

The Managanese prospect was evaluated by the original Shell Angola organisation as part of the Block 18 prospect portfolio. It is unlikely that this evaluation will be of sufficient detail to enter into unitisation discussions. Also the evaluation (which is several years old) would have to be updated to incorporate the results from the recent Block 18 wells. If it is decided to proceed with the above action, additional SDS resources will be required. If no resources are available the basic Block 18 work plan will be impacted.

Classification of wells as expex or capex is related to booking of proved reserves. Wells drilled outside the proven area, or to an unproven depth within the proven area, are classified as expex. Only wells drilled inside the proven area (area to which proved reserves have specifically been attributed) to a proven depth are classified as capex.

In the case of Angola, most of the wells being drilled in 2000 are testing new structures (Paladio and Cromio) so, although they have a high POS due to the high degree of confidence from the seismic calibration, they are still classified as exploration wells as no proved reserves have been booked. In the case of the Plutonio Salt Flank prospect, however, there may be a (strong) case to re-classify this well as 'appraisal', as a prominent flat seismic event suggests the same OWC as penetrated in the nearby Plutonio-1 discovery well. The new prospect is testing a different channel feature (probably connected) over the same general structure and would prove up the high field reserves case. Although there are no plans to use the exploration well in the field development scheme, there might be sufficient technical justification (to be provided by SDS) to re-classify the funding of the well cost from expex to capex, if proved reserves are booked for the Greater Plutonio hub prior to spudding of the salt flank appraisal well.

If the Plutonio Salt Flank is deepened to test the Cretaceous - as being pushed by BP and supported by SDAN in an effort to find a gamechanger for volume potential, a portion of the expenditure would have to remain with the expex budget.

SDAN also needs to investigate any complications versus PSC commitments if the Plutonio Salt Flank well is classified as 'appraisal' rather than 'exploration'. The well is due to spud in December 2000. Re-classification will reduce 2000 expex by about \$10 MM and increase 2000 capex by \$10 MM, impact on 2001 expenditure is that the expex will be reduced by about \$3 MM and the capex will be increased by the same amount.

In the case of Brazil, no funds, either expex or capex, have been allocated for appraisal drilling in 2000/2001, although in the case of exploration success, the need for further appraisal has been flagged. Logically, without appraisal funds no proven reserves can be booked, no FID can be taken and therefore no IBV addition will be achieved. On the EPG scorecard for 2000, proven reserves addition of zero is the mid point target for Brazil, but 100 MMbbls is an upside case subject to a major discovery in BC-10. With the delayed drilling in Brazil and lack of appraisal possibility in 2000 booking of proved reserves for Brazil in 2000 is highly unlikely.

In summary, therefore, it is likely that proven reserves in the order of 300 MMbbls will be booked for Angola by end 2000, offsetting the zero additions for Nigeria-SPDC. The possibility to reclassify the Plutonio Salt Flank well on the 2000 drilling sequence as appraisal and fund under CAPEX will be pursued by SDAN. In Brazil, no proven reserves will be booked for 2000. In the case of success in BC-10 and other blocks, however, booking of proved reserves in 2001 will require the allocation of funds for appraisal drilling in 2001.

The process for booking reserves needs to be clarified both internally and also with respect to Partners BP and Sonangol. The water needs to be tested on all fronts.

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SMJ00037674

RIJ00070241

-----Original Message-----

From: Hines, Ian IM SIEP-EPT-DE
Sent: Sunday, September 10, 2000 8:55 AM
To: Sears, Richard RA SIEP-EPT-DE; Wilhelm, Chandler CT SIEP-EPT-DE;
Knight, Barry BP SIEP-EPT-DE
Cc: Newberry, Derek D SIEP-EPT-DE
Subject: RE: Reserves

Gents,

Attached revision, maps out a number of the issues raised by Gordon's note and may help with the discussion.

Ian.

-----Original Message-----

From: Sears, Richard RA SIEP-EPT-DE
Sent: Friday, September 08, 2000 4:02 PM
To: Hines, Ian IM SIEP-EPT-DE; Knight, Barry BP SIEP-EPT-DE
Cc: Wilhelm, Chandler CT SIEP-EPT-DE
Subject: RE: Reserves
Importance: High

We need to talk about this next week. I spent some time with Gordon earlier this week and there are several stakes in the ground. It's critical that we all know what must be accomplished. Are all of you in early next week? Perhaps Barry, you could get Mary Ann to check my calendar and arrange some time together. Rich

Richard A. Sears
Evaluation and Development Planning
Shell Deepwater Services
Woodcreek 2436
phone +1-281-544-4909
fax +1-281-544-2056
pager +1-800-923-5266

-----Original Message-----

From: Hines, Ian IM SIEP-EPT-DE
Sent: Friday, September 08, 2000 1:15 PM
To: Sears, Richard RA SIEP-EPT-DE; Knight, Barry BP SIEP-EPT-DE
Cc: Wilhelm, Chandler CT SIEP-EPT-DE
Subject: FW: Reserves

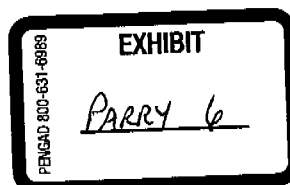
Rich, Barry,

Not sure if Chandlers note included the attachment from Gordon which contains the key messages on the Reserves picture and the implications in terms of our support work programme, given the fragile nature of the Block 18 economics.

