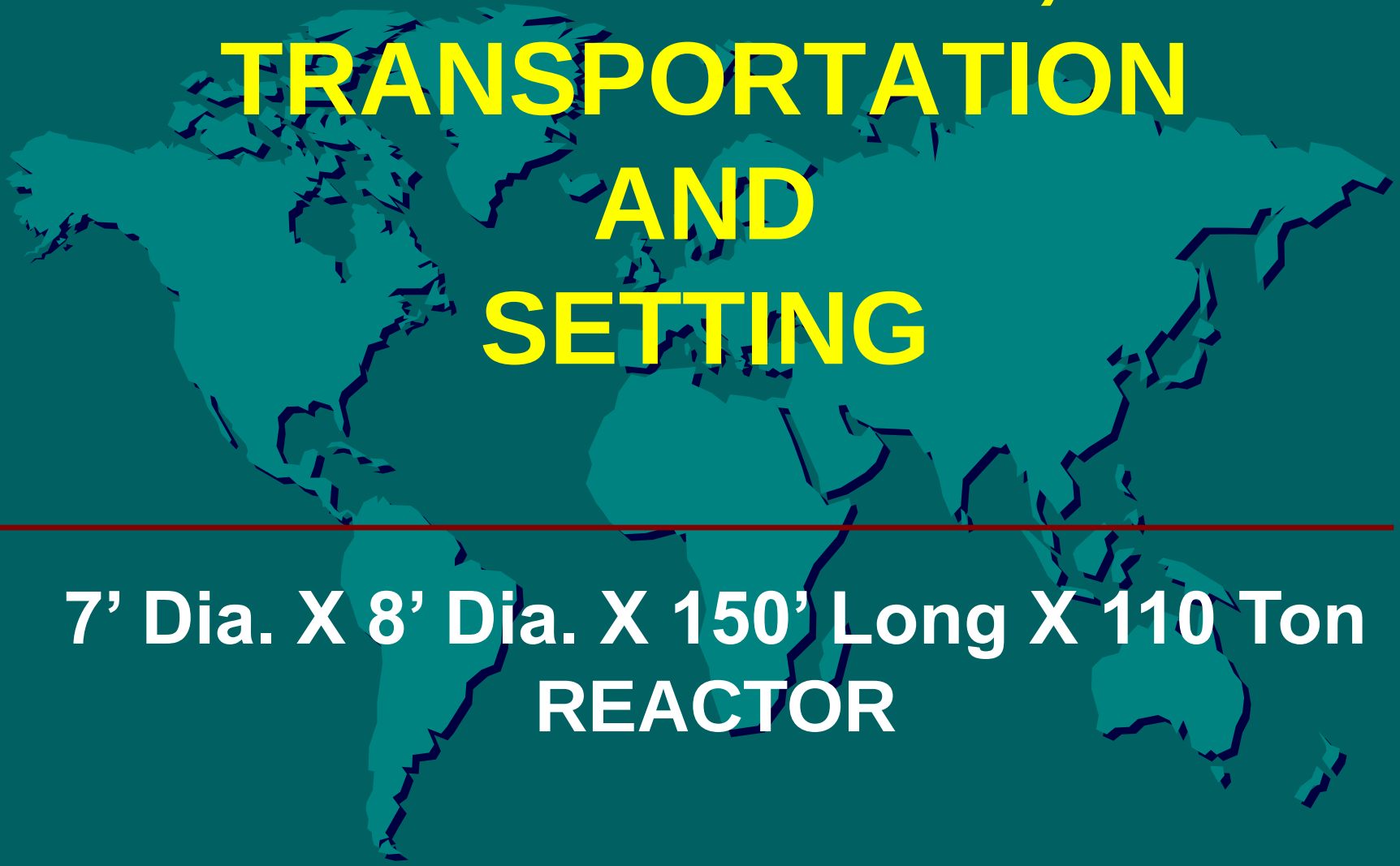
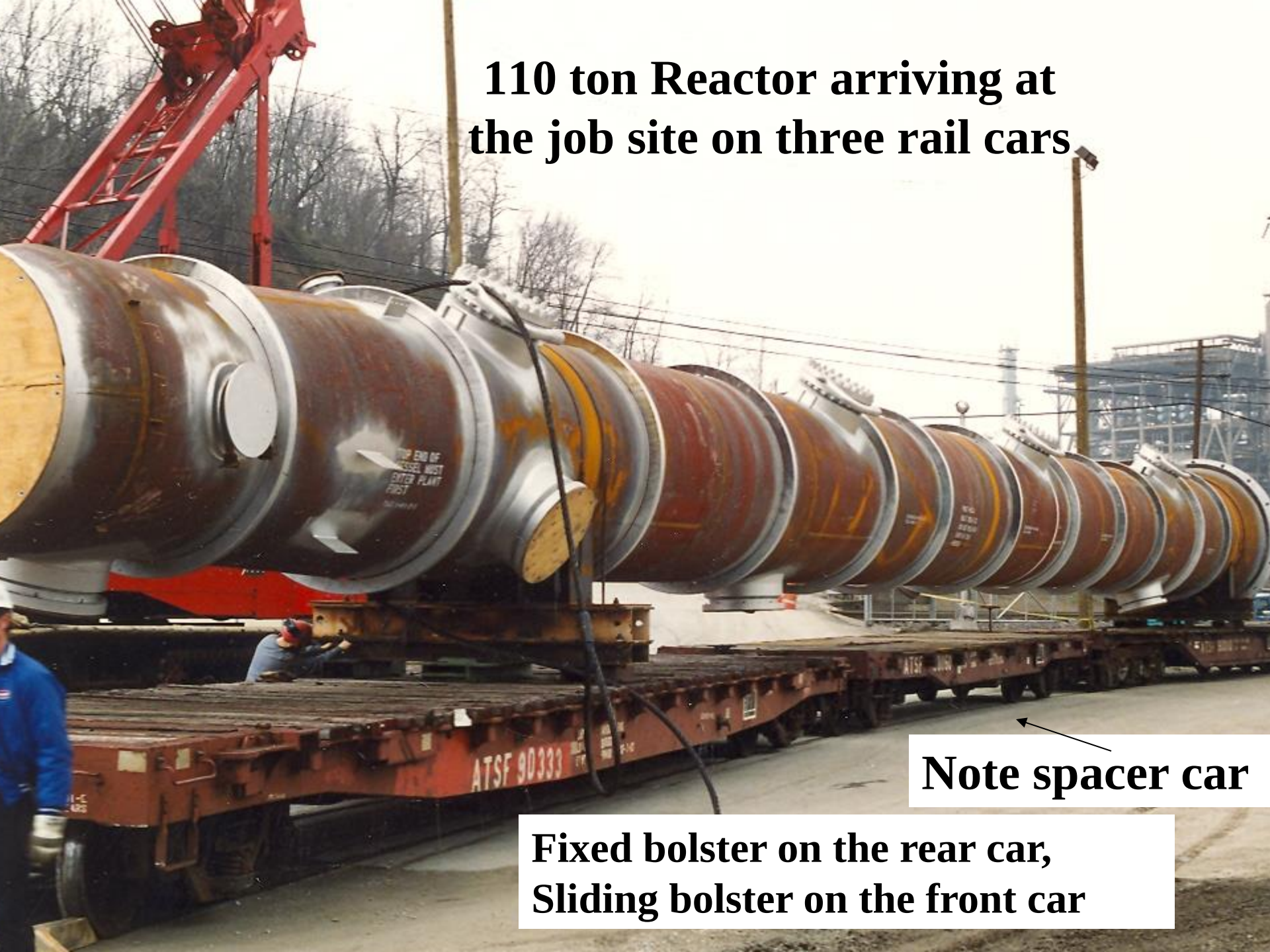
OFFLOADING, TRANSPORTATION AND SETTING



