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~~T O P S E C R E T~~ 252340Z APR 75 CITE CHARGE 4029.
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HEXAGON
FOR WHEELER/HUTCHISON FROM ANDERSON.
SUBJECT: CONTAMINATION OF HEXAGON VEHICLE FILM PATHS.
REFERENCE: WHIG 0584.

1. AS REQUESTED IN PARAGRAPH 3B OF THE REFERENCED TWX, THE SPECIFIC CONTAMINANTS AND THE CORRECTIVE ACTIONS TAKEN ARE:

A. 1202-1 - THE FILM ON THE B-SIDE RIPPED IN THE SUPPLY AND FINALLY SEPARATED IN THE FINE FILM PATH; FOREIGN PARTICLES WERE FOUND AT THE APEX OF THE TEAR.

B. 1204-1 - AN EPOXY RELAY PANEL IN RV-4 RUPTURED AND PEICES OF EPOXY WERE WRAPPED UP IN THE FILM STACK OF RV-3 AND RV-4. CORRECTIVE ACTION: (1) THE RELAY PANEL WAS COVERED WITH TAPE FOR SUCCEEDING FLIGHTS. (2) FOR A LONG TERM FIX THE PROCESS WAS REVISED.

C. 1207-3 - A CONNECTOR CAP WAS FOUND IN THE RV AND THE FILM

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PAGE 2 CHARGE 4029 ~~T O P S E C R E T~~
WAS RIPPED BUT NOT SEPARATED. REWINDING THE RIPPED FILM THROUGH A LOW CLEARANCE AREA WOULD HAVE RESULTED IN A COMPLETE SEPARATION. AN INSPECTION REVEALED CAPS IN RV-3 OF SV-8 AND RV-4 OF SV-9. CORRECTIVE ACTION: (1) MORE DETAILED INSPECTIONS AND BETTER CONTROL IN THE CANISTER DOWN CONFIGURATION HAVE BEEN INSTITUTED IN BUILDING 156. (2) PERKIN ELMER AND MDAC HAVE INITIATED NUMBERING AND CONTROL OF THEIR CONNECTOR CAPS. LOCKHEED HAS COLOR CODED THEIR CONNECTOR CAPS.

D. 1208-1 - A ONE-FOURTH INCH LONG PIECE OF SAFETY WIRE WAS FOUND IN THE FILM STACK IN THE RV. IT HAD PUNCTURED THE FILM. REWINDING THE PUNCTURED FILM THROUGH A LOW CLEARANCE AREA WOULD HAVE RESULTED IN A COMPLETE SEPARATION. CORRECTIVE ACTION: BUILDING 156 PROCEDURES HAVE BEEN REVISED TO ACCOUNT FOR ALL SAFETY WIRE FRAGMENTS.

E. SV-9 AT BUILDING 156 - A PIECE OF STRIPPED INSULATION JAMMED THE 4 INCH DIAMETER ROLLER OF THE FILM EXIT VESTIBULE (FEV). CORRECTIVE ACTION: REPAIR PROCEDURES HAVE BEEN REVISED TO ELIMINATE CABLE REPAIRS IN THE SU.

F. SENSOR SUBSYSTEM S/N 16 AT THE PERKIN ELMER FACTORY - THE 4 INCH ROLLER OF THE FEV JAMMED AND THE FILM TORE WHEILE THE FILM WAS REWINDING. THE ROLLER WAS SCORED AND FRAGMENTS OF ALUMINUM, EPOXY,

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AND STAINLESS STEEL WERE FOUND. CORRECTIVE ACTION: SU CLEANING TECHNIQUES HAVE BEN REFINED AND FEV CLEANING TECHNIQUES ARE BEING EXAMINED.
2. IN ADDITION TO THE SPECIFIC CORRECTIVE ACTIONS CITED ABOVE, THE FOLLOWING ACTIONS HAVE BEEN TAKEN:
A. INTEGRATED VEHICLE TEST FACILITY BUILDING 156.
(1) A SUBGROUP, CHAIRED BY THE SPO [redacted] HAS BEEN ESTABLISHED TO CLARIFY AND ENFORCE BUILDING 156 FACILITY CLEANLINESS.
(2) A COORDINATING GROUP INCLUDING SPO REPRESENTATIVES HAS BEEN ESTABLISHED TO INSURE UNIFORM AND EFFECTIVE CLEANING AND CONTAMINATION CONTROL PROCEDURES. AMONG THE TOPICS CONSIDERED BY THIS GROUP WAS BLOWING VERSUS VACUUMING AS A TECHNIQUE FOR CLEANING ASSEMBLIES. VACUUMING WITH A FILTER HAS BEEN SELECTED AND IS USED UNIFORMLY AT BUILDING 156.
(3) A SINGLE POINT OF RESPONSIBILITY FOR CONTAMINATION CONTROL [redacted] HAS BEEN ESTABLISHED. THESE RESPONSIBILITIES UNCLUDING "POLICING" ALL ASSOCIATE'S PROCEDURES.
B. BRIDGEHEAD - CHIPS AND FRAGMENTS VACUUMED FROM THE CANISTER ARE SENT TO MDAC FOR ANALYSIS AND THEN TO PERKIN ELMER. BOTH MDAC AND PERKIN ELMER ANALYZE THE CHIPS AND FRAGMENTS TO DETERMINE

