

1 resources and the number of simulators I know you guys have,
2 I think it is a little odd that that particular test is the
3 one that was left out.

4 Also, I think I would like to evaluate wear under
5 non-optimal conditions. I think canting would probably be
6 first on my list. In other words, if you have a canted
7 liner in there and don't notice it, what is the long-term
8 laboratory effect of running that particular test.

9 Abduction angle -- you have kind of a protection
10 in there against impingement where you force the device to
11 go metal-on-metal, protecting the ceramic. But if that
12 happens you are probably not in a good state at all, but it
13 is unclear what happens to the wear rate on the ceramic as
14 you move the wear interface from the center of the liner up
15 toward the edges where the same load generates much higher
16 stresses.

17 Obviously, third-body debris -- in our HHS
18 retrieval collection we have retrieved devices over the last
19 30 years and we have many ceramic-on-ceramic heads that look
20 like they rubbed up against something or something-rubbed up
21 against them. Usually whatever the ceramic rubs up against
22 is the thing that gets worn, not the ceramic. So, it would
23 be interesting to see and I think third-body debris effects
24 on wear should also be evaluated while you are doing that.

25 [Slide]

1 So, in general, my comments are that there is no
2 testing of non-optimal conditions. Mal-alignment of liner
3 into the shell -- Ian Clarke, last October, at an
4 Alternative Bearings Conference in San Francisco, said that
5 this canting occurred in one series that he followed in
6 Europe 30 percent of the time, and it is unclear what the
7 long-term ramifications of these cantered liners would be.

8 Abduction angle -- the surgical instructions, near
9 as I can tell, actually don't even give a range of suggested
10 abduction angles. You actually say put it in at 45, and
11 that is it. But in real life the chances of a surgeon
12 putting it in at 45 degrees every single time with 20 degree
13 anteversion is just about zero. So, it is unclear what the
14 range is or what the upper limits of abduction angle in
15 anteversion are and what happens if impingement occurs.
16 There are really no warnings about this, or is it any
17 different than metal-on-polyethylene?

18 [Slide]

19 Chipping of the liner -- I don't think chipping of
20 the liner is a big deal-for two reasons. One, if you are
21 looking at it you know if you have chipped it you are
22 probably going to change it. But I don't like the chipping
23 not because it has a direct effect on performance but it may
24 be an indication of mal-alignment or other implantation
25 issues. In other words, when you chip the thing is it

1 because you didn't have it seated? Again, I am not quite
2 sure why chipping only occurred in those particular
3 instances. So, maybe the chipping itself isn't bad but it
4 may be an indicator of some other feature that is going on
5 surgically that you should recognize.

6 [Slide]

7 Anteverision -- there are only one or two more
8 slides after this, and I guess my big one is that the
9 current application appropriately is based essentially on
10 rules of thumb for metal-polyethylene -- you know, what is a
11 2 mm radiolucent line. So you were using all the predictors
12 that we have used over the years for metal-on-polyethylene
13 to predict performance, and it is unclear if those same
14 predictors are the ones you would use to actually predict
15 long-term ceramic-on-ceramic devices because I think
16 everybody should realize that there has never been a
17 ceramic-on-ceramic device with a 20-year or 15-year follow-
18 up with a 95 percent success rate. Hopefully, this is it.
19 But we really have nothing to point back to for what
20 actually are the predictors for ceramic-on-ceramic-devices.

21 [Slide]

22 Also, as the indications expand, certainly the use
23 of things like bone graft and other things where you have a
24 non-optimal condition need to be addressed. I guess this
25 brings us to the stress transfer issue.

1 Now, apparently I didn't have the volume with all
2 the details of the FEM but looking at what you presented,
3 the bone model side especially seems to be relatively simple
4 and seemed to be an axisymmetric, directly loaded shell.
5 And, I am a little surprised that you can swap out a
6 polyethylene layer with something like a tenth homogenous of
7 the ceramic and have absolutely no difference in stress on
8 the bone side. So, I think I would need to reexamine that
9 model and see if that model is actually appropriate for
10 this. The loading, you know -- the response is that if you
11 swap one of the components out so the modules are all high,
12 the stress can't possibly be the same underneath it. It has
13 actually been proposed as a hypothesis for why the younger
14 patients work better in the early ceramic-on-ceramic.

15 So, if the stress on the bone is different for the
16 ceramic-on-ceramic devices, then things like reaction to
17 bone grafting would be affected, and it is unclear what
18 these devices would do with that.

19 [Slide]

20 I jumped ahead, if that is okay, Dr. Boyan. If
21 the ABC I and II should be combined, which is essentially an
22 HA versus no HA comparison near as I could tell, if
23 loosening is the long-term issue, then one to two years is
24 not really going to let you see it. If you look at the
25 previous clinical series, even in those series where the

1 loosening was relatively massive at 15 years, at one and two
2 years the incidence of loosening was virtually zero.

3 So, although the results are compelling that they
4 are exactly the same at one to two years, I would worry that
5 if you always combine them and never split them back out
6 that, if there was some difference or something had to do
7 with differences in stress transfer, you may or may not see
8 it if you leave it combined. So, my personal recommendation
9 would be not to separate the analysis, and you have to
10 follow these to at least five years, in my mind, if you are
11 actually going to try and catch loosening using previous
12 ceramic-on-ceramic clinical reports as a guide.

13 [Slide]

14 The second question is can Trident essentially use
15 the ABC data. A reminder, the Trident has a titanium alloy
16 sleeve. The sleeve is under tension. I believe this to be
17 more susceptible to corrosion, and this particular aspect
18 was one of the few things that wasn't tested in the rather
19 extensive testing. I don't think there was crevice
20 corrosion of this. Again, it is going to take five to seven
21 years if corrosion of titanium stems is any indicator.
22 Also, the Trident may actually have a benefit over the ABC
23 if it is really true that canting is much less a feature in
24 the Trident System than it is with the ABC System. So,
25 again, my preference would be to have its own study and not

1 to combine the data.

2 [Slide]

3 So, just a quick reminder that all the tests and
4 guidelines for success and failure were all based on the
5 metal-polyethylene experience, which is appropriate because
6 we have no other experience but, for instance, radiolucent
7 lines greater than 22 mm was a failure; 3 mm cup migration
8 were indicators of metal-polyethylene long-term failure but
9 what are the criteria for ceramic-on-ceramic? Maybe they
10 are less, maybe they are more. It is unclear.

11 So, it is not so much that this was a deficiency
12 in your study but I think it is a question that we should
13 all have, and it should be no surprise one way or the other
14 if this is or isn't a predictor of performance.

15 So, in summary, I think this was probably one of
16 the best applications I have seen as far as preclinical
17 testing goes. I will leave it to my statistical colleagues
18 to comment on the statistics, but it appears, at least at
19 the one- and two-year mark, to be a safe and efficacious
20 device.

21 On the nonclinical evaluations, I think I would
22 push for wear testing and essentially looking for some non-
23 optimal conditions for testing, especially canting. I will
24 stop there.

25 DR. BOYAN: Thank you very much. I will now ask

1 Dr. Lyons to give us a review of the clinical part of the
2 application.

3 DR. LYONS: Well, following that nice lead, I had
4 actually some similar concerns from a clinical standpoint
5 that have already been discussed.

6 Really, from a general clinical perspective
7 though, the concept of ceramic bearing surfaces has been
8 rather attractive, at least in terms of the understanding
9 from a clinical view of the smoothness of the surface and
10 the minimization of some wear debris, that sort of thing,
11 and the inertness of the materials.

12 There are some concerns that I think I probably
13 should readdress, because I have a number of notes that have
14 now been covered pretty well with Steve's work. There is
15 some concern about the mechanical integrity of the material,
16 the brittleness. I guess the clinical concern that I have
17 and a couple of questions would be for revision or repair,
18 particularly if the sleeve locks up when you are trying to
19 implant it. And, I don't know enough now about the chipping
20 because the chipping number changed from what I had
21 understood, and exactly the sites of chipping are a little
22 bit of a concern to me from what has been mentioned so far.

23 I don't know if there is any way to really know if
24 there is a greater magnitude of the chipping -- I will just
25 go onto that for just a second. The material itself, was it

1 all peripheral? That is a question that I would have
2 because of the 16 that were mentioned. If that is the case,
3 I would think more about technique and the recommendation
4 would focus more on the technique and educational issues.

5 There are other issues with the integrity of the
6 material if we are going to expand the indications for the
7 patients. You are going to have service life issues that
8 are not very well controlled. We have patients that don't
9 behave even though they are selected by the surgeons, as
10 best we can, and in terms of fracturing of the material, I
11 don't know that we have real good data on how we really
12 investigate that. Sometimes our imaging is not the best
13 even with the poly, and the ceramic would be a new field for
14 us to study. So, it is something that the educational
15 aspect of the approval should address for the surgeons.
16 Maybe the workup would include more of a dye arthrogram type
17 of study for cracks compared to just regular imaging. It is
18 just another thought that comes up from a clinical
19 perspective.

20 If I can move away from the fracture and-chipping
21 issue, then the one thing that I was impressed by was
22 certainly implantation, for the surgeons to really recognize
23 the alignment. It is a nice, smooth surface. It is
24 hemispherical. There are no guides really to the equator on
25 it per se for at least a learning curve for surgeons. I

1 think an educational side or training side to the release
2 would be important, and that was one of the questions that
3 was asked by the FDA and I think that that is going to have
4 to have some address.

5 In addition, because we now know of the chipping
6 issue and the equatorial displacement and some of the
7 stiffness that might occur when you are trying to place
8 these is being offset, probably looking at the warning
9 labels that come with these type of devices would be good.
10 One of the problems that surgeons have at times is that it
11 doesn't do a bit of good to put that warning inside the box.
12 It probably should be set up with the instructional
13 material, the technique manual, so that the warning of the
14 sensitivity of this particular insert to the geometry of
15 implantation in the liner would be important.

16 Then it raises an issue clinically of why you
17 really need the ABC System and the Trident System. The
18 Trident seems, from a clinical perspective from what I have
19 read and from what I have gone over here, to be a fix for
20 some of the ABC problems. Why not just market the Trident?

21 But then there is a question about the interface,
22 the surface, which wasn't addressed by the FDA questions but
23 was one of the first things that came to my mind. We have
24 added a new interface here, and I am not positive about
25 where the mass comes from. It sounds like it comes maybe

1 from the outer shell that has thinned out. Is that of any
2 concern? It didn't seem like it from the presentation on
3 stress analysis.

4 But, really, what is the locking mechanism
5 tolerance? Is there any motion there because we are worried
6 now about screw holes in cups and now we have put in a
7 little bit bigger liner. We didn't' really talk about the
8 locking there. Yet, the Trident seems, from a clinical
9 perspective, to take away probably a bigger issue which is
10 the clumsiness of some of our implantations. If we have
11 poor views and that sort of thing and you are trying to get
12 that one liner in, and again it doesn't have any equatorial
13 markings on it, and it locks up or you think you have it
14 locked down, that may be a clinical problem long-term that
15 would be hard even to image. Whereas, the Trident sounds
16 like it obviates that problem, although I don't know the
17 locking mechanism, and the wear issue and the corrosion
18 issue which are all of some concern. So, I question the
19 actual rationale of using both systems. It looked like the
20 Trident was a little bit better.

21 Moving on to the questions that were asked for
22 really the clinical concern, I really didn't see a problem
23 with any of the clinical data. I don't think that this is a
24 product that shows any suggestion for clinical failure. I
25 think it is kind of an exciting review. The design

1 similarities to the existing hip systems in terms of
2 geometry and hemispherical sizing of the acetabula and the
3 femoral fixation are not a problem at all in this particular
4 device.

5 I think though that disclosure of the data to the
6 surgeons, from a clinical standpoint, for what is known and
7 unknown in terms of the product would be a helpful thing. I
8 think you would probably want to put that in the technique
9 manual.

10 With the educational initiatives, not only are
11 there some pro and con materials that they should have in
12 terms of ceramics and the articulation service, but really
13 focus on the techniques, the importance of alignment, those
14 sorts of problems.

15 I think probably a monitoring recommendation would
16 be a reasonable thing if it goes out to clinical marketing
17 because there is some variability in whether you will see
18 the patient back ever, every one year, two years, five
19 years, ten years, and that type of data looks to be
20 important for long-term-assessment of this particular device
21 because it is new.

22 I would agree that five-year clinical data would
23 be much more helpful than two years; actually, ten years
24 more helpful than five. There is really no upper limit to
25 it.

