

STATEMENT

OF

BO YU

Taken pursuant to Notice by Richard J. Lipuma, CCR, a Court Reporter and Notary Public in and for the Commonwealth of Pennsylvania, at the law offices of Hall & Evans, Suite 600, 1125 17th Street, Denver, Colorado, on Thursday, February 21, 2008, at 9:30 a.m.

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P R O C E E D I N G S

MR. ZELANKO:

My name is Joe Zelanko.
I'm an accident investigator
with the Mine Safety and
Health Administration, an
agency of the United States
Department of Labor. With me
is Tim Williams from the
Solicitor's Office. We will
be conducting the questioning
today.

I, together with other
government investigators and
specialists, have been
assigned to investigate the
conditions, events and
circumstances surrounding the
fatalities that occurred at
the Crandall Canyon Mine in
Utah in August of 2007. The
investigation is being
conducted by MSHA under
Section 103(a) of the Federal

1 Mine Safety and Health Act and
2 the Utah Commission of Labor.
3 We appreciate your assistance
4 in the investigation.

5 After the investigation
6 is complete, MSHA will issue a
7 public report detailing the
8 nature and causes of the
9 fatalities in the hope that
10 greater awareness about the
11 causes of accidents can reduce
12 their occurrence in the
13 future. Information obtained
14 through witness interviews is
15 frequently included in these
16 reports. Your statement may
17 also be used in other
18 proceedings. You may have a
19 personal representative
20 present during the taking of
21 this statement and may consult
22 with a representative at any
23 time.

24 Your statement is
25 completely voluntary. You may

1 refuse to answer any question
2 and you may terminate your
3 interview at any time or
4 request a break at any time.
5 Your personal representative
6 may ask clarifying questions
7 as appropriate.

8 A court reporter will
9 record your interview. Please
10 speak loudly and clearly. If
11 you do not understand a
12 question, please ask me to
13 rephrase it. Please answer
14 each question as fully as you
15 can, including any information
16 you have learned from someone
17 else. I'd like to thank you
18 in advance for your appearance
19 here. We appreciate your
20 assistance in the
21 investigation. Your
22 cooperation is critical in
23 making the nation's mines
24 safer.

25 After we have finished

1 asking questions, you will
2 have an opportunity to make a
3 statement and provide us with
4 any other information that you
5 believe to be important. If
6 at any time after the
7 interview you recall any
8 additional information that
9 you believe might be useful,
10 please contact Richard Gates
11 at the telephone number or e-
12 mail address on this business
13 card.

14 BY MR. ZELANKO:

15 Q. Doctor Yu, would you please
16 state your full name and address for
17 the record?

18 A. My name is Bo Yu, and my
19 address is (b)(7)(C)

20 (b)(7)(C)

21 Q. Doctor Yu, do you have any
22 questions about the interview process
23 as I have described it?

24 A. No.

25 Q. Do you have a personal

1 representative with you today?

2 A. Yes.

3 MR. ZELANKO:

4 Would your personal
5 representative identify
6 himself by name and address
7 for the record?

8 ATTORNEY BARTON:

9 Sure. This is Benton
10 Barton from Hall & Evans.
11 We're in Denver, at 1125 17th
12 Street, Suite 600.

13 ATTORNEY ZELANKO:

14 And it's my
15 understanding that although
16 generally we swear in the
17 witnesses, that Mr. Yu has
18 declined --- Doctor Yu has
19 declined to be sworn in today;
20 is that right?

21 ATTORNEY BARTON:

22 That's correct.

23 BY MR. ZELANKO:

24 Q. Are you appearing here today
25 voluntarily?

1 A. Yes.

2 Q. Our purpose here today is to
3 clarify some information or some ---
4 some information that we received
5 from Agapito previously about work
6 that was done at the Crandall Canyon
7 Mine. And as we go through here, I
8 just encourage you, this incident
9 occurred back in August, and it may
10 be difficult for you to differentiate
11 between what you knew at that time
12 versus what you may know now. If
13 it's important to do that, just feel
14 free to let us know, this is when I
15 gained that information. But don't
16 limit yourself to what you knew at
17 the time you did the work. Okay?

18 A. Yes.

19 Q. We have quite a few exhibits
20 and reports here. And as we go
21 through this, I'll give you the
22 reports if we're referring to
23 something so you can view it in
24 context, rather than just taking one
25 sentence out and asking, do you

1 recall this. We have quite a few
2 documents here.

3 To begin with, I said we
4 appreciate the written response that
5 Agapito did. That's been quite
6 helpful in understanding your work.
7 But there was no cover letter with
8 that. Who prepared the written
9 response to us?

10 A. Which response?

11 Q. We had issued a series of
12 written questions, and Agapito
13 answered those questions and sent
14 them back. Are you aware of that?

15 A. Yeah, I'm aware of that.
16 Yeah, Doctor Hardy organized the
17 response to that.

18 Q. Did you participate and did
19 you provide some of the answers?

20 A. Yes.

21 Q. And you're generally familiar
22 with the document?

23 A. Yes.

24 Q. All right. What is your
25 title?

1 A. Senior mining engineer.

2 Q. And were you hired into
3 Agapito as a senior engineer?

4 A. Yes.

5 Q. What kinds of projects have
6 you been involved with at Agapito?

7 A. A lot.

8 Q. A lot. What types of work
9 have you done? I know Agapito does
10 ventilation work, reserve
11 calculations, things like that.

12 A. Ground control.

13 Q. Ground control. Is your
14 specialty --- do you have a special
15 area that you work in?

16 A. No specific area.

17 Q. No specific area within ground
18 control or no specific area --- you
19 do ventilation, reserve estimations,
20 ground control, everything that
21 Agapito does, you get involved in?

22 A. Except ventilation. I'm
23 involved in, you know, reserve
24 calculation and also ground control.

25 Q. You call them ground control

1 projects or geomechanics?

2 A. Yeah, geomechanics.

3 Q. Geomechanics. In the
4 geomechanics projects that you've
5 been involved in, what's your role
6 been?

7 A. Model impact, mostly.

8 Q. Numerical modeling?

9 A. Yeah.

10 Q. Would you tell us which
11 projects that you've done at Agapito
12 that involved numerical modeling?

13 A. I couldn't remember all.

14 Q. There are quite a few?

15 A. Yeah.

16 Q. Do you have an idea just how
17 many, just approximately?

18 A. About 20.

19 Q. Twenty (20)?

20 A. I should check the number
21 later.

22 Q. Your résumé indicates that
23 you've done numerical modeling on a
24 number of occasions, and you said
25 probably 20 projects now with

1 Agapito. What modeling software have
2 you used in those projects?

3 A. Mostly I used Flag, Flag 3D,
4 LAMODEL. I think that's all.

5 Q. That's all. LAMODEL is
6 boundary element. What type of model
7 is Flag or Flag 3D?

8 A. It's a finite difference,
9 code.

10 Q. Have you used other packages
11 in the past before you got to
12 Agapito?

13 A. Yes.

14 Q. What are some of those?

15 A. ANSYS, UDEC. I also used UDEC
16 at Agapito.

17 Q. And ANSYS is a finite
18 element method?

19 A. Yes.

20 Q. How about UDEC?

21 A. UDEC is a discrete element
22 method.

23 Q. Did you ever use EXPAREA?

24 A. Yes. Yes. I should have said
25 that also.

1 Q. Did you use EXPAREA at
2 Agapito?

3 A. Yes.

4 Q. Had you used it prior to your
5 employment with Agapito?

6 A. No.

7 Q. And when you use it, where did
8 you get the training for EXPAREA?

9 A. From project manager.

10 Q. And who was the project
11 manager?

12 A. Mr. Leo Gilbride.

13 Q. And when was that, Doctor Yu?

14 A. I couldn't remember.

15 Q. And LAMODEL, where did you
16 receive training for LAMODEL?

17 A. From school.

18 Q. School, being WVU?

19 A. Yes.

20 Q. Who did the training there?

21 A. Doctor Heasley.

22 Q. And when would that have been?

23 A. 2001 or 2002.

24 Q. How about the ARMPS program,
25 Analysis of Retreat Mining and Pillar

1 Stability, have you used that?

2 A. No.

3 Q. You said earlier that you used
4 --- that you attended LAMODEL classes
5 at WVU?

6 A. Yes.

7 Q. Can you describe project
8 experience that you had with LAMODEL
9 prior to Crandall Canyon?

10 A. We did a project at the end of
11 semester, but I couldn't remember the
12 detail of the project.

13 Q. At the end of the semester at
14 WVU?

15 A. Yes.

16 Q. How about at Agapito?

17 A. No.

18 Q. No project experience?

19 A. No.

20 Q. How about some of the other
21 folks at Agapito, can you give us
22 some idea of what their experience
23 level might have been with LAMODEL?
24 For example, Dave Conover?

25 A. No.

1 Q. You don't have any idea
2 how --- what kind of experience he's
3 had with it?

4 A. No.

5 Q. How about Hua Zhao?

6 A. She received training at
7 school also.

8 Q. And that was also WVU?

9 A. Yes.

10 Q. And how about project
11 experience with Agapito? Does she
12 have any project experience with
13 LAMODEL at Agapito?

14 A. No.

15 Q. And how about Leo Gilbride?

16 A. I'm not sure.

17 Q. All right. Your resume cites
18 Molycorp, LHD, ground support
19 evaluation, PRC cavern stability
20 study, and UIA drift stability
21 analysis as examples of geotechnical
22 modeling you've done at Agapito. Did
23 any of these projects involve coal
24 mines?

25 A. No.

1 Q. No? How much experience have
2 you had in your career, not just at
3 Agapito but in college and prior?
4 How much experience have you had
5 observing coal mine ground
6 conditions?

7 A. I enrolled in two at WVU.

8 Q. These were two projects?

9 A. Yes.

10 Q. Okay. And what was the nature
11 of the projects?

12 A. It's roof fall.

13 Q. So an operator --- can you
14 describe a little bit about what you
15 did in those projects?

16 A. I couldn't right now.

17 Q. All right. Can you briefly
18 describe the three Agapito modeling
19 projects that you cite in your
20 resume? What was the nature of
21 those, Molycorp, LHD, ground support
22 projects?

23 A. It's ---.

24 Q. Just general terms is fine.

25 A. Yeah, yeah, yeah. It's --- we

1 were required to estimate ground
2 support for that LHD level, so we
3 conducted modeling in Flag 3D.

4 Q. And how about the PRC cavern
5 stability study?

6 A. That's solution mining
7 project. It's calculate ---
8 calculated the stability of cavern
9 after leaching.

10 Q. And what type of modeling was
11 involved there?

12 A. Flag 3D.

13 Q. And finally, the UIA drift
14 stability analysis?

15 A. That's mainly to the stability
16 of the drift mining at UIA. The
17 model we use is Flag 3D.

18 Q. What type of mine is UIA?

19 A. It's a Nevada test site.

20 Q. Oh, okay. Did any of these
21 projects involve ground truthing for
22 calibration, where you ran a model
23 and then you compared the model
24 results with actual underground
25 conditions?

1 A. Yes.

2 Q. And did you do the truthing in
3 those cases?

4 A. Yes.

5 Q. And how was that done? What
6 did you do?

7 A. If there's any data for
8 subsidence, then we can compare our
9 model result with the subsidence data
10 or the other data and then calibrate
11 the input and then do the --- predict
12 the part.

13 Q. Okay. Can you give me an
14 example? The three that we talked
15 about earlier, the Molycorp project,
16 PRC cavern stability, or the UIA
17 drift stability, did you do ground
18 truthing in those?

19 A. Yes.

20 Q. You personally went out to the
21 mine and cavern?

22 A. No. So what do you mean
23 ground truth? Go to the mine?

24 Q. Yeah. The ground truthing ---
25 that's a good point. I should

1 clarify that. I guess what I mean is
2 ground truthing is if we go --- if we
3 do a model that we want to see, as
4 you said, I believe, to what the
5 conditions are and how well they
6 match the model. So the ground
7 truthing is to examine the conditions
8 for data, if you have convergence
9 data or subsidence data. But ground
10 truthing, as I'm defining it here, is
11 to visibly look at the conditions
12 underground. Have you been involved
13 in that activity for any of these
14 models?

15 A. No.

16 Q. Who did the ground truthing in
17 those cases?

18 A. The project manager.

19 Q. The project manager?

20 A. Yeah.

21 Q. We understand that projects
22 management can vary somewhat at
23 Agapito based, for example, on
24 project size. You have small
25 projects that are handled probably

1 differently than a very, very large
2 project. Would you help us
3 understand the work flow as it played
4 out specifically for the 226-20
5 pillaring analysis project at
6 Crandall Canyon? Do you recall how
7 the project was initiated?

8 A. I don't know. I just know the
9 project manager is Mr. Leo Gilbride.
10 How the project managed, I'm not
11 clear.

12 Q. So you're not familiar with
13 how things --- who contacted Agapito
14 initially?

15 A. No.

16 Q. Do you recall when you were
17 first asked to work on the project?
18 Your first involvement, who spoke
19 with you about it?

20 A. Leo Gilbride.

21 Q. And what did he say?

22 A. I couldn't remember right now.

23 Q. Who developed the scope of
24 work and a cost estimate for that
25 project?

1 A. I'm not clear.

2 Q. But did you have involvement
3 in the work and cost estimate
4 initially?

5 A. No, not the first one.

6 Q. So you weren't asked to
7 provide any estimates at all and hand
8 it off to a project manager, who then
9 incorporated it?

10 A. No.

11 Q. Okay. Who selected the types
12 of analysis to be done for the
13 Crandall Canyon project?

14 A. Leo Gilbride.

15 Q. And what types of analysis
16 were done?

17 A. I think he used LAMODEL and
18 ARMPS.

19 Q. Were there any other types of
20 analysis that were done as part of
21 the project?

22 A. I don't know.

23 Q. Why was LAMODEL chosen?

24 A. I'm not clear.

25 Q. And ARMPS, do you know why

1 ARMPS was chosen to be used?

2 A. No.

3 Q. No? Which of these analyses
4 did you do?

5 A. I do LAMODEL part.

6 Q. And who assigned you this
7 role?

8 A. Leo Gilbride.

9 Q. And what were you instructed
10 to do? When he came to you and said,
11 Doctor Yu, I'd like you to be
12 involved in this project, what did he
13 ask you to do?

14 A. First, calibrate the model,
15 add the panel --- I think it's east
16 to first right mains. There are
17 several panels on pillar retreating.

18 Q. And he specified LAMODEL at
19 that time?

20 A. Yes.

21 Q. He didn't mention EXPAREA,
22 using that?

23 A. I think he told me either use
24 EXPAREA or LAMODEL. But later we all
25 used LAMODEL.

1 Q. And why was that?

2 A. I'm not sure.

3 Q. When you were asked to do
4 this, what information were you
5 provided? The project manager comes
6 to you and says I'd like you to run a
7 program, EXPAREA or LAMODEL, and
8 calibrate these conditions, east of
9 the first right mains, what
10 information did he provide you to do
11 that?

12 A. Nothing.

13 Q. Were you given maps, AutoCAD
14 files?

15 A. Yeah, we have maps, but I
16 don't have the rock properties,
17 including overburden and also coal.
18 I don't have this parameter at that
19 time.

20 Q. Okay. So all you were
21 provided was ---?

22 A. A map.

23 Q. A map. Okay. What kind of
24 verbal instructions did you get?
25 They said, here's a map. Create this

1 model. How did you proceed?

2 A. I couldn't remember this one.

3 Q. Okay. Did anyone relate to
4 you the historical ground conditions?

5 A. Yes.

6 Q. They did. Okay. What did
7 they say?

8 A. The ground condition at Genwal
9 --- at Crandall Canyon is good, and
10 there is only several minor roof
11 falls.

12 Q. And how did that
13 information --- how did you use that
14 in the calibration process?

15 A. We calibrated --- the rib
16 stable and used convergence to see if
17 the roof is stable or not.

18 Q. Okay.

19 (Yu Exhibit 16 marked
20 for identification.)

21 BY MR. ZELANKO:

22 Q. We have some exhibits here
23 that we'd ask you to help us
24 understand a little bit. This
25 exhibit is marked Lu 16. I'll pass

1 it across to you. Who wrote these
2 notes? Do you know that, Doctor Yu?

3 A. Leo Gilbride.

4 Q. Leo Gilbride wrote the notes?
5 Do you know when they were written?

6 A. I'm not sure.

7 Q. No idea what the context might
8 have been for writing those notes?

9 A. No.

10 Q. Okay. Were you aware of these
11 notes and have you seen this map
12 before? That's two questions. Were
13 you provided this map ever?

14 A. Yeah.

15 Q. So this was given to you as
16 part of the calibration as well?

17 A. Yes.

18 Q. Is this the map that you
19 referred to earlier that you were
20 given?

21 A. Yes.

22 Q. And how did you use that map
23 then to assist you with the
24 calibration process?

25 A. I first calibrated the panels

1 east to first right mains.

