

SHUT DOWN

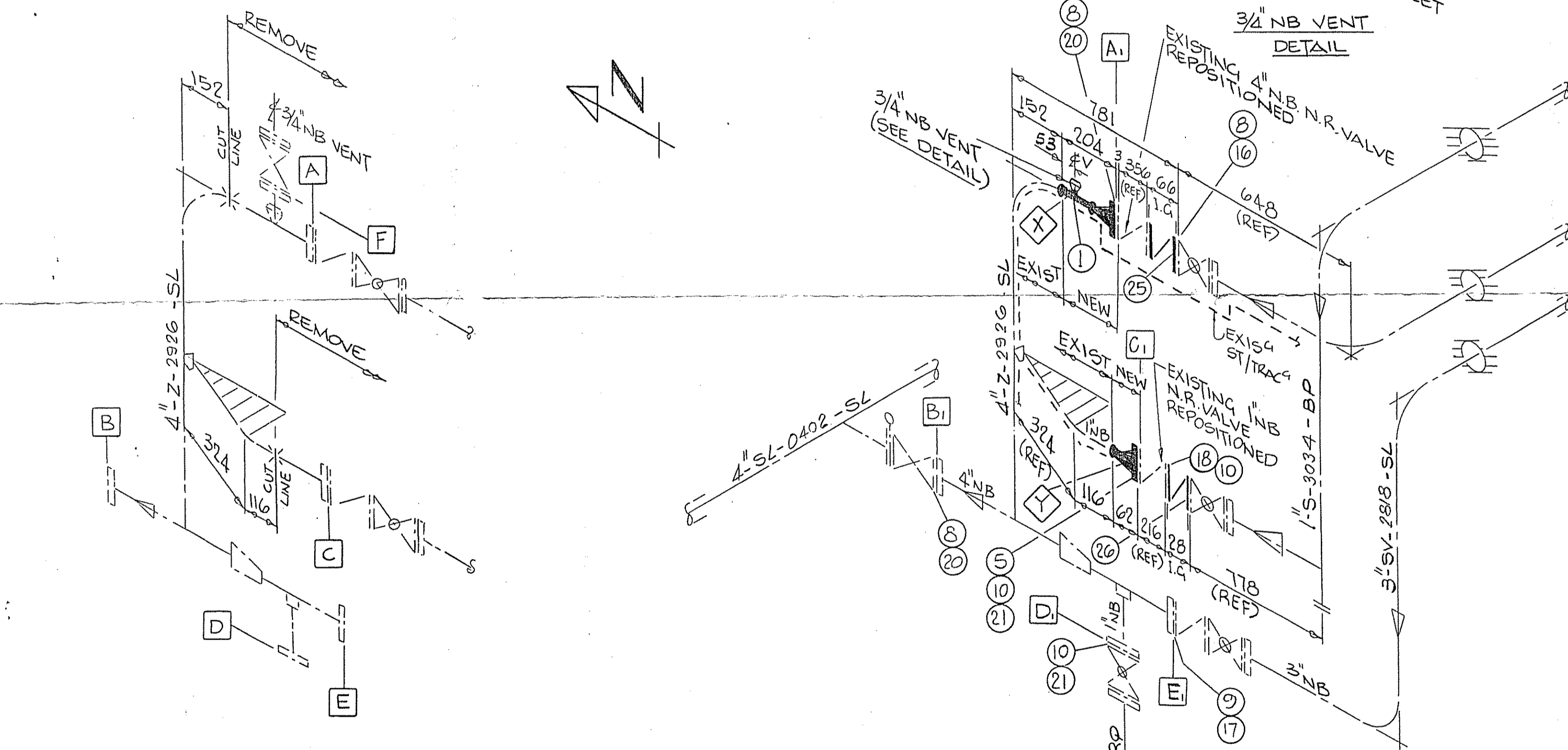
- 1/ REMOVE LAGGING FROM EXISTING SPOOL Z
- 2/ DISCONNECT STEAM TRACING FROM EXISTING SPOOL Z
- 3/ REMOVE EXISTING SPOOL Z BETWEEN POINTS A B C D & E
- 4/ REMOVE EXISTING 4" NB & 1" NB N.R. VALVE
- 5/ REMOVE EXISTING 3/4" NB VENT VALVE COMPLETE WITH BLANK FLANGE AT POINT F
- 6/ MODIFY EXISTING SPOOL Z TO INCORPORATE NEW SPOOLS X & Y & RADIOGRAPH NEW WELDS
- 7/ HYDROTEST MODIFIED SPOOL Z
- 8/ RE-FIT EXISTING 3/4" NB VENT VALVE COMPLETE WITH BLANK FLANGE AT POINT F
- 9/ INSTALL MODIFIED SPOOL Z BETWEEN POINTS B1 D1 & E1
- 10/ REPOSITION EXISTING 4" NB & 1" NB N.R. VALVES AT POINTS A1 & C1
- 11/ INSTALL NEW N.R. VALVES 25 & 26
- 12/ RE-CONNECT STEAM TRACING TO MODIFIED SPOOL Z (SITE TO MODIFY STEAM TRACING WHERE REQUIRED)
- 13/ INSTALL NEW LAGGING.
- 14/ COMMISSION LINE.

JOB PROCEDURE (PRE-SHUT DOWN)

- 1/ FABRICATE SPOOL X
- 2/ RADIOGRAPH SPOOL X
- 3/ MARK UP SPOOLS WITH SPOOL IDENTIFICATION NO
- 4/ DELIVER TO SITE & STORE IN CLEAN SECURE LOCATION.

