Welcome back to our training session. We're going to continue working on the APD that we did in the previous section, and we're going to do the drilling program which is comprised of eight screens. I'm going to go up to my top row, and the most recent APD that we've been working on is on the top row there. So we click on the APD ID, and it will bring up our APD that we worked on.

And you'll notice that on the left hand side, we indicate that the first section of the application that we did in the previous session is there in the upper left hand corner. 100%. What we're going to do is we're going to go to the drilling plan next and fill out the information that's required under the drilling plan screens.

And those are eight. There are eight of those. And you'll see again we have our green numbers or bubbles across the top, one through eight. There's going to be eight different sections in this drilling plan, and we'll go through those one at a time in some pretty good detail.

So the first thing we're going to do is we're going to add our geologic formations. And right now we'll go ahead and click on the Add button. And the first thing it will bring up is the surface formation. And we can select the name. So under that name, we select the formation. And the surface formation is going to be buckhorn. And the buckhorn is a sandstone.

And since it's going to be the surface location, it's going to be the surface of the location. The elevation and the mean sea level will be the surface location of the well, which we are going to say is 5280. The depth of that formation at the surface starts out at zero, obviously, and is going to be approximately 20 feet deep. So we'll put the measure depth as 20 and tab out of there.

This is not a producing formation, and it contains no mineral resources that we need to worry about. So we can click and None. Save, and then you'll notice that that information has been populated. We can edit the information by clicking on the little pen and paper symbol, or we can delete the information with the red x.

We're going to go down and add another formation. And this formation name is going to be called the Castle Rock formation. And again, the Castle Rock formation is a sandstone. The elevation of the formation is still going to be 5280, but the information is going to be calculated. So the true vertical depth that the Castle Rock formation is found is at 150 feet below the formation. And it is 25 feet thick. Oh, excuse me. The measured depth is going to be 175.

And you'll notice that the elevation has been pre-populated or calculated for us. And that is actually the surface elevation at mean sea level of the start of the Castle Rock formation. So we're going to indicate that this is usable

water. It is not a producing formation, but it does contain usable water, and that's why we wanted to put it on the system.

So go ahead and click on Save. And you'll notice that we have the capability to select either one of those and edit them with a pen and paper or delete the one that we just previously added. We're going to add one more geologic formation, and this is going to be a Dakota formation. And again, this is going to be a sandstone formation. And the true vertical depth is found at 7525 in the depth of the well.

Oh, excuse me. That's going to be a negative number. So that's that the 5000 foot level. Go 5000. And that formation is 80 feet thick, so it goes to 5080, correct. And it is a producing formation. And it's going to produce oil, and it's also going to produce natural gas. So we can click both of those things.

All right, we'll save that. Now clearly in your application for a permit to drill, you'll be doing many more information names, basically from the top of the wellbore to the bottom of the wellbore. We'll go ahead and assume that that will get you started on there. So we've added our top formation, a usable water formation, and our producing formation. And we can go ahead and scroll down towards the bottom of the list.

Now again, in the previous slides, the previous screens, we've always used the Validate button and the Save button. So let's go ahead and validate the information that we've got here. And it says all required data on the page is present, so we're good there. And let's go ahead and save our work. Remember our mantra, save early, save often. And if we scroll down through there, we won't see any red messages or red boxes or anything that we've needed to add. So we can go to the next screen.

And you'll notice at the top of the screen, our first bubble has turned blue. We're now on this second bubble, or the second section, which is the blow out prevention table. And you'll notice in the left hand column, our drilling plan has gone from zero to 12%, indicating that we're moving across towards final completion with screen eight.

So we're going to add a BOP, or a Blowout Prevention Equipment Table by clicking on the Add button. And the first thing we're going to be required to do is to select the rating. The rating on this particular BOP is going to be a 5m system, and the rating depth is going to be 10,000 feet.

In our equipment, it's going to ask for additional equipment we're going to use. And what I'm going to do is type in a comment there to say all required equipment per federal regulation to be in place prior to drilling out the surface casing.

OK, and then at this time, we will be requesting a variance. And the variance request will be a variance request for the frequency of testing from daily to weekly. And then the testing procedure is going to be per federal and state regulations as published.

