



Medupi Power Station Project Update

Select Committee on Labour and
Public Enterprises

11 September 2013

Powering your world 

Agenda

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Topic

- 1 Introduction
- 2 Overview of Medupi project progress
- 3 Technical issues
- 4 Issues with contractors
- 5 Labour issues



Our objective for today

- Provide an overview of the **current status of construction, and the way forward to construction completion**
- Give an update on the **Partnership Agreement, recent labour action and on-going labour issues**



Agenda

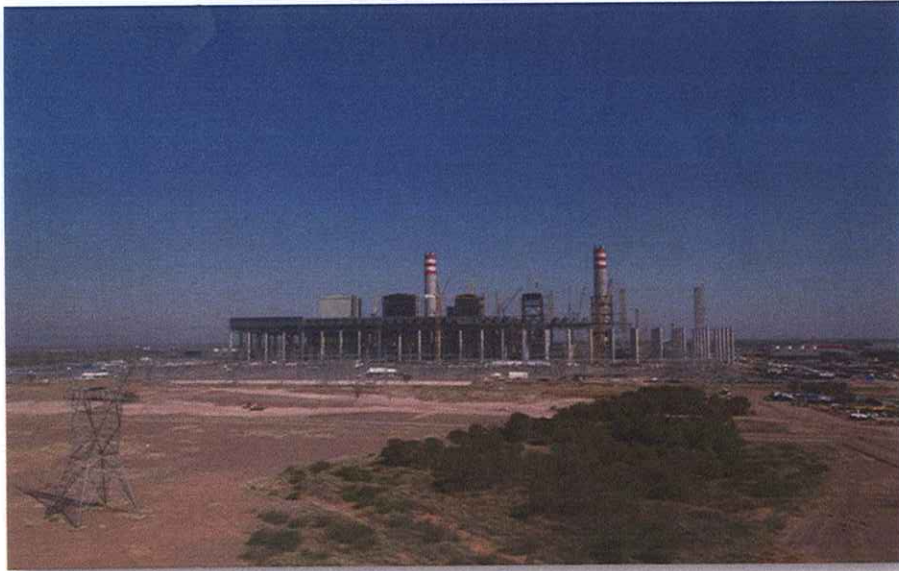
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Power Island and high voltage yard

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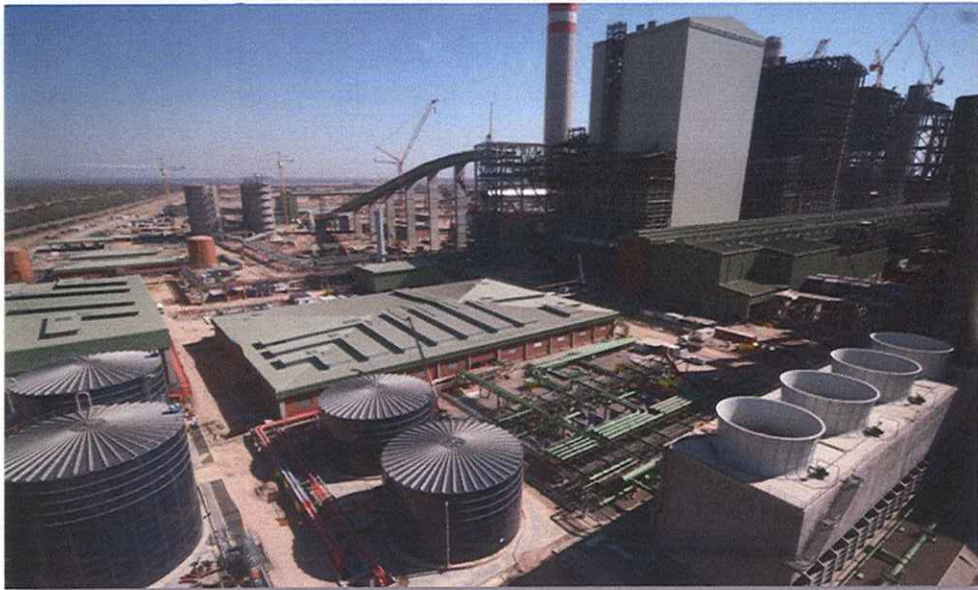
Coal Stockpile, Chimneys & Boiler Structures

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Water Treatment Plant, ACC, Fly Ash Silo's, Unit 6
Boiler House cladding progress



