHT SHALL BE MEASURED FROM THE TOP OF THE CONCRETE FOUNDATION FOR THE SECONDARY BOTTOM AND FROM TOP OF THE INSULATING LAYER FOR THE PRIMARY BOTTOM. ALSO, THE MAXIMUM SLOPE ON ANY DISTORTION SHALL NOT EXCEED .33'' PER FOOT. THE FLATNESS TOLERANCE APPLIES TO ANY AREA ON THE TANK BOTTOM (WITHIN THE KNUCKLE RADIUS LIMITS) IN THE AS-BUILT CONDITION. THE PROPER FLATNESS TOLERANCE IS TO BE ACHIEVED BY ANY APPROPRIATE MEANS EXCLUDING THE USE OF SLEDGE HAMMERS OR EQUIVALENT. ANY FLATTENING OPERATIONS SHALL BE APPLIED PRIOR TO THE STRESS RELIEVING OPERATION. NO FLATTENING WILL BE ALLOWED AFTER STRESS RELIEVING. TRIM THE VERTICAL EDGE OF KNUCKLE PLATES TO A LEVEL LINE ESTABLISHED BY OPTICAL INSTRUMENT, NOT BY WATER BOAT OR EQUIVALENT.

2.3.6

ONLY THOSE OPENINGS IN THE TANKS WHICH APPEAR ON THE APPROVED SHOP DRAWINGS WILL BE PERMITTED. NO HOLES OR TEMPORARY ACCESS OPENINGS SHALL BE CUT IN THE STEEL TANK PLATES BELOW THE LIQUID LEVEL LINE. PLATE SECTIONS ABOVE THE KNUCKLE PLATES MAY BE TEMPORARILY LEFT OUT TO SERVE AS ACCESS DOORS PROVIDED THEY ARE WELDED IN PLACE PRIOR TO STRESS RELIEVING.

*2.3.7

SHARP GOUGES OR DEEP SCRATCHES ON INNER SURFACE OF THE PRIMARY TANK WALLS OR BOTTOM AND SECONDARY LINER BOTTOM WILL NOT BE PERMITTED WHEN IN EXCESS OF 1/32'' IN DEPTH. THESE IMPERFECTIONS SHALL BE GROUND OUT AND IF THE RESULTING DEPRESSION EXCEEDS 1/16'' IT SHALL BE FILLED WITH WELD METAL. THE SUBCONTRACTOR SHALL PROVIDE PROTECTION OF COMPLETED PORTIONS OF THE PRIMARY AND SECONDARY STEEL LINER TANK TO AVOID DAMAGE INSOFAR AS POSSIBLE. SURFACE OF PLATES CONTAINING MILL STENCIL MARKINGS SHALL BE PLACED ON THE EXTERIOR SIDE OF THE TANK.

2.3.8

THE EDGES OF PLATES MAY BE PREPARED BY MACHINING, SHEARING, GRINDING, OR MECHANICALLY GUIDED GAS CUTTING, EXCEPT THAT IRREGULAR EDGES MAY BE PREPARED BY MANUALLY GUIDED GAS CUTTING.

2.3.9

ALL WELDS JOINING THE PRIMARY STEEL TANK WALL, COLUMN AND KNUCKLE PLATES SHALL BE BUTT WELDS CONFORMING TO THE REQUIREMENTS OF SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE, LATEST EDITION, SUBSECTION B, PART UW, FOR 100% JOINT EFFICIENCY (TABLE UW-12 NO. 1). ALL OTHER WELDS SHALL BE FULL PENETRATION BUTT WELDS.

2.3.10

CLIPS, LUGS, ETC, WELDED TO THE LINERS FOR PURPOSES OF PLATE ALIGNMENT, HANDLING, WELD MACHINE GROUNDING, ETC., SHALL BE WELDED TO THE EXTERIOR SURFACES OF THE LINERS EXCEPT WHERE HANDLING AND FABRICATION REQUIREMENTS MAKE THIS IMPOSSIBLE. ALL SUCH ATTACHMENTS SHALL BE REMOVED FROM THE TANK SURFACES PRIOR TO STRESS RELIEVING BY CHIPPING, GRINDING OR BURNING. ANY GROOVES RESULTING FROM THE REMOVAL OF SUCH ATTACHMENTS SHALL BE FILLED WITH WELD METAL AND GROUND SMOOTH PRIOR TO INSPECTION AS SPECIFIED IN PARAGRAPH 2.4.14.

2.3.11

VERTICAL SEAMS OF ADJACENT SHELL COURSES SHALL BE OFFSET CIRCUMFERENTIALLY FROM EACH OTHER. THE POSITIONING OF WELDS SHALL BE SUCH THAT NO MORE THAN THREE TANK PLATES MEET AT ANY ONE WELD JUNCTURE REGARDLESS OF THE LOCATION ON THE TANK.

2.3.12

THE MAXIMUM PERMISSIBLE OFFSET BETWEEN PLATES OF EQUAL THICKNESS

TO BE JOINED BY WELDING SHALL NOT EXCEED TEN PERCENT OF THE PLATE THICKNESS.

2.3.13

FULL PENETRATION WELDS SHALL BE MADE ON THE TANK BOTTOM; PERMANENT BACKUP STRIPS SHALL NOT BE USED. THE JOINT MAKEUP AND WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH APPROVED PROCEDURES AND DETAILS. WELDS ON HORIZONTAL ROOF PLATES MAY BE MADE FROM ONE SIDE ONLY WITH BACKUP STRIPS. IN THIS CASE, BACKUP STRIPS NEED NOT BE REMOVED.

2.3.14

ALL PLATES SHALL BE LAID OUT AND JOINED BY WELDING USING A SEQUENCE THAT WILL PROVIDE MINIMUM DISTORTION AND BUCKLING OF THE PLATES, AND FOR THE BOTTOM PLATE AND KNUCKLE RADIUS ASSEMBLY INSURE MINIMUM VARIATION IN SLOPE AND/OR ELEVATION AS SPECIFIED. THE WELD SEQUENCES ARE TO BE INCLUDED IN THE TANK DETAIL DRAWINGS TO BE SUBMITTED TO DU PONT FOR APPROVAL PRIOR TO STARTING ANY FABRICATION.

2.3.15

PRIOR TO FIT UP FOR WELDING, ALL EDGES ARE TO BE THOROUGHLY CLEANED SO AS TO BE FREE OF DIRT, OIL, WATER, SCALE, SURFACE OXIDES OR ANY OTHER CONTAMINATING MATERIAL WHICH WOULD TEND TO LOWER THE QUALITY OF THE FINISHED WELD. THE USE OF SANDBLASTING TO CLEAN THE WELDING GROOVE PRIOR TO WELDING OR TO CLEAN THE SURFACE OF A LAYER OF WELD METAL PRIOR TO DEPOSITION OF A SUBSEQUENT LAYER IS PERMISSIBLE. WHERE MOISTURE IS VISIBLE OR SUSPECTED ON SURFACE OF METAL IN WELD GROOVE, METAL SHALL BE HEATED PRIOR TO WELDING TO REMOVE ALL SUCH MOISTURE.

2.3.16

IF THE TANK BOTTOM PLATES ARE WELDED WHILE SUPPORTED ON CRIBBING, THE METHOD FOR ACCOMPLISHING THIS MUST HAVE DU PONT:S APPROVAL BEFORE STARTING, AND THE FLATNESS TOLERANCES SPECIFIED FOR THE TANK BOTTOM MUST BE MET.

2.3.17

PRECAUTIONS SHALL BE TAKEN BY THE SUBCONTRACTOR NOT TO DAMAGE THE CONCRETE BASE SLAB OR THE INSULATING LAYER DURING CONSTRUCTION OF THE STEEL TANKS.

2.4. WELDING

2.4.1

WELDING PROCEDURE QUALIFICATION. EACH WELDING PROCEDURE SHALL BE QUALIFIED IN ACCORDANCE WITH SECTION IX OF THE ASME BOILER AND PRESSURE VESSEL CODE. THE PROCEDURE SPECIFICATION SHOULD FOLLOW RECOMMENDED FORM Q-1 IN APPENDIX II OF SECTION IX. ANY CHANGES IN ESSENTIAL VARIABLES OF THE PROCEDURE AS EXPLAINED IN PARAGRAPH Q-11 OF SECTION IX WILL REQUIRE REQUALIFICATION OF THE PROCEDURE.

2.4.2

WELDER QUALIFICATION. ALL TANK WELDING COVERED BY THIS SPECIFICATION SHALL BE PERFORMED ONLY BY WELDING OPERATORS WHO HAVE BEEN QUALIFIED IN ACCORDANCE WITH SECTION IX PARAGRAPH Q-21 OF THE ASME BOILER AND PRESSURE VESSEL CODE. ANY CHANGE IN ESSENTIAL VARIABLES AS EXPLAINED IN PARAGRAPH Q-22 OF SECTION IX WILL REQUIRE REQUALIFICATION OF THE WELDER OR WELDING OPERATOR.