1 Retrieval analysis, from a clinical standpoint,
2 would be of interest to me. I understand from the
3 presentation this morning that there are only three devices
4 apparently that were retrieved. I was interested to know
5 how many there might be. But the retrieval analysis data
6 would be very helpful to understand not only where but
7 alignment and other issues, and I am not sure that that was
8 really addressed although in the manuals, again, if people
9 do extract components historically they have moved from the
10 surgeon's hands, the patient's hands or the garbage can
11 potentially, and a lot of extracted components haven't
12 really had the information gleaned that would be helpful for
13 clinical review. So, considering retrieval analysis would
14 be something of a judgment that I would like to see.

15 Warnings -- I think probably in terms of
16 brittleness and revision issues the one concern I have, and
17 I am not sure this is true but on the ABC System, if your
18 component, for some reason, chipped or failed, it is my
19 understanding from review of the materials that you need to
20 extract the cup and then put a whole new one in, as opposed
21 to the Trident where you can leave the shell and you can
22 implant poly. That, again, is something that I would like
23 to know ahead of time as a surgeon, in pretty bold letters
24 as opposed to maybe the detail man telling me but I kind of
25 missed it, because I really would like to plan for revision

1 and that, again, tells me that the Trident seems to be more
2 of an address for fixes than the ABC which, again, raises my
3 clinical question of why I would want to choose between the
4 two as a clinical physician when the Trident would be
5 simpler for me -- revision and implantation.

6 Postmarket surveillance I think would be the only
7 other comment I have. Two years I think is short term,
8 particularly if it goes onto the market with a varied number
9 of surgeons. I don't want to repeat all the issues that
10 come up from the biomechanical standpoint because it was
11 already mentioned, but from a simple clinical perspective,
12 the idea of ceramic, a smoother surface, getting away from
13 poly is very attractive. You might have a number of
14 physicians that would move toward this device without
15 necessarily recognizing the brittleness that can exist,
16 impact loading and problems that might be difficult to
17 ascertain in the clinical setting. Surgeons might move to
18 it without knowing that the revision on the ABC, if I am
19 understanding it correctly, would be a more difficult
20 challenge. There is a little bit more technique --
21 orthopedists are defined as pressing 200 lbs., knuckles on
22 the ground -- I mean, bottom third of a class, knuckles
23 right on the ground and really kind of macho in that way.
24 For some of us it would be a natural thing to impact very
25 hard the liner -- you make it fit. The poly, the same way.

1 We do have some troubles with that. With the ceramic, I
2 think it needs to be pointed out more strongly to general
3 orthopedists that they have to be more delicate in the
4 implantation. I don't know that there can be anything to
5 help the alignment -- I watched the movie Jim had; it was
6 very nice. But, you know, with the blood issues and all
7 those things, I see that as a potential clinical problem.
8 And, I think a lot of surgeons will move to that. So,
9 knowing about the brittleness and then, finally, the
10 revision issues would be important. Thanks.

11 DR. BOYAN: Finally, Dr. Larntz?

12 DR. LARNTZ: I found the study really well done.
13 I think the 90 percent-plus follow-up at two years, that is
14 gorgeous. Thank you very much. I like that. The
15 radiographic follow-up, above 80 percent, I like that too.

16 The comparisons you have -- Dr. Bushar did a nice
17 job summarizing them -- I think it is very clear that with
18 respect to the intraoperative site adverse events Systems I
19 and II have a little bit of a problem. You have recognized
20 that. I don't know if that is why you went to Trident but
21 there is something there. I think there is a problem with
22 that and I think there is some discussion about that. You
23 know, statistically it is probably not significant, yet, if
24 you had a few more patients it probably would be. So,
25 System I and System II with respect to intraoperative

1 adverse events, if that is important, that looks like that
2 is a difficulty, and Trident is beautiful; it solves that.
3 It is statistically better than those. Right?

4 Statistically better than System I and System II. So, with
5 respect to that particular endpoint Trident is your answer.

6 Now, with respect to two-year failure, System I
7 and System II does really well. It satisfies the
8 equivalence criteria set up with the appropriate delta and
9 beats that nicely. It does a good job. So, System I and
10 System II have, in spite of their intraoperative adverse
11 event problem, a good long-term performance with respect to
12 failure.

13 So, if Trident long-term has the same failure rate
14 as System I and System II, then you are home free; life is
15 wonderful. Okay? But how do I know that? I only have 75-
16 day data on Trident. It has done fine; no problems so far
17 but -- someone said, "oh, it's all the same." Well, it
18 can't be all the same because it improves on System I and
19 System II. Right? It can't be all the same. There are
20 differences, and do any-of these differences affect you
21 long-term with respect to failure? It is a question I can't
22 answer because we don't have data. You guarantee we will
23 have data in two years. I appreciate that and I believe you
24 will have it because you have done such a good job so far,
25 but I can't answer the long-term failure issue on Trident.

1 I can answer that if I were choosing a system based on at
2 least adverse events. I would choose Trident, short-term
3 adverse events, no question. With respect to long-term
4 failure, I can't make a decision yet. Trident looks good
5 but I can't decide because I don't have two-year data.

6 So, those are my comments. No statistical issues.
7 I am just talking about the information that is here.
8 Statistically, you have provided a very nice report. You
9 have done a very nice study. Long-term follow-up is
10 excellent. Congratulations.

11 DR. BOYAN: Thank you. Since we have already had
12 the panel questions put on the screen before us, I am going
13 to ask Mr. Allen to come back and just run very quickly --
14 actually, no, that is not what we will do. What we will do
15 is we will take a five-minute restroom break, five teeny
16 little minutes, and then when we come back what will happen
17 is we will put one question up at a time and we will discuss
18 it in that format. So, five minutes.

19 [Brief recess]

20 **Panel Discussion**

21 DR. BOYAN: The first order of business is for the
22 panel to have the opportunity to ask questions of either the
23 company or questions of the FDA that might help clarify any
24 issues that are outstanding. Maybe we will start with Dr.
25 Lyons. Did you cover all the issues or are there questions

1 you would like to ask?

2 DR. LYONS: I do have a few questions. Maybe Jim
3 could help me with some of the clinical ones. The concern I
4 have initially is can an average orthopedist put the liners
5 in without too much difficulty, or if he would think that
6 maybe the Trident would be more of where you would want to
7 market to try to get the easier liner in. It seems like it
8 is easier, but help me understand the difference between the
9 two.

10 DR. D'ANTONIO: John, the questions on the
11 clinical parts of this that you and Steve raise are really
12 very important issues, and they are issues that we have
13 looked at and addressed.

14 Let me start out by saying that in my own
15 experience I have about 105 of the ABC and 50-some of the
16 Trident in, and I can honestly say that although there is a
17 different feel in putting them in, I personally haven't had
18 difficulty putting either one in. So, I never personally
19 saw a peripheral chip in my operating room, although I have
20 seen them, you know, from the retrieved implants. -

21 When we first started hearing about this chipping
22 problem we became concerned because it was something we
23 hadn't expected and, in talking with the surgeons and then
24 using the implants myself, it became very clear that if you
25 got one of these canted a little bit, even one or two

1 millimeters, and then tried to force it, the brittleness of
2 the ceramic would come out with a little peripheral chip.

3 As opposed to that, if you got it seated and put
4 your impactor in there and hit it with a sledge hammer you
5 couldn't break it. I mean, they are very strong. But if
6 they are canted in any way and you have some eccentric
7 stress on a peripheral rim, then you will get these chips.

8 Your question is a good one. Obviously, people
9 have problems putting these in, maybe because they don't
10 know that this could happen and maybe with an education
11 long-term the number, I would think, would be reduced. But
12 it is very clear that when you put these in there is a
13 technical aspect to getting them first what I call softly
14 seated where you can run your finger around, and it has a
15 feel to it; it has a soft, blottable feel and you can feel
16 the edge of the metal all the way around it. If you get it
17 canted -- I have had them cant on me in the operating room
18 and when I would feel them, they would feel rigid and you
19 could feel a little offset. Then, if you tap on the rim
20 before trying to force them, they loosen up very easily. Of
21 course, if you try and force it first and wedge it, then it
22 becomes more difficult to dislodge it.

23 So, I don't think there is any question that in
24 talking to people the Trident seems to be easier for most
25 surgeons to put in, and I will give you this information,

1 that I was recently in Canada and I know that both in Canada
2 and Australia the movement has been away from ABC to Trident
3 and the surgeons prefer Trident for this very reason, they
4 find it easier to insert. Does that answer the question?

5 DR. LYONS: Yes. Can I do a follow-up?

6 DR. BOYAN: You can do a follow-up, yes.

7 DR. LYONS: If you get one wedged, can you get
8 them out or, once seated, can you get it out? Or, is the
9 reason that you pull the cup because you can't get the liner
10 out once it is properly locked, or if it is wedged in
11 incorrectly it will not come out unless you want to chip it
12 out?

13 DR. D'ANTONIO: If you get one canted you should
14 be able to loosen it by tapping on the rim. If, for some
15 reason, you would not be able to do that, then your options
16 would be to remove the entire shell along with the liner.
17 If the shell happened to have screws in it, you would have
18 to have access to the screws and you would have to forcibly
19 remove that ceramic implant. If you had to forcibly remove
20 the implant, then the recommendation is that the metal shell
21 also be removed because the taper lock on the metal may be
22 damaged and that could create a stress riser with the new
23 ceramic liner going in -- again, a difference between
24 Trident and ABC. So, I think that is another advantage for
25 Trident.

1 So, I think if these things do become canted, then
2 they need to be removed. They can't be left in that
3 position. I had a great deal of concern about these chips
4 and in the U.S. study there have been three that have been
5 left in place that are in the patients. My concern was
6 whether these chips were going to create a stress riser and
7 weaken the implant. So, I asked that some testing be done,
8 and the testing has been done and to my satisfaction. These
9 patients are not at risk. With these small peripheral
10 chips, there is not a stress riser; there is no increased
11 risk of fracture of the ceramic liner in these situations if
12 the ceramic liner is fully seated. If the ceramic liner is
13 not fully seated and there is a peripheral chip, there is a
14 significant risk of fracture through normal use and on
15 loading the system.

16 DR. LYONS: Is it a simple matter to take out with
17 a little osteotome because it will foreclose your address of
18 the screws or even the seating arrangement with the liner
19 caulked in there, but if you just hit it with an osteotome
20 is it easy enough to chip and split?

21 DR. D'ANTONIO: Yes, I think you can break them
22 without too much difficulty if you had something sharp or
23 you hit it on the periphery, and knock them out.

24 DR. BOYAN: Dr. Cheng, do you have any questions
25 that you would like to ask?

1 DR. CHENG: I am just wondering, in those patients
2 that you mentioned where you left the liner in place -- not
3 you personally but the surgeon left the liner in place when
4 it was chipped, it must have been stuck in there well enough
5 that he or she felt that it was okay to leave in place even
6 though it was canted. So, it must get stuck sometimes when
7 you pound it in even though it is not in the correct
8 position.

9 DR. D'ANTONIO: Yes, that is an important
10 observation, and I can't say with certainty what happened in
11 those cases but my assessment is that in those three cases
12 there were very small chips on the periphery and my guess is
13 that the cant or the misalignment was very, very minor and,
14 as it seated, a small peripheral chip was created and the
15 surgeon felt that at that point they were fully seated and
16 locked in, and they didn't think it was a problem, and
17 clinically there hasn't been a problem.

18 Again, it is important to note that in those cases
19 that have been studied where we have intentionally canted,
20 created a chip, they failed very rapidly with very-low force
21 loads. So, they won't last in that situation if they are
22 chipped and are in a canted position.

23 DR. CHENG: So, it would raise the question in my
24 mind that perhaps the company should devise some type of
25 extraction mechanism other than having to fracture it with

1 an osteotome if, indeed, that can be done.

2 DR. D'ANTONIO: Another advantage to the ABC is
3 there is an extraction mechanism. You can actually grab the
4 metal shell and remove it --

5 DR. CHENG: You mean the Trident?

6 DR. D'ANTONIO: Yes, I mean the Trident. With the
7 ABC System you can't. That ceramic liner is recessed and
8 there is really no access to it unless you can get to the
9 back of the cup and tap it out, which you can't do.

10 DR. CHENG: I have a few more questions if you or
11 someone would be willing to address them. In your control
12 group it looked like the revision rate was more than one
13 might expect from just the historical experience with metal-
14 on-polyethylene devices. I recall a figure of five percent
15 at two years. Do you have any opinion as to why it appears
16 to be a little bit higher, your control, than what you might
17 want in your own practice?