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RIJ00070236



Ian Hines
Development Planning
Shell Deepwater Services
Woodcreek, Rm 2462, Houston
Tel: 281 544 2281
Fax: 281 544 2269

-----Original Message-----

From: Parry, Gordon G SIEP-EPG
Sent: Thursday, September 07, 2000 1:38 AM
To: Hines, Ian IM SIEP-EPT-DE
Subject: FW: Reserves

-----Original Message-----

From: PARRY, G.
Sent: Wednesday, September 06, 2000 4:56 PM
To: Inglis, Robert R.B. /SIEP /SDAN-AM; Simon, Grigore G. /SIEP /SDAN-AM; Osborne, Peter L. /SDANG /GM
Cc: Aalbers, Remco R.D. /SIEP /EPB-P; KOOL, W.M. /SEPI /EPG; KAKOK, S. /SEPI /EPG; MINDERHOUD, M. /SEPI /EPG
Subject: Reserves

Gents,

I attach the final version of the note requested by Heinz at the last EPG meeting regarding reserves booking in Angola and Brazil.

This note was forwarded to Phil Watts who remarked, quote

"It is critical that the Angola reserves are booked this year or our EP scorecard will be shot" unquote

Heinz's subsequent comment to me was, quote:

" Herewith Phil's reactions. We must pull this off aggressively! And we need one well, at least, as appraisal, whatever the purists say! "

Let's be guided accordingly!

Gordon



Angola-Brazil
reserves note.doc

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SMJ00037670

RIJ00070237

From: Hines, Ian IM SIEP-EPT-DE
To: Newberry, Derek D SIEP-EPT-DE
CC: Wilhelm, Chandler CT SIEP-EPT-DE
BCC:
Sent Date: 2000-09-07 11:04:46.000
Received Date: 2000-09-07 11:04:46.000
Subject: FW: Reserves
Attachments: Angola-Brazil reserves note.doc

Gents,

I may have misunderstood the process, but my understanding was that a discovery only indicated scope for recovery and was not bookable until supported by a viable development. This gives us a measure of the challenge ahead in managing our senior management's expectations!

Ian Hines
Development Planning
Shell Deepwater Services
Woodcreek, Rm 2462, Houston
Tel: 281 544 2281
Fax: 281 544 2269

-----Original Message-----

From: Parry, Gordon G SIEP-EPG
Sent: Thursday, September 07, 2000 1:38 AM
To: Hines, Ian IM SIEP-EPT-DE
Subject: FW: Reserves

-----Original Message-----

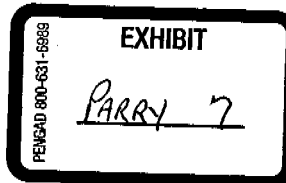
From: PARRY, G.
Sent: Wednesday, September 06, 2000 4:56 PM
To: Inglis, Robert R.B. /SIEP /SDAN-AM; Simon, Grigore G. /SIEP /SDAN-AM; Osborne, Peter L. /SDANG /GM
Cc: Aalbers, Remco R.D. /SIEP /EPB-P; KOOL, W.M. /SEPI /EPG; KAKOK, S. /SEPI /EPG; MINDERHOUD, M. /SEPI /EPG
Subject: Reserves

Gents,

I attach the final version of the note requested by Heinz at the last EPG meeting regarding reserves booking in Angola and Brazil.

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This note was forwarded to Phil Watts who remarked, quote

"It is critical that the Angola reserves are booked this year or our EP scorecard will be shot" unquote

Heinz's subsequent comment to me was, quote:

" Herewith Phil's reactions. We must pull this off aggressively! And we need one well, at least, as appraisal, whatever the purists say! "

unquote

Let's be guided accordingly!

Gordon

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SMJ00034873

788301

NOTE

From: G.R. Parry, EPG

5th September 2000

To: H.C. Rothermund, EPG
Cc: S. Kakok, EPG
M. Wink, EPG
W.M. Kool EPG
R.D. Aalbers, EPB-P
G. Simon, Shell Dev. Angola (SDAN)
R. Inglis, Shell Dev. Angola (SDAN)

Re: Proved Reserves Reporting Angola and Brazil

This note addresses the reserves questions raised at the EPG Meeting on 14th August 2000, following a meeting between EPG and Shell Angola staff with EPB-P on 22nd August 2000.

Proved reserves can be booked if it can be demonstrated that the development project of a discovered field is technically and commercially mature (and a market is expected to be available). Commercial maturity should be demonstrated over a sufficiently large range of possible scenario's (including all surface and subsurface uncertainties). A project is deemed commercial if the $NPV7\% @ PSV14 > 0$.

Booking of proven reserves is not necessarily tied to FID or to economic cut-off ($VIR > 0.35$). Successful completion of a VAR, provided sufficient sub-surface knowledge was included, could support booking of proved reserves. Additional information should be acquired to reduce uncertainties and ensure likely economic development. In the case of Angola Block 18, a VAR 2 is planned for Q4 2000 and could assist with booking of some 300 MMbbls proven oil reserves in Angola by year end.

In marginal cases, especially in new areas where resource volumes are very close to commercial cut-off, reserves should not be booked.

The LE (Shell PSC entitlement) of proven reserves for the Greater Plutonio hub in Block 18 is 293 MMbbls (P85). This excludes the result of the latest well Paladio-1, which came in on prognosis (140 MMbbls expectation, 100%). SDAN will provide an updated proved reserves estimate for 3Q reporting.

The target in 2000 is to exceed the cut-off target of 750 MMbbls (100%) for the Greater Plutonio hub. The remaining two wells to be drilled in 2000 should achieve this, but in the case that one of the wells does not fulfill expectations, the operator and SDAN should investigate alternative economic development schemes with lower cut-off (around 600 MMbbls) to ensure that reserves can be booked 2000 year-end based on the currently discovered volumes.