TANK ERECTION WELDERS SHALL BE QUALIFIED AT THE ERECTION SITE BY THE SUBCONTRACTOR. THE QUALIFICATION TESTS WILL BE WITNESSED BY DU PONT AT THE SITE FOR COMPLIANCE WITH ASME CODE REQUIREMENTS.

QUALIFICATION TEST RESULTS OF SHOP WELDERS WHO WILL BE WORKING ON TANK SUBASSEMBLIES WHICH WILL BE SENT TO THE ERECTION SITE WILL BE WITNESSED BY A DU PONT CONSTRUCTION DIVISION INSPECTOR FOR COMPLIANCE WITH ASME CODE REQUIREMENTS.

RECORDS OF PROCEDURE QUALIFICATION TESTS AND QUALIFICATION TESTS FOR WELDERS AND WELDING OPERATORS SHALL BE RECORDED BY THE SUBCONTRACTOR ON FORMS WHICH INCLUDE ALL OF THE INFORMATION SET FORTH IN RECOMMENDED FORM Q-1, Q-1G, AND Q-1F OF APPENDIX II OF SECTION IX. PROCEDURE QUALIFICATIONS SHALL BE SUBMITTED TO DU PONT AT THE TIME THE TANK DRAWINGS ARE SUBMITTED FOR APPROVAL.

2.4.3

WELDER IDENTIFICATION. EACH WELDER SHALL BE ASSIGNED AN IDENTIFICATION NUMBER BY THE SUBCONTRACTOR. THIS IDENTIFICATION NUMBER IS TO BE RECORDED ON THE QUALIFICATION TEST FORM FOR EACH WELDER. WELDS MADE BY EACH WELDER SHALL BE IDENTIFIED AS DESCRIBED BELOW OR BY METHOD APPROVED BY DU PONT. THE IDENTIFICATION NUMBER IS TO BE PLACED ADJACENT TO ALL WELDS MADE BY THE WELDER. WELDER IDENTIFICATION MARKS ON THE TANK INSIDE AND OUTSIDE SURFACES SHALL BE MADE WITH MARKING CRAYONS ONLY. THE IDENTIFICATION NUMBER FOR MANUAL WELDS SHALL APPEAR AT THREE FOOT INTERVALS. FOR SUBMERGED-ARC WELDS, THE INTERVAL SHALL BE APPROXIMATELY 10 FEET.

2.4.4

APPROVED WELDING METHODS. THE AUTOMATIC SUBMERGED METAL ARC METHOD IS TO BE USED IN THE FABRICATION OF THE TANKS WHEREVER POSSIBLE. VERTICAL SEAMS AND OTHER SEAMS WHICH CANNOT BE WELDED BY THE AUTOMATIC SUBMERGED ARC METHOD MAY BE WELDED BY THE SHIELDED METAL-ARC METHOD USING COATED ELECTRODES. ANY OTHER WELDING METHOD MAY BE USED PROVIDED IT PASSES PROCEDURE QUALIFICATION TESTS AND SUBJECT TO DU PONT APPROVAL.

2.4.5

WELD QUALITY REQUIREMENTS. WELDS TO BE RADIOGRAPHED ARE TO BE OF THE QUALITY REQUIRED BY PARAGRAPH UW-51 OF SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE. SUPPLEMENTARY REQUIREMENTS COVERING SURFACE CONDITION AND SPECIAL INSTRUCTIONS REGARDING BACKING STRIPS, ELONGATED POROSITY, AND SLAG INCLUSIONS ARE LISTED IN PARAGRAPH 3.1.18. IN GENERAL ALL BUTT WELDS SHALL MEET THE REQUIREMENTS OF PARAGRAPH UW-35 AND UW-37 OF SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE.

2.4.6

PREPARATION OF WELDS FOR RADIOGRAPHIC INSPECTION. TO FACILITATE RADIOGRAPHIC INSPECTION OF WELDS, ALL WELDS TO BE RADIOGRAPHED SHALL BE PREPARED ACCORDING TO PARAGRAPH UW-51 A , SECTION VIII, ASME BOILER AND PRESSURE VESSEL CODE.

2.4.7

FILLER WIRE AND ELECTRODES. FILLER WIRE FOR SUBMERGED ARC WELDING AND COVERED ELECTRODES SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS SET FORTH IN THE QUALIFIED WELDING PROCEDURES. TENSILE STRENGTH OF DEPOSITED WELD METAL SHALL NOT BE LESS THAN THAT OF THE PLATE MATERIAL. ONLY APPROVED ELECTRODES AND FILLER WIRE WILL BE PERMITTED ON THE JOB SITE. SUITABLE STORAGE FACILITIES SHALL BE PROVIDED BY THE SUBCONTRACTOR.

2.4.8

WELDING FLUX. THE FLUX USED FOR SUBMERGED ARC WELDING SHALL CONFORM TO THE SPECIFICATIONS SET FORTH IN THE QUALIFIED WELDING PROCEDURE.

2.4.9

WEATHER CONDITIONS. WELDING SHALL NOT BE DONE WHEN THE TEMPERATURE OF THE BASE METAL IS LESS THAN 0 DEGREES F WHEN SURFACES ARE WET FROM RAIN, SNOW, OR ICE; WHEN RAIN OR SNOW IS

FALLING ON THE SURFACES TO BE WELDED; NOR DURING PERIODS OF HIGH WINDS, UNLESS THE OPERATOR AND THE WORK ARE PROPERLY PROTECTED. WHEN THE AIR TEMPERATURE IS BETWEEN 32 DEGREES F AND 0 DEGREES F, THE SURFACE WITHIN 3 INCHES OF THE WELD SHALL BE HEATED TO A TEMPERATURE WARM TO THE HAND (ESTIMATED TO BE ABOVE 60 DEGREES F) BEFORE WELDING.

2.4.10

JOINTS. ALL JOINTS IN THE TANK ARE TO BE OF THE FULL PENETRATION TYPE. BACK CHIPPING WHERE REQUIRED SHALL BE SPECIFIED IN THE QUALIFIED WELDING PROCEDURE. NO PERMANENT BACKING STRIPS ARE PERMITTED EXCEPT ON ROOF PLATES. A CONSUMMABLE INSERT RING, EITHER EB OR FLAT RING TYPE, MUST BE EMPLOYED FOR THE FINAL WELD ON THE SECONDARY CAPITAL SECTION. THE WELDING PROCEDURE MUST SPECIFY THE MAXIMUM ROOT GAP ALLOWED.

2.4.11

CLEANING WELD LAYERS. EACH LAYER OF WELD DEPOSIT ON MULTI-PASS WELD SEAMS IS TO BE CLEANED OF SLAG AND OTHER DEPOSITS AND VISUALLY INSPECTED BEFORE THE APPLICATION OF SUBSEQUENT LAYERS.

2.4.12

ARC STRIKES. ARC STRIKES FROM WELDING ELECTRODES OR "ARCAIR" ELECTRODES WILL NOT BE PERMITTED ON PLATE SURFACES ADJACENT TO WELDS. WHERE ARC STRIKES OCCUR INADVERTENTLY, THEY SHALL BE REMOVED BY GRINDING AND THE LOCATIONS CHECKED FOR CRACKS AS SPECIFIED IN SECTION 3.4. WHERE DEPTH OF GRINDING EXCEEDS 1/16", THE DEPRESSION SHALL BE FILLED WITH WELD METAL AND GROUND SMOOTH. UNFILLED ARC CRATERS SHALL BE GROUND AND INSPECTED AS SET FORTH ABOVE FOR ARC STRIKES.

2.4.13

NONDESTRUCTIVE TESTING OF WELDS. REQUIREMENTS FOR NONDESTRUCTIVE TESTING ARE GIVEN IN SECTION 3 - INSPECTION AND TESTING. SPECIFIC INFORMATION RELATIVE TO APPLICATION OF VARIOUS TEST METHODS AND INTERPRETATION OF RESULTS IS FOUND IN SECTION 3.1 FOR RADIOGRAPHIC EXAMINATION, SECTION 3.2 FOR VACUUM LEAK TESTS AND SECTION 3.4 FOR MAGNETIC PARTICLE EXAMINATION.

2.4.14

WELDING REPAIRS. ALL DEFECTS IN WELDS OR ON PLATE SURFACES WHICH ARE DETECTED BY VISUAL INSPECTION, LEAK TESTING, OR ANY OF THE SPECIFIED NONDESTRUCTIVE TEST METHODS SHALL BE REMOVED BY CHIPPING, GRINDING, FLAME GOUGING, OR "ARCAIR" GOUGING AND THE

RESULTING DEPRESSIONS FILLED WITH WELD METAL. IF FLAME GOUGING IS EMPLOYED, THE RESULTING SLAG AND OXIDE SHALL BE REMOVED FROM THE SURFACES PRIOR TO WELDING. WELDS DEPOSITED TO FILL DEPRESSIONS RESULTING FROM REMOVAL OF DEFECTS SHALL CONFORM TO QUALITY REQUIREMENTS SET FORTH FOR WELDS JOINING TANK PLATES.

