

A large machine in a field

Description automatically generated

**FMG Solomon Firetail Stacker SK802**

**Post Shut Report**

**Work Order: 061**

**Document: BMS-03-REP-061\_FT24OP11**

**Document Revision**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rev** | **Date** | **Prepared** | **Approved** | **Comments** |
| 0 | 20/11/2024 | CN | DR | Issued for Internal review |
| 1 | 28/11/2024 | CN | DR | Issued to Client |

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# Introduction

Fortescue Solomon Firetail (FMG FT) recently engaged Balance Machine Services Pty Ltd (BMS) to provide tooling, equipment and manning resources to execute maintenance scopes for FT24OP11 shutdown on Stacker SK802 in the stockyards.

A total of 12x BMS personnel (6-day shift & 6-night shift) were mobilised to site from Tuesday 5th of November until Wednesday the 13th of November 2024.

With an overall total of 16 work scopes, 11x work scopes were completed & 5x Hydraulic scopes were postponed due to unforeseen problems with equipment, documents or parts as described in this report.

# Safety

All works were completed in accordance with FMG Solomon and BMS Site safety procedures.

Random (AOD) testing notifications and or daily breath testing were conducted for all personnel at the commencement of each day and night shift.

Any shut safety notices, updates & or incident reports were passed onto BMS personnel during pre-start meetings. Personnel were encouraged to provide feedback or concerns they had from their previous shift.

Overall, all jobs were executed safely during the shut.

There were no reportable incidents, accidents or near misses for BMS personnel while onsite.

|  |  |  |
| --- | --- | --- |
| **BMS PERSONNEL ROLL** | **PER SHIFT** | **LOCATION** |
| Mechanical Supervisors | 1 | Stockyards |
| Service Technicians | 1 | Stockyards |
| Mechanical Fitters | 1 | Stockyards |
| Trade Assistants | 1 | Stockyards |
| Hydraulic Technicians | 1 | Stockyards |
| Hydraulic Supervisors | 1 | Stockyards |

# Disclaimers and Limitations

The scope of supply and services for any machine inspections is limited only to a visual inspection of the accessible steel structure and steel components of the plant/machine. In preforming any visual inspections, it is not possible to identify all defects in the components and steel structures.

Some (but not all) of the factors limiting the effectiveness of the inspection are:

* Defects could develop in non-visible areas of the plant / machine.
* Defects could be covered by paint, dust, dirt, material build up, lubricants or a combination thereof.
* Some defects may not have propagated to the surface of the relevant component and may therefore not be visible.
* The completion of a visual inspection of the plant / machine will not confirm, in any way, manner or form that the inspected plant/machine is free from defects.

In light of the above, BMS can offer no warranty or indemnity whatsoever to FMG that the inspection will result in the detection or identification of all or any existing or possible defects in the inspected plant/machine.

# Shutdown Scopes / Work Orders

## Summary

* 52W SK802 Replace Hard Skirts & Soft Skirts
* 52W ME OFF Adjust Cable Reel Torque Limit SK802
* 26W ME OFF Insp LT Bogie Assy SK802
* 5Y ME OFF Repl Suction Valves Luff SK802
* 5Y ME OFF Repl DCV's Hydraulics SK802
* 5Y ME OFF Repl Relief Vlv Luff Cyl SK802
* 13W SK802 Insp Slew Drive & Brakes
* 5Y ME OFF Repl Luff HPU Pump Assy SK802
* 13W SK802 ME OFF Maint HS Coupl Assy
* 104 SK802 Mech OFF Insp Rigid Coupl Drv
* 13W SK802 Inspect Hose Reeler
* 5Y Replace Luff Pressure Transducers
* 1Y MRMP Inspect Cyclone Prep SK802
* SK802 – HR Scope Trailing Hose Removal
* BREAK IN SCOPE – CV802 – PY03 Replace Pulley CM
* 5Y ME OFF Replace Relief Valve Luff HPU SK802

|  |  |  |  |
| --- | --- | --- | --- |
| **AREA** | **SCOPE TOTALS** | **UNCOMPLETED/ CANCELLED SCOPES** | **COMPLETED SCOPES** |
| **SK802** | 14 | 5 | 9 |
| **Break in Tasks** | 2 | 0 | 2 |

# Uncompleted Work Scopes

During FT24OP11 shut prep days for SK802, BMS identified a number of issues with the Work Orders and scopes listed below (5.1 – 5.5). These issues were escalated to FMG Solomon Engineering, Scheduling team & Day shift Area Lead in the form of a Technical Memorandum document. The purpose of that document was to provide clarity and assist with correct planning and parts to safely and efficiently execute the below work scopes.