The target for proven reserves for Angola on the EPG scorecard for 2000 is zero, the 2000LE of 293 MMbbls offsets the zero 2000LE for Nigeria SPDC where proved reserves have been frozen at ARPR 1.1.2000 numbers.

SDAN will also be requested to investigate whether discovered SFR volumes for the 'Mangancse' prospect in Block 18 (based on 3D seismic over the southerly extension of the

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Girassol/Dalia discovery in Block 17) can be booked in 2000 (approx. 50 MMbbls MSV 100%). SDS will be requested to construct a technical case will be constructed to request BP (who are also a partner in Block 17) to open unitisation negotiations with TFE, as production from the Girassol field, currently under development is scheduled to commence in 2001.

Classification of wells as expex or capex is related to booking of proved reserves. Wells drilled outside the proven area, or to an unproven depth within the proven area, are classified as expex. Only wells drilled inside the proven area (area to which proved reserves have specifically been attributed) to a proven depth are classified as capex.

In the case of Angola, most of the wells being drilled in 2000 are testing new structures (Paladio and Cromio) so, although they have a high POS due to the high degree of confidence from the seismic calibration, they are still classified as exploration wells as no proved reserves have been booked. In the case of the Plutonio Salt Flank prospect, however, there may be a (strong) case to re-classify this well as 'appraisal', as a prominent flat seismic event suggests the same OWC as penetrated in the nearby Plutonio-1 discovery well. The new prospect is testing a different channel feature (probably connected) over the same general structure and would prove up the high field reserves case. Although there are no plans to use the exploration well in the field development scheme, there might be sufficient technical justification (to be provided by SDS) to re-classify the funding of the well cost from expex to capex, if proved reserves are booked for the Greater Plutonio hub prior to spudding of the salt flank appraisal well.

SDAN also needs to investigate any complications versus PSC commitments if the Plutonio Salt Flank well is classified as 'appraisal' rather than 'exploration'. The well is due to spud in December 2000. Re-classification will reduce 2000 expex by about \$10 MM and increase 2000 capex by \$10 MM, impact on 2001 expenditure is that the expex will be reduced by about \$3 MM and the capex will be increased by the same amount.

In the case of Brazil, no funds, either expex or capex, have been allocated for appraisal drilling in 2000/2001, although in the case of exploration success, the need for further appraisal has been flagged. Logically, without appraisal funds no proven reserves can be booked, no FID can be taken and therefore no IBV addition will be achieved. On the EPG scorecard for 2000, proven reserves addition of zero is the mid point target for Brazil, but 100 MMbbls is an upside case subject to a major discovery in BC-10. With the delayed drilling in Brazil and lack of appraisal possibility in 2000 booking of proved reserves for Brazil in 2000 is highly unlikely.

In summary, therefore, it is likely that proven reserves in the order of 300 MMbbls will be booked for Angola by end 2000, offsetting the zero additions for Nigeria-SPDC. The possibility to reclassify the Plutonio Salt Flank well on the 2000 drilling sequence as appraisal and fund under CAPEX will be pursued by SDAN. In Brazil, no proven reserves will be booked for 2000. In the case of success in BC-10 and other blocks, however, booking of proved reserves in 2001 will require the allocation of funds for appraisal drilling in 2001.

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SMJ00034875

From: Simon, Grigore G SIEP-SDAN-AM
To: Aalbers, Remco RD SIEP-EPB-P; Lovelock, Susan S SEPI-EPG
CC: Parry, Gordon G SIEP-EPG
BCC:
Sent Date: 2000-10-30 09:18:36.000
Received Date: 2000-10-30 09:54:15.000
Subject: RE: Angola - Reserves LE 3Q00
Attachments:

Sue, Remco,

There is one detail that we have omitted to discuss/include in the Note, but we should keep it in mind. The Shell PSC Entitlement of the oil production is a function of the ROR, which ultimately is a reflection of the reserves and the development costs. SDS is working on the development scenarios, costs and economics. Their work will have a direct impact on the reserves that can be booked at the end of the year. Therefore, we should expect a variation of up to 15% up or down (very likely downwards) in the LE reserves, pending on the outcome of the latest economics. For the time being, to remain on the safe side, a figure of about 300MMbbls MSV or 225MMbbls proved Shell share PSC Entitlement looks realistic.

Regards,

Grigore

-----Original Message-----

From: Aalbers, Remco R.D.
Sent: 27 October 2000 17:27
To: ROTHERMUND, H.C.
Cc: LOVELOCK, S.; Simon, Grigore G.; PARRY, G.
Subject: Angola - Reserves LE 3Q00

Heinz,

Understand from Sue that you would like to get an update on the Angola reserves position. She had to leave before the numbers were finalised so she asked me to send this.

Regards,

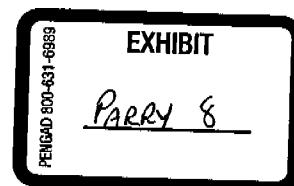
Remco

=====

Proved Reserves LE - 293 mln bbl

This number is LE Shell PSC entitlement for the first hub (Plutonio/Galio/Paladio/Cromio/Cobalto).

Plutonio estimates are under downward pressure as technical evaluation continues in Houston, in this case static modeling. Revision here may drop proved reserves to 265 mln bbl (being challenged). There is still



some additional upside for Cobalto (if no gas is encountered) of 30 mln bbl, the well is currently being drilled, resulting in an upward range for proved reserves of 295 mln bbl. LE is still achievable.