Unit 6 & 5 Boiler Structures

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Raw Water Reservoir

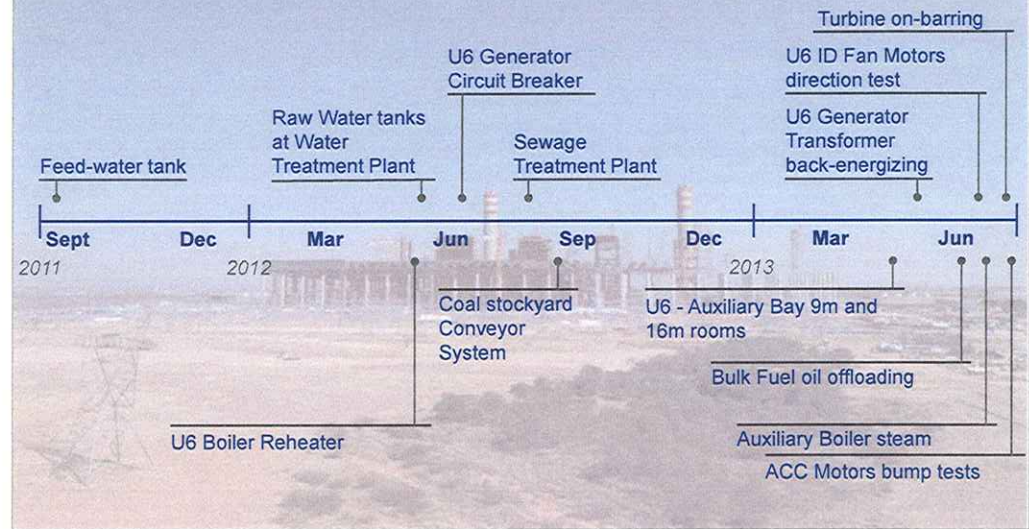
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We have already made progress in commissioning systems



Major commissioning milestones achieved to date



SOURCE: Start-Up Meeting Commissioning Milestones (Jul 2013)

Our most recent commissioning successes are bringing Unit 6 to life







Success	Description	Significance	Photo
Back energizing	<ul style="list-style-type: none"> Back-energized the Unit 6 generator transformer¹ Set an Eskom record by energising 11 electrical boards in 3 days 	<ul style="list-style-type: none"> The plant can now draw power from the 400kV distribution network 	
Aux boiler blow-through	<ul style="list-style-type: none"> Achieved auxiliary boiler blow-through on 24 June 2013 	<ul style="list-style-type: none"> The auxiliary boiler system provides steam on start-up 	
Turbine on-barring	<ul style="list-style-type: none"> We successfully completed Turbine on-barring on 5 July 2013 	<ul style="list-style-type: none"> The turbine barring gear will enable safe operation of the turbine once the plant is running. 	
ACC fan motor direction tests	<ul style="list-style-type: none"> Direction tests of the 64 Air Cooled Condenser (ACC) fan motors commenced this month and will be completed by 20 August 	<ul style="list-style-type: none"> ACC will condense steam coming out of the turbine so that it can be heated again in the boiler 	

¹ The generator transformer is not currently live as we are awaiting the DCS to be connected to enable safe, permanent operation

Our most recent commissioning successes are bringing Unit 6 to life



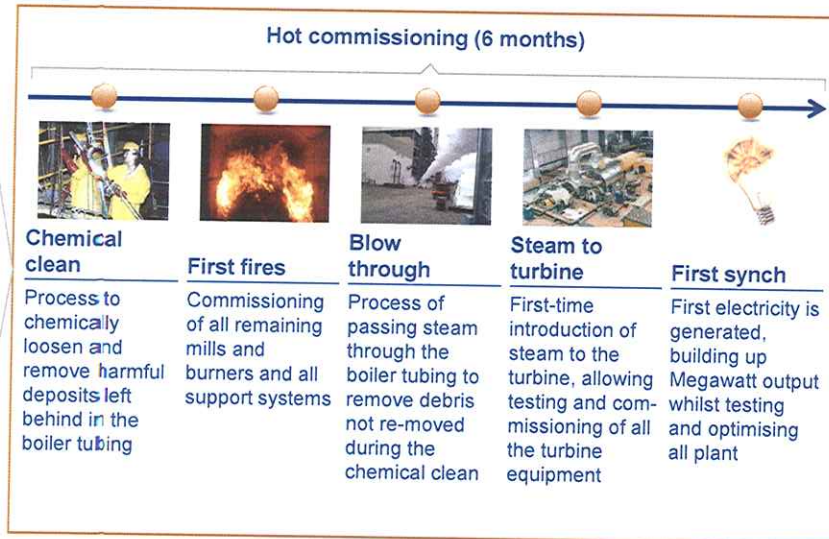
Success	Description	Significance	Photo
Submerged Scraper Conveyor (SSC)	<ul style="list-style-type: none"> The dry run of the SSC began on 29 July. Alterations were completed on 13 August. 	The SSC is used for removing Boiler Bottom Ash (BBA) once coal has been fired in the Boiler.	
Flue Gas Ducting	<ul style="list-style-type: none"> Component 6 of the Flue Gas Ducting between the ID Fans and the Chimney was lifted into place on 13 August. 	The ducting is for removing the gas that will be produced from the combustion of coal in the Boiler.	
Boiler Mills	<ul style="list-style-type: none"> The one hour test runs on the Unit 6 Boiler Mills were completed on 22 August. 	The Boiler Mills crush coal which is fed from the Coal Bunker to the Boiler.	
Water Treatment Plant	<ul style="list-style-type: none"> The damaged tank lining in the Water Treatment Plant was repaired and approved by engineering 	Water storage ready	