2 Q. Okay. You're pointing to that
3 area --- I think it's referred to as
4 section 36, ---

5 A. Yes.

6 Q. --- the mobile bridge conveyor
7 retreat panels. So you used that map
8 to develop a grid; is that correct?

9 A. Yes.

10 Q. And the information that's
11 written on there, what does that
12 appear to be, those notes? They're
13 in reference to ground conditions; is
14 that correct?

15 A. Yes.

16 Q. You can read the notes?

17 A. Uh-huh (yes).

18 Q. So then how was that
19 incorporated into your calibration
20 process? Did you use that
21 information?

22 A. I didn't use roof support in
23 the LAMODEL, no roof supporting and
24 no black shale separated from
25 overburden.

1 Q. Did you use any of the
2 information on there for the purpose
3 of calibration?

4 A. The geometry?

5 Q. The grid, okay.

6 (Yu Exhibit 17 marked
7 for identification.)

8 BY MR. ZELANKO:

9 Q. All right. We have another
10 exhibit that we'd like to give you.
11 We're calling this one Lu 17. Who
12 wrote those notes?

13 ATTORNEY BARTON:

14 Can I ask, is this
15 someone else's exhibits or is
16 this --- should be Yu; right?
17 I mean, I was thinking maybe
18 there's another witness named
19 Lu.

20 MR. ZELANKO:

21 I'm sorry. We'll
22 change that to Yu.

23 ATTORNEY BARTON:

24 I just wanted to make
25 sure.

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MR. ZELANKO:

That's my mistake.

A. This is Leo Gilbride.

BY MR. ZELANKO:

Q. Leo Gilbride. Do you know when those notes were written?

A. No.

Q. Do you know who provided the information?

A. No.

Q. You weren't present whenever these notes were taken; is that correct?

A. I'm not sure. I couldn't remember.

Q. Were you ever provided with that map?

A. No.

Q. Okay. All right. The project 226-20 was conducted in a phased approach. Initially, for example, you evaluated just development mining. Do you know why that was?

A. No.

Q. Were you involved in each

1 phase? I guess to clarify, the three
2 phases, as we break it down, is the
3 development phase of the north
4 barrier, the retreat phase of the
5 north barrier, and the development
6 and subsequent retreat of the south
7 barrier.

8 A. Yes.

9 Q. You were involved in all three
10 phases?

11 A. Uh-huh (yes).

12 ATTORNEY WILLIAMS:

13 Can you say yes, sir,
14 because he can't take down a
15 nod or an uh-huh?

16 A. I said yes.

17 ATTORNEY WILLIAMS:

18 Thank you.

19 BY MR. ZELANKO:

20 Q. Who were the other engineers
21 involved over the course of the
22 project?

23 A. Leo Gilbride and Matt Hardy
24 and Hua Zhao.

25 Q. Dave Conover as well?

1 A. No. He didn't get involved
2 with the project.

3 Q. Okay. I had asked you
4 specifically engineers. Did Leo
5 Gilbride participate as an engineer
6 or in some other capacity?

7 A. Well, he's a project manager.

8 Q. And Michael Hardy, how would
9 you characterize his role?

10 A. He's involved in two site
11 visits.

12 Q. Okay. But aside from the site
13 visits, did you see him also as a
14 project manager or ---?

15 A. I don't know.

16 Q. Don't know, okay. In what
17 ways did you assist ---. In this
18 case, you said the other engineer was
19 Hua Zhao. In what ways did you
20 assist them or did they assist you in
21 the project?

22 A. Pardon me?

23 Q. Hua Zhao was another engineer
24 on the project.

25 A. Yes.

1 Q. Did they assist you with the
2 project or did you assist them?

3 A. Assisted them.

4 Q. Assist Hua?

5 A. Yeah. I passed my input to
6 her.

7 Q. Okay. And she took your input
8 and used it to run additional models?

9 A. Yes.

10 Q. Did you have any --- did you
11 do any review of her work as she was
12 --- she took your initial work and
13 did some more work with it. Did you
14 have any oversight of that?

15 A. Both me and Leo reviewed
16 summaries.

17 Q. What was Leo Gilbride's role
18 in the Crandall Canyon project? You
19 said he was the project manager?

20 A. Yes.

21 Q. Did his role change over the
22 course of the project?

23 A. I'm not sure.

24 Q. In the information that you've
25 provided to us, Leo is listed as

1 engineering manager principal in the
2 summer of 2006, principal and
3 associate in March 2007, and then
4 later on he's listed as an engineer
5 for Gilbride Engineering Services.
6 But his role never changed as far as
7 --- did his role change as far as his
8 interaction with you on this project?

9 A. No.

10 Q. And Michael Hardy's role, I
11 think you already addressed. You
12 said he participated in two site
13 visits?

14 A. Yes.

15 Q. Do you know why he became
16 involved?

17 A. I'm not sure.

18 Q. Okay. Regarding the LAMODEL
19 work that Agapito did, who actually
20 created the models?

21 A. Me.

22 Q. And how were the models
23 constructed? And by that, I mean
24 physically. Did you use a text
25 editor to build the input files or

1 did you use MULPRE, the preprocessor?

2 A. MULPRE.

3 Q. MULPRE. And how did you enter
4 material properties? Did you use ---
5 you're familiar with it, obviously.
6 Did you use the material wizard or
7 did you input them individually?

8 A. I didn't use either. I first
9 used wizard, but in the final input I
10 didn't use that.

11 Q. So how were they input?

12 A. What do you mean how?

13 Q. Well, to construct the .inp
14 file, to provide that to the
15 calculation routine, you have to put
16 in the material properties. You used
17 MULPRE; is that correct?

18 A. No.

19 Q. No? So how did you build that
20 file?

21 A. I used another input equation,
22 then later on I calibrated that
23 equation, compare it to the reality
24 of the mining experience.

25 Q. Okay. That's how you arrived

1 at the material properties to use?

2 A. Uh-huh (yes).

3 (Yu Exhibit Four marked
4 for identification.)

5 BY MR. ZELANKO:

6 Q. But how did you actually
7 assemble the data file that's --- let
8 me pull out Exhibit Four. What I've
9 done here, Doctor Yu, is taken some
10 input files, the .inp files that you
11 provided us, and I opened them up in
12 a notepad, just a typical text
13 editor, and I did a screen capture so
14 we'd have something to look at. Are
15 you familiar with that input file
16 structure?

17 A. Yes.

18 Q. And that's sort of what I'm
19 getting at here. You used an
20 equation, you said, to develop the
21 material properties. But how was it
22 actually assembled into that format?

23 A. Just use notepad.

24 Q. Okay. So you did use a text
25 editor ---

1 A. Yeah.

2 Q. --- to put the numbers in?

3 Okay. And how about the mine level
4 grid? How did you create the grid?

5 A. First, I tracked this contour
6 line from AutoCAD. And then grid it
7 in Surfer.

8 Q. Surfer?

9 A. Yeah.

10 Q. So you had an AutoCAD file, as
11 well as this map that was provided to
12 you?

13 A. Yes.

14 Q. And the AutoCAD file had
15 overburden contours. And I
16 understand then that you used a
17 separate program from AutoCAD called
18 Surfer?

19 A. Yeah.

20 Q. Okay. I'm not familiar with
21 Surfer. Can you give me just a brief
22 description of how that works to pull
23 something out of AutoCAD to generate
24 a grid like this? Do you just
25 dispartize (phonetic) the grid and

1 then tell it what parameter to look
2 at, and it automatically generates
3 the grid?

4 A. Yes. Different method. The
5 Dehall-Kriger (phonetic) method and
6 also universe distance method, which
7 was one method, and then it will give
8 you the grid.

9 Q. Was that for the topographic
10 grid that you used Surfer?

11 A. Yes.

12 Q. How about for the mine level
13 grid, where you're showing the
14 entries in the pillars?

15 A. Mine level is flat, assumed to
16 be flat.

17 Q. The elevation ---?

18 A. This contour is overburden
19 contour.

20 Q. Right. But I guess when I'm
21 talking about the mine grid, I'm
22 asking when you look at that Exhibit
23 Four ---

24 A. This one?

25 Q. --- down below there, you can

1 see the outline of the pillars and
2 the gob and so forth. How was that
3 part of the grid created? Was that
4 also with Surfer?

5 A. No.

6 Q. How did you develop that?

7 A. This first grid --- gather
8 part of this model from AutoCAD, then
9 we have an in-house software called
10 Container, use that to have the grid.
11 And then I output that to LAMODEL to
12 actually Grid 8 --- Code 8
13 (phonetic).

14 Q. So you have an in-house
15 program called Container?

16 A. Yes.

17 Q. And is that --- how is that
18 written? Does it work within AutoCAD
19 or is it a stand-alone program?

20 A. Stand alone.

21 Q. Okay. I'm not --- that's ---
22 okay. And how were yielding
23 properties assigned into the grid?
24 Now, you have the topographic file
25 dispartized. You have the mine level

1 grid with your pillars and entries.
2 How do you --- how were the yielding
3 properties assigned into the grid?

4 A. Automatically generated in
5 LAMODEL.

6 Q. In the LAMPRE program?

7 A. LAMPRE, yeah.

8 Q. Apply yield zone button ---

9 A. Yeah.

10 Q. --- and it assigns those
11 properties? Okay. Did anyone review
12 the input files?

13 A. No.

14 Q. This figure four or Exhibit
15 Four that we're looking at, you
16 looked at it, but no one else
17 reviewed it?

18 A. No. I mean, the final input.
19 The initial input, I sent it to Dave
20 Conover to let her --- to let him
21 review it.

22 Q. The initial file?

23 A. Yes. I think this just the
24 initial file.

25 Q. Okay. Why did you send it to

1 Dave?

2 A. I couldn't run through it, so
3 I asked him to help me to review it,
4 to double check if there is any
5 mistake.

6 Q. It wouldn't run?

7 A. It wouldn't run at the
8 beginning.

9 Q. Was Dave able to help you out
10 with that?

11 A. Dave told me that the
12 topographic file and this input file
13 should be separated.

14 Q. One has .inp and the other one
15 ---

16 A. One has .top, T-O-P.

17 Q. --- .top. Okay. Did he
18 provide any other assistance to you,
19 other than the topographic file,
20 breaking that out?

21 A. I couldn't remember right now.

22 Q. Do you recall which versions
23 of LAMPRE were used to build and run
24 that particular analysis, for
25 example, a preprocessor? Do you know

1 which version he used?

2 A. 1.0.

3 Q. 1.0. And how about the number
4 cruncher?

5 A. What?

6 Q. What version of the number
7 crunching part?

8 A. I couldn't remember that.

9 Q. Okay. And how was the output
10 of the program evaluated? You built
11 the program and built the input file,
12 you run it, now let's talk about the
13 output. How did you evaluate the
14 output?

15 A. Leo Gilbride evaluated that
16 part.

17 Q. But do you know, did you or
18 did he use LAMPLT, the output part of
19 the LAMODEL program?

20 A. We have --- we had two in-
21 house program, one called a QBAR, one
22 called a LAMBAR, to do the process.

23 Q. What were those two names?

24 A. QBAR, Q-B-A-R, ---

25 Q. Okay.

1 A. --- and L-A-M-B-A-R.

2 Q. R-A-M-B-A-R?

3 A. No, L-A-M-B-A-R.

4 Q. Now, both of those are used
5 for post-processing LAMODEL files?

6 A. Yes.

7 Q. And what do they do? What
8 does QBAR do, for example?

9 A. LAMBAR first generated to
10 binary file, and then QBAR read this
11 file and process it.

12 Q. Are you familiar with the
13 LAMPLT program?

14 A. Yes.

15 Q. What's the benefit of using
16 the in-house post processor over
17 LAMPLT?

18 A. We want to see some yield
19 condition, so that --- LAMODEL
20 process program cannot show it, so we
21 --- I use that.

22 Q. The in-house program, QBAR, is
23 it similar to LAMPLT in what it will
24 do, but it has this additional
25 feature?

1 A. Yes.

2 Q. Does it allow output to be
3 presented and the scales to be
4 changed? In other words, with LAMPLT
5 you can choose convergence, you can
6 choose the scale, and you can choose
7 which step in the model if you have a
8 multi-step model.

9 A. Uh-huh (yes).

10 Q. QBAR is similar in that
11 regard?

12 A. Yes.

13 Q. You can select the output?

14 A. Uh-huh (yes).

15 Q. You can select the scale?

16 A. Yes.

17 Q. What are the default displays
18 in QBAR? You take an input file and
19 pull it up. What do you see on the
20 screen?

21 A. You can choose either to see
22 stress, displacement or yielding
23 condition.

24 Q. Does the program default to
25 the same layer every time when you

1 first load it up?

2 A. What do you mean?

3 Q. If you were working on project
4 226-19, another project, and you
5 finish working on that project, now
6 you switch to project 226-20 and you
7 pull up the input file for that one,
8 does it go back to a set default for
9 your screens that you're looking at
10 or does it remember the last one that
11 you looked at and use it initially?

12 A. I'm not sure.

13 Q. Do you know if --- if you pull
14 up in QBAR, say --- let's say
15 convergence and you look at it, do
16 you know if the default scale is to
17 show min to max or is it fixed?

18 A. You have two choices, either
19 to show the minimum to maximum or
20 either to choose a section you want
21 to see.

22 Q. Okay. But you don't know what
23 the default is?

24 A. Default is minimum to maximum.

25 Q. Okay. Who created the figures

1 used in the reports?

2 A. Me.

3 Q. And how were they done? How
4 did you do the figures? How did you
5 create them?

6 A. Just in QBAR and then screen
7 capture the figures.

8 Q. So you can adjust the output
9 that you want, select among the
10 output parameters, convergence,
11 stress or yielding condition?

12 A. Yes.

13 Q. You select a scale and you get
14 a picture on a screen?

15 A. Uh-huh (yes).

16 Q. And you do a screen capture?

17 A. It has screen capture capacity
18 in the program.

19 Q. And those --- what did you do
20 with those screen captures then?
21 Somebody else finished the figures or
22 you finished them?

23 A. Some we didn't have any
24 additional ID'd (phonetic) for that
25 figure. Some we have additional ID'd

1 for that figure.

2 Q. The additions would be things
3 like contour lines for topography?

4 A. Contour lines for topography
5 and also some annotations.

6 Q. You didn't do that or you did?

7 A. No.

8 Q. Who did do that?

9 A. You mean the annotation part?
10 It's Jill.

11 Q. Okay.

12 A. Lawrence.

13 Q. And on those figures, you said
14 the default is min to max. How were
15 the scales chosen that were finally
16 used in the reports?

17 A. We just scale stress or ---.

18 Q. Stress, convergence. Yield
19 condition, I guess, is
20 self-explanatory, but let's talk
21 about convergence and divergent
22 stress.

23 A. Convergence is 0 to 2. Stress
24 is 0 to 10,000.

25 Q. And why did you choose 0 to 2

1 and 0 to 10,000?

2 A. Since 2 is typical for roof
3 feeder and based on the mine's
4 appearance at Crandall Canyon.

5 Q. So you set that as an upper
6 threshold in the output?

7 A. Yeah.

8 Q. And what was the basis for
9 determining that two inches was cause
10 for roof control problems at Crandall
11 Canyon?

12 A. I'm not sure.

13 Q. Was this a number that someone
14 told you to use?

15 A. I discussed with Leo.

16 Q. And based on those
17 discussions, you came away saying two
18 is the number that I should use?

19 A. Yes.

20 Q. And how about 0 to 10,000 PSI,
21 how did you arrive at that for upper
22 limit?

23 A. Just based on experience.

24 Q. Based on?

25 A. Experience.

1 Q. Experience, okay.

2 A. Experience.

3 Q. This is your experience or
4 someone else?

5 A. My experience.

6 Q. Did you have a similar
7 discussion with Leo about that as you
8 did with the two to settle on using
9 an upper bound of 10,000?

10 A. No.

11 Q. Who wrote the reports? And I
12 guess I would be referring to ---
13 there were three separate reports, I
14 believe, July 20th, that were
15 reported initially for the
16 development mining in the north
17 barrier, then the retreat, then the
18 work in the south. Who wrote those
19 reports, the letter or memo reports?

20 A. Leo ---

21 Q. Leo?

22 A. --- Gilbride.

23 Q. What input did you provide for
24 the narrative? When he wrote these
25 memos, he incorporated figures and he

1 wrote a narrative to go along with
2 it. Did you provide any of that
3 written narrative to Leo?

4 A. Yes.

5 Q. You did?

6 A. Uh-huh (yes).

7 Q. Okay.

8 A. What do you mean, written
9 narrative?

10 Q. Let me give you an example.

11 ATTORNEY BARTON:

12 If you can use the
13 actual words in the report.
14 (Yu Exhibit Five marked
15 for identification.)

16 BY MR. ZELANKO:

17 Q. I'll give you --- this is
18 Exhibit Five, Yu Exhibit Five. This
19 is the July 20th report. And if you
20 look --- I'm referring to the written
21 part. There are 20 or more figures
22 at the back, but the narrative, or
23 the text part, refers to those
24 figures. And I guess it sounds to me
25 like you had a lot of involvement in

1 running the model and preparing
2 figures. Did you also provide
3 written ---?

