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Jennifer Williamson: Hi. I'm Jennifer Williamson with Pacific Northwest National Laboratory. I'd like to welcome you to today's energy code commentator webinar on REScheck Basics. We hold this webinar series the second Thursday of every month at the same time so keep watch on BECP's training page as topics get added.

We are still looking for some topics so if you have something that you'd like to see, go ahead and use the e-mail in your webinar reminder messages and let us know.

Our speaker today is Pam Cole from PNNL. She's our resident expert on REScheck and we appreciate her sharing her knowledge with us today. Pam, it's all yours.

Pam Cole: Thank you Jennifer. Hello everyone. Thank you for attending the webinar today on REScheck Basics.

So our topic for today, the course description is really understanding the basic functionality of REScheck. Look at how you generate compliance reports and –

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some of the new features if you're a REScheck user and you're just logging on to see what's the latest and greatest, we'll go over some of that as well.

So our learning objective. Again, we're gonna have an overview of just the basic functionality of how the software works, how REScheck calculates compliance, how you can go in and identify construction specifications on your plans, what's needed to have in front of you actually before you begin your REScheck, learn what building envelope components that you'll need to be familiar with to enter into the software and then understand how the compliance reports are created and what they entail.

So energy code compliance tools. When I go through this presentation today I'm gonna go through –

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some slides, a series of slides and then we're gonna look at the REScheck software, but I have to tie it to an actual energy code so to speak because it is an energy code compliance software tool.

So with the energy code there are different paths that you can take and there's different tools that you can use depending on the path that you take and the energy code that you're working in.

So there is a prescriptive path and actually if you're choosing the prescriptive path in the code, there really isn't a tool really needed. You can look at the prescriptive tables in the energy conservation code and you could fill it out by paper, but that's one option.

There's a total building UA trade-off that's in the actual IECC, International Energy Conservation Code. That is what software REScheck is built on. We have not only a web-based tool, but we have a desktop version right now as well.

Then there's an energy analysis option, which is full energy simulation.

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Then in the most recent versions of the IECC there's actually another new path, Energy Rating Index, ERI, that you might have heard out there. That's in the most recent 2015 IECC.

There's different software out there that does full performance, such as REM design, REM rate, energy gauge and so forth.

REScheck is not a full performance-based tool. Again, it's in the middle here. It's a total UA trade-off and it follows the path that's in the code based on that.

So here's just a screenshot of the energycodes.gov website. That's where you would go out and grab the software. That's if you wanted to download the desktop version or you wanted to go out and get on the web tool. So at energycodes.gov.

This home screen page has already changed. This was to the National Codes workshop. I just presented there back in March.

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So it's a screenshot of that conference, but now there is something else that pops up. So we keep it pretty current on something that's going on within the program. So you'll see something different on the screen if you go out there today and look at energycodes.gov homepage.

Here is the REScheck page. So if you were to take down this URL, energycodes.gov/rescheck, here's where the options are. You have two options. You can either download the software. It's Windows-based. You'll see in the middle of the screen and I know this wording is a little small, but underneath in the middle where it says, "Windows" and then it has "Mac", we don't support the Mac version any longer. It's discontinued because we've moved to the web-based tool.

So if you are a Mac user, then you're gonna want to go out and use the REScheck web tool and I highly advise that you register with your e-mail and a password because you're gonna wanna save your projects.

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So you'll wanna save your data and then you'll wanna save your reports, and they're created differently. There's a data file and then the report is created as a PDF.

Then also there's technical support. So with the program, the Energy Codes Program, we do have a Help desk. You can submit questions in that Help desk. You could submit questions on the National Energy Codes. You can submit questions on the software tools, REScheck and/or COMcheck. We have a COMcheck tool and that's on commercial buildings. We are gonna have a series of webinars on the COMcheck software as well later on in the year.

It is, again, this Help Desk is strictly a site, a resource on just energy codes though and the supporting software tools that the codes program support. So if you have a plumbing question or electrical question, fire code question you would need to go out to another resource.

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Maybe the International Code Council. They have a form on other various codes because they actually publish the codes that you could go out there and get your question answered on other codes that you might be dealing with. This is strictly just the energy code.

So here's two screenshots of the desktop tool and then a screenshot of the REScheck web tool. Today I'm gonna show you the desktop tool. There'll be some screenshots of it, but the functionality and the way the software works is the same. It uses the same engine.

It's just that the real estate that I would call it, the way it looks and some things, some features are a little different. Desktop versus the web. So there are some things, but again, the backend calculates the same. It's running the same code and does the same thing.

Now why do I have both these screens up?

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Well because if you were to create a data file and you have the desktop version, you can actually open it up in the web tool. So you can use both tools with the same data file. So they can work in between each other if you had to do that.

So if you were in a remote location and you might be using the web tool or vice versa, you can work in between these two. A lot of people like the web tool because if they have several people involved in a project, such as if you have a lighting designer, you can't enter lighting into REScheck, but in commercial buildings it might be important or you might have two contractors involved that wanna look at the actual project. You might have a generic login and they could login to the project.

So the web tool is nice because you have more flexibility that you can go log into it no matter where you are if you have access to the internet.

The data exchange is what I just talked about. So if you did log on and you saved your projects out to our server, then you could always go out and pull those.

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If you save them to your desktop then you're limited that you always have to go to your desktop computer to open up those data files. So that is a nice feature that the web tool gives you that; more flexibility.

So a walkthrough the REScheck steps. So the first thing and this is just some teasers to give you some helpful hints as we go along and learn how to use REScheck. Again, this is just the basics of REScheck. This isn't the advanced class. I'm not gonna get into some of the technical calculations in the backend. We are looking at maybe having one of those type of webinars, but this one really is just the real generic basics of REScheck.

So the first thing that you'd wanna do or that you wanna know is what code. REScheck has options for several codes. Department of Energy supports the most recent published IECC and then two versions back.