18 DR. D'ANTONIO: Yes, I think that is a good
19 question. I think if you critically look at the reasons for
20 failure for each one of those, there wasn't a single device-
21 related failure. They were all due to other factors, such
22 as trauma, fracture of the femur, infection, dislocation.
23 So, these are things that do occur and I think if you
24 critically look at series, you know, most series that are
25 reported talk about mechanical loosening so you see these

1 very small numbers. But if you go and look at any potential
2 revisions, then you will find some of these factors in every
3 series.

4 I think what is important is that both in the
5 control as well as the ABC I and II, as well as the Trident,
6 no revision was a result of the failure of the device.

7 DR. CHENG: Did I misread your data? Is this a
8 reoperation rate or revision rate?

9 DR. D'ANTONIO: In other words, one of the
10 reoperations was to repair a fractured femur and, you know,
11 by the guidelines of the study that has to be reported as a
12 failure because it was a reoperation even though it wasn't
13 device related. Of course, there was an infection, one i
14 the control group and one in the ABC group, and there were
15 two reoperations for recurrent dislocation, which is a
16 technical positional thing, placing the implants. So, we
17 didn't have mechanical failure of the implants but we had
18 reoperations for a variety of complications postop.

19 DR. CHENG: Raising the metal lip relative to the
20 ceramic liner means that you would rather have the-titanium
21 femoral neck impinge on the metal liner and I understand
22 why. However, the titanium, being a soft metal, does wear
23 faster than cobalt chrome. So, I am wondering if you have a
24 titanium shell wearing at a titanium liner with the
25 impingement -- I guess it is unknown what will happen in

1 terms of any additional wear at the ceramic-to-ceramic
2 interface as a result of that. I don't know if any testing
3 has been done to look at that. I mean, we all know that
4 impingement occurs because we see that on the polyethylene
5 liners when we revise those for failure.

6 DR. D'ANTONIO: As far I know there hasn't been
7 any testing but maybe Michael can answer that question.

8 DR. MANLEY: Michael Manley. As you correctly
9 said, impingement will occur somewhere in these systems, and
10 probably the most damaging place for that to occur, for the
11 ceramic at least, is between the neck of the femoral stem and
12 the ceramic itself. So, the option for solving that is to
13 raise the lip of the acetabular component so impingement, if
14 it occurs, occurs between the titanium alloy neck and the
15 titanium rim of the implant.

16 Now, you have to also think about what happens if
17 you do the opposite, if you let impingement occur between
18 the ceramic and the titanium neck. It is not only the
19 ceramic that is at risk under these circumstances, it is
20 also the titanium alloy neck of the implant. Because the
21 ceramic is very hard it would score the neck of the femoral
22 component, and then you could put the femoral component at
23 risk for breakage.

24 So, the safest thing to do, knowing that
25 impingement is going to occur somewhere, is to have it

1 between two metal surfaces.

2 DR. CHENG: I would agree. I would just have some
3 concern that titanium-on-titanium does have high wear
4 characteristic, as we saw in the knees, for example, or
5 other places; we have titanium debris. But I understand
6 your rationale for doing that.

7 DR. BOYAN: Dr. Cheng, let me go around and then
8 give you another chance on a second round.

9 DR. CHENG: Fine.

10 DR. BOYAN: Dr. Yaszemski, are there questions
11 that you would like to ask?

12 DR. YASZEMSKI: No, I think all the issues have
13 been covered, but I am just going to restate the issue that
14 is most concerning to me. I think Dr. Larntz said it well
15 in his summary, and that it that it seems that Trident is an
16 improvement in a lot of ways over I and II, and yet we have
17 just 70 or so days, and to take it on faith -- I think we do
18 need to see what is going to happen to them. To try to
19 predict the future and use that as a basis for making a
20 decision is the thing that concerns me, although it seems
21 like a clear improvement over the other two.

22 DR. MANLEY: May I comment on that ?

23 DR. BOYAN: Briefly.

24 DR. MANLEY: Thank you. If this was a 510(k)
25 device, which it is not but if it was, approval would be

1 based on mechanical testing in the lab. Now, if you look at
2 what has happened with the design and development of the
3 Trident, all of the lab testing has shown that it is at
4 least equivalent to the ABC. So, the only thing that is
5 left is does it solve the intraoperative problems. In fact,
6 you can make that decision in 75 days because it either
7 performs well at surgery or it doesn't.

8 The mechanical testing shows equivalence and the
9 75-day clinical data shows that the problem has been solved
10 with Trident. So, as the articulation is identical to the
11 ABC and the other implant components are identical, I think
12 you can predict that the Trident will perform just the same
13 as the ABC at two years.

14 DR. BOYAN: Thank you. At this point we are
15 asking factual questions, if you can limit this part of the
16 panel meeting to factual questions. Yes?

17 DR. FINNEGAN: I have two questions on
18 biomaterials. There is no addressing the effect of the
19 screw in the cup on the ceramic, particularly over time as
20 the polyethylene probably reacts to it even though you are
21 using a better type of polyethylene. Has anyone looked at
22 that?

23 DR. MANLEY: None of the liners can actually touch
24 the screw heads. They are recessed into the acetabular
25 shell. So, there is no contact between the ceramic and the

1 screws.

2 DR. FINNEGAN: Okay. Is there polyethylene
3 between the ceramic and the screw?

4 DR. MANLEY: No.

5 DR. FINNEGAN: My second question was for those
6 potential chips that go unseen and stay inside the patient,
7 do you have any concept of how much elution of alumina there
8 is out of the material?

9 DR. MANLEY: We don't believe there are any chips
10 that stay unseen. We can have Dr. D'Antonio address that
11 issue, but the chips are very easy to see at surgery because
12 they get stained by body fluids and they are completely
13 obvious.

14 DR. FINNEGAN: Let me rephrase my question. If
15 there are postoperative chips that should occur unbeknown to
16 you, do you have any idea of how much alumina is eluted and
17 what the elution rate is?

18 DR. MANLEY: From the chipped region itself?

19 DR. FINNEGAN: Or from the chipped cup.

20 DR. MANLEY: I am not quite sure how chips can
21 occur post -- as long as they don't occur at the time --

22 DR. FINNEGAN: What I am concerned about is there
23 are some concerns that alumina may have some generalized
24 systemic problems over time depending on the concentration
25 of it, so I am wondering if you have any data to show how

1 much the alumina elutes out or what the elution rate is for
2 alumina out of your cup and out of the chip.

3 DR. MANLEY: We have no data on that but the
4 literature does suggest that alumina particles are less
5 active than polyethylene particles. In fact, the particle
6 size of alumina bearings -- according to the literature --
7 compared to the particle size of polyethylene are about the
8 same. So, there does not seem to be any biologic concern
9 with alumina particles.

10 DR. FINNEGAN: But you have no data?

11 DR. MANLEY: I am discussing the literature; we
12 have no data ourselves.

13 DR. BOYAN: Without meaning to cut anybody off,
14 are we covering most of the issues? Are there other
15 substantive issues that need to be addressed? Do not feel
16 obligated to ask them questions because we still have a
17 chance to make comments. Dr. Larntz?

18 DR. LARNTZ: No questions.

19 DR. BOYAN: Dr. Li?

20 DR. LI: I think they are short. This has to do
21 with the flexion angle prior to getting impingement.
22 Because you have the raised metal shell to protect the
23 ceramic, if a surgeon has a 55 mm OD shell and a 28 mm ID
24 femoral component, because of that raised shell is there
25 reduced amount of flexion angle prior to impingement than a

1 surgeon would normally expect to get?

2 DR. MANLEY: For a given size, yes, but you have
3 to bear in mind here that with the ceramic articulation you
4 would use a bigger head. There is a reduction of about 1.5
5 degrees because of the raised lip but with the ceramic-
6 ceramic bearing the surgeon will use a 32 mm or a 36 mm head
7 which are not available in polyethylene.

8 DR. LI: I understand that, I just wonder if this
9 is one of the educational things you would need to tell the
10 surgeon, that you are going to lose a degree or two because
11 of that lip. It is not really a deficiency.

12 The second question, and I don't know if it is a
13 fair question, Dr. D'Antonio, when this gets released
14 commercially there are going to be surgeons probably a lot
15 less familiar or skilled than yourself and the
16 investigational surgeons that are in the study. Typically,
17 the average orthopedic surgeon puts in one or two a month.
18 Under those conditions, for the surgeon who does this
19 essentially part time, do you think this alignment issue is
20 going to be a bigger deal with somebody who is maybe not as
21 aware of all the issues?

22 DR. D'ANTONIO: I think it is. I think that they
23 will have to be educated as to this risk, and they are going
24 to have to be careful when they put it in and, you know, we
25 will have to write a protocol for them to understand how to

1 assess this before they try to impact it and seat it. I
2 think that is an important issue with ABC.

3 DR. LI: The last question, if you have a Trident
4 system and for some reason you have to revise that system,
5 under what conditions is it indicated that you swap the
6 ceramic liner for a polyethylene liner?

7 DR. D'ANTONIO: For a Trident?

8 DR. LI: For a Trident, yes, because you have the
9 option of revising for a ceramic or a polyethylene. Under
10 what condition would you actually want to put a polyethylene
11 liner in there?

12 DR. D'ANTONIO: Well, that is a question that we
13 will be better prepared to answer as time goes on because of
14 the new polyethylenes that are available. I think that if
15 you were able to remove the Trident liner without much
16 difficulty and without any obvious damage to the inside of
17 the Trident cup, I would feel very comfortable in returning
18 another Trident liner into that shell. If I had any
19 questions about it, then I probably would put in a cross-
20 linked polyethylene. You know, you have that flexibility to
21 do that.

22 DR. LI: So, there is no obvious reason. Perhaps
23 Howmedica Osteonics can answer. Is there any technical
24 reason, other than marketing or choice reason, that you
25 would have the option of putting a polyethylene liner in at

1 revision?

2 DR. MANLEY: There is one obvious one, and that is
3 you can produce a polyethylene liner with an offset face.
4 So, if you wanted stability you could put in a 10 degree
5 liner.

6 DR. LI: Other than that, is there a reason?

7 DR. MANLEY: No, it is just intraoperative
8 flexibility.

9 DR. BOYAN: Dr. Aboulafia?

10 DR. ABOULAFIA: I just have two questions but I
11 will start with a comment. The first one is that this issue
12 of ceramic-on-ceramic came before the FDA once before and
13 one of the biggest concerns was that if you had to revise
14 the cup would you have to take the whole cup out, and that
15 has been answered by the Trident. So, starting out by
16 saying something nice, I think that is a huge improvement,
17 that you don't have to take out the entire cup at the time
18 of revision.

19 The question then becomes how easy is it to change
20 the line in the Trident-cup? Were any of them changed? I
21 know there were two revisions. Have there been any
22 revisions of the Trident cup, and were you able to exchange
23 the liner, after it had been in for some period of time,
24 without difficulty?

25 DR. D'ANTONIO: I am not aware of any. Mary Beth,

1 do you want to address that?

2 DR. NAUGHTON: I am Mary Beth Naughton. I am with
3 Howmedica Osteonics, senior clinical analyst. There have
4 been no revisions in the Trident study so we haven't done
5 that yet.

6 DR. ABOULAFIA: It would just be nice to know if
7 that works. Do you know what I mean?

8 DR. NAUGHTON: Yes.

9 DR. ABOULAFIA: That is one of the two advantages
10 of the Trident. Then, the only other question I had was all
11 the trials were done with none cemented femoral components.
12 Do you intend to market this as exclusively indicated for
13 non-cemented femoral components, of cemented and non-
14 cemented femoral components?

15 DR. BUSHELOW: Mike Bushelow. I would just like
16 to comment on the previous question about using the removal
17 tool. It has been used in the lab. Loads up to 600, 700
18 lbs. placed on the components, 10 million cycles fatigue,
19 and the tool has been used to remove it.

20 DR. MANLEY: Your question about whether-the
21 company would market this on cemented stems, there is a
22 difference between the ease of getting these ceramic heads
23 through pass/fail criteria on cobalt chrome stems compared
24 to titanium stems. So, until that development is done it
25 would be press-fit stems only, titanium stems. I am sure

1 that once the ceramics have been improved enough to get
2 through the criteria on cobalt chrome stems, then the
3 situation may change.

4 DR. BOYAN: Dr. Butcher, any questions you would
5 like to address?

6 MS. BUTCHER: Yes, there are. I guess my
7 questions are coming from a consumer's perspective. The
8 application appears to say that you want to market both
9 Systems I and II, as well as Trident. My question as a
10 consumer is how do I pick, or how do you pick on my behalf?
11 Do I get Trident, do I get a I or a II? And, how do you
12 educate the physicians on their choices?

13 I too had a question relative to discarding failed
14 devices in terms of throwing them away instead of taking
15 them and studying them, and determining why they failed or
16 how they might be of service in that way.

