

DOCKET NO. SA-516

EXHIBIT NO. 20B

**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.**

**FIRE AND EXPLOSION GROUP FACTUAL REPORT
Appendix II
(Sooting/Fracture Diagrams)
(34 pages)**

TWA FLIGHT 800 ACCIDENT INVESTIGATION

FIRE AND EXPLOSION

APPENDIX II

Sooting/Fracture Diagrams

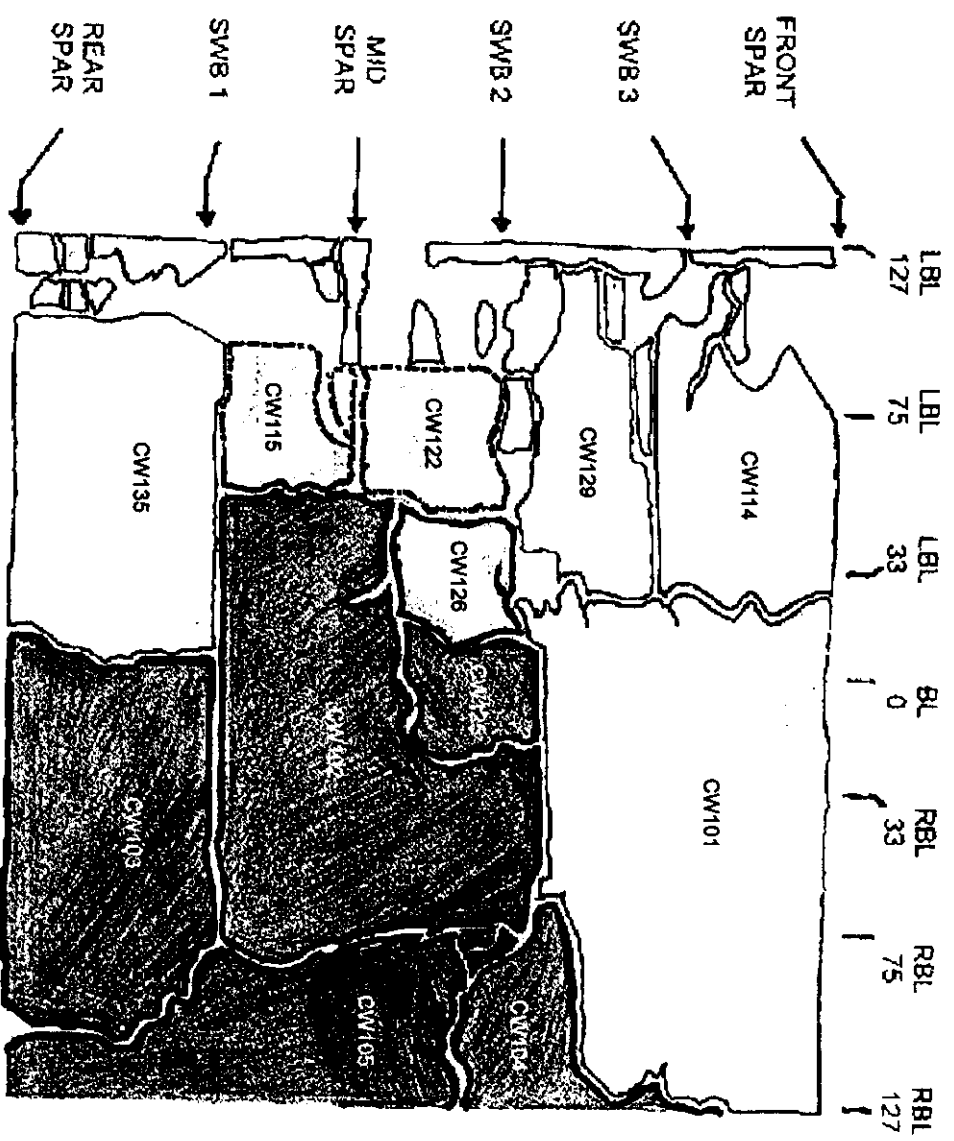
APPENDIX II SOOTING/FRACTURE DIAGRAMS

TABLE OF CONTENTS

Diagram #	Title
1	Upper Surface of the Upper Skin
2	Lower Surface of the Upper Skin
3	Upper Surface of the Lower Skin
4	Lower Surface of the Lower Skin
4.1	Stringer Soot Demarcation Map
5	Forward Surface of the Front Spar
6	Aft Surface of the Front Spar
7	Forward Surface of Spanwise Beam #3
8	Aft Surface of Spanwise Beam #3
9	Forward Surface of Spanwise Beam #2
10	Aft Surface of Spanwise Beam #2
11	Forward Surface of the Mid Spar
12	Aft Surface of the Mid Spar
13	Forward Surface of Spanwise Beam #1
14	Aft Surface of Spanwise Beam #1
15	Forward Surface of the Rear Spar
16	Aft Surface of the Rear Spar
17	Left Surface of the BL 0 Rib
18	Right Surface of the BL 0 Rib
19	Outboard Surface of the Right Hand Side-of-Body Rib
20	Inboard Surface of the Right Hand Side-of-Body Rib
21	Outboard Surface of the Left Hand Side-of-Body Rib
22	Inboard Surface of the Left Hand Side-of-Body Rib
23	External Surface of the Upper and Lower Right Wing Skins
24	Internal Surface of the Upper and Lower Right Wing Skins
25	External Surface of the Upper and Lower Left Wing Skins
26	Internal Surface of the Upper and Lower left Wing Skins
27	Fuel Tank Vent System
28	Right Wing Vent Stringer
29	Seat Fire Damage
30	Right Wing Punctures
31	Fuselage Sooting Patterns

CENTER WING TANK SOOTING PATTERN DIAGRAM

UPPER SKIN - UPPER SURFACE



FRACTURES:
 — CLEAN
 - - - INDETERMINATE
 — SOOTED

SURFACES:
 CLEAN
 HEAVILY SOOTED

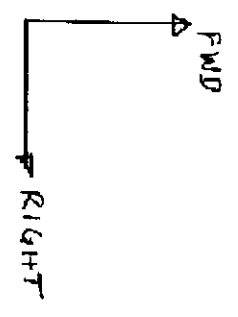
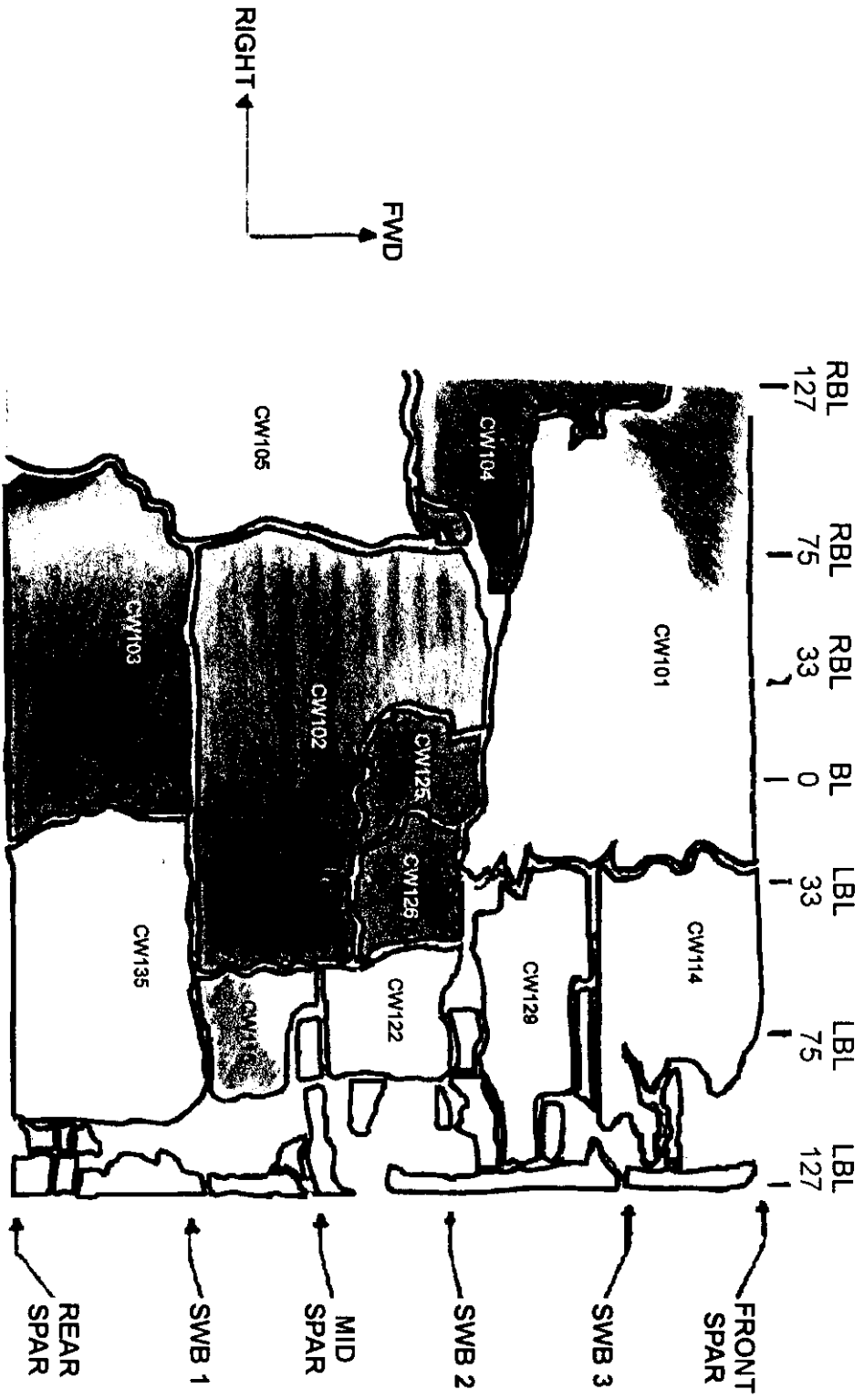


Diagram 1.

CENTER WING TANK SOOTING PATTERN DIAGRAM

UPPER SKIN - LOWER SURFACE



SURFACES:



FRACTURES:



Diagram 2.



Upper Wing Center Section Skin Panel

Note: Yellow Areas indicates Absence of Identified Parts
(Not to Scale)

Handwritten notes:
 3/20/66
 F. J. ...
 11-09-46

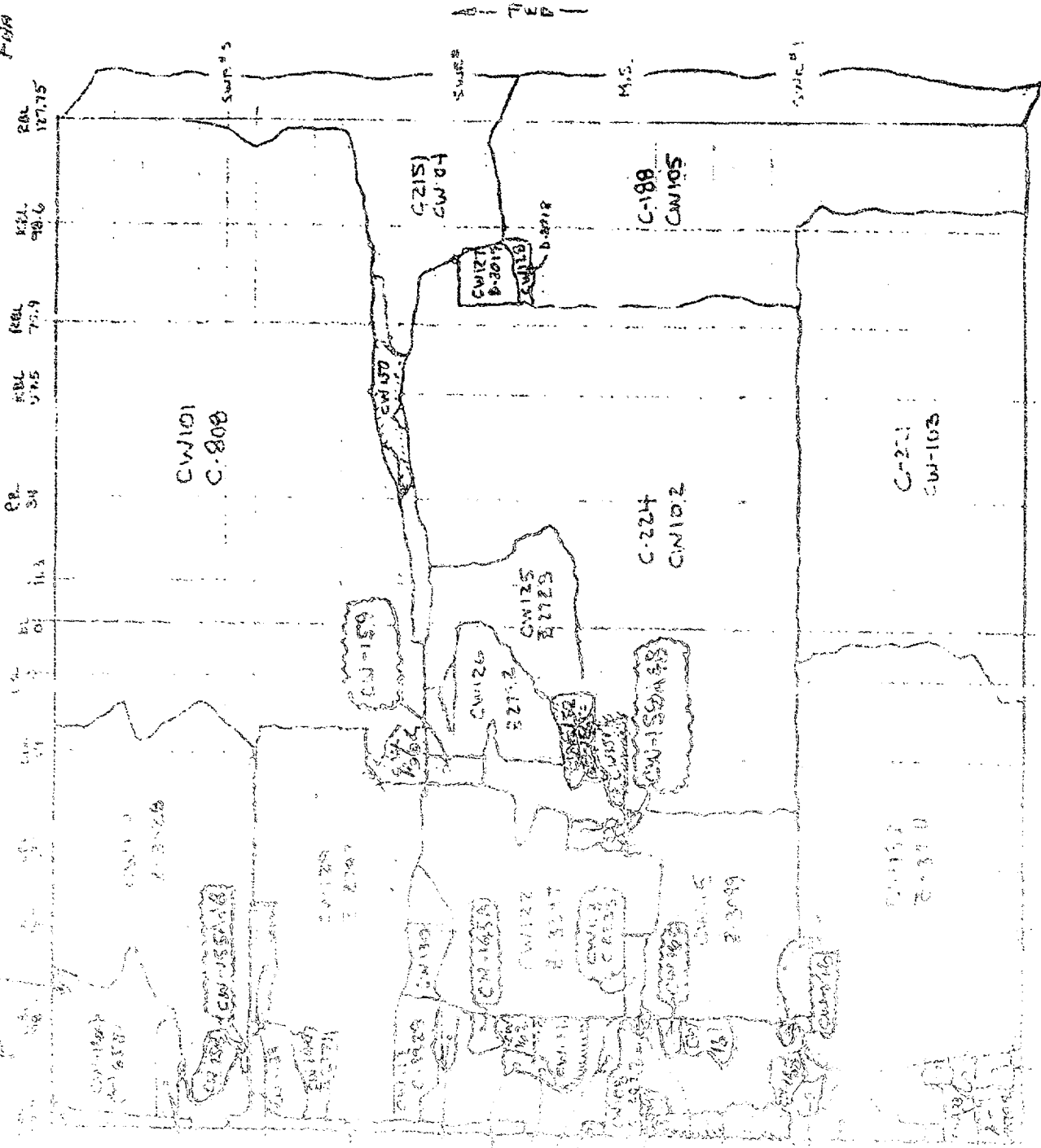


Diagram 2.1.