7’ Dia. X 8’ Dia. X 150’ Long X 110 Ton REACTOR


110 ton Reactor arriving at
the job site on three rail cars
ATSF 90333
Note spacer car
Fixed bolster on the rear car,
Sliding bolster on the front car

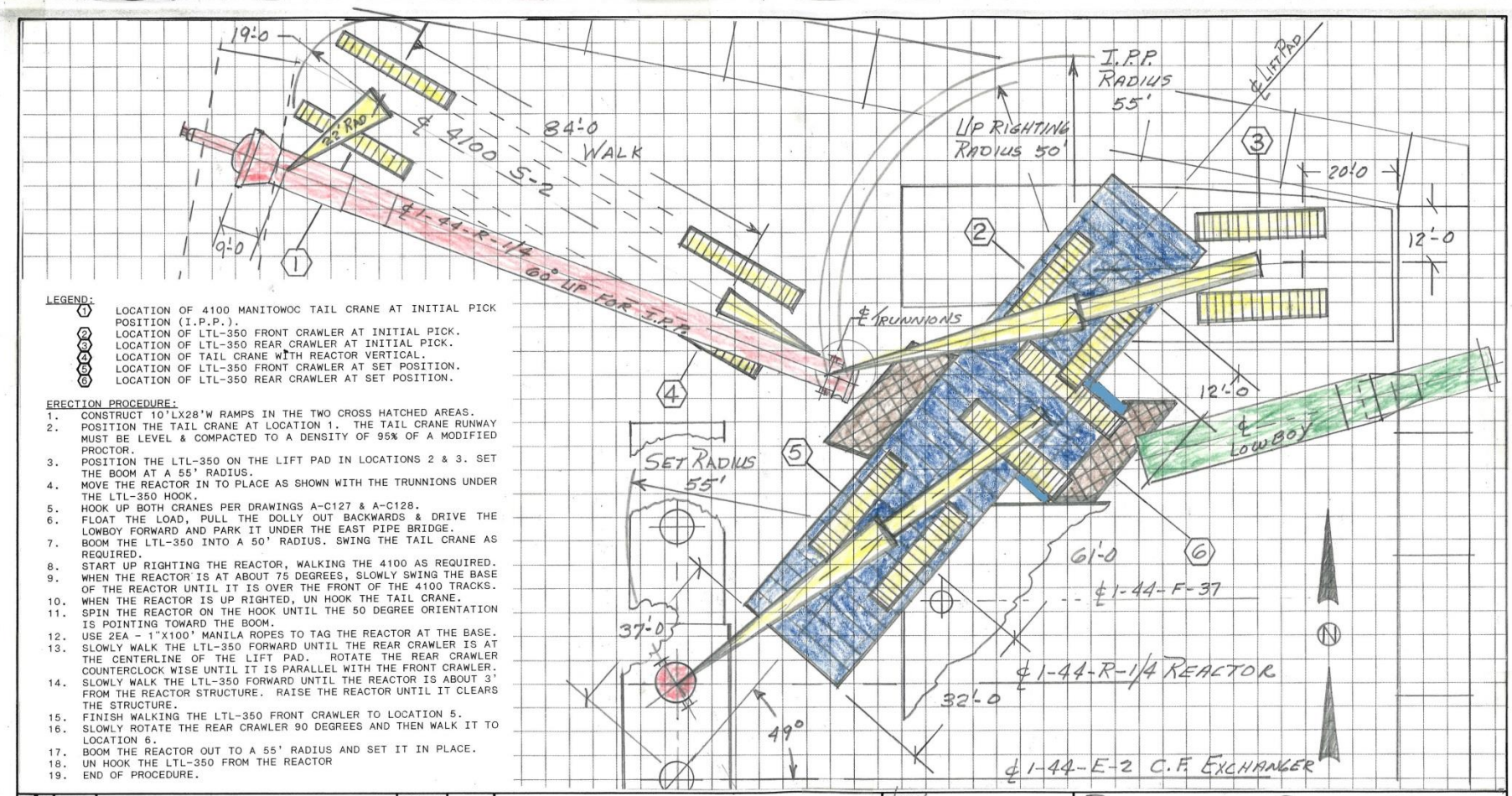
Manitowoc 4100 S-2
230 Ton Crane

Removing front car and spacer car

Installing the lowboy under the top end of the reactor.


Note that the 4100 Manitowoc is in front of the lowboy. It is being moved in to the lift area to tail the reactor up.
Steerable Dolly


TAG 1-44-D-1
Tie down for
rail shipment



LEGEND:

1. LOCATION OF 4100 MANITOWOC TAIL CRANE AT INITIAL PICK POSITION (I.P.P.).
2. LOCATION OF LTL-350 FRONT CRAWLER AT INITIAL PICK.
3. LOCATION OF LTL-350 REAR CRAWLER AT INITIAL PICK.
4. LOCATION OF TAIL CRANE WITH REACTOR VERTICAL.
5. LOCATION OF LTL-350 FRONT CRAWLER AT SET POSITION.
6. LOCATION OF LTL-350 REAR CRAWLER AT SET POSITION.