4 A. I provided written, but Leo, I
5 think, rewrote all the text. This
6 letter, I think, is written by Leo
7 Gilbride.

8 Q. But did he use your --- the
9 text that you provided, did he use
10 it ---

11 A. Yes.

12 Q. --- correctly into there?

13 A. Yes.

14 Q. But he modified it?

15 A. Yeah.

16 Q. But were you in agreement with
17 his written text, his narrative in
18 the reports?

19 A. Yes.

20 Q. What I'm asking is, you wrote
21 something, he modified it, but you
22 were satisfied that the way he
23 modified it still represented your
24 thoughts?

25 A. Yes.

1 Q. Okay. Let's talk a little bit
2 about the calibration of LAMODEL for
3 Crandall Canyon. Who selected the
4 areas that were used for calibration?

5 A. Mr. Leo Gilbride.

6 (Yu Exhibit Two marked
7 for identification.)

8 BY MR. ZELANKO:

9 Q. In the proposal that was
10 submitted to Genwal --- we have that
11 here as Exhibit Two. I'll give you
12 that in case you --- that's Yu
13 Exhibit Two, in case you need to
14 refer to it. This proposal makes
15 reference to two areas for LAMODEL
16 calibration. One was the south mains
17 pillar retreat area and the second
18 was the mobile bridge conveyor panels
19 in Section 36. Was the south mains
20 area actually used for calibration?
21 Would you like me to show you what
22 I'm referring to?

23 A. This area?

24 Q. Right.

25 A. No.

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MR. ZELANKO:

Doctor Yu indicated the south mains retreat area.

BY MR. ZELANKO:

Q. That wasn't used for calibration?

A. No.

Q. And who made that decision?

A. Leo Gilbride.

Q. Do you know why he chose not to model that as a calibration point?

A. I'm not clear.

Q. You said earlier you did the calibration work?

A. Yes.

Q. Were you assisted by anyone else?

A. No.

Q. As you were doing the calibration work, can you describe how you did it sort of step by step? You said earlier that you used the geometry from the AutoCAD map, you got the topography. But in the calibration process itself, what was

1 involved? How many runs? What were
2 you looking to modify, that sort of
3 thing?

4 A. What I remember is when we
5 calibrated the coal strengths there,
6 I ran the coal strengths from low
7 value to high value until this
8 Section 33 part, when it developed
9 --- the pillars still not yield.

10 Q. Can you indicate which pillars
11 you were looking at? You adjusted
12 the properties until which pillars
13 did yield?

14 A. This Section 33 --- 36.

15 Q. Section 36, and there are one
16 --- well, are there panel numbers on
17 there?

18 A. No panel number.

19 Q. Okay. But you're referring to
20 the panel just north of the main
21 west. Yeah, perhaps I could give you
22 an orange marker here and you could
23 just indicate on Yu Exhibit 16 which
24 pillars you calibrated the model to.

25 A. This pillar and also this.

1 These two pillars.

2 Q. And can you indicate which ---
3 are you referring to the groups of
4 pillars in those panels?

5 A. Yes. We calibrated and did
6 this --- these two panels, this panel
7 total yield and went and developed
8 this part, Section Six, the pillar is
9 competent when it retreat. Some
10 pillar just outby the gob yield, and
11 the other pillar still competent.

12 Q. The first two panels that you
13 referred to were three and four
14 panels north of the main west. And
15 the last panel that you referred to
16 was the panel just north of main
17 west, in Section 36. And you're
18 saying you developed --- you modified
19 that until you could develop it and
20 then retreat it back?

21 A. Yes.

22 Q. And on retreat, what was the
23 pillar behavior that you were looking
24 for?

25 A. On retreat, just the pillars

1 adjacent to the gob yield. But the
2 other pillars still competent.

3 Q. Okay. It's just the first
4 row?

5 A. Yeah.

6 Q. And what was the basis for
7 trying to match that behavior? Why
8 did you believe that that was the
9 behavior that you needed the model to
10 reflect?

11 A. I couldn't remember at that
12 time how we discussed that, but
13 it --- I think it represented to the
14 field experience there, but I'm not
15 clear how in reality it did.

16 Q. You don't recall who related
17 that field experience to you
18 personally?

19 A. I think it's --- Leo discussed
20 with me. Leo first reviewed the
21 figure and discussed with me.

22 Q. And as you're making these
23 runs and looking for that behavior,
24 you said you modified coal strength.
25 Did you evaluate or discuss those

1 intermediate results with someone?

2 A. No.

3 Q. So your instruction at the
4 beginning was this is the behavior to
5 try to make the model calibrate to,
6 and you did that analysis and reached
7 the final calibrated model? No one
8 helped you with the intermediate
9 steps?

10 A. No.

11 Q. Did anyone review the final
12 calibrated model?

13 A. Leo reviewed the figures.

14 Q. And when did he do that; do
15 you recall?

16 A. I think before he generated
17 the report.

18 Q. Do you recall any discussions
19 you might have had with him about the
20 calibrated model? When you finished
21 and you achieved the result that you
22 were looking for with the
23 calibration, did you take those
24 results to Leo and say here's where
25 I'm at, before you proceeded to do

1 the predicted modeling?

2 A. Yes.

3 Q. And do you remember those
4 discussions, what you talked about
5 and ---?

6 A. I couldn't remember right now.

7 Q. The written response, I have a
8 copy of that, and we can give you ---
9 enter that as Yu Exhibit One in case
10 you need to refer to anything in
11 there as we go through this.

12 (Yu Exhibit One marked
13 for identification.)

14 BY MR. ZELANKO:

15 Q. There was an indication in a
16 written response that three
17 parameters provided the principal
18 quantitative basis for comparing the
19 historical and future mining
20 conditions. That was on Question 51.
21 And I can refer you to --- page 9964
22 is the Bates number stamped at the
23 bottom.

24 A. What's that question?

25 Q. Question 51.

1 WITNESS REVIEWS DOCUMENT

2 A. Yes, I read the question.

3 BY MR. ZELANKO:

4 Q. You're familiar with the
5 response in here?

6 A. Yeah.

7 Q. Did you write the response to
8 those questions?

9 A. Yes.

10 Q. Okay.

11 A. I drafted.

12 Q. So three parameters provided
13 the principal quantitative basis for
14 comparing historical and future
15 mining conditions. How was in-seam
16 vertical stress used in the
17 calibration process? Is that
18 essentially what you described to us
19 earlier, where you looked at ---
20 well, I guess earlier you talked
21 about pillar yielding.

22 A. Yes.

23 Q. How was in-seam vertical stress
24 used in the calibration process?

25 A. I didn't remember that. I

1 need to read the report. But I
2 didn't remember if we used vertical
3 stress to calibrate.

4 Q. Are you saying you don't
5 remember or you don't think that you
6 did?

7 A. I don't remember.

8 Q. And you said you'd have to
9 review a report. Which report would
10 that be?

11 A. It should be the first report.

12 Q. The July 20th report?

13 A. Uh-huh (yes).

14 Q. Roof-to-floor convergence, and
15 how was that used again?

16 A. This yields two inches crete
17 (phonetic) area.

18 Q. And pillar yielding, that was
19 used in the manner you described
20 earlier?

21 A. Yeah, just a minor yield on a
22 rib.

23 Q. Okay. All right. So you
24 established a criteria. You said two
25 inches was held --- with some

1 assistance from Leo, you decided to
2 use two inches. And you don't recall
3 exactly how you used in-seam vertical
4 stress, and you've described to us
5 how you used pillar yielding. Who
6 ensured then that the criteria that
7 you used were satisfied in the
8 calibrated model? You said you took
9 those to Leo when you were satisfied,
10 and he concurred; is that correct?

11 A. Yes.

12 Q. Okay. And the 0 to 10,000 PSI
13 scale that you used on the stress
14 levels, you said that was based on
15 your experience?

16 A. Yes.

17 Q. Can you tell us a little bit
18 about that experience? Was it ---
19 what types of mines or what types of
20 issues were you dealing with?

21 A. I cannot run analysis using
22 EXPAREA for Andalex. And at that we
23 used 0 to 10,000.

24 Q. Andalex is the Tower Mine?

25 A. Yeah.

1 Q. Were there any other
2 experiences that you had similar
3 experiences that led you to that
4 range?

5 A. No.

6 Q. All right. Once calibrated
7 and Agapito applied the model to
8 proposed scenarios, who decided what
9 designs and what pillar geometry did
10 they evaluate?

11 A. I remember it's based on the
12 map, AutoCAD map. This map is
13 provided to us by Crandall Canyon.

14 Q. So Crandall Canyon provided a
15 map and it showed geometries on it,
16 and that's what you modeled?

17 A. Yes.

18 Q. Were other designs considered
19 in the north? And I'm talking about
20 the north barrier section. Do you
21 recall ---?

22 A. I'm not clear.

23 Q. Do you recall any
24 conversations where you might have
25 discussed with someone at Agapito or

1 at Genwal and said maybe we could
2 model a different geometry to see
3 what the impact might be?

4 A. No.

5 Q. And you said --- you ran the
6 models in the first two phases of the
7 project and you provided some
8 assistance to Hua Zhao in the third
9 phase?

10 A. Yes.

11 Q. And who reviewed the model
12 results in each of those cases? In
13 the first phase, you ran the models.
14 Who reviewed the results?

15 A. Mr. Leo Gilbride.

16 Q. And in the second case, when
17 they decided to retreat mine in the
18 north, ---

19 A. Yes.

20 Q. --- who reviewed those
21 results?

22 A. Mr. Leo Gilbride.

23 Q. And in the third case, Hua
24 Zhao ran the models. Who reviewed
25 the results?

1 A. Mr. Leo Gilbride.

2 Q. Did anyone else take a look at
3 them?

4 A. I also looked at it, but I
5 didn't write out the report.

6 Q. Did you ever discuss with Leo
7 what the results of these models
8 were?

9 A. Yes.

10 Q. And what did you talk about
11 with --- which of the models first
12 did you discuss with him?

13 A. You mean the ---

14 Q. Phase one?

15 A. --- phase three?

16 Q. Phase one, phase two, phase
17 three. Did you have those
18 conversations each time with him?

19 A. Yes.

20 Q. Okay. When you're having
21 those discussions, what are you
22 looking at? What's physically in
23 front of you? Were they the color
24 graphs, figures, or did you go right
25 to the QBAR program and look at the

1 output?

2 A. The printout figure.

3 Q. The printouts. And those
4 printouts show multiple steps. Who
5 chose the steps that you modeled?

6 A. Leo gave me the steps.

7 Q. Leo identified --- he said run
8 the model, show development, then
9 retreat to this point, that's how it
10 went?

11 A. Yes.

12 Q. Okay. And so when you made
13 these color figures, you were doing
14 color figures for the steps and
15 sitting down, looking at the output?

16 A. Yes.

17 Q. Okay. And it was only ever in
18 the color figures? Leo never went to
19 look at the --- did he look at the
20 input files?

21 A. No.

22 Q. Did he look at the digital
23 data in the QBAR system or in LAMPLT?

24 A. No.

25 Q. Some of the figures included

1 cross-sections with stress profiles,
2 for example, or convergence. Whose
3 decision was it to make those
4 figures?

5 A. Leo asked for the figures.

6 Q. And do you know why?

7 A. No, I don't know why.

8 Q. Did you have any discussions
9 about those figures in particular?

10 A. Yes.

11 Q. And what --- let's look ---
12 well, hold on. We'll get to the
13 individual figures later. In that
14 review process, what parameters did
15 the reviewer look at? All of them?
16 You said three parameters were used,
17 convergence, vertical stress, and
18 yield condition.

19 A. All of them.

20 Q. All of them. How do you
21 archive model files? How did you do
22 it for this Crandall Canyon project?
23 I'm saying that --- give you a little
24 bit of background. I know that
25 sometimes when you're running these

1 files, you create big files. In the
2 calibration process, for example, you
3 looked at multiple strengths. Those
4 files, the output can be big. What's
5 your procedure for handling all the
6 files that are generated in this
7 process?

8 A. I couldn't remember. This was
9 in summer. They're always large. So
10 it just --- sometime I just overlap
11 the previous one.

12 Q. So you're naming the new file
13 the same name as the old file, so
14 it's just writing over the old one,
15 is that what you mean?

16 A. Yeah.

17 Q. So that, in a sense, takes
18 care of the duplication problem?

19 A. Yeah. Since this a lot of
20 input and output, sometimes just
21 even, you know, two days later you
22 come back, you cannot see what you do
23 two days ago.

24 Q. Does Agapito have a policy for
25 handling files, modeling files?

1 A. I'm not clear.

2 Q. Has Agapito provided us with
3 all the LAMODEL files that are
4 available for Crandall Canyon?

5 A. I don't know. I didn't ---
6 it's not ---.

7 Q. Agapito's run models to
8 compare the results of EXPAREA and
9 LAMODEL. Who ran those models?

10 A. I ran once to compare the gob
11 behavior and also yield of pillar
12 behavior at one section. I think
13 it's Tower Mine.

14 Q. That was to compare gob
15 behavior and what else?

16 A. And yield pillar behavior.

17 Q. And how did you make that
18 comparison? Can you describe what
19 you did?

20 A. The gob --- you use --- I use
21 different stiffness and to get the
22 same load over the gob between
23 EXPAREA and LAMODEL. And the yield
24 pillar we compared to case data. The
25 yield pillar just yielded his --- had

1 to get half of the pillar yield at the
2 gob site and half of the pillar is
3 still competent behind the face,
4 outby the face. And the tailgate
5 (phonetic) side yield pillar total
6 yield. These two conditions we
7 compare with two models. It's very
8 similar.

9 Q. Doctor Hardy offered to do a
10 comparison for us. Are you prepared
11 to discuss those results today?

12 A. No. No.

13 Q. Do you need to take a break?

14 A. Yeah.

15 SHORT BREAK TAKEN

16 BY MR. ZELANKO:

17 Q. Just to go back, we asked you
18 earlier if Agapito had a policy for
19 handling numerical modeling files.
20 Did anyone ever talk to you about
21 handling model files, how to archive
22 them or delete them, keep them?

23 A. No.

24 Q. All right. The LAMODEL work
25 that was done for Crandall Canyon

1 made use of some material properties
2 developed for EXPAREA but with some
3 modifications. Regarding the rock
4 mass, what rock models did you use?

5 A. You mean coal overburden?

6 Q. Overburden.

7 A. I couldn't remember right now.

8 Q. Okay.

9 A. Do you have an input file?

10 Q. Exhibit Four is the input
11 files that you gave us. And I
12 believe at the bottom you can tell
13 from that the origin of the file.
14 For example, this is Genwal input ---
15 up here, Genwal input 1.inp.

16 A. I don't think this is the
17 final one. It says final one, I
18 didn't use it. I did not use an
19 elastic/plastic model here. I used
20 elastic --- strength softening
21 material ---

22 Q. Okay.

23 A. --- on this number.

24 Q. I believe these were all from
25 --- down here you can see this was

1 from Dave Conover's modeling file.

2 A. Yes. I e-mailed him this
3 material already, but this not the
4 finalized.

5 Q. Did I understand you to say
6 you e-mailed this file to Dave
7 Conover?

8 A. Yes.

9 Q. So are these the material
10 properties you generated using the
11 material wizard?

12 A. Yes.

13 Q. And he fixed the topographic
14 file?

15 A. Yes.

16 Q. Now, this says ---

17 A. This looks familiar.

18 Q. --- Bo Yu modeling files,
19 7/20/06, Crandall Canyon Mine, west
20 barrier modeling.

21 A. You mean this overburden;
22 right?

23 Q. Right.

24 A. Yeah, it's 3,000,000 PSI.

25 Q. Why did you use 3,000,000,

1 Doctor Yu?

2 A. Just the default value in the
3 model.

4 Q. In your written response,
5 that's Exhibit One, on page 9963,
6 Question 47(c)(1).

7 A. Actually, Table Two in the
8 report is not the right table.
9 It's ---.

10 ATTORNEY WILLIAMS:

11 Did you say it's not
12 the right table?

13 A. No, the right table. So
14 actually, the input file is
15 inconsistent with that table.

16 BY MR. ZELANKO:

17 Q. Table Two in ---

18 A. Table two.

19 Q. --- the July 20th report?

20 A. Yes. I just ---.

21 Q. Which is Exhibit Number? On
22 the front.

23 ATTORNEY BARTON:

24 What's the exhibit
25 number on the front, Bo?

1 A. Five.

2 BY MR. ZELANKO:

3 Q. So Exhibit Five, Table Two.

4 A. Table Two is not the right
5 number.

6 Q. Okay. So in the written
7 response, how did you arrive at
8 2,000,000 in Question 47(c)(1)?

9 A. The written response, I just
10 base the data in Table One.

11 ATTORNEY BARTON:

12 Table Two, you mean?

13 A. Table Two.

14 BY MR. ZELANKO:

15 Q. Table Two. But as you look at
16 the input files now, you indicate
17 that you used 3,000,000?

18 A. Yes.

19 Q. And why did you use 3,000,000?

20 A. It's the default value in the
21 model.

22 Q. Did you make any effort to ---
23 in EXPAREA, what value had you used?

24 A. I did not use EXPAREA in this
25 project.

1 Q. The Question 47(c)(1)
2 indicated to me that you used a
3 higher modulus in LAMODEL to try to
4 increase the stiffness since you knew
5 that there were laminations. But, in
6 fact, that wasn't the case?