Booking of any reserves is based on commerciality and here team is making progress. Positive NPV looks possible, (although peer review in Houston still in progress). Although current position does not meet screening VIR (which is being worked), this alone would not prevent reserves booking, which is based on commerciality test. Notional Development Plan is part of model, so in progress. Angola Team will maintain pressure on SDS in Houston.

We understand that BPA is not under any pressure to book further reserves this year, so will not book Block 18 reserves. Their target remains FID date (Sanction in BP's terminology), which overall is still good news for Shell. It would have been helpful if they also booked Blk 18, but understand we have deviated from partners before in our booking of proved reserves.

Another booking test is move from exploration licence to production licence. Team have reviewed PSC. View is that as long as venture declares commercial project within 24 months from formal notice of discovery there is automatic right to 25 year production licence. Formal Notices will no doubt be required, but there seems nothing legal to prevent reserves booking. Production term is long enough to support booking of reserves. Proved reserves booking will be visible externally and therefore available to Angolan Govt etc. We would not necessarily want to have this be seen as trigger FID for production licence and be committed to development expenditure. This is issue raised before, but not concluded - we really need to watch carefully. Will take up with team, Gordon and Martijn on return.

SFR Maturation to expectation reserves LE - 367 mln bbl

Expectation reserves of 367 mln bbl is for 1st hub and includes same fields as above. Similar to proved reserves there is pressure on the Plutonio expectation estimate which might drop to SFR maturation to 328 mln bbl, again possible upside for Cobalto of some 40 mln bbl to 368 mln bbl.

Given move within same year from SFR maturation to proved reserves we will get some bbls in both SFR maturation and proved reserves additions.

Good news.

Susan Lovelock

From: Aalbers, Remco RD SIEP-EPB-P
To: Parry, Gordon G SIEP-EPG
CC: Minderhoud, Martijn M SEPI-EPG; Barendregt, Anton AA SIEP-EPB-
 GRA; Lovelock, Susan S SEPI-EPG
BCC:
Sent Date: 2000-11-21 14:00:19.000
Received 2000-11-21 14:00:19.000
Date:
Subject: Angola - Proved reserves year end
Attachments:

Gordon,

Could we sit down next week to discuss the Angola reserves issue and possible review. I would suggest to include Anton Barendregt for the review as the Group's Reserves Auditor.

Do you have a notional date? We are quickly nearing year end and I have planned leave over X-mas.

Regards,

Remco

---Original Message---

From: Parry, Gordon G SIEP-EPG
Sent: Wednesday, November 15, 2000 08:49
To: Aalbers, Remco RD SIEP-EPB-P; Lovelock, Susan S SEPI-EPG; Van Nues, Hans JWF SIEP-EPF
Cc: Jespers, Bea BL SIEP-EPB-P; Minderhoud, Martijn M SEPI-EPG
Subject: RE: Angola - Reserves LE 3Q00

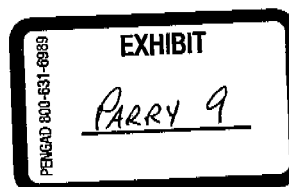
Hans,

As you know, booking of reserves in Angola is a sensitive issue. You are right that the latest figures coming out of SDS are lower than the 293MM LE currently carried. This has been mentioned to Heinz Rothermund - he is still firmly of the opinion that reserves should be booked. SDS's more conservative figure (P85) has been challenged and more work is underway to come up with a more realistic figure that will still be economic. It is the intention to review this work again next month to come to a figure we can all live with. I suggest Remco is part of the review team. Just like in Florida, we have asked for a recount, and the

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magic number is around 300.

Regards, Gordon

-----Original Message-----

From: VanNues, J.W.F.

Sent: Tuesday, November 14, 2000 10:46 AM

To: PARRY, G.; Aalbers, Remco R.D.; LOVELOCK, S. /SEPI/EPG

Cc: Jespers, Bea B.L. /SIEP/EPB-P; MINDERHOUD, M. /SEPI/EPG

Subject: RE: Angola - Reserves LE 3Q00

Importance: High

Gordon; Remco; Sue

With reference to page 15 of the VAR report it seems that booking of reserves for Angola may well be a stretch. It seems difficult to book reserves at all and if so, probably significant below current numbers hold in LE. The figure for Angola in LE September was 293 mln barrels while VAR indicates number of below 200 mln boe.

Considering the outcome of VAR (and depending on ongoing discussions) wonder whether in LE October Angola numbers should be adjusted downwards and full downside should be flagged so that ExCom is put fully in the picture. We need to close this out by Friday noon latest.

Regards

Hans

-----Original Message-----

From: PARRY, G.

Sent: 13 November 2000 14:26

To: Aalbers, Remco R.D.

Cc: VanNues, J.W.F.; LOVELOCK, S.

Subject: RE: Angola - Reserves LE 3Q00

Remco,

When you are back in the office, we would like to discuss the Angola reserves situation with you, following a meeting with SDS in New Orleans last Wednesday. It is our intention to arrange a further peer review (including yourself) of the SDS work at a mutually convenient date next month to finalise the reserves submission before end 2000.

The outcome of VAR2 is being reported to Heinz tomorrow. As we expected, BP failed and will need to remedy some ten high urgency/high

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importance category recommendations.

The VAR2 summary is attached.

Regards, Gordon

-----Original Message-----

From: Aalbers, Remco R.D. On Behalf Of Aalbers, Remco R.D.
Sent: Friday, November 10, 2000 12:27 PM
To: LOVELOCK, S.
Cc: PARRY, G.; VanNues, J.W.F.
Subject: FW: Angola - Reserves LE 3Q00

Sue,

Has there been any progress on the outstanding Angola contractual issue and tech/com maturity vs proved reserves year end?