Key activities that lead to first synchronisation of a unit after successful pressure test

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All three challenges, WPQR, PWHT, C&I need to be resolved before hot commissioning can start



SOURCE: Medupi Project team

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NB

Potential delays to First Sync



Package	Critical system impacted	Reason for delay	Target completion	Potential delay to First Sync Months
All	All	Continued strikes	N/A	Forecast: 2.0, Range: 1.0 - 3.0
P02	Re-heater 1	Potential extensive work for re-alignment	20 Jul 13	Forecast: 0.5, Range: 3.5 - 4.0
P02	Post Weld Heat Treatment (PWHT)	Over-run of program due to delayed start and slow progress, and Start-up Vessel test completion	7 Aug 13	Forecast: 0.5, Range: 3.5 - 4.0
P17	Boiler Protection System (BPS)	Continued failure of Factory Acceptance Tests (FATs)	15 Sep 13	Forecast: 3.0
P03	Condensate System	Insufficient construction labour on site	30 Jul 13	Forecast: 3.0
P06	Water Treatment Plant (WTP) commissioning	Insufficient construction labour on site	21 Aug 13	Forecast: 3.0
P03	Feedwater System	Potential replacement of welds Insufficient construction labour on site	9 Aug 13	Forecast: 3.0
P17	C&I Cabling	Poor productivity	30 Aug 13	Forecast: 3.0
P17	C&I Loop Checks after commissioning	Potential insufficient people and time allocated for loop checks	15 Sep 13	Forecast: 3.0
P17	Distributed Control System (DCS)	Loop wiring diagrams not submitted as per agreement, Re-testing on site outstanding	30 Jul 13	Forecast: 2.0
P11	Electrical cabling	Poor productivity	30 Aug 13	Forecast: 2.0

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Unit 6 first synchronisation date of December 2013 could potentially be affected in 3 areas

C Control & Instrumentation

- Software has not passed Factory Acceptance Test
- Site installation to be accelerated

B Boiler – Post Weld Heat Treatment

- Multiple welds need to be tested
- Replacement of insufficiently treated welds required

A Boiler – Welding Procedure Qualification Record

- Welds made using unqualified welding procedure will need to be replaced

*fraudulent activity picked up
∴ SAPS criminal investigation underway*

A What is a Weld Procedure Qualification Record (WPQR)? STRICTLY CONFIDENTIAL
Eskom

What is it, and where does it fit into the power station?	What is the problem?	What is being done about it?
<ul style="list-style-type: none"> The boiler is made up of a large number of tubes that need to be welded following a specific procedure, to ensure the system can handle very high heat and pressures The weld procedure specifications (WPS) are written according to a specific code, laboratory tested by Moody's and certified by an independent authority, TUV, producing a series of welding procedure qualification record (WPQR) Without proper certified procedures, TUV cannot certify that the boiler has been constructed according to the code 	<ul style="list-style-type: none"> A Hitachi sub-contractor manufactured certain high-pressure part equipment according to the incorrect weld procedures. <i>lapse in quality control</i> Hitachi and Eskom reviewed 187 weld procedures and found that 30 procedures required testing to check they meet the code requirements Of the 30 procedures, 4 failed the laboratory testing, requiring welds done using these procedures to be redone This is absolutely critical to obtain certification to operate the boiler 	<ul style="list-style-type: none"> All 30 non-compliant procedures test piece samples sent to laboratory testing and examination results witnessed by Moody's TUV approved and Eskom Engineering validated the qualified welding procedures. In order to allow welding to continue on all procedures and components WPQR that passed testing Scope of repair has been defined for all affected welds and repairs are underway 100% of Weld Repairs were completed in July 28% of 2nd cycle PWHT procedures have been completed