5

CENTER WING TANK SOOTING PATTERN DIAGRAM

LOWER SKIN - LOWER SURFACE

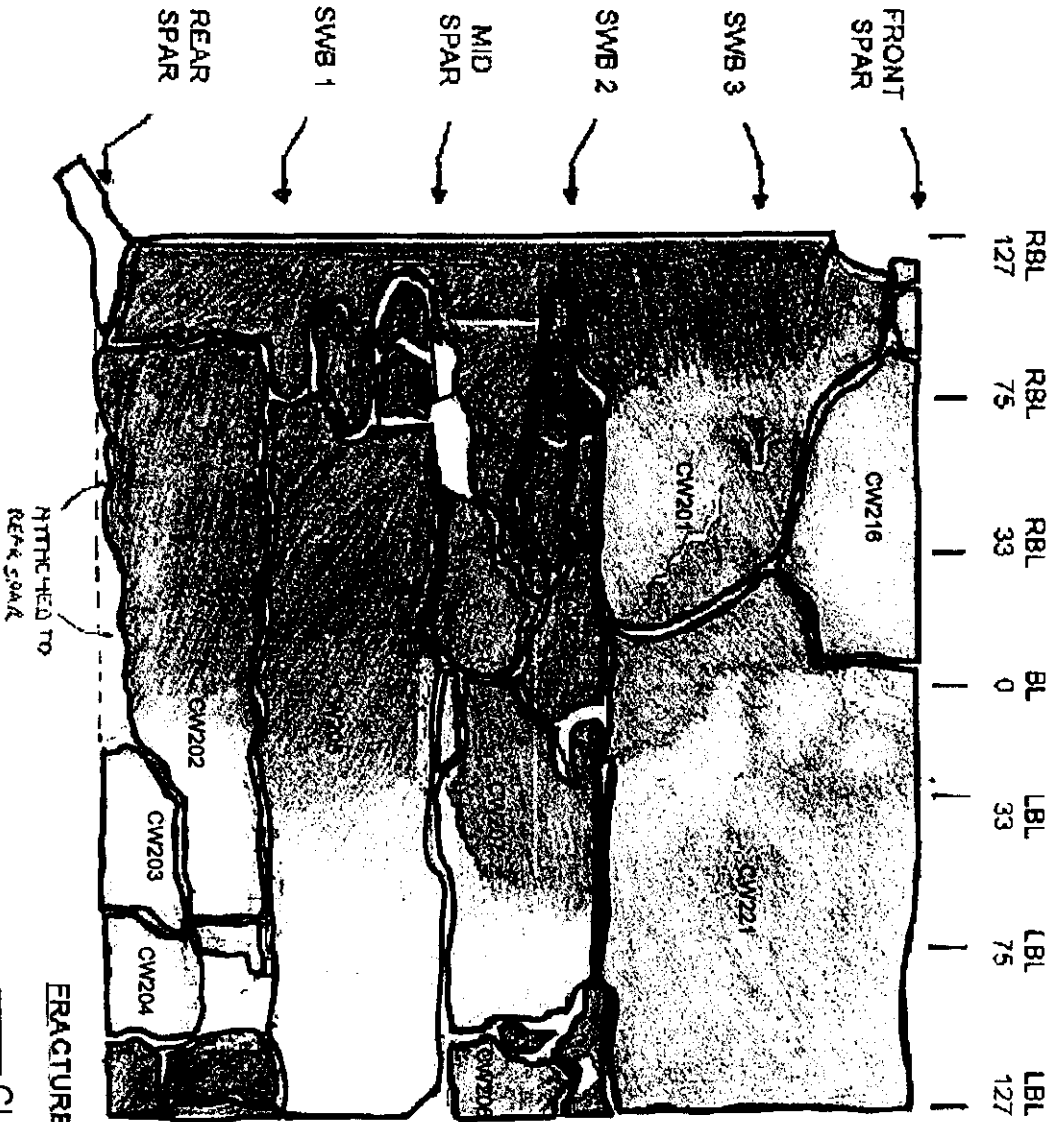


Diagram 4.

FRACTURES:

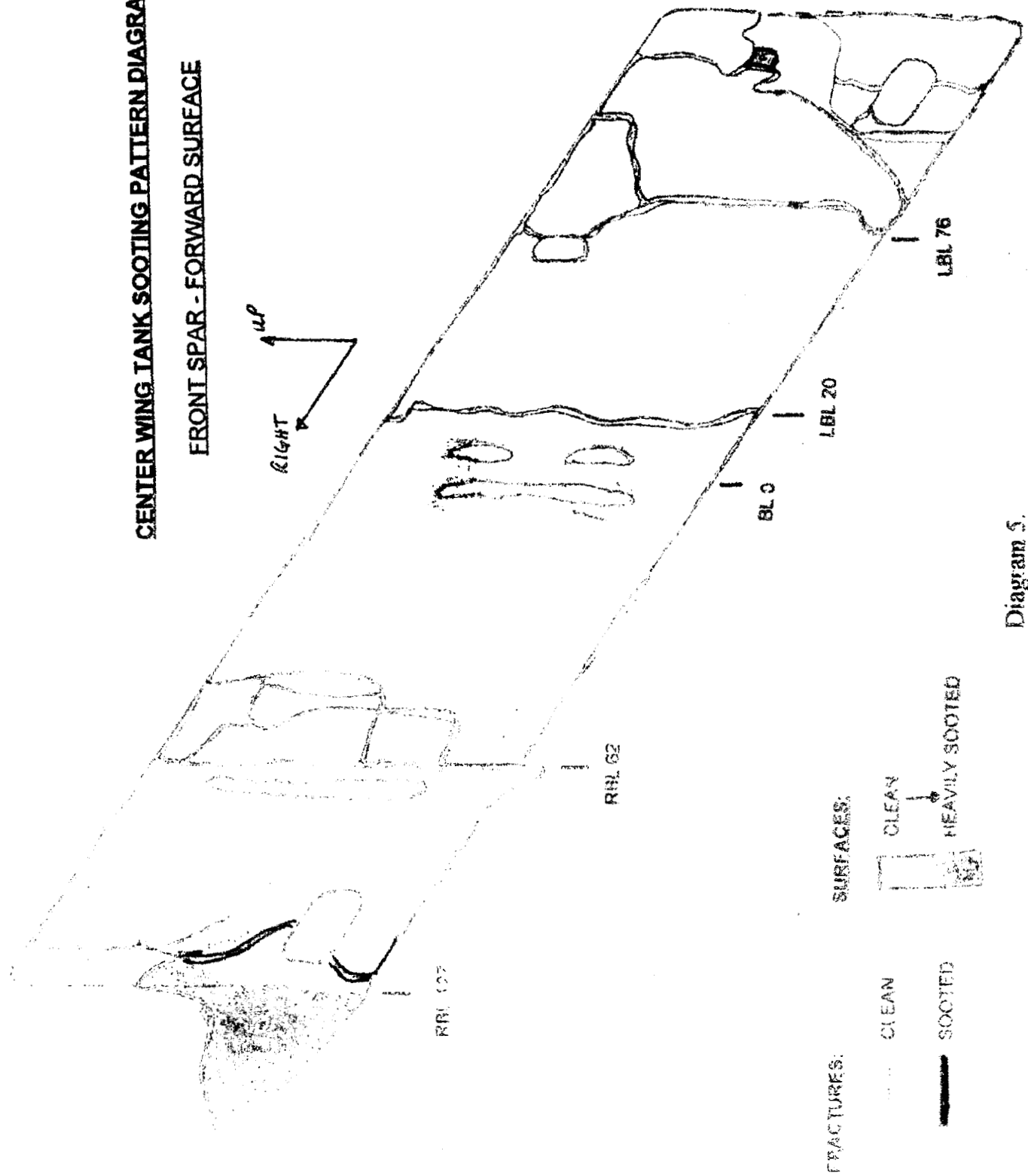
- CLEAN
- - - - INDETERMINATE
- · · · · SOOTED

SURFACES:

- CLEAN
- HEAVILY SOOTED

CENTER WING TANK SOOTING PATTERN DIAGRAM

FRONT SPAR - FORWARD SURFACE



LBL 127

Diagram 5.

CENTER WING TANK SOOTING PATTERN DIAGRAM

FRONT SPAR - AFT SURFACE

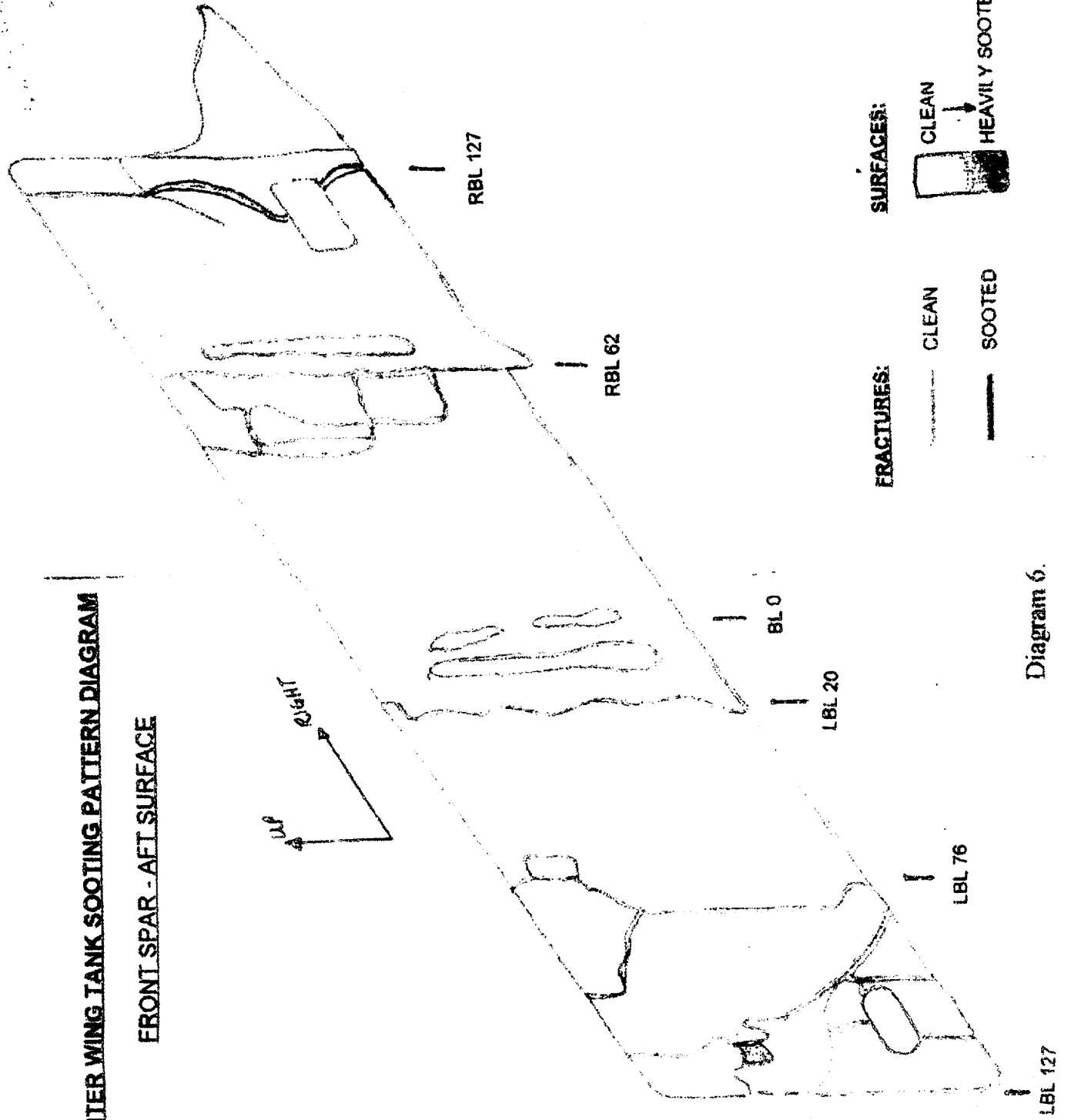


Diagram 6.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #3 - FORWARD SURFACE