I am working on a number of possible add. proved reserves, which we might want to highlight as possible upside but we might have to balance with a possible downside for Angola?

I have not heard from Gordon yet on the VAR position in Angola.

Regards,

Remco

-----Original Message-----

From: Aalbers, Remco RD SIEP-EPB-P
Sent: Friday, October 27, 2000 17:27
To: Rothermund, HC SEPI-EPG
Cc: Lovelock, Susan S SEPI-EPG; Simon, Grigore G SIEP-SDAN-AM;
Parry, Gordon G SIEP-EPG
Subject: Angola - Reserves LE 3Q00

Heinz,

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=====

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Susan Lovelock

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SMJ00035946

101403361

From: Rothermund, HC SEPI-EPG
To: Bichsel, Matthias M SIEP-EPT-D
CC: Lewis, Keith K SEPI-EPG; Lovelock, Susan S SEPI-EPG; Minderhoud, Martijn M SEPI-EPG; Parry, Gordon G SIEP-EPG; Wink, Maarten MN SEPI-EPG
BCC:
Sent Date: 2000-11-23 21:21:13.000
Received Date:
Subject: West Africa reserves 2000
Attachments:

Matthias,

I would describe the problem differently. There has been a historical shift, in the past two to five years. Ever since we are reviewing booking of reserves closely, in the context of financial results and our focus on actual performance, the old focus on exploration success and the much "looser" talk about reserves has become obsolete. Yet, particularly amongst explorers, and whenever we book a technical success, we forget that volumes found with an "exploration mindset" are not the same as reserves defined in terms of Financial results. And this we must get after and communicate with greater focus.

Regards
Heinz

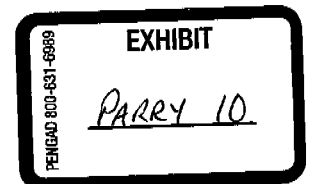
-----Original Message-----

From: Bichsel, Matthias M. /777264
Sent: 23 November 2000 14:00
To: ROTHERMUND, H.C.; PARRY, G.
Cc: Lewis, Keith K.; LOVELOCK, S.; MINDERHOUD, M.; WINK, M.N.; Bichsel, Matthias M. /777264
Subject: RE: West Africa reserves 2000

Heinz,

I don't think it is an issue of doing reservoir engineering properly but an issue of definition. An age-old problem in Shell.

We often quote success volumes pre-drill and in case of success than adjust net pay and other parameters across the whole structure to reflect what we found. These then are volumes for the whole structure - volumes that indeed are likely there, but because of the way we have to book proved reserves, non-connected bodies etc are very heavily discounted, particularly in virgin areas such as block 18 - and Angola as a whole.



What my comment referred to was that the information on what we can book as proved reserves with one exploration well was pre-mature when reported in mid-year and, hence, when used for the global reserves monitor, not "correct" information.

Best regards,
Matthias

-----Original Message-----

From: Rothermund, HC SEPI-EPG
Sent: 23 November 2000 01:21
To: Parry, Gordon G SIEP-EPG
Cc: Bichsel, Matthias M SIEP-EPT-D; Lewis, Keith K SEPI-EPG; Lovelock, Susan S SEPI-EPG; Minderhoud, Martijn M SEPI-EPG; Wink, Maarten MN SEPI-EPG
Subject: West Africa reserves 2000

Gordon,

I am obviously disappointed by the attached information. In some way, however, we can say that it was not for lack of trying. Equally, however, I am concerned about the the second paragraph in the e-mail, since it states that we simply made an error, and this I do not understand! What does this statement refer to, and why is it only now that we realise that we are not doing our reservoir engineering "properly"?

Regards
Heinz

-----Original Message-----

From: Bichsel, Matthias M. /777264
Sent: 22 November 2000 01:28
To: ROTHERMUND, H.C.
Cc: Warren, Tim T.N.
Subject: West Africa reserves 2000

Heinz,

I am responding to your e-mail from 29th October regarding reserves booking in Angola. I attach a note that addresses the issue in the wider context of West Africa, since we are also working on identifying additional volumes in Bonga.

As you will have heard already, the earlier quoted figures of some 300 MMB of proved reserves to be booked in 2000 were incorrect and represent volumes of entire structures rather than what can be booked with confidence in 2000, and in accordance to SEC rules and Shell guidelines.

I can assure you that I am personally pushing and cajoling my staff to get the most out of what is possible. Contrary to what you have heard,

we are not "covering our back side" and are "overly conservative" but are exploring every avenue to trying to increase reserves bookings.

The current total reserves booking potential is, on a P50 basis, 195 to 315 MMB and on a P85 (proved) basis 130-190 MMB. I have asked for another set of eyes of reservoir engineering expertise from SepTAR and SEPCo to ensure that we are not missing anything and literally leave no stone unturned at our next peer review session.

Regards,
Matthias

From: Rothermund, HC SEPI-EPG
To: Watts, Phil PB SI-MGDPW
CC:
BCC:
Sent Date: 2000-11-23 21:21:13.000
Received Date: 2000-11-23 21:22:13.000
Subject: West Africa reserves 2000
Attachments: West Africa reserves 2000{R} , West Africa reserves 2000

Phil,

For interest, some further correspondence on this sorry subject.

