

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)
(35 pages)**

TWA FLIGHT 800 ACCIDENT INVESTIGATION

FIRE AND EXPLOSION

APPENDIX II

Sooting/Fracture Diagrams

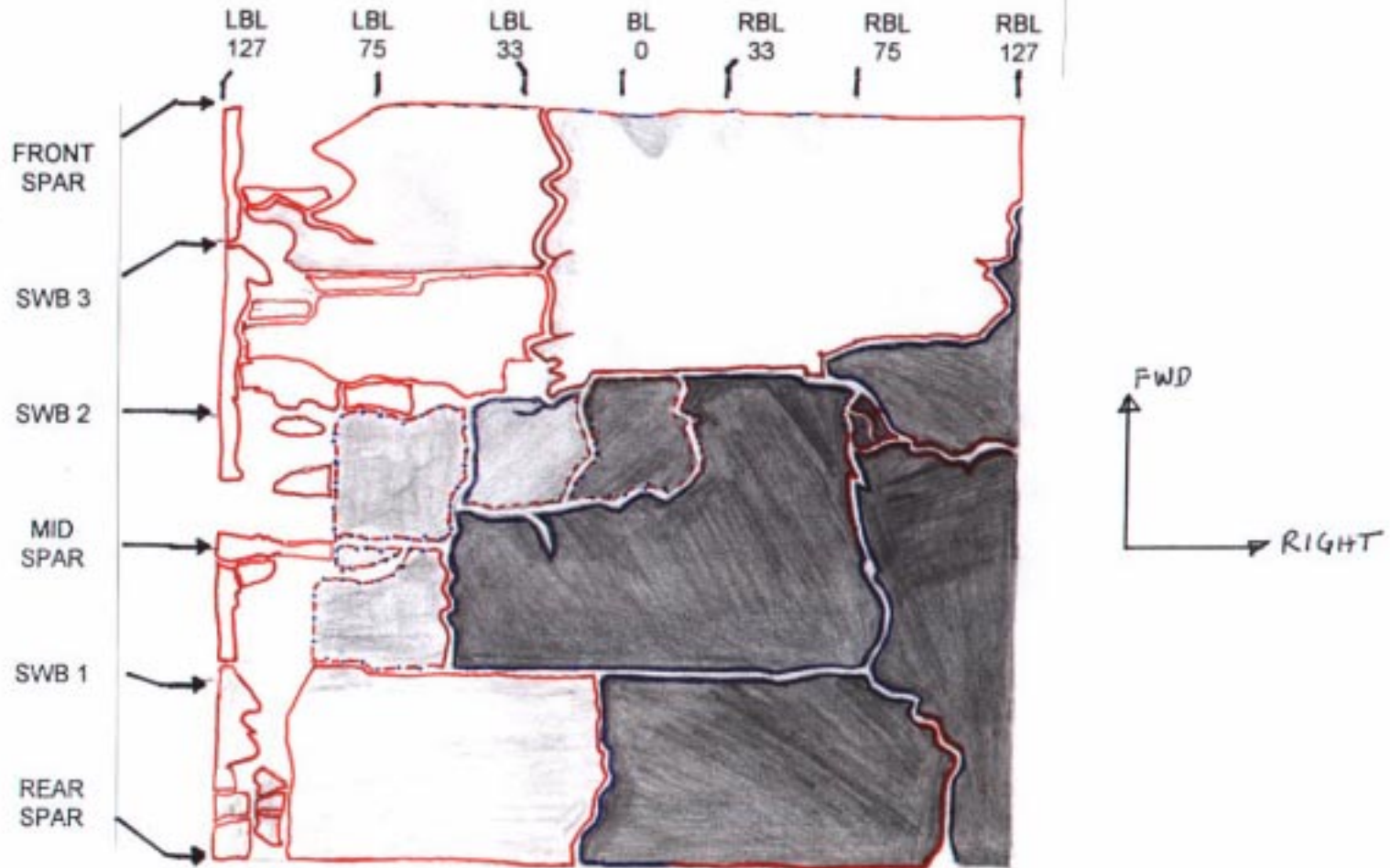
**APPENDIX II
SOOTING/FRACTURE DIAGRAMS**

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 O Rib
18	Right Surface of the BL O 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 Wins Skins
25	External Surface of the Upper and Lower Left Wing Skins
26	Internal Surface of the 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
- SOOTED

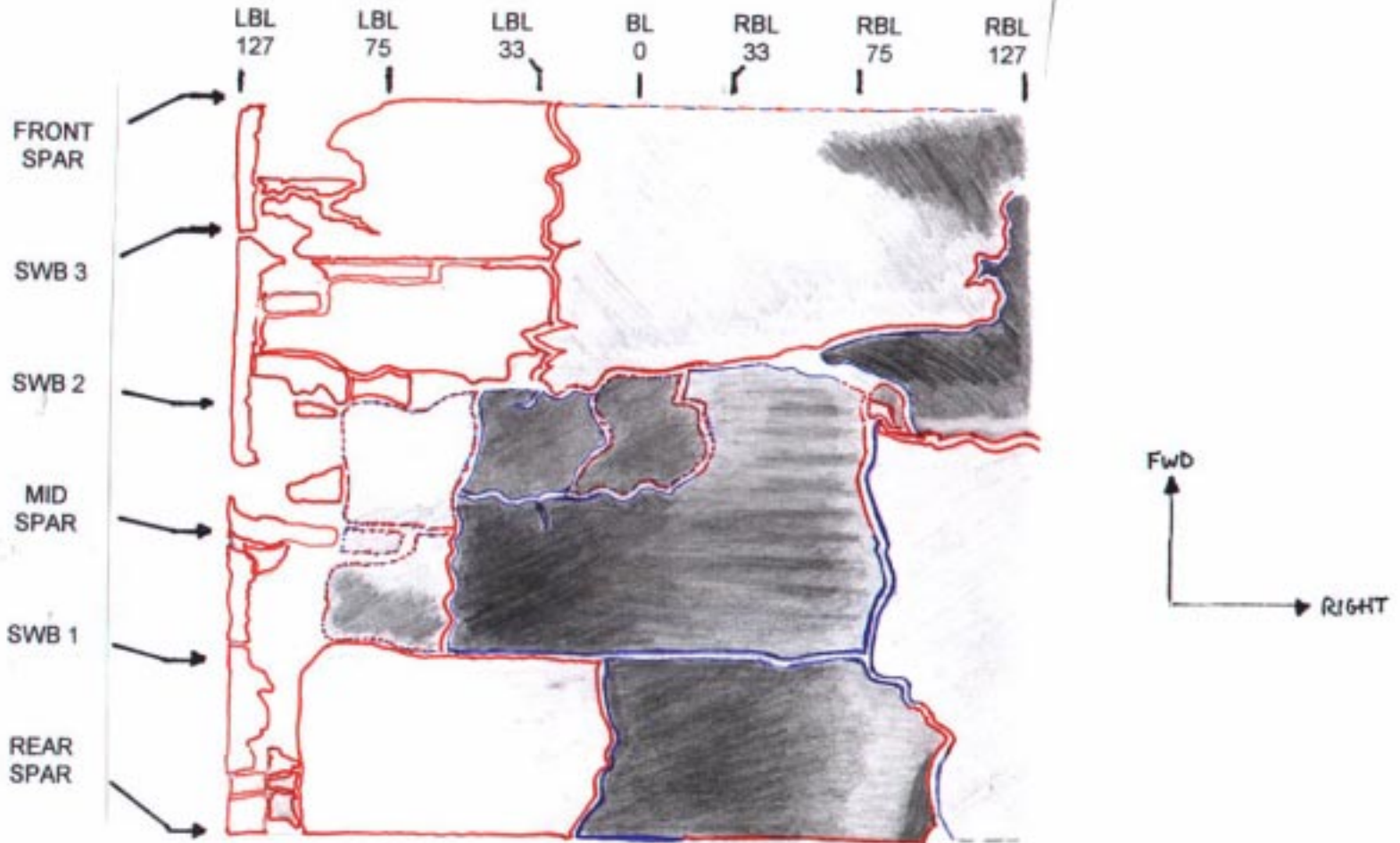
SURFACES:

- CLEAN
- HEAVILY SOOTED

Diagram 1.

CENTER WING TANK SOOTING PATTERN DIAGRAM

UPPER SKIN - LOWER SURFACE



FRACTURES:

-  CLEAN
-  SOOTED

SURFACES:



-  CLEAN
-  HEAVILY SOOTED

Diagram 2.

CENTER WING TANK SOOTING PATTERN DIAGRAM

LOWER SKIN - UPPER SURFACE

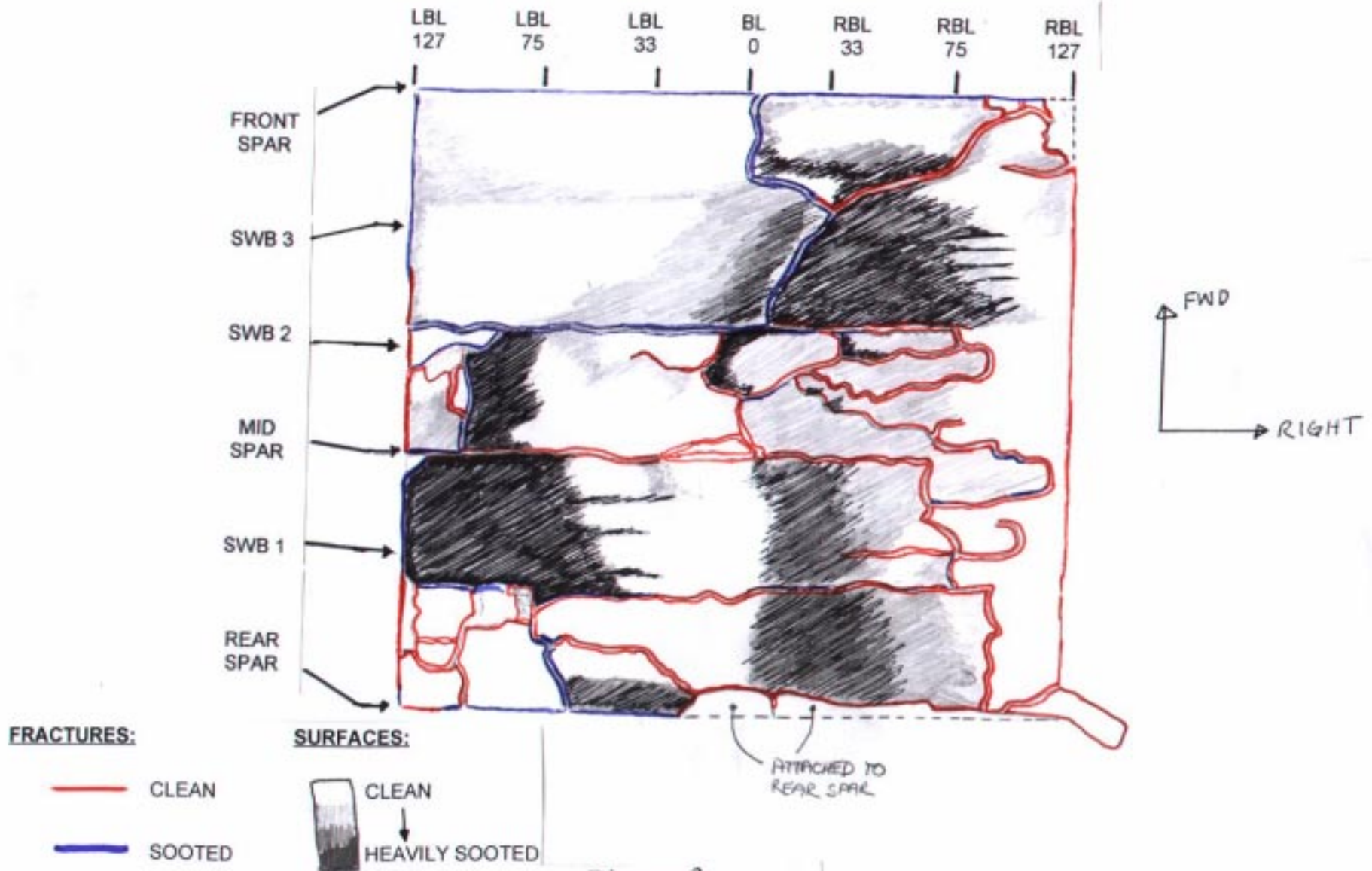


Diagram 3.