ERECTION PROCEDURE:

1. CONSTRUCT 10'LX28'W RAMPS IN THE TWO CROSS HATCHED AREAS.
2. POSITION THE TAIL CRANE AT LOCATION 1. THE TAIL CRANE RUNWAY MUST BE LEVEL & COMPACTED TO A DENSITY OF 95% OF A MODIFIED PROCTOR.
3. POSITION THE LTL-350 ON THE LIFT PAD IN LOCATIONS 2 & 3. SET THE BOOM AT A 55' RADIUS.
4. MOVE THE REACTOR IN TO PLACE AS SHOWN WITH THE TRUNNIONS UNDER THE LTL-350 HOOK.
5. HOOK UP BOTH CRANES PER DRAWINGS A-C127 & A-C128.
6. FLOAT THE LOAD, PULL THE DOLLY OUT BACKWARDS & DRIVE THE LOWBOY FORWARD AND PARK IT UNDER THE EAST PIPE BRIDGE.
7. BOOM THE LTL-350 INTO A 50' RADIUS. SWING THE TAIL CRANE AS REQUIRED.
8. START UP RIGHTING THE REACTOR, WALKING THE 4100 AS REQUIRED.
9. WHEN THE REACTOR IS AT ABOUT 75 DEGREES, SLOWLY SWING THE BASE OF THE REACTOR UNTIL IT IS OVER THE FRONT OF THE 4100 TRACKS.
10. WHEN THE REACTOR IS UP RIGHTED, UN HOOK THE TAIL CRANE.
11. SPIN THE REACTOR ON THE HOOK UNTIL THE 50 DEGREE ORIENTATION IS POINTING TOWARD THE BOOM.
12. USE 2EA - 1"X100' MANILA ROPES TO TAG THE REACTOR AT THE BASE.
13. SLOWLY WALK THE LTL-350 FORWARD UNTIL THE REAR CRAWLER IS AT THE CENTERLINE OF THE LIFT PAD. ROTATE THE REAR CRAWLER COUNTERCLOCK WISE UNTIL IT IS PARALLEL WITH THE FRONT CRAWLER.
14. SLOWLY WALK THE LTL-350 FORWARD UNTIL THE REACTOR IS ABOUT 3' FROM THE REACTOR STRUCTURE. RAISE THE REACTOR UNTIL IT CLEARS THE STRUCTURE.
15. FINISH WALKING THE LTL-350 FRONT CRAWLER TO LOCATION 5.
16. SLOWLY ROTATE THE REAR CRAWLER 90 DEGREES AND THEN WALK IT TO LOCATION 6.
17. BOOM THE REACTOR OUT TO A 55' RADIUS AND SET IT IN PLACE.
18. UN HOOK THE LTL-350 FROM THE REACTOR
19. END OF PROCEDURE.

REV. NO.	DATE	REVISION DESCRIPTION	DRAWN / CHECK	APP.
1	2/1/93	DRAWING ISSUED 'AFC'		KE6

FLUOR DANIEL

DRAWN BY	KEGOODMAN
CHECKED BY	
SUPERVISOR	RELEASE DATE
SUPERVISOR ENGR	INITIALS KEGOODMAN
PROJECT ENGR	APP. DATE
CLIENT	APP. DATE