Regards
Heinz

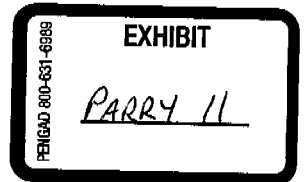
-----Original Message-----

From: Bichsel, Matthias M. /777264
Sent: 23 November 2000 13:50
To: MINDERHOUD, M.; PARRY, G.
Cc: Aalbers, Remco R.D.; Lewis, Keith K.; Lohr, Fran F.A. /157182;
LOVELOCK, S.; ROTHERMUND, H.C.; WINK, M.N.; Sears, Richard R.A. /172889;
Knight, Barry B.P. /777890
Subject: RE: West Africa reserves 2000

Martijn,

we obviously need to involve our RE and reserves auditors in your questions. An observation I can make however and that it is not necessary to penetrate ALL channels. It is one of confidence and using analogue settings. At the moment we only have Bonga and as you know in Bonga, we did not penetrate each and every reservoir body, but with the appraisal wells results and the ensuing seismic calibration, a strong story can be built to support booking of proved reserves (proved is the operative word here) over a whole hc bearing structure. This was the main comment by the reserves auditors that we do not have any appraisal data and little understanding of the reservoir model in block 18 (as you may have heard, whilst we have at least Bonga from West Africa, bp is using North Sea analogues!) Incidentally that also applies to Bonga, where SDS has identified significant in-field scope, in somewhat deeper horizons, but because they have not yet been penetrated we cannot booked proved reserves. As you know the development drilling campaign has built in exploratory/appraisal elements exactly for this reason.

I still believe in the large volumes in block 18, that, given a programme of appraisal (which I don't think needs to be overly ambitious)are realisable as booked reserves in the short term.



Re. GoM, please be assured that we are using SEPCo reservoir engineers AND the SEPCo reserves auditor to ensure that we capture all possibilities regarding booking away from well penetration. I do not believe that we are missing a trick here, but I agree that we need to be continuously vigilant.

Let me know when you want to meet.

Matthias

-----Original Message-----

From: Minderhoud, Martijn M SEPI-EPG

Sent: 23 November 2000 03:51

To: Bichsel, Matthias M SIEP-EPT-D; Parry, Gordon G SIEP-EPG

Cc: Aalbers, Remco RD SIEP-EPB-P; Lewis, Keith K SEPI-EPG; Lohr, Fran FA SIEP-EPB; Lovelock, Susan S SEPI-EPG; Rothermund, HC SEPI-EPG; Wink, Maarten MN SEPI-EPG

Subject: RE: West Africa reserves 2000

Gordon, Matthias,

can we have another meeting shortly to address these issues, as I think they are of wider consequence for deep water settings.

If I understand Matthias e-mail correctly, the originally quoted volumes are the MSV (pre-drill) and SFR (after discovery) of the ENTIRE PROSPECTIVE STRUCTURE; this may comprise a complex of individual channels, the total of which makes up the number. For proved reserves booking, a very strict rule appears to apply, essentially related to PENETRATED hydrocarbon occurrences; obviously, in a complex channel setting potentially only a subset of the total is being penetrated and the remainder can only be booked as proved reserves after penetration thru appraisal wells. This I think is the "incorrect" that Matthias refers to.

A number of questions come to mind:

- how many of additional appraisal wells are required prior to taking FID

- is that taken into account in the pre-drill economics?

- for new prospects, how are we going to define pre-drill MSV, when we know we are not going to penetrate all channels in the well?

I could see the dilemma of first wells not penetrating enough channels to make an economic development if taken strictly. To make it pre-drill, would require the entire structure volume to be quoted for MSV/expectation purposes; however, after discovery only a smaller volume is bookable as reserves, but even that only if we have proven up the additional reserves through appraisal, to demonstrate an FID-able project. It means spending more money to prove up the necessary reserves, is that still economic? How does this impact the attractiveness of Block 34, the SNEPCO UDW blocks or Brazil? We may come to the conclusion that economic exploration wells cannot be drilled in

these settings; if that is correct, are we doing the right thing here then?

How did the GoM overcome these problems, which they must have also faced in drilling turbidite channels. I hope there are some learnings exportable.

Martijn

-----Original Message-----

From: ROTHERMUND, H.C.

Sent: 23 November 2000 08:21

To: PARRY, G. /SIEP /EPG

Cc: MINDERHOUD, M. /SEPI /EPG; WINK, M.N. /SEPI /EPG; LOVELOCK, S. /SEPI /EPG; Lewis, Keith K. /SEPI /EPG; BICHSEL, MATTHIAS M. /SIEP /EPT-D /777264

Subject: West Africa reserves 2000

Gordon,

I am obviously disappointed by the attached information. In some way, however, we can say that it was not for lack of trying. Equally, however, I am concerned about the the second paragraph in the e-mail, since it states that we simply made an error, and this I do not understand! What does this statement refer to, and why is it only now that we realise that we are not doing our reservoir engineering "properly"?

Regards
Heinz

-----Original Message-----

From: Bichsel, Matthias M. /777264

Sent: 22 November 2000 01:28

To: ROTHERMUND, H.C.

Cc: Warren, Tim T.N.

Subject: West Africa reserves 2000

Heinz,

I am responding to your e-mail from 29th October regarding reserves booking in Angola. I attach a note that addresses the issue in the wider context of West Africa, since we are also working on identifying additional volumes in Bonga.

