

**PE07-012**  
**FREIGHTLINER**  
**4/20/2007**  
**ATTACHMENT**  
**PART 1 OF 7**

**Thomas, Arlene <NHTSA>**

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**From:** Howell, Rosa <NHTSA>  
**Sent:** Wednesday, May 02, 2007 8:28 AM  
**To:** Thomas, Arlene <NHTSA>  
**Subject:** FW: PE07-012 FREIGHTLINER 4/20/2007

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**From:** Murianka, Sonny <NHTSA>  
**Sent:** Wednesday, May 02, 2007 7:19 AM  
**To:** Howell, Rosa <NHTSA>  
**Subject:** RE: PE07-012 FREIGHTLINER 4/20/2007

Rosa:  
There is no confidential info. per Freightliner.

Thanks

Sonny

**CONFIDENTIAL**

CSR:mmiller 4/16/2007 7:38:23 AM  
Reference No 000000001536258

Problem Ticket Report

Contact Information

Caller [REDACTED] Phone [REDACTED] Contact Type Service Manager

Location

Des Moines, IA

Ticket Details

| System | Comments and Concerns | Category | Product Issue | Reason for Call | Useability |
|--------|-----------------------|----------|---------------|-----------------|------------|
|--------|-----------------------|----------|---------------|-----------------|------------|

Call Details

| VIN/Serial No | 4UZABRDC16C[REDACTED] | Base Model | B2 106 CH | Vehicle Mileage |
|---------------|-----------------------|------------|-----------|-----------------|
| Make          |                       | Model Year | 2006      | Symptoms        |

| CSR Comments | C2 Rapid Response issue 4170 | Action Requested by | Yes |
|--------------|------------------------------|---------------------|-----|
|              |                              | CAC                 |     |

Work Log

Date/Time User

Work Description

Wed  
4/20/2005  
10:27:07 AM  
MMiller

The entrance door has quit working on the Boone bus. It will not operate from the inside switch. After talking to you this morning I contacted Mike at Boone Schools. He said the door was working in the garage, he ran it three times. On route he did five stops with eight ways on. On the sixth stop he was at a turn around and did not use the eightways but did open the door. At the next stop the door did not work or any time for the rest of the route. The door was opening full width. He had to get up and down to run the override switch. About an hour later he was in the bus trying to run the door and after turning off and on the ignition and flipping the door switch several times the door starting working again. please order a new door switch for mike emergency and return his old switch to my attention please connect to bus with servicelink at your earliest convinence and please send me any inactive fault codes please follow up with mike after new switch is installed CSR Initial Comments: C2 Rapid Response issue 4170

Fri  
6/17/2005  
11:53:08 AM  
MMiller

during each stop warning lights were operating,after ignition was off for a period the door switch began to operate properly instructed dealer to order new door switch and return old switch to tbb customer support additionally dealer to connect with servicelink and collect any inactive/historic fault codes and communicate them to customer support advsied tech to verify j1939 harness at 60 ohms and refresh bhm features with servicelink inactive codes are sid19,fmi7;sid4,fmi2;sid22,fmi7;sid38,fmi2;sid17,fmi2 tech found damaged pin on j1939-green wire circuit pin to be repaired shipped pins to repair connection shipping 1-120721 door switch upsndair 1z59rv310140 [REDACTED] Circuit pins repaired and door is now operating correctly. Ticket resolved.

**CONFIDENTIAL**

CSR:rthornburg 4/16/2007 7:39:01 AM  
Reference No 000000001709667

Problem Ticket Report

**Contact Information**

**Caller** [REDACTED] **Phone** [REDACTED] **Contact Type** Service Manager

**Location**

Phoenix, AZ [REDACTED]

**Ticket Details**

|               |         |                 |                       |                        |                        |
|---------------|---------|-----------------|-----------------------|------------------------|------------------------|
| <b>System</b> | Service | <b>Category</b> | Diagnostic Assistance | <b>Reason for Call</b> | CAC Technical Guidance |
|---------------|---------|-----------------|-----------------------|------------------------|------------------------|

**Service Call Details**

|                      |                        |                        |             |                          |      |
|----------------------|------------------------|------------------------|-------------|--------------------------|------|
| <b>VIN/Serial No</b> | 4UZABRDC56C [REDACTED] | <b>Vehicle Mileage</b> | 2,158 Miles | <b>Truck Application</b> |      |
| <b>Base Model</b>    | B2 106 CH              | <b>Make</b>            |             | <b>Model Year</b>        | 2006 |
| <b>Symptoms</b>      |                        |                        |             |                          |      |
| <b>Resolution</b>    |                        |                        |             |                          |      |

**Work Log**

| <b>Date/Time</b>                  | <b>User</b> | <b>Work Description</b>  |
|-----------------------------------|-------------|--|
| Fri<br>9/16/2005<br>9:16:15<br>AM | MMiller     | ELECTRIC ENTRANCE DOOR STOPPED WORKING FROM THE DRIVERS CONTROL SWITCH. UNIT STILL OPERATES FROM THE EXTERIOR KEY SWITCH. UNIT WORKED FINE YESTERDAY.. WE ARE AT THE ONE HOUR TIME LIMIT. FAULT CODES AS FOLLOWS: FAULT 1 BHM 164 SID 020 FMI07 FAULT 2 BHM 164 SID 022 FMI 07 MILAGE 2158 THIS UNIT WAS SCHEDULED FOR STATE INSPECTION AND DELIVERY TO CUSTOMER THIS MORNIG. YOUR HELP WITH THIS WOULD BE GREATLY APPRECIATED. Working with RSTM to resolve this issue. |
| Fri<br>9/16/2005<br>9:22:29<br>AM | MMiller     | RSTM has been contacted and is working with dealer to resolve the issue. Issue was found to be faulty smart switch. Will install new switch. Ticket resolved.  |
| Fri<br>9/16/2005<br>9:42:46<br>AM | RThornburg  | Dealer has been contacted codes show faulty smart switch dealer to repair. rkt   |

**CONFIDENTIAL**

**CSR:mmiller 4/16/2007 7:39:47 AM**  
**Reference No 000000001815967**

**Problem Ticket Report**

**Contact Information**

**Caller** [REDACTED] **Phone** [REDACTED] **Contact Type** Warranty Admin.

**Location**

Silver Lake, IN

**Ticket Details**

**System** Service **Category** Diagnostic Assistance **Reason for Call** CAC Technical Guidance

**Service Call Details**

**VIN/Serial No** 4UZABRCS86C [REDACTED] **Vehicle Mileage** [REDACTED] **Truck Application** [REDACTED]  
**Base Model** B2 106 CH **Make** [REDACTED] **Model Year** 2006  
**Symptoms**  
**Resolution**

**Work Log**

| <b>Date/Time</b>                   | <b>User</b> | <b>Work Description</b>  |
|------------------------------------|-------------|--|
| Thu<br>12/15/2005<br>8:40:41<br>AM | MMiller     | This is our demo unit...salesman just called, he is going down the highway and his entrance door just opened. I am ordering a replacement switch hub module for this unit also. I am curious if I need to be prepared to replace all switch hub modules in C2's we have on the road with electric doors?? Is a bulletin in the works for this problem???   |
| Thu<br>12/15/2005<br>9:23:18<br>AM | MMiller     | Product Support Bulletins are in process concerning water intrusion. There is currently no PSB in process regarding the switch hub module failure due to the fact that water intrusion into this area causes the failure. Units currently in production have a revised water shield (poncho) installed to address this area and all units are being 100% water tested and leaks are being repaired before delivery. Ticket resolved. |

**CONFIDENTIAL**

**CSR:mmiller 4/16/2007 7:40:24 AM**  
**Reference No 000000001815669**

**Problem Ticket Report**

**Contact Information**

|               |            |              |            |                     |                 |
|---------------|------------|--------------|------------|---------------------|-----------------|
| <b>Caller</b> | [REDACTED] | <b>Phone</b> | [REDACTED] | <b>Contact Type</b> | Warranty Admin. |
|---------------|------------|--------------|------------|---------------------|-----------------|

**Location**

Silver Lake, IN  
[REDACTED]

**Ticket Details**

|               |                |                 |                              |                        |                        |
|---------------|----------------|-----------------|------------------------------|------------------------|------------------------|
| <b>System</b> | <b>Service</b> | <b>Category</b> | <b>Diagnostic Assistance</b> | <b>Reason for Call</b> | CAC Technical Guidance |
|---------------|----------------|-----------------|------------------------------|------------------------|------------------------|

**Service Call Details**

|                      |                        |                        |             |                          |      |
|----------------------|------------------------|------------------------|-------------|--------------------------|------|
| <b>VIN/Serial No</b> | 4UZABRDC26C [REDACTED] | <b>Vehicle Mileage</b> | 3,000 Miles | <b>Truck Application</b> |      |
| <b>Base Model</b>    | B2 106 CH              | <b>Make</b>            |             | <b>Model Year</b>        | 2006 |
| <b>Symptoms</b>      |                        |                        |             |                          |      |
| <b>Resolution</b>    |                        |                        |             |                          |      |

**Work Log**

|                                    |             |  |
|------------------------------------|-------------|--|
| <b>Date/Time</b>                   | <b>User</b> | <b>Work Description</b>  |
| Thu<br>12/15/2005<br>6:19:04<br>AM | MMiller     | the service entrance door (electric) comes open and closes as it is going down the road. Allen Black has sealed all windows as directed by Thomas Bus, we heard thru another C2 owner who contacted Ricky Myers directly that he was sending him a new switch hub module. Is this something you want us to try with this unit and it's sister unit???? Other unit at dealership with same issue is w19405. Advising to order new switch hub module TBB 101420 and install to correct issue. Ticket resolved. |

**CONFIDENTIAL**

**CSR:sgroat 4/16/2007 7:40:49 AM**  
**Reference No 000000001888798**

**Problem Ticket Report**

**Contact Information**

|                 |              |              |            |                     |                  |
|-----------------|--------------|--------------|------------|---------------------|------------------|
| <b>Caller</b>   | Eric Coulter | <b>Phone</b> | [REDACTED] | <b>Contact Type</b> | Dealer Principle |
| <b>Location</b> | Troy, MI     |              |            |                     |                  |

**Ticket Details**

|               |                       |                 |               |                        |            |
|---------------|-----------------------|-----------------|---------------|------------------------|------------|
| <b>System</b> | Comments and Concerns | <b>Category</b> | Product Issue | <b>Reason for Call</b> | Useability |
|---------------|-----------------------|-----------------|---------------|------------------------|------------|

**Call Details**

|                      |                        |                   |           |                        |             |
|----------------------|------------------------|-------------------|-----------|------------------------|-------------|
| <b>VIN/Serial No</b> | 4UZABRDC77C [REDACTED] | <b>Base Model</b> | B2 106 CH | <b>Vehicle Mileage</b> | 2,718 Miles |
| <b>Make</b>          |                        | <b>Model Year</b> | 2006      | <b>Symptoms</b>        |             |

**Work Log**

| <b>Date/Time User</b>                    | <b>Work Description</b>  |
|--|--|
| Wed<br>2/15/2006<br>2:04:49 PM<br>SGroat | <p>FSR#SG051222 issued for this and a copy will be e-mailed to you. -----Original Message-----<br/>                     - From: Eric Coulter [mailto:ecoulter@hoekstratruck.com] Sent: Tuesday, December 27, 2005 11:48 AM To: Groat, Steve Subject: WATERFORD C2 - SWITCH BANK<br/>                     WATERFORD SCHOOL DISTRICT BODY # 561270 VIN # 7C [REDACTED] IN SERV 9/19/05<br/>                     MILEAGE 2,718 Problem - Entrance door intermittently inoperative. On two occasions the door opened while driving without activating switch. Cause - Defective switch bank.<br/>                     Solution - Test to verify complaint. Door is currently inoperative. Found no fault codes in system. Check switch hub module for possible water intrusion. Module is dry and all connections good. Check circuits from switch hub module to door. All ok. Unable to obtain wiring schematics for circuits from switch bank to switch hub module. Contacted TBB for assistance. Check circuits from switch bank with information provided by very competent TBB Northern Region Service Manager. Determined switch bank to be defective. R/R switch bank. Test. All OK. Labor: 5.7 hrs @ \$75.00 = \$427.50 Parts: \$56.48 Qty 1 &gt; TBB 100279<br/>                     Total FSR Requested = \$483.98</p> |

**CONFIDENTIAL**

CSR:rmyers 4/16/2007 7:41:19 AM  
Reference No 000000002167514

**Problem Ticket Report**

**Contact Information**

**Caller** [REDACTED] **Phone** [REDACTED] **Contact Type** Service Writer/Foreman

**Location** [REDACTED]  
Jackson, MS [REDACTED]  
[REDACTED]

**Ticket Details**

**System** Service **Category** Diagnostic Assistance **Reason for Call** CAC Technical Guidance

**Service Call Details**

**VIN/Serial No** 4UZABPCT08C [REDACTED] **Vehicle Mileage** [REDACTED] **Truck Application** [REDACTED]  
**Base Model** B2 106 CH **Make** [REDACTED] **Model Year** 2007  
**Symptoms**  
**Resolution**

**Work Log**

**Date/Time User** **Work Description**  
Tue 9/26/2006 10:10:51 AM RMyers Rick, we have a bus who's entrance door is opening and closing by itself while going down road and sitting in parking lot . We have tried a new interior door switch and have also moved this switch to a different switch bank but the problem still occurs. We checked door micro switch adjustment, ok. What direction do we go from here? This bus does have a exterior door switch if this makes a difference. Requested he review the SHM



# CONFIDENTIAL

CSR:mmiller 4/16/2007 7:41:53 AM  
Reference No 000000002183028

Problem Ticket Report

**Contact Information**

**Caller** [REDACTED] **Phone** [REDACTED] **Contact Type** Service Manager

**Location** [REDACTED]  
Grand Rapids, MI [REDACTED]  
[REDACTED]

**Ticket Details**

**System** Service **Category** Service Inquiries **Reason for Call** Undocumented to CAC

**Service Call Details**

**VIN/Serial No** 4UZABTCS97C [REDACTED] **Vehicle Mileage** 3,500 Miles **Truck Application**  
**Base Model** B2 106 CH **Make** [REDACTED] **Model Year** 2007  
**Symptoms**  
**Resolution**

**Work Log**

**Date/Time User** **Work Description**  
Fri 10/6/2006 2:26:55 PM MMiller ENTRANCE DOOR OPENING IN ROUT, NO OTHER FUNCTIONS ARE FAILING. DOOR DOES NOT APPEAR TO BE POWERED OPEN IT SEAMS TO LOOSE POWER AND SLOWLY DRIFT OPEN THAN SNAP SHUT AS IF POWER IS LOST THAN REGAINED. UNIT NOT HERE CUSTOMER VERY RELUCTANT TO WORK ON AND HARD TO PULL INFO FROM. Check SHM for possible water intrusion/damage. Also check microswitches above the door for correct adjustment. Unit will need to be brought in to duplicate concern and correct. Ticket resolved.

**CONFIDENTIAL**

**CSR:cblaha 4/16/2007 7:42:15 AM**  
**Reference No 000000002262005**

**Problem Ticket Report**

**Contact Information**

|               |            |              |            |                     |               |
|---------------|------------|--------------|------------|---------------------|---------------|
| <b>Caller</b> | [REDACTED] | <b>Phone</b> | [REDACTED] | <b>Contact Type</b> | Sales Manager |
|---------------|------------|--------------|------------|---------------------|---------------|

**Location**

Parkersburg, WV [REDACTED]  
[REDACTED]

**Ticket Details**

|               |                              |                 |                      |                        |                      |
|---------------|------------------------------|-----------------|----------------------|------------------------|----------------------|
| <b>System</b> | <b>Comments and Concerns</b> | <b>Category</b> | <b>Product Issue</b> | <b>Reason for Call</b> | <b>Build Quality</b> |
|---------------|------------------------------|-----------------|----------------------|------------------------|----------------------|

**Call Details**

|                      |                        |                   |           |                        |
|----------------------|------------------------|-------------------|-----------|------------------------|
| <b>VIN/Serial No</b> | 4UZABPDC36C [REDACTED] | <b>Base Model</b> | B2 106 CH | <b>Vehicle Mileage</b> |
| <b>Make</b>          |                        | <b>Model Year</b> | 2006      | <b>Symptoms</b>        |

**Work Log**

| <b>Date/Time</b>                  | <b>User</b> | <b>Work Description</b>  |
|-----------------------------------|-------------|--|
| Sat<br>12/9/2006<br>7:52:56<br>AM | CBlaha      | Dealer reported air entrance door issue for not closing. Requested additional details when they got the unit in and looked at it |

**CONFIDENTIAL**

**CSR:sgroat 4/17/2007 3:00:30 PM**  
**Reference No 000000002428935**

**Problem Ticket Report**

**Contact Information**

**Caller** [Redacted] **Phone** [Redacted] **Contact Type** Service Technician

**Location**

Ballston Spa, NY  
[Redacted]

**Ticket Details**

| System | Comments and Concerns | Category | Product Issue | Reason for Call | Useability |
|--------|-----------------------|----------|---------------|-----------------|------------|
|--------|-----------------------|----------|---------------|-----------------|------------|

**Call Details**

|                      |                        |                   |           |                        |  |
|----------------------|------------------------|-------------------|-----------|------------------------|--|
| <b>VIN/Serial No</b> | 4UZABRCS07C [Redacted] | <b>Base Model</b> | B2 106 CH | <b>Vehicle Mileage</b> |  |
| <b>Make</b>          |                        | <b>Model Year</b> | 2006      | <b>Symptoms</b>        |  |

**Work Log**

| Date/Time User | Work Description |
|----------------|------------------|
|----------------|------------------|

Steve, sorry for the delay. I had to go to our Ballston Spa shop and pick up the parts, and then transfer them to Syracuse shop for shipment. I have them in my possession and they should ship out Thursday. I have four switches and switch banks out of four units with this issue. As I stated earlier, generally I only replace the switch bank with the new style harness to resolve the door closing on its own issue. I have yet to see a switch failure cause this, though it could. I have only changes switches on the ones that the switch will not stay in its slot. -----Original Message----- From: Groat, Steve [mailto:Steve.Groat@ThomasBus.com] Sent: Monday, February 19, 2007 4:17 PM To: Fitch, Mike Cc: Gablenz, Scott; Dodson, Ken Subject: RE: Mount Markham / Entrance Doors -C2 Just following up on status of the shipment of switches to Ken. Thanks -----

----- From: Fitch, Mike [mailto:mfitc@matthewsbuses.com] Sent: Thursday, February 08, 2007 6:58 PM To: Groat, Steve Cc: Gablenz, Scott (MatthewsBus); Dodson, Ken Subject: RE: Mount Markham / Entrance Doors -C2 I will make sure these are sent. I will work with Scott Gablenz to get these shipped to Ken. Thanks -----Original Message----- From: Groat, Steve [mailto:Steve.Groat@ThomasBus.com] Sent: Thursday, February 08, 2007 6:49 PM To: Fitch, Mike Cc: Gablenz, Scott; Dodson, Ken Subject: RE: Mount Markham / Entrance Doors -C2 Thanks for the update Mike. We will need the switches sent to High Point asap for review. Would you please send them to the attention of Ken Dodson, VP of Engineering. Thanks -----

-- From: Fitch, Mike [mailto:mfitc@matthewsbuses.com] Sent: Thursday, February 08, 2007 6:36 PM To: Groat, Steve Cc: Gablenz, Scott (MatthewsBus) Subject: FW: Mount Markham / Entrance Doors -C2 Importance: High Steve, I apologize for the delay in responding to you. Today is the first day I have had e-mail all week. I have gone ahead and replaced switch bank A with the new style harness, PN# 130802, on 10 Mount Markham buses. Some were more problematic than others. Body #'s 561284,561348,561275,562961,562945,562920,562916,562901,561308. I have only changed the switch on a few units, generally due to the locking tabs not holding the switch in

place. I do not believe any of the switches actually fail, but the locking tabs do not hold the switch securely and allow it to rock back and forth, loosening the terminals in the switch bank and sometimes the switch will walk up out of the panel. They have made improvements to the locking tabs, but I have seen complaints with those as well. I have had several complaints from other schools since Mount Markham and have witnessed the failures as well. We have had a 100 percent success rate by installing harness 130802 in place of the earlier switch banks. The early C2 doors will close by default when the door switch is lost, turning the red warning lights off when the door closes. Generally after cycling the switch again, the doors will return to normal operation. The gen 2 doors work slightly different. They will start closing very slowly when the switch is lost, generally not closing fully therefore not shutting the lights off. But the driver may have to drive with the doors slightly ajar if they don't cycle the switch. These are starting to pop up all over. Some drivers don't mention it because it is so intermittent on some units. But if you question them, they will recall this happening from time to time. In some cases, I think the installation of the gel packs has aggravated the situation because the switches do not fit properly and you will find the switch raised up out of the panel. My current cell # is 607-283-1086 if I can be of further assistance Steve. To my knowledge, none of these switches or switch banks have been returned. Mike Fitch Matthews Buses, Inc. -----Original Message----- From: Gablenz, Scott Sent: Thursday, February 08, 2007 11:51 AM To: Fitch, Mike Subject: FW: Mount Markham / Entrance Doors -C2 Importance: High Hi Mike can you assist me with the info that Steve is looking for?? If you can get me the switches I will process them to High Point. Thanks, Scott -----Original Message----- From: Groat, Steve [mailto:Steve.Groat@ThomasBus.com] Sent: Thursday, February 08, 2007 11:09 AM To: Gablenz, Scott Subject: FW: Mount Markham / Entrance Doors -C2 Hi Scott, I have not heard anything back from Mike on this issue so I'm hoping you can help me out. As well as needing the body numbers of the affected units I also need to know if the door switches were sent back to High Point or are they still in Matthews possession. Thanks Steve -----From: Groat, Steve Sent: Monday, February 05, 2007 2:18 PM To: Fitch, Mike Subject: FW: Mount Markham / Entrance Doors -C2 Mike, Will you please get for me the body number of this unit or body numbers of all units they have had this issue with. I need to forward them to High Point. Thanks ----- From: Fitch, Mike Sent: Thursday, November 16, 2006 5:50 PM To: Burgess, Wayne; Schermerhorn, Paul Cc: Harrod, Roger Subject: Mount Markham Guys, I stopped into Mount Markham today (11/16) to look at their entrance door closing on its own issue. I looked at one of the problem buses and it did exactly what they are claiming, with the door opened with the switch, it will close on its own intermittently. I found that if I wiggled the switch, it would act up. I hooked up service link and viewed the smart switches and found that the entrance door switch would drop out of the list when the door closed by itself. I also found that it would log an active code for missing smart switch. They have already replaced the switch to no avail. My belief is that the switch is losing contact with the switch bank. The switch bank is securely fastened to the switch panel, but the switch has some movement within the panel, which I believe due to the very high cycling of the switch, the switch rocks back and forth and loosens up the terminals in the switch bank. I did not have another switch bank to replace it with, so I swapped it with the bottom switch bank which only had one switch in it. It cured the problem for now. What I intend to do is to replace switch bank A with the switch harness that current production is using. With the harness, it is directly secured to the switch and they will move in unison, preventing loosening of terminals. The harness should also be less prone to water issues. Because this is a new part, it is not readily available, so I ordered new switch banks to be shipped to them, which we had in stock, and I will replace the banks in the buses having this issue early next week. When the harnesses arrive, I will install them in the same buses. New switch banks probably would correct the issue, but it may occur again, and I believe the new style harness will prevent that.

Tue  
 4/17/2007  
 7:23:00 AM S Groat



## BODY

**MODEL:** C2

**SUBJECT:** SWITCH BANK GEL PAC GASKET

**DATE:** MAY 9, 2006

**INDEX:** C2 5

**PAGE:** 1 OF 3

**BULLETIN:** 4

To help prevent moisture from entering the switch bank, a Gel Pac Switch Base Gasket, part #TBB 124989 is being installed under the switches. This installation began in production with Body #660108.

### Switch Bank Sealing procedure:

1. **Make note of the location of the switches before disassembling the Switch Panel. Fig. 1**
2. Remove screws securing the Switch Panel. Retain screws for reinstallation.
3. Lift switch panel out of switch cabinet. It may be necessary to unplug the harnesses.

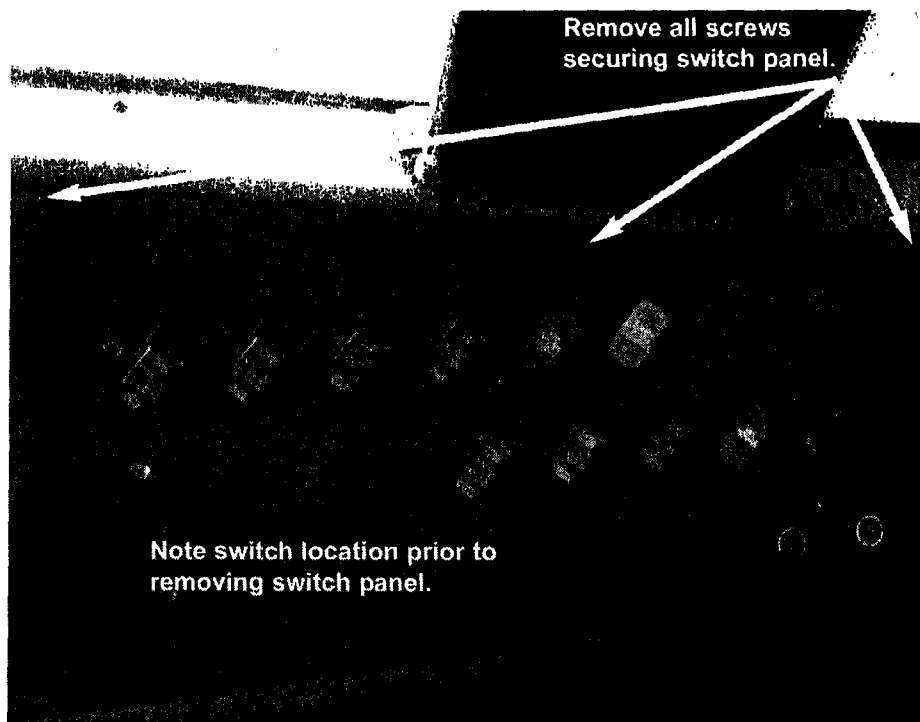


Figure 1

4. Remove Switch Bank from Switch Panel. Retain fasteners. Fig. 2
5. Pull the Switches out of the Switch Bank and set aside. **Note switch location prior to removing switches.**

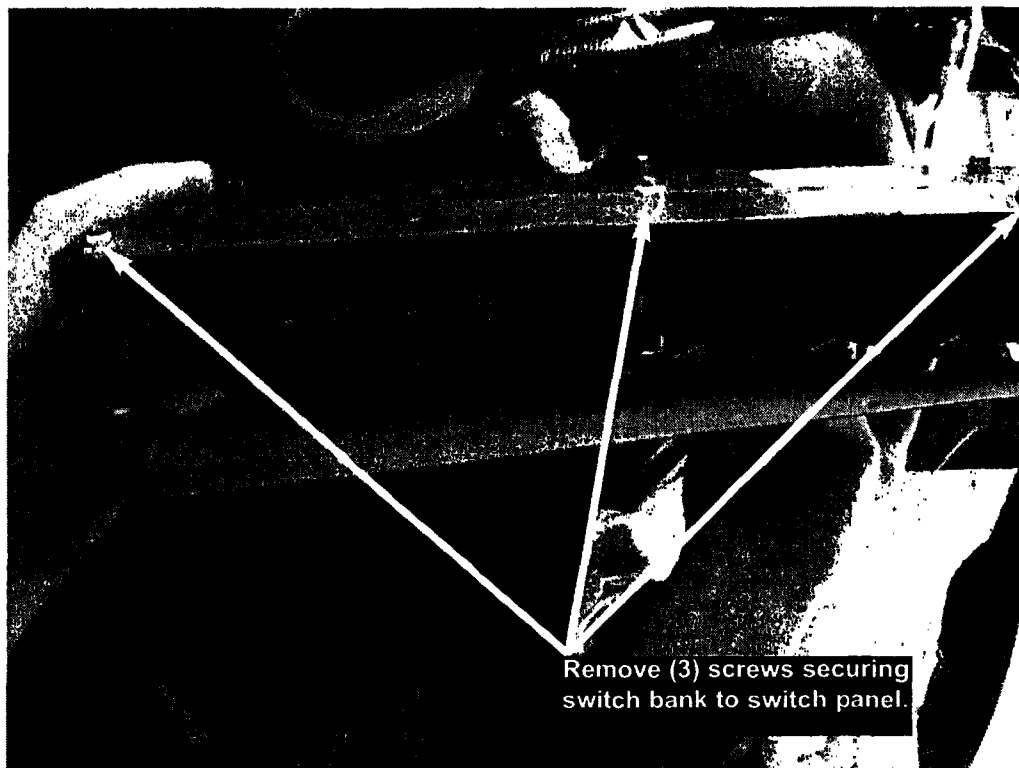


Figure 2

6. Remove the white backing from the Gel Pac Gasket.
7. Flip the Gel Pac Gasket over; orientate to fit into the Switch Bank, and insert. **Fig. 3** After Gasket is in place, remove the clear film from the Gel Pac Gasket.

**Note:** Install a Gel Pac Gasket in each switch base, whether it is currently being used or not.

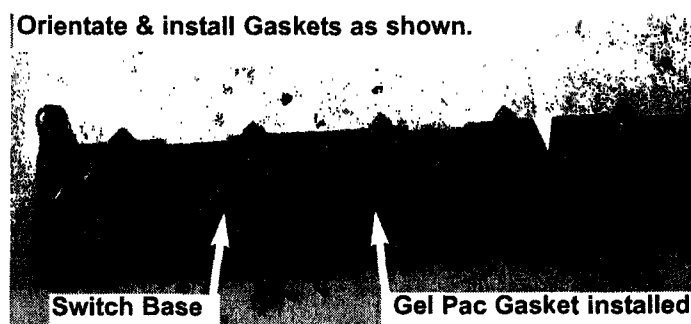


Figure 3

8. Reinstall Switch Bank using existing screws and add Washers, Part #TBB 27446152 as spacers. **Fig. 4**
9. Reinstall the Switches into the Switch Bank.
10. Repeat steps 1 - 9 for additional Switch Banks.
11. Test switches for functionality.
12. Reinstall Switch Panel.

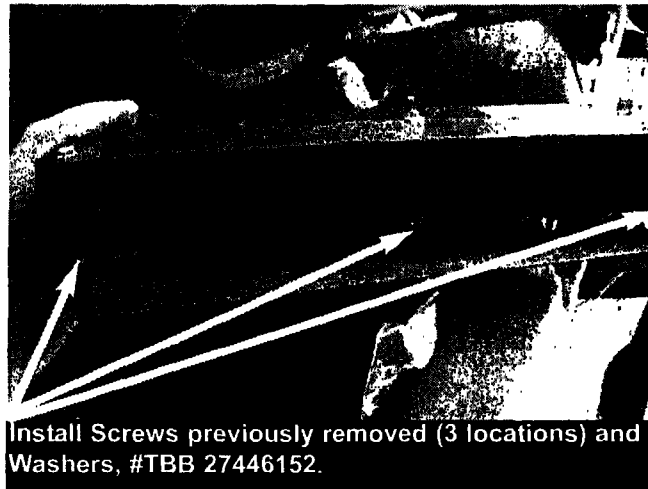


Figure 4

**MATERIALS REQUIRED:**

| <b><u>PART NUMBER</u></b> | <b><u>QTY.</u></b> | <b><u>DESCRIPTION</u></b>                          |
|---------------------------|--------------------|--|
| TBB 124989                | A/R                | Gasket, Gel-Teck, Switch Base (8 per Switch Bank)  |
| TBB 27446152              | A/R                | Washer - Flat, #10, 3/16", SAE (3 per Switch Bank) |

**WARRANTY STATUS:**

SIX MONTHS FROM THE DATE OF THIS BULLETIN.