MATERIAL SCHEDULE

PART No.	DESCRIPTION	SCHED. OR RATING	MAT'L	SIZE					INDEXT/CODE ORDER No. SUPPLIER
				STD.	4"	3"	1"	3/4"	
1	PIPE SML'S	40S	ASTM A312 TYP 316L 0.03% MAX	ANSI B36.10	0.2m				562.675.00.04
4	FLANGE WNRF SCH 40	300#	ASTM A182 GR 316L	ANSI B16.5		1			62/4022B15
5	FLANGE WNRF SCH 80	300#	ASTM A182 GR 316L	ANSI B16.5			1		62/4022B15
6	FLANGE WNRF SCH 80	300#	ASTM A182 GR 316L	ANSI B16.5				1	62/4022B15
8	GASKET SP WOUND CORRUGATED STRIP TYPE, SOFT IRON OUTER RING	300#	G11 FLUON 316	BS 3381		4			PLANT TO SUPPLY
9	"	300#	G11 FLUON 316	BS 3381			1		PLANT TO SUPPLY
10	"	300#	G11 FLUON 316	BS 3381				4	PLANT TO SUPPLY
11	"	300#	G11 FLUON 316	BS 3381				1	PLANT TO SUPPLY
16	3/4" DIA x 7" STUDBOLTS C/W NUTS	87 STUDB 24 NUTS	1/2 CR MO	BS 4882		8			510.720.26.02
17	3/4" DIA x 4 1/4" STUDBOLTS C/W NUTS	87 STUDB 24 NUTS	"	BS 4882			8		510.720.17.00
18	5/8" DIA x 4" STUDBOLTS C/W NUTS	87 STUDB 24 NUTS	"	BS 4882			4		510.719.16.00
19	5/8" DIA x 3" STUDBOLTS C/W NUTS	87 STUDB 24 NUTS	"	BS 4882				4	510.719.12.00
20	3/4" DIA x 4 1/2" STUDBOLTS C/W NUTS	87 STUDB 24 NUTS	"	BS 4882		16			510.720.18.00
21	5/8" DIA x 3" STUDBOLTS C/W NUTS	87 STUDB 24 NUTS	"	BS 4882				8	510.712.12.00
23	WELDOLET	SCH 40 SCH 80	S.S. 316L	ANSI B16.9				1	62/2928914 *
25	GESTRA (1.4571) NRV	300#	S.S.				1		PLANT TO SUPPLY
26	GESTRA (1.4581) NRV	300#	S.S.					1	PLANT TO SUPPLY



EXISTING SPOOL Z

GENERAL NOTES:

- 1/ ALL SPOOLS TO BE CLEARLY MARKED WITH ISO NO & INDIVIDUAL SPOOL IDENTIFICATION LETTER.
- 2/ NEW STEAM TRACING MATERIAL TO BE SUPPLIED BY PLUMBERS

REFERENCE DRGS

- 1/ FOR EXISTING ISOMETRIC DETAIL DRG SEE DRG. NOS 1441-3-52-1141

DRAWING PREPARED BY
K HOME ENGINEERING LTD
Thornaby Cleveland

K.H. ENG JOB NO 6760

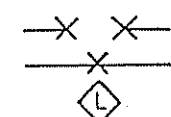
I.C.I. CHEMICALS & POLYMERS LTD. - TEESIDE OPERATIONS - ENGINEERING - WILTON, MIDDLESBROUGH, CLEVELAND.

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	DESIGN	WORKING	LINE SPEC.	SL
PRESSURE	30.4 bar g	26.5 bar g		
TEMPERATURE	252 °C	224 °C		
HYDRAULIC TEST	661 P.S.I.G.		FROM	4"-Z-2705-BQ 1"-S-3034-BP
SERVICE TEST			TO	4"-SL-0402-SL 4"-Z-2926-SL
FABRICATION SPEC.	EDS-PIP-51-02	CLASS II	LINE DIAG. No.	F/W/A/405122 & F/W/A/405130
RADIOGRAPHY	100%		PIPE ARRGT. No.	SK-1441-1-A6
N.D.T.			MAT'L LIST No.	D.O. REF. No. 3756
METASCOP	NIL		CALC. No.	
STRESS RELIEF	NIL		JOB No./E.W.O. No.	501.703569.000000.273
PAINTING SPEC.	NIL		DRAWN	AA
LAGGING SPEC.	M5015		CHECKED	BP
HEAT TRACING	YES (STEAM)		APPROVED	<i>C. Cleveland</i>

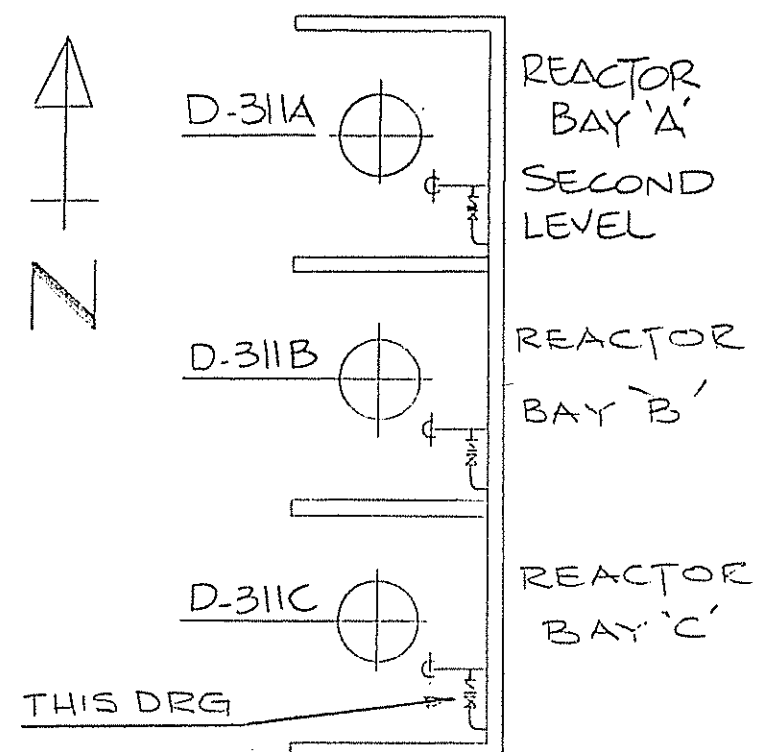
PLANT	T7 OXIDATION	TITLE	REACTOR FLUSH MANIFOLD ADDITIONAL N.R. VALVES REACTOR BAY 'B'	DRG. SIZE	A1
BUSINESS AREA	POLYESTERS & INTERMEDIATES	PROJ. No.		DRG. No.	IP/A7/7378
ISSUE	A	ISSUE	A		

ISSUE	REVISIONS	INTL	DATE
A	ISSUED FOR APPROVAL	AA	22/3/20



INDICATES MAKE UP PIPE TO BE WELDED AT SITE
INDICATES BREAK IN PIPE TO BE WELDED AT SITE
INDICATES FLANGE LEFT LOOSE AND WELDED AT SITE
N.B. A MAKE UP LENGTH OR WHERE A FLANGE IS LEFT LOOSE MUST BE A SHOP RUN OUT AT LEAST 3" LONGER THAN CALCULATED DIMENSIONS GIVEN UNLESS OTHERWISE STATED. ALL HOLES TO BE DRILLED OFF CRS. AND ALL BENDS 90° UNLESS OTHERWISE STATED.