B What is Post-Weld Heat Treatment (PWHT)? STRICTLY CONFIDENTIAL
Eskom

What is it, and where does it fit into the power station?	What is the problem?	What is being done about it?
<ul style="list-style-type: none"> When welds are constructed, the heat from the welding process creates stress in the material surrounding the weld, reducing its strength Post-weld heat treatment is a method to stress-relieve the weld and its surrounding material by controlled heating and cooling of the affected area Without the correct heat treatment, the compromised material may fail during operation Post-weld heat treatment is a Code requirement Other anomalies such as Stress Corrosion Cracking (SCC) may have consequential impact on life expectancy of plant 	<ul style="list-style-type: none"> A sub-contractor of Hitachi failed to heat-treat many welds with the appropriate procedure Eskom was knowingly misled by the contractor / subcontractor that the correct procedure had been followed Of the 9253 welds that require testing, 6043 welds have already been accepted, 524 require repair and 2686 welds have yet to be tested, a failure rate of less than 10% 	<ul style="list-style-type: none"> Eskom Engineering, TUV and Hitachi agreed on procedure to test and sample potentially affected welds (~9,000) Scope of repair work is being defined as the testing proceeds, In an effort to minimise schedule impact, Eskom and Hitachi are having on-going technical meetings to define exact affected areas 60% of weld repairs have been completed 14% of 2nd cycle PWHT procedures have been completed

WPQR and PWHT repair progress



■ Complete
■ Outstanding

	Background	Actions	Status	Completion
Failed WPQR ¹	<ul style="list-style-type: none"> There were 4 WPQRs Two of the 4 affected WPQRs are resolved <ul style="list-style-type: none"> E23B7-1 (closed) H03B7-1 (closed) EH03E7-1 (testing in progress) H23B7-1 (Repairs in progress) 	Weld repairs 2nd PWHT cycle	<ul style="list-style-type: none"> All repair work complete as of 25 July 0 welds outstanding 	100,0%
			<ul style="list-style-type: none"> 38 of 138 welds have had 2nd PWHT cycle Reheater scope complete 28 PWHT's since last report 	27,5% 72,5%
Failed PWHT ²	<ul style="list-style-type: none"> In 2012 Hitachi Power Africa were informed of PWHT irregularities To determine state of plant, hardness testing was carried out Failed results led to re-welding and re-PWHT repairs 	Weld repairs 2nd PWHT cycle	<ul style="list-style-type: none"> Reheater scope complete 1992 welds outstanding, down from 2375 2677 PWHTs outstanding 	59,8% 40,2%
			<ul style="list-style-type: none"> Reheater scope complete 161 PWHTs outstanding (down from 183) 	14,4% 85,6%

1. Weld procedure qualification record 2. Post weld heat treatment
SOURCE: Hitachi Medupi unit 6 14/08/13 repair report

Key boiler repair issues have the ability to delay hydro test by 4 months



■ Days delay

Issue	Description	Options	First sync delay (months)
Reheater alignment	<ul style="list-style-type: none"> Boiler 6 Reheater 1 has been constructed outside of design tolerances Construction team estimate 7,000-9,000 welds to repair to specification Hitachi have attempted to repair misaligned portions of the Reheater Inspections have taken place on August 17th and 21st <ul style="list-style-type: none"> Eskom Engineering (in conjunction with 2 independent companies) have stated that the repair methodology has not turned the boiler to acceptable tolerances 	Repair later <ul style="list-style-type: none"> Repair during 1st outage 	0
		Repair now <ul style="list-style-type: none"> Repair prior to hydro test 	4
Start-up vessel testing	<ul style="list-style-type: none"> All offshore test have passed Currently Eskom is awaiting Start-up Vessel PWHT method statements <ul style="list-style-type: none"> Expected by Friday, August 23rd Due to failed NDT¹, multiple PWHTs² were carried out on the test piece <ul style="list-style-type: none"> This procedure is not in line with the method that will be followed to heat treat unit 6 start-up vessel Potential of invalid procedure being developed 	If method statement passes <ul style="list-style-type: none"> 2nd round PWHT continues 	0.5
		If method statement fails <ul style="list-style-type: none"> Method statement to be re-developed 	2