RIGGING PLOT PLAN FOR ERECTING 1-44-R-1/4 REACTOR

ASHLAND OIL CATLETTSBURG, KY

SCALE	DRAWING NUMBER	REVISION
1"=20'	580500-B-C126	1

DISTRIBUTION CODE _____

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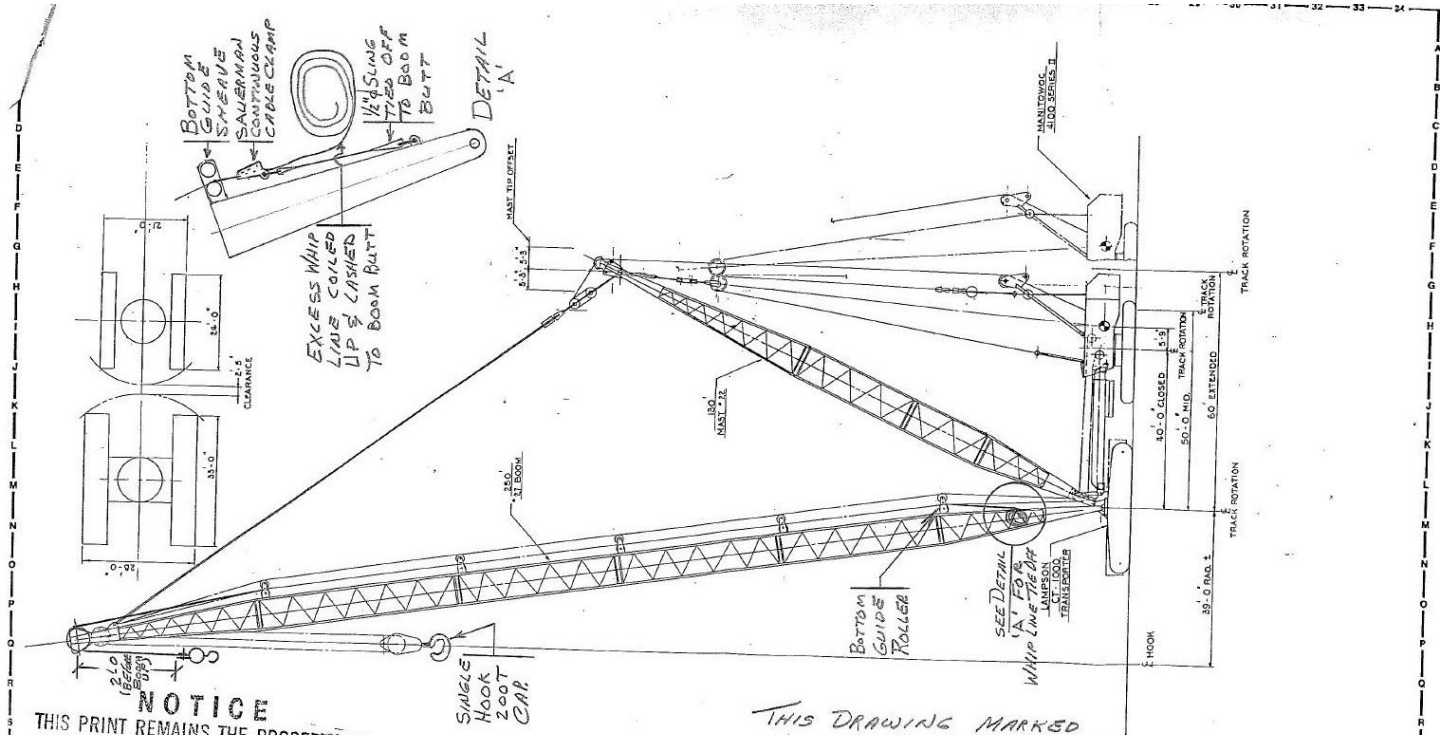

THIS DRAWING MARKED UP TO SHOW WHIP LINE INSTALLATION PRIOR TO BOOMING UP AT ASSY TIME. kel 2-25-92

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REV NO	CHECKED DATE	REVISIONS

APPD. FOR CONST. BY:
ENG.
CHECKED
DRAWN D.N.
SCALE: 1" = 10'
JOB NO.

DATE TITLE

NEIL F. LAMPSON INC.
KENNEWICK, WASHINGTON

LTL 350 TRANSI-LIFT
GENERAL ARRANGEMENT

CUSTOMER/PURCHASED
NEIL F. LAMPSON

SIZE D | DWG NO 350-001 | SHT NO | REV NO

Two things to note about the general arrangement drawing for the LTL-Transi-lift.

1. See the overhaul ball detail at the boom point which was used for the whip line.
2. See detail A just above it showing how to tie off the whip line using a Sauerman continuous cable clamp and then how to lash it to the back side of the boom butt. The reason for this is that the Manitowoc 4100 did not have enough drums to be able to hook up the whip line during the erection of the heavy plant equipment. So it was tied off until all of the heavy lifts were made, then the main line was tied off and the excess wire was removed from the drum. The whip line was then attached to the same drum, and the main line was coiled up and lashed to the back side of the boom drum in the same location where the whip line had been lashed.

Ordinarily, a heavy lift crane is not used to set structural steel. They are too expensive and too slow. But in this case there were two reasons for doing so.

1. The reactor structure needed to be constructed as soon as possible and a long boom was required.
2. In this case, the front crawler could be left in one position and the rear crawler (the Manitowoc 4100 crawler crane) could be walked side ways so the whip line hook could be swung from the pick point of the structural steel to the set point. This allowed the LTL-350 to be used pretty much like a regular crane.