2.5. INSULATING LAYER

2.5.1

THE SUBCONTRACTOR SHALL SUPPLY AND INSTALL AN INSULATING LAYER BETWEEN THE INSIDE BOTTOM OF THE SECONDARY LINER AND OUTSIDE BOTTOM OF THE PRIMARY TANK. THE TOP SURFACE OF THE INSULATION WILL HAVE SLOTS EITHER FORMED OR CUT AFTER PLACING REFRACTORY. BIDDER SHALL STATE HIS PROPOSED THICKNESS OF REFRACTORY AS PART OF BIDDER'S PROPOSAL.

*2.5.2

THE MATERIAL USED SHALL HAVE INSULATING PROPERTIES SUCH THAT THE TEMPERATURE AT ANY PLACE ON THE TOP SURFACE OF THE BASE SLAB SHALL NOT EXCEED 300 DEGREES F DURING THE STRESS RELIEF OPERATION. THE MINIMUM COMPRESSIVE STRENGTH OF THE INSULATING MATERIAL AFTER THE STRESS RELIEF OPERATION SHALL BE 130 PSI. THE TOP SURFACE SHALL BE SMOOTH WITHIN 1/2" OF A TRUE PLANE.

*2.5.3

THE PROPOSED MATERIALS AND INSTALLATION PROCEDURES SHALL BE SUBJECT TO DU PONT APPROVAL PRIOR TO THEIR USE AT THE SITE.

2.6. STRESS RELIEVING

2.6.1

AFTER THE COMPLETION OF ALL WELDING, CUTTING, BURNING AND OTHER HIGH TEMPERATURE WORK, THE PRIMARY STEEL TANKS COVERED BY THIS SPECIFICATION ARE TO BE FULLY STRESS RELIEVED AT 1100 DEGREES F. AS FOLLOWS:

2.6.1.1

ABOVE 600 DEGREES F. THE RATE OF HEATING SHALL NOT BE MORE THAN 100 DEGREES F PER HOUR. DURING THE HEATING PERIOD THERE SHALL NOT BE A GREATER VARIATION IN TEMPERATURE THAN 200 DEGREES F BETWEEN THE HIGHEST AND LOWEST TEMPERATURE THROUGHOUT THE PRIMARY TANK. IN ADDITION ANY THERMOCOUPLE 15 FT APART OR LESS SHALL NOT SHOW A TEMPERATURE DIFFERENTIAL GREATER THAN 125 DEGREES F.

*Addendum C: 4/28/76

2.6.1.2

THE PRIMARY TANK SHALL BE HELD AT OR ABOVE 1100 DEGREES F FOR NOT LESS THAN ONE HOUR. DURING THE HOLDING PERIOD THERE SHALL NOT BE A GREATER DIFFERENCE THAN 150 DEGREES F BETWEEN THE HIGHEST AND LOWEST TEMPERATURE THROUGHOUT THE PRIMARY TANK. IN ADDITION, ANY THERMOCOUPLE 15' APART OR LESS SHALL NOT SHOW A TEMPERATURE DIFFERENTIAL GREATER THAN 125 DEGREES F.

2.6.1.3

DURING THE HEATING AND HOLDING PERIODS, THE FURNACE ATMOSPHERE SHALL BE SO CONTROLLED AS TO AVOID EXCESSIVE OXIDATION OF THE SURFACE OF THE PRIMARY TANK. THE HEATERS SHALL BE OF SUCH DESIGN AS TO PREVENT DIRECT IMPINGEMENT OF THE FLAME ON THE TANK.

2.6.1.4

ABOVE 600 DEGREES F, COOLING SHALL BE DONE AT A RATE NOT GREATER THAN 125 DEGREES F PER HOUR. DURING THE COOLING PERIOD THERE SHALL NOT BE A GREATER VARIATION IN THE TEMPERATURES THAN 200 DEGREES F BETWEEN THE HIGHEST AND LOWEST TEMPERATURE THROUGHOUT THE PRIMARY TANK.

THE SPECIFIC PROCEDURE TO BE FOLLOWED SHALL BE THE APPROVED "STRESS RELIEVING PROCEDURE" PREVIOUSLY SUBMITTED BY THE SUBCONTRACTOR AS PER PARAGRAPH 1.7.7.

2.6.2

THE DETAILED "STRESS RELIEVING PROCEDURE" SHOULD CONTAIN THE FOLLOWING DETAILED INFORMATION:

2.6.2.1

STEP BY STEP PROCEDURAL INSTRUCTIONS.

2.6.2.2

DETAILS OF TEMPORARY SUPPORTS, COVERS, INSULATION, ETC., REQUIRED FOR MINIMIZING DEFORMATION OF THE TANKS AND LIMITING TEMPERATURE GRADIENTS IN THE VESSEL, AND PROCEDURES FOR REMOVING THESE MATERIALS AFTER THE STRESS RELIEF OPERATION IS COMPLETE.

2.6.2.3

THE NUMBER, LOCATION AND MEANS OF PLACING THERMOCOUPLES

ON THE TANK. THERMOCOUPLES SHALL BE INSTALLED IN SUFFICIENT NUMBER ON OUTSIDE (ONLY) SURFACES OF THE TANK TO DETECT UNDERHEATING AND LOCAL OVERHEATING AND TO INSURE UNIFORM HEAT DISTRIBUTION, SO FAR AS POSSIBLE, THROUGHOUT THE STRESS RELIEF OPERATION.

2.6.2.4

THE EXACT TIME-TEMPERATURE RELATIONSHIP WHICH IS TO BE FOLLOWED OVER THE ENTIRE DURATION OF THE STRESS RELIEF OPERATION, SHOWING MAXIMUM AND MINIMUM HEAT-UP AND COOL-DOWN RATES; MAXIMUM THERMAL GRADIENTS WHICH WILL BE PERMITTED TO OCCUR BETWEEN ANY TWO POINTS IN THE TANK METAL; AND THE STRESS RELIEF TEMPERATURE AND HOLDING TIME AT THIS TEMPERATURE.

2.6.2.5

METHOD OF INTRODUCING HEAT TO THE TANK FOR THE STRESS RELIEF OPERATION, INCLUDING NUMBER AND TYPE OF BURNERS (OR OTHER DEVICES) TO BE USED, PLACEMENT OF BURNERS, TYPE OF FUEL, DESCRIPTION OF BURNER CONTROLS, THE MEANS OF PROTECTING THE TANK AGAINST LOCAL OVERHEATING, SAFETY PROTECTION AND BACK-UP CONTROLS.

2.6.3

THE SUBCONTRACTOR IS TO SUPPLY ACCURATELY CALIBRATED EQUIPMENT FOR CONTINUOUSLY RECORDING THE TIME-TEMPERATURE RELATIONSHIP WHICH OCCURS DURING THE STRESS RELIEF OPERATION. THE CAPACITY OF THE RECORDING EQUIPMENT MUST BE SUFFICIENT TO ACCOMMODATE THE THERMOCOUPLE SETS PLACED IN THE BASE CONCRETE SLAB. THE SUBCONTRACTOR WILL BE RESPONSIBLE FOR PLACING SUFFICIENT THERMOCOUPLES TO RECORD THE TEMPERATURES AT TOP OF STRUCTURAL BASE SLAB TO INSURE THAT THIS SLAB DOES NOT EXCEED 300 DEGREES F. THERMOCOUPLES AND WIRING FOR STRUCTURAL BASE SLAB TEMPERATURE MEASUREMENTS WILL BE SUPPLIED AND INSTALLED BY THE SUBCONTRACTOR. THERMOWELLS WILL BE INSTALLED BY DU PONT.

2.6.4

THE SUBCONTRACTOR SHALL NOTIFY DU PONT IN WRITING WHEN EACH TANK IS READY FOR STRESS RELIEVING. THE STRESS RELIEF NOTIFICATION MUST CERTIFY THAT ALL WELDING AND THERMAL CUTTING WORK ON THE TANK IS COMPLETE AND THAT THE TANKS MEET THE TOLERANCES SPECIFIED ON APPROVED SHOP DRAWINGS AND THE CONDITIONS AND INTENT OF THIS SPECIFICATION.

2.6.5

UPON RECEIPT OF A STRESS RELIEF NOTIFICATION, THE SUBCONTRACTOR AND AUTHORIZED REPRESENTATIVES DESIGNATED BY DU PONT WILL MAKE A JOINT INSPECTION OF THE TANK. DEFECTS, DISCREPANCIES, OMISSIONS, ETC., REVEALED IN THIS INSPECTION SHALL BE CORRECTED AS REQUESTED BY DU PONT REPRESENTATIVES.