Approval of weld qualifications is on track and is a low risk



Issue	Description	Status					
		Submit concession	HPE concession approval	TUV concession approval	HPE compile risk assessment	TUV review risk assessment	Eskom approve concession
Thermo-weld qualification	<ul style="list-style-type: none"> Thermo-couple welds are below welder qualification range 50 welds per unit affected, for 3 units (Units 6, 5, 4) 	✓	✓	✓	✓	✓	Open
Sleeve weld qualification	<ul style="list-style-type: none"> Welders are only qualified for carbon-carbon and steel-steel 8,000 welds/unit, 3 units Welders performed carbon-steel welds which they were not pre-qualified for 	✓	✓	✓	✓	✓	Open
Welder qualification	<ul style="list-style-type: none"> 41 welders affected No welder certificates available <ul style="list-style-type: none"> However supporting documents in place Certificates required 	<ul style="list-style-type: none"> Regarding 12 welder certificates that will be re-issued by DBT on the basis of internal backups: <ul style="list-style-type: none"> All documentation has been produced by HPE and TUV Process is awaiting Eskom concession approval 					

SOURCE: Medupi Boiler Team, Hitachi Power Europe

What is Control & Instrumentation (C&I)? (2/2)

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What is it, and where does it fit into the power station?

- The whole of Medupi will be controlled by a Distributed Control System (DCS), a complex computer and instrumentation system that allows operators to safely monitor and control what happens internal and external to the plant
- To assist Alstom, the DCS testing has been divided into eight Factory Acceptance Tests to verify it will function correctly when installed. This increases the risk of later integration issues
- Factory Acceptance Tests ensure adequate functionality of the DCS system to manage/ monitor unit controls and protection

What is the problem?

- Continued Factory Acceptance Test failures (2 of 8) due to errors, omissions and faults in the design performed by Alstom, despite Eskom's assistance
- In December, Alstom failed the Factory Acceptance Tests on the Boiler Protection System for the third time (critical to commencing hot commissioning)
- The Boiler Protection System must undergo substantial redesign
- The planned BOP FAT was conducted in May 2013 and failed, preventing BOP commissioning from going ahead

What is being done about it?

- The Eskom team is supporting Alstom with a team of Engineers in France to ensure the Factory Acceptance Tests succeed
- Through Eskom's insistence, Alstom is bringing on board additional experienced partners to assist with problem rectification
- Eskom is engaging Alstom at the highest levels to improve their transparency, productivity and team expertise

Projected delay:
3-6 months

SOURCE : Team Medupi

* Control system for welder safety

Eskom is working with Alstom to build an action plan for the remaining FAT's



	Details
Situation	<ul style="list-style-type: none"> FAT¹ H2 was held from 28 July to 2 August and failed <ul style="list-style-type: none"> 13 new defects were opened during FAT H2. 16 of 42 defects are still open from FAT H Current systems excluded from FAT H (Concession granted) are the EMDAS, AGC and LCPs². Alstom will perform these off-shore.
Actions taken	<ul style="list-style-type: none"> No new Patches or time schedule for Defects identified during FAT H2 were received
Way forward	<ul style="list-style-type: none"> A time schedule is to be agreed with Alstom to complete the outstanding FAT H (BOP) defects – Not received yet A revised time schedule to be submitted by Alstom to complete the outstanding FAT's (EMDAS, AGC and LCP). – Received: shows FAT in November 2013 only

¹ Factory Acceptance Test

² EMDAS = Energy Management Data Acquisition System, AGC = Automatic Grid Control, LCP = Local Control Panel