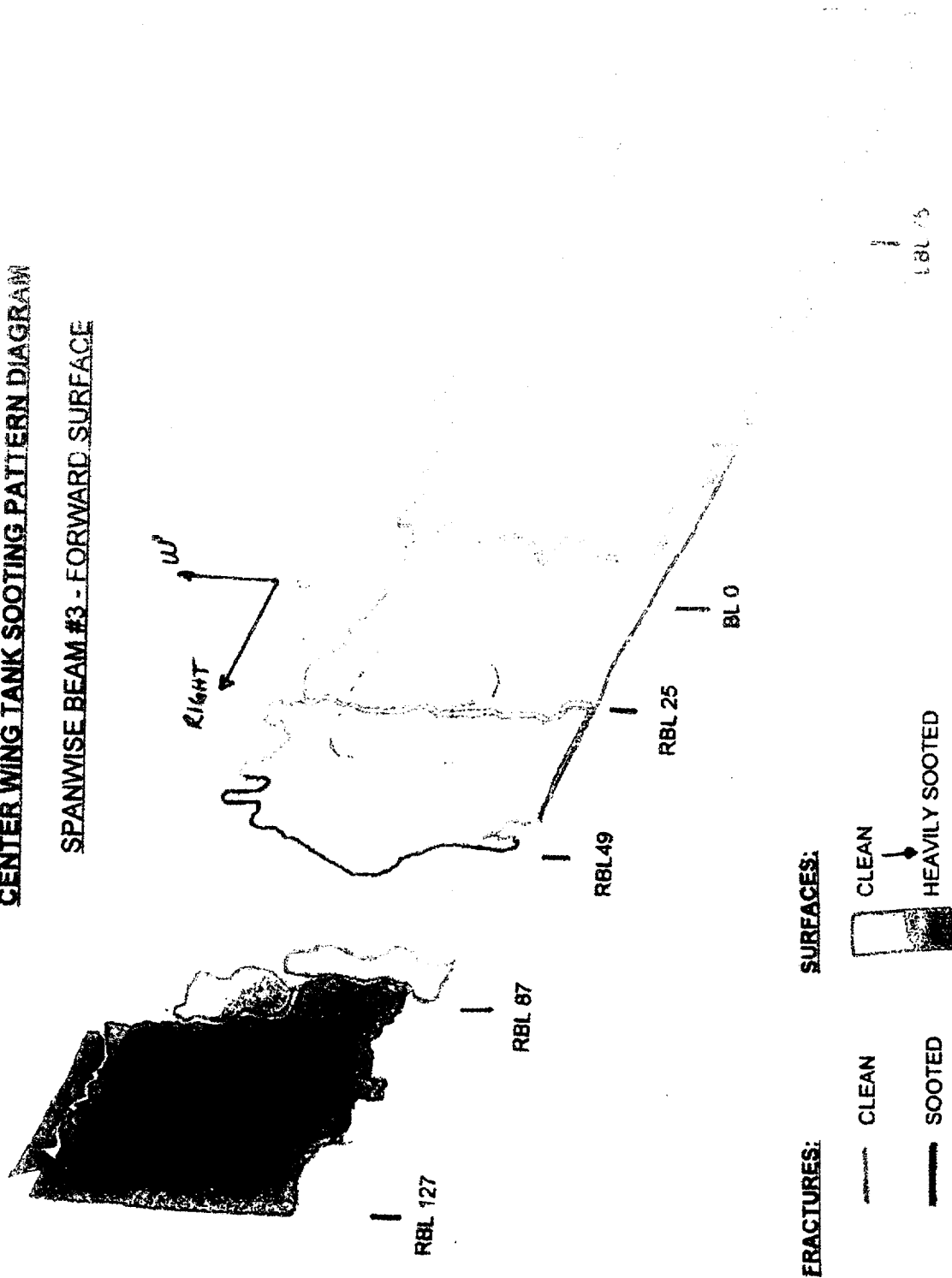


Diagram 7.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #3 - AFT SURFACE

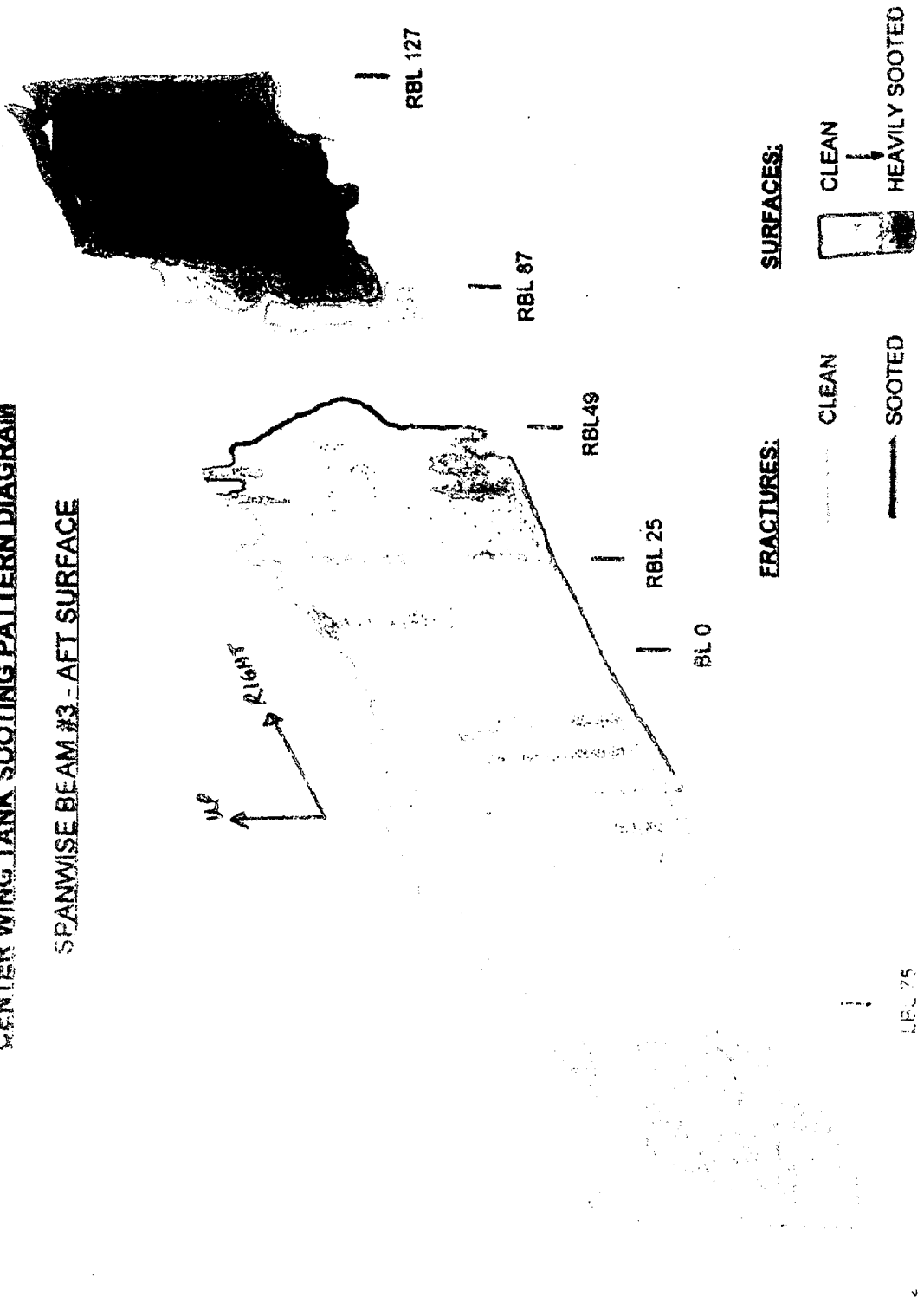


Diagram 8.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #2 - FORWARD SURFACE

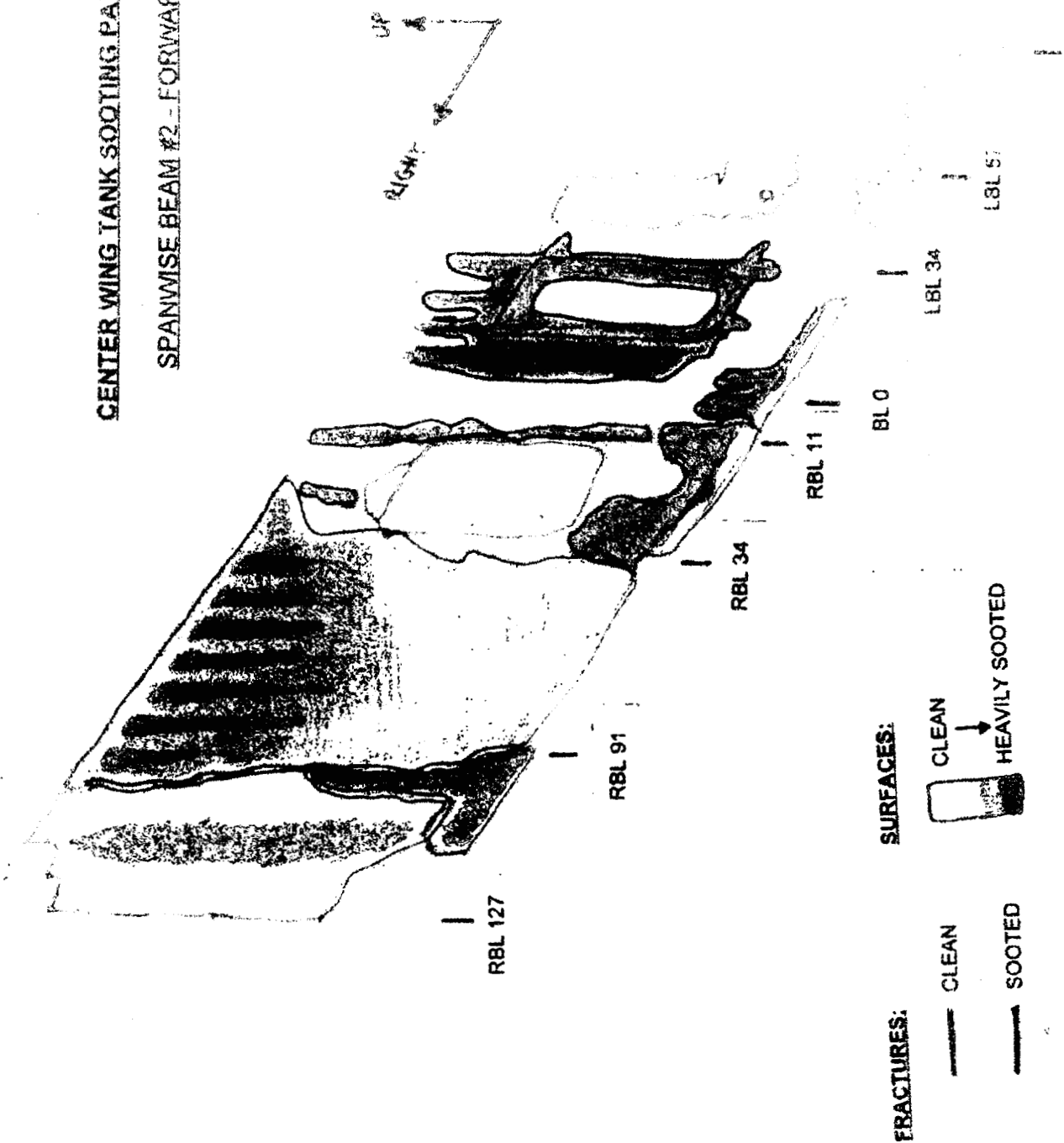
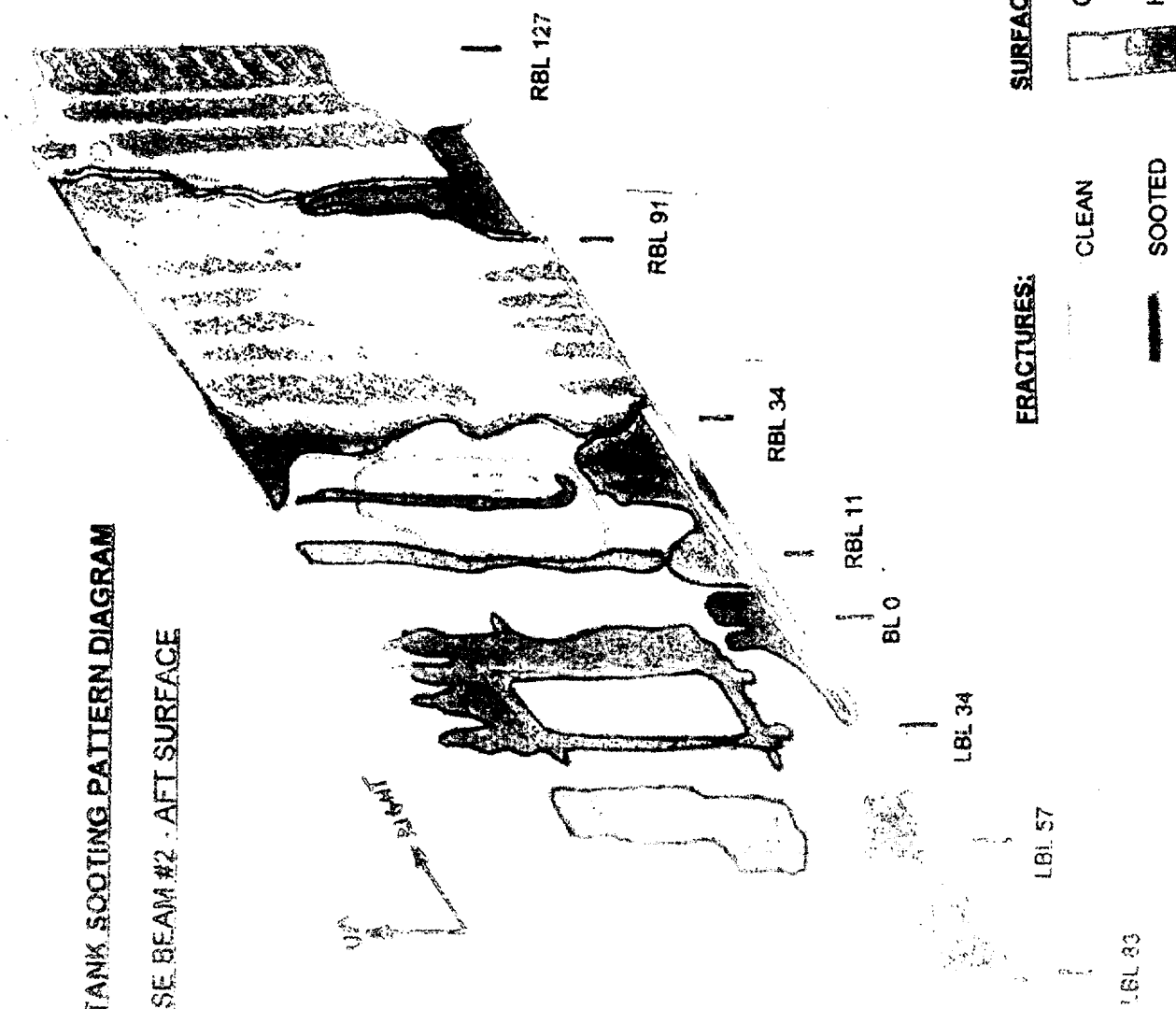


Diagram 9.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #2 - AFT SURFACE



SURFACES:



FRACTURES:

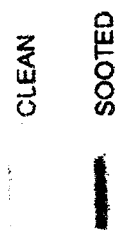


Diagram 10.

CENTER WING TANK SOOTING PATTERN DIAGRAM

MIDSPAR - FORWARD SURFACE

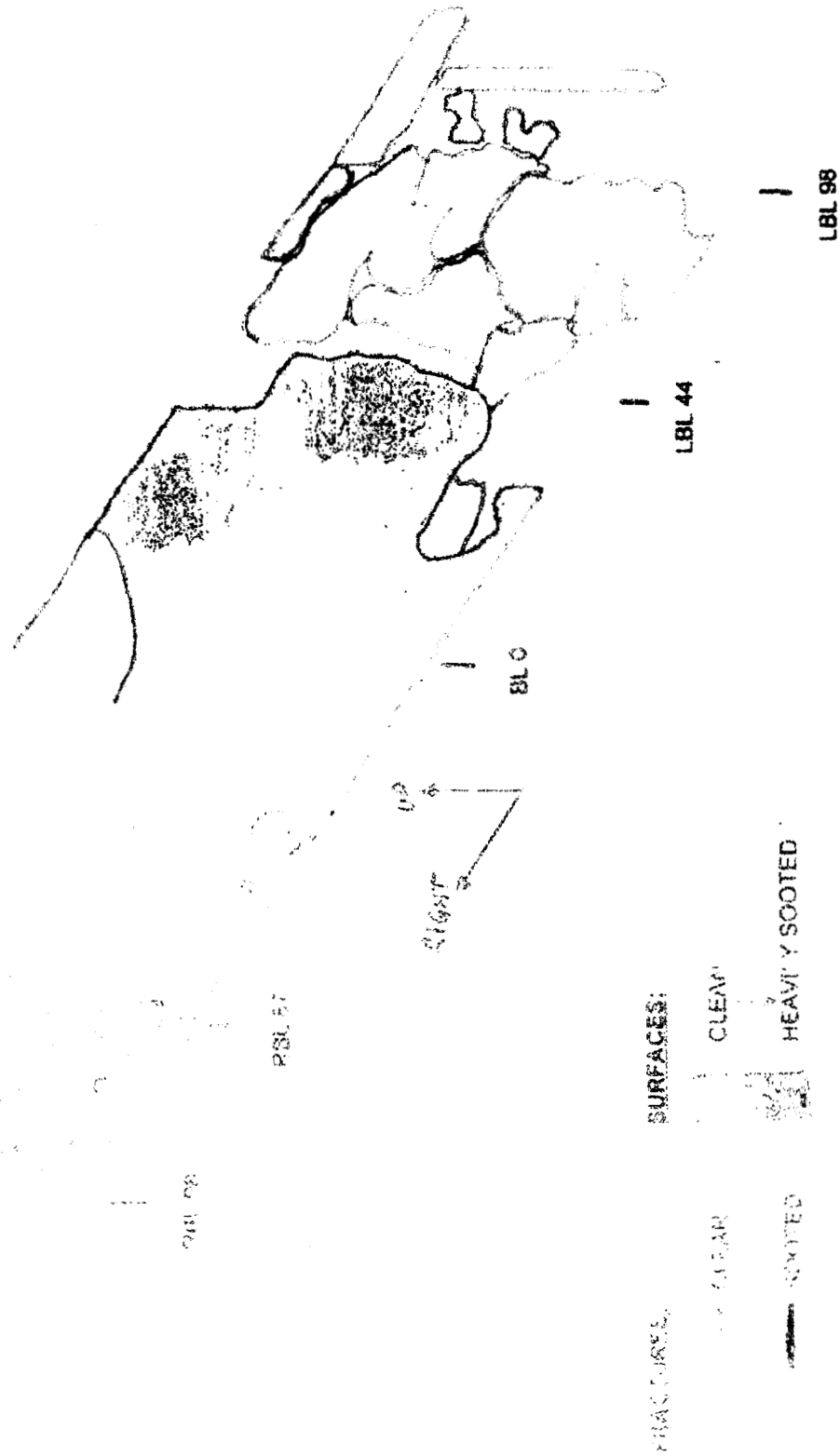


Diagram 11.