**ELECTRONIC WARRANTY CODE: 7552**

**SRT CODE: 52-30, TIME ALLOWANCE - 0.5 HR.**

**QC: X10**



## BODY

**MODEL:** C2

**SUBJECT:** SEALING DRIVER'S WINDOW

**DATE:** DECEMBER 15, 2005

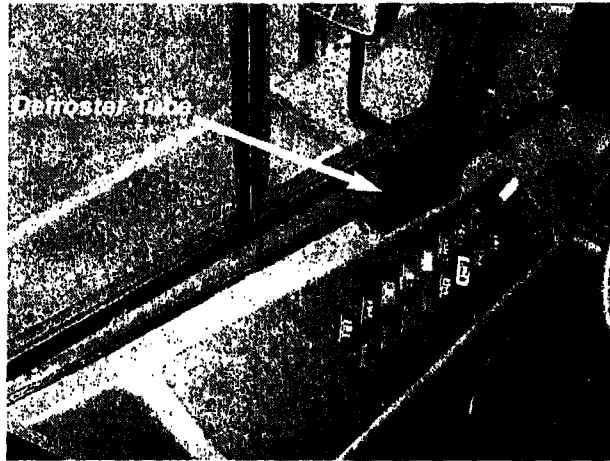
**INDEX:** C2 1

**PAGE:** 1 OF 4

**BULLETIN:** 5

To help prevent water from leaking around the driver's window and entering the side switch panel, follow the procedure below. This process was started in production with Body #561999.

1. Remove three screws attaching the defroster tube. Retain screws for reinstallation in Step 8. **Figure 1.**



**Figure 1**

2. Cut a 2" piece of Rubber Seal, part #TBB 121781. **Figure 2.**
3. Peel off protective liner to expose adhesive side of rubber seal.
4. Install into hole as shown in **Figure 3.**



**Figure 2**



**Figure 3**

Product Support Bulletin

5. Apply black Manus Bond around post and along lower drivers window. **Figure 4, 5, 6 & 7.**



**Figure 4**



**Figure 5**



**Figure 6**



**Figure 7**

6. Remove excess Bond using plastic tool and clean with alcohol wipe. **Figure 8.**

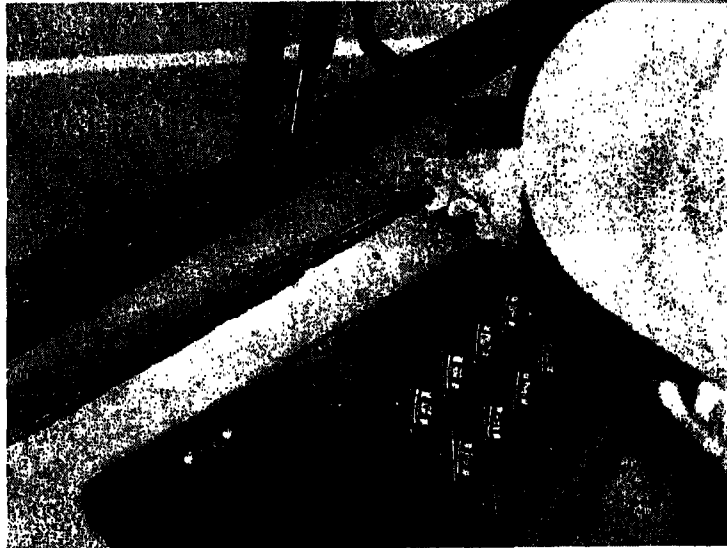


Figure 8

7. Apply Bond around defroster outlet on three sides only, as shown. Figures 9 & 10.



Figure 9

Apply bond  
around three  
sides only.

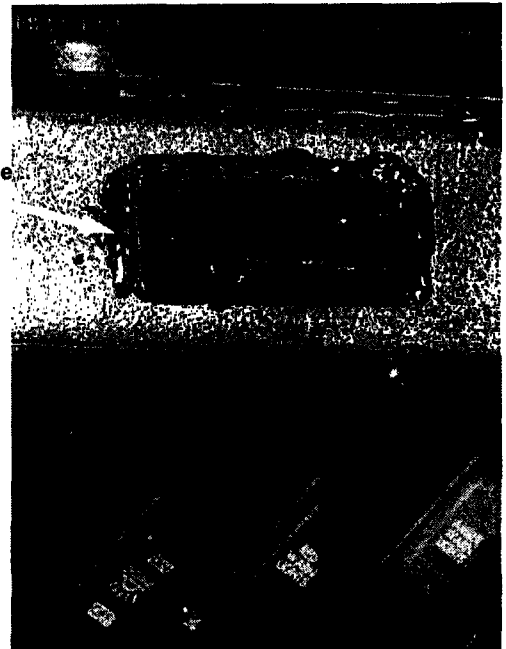


Figure 10

8. Re-attach defroster tube using three (3) original screws. Figure 11.



Figure 10

| <u>PART NUMBER</u> | <u>QTY.</u> | <u>DESCRIPTION</u>                 |
|--------------------|-------------|------------------------------------|
| TBB 121781         | 2"          | Seal, Closed Cell                  |
| TBB 68152446       | A/R         | Adhesive/Sealant, Manus Bond 75-AM |

WARRANTY STATUS:

WITHIN PROVISIONS OF THOMAS WARRANTY.

ELECTRONIC WARRANTY CODE: 7404

SRT CODE: 45-56, TIME ALLOWANCE - 0.1 HRS.

QC: X09

TBB field return 103223

| No          | Date Code | Visual                     | Mech Funct     | Shake        | R Switch Assembled |             |              |            |                    |                    | R Switch Open |        |        | Comments  |
|-------------|-----------|----------------------------|----------------|--------------|--------------------|-------------|--------------|------------|--------------------|--------------------|---------------|--------|--------|---|
|             |           |                            |                |              | R1<br>1.02K        | R2<br>7.87K | R3<br>0.825K | R5<br>3.83 | R3/R4 (3)<br>0.734 | R4/R5 (4)<br>2.430 | T1 - 9        | T4 - 9 | T2 - 9 |   |
| 1           | W0621     | No damage<br>Lube on Term  | Action<br>OK   | No<br>Rattle | 1.027              | 7.950       | 0.829        | 3.786      | 0.744              | 2.456              | 0.830         | 6.720  | 3.890  | Lube very thick difficult to remove   |
| 2<br>(5, 6) | W0621     | No damage<br>Lube on Term  | Action<br>OK   | No<br>Rattle | 1.027              | 7.955       | 0.830        | 3.873      | Erratic<br>.8-1.0  | 6.720              | 0.829         | 6.730  | 3.876  | Lube very thick difficult to remove<br>Pressing on probes causes resistance change T2 |
| 3           | W0519     | No Paddle<br>All term bent | Action<br>OK   | No<br>Rattle | 1.027              | 7.970       | 0.823        | 3.838      | Erratic            | Erratic<br>2.4-2.6 |               |        |        | Pressing on probes causes resistance change T2  |
| 4           | W0615     | No Bezel and<br>paddle     | Can't<br>Check | Rattle       | 1.024              | 7.950       | 0.828        |            |                    |                    |               |        |        | Appears switch was disassembled unable to record all values. Green corrosion inside   |
| 5<br>(5)    | W0543     | Lube on Term               | Action<br>OK   | No<br>Rattle | 1.027              | 7.940       | 0.830        | 3.875      | Erratic<br>0.77    | Erratic<br>2.5-2.6 | 0.830         | 6.720  | 3.874  | Pressing on probes causes resistance change T2  |
| 6           | w0503     | Paddle off<br>Lube on Term |                |              | 1.028              | 7.97        | 0.827        | 3.832      | 0.735              | 2.434              |               |        |        | All terminals bent in same direction  |
| 7           | W0509     | Paddle off<br>Lube on Term |                |              | 1.025              | 7.99        | 0.831        | 3.860      | 0.739              | 2.449              |               |        |        |   |
| 8           | W0610     | No Paddle<br>Lube on Term  |                |              | 1.027              | 7.97        | 0.828        | 3.841      | 0.737              | 2.442              |               |        |        |   |
| 9           | W0434     | No damage                  |                |              | 1.022              | 7.96        | 0.831        | 3.856      | 0.739              | Erratic<br>2.4-2.6 |               |        |        |   |
| 10          | W0509     | No damage                  |                |              | 1.029              | 7.95        | 0.826        | 3.859      | 0.736              | 2.451              |               |        |        |   |
| 11          | W0620     | No damage                  |                |              | 1.020              | 7.90        | 0.825        | 3.837      | 0.735              | 2.435              |               |        |        | Resistance checked with Valhalla 4100ATC meter<br>Sample received 3/6/07 from TBB (8) |

Notes

- 1 Contacts between terminal 1 and 2 closed
- 2 Contacts between terminal 4 and 2 closed
- 3 Varied pressure on probes
- 4 Varied pressure on probes
- 5 Checking disassembled switch by contacting probes on lever and T9 the correct values are recorded.
- 6 Sample was reassembled and the erratic readings are now stable
- 7 No 1 and 2 Solder appears to be lead free, all others appears to be leaded. No 1 and 2 solder appearance poor on all connection points.
- 8 It was reported that by pressing laterally on paddle resistance readings fluctuate. Could not repeat when pressing the paddle or T2, tested on 3/7/07

Attachment 12  
(TR\_TBB\_Feb-07 (Action 1).pdf)

TBB field return 103223

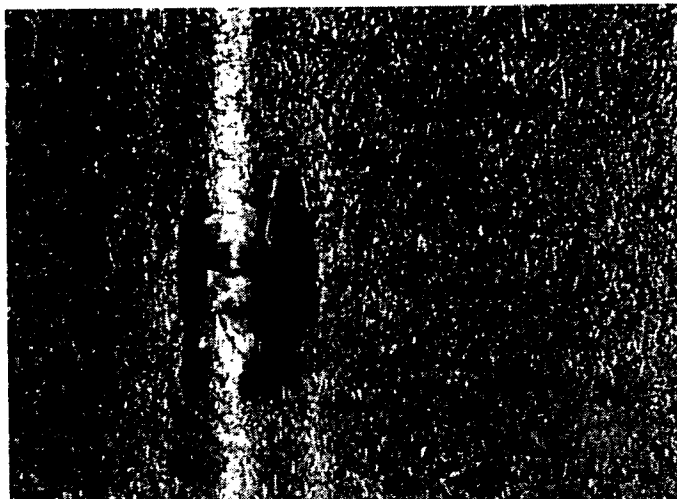
| No | Date Code | Visual             | Mech Funct | Shake | R Switch Assembled |             |              |             |                     |                       | R Switch Open   |                 |        | Comments  |
|----|-----------|--------------------|------------|-------|--------------------|-------------|--------------|-------------|---------------------|-----------------------|-----------------|-----------------|--------|---|
|    |           |                    |            |       | R1<br>1.02K        | R2<br>7.87K | R3<br>0.825K | R5<br>3.83K | R3/R4 (3)<br>0.734  | R4/R5 (4)<br>2.430    | T1 - 9<br>0.825 | T4 - 9<br>6.650 | T2 - 9 |   |
| 12 | W0621     | Base damage by T9  | OK         | OK    | 1.023              | 7.950       | 0.829        | 3.873       | 0.737<br>0.736      | 2.454<br>2.441        |                 |                 |        | Checked with hand meter applying force to terminal<br>Check with DMM apply force to paddle and terminal (5, 6)    |
| 13 | W0610     | Paddle off T9 bent | OK         | OK    | 1.022              | 7.970       | 0.826        | 3.856       | 0.735<br>0.734      | 2.447<br>2.434        |                 |                 |        | Checked with hand meter applying force to terminal<br>Check with DMM apply force to paddle and terminal (5, 6)    |
| 14 | W0601     | OK                 | OK         | OK    | 1.023              | 7.950       | 0.833        | 3.845       | .74 -.96<br>0.738   | 2.48 -2.78<br>2.5-6.6 |                 |                 |        | Checked with hand meter applying force to terminal<br>Check with DMM apply force to paddle and terminal (5, 6)    |
| 15 | W0621     | T7 bent            | OK         | OK    | 1.023              | 7.960       | 0.828        | 3.875       | 1.07-1.7<br>.74-6.6 | 2.9-3.4<br>2.4-6.6    |                 |                 |        | Checked with hand meter applying force to terminal<br>Check with DMM apply force to paddle and terminal (5, 6, 7) |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |
|    |           |                    |            |       |                    |             |              |             |                     |                       |                 |                 |        |   |

- Notes
- 1 Contacts between terminal 1 and 2 closed
  - 2 Contacts between terminal 4 and 2 closed
  - 3 Varied pressure on probes
  - 4 Varied pressure on probes
  - 5 DMM Valhalla 4100ATC meter
  - 6 Force applied to paddle so it pops out from pivot location. Terminal force applied with screwdriver.
  - 7 Reading fluctuated more by both paddle and terminal

TBB field return 103223

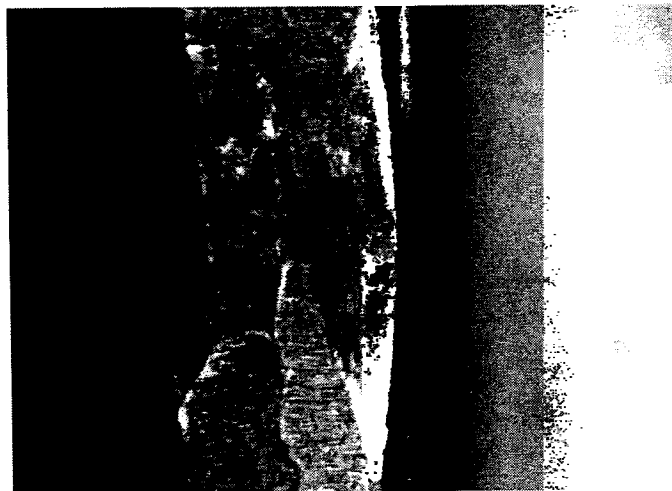


Pivot Sample 1

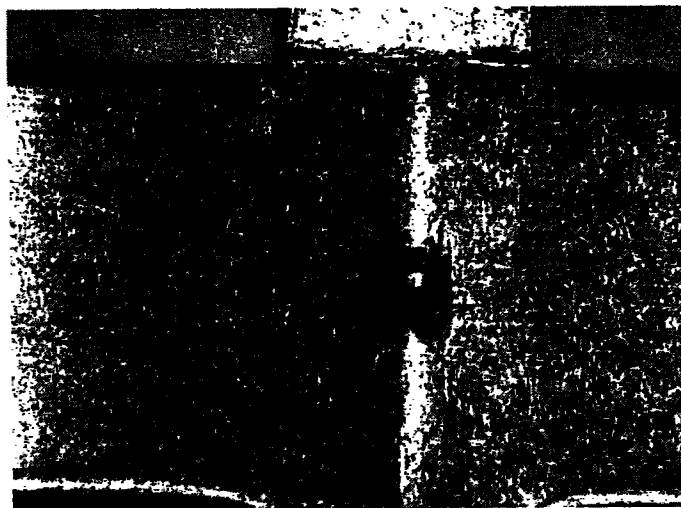


Lever Sample 1 Pivot Area

Note  
Blue areas on pivot are areas of wear  
through of the gold plating. The color  
is a result of the illumination

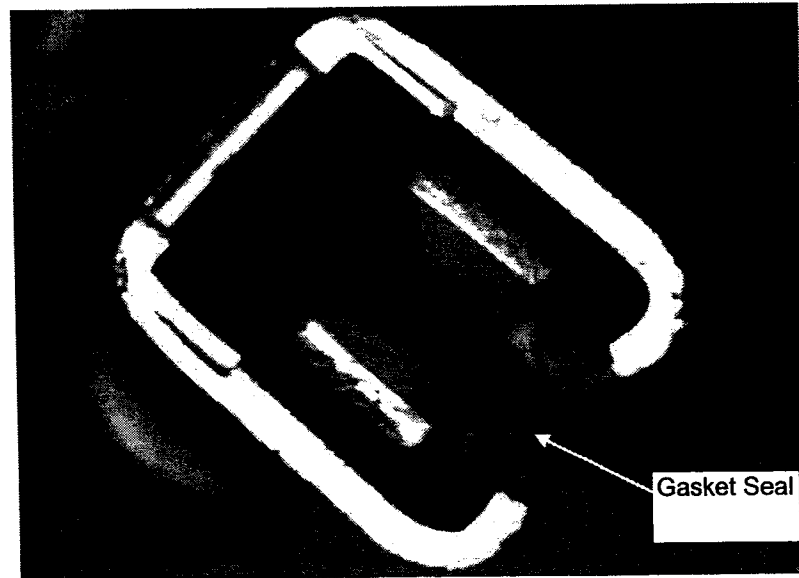
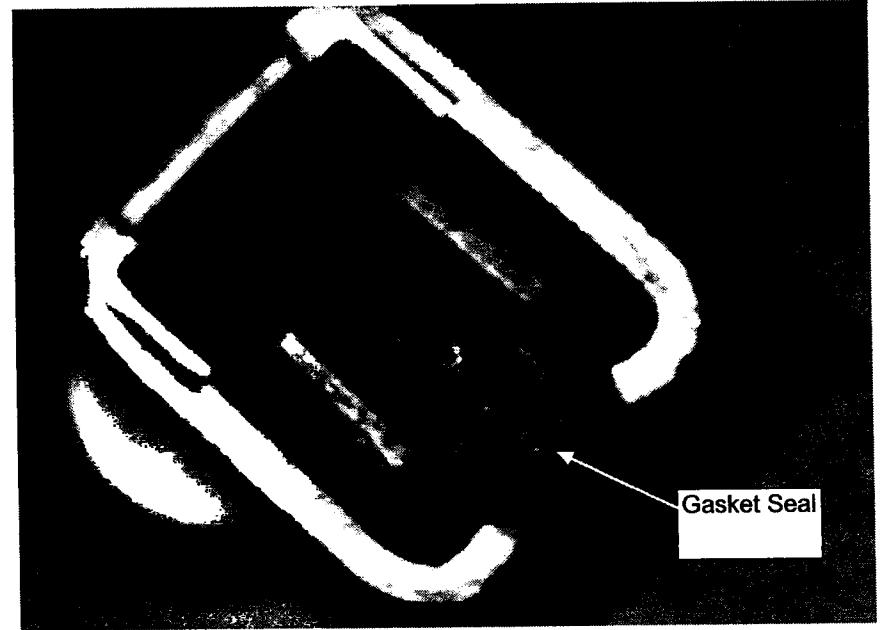
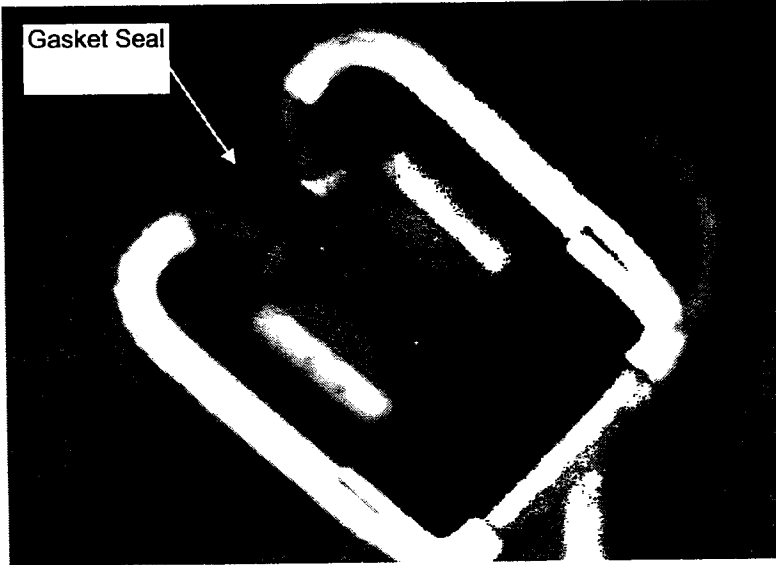


Pivot Sample 5



Lever sample 5 Pivot Area

TBB field return 103223



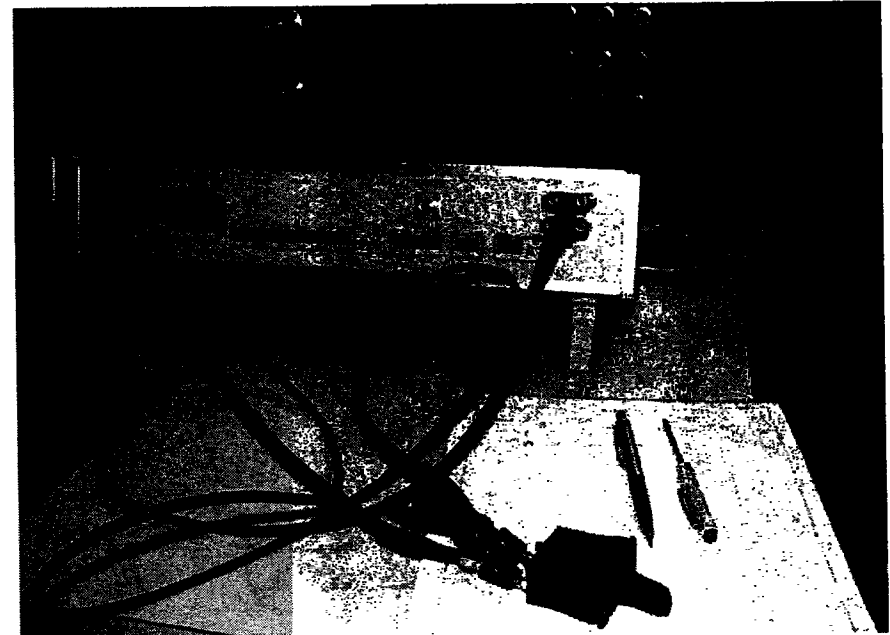
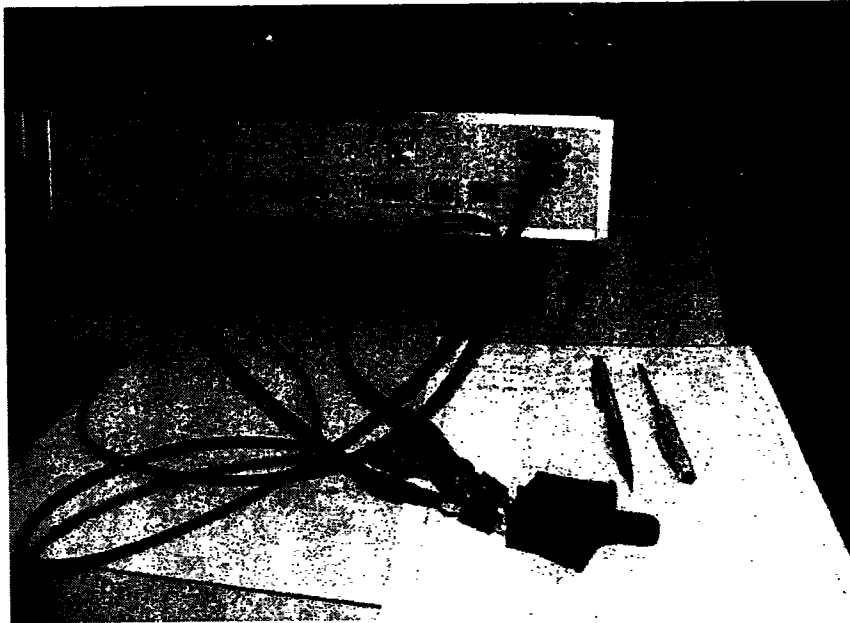
TBB Module CB Terminal with seal material

Carling Technologies, Inc  
Plainville, CT

DATA SHEET

Test Report No. \_\_\_\_\_  
Project No. \_\_\_\_\_  
Date: 3/15/2007  
Performed By: WAS  
Approved By: \_\_\_\_\_  
Sheet: 5 of \_\_\_\_\_

TBB field return 103223



Sample 11 Recording resistance values prior to toggle test. During the test applying lateral force to the toggle did not change resistance values  
pictured added 3/15/07



## BODY

**MODEL:** C2

**SUBJECT:** SEALING DRIVER'S WINDOW

**DATE:** DECEMBER 15, 2005

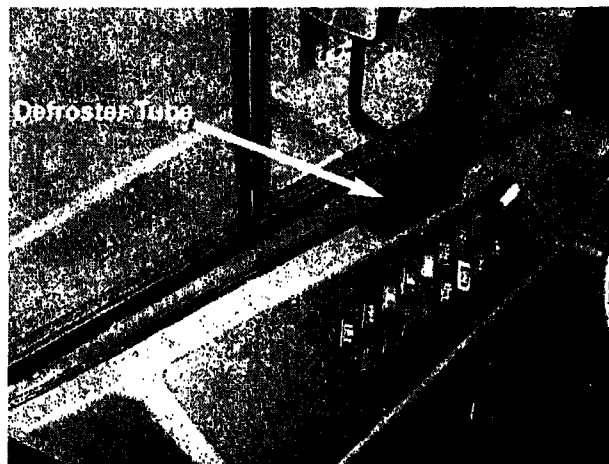
**INDEX:** C2 1

**PAGE:** 1 OF 4

**BULLETIN:** 5

To help prevent water from leaking around the driver's window and entering the side switch panel, follow the procedure below. This process was started in production with Body #561999.

1. Remove three screws attaching the defroster tube. Retain screws for reinstallation in Step 8. **Figure 1.**



**Figure 1**

2. Cut a 2" piece of Rubber Seal, part #TBB 121781. **Figure 2.**
3. Peel off protective liner to expose adhesive side of rubber seal.
4. Install into hole as shown in **Figure 3.**



**Figure 2**



**Figure 3**

Product Support Bulletin

5. Apply black Manus Bond around post and along lower drivers window. **Figure 4, 5, 6 & 7.**



**Figure 4**



**Figure 5**



**Figure 6**



**Figure 7**

6. Remove excess Bond using plastic tool and clean with alcohol wipe. **Figure 8.**

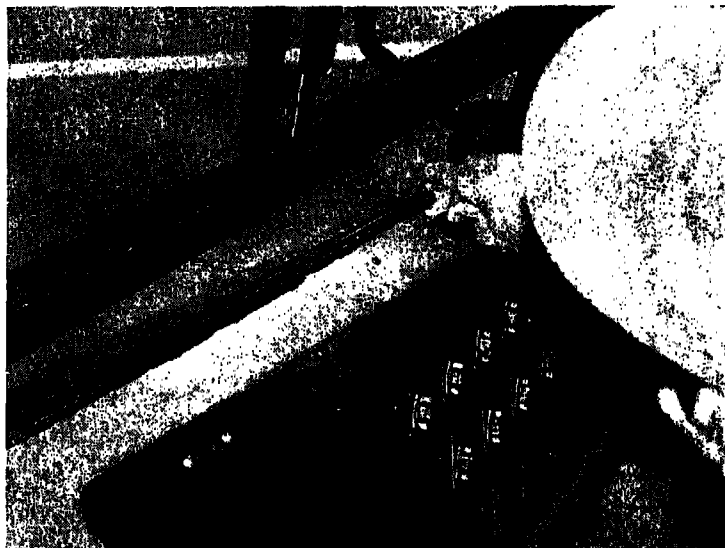


Figure 8

7. Apply Bond around defroster outlet on three sides only, as shown. **Figures 9 & 10.**



Figure 9

Apply bond  
around three  
sides only.



Figure 10

8. Re-attach defroster tube using three (3) original screws. **Figure 11.**

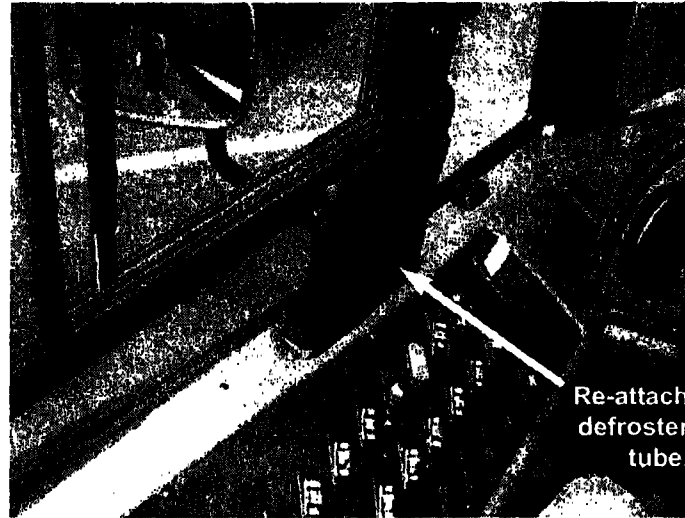


Figure 10

| <u>PART NUMBER</u> | <u>QTY.</u> | <u>DESCRIPTION</u>                 |
|--------------------|-------------|------------------------------------|
| TBB 121781         | 2"          | Seal, Closed Cell                  |
| TBB 68152446       | A/R         | Adhesive/Sealant, Manus Bond 75-AM |

WARRANTY STATUS:

WITHIN PROVISIONS OF THOMAS WARRANTY.

**ELECTRONIC WARRANTY CODE: 7404**

**SRT CODE: 45-56, TIME ALLOWANCE - 0.1 HRS.**

**QC: X09**

Walter Sadowski email.txt

From: Walt Sadowski [walt.sadowski@carlingtech.com]  
Sent: Tuesday, April 10, 2007 4:48 AM  
To: Calin Salagean  
Cc: Ken Whisnant; Jim Freiburger; Ken Dodson; 'Peter D'addario'; 'Terry Murch';  
'Allan Moore'; 'Mike Fasano'  
Subject: RE: Door switches info

Attachments: TR4024-006\_75K.pdf

Calin

Enclosed is the report with 75K cycle results, the samples continue to perform well. We have not implemented the lubricant yet. We need to get TBB's approval, and I wanted to review the condition of the samples at 100K. Does TBB have a process/material change request form that we need to fill and submit?

Looking at the analyzed return samples built before March 2006; that would start with week 0609 on our date codes. According to the other report, "TR\_TBB\_Feb" we have sample; 3, 5, 6, 7, 9, 10, and 14 that are before that date code. In addition samples 5 and 9 were sent for SEM analysis.

Walter Sadowski

NPD Manager

Carling Technologies

860-793-7721 Direct

860-793-2239 Fax

walt.sadowski@carlingtech.com

---

From: Salagean, Calin [mailto:Calin.Salagean@ThomasBus.com]  
Sent: Monday, April 09, 2007 9:11 AM  
To: Walt Sadowski  
Cc: Whisnant, Ken; Freiburger, Jim; Dodson, Ken; Peter D'addario; Terry Murch; Allan Moore; Mike Fasano  
Subject: RE: Door switches info

walt,

will this means that you will begin implementing the lubricant? Do we have a SOP?

Did you tested some return switches prior to March 2006? These switches should have no gel pack. I want to see if we can find some problems on that switches, too.

Calin Salagean

walter sadowski email.txt

---

From: Walt Sadowski [mailto:walt.sadowski@carlingtech.com]  
Sent: Monday, April 09, 2007 7:57 AM  
To: Salagean, Calin  
Cc: Whisnant, Ken; Freiburger, Jim; Dodson, Ken; 'Peter D'addario'; 'Terry Murch';  
'Allan Moore'; 'Mike Fasano'  
Subject: RE: Door switches info

Calin

Enclosed is the preliminary report on the samples under test. The switches completed 75K cycles last week, but we were not able to complete the data collection. This report shows the results after 50K cycles. The condition on group B at 25K cycles did not repeat it's self at 50K cycles, and I could not get a clear explanation from the technician on the condition, but it appears that it was mechanical.