2.6.6

UPON COMPLETION OF THE INSPECTION REQUIRED ABOVE AND RESULTANT CORRECTIONS, THE SUBCONTRACTOR WILL COMPLETE ALL PRELIMINARY PREPARATIONS INSTALLATION OF THERMOCOUPLES ON TANK, FIRING DEVICES, INSULATION, TANK COVERING, ETC. FOR STRESS RELIEF. ALL THERMOCOUPLES AND LEADS WILL BE CHECKED BY DU PONT PRIOR TO STARTING THE STRESS RELIEF OPERATION. THE PREPARATORY STRESS RELIEF WORK WILL THEN BE JOINTLY INSPECTED BY THE SUBCONTRACTOR AND DU PONT REPRESENTATIVES FOR GENERAL COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS. THIS INSPECTION BY DU PONT SHALL NOT BE CONSTRUED AS RELIEVING THE SUBCONTRACTOR OF HIS RESPONSIBILITY.

2.6.7

DIMENSIONAL TOLERANCES AFTER STRESS RELIEF SHALL MEET THE REQUIREMENTS OF PARAGRAPH 2.3.4 AND PARAGRAPH 2.3.5.

2.6.8

ANY REQUIRED REPAIR WELDING, CUTTING, BURNING OR OTHER HIGH TEMPERATURE WORK ON THE TANK AFTER COMPLETION OF THE STRESS RELIEVING OPERATION WILL REQUIRE THAT THE STRESS RELIEF OPERATION BE REPEATED. REPEATED STRESS RELIEVING RESULTING IN WARPAGE AND BUCKLING EXCEEDING THE SPECIFIED TOLERANCES RENDER THE TANK UNACCEPTABLE. FOR THIS REASON, THE SUBCONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO INSURE THAT ALL TANKS HAVE BEEN FABRICATED AND TESTED IN ACCORDANCE WITH ALL REQUIREMENTS BEFORE STRESS RELIEF, AND THEN INSTITUTE SUCH CONTROL PROCEDURES AS REQUIRED TO MAINTAIN TANK INTEGRITY.

2.6.9

TO AVOID INADVERTENTLY DAMAGING THE TANKS AFTER STRESS RELIEVING, THE SUBCONTRACTOR SHOULD ATTACH ALL SPECIFIED RISERS AND APPURTENANCES TO THE ROOF PRIOR TO STRESS RELIEVING. HOWEVER, WELDING ABOVE THE LIQUID LEVEL LINE WILL BE PERMITTED PROVIDED ADEQUATE PRECAUTIONS ARE TAKEN TO PROTECT THE AREA BELOW THE LIQUID LEVEL LINE. THESE PROTECTIVE MEASURES MUST BE APPROVED BY DU PONT IN WRITING PRIOR TO ANY WELDING OR CUTTING.

2.6.10

INASMUCH AS LOCAL STRESS RELIEF IS NOT AS EFFECTIVE FOR THE INTENDED SERVICE AS A FULL STRESS RELIEF, DAMAGE REQUIRING WELDING REPAIR AND HENCE, LOCAL STRESS RELIEF MUST BE AVOIDED INSOFAR AS POSSIBLE. FOR THIS REASON, THE INSTALLATION OF A PROTECTIVE COVERING INSIDE THE TANKS PRIOR TO THE REMOVAL OF THE TEMPORARY ROOF SUPPORTS IS SUGGESTED. IN THE UNLIKELY EVENT THAT DAMAGE DOES OCCUR AFTER THE CONCRETE ROOF SLAB HAS BEEN PLACED, NO REPAIR WELDING SHALL BE DONE WITHOUT PRIOR APPROVAL BY DU PONT. WHEN AUTHORIZED, SUCH REPAIRS SHALL BE ACCOMPLISHED AS FOLLOWS: SHARP GOUGES SHALL BE SMOOTHED OUT BY WET GRINDING, THEN CLEANED AND DRIED PRIOR TO ADDING FILLER METAL. IF REQUIRED, REPAIR WELDING SHALL BE DONE BY USING METAL ARC ELECTRODES AS SPECIFIED IN SECTION 2.4. STRINGER TYPE BEADS SHOULD BE MADE TO FILL UP DAMAGED AREAS TO REDUCE SLAG INCLUSIONS. IF MORE THAN ONE LAYER IS REQUIRED, SLAG SHALL BE CAREFULLY REMOVED BETWEEN LAYERS.

2.6.11

REPAIR WELDS MADE ON THE TANK AFTER THE CONCRETE ROOF SLAB HAS BEEN PLACED SHALL BE STRESS RELIEVED LOCALLY. EQUIPMENT FOR LOCAL STRESS RELIEVING SHALL CONSIST OF A FLAT ELECTRICAL RESISTANT HEATING BLANKET WITH DIMENSIONS SUCH THAT THE BASE STOCK SHALL BE HEATED AT LEAST 18'' FROM THE EDGE OF THE REPAIR WELDS. REPAIR WELDS SHALL BE IN THE CENTER OF THE HEAT BLANKET INSOFAR AS POSSIBLE. THE RESISTANCE HEATING BLANKET SHALL BE THERMOSTATICALLY CONTROLLED TO MAINTAIN HEAT-UP AND COOL-DOWN TEMPERATURES AND HOLD TIME TEMPERATURES IN ACCORDANCE WITH THE APPROVED STRESS RELIEF PROCEDURE. NO FLAME HEATING SHALL BE ALLOWED.

2.7. SCALE REMOVAL AFTER HEAT TREATMENT

2.7.1

UPON COMPLETION OF THE STRESS RELIEF OPERATION ON EACH OF THE TANKS, ALL LOOSE SCALE SHALL BE REMOVED FROM THE INSIDE OF THE PRIMARY TANKS. TIGHTLY ADHERING SCALE WILL BE ALLOWED TO REMAIN. ''LOOSE SCALE'' IS DEFINED AS SCALE THAT WILL BECOME DETACHED BY HAND OPERATED WIRE BRUSH. THE CLEANING METHOD IS AT THE OPTION OF THE SUBCONTRACTOR, SUBJECT TO DU PONT APPROVAL.

3. INSPECTION & TESTING

3.1. RADIOGRAPHIC EXAMINATION

3.1.1

ALL WELDS SPECIFIED IN PARAGRAPH 3.1.2 BELOW SHALL BE EXAMINED BY RADIOGRAPHIC TECHNIQUES IN ACCORDANCE WITH SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE, PARAGRAPH UW-51 AND WITH THE REQUIREMENTS AND INTENT OF THIS SPECIFICATION.

3.1.2

THE FOLLOWING WELDS SHALL BE RADIOGRAPHICALLY EXAMINED BY THE SUBCONTRACTOR.

3.1.2.1

ALL BUTT WELDS ON THE PRIMARY STEEL TANKS JOINING PLATES, INCLUDING KNUCKLES, COLUMN PLATES AND CAPITAL PLATES EXCEPT WELDS ON THE HORIZONTAL ROOF SURFACE.

*3.1.2.2

ALL WELDS BELOW LIQUID LEVEL LINE ON PRIMARY TANK USED FOR FASTENING COOLING COIL SUPPORTS, INSTRUMENT TUBING SUPPORTS, ETC.

3.1.2.3

ALL BUTT WELDS ON THE SECONDARY LINER TANKS JOINING PLATES ON THE BOTTOM, KNUCKLE PLATES, COLUMN PLATES, COLUMN CAPITAL PLATES, AND WALL PLATES.

3.1.2.4

ALL WELD EXTENSIONS ON PLATE SURFACES AT INTERSECTIONS OF WELDS DESCRIBED IN PARTS 3.1.2.1 THRU 3.1.2.3 ABOVE.

3.1.3

RADIOGRAPHY SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL BUREAU OF STANDARDS AND/OR THE UNITED STATES ATOMIC ENERGY COMMISSION RULES AND REGULATIONS, TITLE 10, WHICHEVER IS APPLICABLE.

3.1.4

X-RAY WORK SHALL BE PERFORMED AT HOURS OTHER THAN THE NORMAL DAY SHIFT. EXCEPTIONS TO THIS REQUIREMENT SHALL BE APPROVED BY DU PONT

IN WRITING.

3.1.5

FINE GRAIN FILM WITH LEAD SCREENS SHALL BE USED FOR X-RAY EXAMINATIONS. MINIMUM LEAD SCREEN THICKNESS SHALL BE .005". CALCIUM TUNGSTATE INTENSIFYING SCREENS ARE NOT ACCEPTABLE.

3.1.6

AT LOCATIONS WHERE IT IS NOT PHYSICALLY POSSIBLE TO POSITION AN X-RAY MACHINE, IRIDIUM 192 MAY BE USED AFTER RECEIVING DU PONT APPROVAL. THE USE OF COBALT 60 IS SPECIFICALLY PROHIBITED.