CENTER WING TANK SOOTING PATTERN DIAGRAM

MIDSPAR AFT SURFACE

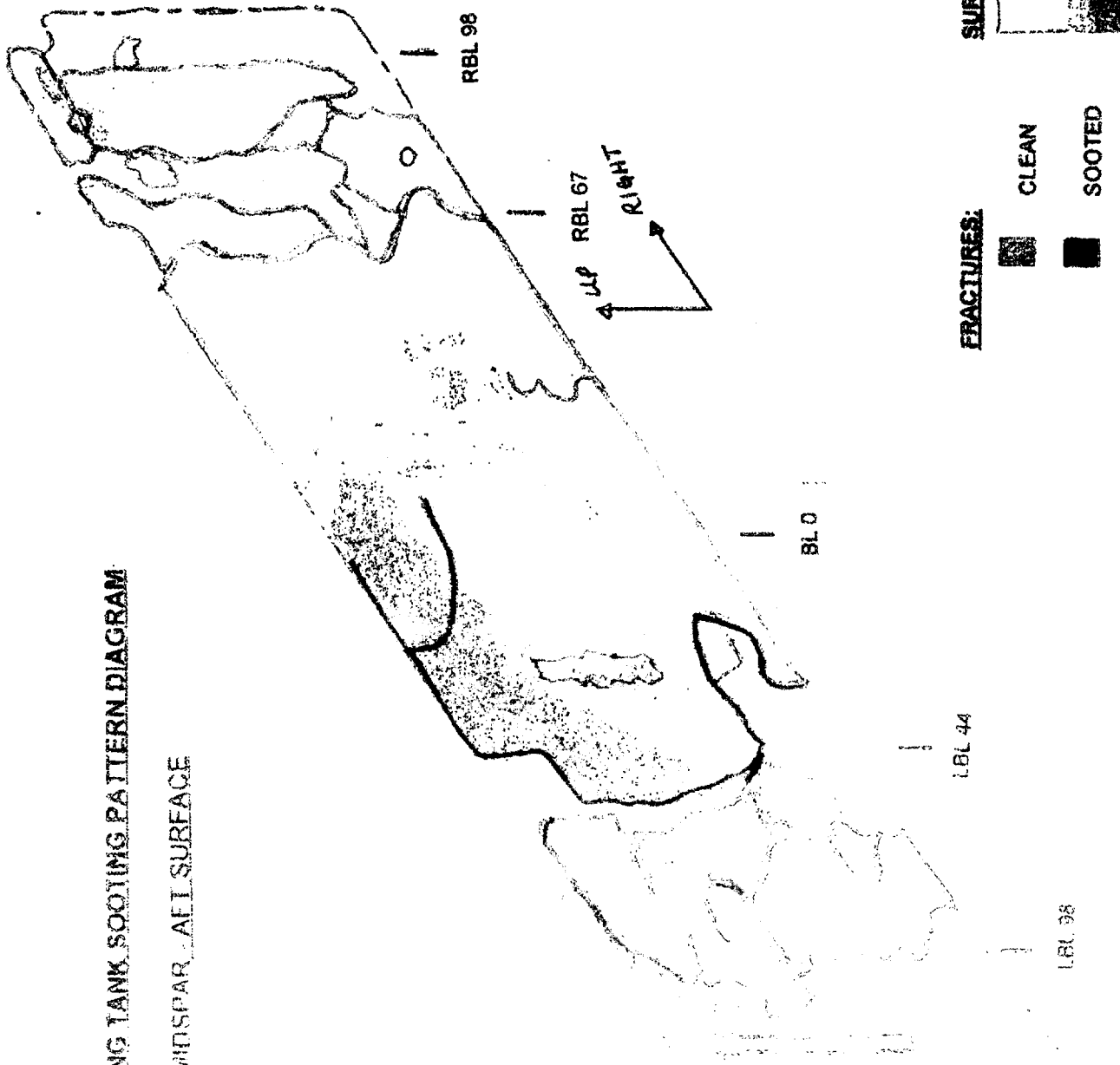


Diagram 12.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #1 - FORWARD SURFACE

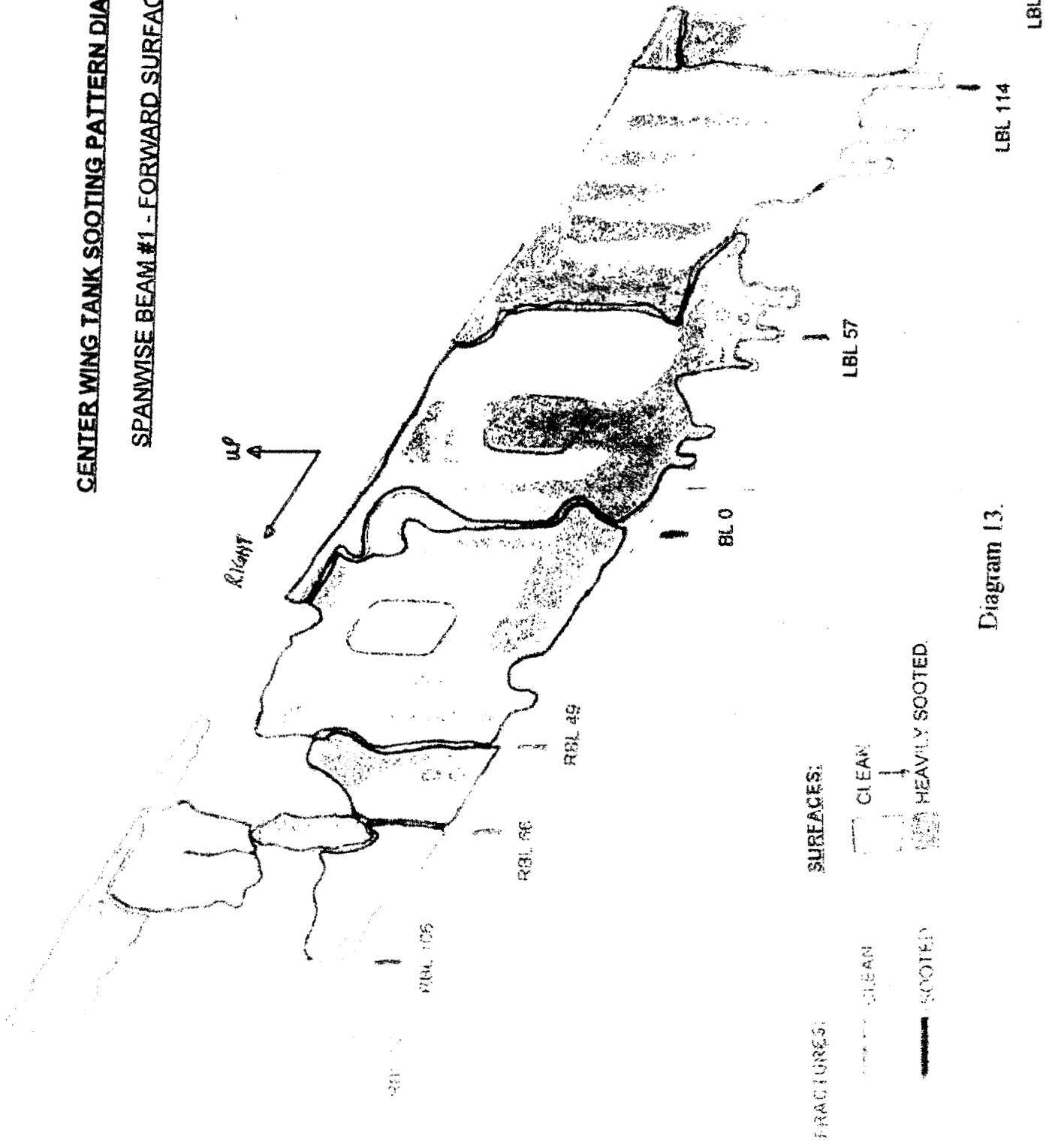


Diagram 13.

CENTER WING IANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #1 - AFT SURFACE

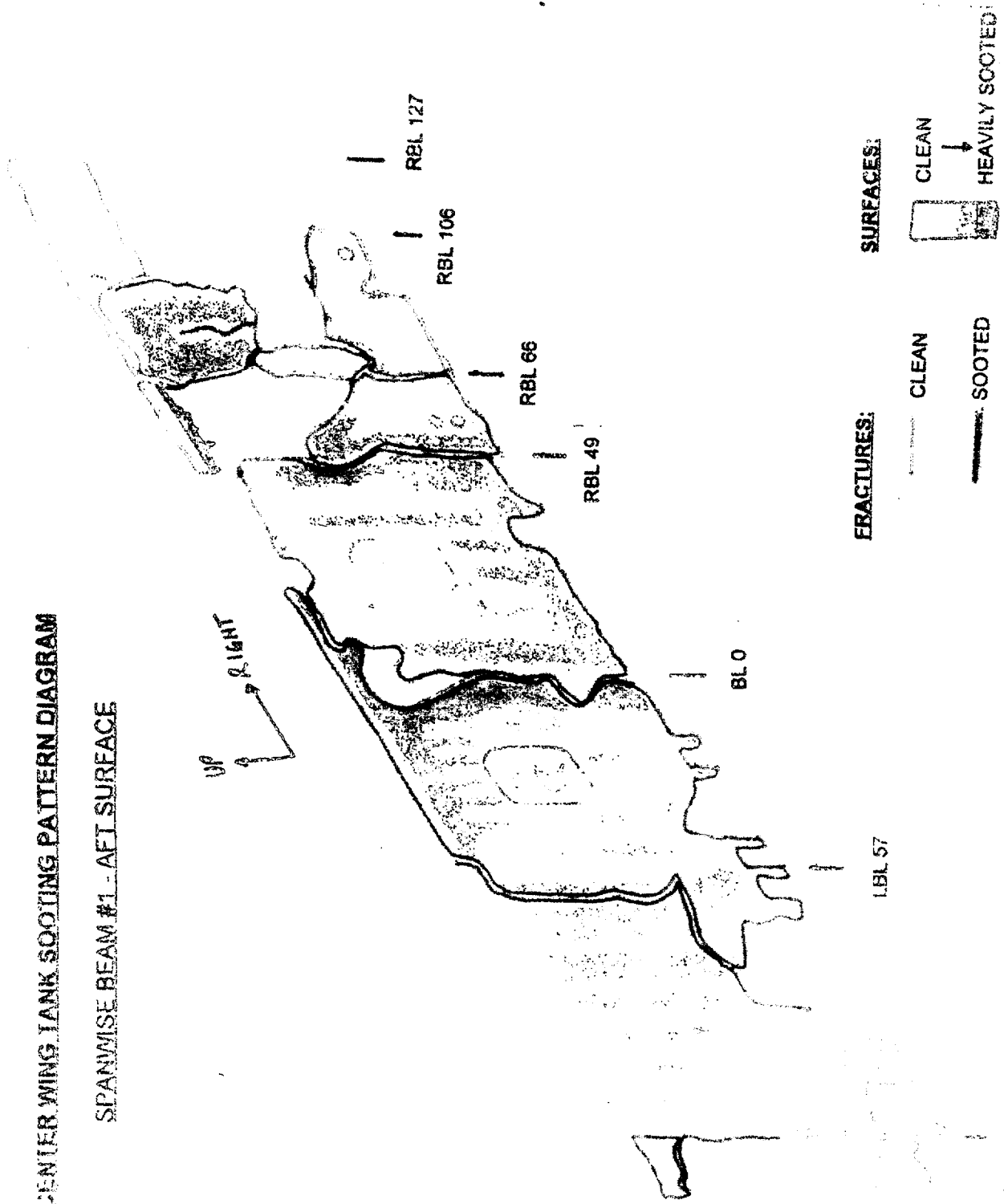


Diagram 14.