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Regards,
Matthias

From: PARRY, G.
To: Inglis, Robert R.B. /SIEP /SDAN-AM; Simon, Grigore G. /SIEP /SDAN-AM
CC:
BCC:
Sent Date: 2000-12-07 12:53:24.000
Received 2000-12-07 12:53:37.000
Date:
Subject: FW: Angola Block 18 reserves meeting
Attachments:

-----Original Message-----

From: PARRY, G.
Sent: Thursday, December 07, 2000 12:03 PM
To: Hines, Ian I. /SIEP /EPT-DE /777319
Cc: WILHELM, CHANDLER C.T. /SIEP /EPT-DE /136060; KNIGHT, BARRY B.P. /SIEP /EPT-DE /777890
Subject: Angola Block 18 reserves meeting

Ian,

After a discussions in Rijswijk yesterday with Anton, Remco, Rob, Grigore and myself, please find below a list that summarises the main issues that we would like to discuss in our meeting on Reserves Booking on December 12 in Houston. I have had the opportunity to discuss all these issues with Rich this morning.:

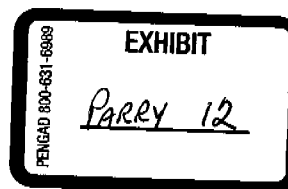
Meeting OBJECTIVES:
 - to demonstrate technical & commercial maturity of reserves volume (if any) to be booked, supported by proper economic estimate.

Proposed OUTLINE of the Presentation"
 - Overview discovered fields
 - Details per field:
 * maps, cross-sections, exploration well summary, well-test results
 * geological summary - static model - connectivity
 * volumetrics, what are high confidence areas and why
 * uncertainties on all input parameters
 * recovery factors linked to development scenario (#wells prod, WI, GI & WD)

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- * demonstrate what RF are based on (dynamic model, analogue ...)
- * support initial well rates & well design linked to well test results & UR/well
- * production profile for proposed scenario
- * support for cost estimates wells, facilities, manifold, pipelines (incl. km)
- * cost gas injection option
- * opex estimates

- Economics for full 1st hub at P85 and P50
- Economics for minimum development (note each 'satellite' should be commercially viable ...) P85 & P50

It is understood that the reserves work done to date by the SDS team has focused on ranges of in-place volumes and recovery factors from analogue reservoirs. The crucial link with actual numbers of wells required to obtain those RFs seems underdeveloped. Only by postulating numbers and locations of wells (plus their initial rates and reserves) can we judge whether we have an economic project or not.

Questions that are likely to be asked at this meeting:

- * How did we determine the cut-off for delineating 'high confidence areas' in the volumetrics? (Note that SEPTAR (Alan Jackson) have prepared for SEPCO a useful set of criteria to judge pay continuity from well data - ask Rod Sidle or John Bickley for details)
*
- * How did we determine initial rates for the development wells? What is the foreseen well lift (solution gas, ESPs?). Are improvements feasible (e.g. horizontal wells)?
*
- * Do we have analogue data showing well rates and recoveries as a function of pay thickness, net-to-gross etc? Could these data perhaps also be generated by notional reservoir models? (Note that SEPCO use an empirical reference set of producer-injector continuity functions vs well spacing for a variety of reservoir types (sheets, channels, thin beds) - ask Rod Sidle or AJ Durrani for details)
*
- * Do we have economics (number of wells, initial rates) associated with the low and expectation case reserves we have at present in these fields and are they robust?
*
- * If not, is there an obvious first set of fields / reservoirs that could support a low cost stand-alone or first stage development (rented FPSO etc), which would allow us to book these reserves ahead of formulating an optimised full area development plan?

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*
* What are the critical questions we see ourselves / BP addressing in the coming year and what is our schedule for seeking the answers? This includes further appraisal drilling, study work etc.

We hope this helps to set the scene for what should be a useful meeting. After the meeting, I would like us to jointly draft a note to Heinz explaining why the reserves booked, if any, are likely to be less than the 293MMbbls currently recorded, and what our plans can be designed to redress this next year. As you realise, booking reserves this year is psychologically very important for the "health" of Angola in the eyes of top management. We have still to seek funding for Block 18 in 2001 and are on the verge of considerable additional investment in Block 34 and the UUDW, so I feel it is important to book something to get us on the map and help the overall EP scorecard in 2000.

Regards,

Gordon

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Shell Development Angola - SDAN

From: Grigore Simon SDAN-AM; Robert Inglis SDAN-AM
 To: Gordon Parry SIEP-EPG
 Cc: Peter Osborne SDAN-GM;
 Date: 14th December 2000

NOTE FOR INFORMATION Block 18 Reserves Update

On December 12th, 2000 a Block 18 Technical Support Team from SDS and Shell Development Angola (SDAN) provided an update on the situation of Block 18 reserves to EPG (Gordon Parry), EPB (Remco Aalbers) and the reserves auditor Anton Barendregt in the light of the results of the 6 exploration wells drilled to date. The meeting focused on the volume of reserves that SDAN could book this year, if any, based on the current level of project maturity. It was concluded that due to the technical immaturity of the Block, no more than about 60-70MMbbls Shell share may be booked in 2000, assuming that a technically and commercially mature development scenario can be confirmed for the high confidence areas in Plutonio and Cobalto by early January 2001.

EXPLORATION PHASE – WHY 293MMbbls were initially reported as possible?

Exploration has been very successful (100% success rate in 6 wells) in discovering hydrocarbons in Block 18. A total MSV of about 750MMbbls recoverable reserves (100% volumes) and a P85 of about 620MMbbls was predicted in the Greater Plutonio development area early this year before the 2000 drilling campaign. In addition, the Platina structure, which sits outside the Greater Plutonio development area, contains some 110 MMbbl MSV and 80 MMbbl P85. These predictions assume an average 40% recovery factor, in agreement with BP's figure and in line with TFE's and Exxon's models for other Angolan fields. BP's pre-drill volumes were in the same range as above.