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So you could be in the 2012 IECC. Your state or your location might have just adopted the 2015 IECC. So it's really important that you know what code is applicable in your location. If you don't know you can go out to our state pages and actually the REScheck software has the link that'll take you out. I think I have a screenshot of it here in a little bit that shows you the status of state code.

The next thing is that you'll wanna enter your project information. So the location of your project, the city or the county, who the builder is, if that's applicable and any of that information in the project area.

Then you're gonna want to have in front of you before you start a REScheck, you're gonna wanna have all the construction specs. So you'll wanna know the building envelope component.

Then mechanical equipment, it's optional anymore. There are no trade-offs for mechanical systems in the most recent energy code.

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You don't need to enter mechanical equipment. It needs to meet minimum efficiencies regardless anyway.

The software does not do load calculations. So within the codes doing load calculations on HVAC sizing or duct design and duct sizing, REScheck does not do that. You would need to use another mechanism to do those calculations.

Then there's a requirements tab feature that I'll show you that actually shows you all the stuff that you enter into REScheck it's not the entire code, but what's nice about the software is that it provides you a list of all the other code requirements that are in the actual energy code and then you will go in there and confirm that you're gonna meet the rest of the provisions.

There are mandatory requirements that are in the IECC, such as in the most recent one, air leakage testing is one of them. So those

requirements sit in the requirements tab and they're not actual entries that you would enter into REScheck.

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So as I mentioned, here is a screenshot of the actual status of state code. So you could go out there, look at the map or you could actually click on your state from the dropdown list and go out. For example, if I wanted to know what's happening in Washington State where I'm from, they have their own state code. It just happens to be that we have their state code as a dropdown in REScheck, but we don't have a lot of state codes in the software. That's just one unique one that we do have.

But you could go out there and look and see what's applicable within your location.

Another feature that's within the tool, it's called Preferences. It's a menu that's up at the top of the program. This lets you customize things. So I can go under General and I can look at File Options or I can tell it where I wanna save all my projects. I can also tell the software if I'm in the desktop that I want it to go out every three months or every two weeks and see if there's a new version available.

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We do have build versions that we call them that we put out on our website. Say we have a significant upgrade to the tool or a new code comes out. Well, when the new codes come out, we're actually working on those and trying to get them implemented into the tool. So you might wanna have that feature where you wanna go out and have it look for the version updates.

There's also an upload usage data. You can turn that off. We can actually capture data. One thing that is in a great need is data and for us to analyze data. When I talk about that, when you're out there looking at the REScheck web tool and when I say you can save your project, we don't share proprietary information. We wouldn't and we're not allowed to, but we might take a look at, for example, I wanna know the average amount of insulation for ceilings in Texas. If we have that type of data we can take a look at it and see –

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how many people or how much data is available for what's the average amount of insulation in Climate Zone 2, for example. We might be able to take a look at that based upon the data that's been uploaded to our servers, but again, no proprietary information is shared with anyone.

There's also a project feature. So I can default to a specific code and location every time. The applicant, there's project details. If I'm a builder and I'm doing lots of REScheck runs and I don't wanna enter my builder information every time, there is a feature in REScheck under Preferences that allows you to just enter it once and then it's saved there. So it'll automatically open up your builder name every time that you open up REScheck.

Then there's a report feature. Maybe I wanna have a customized signature line. You can customize your reports for your signature as well or maybe you have two signers. You have an architect. You have a contractor on site. Both of you are signing the REScheck report.

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You can customize that signature line under Preferences.

Then you can actually e-mail these compliance reports right from within the tool. That feature works in the desktop version and it works in the web version. So both of those have that feature. You might wanna put your e-mail in there only once. So if you're gonna become a heavy user or you are of REScheck, under Preferences at the top, the menu, you can put your e-mail in there and then it'll automatically populate that feature where you don't have to type your e-mail in every time.

So project information. There's your city or county. In REScheck web you have the option right on the project screen. You can choose from city or county. In the desktop, not so easy to do. It defaults to city locations. If you wanna use counties, then there is some explanation that's in the Help section, which is in the Help menu in the *[audio breaks up]* how to do that.

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Also, what if your city's not listed in the dropdown list. Not every city's in there. If you live in a small town such as where I live, it has one gas station, my city's not listed in the software. Then I would find a city that's the closest to my location that has similar

weather and I would use that location instead. However, you would wanna check with the building official that that is okay with them. The code official, building plan reviewer, they have the final say of what they will and will not accept. So you need to make sure that they're okay with you using a city that might be next door, so to speak, that that is okay with them to submit a report doing so.

The big thing to keep in mind is that the code is tied to climate zones. The city locations are tied to climate zones within the code. It will give down and detailed city data. So heating degree day, cooling degree day data if you choose city, –

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but I won't go into any more details about that, but it is tied to the actual climate zones that are within the code and the prescriptive table. We'll get more into that in a minute.

With Project Type you also have the options to choose from single family. So one family unit. Multi-family, which would be one or two family dwelling or it could be a more than three dwelling as long as it's residential and the residential definition. Meaning three stories or less above grade. If it is greater than three stories, it becomes a definition that would fall under the commercial code. If it's multi-family, greater than three stories above grade, then you wouldn't be looking at the residential code and you would wanna probably go look at COMcheck software which is for commercial buildings, high-rise and multi-family.

Then it also has an option to show compliance for additions and for alterations.

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The alterations feature is a little bit different in the software than showing compliance for new construction. So keep that in mind.

Project details are optional. All of this information can get printed on the report.

So I talked a little bit about multi-family, the three stories and here's a screenshot again repeating about what is the definition of when it follows residential versus commercial. So the three story is the cutoff unless you have a state specific code that has a different amendment and there are a couple states out there that have a four-story limit, but the actual National Energy Code is three stories or

less height above grade and contains more than three attached dwelling units. So some examples of that would be apartments, condominiums, townhouses and so forth.

So some helpful hints if you're selecting addition or alteration from the project screen.