CENTER WING TANK SOOTING PATTERN DIAGRAM

REAR SPAR - FORWARD SURFACE

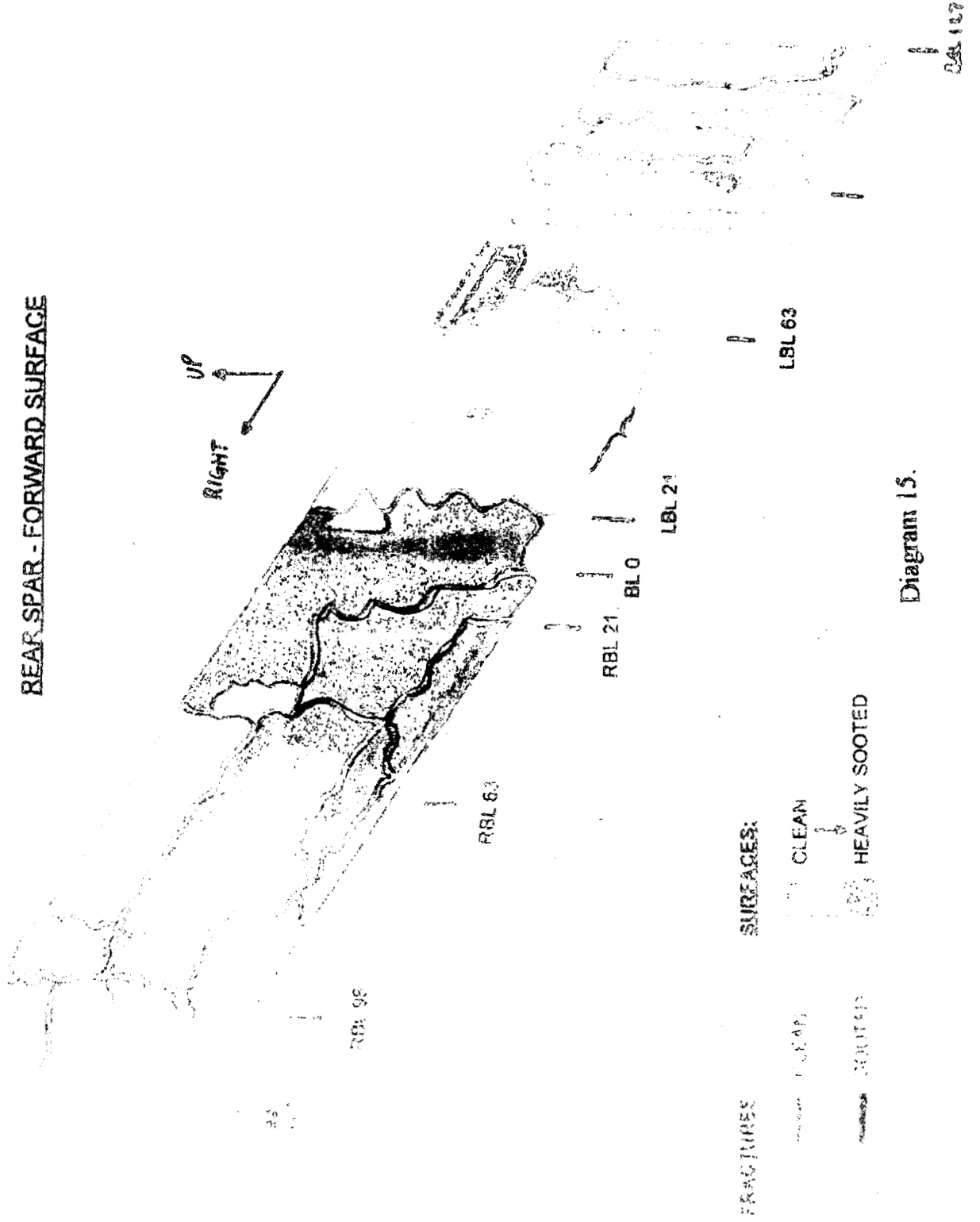


Diagram 15.

CENTER WING TANK SOOTING PATTERN DIAGRAM

REAR SPAR - AFT SURFACE

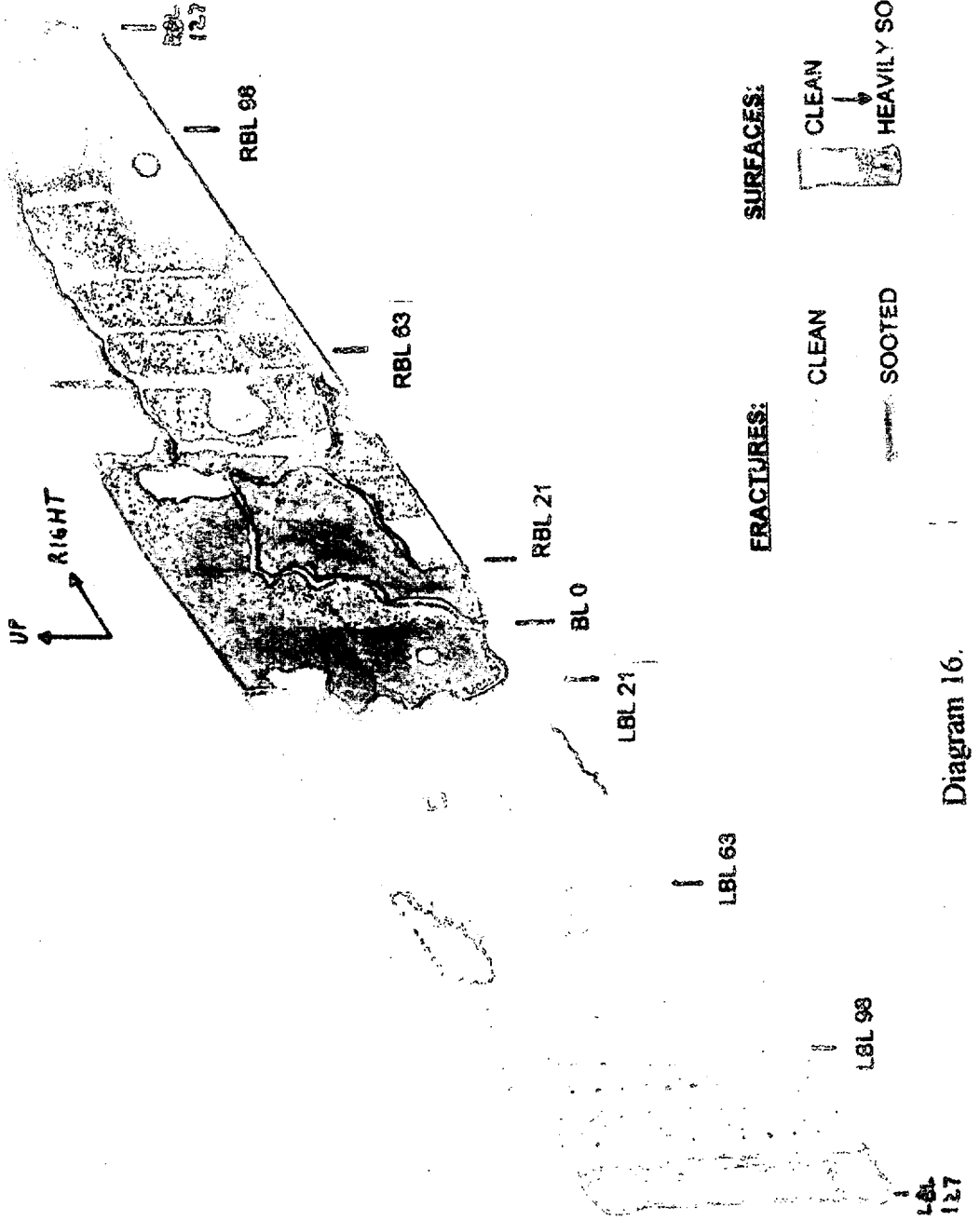
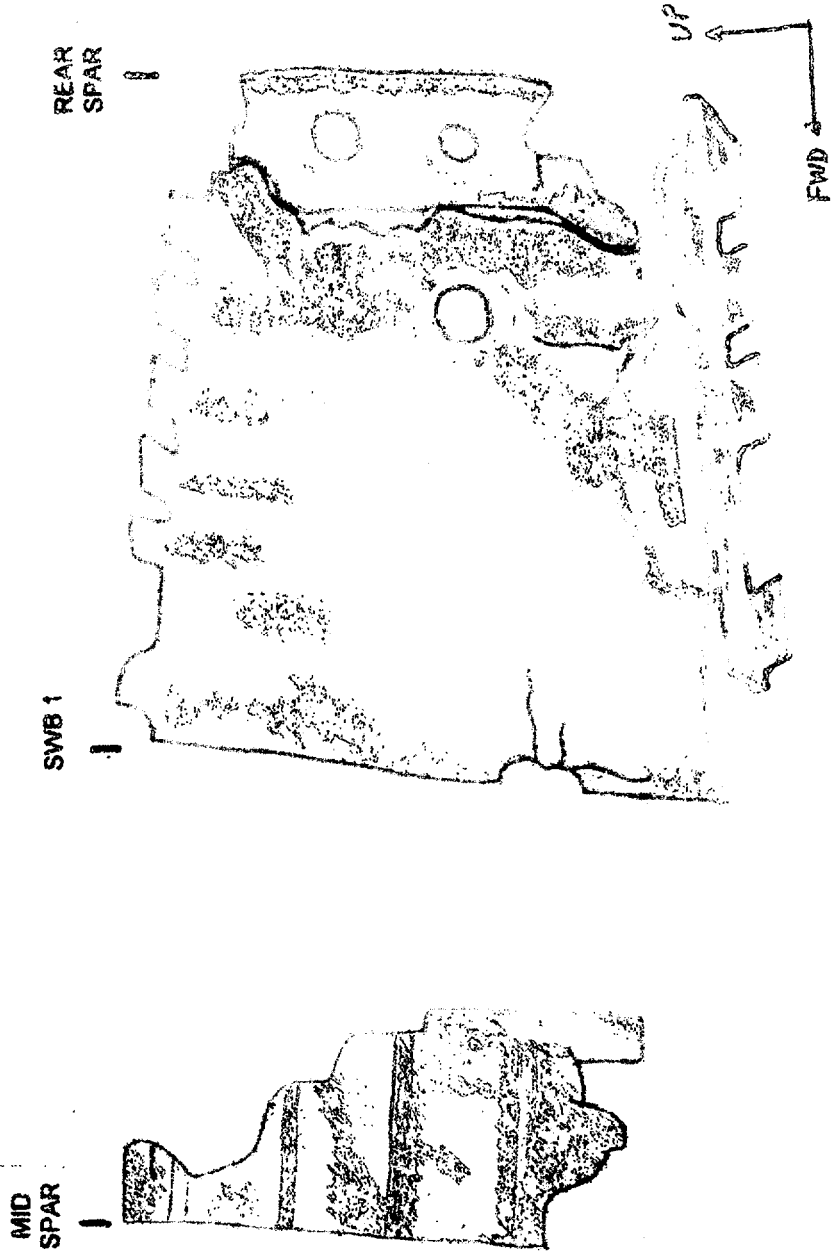


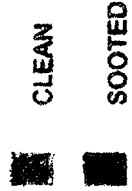
Diagram 16.

CENTER WING TANK SOOTING PATTERN DIAGRAM

BLO RIB - LEFT SURFACE



FRACTURES:



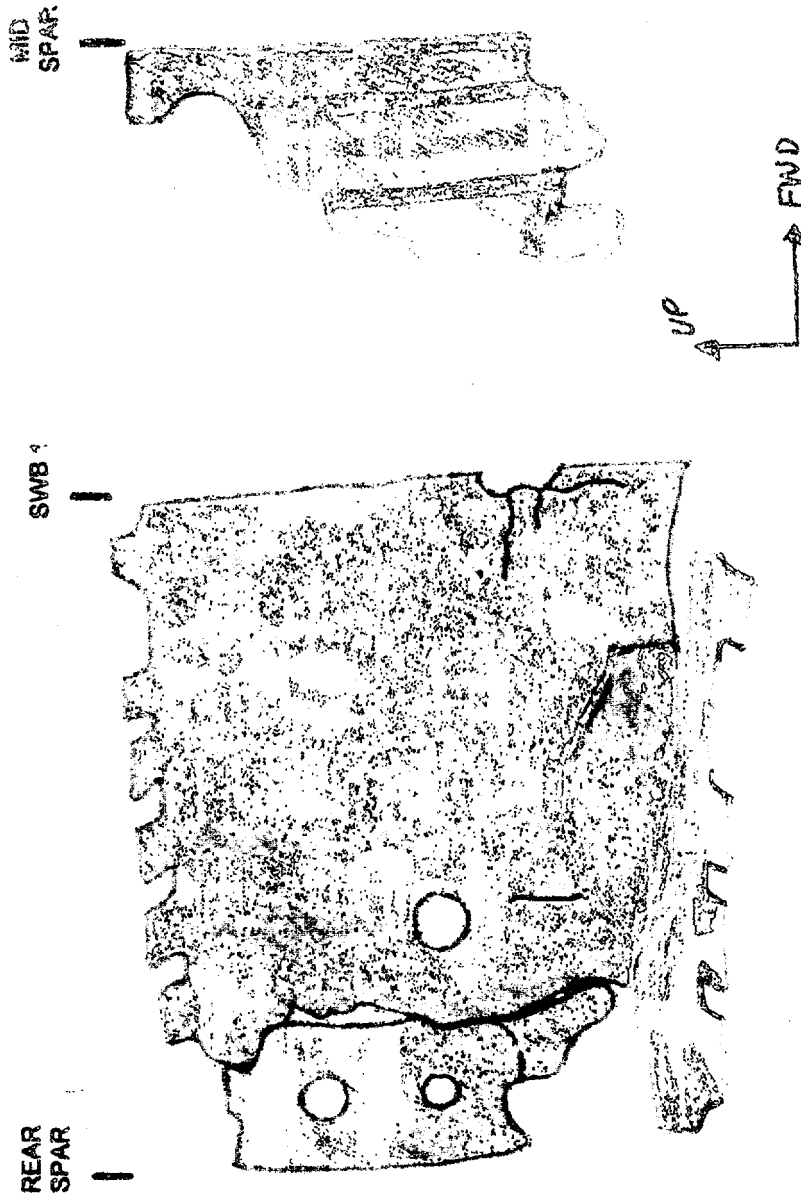
SURFACES:





Diagram 17.

CENTER WING TANK SOOTING PATTERN DIAGRAM

BL 0 RIB - RIGHT SURFACE



FRACTURES:

-  CLEAN
-  SOOTED

SURFACES:



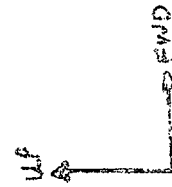
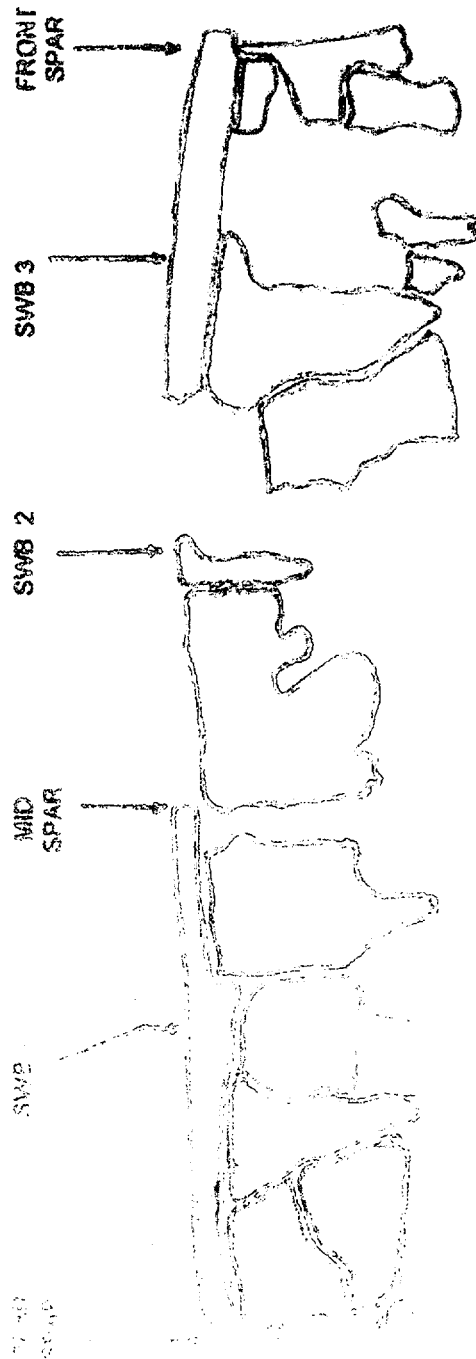
-  CLEAN
-  HEAVILY SOOTED

Diagram 18.