3.1.7

USE OF PENETRAMETERS. THE REQUIREMENTS OF PARAGRAPH UW-51 (C) (5) OF THE ASME CODE SHALL GOVERN THE USE OF PENETRAMETERS ADJACENT TO WELD SEAMS ON WHICH THE WELD REINFORCEMENT HAS NOT BEEN REMOVED. WHEN A SHIM IS PLACED UNDER A PENETRAMETER TO COMPENSATE FOR WELD REINFORCEMENT THE PENETRAMETER USED SHALL BE NOT THICKER THAN 2% OF THE BASE METAL THICKNESS.

3.1.8

DETAILS OF METHOD OF IDENTIFYING X-RAY EXPOSURE LOCATIONS SHALL BE SUBJECT TO DU PONT APPROVAL.

3.1.9

RECORDS SHALL BE MADE BY THE SUBCONTRACTOR IN THE FORM OF CHARTS WHICH WILL LOCATE THE RADIOGRAPHIC EXPOSURE ON EACH WELD AND WHICH WILL BE REFERENCED TO THE TANK IN THE SAME MANNER AS WELD SEAMS ARE LOCATED, AS SPECIFIED IN PARAGRAPH 1.8.3 OF THIS SPECIFICATION. THE SUBCONTRACTOR SHALL INDICATE ON THE CHART ALL WELD REPAIR LOCATIONS AND NUMBER OF REPAIRS AT EACH LOCATION.

3.1.10

NO PUNCH MARKS WILL BE PERMITTED ON THE INNER SURFACES OF THE PRIMARY STEEL TANKS. STENCILLED NUMBERS MAY BE USED FOR IDENTIFICATION OF X-RAY EXPOSURE LOCATIONS AS LONG AS APPROVED MARKING PAINT IS USED WHICH WILL BE CONSUMED DURING STRESS RELIEF OPERATIONS. AS AN ALTERNATIVE, TAPE, SECURELY CEMENTED, MAY BE USED TO IDENTIFY X-RAY EXPOSURE LOCATIONS.

3.1.11

THE LENGTH OF WELD COVERED BY EACH RADIOGRAPHIC EXPOSURE NORMALLY

SHALL NOT EXCEED 15 INCHES. THIS PROVIDES FOR THE USE OF STANDARD 17 INCH LONG FILMS WITH A 1 INCH OVERLAP ON EACH END. LARGER EXPOSURE AREA MAY BE USED PROVIDED THE SUBCONTRACTOR DEMONSTRATES THAT THE REQUIRED SENSITIVITY CAN BE OBTAINED ON ALL PORTIONS OF THE RESULTANT RADIOGRAPH.

3.1.12

THE PRIMARY TANK AND SECONDARY LINER BOTTOM ASSEMBLIES WILL BE RADIOGRAPHICALLY EXAMINED WHILE RESTING ON CRIBBING. THIS INCLUDES ALL WELDS IN THE BOTTOM ASSEMBLIES AS DESIGNATED IN PARAGRAPH 3.1.2. THE SUBCONTRACTOR WILL BE REQUIRED TO MOVE THE CRIBBING AS NECESSARY TO OBTAIN COMPLETE RADIOGRAPHS OF ALL WELDS. DEFECTIVE WELDS WILL THEN BE REPAIRED AND A RECHECK MADE TO DETERMINE THE ACCEPTABILITY OF THE REPAIR. THIS WILL BE REPEATED AS OFTEN AS NECESSARY UNTIL ALL WELDS ARE APPROVED.

3.1.13

INTERPRETATION OF RADIOGRAPHS. IT IS THE RESPONSIBILITY OF THE SUBCONTRACTOR TO PROVIDE THE COMPETENT INTERPRETATION OF RADIOGRAPHS. THE SUBCONTRACTOR SHALL SUBMIT HIS ACCEPTED RADIOGRAPHS TO THE DU PONT INSPECTION ENGINEER ON AN AGREED UPON SCHEDULE FOR REVIEW BY A QUALIFIED DU PONT REPRESENTATIVE. ALL RADIOGRAPHS SUBMITTED TO DU PONT FOR REVIEW WILL BE RETURNED TO THE SUBCONTRACTOR WITHIN TWO WORKING DAYS.

3.1.14

REVIEW BY DU PONT OF ACCEPTABLE RADIOGRAPHS IS TO ASSURE COMPLIANCE WITH PARAGRAPH UW-51 OF SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE AND WITH THE SUPPLEMENTARY PROVISIONS OF THIS SPECIFICATION. WHERE DU PONT IS OF THE OPINION THAT AN IMPERFECTION WHICH HAS BEEN CLASSIFIED ACCEPTABLE BY THE SUBCONTRACTOR'S INTERPRETER IS REJECTABLE, THE DECISION OF DU PONT WILL BE FINAL.

3.1.15

THE SUBCONTRACTOR'S INTERPRETER SHALL MAKE A TISSUE PAPER TRACING FROM EACH RADIOGRAPH THAT CONTAINS IMPERFECTIONS OF REJECTABLE SIZE. THIS TRACING SHALL SHOW THE POSITION OF THE DEFECT WITH RESPECT TO THE PERMANENT IDENTIFICATION MARKS ON THE OUTSIDE SURFACE OF THE TANK AND TEMPORARY LEAD MARKERS AS USED ON THE INNER SURFACE. WHEN A WELD IS FOUND TO CONTAIN A REJECTABLE IMPERFECTION, ALL RADIOGRAPHS OF THAT WELD SHALL BE RETAINED UNTIL THE WELD HAS BEEN REPAIRED AND AN ACCEPTABLE RADIOGRAPH OBTAINED. (SEE PARAGRAPH BELOW FOR DISPOSITION OF RADIOGRAPHS.) A COMPARISON SHALL BE MADE BETWEEN THE RADIOGRAPHS TO INSURE THAT

THE SAME AREAS HAVE BEEN RE-RADIOGRAPHED. IF A REPAIRED AREA IS SUFFICIENTLY CLOSE TO THE END OF AN EXPOSURE LOCATION, THE ADJACENT LOCATION MUST BE RE-X-RAYED EVEN THOUGH IT WAS ORIGINALLY FREE FROM REJECTABLE DEFECTS.

3.1.16

REPORTS. THE SUBCONTRACTOR'S RADIOGRAPHIC INTERPRETER SHALL ISSUE A REPORT DAILY INDICATING THE TOTAL NUMBER OF EXPOSURES MADE, WELDS RADIOGRAPHED (BY IDENTIFICATION NUMBER), AND HIS ANALYSIS OF EACH RADIOGRAPH (WHETHER IT IS ACCEPTABLE OR REJECTED). WHEN THE REPORT INCLUDES RADIOGRAPHS OF WELDS WHICH HAVE BEEN REPAIRED, IT SHALL INDICATE THAT THE WELD IS A REPAIR WELD AND SHALL INDICATE HOW MANY TIMES THE WELD HAS BEEN REPAIRED. THE SUBCONTRACTOR SHALL FURNISH DU PONT WITH A CHART OF EACH TANK WHICH WILL INDICATE THE LOCATION OF EACH WELD AND THE LOCATIONS OF THE INDIVIDUAL RADIOGRAPHIC EXPOSURES. THE DU PONT REPRESENTATIVE WILL USE THIS CHART TO KEEP A CHECK ON THE PROGRESS OF THE RADIOGRAPHIC EXAMINATION BY CHECKING OFF THE INDIVIDUAL EXPOSURE LOCATIONS AS HE RECEIVES REPORTS FROM THE INTERPRETER. ALL RADIOGRAPHS, INCLUDING BOTH REJECTED AND ACCEPTABLE FILMS, SHALL BE RETAINED BY THE SUBCONTRACTOR FOR THE LENGTH OF TIME THAT THEY ARE OF VALUE TO HIM. ALL RADIOGRAPHS SHALL BE TURNED OVER TO DU PONT BY THE SUBCONTRACTOR IN NUMERICAL ORDER AT THE CONCLUSION OF THE JOB.

3.1.17

ALL X-RAY FILMS SHALL BE INTERPRETED IN ACCORDANCE WITH SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE, PARAGRAPH UW-51 I , AND THE INTERPRETATION STANDARDS LISTED BELOW.

3.1.18

INTERPRETATION STANDARDS. TO ASSIST IN THE INTERPRETATION OF RADIOGRAPHS IN THOSE SITUATIONS NOT COVERED BY THE ASME CODE, THE FOLLOWING INTERPRETATION STANDARDS ARE GIVEN.