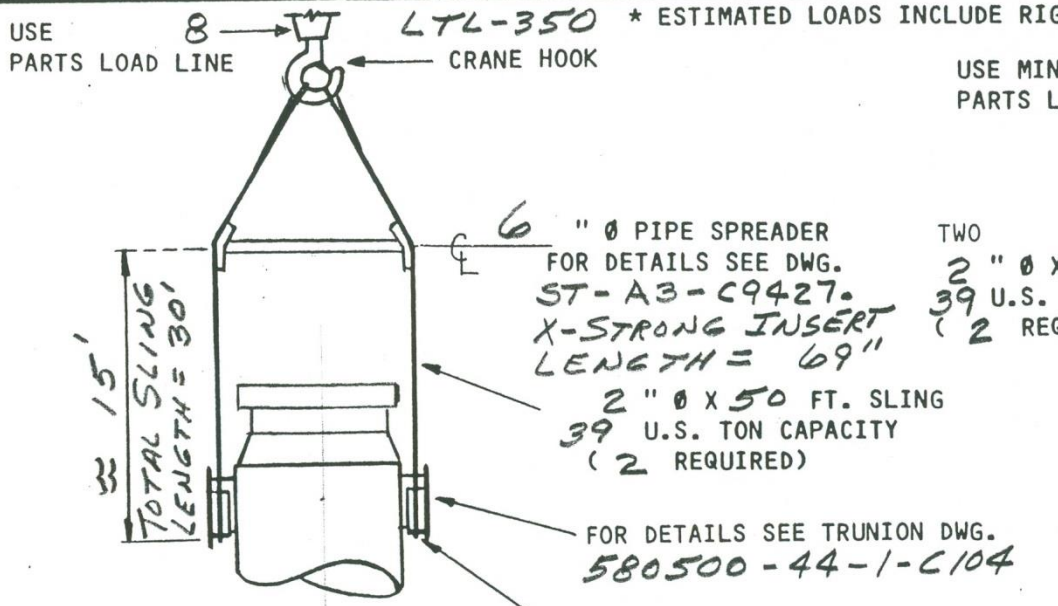
Note:

1. **The bottom end of the reactor is still under the pipe bridge.**
2. **There are pipe racks on all three sides of the lift area.**
3. **The view is looking East.**

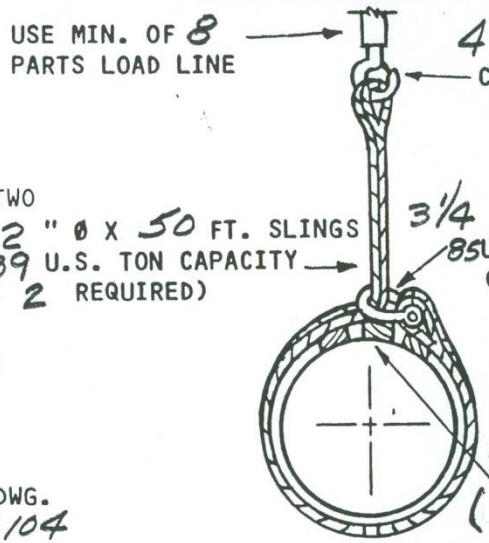
Lowboy pulled forward through pipe rack.
Steerable dolly is being rolled out backward.

LIFT CRANE DATA FOR LTL-350		TAILING CRANE DATA FOR 4100 S-2		VESSEL DATA
MIN. BOOM = 260'	MAX. BOOM = 260'	MIN. BOOM = 110'	MAX. BOOM = 110'	SIZE: 7'ϕ x 8'ϕ x 149'-6 x 220,000 lbs
MIN. RAD.= 40'	MIN. RAD.=	MIN. RAD.= 22'	MIN. RAD.=	EST. ERECTION WT.* 229,000 lbs
MAX. RAD.= 72'	MAX. RAD.=	MAX. RAD.= 29'	MAX. RAD.=	EST. I.P. LOAD:* 115,000 lbs
				EST. TAIL LOAD:* 124,000 lbs

* ESTIMATED LOADS INCLUDE RIGGING



RIGGING HOOK UP



TAILING HOOK UP

3 AS SHOWN 1 CENTERED ON TOP

6. SEE DWG A-C128 FOR TAIL SLING POSITIONING ON HARDWOOD SOFTENERS

1. BEARING SURFACES OF SLING PROTECTORS THAT TURN DURING ERECTION ARE TO BE GREASED BEFORE MAKING LIFTS.
2. LOADS DO NOT INCLUDE WEIGHT OF JIB AND OVERHAUL BALL (INCLUDES LTL-350 OVERHAUL BALL.
3. ERECTION TRUNIONS TO BE SHOP WELDED TO THE VESSEL BY FABRICATOR.
4. CRANES MUST BE LEVEL AND ON CRANE MATS (TAIL CRANE IS NOT ON MATS).
5. THIS DRAWING FOR ERECTION ONLY.