CENTER WING TANK SOOTING PATTERN DIAGRAM

LOWER SKIN - LOWER SURFACE

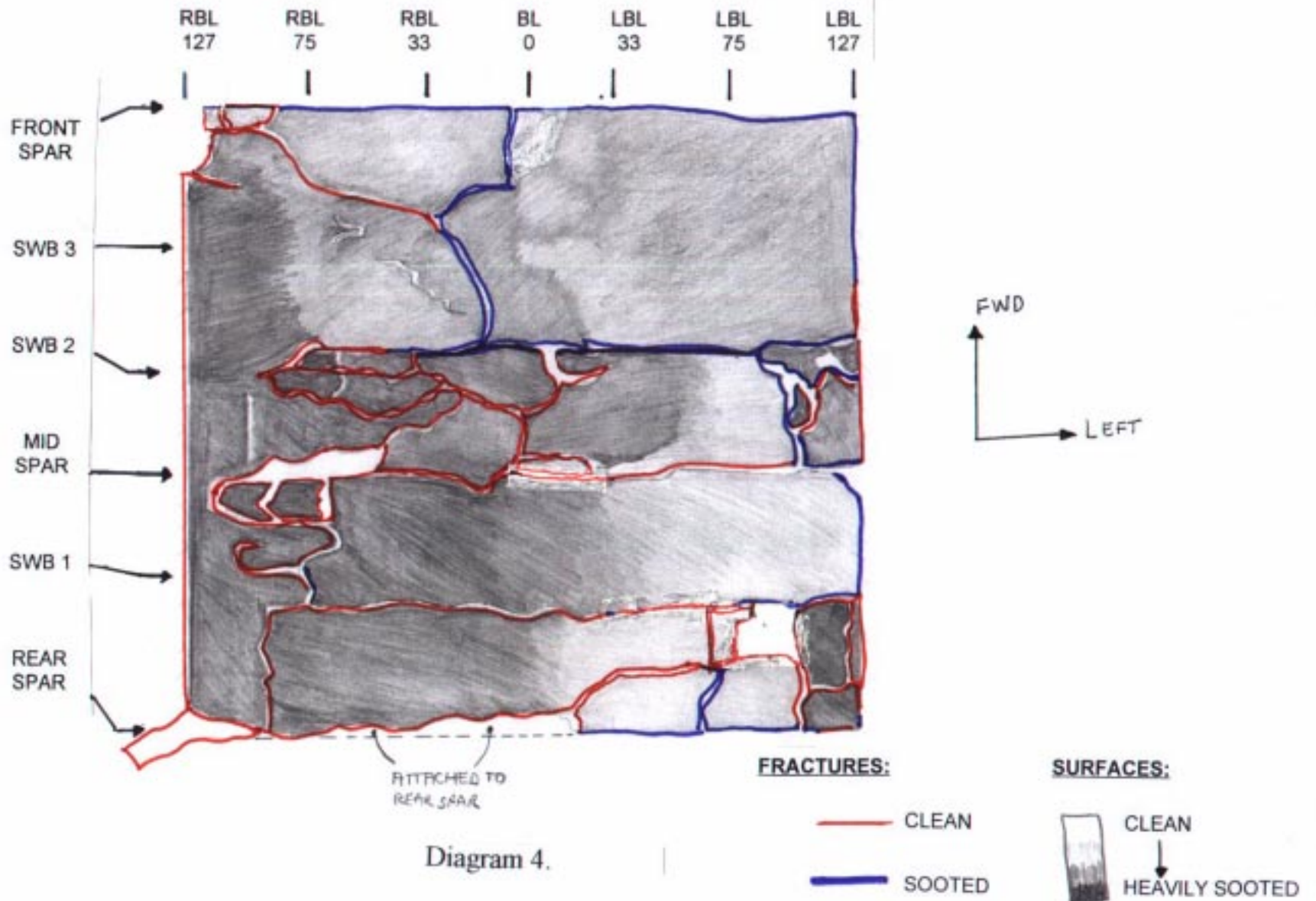
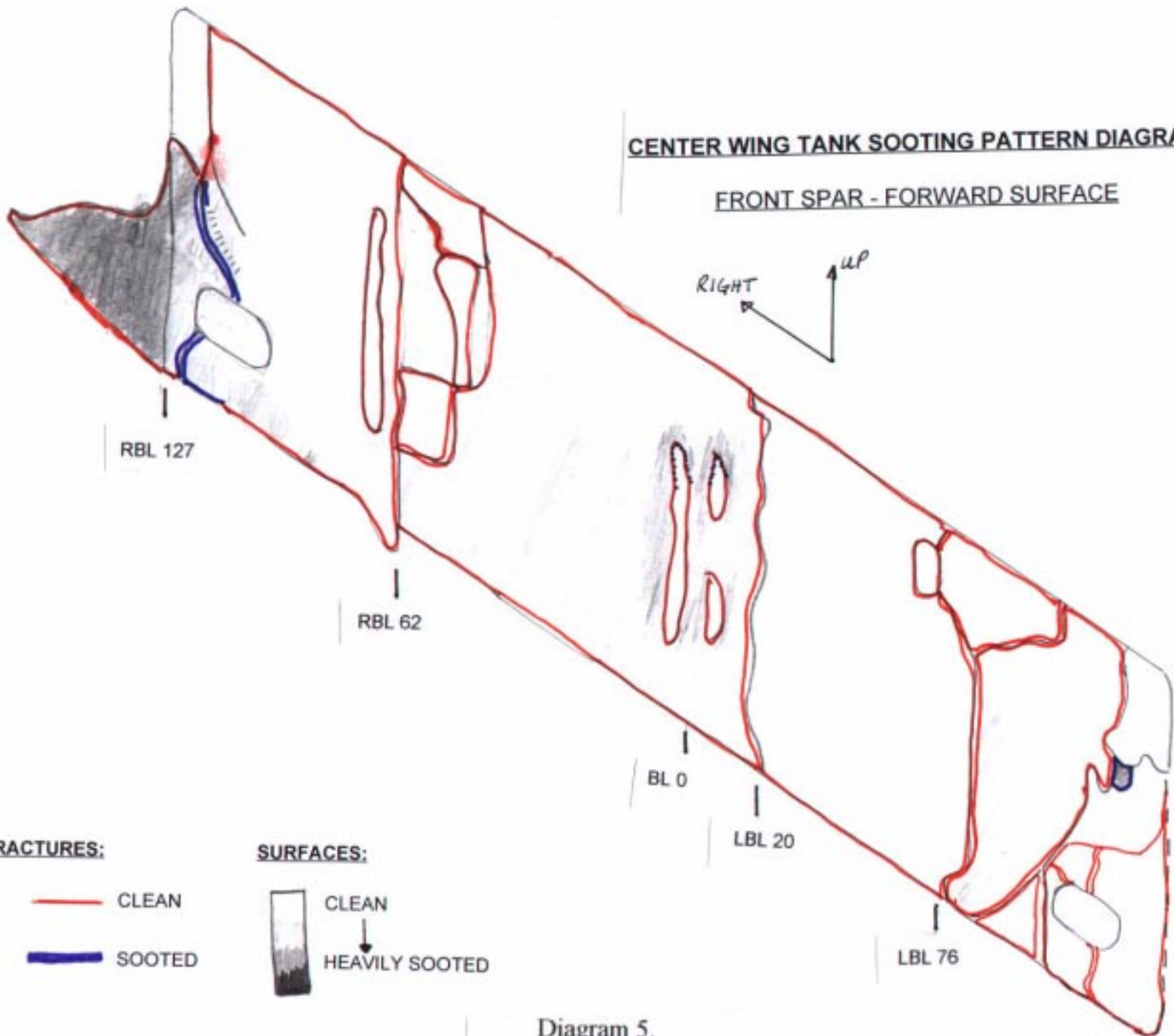


Diagram 4.

CENTER WING TANK SOOTING PATTERN DIAGRAM

FRONT SPAR - FORWARD SURFACE



FRACTURES:

-  CLEAN
-  SOOTED

SURFACES:



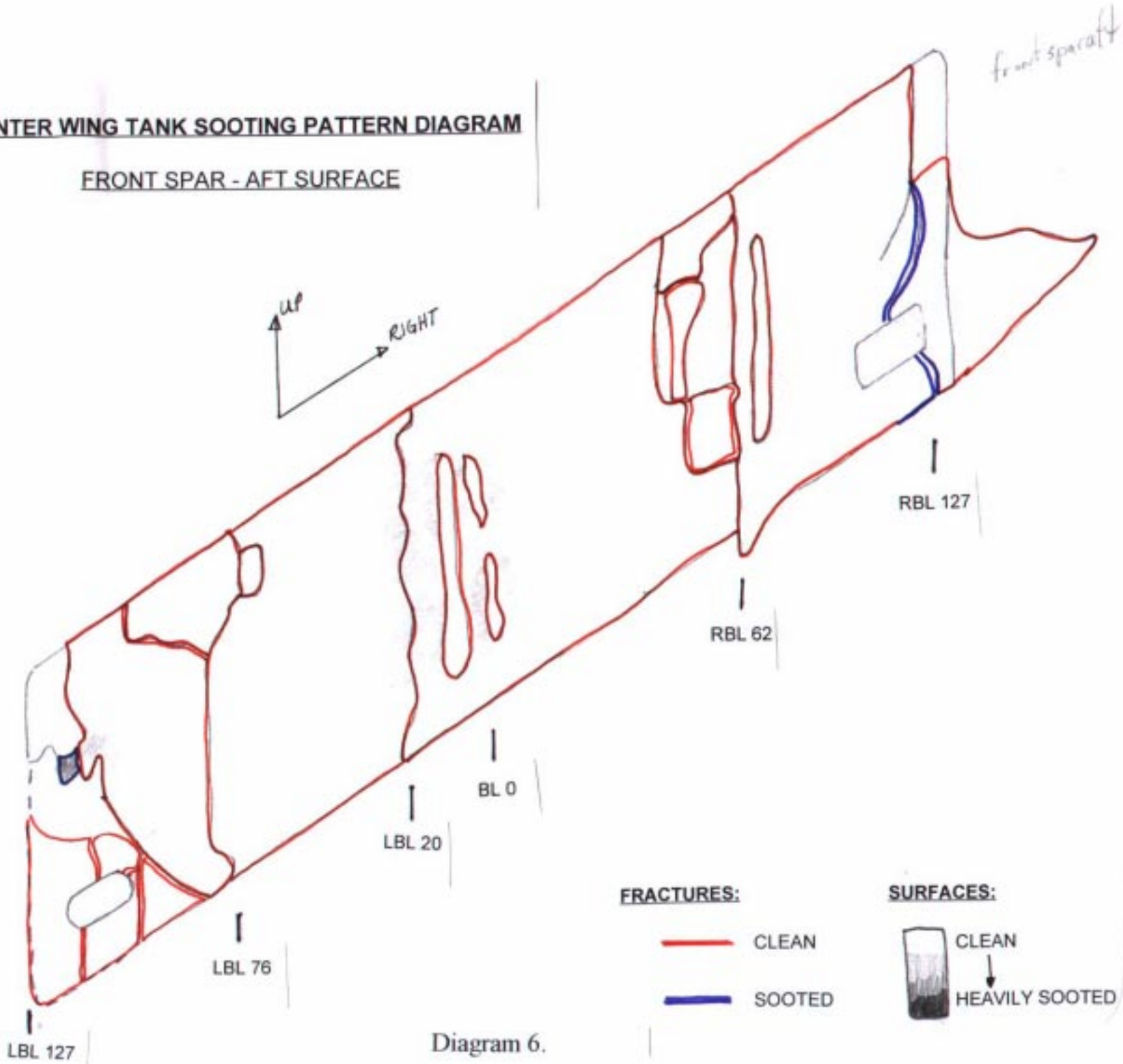
-  CLEAN
-  HEAVILY SOOTED

Diagram 5.

LBL 127

CENTER WING TANK SOOTING PATTERN DIAGRAM

FRONT SPAR - AFT SURFACE



CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #3 - FORWARD SURFACE

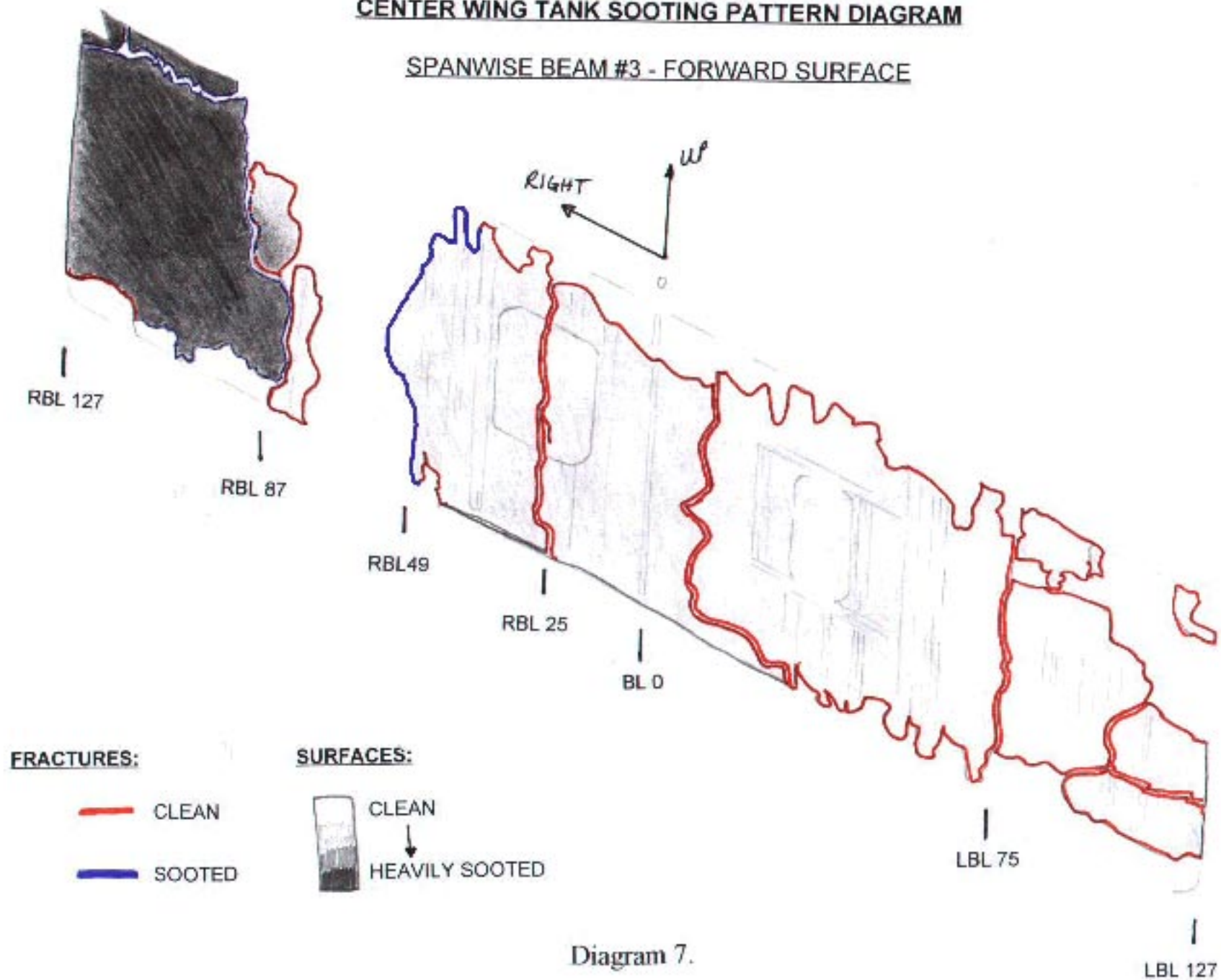
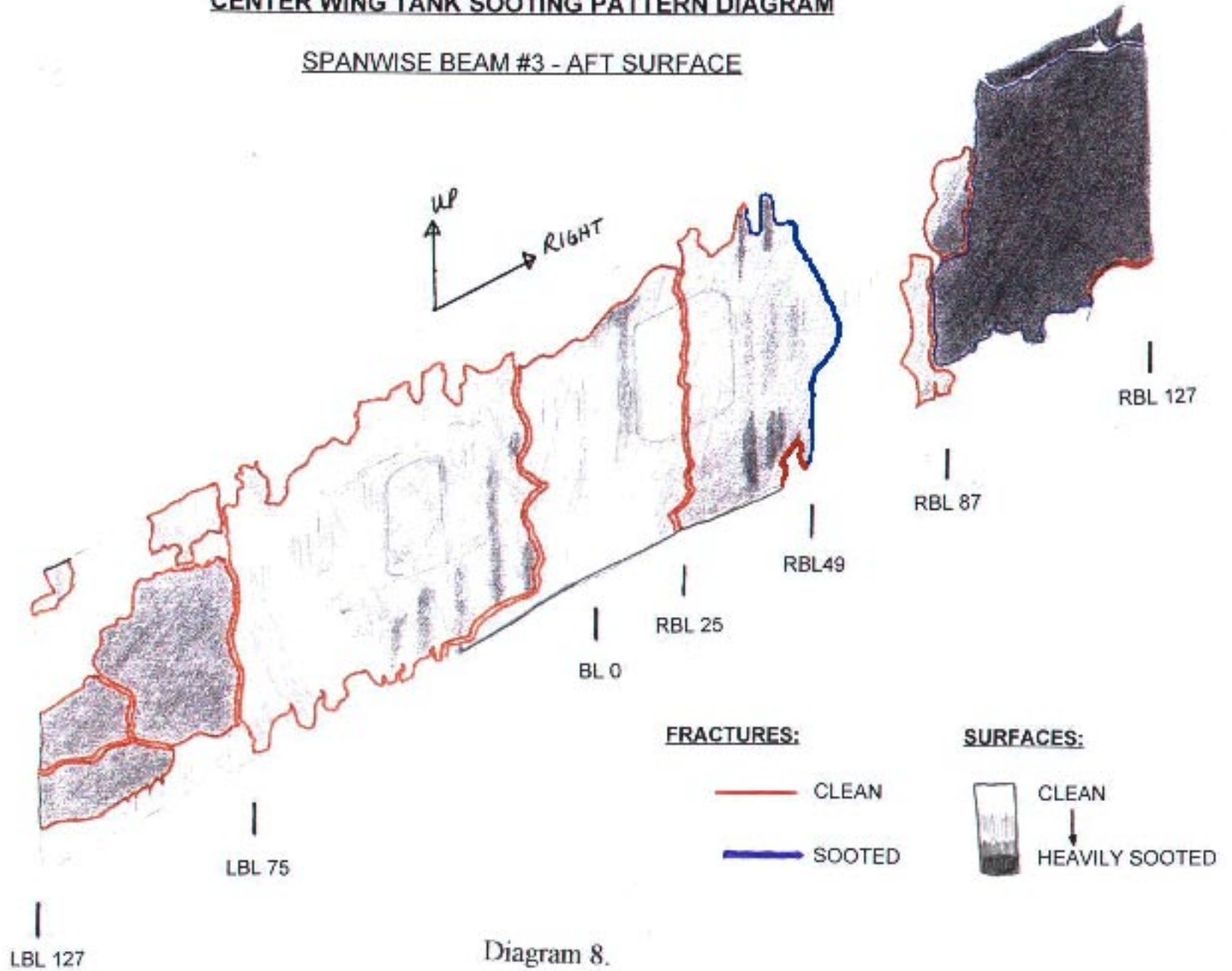