OK, we'll go ahead and save that work. And you'll notice that it saves the information, populates it in the screens in front. We can either edit that information or delete that information with the red x or the pencil paper diagram. And you'll notice that next we have the capability to add an attachment for both the choke diagram and the BOP diagram.

Now, these diagrams are required, as indicated by the asterisk next to the name. And we've previously shown you how to do attachments, but we'll go ahead and do that again just to reference that information. So you click on the Add Attachment button, go to your file browser, select the file that you are looking for, click on the file, Open, and as soon as the title shows up, you can click Save.

If you have a second choke diagram attachment, you can continue to add the attachment one at a time. If you go to the BOP diagram attachment, you can collect that bit of information, go to your browser, choose your file, and open and add that to the application.

And you'll notice again we have the red x's to allow us to delete that diagram or attachment if necessary. Let's go ahead and validate. Since we've got our message this is all required data is present, we're going to go ahead and save. And we'll go to Next.

Now you'll notice that the drilling plan is now at 25% as indicated in the left hand column. The first two bubbles are completed, and the third bubble is now green. Moving on, we'll add to our casing strings as necessary by clicking on the Add Casing button.

The first string type that we're going to do is the surface. The hole size is going to be 12.5. Excuse me, the top setting depth. And we can either tab or click with our mouse to those individual fields. Now here's something that's very helpful. Our top setting depth has been set at zero, and top setting depth true vertical depth has been set at zero. Because this is surface casing, and it's assumed that the surface casing is going to go to the surface and will be set at mean sea level, which we've already indicated is 5280.

So the bottom setting depth and the measured depth of the bottom of the surface casing is going to be 150. And since this is a straight hole, true vertical depth will also be 150. The size of the surface casing is going to be 11 inches. Actually, it's 10.75. Sorry about that correction.

And the grade is going to be H40. The weight in pounds per foot is going to be 15.5. And the joint type will be butt. The condition on this surface casing will be new and will meet API standards. It will not be a tapered string.

And now we get into the safety factors. Safety factors are a number less than 100 that you've design your various casing factors to. And in this casing factor, we're going to be at 75% or 75. The burst design safety factor is also

75. This is at a dry body tensile design safety factor type. And the safety factor on this is going to be 75% as well.

The joint tensile design safety factor is also going to be dry. And it will be at 75% as well. We'll go ahead and save this, and you'll notice it's added a string type for surface. We can edit it using the pen and pencil, or we can delete using the red x under the Edit Symbol.

We're going to add a worksheet. It is a required field, and this is more than likely a spreadsheet or a WordPerfect document that we've done our calculations assumptions for the casing design in the worksheet. We'll go ahead and add that attachment, save it, and again we have the opportunity to either delete it or continue to add a casing string.

Let's go ahead to add one more casing string or two. And this one is going to be our intermediate casing. The hole size is going to be 8.75. Top setting depth is going to be zero. We're going to bring our intermediate back up to the surface. And the top setting true vertical depth is going to be zero.

And that intermediate casing string is going to be for the first 2,000 feet of the well. So the bottom setting depth is at 2,000. And the bottom setting depth for the true vertical depth is going to be 2,000 as well. As we tab out of that, you'll notice that we calculate the bottom setting depth in mean sea level, and the length of the casing overall. In the event that it didn't start at the surface and went to 2,000 feet, it would adjust that accordingly.

The size of the casing is going to be eight inches. The grade will be C90. Weight per foot is going to be 12.5 pounds. And it will be new-- oh, excuse me. It'll have a butt joint again. And it will be new and have API standards applied.

Now one point that we might want to note, in the event that you select either used or non-API, you'll be required to provide some additional information. The inspection document of the used casing or in the sense of non-API standard, the specification document for each one of those strings of casing that are non-API standard. So for right now, just be cautioned if you use used or non-API casing for any of your strings, you'll be required to add an inspection document and/or a spec document for that.

So we'll go back to New and API standard. And this will not be a tapered string. In the event that it would be a tapered string, there is a file that would be required to show the tapered string specifications. But in this case, we will be using a non-tapered string. So that's not going to be required.

Again, our design factors. Now, our intermediate casing is a little bit more important, so we were going to design that to 85. The burst will also be 85. These are buoyant tests for body tensile and joint. And we will test those to 85 as well.