REV. NO.	DATE	REFERENCE DRAWING	DRAWN	APP.
1	8/25/93	DRAWING ISSUE AFC		KE6

FLUOR

DR KEGOODMAN	RIGGING DATA SHEET FOR ERECTING 1-44-R-1/4 REACTOR ASHLAND OIL CATLETTSBURG
CH	
SUPR	
SUPR ENG. KEGOODMAN	
SCALE NONE	DRAWING NUMBER 580500-A-C127 REV. 1

Note the ropes hooked to the lift slings for easy sling removal

Lampson LTL-350 Transi-Lift 350 ton Lift Crane With 260’ boom

Note that both crawlers are in line with each other

Rear crawlers turned in order to swing for final setting of reactor

The next two slides show the drawing of a Rigging Progress Report and a Rigging Equipment List. Note that the rigging progress report is not for this project as one could not be found. They are shown here as they are two of the most important documents that the rigging engineering department uses to communicate with the field Construction Manager, the field Purchasing Agent and the field Rigging Superintendent. They are both issued to the field on the 1st and 15th of each month.

The rigging progress and information report is filled out by the home office rigging engineer as soon as a plant equipment list is available. Using established guide lines, the rigging engineer lists the plant equipment that he feels the rigging engineering department should be responsible for as **engineered lifts**. It is then sent to the field Construction Manager who reviews it and then agrees with it or marks it up to delete or add certain plant equipment. He then sends it back to the home office rigging department and it becomes their scope of work. It is filled out as the rigging engineer designs the lifts.

The rigging equipment list is made out by the home office rigging engineer as he designs the lifts for a project. The field then knows what equipment to buy, rent or fabricate. It also shows the drawing numbers or tag numbers of the equipment that it will be used to lift with. By using the ETA at site of each piece of plant equipment shown on the right side of the rigging progress report, the field knows when the rigging equipment/gear for a particular lift should be at the site.

RIGGING PROGRESS & INFORMATION REPORT

FLUOR DANIEL

DISTRIBUTION

Project manager (1)
Manager Construction (1)
Construction Technology
Camberley
Greenville (1)
Houston (1)
Irvine (1)
Vessels Group (1)

KEY

1. VESSEL ONLY
2. VESSEL WITH TRAYS W/O INSULATION
3. VESSEL WITH INSULATION W/O TRAYS
4. VESSEL WITH TRAYS AND INSULATION
5. VESSEL WITH REFRACTORY
6. VESSEL WITH REFRACTORY AND INSULATION

TYPE

V= VERTICAL
H= HORIZONTAL
S = SPHERE

LEGEND:

TYPE LIFT & TAIL ATTACHMENT

C.H = CHOKERS
C.L. = CONE LUG
F.L. = FLANGE LUG
T.H.L. = TOP HEAD LUG
TR = TRUNION
TL = TAIL LUG
T.B. = TAIL BEAM

RDS = RIGGING DATA SHEET
RPP = RIGGING PLOT PLAN
FTR = FIELD TO RIGG

DRAWING: 429400-B-C1646
CLIENT PERTAMINA
PLANT CILACAP DEBOTTLENECKING PROJECT
LOCATION CILACAP, JAVA, INDONESIA
CONTRACT 429400
DATE JULY 97