CENTER WING TANK SOOTING PATTERN DIAGRAM

RIGHTHAND SIDE OF BODY RIB - OUTBOARD SURFACE



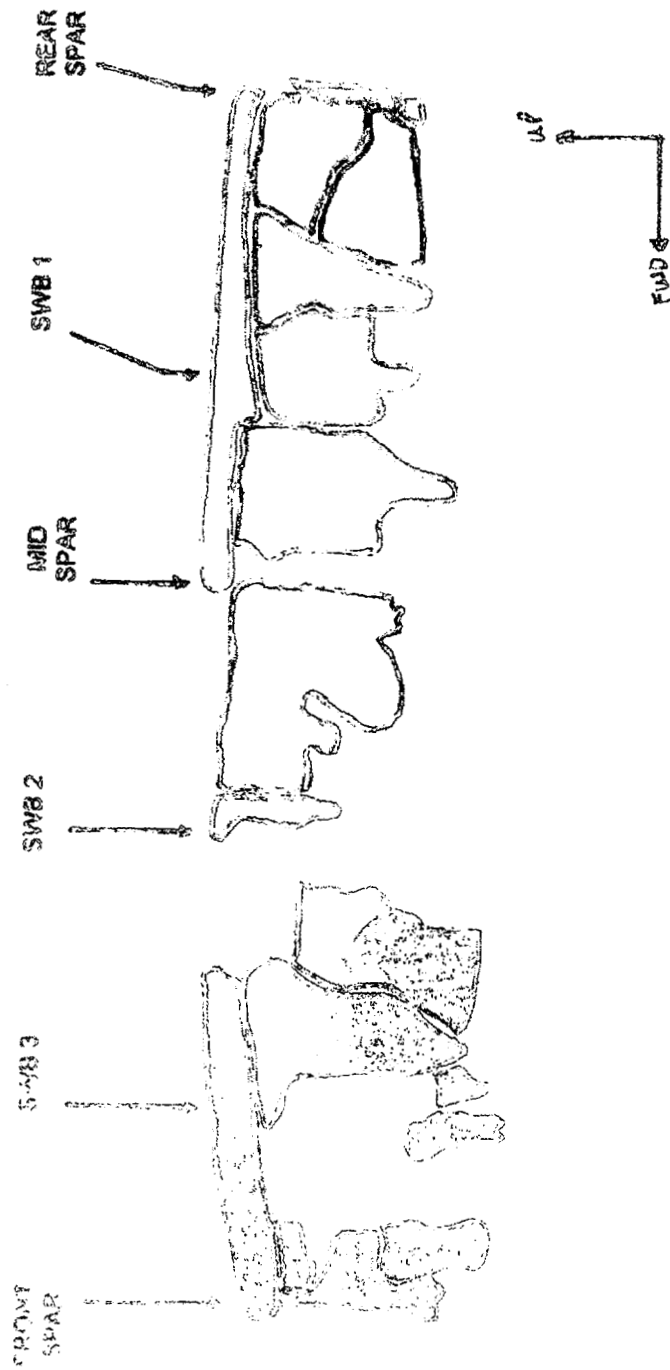
STRUCTURES:
 CLEAN
 SOOTED
 HEAVILY SOOTED

SURFACES:
 CLEAN
 SOOTED
 HEAVILY SOOTED

Diagram 19.

CENTER WING TANK SOOTING PATTERN DIAGRAM

RIGHTHAND SIDE OF BODY RIB - INBOARD SURFACE



SURFACES:

CLEAN

HEAVILY SOOTED

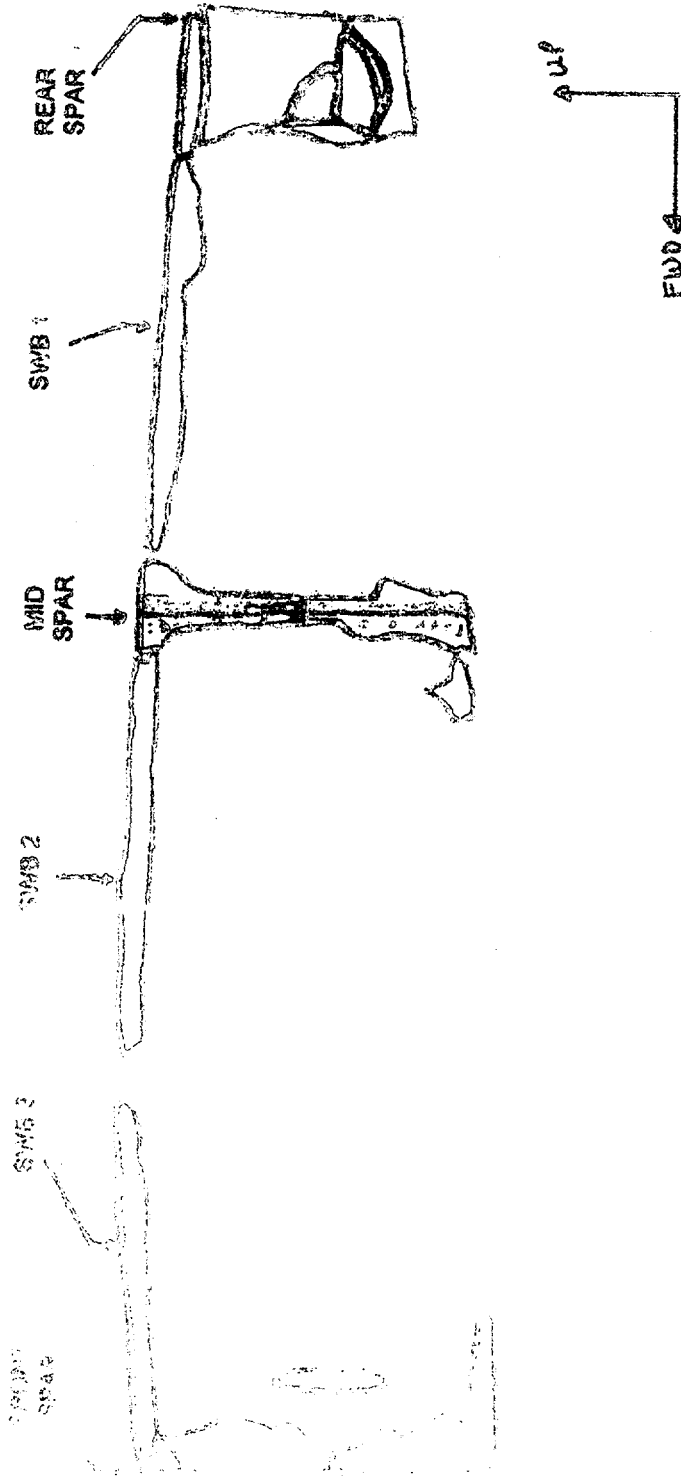
CLEAN

SOOTED

Diagram 20.

CENTER WING TANK SOOTING PATTERN DIAGRAM

LEE/HAND SIDE OF BODY RIB - OUTBOARD SURFACE



FRONT SPAR

SWB 2

MID SPAR

SWB 1

REAR SPAR

FWD

AUP

SURFACES:

CLEAN

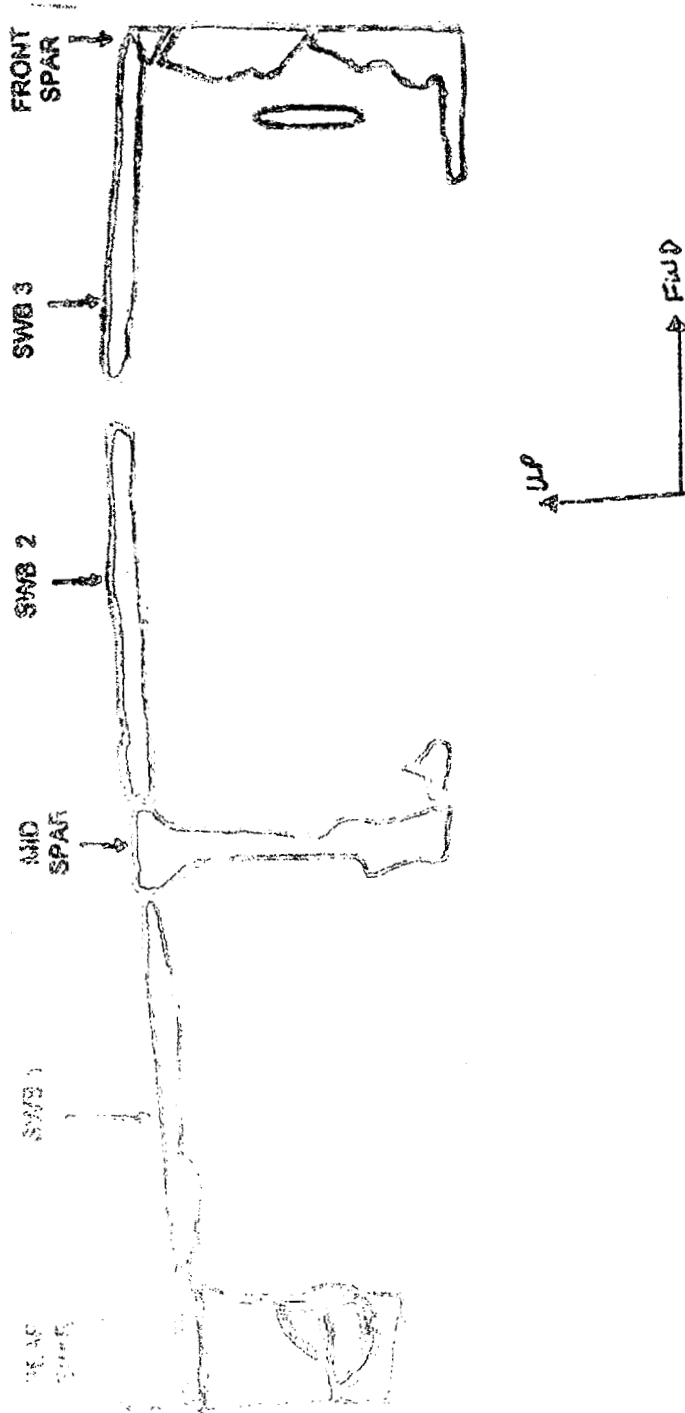
SOOTED

HEAVILY SOOTED

Diagram 21.

CENTER WING TANK SOOTING PATTERN DIAGRAM

LEFT HAND SIDE OF BODY RIB - INBOARD SURFACE



SURFACES:

CLEAN

HEAVILY SOOTED

Diagram 22.

NO. 11 WEIGHING SOOTING PATTERN DIAGRAM

UPPER SKIN - EXTERNAL SURFACE



27

FRACTURES:



CLEAN



SOOTED

SURFACES:



CLEAN



HEAVILY SOOTED

LOWER SKIN - EXTERNAL SURFACE

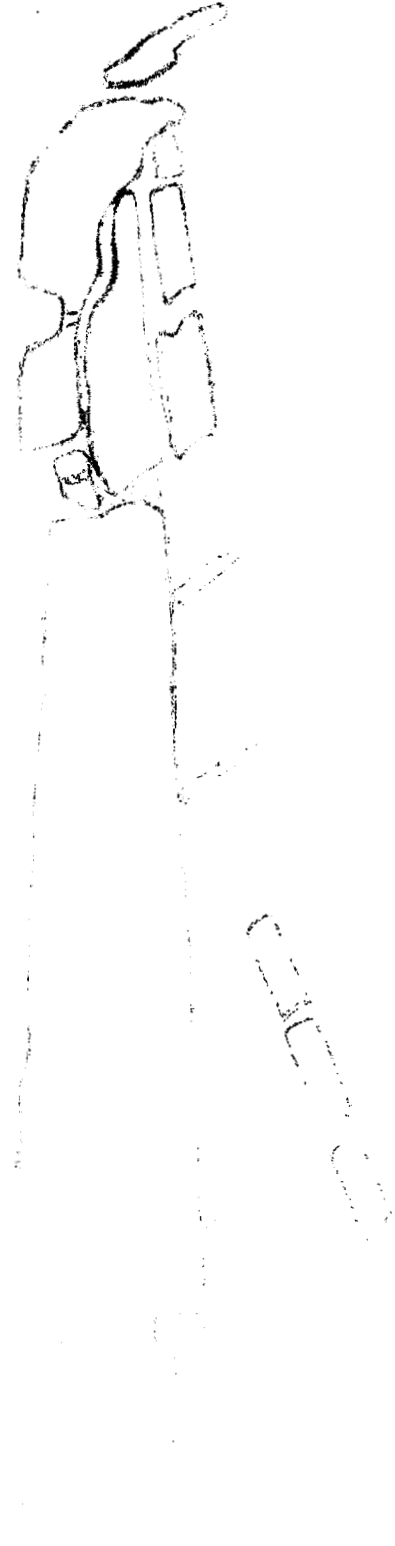
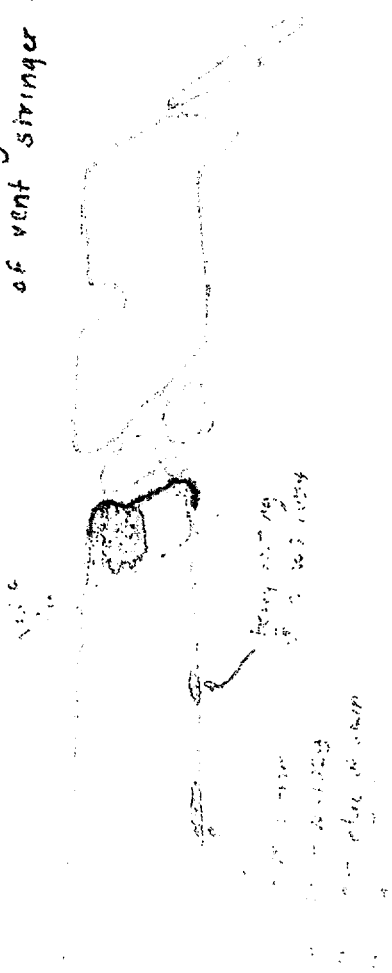


Diagram 23.