17 DR. D'ANTONIO: Very good questions. The
18 selection process becomes one of sometimes religion and
19 sometimes actual fact. At this point in time, I would
20 select to use the Trident System with the roughened Arc-
21 Deposited titanium surface with HA. The reason for that is
22 all the reasons we gave for Trident over ABC with regard to
23 flexibility for removal, safety of insertion and the ability
24 to revise with greater ease.

25 MS. BUTCHER: I think I would choose that also.

1 Having studied all that you have given me to study, I think
2 I would choose that also. So, then my question becomes why
3 would you want to market I and II when you have already
4 moved to the third level which appears to be an improvement
5 in terms of ease of insertion and all of the things that you
6 have shared with us?

7 DR. D'ANTONIO: You know, I can't speak for the
8 company. I think that they may have to market both for
9 other countries. Maybe other countries would not allow
10 Trident, I am not sure. I think probably in this country
11 they would prefer to market Trident but I think to have them
12 both available --

13 DR. BOYAN: I am going to take the chairman's
14 prerogative. I think this is a philosophical marketing,
15 commercialization question and really isn't our issue here.
16 So, let's table that particular question.

17 DR. D'ANTONIO: All right. There was another
18 issue about the different surfaces. We haven't solved the
19 problem of fixation long-term on the socket side. We are
20 still starting to see, at 10 and 15 years, socket loosening
21 with porcine-growth sockets, and we are hoping that this new
22 surface will give us even better fixation than what has been
23 very good fixation with the titanium porous coated surface.
24 So, that is why I would like that implant.

25 DR. BOYAN: Dr. Silkaitis, anything?

1 DR. SILKAITIS: I don't have a question to the
2 company but I was just thinking about the fact that what
3 makes this product a PMA product is the articulating
4 surface, ceramic-on-ceramic, which obviously we need
5 information on and the company has provided.

6 The question becomes when you have design
7 modifications to the implant, does that necessarily put it
8 into a PMA class. The articulating surface is the same for
9 both the Trident and the other system. So, then data is
10 being provided on the articulating surface which is the
11 subject of the PMA. That is a comment that I have.

12 DR. BOYAN: Thank you for the comment. Because I
13 changed things around a little, I do want to give everybody,
14 and Dr. Cheng first, the opportunity to make last comments
15 before we go to the panel questions. So, why don't we start
16 with Dr. Cheng, if you have any remaining issues. In this
17 particular instance I would like there to be as few
18 questions as possible. This is more of an opportunity --
19 you can ask your questions because I made you wait, but this
20 has been more of an opportunity for us to get any comments
21 out into the record that any panel member might like to
22 make.

23 DR. CHENG: I have just one question and one
24 comment. The question is on your outcome measurements and
25 the statistical analysis. Why was the Harris Hip Score

1 chosen as the outcome measurement when, to my knowledge, it
2 is not validated yet as a reproducible measurement and
3 perhaps may not be sensitive enough to pick up a small
4 difference that you would like to show, either beneficial or
5 not beneficial to your product at two years? And, analyzing
6 it actuarially with a Kaplan-Meier survival analysis and
7 comparison between the two curves may be a little bit more
8 sensitive way for comparing time-dependent data rather than
9 the actual numbers at two years for the patients that you
10 have.

11 DR. MANLEY: When the study was designed four or
12 five years ago, the standard in ID type studies was the
13 Harris Hip Scoring system. I have taken the same issue as
14 you, that it is not sensitive enough to look at fine
15 differences between these very similarly performing systems,
16 but it was the standard. So, unfortunately, that is what we
17 have.

18 DR. CHENG: My only comment, Dr. Boyan, is that it
19 seems to me that in the analysis of this product the
20 advantage to it is for its long-term benefit in terms of
21 wear characteristics for younger patients who are going to
22 need that benefit. However, we really don't have the
23 information right now on hand, even with the two-year data
24 in my opinion, to show that the long-term benefit is there.
25 So, if I am a surgeon or a consumer I don't see why there is

1 an advantage to this. There is definitely a theoretical
2 advantage but no proven advantage to the product until we
3 can see some longer-term data.

4 So, how long does that have to be? I don't have
5 the answer to that. Dr. Lyons raised that -- three years,
6 four years, five years. But I know that history is replete
7 with examples of products that look fine at two years and
8 then we find out later on in the real-world experiment that
9 they are not working out as well as we would like or had
10 hoped they would work out.

11 So, hopefully, your product is going to be a large
12 benefit to the younger patients but in actuality this panel
13 and everyone in this room, we don't know.

14 DR. MANLEY: May I comment on that?

15 DR. BOYAN: Actually, unless you have a factual
16 comment, based on data, I would like --

17 DR. MANLEY: I have a factual comment based on
18 data.

19 DR. BOYAN: Okay, good. Go for it.

20 DR. MANLEY: The lab testing on ceramic-ceramics,
21 and hip joint simulators represent fairly well what happens
22 clinically, show that wear on ceramic-ceramic bearings is
23 three orders of magnitude less than conventional
24 polyethylene. Those are real data.

25 DR. CHENG: You know as well as I that laboratory

1 testing does not always indicate what will happen in the in
2 vivo situation. So, as much as we would like to use it as a
3 model and think it will help, and there are benefits, it
4 still doesn't answer the question is this a better
5 prosthetic device to use in the patients who need that
6 longer-term benefit.

7 DR. BOYAN: Thanks, Dr. Manley. Dr. Witten?

8 DR. WITTEN: I just want to make one
9 clarification, which is that what we are going to be asking
10 the panel when we ask for the vote is based on reasonable
11 assurance of safety and effectiveness, and not whether or
12 not there is a benefit compared to another product on the
13 market unless that was a claim that the sponsor was
14 particularly planning to make. So, in other words, that
15 would just be based on if there were a claim but otherwise
16 it is reasonable assurance of safety and effectiveness.

17 DR. BOYAN: Thanks, Dr. Witten. Are there any
18 comments that any member of the panel would like to make
19 before we move to the panel questions? Dr. Lyons?

20 DR. LYONS: I-just have one question, probably of
21 the FDA. We are looking at the articulating surface; we are
22 not concerned primarily about the metal-on-metal locking
23 mechanism. Right?

24 DR. WITTEN: No, that is not correct. When you
25 are going to be evaluating the product, it is the whole

1 product. That is the whole product and what the safety and
2 effectiveness of that product will be as experienced by the
3 patient. So, it is not the articulating surface that you
4 are evaluating, it is the product.

5 I think the point that Dr. Silkaitis was making
6 was that it is the articulating surface that makes this
7 different from some other things that are on the market
8 under a 510(k) process, but that doesn't mean that you are
9 evaluating the articulating surface; it is the product you
10 are evaluating, or products in this case.

11 DR. BOYAN: Thank you for that clarification. Any
12 further questions or comments?

13 [No response]

14 Then I would like for the first panel question to
15 come up, panel question number one. You all have this in
16 your handout, these questions.

17 **Panel Questions**

18 [Slide]

19 MR. ALLEN: This is question number one to the
20 panel. Intraoperative chipping of the ceramic insert was
21 reported in 16 of 466 cases implanted with the ABC Systems
22 ceramic insert for a chipping rate of 3.4 percent. Please
23 provide input on whether you consider this chipping rate to
24 be of clinical concern.

25 If you believe this to be of a clinical concern,

1 but not one that would preclude you from recommending
2 approval of the ABC System, then please provide input on
3 what additional steps the sponsor should take, if any, to
4 reduce this rate.

5 DR. BOYAN: I would like to ask Dr. Lyons to take
6 the first stab at answering this question.

7 DR. LYONS: I think the finding of chipping is of
8 concern, but I don't think it would preclude the use of the
9 product because I think it is explained principally by
10 implantation techniques which can be addressed by proper
11 education, warnings and technique book.

12 I think long-term we should follow the product
13 more because ceramic may be sensitive to impact loading that
14 is not seen at the time of surgery, and with patients and
15 time things change. There can be some changes that I would
16 be a little concerned about, but I would not preclude the
17 use. You would never know if that could ever happen unless
18 you implanted the devices. So, I think it is a concern but
19 not to preclude use of the product.

20 DR. BOYAN: I-would like to make one brief
21 comment, and this is really for the company's interest. I
22 think what Dr. Finnegan was trying to get to was leaching of
23 ions, not particulates, and that it might not hurt to take
24 some chipped inserts and put them into solution and look at
25 the ion leaching over time because there is a degree of

1 toxicity to cells from alumina that is now becoming pretty
2 well understood.

3 Any other comments related to the chips? Dr. Li?

4 DR. LI: I agree with what Dr. Lyons said. The
5 only thing I would add to that, because I don't think the
6 chipping would preclude my accepting this application, but I
7 think it would be, in my mind anyway, useful to provide some
8 additional testing of the type Dr. D'Antonio alluded to,
9 that if you have a chip, and it is canted, and you loaded it
10 is really bad -- to actually document that to drive home the
11 problems of the canting as part of the education. So, I
12 think I would add to that some additional testing just to
13 make the education a little more obvious as to why it is so
14 important.

15 DR. BOYAN: Dr. Finnegan, did you have a comment?

16 DR. FINNEGAN: I just want to say I support Dr.
17 Li's comments.

18 DR. BOYAN: Good. Dr. Larntz?

19 DR. LARNTZ: I would just like to have every
20 clinical answer that question yes or no, whether the
21 chipping is clinically relevant -- every clinical. Is that
22 okay to ask?

23 DR. BOYAN: Sure. Let's go to Dr. Cheng and then
24 we will just do a quick summary of the clinicians and ask
25 them. Dr. Cheng?

1 DR. CHENG: Well, the chipping is definitely
2 clinically important and relevant, but I think it is
3 addressable as long as some type of extraction is available
4 so that in those cases where it does become wedged in place,
5 like a mis-threaded screw or something, you have a means for
6 getting it out and can reimplant another liner. I don't
7 know if you have data to show that the metal shell is not
8 damaged by the canting or the wedged implant.

9 DR. BOYAN: Dr. Aboulafia?

10 DR. ABOULAFIA: Related to this, at the risk of
11 going backwards I have a question for industry sponsor or
12 physicians --

13 DR. BOYAN: Do a favor for me, phrase it as a
14 comment and at the end of all the panel questions I am going
15 to let them come up and have one last moment to fix anything
16 we say that causes them stress.

17 DR. ABOULAFIA: Okay. In the form of a comment,
18 it would help me to know if the incidence of chipping --
19 what it was per physician. In other words, there are some
20 physicians who are probably a little more bull-like than
21 others, and knowing some of the people who are involved in
22 the study, I wonder if there were physicians that had maybe
23 three or four incidents of chipping, whereas another
24 physician had zero with near equal numbers of patients, and
25 might that not reflect or impact on how significant this

1 problem really is.

2 DR. BOYAN: Thank you. Any other comments? There
3 is a question from the panel. I would like just to see from
4 the surgeons a response to this question, do they find -- I
5 don't know how to phrase the question. Dr. Larntz, you
6 phrase your question.

7 DR. LARNTZ: I seem to be hearing it is a clinical
8 concern, then I seem to be hearing "but it's addressable"
9 but it sounded like there were two or three different ways
10 to address it. So, I am getting a little more confused as I
11 hear the answers. So, the first thing is, is it a clinical
12 concern? I would break it up like that.

13 DR. BOYAN: What I have heard is it is a clinical
14 concern, and it is addressable. Maybe we can go around the
15 room really quickly and ask them what they think is the
16 preferred method for addressing it, which is the question
17 that the FDA is asking. How would you address it?

18 DR. ABOULAFIA: I think I have already said I
19 would still want to know, in order to address it, whether it
20 is a problem that they saw associated as surgeon specific or
21 in general. That does help me determine the second part of
22 the question, which is how they address it.

23 DR. BOYAN: Dr. Finnegan, do you have any comment?

24 DR. FINNEGAN: Only that I think education is
25 mandatory, and probably some visual education as was

1 described as mandatory.

2 DR. BOYAN: Dr. Yaszemski, anything?

3 DR. YASZEMSKI: I think Dr. D'Antonio's
4 description was well stated -- recognize it, do something
5 about it and try to educate future surgeons that it can
6 happen.

7 DR. BOYAN: Any other comments?

8 [No response]

9 All right, have we addressed this question to the
10 satisfaction of the FDA, Dr. Witten?

11 DR. WITTEN: Yes, thank you.

12 DR. BOYAN: Okay, let's go to question number two,
13 Mr. Allen.

14 [Slide]

15 MR. ALLEN: The sponsor has provided minimal
16 clinical data for the Trident System compared to two-year
17 clinical and radiographic data for the ABC Systems. The
18 sponsor believes that the clinical data for the ABC combined
19 with the clinical safety data and mechanical testing results
20 for the Trident are adequate to support the safety and
21 effectiveness of the Trident System.