## 5Y ME OFF Repl Luff HPU Pump Assy SK802

WO 2200602077 - 5Y ME OFF Replace Luff Pump Assy SK802

* **Luff pump**: supplied is an A10VO45DFR1/31R, with no paperwork or certification, and potentially has incorrect internals.
* **Luff HPU Tank Cover Seals**: Not supplied for the purpose of draining and cleaning the HPU Tank.

## 5Y ME OFF Repl Relief Vlv Luff Cyl SK802

WO 2200602041 - 5Y ME OFF Replace Relief Valve Luff Cylinder SK802

* **Luff Cylinder Pressure Relief Valves**: Engineering Methodology from the Client not provided. It is critical to have an engineering methodology developed for scopes where there is a potential risk of changes to machine balance or stability.
* **Balance Lines**: It is noted that SK802 has balance lines installed, however no valves are present, which inhibit the ability to isolate each cylinder hydraulically to facilitate PRV change-out. Ideally, a procedure should be in place to identify controls needed for potential hazards & risks associated with this scope & include step by step work instruction.

## 5Y ME OFF Replace Luff Pressure Transducers

WO 2200602020 - 5Y ME OFF Replace Luff Pressure Transducers

* **Pressure Transducers**: It is noted that SK802 currently has 4 pressure transducers installed, however the machine schematic only shows a total of two (2). Also, two types of transducers are currently installed:

T20 Test port type (3 of 4 transducers)

Direct Fit to manifold (1 of 4 transducers)

Only Two transducers were supplied for this outage.

## 5Y ME OFF Repl Suction Valves Luff SK802

WO 2200602077 – 5Y ME OFF Replace Suction Valves Luff SK802

* **Suction valves and bellows**: It is noted that the luff pump arrangement on SK802 is in-tank. The suction valve and bellows relates to an external pump configuration, such as the Reclaimer. This work scope is not required on SK802.

## 5Y ME OFF Repl DCV’s Hydraulics SK802

WO 2200609981 – 5Y ME OFF Replace DCV’s Hydraulics SK802

* DCV’s: Parts not available for this shut.

***For recommendations & extra comments on cancelled hydraulic scopes, refer to BMS 061- FT24OP11-BMS-TR-SK802 Technical Memorandum (attached to this Report)***

# Scopes Completed

## 52W SK802 Replace Hard Skirts & Soft Skirts (Break in Job)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200833463 | **SCOPE** | 52W SK802 Replace Hard Skirts & Soft Skirts | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **11/11/2024** |
| **Summary (What was completed):**   * BMS were asked to complete this scope as one of the two Break in jobs. * Excess product built up around CV01 belt transfer/spoon chute area & cleaned so hard skirts could be inspected. * All Soft skirts adjusted to contact belt. | | | | | |
| **Problems or Delays:**   * New type of Hard skirts installed on SK802 CV01 Belt – Not supplied or available for replacement. Only 20x of the older flat type hard skirts were provided. | | | | | |
| **Recommendations:**   * KG-02004-WI-ME-0014 Work instruction provided for the scope looks to be the Work instruction for hard & soft skirt replacement instructions and only relevant to SK801 & Port stackers but not SK802. A Separate WIN for SK802 Hard & Soft skirt maintenance should be developed & issued when completing this scope. * Material part number for New Type of Hard Skirt needs to updated on future scope Work orders and supplied during next outage. | | | | | |
| A metal beam with red dirt  Description automatically generated with medium confidence**Photo 1.** Product build up on Boom Belt | | | | | |

## 52W ME OFF Adjust Cable Reel Torque Limit SK802

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200573363 | **SCOPE** | 52W ME OFF Adjust Cable Reel Torque Limit SK802 | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **11/11/2024** |
| **Summary (What was completed):**   * Actual scope description & tasks were for Cable Reel Inspection. * Cable reel motor was removed & Torque Limit Coupling friction disc visually inspected and measured. * Work order operational steps also included – adjust chain tension & replace rollers on layering mechanism - these are not applicable to SK802 cable reel. | | | | | |
| **Problems or Delays:**   * No issues or delays reported. | | | | | |
| **Recommendations:**   * Remove chain tension adjustment & roller replacement on layering mechanism, task operations & parts from SK802 inspection work scopes. | | | | | |