Eskom is working with Alstom to find solutions for the BPS FAT



	Details
Situation	<ul style="list-style-type: none"> The BPS¹ FAT² (FAT F3) commenced on 19 June It was suspended on 5 July, at which point 36 defects had been discovered <ul style="list-style-type: none"> There are 3 non-negotiable defect categories. These are safety, latching and forcing function defects. 8 defects (3 Forcing, 4 Safety and 1 Latching) must be resolved before recommencing the FAT. 28 defects to be closed out before Unit 6 Handover. 4 defects have been cleared (3 Safety and 1 Latching) 3 Forcing Defects solutions still outstanding. Alstom has proposed a Belchatow solution - Segregation of Safety Logic from Non-Safety Logic needs speedy resolution – Awaiting DC 2115 Revised BPS Program shows delivery to site by November 2013.
Actions taken	<ul style="list-style-type: none"> Alstom and Eskom teams in France working extended hours to expedite resolution Alstom secured the services of ICS Triplex and TUV to expedite the implementation of Design Changes.
Way forward	<ul style="list-style-type: none"> RWE commissioned to evaluate whether the concessions granted will impact on the safety of the system. Report expected end of August 2013. Alstom's Belchatow proposed solution needs to be approved by the Eskom TCG as a concession as it does not meet all the technical requirements – This will only be tabled once report from RWE received. Completing Cable work for BPS (from Field to Marshaling Cubicles)

¹ Boiler Protection System

² Factory Acceptance Test

Eskom is implementing a C&I mitigation strategy for Units 6 & 5, Units 4 to 1, and BPS



Situation

Details

- Units 6 and 5
 - On 10 July Eskom placed an order with Siemens to do an Investigatory Survey Concept for replacement of Medupi PI6 and PI5 C&I (full solution) and a replacement of the PI6 BPS as a patch solution
 - The cost of the survey is R7.2M
 - Siemens requires 10 weeks to complete their proposal
- Units 4 to 1
 - Eskom has initiated the commercial process for a closed enquiry to a selected group of suppliers for a full solution
 - ABB South Africa; Honeywell South Africa; Siemens Limited; Yokogawa; Protea Automation Systems; Helmut Maueel GmbH; and Emerson Process Management
 - We are awaiting a decision from Engineering on the final list of suppliers and the scope of work, and go-ahead from firm legal

Actions taken

- Siemens commenced a site survey on 31 July
- A weekly meeting has been set up with Siemens to handle all technical queries

Way forward

- Siemens submitted an offer for PI6&5 BPS on 19 August, requiring 7 months to deliver and costing R57,4 million for PI6 and R34.3 million for PI5
- Siemens to propose Unit 5 and 6 full solution by September 2013

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Forums have been established on-site to improve communication + reduce bottlenecks

Contractor management is being improved through the CEO forum and an improved claims strategy



We have further ramped up contractor engagements to help us meet our target dates



	Description
CEO forum	<ul style="list-style-type: none"> ▪ Fortnightly meeting on-site of the CEOs and MDs of the contractors ▪ Aims to review progress and identify issues which each contractor must resolve to expedite progress ▪ Agree on strategic issues for the site, technical, logistics and labour relations issues ▪ Agree on initiatives to be set up to resolve systemic issues, such as the Engineering Clearing House
Medupi claims strategy	<ul style="list-style-type: none"> ▪ Aims to recover expenditure Eskom has had to make due to contractors having breached contract ▪ Claims are being broken into three groups: <ul style="list-style-type: none"> – Those requiring prior notice before monies can be recovered – Those not requiring prior notice – Exotic claims where a tailored legal strategy is required ▪ Claims are currently being collected and documented prior to the recovery process being launched

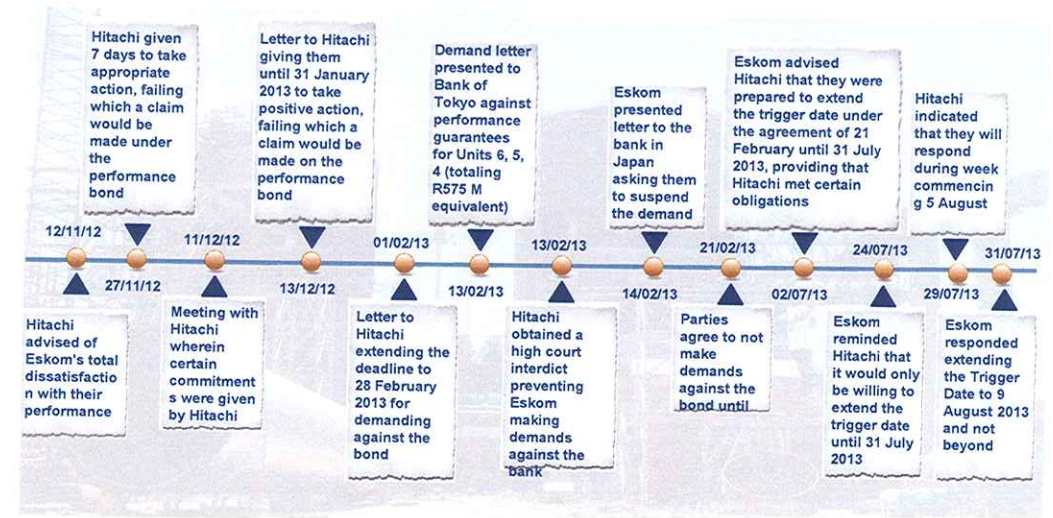
- **Executive Consultative Forum (ECF)** – strategic, meets quarterly
- **Contractor Consultative Forum (CCF)** – site specific issues
- **Contractor Management Forum (CMF)** – site specific compliance
- **Medupi Performance Improvement Centre (MPIC)** – daily meeting with contractors
- **Leadership Forum** (Eskom, Contractors and Organized Labour)
 - Medupi / Kusile Partnership Agreement (PA) takes place as and when needed