ITEM NO.	ITEM NAME	ITEM SIZE OVERALL LENGTH IN MM	KEY	ITEM WT. IN METRIC TONS	TYP	TYPE LIFT & TAIL ATTACH.	LIFT EQUIPMENT	LIFT ATTACHMENT DRAWING	TAILING ATTACHMENT DRAWING	INTERFERENCE DRAWING	RIGGING DRAWING DWG - REV	SHIPPING DATE MM/DD/YY	ETA DATE MM/DD/YY	REMARKS
023C108	RAFFINATE VACUUM FLASH & STRIPPING TOWER II	2200 Ø X 1500 Ø X 21 260	4	28.1	V	THL & CH	4100W S2	A4-23-C1623 REV. 2			RDS		11/07/97	
11C1	CRUDE SPLITTER (EXISTING TO BE REMOVED)	4600 Ø X 9800	4	36	V	THL & CH	4100W S2	11-A-C1601 24 MAR-REV1			RPP		02/15/97	LIFT CONTRACT
11C2	HEAVY GASOIL STRIPPER	1600 Ø X 12300	4	16.42	V	THL & CH	4100W S2	11-A3-C1602 REV 1-24MAR			RDS 11-A-C1636		01/25/97	
11C8	GASOLINE SPLITTER COLMN (EXISTING)	19000 X 24400	4		V	THL & CH	4100W S2	A-11-C1648 REV 1			RPP			
11C8	GASOLINE SPLITTER COLMN (NEW)	2750 Ø X 27925		44.9	V	THL & CH	4100W S2	11-A3-C1603 REV2 24MAR			RPP 11-B-C1635		01/25/97	
11E50	CRUDE SPLITTER OVERHEAD CONDENSER	3962 W 5055 H X 8686L		15.8	H	4 SLINGS W/ 2 SPD BARS					FTR		01/25/97	FIN FAN UNITS
11E57 STRUCT	FIN FAN STRUCTURE										RDS			@FOC1 Shutdown
11V15	CRUDE PREFLASH DRUM	4270 Ø X 25540	4	45.4	V	THL & TL	4100W S2	11-A3-C1604 REV4 16SEPT	11-A2-1605 REV4 16SEPT		260-C1634		01/25/97	
11V16	BILECTRIC DESALTER	3658 X 12120	1	72.2	H	CH	TG-1200M				RDS A-11-C1646		03/01/97	
220C101	ROTATING DISC CONTACTOR	3600 Ø X 19 600	4	150	V	TR & CH		VENDOR 2428-05-11			RPP		06/15/97	HEAVY LIFT CONTRACT

QTY.	DESCRIPTION	WEIGHT	P.O. NO.	REFERENCE DRAWINGS	STATUS
	SHACKLES:				
4	1 5/8" ϕ PIN SHACKLES, 17 TON CROSBY 209			580500-B-C117	RENTAL FROM JAKES
4	2" ϕ PIN SHACKLE, 25 TON CROSBY 2130				
4	2 1/4" ϕ PIN SHACKLE, 35 TON				
4	2 3/4" ϕ PIN SHACKLE, 55 TON				
4	3 1/4" ϕ PIN SHACKLE, 85 TON				
	SLINGS:				
2	1" ϕ X 30' EIPS SLING			580500-A-C110	
4	1 1/8" ϕ X 10' EIPS SLING, 12 TON			580500-A-C116, B-C117	
2	1 1/8" ϕ X 20' EIPS SLING, 12 TON			580500-A-C116, B-C117	
2	1 1/2" ϕ X 20' EIPS SLING,				
2	1 1/2" ϕ X 60' EIPS SLING			580500-A-C110	
4	2" ϕ X 20' EIPS SLING			580500-A-114&115	
4	2" ϕ X 50' EEIPS SLING				
2	2 1/2" ϕ X 12' EEIPS SLING				
2	3" ϕ X 50 EIPS SLING			580500-A-114&115	
	SPREADER BARS:				
3 SETS	6" ϕ END CAPS (6 CAPS)			ST-A3-C9427	RENTAL FROM JAKES
1	6" ϕ X 4'-2" STD WALL INSERT			580500-A-C110	FIELD FAB
1	6" ϕ X 5'-9" X-STRONG WALL INSERT				
1	6" ϕ X 8'-10" STD WALL INSERT			580500-B-C117	
2	6" ϕ X 9'-10" X-STRONG WALL			580500-A-114&115	
1	W10 X 12' SPREADER BAR				
1	14" ϕ X 34'-6" STD WALL PIPE SPREADER			580500-B-C113, A-114&115	
	MISC:				
4	3" ϕ CROSBY CLIP CROSBY # G-450			580500-B-C113	PURCHASE
20	CRANE MATS, 1'X5'X31' HARDWOOD				"

REV. NO.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	DATE
1	11/25/93	DRAWING ISSUED 'AFC'		KEL	

CE-2.5.8 REV.1 9/81

FLUOR

DRAWN BY KEL GOODMAN
CHECKED BY
SUPERVISOR — RELEASE DATE
SUPERVISING ENGR. KEL GOODMAN — INITIALS
PROJECT ENGR. — APP. DATE
CLIENT — APP. DATE

RIGGING EQUIPMENT
FOR HEAVY LIFTING
RENTAL - PURCHASE - FABRICATION
ASHLAND OIL CATLETTSBURG, KY

SCALE ~ | DRAWING NUMBER 580500-B-C118 | REVISION 1

FORM E-306 REV. 8/76
PRINTED IN U.S.A.

FINÉ