3.1.18.1

POROSITY. THE ASME CODE POROSITY CHARTS ARE ADEQUATE FOR INTERPRETATION OF RADIOGRAPHS IN WHICH THE POROSITY IS SPHERICAL IN SHAPE. WHEN A SPOT OF POROSITY IS ELONGATED, IT SHALL BE REJECTED WHEN THE LONGEST DIMENSION EXCEEDS THE DIAMETER SHOWN ON THE ASME CODE POROSITY CHART FOR THE APPLICABLE PLATE THICKNESS AND POROSITY DISTRIBUTION.

3.1.18.2

IN INSTANCES WHERE THE IMAGE OF A DEFECT HAS AN APPEARANCE WHICH COULD BE CAUSED BY A CRACK OR LACK OF FUSION AS WELL AS A FINE SLAG STRINGER, AND IT IS NOT POSSIBLE TO DETERMINE ACCURATELY THE NATURE OF THE DEFECT, THE WELD SHALL BE REJECTED.

3.1.19

AT LOCATIONS WHERE THE FILM INTERPRETER OBSERVES CHANGES IN DENSITY ON THE FILM WHICH INDICATE THAT THE THICKNESS OF THE WELD AND OF THE ADJACENT BASE METAL HAS BEEN REDUCED TO A NOTICEABLE DEGREE BY GRINDING, HE SHALL COMPARE THE DENSITY OF THE LOW AREA WITH THAT OF AN APPLICABLE STANDARD FILM SHOWING A STEP BLOCK AND SHALL DETERMINE THE DEPTH OF THE LOW AREA ACCORDINGLY. IF THE DEPTH OF THE LOW AREA EXCEEDS 1/16 INCH, THE AREA SHALL BE BUILT UP WITH WELD METAL TO AT LEAST THE ORIGINAL THICKNESS, GROUND TO REMOVE WELD RIPPLE AND RE-X-RAYED.

3.1.20

SMOOTH LOW AREAS NOT UNDERCUTS ADJACENT TO WELDS WILL BE ACCEPTABLE, PROVIDED THAT THEY DO NOT EXCEED 1/32 INCH IN DEPTH AND BLEND SMOOTHLY INTO THE PLATE AND WELD SURFACES.

3.1.21

SURFACE DEFECTS SUCH AS DEEP GOUGES, UNDERCUTS, INCORRECT WELD CONTOUR AND TORN AREAS SHOULD HAVE BEEN LOCATED BY VISUAL INSPECTION AND REPAIRED PRIOR TO RADIOGRAPHIC EXAMINATION. IF, HOWEVER, SUCH AREAS ARE DETECTED BY THE FILM INTERPRETER, HE SHALL REJECT THE WELD PENDING VISUAL INSPECTION. IF VISUAL INSPECTION INDICATES THAT THE AREA IS ACCEPTABLE, THE INSPECTOR SHALL SO INDICATE ON THE TRACING AND THE INTERPRETATION WILL BE CHANGED TO "ACCEPTABLE". IN THE EVENT THAT VISUAL INSPECTION INDICATES THAT REPAIR WHICH INVOLVES WELDING IS NECESSARY, THE REPAIRED AREA SHALL BE RADIOGRAPHED.

3.1.22

WHEN THE RADIOGRAPH OF THE ACTUAL WELD SHOWS BUT ONE TYPE OF IMPERFECTION WHICH IS EQUAL TO OR BETTER THAN THE BORDERLINE REFERENCE STANDARD, THE CORRESPONDING PORTION OF THE WELD SHALL BE CONSIDERED AS ACCEPTABLE WITHOUT REPAIR. IF THE DEFECTS ARE MORE NUMEROUS THAN INDICATED BY THE BORDERLINE STANDARD, THE WELD SHALL BE UNACCEPTABLE UNTIL PROPERLY REPAIRED.

3.1.23

WHEN ONE TYPE OF DEFECT PREDOMINATES AND THE OTHER TYPES ARE BETTER THAN THE BORDERLINE STANDARD FOR THEIR PARTICULAR CLASS, THE BORDERLINE STANDARD OF THE PREDOMINATING DEFECT SHALL GOVERN WITHOUT REGARD TO THE OTHER TYPES OF DEFECTS.

3.1.24

WHEN TWO OR MORE TYPES OF DEFECTS ARE PRESENT TO AN EXTENT EQUAL TO THE BORDERLINE STANDARD FOR EACH TYPE, ALL BORDERLINE DEFECTS SHALL BE CONSIDERED UNACCEPTABLE AND THE WELD SHALL BE REJECTED UNTIL PROPERLY REPAIRED.

3.1.25

IN GENERAL, THERE WILL BE NO LIMIT WITH REGARD TO THE EXTENT OF ACCEPTABLE DEFECTS THROUGHOUT THE AREA ON A PARTICULAR WELD, PROVIDED THAT NO AREA CONTAINS DEFECTS IN EXCESS OF THOSE INDICATED ON THE BORDERLINE STANDARD.

3.1.26

THE SUBCONTRACTOR WILL BE EXPECTED TO REPAIR ALL WELD DEFECTS DETECTED BY HIS RADIOGRAPHIC FILM INTERPRETER WITHOUT CONSULTING THE DU PONT INSPECTION ENGINEER.

3.2. VACUUM LEAK TESTING

3.2.1

THE FOLLOWING WELDS ARE TO BE VACUUM LEAK TESTED BY THE SUBCONTRACTOR IN ACCORDANCE WITH THE INTENT AND PROCEDURE SPECIFIED BELOW:

3.2.1.1

ALL BUTT WELDS JOINING PLATES ON THE BOTTOM ASSEMBLY, INCLUDING KNUCKLES AND LOWER PART OF COLUMN OF THE SECONDARY LINER TANKS AFTER THEY HAVE BEEN LOWERED INTO FINAL POSITION.

3.2.1.2

ALL BUTT WELDS JOINING PLATES ON THE WALLS, COLUMN, AND CAPITAL SECTIONS OF THE SECONDARY LINER AND PRIMARY LINER.

3.2.1.3

ALL BUTT WELDS JOINING PLATES ON THE BOTTOM ASSEMBLY, INCLUDING KNUCKLE AND LOWER PART OF COLUMN, ON THE PRIMARY

LINER TANKS AFTER THEY HAVE BEEN LOWERED INTO FINAL POSITION AND ALSO AFTER THE TANKS HAVE BEEN FULLY STRESS RELIEVED.

*3.2.1.4

ALL BUTT WELDS JOINING PLATES ON THE COLUMN AND CAPITAL SECTIONS AND WALLS OF THE PRIMARY TANKS AFTER STRESS RELIEF.

3.2.2

ALL VACUUM LEAK TESTS SHALL BE PERFORMED IN THE PRESENCE OF THE DU PONT INSPECTION ENGINEER AT THE SITE.

3.2.3

THE VACUUM BOX USED FOR VACUUM TESTING FOR LEAKS IS TO BE SUFFICIENT STRENGTH TO WITHSTAND A VACUUM OF 6 PSI. THE TOP OF THE BOX IS TO HAVE A WINDOW IN IT OF SUFFICIENT SIZE AND TRANSPARENCY AS TO PERMIT CLOSE OBSERVATION OF THE WELD BEING TESTED. THE BOX SHALL BE OF SUCH SIZE, SHAPE AND DESIGN TO PERMIT TESTING OF ALL WELDS REQUIRING THE VACUUM LEAK TEST.

3.2.4

METHOD OF VACUUM LEAK TESTING. (1) CLEAN TEST AREA OF ALL RUST (2) COVER THE WELD THOROUGHLY WITH A SOAP SOLUTION. (3) PLACE THE VACUUM BOX OVER THE WELD AND INDUCE A VACUUM OF 6 PSI. THIS VACUUM IS TO BE HELD AS LONG AS NECESSARY IN THE OPINION OF THE DU PONT INSPECTION ENGINEER TO PROVIDE SATISFACTORY OBSERVATIONS.

3.2.5

ANY LEAKS REVEALED BY THE VACUUM LEAK TEST ARE TO BE REPAIRED IN ACCORDANCE WITH PARAGRAPH 2.4.14 OF THIS SPECIFICATION.

3.3. HYDROSTATIC TESTS

3.3.1

A FULL HYDROSTATIC TEST WILL CONSIST OF FILLING THE PRIMARY TANK WITH WATER TO A DEPTH OF THIRTY-TWO (32) FEET PLUS OR MINUS ONE INCH AND ALLOW TO STAND FOR FORTY-EIGHT (48) HOURS.

3.3.2

AT THE OPTION OF THE SUBCONTRACTOR, A FULL HYDROSTATIC TEST OF THE PRIMARY STEEL TANKS CAN BE MADE UPON COMPLETION OF TANK ERECTION, THE RADIOGRAPHIC EXAMINATION OF WELDS, AND REPAIR WELDS. THIS HYDROSTATIC TEST SHALL PRECEDE THE STRESS RELIEF OPERATION.