22 Please provide input on whether the combined data
23 are appropriate and adequate to assess safety and
24 effectiveness for the Trident System.

25 DR. BOYAN: Thank you. I guess, Dr. Larntz, this

1 is right at you. Would you like to start the panel
2 comments?

3 DR. LARNTZ: Well, the answer is I don't know
4 without the data, so I guess the answer is it is not
5 adequate. Two-year data on failure for Trident seems to be
6 important because changes were made. If changes were made
7 it wouldn't work better on the interoperative aspects but I
8 will defer to others to enlighten me on the specific device
9 configuration that would make it so they were the same.

10 DR. BOYAN: Comments? Dr. Finnegan?

11 DR. FINNEGAN: Actually, I have a procedural
12 question for Dr. Witten. If the Trident were to stay on an
13 IDE and over a period of time there was such a statistically
14 significant improvement that it was obviously in the best
15 interest of the patients to have it approved, could that be
16 done without much ado?

17 DR. WITTEN: If what you are asking is would it be
18 our options about taking it back to panel or not, the answer
19 is yes.

20 DR. BOYAN: Dr. Yaszemski, any comment?

21 DR. YASZEMSKI: No, I agree with Dr. Larntz. It
22 appears in all respects to be superior but I am always
23 concerned about trying to predict the future without data.

24 DR. BOYAN: Dr. Cheng?

25 DR. CHENG: I don't think you can combine the two.

1 DR. BOYAN: Dr. Lyons?

2 DR. LYONS: I think it is alright from a geometric
3 materials standpoint. The only concern I would have is the
4 articulation to extract. If it is as easy to extract as it
5 is designed to be, it is going to be superior -- I mean, it
6 is easier to revise. If that articulation -- which I
7 honestly didn't look at to be the principal question from
8 the three that were given -- locks up and you have trouble
9 getting that out, that is the only concern I would have and
10 statistically we don't have any revisions to work with. So,
11 I can't say from a statistics standpoint. That is the only
12 comment that I would have.

13 DR. BOYAN: Dr. Silkaitis, would you like to make
14 any comments on this?

15 DR. SILKAITIS: I just wanted to make a comment to
16 Dr. Witten that I understand that it is not only the
17 articulating surface but the product that is under review
18 here. But I guess I am wondering, at least for the benefit
19 of industry in general, when there are design changes to
20 address a particular issue, in this case, when does that
21 design become significant enough that it gets back to
22 needing the full complement of information? Is the data
23 from the ABC System enough to shed light on what is going to
24 happen with the Trident? That is all I have, and I
25 understand from the clinicians point of view that obviously

1 more data is helpful but is the mechanical data helpful to
2 be able to answer some of those questions?

3 DR. BOYAN: Thank you. Dr. Butcher?

4 MS. BUTCHER: I concur with the discussion
5 relative to not having sufficient data, but it concerns me,
6 in balancing, will this discourage people from going to the
7 next level and improving products and bringing them forward
8 in a timely manner or in this manner, or where do we draw
9 the line. I am listening to the experts and I still kind of
10 fall on the side of questioning.

11 DR. BOYAN: Any comments, Dr. Aboulafia?

12 DR. ABOULAFIA: Yes, very briefly, I think the
13 question for Dr. Silkaitis is are they substantially
14 equivalent, and if we are going to require different
15 standards for the ABC versus the Trident, it would fall
16 probably under the rule of substantially equivalent or not.

17 DR. WITTEN: May I provide some clarification?

18 DR. BOYAN: Yes, please.

19 DR. WITTEN: Actually, what Dr. Silkaitis said is
20 what we are trying to get at with this question. So, maybe
21 we didn't put it right. I think actually we want to hear in
22 particular from Dr. Li -- perhaps I should have had Dr.
23 Silkaitis ask this question but the sponsors are always
24 making design modifications during the course of product
25 development and sometimes we don't have them repeat

1 everything from first principles. We have to make an
2 assessment -- and this happens all the time, we have to make
3 an assessment as to whether or not their design change would
4 have a negative impact on the parts of the product that were
5 already performing well. You know, we see that it solved
6 the problem that it was designed to solve but the question
7 is, is the engineering data and the short-term clinical
8 results -- does that show that you can use the clinical data
9 from the ABC System at two years to support this product,
10 and the sponsors made the point that they think the
11 important thing with the clinical data that needed to be
12 addressed had to do with the articulating surface and, you
13 know, maybe some other things that they talked about in
14 their study. And, that is really our question, can you make
15 that link? It is not really substantial equivalence. It is
16 what effect the design modification of the product has on
17 the expected performance.

18 DR. ABOULAFIA: I am not concerned with the same
19 things as Dr. Lyons is. He said we have no revisions. I
20 think that is something you can test in the lab, and we
21 asked that and it was answered -- we tried to pull it apart,
22 it pulled apart. Maybe it did it a thousand times or a
23 hundred, but it worked. My issue is more whether there is
24 an increased incidence of corrosion because you are adding
25 another metal and it is going to potentially provide a long-

1 term complication that would be unforeseen in the ABC
2 System. Having said that, I compliment the industry for
3 trying to make a modification to improve and address some of
4 the concerns.

5 DR. BOYAN: Dr. Li?

6 DR. LI: My comment is basically the same. I
7 think although my personal expectation is that the Trident
8 will perform the same or better than the ABC at two years,
9 it seems an odd place to stop your study, after 75 days,
10 after all the work you have done because it won't be the
11 first time in orthopedics that you try to solve one thing
12 only to create some unforeseen problem.

13 There is a difference between the two systems.
14 There are manufacturing, quality and chemical reasons
15 related to the titanium alloy sleeve. Now, you may have
16 addressed them all and it may be perfectly fine but it seems
17 like an odd place to stop the study at this point rather
18 than just complete minimally the two-year period because,
19 again, if -- and it is a big if crevice corrosion in a piece
20 of thin titanium alloy that is under some high tension -- it
21 does have a higher penchant for crevice corrosion and you
22 are not really going to see that for five or six years. So,
23 I think two years would be minimal.

24 DR. BOYAN: Dr. Larntz, did you have a comment?

25 DR. LARNTZ: Yes, very briefly. This is too much

1 to put on people but, I mean, I really think you did the
2 right thing; you found the problem and you improved the
3 device. That is great. And, now some statistician says but
4 you didn't go out to two years to prove, you know, failure.
5 The question I have to our clinicians and engineers is do we
6 believe that there is a substantial risk that we are going
7 to have failure rates that are higher? If we don't believe
8 that -- it is my understanding that you are going to do the
9 two-year study. I mean, you are not going to stop the
10 study. Right? Because if you said that I would take all
11 bets back.

12 You are doing a good study so keep it up. Don't
13 lose your follow-up. But the question to me is I don't want
14 to say, you know, there is a two percent chance or a five
15 percent chance or a ten percent chance. You know, we have
16 to take a little bit of risk in making a statement. Do we
17 believe there is more than a 25 or 30 percent chance that it
18 is going to fail at this time? I am not looking for two and
19 three percent. I am looking for something that seems
20 reasonable. Then they are going to have the data and they
21 are going to report the data. So, I am not saying that.

22 But I agree completely that design changes are
23 made all the time. We can statistically analyze every
24 design change and we might never approve anything. So, we
25 have to be very careful on this. But, do we in fact believe

1 there is a substantial risk? I have heard some concerns but
2 the question to my mind is, is it enough to say, you know,
3 there is 25 percent chance it is going to fail? I would put
4 it at that kind of level. If it is less than 25 percent
5 chance I would feel comfortable with saying go ahead.

6 DR. LI: Can I ask a clarification question?

7 DR. BOYAN: Yes.

8 DR. LI: If the sponsor is going to complete the
9 data and do the report anyway, what is the purpose of this
10 question?

11 DR. BOYAN: I think, Dr. Witten, what Dr. Li is
12 asking you is what we are all wondering. As I understand
13 it, there will come a point here where -- we understand what
14 your issue is but I think what we are wondering is can we
15 separate the ABC question from the Trident question.

16 DR. WITTEN: You can certainly do that. I mean,
17 we are asking you about both systems. You can separate them
18 out when the time comes. The purpose of this question is
19 really to ask about the approvability of the Trident System
20 because the question about the study is going to be is it
21 pre-approval -- you know, they already demonstrated
22 reasonable assurance of safety and effectiveness but there
23 are some other things you want them to be able to tell you
24 after approval, or do you think they need to complete it
25 before approval. That is kind of what it is going to end

1 up, in part I suppose, coming down to.

2 DR. LI: Not to complicate it but would a voting
3 option be to approve it until the two-year data comes out
4 and then they get to evaluate it at that point?

5 DR. WITTEN: No.

6 [Laughter]

7 DR. LI: I tried!

8 DR. BOYAN: We are going to get to the options in
9 a second. Are there any other comments about question
10 number two? Dr. Cheng? Dr. Lyons?

11 [No response]

12 FDA, have we answered question number two to your
13 level of satisfaction?

14 DR. WITTEN: You have answered question number
15 two.

16 DR. BOYAN: Now, question number three, Mr. Allen.

17 [Slide]

18 MR. ALLEN: If the PMA is approved, do you believe
19 that a post-approval study is warranted given that the long-
20 term performance data for ceramic-on-ceramic hip systems is
21 limited when compared to traditional metal-on-polyethylene
22 and ceramic-on-polyethylene hips?

23 If yes, please provide input on what type of data
24 you believe would be beneficial in evaluating the long-term
25 performance of the ABC and Trident Systems.

1 DR. BOYAN: Do we have a volunteer to start off on
2 this one? Yes, Dr. Larntz?

3 DR. LARNTZ: Data are needed. I don't know if
4 five years or ten years. You certainly have to complete
5 your two-year study. If I have heard right, and I am trying
6 to listen as best I can, there are potential difficulties
7 going out with years and that is difficult to put on one
8 sponsor but someone has to organize it with respect to these
9 devices to make sure those long-term follow-ups are done.
10 Whether it is done under FDA auspices or not is a question,
11 but it is clear if complications are going to be ten years
12 out -- how long are these going to be in people? You need
13 studies that go that long.

14 DR. BOYAN: Dr. Finnegan, do you have any comments
15 on this question?

16 DR. FINNEGAN: Only to say that I do think
17 postmarket surveillance is needed, and I think a minimum of
18 five years is needed.

19 DR. BOYAN: Dr. Yaszemski?

20 DR. YASZEMSKI: No additional comment.

21 DR. BOYAN: Dr. Cheng?

22 DR. CHENG: I guess I would vote for premarket
23 surveillance of five years. I mean, this is not an
24 emergency here. People aren't dying because they don't have
25 hips. There are plenty of appliances to put in people. Dr.

1 Witten asked us is it safe and effective? All I can say is
2 at two years it is safe and effective, but that doesn't help
3 me, unfortunately.

4 DR. BOYAN: Dr. Lyons?

5 DR. LYONS: I think postmarket study is warranted.
6 I would say five years would be real reasonable. I have no
7 upper limit. I don't want it to be burdensome but five
8 years isn't very long -- I think a minimum.

9 DR. BOYAN: Dr. Silkaitis?

10 DR. SILKAITIS: I have no comment at this time.

11 DR. BOYAN: Coming around to you, Dr. Aboulafia?

12 DR. ABOULAFIA: Nothing to add.

13 DR. BOYAN: So, did we cover everybody? Everybody
14 has answered this but Dr. Witten still wants to know
15 something.

16 DR. WITTEN: Well, I wonder if Dr. Li has any
17 additional comments. That is one question. Then, the
18 second question I have I guess is for Dr. Finnegan or Dr.
19 Lyons, which is if you have anything specific that you think
20 we ought to be looking for in this five-year or so-longer-
21 term study.

22 DR. BOYAN: First you, Dr. Li.

23 DR. LI: Really just to echo the original
24 comments, but maybe to follow on Dr. Witten's question, what
25 I would look for probably in the five to ten year period for

1 the reasons that all the other ceramic-on-ceramic devices
2 failed, I would look for mainly loosening. In this
3 particular case I would look for evidence in the Trident
4 case for failures related to the titanium alloy sleeve.
5 History tells us you are going to have to wait a minimum of
6 five years to begin to see those problems bump up, but
7 probably less than ten.

8 DR. BOYAN: Dr. Finnegan?

9 DR. FINNEGAN: And, I think you can do it in a
10 fairly least burdensome way. Pain is usually a significant
11 presenting complaint, so subjective complaints from the
12 patient on their yearly visits and then x-rays should be
13 sufficient.