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So for addition, what is an addition. That's an existing home that you're adding conditioned floor area to. So let's say that you are going to remodel the garage and you're gonna make the garage a family room. The garage used to be for cars and it was not a heated and cooled space. When you are taking a garage and you're converting it to livable, conditioned space that's gonna be heated and cooled, that would be considered an addition.

There's also a feature for alterations. So what is an alteration. Alteration is an existing house that's heated and cooled, heated and/or cooled, and maybe I'm replacing some windows. That would require a permit and that would be considered an alteration to an existing building. So just if you're adding new conditioned space that's an addition. If you're starting from scratch that's new construction.

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If you are altering a conditioned building that's existing, that's an alteration. You would choose from those three options within the tool.

So what is important to know and what type of information do you need to start your REScheck. It is the building thermal envelope. Here's a screenshot of the building thermal envelope. So we're talking about really where the insulation is placed. So let's separate conditioned space form outside air or unconditioned space, such as a vented crawl space. I'll show you more pictures as we get down further.

It's not interior walls that are between two conditioned spaces. It's only the exterior building envelope that defines the conditioned space. So if you have a two story building that's conditioned you wouldn't show that interior floor between those two conditioned spaces.

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You would only have one floor, the bottom floor. Maybe that's your basement or you have a walkout basement so it's your slab on grade.

Another nice feature when you've defined that building thermal envelope is entering applicable building components or light components. So it's understanding what your construction is, where that building thermal envelope is and then start defining that within the tool.

So some helpful hints. Within the software there is, as I call them, buttons for every assembly. There's ceilings, skylight, wall, window, door, basement, floor, crawl. That doesn't mean that you're gonna choose from every one of those. You have to determine where your building envelope is defined first. You might not ever touch the crawl wall button because your crawl space is vented to the outside.

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The other nice thing is you don't have to list every component in the software. If I have 16-inch on center wood frame exterior walls, I can group all my exterior walls together and show one wall if I want to. Height times length of that opaque wall area and add them up; total square footage. I could group all my windows. If they all have the same U factor and the same solar heat gain coefficient, the SHGC, rough opening of all the windows I could total them all up.

I don't need to have and I've seen these projects before. I've seen project data files that have literally 100 line items. You do not need to have 100 line items and enter every window, but if you do have designer windows or you have windows that have different U factors, different labels, you wanna separate those out.

If you do and let's say you get into starting –

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separating out building assemblies, just be really careful that you might wanna start separating out your walls because it does a parent/child relationship, the software does. If you group them all together that's great. Put all your windows underneath, but if you start separating things out, then you wanna separate your walls out

and put the appropriate windows under the appropriate wall that you put into the software. We'll take a look at that in the software when we get there.

There's also another feature that is called "other assembly." Each one of these, the ceiling, skylight, the buttons down on this screenshot has a dropdown list of assembly types that you can choose from.

Each one of them also has an option to choose Other. Other means that the assemblies that are within the software that already have a calculated U factor, that doesn't match your assembly type. Maybe you have a unique construction –

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that you're doing in your building and from the dropdown list those don't match. So you have an option to choose Other, but when you do, you gotta keep in mind that you are gonna have to calculate out what that assembly is. So a complete calculation would be needed. Total U factor.

Then you would wanna backup that calculation with your compliance report and your construction documents to the building official on how you calculated that U factor. So it's really important to take note of that one.

Some other helpful hints. Fenestration ratings. Where am I getting those. When you start your REScheck you're gonna wanna know what the rated ratings are for all your fenestration. When I say fenestration that's your windows and doors/doors. Anymore the codes have a default table. It's called the energy code default, but those values don't even meet some of the prescriptive values in the code.

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So that option is available and you can do trade-offs. When I say defaults it means that the code requires that there be a certain testing, certified labeled rated product through NFRC100 and 200. Those are the two ones, U factor and solar heat gain. I'm saying it really quickly, but if you have a question on it, we can get into it in a little bit more detail, but really what I'm saying is that you have to have an NFRC labeled product. That's what you would enter into the software. The default values are really worst case scenario. So that's a biggie that you're gonna wanna have as you get into

these newer codes.

Cavity R value. What does it mean. When you start entering your building components into REScheck if you're a new user, Cavity R value is insulation placed between the structural members. Continuous R value is just that. It's rigid foam board. It could be structural sheathing, insulated siding, but it's insulation –

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that has no thermal breaks and it's not between structural members. There's two columns in REScheck. One for cavity and one for continuous. So you'll wanna make sure you know which one is applicable to your assembly type that you're entering for your building component.

After you've entered all your building thermal envelope components, there's a button called Check Compliance. You'll wanna click that. Then you'll wanna look at your compliance results.

The other thing that you wanna look for is anything and there's colors within the tool. If you see anything in red then that means that you have something that is missing or something is not right. We'll go into some more detail here as far as what that is.

So here's a screenshot of NFRC labeled product. This would be on the window and it gives you the ratings that you need to enter into REScheck, which is the U factor and depending on climate zone, the SHGC, which is the solar heat gain coefficient.

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The other values, the visible transmitence and air leakage and condensation resistance are not ratings that you would enter into REScheck, but they are typically ones that you would see on an NFRC rated product.

Here is a screenshot of the differences of the things that we just talked about; cavity versus continuous insulation. So this would be between the structural members and foam board that's outside of the structural members. So this has interior rigid foam board on the inside of those interior walls there.

Some other buttons within the tool, basement, floor and crawl wall. So if you have a basement and what defines a basement, which is

below grade wall is really the term is, when you have walls that are more than 50 percent below grade and you're going to condition that space, then that's a basement.

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For floors you gotta determine where your floor is for your house. When we're talking floors it's the building thermal envelope. So if I have a two-story house and let's say I have a walkout basement, then I'm gonna have a slab on grade. I'm gonna have a slab on grade, exposed edge of the slab is what I would have for my building envelope assembly for that walkout.

You might though have a conditioned crawl where it's not vented to the outside and then I'm entering my crawl space, my crawl wall into the software. If I have a conditioned crawl space, then the floor above that crawl space would be an interior floor and I would only be showing my crawl wall.