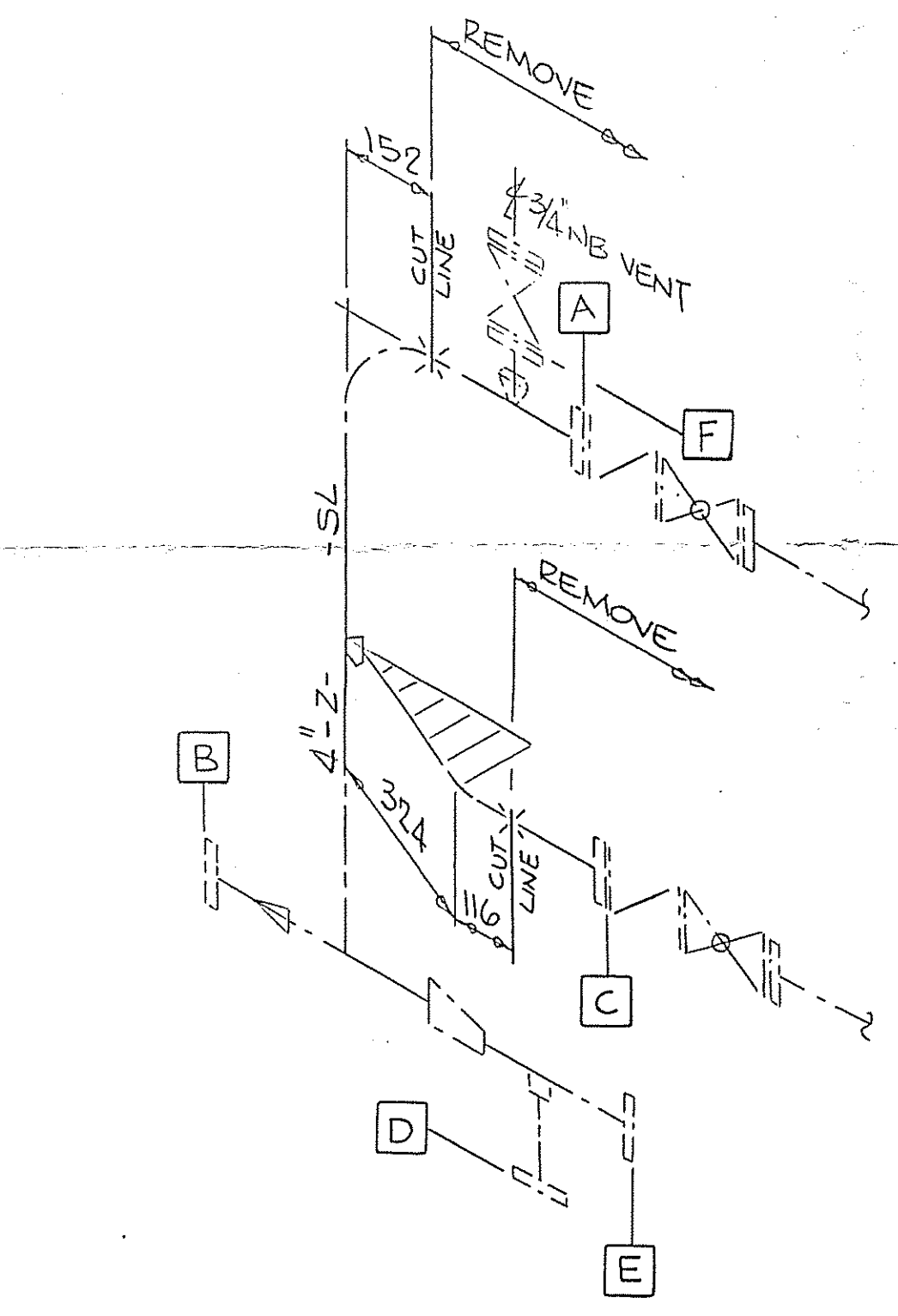
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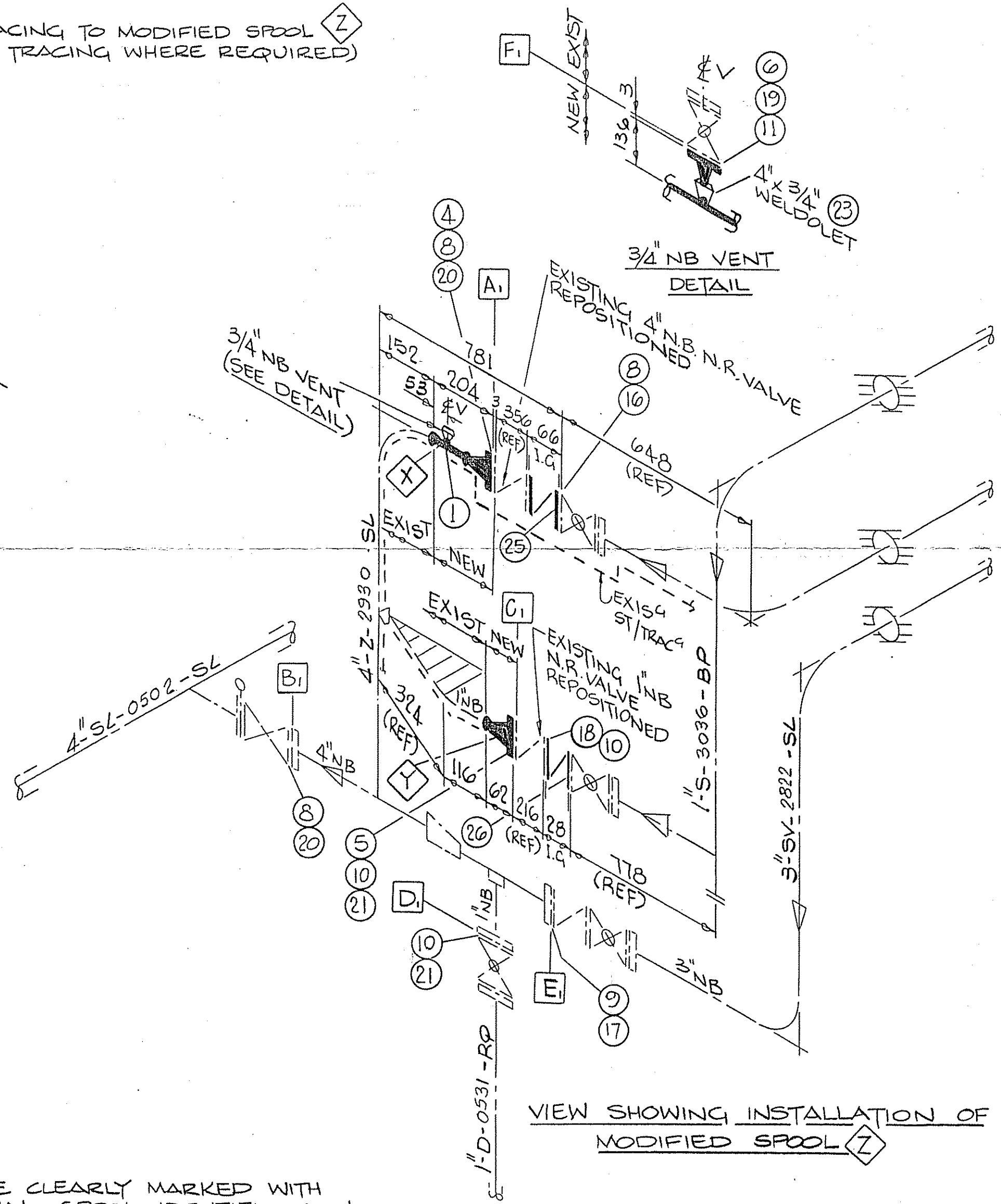
KEY PLAN