14 DR. BOYAN: Dr. Lyons, anything to add?

15 DR. LYONS: No, I think specifically what you are
16 looking for is the locking mechanism-sleeve-shell interface
17 issues which would be corrosion, fatigue, all the changes
18 that you would see if you do extract. So, retrieval data is
19 helpful as far as extracting, a surgeon will tell you if it
20 is locked in there or if it easy to extract. So, I am
21 looking more for that data. That is what I would
22 specifically look for, in addition to erosion, the loosening
23 and all those other issues that you are always going to look
24 for. In this particular case I am looking for the interface
25 issues, just like Dr. Li.

1 DR. BOYAN: Any other comments from the panel
2 related to this question? Seeing none, what we will next do
3 is invite the company forward to make any last comment to
4 the panel that they would like to make concerning these
5 products.

6 DR. MANLEY: There were three questions raised
7 here. The first one was chipping. The second one was the
8 75-day data with the Trident. The third was postmarket
9 surveillance.

10 Let's start with the last one. The company has no
11 problems with postmarket surveillance. In fact, by the time
12 the study is complete and all patients are at two years
13 follow-up the longest patients will be close to five years
14 follow-up. So, our intention is to follow these patients
15 right through in any case. So, that is not an onerous thing
16 to ask.

17 Let me go to the question of chipping. There are
18 extraction tools both for the ABC insert and for the Trident
19 device. In fact, we have implants here which we can pass
20 around in a moment so that you can actually put your hands
21 on them and see how they differ or how they are similar.

22 I think Dr. D'Antonio ought to address, while we
23 are still talking about chipping, how you actually see
24 chipping in the operating room. As we have shown, it is a
25 preventable event by changing the design a little, and the

1 incidence of implants actually left in people is very small,
2 3 out of 350. The rest of them were removed at the time of
3 surgery.

4 If I move on to the Trident, it seems a little
5 unfortunate that now we know how to solve the chipping
6 problem which, as I said, is not a big event -- it seems a
7 little unfortunate that at least the surgeon's irritation or
8 the waste of money in throwing away chipped inserts could
9 not be simply solved with Trident.

10 I listened to Dr. Li's concerns about Trident, and
11 if you look at the PMA document, there is far more data on
12 the Trident testing than was presented here. We presented a
13 small subset in the interest of time but there is a lot of
14 data on offset loading. There is a lot of data on fatigue
15 testing. And, if you would like Mike Bushelow to quickly,
16 in three minutes, run through all of the testing that has
17 been done on the Trident, we could certainly do so. But it
18 is in your document. The questions he asks are there. The
19 concerns about metal sleeves subjected to high stresses in
20 vivo have been adequately addressed in implants where very
21 high bending loads are put around most taper connections in
22 vivo, much higher loads than this Trident device will ever
23 see. So, it seems to me a little unfortunate that we
24 couldn't take this solution when it is so readily available.

25 DR. LI: Excuse me, can I comment? I thought I

1 slugged through the data you provided, which is substantial
2 and well done. I didn't really see though anything that was
3 related to corrosion type of issues.

4 DR. MANLEY: Corrosion data does exist. It is not
5 part of the document. We can discuss it now if you wish.

6 DR. LI: That was my main point. To me, that was
7 like a key feature that was missing out of your rather
8 voluminous testing data that you have done.

9 DR. MANLEY: Corrosion or fretting data does
10 exist. It could be submitted to FDA to support the
11 application for the Trident. It shows nothing remarkable.

12 So, let me just ask Dr. D'Antonio if he wishes to
13 further address this issue of insert chipping which seems to
14 be a concern.

15 DR. D'ANTONIO: Just to answer a couple of the
16 questions. Albert, I think you had one on incidence and,
17 let's see, there were five chips with one surgeon; there
18 were two chips with three surgeons; and then one with a
19 couple of others. So, it was skewed towards just a few,
20 with many of the surgeons not having the problem with the
21 inserts. So, it was a technical thing with a few surgeons.

22 Ed, I think your question brought to mind
23 something that I probably didn't clarify when we were
24 talking about extractability of the ABC. When I was talking
25 about breaking it and how difficult it was to get out, it

1 was in those cases where it was frozen. We haven't seen
2 that happen. There are strike plates that are available
3 that go on the periphery of the ABC, and when you strike it
4 the ceramic will extract. Now, if that didn't work then you
5 would have to go to the extreme of breaking it. So, there
6 is an extractable device for the ABC that I really didn't
7 fully explain. I don't think it is as easy though as
8 removing the Trident liner.

9 With regard to the other comments that you made
10 about maybe not having an urgency, I feel as a clinical some
11 urgency in young patients with total hips. The thing that
12 is defeating our long-term fixation in young patients is
13 osteolysis, and it is a problem that we haven't solved. We
14 have solved the problem of fixation. We can get these
15 implants to be well fixed. The bearing surfaces are
16 wearing, and the wear debris is creating lysis, and the
17 lysis is creating loosening of our prostheses.

18 You know, there are three mechanisms right now
19 that we think are going to solve that problem. One is the
20 new cross-linked polyethylenes which we know something about
21 from the lab and from a few experiences, clinical
22 experiences. There is the ceramic-on-ceramic which I think
23 we know a whole lot more about because we have learned a lot
24 over twenty-five, thirty years of use of ceramic liners, and
25 a lot of what you heard today -- the changes in the

1 evidence, that the probable benefits to health under the
2 conditions of use outweigh any probable risks.

3 Effectiveness is defined as reasonable assurance
4 that in a significant portion of the population the use of
5 the device for its intended uses and conditions of use, when
6 labeled, will provide clinically significant results.

7 Your recommendation options for the vote are as
8 follows, and this can be broken up or can be collective for
9 all systems or you can break out one system or several
10 systems, and just specify this in your motion. So, your
11 first option is approvable; there are no conditions
12 attached.

13 Second, approvable with conditions. You may
14 recommend that the PMA be found approvable subject to
15 specified conditions such as a resolution of clearly
16 identified deficiencies which have been cited by you, the
17 panel, or FDA staff. All conditions are discussed by the
18 panel and listed by the panel chair, and then voted on one
19 at a time. For example, you may specify what type of
20 follow-up information the panel or FDA should evaluate prior
21 to or after approval. Panel follow-up is usually done
22 through homework assignments, one or two panel primary
23 reviewers of the application, or through other specified
24 members of this panel. A formal discussion of the
25 application at a future panel meeting is usually not held.

1 If you recommend postmarket approval requirements
2 to be imposed as a condition of approval, then your
3 recommendation should address the following points: The
4 purpose of the requirement; the number of subjects to be
5 evaluated; and the type of reports that should be submitted.

6 The third option, not approvable. Of the five
7 reasons the Act specifies for denial of approval, the
8 following three reasons are applicable to your panel
9 deliberations: The data do not provide reasonable assurance
10 that the device is safe under the conditions of use
11 prescribed, recommended or suggested in the proposed
12 labeling. Reasonable assurance has not been given that the
13 device is effective under the conditions prescribed,
14 recommended or suggested in the labeling. And, based on the
15 fair evaluation of the material facts in your discussion,
16 you believe the proposed labeling to be false and
17 misleading.

18 If you recommend that the application is not
19 approvable for any of these stated reasons, then we ask that
20 you identify the measures you think are necessary for the
21 application to be placed in approvable form.

22 Traditionally, again, the consumer representative
23 and the industry representative do not vote, and Dr. Boyan,
24 as panel chairperson, only votes in the case of a tie. Dr.
25 Boyan?

1 DR. BOYAN: Before we begin the voting process, I
2 would like to mention for both the panel's benefit and for
3 the record that the votes taken are votes in favor of or
4 against the motion made by the panel. Votes are not for or
5 against the product.

6 I want to remind everybody that this is
7 complicated. There is more than one item here and we can
8 handle it -- we really can, but I require everybody to help
9 us out on this. The first motion is only for one short
10 phrase, approvable; approvable with conditions; or not
11 approvable.

12 Then, if it turns out that we vote approvable with
13 conditions, then we go through each condition and we vote on
14 each condition. So we can be very creative doing that.

15 No matter how we vote though, we get a chance, all
16 of us, to state what our vote was and why. So, everything
17 goes into the record. Everything is heard by FDA. Nothing
18 is lost here; all information is available. Yes?

19 MR. DEMIAN: Just one point of clarification. You
20 should specify what system you are talking about for the
21 motion.

22 DR. BOYAN: That is a good point. We need that.
23 We will refer to them as ABC and Trident so people know what
24 we are talking about.

25 DR. FINNEGAN: Madam Chair, actually I was

1 wondering if I could complicate your life. Is it possible
2 to make a motion to separately consider ABC and Trident?

3 DR. BOYAN: Well, I suppose we can do that but we
4 can also handle it in the plastic system. Should we move
5 toward approvable with conditions, we certainly can handle
6 it right there.

7 DR. FINNEGAN: Okay.

8 DR. BOYAN: So, Dr. Lyons, could you start us off?

9 DR. LYONS: I make a motion for approval with
10 conditions for both systems.

11 DR. ABOULAFIA: Second.

12 DR. BOYAN: There is a motion and a second. We
13 can now have discussion. Any comments on this motion?

14 DR. CHENG: I would like to make a comment.

15 DR. BOYAN: Take it, Dr. Cheng.

16 DR. CHENG: I do think they should be considered
17 separately. However, I think the Trident system is
18 theoretically better. It is better in terms of no chipping
19 seen in the 100-some odd cases that have been done already.
20 But there are some issues. It is a different prosthesis.
21 Steve has pointed out the differences, and the sponsor has
22 said that there is some information that they are probably
23 the same. If they are the same, this can always be brought
24 back through a 510(k) mechanism to go ahead and approve that
25 device.

1 But I think we have to be careful about
2 considering even an approval with conditions of a device
3 which we have very limited information about -- 75-day
4 follow-up. And, I just don't think that that amount of
5 information is enough to approve a brand-new method, which
6 it is, of hip replacement with ceramic-on-ceramic
7 articulation.

8 DR. BOYAN: So, your comment is well taken but let
9 me point out to you that we have a motion on the floor which
10 is just for simple approval, approval with conditions, not
11 approvable. Let's get that part out of the way and then, if
12 we vote it down, we can entertain the motion to separate
13 them. Dr. you have a comment, Dr. Aboulafia?

14 DR. ABOULAFIA: A procedural question. The
15 conditions for one system may different than the other,
16 which may address some of Dr. Cheng's concerns or may not.

17 DR. BOYAN: Correct.

18 DR. CHENG: I am just commenting on the approval
19 with conditions for the Trident System, which obviously I
20 don't agree with.

21 DR. BOYAN: Well, we can make the conditions
22 amazingly interesting for them. So, I think what we need to
23 do right now is vote on the motion that is on the floor.
24 So, the motion that is on the floor, Dr. Lyons, is
25 approvable --

1 DR. WITTEN: You have to go around and get the
2 conditions before you vote on the main motion.

3 DR. BOYAN: No, no, no. We are not yet on the
4 final -- you are worried about the final one. We are not
5 there yet. We want to just to get approvable with conditions
6 out on the table. Then we start tacking the conditions on.

7 DR. WITTEN: Okay.

8 DR. BOYAN: If we vote yes to this motion, we are
9 agreeing with approvable with conditions on both products.
10 That is the motion currently on the floor.

11 All in favor of that motion, raise your hand.

12 [Show of hands]

13 Five. All voting against that motion, raise your
14 hand.

15 [Show of hands]

16 Two. So, the motion carries. The working motion
17 -- not the final, final one; no need for panic yet -- the
18 working motion is approvable with conditions for both
19 products. Now, let's start telling what conditions we would
20 like to add, and I suggest we start first with ABC. Let's
21 just go through the conditions that we might like to put
22 onto the ABC product. Is there a motion for some
23 conditions, Dr. Lyons?

24 DR. LYONS: Yes. I think though they are going to
25 be a little redundant. The first one that I would have is

1 that there would be disclosures, or however you would like
2 to word it; maybe even warnings, of the data to the
3 surgeons. Of particular importance for the ABC would be
4 the brittleness, the chipping, the surgical technique and
5 sensitivity, which wouldn't be the same for the Trident.

6 Second would be the revision limitations on the
7 ABC. I think that should be focused on.

8 The third would be the Trident articular system --

9 DR. BOYAN: Wait, we are not at Trident yet. We
10 are just doing the ABC conditions. We have to do these
11 conditions one at a time.