So here's a nice screenshot of what's considered a basement and this is actually of a walkout. So I have two side walls that are on grade, and as long as that grade is greater than 50 percent, then they're considered a below grade wall.

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Then the minimum starts at the basement walls, starts the prescriptive values are what starts the baseline for it from the U factor tables for the national code within the IECC.

The front wall is considered an exterior wall because it's less than 50 percent below grade. It's basically all above grade at this point because this is a picture of a screenshot of a walkout basically.

So some other helpful hints. Entering your wall height. For basement floors or wall height for a basement is you are taking from the top of the wall down to the basement floor. So typically for basement walls, they're eight or nine feet high and your basement wall entry in REScheck that it asks you for a couple more entries for that 'cause it also needs to know the depth below grade and depth of insulation.

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You can look at doing trade-offs, basement wall insulation where you're not insulating the entire height of the wall, however, as you

move in these codes. For example, the most recent code, 2015, it's really hard to trade-off full height insulation on a basement wall in your higher climate zones in your more heated demand climates, such as Climate Zones 7 and 8 and 6. So again, the basement wall inputs is more than one input wall height; depth below grade, depth with insulation.

So the code has a requirement for depth of insulation and it starts at requirements for full depth of a basement wall or up to ten feet. This is where if you're not doing up to ten feet or –

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the entire height of that wall, you can do trade-offs.

So let's say I'm not gonna insulate that entire basement wall. I'm gonna have to make up for that some where's else. So as long as I have increased amount of insulation on another assembly that's better than code, I'm trading off that lower amount of insulation somewhere's else. That's what a trade-off is.

Some other helpful hints here is continuous insulation. So the software will assume you have exterior rigid foam board. When you enter a continuous R value into the software, it has to make an assumption. Cavity insulation is assuming that you have insulation in between structural members.

I talked a little bit about colors. Here is a screenshot of colors. So red really means something is missing.

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It shows you in red, if you look under the screenshot here, the gross area, I'm missing my square footage for my ceiling.

So after you've entered all your building envelope components or you've checked compliance and you see something in red, you're missing some data.

The other thing that's gonna show in red and I hate to say this, is if your project is failing, it's gonna show it in red.

Green means good and that would show a passing number down below. So green, think of it as good and that you have a passing project.

Blue, if you see blue, you could be missing some information. Down at the very bottom of this is a screenshot showing a teaser that says, "No envelope assembly specified" and "TBD, to be determined." So if you see anywhere you have a TBD, then it's probably that you don't have some information entered and it's missing something before it can finish running a full calculation, the software.

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So here's a screenshot of REScheck, an actual building envelope that's been entered, a data file, and there are some screen operations. So there's a compliance bar down at the very bottom. This one is an example that shows in red. Red is bad. Missing something or something's failing, as I said. It shows a failed. You want it to show green when you enter your information.

Then the status bar. The status bar is nice because it can give you little helpful hints. So be aware of that because as you're entering your information, look down there and see if it's giving you information that might be helpful to you as you start entering your building envelope component.

I talked a little bit about trade-off and total UA. What is UA. UA is U factor times the area for each building assembly

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So I'd have my ceiling and I enter my ceiling. I enter the square footage. You enter it into REScheck. It calculates a U factor. That U factor already has an assumption for that ceiling component. The only thing else I would enter as a user is what am I insulating that assembly to. Once I enter the insulation R value it recalculates that U factor and it recalculates based on the square footage of that assembly. That's your total UA for that assembly.

When I entire my entire building, my building thermal envelope, at the bottom of the program it'll have total UA of the entire building. What it does it's gonna look at a code building. It looks at the U factor, equivalent U factor table from the baseline from the code and your climate zone. It looks at the match UA and your UA. Those are the two biggie numbers.

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It's looking at if it were just meeting code and it's calculating the

overall U factor and UA and then what you're proposing; your total UA. We'll look more at this when we get into REScheck.

There's also a performance alternative in REScheck. Now I talked a little bit about whole building performance. This is not a whole building performance tool, but it does have a simulated performance approach. Really what that is is that it looks at your solar gain and it can look at your mechanical equipment. It will do like for like on mechanical equipment though. You're not getting trade-offs for mechanical equipment, but it will look at it and it'll look at the efficiency of the equipment and the solar gains on your building.

So when I say solar gains, basically if you wanna use this approach you have to do all your walls. You're gonna have to have at least four walls and show orientation.

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Orientation is a feature that you can choose that'll add another column to your spreadsheet, so to speak, and you will show every one of your walls and how they're facing. When I say facing as though you were standing in your house facing the front door and is it facing north, south, east or west; whatever it might be. That's how you determine.

We'll play around with this a little bit in REScheck, but if you wanna use the simulated performance approach you would have to do take offs for all your walls and show the orientation. Put your applicable windows and doors under each wall.

So some helpful hints if the compliance is failing. What do I do. Well, if you show it's failing, first thing you wanna look at is first confirm that you've entered all your building envelope components for the building thermal envelope, check your square footages. Check that your insulation values have been entered appropriately.

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Check all your readings on any of your fenestration that you've entered and the rough opening for the square footage. Then start looking at where your big hitters are. Meaning are you not meeting minimum insulation requirements for a certain assembly. Maybe you can't fit the amount of minimum insulation in a certain building envelope assembly, such as the walls, and you need to trade that off somewhere.

So start looking at insulation values and then your fenestration, but keep in mind the code is not driven by the amount of windows you have any longer. So stringency is not increased or energy efficiency you're not penalized for having a lot of glass. It does like for like components.

So if you have a lot of windows, as long as they have a really good U factor, the more square footage you have of –

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that component and the better it is than the minimum code, you're gonna get trade-off for that component. You'll be able to make *[audio breaks up]* you can use that for making up on a different component somewhere's else. So it's really based on square footage.

So don't think of it as you can fail 'cause you have a lot of glass in a house. That's not the case. It just means that you'd have to meet the minimum U factor and solar heat gain that's in the code for all that glass. If not you're gonna have to trade that off for another component somewhere's else and it's gonna have to be better than code.

