

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLORADO

NATIONAL OILWELL VARCO, L.P.	)	
	)	
Plaintiffs,	)	
	)	
vs.	)	1:03-cv-02579-RPM
	)	
PASON SYSTEMS USA, CORP.,	)	
	)	
Defendants.	)	

---

TRIAL TO JURY - DAY 6  
TRANSCRIPT OF PROCEEDINGS

---

Proceedings held before the HONORABLE RICHARD P.  
MATSCH, U. S. District Judge for the District of Colorado,  
beginning at 9:01 a.m. on the 3rd day of November, 2008, in  
Courtroom A, United States Courthouse, Denver, Colorado.

APPEARANCES

For the Plaintiffs:	Jane Michaels, Esq. Guy Matthews, Esq. Ryan T. Bergsieker, Esq. Holland & Hart, LLP-Denver 555 17th Street, #3200 Denver, Colorado 80201
	Robert M. Bowick, Jr., Esq. Matthews, Lawson, Bowick & Al-Azem, PLLC 2000 Bering Drive, #700 Houston, Texas 77057

Proceedings recorded by electronic sound recording;  
transcript produced by transcription service.

Warren - Direct

1 manually set a set point in the servo controller exactly the  
2 same as you would set a set point in the autodriller. You  
3 turn a little knob and adjust the parameters as you want.  
4 You didn't literally move a brake.

5 Q So let's talk about the components of this rig. You had  
6 various sensors on the rig, I'm sure?

7 A Yes, there were sensors all over the rig.

8 Q And what types of sensors? What parameters were you  
9 sensing?

10 A Well, there were various things. We sensed the hook  
11 load. From that we were able to measure the weight on bit.  
12 We would sense the rotational speed of the drill string. We  
13 would sense the torque required to rotate the drill string,  
14 the mud pump flow right of the strokes that--how fast the  
15 pump was running, what we call the standpipe pressure, that  
16 is the pressure of the mud as it was going downhole. Then  
17 there were a whole host of rig help sensors and other things  
18 that we sense to make sure that the rig itself was operating  
19 properly.

20 Q Now, you mentioned the standpipe pressure. Is that also  
21 commonly referred to as the drilling fluid pressure?

22 A Pardon me?

23 Q I'm sorry. You mentioned the standpipe pressure.

24 A Yeah.

25 Q Was that also commonly referred to as the drilling fluid

Warren - Direct

1 pressure?

2 A Yeah, yeah.

3 Q So you sensed the drilling fluid pressure?

4 A Yes. It simply was the pressure of the drilling mud at  
5 the rig floor level as it was being pumped down the drill  
6 string, through the mud motor, and through the bit.

7 Q Now, you also mentioned a device called the servo  
8 controller?

9 A Yes.

10 Q Could you explain to the ladies and gentlemen of the  
11 jury what a servo controller is?

12 A A servo controller is used in a lot of different  
13 applications, but basically it's a device where the user can  
14 set a parameter that they want to keep constant and maintain.  
15 There is some parameter that is measured, and this piece of  
16 electronics compares those two and it outputs a control  
17 signal that is in use to control (inaudible).

18 Most commonly the thing you might think about is  
19 the cruise control in your car. You drive down the road,  
20 your speed is at 50 miles and hour; you set the cruise  
21 control on. That as the user set that he wants to drive at  
22 50 miles an hour. The cruise control has a measure of the  
23 actual speed of the car. That's why if you're going up a  
24 hill and the car slows down, then it accelerates the car and  
25 it drives faster. Or if you're going down a hill, it might

Warren - Direct

1 be the opposite to slow the car down. It's exactly the same  
2 thing; it's just a computer--I mean it's not a computer, but  
3 it's an electronic box that has these input parameters and  
4 output parameters that you wire up to control whatever you  
5 would like to control.

6 Q And so depending on the input parameter, the servo  
7 controller would input a signal and then output a separate  
8 signal?

9 A Yes.

10 Q And it would be a command signal--

11 A Yes.

12 Q --would be output from the servo? And that servo  
13 controller could take inputs from weight on bit?

14 A Yes.

15 Q And pressure?

16 A Yes.

17 Q And Torque?

18 A Yes.

19 Q And whatever else you were monitoring and wished to  
20 control at the time, right?

21 A That's correct.

22 Q And let's talk about the hoisting system right now. You  
23 mentioned before you had a hydraulic snubbing unit, so that  
24 was just for purposes of advancing the drill string, correct?

25 A That's correct.

Warren - Direct

1 the low side, switch to pressure control, and increase the  
2 knob to apply a little bit more pressure, depending on what  
3 he wanted. Typically he might want 200 psi differential  
4 pressure above bottom pressure. Once you set that, the servo  
5 controller would advance the drill string in order to  
6 maintain constant surface and standpipe pressure.

7 Q Now, this servo controller, was this something that you  
8 actually built yourself?

9 A No, it is not.

10 Q It was commercially available?

11 A Yes.

12 Q And why did you choose to use a servo controller?

13 A Well, that was just sort of an obvious piece of  
14 equipment. I mean that's what it was made for is basically  
15 if you want to control something that--that can be controlled  
16 by an electrical signal and you have a measurement of what it  
17 is that you want to control, that is the--I mean that's just  
18 what the piece of equipment you would use for that.

19 Q So if we're controlling by fluid pressure, I would like  
20 you to walk the ladies and gentlemen of the jury through how  
21 pressure could control the advancement of the drill string  
22 when it was the sole parameter? If the pressure increased,  
23 what would happen?