12 DR. LYONS: Okay, if you would like.

13 DR. BOYAN: So, the conditions on the ABC that I
14 heard you say are warnings to surgeons, and examples are on
15 the potential for chipping, the brittleness and you had a
16 couple of other little ideas there.

17 DR. LYONS: Yes, revision limitations.

18 DR. BOYAN: And revision limitations.

19 DR. LYONS: Which is important, one of my bigger
20 things.

21 Number two would be disclosure. I would recommend
22 in the technical manual as opposed to just the package
23 inserts -- not a big point but it is helpful to the surgeon.

24 Number three would be educational issues, not just
25 the materials that you are going to discuss in terms of

1 technique but corrosion, ceramics, the materials issue to
2 educate those surgeons to understand the differences; some
3 insertional technique; educational issues, maybe some
4 workshops; really a good manual, more expanded than a
5 typical manual. Also, maybe a suggestion for monitoring
6 that may be more than traditional monitoring for these hips
7 because it is a new system.

8 Number four would be further study or long-term
9 monitoring.

10 Number five that I have is some retrieval analysis
11 but I don't know how you would work it in, but some way, if
12 you can, to capture and study these parts. They are new to
13 the market.

14 DR. BOYAN: Okay. Are there any other conditions
15 that people would like to see put on just the ABC product?
16 Yes, Dr. Li?

17 DR. LI: Is postmarket surveillance a condition?

18 DR. BOYAN: Yes. Yes, I wrote it down, and I
19 heard five years.

20 DR. LI: Minimum five. It might be a little
21 redundant and you may just generate a bunch of zeroes but I
22 think I would want to see some wear testing done on these
23 actual parts rather than some, as good as it may be, general
24 data from CeramTec on the generic ceramic, and I would like
25 to see that wear testing done under the range of conditions

1 a surgeon might encounter in the patient just to make sure
2 that with some high abduction angle or some unusual
3 situation the wear rate doesn't become surprisingly high.

4 DR. BOYAN: Yes, Dr. Finnegan? We are just doing
5 ABC right now.

6 DR. FINNEGAN: Correct. Just one comment and that
7 is, as Dr. Li said earlier, a lot of people only do a couple
8 of these a month, I think the visual education that people
9 can have at their place, either a CD ROM or a video or
10 something that they can review before they do an
11 implantation is essential.

12 DR. BOYAN: Do I hear anything else?

13 [No response]

14 So, we are just going to look at ABC one set of
15 conditions, and the set of conditions that we are getting
16 ready to vote on are that there be disclosure to the
17 surgeons not only in the package insert but also in the
18 technical manual concerning chipping, brittleness, so forth
19 and so on, including revision limitations. I think the
20 transcriptionist got the rest of Dr. Lyons comments.

21 There is a whole package of educational issues.
22 There should be some basic science education concerning
23 corrosion and ceramics. There should be consideration of
24 workshops. There should be a more extensive manual. There
25 should be monitoring of the surgeons after they begin to use

1 the product. There should be some visual tape of education
2 in their office, a CD ROM or a video. There should be
3 postmarket surveillance with a minimum five years, including
4 retrieval analysis, and there should be wear testing on
5 actual parts under a range of conditions that the surgeon
6 might actually encounter.

7 Does that cover it? We are going to vote on this
8 package. Is there anybody in this room that feels that any
9 part of that package is inappropriate? Not you, guys!

10 [Laughter]

11 All right, we are voting on the package of
12 conditions on the ABC. May I see a show of hands from
13 people who think that those are okay conditions?

14 [Show of hands]

15 It is unanimous.

16 Now, let's look at a package of conditions for the
17 Trident. I think it is safe to say, if I may, that for the
18 Trident we want the disclosure but the disclosure might be
19 slightly different. We are going to want all the same
20 educational issues. We are going to want the same
21 postmarket surveillance. We are going to want the same wear
22 testing, and what else do we want? Yes, Dr. Li?

23 DR. LI: If you have corrosion data already in
24 hand, that would go a long way. So, either to do the tests
25 or just present the tests I think would be a critical

1 feature.

2 I really didn't mean to create this monster of
3 corrosion. It is not that I have an expectation that this
4 is going to be a big problem; it is just an area that I
5 didn't see any information on.

6 DR. BOYAN: Dr. Finnegan?

7 DR. FINNEGAN: I would wonder if there shouldn't
8 be a condition of a minimum number of patient days before
9 this can be approved, and I am not expert enough to know
10 what that minimum number should be but I will ask Dr.
11 Larntz.

12 DR. WITTEN: I just want to make some
13 clarification. Additional data that we need to review prior
14 to approving the product isn't a post-approval condition.
15 In other words, are you making a post-approval
16 recommendation, or are you making a recommendation of what
17 the sponsor needs to do to put their application in
18 approvable form?

19 DR. FINNEGAN: The latter. I am making a
20 recommendation for what-needs to be done before it-goes into
21 approvable form.

22 DR. BOYAN: Right.

23 DR. FINNEGAN: Taking into consideration that if
24 you had that data and it was reasonable they would not have
25 to come back to panel.

1 DR. WITTEN: That is not a recommendation for
2 approvability right now.

3 DR. BOYAN: Even though that is not a
4 recommendation for approval with conditions, that those
5 conditions be met?

6 DR. WITTEN: A condition should be like for
7 training, a focused study looking at a specific issue that
8 you think can be done post-approval. But if there is some
9 information that you think there is new data, new testing or
10 new studies, then that is not a post-approval condition.

11 DR. BOYAN: All right. Let me phrase it to you
12 this way, all of these things that we want to see with the
13 ABC, with the exception of postmarket surveillance, in my
14 estimation are things that you need to have assurance are
15 going to exist before you should approve. We are only
16 telling you that we think it is approvable if they do all
17 these things.

18 DR. CHENG: This is why I brought up my comment
19 earlier about Trident being separate, and my feeling of not
20 approving it with conditions and perhaps the sponsor going
21 through a different mechanism for approving it. At that
22 point they would have more data. There would be more data
23 for ABC, and they could bring it through a 510(k).

24 DR. BOYAN: Do you understand what our thinking
25 is? How do we handle that?

1 DR. WITTEN: I am just telling you, you have to
2 decide what it is you think that you are recommending to us.
3 If you are recommending that there is some focused
4 information or some labeling kind of concerns -- labeling,
5 of course, would be addressed around approval time, but if
6 there are some focused scientific questions that you think
7 can be addressed after approval but that should be looked
8 at, those are conditions of approval.

9 If you think that new clinical data or any kind of
10 data needs to be generated prior to approval, then that
11 would come under the category of recommendations of how to
12 put the product in approvable form. So, that would be a
13 different motion.

14 And, I am not telling you which category this
15 should be in. That is something that you all -- you know,
16 we are asking you all to recommend to us.

17 DR. FINNEGAN: So, there is no way that we can do
18 approval with premarket conditions that have to be
19 satisfied?

20 DR. WITTEN: If there is new data that you think
21 needs to be generated, then that is not a recommendation for
22 approval. That is a recommendation that you are making
23 about how to put the application in approvable form. But,
24 as I mentioned before and also as Hany mentioned during his
25 reading of the rules, we don't necessarily bring these

1 applications back to panel. It is our option. So, if it is
2 clear enough and we know what the path is we wouldn't
3 necessarily bring it back for another panel discussion. We
4 would feel we had already received the panel input we needed
5 about the kind of data that we needed to look at and what
6 kind of results we were hoping to see.

7 DR. BOYAN: Okay. Let me phrase it in another way
8 because I think we all want to do the same thing. I don't
9 hear any of us not want to do one half of this thing, but,
10 you know, I talked him out of separating out the two devices
11 because I thought that we could handle what I was perceiving
12 as the developing need for more data, and I maybe misled the
13 panel down a primrose path on this one. Did I?

14 DR. ABOULAFIA: I think probably just from a
15 procedural point of view, if I may be so bold as to say, we
16 can vote on an amendment or make a motion to approve
17 something that doesn't have premarket analysis. If it
18 doesn't pass, then we are going to have to go backwards, but
19 if it does pass then it is a moot point. Do you understand
20 what I am saying? Did I make myself clear? -

21 DR. BOYAN: Yes, I think I know what you are
22 saying.

23 DR. ABOULAFIA: Instead of a motion that Dr.
24 Finnegan made which required premarket analysis, which we
25 can't vote on -- we have to go backwards and take back our

1 vote on combining the two; we could make a motion to vote on
2 something that doesn't require premarket analysis. If the
3 majority feels that that is appropriate then it will pass
4 and we don't have to go backwards. If the majority doesn't
5 feel that that is appropriate, then we will have to go
6 backwards and separate them. Does that make sense?

7 DR. BOYAN: Yes. I guess I need some help. I see
8 how we can do it procedurally. We are going to go ahead
9 and, since we can't do a premarket statement, we are going
10 to put as many conditions down that we can think of that are
11 postmarket, and then we will vote on the overall motion and
12 it will either pass or not pass, as the case may be.

13 So, other conditions on the Trident in addition to
14 presenting the already existing corrosion data to the FDA --

15 DR. LI: I have a question on that. I am still
16 trying to get myself out of the fog of confusion here. So,
17 if I wanted to see that corrosion data -- because I don't
18 know what it is, you know, good, bad or evil; I just haven't
19 seen it -- but if I wanted to evaluate that --

20 DR. BOYAN: It is not yours to evaluate.--

21 DR. LI: If I wanted the FDA to evaluate that
22 before I approve it, is that voting not to approve it?

23 DR. WITTEN: If you think that we need to look at
24 new data and new testing, then that is not a post-approval
25 condition. If you think that we need to look at it before

1 approval, then that is not a condition for approval; that is
2 a recommendation that you would make about how to put the
3 application into approvable form.

4 DR. ABOULAFIA: We could say that the condition is
5 that the question of corrosion be satisfactorily answered by
6 the FDA with the material that they have on file, and
7 exists, and is not new data.

8 DR. FINNEGAN: But that is not the only thing --

9 DR. ABOULAFIA: No, but his question could be
10 answered in this form without going backwards by saying a
11 condition of approval of the Trident System would be that
12 the questions raised by the panel members are satisfactorily
13 answered by industry providing the data to FDA. It is not
14 new data. They say they have it.

15 DR. CHENG: However, we could also vote on the
16 motion. If it carries or doesn't carry, come back as a
17 second motion and not approve it, and let the FDA handle it
18 with the sponsor in terms of getting these issues clarified
19 because that doesn't address Dr. Finnegan's concern.

20 DR. FINNEGAN:~ I am going to put Dr. Witten on the
21 spot big time, given this least burdensome, and I am very
22 strongly in favor of least burdensome not meaning more
23 burdensome to the patient, which is what is going to happen
24 if we don't have enough data, how can we accommodate what
25 the panel obviously wants and sort of what the company would

1 like? It is not exactly what they would like but sort of
2 what they would like.

3 DR. WITTEN: Well, you have the option based on
4 whatever data you have on hand. If you think that
5 reasonable assurance of safety and effectiveness has been
6 demonstrated for both systems for making that
7 recommendation. If you think that we need to get some
8 additional studies done of one of the systems, then that is
9 not more burden that we are putting on, it is your opinion
10 that you are providing us about what additional kind of
11 information is needed.

12 DR. FINNEGAN: The only burden I was looking at
13 was coming back through the system.

14 DR. WITTEN: I don't think that really should be a
15 major concern because in general unless new data generated
16 raised some other kind of question, it is difficult to
17 imagine the circumstances under which we would feel that it
18 was necessary to bring it back for a panel review. And, if
19 it did raise some new type of questions, in general, you
20 probably would want to see it again. So, I think you can
21 really safely leave it up to our option about the panel
22 presentation because that basically summarizes our view of
23 bringing these types of things back to panel.

24 DR. BOYAN: I really think we have given the FDA
25 as much information on this topic as we can give them and

1 another panel meeting is not really a concern of ours right
2 now. What we do need to do though is come to some closure
3 on the motion that is on the table, which is that we
4 consider them both together, and we have already accepted a
5 list of conditions on the ABC System.

6 We are voting on them together and we can get a
7 list of conditions on the Trident System that could, in
8 fact, make us very happy, and then vote. The problem is
9 that we cannot consider data that we wish we had.

10 So, what I am looking for without calling the
11 question right now, or asking someone to call the question
12 right now, is to vote on whether we want to keep them
13 together or whether or not we want to separate them, and
14 that is the real issue at hand.

15 DR. FINNEGAN: I would like to make the motion
16 again that we separate them.

17 DR. BOYAN: Yes, there is a motion on the table;
18 we have to vote down the other motion. So, someone needs to
19 call the question on the current motion that we keep them
20 together.