So some other helpful hints and I said UA. Here's a screenshot of what I was referring to in the column that will show you in REScheck. I've circled two. So I have a basement here that doesn't show an insulation value and look at the UA. It shows 183. That's pretty darn high. The reason being is I forgot to enter what I'm insulating that basement wall to so that was a big hitter.

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So once I fixed that, then I was passing.

What I also forgot is that I didn't show the depth of insulation. I showed the depth below grade, but I didn't show my depth of insulation either. So even if I entered insulation, my cavity and/or continuous, I can do continuous on my basement wall if I wanted to.

I have zero over to the very far right for my depth of insulation. So you gotta be very careful when you start getting into some of these building envelope components. If they're asking for more information don't forget to enter it because it's gonna calculate it

or it won't calculate it depending on what values or what depth or height or square footage that you've entered there. So be very careful that you wanna double check all your work once you're done.

Similar to the slab on grade, the walkout basement. I didn't enter what my depth of insulation was. For slab on grade, you're only entering that exterior edge of insulation.

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So from the top of the footing down, the distance that you're gonna insulate that slab edge. There are some diagrams in REScheck, the different ways you can insulate a slab edge that you can take a look at.

If you're doing vertical plus horizontal, then you'll add up the distance for both. So you could have up to six feet of slab edge insulation. If you had the entire slab insulated, that would typically only happen if you had a hydronic heating system within the slab. When I say heated slab I'm referring to a hydronic heated slab. Meaning the actual slab is heated; not that the house is heated. That is a question that has come up so keep that in mind. There are two options in the software; heated and non-heated slab.

Requirements tab. There are a couple tabs within REScheck.

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So there's a Project tab, an Envelope, Mechanical and a Requirements tab. Kind of new to the tool. It's only been out for a couple years, but this is where it has all those other requirements that are in the code, such as air leakage testing, mechanical systems, duct insulation, duct testing, service water heating, duct construction.

You'll wanna go through and look at all those provisions that are pulled in and confirm that you're *[audio breaks up]* all those provisions and check them off because that will actually get populated into the inspection checklist that you will wanna turn in with your compliance report and you're gonna wanna keep a copy of it and you'll wanna have a copy out on site that will be out there during inspections when the field inspector comes out. So you'll wanna have one out on site as well.

The other thing that you can do within the software is create a certificate, which is required by code. So here is the report.

[0:40:59]

So after I'm done entering my project and it passes, I would go up to the File menu and I can click View Print Report. I have options. I have Compliance Certificate, Inspection Checklist and Panel Certificate.

The Panel Certificate is something that you can create and that you'd wanna take out on the construction site 'cause it's required. It will give you the average insulation levels and so forth that can be put out there and stays with the home after the home is built.

So what else does the Requirements tab have and how is it setup. The code requirements and the Requirements tab are really setup based upon phases of construction for inspection. Those are written in the actual IECC, those phases of inspections as well. So there's a plan review section. There's a footing and foundation and rough-in and then final.

[0:42:00]

That's how we've set it up in the Requirements tab as well. So you'll see those as you start moving through and you're confirming that you're meeting the other provisions.

Here's a screenshot of an actual report. So this is a project that's been done. So you'll wanna verify that you have the applicable code. This one shows 2015. That's the most recently published IECC. The location is correct. The construction type is correct. Is it single family? Is this an addition? Is this an alteration? What is the construction type?

The condition floor area. This is the only time that you would enter total conditioned floor area. So if I have a two-story house I'm gonna total up each floor, but under the Envelope tab you would enter just the building thermal envelope. It's showing that interior floor, but total conditioned floor area is a biggie.

[0:43:01]

So during plan review when they're looking at the load calc, that number comes into play 'cause you need total conditioned floor area to run your load calc. so that is an entry to enter into the

software in the Project tab.

Climate Zone is automatically populated based upon the city that's chosen. Then you can put your permit date if you wanted to. You can put the date on your project in there.

Then you have Compliance Passes. Of course you're not gonna turn in a failing report. If you wanted to create a report that was failing you'd see that there wasn't this signature line because we will automatically remove the signature line if the project is failing. So if you don't see a signature line, go back and look and see if the project was failing because that's probably why.

Then the Envelope Assemblies would sit down below the compliance results. So it will list all the building envelope assemblies that you've entered into the REScheck program. It'll show the gross area of each assembly, the cavity –

[0:44:00]

and/or continuous R value, the calculated U factor and then the total UA for each assembly that you've entered.

Here is just scrolling down another screenshot of the rest of this project. So this is actually a case study that I have that we'll walk through real quickly and then we'll get into the *[audio breaks up]*.

So the signature line down below, it shows Dun Rite Construction. I made that up. Anyway, that's where you can under Preferences in REScheck you can customize your signature line if you want to. Then you would sign it, date it and submit it.

Here is a screenshot of the inspection checklist. So with this one, this is an example of the 2009 code, but it'll give you the code section. You can ignore the next line item down, the FO1. That just means foundation number one. It's actually a tracking feature for data gathering.

[0:45:02]

So that's really what that means, but 402.1.1 is actually from code. It's the code section. So that's another helpful hint. The slab edge insulation R value.

Then the other columns are really for the plan reviewer and the field inspector. I have been asked that question as well. Am I

supposed to fill those out. No.

In REScheck you'll go into the Requirements tab and you'll confirm you're gonna meet the measures, but once you create this inspection checklist report, the rest of this is done at the building department and out in the field. So if the plan's verified, it's for the plan reviewer to look at the building plans and confirm that everything is meeting code for permitting.

Then the field verified is for the field inspector and whoever that might be. Could be a third party rater. Could be anyone that is tied to that building department that's gonna go out and do the field inspection before they get certificate of occupancy.

[0:46:01]

The Complies box is also for the inspector. Does it comply, not comply, not observable. Maybe they couldn't see it at the time of inspection or non-applicable.