MOOD BURN SOOTING PATTERN DIAGRAM

UPPER SKIN INTERNAL SURFACE

Note: See Vent Stringer for details of vent stringer sooting.



LOWER SKIN INTERNAL SURFACE

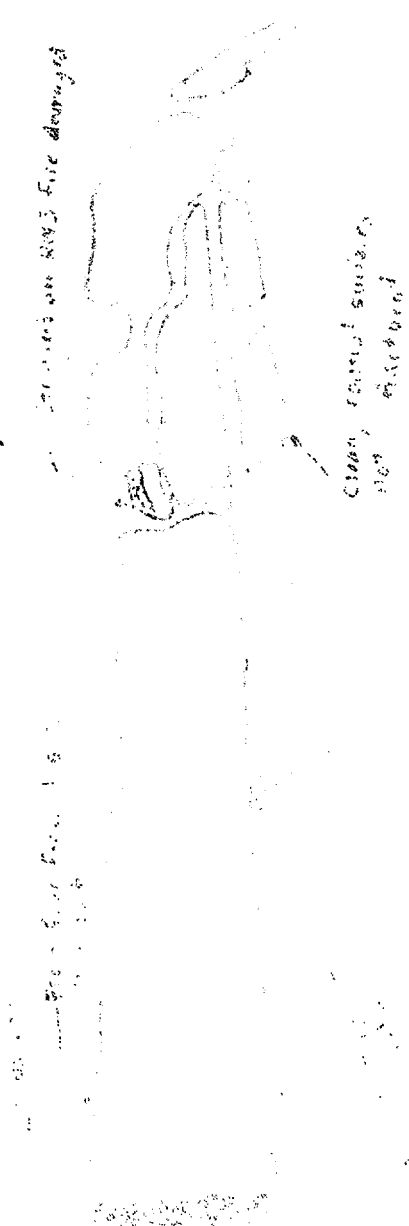
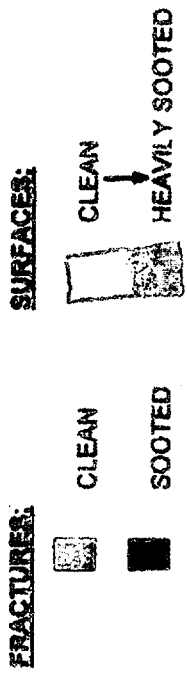
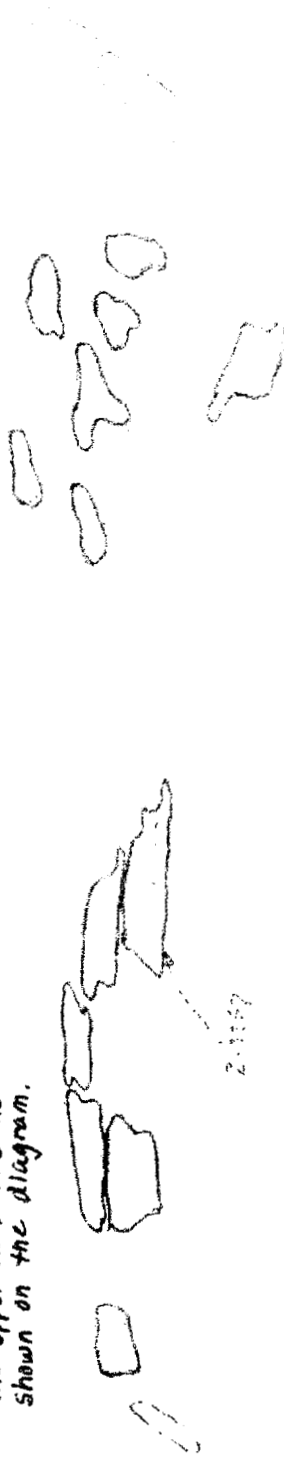


Diagram 24.

LEFT WING SOOTING PATTERN DIAGRAM

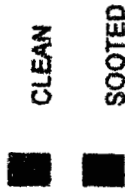
UPPER SKIN - EXTERNAL SURFACE

NOTE: Many small pieces of the upper skin are not shown on the diagram.



NOTE: With the exception of the piece noted, the external surface of the upper skin is clean. The control surfaces do show sooting and fire damage to the composite parts.

FRACITURES:



CLEAN

SOOTED

SURFACES:



CLEAN

HEAVILY SOOTED

LOWER SKIN - EXTERNAL SURFACE

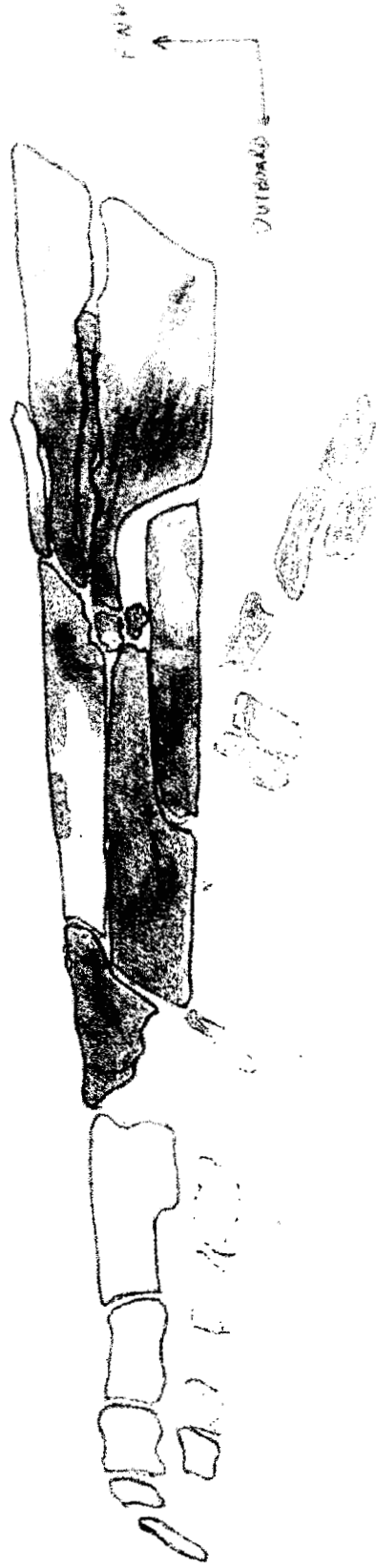


Diagram 25.

LEFTING SOOTING PATTERN DIAGRAM

UPPER SKIN - INTERNAL SURFACE

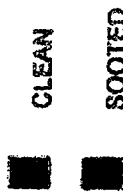
NOTE: Many small pieces of the upper skin are not shown on the diagram.



NOTE:

With the exception of the piece noted, the internal surface of the upper skin is clean. The control surfaces do show sooting and fire damage to the composite parts.

FRACTURES:



SURFACES:



NOTE: See page 26 for details of the control surfaces.

LOWER SKIN - INTERNAL SURFACE

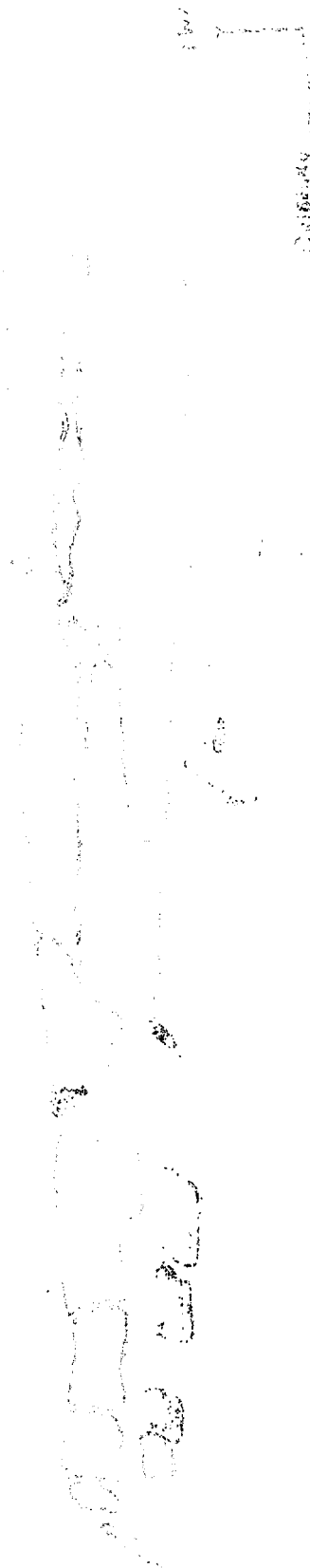
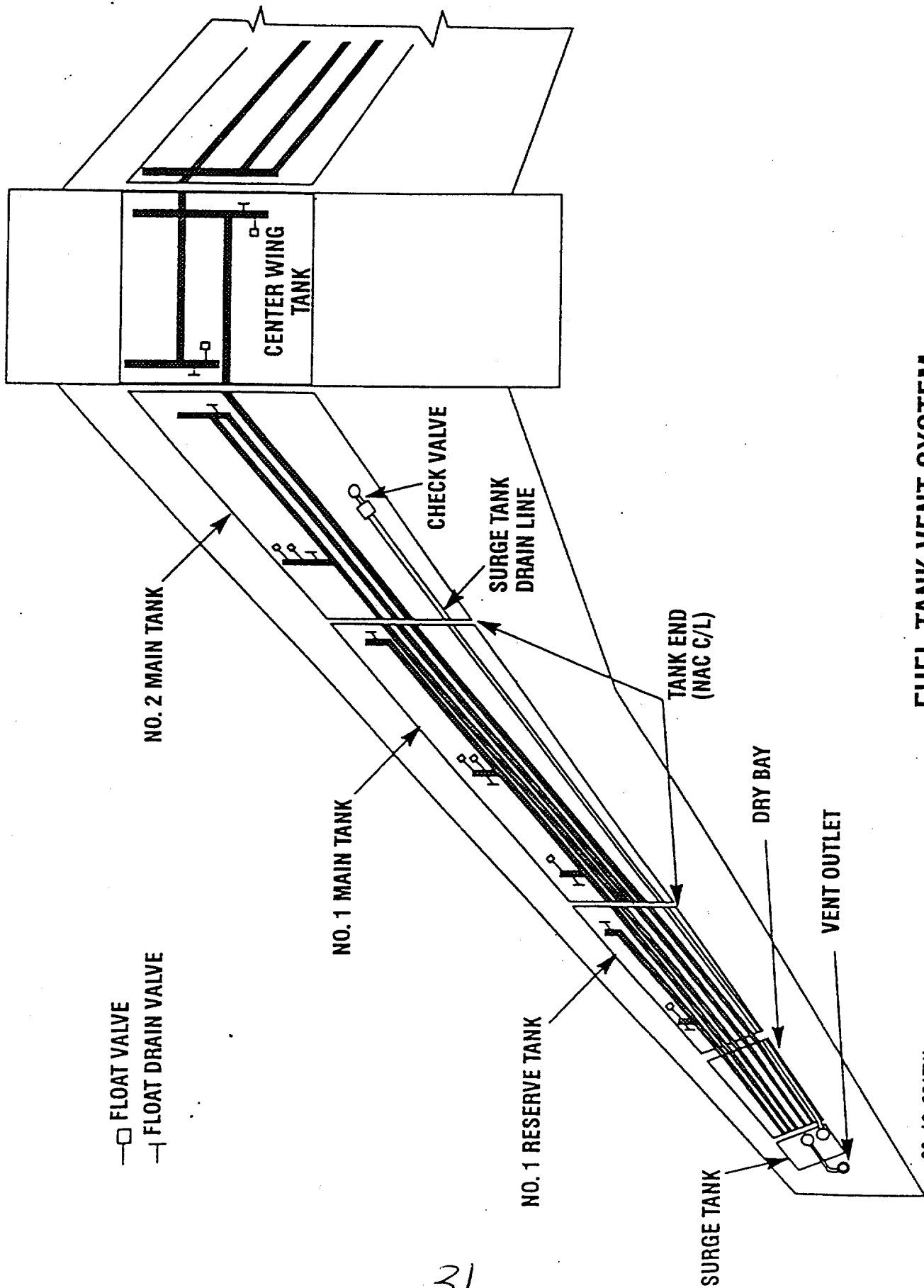


Diagram 26.