## 26W ME OFF Insp LT Bogie Assy SK802

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200862747 | **SCOPE** | 26W ME OFF Insp LT Bogie Assy SK802 | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **11/11/2024** |
| **Summary (What was completed):**   * Work & Inspections completed as per SO-13008-WI-ME-0020 26W ME OFF Insp LT Bogie Assembly SK802 Work Instruction check sheet. No notifiable issues were detected during the inspections. | | | | | |
| **Problems or Delays:**   * No issues or delays reported. | | | | | |
| **Recommendations:**   * Photos, drawings & information provided on the current WIN & Check sheet needs to be updated. This includes Note for Long Travel Drive Motor Brake Gaps = 0.4mm, not 1mm. | | | | | |

## 13W SK802 Insp Slew Drive & Brakes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200821678 | **SCOPE** | 13W SK802 Insp Slew Drive & Brakes | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **11/11/2024** |
| **Summary (What was completed):**   * Work & Inspections completed as per SO-13008-WI-ME-0015 Mech Inspect Slew Drives & Brakes SK802 Work Instruction check sheet. Issues noted below;   DRIVE 1   * Oil leaking from Drive 1 encoder shaft due to damaged Seal * Breather needs replacing – this was escalated but not supplied or available. * Excessive grease pumping through drive input seals * MAYR Torque limit coupling installed on both drives is not the same MAYR Type coupling referenced on Work instruction (see photos 2, 3 & 4).   DRIVE 2   * Oil level low on Drive 2 * Breather needs replacing – this was escalated but not supplied or available. * Excessive grease pumping through drive input seals | | | | | |
| **Problems or Delays:**   * No other issues or delays reported. | | | | | |
| **Recommendations:**   * Monitor Oil Leak Drive 1 Encoder & Order replacement Shaft & seals | | | | | |
| **Photo 2.** Torque limiter coupling **Photo 3.** SD1 Coupling Cleaned **Photo 4.** SD2 Cleaned  **A close up of a machine  Description automatically generatedA close up of a metal wheel  Description automatically generatedA rusty machine with a yellow paint on it  Description automatically generated with medium confidence** | | | | | |

## 13W SK802 ME OFF Maint HS Coupl Assy

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200953011 | **SCOPE** | 13W SK802 ME OFF Maint HS Coupl Assy | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **8/11/2024** |
| **Summary (What was completed):**   * Works & Inspections completed as per SO-13008-WI-ME-003 13W ME OFF Maintain Stacker HS Coupling Work Instruction check sheet. * Oil Sample collected by TLS * All fasteners & Tie wires checked & secure * Minor damage from what looks to have been caused from excessive hammering, noticed on disc coupling flange - Motor side. No obvious signs of fatigue or cracking around the damaged area so should not affect performance during operations. (See photo 5). | | | | | |
| **Problems or Delays:**   * No issues or delays reported. | | | | | |
| **Recommendations:**   * Would recommend checking for signs of fatigue or cracking around damaged edges on disc coupling flange during next maintenance shuts. | | | | | |
| **Photo 5.** Damaged edges on Disc Coupling  A close up of a machine  Description automatically generated | | | | | |

## 104 SK802 Mech OFF Insp Rigid Coupl Drv

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200953005 | **SCOPE** | 104 SK802 Mech OFF Insp Rigid Coupl Drv | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **8/11/2024** |
| **Summary (What was completed):**   * Works & Inspections completed as per SO-13004-WI-ME-0016 104W MECH OFF Inspect Stacker CV Rigid Brevini LS Couplings Work Instruction check sheet. | | | | | |
| **Problems or Delays:**   * Physically unable to fit torque wrench & socket on 6x of the lower LS coupling bolts (motor side) to confirm torque values. Could not rotate coupling due to belt clamps in place for pulley change out. | | | | | |
| **Recommendations:**   * Order & replace existing M24 x 100 Gr 8.8 bolts with M24 x 100 Gr 10.9 bolts & nuts. * Recommend using a Low profile hydraulic Hytorc cassette to suit existing or new M24 nuts. If unavailable or unable to fit or use Hytorc cassette, a rotation of the gearbox & coupling will be required to fit torque wrench & socket to lower bolts on Motor end. This scope may be best planned during a belt change on the boom (& when belt has been removed and brakes on Drive have been backed off). | | | | | |
| **Photo 6.** LS Coupling on CV01 Drive  A close-up of a bolt  Description automatically generated | | | | | |