Eskom expects Hitachi to seek an extension to the bond claim trigger date



	Timeline	Actions
Eskom intervention	Nov 2012 to present	<ul style="list-style-type: none"> Eskom advised Hitachi of dissatisfaction with performance and demands payout Deadline for rectification has been postponed several times
Hitachi response	Feb 2013 to present	<ul style="list-style-type: none"> Hitachi obtained a high court interdict preventing Eskom making demands against Hitachi <ul style="list-style-type: none"> Eskom suspended the demands made against the performance bonds subject to Hitachi providing demonstration of performance by 31 May 2013 (Trigger Date)
Next steps	Jul 2013 onwards	<ul style="list-style-type: none"> Hitachi has requested an extension to the Trigger Date Eskom has extended the date to 9 August 2013 Eskom, thereafter, to consider making demands against all performance bonds

Hitachi bond timeline



Eskom would recover R1.5 Bn if all 6 Hitachi performance bonds were pulled



The guaranteed sum reduces by 50% once a unit has reached 50% completion as certified by the Engineer in writing

¹ Each performance bond is made up of ZAR, EUR and USD denominated commitments. FOREX rates used - EUR 13.15 - US\$ 10.25 (8 July 2013)

SOURCE: Performance bond schedule - Hitachi package



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- minimum wage
- travel + commuting allowances

Partnership agreement and demobilisation overview



Topic	Description
Partnership Agreement (PA)	<ul style="list-style-type: none"> • Signing the Negotiation Framework on 18 May 2013 constitutes the foundation for Eskom, Contractors and Unions to reach a PA • Partnership Agreement concluded and signed on 12 June 2013 • Subsequently partnership forums established to further bargain unresolved issues • The PA enables finalisation of Site Specific Agreements at Medupi and Kusile
Demobilization	<ul style="list-style-type: none"> • The parties met at Plenary on 1 August 2013 to discuss outstanding issues, progress of task teams and next steps • The unions formulated four conditions on 15 to 16 August: <ul style="list-style-type: none"> - PA finalisation including outstanding implementation and Site Specific Agreement - Removal of all Expatriates - Standard wage rates across the site - Skills transfer and upgrade • As a resolution agreed by Kusile and Medupi, it was agreed that demobilisation would continue and the following topics will be taken to Plenary at PA level <ul style="list-style-type: none"> - Pay demob entitlement - The demob / benefit will be taken to PA-level discussion for agreement and retrospectively paid out to employees as at beginning August

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Ongoing labour issues



Details

Commuting allowance	<ul style="list-style-type: none"> ▪ The current request or belief is that employees will get one hour commuter allowance in the evening and one hour in the morning
Traveling allowance	<ul style="list-style-type: none"> ▪ It was agreed at the PA that the standard rates for hourly paid non-local / seconded employees traveling home on long pay weekend will be R2.50/km before tax. Employees are dissatisfied with certain companies providing busses from Medupi site to Park station and thereafter paying the allowance.
Taxation of allowances	<ul style="list-style-type: none"> ▪ It was advised in the feedback sessions between Contractors and employees that employees wanted the Employer to bear the tax
No work no pay	<ul style="list-style-type: none"> ▪ A "no work, no pay" principle applies for the period of unprotected work stoppages. Employees are disgruntled with lesser quantum
Disciplinary process and sanctions	<ul style="list-style-type: none"> ▪ Contractors to follow necessary disciplinary process and apply appropriate and consistent discipline. Employees are aggrieved with disciplinary processes and sanctions

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Commuting Allowance issues being resolved



- All routes will be travelled twice, once on a Friday and once on a Wednesday and the average will be determined for compensation purposes.
- This will be done by means of physically traveling on the bus with at least two parties present.
- The time circle that parties currently are in possession of and is being used for implementation will be used as the base document.
- Any routes not covered yet will be added.
- The target for resolution of this issue is September 2013 .