Then the Comments column is in the Requirements tab, if you enter additional information for a provision, it's gonna show up there. If you look down towards the very bottom you'll see that a protective covering is installed. It's highlighted in blue and it says, "Requirement will be met." It's a checkbox in REScheck saying I'm gonna meet this requirement or/and I could add additional information if I wanted to and it will show up on this inspection checklist report.

Here is an example of one provision from the inspection checklist. This has to do with the ACCA Manual S and J for the load calc.

[0:46:59]

So this is where you would have to manually enter the load calculations for the heating and cooling. You don't enter this into REScheck. It's not a feature or an entry into REScheck.

So here's the code section or sections if it's in more than one section. The Inspection Type is the next column. The Value for the Plan, the Value for the Field, the Compliance, which is typically done out in the field. Then we'll move over and here is a screenshot example of the panel certificate. So this is showing you the 2015 IECC. This takes averages. So if I had 100 line items, which we don't wanna have, but if we did, it wouldn't put 100 on this panel certificate. It's gonna take the average amount of

insulation for the above grade walls and enter the overall R value there.

Same for below grade wall if there were any, and this one's showing zero.

[0:48:00]

So it's an example of there were no below grade walls in this project, but it had a floor, shows the insulation, has a ceiling, showing the ceiling insulation and so forth and the fenestration. Glass doors that, but you'll see heating and cooling. You need to enter those efficiencies and the equipment manually and the name.

So there is some other things that if you wanted to use this – you don't have to use this panel certificate. It's just a nice feature that we put within the software that you can create one because it's required by the most recent code that you have one, but just keep in mind there are some additional information that you need to manually enter if you use this certificate.

AreaCalc is a tool that we probably will not be supporting any longer, but you would see it in the desktop tool. It's not supported in the web tool, but it just runs a takeoff. It can save all your windows and doors so if you're doing track homes and you use the same –

[0:49:00]

schedule of windows and doors every time you could save them in AreaCalc and just move them on in to your project. That is what AreaCalc is. Pretty basic tool.

So let's take a look at the case study. If you're online and you're a trainer, this might be a good case study that you can use to go back to your billing department or what have you and use this case study for using for training.

So this is a house that has a lot of different components involved in it. So it has a basement. It has a crawl. It has a slab on grade. So the first thing you do is you're taking a look at the building section and the building plans and really you can take a highlighter. I can go with a highlighter with my building plans and highlight that building thermal envelope.

The other thing is is if you were to take that highlighter and

highlight around the building thermal envelope on your plans and you have to lift up that highlighter, then you have a break in your continuous air barrier.

[0:50:03]

The most recent code require a continuous air barrier. You do not wanna have a break in your air barrier. So another nice, little helpful hint there. *[Audio breaks up]* lift that highlighter up then you might wanna be taking a look on your building plans of why. If you can do continuous highlighting around that building envelope, good, because it's required by code that you have a continuous air barrier.

So this shows the building section for the main floor, the basement section. I'm giving you for this case study what the square footage is for the ceiling area. This one has some knee walls. So it has a cathedral ceiling and it has a typical ceiling. So there would be more than one ceiling entry, ceiling assembly in the software more than likely.

Here are all the exterior walls for this project. So I have some walls. I said I have some knee walls. So I have a cathedral ceiling –

[0:51:00]

so I have some 12-foot walls on these plans and I have some typical walls that are 9 feet. I've done the orientation and the square footage for this project.

The knee walls. When you have knee walls, and this really is for the plan reviewers, you might wanna show those separately. You can actually double click on the actual wall that is shown and change it to knee wall instead of it just saying wall. It's really nice for the plan reviewer. It just makes it quicker that they can go take a look at a REScheck and go, "Oh, that's the knee walls. Got it."

Even out on site when they have the REScheck report when they're going out there and they're inspecting the knee walls. They might have a different insulation cavity R value than some exterior walls. It's really important that you separate them out.

So here's an example of some bad insulation done and some knee walls that are over to the right –

[0:52:00]

versus insulation installed properly in a knee wall. Really the side view of this house and defining where the knee walls are and that red line going across the ceiling area.

So, ceilings - a lot of questions come in if you're a first time user, "How do I enter the insulation for a ceiling?" Or, "Am I entering it at the roof?" The only time you would enter a roof deck is if you have insulation at the roof deck and that attic is conditioned. It's not vented to the outside.

Typical construction has been attics that are vented to the outside and the insulation is placed down at the ceiling level. So that's where you're calculating your square footage is at the ceiling. If that's where it's at, it's typically the same, if it's a one-story house, then it's the same as your floor area, conditioned floor area unless you have a –

[0:53:00]

garage and you're insulating above the garage, but again, if you have a thermal break there you would not show that ceiling area above the unconditioned garage.

So with the insulation, if it's all one application, if I'm blowing in R-38, I show that all as cavity insulation. I don't break out my insulation and show this much R value above the trusses and this is R value that's in between the framing members. REScheck already makes assumptions for the ceiling based upon the R value entered. If I enter R-38, R-49, it's running a series of calculations in the backend. It makes assumptions if you're using typical standard flat ceiling scissor truss, that there is decreased amount of insulation towards the eave. It's running that calculation as well.

Only if it's an energy truss do you get full height, full credit for that entire R value for that ceiling insulation.

[0:54:02]

So don't double up your R values for your ceiling. Enter as cavity unless you're insulating truly with foam board at the roof deck. Outside of the structural members would you show continuous insulation for your ceiling or your roof entry.

Basement walls. Again, more than 50 percent more below grade

it'd be considered a basement wall. It's not. It's an above grade wall.

Different ways to insulate your basement wall. I can do it on the exterior. I can do it on interior. I can fur out on the interior and have insulation between those furring members and that would be considered cavity insulation in my basement wall or I might have foam board on the exterior and I'd enter it as continuous insulation in REScheck.

Now if I have a two-story, I don't wanna forget about my rim joist, but where do I include that rim joist. Here's a screenshot that I wouldn't include that rim joist area.