***Addendum C: 4/28/76**

3.3.3

A FULL HYDROSTATIC TEST OF THE PRIMARY STEEL TANKS WILL BE REQUIRED AFTER THE TANKS HAVE BEEN FULLY AND FINALLY STRESS RELIEVED AND AFTER SCALE REMOVAL.

3.3.4

ANY LEAKS DETECTED DURING THE REQUIRED HYDROSTATIC TEST ARE TO BE REPAIRED IN ACCORDANCE WITH PARAGRAPH 2.4.14 OF THIS SPECIFICATION. AND THE TANK MUST THEN BE RESTRESS RELIEVED IN ACCORDANCE WITH PARAGRAPH 2.6.8.

3.3.5

ALL WELDED JOINT SURFACES ON THE OUTSIDE OF THE PRIMARY LINER (EXCLUDING BOTTOM) ARE TO BE SUFFICIENTLY CLEANED TO PERMIT ADEQUATE INSPECTION OF THE WELD SEAM AREA DURING THE HYDROSTATIC TESTS.

3.3.6

VISUAL INSPECTION SHALL BE CONDUCTED JOINTLY BY THE SUBCONTRACTOR AND THE DU PONT INSPECTION ENGINEER TO DETERMINE IF THERE ARE ANY LEAKS.

3.3.7

THE HOLD TIME FOR THE HYDROSTATIC TEST IS TO BE ADJUSTED TO COMPENSATE FOR RAINY WEATHER CONDITIONS. THE INSPECTION OF THE PRIMARY TANK LINER FOR LEAKS SHALL TAKE PLACE AT A TIME WHICH INSURES AGAINST THE EXISTENCE OF THE LINER SWEATING CONDITIONS.

3.3.8

HYDROSTATIC TESTING IS PROHIBITED WHEN WEATHER CONDITIONS INDICATE THE POSSIBILITY OF FREEZING CONDITIONS DURING THE TEST PERIOD. THE TEMPERATURE OF WATER FURNISHED FOR HYDROSTATIC TESTING SHALL BE A MINIMUM OF 50 DEGREES F. IT SHALL BE THE RESPONSIBILITY OF THE SUBCONTRACTOR TO PERFORM HYDROSTATIC TESTS UNDER CONDITIONS WHICH ASSURE THAT THE METAL TEMPERATURES WILL NOT BE BELOW THE NIL DUCTILITY TRANSITION TEMPERATURE (NDT) OF THE STEEL.

3.3.9

ALL WATER USED IN THE HYDROSTATIC TESTING OF TANKS IS TO BE DISPOSED OF AS DIRECTED BY THE DU PONT INSPECTION ENGINEER.

3.4. MAGNETIC PARTICLE EXAMINATION (MAGNAFLUX) AND LIQUID PENETRANT EXAMINATION (DYE CHECK)

3.4.1

ALL AREAS AS SPECIFIED IN PARAGRAPH 3.4.2 BELOW SHALL BE CHECKED FOR DEFECTS BY MAGNETIC PARTICLE EXAMINATION TECHNIQUES IN ACCORDANCE WITH SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE, APPENDIX VI OR BY THE LIQUID PENETRANT EXAMINATION TECHNIQUE IN ACCORDANCE WITH SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE, APPENDIX VIII AND WITH THE REQUIREMENTS AND INTENT OF THIS SPECIFICATION.

3.4.2

THE FOLLOWING AREAS SHALL BE CHECKED BY THE SUBCONTRACTOR.

3.4.2.1

ALL AREAS ON THE INSIDE AND OUTSIDE SURFACES OF THE PRIMARY LINER TANKS WHERE CLIPS, LUGS, ETC., HAVE BEEN REMOVED AND /OR REPAIRED AND ALL AREAS WHERE PLATE DAMAGE HAS BEEN REPAIRED BY FILLING, WELDING, GRINDING, ETC., EXCEPT THE SURFACES OF THE HORIZONTAL ROOF PLATES.

3.4.2.2

ALL AREAS ON THE INSIDE SURFACE OF THE SECONDARY LINER TANKS WHERE CLIPS, LUGS, ETC. HAVE BEEN REMOVED AND DAMAGE REPAIRED AND ALL AREAS WHERE PLATE DAMAGE HAS BEEN REPAIRED.

3.4.2.3

THE FIRST AND LAST WELD PASS ON ALL WELDS CONNECTING INLET PIPING AND COOLING COIL RISER PIPES TO THE PRIMARY LINER TANKS.

3.4.3

ALL MAGNETIC PARTICLE EXAMINATIONS SHALL BE MADE ONLY IN THE PRESENCE OF THE DU PONT INSPECTION ENGINEER AT THE SITE.

3.4.4

THE SURFACES TO BE EXAMINED SHALL BE CLEAN, DRY, FREE FROM OIL, LOOSE RUST, OR LOOSE SCALE.

3.4.5

THE EXAMINATION OF DESIGNATED AREAS SHALL BE REPEATED AS MANY TIMES AS NECESSARY, IN THE OPINION OF THE DU PONT INSPECTION ENGINEER, TO PROVIDE ACCURATE AND SATISFACTORY INTERPRETATION OF DEFECTS.

3.4.6

ANY DEFECTS REVEALED BY MAGNETIC PARTICLE EXAMINATION ARE TO BE REPAIRED IN ACCORDANCE WITH PARAGRAPH 2.4.14 OF THIS SPECIFICATION AND RE-EXAMINED.

9/9/74
*Addendum B - 11/21/74

SPECIFICATION 6797 - ADDENDUM A

PRIMARY AND SECONDARY STEEL LINER TANKS

FOR

PROJECT 9S1493

WASTE STORAGE TANKS
200 AREA - BLDG. 241-14F
SAVANNAH RIVER PLANT

*2.1.1 Add the following:

In addition to standard mill certification reports for ASTM A516 Grade 70 normalized steel, certification is required in accordance with supplementary requirement S6 that a sample from each heat passes a drop weight test at zero degrees F.

2.1.10 Ductwork to be carbon steel, not galvanized as specified in Standard Specification SH1A.

3.1.2.2 Delete this paragraph. Seal welds on coil support plates to be tested by vacuum technique. Details of test procedure and type of test equipment required will be furnished by Du Pont.

11/21/74

SPECIFICATION 6797 - ADDENDUM B

PRIMARY AND SECONDARY STEEL LINER TANKS

FOR

PROJECT 9S1493

WASTE STORAGE TANKS
200 AREA - BLDG. 241-14F
SAVANNAH RIVER PLANT

1.4.1 The following list of drawings replaces those originally submitted. All changes that are the responsibility of the tank vendor are noted by revisions.

W-700339	Cooling Slots	Replaces W-449824
W-700320	Secondary Liner	" W-448842
W-700321	Primary Liner	" W-448843
W-700322	Air Inlet Manifold	" W-448846
W-700323	Base Slab Reinforcing	" W-448847
W-700324	General Arrangement	" W-448849
W-700325	Liner Plate Attachments, Sh. 1	" W-448883
W-700326	Liner Plate Attachments, Sh. 2	" W-448884
W-700340	Top Slab Plan - Tank 25	" W-449796
W-700341	" 26	Added
W-700342	" 27	"
W-700343	" 28	"
W-700397	Cooling Coil Supports Tk. 25	Replaces W-449389
W-700400	" 26	Added
W-700423	" 27	"
W-700426	" 28	"
W-700396	Cooling Coil Guides Tk. 25	Replaces W-449823
W-700399	" 26	Added
W-700422	" 27	"
W-700425	" 28	"
W-700395	Header Supports Tk. 25	Replaces W-449823
W-700398	" 26	Added
W-700421	" 27	"
W-700424	" 28	"
W-162690	Tank Bottom Lowering Frame	No Change
W-162691	"	"
W-700107	T.C. Plot Plan	"
W-449600	Study Plot Plan Sh. 1	Replaces W-449600
W-700159	" 3	Added
W-700283	Excavation Drawing	"
W-700413	Tk. #25 Exterior Thermo-couples Sh. 1	Replaces W-449815
W-700414	Tk. #25 Exterior Thermo-couples Sh. 2	W-449822
W-700415	Tk. #26 Exterior Thermo-couples Sh. 1	Added

W-700416	Tk. #26 Exterior Thermo-couples Sh. 2		Added
W-700417	Tk. #27 Exterior Thermo-couples Sh. 1		"
W-700418	Tk. #27 Exterior Thermo-couples Sh. 2		"
W-700419	Tk. #28 Exterior Thermo-couples Sh. 1		"
W-700420	Tk. #28 Exterior Thermo-couples Sh. 2		"
W-700476	H&V Dehumidification Tk.	25	Replaces W-449193
W-700477	"	26	Added
W-700478	"	27	"
W-700479	"	28	"

1.6.1 Mail to:

E. I. du Pont de Nemours & Co. Inc.
B. G. Custer, Design Division
Engineering Department L-33W11
Wilmington, Delaware 19898

1.7.3.1 The minimum design load for the temporary roof supports shall be for a dead load plus live load of 800 pounds per square foot.