Walter Sadowski  
NPD Manager  
Carling Technologies  
860-793-7721 Direct  
860-793-2239 Fax  
walt.sadowski@carlingtech.com

---

From: Salagean, Calin [mailto:Calin.Salagean@ThomasBus.com]  
Sent: Thursday, April 05, 2007 8:50 AM  
To: walt sadowski  
Cc: whisnant, Ken; Freiburger, Jim; Dodson, Ken; Peter D'addario; Terry Murch; Allan Moore; Mike Fasano  
Subject: RE: Door switches info

No. Your report has only 11 samples (see attachment).

Calin Salagean

---

From: walt sadowski [mailto:walt.sadowski@carlingtech.com]  
Sent: Thursday, April 05, 2007 8:45 AM

Walter Sadowski email.txt

To: Salagean, Calin  
Cc: Whisnant, Ken; Freiburger, Jim; Dodson, Ken; 'Peter D'addario'; 'Terry Murch';  
'Allan Moore'; 'Mike Fasano'  
Subject: RE: Door switches info

Calin

Does the report I sent include sample 12-15? Those were the last switches I received.

Walter Sadowski

NPD Manager

Carling Technologies

860-793-7721 Direct

860-793-2239 Fax

walt.sadowski@carlingtech.com

---

From: Salagean, Calin [mailto:Calin.Salagean@ThomasBus.com]  
Sent: Thursday, April 05, 2007 7:49 AM  
To: Walt Sadowski  
Cc: Whisnant, Ken; Freiburger, Jim; Dodson, Ken; Peter D'addario; Terry Murch; Allan Moore; Mike Fasano  
Subject: RE: Door switches info

Walt,

Is this the last report? It seems that these are the switches which I send it before and not the switches from March 16th. Can you confirm it?

Calin Salagean

---

From: Walt Sadowski [mailto:walt.sadowski@carlingtech.com]  
Sent: Wednesday, April 04, 2007 5:16 PM  
To: Salagean, Calin  
Cc: Whisnant, Ken; Freiburger, Jim; Dodson, Ken; 'Peter D'addario'; 'Terry Murch';  
'Allan Moore'; 'Mike Fasano'  
Subject: RE: Door switches info

Calin

I believe I sent you the report on my findings, I enclose again.

Lubricant, white grease

what little we had was sent for analysis. The results show that the gelling agent is fumed silica, or glass. This type of grease must not be used on switch contacts, as the silica particles during movement, i.e. contact open and close, pools together and form an insulative layer, as we confirmed. The base is silicone, and may be blended with a low, and high viscosity fluids, we will need more material to confirm. The low viscosity fluid volatizes at a lower temperature, which would explain why we are seeing deposits on the lever and terminals. Also, silicone has a low surface tension, which allows it to migrate, even up hill.

#### SEM Analysis

The analysis confirmed silicone present on surfaces other than the contact areas of the lever and terminals, see enclosed report "Job 1448". There is also silicone present on a switch that did not show the white grease, date code 0434, and 0621. It may be possible that the silicone gasket is also vaporizing. On one sample #15, from the last group sent, no silicone was found, but there was hydrocarbon, def: an organic compound (as acetylene, benzene, or butane) containing only carbon and hydrogen and often occurring in petroleum, natural gas, coal, and bitumen. How it got in the switch is unknown.

Some samples show that on the blade portion of the terminal the gold is removed by the insertion of the switch into the module.

#### Test

Samples with the current plating; and with a proper lubricant on the pivot are in the lab.

Walter Sadowski

NPD Manager

Carling Technologies

860-793-7721 Direct

860-793-2239 Fax

walt.sadowski@carlingtech.com

walter sadowski email.txt

---

From: Salagean, Calin [mailto:Calin.Salagean@ThomasBus.com]  
Sent: Wednesday, April 04, 2007 9:19 AM  
To: Walt Sadowski  
Cc: Whisnant, Ken; Freiburger, Jim; Dodson, Ken  
Subject: Door switches info  
Importance: High

Walt,

Do you have an update on the last 4 switches send it to you on 3/16/07?

Calin Salagean

\*\*\*\*\*  
This inbound message swept by MIMESweeper for spam and computer viruses.  
\*\*\*\*\*

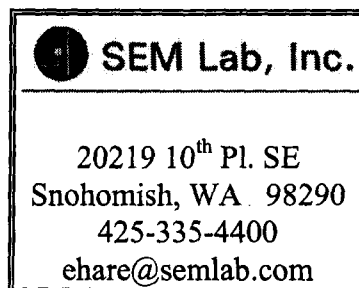
**Carling Technologies**

**SEM/EDS Analysis of  
Contacts**

**3/23/2007**

**Report**

*Contact: Walt Sadowski*





## **Background**

Walt Sadowski of Carling Technologies requested additional analysis on six (6) contacts (from SLI-1444) and a new set of eight (8) contacts. The purpose of the analysis was to characterize the material on the contact surface, particularly the distribution of silicone lubricant.

## **Results**

The samples were assigned arbitrary letter codes for the purposes of this report as shown below.

Sample A – Lever #1  
Sample B – Terminal #1  
Sample C – Lever #2  
Sample D – Terminal #2  
Sample E – Lever #5  
Sample F – Terminal #5  
Sample G – Lever #9  
Sample H – Pivot Terminal #9  
Sample I – Lever #11  
Sample J – Pivot Terminal #11  
Sample K – Contact Terminal #11  
Sample L – Lever #15  
Sample M – Pivot Terminal #15  
Sample N – Contact Terminal #15

Samples A – F were originally examined in SLI-1444. Samples G – N are the new set of contacts.

The analysis results are documented in Figs. 1 – 48 and are summarized here. The silicone lubricant appears as a dark liquid (or grease) in the BSE SEM images due to its low average atomic number relative to the gold plated surface. Elemental spectra of the lubricant show a large Si-peak (e.g. Fig. 2). Heavy deposits of silicone lubricant can be seen in Figs. 5, 8, 16, & 18. In several cases, the silicone appears to be mixed with hydrocarbon or polymeric contamination and salts (e.g. Figs. 12, 18, & 31). There were a number of locations showing wear through the gold plating. These locations showed oxidized copper often mixed with silicone or hydrocarbon (e.g. Figs. 6, 30, & 40).

## **Conclusions**

The analysis results document the types and distribution of contamination on the contact surfaces.

---

Ed Hare, Ph.D.  
Vice President - SEM Lab Inc

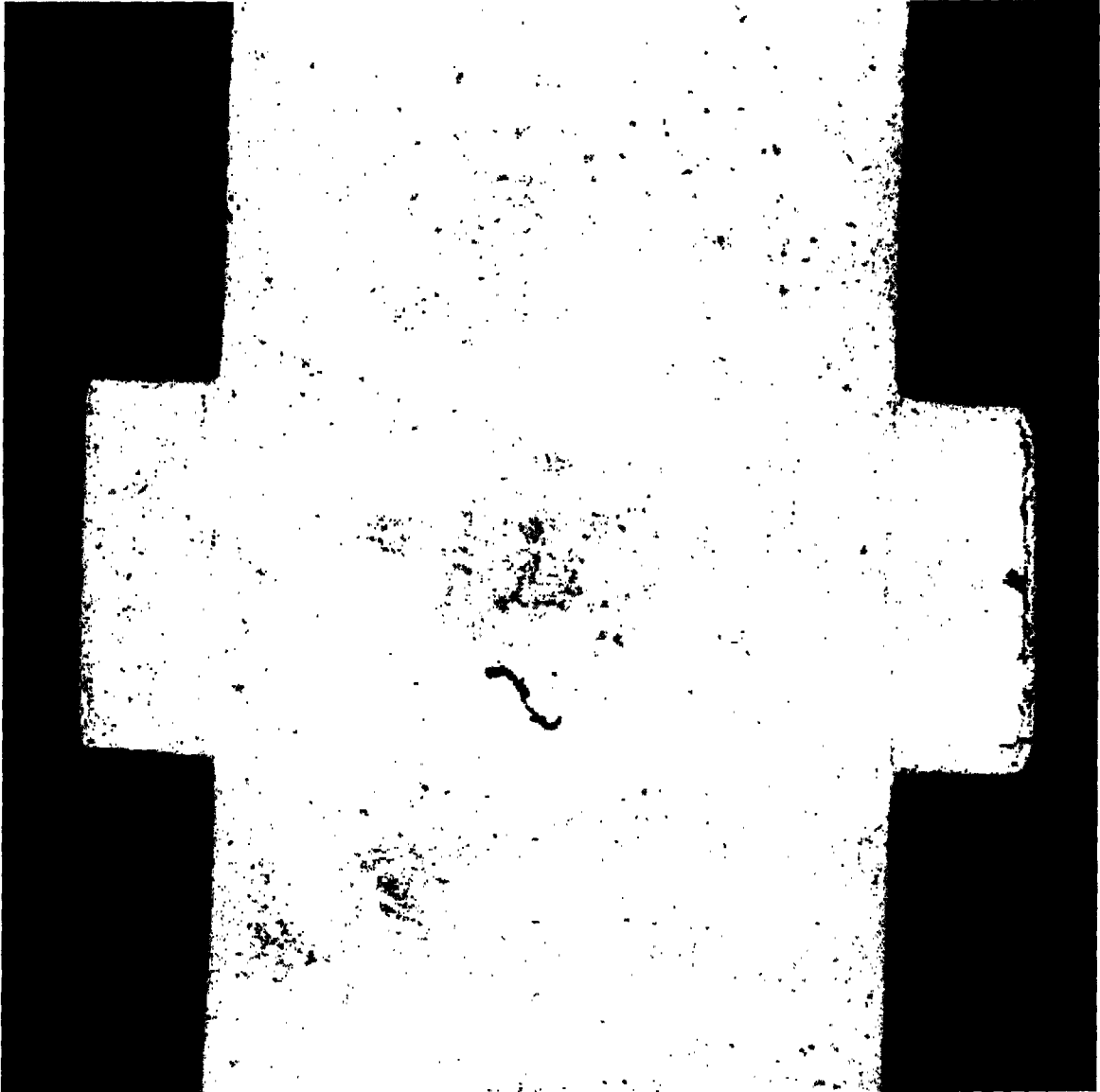


FIGURE 1: IFN 1448A\_1 [22X], Sample A – Lever #1. This is a BSE SEM image of the area around the pivot point on the lever. There is a little silicone lubricant here (dark areas).

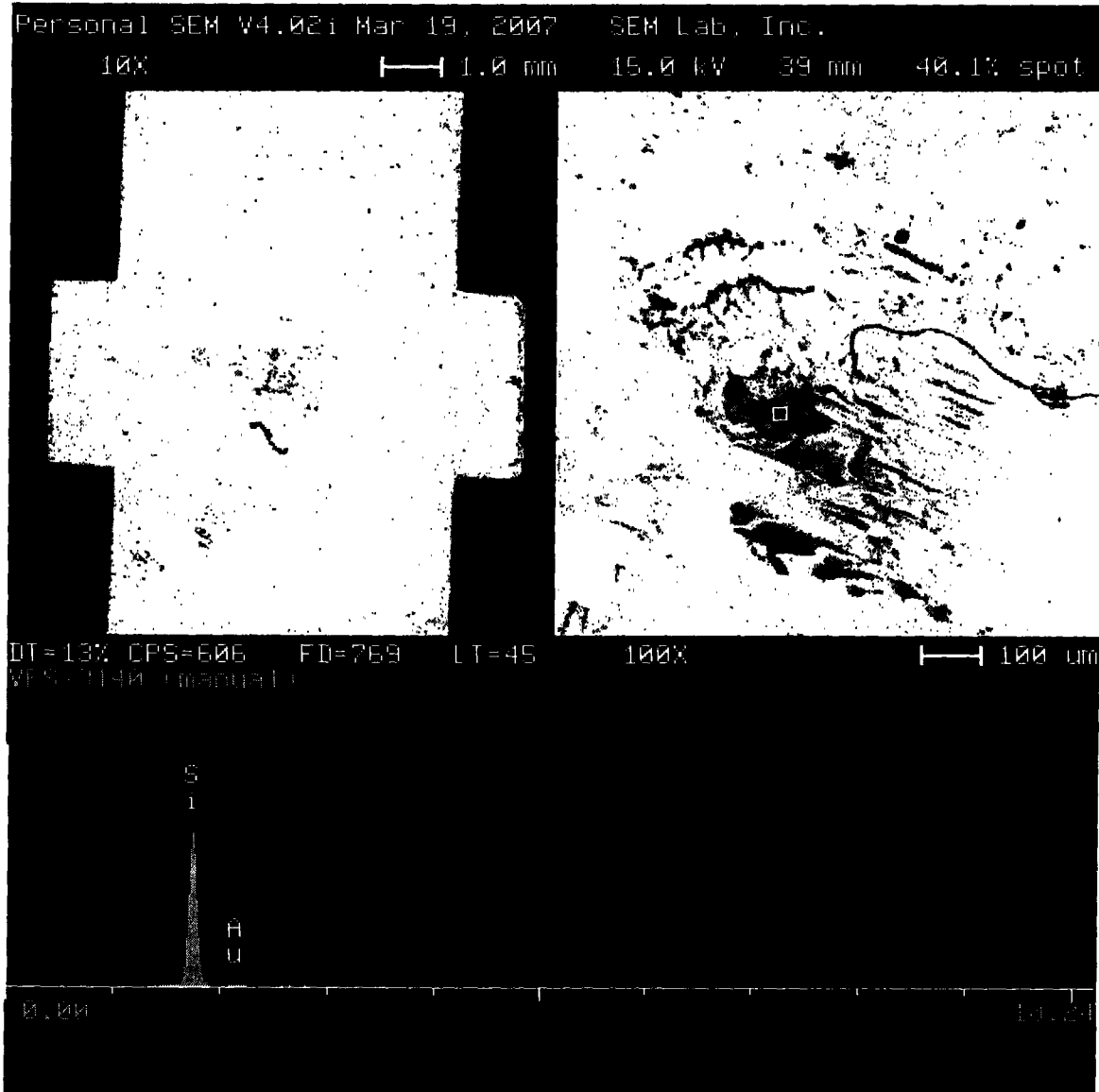


FIGURE 2: IFN 1448A\_2, Sample A – Lever #1. This spectrum suggests the dark contrast material on the surface is silicone lubricant.



FIGURE 3: IFN 1448A\_3 [22X], Sample A – Lever #1. This image shows the distribution of lubricant on the lever arm.

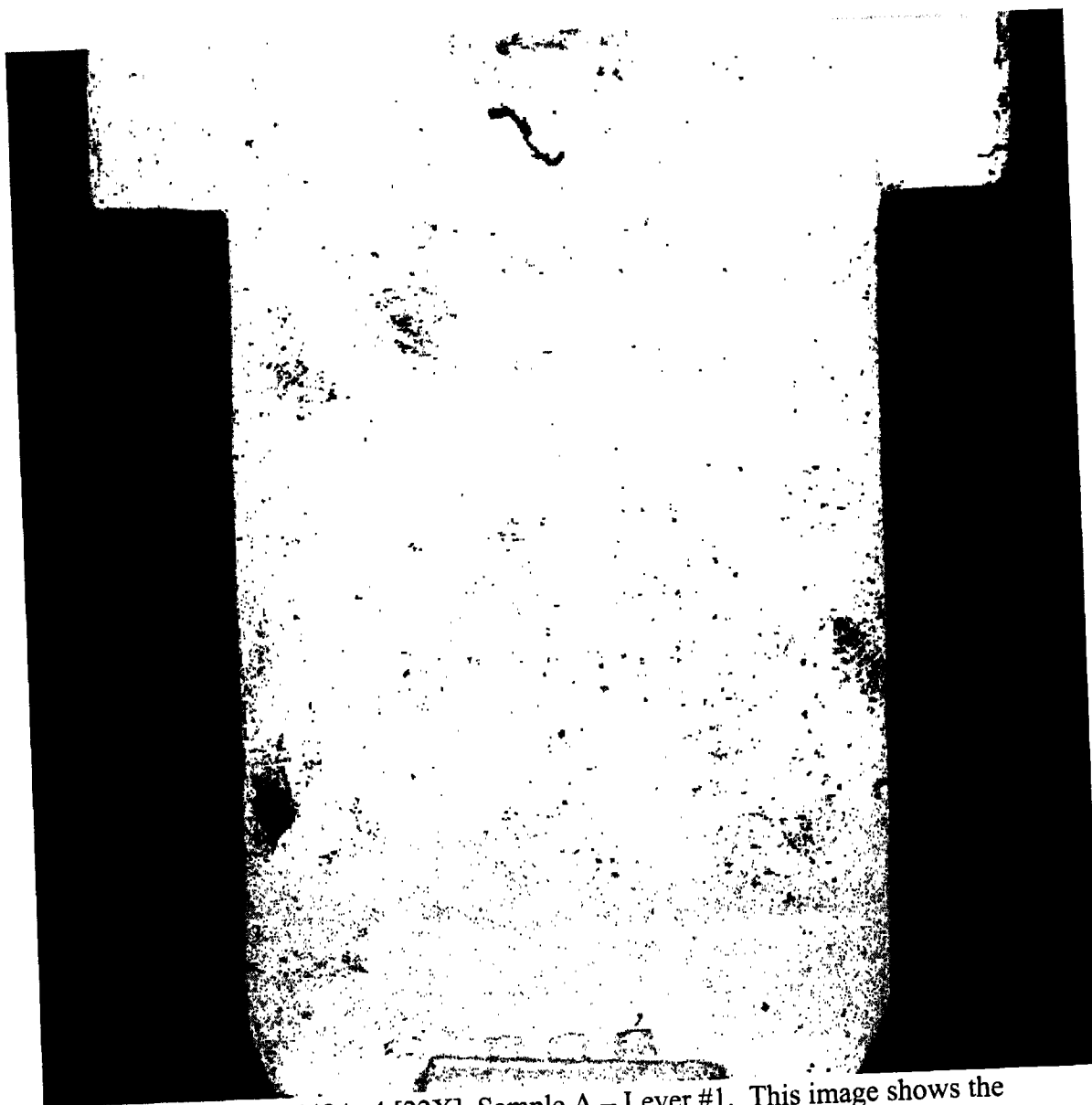


FIGURE 4: IFN 1448A\_4 [22X], Sample A – Lever #1. This image shows the distribution of lubricant on the lever arm.

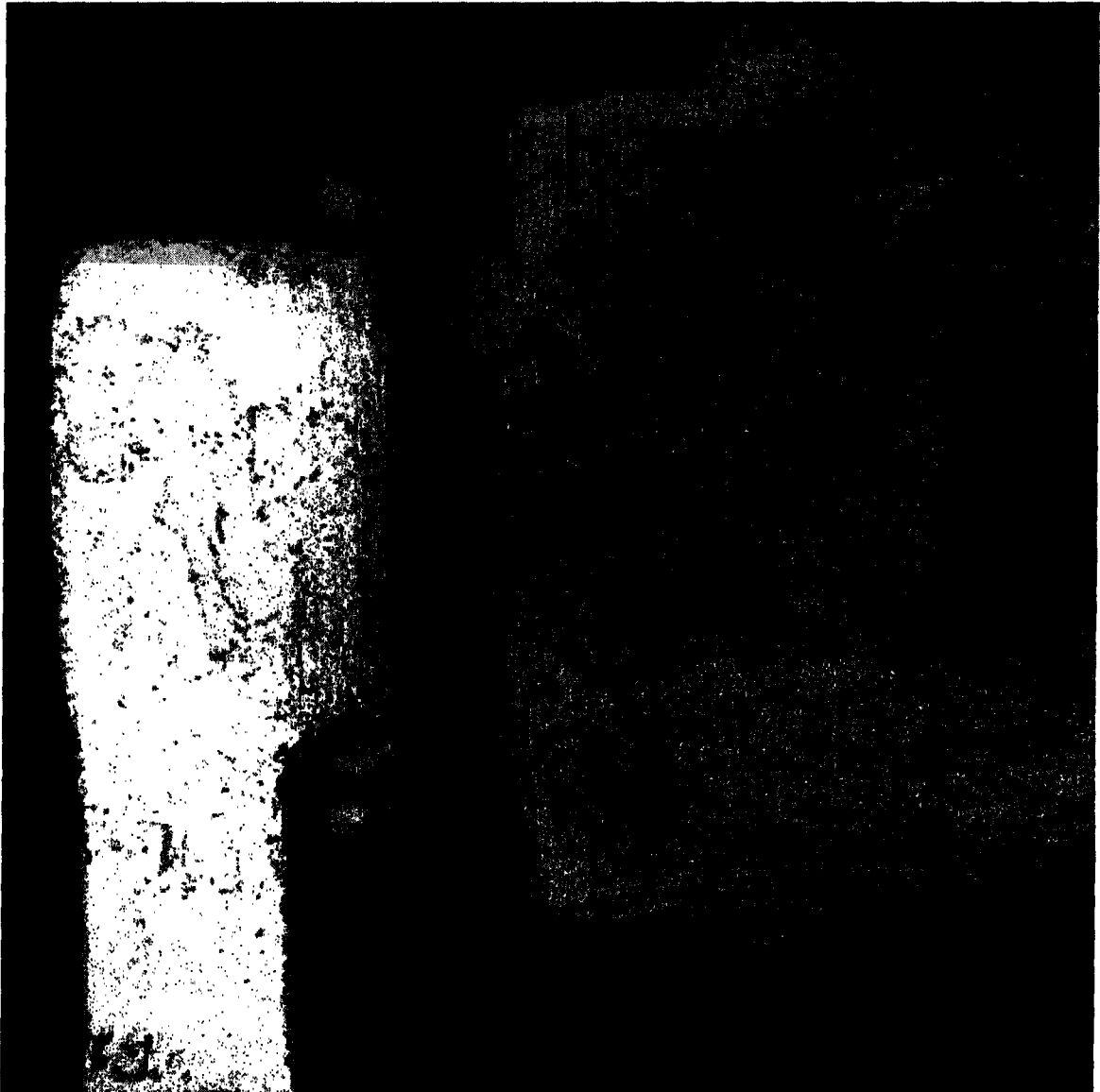


FIGURE 5: IFN 1448B\_1 [22X], Sample B – Terminal #1. There is a great deal of lubricant on the base of the blade.

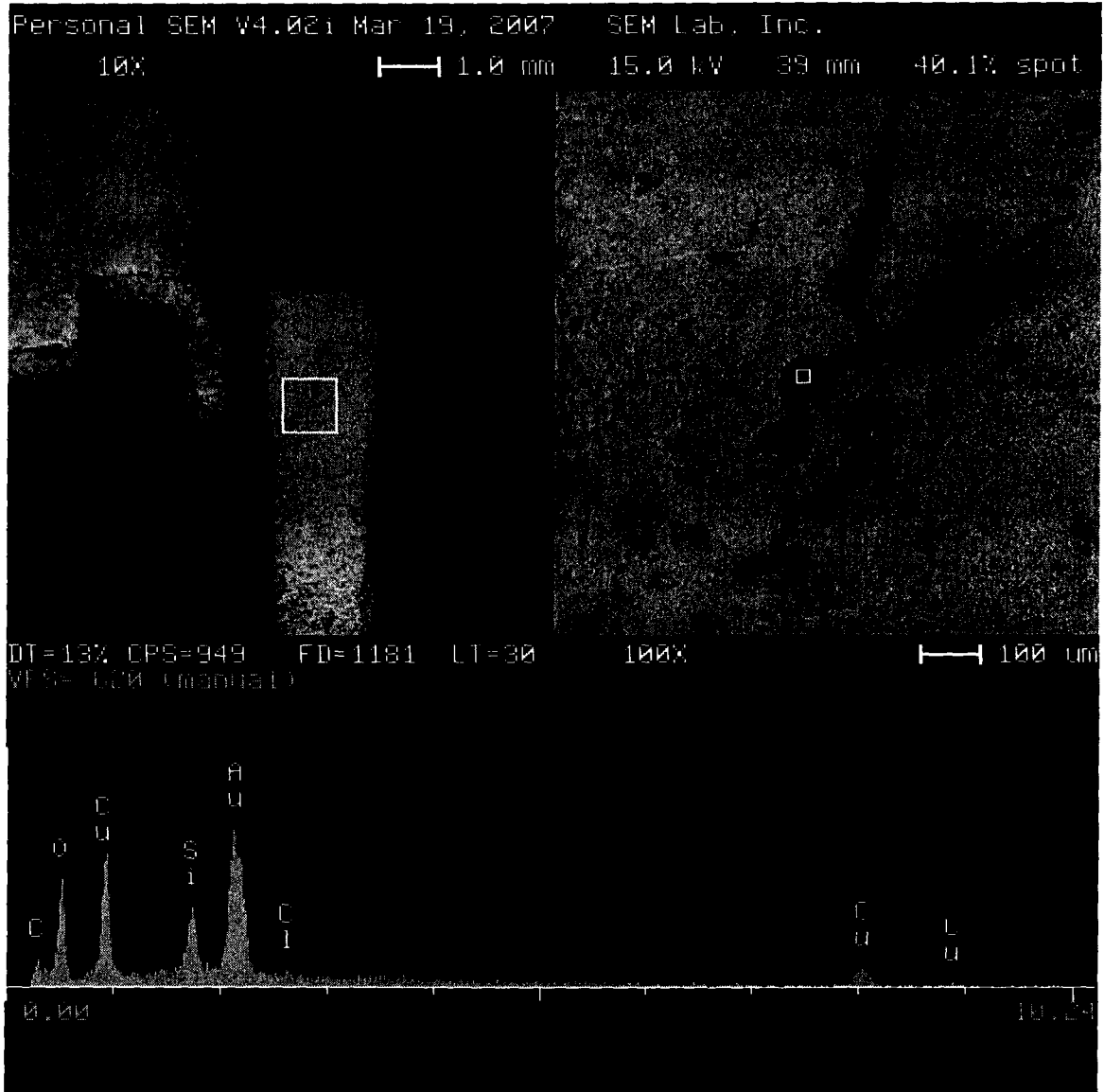


FIGURE 6: IFN 1448B\_2, Sample B – Terminal #1. This spectrum suggests that there is silicone lubricant and oxidized copper at this location.

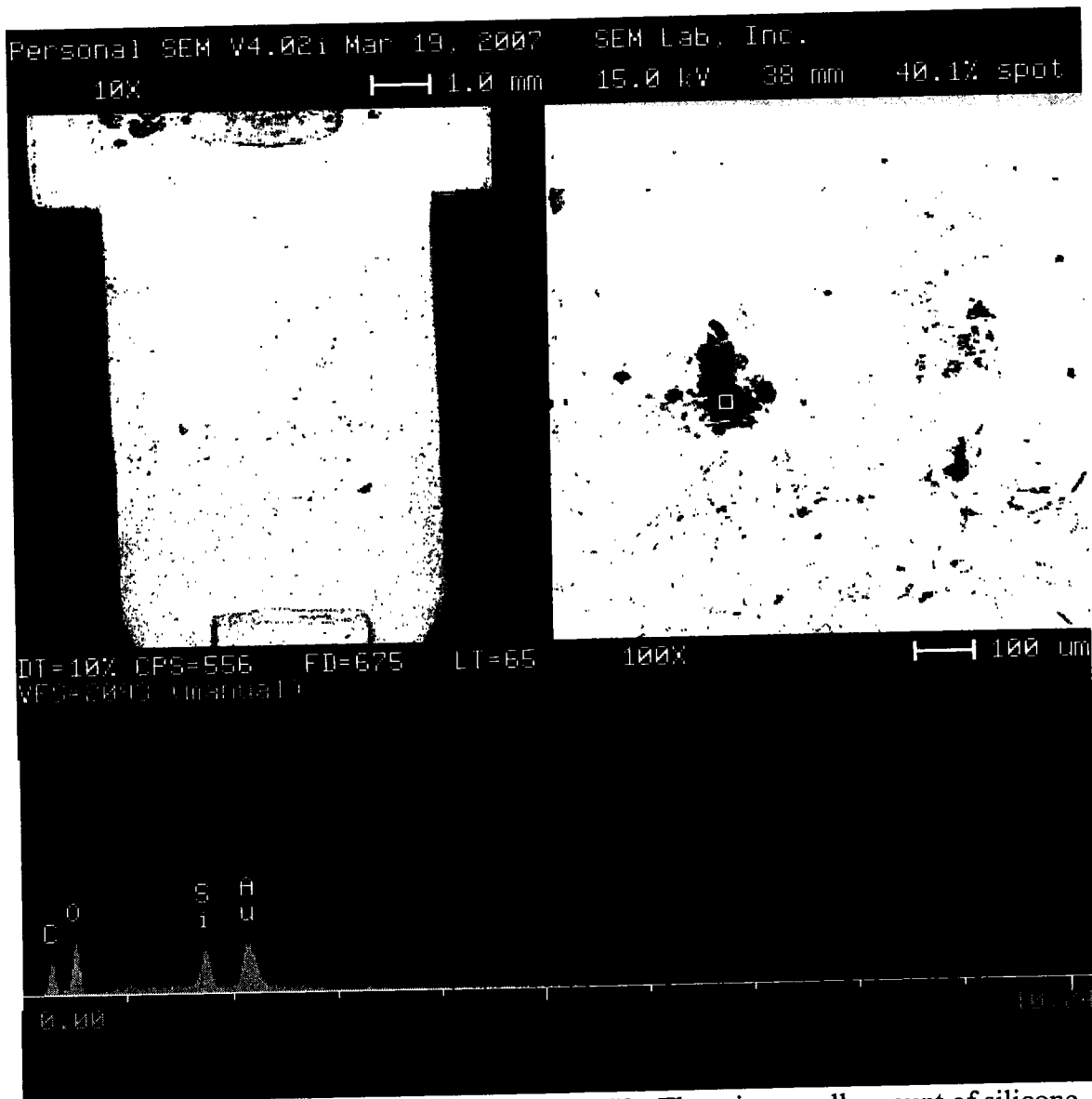


FIGURE 7: IFN 1448C\_1, Sample C – Lever #2. There is a small amount of silicone lubricant at this location.

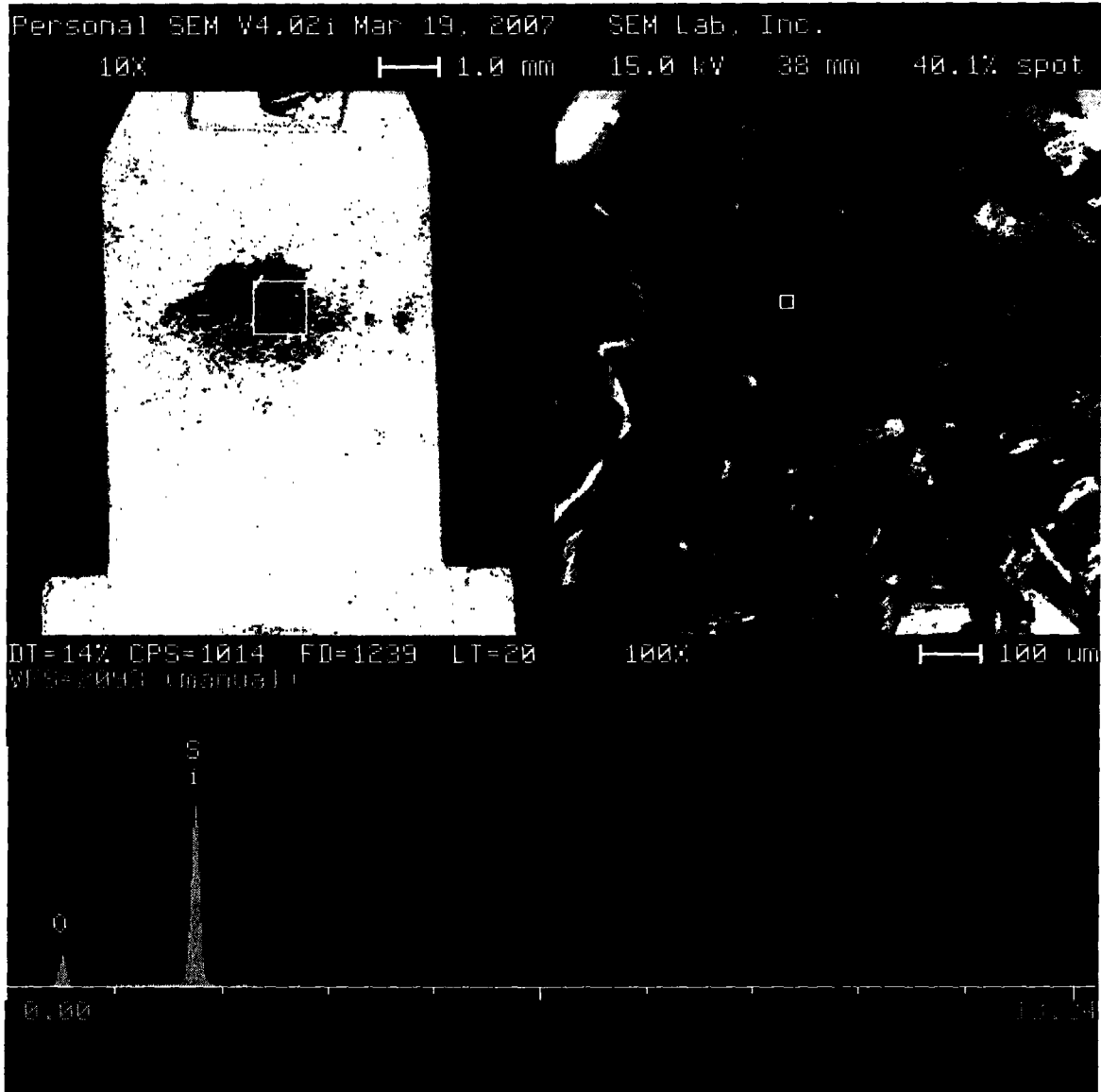


FIGURE 8: IFN 1448C\_2, Sample C – Lever #2. There is a large amount of silicone lubricant at this location.