Now, since I'm not an engineer, I would think that something greater than 100% or a factor of more than 100 would be required. If for some reason I was to put 185 in one of these fields and tab out, when I save, it's going to give me an error message. It said, this value cannot be greater than 99.99. OK, so I've got a visual cue to keep that at 85. Go ahead and say Save. And you'll see that you can either edit or delete or add a worksheet. And we can go ahead and add the worksheet for that particular casing string by clicking on the Add Worksheet, opening our file, making a selection. And as soon as it puts the name up there, we can save it.

All right, for purposes of this training, we're going to do one more casing string. So we're going to go down to Add Casing. And this is going to be our production casing. And that's going to be a hole size that is 5 inches in diameter. The top setting depth is going to be zero. Again, we're going to bring our production casing all the way back up to surface. True vertical depth and measure depth is going to be zero. And the bottom setting depth is going to be 5280.

The size of this casing is going to be 4.5. The grade will be C75. Weight per foot is 10.5. The joint again is going to be butt, and it's going to be new, and API standard. Non-tapered string, and the design factor actually is going to be a little bit higher since it's our production string. And we're going to go to 98 on the collapse, 98 on the burst. The body tensile will be buoyant at 95, and our joint tensile strength will be buoyant as well at 95.

We'll go ahead and save that screen. And let's come down to the bottom and validate. And it says, at least one casing design assumption and worksheet is required on row three. So if we go ahead and click grow three, add the worksheet, add attachment, search for a file, and save.

Let's go ahead and come down again and do validate. All required data is present. Go ahead and make that message go away and click on Save. And if we scroll back up to the top, you can see that we're still in section three. The drilling plan is 37%. So go back down to the bottom of the form and go Next.

OK, we're now on the cement. And you'll notice that the cement design tables in section four match our surface production and intermediate string of casing that we added previously. So for the segments and the casing string types for the surface, the production intermediate are going to be required. A separate cement program for each one of our casing strings.

So we'll go to segment one. And our stage tool depth is going to be at 50 feet. There won't be any leads. So the top of the segment is zero. The bottom of the segment is going to be 100. Cement type is going to be the now-famous PDQ cement type. No additives. The quantity in terms of sacks is going to be 50.

Yield in cubic feet per sack is going to be 25. Density is going to be 8.5 pounds per gallon. And the volume is going to be 500 cubic feet. Our percent excess is designed to be 10%. And we'll go ahead and save that

information.

Down in our production string, we're going to add the same information. The stage tool depth is actually going to be 2,000 feet this time. Top of the segment is going to be zero. Bottom of the segment is going to be 2,500. Cement type is going to be ASAP. No additives. Quantity in terms of sacks is going to be 500. Yield in cubic feet per sack is going to be 100. Density in pounds per gallon is going to be 9.5. Volume cubic feet is going to be 5,000. And in this string, we want a percent excess of 15%.

Go ahead and save that and move on to the third segment on the intermediate casing. And we'll click Edit. Stage tool depth is going to be 5,200 feet. Top of the segment's again going to be zero. Bottom of the segment is going to be 52,000 feet. Cement type ASAP. Additives are going to be sawdust. Quantity is the next field. Quantity in terms of sacks is going to be 1,000. Yield cubic feet per sack is 500. The density again is 9.0. Volume in terms of cubic feet is going to be 5,000. And percent excess is going to be 25.

Now notice that we have a slight typo. So if you go up to the bottom measured depth of the segment, and we have one extra zero there. Go ahead and save. Now, we've got a couple of different options in these particular segments. We can either add a lead in the segment. And let's go down to the intermediate or the production stream, the last one there.

I'm wondering why the production string and the intermediate string are swapped in depth. One is deeper than the other one. OK, let's go ahead and click on the word Lead in that section there. And nothing happens. We can add a segment. If we say that there is going to be two segments of casing string in the cementing design.

So we can add a tail. We can add a tail, but we won't do that right now. So go ahead and cancel out of that. Just be aware that you can add a segment, and that would be either the lead or the tail. Click on that Add Segment again if you would. And there's the lead, and there's the tail.

Add the tail. If we click on Add Tail, it will actually give us a split screen or two different groupings. We can either do the lead or the tail. And we won't do either one of those right now. So we can cancel out. Just be aware that a lead and a tail is available.

OK, I think you get the general idea of the casing string type. We're going to go ahead and click on Validate. And we see that all required data is present. We can click on that message and then save. And then scroll back down to the bottom and do Next.