7 A. I just used the default value.

8 Q. Okay. With respect to the
9 gob, EXPAREA used a bilinear gob. I
10 believe it was described in Question
11 47(c)(2) as a constant gob modulus
12 after a critical closure of .7 feet.
13 Does the version of LAMODEL that you
14 used have a bilinear capability ---

15 A. Yeah, it ---.

16 Q. --- for the gob?

17 A. It has, but not the default
18 gob material in LAMPRE. You cannot
19 input in LAMPRE.

20 Q. And do you know which version
21 of LAMPRE? You said 1.0?

22 A. Yeah.

23 Q. So why did you use a strength
24 hardening model?

25 A. It's default.

1 Q. And what final gob modulus
2 value did you use?

3 A. I looked at the input file. I
4 used 2,180.

5 Q. And why did you use that
6 number?

7 A. This is also a default
8 material parameter for a gob.

9 Q. With regard to Question 47,
10 who provided the answers in that
11 written response?

12 A. I provided.

13 Q. Okay. Can you describe what
14 is the effect of gob modulus in a
15 boundary element model? If it's a
16 high gob modulus, what's the effect?

17 A. High gob modulus, a lot of gob
18 material model and softer gob
19 modulus, actually, or through a load
20 to the pillars and also the barriers.

21 Q. Okay. Let's talk about coal
22 properties. Agapito, in Exhibit
23 Five, the report, talks about a
24 method of slices to approximate the
25 load-bearing capacity of pillars.

1 Did Agapito use the equations on page
2 96 and 97 for that exhibit to
3 determine the properties for the
4 slices?

5 A. I remember this starting
6 point, first to do the background
7 analysis. In the final input, we
8 didn't use these numbers.

9 Q. What equations do you use to
10 determine properties for slices in
11 this method of slices?

12 A. Equation wise, a starting
13 point to do the coal strengths. But
14 later on, I found that this predicted
15 small strengths greater than the
16 default value in LAMODEL, so I put
17 --- I modified this equation, put
18 same levels of coal strengths on the
19 corner and then put the same levels
20 on the rib. This is all the starting
21 point of calibration.

22 Q. Do you know what the source of
23 that equation is, equation one?

24 A. This is from my paper. The
25 equation base, a result of boundary

1 element method.

2 Q. What value of coal strength
3 did you use in that equation?

4 A. I used 1,640.

5 Q. And why did you use that
6 value?

7 A. It's just calibrated to the
8 section 36, and that value --- give
9 that value, the output is consistent
10 with the mining experience at that
11 area.

12 Q. And the equation one is a
13 starting point for determining peak
14 strength of coal, ---

15 A. Yes.

16 Q. --- according to the method of
17 slices?

18 A. Uh-huh (yes).

19 Q. And you used 1,640 as the coal
20 strength?

21 A. Yes.

22 Q. The other three equations in
23 there, I know one of them is Hooke's
24 Law. But the others, do you know
25 what the source of those other

1 equations is?

2 A. Just only in that paper.

3 Q. BESOL paper?

4 A. Yeah.

5 Q. Do you know who the author of
6 that was?

7 A. Couldn't remember. I think
8 it's NIOSH web page.

9 Q. All right. If we look at
10 Exhibit Five, page 96 there, the
11 report discusses strengths for eight
12 levels of increasing confinement
13 based on depth in the rib.

14 A. Okay.

15 ATTORNEY BARTON:

16 Could you repeat where
17 you are? I'm sorry.

18 MR. ZELANKO:

19 The second paragraph
20 under analysis on page 96.

21 A. Okay.

22 BY MR. ZELANKO:

23 Q. It discusses strengths for
24 eight levels of confinement based on
25 depth into the rib. Are those eight

1 levels of confinement shown in Table
2 One on the next page?

3 A. Yes.

4 Q. Who created table one?

5 A. I created.

6 Q. So you ran --- you plugged the
7 numbers into the equations. Did you
8 --- you plugged the numbers into the
9 equations and generated the table?

10 A. Yes.

11 Q. Can you describe what each row
12 includes in Table One?

13 A. What do you mean each row?

14 Q. If you pick just one row in
15 the table. Say the first one is
16 two-and-a-half.

17 A. Yeah.

18 Q. Two-and-a-half describes what?

19 A. Confined distance into rib.

20 Q. And then the next four
21 columns, what do they represent?

22 A. They represent different
23 distances into rib.

24 Q. How about the columns, the
25 next four columns?

1 A. The second column is confined
2 strengths and the third column is
3 peak strength. The first column is
4 residual strengths. The first column
5 is residual strength.

6 Q. Okay. So do they essentially
7 define strength softening, stress
8 anchor? Is that what those columns
9 are?

10 A. Yes.

11 Q. And each row, from row to row
12 the depth increases by five feet?

13 A. Yes.

14 Q. And does that correspond to
15 the center of a five-foot element?

16 A. Yes.

17 Q. So as we move down that table,
18 each row is progressively a slice
19 deeper into the pillar; is that
20 correct?

21 A. Correct.

22 Q. Why were five-foot elements
23 used?

24 A. This decision was made by Leo
25 Gilbride.

1 Q. Do you know why he chose to do
2 five feet?

3 A. No.

4 Q. Who chose a depth of
5 37-and-a-half feet?

6 A. I chose it.

7 Q. Why did you go 37-and-a-half
8 feet?

9 A. Again, this is only the
10 starting point of background
11 analysis. I didn't have too many
12 ration --- it's not a rationalized
13 two years, how deep into the rib to
14 use yield material.

15 Q. I'm sorry, I didn't follow
16 you.

17 A. It's a starting point of model
18 calibration, not --- I don't have too
19 much reason to elaborate why I used
20 37.5 feet into the rib.

21 Q. Some of these properties were
22 based on the EXPAREA experience, the
23 calibrated EXPAREA models. How deep
24 do they use yielding properties in
25 those EXPAREA models?

1 A. I don't know.

2 Q. In the written response it
3 said --- or in the document there
4 that we're looking at, Exhibit Five,
5 it says the material properties were
6 based on the calibrated EXPAREA model
7 of the sum modifications. How were
8 you provided with that information?
9 How did you receive those calibrated
10 properties?

11 A. I couldn't remember that.

12 Q. Did you have the EXPAREA
13 files?

14 A. No. No. This --- I saw the
15 EXPAREA file after I think this ---
16 only late half of last year.

17 Q. You've seen the EXPAREA files
18 for Crandall Canyon Mine this year?

19 A. No, the late of last year.

20 Q. Later last year. So you saw
21 that after the modeling work was
22 done?

23 A. Yes.

24 Q. Have you provided --- has
25 Agapito provided us with those

1 EXPAREA files?

2 A. I don't know.

3 Q. How did you see them? Who
4 provided them to you?

5 A. No, I didn't see --- I just
6 see the report. The report has data
7 input in that report.

8 Q. Oh, okay. So you didn't see
9 the input files. You just saw
10 the --- in the reports?

11 A. Yes.

12 Q. Okay. But you weren't
13 provided those before you did this
14 work?

15 A. No.

16 Q. Do you recall when you were
17 asked to do this, did someone say,
18 base the material properties on the
19 previous calibrated models?

20 A. No.

21 Q. Were you aware that there had
22 been modeling work done at Crandall
23 Canyon?

24 A. No.

25 Q. Okay. The properties that are

1 shown in Agapito's --- it's shown in
2 Table One for that Exhibit Five.
3 Were the properties in the models
4 deployed as shown on that table?

5 A. No.

6 Q. How were they deployed?

7 A. I put four layers on the
8 corner --- for the corner zones and
9 the other four layers for the rib
10 zones.

11 Q. And why were they done that
12 way?

13 A. I done that way and the
14 calibration result showed to be more
15 representative than the way showed in
16 that table. This showed the table
17 that the pillar --- the pillar always
18 yielded to about ten feet. The
19 outside pillar confinement strengths
20 is low, so --- however, I adjusted
21 this confinement core strengths. The
22 outside layers always yield, so I
23 decided to strengthen it.

24 Q. So the outside layer always
25 yielded when you used materials this

1 way, and you thought that was
2 inappropriate?

3 A. Yes, you are right.

4 Q. Okay. And why did you think
5 that was inappropriate?

6 A. Since I was told of that
7 pillar condition at the sections.
8 Thirty-six (36) is very good. There
9 is no hourglass when they develop or
10 either they retreat. There's no
11 yielding seen on the rib.

12 Q. And who told you that?

13 A. I think Leo told me that.

14 Q. Okay. If we look at Exhibit
15 17, this is the map right here, ---

16 A. Okay.

17 Q. --- the area of Section 36
18 that you calibrated to, there were
19 blocks that were left in place.

20 A. Uh-huh (yes).

21 Q. Do you have any knowledge of
22 why they left those blocks?

23 A. I think I was told that that
24 is because some minor roof falls,
25 roof failure, not because of the

1 pillar.

2 Q. But you were told that those
3 pillars was --- what was the
4 condition of the pillars as you were
5 --- that you were told?

6 A. The pillar condition is very
7 good.

8 Q. Okay. But when you did the
9 calibration, you did attempt to do
10 what? What were you trying to match
11 up to?

12 A. To match the pillar condition.
13 To try to make pillar condition very
14 good at Section 36.

15 Q. The first row you anticipated
16 would yield on retreat?

17 A. Yes.

18 Q. Okay. And so the basis of
19 that information, who told you that
20 would be representative?

21 A. I couldn't remember clearly,
22 but I think I talked this with ---
23 discussed this with Leo Gilbride.

24 Q. What's the effect of using the
25 properties the way you did use them

1 versus the way as shown in Table One?

2 A. I couldn't understand your
3 question.

4 Q. The properties in Table One
5 were developed based on empirical
6 information that's been established
7 in the literature. It's basically
8 pillar strength equations.

9 A. Yeah. I read this paper, and
10 in this paper it says that this
11 equation is only regress from three
12 miles. And these three miles are
13 Shadow Mine, I think. And it also
14 says that this equation should be
15 calibrated, shouldn't be used this
16 way --- as originally. The most
17 important thing is to calibrate this
18 equation.

19 Q. And so you used that as a
20 starting point?

21 A. Yes.

22 Q. You visited the main west
23 barrier section at Crandall Canyon
24 Mine in December of 2006. Why did
25 you go?

1 A. The objective of that trip is
2 to see something at the Tower Mine,
3 not to see the development at the
4 Crandall Canyon. Later we visited
5 Tower Mine. Then I remember Laine
6 brought us to Crandall Canyon to see
7 the development there.

8 Q. Do you recall what he said,
9 why he wanted you to go over and see
10 that?

11 A. No. No. I didn't --- I
12 didn't recall his ---.

13 Q. Three people went to Genwal
14 from Agapito. Did anyone say why
15 they wanted you to go along?

16 A. At that time, it's --- I
17 couldn't remember.

18 Q. Do you know why Leo didn't go?

19 A. No.

20 Q. Can you recall the areas that
21 you visited during that trip?

22 A. We visited north section.

23 (Yu Exhibit 14 marked
24 for identification.)

25 BY MR. ZELANKO:

1 Q. I'm going to give you Exhibit
2 14, Yu Exhibit 14. This sheet, the
3 top sheet, we've enlarged from the
4 full-size map. You have both of them
5 there to look at if you like. Did
6 you make those notes?

7 A. Doctor Hardy made these notes.

8 Q. Can you read them?

9 WITNESS REVIEWS NOTES

10 A. Not all of them.

11 BY MR. ZELANKO:

12 Q. Can you give us some idea what
13 the notes refer to?

14 A. The notes refer to very good
15 pillar and roof condition, minor rib
16 yield. The roof lies six roof bolts
17 plus mesh and 17 feet wide from
18 inside of the rib. Oh, it's 17 feet
19 wide at planning, but made the height
20 20 to 21 feet. The entrance near the
21 barrier is --- looks the same as the
22 three other entrances. This --- from
23 Crosscut 120 to Crosscut at 117
24 there's less --- no, more rib
25 sloughage than at deeper --- at

1 deeper cover.

2 Q. What were you looking for when
3 you were in there making these
4 observations? What specifically were
5 you trying to see?

6 A. I think we --- I tried to see
7 the rib/roof condition, if there is
8 any significant yielding or see any
9 indication of load override from the
10 edges in the normal gob.

11 Q. What would give you an
12 indication of those things, load
13 override?

14 A. We don't have --- we didn't
15 see any indication of load override
16 to the pillars they already
17 developed. The pillar rib looks very
18 good, and there is no yielding on the
19 ribs of the barrier. And no yielding
20 on the pillars developed.

21 Q. If there had been yielding,
22 what would that look like?

23 A. They look like an hourglass.

24 Q. Hourglass?

25 A. Yeah.

1 Q. That note says 17 feet wide
2 and then it says mid-height, 20 to 21
3 feet. Can you explain what that
4 means?

5 A. No. This 17 wide is the plan,
6 I think. But the rib there is
7 straight. There is no hourglass.

8 Q. So that doesn't describe
9 hourglassing?

10 A. I don't think so.

11 Q. Well, what did you conclude
12 from those observations?

13 A. We have issued a later trip
14 report to Crandall Canyon. And I'm
15 not clear with that conclusion right
16 now, but the main idea is the pillar
17 and the --- the pillar looks good.
18 There is no stress override from the
19 previous cul-de-sac. These are main
20 idea of that later report, but I
21 don't --- I don't recall the exact
22 words.

23 Q. I think one of the conclusions
24 --- if we look at your written
25 response to us, you concluded that

1 conditions were good with roof, floor
2 and rib conditions consistent with
3 analytical predictions. Who reached
4 that conclusion?

5 A. Me and Doctor Hardy.

6 Q. And what did you base it on?

7 A. I based it on the yielding
8 condition of the rib, the rib of the
9 barrier pillar and the development of
10 pillars.

11 Q. When you came back from the
12 trip --- this response here says it
13 was consistent with analytical
14 predictions. Did you sit down with
15 the model results and look at them
16 and compare them to what you had seen
17 underground?

18 A. I remember I saw --- I checked
19 the yielding condition in my output
20 and compared some photos that were
21 during our trip.

22 Q. So which of those LAMODEL
23 results did you rely on to make that
24 analytical comparison, stress,
25 convergence or yield?

1 A. Yield.

2 Q. Okay. Agapito made a second
3 visit in March of 2007. Were you
4 asked to go in that trip?

5 A. No.

6 Q. Why weren't you asked to go
7 then?

8 A. I don't know.

9 Q. What were you told afterward
10 about that visit?

11 A. After, I was told that there's
12 some bounce happened and they lost
13 men and that they wanted to move into
14 the south main to continue pillar
15 retreating.

16 Q. And who did you talk to about
17 those conditions?

18 A. Doctor Hardy.

19 Q. Did Leo ever talk to you about
20 those as well?

21 A. I couldn't remember Leo
22 talking to me.

23 Q. Did you ever review notes or
24 maps or photographs associated with
25 that March event or that March site

1 visit?

2 A. Yeah.

3 Q. What did you review?

4 A. I think we have a note. Leo
5 has some note, and I looked through
6 his note.

7 Q. They were just written notes
8 or notes on a map or ---?

9 A. Not on the map.

10 Q. And when you reviewed that,
11 did you discuss it with anyone while
12 you were reviewing it?

13 A. Because we were required to do
14 some further modeling of that part,
15 Doctor Hardy just let me review the
16 notes that he took and write a
17 proposal to Crandall Canyon to do
18 further modeling.

19 Q. Maybe you could just step back
20 and just think about how things
21 transpired. There's this event at
22 the mine. The mine calls Agapito and
23 requests someone to take a look.
24 Were you aware of that?

25 A. No.

1 Q. So when did you learn that
2 someone from Agapito had gone to the
3 mine?

4 ATTORNEY BARTON:

5 The last couple of
6 questions didn't really define
7 time frame. You're talking
8 about the March bump?

9 MR. ZELANKO:

10 The March bump.

11 ATTORNEY BARTON:

12 I just wanted to make
13 that clear.

14 A. I think Doctor Hardy informed
15 me of that after they conducted a
16 site visit.

17 BY MR. ZELANKO:

18 Q. And what was the context
19 of --- he tells you, yeah, we went to
20 the mine. What was the context of
21 it, to let you know that there were
22 going to be additional modeling runs
23 or to just give you some feedback on
24 a project? What was the nature of
25 the conversation?

1 A. The nature of the conversation
2 is to do further modeling.

3 Q. And what did he tell you?

4 A. I couldn't remember how that
5 happened.

6 Q. Well, was it then that he gave
7 you the notes?

8 A. Yeah. He let me see the
9 notes, yeah.

10 Q. And did he explain anything to
11 you then, give you any guidance?
12 What did he tell you?

13 A. I just remember he want me to
14 do the further modeling and to try to
15 figure out what was the cause of the
16 burst. And they asked me how much
17 time I needed to do that.

18 Q. What did you do to try to
19 address the cause of the bounce? He
20 asked you to take a look at it. What
21 did you do?