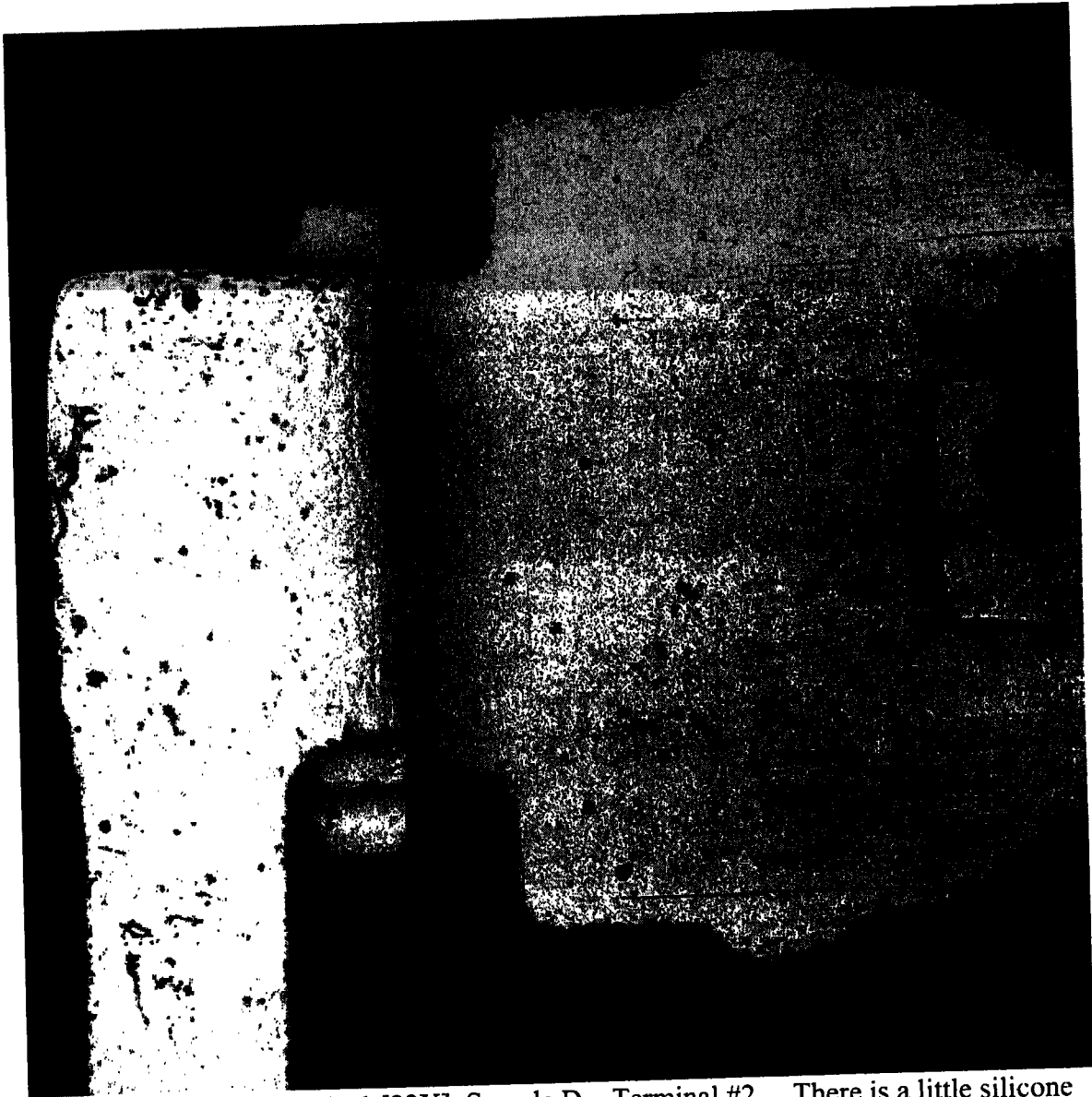


FIGURE 9: IFN 1448D\_1 [22X], Sample D – Terminal #2. There is a little silicone lubricant on the side of the pivot contact.

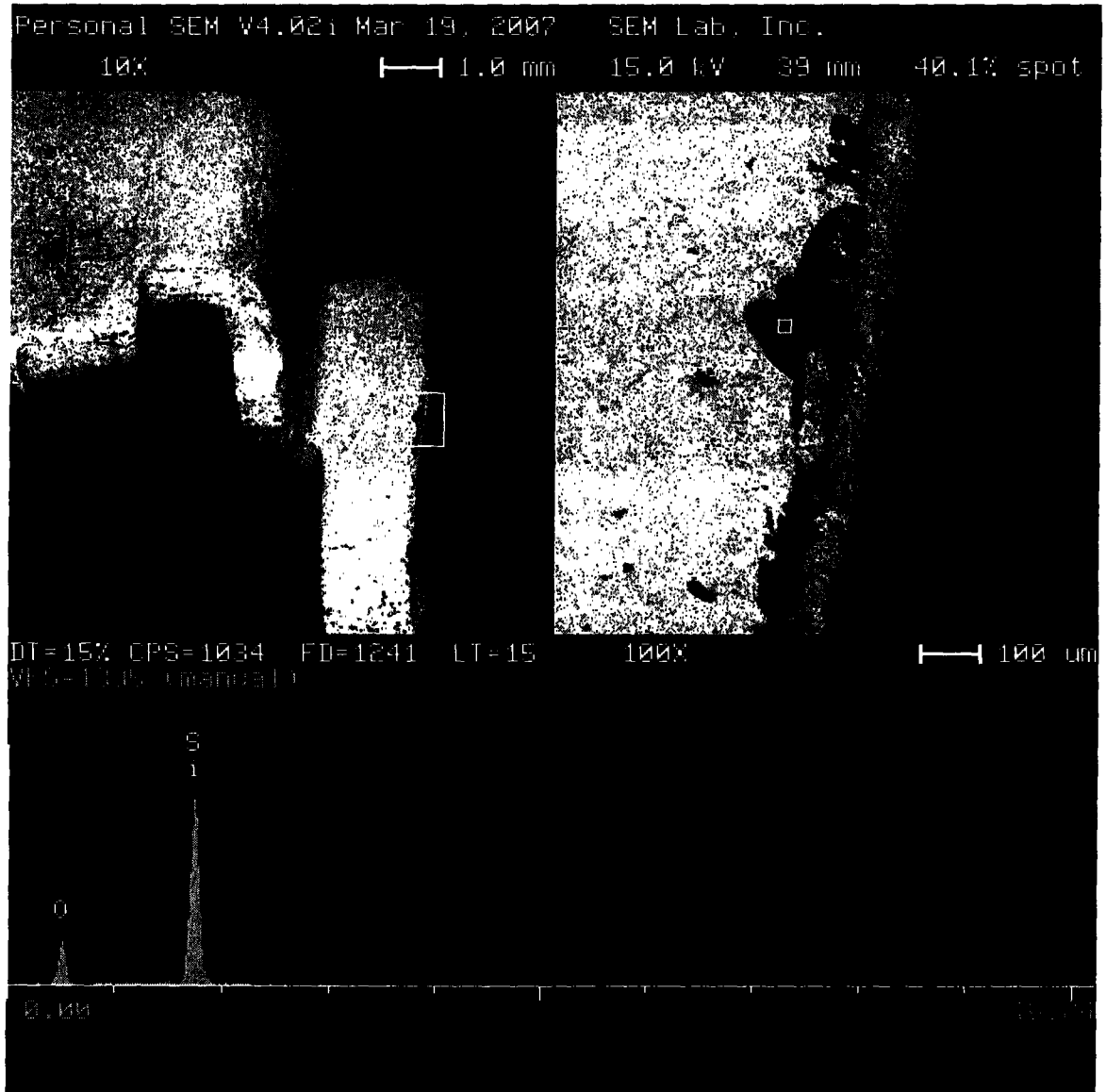


FIGURE 10: IFN 1448D\_2, Sample D – Terminal #2. There is a small amount of silicone lubricant on the opposite side of the pivot contact.

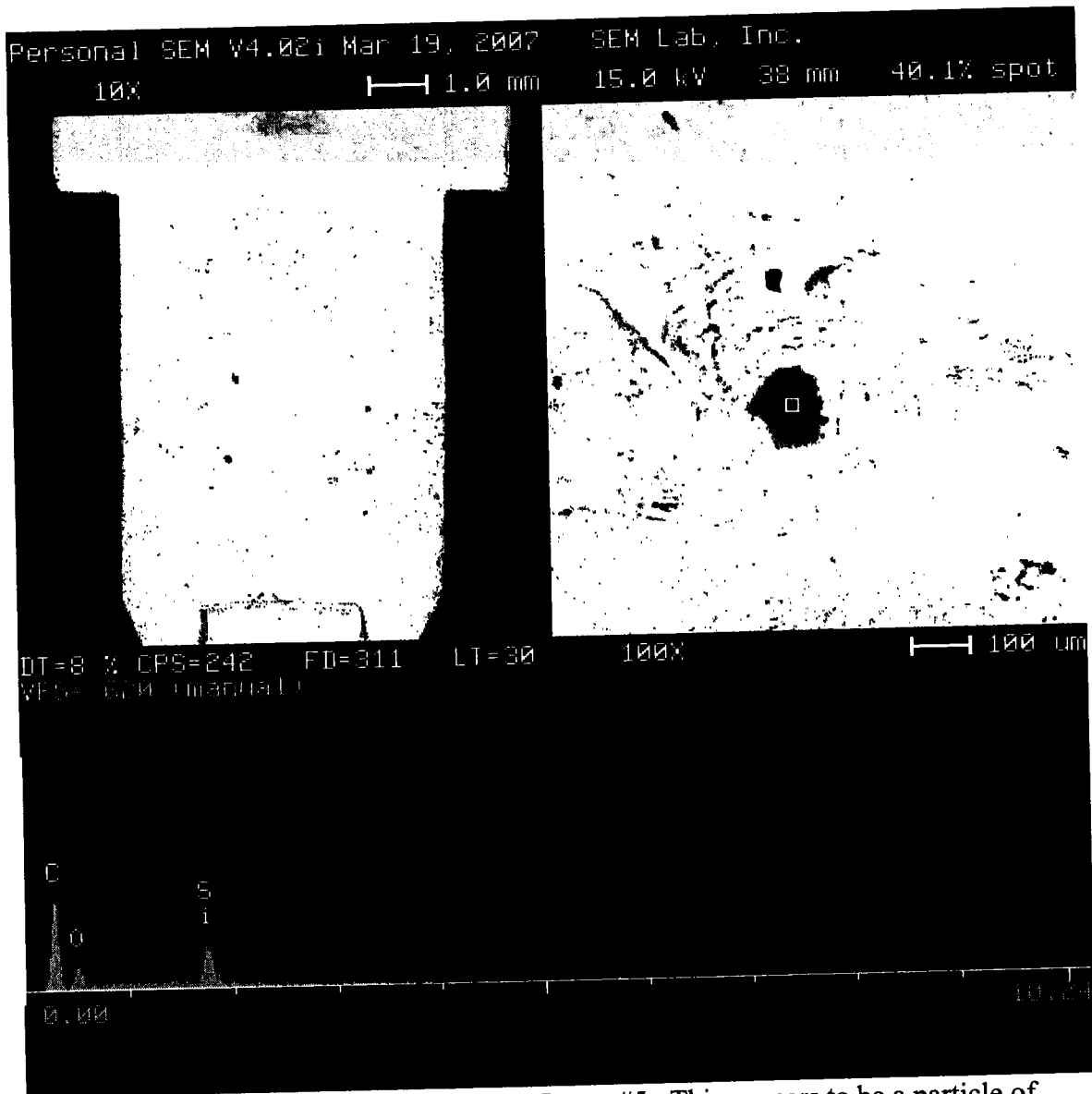


FIGURE 11: IFN 1448E\_1, Sample E – Lever #5. This appears to be a particle of dried lubricant.

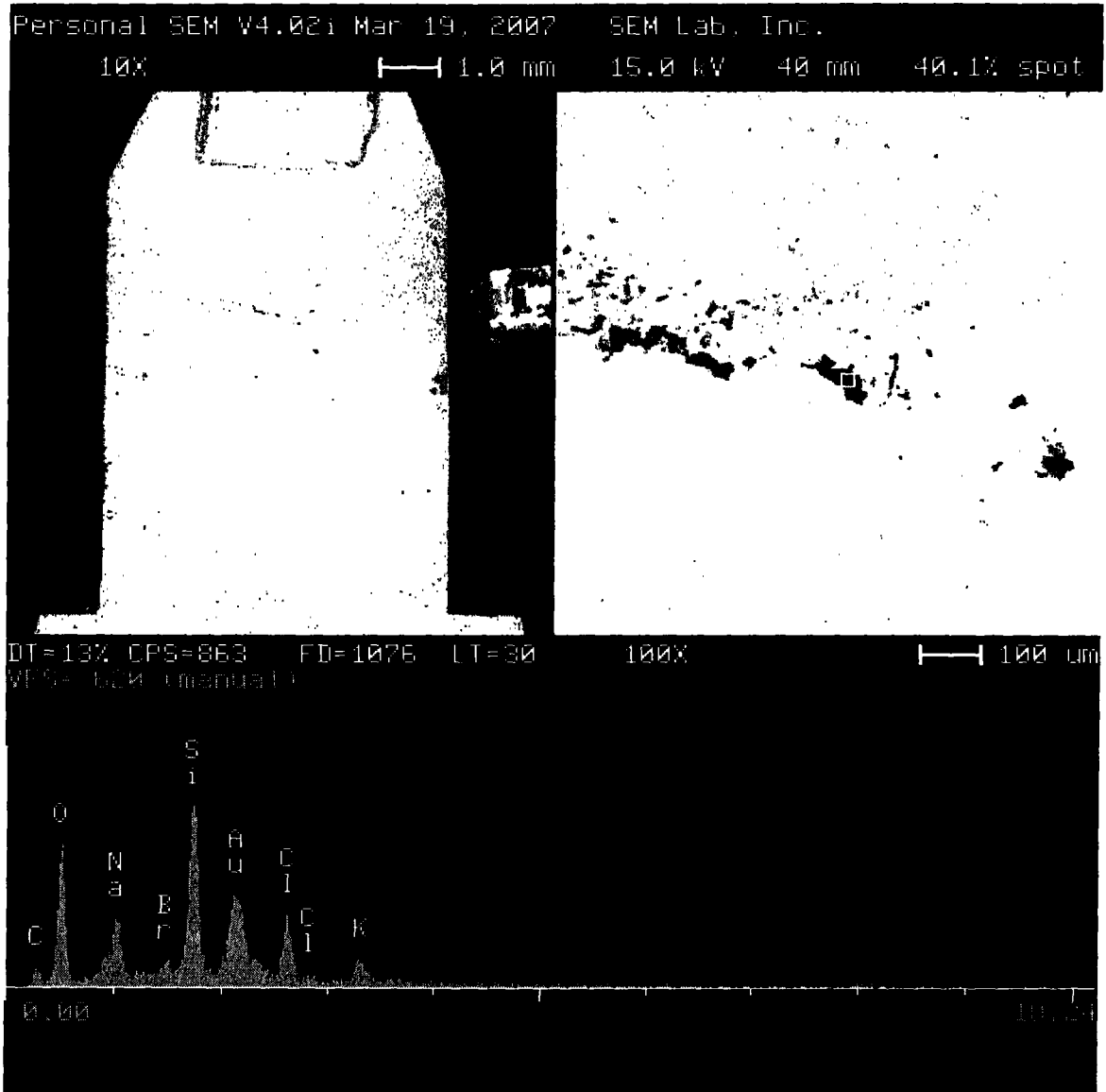


FIGURE 12: IFN 1448E\_2, Sample E – Lever #5. This appears to be lubricant mixed with salts.

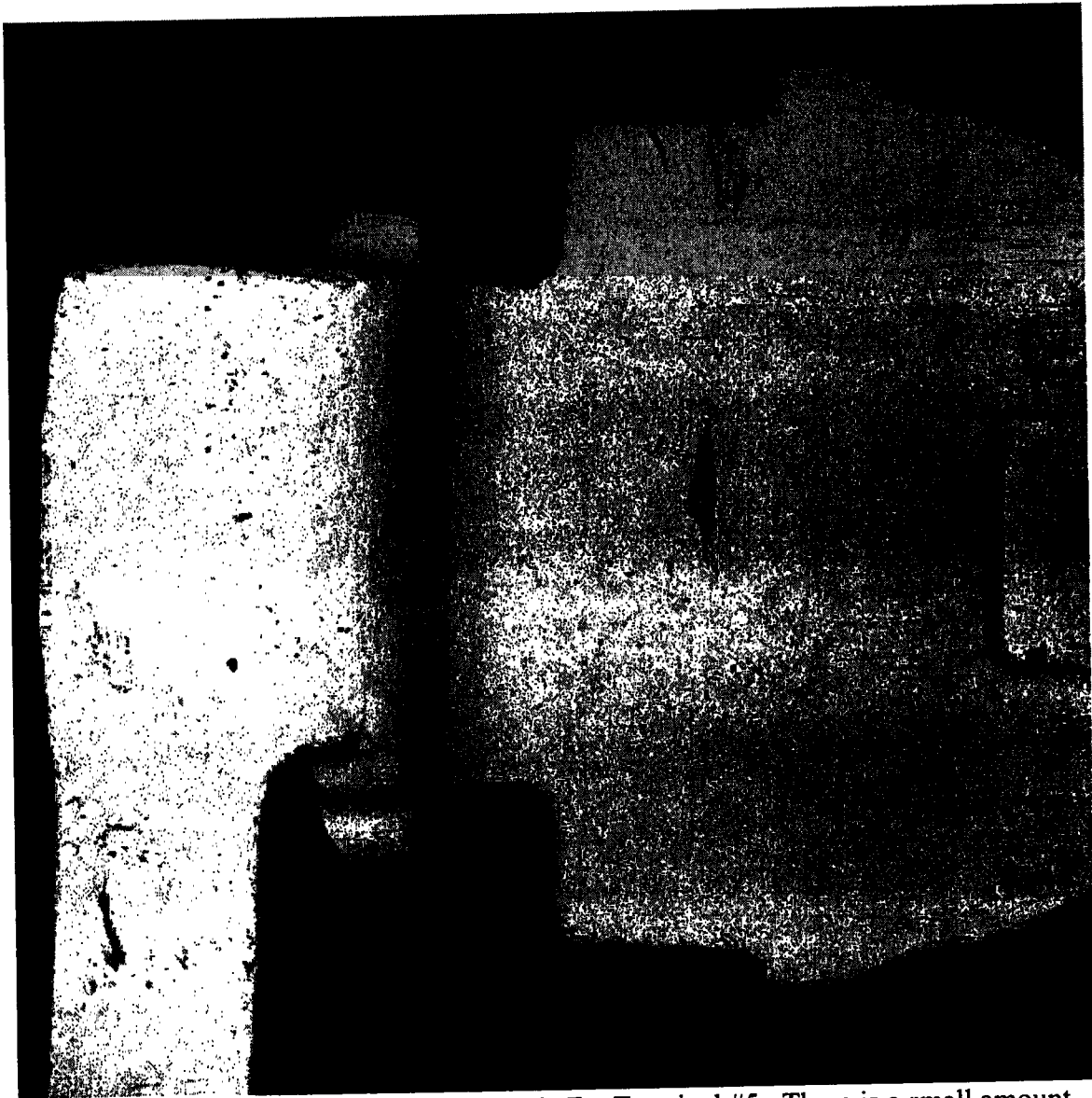


FIGURE 13: IFN 1448F\_1 [22X], Sample F – Terminal #5. There is a small amount of silicone lubricant at this location.

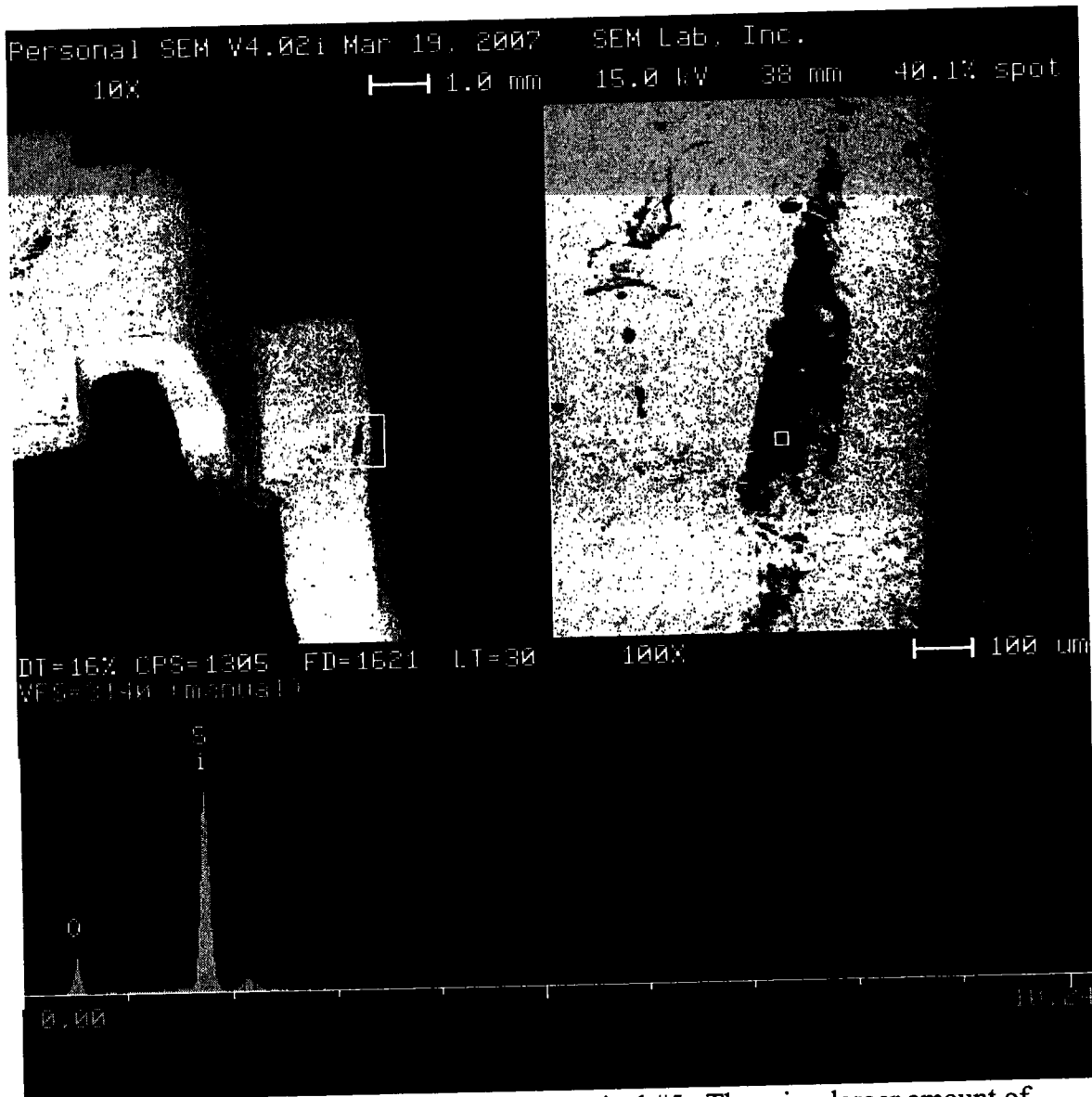


FIGURE 14: IFN 1448F\_2, Sample F – Terminal #5. There is a larger amount of silicone lubricant on the opposite side of the pivot contact.

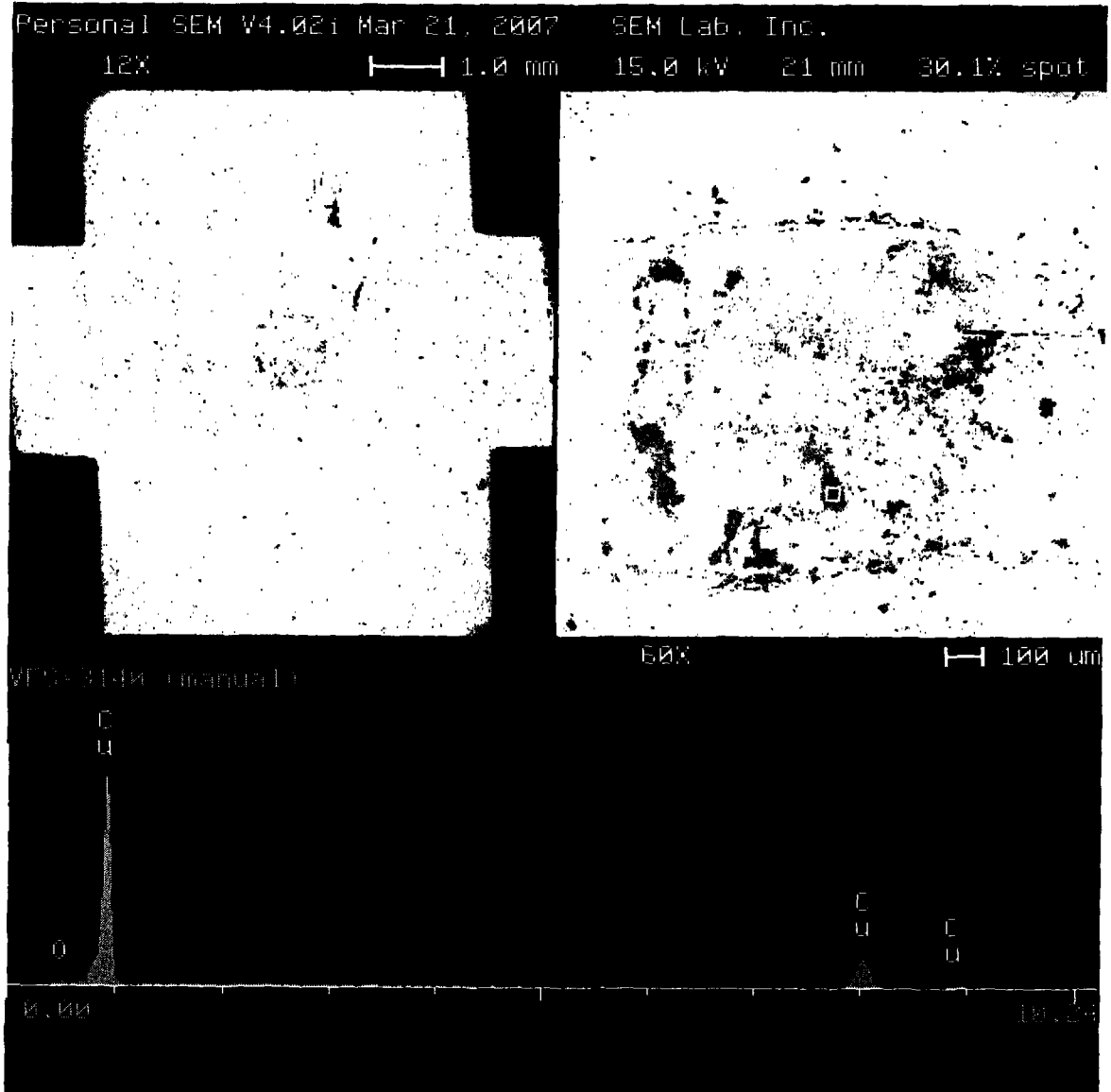


FIGURE 15: IFN 1448G\_1, Sample G – Lever #9. This is exposed copper in the contact region.

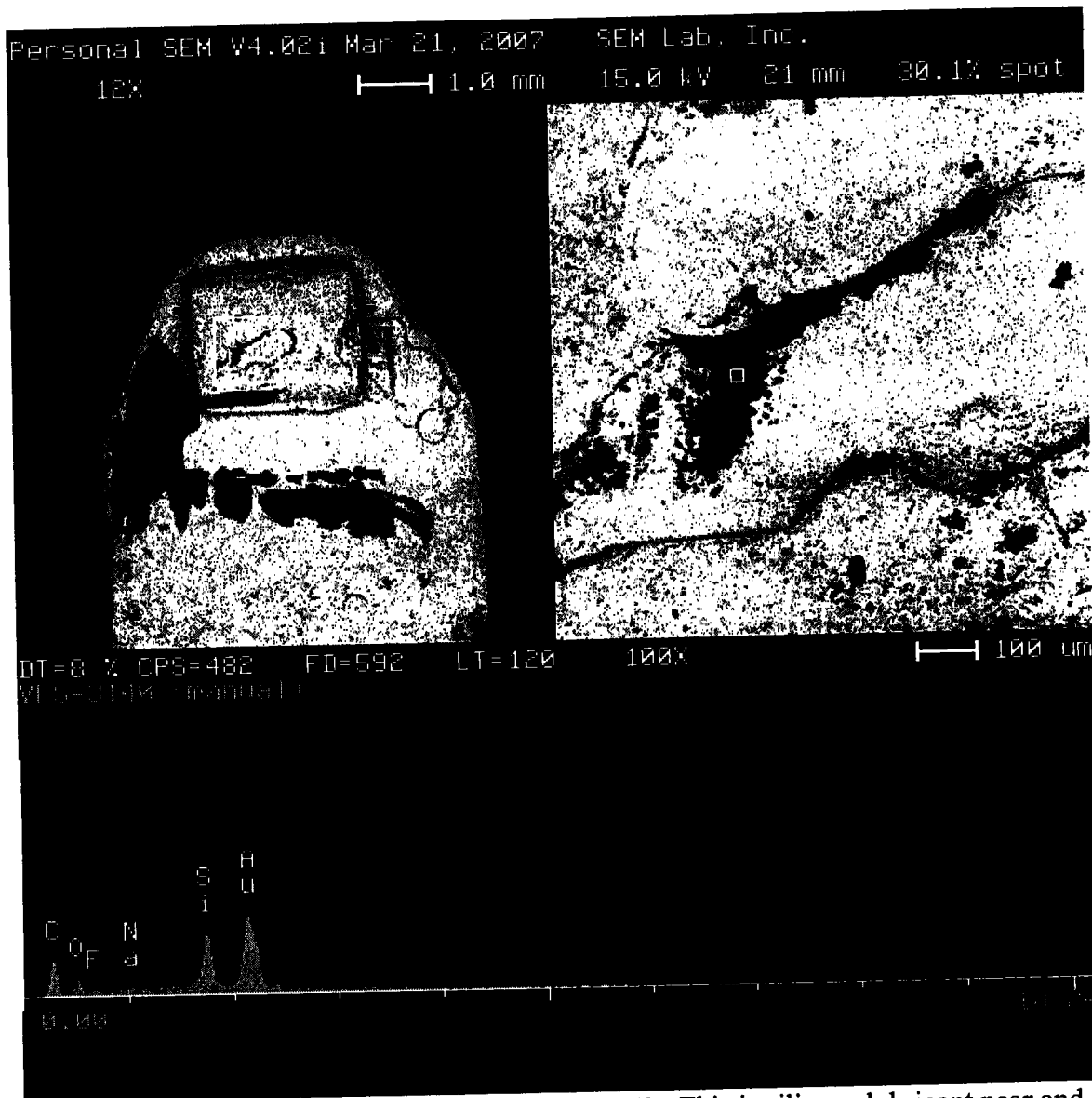


FIGURE 16: IFN 1448G\_2, Sample G – Lever #9. This is silicone lubricant near and on the contact.