[0:55:01]

That would be above my first main level. So if I had a typical nine-foot wall for my main level and I need to include that rim joist area, I'm gonna calculate ten foot. If it's just a one-foot rim joist, then I'm gonna calculate out ten foot high and then the length of that wall.

I would not include it in my below grade basement and add the square footage there. I would add the square footage to my main level and show it as the above grade wall.

The insulation is, by code, for your rim joist is supposed to be the same as the exterior above grade wall. So more than likely you're gonna have the same value anyway. You wouldn't wanna separate it out and show your rim joist. It wouldn't be considered the floor. That's part of the exterior wall.

[0:56:00]

Here are the square footages for your basement wall. In red is the actual slab on grade. So I have a side wall, the two side walls and square footage and I have a back wall. So if I have a walkout basement, I'm definitely gonna have at least two basements walls in REScheck 'cause I have one wall that's fully below grade and if the two side walls have the same gradient, then I can total those up together, their light components and take the total square footage and show just one basement wall if they're both the same grade and enter it up.

Then do height of the basement wall, depth below grade and then depth of the insulation. As long as I'm insulating both of those side

walls to the same depth. If it's full height insulation then you're good to go. Show it at full height.

Here is a screenshot of the basement wall entries because you're entering a little bit more into the software. So you have the wall height, the depth below grade and then the depth of insulation.

[0:57:02]

You have the option that you don't have to insulate the entire height of the wall, but code minimum starts at full height. Just keep that in mind.

Now to the floor. For this case study I have a crawl space, but the crawl space is vented to the outside. So if that's the case, the floor above the crawl is what I'm going to be entering and that's where I'm gonna insulate. I wouldn't be showing the crawl walls if I'm venting to the outside. I'm insulating that floor above the crawl. This is the square footage of that crawl space floor area above the crawl.

However, if this is an example of an insulated crawl space, then you would enter your crawl wall. So you wouldn't see any vents. You would be seeing insulation. You're gonna see a vapor barrier laid down on the flooring of the crawl and there's mechanically ventilated.

[0:57:59]

It's conditioned and more applicable components would need to be submitted to the building department as far as how you are mechanically ventilating that crawl space. Similar to as if you had a conditioned attic. Then more provisions might apply to you as well.

Crawl space walls. One more entry for crawl space walls. It will ask you the depth of inside grade because of the soil. So one more entry for the crawl space walls if you have a conditioned crawl space.

Then here is for the case study, the slab. So 93 linear feet. This is the only entry in the software that's in feet. All the other entries are total square footage.

So for slabs, there are different ways you can insulate that slab edge.

[0:59:00]

You'll want to make sure you enter the depth of the insulation and then the R value. So if it's two feet, four feet, make sure you do not forget to enter your depth of insulation and then the R value of your insulation; R-10, R-5; whatever it might be.

One point to make is even if you're in a climate zone where the minimum requirements in that climate zone does not require slab insulation, but you are working with a slab, just because the code doesn't require it doesn't mean you don't show it. You've gotta have a full building envelope.

So let's say I'm down in the panhandle of Texas and slab insulation isn't required, I still would show my slab for this house if I'm gonna enter it and submit this to the building department. You would have zero for the depth of insulation on that project.

[0:59:58]

Insulation levels. So this case study's given them to you for the roofs, the walls, the floor and the slab. Those are my building thermal envelope components. I go out and I'm gonna enter them into the software for whatever it might be; cavity and/or continuous.

The window areas and door areas. Rough opening. I will wanna have what the rated, labeled U factor and solar heat gain is of my product. So the U factor and solar heat gain is provided for this case study here.

Now let's go take a look at REScheck. So I'm gonna go ahead and open up REScheck. Maybe.

[1:01:00]

Here we go. Okay. I'll give it a minute to make sure it refreshes onto your screen there.

So this is the desktop version. We'll play around with this for about a half hour or so and then we're gonna go right into questions. So when I open up the software, let's take a look at the very top. So at the very top it says, "Untitled" 'cause I haven't opened up a data file and the data files are saved as RCK. That's a data file. Since I don't have one open it says "Untitled" at the very

top. Hopefully you can see that. It's kinda' small.

This gives you the build version. It says 462 and then the code. It's defaulted to so to speak. Once I've chosen a code and I close REScheck and I open it back up again, it's gonna open it with that same code that I was on the last time I was in it.

[1:01:58]

So the last time I was in REScheck I was on the 2015. So that's what it's on.

The next, down below that is the Menu bar. So I have File, Edit, View, Options, Code, Tools and Help. Under File is I can open up a data file if I have an existing one and we're gonna look at one today. I can Save it as a data file. I can save it as a report. Two different data types. If I save it as a report it saves it as a PDF. So if I hit Save or Save As here it's saving the data file.

Then I can do View Print Report. The screenshot that I showed you was of the actually case study that I had showed you earlier today. We'll take a look at a report.

The E-Mail Report feature. So let's click on that one. So here is where if I have my project, I can go in and then I can specify what do I want to e-mail over to the building department.

[1:03:00]

It'll default to click all the files on. So the compliance certificate, inspection checklist. I can unclick panel certificate if I don't want that to be e-mailed over to the building department. So you can unclick those.

You can create an RTF. Maybe I wanna upload that into a CAD drawing. That's a nice RTF feature if you wanted to do that. Then will these projects be submitted for approval. You gotta click yes or no here. So if your project's done then you click Yes and then hit Okay. Then you can once you do that, the next screen will be who am I sending the report to.

So you just follow it through and you can then send off that compliance report to the building department if you have their e-mail address and the building department allows you to electronically submit. So we wanna make sure that you confirm that with them that you can do electronic submittal.

[1:03:59]

Up at the top, again, there's an Edit button. You'll see that those are grayed out. If I click into one of the screens, then some of those features become live. So under Edit is the Preferences that I talked about. This is where I can customize some things in REScheck.