POSSIBLE SOURCES.
C. PERKIN ELMER DANBURY PLANT (OTD)
(1) SINGLE POINT RESPONSIBILITY FOR CONTAMINATION CONTROL (D. KESSLER).
(2) ALL CLEAN ROOM PERSONNEL HAVE BEEN RETRAINED ON CONTAMINATION CONTROL PROCEDURES.
(3) SPECIFICATIONS FOR CHIP PRODUCING OPERATIONS HAVE BEEN REVISED. HESE REVISIONS INCLUDE THE USE OF SPECIAL TOOLS AND THE REQUIREMENT FOR INSPECTION DURING ANY CHIP PRODUCING OPERATIONS.
(4) TOOLS HAVE BEEN DEVELOPED TO CAPTURE CHIPS PRODUCED DURING ASSEMBLY.
(5) AND AUDIT OF SENSOR SUBSYSTEM MANUFACTURING FLOW FOR CONTAMINATION CONTROL WILL BE COMPLETD BY MID-MAY.
(6) DESIGN ACTIVITIES HAVE BEEN INITIATED TO REDUCE THE SUSCEPTIBILITY OF THE 4 INCH ROLLER OF THE FILM EXIT VESTIBULE, AND TO REDUCE THE USE OF EPOXY DURING ASSEMBLY.
D. PERKIN ELMER TUA FACILITY (EOD)
(1) A SINGLE POINT OF RESPONSIBILITY HAS BEEN ESTABLISHED (R. RUNG).
(2) SIX NEW SPECIFICATIONS HAVE BEEN INSTITUTED COVERING

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CONTAMINATION CONTROL, CLEAN ROOMS, CONTAMINATION PRODUCING OPERA-

TIONS, PARTICLE COUNT MONITORING, SOLDERING AND PARTS CLEANING.
(3) THE TOOLS DEVELOPED BY OTD TO CONTROL CHIPS PRODUCED DURING ASSEMBLY ARE BEING USED AT EOD.
(3) CAPITAL EQUIPMENT HAS BEEN PURCHASED. THIS PURCHASE INCLUDES A NEW CENTRAL VACUUM SYSTEM OF TWICE THE PRESSURE HEAD AND THE REPLACEMENT OF A HYDRAULIC HOIST.
(5) CONTAIMINATION REMOVED FROM THE TAKEUP DURING AND AFTER VIBRATION IS MEASURED AND ANALYZED.
3. PARAGRAPH 2 OF THE REFERENCED TWX SUGGESTED CONSIDERATION OF AN ENGINEERING TEST OF REWIND DURING 1210-4. NO ENGINEERING TESTS OF REWIND HAVE BEEN PLANNED FOR THE FOLLOWING REASONS:
A. THE ONLY SIGNIFICANT DIFFERENCE BETWEEN SV-10 AND THE PREVIOUS VEHICLES THAT HAVE ATTEMPTED REWIND IS THE 180 DEGREE BUILDER ROLLER IN TUA'S NUMBER 2,3 AND 4.
B. THE 180 DEGREE BUILDER ROLLER WAS DESIGNED TO PRECLUDE MIS-STACKING ON THE TAKEUP IN THE FORWARD DIRECTION DUE TO FILM UNFLATNESS. BECAUSE IT IS NOT IN CONTACT WITH THE FILM STACK DURING REWIND IT HAS NO SIGNIFICANT EFFECT ON FILM TRACKING IN THE REVERSE DIRECTION. DEMONSTRATION OF PROPER FILM STACKING IN THE FOR-

WARD DIRECTION ON RV-2, 3 AND 4 WILL VALIDATE ALL ASPECTS OF THE 180 DEGREE BUILDER ROLLER. IN ADDITION, FILM FLATNESS TOLERANCES ON FLIGHT STACKS HAVE BEEN IMPROVED THUS INCREASING SAFETY MARGINS.
C. THE 180 DEGREE BUILDER ROLLER WAS QUALIFIED BY SPOOLING OVER ONE MILLION FEET OF FILM AND SV-10 HAS BEEN TESTED THROUGH ITS FACTORY AND FIELD FLOW TO FULL REWIND VELOCITY (-68 IPS).
4. PARAGRAPH 3C OF THE REFERENCED TWX REQUESTED AN ASSESSMENT OF PROBABILITY OF REWINDING ON 1213. THE PROBABILITY OF DEMONSTRATING FULL CONTROL OF CONTAMINATION BY SV-13 IS NOT HIGH. THE SENSOR SUBSYSTEM FOR SV-13 WILL BE DELIVERED FROM PERKIN ELMER IN LATE MAY OR EARLY JUNE AND ALL FOUR TAKEUPS FOR SV-13 ARE ALREADY AT MDAC. HENCE MUCH OF THE EQUIPMENT WILL HAVE BEEN FABRICATED PRIOR TO FULL IMPLEMENTATION OF THE CORRECTIVE ACTIONS. HOWEVER, THE PROGRESS OF THE CONTAMINATION CONTROL PROGRAM WILL BE MONITORED REPEATEDLY AND SPECIFIC RESULTS EVALUATED AFTER EACH RECOVERY. MY PERSONAL EVALUATION IS THAT WE WILL PROBABLY NOT REWIND UNTIL BLOCK IV.
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