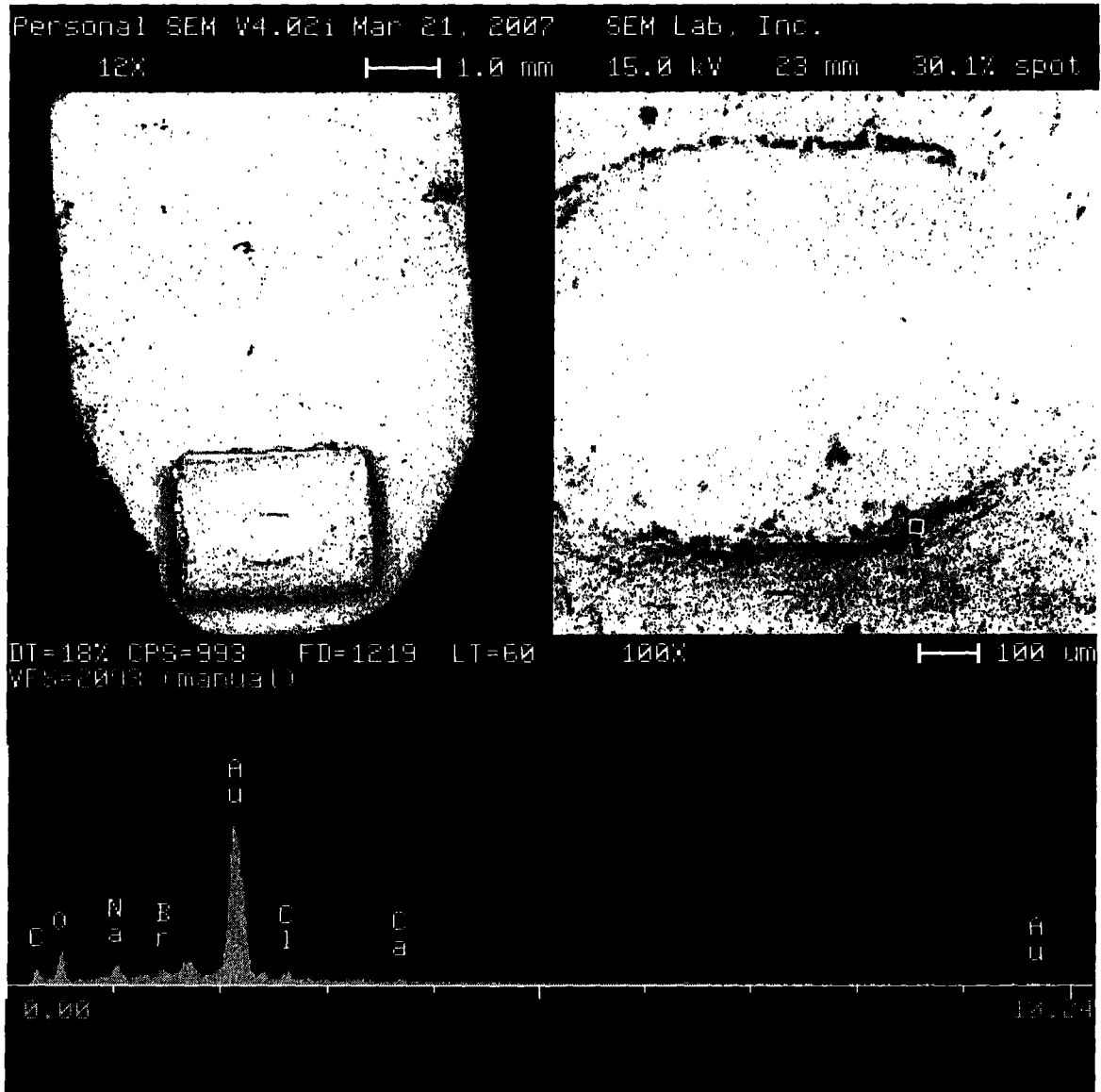


FIGURE 17: IFN 1448G\_3, Sample G – Lever #9. This appears to be salt and hydrocarbon residue.

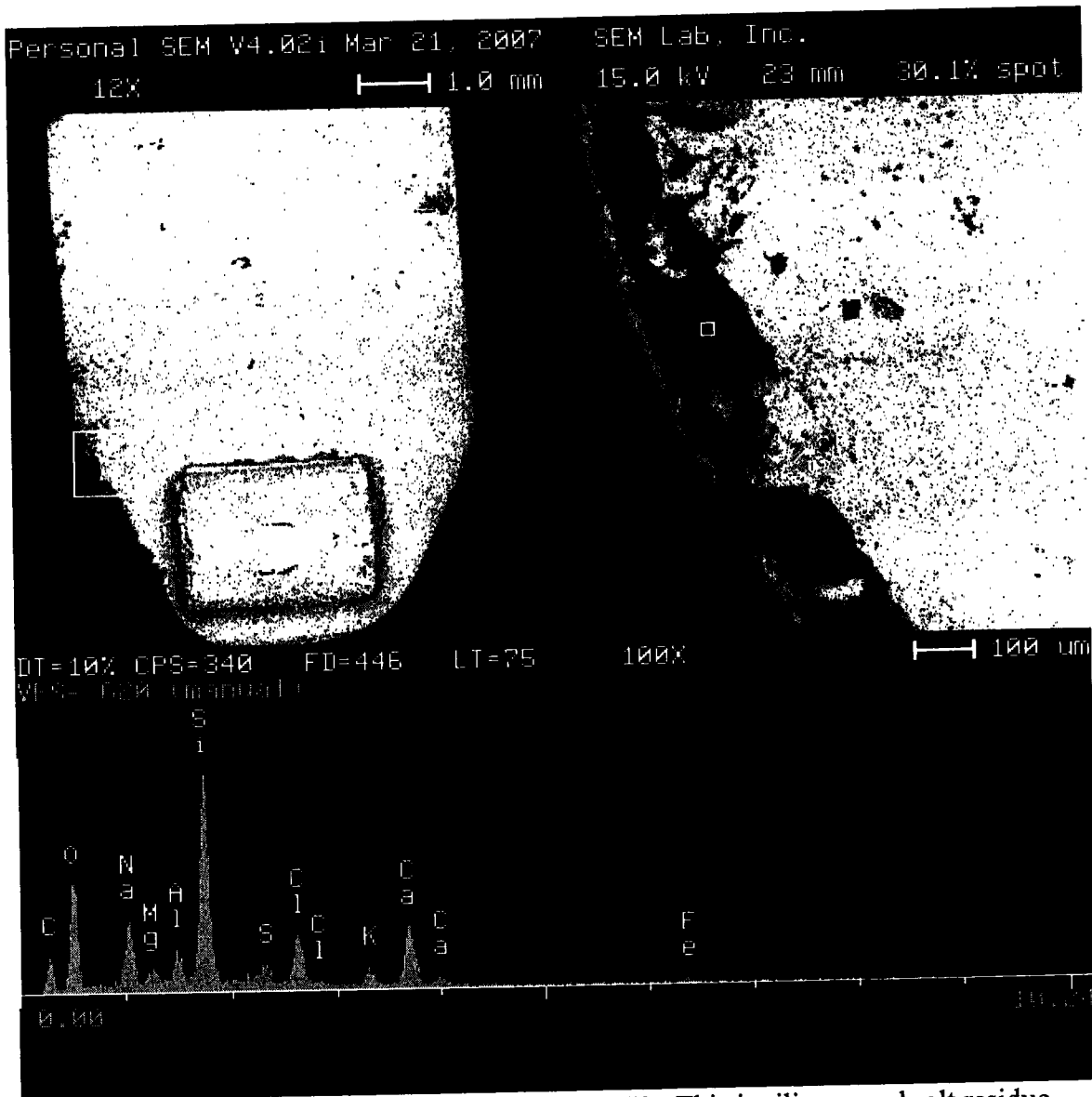


FIGURE 18: IFN 1448G\_4, Sample G – Lever #9. This is silicone and salt residue.

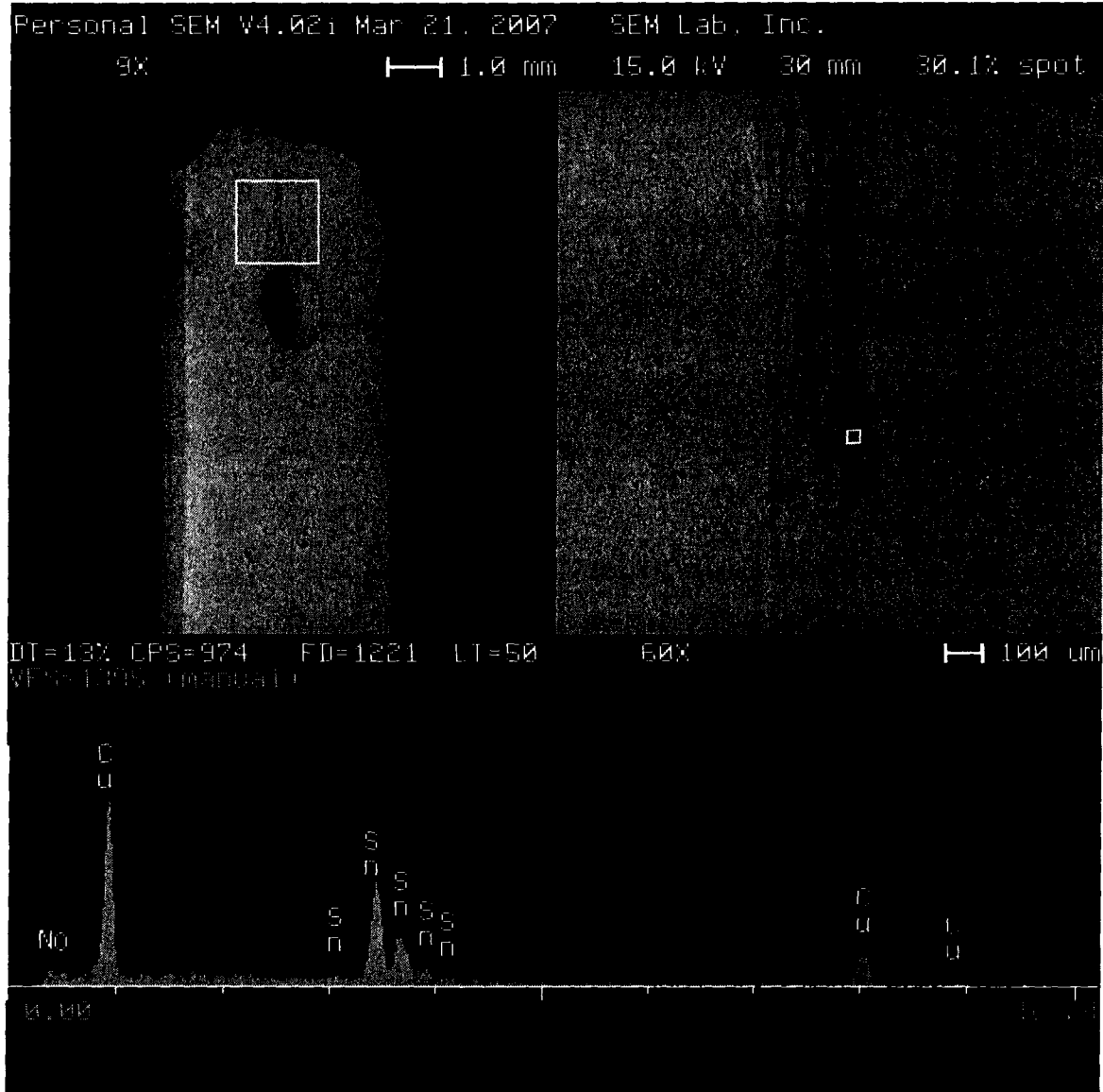


FIGURE 19: IFN 1448H\_1, Sample H – Pivot Terminal #9. This is exposed tin and copper on the blade surface.

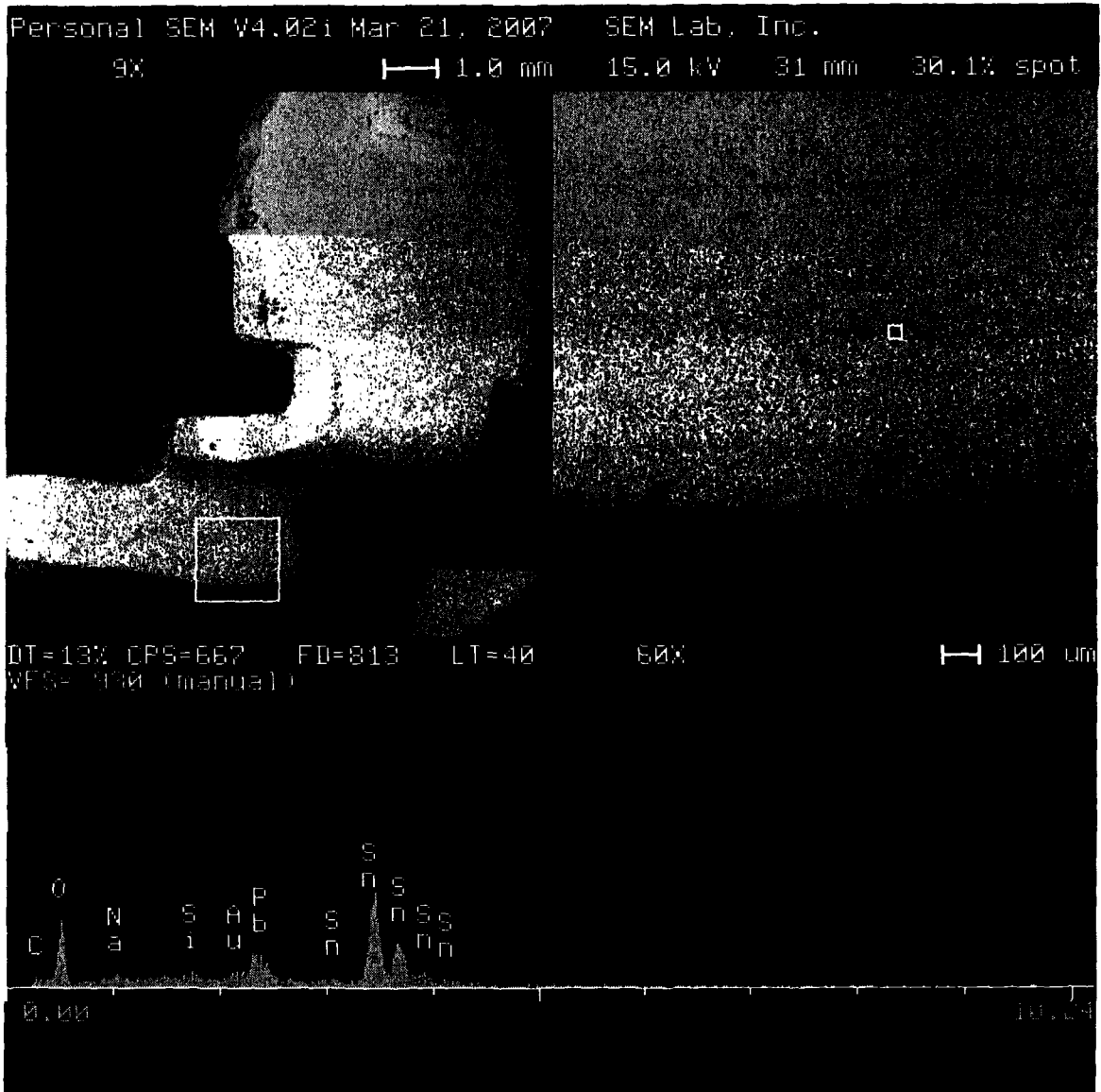


FIGURE 20: IFN 1448H\_2, Sample H – Pivot Terminal #9. This may be a small area of solder (Sn-Pb) splash.

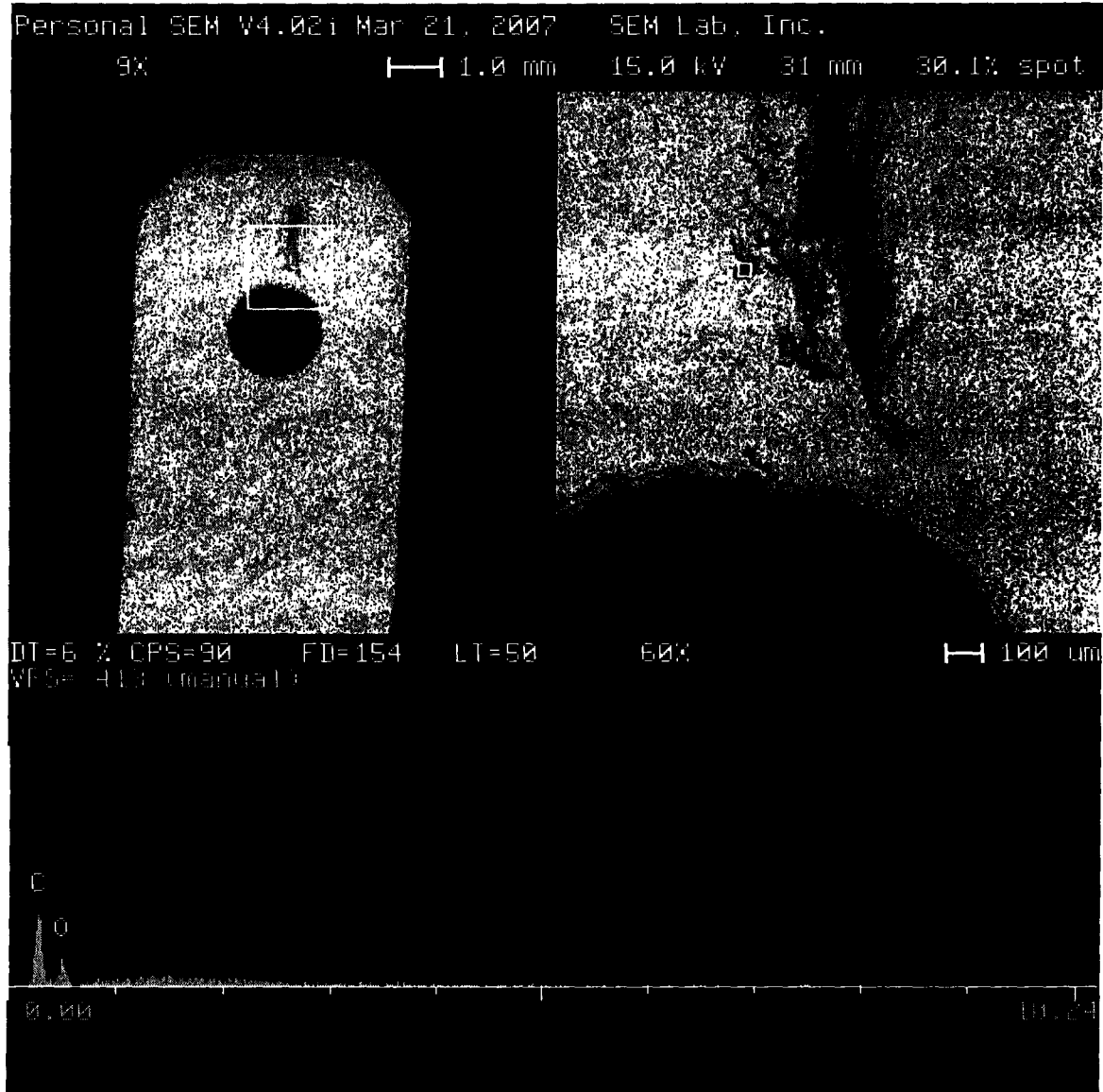


FIGURE 21: IFN 1448H\_3, Sample H – Pivot Terminal #9. This appears to be a hydrocarbon or polymer particle.

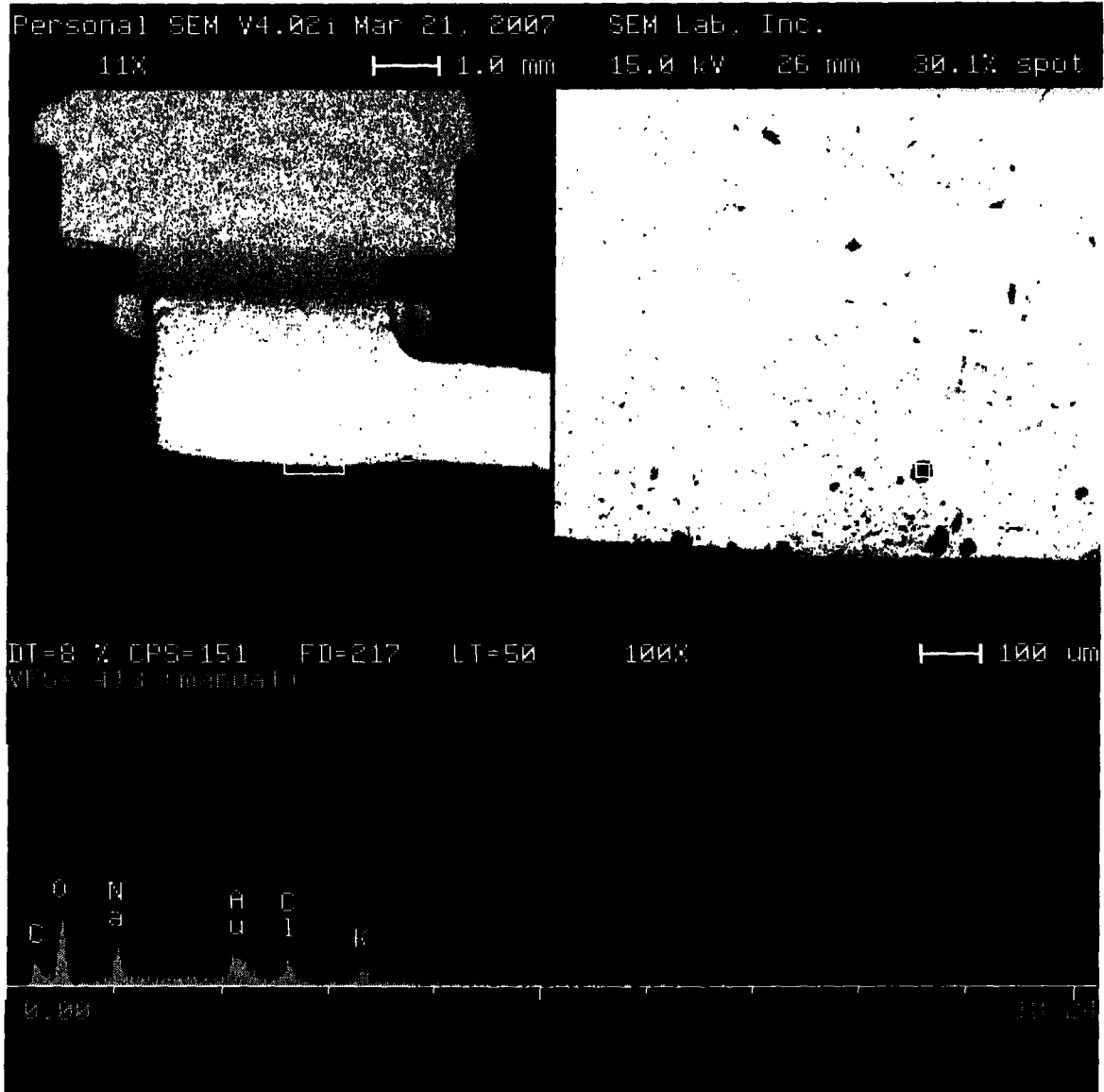


FIGURE 22: IFN 1448H\_4, Sample H – Pivot Terminal #9. This appears to be salt and hydrocarbon.

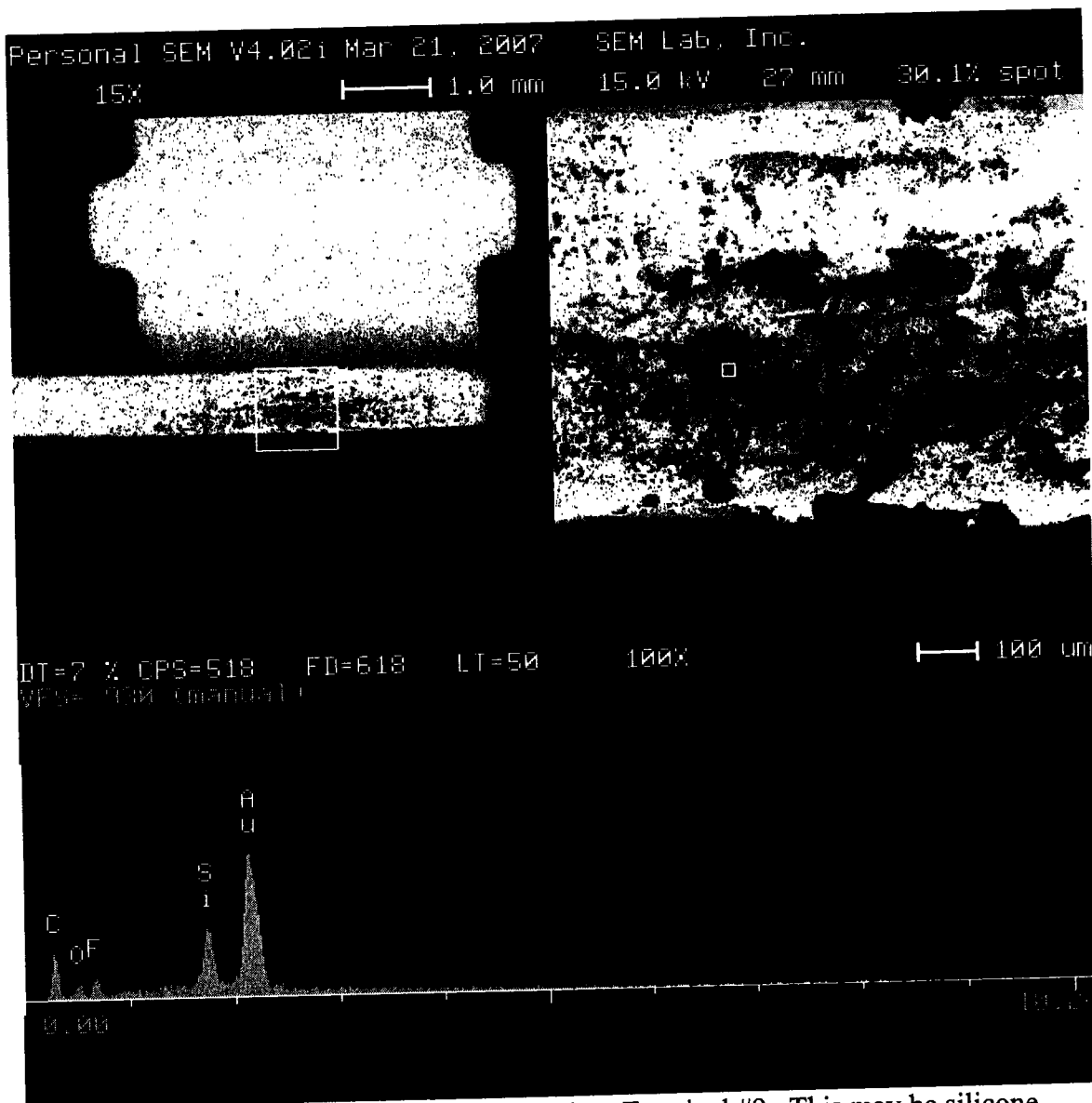


FIGURE 23: IFN 1448H\_5, Sample H - Pivot Terminal #9. This may be silicone lubricant with Teflon.

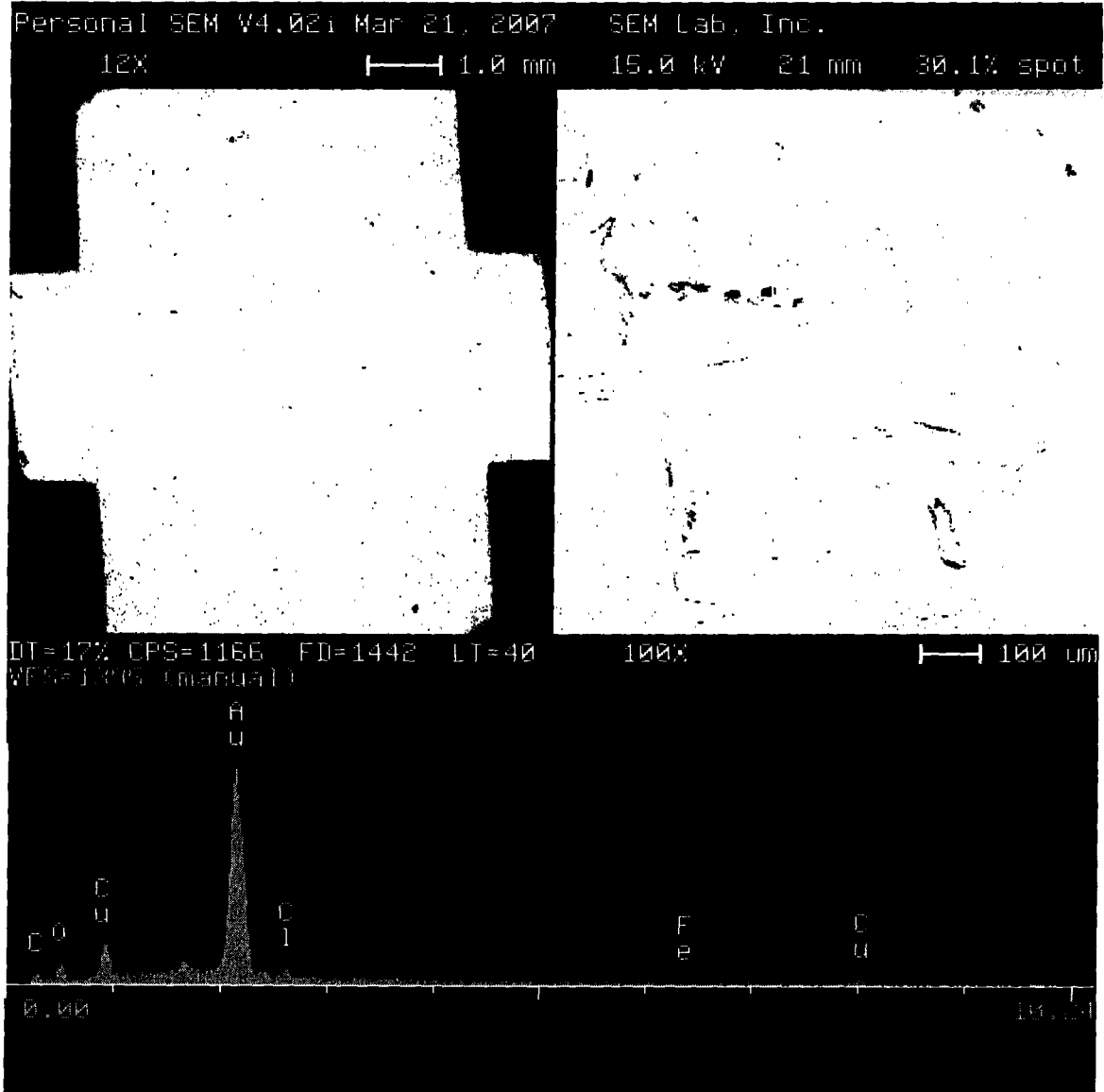


FIGURE 24: IFN 1448I\_1, Sample I – Lever #11. This lever is relatively clean.