Diagram 7.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #3 - AFT SURFACE



CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #2 - FORWARD SURFACE

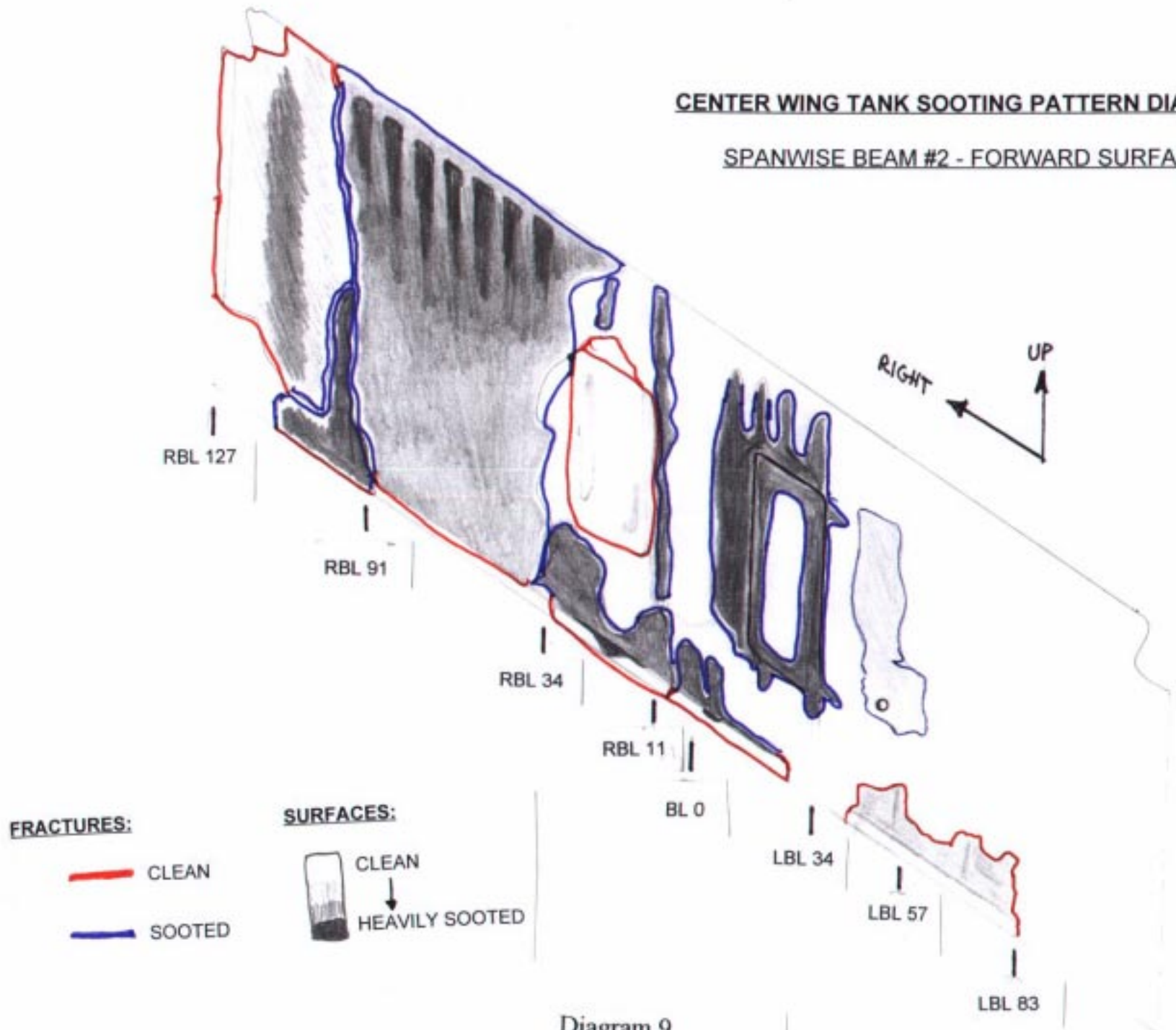


Diagram 9.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #2 - AFT SURFACE

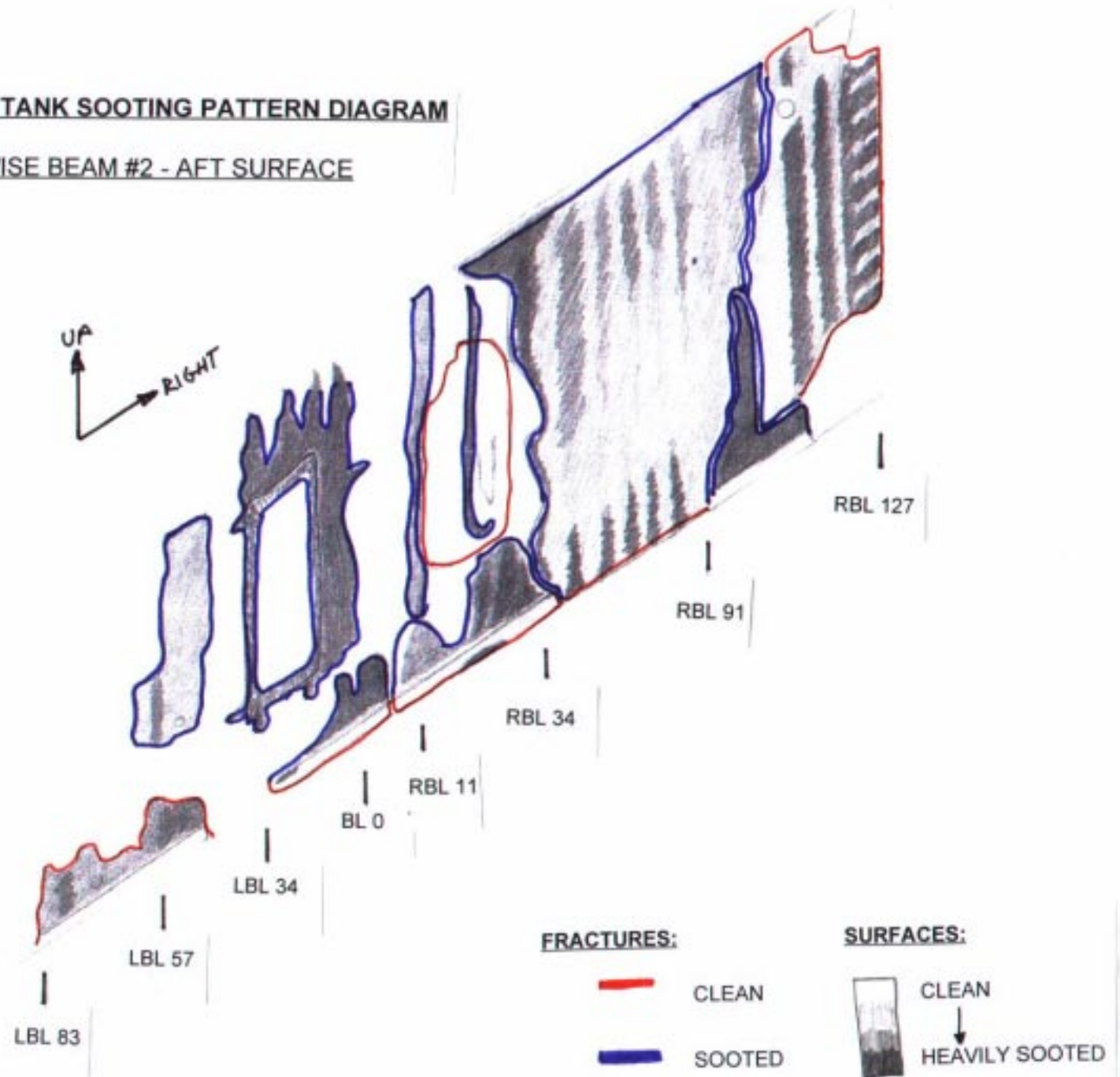
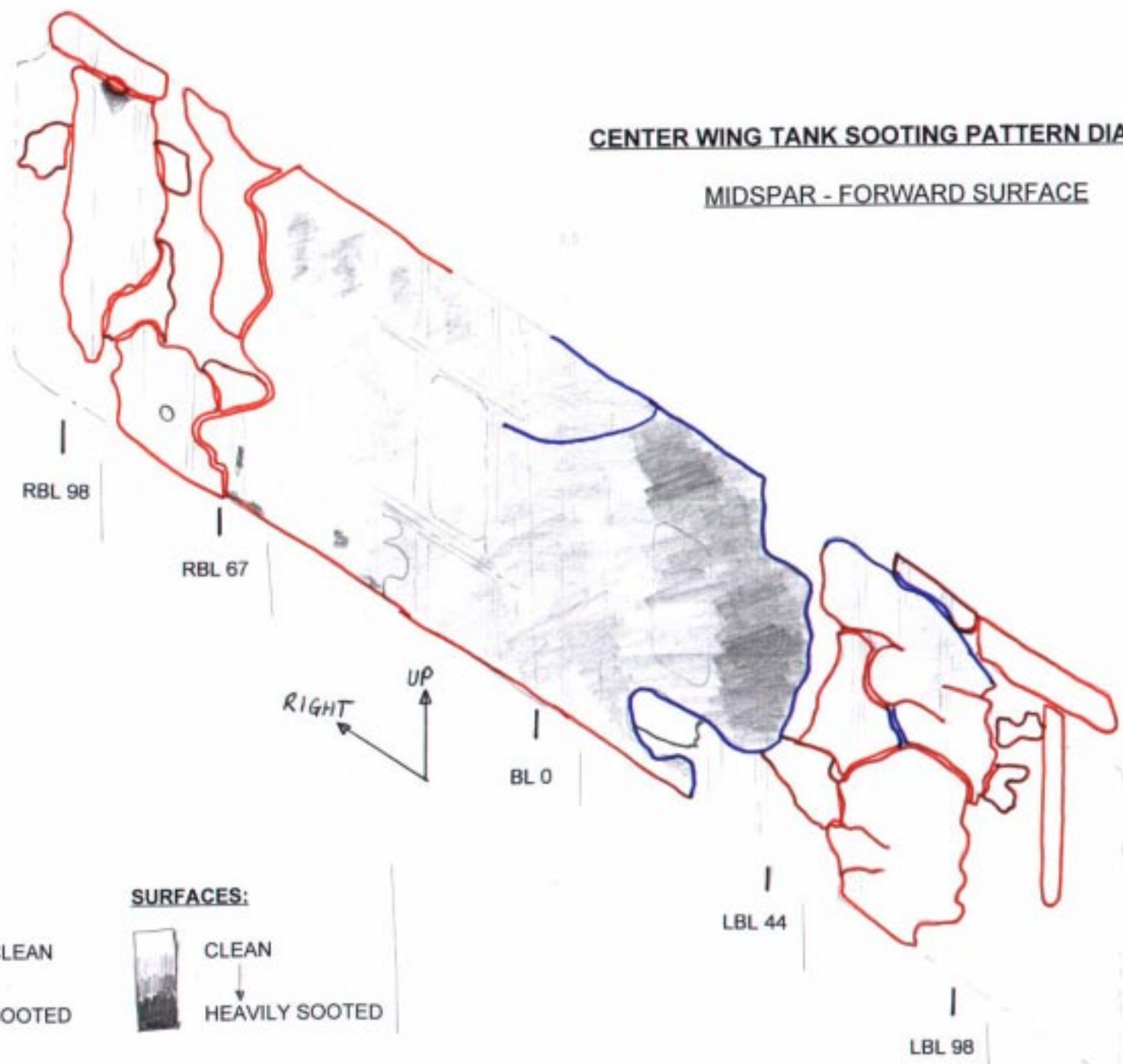


Diagram 10.

CENTER WING TANK SOOTING PATTERN DIAGRAM

MIDSPAR - FORWARD SURFACE



FRACTURES:

-  CLEAN
-  SOOTED

SURFACES:



-  CLEAN
-  HEAVILY SOOTED

Diagram 11.