I think that's all right. There was a pause there. OK, on the bubble side, we're a little bit further than halfway through in our information. This is going to be an open mud system type, and gas or air will not be used. The location, describe what will be on the location to control the well or mitigate other conditions. And type in there, we

are going to have 100 sacks of 10-pound mud in addition to standard 5M wellbore control.

The mud monitoring system to be utilized will be a standard gas measurement mud system with alarms. OK. We can go ahead and validate that. And it says we need to do at least one circulating medium table. So we'll click there and add a circulating medium table.

The mud type is going to be a water-based mud. Total depth will be 5280. Or excuse me. Top depth, I'm sorry. The top depth is going to be zero, and we'll be using this to drill the whole well, so the bottom depth will be 5280. Minimum weight per gallon is going to be 8.5. Maximum weight will be 9.5.

Density in pounds per cubic foot will be 25. Gel strength will be 14 pounds per 100 square foot. pH will be 7.2. Viscosity will be 14. Filtration in CCs will be 25. Salinity and parts per million will be 2. And we don't need to add any extra characteristics. So we'll go ahead and save that.

And you'll notice that we get a error message. And actually, I meant that to be 0.14. And so go ahead and save. And let's see. We can go down to the bottom and we can add another medium table, but we won't do that right now. So we can validate. All required data is present. And we'll save and go to Next.

I'm going to insert a little break here. OK, we're in section six of our eight sections. We're now going to do our test logging and coring. And I'll admit to you that I'm not an engineer or geologist. So if I'm giving you information in this training that seems to be a little bit bizarre, just know that we're using this as an educational purpose and it doesn't necessarily have to be correct or realistic for that matter.

OK, so what we're going to do here is give you a list of production tests, testing procedures, equipment, and safety measures. But I'm actually going to do that in an attachment. So I'm going to say see attachment for section six of the drilling plan. Thank you.

Now open and hole case logs that are going to be open and cased hole logs running this well. We're going to go down these columns and select. So we're going to do a caliper log, a compensated dense log, a sonic log, a cement bond log, an electric log, and a temperature log.

And we're going to core the well in the producing zone at a half inch core for a minimum of 10 inches depth. We'll go ahead and validate. And once we see that all the data is there, we'll go ahead click on Save. Now, I do want to point out that at any point in this process, we can always come back and edit any of the information that we've added. So we've done our save, now we can go to Next.

It'll bring up the pressures. That's bubble seven. One through six are now blue. We're working on number seven. We're about 75% of the drilling plan. We're going to continue on in our drilling plan. We're now in section seven,

the anticipated pressures. The anticipated bottom hole pressure in this particular well is going to be 3,000 pounds.

It's anticipated that this is going to be bottom hole pressure in PSI. It calculates the surface pressure in PSIG as 1264.2. The bottom hole pressure in degrees Fahrenheit is anticipated to be 250. We can either check yes or no when we anticipate abnormal pressures, temperatures, or potential geologic hazards. We do not anticipate those, so we're going to click No. And hydrogen sulfide is not present in this wellbore as anticipated, so we're going to go ahead and click No.

If we clicked Yes on either one of the H2S or the anticipated abnormal pressures, you'll notice that we have an option on the anticipated abnormal pressures. We either give a description or add an attachment. So we'll go ahead and we can either describe that, add the description hazard. We'll go ahead and change that back to no.

And you'll notice if we select Yes on hydrogen sulfide drilling operations, it'll give us an opportunity to add an attachment. We're going to leave both of those as noes and go ahead and move on. So we'll validate. And if it looks like all of our information is there, we'll go ahead and click on Save, and then go Next.

And we're almost done, believe it or not. OK, section eight is other information. It says other proposed operation facets description. We're going to put N/A. And if we did have other proposed operations attachments, we could add those at this time. Also, if we had a different variance other than the one we've already requested, we could click Yes.

Or we could click Yes and add an attachment for variances, or we could click No for no further variances. Can click on Validate, all data is present. And so we can save and go next. Now you'll notice two things. Our heading changed. We're now on the surface use plan of operations, and we're at 0%. We've got a drilling plan that's at 100%. So that indicates that we've done our drilling plan completely. And that's where we will pick it up when we come back from a break.