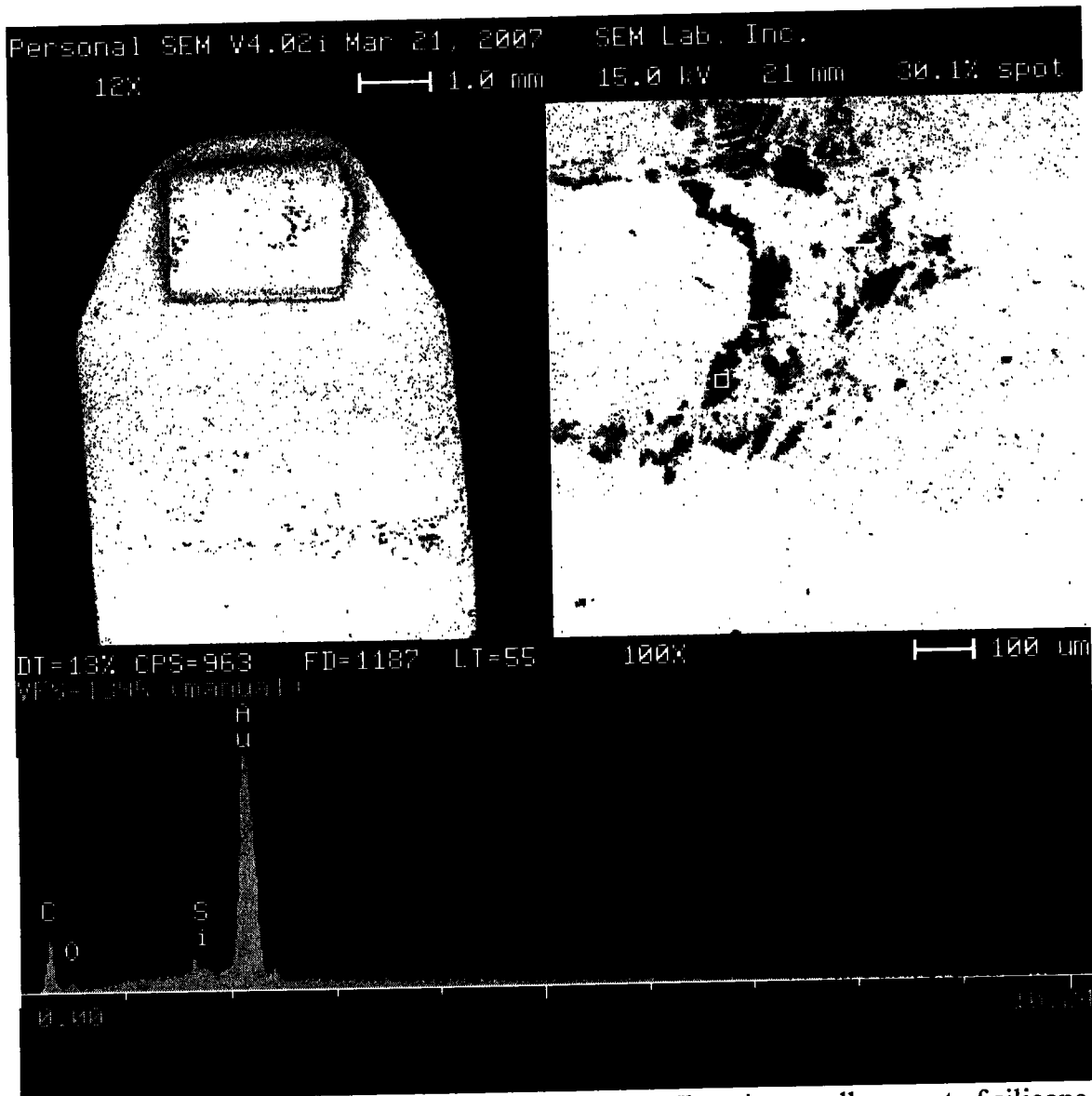


FIGURE 25: IFN 1448I\_2, Sample I – Lever #11. There is a small amount of silicone lubricant and hydrocarbon at this location.

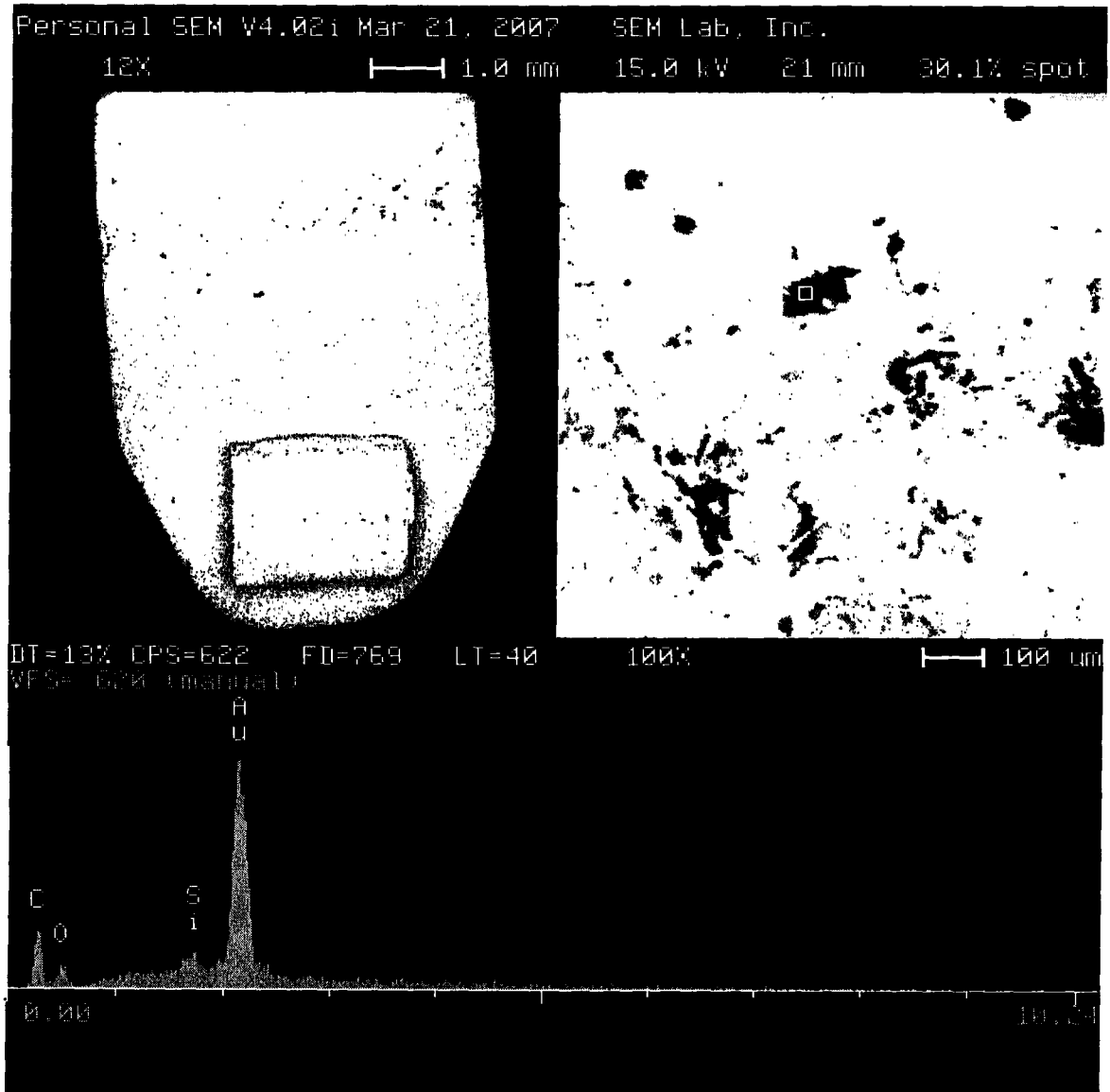


FIGURE 26: IFN 1448I\_3, Sample I - Lever #11. This appears to be silicone plus hydrocarbon.

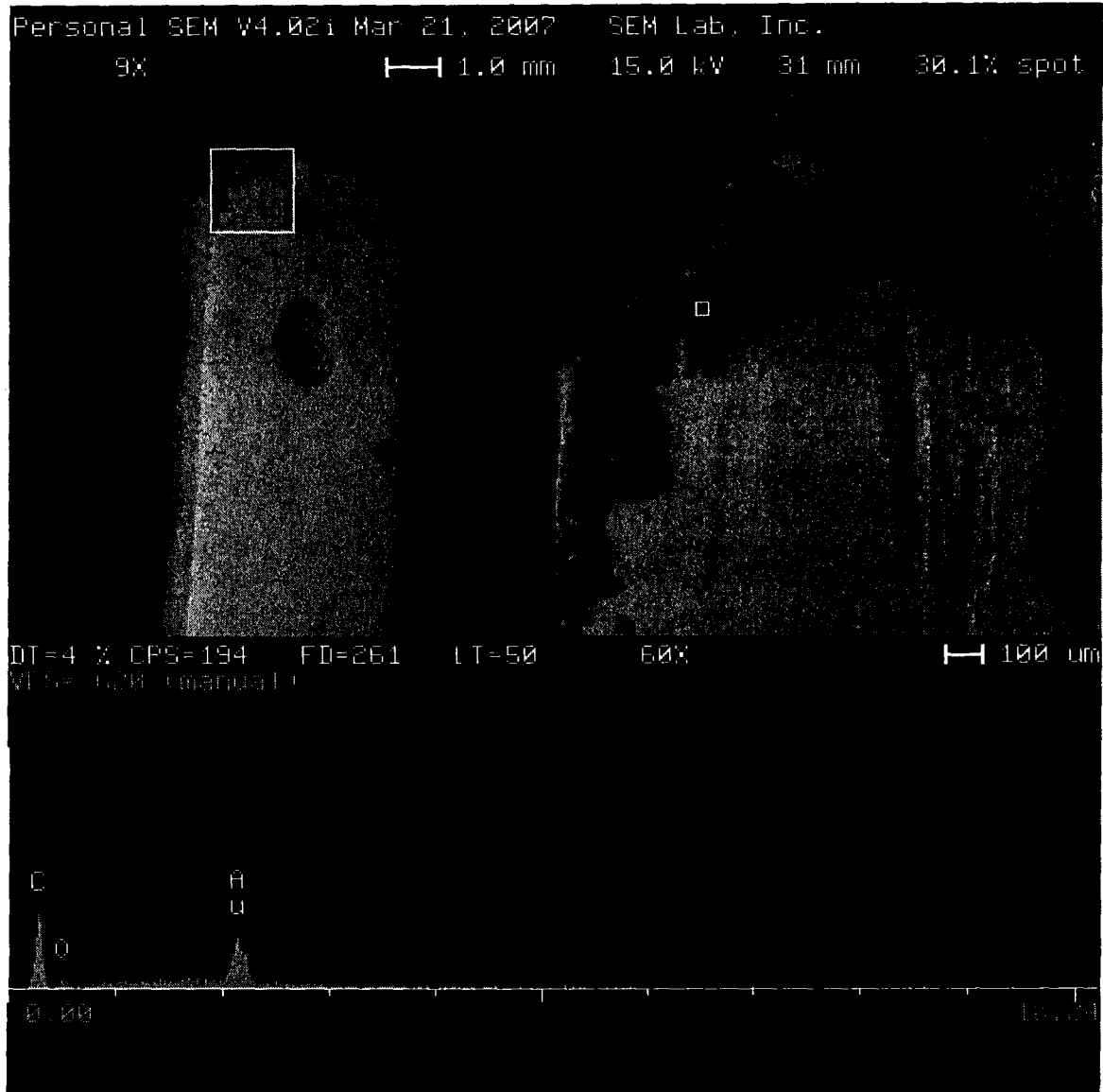


FIGURE 27: IFN 1448j\_1, Sample J – Pivot Terminal #11. This may be polymeric debris.

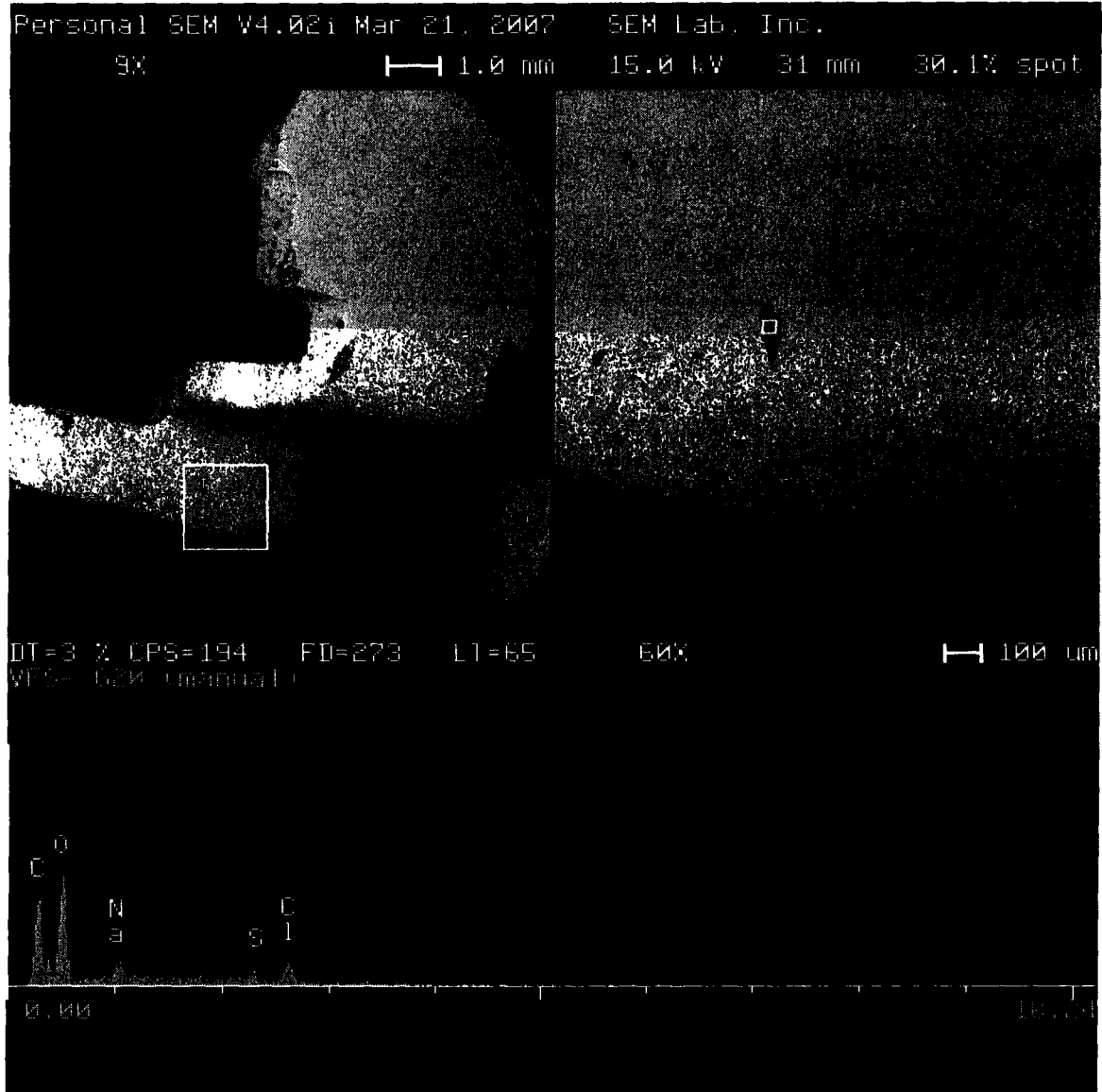


FIGURE 28: IFN 1448j\_2, Sample J – Pivot Terminal #11. This is salt and hydrocarbon or polymer.

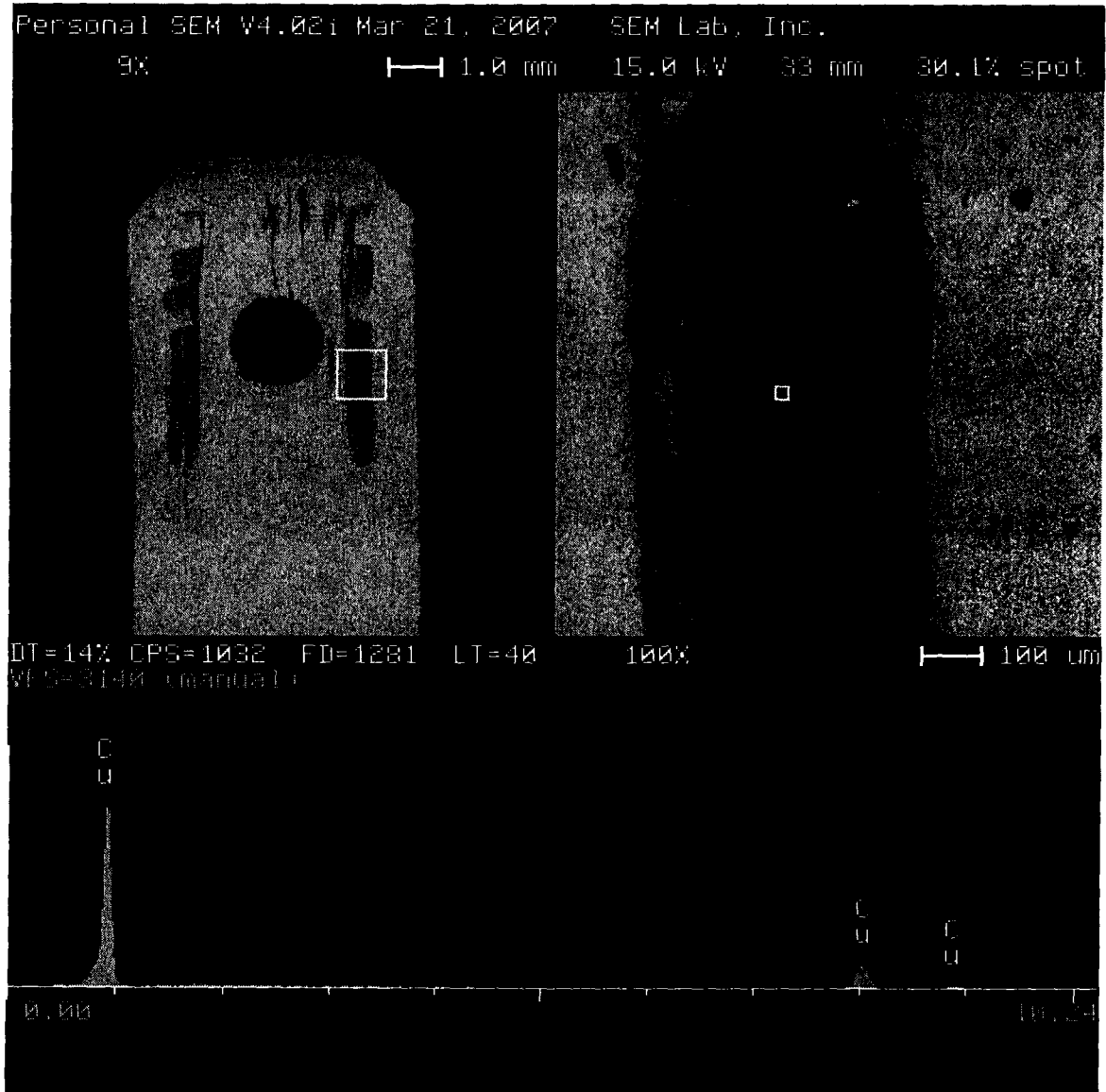


FIGURE 29: IFN 1448J\_3, Sample J – Pivot Terminal #11. This is a heavily worn area on the blade.

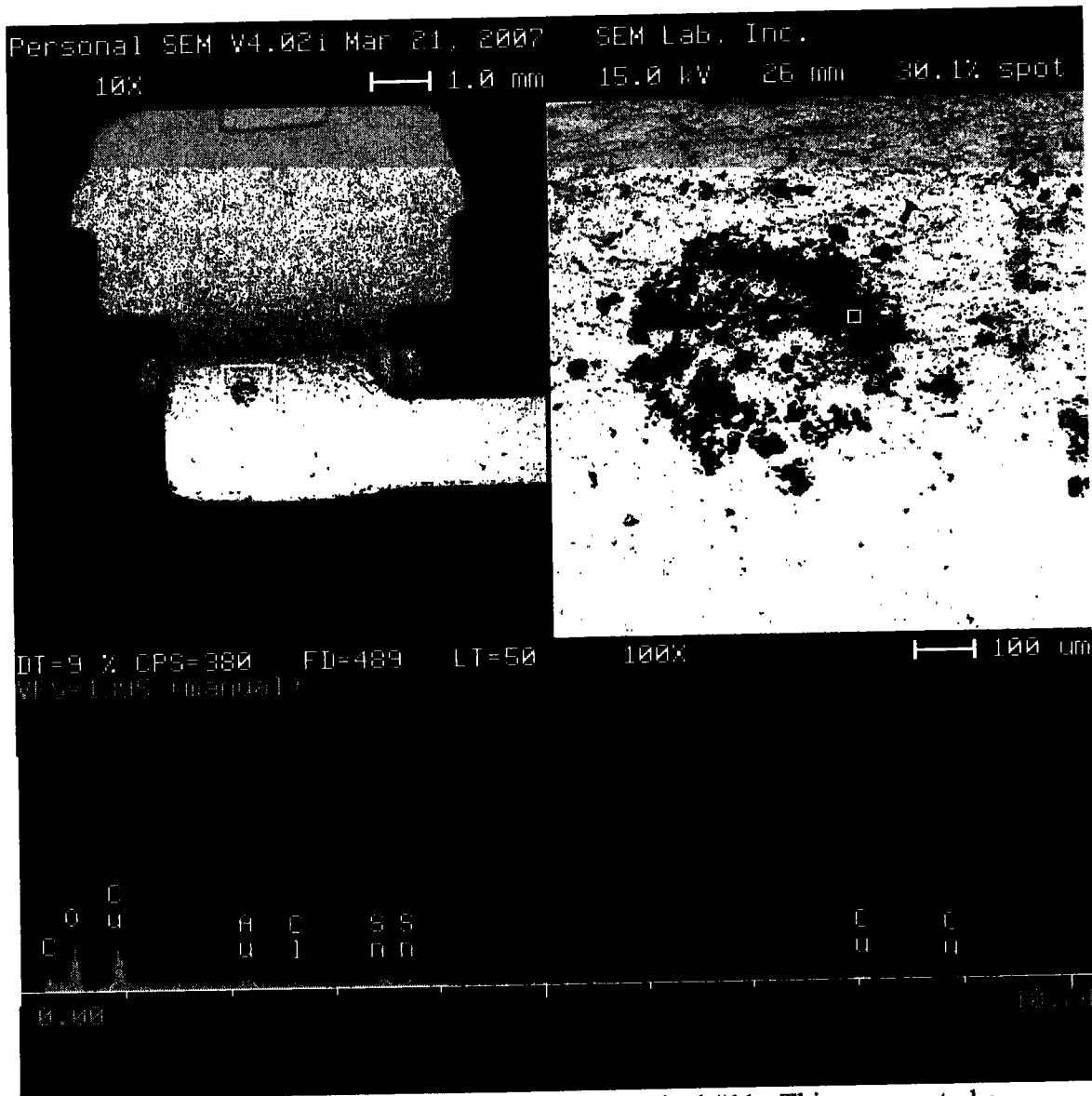


FIGURE 30: IFN 1448J\_4, Sample J – Pivot Terminal #11. This appears to be oxidized copper, salt and hydrocarbon.

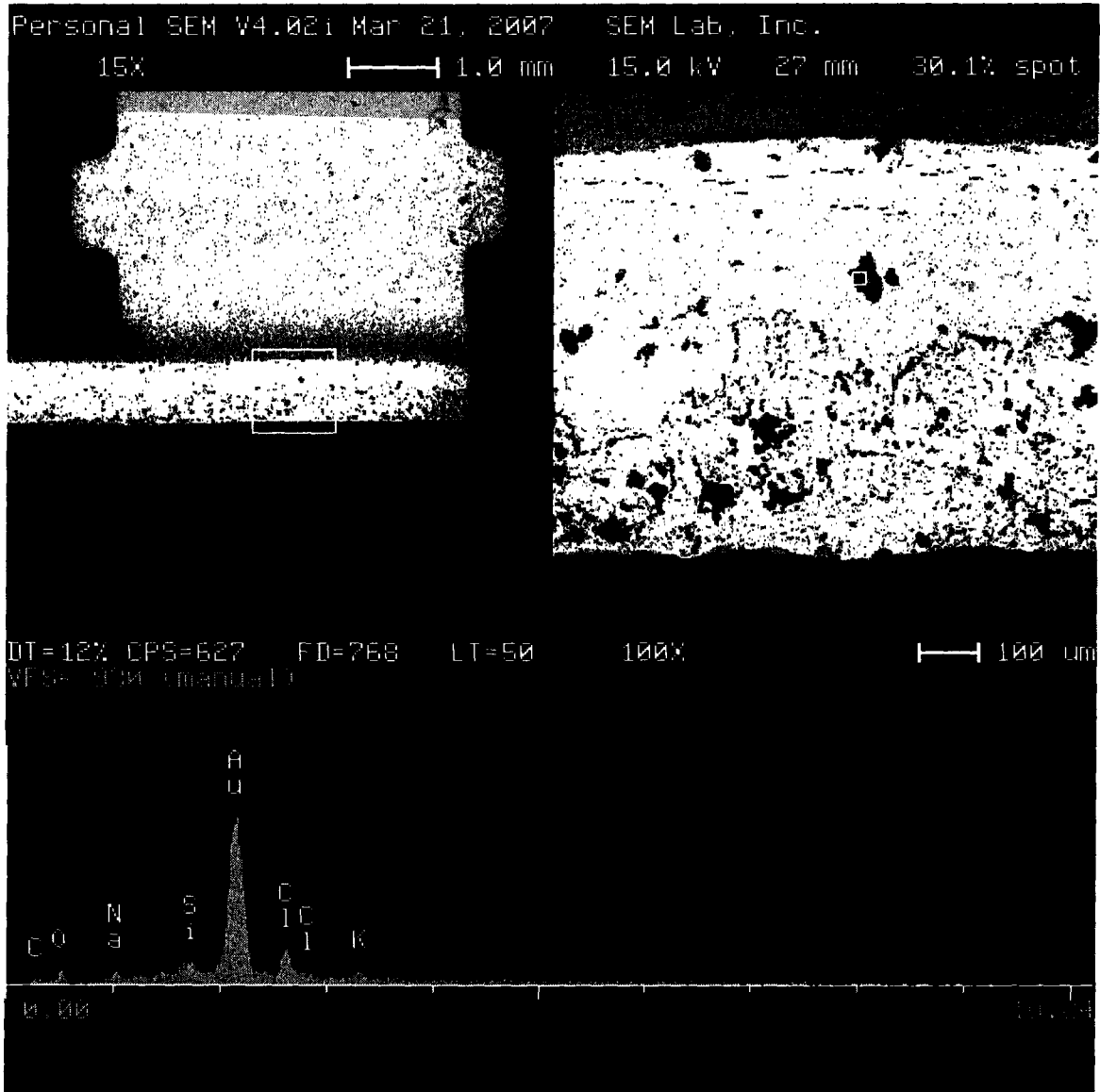


FIGURE 31: IFN 1448J\_5, Sample J - Pivot Terminal #11. This appears to be salt, silicone and hydrocarbon.

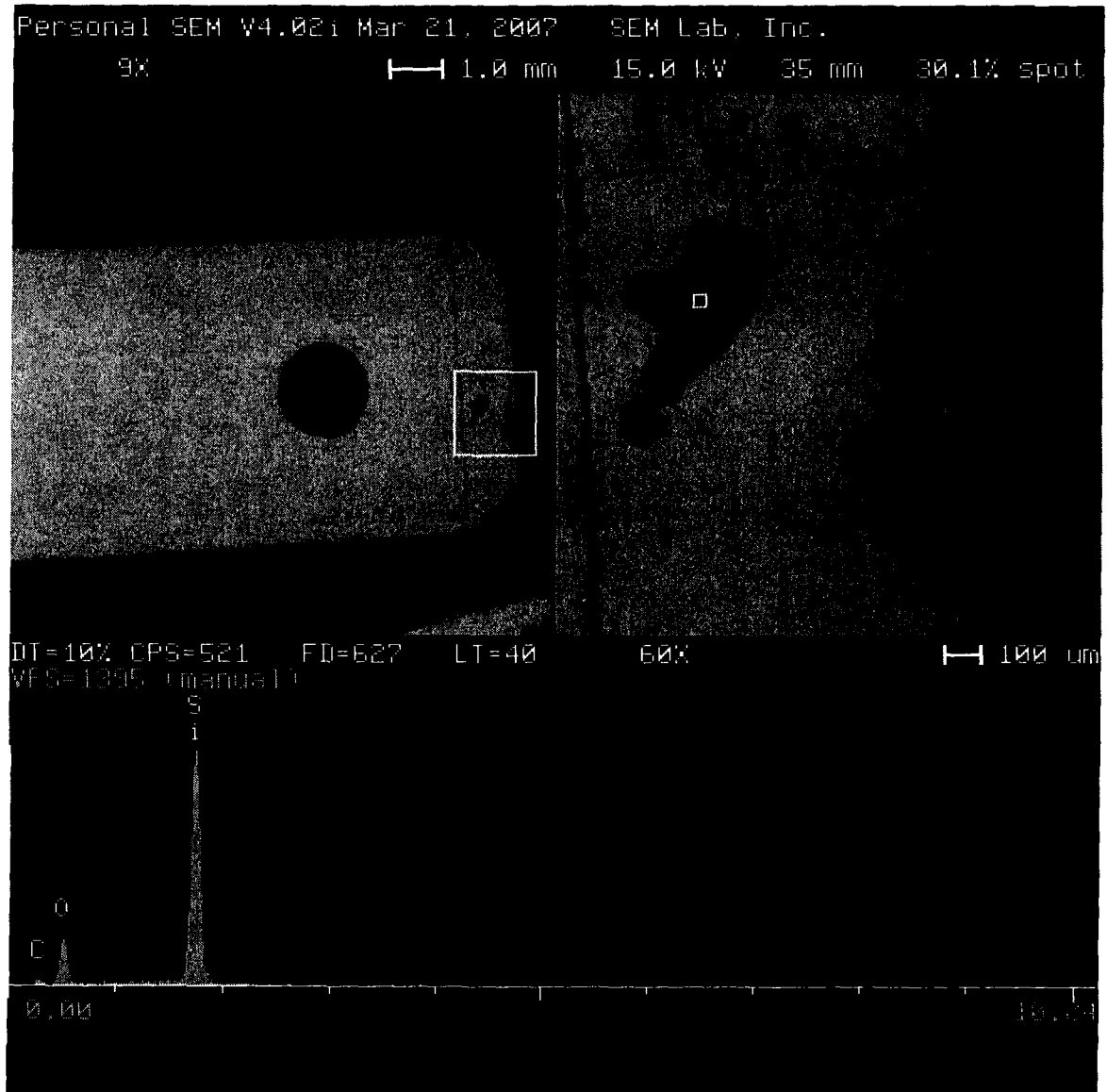


FIGURE 32: IFN 1448K\_1, Sample K – Contact Terminal #11. This is silicone.