CENTER WING TANK SOOTING PATTERN DIAGRAM

MIDSPAR - AFT SURFACE

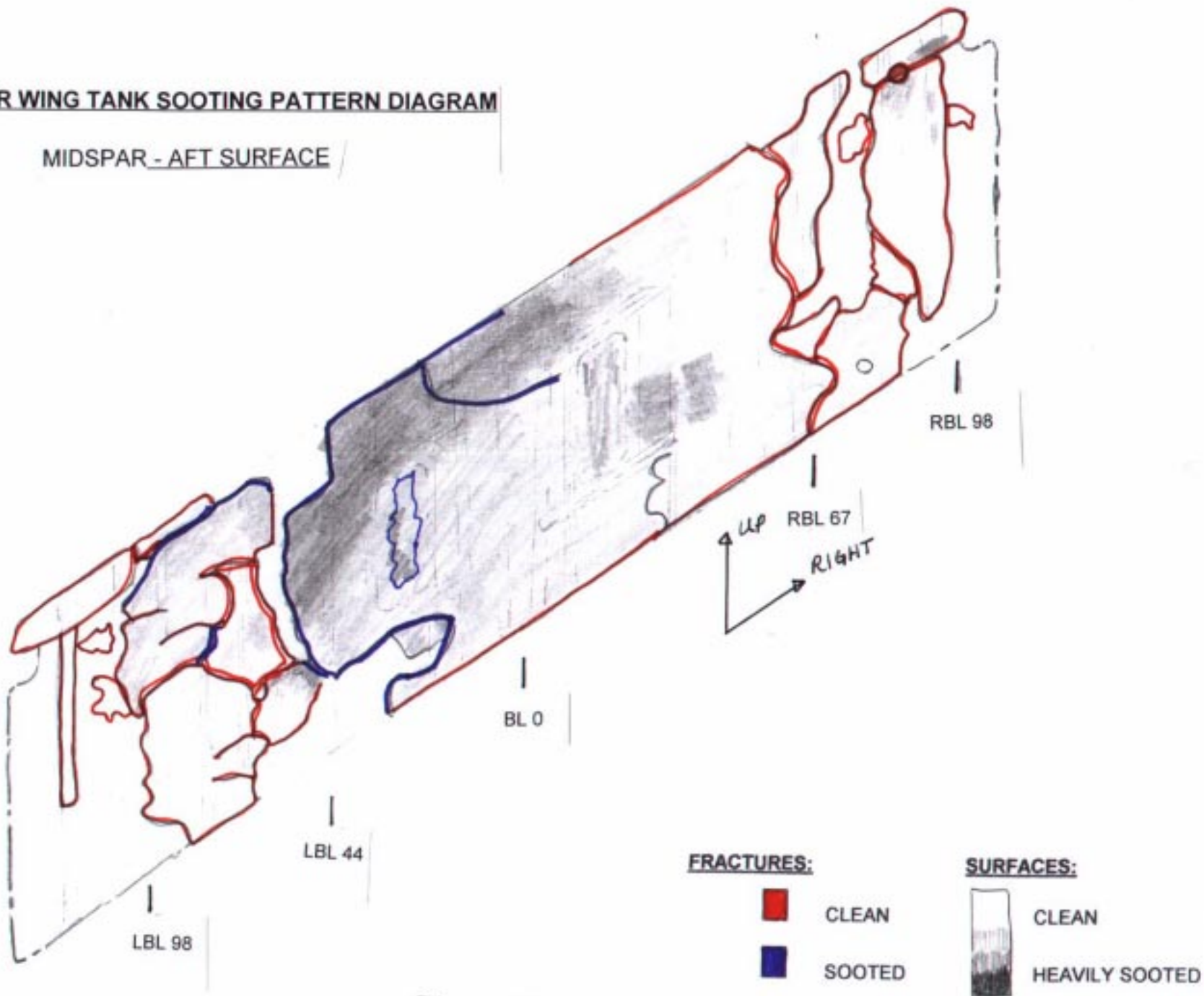


Diagram 12.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #1 - FORWARD SURFACE

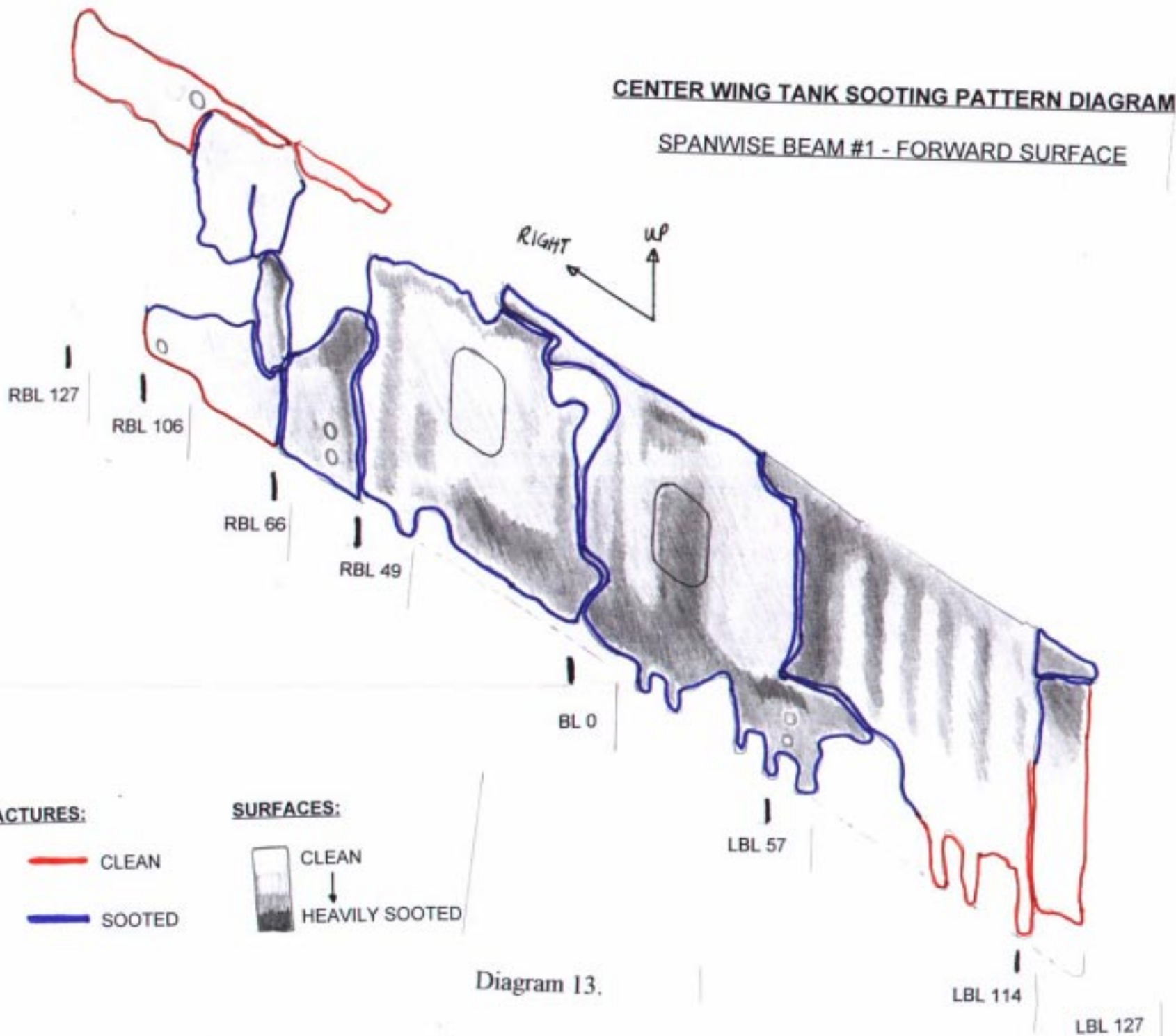


Diagram 13.

CENTER WING TANK SOOTING PATTERN DIAGRAM

SPANWISE BEAM #1 - AFT SURFACE

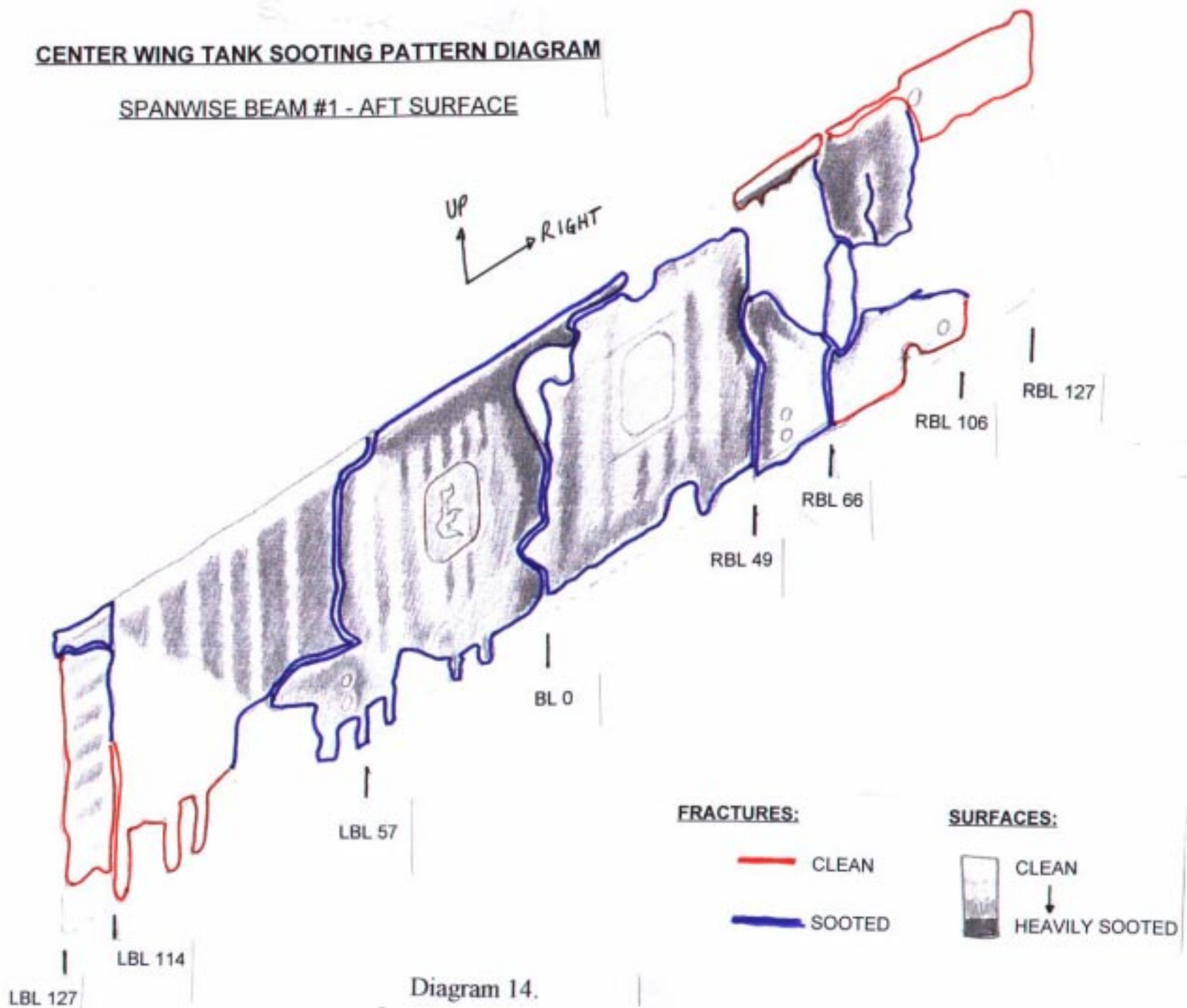


Diagram 14.

CENTER WING TANK SOOTING PATTERN DIAGRAM

REAR SPAR - FORWARD SURFACE

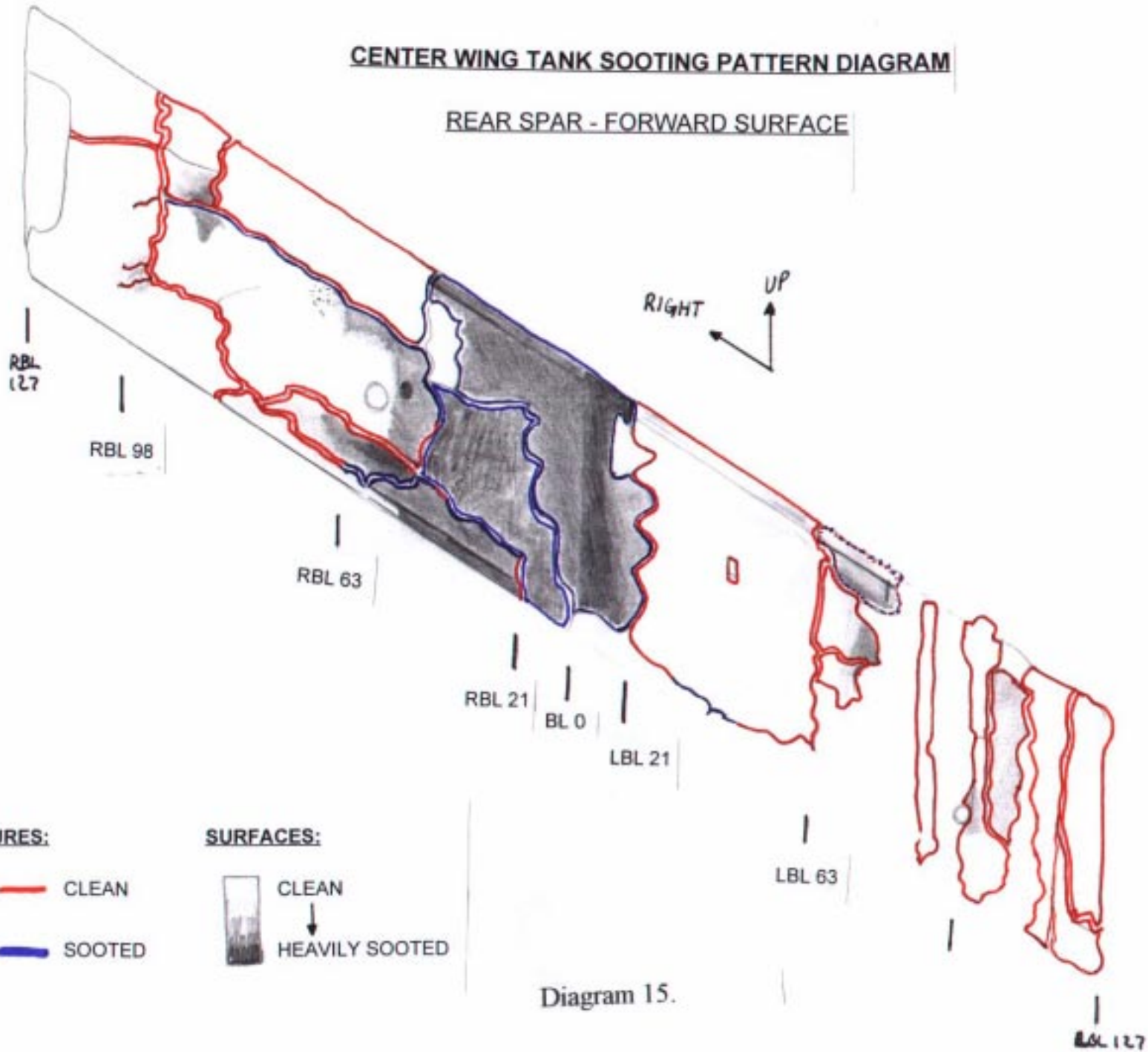


Diagram 15.