22 A. We reached the conclusion that
23 Crandall Canyon skipped some pillars,
24 especially some remnant pillars. And
25 also the gob cave-in condition is not

1 good. So that the conclusion is that
2 those two cause pillar burst.

3 Q. You say we reached that
4 conclusion. Who were you talking to
5 at that time?

6 A. I talked with Leo, discussed
7 the modeling result with Leo before
8 we issued the last report to Crandall
9 Canyon.

10 MR. ZELANKO:

11 Let's go off the record
12 for just a minute.

13 OFF RECORD DISCUSSION

14 MR. ZELANKO:

15 We've got a map here
16 we're going to enter as
17 Exhibit --- Yu Exhibit Three.
18 (Yu Exhibit Three
19 marked for
20 identification.)

21 BY MR. ZELANKO:

22 Q. Does this look familiar?

23 A. Yes.

24 Q. Is this the map that we were
25 just discussing and you said that you

1 referred to this after the March
2 visit?

3 A. Yes.

4 Q. Okay. So Doctor Hardy gave
5 you this map, you had some
6 discussion, and he says, what caused
7 this bounce. And you looked at the
8 map. What did you do?

9 A. He said what maybe may cause
10 the bounce. He was not sure what had
11 caused the bounce at that time. What
12 I think is sought at that time is to
13 continue to use the model we build
14 before and change the geometry of
15 remnant pillars and then to do some
16 analysis.

17 Q. And what did you conclude?

18 A. I think you're referring to
19 the third report; right?

20 Q. It's Exhibit Seven. The April
21 18th report, is that the one?

22 A. Yeah. The conclusion was made
23 by Leo Gilbride after he reviewed all
24 the figures, modeling figures.

25 Q. And what was that conclusion?

1 A. It's not clear from this.

2 Q. Doctor Hardy asked you to look
3 at this and consider this sketch, and
4 draw some conclusion about what might
5 have happened to cause that; is that
6 correct?

7 A. Correct.

8 Q. What did you conclude?

9 A. I thought it's because the
10 panel is narrow and the caving of the
11 gob is not good, so it transfer more
12 load on the pillars that lay between
13 two gob areas. So this cause stress
14 concentration on the edge of the rib
15 and then cause coal burst.

16 Q. And what do you base that
17 conclusion on?

18 A. Just this receded panel. I
19 didn't see the subsidence data of
20 this receded panel. So then I
21 thought maybe it's because of this
22 gob. Gob caving is not good.

23 Q. So you didn't have subsidence
24 data to confirm what the gob behavior
25 was?

1 A. No.

2 Q. But you felt that gob caving
3 behavior had some influence ---

4 A. Yes.

5 Q. --- based on --- what did you
6 base that on?

7 A. And when Doctor Hardy and Leo
8 conducted the --- saw some --- they
9 go inby the bleeders and saw some
10 locations that the cave --- the roof
11 had not caved in, had not caved in.
12 Even they saw some stumps in the gob.

13 Q. Did you do any models to
14 indicate what the impact of that
15 might have been?

16 A. Hua did that part of the
17 model, Hua Zhao. She adjusts the
18 input of the geometry as Leo drewed
19 on this map, and he used the inputted
20 data I used in the second project.

21 Q. Once you saw this --- not the
22 photographs, but this map and you saw
23 the extent of the --- well, let me
24 ask you. What do those lines
25 represent to you, for example,

1 surrounding Number 44? There's a
2 circle surrounding 44. What does
3 that indicate to you?

4 A. I think this indicates that
5 depths of rib burst. This circle
6 represents still competent pillar
7 core.

8 Q. And how did you conclude that?
9 Did somebody tell you that's what
10 that ---?

11 A. Yeah. Either Leo or Doctor
12 Hardy told me that.

13 Q. And did you mention competent
14 core?

15 A. Yes.

16 Q. Who indicated it was a
17 competent core?

18 A. I think that's Leo Gilbride.

19 Q. Do you know how they concluded
20 that?

21 A. No.

22 Q. Did the results that you saw
23 here when you see the yield and the
24 extent of it, did it cause you to
25 reassess the validity of the

1 calibrated model?

2 A. You mean the input parameter
3 --- input ---?

4 Q. Yeah, of the calibrated model.

5 A. We first run a model and see
6 the stress around this pillar are
7 very high. The pillar yielding
8 condition in the model output is
9 consistent with the actual pillar
10 yielding condition.

11 Q. Okay. Can you take a look at
12 the April 18th report. I can't
13 recall the exhibit number.

14 A. Seven.

15 Q. Exhibit Seven. Okay. And
16 let's look at --- let's see if we can
17 find a ---. Which of the output
18 values for LAMODEL would you say
19 would be best to try to correlate
20 with the observed conditions there?

21 A. I thought this yield condition
22 here and also the burst around this
23 mining area.

24 MR. ZELANKO:

25 For the record ---

1 sorry to interrupt you, but
2 for the record, we're looking
3 at Figure Three in Exhibit
4 Seven. It's modeled coal
5 yielding. It's showing the
6 yield condition of the model
7 for both the north section,
8 where the March event
9 occurred, as well as the
10 projections for the south
11 barrier.

12 BY MR. ZELANKO:

13 Q. And so you looked at this
14 model. How did you compare this
15 model with the observed conditions?

16 A. Mainly the yield condition
17 around the pillar rib, this yield and
18 this also burst here, the corners,
19 all the corners here.

20 Q. And you were satisfied that
21 that figure matches pretty much what
22 they saw underground?

23 A. Yeah, I was satisfied with it.

24 Q. How well do you think it
25 matches in the Number Four entry,

1 which is --- these are numbered left
2 to right. One, two, three, four
3 would be the northernmost entry.

4 A. Uh-huh (yes). This part not
5 match very well.

6 Q. Was there any discussion about
7 modifying the model further to try to
8 get a better match to what you saw in
9 the north?

10 A. No.

11 Q. Why not?

12 A. I don't know.

13 Q. What was the --- when doctor
14 Hardy says, take a look at this, what
15 caused the bump, did you consider
16 running more models to see if you
17 could match that configuration to
18 damage?

19 A. Actually, we cut the gob back
20 one pillar to try to allow more load
21 transferred to the pillars adjacent
22 to the gob.

23 Q. So that was a change. You
24 altered the model to try to match
25 these results better ---

1 A. Yes.

2 Q. --- by making a hanging gob;
3 is that a fair summary?

4 A. Correct.

5 Q. And how much --- but those
6 results that we're looking at there
7 in Figure Two incorporate that
8 change; is that correct?

9 A. Yes. It is Figure Three.

10 Q. And we still have some areas
11 in there that we agree don't match up
12 very well with the observed
13 conditions?

14 A. Well, since this boundary has
15 greater --- black boundary here, I
16 didn't see the yield condition very
17 well from this figure. I think it's
18 representative very well.

19 Q. Okay. Did you recognize any
20 discrepancy between the model and the
21 actual conditions in the Number Four
22 entry before you issued your report?

23 A. I missed your question.

24 Q. The discrepancy that we just
25 talked about earlier, ---

1 A. Uh-huh (yes).

2 Q. --- did you notice that before
3 you issued the April 18th report?

4 A. I didn't issue the report. I
5 think it's Leo who issued the report.

6 Q. Well, before Leo issued it,
7 did you ever have any discussions,
8 say, --- did he ask you your opinion,
9 how well do you think it matches?

10 A. I couldn't remember.

11 Q. What were the effects --- when
12 you changed the gob parameters ---
13 essentially when you looked at these
14 results and you talked to the guys
15 that were at the mine, you felt
16 compelled to make changes to the
17 model; is that correct?

18 A. Pardon me? I'm sorry.

19 Q. That's all right. Do we need
20 to take a break?

21 A. Yeah.

22 Q. I'm awfully warm, too.

23 MR. ZELANKO:

24 Let's take a
25 five-minute break.

1 SHORT BREAK TAKEN

2 BY MR. ZELANKO:

3 Q. We're back on the record. Go
4 ahead.

5 A. This color, the yielding
6 condition is overlapped on the edge
7 with black lines. Those black lines
8 indicate the boundary of the pillar.
9 So that the actual yielding condition
10 here at the edge is not black. It's
11 actually yield to here. And this ---
12 I'm not sure how wide this line is,
13 but this black line is not yielding
14 condition. I wanted to clarify that.

15 ATTORNEY BARTON:

16 Do you follow what he's
17 saying? I think what --- the
18 one question you said, does
19 this reflect the map, and he
20 said, no, I agree with you, it
21 doesn't. And then the next
22 question he said, I think it
23 does show some yielding. And
24 then another question he said,
25 well, they don't match up.

1 And then over the break, he
2 asked me to have the chance to
3 clarify that.

4 MR. ZELANKO:

5 Okay. Well, we can
6 explore it right now so
7 there's no confusion.

8 BY MR. ZELANKO:

9 Q. Let's look at the map that you
10 provided --- or that Doctor Hardy
11 provided you upon his return from the
12 March trip. And we see these pillars
13 marked as 43, 44, and they correspond
14 to the pillars in the model between
15 the two gob areas, the very center
16 row of the three.

17 ATTORNEY WILLIAMS:

18 On Figure Three,
19 Exhibit Seven; right?

20 MR. ZELANKO:

21 Figure Three, Exhibit
22 Seven, yes.

23 BY MR. ZELANKO:

24 Q. And I would ask you --- I see
25 --- what do you see in here, in these

1 pillars, 43, 44?

2 A. I was told that this --- this
3 sloughage here only --- less than
4 five feet into the rib.

5 Q. So we're talking about the
6 pillar between entry three and four
7 just north of the pillar marked 44.
8 You said that was less than five
9 feet?

10 A. Yes.

11 Q. And who told you that?

12 A. I think Leo told me that. And
13 also the yielding condition of the
14 barrier pillar rib. The model shows
15 here actually yielded to about one or
16 two element here. See, this yield
17 here? It's all 100-percent yield.

18 COURT REPORTER:

19 Can you repeat that,
20 sir? We missed it with the
21 door.

22 A. This yield condition here,
23 this element.

24 BY MR. ZELANKO:

25 Q. Excuse me. We got to stop.

1 Rich missed ---. You were describing
2 the yellow, I believe.

3 A. The yellow and the red and the
4 orange here.

5 ATTORNEY WILLIAMS:

6 Can you restate what
7 you just said about that?

8 A. In this figure, Figure Three,
9 yellow, orange and red colors
10 indicate the coal already yield. And
11 the figure shows the yielding
12 condition is consistent with the
13 observation in site visit.

14 BY MR. ZELANKO:

15 Q. With that in mind, can you
16 tell me how much different is that
17 condition on pillars further outby?
18 I see some yellow around those
19 pillars as well; is that correct?

20 A. Yes.

21 Q. To what depth would you say
22 that that's occurring?

23 A. 2,200.

24 Q. I'm sorry. The depth into the
25 pillar rib that the yielding is

1 occurring?

2 A. One element.

3 Q. One element. And you're
4 basing that on?

5 A. On the color ---

6 Q. Okay.

7 A. --- on the edge here.

8 Q. And how much different then is
9 that, the condition of the pillar
10 ribs out around Crosscut 130 in the
11 Number Four entry versus the one in,
12 say, between 134 and 135?

13 A. 134 and the 136 --- the rib
14 here that looked like it has two-
15 element yield.

16 Q. Two-element yield in the
17 crosscuts?

18 A. Yeah, in the crosscut.

19 Q. In the Number Three entry,
20 what could you say about the Number
21 Three entry? Is there a substantial
22 difference between the conditions in
23 these pillars, 130, 131, 132, and
24 these pillars in this between ---
25 adjacent to Crosscut 134?

1 A. I couldn't understand your
2 question.

3 ATTORNEY BARTON:

4 Does the model show us
5 any big difference, these
6 pillars over here versus these
7 pillars over here?

8 BY MR. ZELANKO:

9 Q. In that Number Four entry.

10 A. Just the Number Four entry,
11 right?

12 Q. That's correct.

13 A. I couldn't see too much
14 difference.

15 Q. And yet when I look up here
16 and I look at these ribs, I see
17 substantial amounts of damage,
18 particularly in this area. Does that
19 indicate a great deal of damage to
20 you and this map, the area, in Number
21 Four entry between 133 and 136?

22 A. Not great damage.

23 Q. Not great damage?

24 A. No. See here, this three
25 feet, there's only three feet of

1 sloughage into this rib.

2 Q. And three feet is not
3 significant?

4 A. No, three feet is not
5 significant.

6 Q. I can't tell if that says
7 three feet sloughage or --- I
8 actually can't read it.

9 A. I think Leo can also use the
10 expression ---.

11 Q. And the reason I say that is
12 that some of these indications in
13 here are the amount of coal piled in
14 the entries. As a matter of fact, I
15 believe you do have a key ---.

16 MR. GAUNA:

17 9956 of Exhibit One.

18 A. I think nobody can answer this
19 question very clearly, more clear
20 than Leo.

21 BY MR. ZELANKO:

22 Q. Yeah. It says three feet out.
23 We asked for an explanation of these
24 terms or, you know, to tell us what
25 the term said, and that particular

1 term says three feet out. Okay. I'm
2 not sure I follow what you said,
3 Doctor Yu. You said you don't think
4 anyone could make ---?

5 A. I don't think anyone could
6 make more clear explanation of this
7 note than Mr. Leo Gilbride.

8 Q. Okay.

9 MR. ZELANKO:

10 Can we go off the
11 record a minute?

12 OFF RECORD DISCUSSION

13 BY MR. ZELANKO:

14 Q. Agapito's mine visits
15 indicated that UtahAmerican had
16 implemented a plan that you
17 evaluated, with the exception of
18 leaving some pillars. When did
19 Agapito first advise the company not
20 to leave pillars?

21 A. I don't know. Some
22 recommendations from the third
23 report.

24 Q. From the which report?

25 A. The third report.

1 Q. Third report?

2 A. Uh-huh (yes).

3 Q. Why should they avoid skipping
4 blocks?

5 A. Based on what I learned, that
6 if you do remnant pillar or pillars,
7 between the gob was in that --- the
8 other pillar, you have more load and
9 taking more load, that's a risk for
10 coal burst, trigger coal burst.

11 Q. And you said based on what you
12 learned. Where did you learn that or
13 how did you learn that?

14 A. From the --- all the examiners
15 and the conference and also all the
16 papers I write.

17 (Yu Exhibit Seven
18 marked for
19 identification.)

20 BY MR. ZELANKO:

21 Q. In Exhibit Seven there's a
22 distinct recommendation to avoid
23 skipping blocks. It's, I think, the
24 next-to-the-last sentence in the
25 text.

1 A. Yes.

2 Q. It says, skipping pillars
3 should be avoided in the south
4 barrier, particularly under the
5 deepest cover. What does under the
6 deepest cover mean?

7 A. Under deepest cover, what I
8 understand that here is deepest cover
9 will put more load on a pillar so
10 that make the pillar more burst-prone
11 than the other area.

12 Q. What does under the deepest
13 cover mean? If you're saying don't
14 do this particularly under the
15 deepest cover, you're putting the
16 company on alert not to do something.
17 But what would be the level that you
18 would consider deepest cover?

19 A. I think this question I
20 couldn't understand --- I couldn't
21 answer this question.

22 Q. You never had any discussions
23 with anyone about that aspect of the
24 report?

25 A. No.

1 Q. I think I failed to mention
2 earlier, do you actually review the
3 reports before they go out?

4 A. Not the third one.

5 Q. But you did review the first
6 two before they were issued to the
7 company?

8 A. I couldn't remember.

9 Q. Is it typical that you do?

10 A. Normally the project manager
11 reviews the report.

12 Q. But he wouldn't come back to
13 you and say, this is what we're going
14 to put out before it's released, can
15 you take a look at it? That's not
16 typical, or it is?

17 A. Sometimes the project manager
18 did this, but sometimes they just
19 listen to all the reports.

20 Q. So it's not a company policy
21 to always do that, it's just ---?

22 A. No.

23 Q. Did you write any of these
24 recommendations regarding skipping
25 pillars or not skipping pillars?

1 A. No.

2 Q. Do you know if Agapito ever
3 clarified that statement, what under
4 the deepest cover means to Genwal?

5 A. I don't know. I don't know.

6 Q. All right.

7 (Yu Exhibit 15 marked
8 for identification.)

9 BY MR. ZELANKO:

10 Q. Can we go back to --- this is
11 Yu Exhibit 15. It's the August 9th
12 report. On page 136 ---.

13 UNIDENTIFIED SPEAKER:

14 I don't think we have
15 that.

16 MR. ZELANKO:

17 No. I'm going to give
18 it to you here now.

19 BY MR. ZELANKO:

20 Q. This is the --- I guess you
21 call these memo or e-mail reports
22 that was sent from Leo Gilbride to
23 Laine Adair. Are you familiar with
24 this one?

25 A. No.

1 Q. Well, in this particular
2 report, and you can read it for
3 yourself, one of the conclusions was
4 that the mining plan and pillar
5 layout, as proposed, are considered
6 viable. The plan affords the
7 contingency to leave occasional
8 pillars for protection during retreat
9 if conditions warrant, thus providing
10 additional control over geotechnical
11 risks.