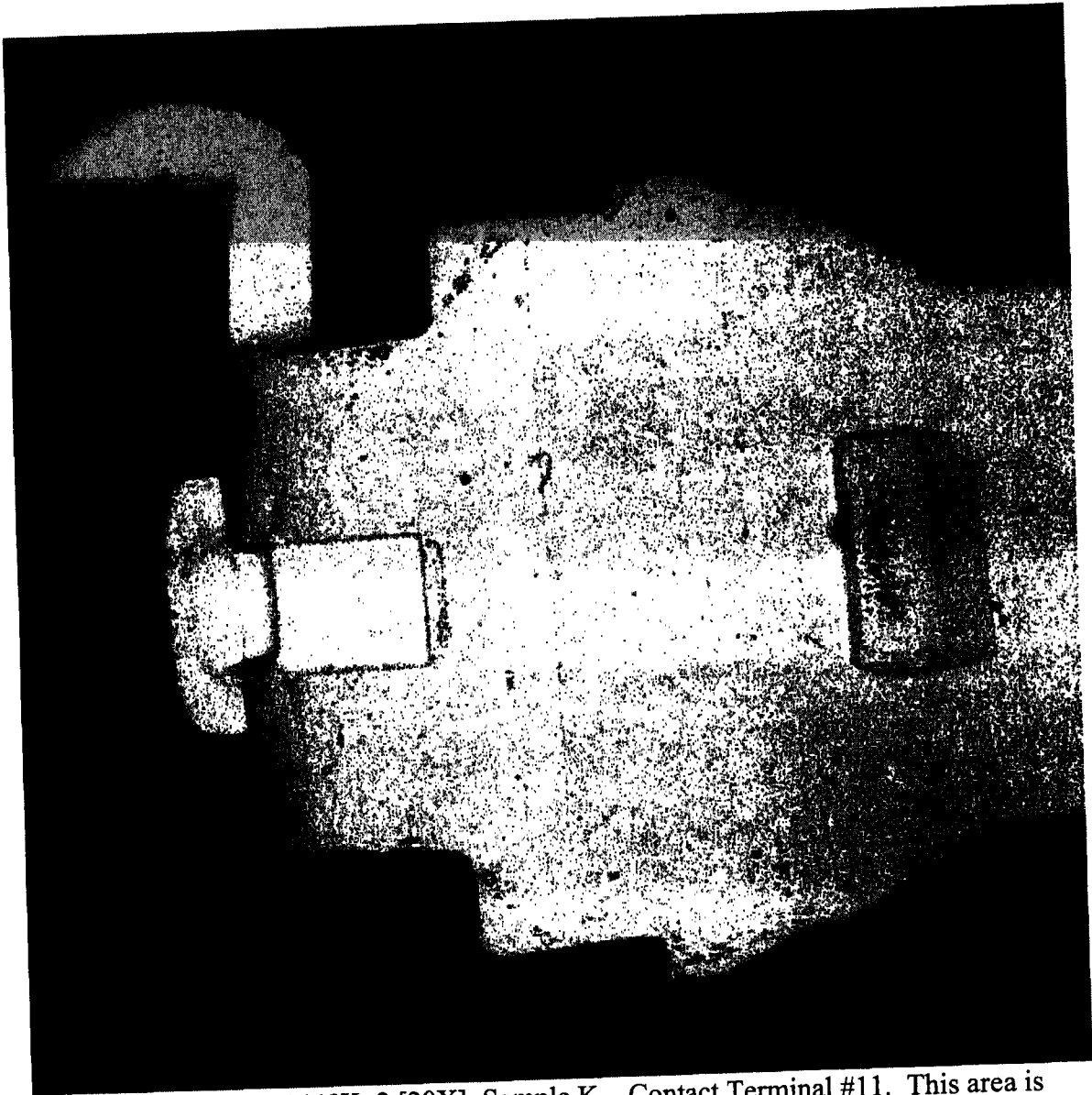


FIGURE 33: IFN 1448K\_2 [20X], Sample K – Contact Terminal #11. This area is relatively clean

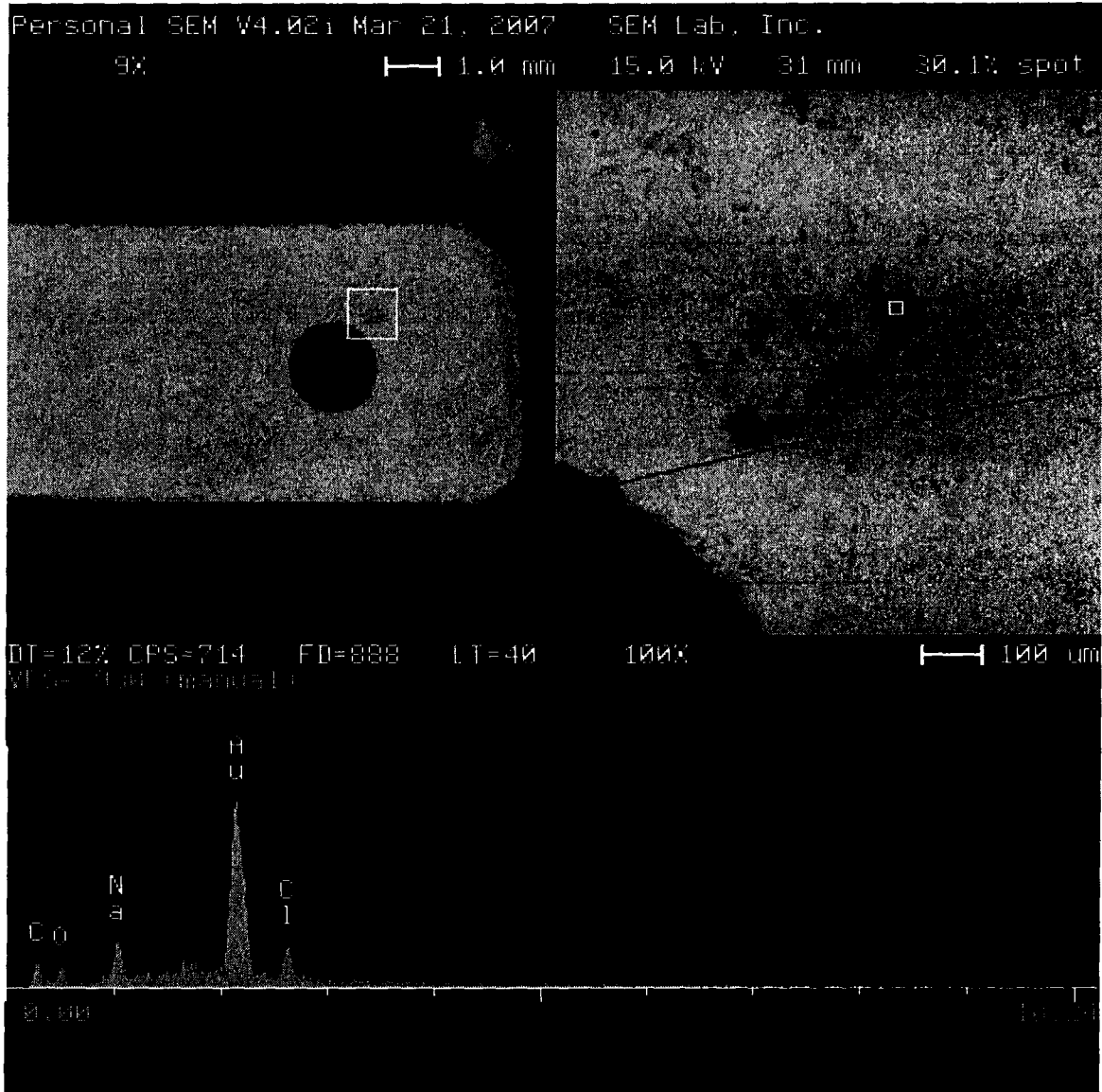


FIGURE 34: IFN 1448k\_3, Sample K – Contact Terminal #11. This appears to be salt and hydrocarbon.

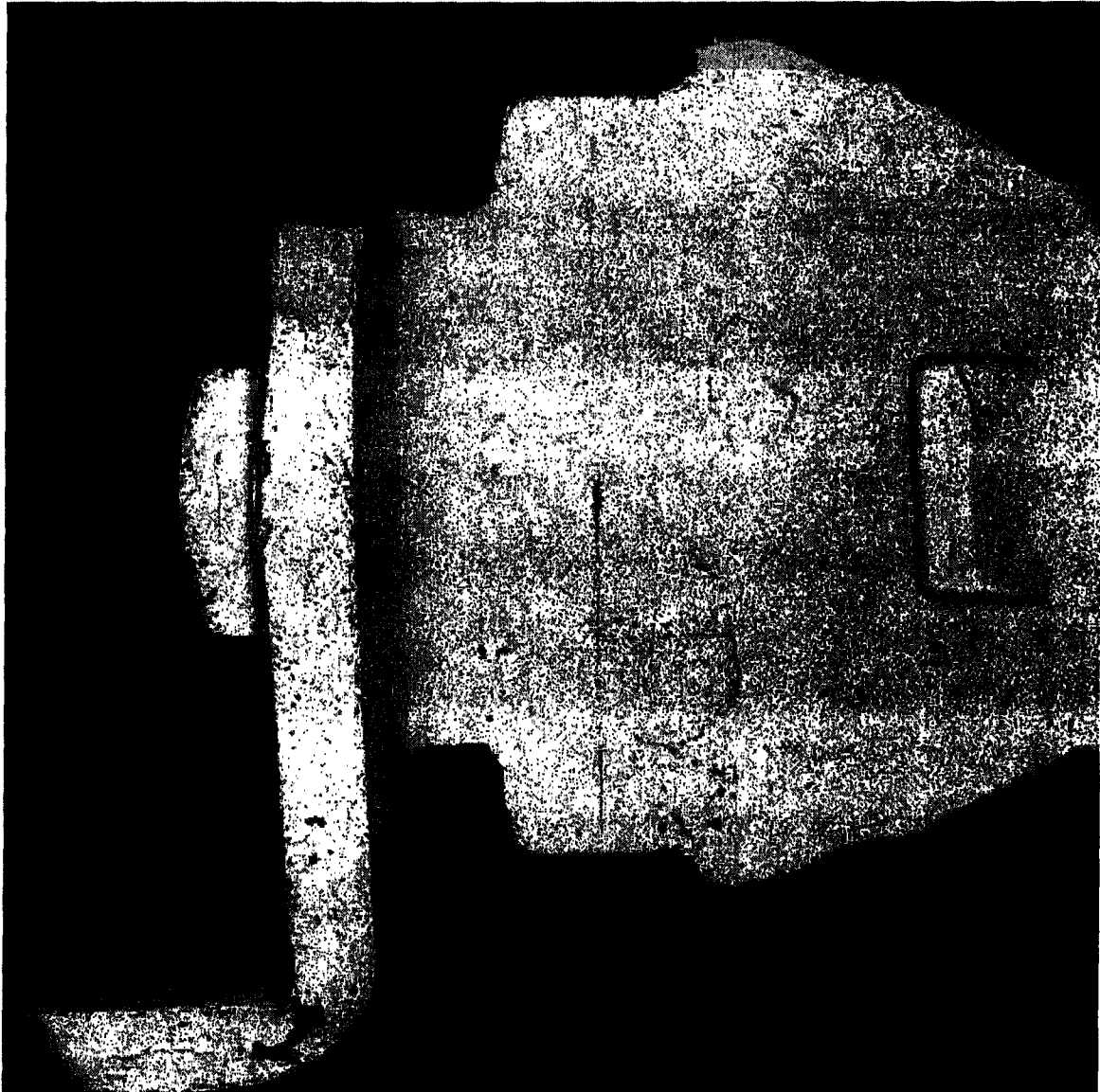


FIGURE 35: IFN 1448k\_4 [21X], Sample K – Contact Terminal #11. This area appears to be relatively clean.

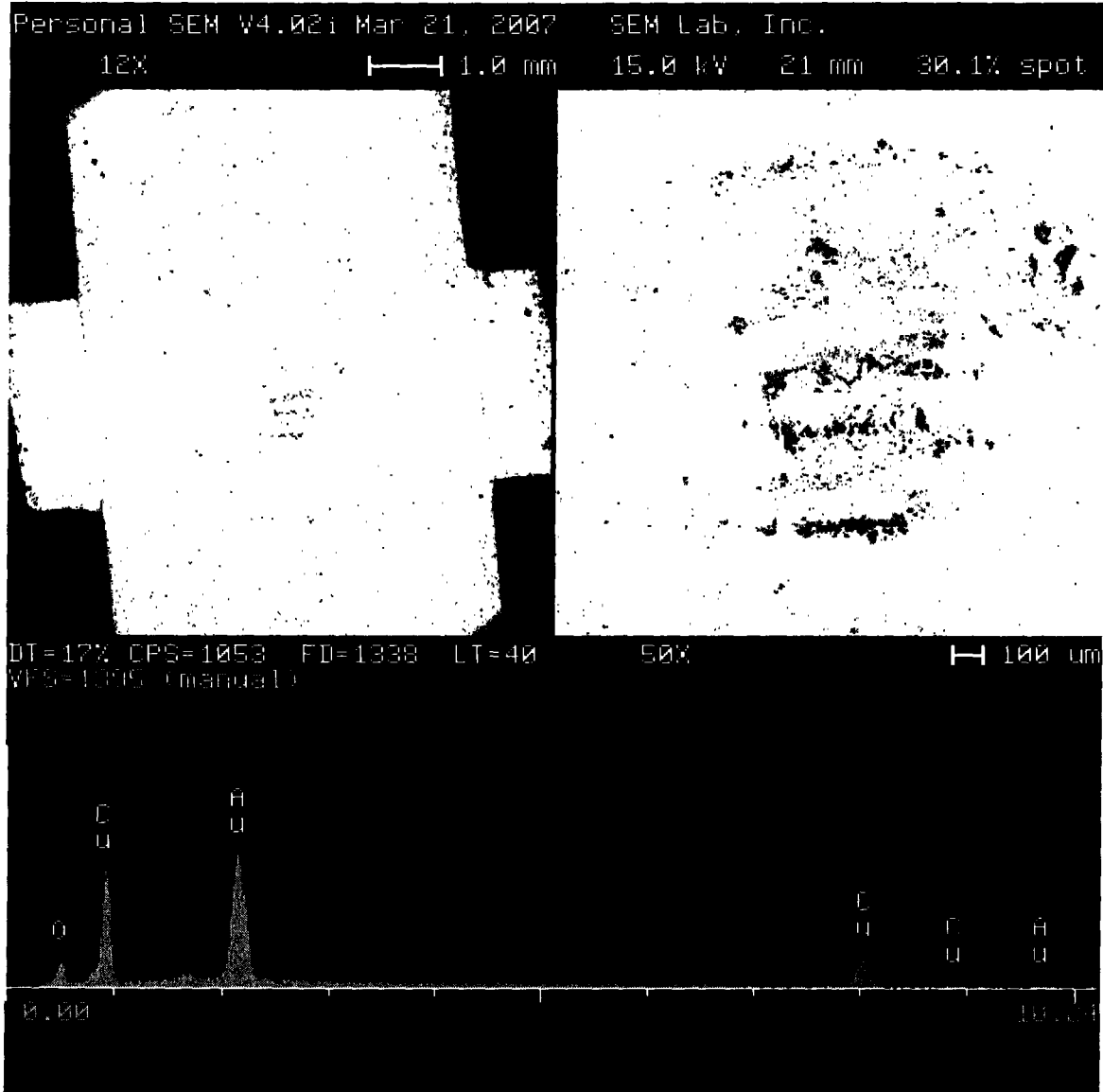


FIGURE 36: IFN 1448L\_1, Sample L – Lever #15. This is the worn contact area at the pivot point.

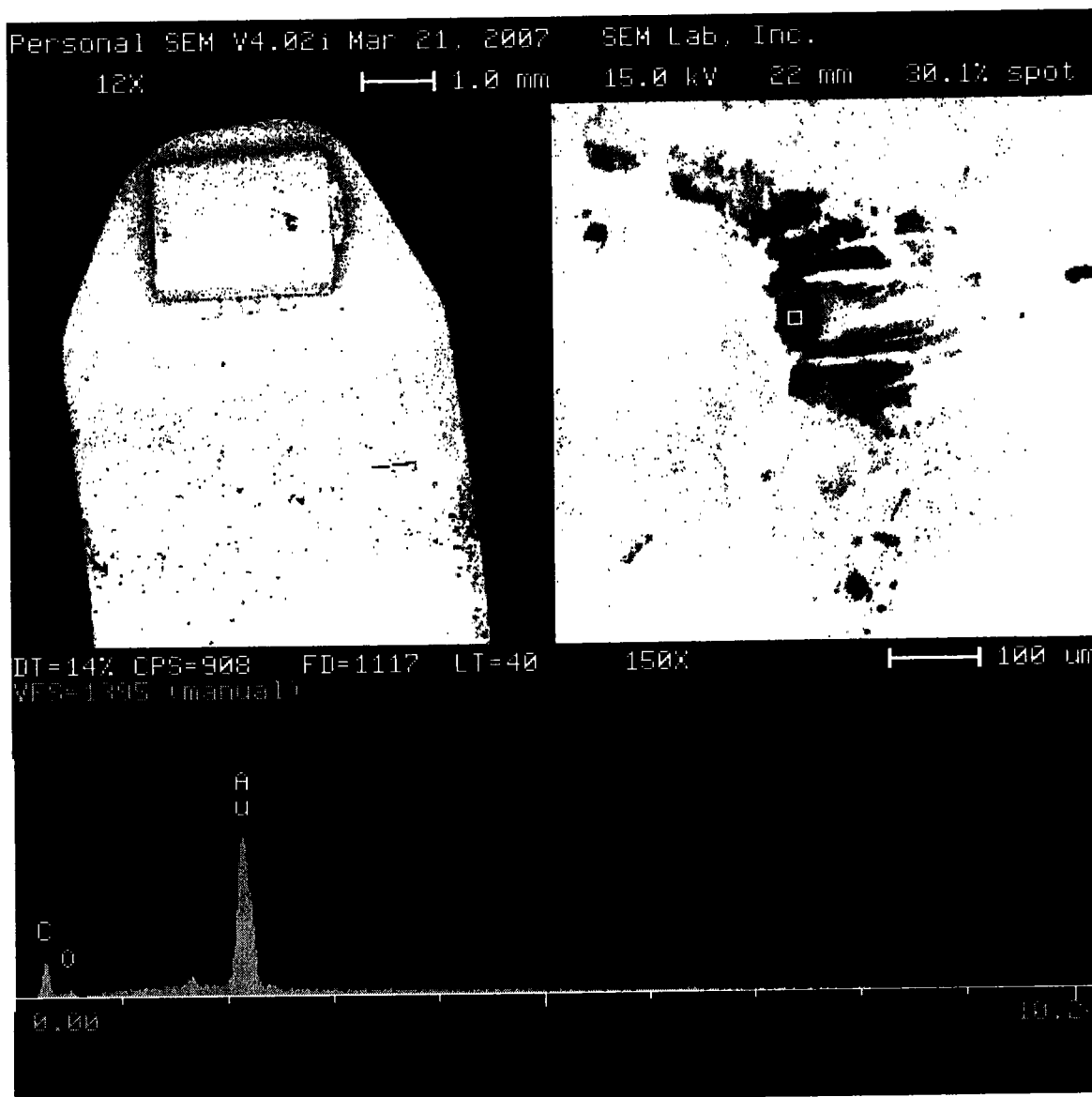


FIGURE 37: IFN 1448L\_2, Sample L – Lever #15. This appears to be hydrocarbon residue.

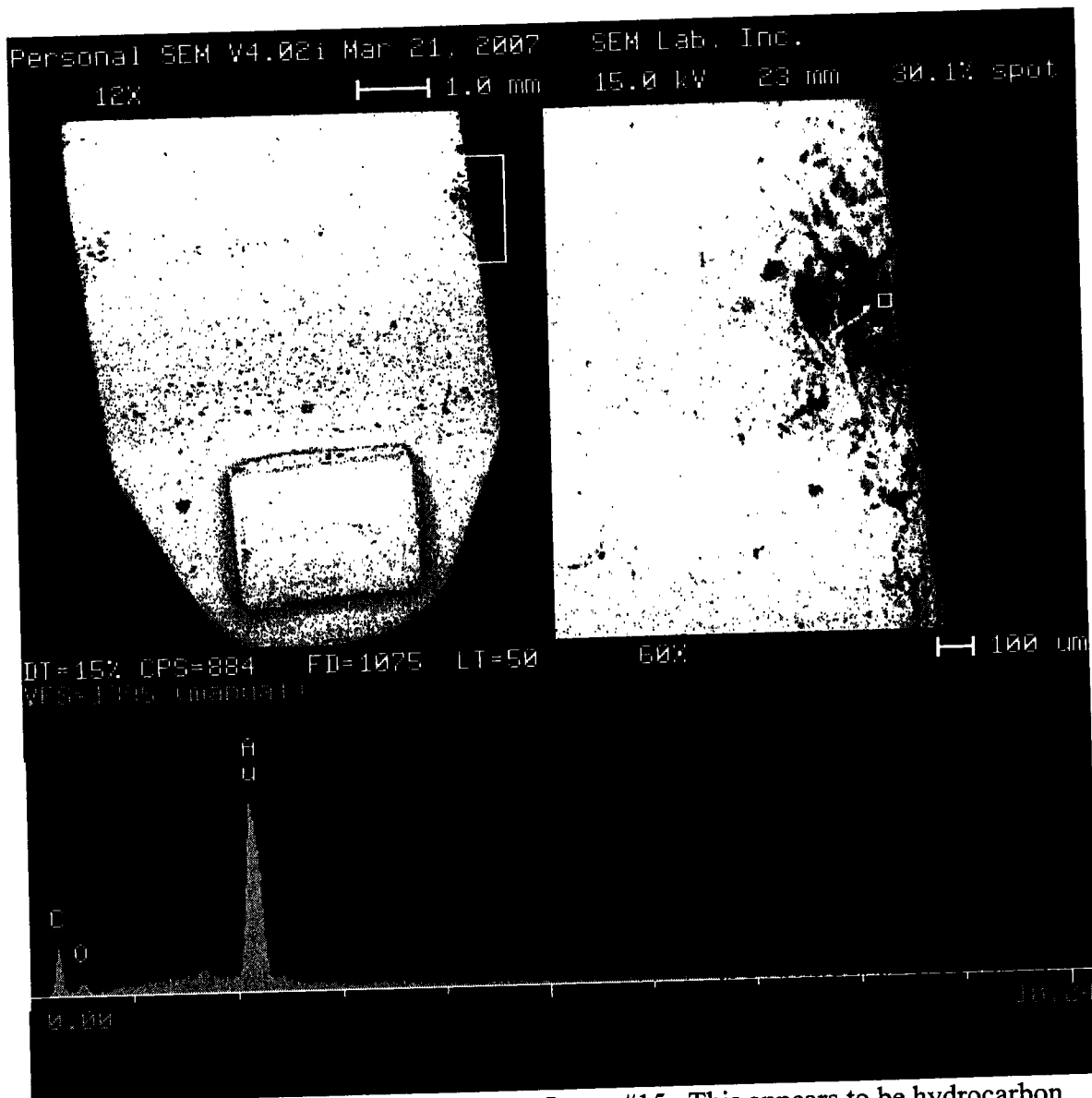


FIGURE 38: IFN 1448L\_3, Sample L – Lever #15. This appears to be hydrocarbon residue.



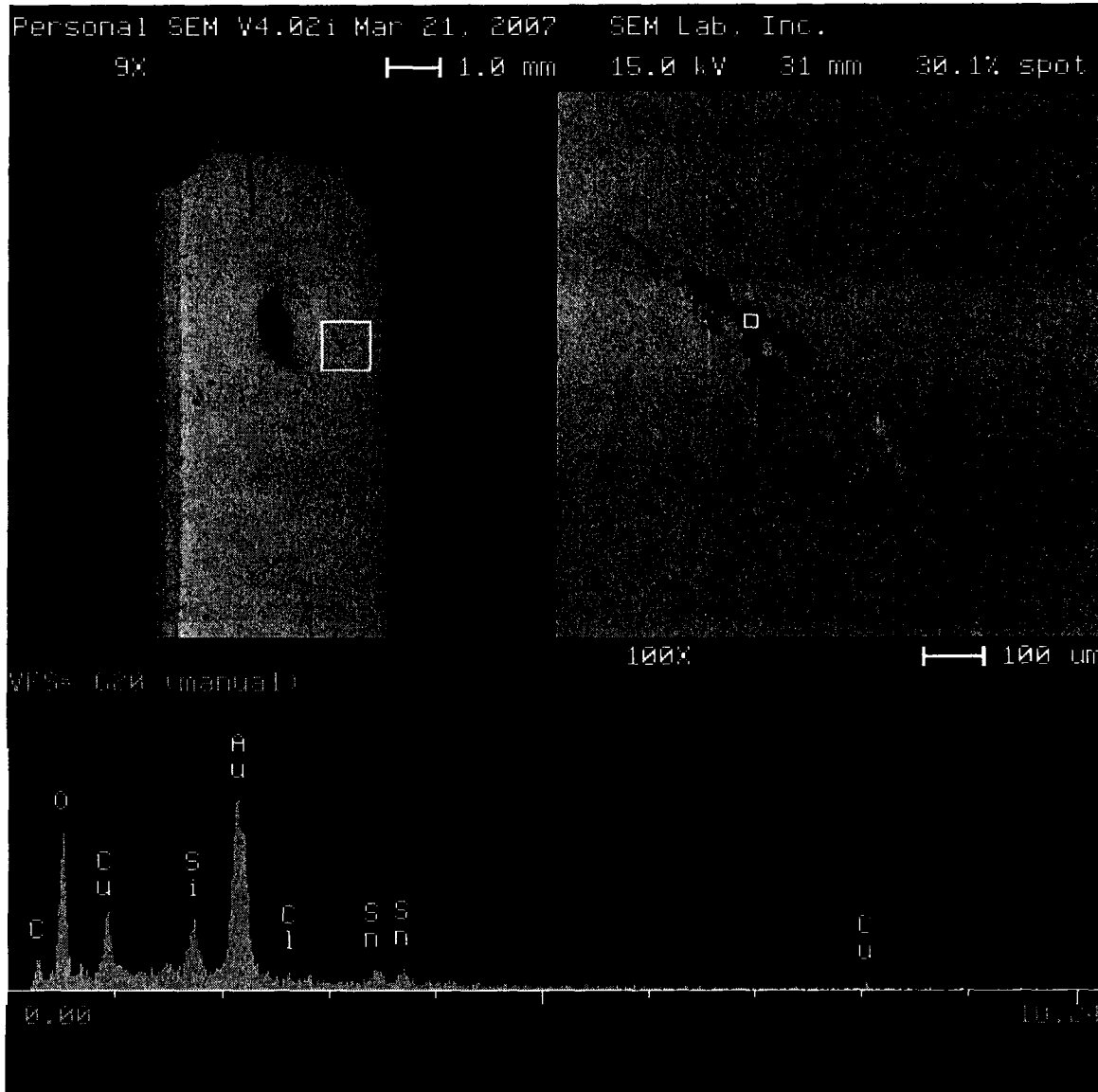


FIGURE 40: IFN 1448m\_1, Sample M – Pivot Terminal #15. This is hydrocarbon, oxidized copper, and salt.

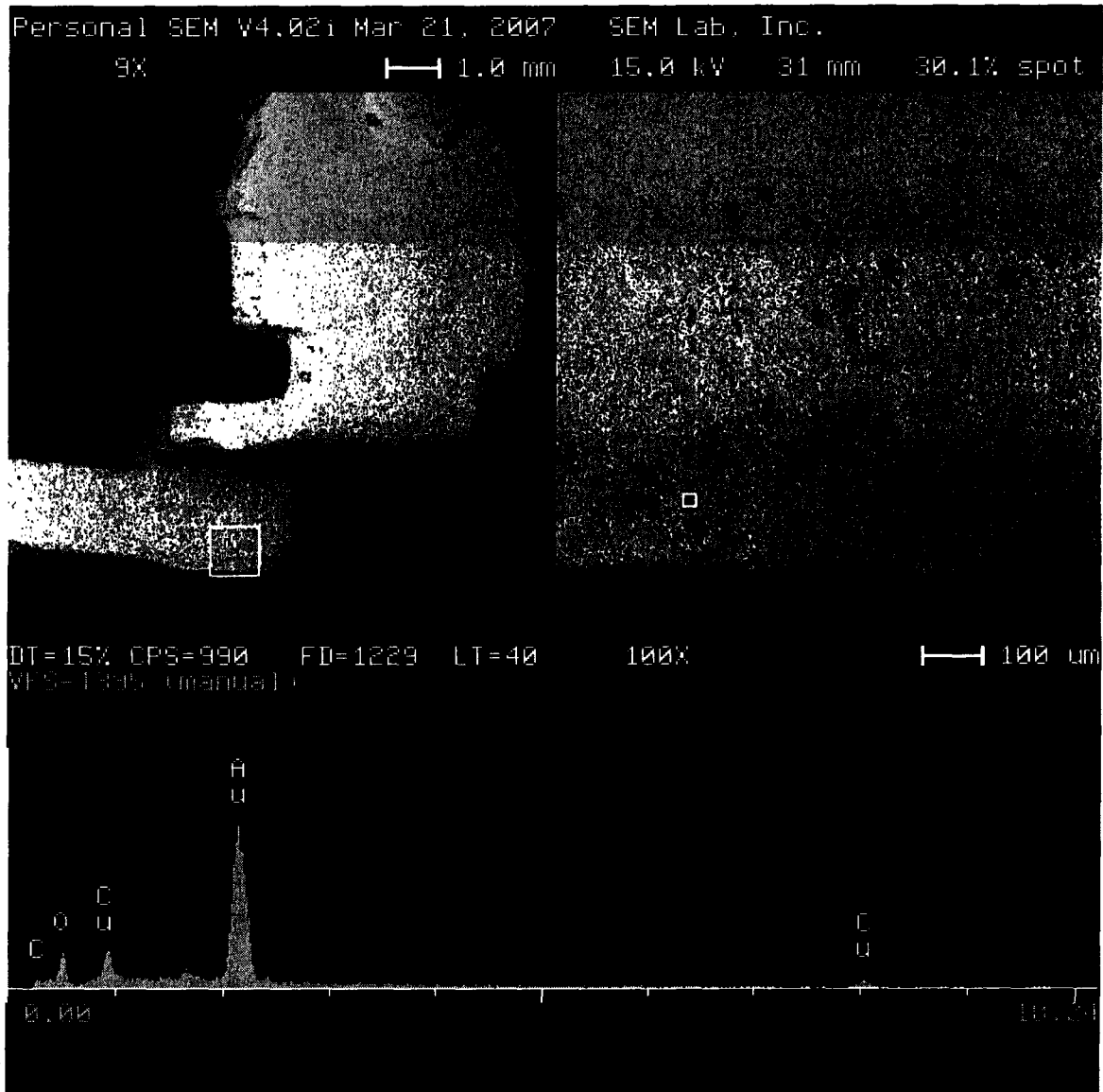


FIGURE 41: IFN 1448m\_2, Sample M – Pivot Terminal #15. There is some oxidized copper at this location.