CENTER WING TANK SOOTING PATTERN DIAGRAM

REAR SPAR - AFT SURFACE

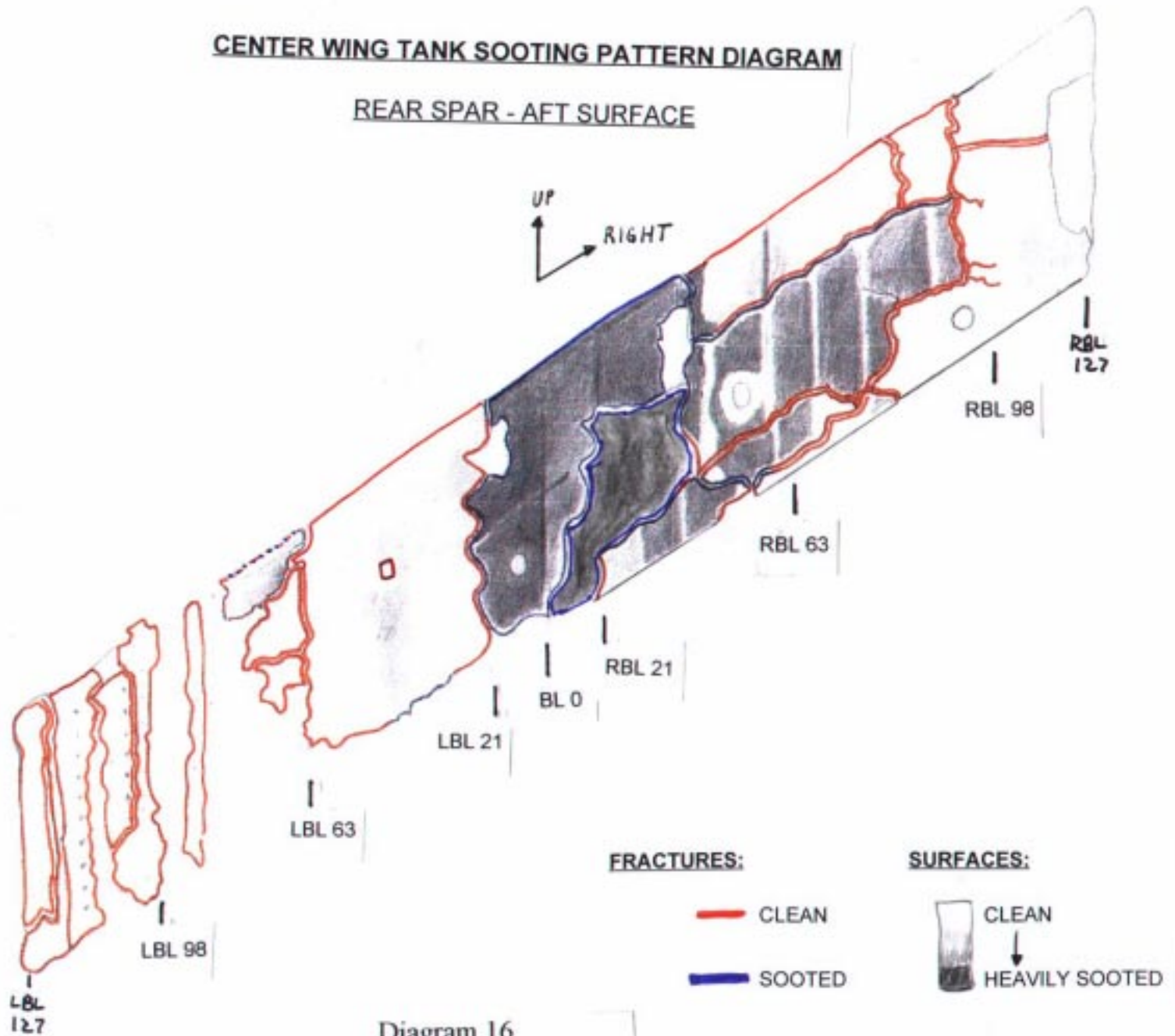
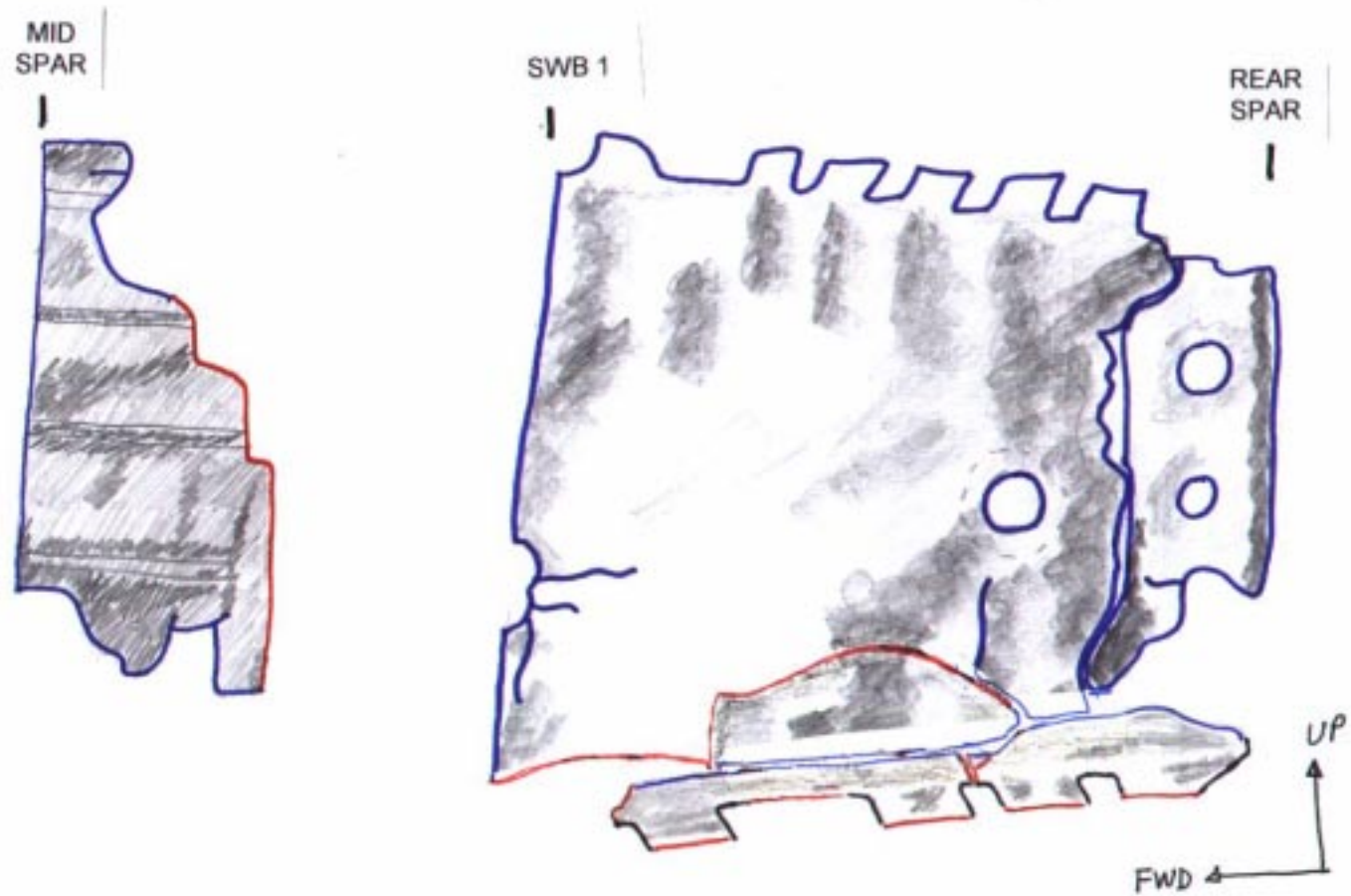


Diagram 16.

CENTER WING TANK SOOTING PATTERN DIAGRAM

BL 0 RIB - LEFT SURFACE



FRACTURES:

- CLEAN
- SOOTED

SURFACES:


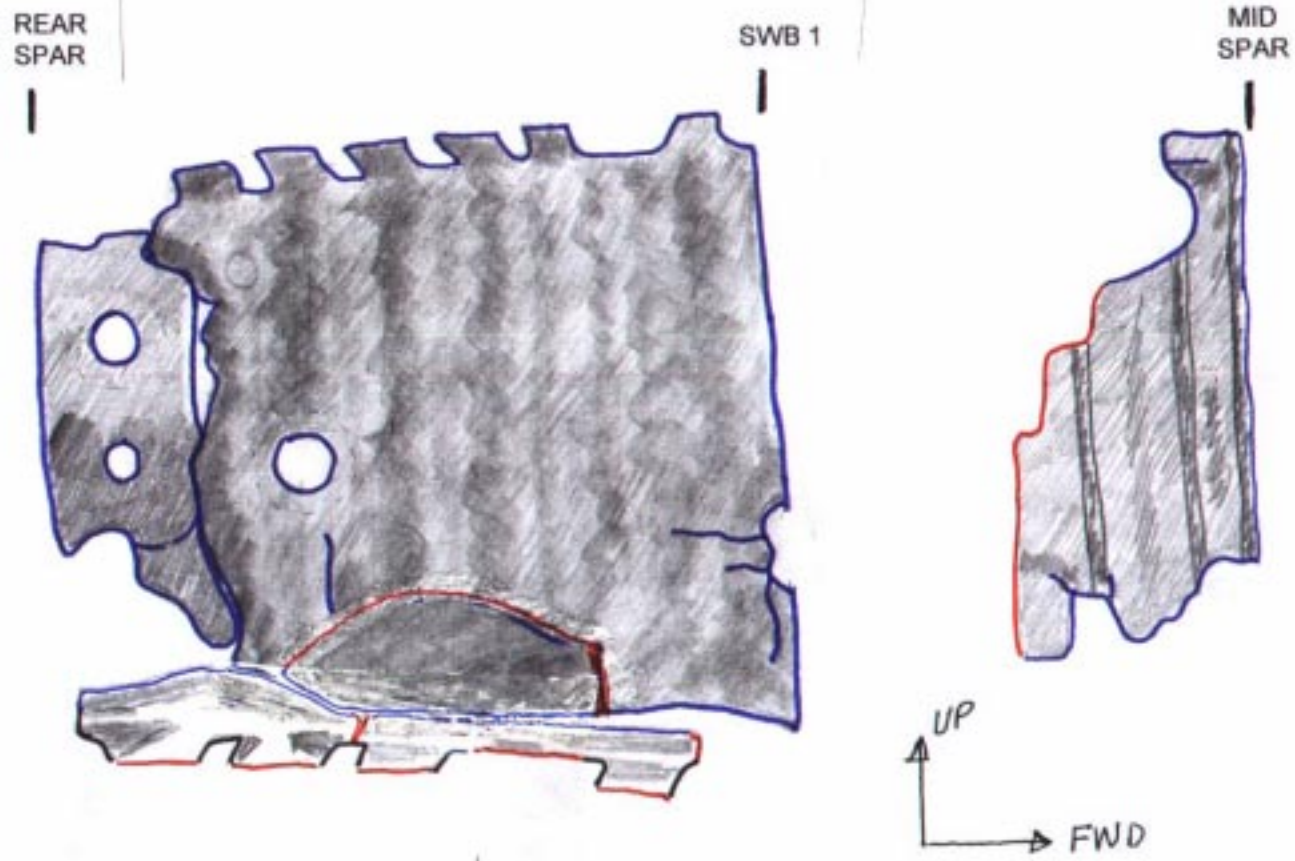
-  CLEAN
- ↓
-  HEAVILY SOOTED

Diagram 17.

CENTER WING TANK SOOTING PATTERN DIAGRAM

BL 0 RIB - RIGHT SURFACE



FRACTURES:

- CLEAN
- SOOTED

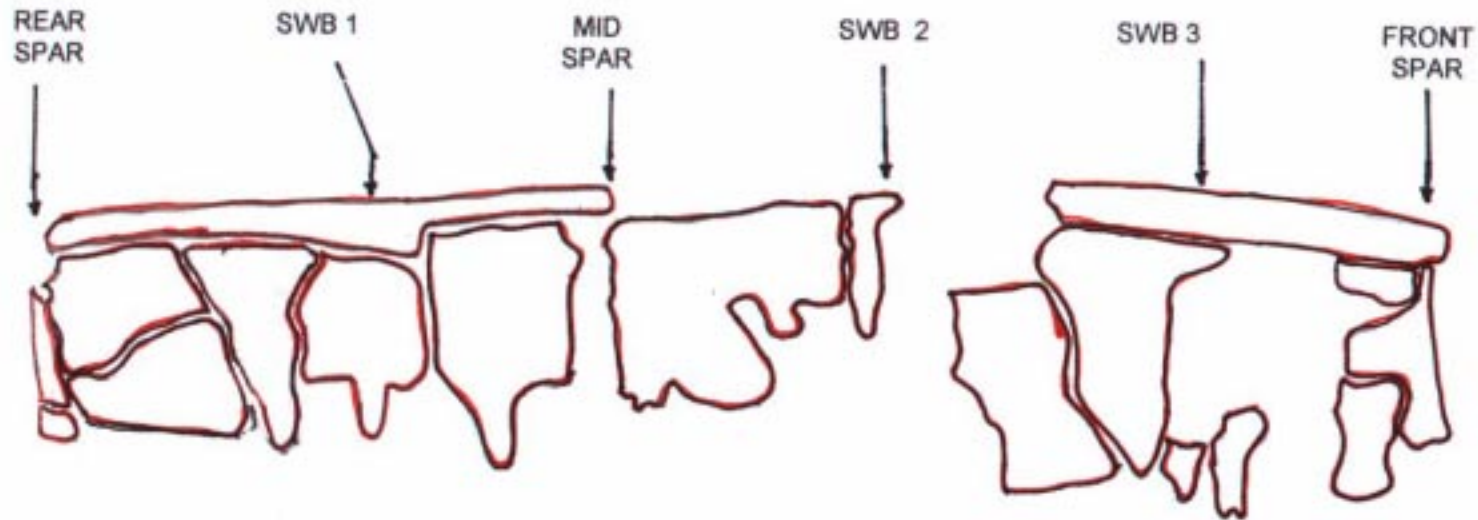
SURFACES:

- CLEAN
↓
HEAVILY SOOTED

Diagram 18.