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Recent employee unrest and remobilisation



Recent employee unrest

- On 24 July 2013, approximately 100 employees of Murray & Roberts, a Hitachi subcontractor, embarked on a work stoppage.
- The stoppage rose to 1000 participants, and resulted in damage to vehicles and equipment and injuries to 20 employees
- The issues raised as the cause of the strike are related to the new Partnership Agreement, namely:
 - Dissatisfaction with the commuting allowance
 - Lack of consultation

Remobilisation plans

- On 25 July, a Leadership Partnership Forum was held, where Eskom, Contractors and Unions condemned the violent behaviour
- Contractors had feedback meetings on 31 July with employees
- Contractors began inductions and information sessions with employees on 15 August, and employees started returning on 16 August

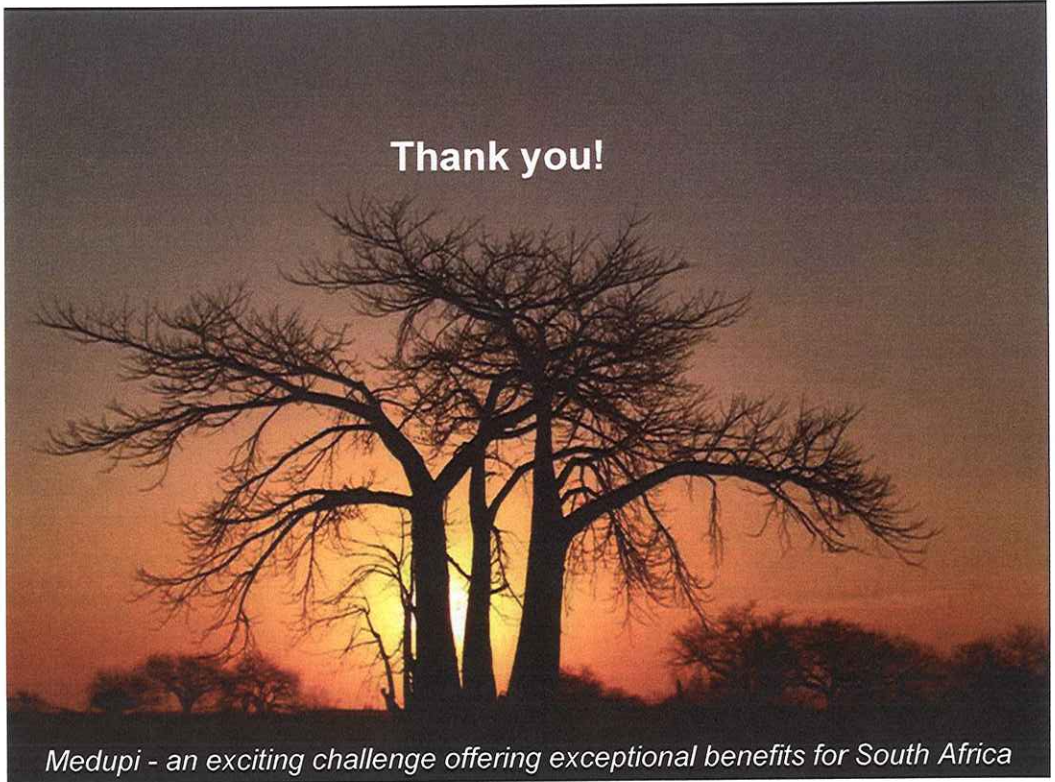
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On-going Construction Industry Strike



- Meeting between Civil Contractors and NUM/BCAWU was held on 24th and 26th August 2013.
- It was agreed that NUM and BCAWU members were released from site on 26th August 2013 as from 12:00 by the Civil Contractors.
- Contractors made buses available to transport the employees to Marapong Stadium for a mass meeting which the unions requested.
- No Work No Pay principle will be applicable and has been communicated to all site employees irrespective of whether party to the protected strike or not.
- Buses to Medupi have operated as normal to transport employees wanting to work.
- Unions had initially indicated that they did not wish to picket but chose to support the strikers at Exxaro and Aveng Pipe line project at their picketing areas. However on the 27 August, there were approximately 350 employees at the Medupi picketing area.

Thank you!



Medupi - an exciting challenge offering exceptional benefits for South Africa