- SHUT DOWN**
- 1/ REMOVE LAGGING FROM EXISTING SPOOL Z
 - 2/ DISCONNECT STEAM TRACING FROM EXISTING SPOOL Z
 - 3/ REMOVE EXISTING SPOOL Z BETWEEN POINTS A B C D & E
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 - 13/ INSTALL NEW LAGGING
 - 14/ COMMISSION LINE.

- JOB PROCEDURE (PRE-SHUT DOWN)**
- 1/ FABRICATE SPOOL X
 - 2/ RADIOGRAPH SPOOL X
 - 3/ MARK UP SPOOLS WITH SPOOL IDENTIFICATION N°
 - 4/ DELIVER TO SITE & STORE IN CLEAN SECURE LOCATION.



EXISTING SPOOL Z



VIEW SHOWING INSTALLATION OF MODIFIED SPOOL Z

- GENERAL NOTES!**
- 1/ ALL SPOOLS TO BE CLEARLY MARKED WITH ISO N° & INDIVIDUAL SPOOL IDENTIFICATION LETTER.
 - 2/ NEW STEAM TRACING MATERIAL TO BE SUPPLIED BY PLUMBERS

- REFERENCE DRGS**
- 1/ FOR EXISTING ISOMETRIC DETAIL DRG SEE DRG NO. 1441-3-52-1142

DRAWING PREPARED BY
K HOME ENGINEERING LTD
 Thornaby Cleveland

K.H. ENG JOB N° 6760

MATERIAL SCHEDULE

PART No.	DESCRIPTION	SCHED. OR RATING	MAT'L	SIZE				INDET./CODE ORDER No. SUPPLIER
				STD.	4"	3"	1"	
1	PIPE SML'S	40S	ASTM A312 TYP 316L 0.03% MAX	ANSI B36.10	0.2m			562.675.00.04
4	FLANGE WNRF SCH 40	300#	ASTM A182 GR 316L	ANSI B16.5		1		62/4022815
5	FLANGE WNRF SCH 80	300#	ASTM A182 GR 316L	ANSI B16.5			1	62/4022815
6	FLANGE WNRF SCH 80	300#	ASTM A182 GR 316L	ANSI B16.5			1	62/4022815
8	GASKET, SP. WOUND CORRUGATED STRIP TYPE, SOFT IRON OJER RING	300#	G11/FLUON 316	BS 3381		4		PLANT TO SUPPLY
9	"	300#	G11/FLUON 316	BS 3381		1		PLANT TO SUPPLY
10	"	300#	G11/FLUON 316	BS 3381			4	PLANT TO SUPPLY
11	"	300#	G11/FLUON 316	BS 3381			1	PLANT TO SUPPLY
16	3/4" DIA x 7" STUDBOLTS C/W NUTS	87 STUDS 2H NUTS	1% CR A193	BS 4882		8		510.720.26.02
17	3/4" DIA x 4 1/4" STUDBOLTS C/W NUTS	87 STUDS 2H NUTS	"	BS 4882			8	510.720.17.00
18	5/8" DIA x 4" STUDBOLTS C/W NUTS	87 STUDS 2H NUTS	"	BS 4882			4	510.719.16.00
19	5/8" DIA x 3" STUDBOLTS C/W NUTS	87 STUDS 2H NUTS	"	BS 4882			4	510.719.12.00
20	3/4" DIA x 4 1/2" STUDBOLTS C/W NUTS	87 STUDS 2H NUTS	"	BS 4882		16		510.720.18.00
21	5/8" DIA x 3" STUDBOLTS C/W NUTS	87 STUDS 2H NUTS	"	BS 4882			8	510.719.12.00
23	Weldolet	SCH 40 SCH 80	SS 316L	ANSI B16.9			1	62/2928914
25	GESTRA (1.4571) N.R.V.	300#	SS				1	PLANT TO SUPPLY
26	GESTRA (1.4581) N.R.V.	300#	SS				1	PLANT TO SUPPLY