CENTER WING TANK SOOTING PATTERN DIAGRAM

RIGHTHAND SIDE OF BODY RIB - OUTBOARD SURFACE



FRACTURES:

-  CLEAN
-  SOOTED

SURFACES:



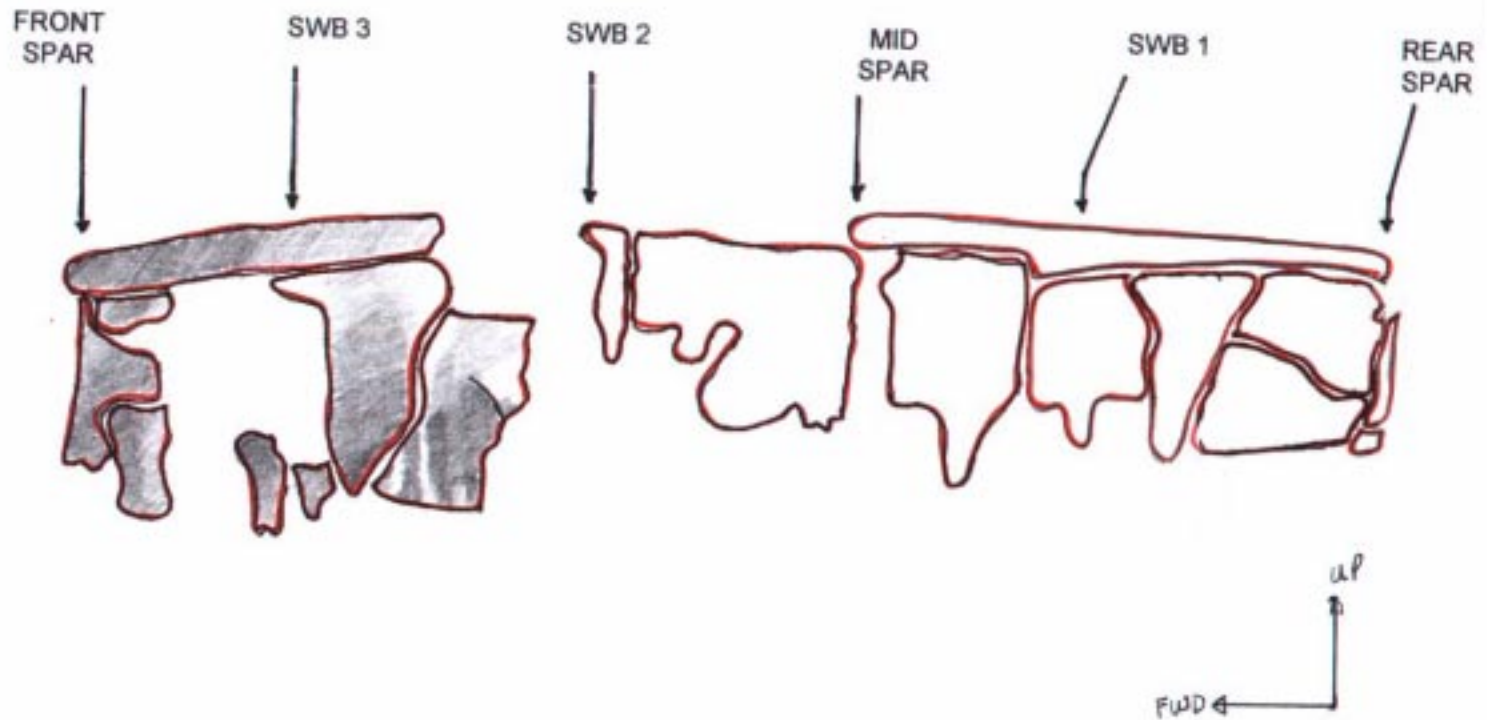
-  CLEAN
-  HEAVILY SOOTED



Diagram 19.

CENTER WING TANK SOOTING PATTERN DIAGRAM
RIGHTHAND SIDE OF BODY RIB - INBOARD SURFACE



FRACTURES:

- CLEAN (represented by a red line)
- SOOTED (represented by a blue line)

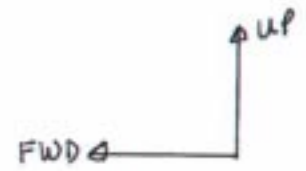
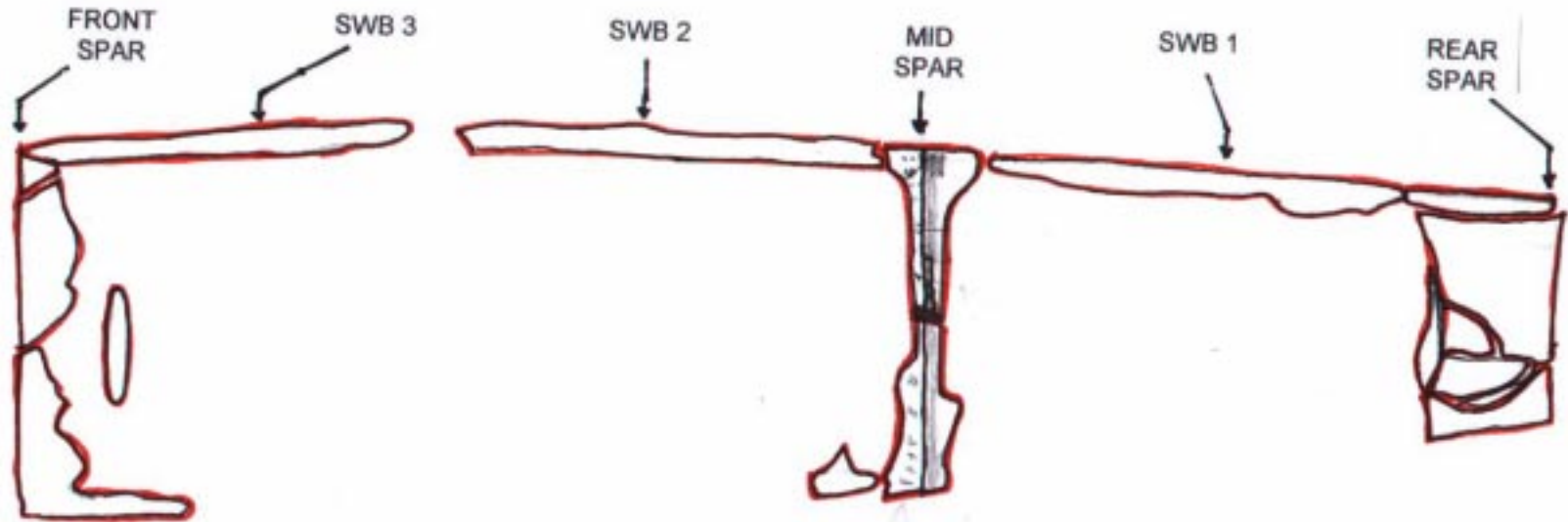
SURFACES:

- CLEAN (represented by a white rectangular surface)
- HEAVILY SOOTED (represented by a rectangular surface with a dark, shaded bottom portion)

Diagram 20.

CENTER WING TANK SOOTING PATTERN DIAGRAM

LEFTHAND SIDE OF BODY RIB - OUTBOARD SURFACE



FRACTURES:

-  CLEAN
-  SOOTED

SURFACES:



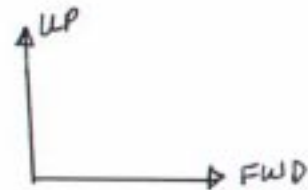
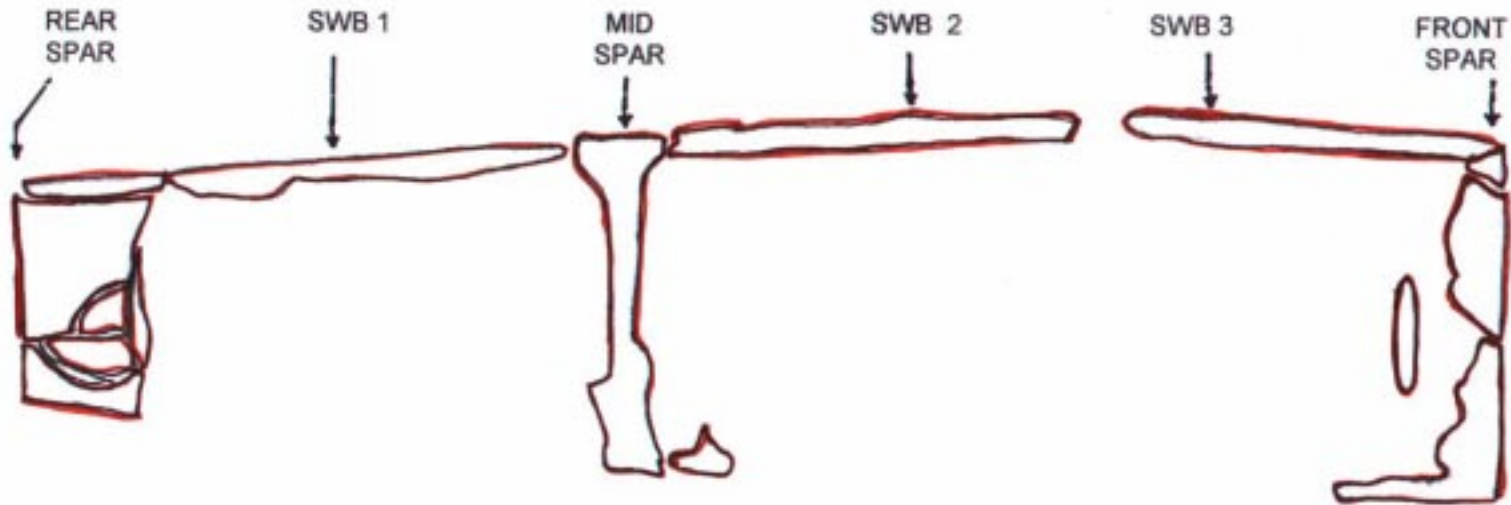
-  CLEAN
-  HEAVILY SOOTED

Diagram 21.

CENTER WING TANK SOOTING PATTERN DIAGRAM

LEFTHAND SIDE OF BODY RIB - INBOARD SURFACE



FRACTURES:

-  CLEAN
-  SOOTED

SURFACES:



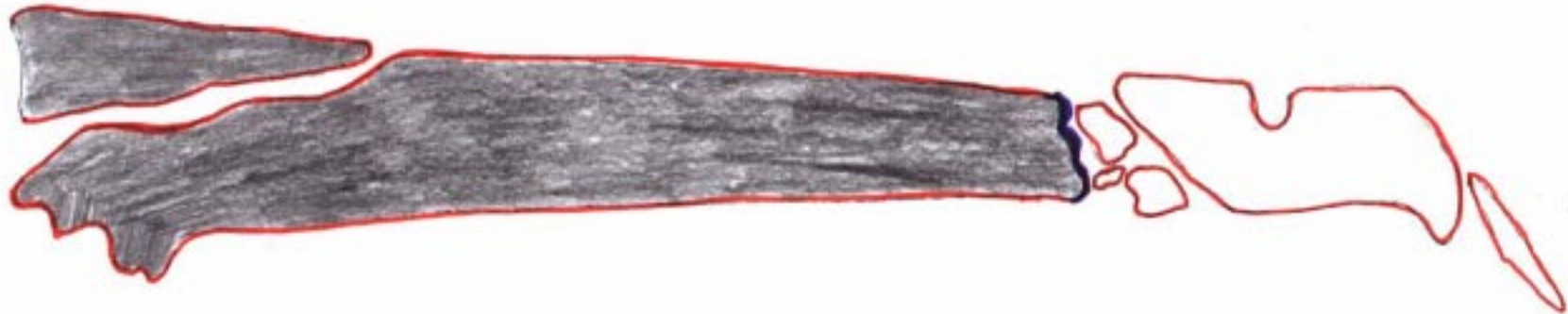
-  CLEAN
-  HEAVILY SOOTED

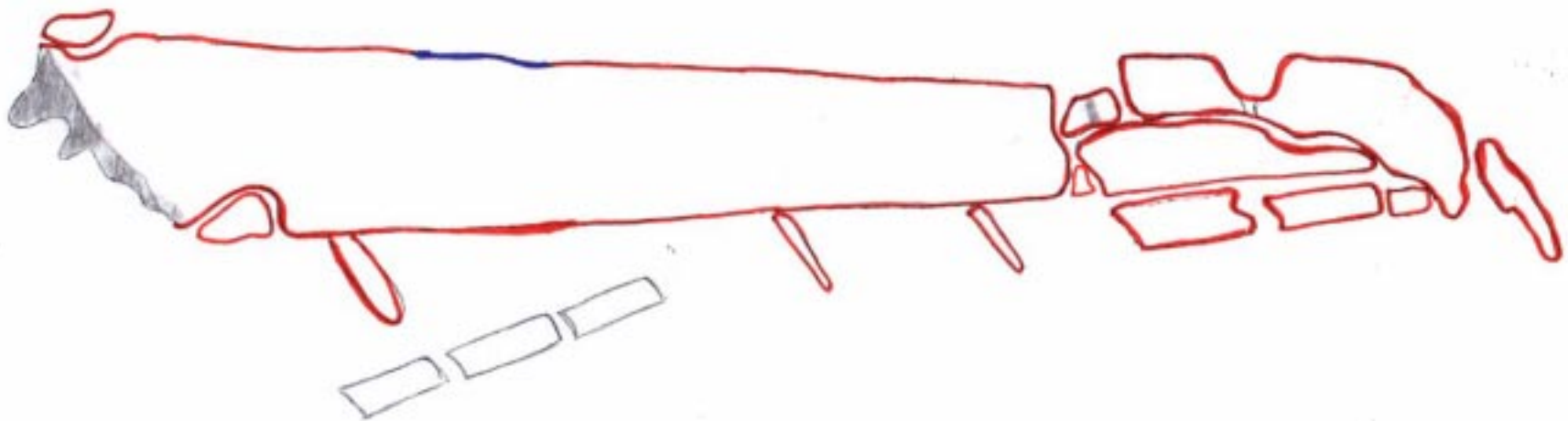
Diagram 22.