24 A If the pressure increased, that would indicate that the  
25 motor is putting out more torque, maybe more torque than you

Warren - Direct

1 would want, so it would reduce the rate that the drill string  
2 was being advanced.

3 Q And if the pressure decreased?

4 A That means the torque was less than you desired and it  
5 would increase the rate of advancement of the drill string.

6 Q And what if the pressure increased a little?

7 A It would decrease the rate of advancement a little bit.

8 Q And what if the pressure increased a lot?

9 A It would decrease the rate of advancement more.

10 Q And then vice versa. So if the pressure decreased a  
11 little?

12 A It would increase the advancement a little bit.

13 Q And if the pressure decreased a lot?

14 A It would increase the advancement a lot.

15 Q So was the output signal of the servo controller  
16 continuous and proportionate--

17 A Yes.

18 Q --to the corresponding input signal of pressure?

19 A Yes.

20 Q Now, Mr. Warren, in 1985, 1986, when you were working on  
21 this rig, when did the project end? When did your work on  
22 this project end?

23 A Well, I worked--in that particular project, we continued  
24 to work on that test rig basically as long as I was working  
25 at Amoco on various projects. I'm not sure exactly when we

Warren - Direct

1 would say the high speed project ended. Sort of there was no  
2 fixed end. It involved other things that we were doing, but  
3 probably within two years or so after 1986 we were pretty  
4 much focusing on something other than high speed drilling.  
5 We were focusing on the bit itself.

6 Q And did any patents issue from this project?

7 A Yes, there were a number of patents related to bits and  
8 that kind of thing. There was one patent that related to rig  
9 equipment that had to do with a hydraulic system for a  
10 conventional rig that came out of this project.

11 Q But you didn't patent the actual automated control  
12 system that you developed on this experimental rig, correct?

13 A No, we did not.

14 Q Did you publish your findings?

15 A Yes, we did.

16 MR. LACIS: Mr. Mason, if we could bring up Exhibit B-24  
17 for the witness's eyes only.

18 Q (by Mr. Lacis) Mr. Warren, are you familiar with this  
19 document?

20 A Yes. That is the paper that was published that  
21 described the control system on the rig.

22 Q And it is entitled "Field Experiences With Computer  
23 Controlled Drilling"?

24 A Yes.

25 Q And you're one of the authors, correct?

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLORADO

NATIONAL OILWELL VARCO, L.P.	)	
	)	
Plaintiffs,	)	
	)	
vs.	)	1:03-cv-02579-RPM
	)	
PASON SYSTEMS USA, CORP.,	)	
	)	
Defendants.	)	

---

TRIAL TO JURY - DAY 7  
TRANSCRIPT OF PROCEEDINGS

---

Proceedings held before the HONORABLE RICHARD P. MATSCH, U. S. District Judge for the District of Colorado, beginning at 9:02 a.m. on the 4th day of November, 2008, in Courtroom A, United States Courthouse, Denver, Colorado.

APPEARANCES

For the Plaintiffs:	Jane Michaels, Esq. Guy Matthews, Esq. Ryan T. Bergsieker, Esq. Holland & Hart, LLP-Denver 555 17th Street, #3200 Denver, Colorado 80201
	Robert M. Bowick, Jr., Esq. Matthews, Lawson, Bowick & Al-Azem, PLLC 2000 Bering Drive, #700 Houston, Texas 77057

Proceedings recorded by electronic sound recording;  
transcript produced by transcription service.

Brett - Cross

1 A Yeah.

2 Q And it was an on/off.

3 A Right.

4 MR. RALEY: In fact if I could just approach the chart,  
5 Your Honor?

6 THE COURT: Sure.

7 MR. RALEY: Thank you, Your Honor.

8 Q (by Mr. Raley) Mr. Brett, you lump Le Compte, Dillon,  
9 Miller, Garrett, and Varney all together.

10 A They all--I lump them together because they have that  
11 similar on/off type nature to them.

12 Q They all have the on/off nature, which you just  
13 testified is different than the Bowden 142.

14 A I agree.

15 Q Thank you. I think that you've said for these four that  
16 are the on/off, if the error is big enough it will either  
17 hold back or let go, put the pressure back on target.

18 A Right.

19 Q It's not a continuous--the automatic drillers at issue  
20 in this case, the Bowden 142 and the Pason, the evidence has  
21 been move the brake handle continuously up or down.

22 A That's right.

23 Q Would it be kind of like when you're driving the car,  
24 the steering wheel, you're just always kind of adjusting to  
25 keep it straight?

Brett - Cross

- 1 A Similar to that--
- 2 Q Thank you.
- 3 A --in continuous mode, yeah. Pason and Bowden are like
- 4 that.
- 5 Q Thank you, sir. Hobhouse, it's sort of an on/off with a
- 6 twist. I believe you described it's a little or a lot.
- 7 A Right, so there's two steps.
- 8 Q There's a two-step on/off.
- 9 A Yeah.
- 10 Q But it's still not the continuous--
- 11 A That's right.
- 12 Q --brake handle or steering wheel that you see in the
- 13 Bowden 142 or in the Pason auto driller, correct?
- 14 A Right.
- 15 Q Thank you. Young, you mentioned that in direct
- 16 examination--
- 17 A Yes.
- 18 Q --correct? I believe I heard you say that it does not
- 19 use pressure to increase or decrease the rate of release.
- 20 A What he described there did not use pressure--
- 21 THE COURT: We're having a little trouble hearing you.
- 22 THE WITNESS: Yeah, what he described there did not use
- 23 pressure.
- 24 Q (by Mr. Raley) It uses weight on bit, correct?
- 25 A And a couple other things.