	DESIGN	WORKING		
PRESSURE	30.4 bar g	26.5 bar g	LINE SPEC.	SL
TEMPERATURE	252°C	224°C	LINE No.	4"-Z-2930-SL 1"-S-3036-SL
HYDRAULIC TEST	661 P.S.I.G		FROM	4"-Z-2705-BQ 1"-S-3036-BP
SERVICE TEST			TO	4"-SL-0502-SL 4"-Z-2930-SL
FABRICATION SPEC.	EDS-PIP-51-02	CLASS II	LINE DIAG. No.	F/W/A/405122 & F/W/A/405130
RADIOGRAPHY	100%		PIPE ARRGT. No.	SK-1441-1-46
N.D.T.			MAT'L LIST No.	D.O. REF. No. 3756
METASCOP	NIL		CALC. No.	
STRESS RELIEF	NIL		JOB No./E.W.O. No.	501.703569.000000.273
PAINTING. SPEC.	NIL		DRAWN	AA 20/3/00
LAGGING SPEC.	M5015		CHECKED	BP 20/3/00
HEAT TRACING.	YES (STEAM)		APPROVED	23.5.90

ICI CHEMICALS & POLYMERS LTD. - TEESIDE OPERATIONS - ENGINEERING - WILTON, MIDDLESBROUGH, CLEVELAND.