RIGHT WING SOOTING PATTERN DIAGRAM

UPPER SKIN - EXTERNAL SURFACE



LOWER SKIN - EXTERNAL SURFACE



FRACTURES:

- CLEAN
- SOOTED

SURFACES:

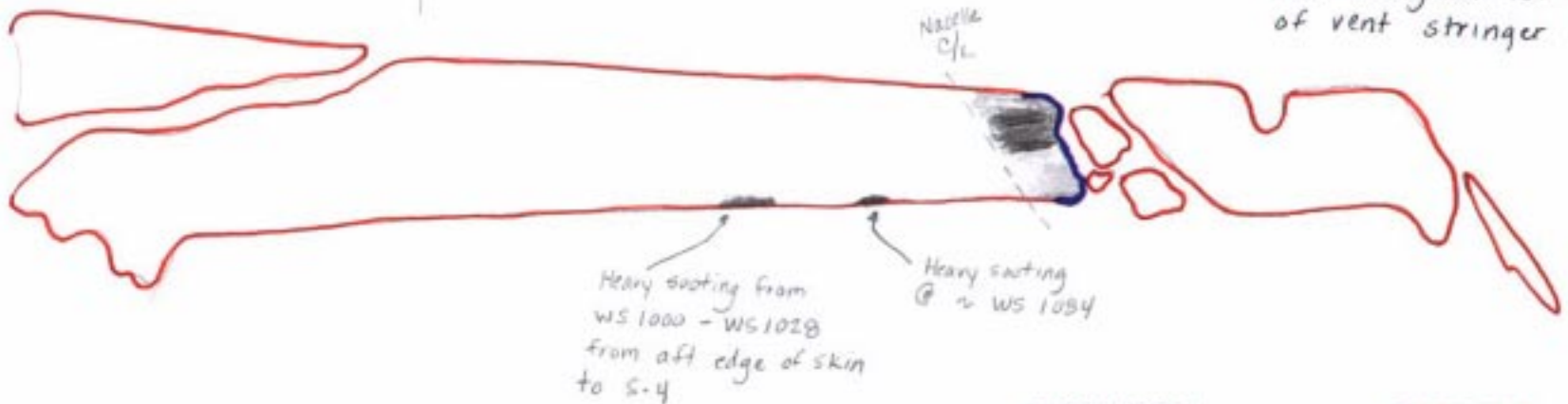
- CLEAN
- ↓
- HEAVILY SOOTED

Diagram 23.

RIGHT WING SOOTING PATTERN DIAGRAM

UPPER SKIN - INTERNAL SURFACE

NOTE: See Vent Stringer soot diagram for details of vent stringer sooting.



LOWER SKIN - INTERNAL SURFACE

FRACTURES:

- CLEAN
- SOOTED

SURFACES:

- CLEAN
- ↓
- HEAVILY SOOTED

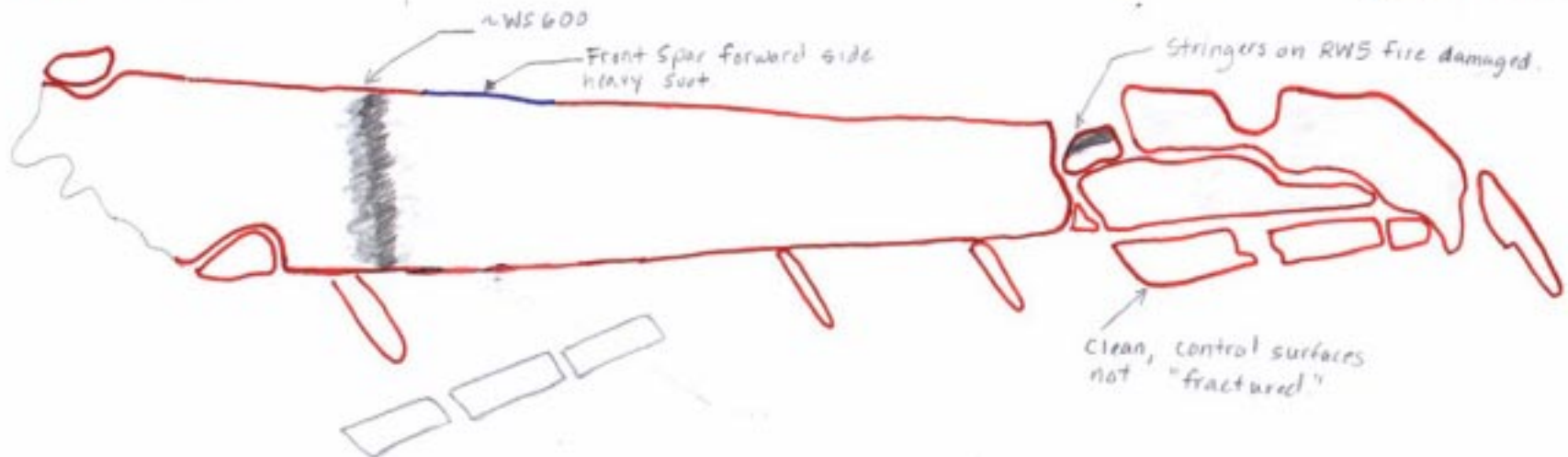


Diagram 24.

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.

FRACTURES:



CLEAN



SOOTED

SURFACES:



CLEAN

↓
HEAVILY SOOTED

LOWER SKIN - EXTERNAL SURFACE

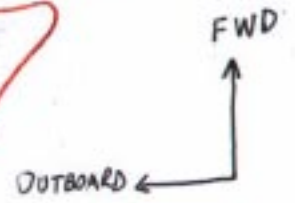
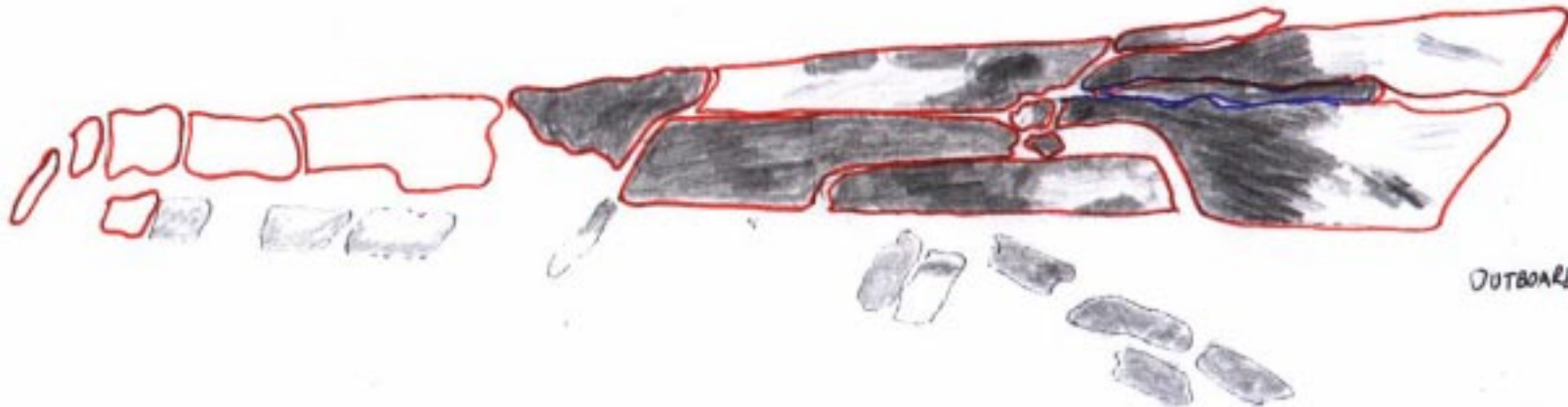


Diagram 25.

LEFT WING SOOTING PATTERN DIAGRAM

UPPER SKIN - INTERNAL SURFACE

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



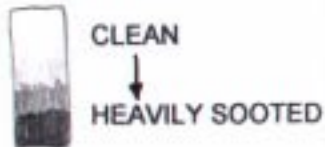
NOTE: With the exception of the piece noted, the internal surface of the upper skin is clean. The control surfaces do show sooting and fire damage to the composite parts.

NOTE: SEE vent stringer soot diagram for details of vent stringer sooting.

FRACTURES:



SURFACES:



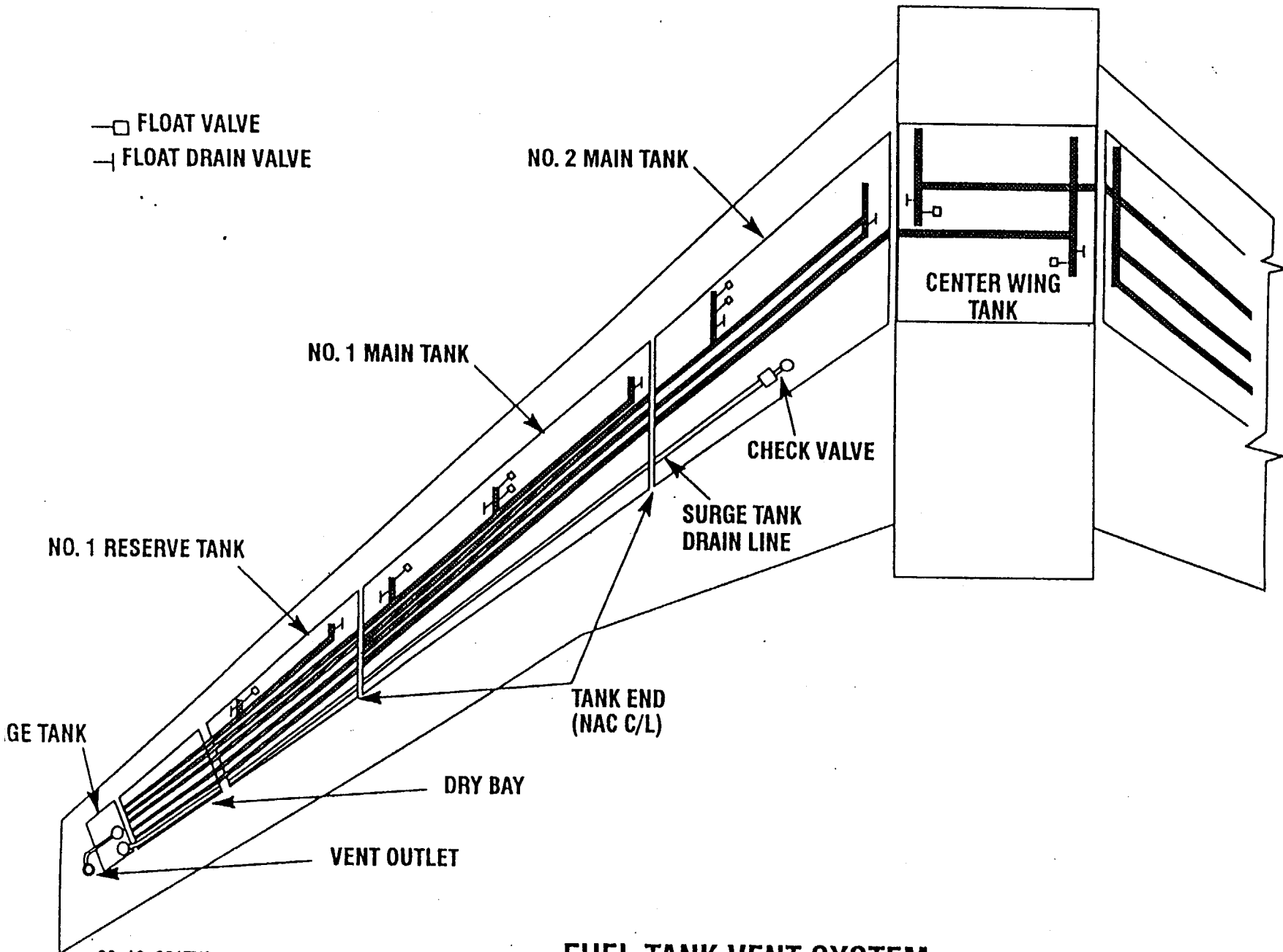
LOWER SKIN - INTERNAL SURFACE



Diagram 26.

DIAGRAM 27

~~28-13-001TW~~



□ FLOAT VALVE
└─┘ FLOAT DRAIN VALVE

NO. 2 MAIN TANK

NO. 1 MAIN TANK

NO. 1 RESERVE TANK

GE TANK

DRY BAY

VENT OUTLET

TANK END
(NAC C/L)

SURGE TANK
DRAIN LINE

CHECK VALVE

CENTER WING
TANK

28-13-001TW

FUEL TANK VENT SYSTEM

747 ALL
10/88

679
1109
58

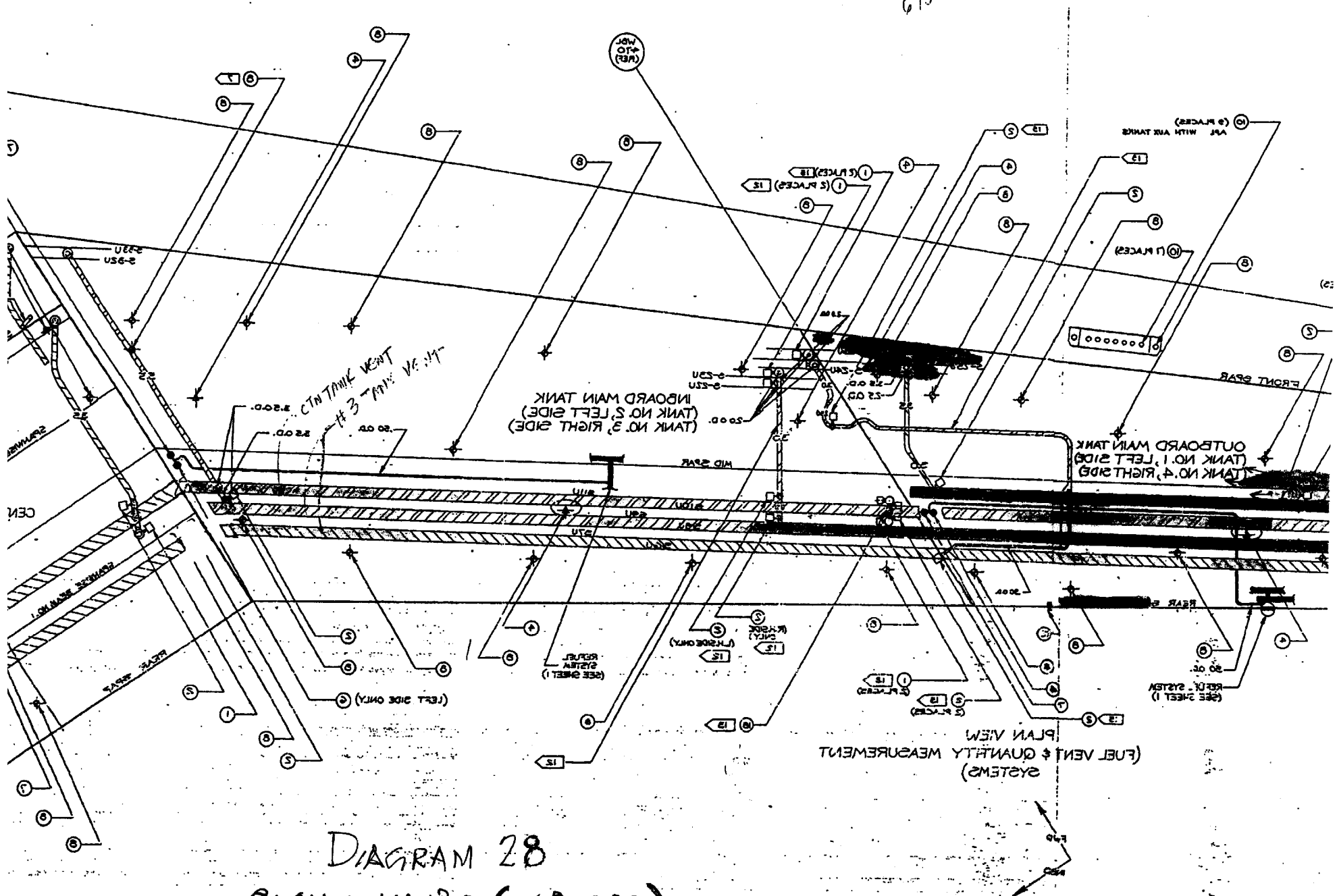


DIAGRAM 28

RIGHT SIDE (INBOARD)