21 DR. FINNEGAN: Call the question.

22 DR. BOYAN: And we have already voted to keep them
23 together, right? We did that. So, now we have to vote on
24 the current motion of the conditions. Here is the situation
25 with the conditions. We have conditions on ABC that we are

1 happy with. We have no conditions right now on Trident that
2 we are happy with, other than the ones that are already down
3 for ABC that we were trying to add more to. So, if we can't
4 reach closure on this with conditions on Trident that make
5 us happy, then we have to vote down the entire motion. Then
6 we can have a motion to separate again and we can separate
7 them and do them separately. Right?

8 DR. FINNEGAN: Can't we amend the motion?

9 DR. BOYAN: Well, that is what I just asked, could
10 I request an amendment. She is saying yes we can? Okay, so
11 offer to amend the motion.

12 DR. FINNEGAN: I would like to amend the motion to
13 consider the two entities separately.

14 DR. BOYAN: Second the amendment, please.

15 DR. CHENG: Second.

16 DR. BOYAN: Do you accept the amendment, Dr.
17 Lyons, or do we need to vote on it? Can you accept it?

18 DR. LYONS: It is fine; I am not going to stand in
19 the way here.

20 DR. BOYAN: Okay. So, if Dr. Lyons accepts the
21 motion, Nancy, are we now separated? It is seconded and
22 accepted. Now they are separate. Now let's just stick with
23 ABC. We are going to do ABC first. We have already
24 accepted the conditions minimally. So, we now go to the
25 main vote on ABC. Let me just read it again, it is

1 approvable with these conditions, that there be disclosure
2 to the surgeons in the technical manual as well as in the
3 package insert concerning chipping, brittleness, revision
4 limitations, etc.; that there be basic science education on
5 corrosion and ceramics in addition to workshops; an
6 extensive manual; that there be monitoring of the surgeons
7 and how well they are doing; that there be in-office
8 training available in the form of either a CD ROM or a
9 video; that there be postmarket surveillance out to five
10 years, including retrieval analysis, and that there be wear
11 testing done -- and I am not certain anymore if we can say
12 this, that there be wear testing done on actual parts under
13 a range of conditions that a surgeon might encounter.

14 So, those are the current conditions for
15 approvable with conditions. Now we are going to go to the
16 main vote unless there are any other comments. The main
17 vote -- this is it, this is the real one, the whole nine
18 yards on the ABC System. After the vote we will go around
19 the room again, asking everybody to state their name, their
20 vote and why they voted the way they did. - - -

21 All those in favor of the motion on the ABC System
22 say aye or raise your hand.

23 [Show of hands]

24 Seven. So, the ABC System motion passes. Now,
25 starting with you, Dr. Aboulafia, just state your vote.

1 DR. ABOULAFIA: Aboulafia, yes. It has already
2 been stated.

3 DR. BOYAN: Any comments you want to make as to
4 why?

5 DR. ABOULAFIA: No.

6 DR. LI: Steve Li. I voted yes and I have
7 provided all my comments previously.

8 DR. LARNTZ: This is Larntz. I voted yes and I
9 was very concerned because of the chipping rate. I
10 understand from my colleagues at the table that with proper
11 education chipping can be reduced and eliminated maybe, and
12 I appreciate their input.

13 DR. FINNEGAN: Maureen Finnegan. I said yes, and
14 comments before.

15 DR. YASZEMSKI: Yaszemski, yes. No new comments
16 to add.

17 DR. CHENG: I voted yes and my only comments to
18 the FDA -- a suggestion, I think we do need to establish
19 some guidelines for panels and for the sponsors, because it
20 is unfair to both, as to what type of follow-up is needed
21 for what disease, whether it is fraction, non-union,
22 prostheses or what-have-you. But that needs to be
23 established so there is a level playing field for all
24 sponsors.

25 DR. LYONS: Lyons, yes. No more comment.

1 DR. BOYAN: Now, we have separated them. So, we
2 now need a motion on the Trident System. Dr. Lyons, do you
3 want to try it again?

4 DR. LYONS: Yes, I basically make the same motion
5 for approval with conditions. Do you want to stop there and
6 do the conditions?

7 DR. BOYAN: Okay.

8 DR. ABOULAFIA: I will second that motion.

9 DR. BOYAN: Then we are open for discussion. The
10 motion is approvable with conditions. We are not now
11 listing the conditions. Right now all we are doing is
12 discussing the current motion.

13 DR. FINNEGAN: I don't think there is enough data
14 to do that.

15 DR. BOYAN: Any other comments?

16 DR. LYONS: Yes. I don't think we should have the
17 ABC out without the Trident that fixes the big problems. We
18 are talking about corrosion five years from now. We are
19 talking about a locking mechanism that is less stressed than
20 the S-Rom. I want the better system if I am going to put it
21 in. If I am going to be a gorilla I want the better system.
22 I don't want to leave the ABC alone. I don't think they
23 should be separated. That is all I have to say.

24 DR. ABOULAFIA: I would say the same thing. There
25 are those panel members who might be willing to approve a

1 product that has some inherent disadvantages to another
2 product based on a theoretical concern, which the company
3 believes there is data to address.

4 DR. CHENG: I agree with you and I sympathize with
5 your feelings but I don't think if we make a motion for not
6 approvable and place some recommendations as to how to make
7 the product approvable to the FDA -- I don't think that
8 means that we have to go without it.

9 DR. BOYAN: Any other comments? Dr. Yaszemski?

10 DR. YASZEMSKI: No, no additional comments.

11 DR. BOYAN: So now we are only voting on the
12 motion of approvable with conditions, yes or no. All those
13 in favor of approvable with conditions, raise your hand.

14 [Show of hands]

15 Three. Those against approvable with conditions?

16 Four. We have now voted down approvable with conditions.

17 The other two options are approvable or not approvable. Do
18 I have a motion?

19 DR. FINNEGAN: Yes, I would like to make a motion
20 that it is not approvable, but amended with everything the
21 panel has said to the FDA.

22 DR. CHENG: I would second that.

23 DR. BOYAN: Any discussion on this motion?

24 DR. LI: Can I ask a procedural question? If it
25 turns out that we decide not to approve it -- I will make it

1 personal in this case. If I see the corrosion data and it
2 looks fine to me, what is the time lag to this? Are we
3 keeping them off the market for years? Months? Days?

4 DR. BOYAN: No, no. Steve, this is my opinion and
5 then Dr. Witten can fix it. We are only making a
6 recommendation. They make the decision. So, they hear this
7 whole discussion. Everybody gets panicked about this.
8 Nothing that horrible or that wonderful is going to happen
9 by anything that we do. So, what will happen is that we
10 will go around the room after we have the vote and everyone,
11 again, will explain why they voted the way that they did.
12 Then, the people from the company will either be so elated
13 they will fly out the door, or they will be so miserable
14 that they will call Dr. Witten.

15 DR. WITTEN: Thank you, I don't see what I can add
16 to that. No, joking aside, if you do vote in this
17 direction, we ask you to make recommendations about how to
18 put it in approvable form. I think there have already been
19 a lot of comments in that direction but we will probably
20 formally go around and ask that. Then, we would look to see
21 how to work with the sponsor to address the things that were
22 mentioned in this room.

23 DR. ABOULAFIA: Can I make a motion then that it
24 is not approvable but what the conditions for approval are?

25 DR. BOYAN: No. Actually, we will vote and then

1 we will actually go around the room and actually write them
2 down and enter them into the record officially. So, the
3 motion on the floor is for not approvable. All those who
4 favor that motion, raise your hand.

5 [Show of hands]

6 Four for that motion. All those not in favor of
7 that motion?

8 [Show of hands]

9 The motion carries. The motion is that it is not
10 approvable. At this point we are going to go around the
11 room and I am going to ask each person to state their name,
12 their vote and not only why they voted the way they did but
13 what things they would add to the application that would
14 make it approvable. Starting with you, Dr. Aboulafia.

15 DR. ABOULAFIA: First, I did think it was
16 approvable but the stipulations I would have made were all
17 those that were mentioned with the ABC, with the exception
18 of limitations with revision because that is an advantage so
19 they don't need to put that. Then, the only other thing I
20 would say is that the question of corrosion could be
21 satisfactorily addressed by data provided from industry to
22 FDA, without them necessarily going through additional
23 testing.

24 DR. BOYAN: Dr. Li?

25 DR. LI: The same comments. I feel a little bit

1 bad about this because if I had to, just as a lay person,
2 guess I would think the Trident System would be fine. It
3 seems somehow not correct not to look at all the data that
4 you have got and evaluate that prior. Again, I would want
5 to see -- was wear testing on the ABC list? I would make
6 sure that was there. I will leave it as that.

7 DR. BOYAN: Dr. Larntz?

8 DR. LARNTZ: I voted non-approval, and I was
9 concerned about the predictability of the clinical data at
10 two years. I am still concerned about that. My colleagues
11 have not provided me assurance that this device will perform
12 the same as the ABC System. I asked for that and my
13 colleagues said it may; in fact, there is substantial chance
14 it will perform differently. That is my understanding. If
15 I had assurance that it would perform the same with respect
16 to the failure, I would have voted for approval with
17 conditions but I had no such assurance.

18 DR. FINNEGAN: Finnegan. I voted for not
19 approvable. However, I would like to make my own personal
20 amendment that I don't think that this needs to come back to
21 the panel unless, in fact, there is really significant data
22 that shows up with the further data.

23 I think also one of the things that Dr. Li talked
24 about which people have forgotten about is that there is an
25 additional interface in this implant which is not in the

1 other implant, and every time we add an interface in
2 orthopedics we find problems that we weren't planning on.
3 So, I do think that this needs to be a separate issue.

4 DR. BOYAN: Dr. Yaszemski?

5 DR. YASZEMSKI: I voted against the amendment. I
6 initially said I had concerns on sort of predicting the
7 future and I still have those concerns. However, I do
8 believe, based upon what the sponsor showed, that the
9 Trident is an improvement and I also didn't feel comfortable
10 voting to have the device that I thought was less desirable
11 go out on the market compared to the one I thought was more
12 desirable.

13 The way I would have handled the issue of the
14 unknown future would be to ask the company to consider in
15 addition to finishing the study for two years or for five
16 years on the Trident that exists, perhaps if the product
17 went out on the market and were used by the general
18 orthopedic community, be put in many patients outside the
19 study who we don't have a handle on, perhaps something like
20 product tracking during the rest of the study would handle
21 the potential unexpected occurrence. Then, if the study
22 endpoint were reached and no additional bad things happened,
23 the product tracking could be stopped. However, if
24 something bad happened you would have a handle on who these
25 prostheses were in and the appropriate patients and their

1 physicians could be contacted.

2 DR. CHENG: I voted against approval for some
3 reasons I have already stated. I do think it is a different
4 prosthesis. I do this with a little bit of trepidation
5 because I do see the definite clinical advantages to the
6 Trident System in terms of ease of insertion and, more
7 importantly for me, ease of eventual revision because I
8 think that is a real definite advantage. But I don't think
9 that I can in good conscience vote for approval of a device
10 with data only for 75 days.

11 DR. LYONS: Lyons. I voted against the non-
12 approval because of the reasons stated pretty much already,
13 particularly revision and for implantation reasons. I
14 thought it would be important to have this product
15 available.

16 DR. BOYAN: You get the last word.

17 MS. BUTCHER: Thank you, I will take it. I do
18 concur with Dr. Li in terms of his comments about the added
19 information and believe, as has been stated, postmarket
20 surveillance of five years is reasonable.

21 DR. BOYAN: All right. The panel is recommending
22 that the premarket approval application for Howmedica
23 Osteonics ABC device be approvable with conditions, as laid
24 out in our recommendation and to include all the things that
25 have already been discussed. In addition, we recommend that

1 the premarket approval application for the Osteonics Trident
2 be not approvable and we have put forth some comments on
3 those issues that we think are necessary to render that
4 application approvable.

5 MR. DEMIAN: Thank you, Dr. Boyan. At this time,
6 I would like to thank all the panel members for their time,
7 their effort and their energies in reviewing the material
8 that was presented to us today and for participating on this
9 panel. All your efforts are truly appreciated.

10 At this time, I would like to remind all panel
11 members that if you want the review material destroyed, just
12 please leave it in front of you. This meeting is adjourned.

13 [Whereupon, at 5:25 p.m., the proceedings were
14 adjourned.]

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C E R T I F I C A T E

I, **ALICE TOIGO**, the Official Court Reporter for Miller Reporting Company, Inc., hereby certify that I recorded the foregoing proceedings; that the proceedings have been reduced to typewriting by me, or under my direction and that the foregoing transcript is a correct and accurate record of the proceedings to the best of my knowledge, ability and belief.


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