12 A. This is Leo's comment. I
13 think it's better to address this
14 question to him. I don't know.

15 Q. You didn't review this before
16 it went out?

17 A. No.

18 Q. Do you agree with that, that
19 that --- do you agree with that
20 statement?

21 A. I have no comment on that.

22 ATTORNEY WILLIAMS:

23 Do you have no comment
24 because you don't understand
25 or do you just not ---?

1 A. I couldn't answer that
2 question.

3 ATTORNEY WILLIAMS:

4 You don't know?

5 A. I don't know.

6 BY MR. ZELANKO:

7 Q. Can we go back to the July
8 20th report, which is Exhibit Five?
9 Let's look at Table One again. Just
10 so I'm clear, that table reflects
11 layers that are five foot --- at
12 five-foot intervals from the skin of
13 the pillar in towards the core; is
14 that correct?

15 A. Yes.

16 Q. And the basis of those are the
17 pillar strength --- empirical pillar
18 strength equations that you said were
19 related to a paper on BESOL?

20 A. Uh-huh (yes).

21 Q. And did you do those
22 calculations and prepare the table?

23 A. Yes. But this --- as I
24 mentioned before, this is the start
25 point of calibration, so I modified

1 this data later.

2 Q. And how was it modified later?

3 A. I put four layers on the
4 corner zones and I put four layers on
5 the rib zones.

6 Q. Okay. And how did you decide
7 what the values should be on the
8 corners and on the sides?

9 A. When I start modeling, I use
10 this as a start point and all this
11 data subject to modification. And
12 the output of calibration model to
13 compare it to the field experience
14 and then come back to further modify
15 this data.

16 Q. Okay. So you decided that the
17 original scenario, this Table One
18 that was prepared, didn't fit.

19 A. Didn't fit.

20 Q. Right. So you chose to change
21 those properties. And I guess what
22 I'm saying is what's the basis
23 for --- how did you choose the
24 properties that you did use? Which
25 properties did you use?

1 A. All the properties I used, but
2 I switched some of it, like a weaker
3 --- weak strengths on the --- as the
4 corners on some layers and the rib
5 zones.

6 Q. Well, is there a corrected
7 table then? This table isn't
8 corrected; is that right?

9 A. It's inconsistent with model
10 coding.

11 Q. Okay. Have you got a
12 corrected table?

13 A. No.

14 Q. No.

15 ATTORNEY WILLIAMS:

16 Why was the table left
17 in the report?

18 A. I don't know.

19 BY MR. ZELANKO:

20 Q. Well, when did you discover
21 that this table wasn't correct?

22 ATTORNEY WILLIAMS:

23 Was it after we
24 interviewed Doctor Hardy?

25 A. Yes.

1 BY MR. ZELANKO:

2 Q. With regard to equation one in
3 that same --- I think it's on the
4 page before, yeah, what coal strength
5 --- the distribution of properties
6 that's in Table One, regardless of
7 how they were deployed, would
8 correspond to what coal strength?
9 What coal strength was put into that
10 equation? Is it S1?

11 A. I put several numbers there.
12 I couldn't remember the exact number
13 I put. But after increasing the
14 numbers to 1,640, then the model
15 output is representative to field
16 experience.

17 Q. Okay. If you go back to Table
18 One then, that equation is consistent
19 with a 1,640 PSI coal strength. So
20 as I understand it, those parameters
21 would define pillar strength
22 consistent with that 1,640. But you
23 chose to use some in corner elements,
24 if I understand you correctly, and
25 some as rib elements; is that

1 correct? The same properties in
2 Table One, but they're deployed
3 differently?

4 A. Yeah, this --- as I mentioned
5 before, the author of this equation
6 emphasized that this equation only
7 has limited data --- regressed from
8 limited data, and it should be
9 calibrated with site-specific
10 experience.

11 Q. So how many different ways did
12 you deploy the properties until you
13 settled on this was the right way to
14 do it to match the field conditions?

15 A. One.

16 Q. All right. Let's look at
17 Figure 20 in that same report. I
18 think it's page 121. Is Figure 20 a
19 cross-section through a portion of
20 Figure 14? If you look at Figure 14
21 there's a line there that indicates
22 Cross-Section 8A.

23 A. Yes.

24 Q. And you prepared that
25 cross-section?

1 A. Yes.

2 Q. And why did you do a
3 cross-section through there?

4 A. Leo asked me to do a
5 cross-section through there.

6 Q. Let's look at the scale.
7 Well, do you know why he wanted to
8 see a cross-section?

9 A. He wanted to see the load
10 transfer.

11 Q. And by that you mean --- what
12 do you mean the load transfer? What
13 would he have been looking at in that
14 figure?

15 A. The load in the gob and the
16 load in the barrier pillar.

17 Q. And would he have been looking
18 at --- what aspect of that, the peak,
19 the distance, what --- did he
20 indicate to you what he was looking
21 at?

22 A. No.

23 Q. When you're doing this kind of
24 modeling work, what would you be
25 looking at?

1 A. I couldn't understand this
2 question. We already output stress
3 and the convergence and also yield
4 condition. This all goes into the
5 load in a typical project.

6 Q. What's the highest level
7 there, just roughly, in that figure?

8 A. It's 35.

9 Q. And in Figure 14, if you go
10 back to that, what's the highest
11 range on the scale?

12 A. I think it's 10,000.

13 Q. Is that --- do you see any
14 problem with that? Is it really
15 9,000 to 10,000 PSI, the red?

16 A. The red is actually 9,000 PSI
17 and above.

18 Q. And can you tell from that
19 figure what the peak stresses are and
20 where they occurred?

21 A. No.

22 Q. And what's the lowest range?

23 A. Pardon me.

24 Q. What's the lowest range in
25 that scale?

1 A. It's 0 to 1,000.

2 Q. And so the accuracy you can
3 tell gob stress in that figure is 0
4 to 1,000; is that correct?

5 A. Yes.

6 Q. All right. What's the purpose
7 of using material --- yielding
8 material properties in a boundary
9 element model?

10 A. What I want to use --- I want
11 to use the yield condition of the
12 pillar compared with field
13 experience.

14 OFF RECORD DISCUSSION

15 BY MR. ZELANKO:

16 Q. We were talking about Table
17 One and the --- and how those values
18 were determined and what the basis
19 for the S-1 value, the coal strength
20 would be in that equation. Let me
21 just ask, the distribution that you
22 did do, did you ever go back and see
23 what coal strength would correspond
24 to the distribution that you used?

25 A. I found this equation is

1 different from the equation that
2 LAMODEL used and that default --- the
3 default material in LAMODEL is
4 elastic and plastic material, and
5 this one is strength-softening
6 material. So I compared the residual
7 strengths of this one with plastic
8 and --- with strengths of coal in
9 LAMODEL that I found is similar, the
10 value --- magnitude of residual
11 strengths is similar to the default
12 value in LAMODEL.

13 Q. Let me make sure I understand
14 that right. You compared residual
15 values for these strength-softening
16 properties the way you deployed
17 them ---

18 A. Uh-huh (yes).

19 Q. --- with the plastic stress
20 level in the elastic/plastic model
21 that's available in LAMODEL?

22 A. Yes.

23 Q. And they were consistent?

24 A. Yes, similar. The difference
25 is not too much.

1 Q. Okay. So can you give me an
2 example? In Table Two --- or Table
3 One, what parameter did you use for
4 the deepest element? What's the
5 deepest rib element that you used,
6 the strength, peak and residual?

7 A. Peak and residual is 11,896.

8 Q. All right. So you compared
9 that with the elastic/plastic, which
10 would be the peak for that level,
11 using LAMODEL?

12 A. Yes.

13 Q. And they were similar?

14 A. Yes.

15 Q. So then --- are you saying
16 then that the basis for making those
17 changes that you made to the original
18 table one, you based it on the
19 formulas available in LAMODEL for an
20 elastic/plastic?

21 A. Yes.

22 Q. Okay. And that 118960, what
23 distance would that be as you used it
24 in your model from the rib?

25 A. I think it's 20 feet.

1 Q. Twenty (20) feet, okay. The
2 July 20th letter discusses yielding
3 in the skin all the way around the
4 pillar split. The pillar cores
5 remain competent. What was the basis
6 for determining that the cores are
7 competent?

8 A. I think based on the stress.
9 The stress in the pillar core are
10 small.

11 Q. Was there some threshold that
12 you looked for there to say that this
13 pillar --- I looked at this stress
14 level and this pillar core is
15 competent?

16 A. No.

17 Q. But it's important that it's
18 low?

19 A. Yeah. You can see from this
20 profile 8A and the stress in the
21 pillar core are I think less than
22 3,000.

23 Q. Less than 3,000?

24 A. Yeah.

25 Q. Was that a number that you

1 used to make that conclusion in this
2 July letter?

3 A. No. I couldn't understand
4 you. Since this one here, this ---
5 it didn't yield to the pillar center
6 here, so that's --- that's the basis
7 for that conclusion.

8 Q. That it didn't yield to the
9 center?

10 A. No, it didn't yield to the
11 center.

12 ATTORNEY BARTON:

13 I think you all said
14 the same thing.

15 MR. ZELANKO:

16 Did we say the same
17 thing?

18 ATTORNEY BARTON:

19 I don't know. I
20 thought you did.

21 BY MR. ZELANKO:

22 Q. It did not yield to the
23 center?

24 A. This one here at the rib
25 didn't fully yield here. So this

1 center here won't yield. Yield
2 should be first yield to the rib; all
3 right?

4 Q. Right.

5 A. The rib has not yielded in the
6 center. The rib is not fully yield.

7 Q. So the basis for this
8 determining that the --- or the core
9 is stable, you're saying, is because
10 the rib wasn't fully yielded?

11 A. Yes.

12 Q. So you're saying the
13 peaks --- so are you saying that as
14 long as the peak stress is occurring
15 in the yield zone, then you know that
16 the core is stable?

17 A. If it all yielded to the core
18 here, then we should say that the
19 core is prone to yield. But the
20 joints that surround the pillar core
21 are not yield.

22 Q. Okay. And is it true then
23 that the opposite or the converse
24 would be true, that if you did see
25 yield ---

1 A. To the center.

2 Q. --- all the way in, what would
3 that --- what conclusion would you
4 reach about the core?

5 A. If it all --- yielded all the
6 way to the pillar core, then the
7 pillar core is --- I think it's
8 possible to yield.

9 Q. Okay. Just so that we're
10 sure, can we get out Exhibit Four
11 again, just so I'm clear? Sorry to
12 keep doing this to you. Can you
13 switch to one of your files back
14 there? And what's the title of the
15 file there at the top?

16 A. It's just Genwal.

17 Q. Genwal?

18 A. Yeah.

19 Q. Okay. Do the groups of
20 letters at the bottom there represent
21 the grid? The first 18 rows or so, I
22 believe, are input properties,
23 material properties, control
24 parameters for the program. But the
25 bottom part, do those represent the

1 LAMODEL grid?

2 A. Yes.

3 Q. And do the ones represent
4 entries?

5 A. Yes.

6 Q. And does it appear to you that
7 those are five-foot elements?

8 A. Yes.

9 Q. Okay. So if we were to
10 compare the placement of those
11 elements with the original --- Table
12 One in that other document, ---

13 ATTORNEY WILLIAMS:

14 Table One in Exhibit
15 Seven?

16 MR. ZELANKO:

17 I believe it's Seven.

18 A. This one; right?

19 BY MR. ZELANKO:

20 Q. Yeah, that's it.

21 ATTORNEY BARTON:

22 Exhibit Five.

23 BY MR. ZELANKO:

24 Q. Exhibit Five. And the deepest
25 yielding element is what letter,

1 Doctor Yu?

2 A. It's B.

3 Q. B. So which of those letters
4 in the table corresponds to the
5 letter B?

6 A. It's low.

7 Q. What's the peak stress for
8 that row?

9 A. It's 14,562.

10 Q. So the row that Table One
11 indicates is 37-and-a-half feet into
12 the rib ---

13 A. Yes.

14 Q. --- is the one that's
15 indicated in the grid there as being
16 --- how far is it in the actual grid
17 there?

18 A. Twenty (20) feet into the rib.

19 Q. Twenty (20) feet, okay. And
20 there's no letter A in Table One, but
21 there are letters A in the grid.
22 What does letter A represent?

23 A. Elastic.

24 Q. Elastic properties, okay. All
25 right. If we can go now to Exhibit

1 Five on page 116, at the bottom of
2 that, the main west pillars are shown
3 as 70 by 72.

4 A. Yes.

5 Q. What's the yield condition in
6 the center of those pillars?

7 A. The center pillar is elastic.

8 Q. And what's --- so the center
9 of those are elastic. So if you were
10 trying to evaluate this model to see
11 whether that system was competent or
12 not, how do you make that distinction
13 between a competent pillar and one
14 that might become unstable?

15 A. I couldn't answer this
16 question. What's your question?

17 Q. The question is, when you're
18 doing these models and you're looking
19 at this, at some point the purpose is
20 to evaluate the stability of the
21 workings. And you're looking at
22 these pillars and their elastic
23 cores, and I'm saying how do you make
24 a determination as to the stability
25 of those pillars?

1 A. I think this --- the main
2 objective --- the main problem at
3 Genwal is just roof, I think is the
4 roof stability. When I conduct this
5 modeling, I never saw the pillar
6 collapse. So this pillar was too
7 hard, is very large. I never saw it
8 not as stable --- I never saw it real
9 unstable.

10 Q. The focus was --- the focus of
11 the modeling effort was what?

12 A. Is not the stability of these
13 pillars. It's if there are any large
14 convergence of the drift.

15 Q. So when you were asked to
16 evaluate this design, what did you
17 think --- what was the purpose of
18 this study? What was the goal?

19 A. The goal is to clear the
20 stress condition and also the
21 convergence.

22 Q. And how was that to be used?
23 What was the purpose? Why did you
24 look at that?

25 A. Can we have a break?

1 Q. Sure.

2 SHORT BREAK TAKEN

3 BY MR. ZELANKO:

4 Q. In your written response to
5 us, Agapito stated that the
6 conditions that were observed in one
7 part of the mine were attributed in
8 part to a relatively mature cave in
9 the north panels, resulting in
10 partial alleviation of the original
11 peak abutment loads. And if you need
12 to refer to that, it's 9967.

13 ATTORNEY BARTON:

14 In Exhibit One?

15 MR. ZELANKO:

16 In Exhibit One.

17 ATTORNEY BARTON:

18 Which question?

19 MR. ZELANKO:

20 It's talking about
21 mature cave. I didn't write
22 the question down.

23 ATTORNEY BARTON:

24 It's Question 60.

25 WITNESS REVIEWS DOCUMENT

1 A. Yes.

2 BY MR. ZELANKO:

3 Q. Are you familiar with that
4 term, mature cave, as it's used
5 there?

6 A. Yes.

7 Q. What are the effects of the
8 mature cave on abutment stress and
9 gob load?

10 A. Mature cave, that means the
11 gob take followed overburden. And
12 that's less stress load transferred
13 to the barriers.

14 Q. Okay. In Figure 20, in that
15 Exhibit Five, we were looking at the
16 cross-section on page 121 --- Exhibit
17 5, page 121. You said the mature
18 cave was --- you would expect what
19 kind of gob loading?

20 A. Follow overburden.

21 Q. In that figure, when we look
22 at the right side of Figure 20, can
23 you estimate what the gob load is
24 that's illustrated in that figure?

25 A. The gob load is very low here.

1 Q. Can you explain that? Well,
2 is that consistent with a mature
3 cave?

4 A. No. The objective of this
5 modeling here, it was to see how much
6 load on the barrier. So the gob
7 stiffness --- yields a low value for
8 gob stiffness.

9 Q. But that is a cross-section
10 through the actual model that you
11 used; is that correct?

12 A. Yes.

13 Q. Did you have any concern that
14 the good conditions that you
15 observed, you attributed to a
16 relatively mature cave, but the model
17 doesn't reflect the mature cave?

18 A. No.

19 Q. Why not?

20 A. Since the model wants to see
21 more load on the barrier, so that the
22 gob stiffness --- I use low gob
23 stiffness.

24 Q. You intended to use the low
25 gob modulus?

1 A. This default value in FLAG ---
2 no, in LAMODEL, default of gob
3 material in LAMODEL.

4 Q. How do you --- can you explain
5 to me in the version of LAMODEL that
6 you have how you generate those
7 properties? I'm not familiar with
8 that default value.

9 A. The default value is obtained
10 from LAMPRE.

11 Q. Okay.

12 A. When you click on the type of
13 gob material, ---

14 Q. Okay.

15 A. --- you input some parameters,
16 like gob height factor, mining
17 height, and it will give you a gob
18 material property.

19 Q. And that's how you generated
20 the 2,180?

21 A. Yeah.

22 Q. Do you recall what those other
23 parameters were that you put in?

24 A. No, I don't.

25 Q. Okay. We started to talk

1 about this on page 100 of that same
2 exhibit, the July 20th letter. It
3 discusses yielding in the skin all
4 the way around the pillars, but the
5 pillar cores remain competent. Can I
6 ask you, what was the basis for
7 determining the cores? Can you
8 explain that to me again? It's page
9 100. I hate to keep jumping around,
10 but I think you can ---.