Overall the 2000 pre-drilling predictions came in on target in terms of STOIP and MSV based on the above assumptions.

From this data it was suggested that about 290-300MMbbls Shell share might be booked in 2000, assuming that the project would achieve the necessary technical and commercial maturity level required for reserves booking.

PRESENT SITUATION – WHY only 60-70MMbbls now?

Block 18 volumes – General view

Project economics for the Block 18 fields depends crucially on ultimate recovery per well and is influenced by the spread-out nature of the fields (necessitating long subsea flowlines) and the relatively thin nature of many of the reservoir sands. An added complexity (not yet fully addressed by SDS) is the poor lateral continuity of the turbidite reservoir channel sands, which may restrict recoveries per well.

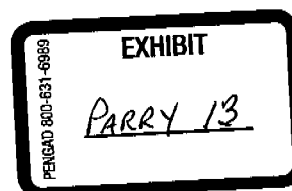
BP does not intend to book reserves for Block 18 until FID so Shell had to carry out our own assessment for the purposes of reserves booking. During the last month the Block 18 Technical Support Team from

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SDS focused on better characterisation of reservoir uncertainties by completing the first static model for Plutonio structure, updating the database of analogue data from other turbidite fields and making use of the results of the wells drilled in the 2000 campaign. In addition, in order to improve project economics, SDS looked at a 'creaming' project, which would focus on areas of 'high confidence', i.e. the areas of high seismic amplitude around the existing exploration wells.

The Impact of Plutonio Static Model

The impact of the first static model in Plutonio reduced recoverable reserves, the Plutonio MSV volumes being decreased by about 14%. The reason for this was that reservoir parameters in the well, being in the high amplitude area of the structure, were not seen as representative for the entire structure, in particular the lower amplitude areas. Overall Block 18 MSV volumes were decreased from 750MMbbls to 720MMbbls, and P85 volumes from 620MMbbls to about 590MMbbls. Based on the above data the volumes that might be booked as Group share proved reserves dropped from 290MMbbls to about 260MMbbls.

The Impact of Updated Analogue Database

Preliminary data, based on existing analogues, suggest that the ultimate recovery per well and the recovery factor in the channelised sand reservoirs might be much lower than initially predicted by BP and Shell, as low as an average 27%. This is also valid for all other similar developments including Erha.

Due to the current level of understanding of the Block 18 project (i.e. no appraisal wells drilled to date, no dynamic models in place for any structure) it was suggested that this low range of recovery factors should be used for reserves booking.

The impact of using the above analogue data on Block 18 volumes is significant. Overall MSV volumes in the Greater Plutonio area would decrease from 720MMbbls to 456MMbbls (BP currently carries between 610MMbbls and 700MMbbls discovered MSV), and P85 volumes from 620MMbbls to about 336MMbbls (100% volumes). Based on this data the volumes that might be booked in Block 18 as Shell share proven reserves dropped from 260MMbbls to about 150MMbbls!

The need for caution on the assumptions regarding recovery factors is also borne out by SEPCO/BTC work on turbidites, which demonstrates that, for some of the semi-amalgamated channel sands, lateral continuity deteriorates rapidly, resulting in recovery correction factors of 50% or less for well spacing of some 5000 ft.

During the 12th December meeting it was remarked by the EPB advisers that the analogue data (plots of reservoir recovery vs recovery per well) were not very applicable due to the absence of reservoir thickness data. Only with these data would it be possible to relate the recoveries per well to lateral drainage areas per well suitable for Block 18; massive sands would be much more likely to yield high recoveries than the relatively thin sands in Block 18. In addition, it was noted that the assumed recovery of 33 MMbbls per well for the Plutonio / Cobalto 'high confidence' areas (see below) was more than double that of the channel sands seen in the West-of-Shetland fields.

Development of 'high confidence areas'

It was hoped that, by concentrating on the 'high confidence' areas in the five Block 18 fields, well numbers could be reduced and that the overall project economics could be improved (even if the project size would be smaller). The result was that only a development of the Plutonio and Cobalto fields (which are close together) was anywhere near commercial. The other four discoveries – based on the current high confidence areas - not being able to carry the cost of their respective tie-ins to a central development. Further cost reductions are still being pursued by SDS.

The impact of the High Confidence area on recoverable expectation reserves (MSV) is reflected in a further decrease of volumes from 336MMbbls to 252MMbbls (100% volumes), or about 110MMbbls Shell share for the total Block 18 area. The proven recoverable volumes in the high confidence areas in Cobalto and Plutonio amount to some 164 MMbbls (100% volumes) or some 70 MMbbls Shell share.

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ACTIONS:

At the conclusion of the 12th December meeting it was agreed that SDS would:

- Qualify the analogue database by taking into account net reservoir thickness and thus, true lateral drainage areas per well.
- Reconcile the resulting reservoir recoveries and well spacing with the reserves correction factors available from SEPCO/BTC
- Review and reduce cost estimates where possible.
- Prepare a written assurance that water injection problems in these reservoirs (e.g. due to limited well injectivity or water incompatibilities) would not be a showstopper.
- Demonstrate that the small scale Plutonio / Cobalto development would be commercially viable for a sufficiently wide range of scenarios (in line with Group Reserves Guidelines)

DEADLINES:

- Answers to the above action points – end December – Responsible Block 18 Technical Team SDS
- Prepare SDAN's final recommendation on Reserves Booking to EPG – 16 January – Responsible SDAN Management Team.

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