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PLANT: **T7 OXIDATION**

BUSINESS AREA: **POLYESTERS & INTERMEDIATES**

TITLE: **REACTOR FLUSH MANIFOLD ADDITIONAL N.R. VALVES REACTOR BAY 'C'**

PROJ. No. **IP/A7/7379**

DRG. No. **IP/A7/7379**

DRG. SIZE **A1**

ISSUE **A**

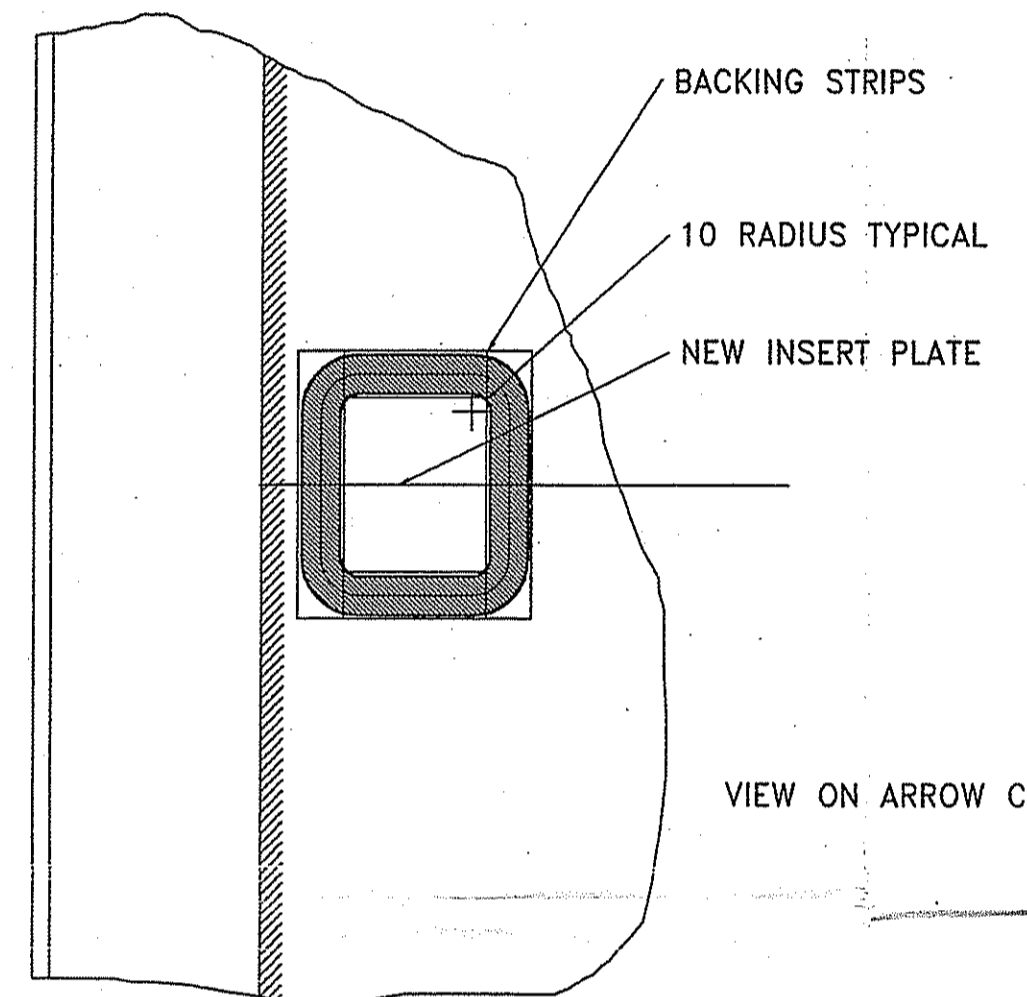
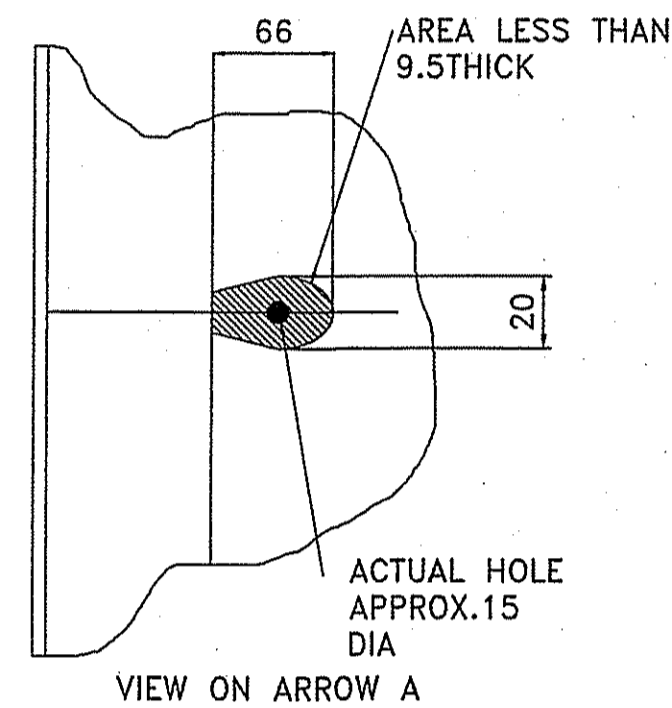
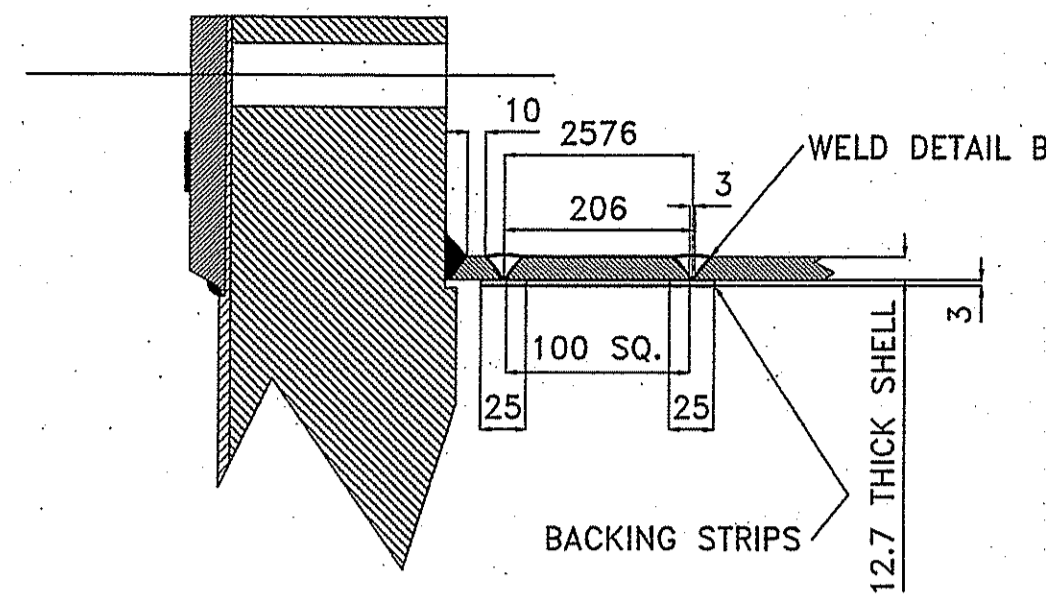
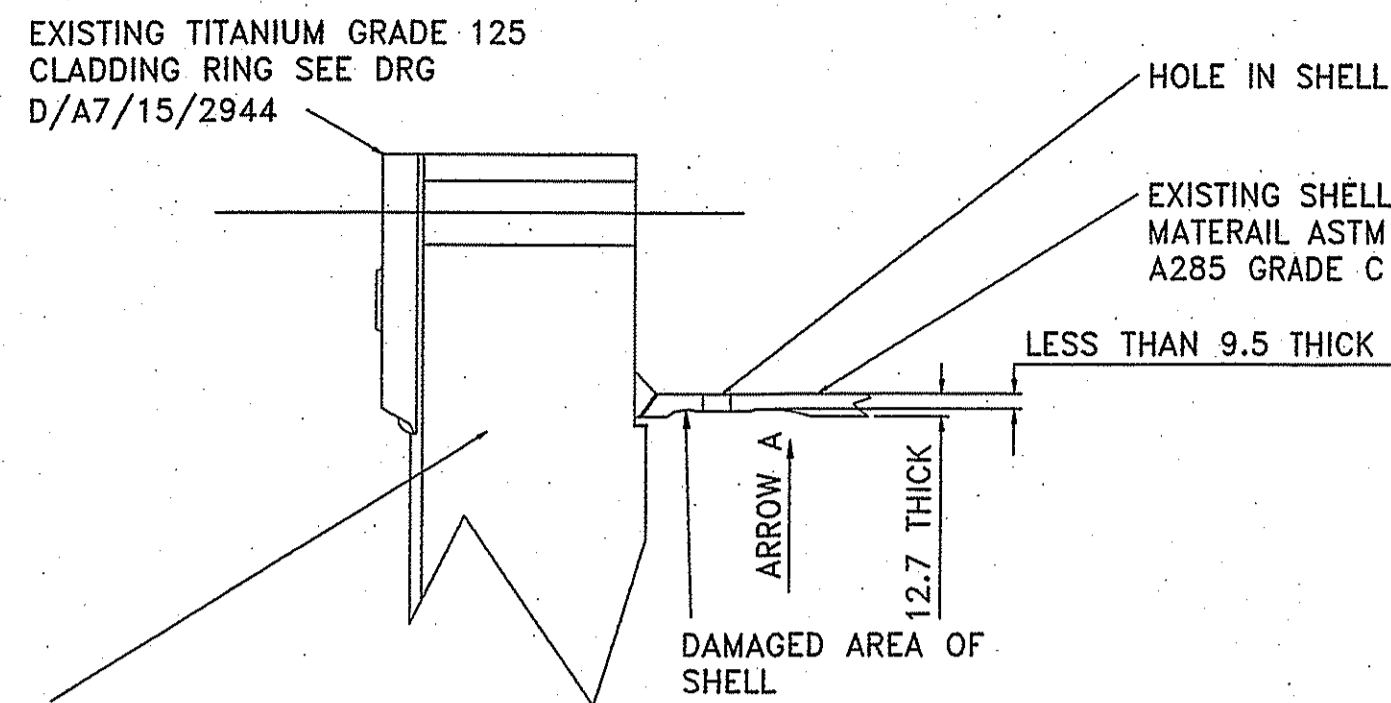
ISSUE	REVISIONS	INTL	DATE
A	ISSUED FOR APPROVAL	AA	22/3/00