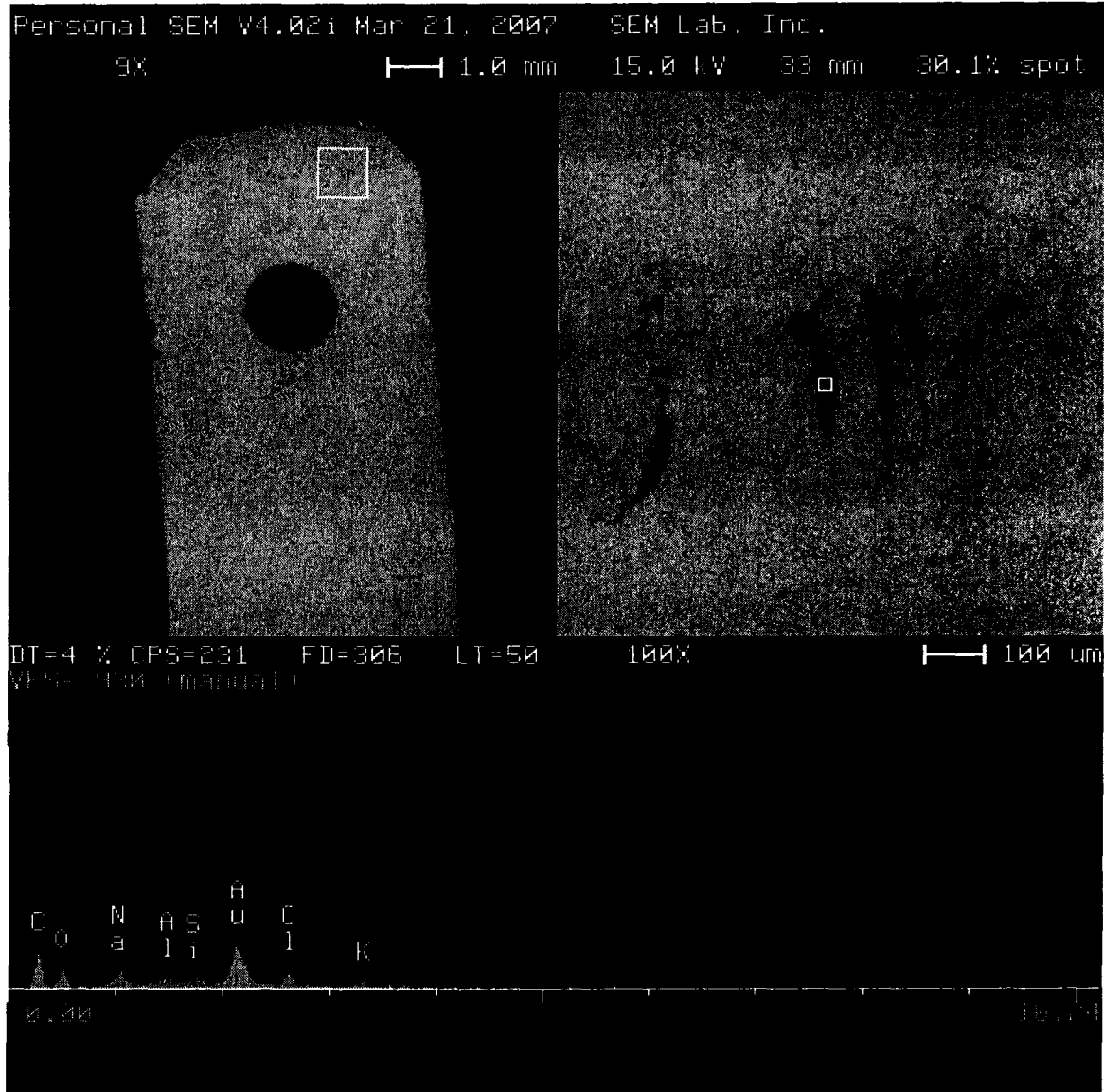


FIGURE 42: IFN 1448M\_3, Sample M – Pivot Terminal #15. This is a mix of hydrocarbon and salt.

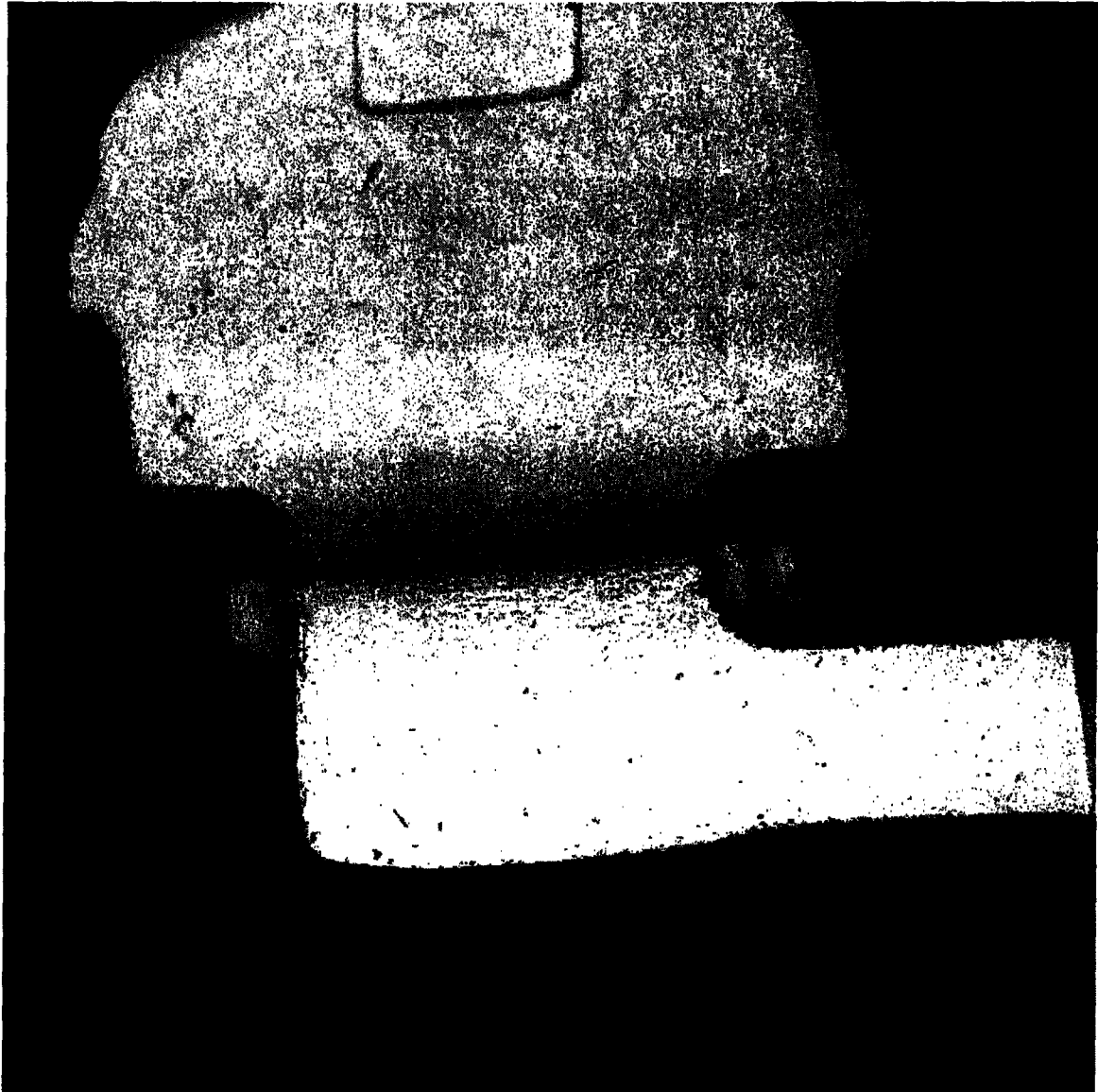


FIGURE 43: IFN 1448M\_4 [22X], Sample M – Pivot Terminal #15. The side of the pivot contact is relatively clean.

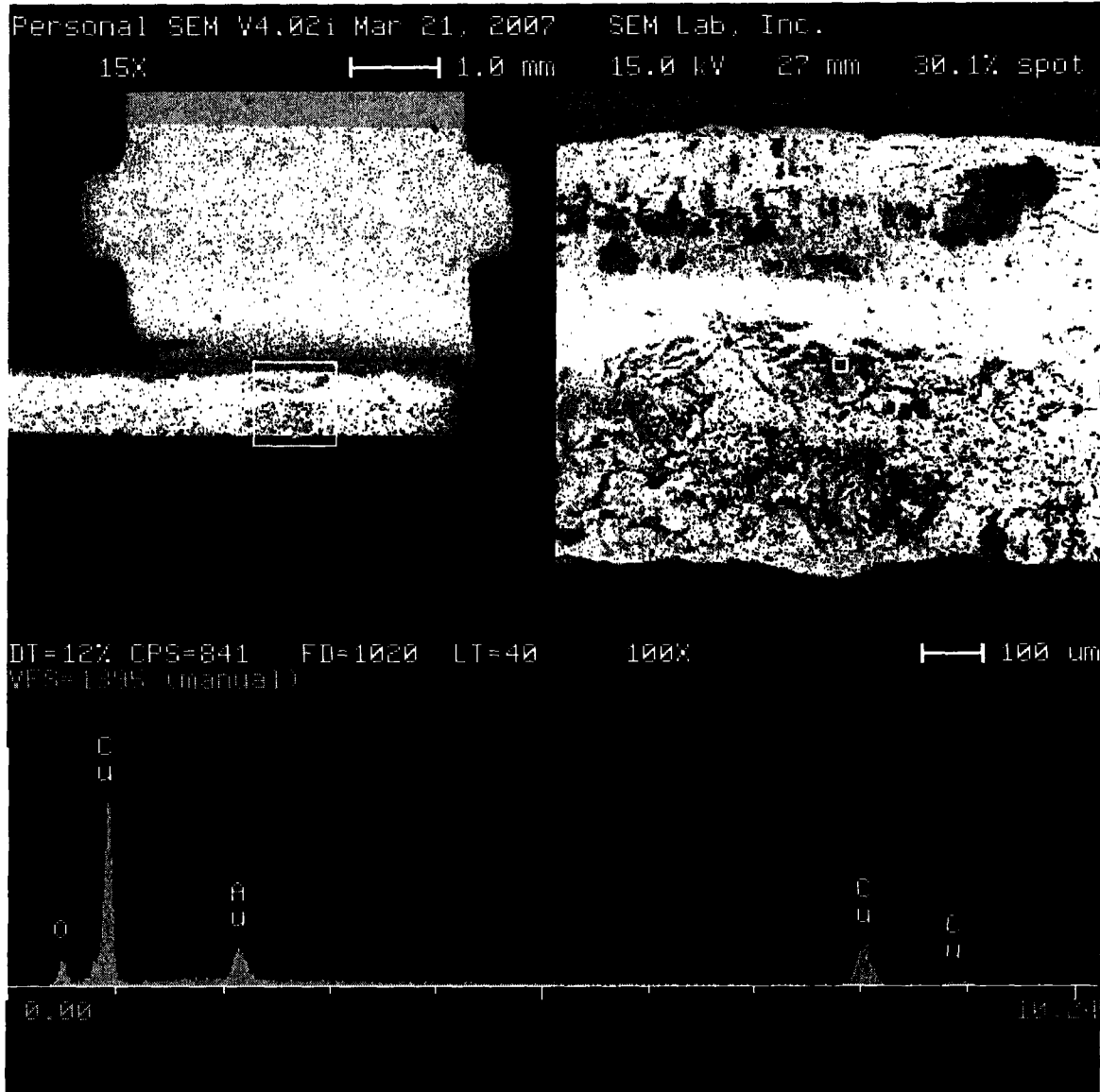


FIGURE 44: IFN 1448M\_5, Sample M – Pivot Terminal #15. This pivot contact is heavily worn.

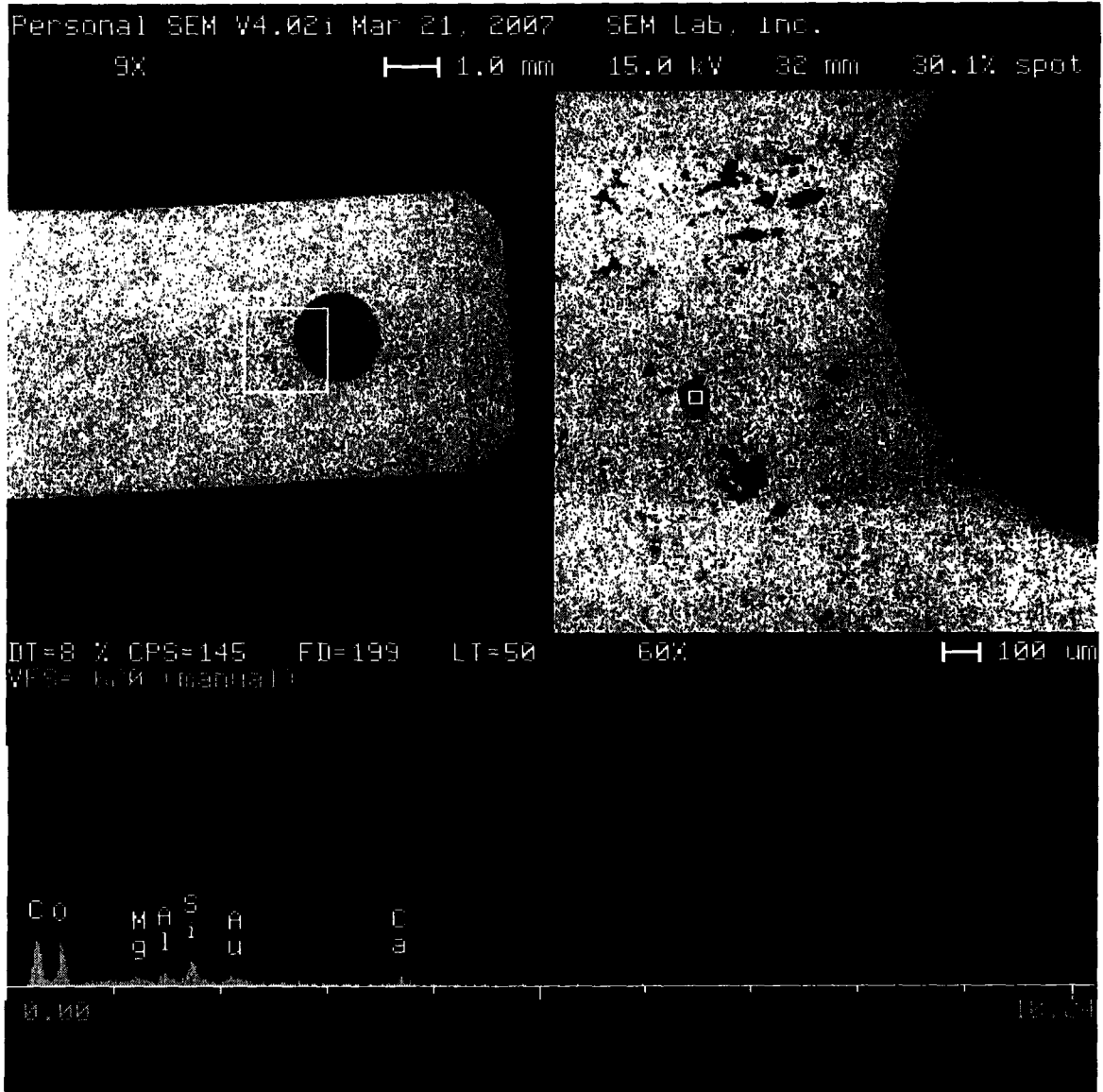


FIGURE 45: IFN 1448N\_1, Sample N – Contact Terminal #15. This appears to be a mineral or glass particle with hydrocarbon.

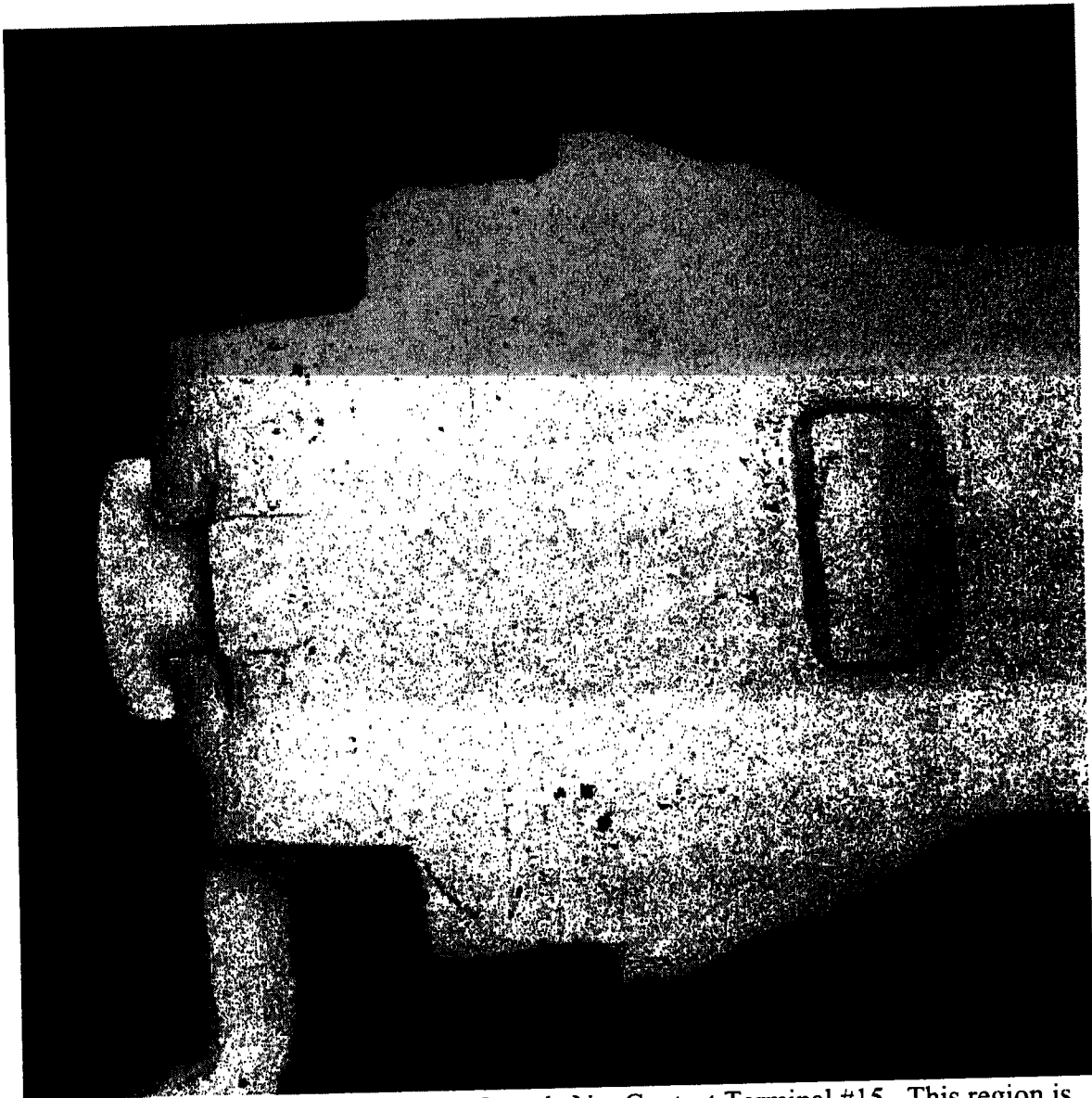


FIGURE 46: IFN 1448N\_2 [21X], Sample N – Contact Terminal #15. This region is relatively clean.

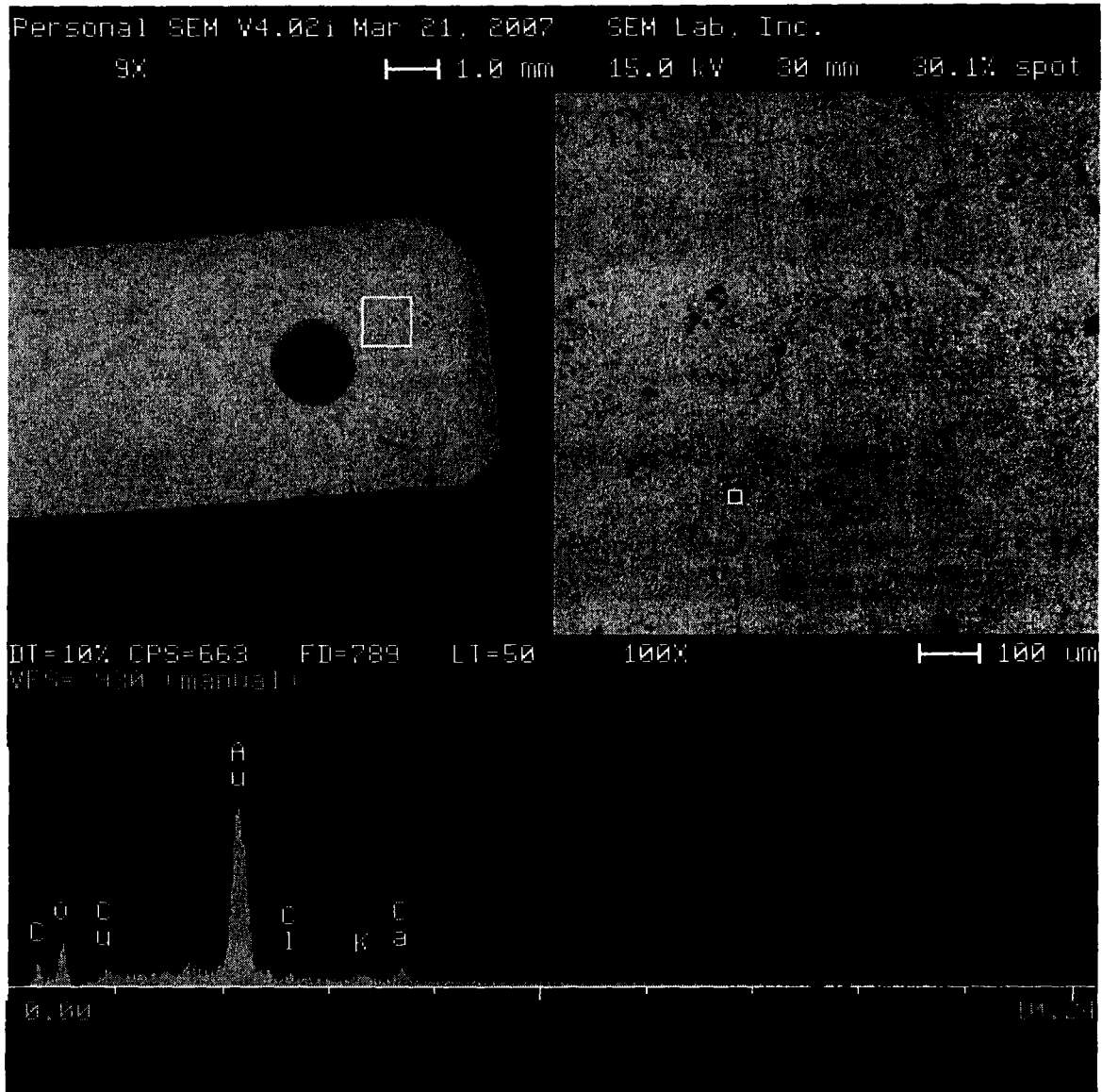


FIGURE 47: IFN 1448n\_3, Sample N – Contact Terminal #15. This blade has a thin hydrocarbon residue.

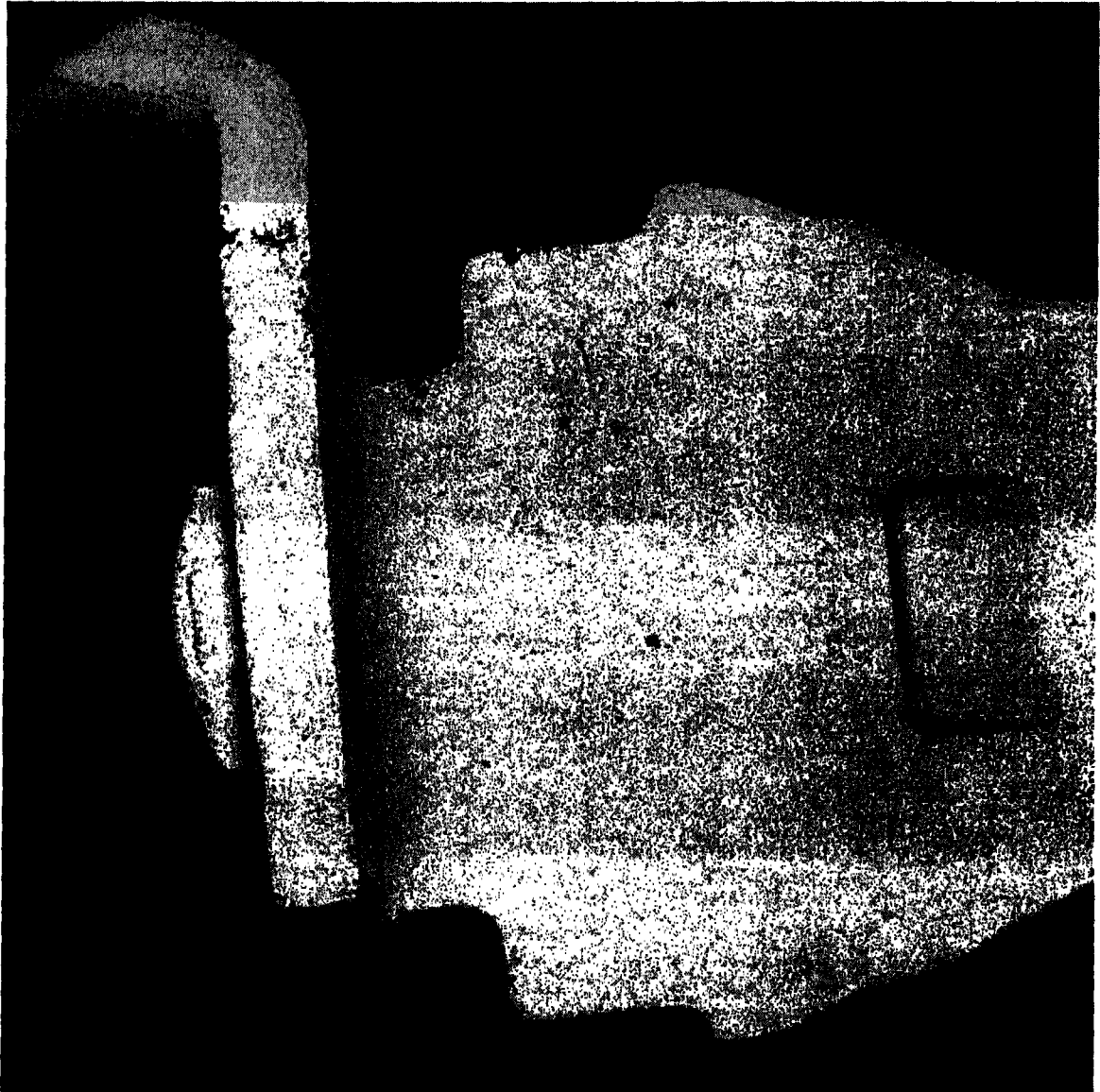


FIGURE 48: IFN 1448n\_4 [22X], Sample N – Contact Terminal #15. This region is relatively clean.

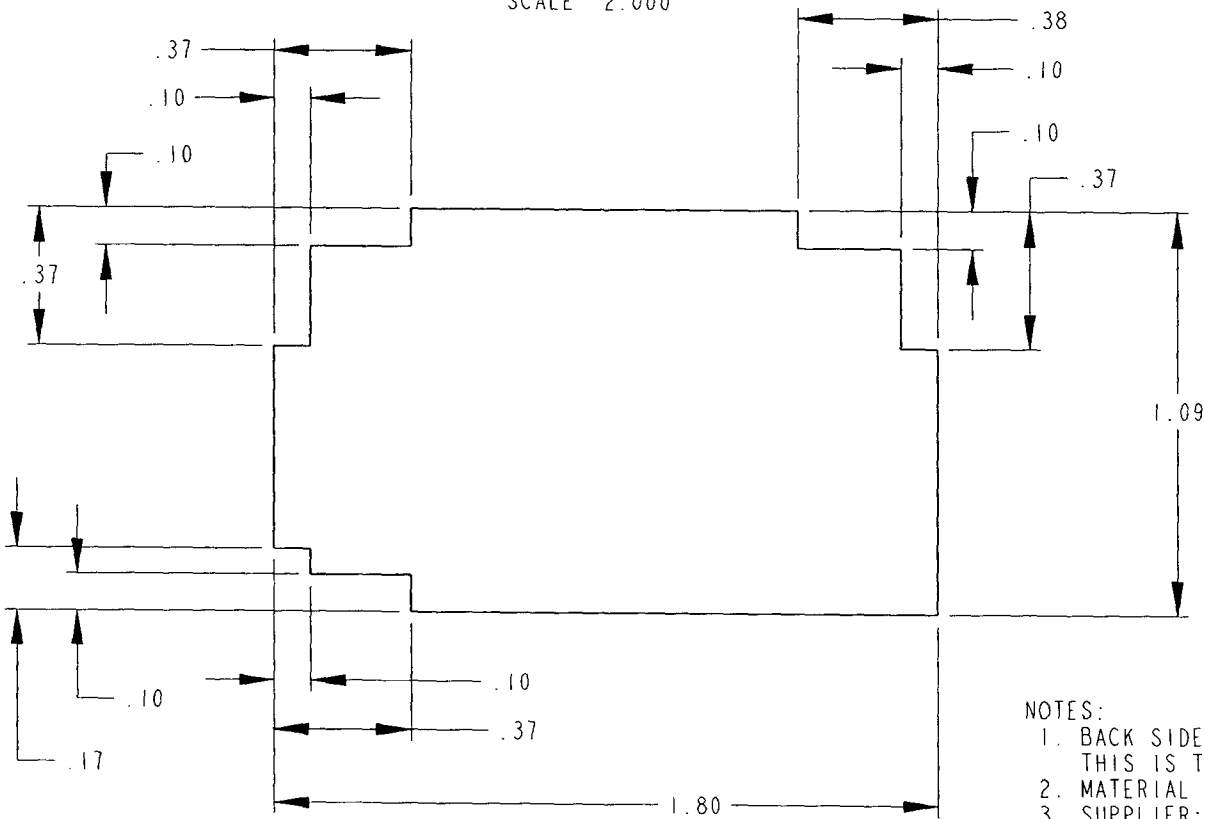
FRONT VIEW

SCALE 2.000

Attachment 18  
(124989.pdf)

B

A



- NOTES:
1. BACK SIDE IS TO BE THE STICKYER SIDE. THIS IS THE SIDE TO BE APPLIED TO THE SWITCH BASE.
  2. MATERIAL IS GEL-TEK GT-6201-T2.3.
  3. SUPPLIER: PRECISION GASKET COMPANY.

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|                            |  |                     |                |  |       |                               |                       |
|----------------------------|--|---------------------|----------------|--|-------|-------------------------------|-----------------------|
| THIRD ANGLE PROJECTION<br> | TOLERANCE UNLESS OTHERWISE NOTED           |                     |                | THOMAS BUILT BUSES, INC.<br>HIGH POINT, NC |       |                               |                       |
|                            | DECIMAL ±<br>.xxx .015<br>.xx .06<br>.x .1 | FRACTIONAL<br>±1/32 | ANGULAR<br>±1° |  |       | GASKET, GEL-TECK, SWITCH BASE |                       |
| A                          | RELEASED                                   |                     |                | DRN. 11-4-05                               | DJH   | MATERIAL: SEE NOTE #1         | 2                     |
|                            |  |                     |                | CK'D 11-4-05                               | TWH   | SIZE                          | DWG. NO. SHEET 1 OF 1 |
|                            |  |                     |                | 11-4-05                                    | DJH   | MIG                           |                       |
|                            |  |                     |                | ECR_1247                                   | TWH   | ENGR/DESIGNER                 | DJH                   |
| LET                        | REVISION                                   | DATE                | BY             | CF   | 1.000 | A                             | 124989                |