11 A. You want to ---?

12 Q. If you've familiarized
13 yourself with it, I guess I'm going
14 to ask again. What was the basis for
15 determining --- first of all, I'm a
16 little bit confused about the goal.
17 You had said earlier it was more roof
18 stability oriented, I think, ---

19 A. Yes.

20 Q. --- but not so much looking at
21 wide-scale pillar failure. But this
22 statement addresses the competency of
23 pillar cores, and so my question is,
24 what was the basis for looking at
25 pillar core competency? And I think

1 you had said at one point it was
2 stress, stress-based, you looked at
3 the stress levels. You indicated
4 maybe 3,000 PSI was a level. But was
5 that the level that was used? Was
6 there a threshold established to look
7 at core stress?

8 A. No.

9 Q. Okay. And then you said ---
10 my understanding of what you said was
11 that if you looked at that profile,
12 as long as the yielding was outside
13 --- as long as the high stresses were
14 in the yield zone and those zones had
15 fully yielded, that you would expect
16 the core to be competent. But if
17 they were fully yielded, then the
18 core could be compromised; is that
19 correct?

20 A. Yes.

21 Q. So in what way --- how did you
22 evaluate that to reach this kind of a
23 conclusion that the pillar cores were
24 incompetent? If you're looking at
25 the yield zone, which of these figure

1 or what analysis did you do to reach
2 this conclusion?

3 A. If looking at this yield zone
4 --- if the yield zone --- this looked
5 like only one element of yield here.
6 If there are more than one element of
7 yield, then the center may be, you
8 know, ---.

9 Q. So we're looking at Figure 15
10 in the July 20th report. And you're
11 indicating that those pillars at the
12 bottom, the 70 by 72-foot pillars in
13 the main west, you're --- go ahead
14 and indicate how you're interpreting
15 the ---.

16 A. If there are more than one
17 layer, those yield, then the pillar
18 center may be compromised or has the
19 potential to yield.

20 Q. Okay. So if more than --- you
21 say two, two rows, or how many?

22 A. More than two, I think.

23 Q. More than two. Okay. Then in
24 the --- if we look at the April 18th
25 report then ---.

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ATTORNEY WILLIAMS:

Exhibit Seven.

BY MR. ZELANKO:

Q. If you look at that last page and see what Exhibit Number that is.

ATTORNEY WILLIAMS:

Seven.

BY MR. ZELANKO:

Q. If we look at these pillars, for example, inby the retreat line in --- I'm looking at Figure Six, Exhibit Seven, what would you conclude about the cores of these pillars that are inby the retreat line in both the retreat line in both the north and south barrier?

A. It would be yield, totally yield.

Q. So what does that suggest about the competency of those pillars back in that bleeder entry?

A. It would yield, yeah.

Q. So in terms of this sort of a statement that the pillar cores remain competent, would you

1 anticipate that those would remain
2 competent?

3 A. No. No, this won't.

4 Q. Is that the same for the
5 south, the pillars in by the gob line?
6 What would you say about the cores
7 down there?

8 A. Yeah, I think it will yield in
9 the model.

10 Q. In this particular model, can
11 the elastic elements fail?

12 A. No.

13 Q. If we have yielding material
14 properties that comprise the whole
15 pillar, whether they be strength
16 softening or elastic/plastic, what
17 does that do to the pillar
18 load-carrying capability if we use
19 yield properties or, you know --- at
20 some point there's a peak. Can that
21 pillar fail?

22 A. Based on my experience, this
23 pillar won't fail to the center, to
24 the core. This pillar, the
25 width-to-height ratio is about seven

1 or larger than seven.

2 Q. Is that true for any depth?

3 A. I'm not sure.

4 Q. I recognize the width-to-
5 height ratio affects pillar strength,
6 but I'm just trying to get a handle
7 on how you relate the width-to-height
8 ratio of seven to not failing the
9 pillar. What's the basis for that?

10 A. This is based on NIOSH's
11 database. They have 12 cases of
12 pillar failure --- catastrophic
13 pillar failure. But all the
14 width-to-height ratio of those cases
15 are less than four.

16 Q. Those failures were mass
17 pillar collapses?

18 A. Yes.

19 Q. You're referring to criteria
20 that NIOSH put out for preventing
21 massive pillar collapses?

22 A. Yes.

23 Q. Is a massive pillar collapse
24 the same thing as a bump?

25 A. No.

1 Q. How are they different?

2 A. Bump is coal outburst on the
3 pillar rib. But a pillar collapse is
4 the pillar loses loading capacity.

5 Q. So would that same criteria
6 apply to a large-scale bump?

7 A. What?

8 Q. The width-to-height ratio of
9 four and under, the stability factor
10 less than 1.5, the criteria that
11 NIOSH put out for massive pillar
12 collapses, would it also --- I think
13 you said the two were different,
14 pillar collapse versus a bump.

15 A. It's different.

16 Q. That's different. So would
17 the criteria then --- would it say
18 anything about what you might expect
19 the width-to-height ratio to be in a
20 large-scale bump?

21 A. I couldn't understand this
22 question.

23 Q. That's okay. Have you rerun
24 any of those models since August?

25 A. No.

1 Q. Can you explain how --- it
2 appears that --- well, let me back up
3 and say this.

4 What coal strength was used in
5 the calibrated EXPAREA models for
6 Crandall Canyon Mine?

7 A. EXPAREA model ---?

8 Q. The models that were developed
9 earlier.

10 A. What's your question?

11 Q. There was a project done in
12 1997 to design a longwall --- to help
13 design the longwall gate road systems
14 at Genwal.

15 A. Uh-huh (yes).

16 Q. And it's my understanding and
17 the documents that we have show that
18 Agapito developed EXPAREA models for
19 Genwal. Those models were also
20 defined using --- refined using field
21 data, it's our understanding. And
22 EXPAREA was used even later in a
23 public --- in a project to look at
24 barrier pillar design. Have you
25 looked --- have you ever looked at

1 any of that data, any of those model
2 parameters?

3 A. When I conducted this
4 modeling, I didn't know about this
5 report.

6 Q. Okay. Do you know it now?
7 Have you looked at those reports?

8 A. Yes.

9 Q. Can you explain how EXPAREA
10 and LAMODEL models could both be
11 calibrated to Crandall Canyon
12 conditions with different pillar
13 strengths, or did they use the same
14 strengths?

15 A. The material property in
16 EXPAREA is different from LAMODEL.
17 EXPAREA uses uniform strengths
18 through the pillar. It uses one
19 number. So it's different from ---
20 LAMODEL. You can find a core method
21 to get the strengths of the cores.
22 It has a gradient from rib to thinner
23 (phonetic). But EXPAREA, they use
24 one number for all the yield of
25 pillars --- of barrier pillar they

1 use one number, which is different.

2 Q. Okay. Did Agapito consider
3 surface subsidence data in the
4 pillaring analysis project, 226-20?

5 A. I don't know.

6 Q. Well, did you use any
7 subsidence data?

8 A. No.

9 Q. Who decided to do ARMPS
10 analysis in addition to the LAMODEL?

11 A. I don't know.

12 Q. Do you know why it was used?

13 A. No.

14 Q. Do you know who ran the
15 program?

16 A. Leo Gilbride.

17 Q. Did he ever talk to you about
18 those results?

19 A. No.

20 Q. Which version of ARMPS did Leo
21 use?

22 A. I'm not clear.

23 Q. In your written response to us
24 --- you are familiar with ARMPS?

25 A. No.

1 Q. No?

2 A. No.

3 Q. No familiarity at all with it?

4 A. No.

5 Q. In April of 2007, Agapito ran
6 additional ARMPS models. And that
7 information was provided to us. And
8 you've indicated you think Leo ran
9 the ARMPS analysis that was done for
10 Crandall Canyon?

11 A. Yes.

12 (Yu Exhibit Ten marked
13 for identification.)

14 BY MR. ZELANKO:

15 Q. I'm going to give you another
16 exhibit. This is Yu Ten. That's the
17 output that you provided --- that
18 Agapito provided to us. And on April
19 the 5th, we've also got a few records
20 here that show that Agapito had a
21 conference call with Laine Adair.
22 Did you participate in that
23 conference call?

24 A. When?

25 Q. It was --- it appears to have

1 been April the 5th at 3:00 p.m. in
2 '07.

3 A. I couldn't remember.

4 Q. These are notes that appear to
5 be a result of that meeting.

6 A. This is March 5th.

7 Q. Yeah. There's every
8 indication that the date was wrong.
9 We have cross referenced it with a
10 number of things, and it looks like
11 it was the wrong month. But your
12 name is on there, and whether it was
13 March or April --- like I said, we
14 believe it was April. Do you
15 remember ---

16 A. Yeah.

17 Q. --- having a phone call?

18 A. Uh-huh (yes).

19 Q. Are those Gary Skaggs' notes?

20 A. I'm not sure.

21 Q. In the one part there, he's
22 talking about ARMPS analysis. It
23 says, below its safety factor or
24 below its stability factor.

25 A. Yes.

1 Q. Do you see that line? Can you
2 explain what that means?

3 A. No.

4 Q. Do you recall ---?

5 ATTORNEY WILLIAMS:

6 Do you remember that
7 discussion? I'm sorry.

8 BY MR. ZELANKO:

9 Q. Do you recall in the
10 conference call what the topics were
11 that were discussed?

12 A. I couldn't remember.

13 Q. Do you remember why the call
14 was made?

15 A. No.

16 Q. There were ---?

17 ATTORNEY WILLIAMS:

18 Did we identify this as
19 Exhibit 11 for the record?

20 MR. ZELANKO:

21 No, I don't think we
22 did.

23 (Yu Exhibit 11 marked
24 for identification.)

25 ATTORNEY WILLIAMS:

1 It is.

2 (Yu Exhibit 12 marked
3 for identification.)

4 BY MR. ZELANKO:

5 Q. I'm going to give you another
6 exhibit, Yu Number 12. Do you know
7 who made those notes?

8 A. It's Leo's notes.

9 Q. Leo's notes. Does that help
10 refresh your memory with what might
11 have been discussed, those two
12 documents?

13 A. I couldn't remember.

14 Q. Well, can you read what they
15 said in there?

16 A. I remember I --- I mean, this
17 phone call, but I couldn't remember
18 the topic of this phone call.

19 Q. Given that they're making
20 notations on here, does it suggest to
21 you that you were reviewing some of
22 these model results?

23 A. This is Leo's review.

24 Q. That's Leo's review. Can you
25 explain what was the purpose of that?

1 A. No.

2 Q. It's Leo's review. Did he
3 share with you his thoughts? Did he
4 show you that or ---?

5 A. No.

6 Q. Do you recall that these
7 things were discussed in the April
8 15th phone call?

9 ATTORNEY BARTON:

10 April 5th.

11 MR. ZELANKO:

12 I'm sorry.

13 A. No.

14 BY MR. ZELANKO:

15 Q. Some of these comments down
16 here, when --- there's a discussion
17 here that --- or a note here that
18 says dangerous, barrier, high stress,
19 danger. Did you discuss those things
20 with anyone?

21 A. No.

22 ATTORNEY WILLIAMS:

23 Were they talked about
24 at the meeting?

25 A. I couldn't remember.

1 BY MR. ZELANKO:

2 Q. There's a note on there about
3 --- it says choosing a 40-foot slab
4 into the barrier, cut into the
5 barrier.

6 A. This part; right?

7 Q. Right. That's where the slab
8 was to be taken. But up above there
9 it says --- there's a note about
10 deciding on the barrier distance. Do
11 you know what the basis was for
12 choosing a 40-foot depth?

13 A. No.

14 Q. Were you ever asked to
15 evaluate any narrower barrier widths?

16 A. What's your question?

17 Q. Was Agapito ever asked to
18 evaluate narrower barrier widths than
19 what was shown in there?

20 A. I don't know.

21 Q. Do you know if anyone was ever
22 consulted in any way about the
23 effects of a narrower barrier?

24 A. No.

25 Q. Nobody ever talked to you

1 about it?

2 A. Nobody talked to me.

3 Q. Do you know what the actual
4 barrier thickness was as mined?

5 A. The north or the south?

6 Q. Both, the north and the south.

7 A. I don't know.

8 Q. We talked about those
9 notations down in the lower left on
10 that figure --- or that exhibit,
11 things like worse stress, not any
12 worse than before. Can you elaborate
13 on what those comments refer to?

14 A. No.

15 Q. I see at the top there it says
16 worse stress, there's a line that
17 goes down to where they left pillars
18 in the north, and then down below.
19 Is there a notation there that says
20 not any worse than before? Do you
21 see that one?

22 A. Yes.

23 Q. Do you have any idea what ---
24 were these comments comparing the
25 conditions in the north and the

1 south?

2 A. This is Leo's note. I don't
3 know.

4 Q. What did Agapito do to
5 alleviate the concerns that are
6 expressed there about the danger of
7 that barrier and the stresses being
8 similar?

9 A. I don't know.

10 Q. When were longer blocks
11 proposed?

12 A. Longer blocks?

13 Q. Longer crosscut spaces.

14 A. I don't know.

15 Q. Did you get involved with any
16 of the modeling subsequent to this
17 where you were looking at alternative
18 designs?

19 A. Normally the project manager
20 tells modulus model what kind of
21 option, but I don't know the purpose
22 of that option.

23 Q. You don't know who proposed
24 longer blocks?

25 A. No.

1 Q. Or when that might have been
2 proposed?

3 A. No.

4 Q. Do you know if other designs
5 were considered? Wider blocks, for
6 example, or narrower blocks?

7 A. I don't know.

8 Q. Okay. Well, there's every ---
9 if we look at page 216 and 220, is
10 that ---?

11 ATTORNEY WILLIAMS:

12 217.

13 MR. WEAVER:

14 217.

15 BY MR. ZELANKO:

16 Q. 217 and 220.

17 A. Which exhibit?

18 ATTORNEY WILLIAMS:

19 Exhibit Seven. Joe
20 didn't write it down. I don't
21 know if that's actually
22 accurate.

23 MR. ZELANKO:

24 Yeah, it could be.

25 ATTORNEY BARTON:

1 What page?

2 MR. ZELANKO:

3 217 and 220.

4 BY MR. ZELANKO:

5 Q. To make this easier
6 comparison, we could probably just
7 tear one of these out of there and
8 staple it back in. Is that okay?

9 A. Yeah.

10 Q. It's too cumbersome to try
11 to --- we're looking at Figure Two
12 and Figure Five in this exhibit. And
13 it appears that the outcome of the
14 numerical modeling was to propose in
15 this April 18th memo longer pillar
16 centers, crosscut centers. Are you
17 familiar with that, that this was the
18 recommendation?

19 A. Yeah, I know that.

20 Q. Do you know why they made that
21 recommendation?

22 A. No, I don't know why.

23 Q. Looking at those models, can
24 you express to us how Agapito ---
25 what was the basis for saying that

1 there's a substantial improvement
2 between those two?

3 A. No. I don't know.

4 ATTORNEY WILLIAMS:

5 Do you see any
6 improvement?

7 A. This is interpreted by Leo,
8 and I didn't even model this part.

9 BY MR. ZELANKO:

10 Q. So you didn't participate in
11 this recommendation?

12 A. No.

13 Q. You were never asked to
14 provide your insight?

15 A. This three report
16 recommendations all suggested by Leo
17 Gilbride. I never was involved in
18 this recommendation or suggestion.

19 Q. So I think we established
20 earlier that Hua Zhao did this
21 modeling?

22 A. Yeah.

23 Q. With your assistance?

24 A. Yes, but I didn't interpret
25 the result.

1 Q. In the work that you've done
2 with Agapito --- let me back up and
3 just ask this, too. If you were to
4 compare 217 to 220, you said you ---
5 would you --- based on your modeling
6 experience, would you be willing to
7 comment on how much improvement there
8 is there?

9 A. First, I think for longer
10 pillars, there's no yielding outby
11 the gob here. But for the smaller
12 pillar, all the ribs are yield.
13 That's what I see from this, too.

14 Q. And your conclusion would be
15 then that --- what, as far as how
16 they compared?

17 A. I don't want to answer this
18 question.

19 Q. Okay. About how many pillar
20 rows would you say are yielded on
21 either one of those drawings? How
22 many rows of elements would be
23 yielding in the vicinity --- say the
24 pillar row in the south adjacent to
25 the gob, how many rows of elements

1 would you say are yielding?

2 ATTORNEY BARTON:

3 On Figure Two or Figure
4 Five?

5 MR. ZELANKO:

6 Either one.

7 A. Only one. You mean this row
8 right ---?

9 BY MR. ZELANKO:

10 Q. One row of pillars, but how
11 many rows of elements?

12 A. This is 70 --- no, 60 by ---
13 60 by 72. Sixty (60) by 70 is ---
14 12-by-14 element for this one.

15 Q. So about how many of those
16 would be --- how many rows from the
17 rib line would you say are yielded in
18 there adjacent to the gob?

19 A. This model, the pillar still
20 is elastic element.

21 Q. But we established earlier
22 that the --- the competency of that
23 core, you said, was based on the
24 amount of yielding in the periphery,
25 too?