INDICATES MAKE UP PIPE TO BE WELDED AT SITE
 INDICATES BREAK IN PIPE TO BE WELDED AT SITE
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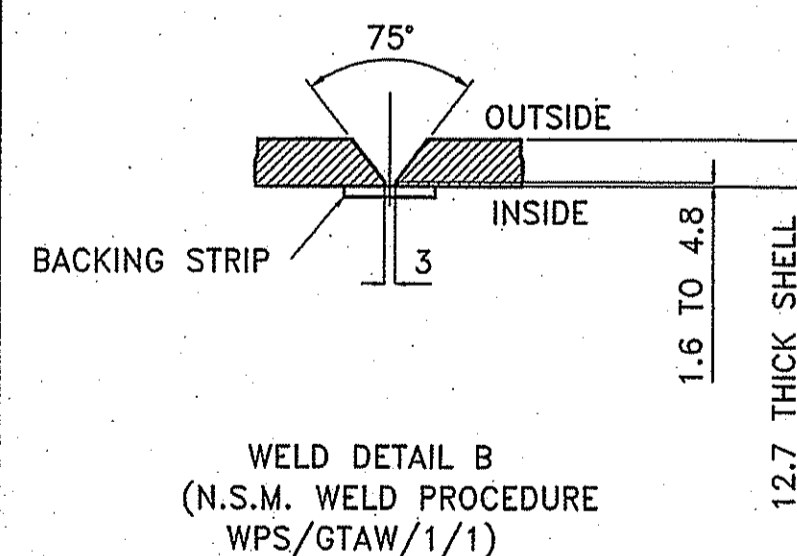
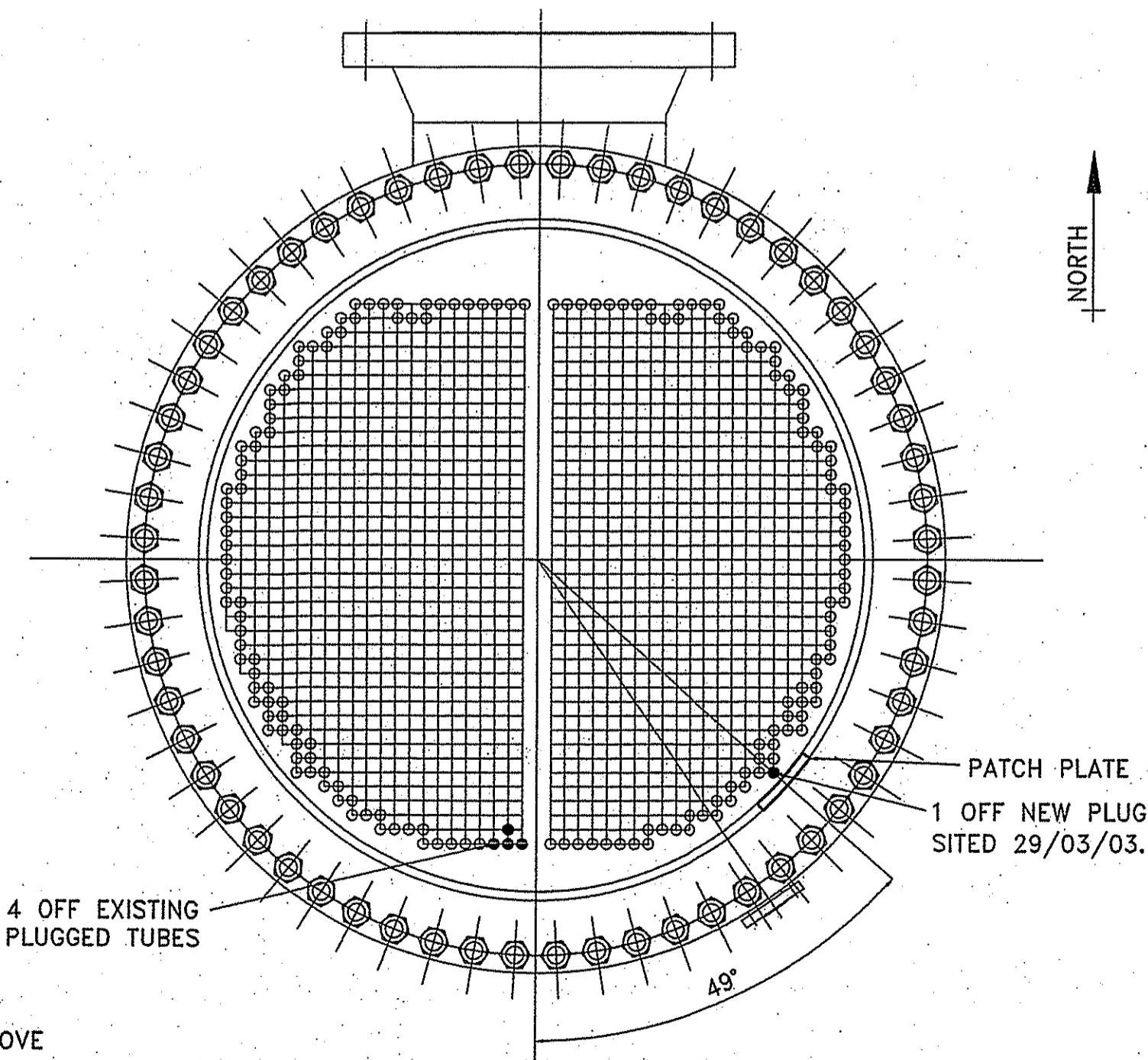
DRG. No. **IP/A7/7379**

DRAWING No.	REV
D/A7/15/13606	A1
CDM REGULATIONS/SAFETY NOTES	
THESE HAVE BEEN DULY CONSIDERED	



DETAIL OF DAMAGED AREA OF SHELL.