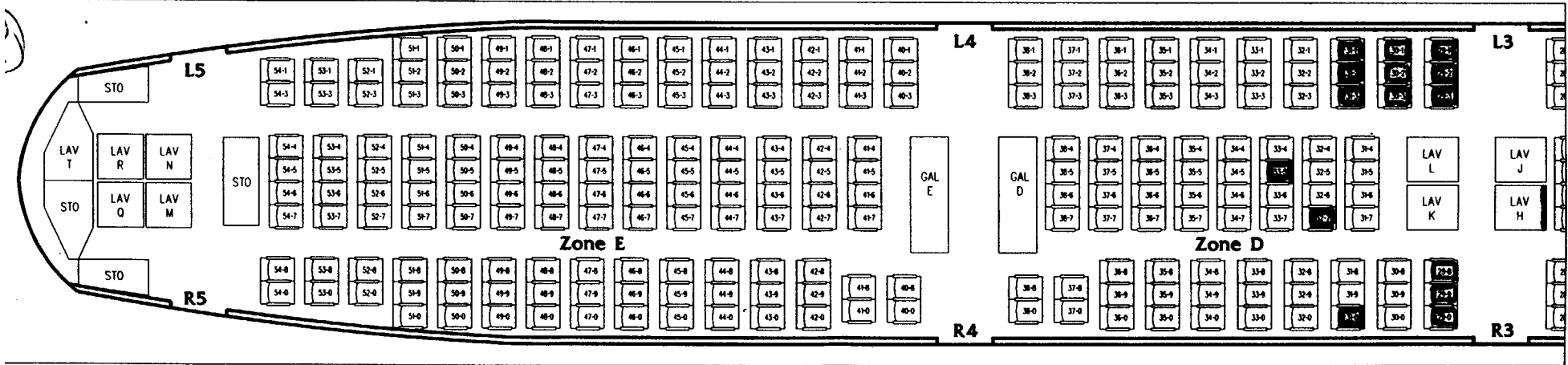
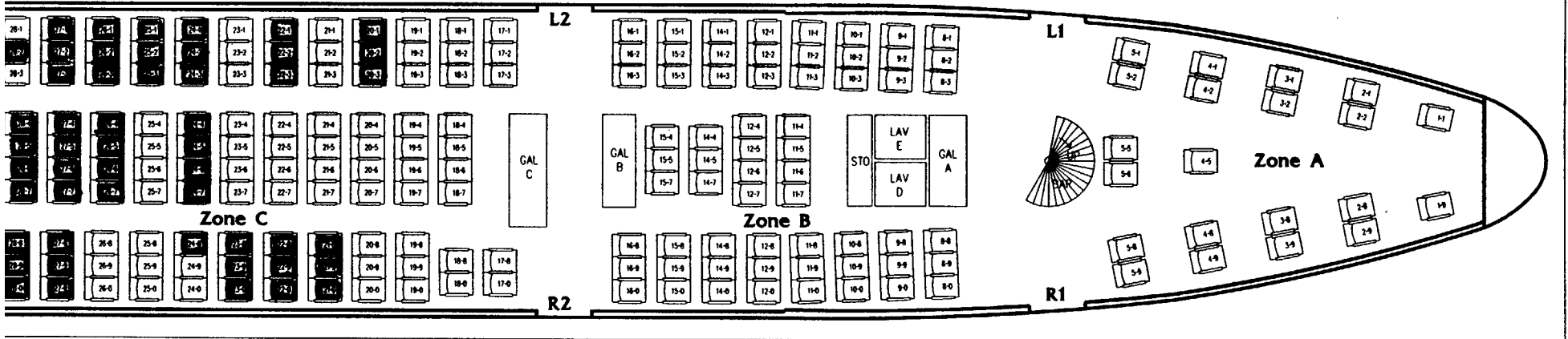
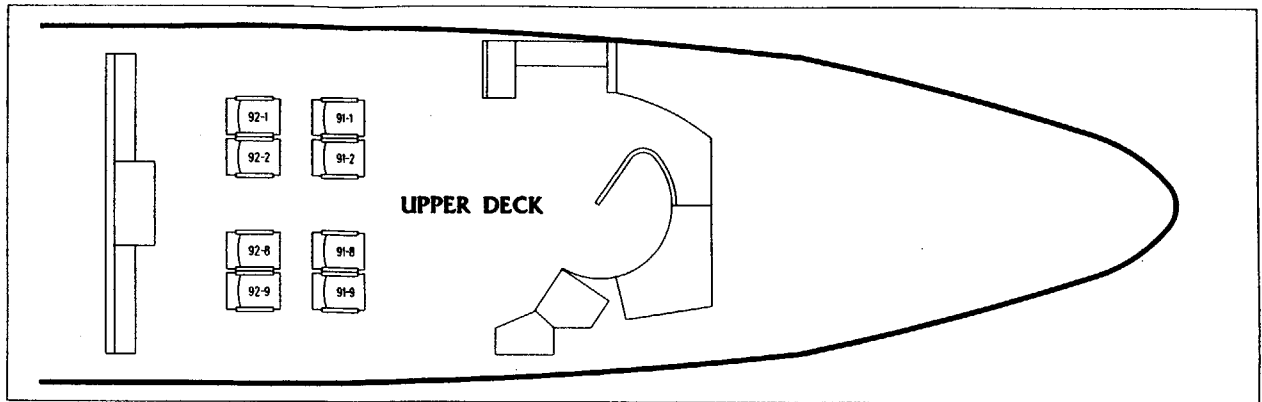
**Seat Damage
Center Wing Tank Area
Data gathered by Fire and Explosion Group**

Diagram 29

Fire Damage and/or Soot



Not Recovered/Identified



RW3

FUEL FILLER NECK
(UPPER SURFACE)

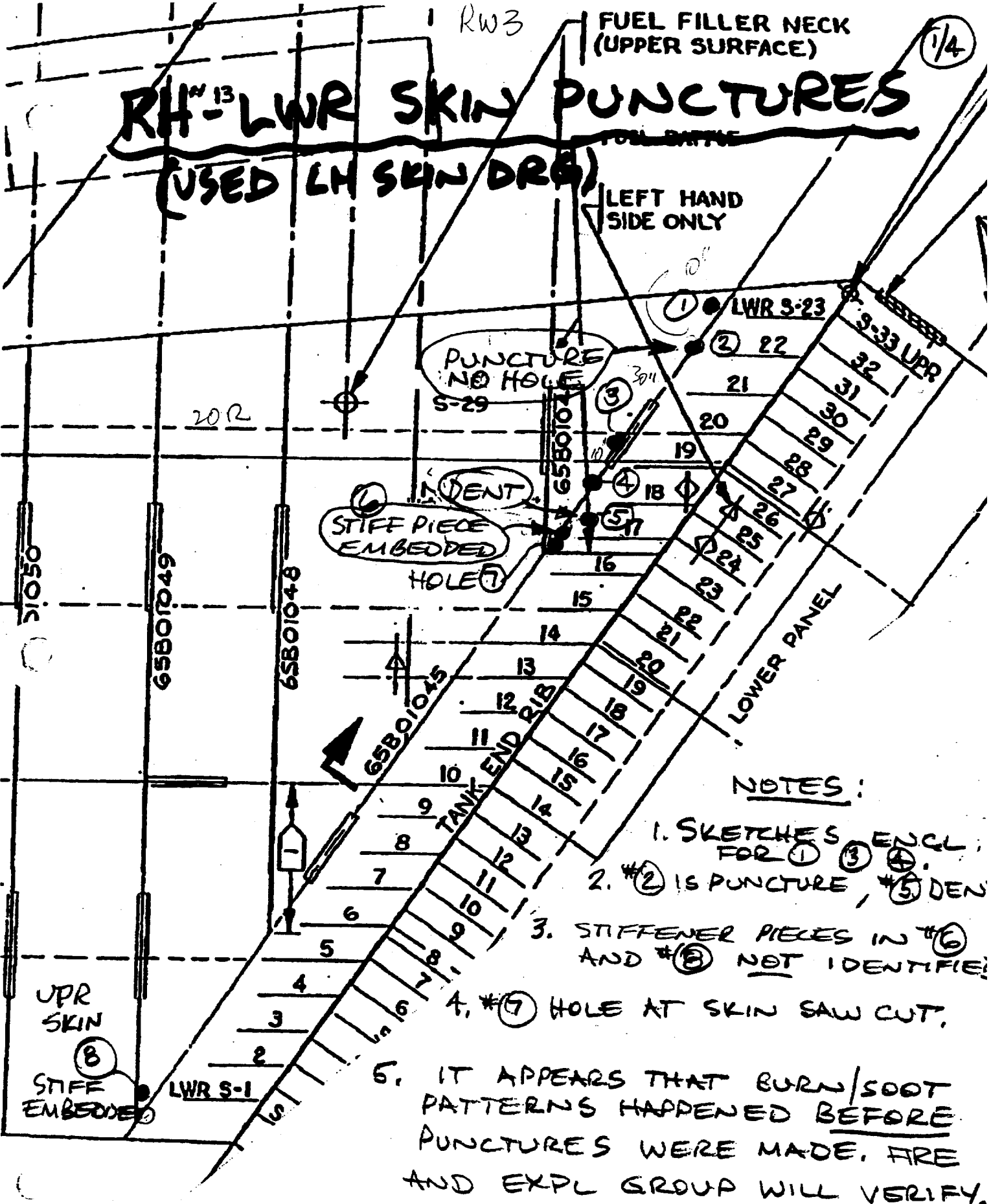
1/4

RH^{W13}-LWR SKIN PUNCTURES

(USED LH SKIN DRG)

FUEL BATTLE

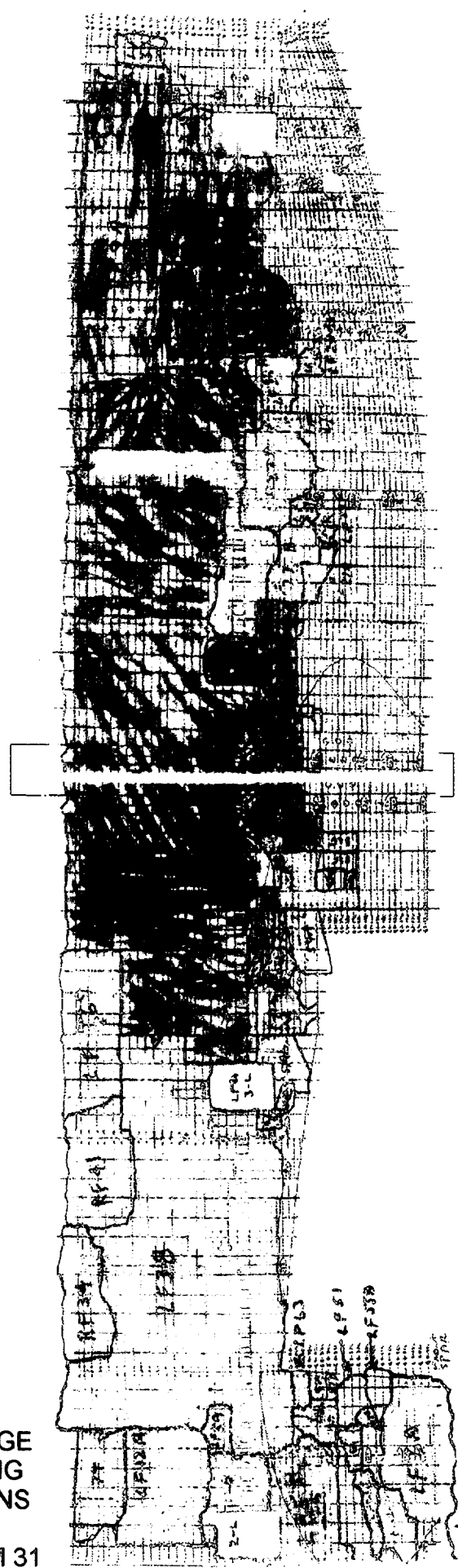
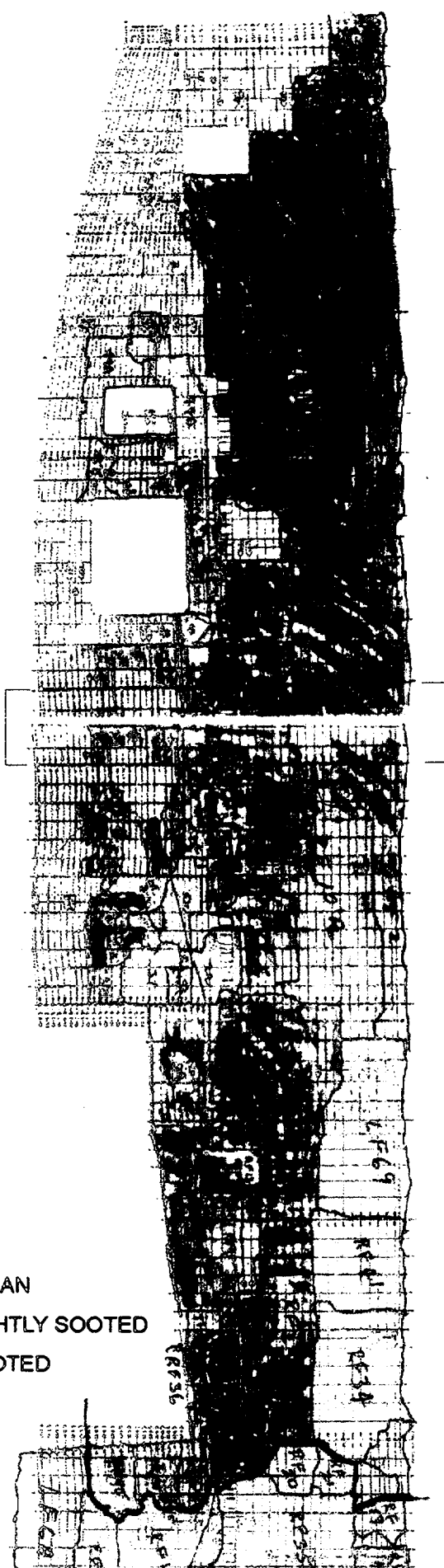
LEFT HAND
SIDE ONLY



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



FUSELAGE
 SOOTING
 PATTERNS
 DIAGRAM 31