1 A. Yes. You know, we did --- we
2 didn't change the coding for the
3 pillar --- for the pillars adjacent
4 to the gob. We didn't do that.

5 Q. So those pillars, would
6 they --- in the model, would they
7 ever fail?

8 A. The center doesn't fail.

9 Q. All right. And if we look at
10 --- okay. Let's leave those figures
11 alone. And could you clarify, in
12 your experience, either here or
13 prior, have you --- are you familiar
14 with how designs vary based on short-
15 term workings versus long-term
16 workings?

17 A. No.

18 Q. So that's not something
19 that --- do you consider that in your
20 work?

21 A. No.

22 Q. Are you aware of work that
23 Agapito did on barrier design at
24 Crandall Canyon in 2000?

25 A. No.

1 Q. We have another exhibit here.
2 We'll mark it Yu 13.

3 (Yu Exhibit 13 marked
4 for identification.)

5 ATTORNEY BARTON:

6 Can we go off the
7 record for just a second?

8 OFF RECORD DISCUSSION

9 BY MR. ZELANKO:

10 Q. We're looking at Figure 2 in
11 Exhibit Yu 13. And what I'd like to
12 do --- are you familiar with this
13 work that was done on Panel 15,
14 barrier pillar design --- or protect
15 the bleeders from Panel 15?

16 A. No.

17 Q. You've never seen this before?

18 A. No.

19 Q. Okay. This is work that
20 Agapito did on the same property. I
21 would just ask you to comment on the
22 extent of the abutment stress
23 transfer that's shown here versus
24 what was shown in the previous Figure
25 20 in Exhibit 5, I believe it is.

1 A. What's your question?

2 Q. Can you just comment on how
3 far in the one --- what's the extent
4 of the stress distribution or
5 abutment stress transfer in the model
6 that was done more recently at
7 Crandall Canyon?

8 A. You mean using LAMODEL?

9 Q. Yes.

10 A. It's about 150.

11 Q. Okay. And then the other
12 model that was --- appears to have
13 been done with EXPAREA, ---

14 A. Uh-huh (yes).

15 Q. --- can you comment on ---?

16 A. This difference is caused by
17 the difference between the two
18 models.

19 Q. Okay. So the abutment stress
20 transfers substantially further than
21 the model used in EXPAREA than it is
22 with the LAMODEL, is that what you
23 see?

24 A. Yes.

25 Q. And can you explain that?

1 A. No.

2 Q. Well, earlier you said that
3 you used lamination thickness --- you
4 established a lamination thickness
5 for LAMODEL. Can you explain a
6 little bit about how you did that,
7 how you selected the values that you
8 did?

9 A. It's just a default value from
10 LAMODEL.

11 Q. Did you do any parametric
12 studies to choose between them?

13 A. I choose --- I used 50 and 25.
14 There's no difference.

15 Q. There's no difference?

16 A. No difference.

17 Q. Did anyone ever talk to you
18 about ground conditions that were
19 experienced in the main west, the old
20 main west, when the panels were
21 pulled adjacent to it, Panel 12 to
22 the north and Panel 13 to the south?

23 A. No.

24 Q. They never indicated that they
25 saw abutment stress effects in the

1 old mains, or in the old main west,
2 whenever they pulled the panel north?

3 A. You mean north mains? You
4 mean north barrier?

5 Q. When the main west was
6 originally driven many years ago and
7 they came back and ---.

8 A. Oh, this one?

9 Q. Yes, and they came back and
10 pulled this panel. Did anyone ever
11 relate to you any experience they had
12 in these entries where there was
13 damage due to abutment stress
14 transfer?

15 A. No. No.

16 Q. No one ever told you that?

17 A. No.

18 Q. In a previous report, Agapito
19 observed minimal evidence of abutment
20 load in the second north mains. Did
21 anyone ever talk to you about that?

22 A. Which report?

23 Q. If you look on Exhibit One, on
24 9971 --- that's the one underneath
25 here.

1 A. This one?

2 Q. Yeah, page 9971.

3 A. Yes. What's your question?

4 Q. The question is, did anyone
5 ever relate to you that experience
6 where they had seen abutment load
7 transfer over barriers 400 feet away?

8 A. No.

9 Q. There are in that --- on page
10 9970 of that same report, there's a
11 discussion about barrier pillar
12 formulas. Were you involved in using
13 barrier pillar equations ever?

14 A. No.

15 Q. All right. Just a few final
16 questions then, Doctor Yu. Did
17 Agapito ever consider ventilation
18 issues in this project?

19 A. No. I don't know.

20 Q. No one ever --- you didn't
21 hear anybody discuss how ground
22 conditions might affect ventilation?

23 A. I'm not clear with this issue.
24 I never involved in any discussion of
25 ventilation.

1 Q. Was there any consideration
2 given to the design of the remnant
3 barrier in the south? We're talking
4 about --- we can use any of these
5 figures. But here, for example, when
6 there was this discussion apparently
7 with the barrier high stress and
8 danger in this remnant barrier down
9 here, was there any consideration
10 ever given to maintaining the
11 integrity of that barrier as a
12 ventilation separation between the
13 gob and the sealed area?

14 A. No. I don't know.

15 Q. You never heard anybody ---

16 A. No.

17 Q. --- talking about that?

18 A. Yeah.

19 Q. Do you know if there was any
20 consideration given to design the
21 pillars in the bleeder so that they
22 would be stable in this area
23 behind --- in the Number Four entry
24 behind the face, to maintain that
25 entry stability?

1 A. No.

2 Q. To maintain the stoppings?

3 A. No.

4 Q. Did anyone ever express any
5 concern about the conditions that
6 might be experienced back in this
7 bleeder where people were required to
8 travel to the point of deepest
9 penetration?

10 A. No.

11 Q. Why not?

12 A. I don't know.

13 Q. You don't know if this was
14 ever a consideration or part of the
15 study that you were asked to do, or
16 that Agapito was asked to do?

17 A. I don't know.

18 Q. Do you know why mining was
19 discontinued up here in the north?

20 A. I was told it's because of the
21 burst.

22 Q. Because of the burst?

23 A. Yeah.

24 MR. ZELANKO:

25 All right. If we can

1 take another short break. And
2 I'll just see if the guys have
3 any questions, and we'll try
4 to wrap things up here
5 shortly.

6 SHORT BREAK TAKEN

7 BY MR. ZELANKO:

8 Q. I want to enter one more
9 exhibit, Doctor Yu. We'll call it Yu
10 Exhibit Eight.

11 (Yu Exhibit Eight
12 marked for
13 identification.)

14 BY MR. ZELANKO:

15 Q. Do you know what that document
16 represents? Is that a draft report?

17 A. No. This is my report to Leo.

18 Q. That's your report to Leo?

19 A. The initial report to Leo.

20 Q. Okay. And in this report to
21 Leo, we have Table One and Table Two
22 that appeared in the final
23 report, ---

24 A. Yeah.

25 Q. --- the July 20th report. But

1 this table has LAMODEL input element
2 labels as well.

3 A. Yes.

4 Q. Did you prepare that table?

5 A. Yes.

6 Q. And at the time you prepared
7 it and gave it to Leo, did you
8 believe it to be accurate?

9 A. As I said, there's no --- this
10 data I prepared from the equation,
11 and the equation is subject to
12 modification. And all your --- all
13 my modification is try to gather ---
14 model output consists of reality.

15 Q. And so you work these numbers
16 up and you're saying that was your
17 starting point?

18 A. Yes.

19 Q. Can you walk us through so we
20 understand? Yeah. Did you believe
21 it to be accurate when you gave it to
22 Leo?

23 A. I don't think there is any
24 equation that is accurate to predict
25 pillar strengths. Any equation you

1 need to be calibrated with
2 site-specific observation or
3 experience.

4 Q. But the table that's there
5 when you gave it to them, you thought
6 that represented what the input
7 parameters were?

8 A. Yes.

9 Q. And on the next page, Table
10 Two, where are those input parameters
11 --- where did you get those
12 parameters? You created that table
13 as well?

14 A. Yeah. I couldn't remember
15 what's wrong with this table. I just
16 realized it's wrong after you talked
17 with Doctor Hardy.

18 Q. Okay. But at the time you
19 gave it to Leo Gilbride, you believed
20 that to be accurate as to what was
21 used in the model?

22 A. Yes.

23 Q. Now, at some point you went
24 from the starting point, which was
25 Table One, the numbers developed from

1 those criteria, from the equation,
2 and you decided you wanted to ---
3 although that was your starting
4 point, you moved to other properties
5 to match reality, as you said?

6 A. Yes.

7 Q. How did you make that
8 decision? How many model runs did
9 you run to make that transition?

10 A. I don't remember.

11 Q. Can you tell us how you chose
12 those particular parameters and the
13 configuration that you did, because
14 essentially the properties that were
15 used in the actual model --- if we go
16 to figure --- or Exhibit Four. If
17 you go to Exhibit Four, the Bo Yu
18 modeling files, and you compare that
19 with Table Two in the document you
20 have --- I'm sorry, compare it to
21 Table One in Yu Eight, these
22 parameters are --- in fact, these
23 being the peak and residual stress
24 and strain numbers for a strain-
25 softening model that were used in the

1 input are consistent with the numbers
2 used in the table; is that correct?

3 A. Correct.

4 Q. So how did you decide that
5 this orientation or this deployment
6 of parameters suited reality better
7 than what was shown in Table One?

8 A. It just depends on LAMODEL
9 output. This equation actually has
10 low stress gradient than LAMODEL
11 default value.

12 Q. Do you know what the basis is
13 for the one in LAMODEL, the equation
14 that's used in there?

15 A. Yeah. I know that it's from
16 statistic study for many months
17 there. But every pillar strength
18 equation needs to be calibrated to
19 the site specific data.

20 Q. And I guess that's what we'd
21 like to know, is how did you
22 calibrate --- you go from Table One
23 to the deployment of properties used
24 in Exhibit Four, a different
25 arrangement of those properties,

1 which was substantially higher,
2 stress strength levels and an elastic
3 core. Tell us about that calibration
4 process. How did you get --- how did
5 you arrive at saying these are the
6 numbers that I should be using?

7 A. I used equation one, input of
8 low stress value from several hundred
9 PSI to the value I used. But to use
10 it consistent --- use that same
11 equation here until the model show
12 the --- the output show consistent
13 with reality.

14 Q. I know we don't have Doctor
15 Hardy's transcript here, but did you
16 ever express to him that you
17 increased the strength until --- the
18 lower strengths were inappropriate
19 because the main west failed on
20 development?

21 A. Yes. Main west, you know,
22 coating method is different from this
23 one. This is rectangular coating and
24 actually the center is elastic. But
25 main west, that area of the pillar is

1 diamond-shaped.

2 Q. That's not main west.

3 That's ---

4 A. Section ---.

5 Q. --- Section 36.

6 A. Yeah, Section 36. And it's
7 diamond shaped. All the coating
8 there is plastic material. So when I
9 use low stress there, low coal
10 stress, then I got several hundred
11 --- 900 PSI. When it's developed,
12 the pillar will yield.

13 Q. Okay.

14 A. That's what I calibrate the
15 model for that ---.

16 Q. So it wasn't --- the main west
17 wasn't what failed when you used
18 lower strengths, it was the pillars
19 that were left behind, those remnant
20 pillars in the mobile bridge conveyor
21 section?

22 A. This one?

23 Q. In your calibration model,
24 Section 36, ---.

25 A. Uh-huh (yes).

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MR. GAUNA:

Exhibit 17. That's the
one, yeah.

BY MR. ZELANKO:

Q. In Exhibit 17, it's the
pillars in the old retreat room and
pillar back analysis area, these are
the ones that you iterated to; is
that correct?

A. Yes.

Q. Not these blocks down here
in ---?

A. No, no.

Q. And so this change in material
properties from your starting point,
why did you opt to make that change?
What prompted you early on to say,
I'm not going to use the tables as
they're shown in Table One?

A. I actually write the paper off
of --- you reach this equation right
here, and then the paper says that
this equation should be calibrated.
And you cannot use that equation this
way in LAMODEL. You can see the

1 different --- if you look into the
2 LAMODEL equation, this gradient is
3 totally different from this one. And
4 that's why I modified this to use the
5 model output to compare with the
6 reality observation.

7 Q. So you decided to do that
8 based on reading the paper. This is
9 before you even ran a model?

10 A. I think before. I ran the
11 model. This low value here is all
12 yield on the rib.

13 Q. Can you clarify for us, after
14 the north --- the bump or bounce in
15 the north barrier section, you ran
16 more models. Can you clarify for us
17 what you changed? I'll simplify it
18 for the sake of expediency. I
19 believe you said you adjusted the
20 geometry for the remnants?

21 A. Yeah, adjust the geometry here
22 and ---.

23 Q. You showed the actual layout,
24 the way it was after the bump?

25 A. Yeah.

1 Q. And you also changed some ---
2 another aspect?

3 A. Changed the gob, the distance
4 from gob edge to the pillar lines.

5 Q. Okay. When you made the
6 change and you went from Table One,
7 originally the way the materials were
8 deployed, up to 37-and-a-half feet,
9 and chose to go the other route,
10 where they're deployed up to 20 feet,
11 was there anybody else that was aware
12 that you had made that change?

13 A. No.

14 Q. That wasn't something that was
15 discussed with Leo?

16 A. No.

17 Q. For both LAMODEL and EXPAREA,
18 could you just expound for a minute
19 on what your training consisted of?
20 Let's start with LAMODEL, I guess.

21 A. I have actual class at school.

22 Q. It was a three-credit class,
23 full ---.

24 A. Three? It's a one-semester
25 class.

1 Q. It wasn't a one-day or two-day
2 seminar. It was the ---

3 A. No.

4 Q. --- semester? Have you had
5 any other --- I know there had been
6 some other seminars on that. Did you
7 ever attend any of those?

8 A. Yeah. I attend a seminar last
9 year --- seminar last year, ground
10 control conference at Morgantown.

11 Q. WVU?

12 A. Yeah.

13 Q. At Lakeview. You attended one
14 there. Was that the multiple seam
15 training?

16 A. Yes. Uh-huh (yes).

17 Q. Okay. How about with EXPAREA?

18 A. EXPAREA, I was trained by Leo.

19 Q. And how about with LAMODEL?
20 The training that you had, you would
21 have been using the pre-processor,
22 the program, and the post-processor.
23 How were you trained in the use of
24 QBAR and Container and those
25 programs?

1 A. QBAR is the in-house program.
2 I was trained by Dave Conover.

3 Q. What did the training consist
4 of? Did he spend a day with you?

5 A. Yes.

6 Q. Was it working on a project
7 actively?

8 A. No.

9 Q. He just came out and spent a
10 day with you?

11 A. Yeah, just came here and spent
12 a day with me.

13 ATTORNEY WILLIAMS:

14 Was it the whole day or
15 a couple hours or ---?

16 A. Couple hours, not a whole day.
17 That, too, is simple.

18 BY MR. ZELANKO:

19 Q. It's a pretty simple program?

20 A. Yeah.

21 Q. Is there a user manual for any
22 of the in-house software that you
23 use?

24 A. No.

25 Q. No?

1 A. No.

2 ATTORNEY WILLIAMS:

3 Was that true for the
4 other in-house software use,
5 somebody would show you for a
6 couple hours how to use it?

7 A. Yeah.

8 BY MR. ZELANKO:

9 Q. And then the seminar that you
10 attended in Morgantown, what portion
11 of that was actually LAMODEL?

12 A. Afternoon.

13 Q. The afternoon?

14 A. Session, yeah.

15 Q. And the morning was?

16 A. Was multiple seam.

17 ATTORNEY WILLIAMS:

18 Go off the record a
19 second.

20 OFF RECORD DISCUSSION

21 ATTORNEY WILLIAMS:

22 Let me just note for
23 the record we did not use
24 Exhibits Six or Nine.

25 MR. ZELANKO:

1 On behalf of MSHA, I
2 want to thank you for
3 appearing and answering
4 questions today. Your
5 cooperation is very important
6 to the investigation as we
7 work to determine the cause of
8 the accident. We ask that you
9 not discuss your testimony
10 with any person who may have
11 already interviewed or who may
12 be interviewed in the future.
13 This will ensure that we
14 obtain everyone's independent
15 recollection of events
16 surrounding the accident.

17 After questioning other
18 witnesses, we may call you if
19 we have any follow-up
20 questions that we feel that we
21 need to ask you. If at any
22 time you have any additional
23 information regarding the
24 accident that you would like
25 to provide to us, please

1 contact us at the contact
2 information that was provided
3 to you previously.

4 If you wish, you may
5 now go back over any answer
6 you have given during this
7 interview and you may also
8 make any statement that you
9 would like to make at this
10 time. Would you like to
11 clarify anything or make a
12 statement?

13 ATTORNEY BARTON:

14 Do you want to take a
15 break and think about it for a
16 minute?

17 A. No.

18 MR. ZELANKO:

19 Again, I want to thank
20 for your cooperation in this
21 matter.

22

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STATEMENT CONCLUDED AT 2:25 P.M.

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