ARRANGEMENT AND DETAIL OF SHELL REPAIR ON BOTTOM FLANGE.



TUBEPLATE VIEW FROM ABOVE

ORIGINAL DESIGN DATA

DESIGN CODE : ASME VIII DIV.1 :1965 & TEMA R
 SHELLSIDE : 8 BARG
 TUBESIDE : 29.31 BARG
 DESIGN TEMPERATURE : 212.8°C
 224°C
 TEST PRESSURE : 12 BARG
 43.99 BARG
 CORROSION ALLOWANCE : 3MM
 NIL

MATERIALS OF CONSTRUCTION.

EXISTING TUBEPLATE : SEE DRAWING
 EXISTING SHELL : ASTM A285 GRADE C
 NEW INSERT PLATE : ASTM A285- GRADE C OR EQUIVALENT.

JOB PROCEDURE

STAGE ONE- INVESTIGATION

- 1) CARRY OUT ULTRASONIC THICKNESS SURVEY OF EXISTING SHELL LOCAL TO HOLE TO DETERMINE EXTENT OF DAMAGE.
- 2) CARRY OUT INTERNAL INSPECTION OF TUBES USING AN ENDSCOPE.
- 3) CARRY OUT EDDY CURRENT TESTING OF APPROXIMATELY 240 TUBES IN SELECTED AREA'S FOLLOWED BY IRIS TESTING OF TUBES INDICATING POOR RESULTS FROM EDDY CURRENT TEST.
- 4) PREHEAT SHELL TO ABOVE 100°C WITH 5BARG STEAM. STEAM INSERTION POINT TO BE NO LESS THAN 1".
- 5) CARRY OUT 2BARG HELIUM TEST ON TUBES FOR LEAKS.
- 6) CARRY OUT ULTRASONIC THICKNESS SURVEY OF BOTTOM TUBESHEET AT ALL TUBE SPACES TO DETERMINE IF TUBESHEET IS FULL THICKNESS.

STAGE TWO

- 1) GRIND OUT PORTION OF SHELL AS SHOWN AND FORM WELD PROFILE.REMOVE ALL DEBRIS.
NOTE: EXTREME CARE TO BE TAKEN TO ENSURE NO DAMAGE TO TUBES.
- 2) CARRY OUT 100%DPI OF PREPARED EDGES.
- 3) FABRICATE PATCH PLATE, ROLL PLATE TO SUIT EXISTING SHELL OUTSIDE DIAMETER.
- 4) FIT AND TACK WELD BACKING STRIPS INTO POSITION.
- 5) FIT PATCH PLATE AND TACK WELD INTO POSITION LEAVING 3MM GAP ALL-ROUND TO ALLOW FULL PENETRATION ON TO BACKING STRIPS.
- 6) COMPLETE WELD USING 3 RUNS TO NSM WELD PROCEDURE WPS/GTAW/1/1.
- 7) CARRY OUT 100%MPI ON COMPLETED WELD.

STAGE THREE

- 1) EXTRACT LEAKING TUBE.
- 2) FABRICATE TUBE PLUG TO DRAWING NO. D/A7/13603.
- 3) CARRY OUT WELDING OF ONE OFF TUBE PLUG TO NSM WELD PROCEDURE WPS/GTAW/51/1A.
- 4) CARRY OUT 100% DPI OF PLUG WELD.

STAGE FOUR.

- 1) CARRY OUT SHELLSIDE HYDRAULIC TEST OF 12 BARG ON COMPLETION OF ALL WORK.

WELDING NOTES.

WELD ENGINEER TO APPROVE WELD PROCEDURES,SET UP & COMPLETED WELD.
 ALL WELDERS TO BE QUALIFIED & APPROVED.

INSPECTION.

ALL STAGES OF REPAIR TO BE WITNESSED BY PRESSURE VESSEL INSPECTOR.
 ALL DOCUMENTATION TO PVI ON COMPLETION.

JOB TO BE CARRIED OUT AS IF VESSEL WAS FABRICATED FROM TITANIUM.

ABB UNSERVICED COPY
 25 AUG 2005
 CONSULT MASTER PRINT FOR LATEST REVISION

DRG TITLE: REACTOR CONDENSER - ITEM NO E312A
 ARRANGEMENT AND DETAIL OF SHELL REPAIR
 PROJECT No:
 SITE: WILTON PLANT: T7
 BUSINESS: DUPONTSA AREA: REACTION
 SCALES:
 CAD DISK REF:
 DRG TYPE: DO LOC: BROADWAY
 DRAWN: P.F.LAWRENCE DATE: 31/03/03
 CHECKED: R.DOBSON DATE: 17/04/03

ABB

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DRAWING No. D/A7/15/13606
 REV. A1

DESIGN VERIFIED IN ACCORDANCE WITH CODE/APPROVED	D/A7/13603	DETAIL OF WELDED PLUG	DATE: 31/03/03	UNLESS OTHERWISE STATED IN THE CONTRACT THIS DRAWING IS THE PROPERTY OF ABB LTD. IT MUST NOT BE COPIED OR LENT WITHOUT THE CONSENT OF ABB LTD. AND MUST BE RETURNED ON REQUEST TO ABB LTD.	DRG SIZE: A1
AUTHORISED ENGINEER	D/A7/15/3043	SHELL MODIFICATIONS	DATE: 17/04/03		
DATE: 23/04/03	D/A7/15/2945	WELD DETAILS PLUS SUPPORTS	DATE: 17/04/03		
AT APPROVED FOR CONSTRUCTION	D/A7/15/2944	MAIN JOINT REAIRS PLUS NEW HEADERS	DATE: 15/04/03		
REVISION	P.F.L.	REACTOR CONDENSER - ITEM NOS. E312A,B&D	DATE: 15/04/03	DRAWING No. D/A7/15/13606	REV. A1
REVISION	APP. DATE GRID REV.	REFERENCE DRAWING No.	REFERENCE DRAWINGS		