## 13W SK802 Inspect Hose Reeler

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| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200935205 | **SCOPE** | 13W SK802 Inspect Hose Reeler | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **11/11/2024** |
| **Summary (What was completed):**   * Works & Inspections completed as per FT-09008-WI-ME-0022 13W ME OFF Inspect Hose Reeler SK802 Work Instruction & check sheet. * Seized & worn pendulum roller guides replaced. | | | | | |
| **Problems or Delays:**   * Rotary union (water swivel) is leaking but a replacement union was not available on site to replace it. * Materials including pendulum rollers and bolts were not supplied for this scope. HES had some parts available from the cable reel scope but dimensions were not the same as what is currently installed (too long). BMS managed to modify (shorten) 2x of the longer sleeves that HES had, to replace two of the pendulum guide roller parts that were seized. | | | | | |
| **Recommendations:**   * Order rotary union & plan to change out during next shut window. * Order replacement Pendulum rollers, fasteners and scope to replace these during next shut window. Small scaffold required. | | | | | |

## 1Y MRMP Inspect Cyclone Prep SK802

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200890137 | **SCOPE** | 1Y MRMP Inspect Cyclone Prep SK802 | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **9/11/2024** |
| **Summary (What was completed):**   * Inspections completed as per SO-080008-CK-ST-0012 Solomon Stacker 12 Monthly Cyclone Preparedness Inspection check sheet. | | | | | |
| **Problems or Delays:**   * No reportable defects or issues found during mechanical & structural inspections. | | | | | |
| **Recommendations:**   * Function Test proximity switches during initial isolations or commissioning to confirm they are working correctly. | | | | | |

## SK802-HR SCOPE Trailing Hose Removal

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2100756887 | **SCOPE** | SK802-HR SCOPE Trailing Hose Removal | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **9/11/2024** |
| **Summary (What was completed):**   * Photos & measurements taken for scoping trailing hose removal/ replacement. BMS to provide further details to planning team. | | | | | |
| **Problems or Delays:**   * No reportable issues or delays. | | | | | |
| **Recommendations:**   * BMS will provide recommendations during scope & planning of works. | | | | | |

## CV802 – PY03 Replace Pulley CM (Break in Job)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2500028042 | **SCOPE** | CV802 – PY03 Replace Pulley CM | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **9/11/2024** |
| **Summary (What was completed):**   * BMS were asked to complete PY03 Pulley on CV802 as another break in job. * A Conveyor pulley ITP (Asset Installation Check sheet) was completed for this scope and copy attached to this report. | | | | | |
| **Problems or Delays:**   * No reportable problems or delays while completing this task. | | | | | |
| **Recommendations:**   * Nil. | | | | | |
| **Photo 6.** CV802 PY03 Pulley Change out  A metal structure with a chain attached to it  Description automatically generated | | | | | |

## 5Y ME OFF Replace Relief Valve Luff HPU SK802

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WORK ORDER#** | 2200609982 | **SCOPE** | 5Y ME OFF Replace Relief Valve Luff HPU SK802 | | |
| **Complete  Incomplete  Further works required** | | | | **Date Completed** | **10/11/2024** |
| **Summary (What was completed):**   * 3x Luff HPU Pressure Relief Valves supplied by BMS and bench tested with serialised tamper proof seals (Test certs provided & attached) * 1x VSPN-10A - item 27 on drawing – set to 145bar Supplied and installed. * 1xKK10-2/RVPD-10-N-S-0-50 - item 26 on drawing – set to 125bar – supplied by FMG – set/tested by BMS. * 1x ZDBK6VP2 - item 31 on drawing – set to 70bar - Supplied and installed * PART REFERENCES FOR ITEMS ON DRAWING SO-08008-DR-ME-004 | | | | | |
| **Problems or Delays:**   * No reportable problems or delays. | | | | | |
| **Recommendations:**   * Nil. | | | | | |

# Further Recommendations / Actions

## Parts Supply

BMS will generally check all parts supplied during shut prep days and promptly escalate any issues if known at that time. BMS will also try to provide information or details on post shut reports when incorrect parts have been supplied for scopes.

## Personnel

There were no notable issues on site or camp reported from BMS personnel.

BMS supervisors & personnel were happy to provide help or services to other contractors when asked or requested.

New team members were buddied up with our experienced tradesmen during the shut duration to familiarise themselves with FMG Solomon Site, Kangi/Dally Camps and BMS/FMG important Site policies and procedures.

## Shut Support

BMS Supervisors & Service technicians received great support from Fortescue personnel including Area Leads, planners, schedulers & shut co-ordinators to ensure parts, equipment or information was provided for scopes when required.

## Safety

* BMS will always strive to provide our site personnel with the necessary tools, equipment and information to maintain a safe work environment whilst onsite.
* Continue to maintain the current injury free record during shutdowns but ensure the incident reporting culture is not compromised.

# END OF REPORT

Extra documents attached

* 061-FT24OP11-BMS-TR-SK802 Technical Memorandum Pages 13 - 14
* HPU PRV test certificates Pages 15 – 17