DIAGRAM 27



□ FLOAT VALVE
 └─ FLOAT DRAIN VALVE

31

747 ALL
10/88

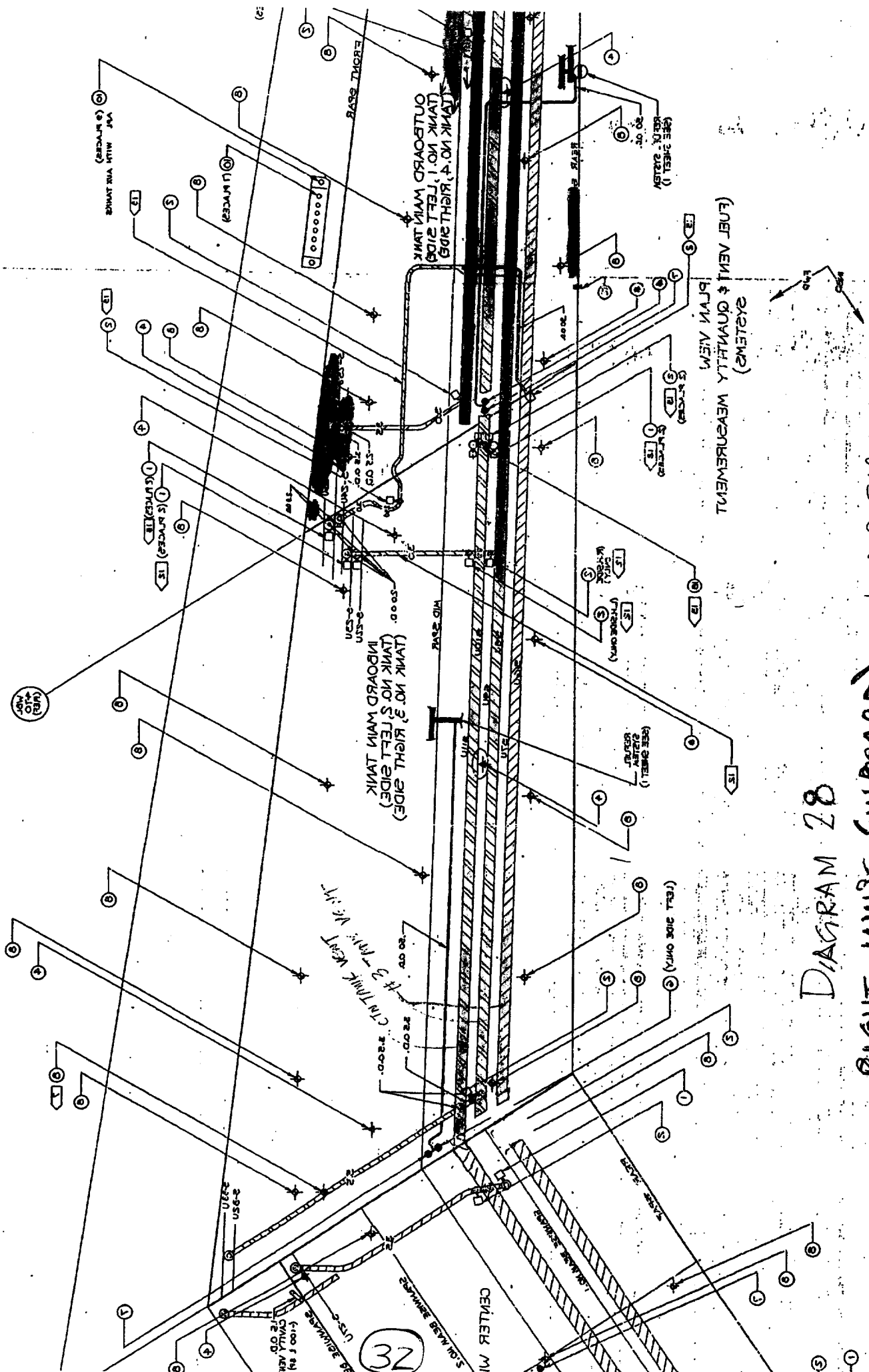
FUEL TANK VENT SYSTEM

28-13-001TW

RIGHT WING (INBOARD) LOWER SURFACE OF UPPER WING SKIN

DIAGRAM 28

RIGHT WING (INBOARD)



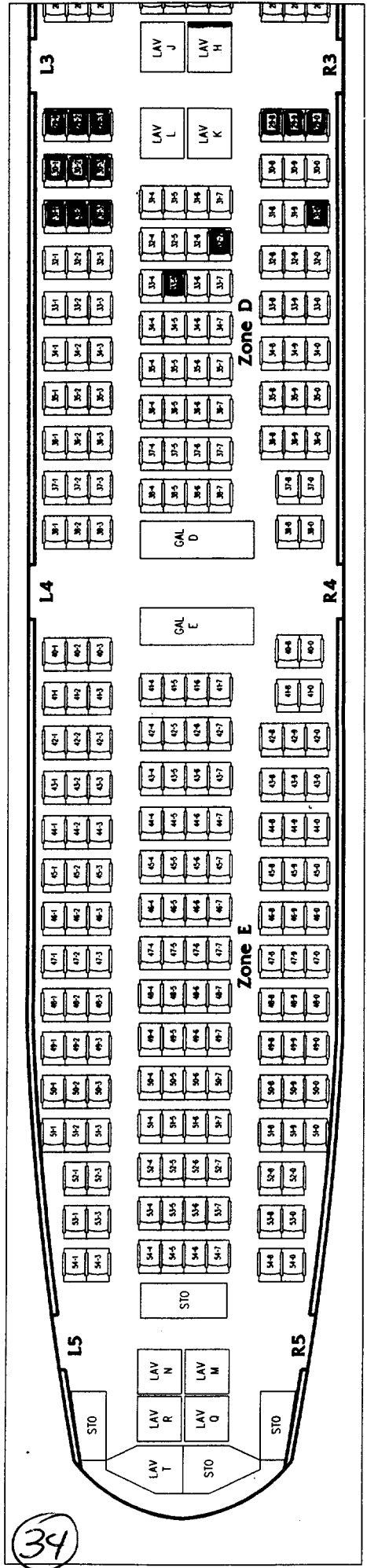
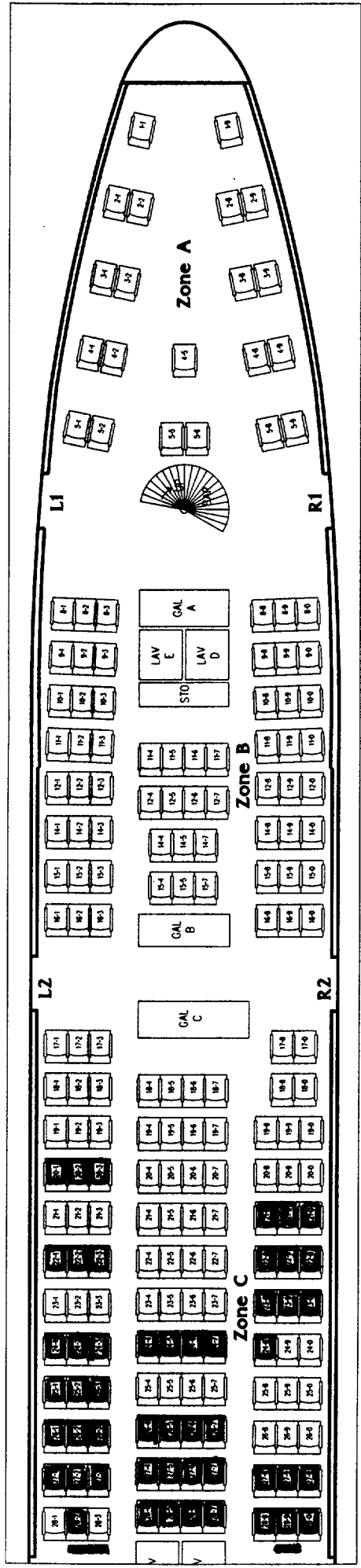
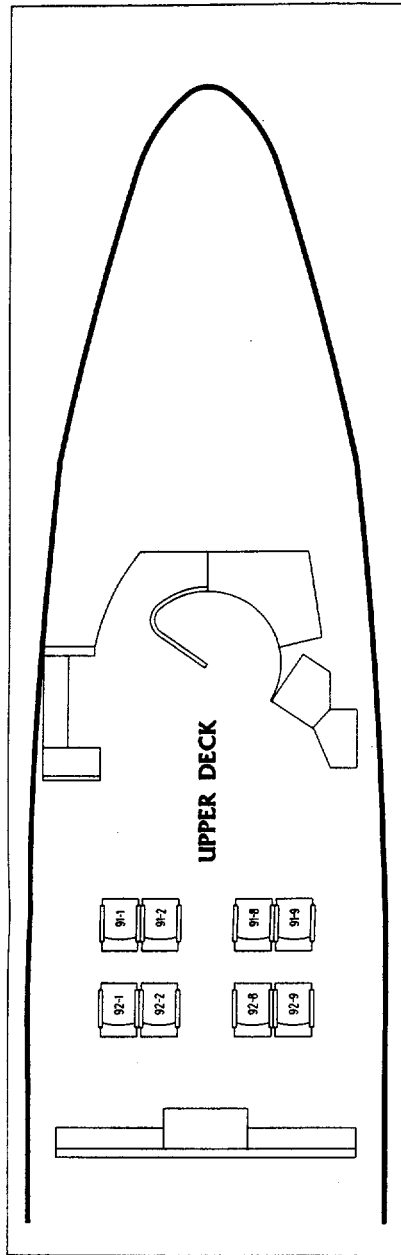
279
CONV SK

32

Seat Damage
Center Wing Tank Area
Data gathered by Fire and Explosion Group

Diagram 29

Fire Damage and/or Soot [] Not Recovered/Identified []



RW3

FUEL FILLER NECK
(UPPER SURFACE)

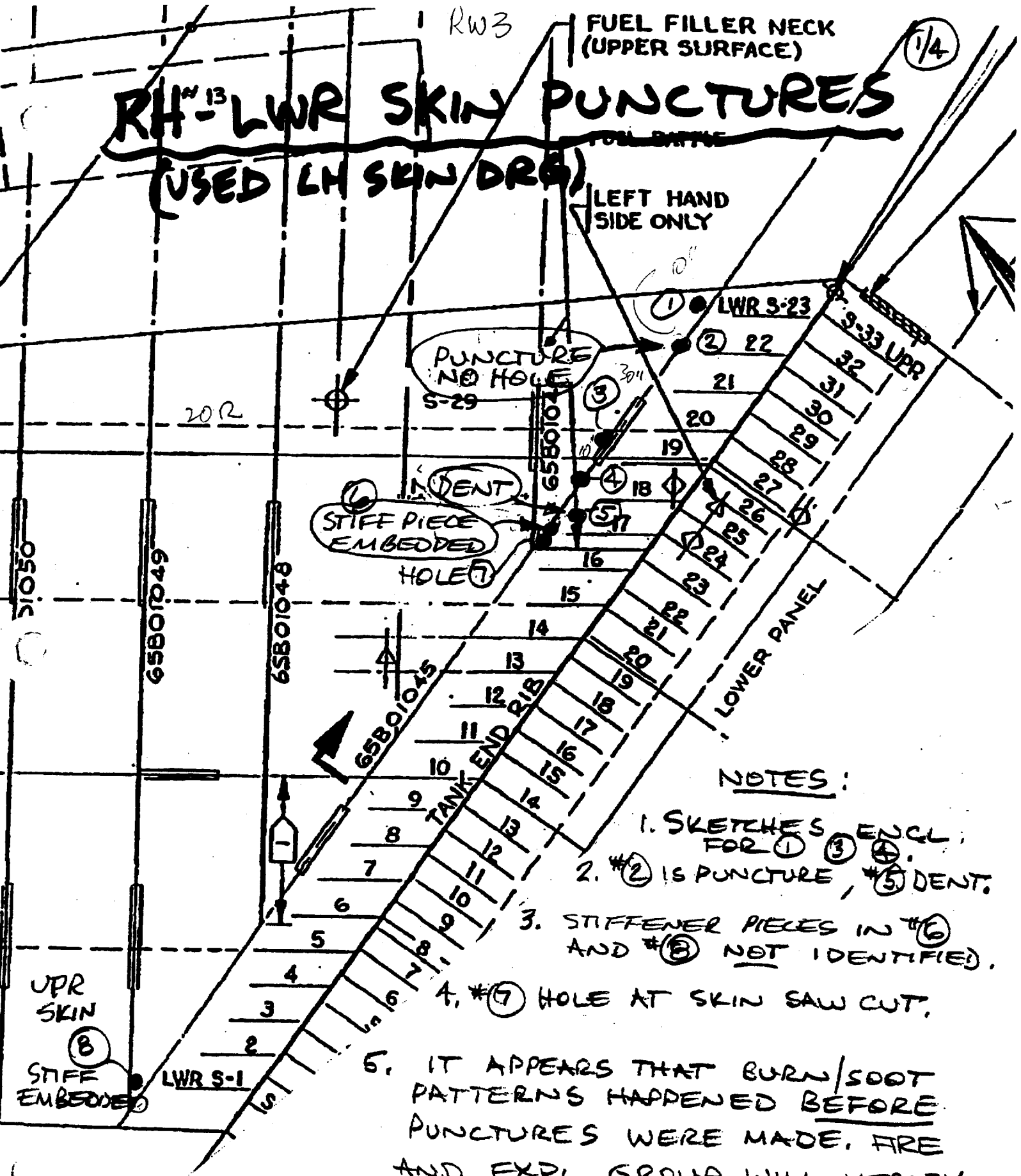
1/4

RH^{#13}-LWR SKIN PUNCTURES

(USED LH SKIN DRG)

FUEL BATTLE

LEFT HAND
SIDE ONLY



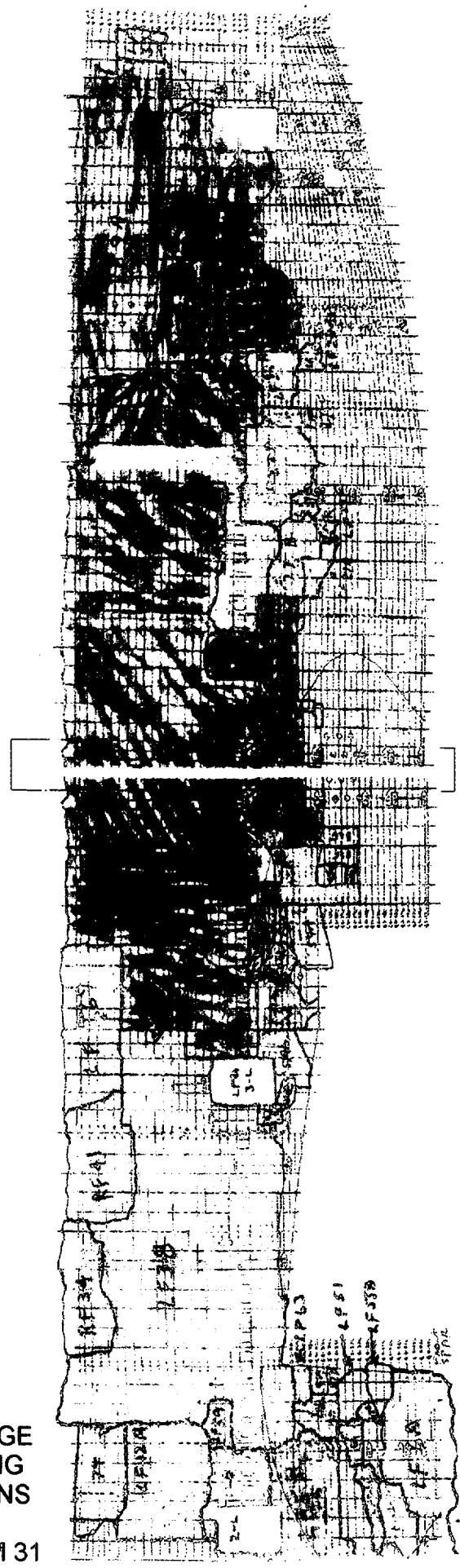
NOTES:

1. SKETCHES ENCL. FOR ① ③ ④.
2. #② IS PUNCTURE, #⑤ DENT.
3. STIFFENER PIECES IN #⑥ AND #⑧ NOT IDENTIFIED.
4. #⑦ HOLE AT SKIN SAW CUT.
5. IT APPEARS THAT BURN/SOOT PATTERNS HAPPENED BEFORE PUNCTURES WERE MADE. FIRE AND EXPL GROUP WILL VERIFY.

A. REIMER 10/16/96

DIAGRAM 30

35



- CLEAN
- LIGHTLY SOOTED
- SOOTED

FUSELAGE
SOOTING
PATTERNS

DIAGRAM 31