1.7.6 The subcontractor is to provide all labor, equipment, insulation, controls, etc., necessary to stress relieve the four erected primary steel tanks in accordance with the requirements of this specification as set forth in Section 2.6 - Stress Relieving.

1.7.7 As part of the bidder's proposal, the bidders are required to submit an outline of their proposed stress relieving procedure. The subcontractor is required to furnish nine (9) copies of a complete and detailed "Stress Relieving Procedure" (see Paragraph 2.6.2) to B. G. Custer, Du Pont Design Division within 60 days after the award of this contract. Du Pont will consider this information confidential if so requested. The stress relieving procedure will be subject to Du Pont approval and this stress relieving operation must be witnessed in its entirety by Du Pont.

2.1.1 Add:

All normalized plate 5/8" thick and over for the primary tanks shall be drop weight tested in accordance with ASTM E-208. Tests will be on each mill plate, two test pieces in the heat treated condition, drop weight no-break performance at 0°F. Failure is cause for rejection.

2.3.7 Sharp gouges or deep scratches on inner surface of the primary and secondary tank walls or bottom will not be permitted when in excess of 1/32" in depth. These imprefections shall be ground out and if the resulting depression exceeds 1/16", it shall be filled with weld metal. The subcontractor shall provide protection of completed portions of the primary and secondary steel

liner tank to avoid damage insofar as possible. On the primary tank, surface of plates containing mill stencil markings shall be placed on the exterior side of the tank.

2.3.4 Delete "If cold formed, they must be stress relieved after forming and before field assembly."

April 28, 1976

SPECIFICATION 6797 - ADDENDUM C

PRIMARY AND SECONDARY STEEL LINER TANKS

FOR

PROJECT 9S1493

WASTE STORAGE TANKS
200 AREA - BLDG. 241-14F
SAVANNAH RIVER PLANT

1.6.1 Revised, Rewritten as Follows:

Materials for plates, structural shapes, and pipe shall be certified by mill test reports as prescribed by the ASTM specifications applicable to each material (see Paragraph 2.1). Mill test reports are to be submitted to the Du Pont inspector for approval prior to the use of the material. Mill test reports are to be reviewed and approved by the Du Pont inspector at the subcontractor's shop. The Du Pont inspector will make necessary distribution of mill test reports including two copies to Procurement Coordinator for Design File.

2.1.2 Add:

Welding temporary attachments of galvanized steel will not be permitted.

2.1.3.1 Add:

All steel plate attachments to the primary tank, below the liquid level, shall be of the same material as the primary tank.

2.3.7 Revised, Rewritten as Follows:

Sharp gouges or deep scratches on inner surface of the primary and secondary tank walls or bottom in excess of 1/32" in depth will not be permitted. These imperfections shall be ground out and if the resulting depression exceeds 1/16", it shall be filled with weld metal. The subcontractor shall provide protection of completed portions of the primary and secondary steel liner tank to avoid damage insofar as possible. On the primary tank, surface of plates containing mill stencil markings shall be placed on the exterior side of the tank. At the subcontractor's option, the primary tank bottom plates may be placed with mill stencil marks up to eliminate the need to turn over plates that are shipped with stencil marks up, provided they are ground smooth and repaired as specified above.

2.3.9 Revised, Rewritten as Follows:

All welds joining the primary and secondary steel tank wall, bottom, column, and knuckle plates shall be butt welds conforming to the requirements of Section VIII of the ASME Boiler and Pressure Vessel Code, Subsection B, Part UW, for 100% joint efficiency (Table UW-12 No. 1).

2.5.2 Revised, Rewritten as Follows:

The material used shall have insulating properties such that the temperature at any place on the top surface of the base slab shall not exceed 300 degrees F during the stress relief operation. The vendor must submit chemical composition of proposed material for Du Pont to determine that the material will not act as a corrosive agent against the tank bottom during the construction period when the material is exposed to the weather. The proposed material and installation procedure shall be approved by Du Pont prior to use. Test data of the refractory shall be submitted by the subcontractor as part of this procedure. The top surface shall be smooth within 1/2" of a true plane.

2.5.3 (New)

The material recommended shall have a minimum compressive strength of 300 psi after the tank stress relief operation. This compressive strength shall be verified as follows:

2.5.3.1 Testing by Subcontractor (New Section)

1. Three cylinders shall be cast in the morning and three in the afternoon of each day's pour. A minimum of 24 cylinders shall be cast.

2. The cylinders shall be taken in standard 6" diameter by 12" long concrete test cylinder molds.

3. All cylinders shall be air dried on the job site for a minimum of seven days.

4. The cylinders shall then be delivered to testing lab and oven dried at 230°F for 24 hours.

5. After removal from oven, cylinders will be capped and crushed.

6. The cold crushing strength of each of the three cylinder groupings mentioned in Item 1 will be numerically averaged. The averaged cold crushing strength for each grouping shall not be less than 380 psi.

2.5.3.2 Testing by Du Pont (New Section)

1. Final acceptance of refractory installation will be based on cored samples taken and tested by Du Pont.

2. Cores shall be taken a minimum of 24 hours after refractory installation.

3. Six cores shall be taken in the area of each day's pour - 2 in refractory material placed during morning, 2 in material placed at mid-day, and 2 in material placed during the afternoon.

4. All cored samples shall be air dried for 24 hours and then oven dried at 230°F for 24 hours prior to testing.

5. The minimum cold crushing strength of any core shall not be less than 380 psi.

6. Design shall be notified of any core failing to meet this minimum. In this case, Design will either approve the test results or will require additional core samples taken in the same location. These cores would be taken in sufficient number to determine whether the failure is the result of a faulty sample, damaged while being cored, or the result of unacceptable refractory.

7. The results of all core samples shall be transmitted to the project's A&C specialist engineer and made available to the tank subcontractor.

2.5.3.3 (New)

Compressive strength values listed throughout Section 2.5.3 are minimums and may be increased, and test procedures modified, depending on material submitted for approval per Paragraph 2.5.2.

3.2.1.4 Revised, Rewritten as Follows:

All butt welds joining plates on the walls, center column, and capital sections of the primary tanks after stress relieving and before hydrostatic test if they cannot be visually inspected during the hydrostatic test.

3.5. PROCEDURE FOR WELD TESTING OF COIL SUPPORT PLATES (New Section)

3.5.1

Make convenient pressure connection to stress-relief vent hole in coil support plate. Attach to source of 6 psi minimum nitrogen or air pressure.

3.5.2

Apply soap solution to entire weld area and the heat affected zone.

3.5.3

If any bubbles appear on application of pressure, the weld shall be rejected and repaired.

3.5.4

Weld tests for coil support plates shall be performed in the presence of the Du Pont Inspection Engineer at the site.

3.6. PLATE INSPECTION (New Section)

3.6.1

Plate thickness shall be checked for compliance with ASTM A20 requirements at the vendor's shop prior to shop fabrication or edge preparation. Plates shall be rejected if they do not meet ASTM A20 requirements.

3.6.2

Plates shall be inspected for cold laps, surface imperfections, stringer separations at edges, etc.

3.6.3

Vendor shall submit shop inspection procedures used for plates used in this work as part of quality assurance procedure.

DISTRIBUTION

Wilmington

N. J. Letang
F. E. Kruesi
J. E. Conaway
J. F. Proctor
A. A. Kishbaugh
AED File

Savannah River Laboratory

S. Mirshak
D. L. McIntosh

Savannah River Plant

J. T. Granaghan-T. Hendrick, 703-A
R. Maher, 703-A
H. H. McGuire, 703-A
H. J. Groh, 703-A
R. S. Swingle, 703-A
E. O. Kiger, 703-A
J. H. Hershey, 704-F
D. C. Nichols, 704-1H
D. B. Jett, 704-1H
E. J. O'Rourke, 704-2F
O. M. Morris, 704-H
C. W. Swindell, 703-A
J. P. Maloney, 703-A
G. McCalley, 703-A
E. P. Kenny, 706-F
J. W. Jennings, 706-F
J. E. Bodie, 703-A
S. F. Goodman, 703-A
R. F. Mittelberg, 723-7A
J. M. Ferrell, 723-7A
P. R. Vormelker, 723-7A
C. F. Jenkins, 723-7A
M. E. Du Pont, 723-7A
R. E. Sprayberry, 723-7A
D. C. Jones, 723-7A
P. E. Eyre, 723-7A
J. W. Crichton, 704-2F
G. L. Albert, 704-2F
O. W. Mowry, 704-2H
Building File, 723-A
TIS File, 773-A
TS File, 703-A
R&AS Extra Copies, 703-A
R&AS Vital Records File, 703-A
R&AS Record File, 703-A
Tech File, 706-1H