In the General tab there's a General Project Applicant and Reports tab. This is under Preferences. In general that's where I can save to a file location if I want to. I can block other users from open a currently open data file. You could click that. I leave mine unclicked.

I can look at version updates. Every month, never; every six months. Then the Upload Usage Data. If I click/unclick this, this only is applicable that when I install a new version, we can actually capture the data at that time that you're installing a new version. We don't capture it every time you save data.

[1:05:00]

It'd only be if you're installing a new version where we could capture it from desktop data, but the web tool, again, if you are using REScheck Web, you can save your projects to our server. Again, we don't share any proprietary information with anyone. So that's that feature.

Project tab. This is where I can default the code of the location if I want to. So if I click on "Use the Following Setting." If you change anything under Preferences just make sure you realize that you have to go back out under Preferences and fix it 'cause it will save it and every time you open up REScheck it's gonna be there. So you'd have to go back out and change it under Preferences when you start customizing things with under this feature.

So I can enable Orientation if I want it to show up every time or Enable Comments to show up every time. I'm not gonna click on those. I'll show you that under the Envelope tab.

[1:05:59]

Here I have customized my report that I don't wanna have to deal with every time I create a report. So I've entered the owner and the designer. Then I've also entered the construction person, which is just a made up name, but I've entered that in as well that I want for

that to show up on the report. Then I can click Okay.

Up at the top again, glazing requirements under the View menu is when I start entering my building envelope it's gonna start calculating area weighted averages. A nice feature is because it's going out and looking at code and it's looking what you've proposed and it will start calculating up what's the maximum allowed if there's hard limits. When I say hard limits, in certain climate limits you can't go over an applicable U factor or solar heat gain coefficient no matter what you do. Trade-offs stop.

[1:07:00]

So you might wanna take a look, if you are in a zone where there is *[audio breaks up]* you start entering your building envelope components, this nice feature here will calculate up your area weighted averages for you and show them to you.

Under Options, this is where you have the UA or the performance alternative. So my suggestion is don't choose the performance alternative. Use the UA because, again, you have to enter a lot more assemblies by going down the simulated performance approach. I'd only go there if I was failing and I wanted to look at I had really good orientation and some really good windows based on my orientation and I wanted to get credit for that. That's basically what you're gonna see is what it calculates. It's not full performance-based tools. The other thing is you can define that you wanna show orientation.

[1:08:00]

So if I click on this it's gonna add another column down below.

Then Comments. Let's say I wanna add some comments to my assembly. So I clicked on that. You'll see that it added another column. So now I have a Comment Description. It's optional. Maybe I have some certain features or things or I wanna show where on the building plans that a specific wall might be for the plan reviewer to look at or the inspector.

Then the other thing, it's back up to the top again where you're now looking at code. Here are the applicable national codes and then here's some state specific codes that are in there. We're on the 2015. We'll just leave it there. Then the AreaCalc Take-Off Tool, we're no longer supporting this tool. So it's just a real simple tool that you can actually just run your square footages in and save

windows and doors. Pretty easy to use.

Then to Help. In the Help is where the entire software user guide is.

[1:08:58]

Could take you out and look for updates, frequently asked questions and help topics, like how do I enter my above grade wall. You can find a lot of good information under Help Topics. If you *[audio breaks up]* I would go to Help Topics first and look at that information out there and see if something out there can help you.

So the next item down, these are Windows-type features; the cut, paste, save. Those options duplicate. I can duplicate rows. I can print from right here if I wanted to. Then the next item down are the tabs within the tool.

So I have Project, Envelope, Mechanical and Requirements. If I click on the Project tab, this is where I choose my location and my city from the dropdown list. I've already chose my code from the Code menu. So it's defaulting to the 2015 here up at the top. Now my Project Type. This is where new construction, addition or alteration would come in.

My Building Characteristics. Is it a one, two-family or multi-family and then that conditioned floor area?

[1:10:03]

The conditioned floor area is all floors that are heated and cooled. So it's a two-story, three-story, total up all the floors that are conditioned. Only time you enter it here. The rest of the time it's the exterior building thermal envelope of the assembly in the Envelope tab.

For this code there are some other things that apply that it wants to know, such as are the ducts and air handlers within the conditions safe, do you have a sunroom, do you have a spa or a fireplace because there are some items that are code driven that will actually automatically display if you do. It's gonna add those in. so pay attention to those. Click on them if they're applicable to your project.

Over to the right hand side is the project details. So I would go up

and I would click on the Edit button, Edit Project Details and I could start entering my title, –

[1:11:00]

my owner/agent, designer and so forth under the right hand side of the screen.

Let's take a look at the Envelope tab. I have nothing in this project. So here are the buttons; the ceiling, skylight, walls. This is where I start building my building envelope. So if I click on Ceiling it has the dropdown list already there for me to choose from and I would choose one that is applicable to my construction type. If one of these matches your construction type, choose it because it's already gonna have a calculated U factor for that assembly.

So if I have a flat ceiling I would click on it and you'll see it calculate what that U factor is. It's gonna recalculate that U factor once you enter some more information. I'd enter the total square footage of that ceiling area. So let's say that it's 2,000 square feet and then what I'm insulating it to. Let's say I'm installing R-38 in the ceiling.

[1:11:59]

It recalculated what the overall U factor was for that ceiling area.

Then it also calculated what the UA is. If I wanted to add some notes, I could put some notes in here if I wanted to. It already says flat ceiling, but if I wanted to put some special notes in here I could do so.

If I have a skylight, I would choose Skylights. If I don't then I skip over to the next button. So now I'm gonna enter my exterior walls. If they're all the same construction and I have let's say a one-story house, I could just create one line item if I wanted to. Height times length, total square footage. Enter it. Cavity and/or continuous. If I'm doing insulated sheathing, I'd enter it, but if I'm not doing insulated sheathing or additional rigid foam board I'm just insulating between the structural members, then I'm gonna enter my cavity insulation of what the overall R value is under cavity and be done.

[1:13:03]

It recalculates the overall U factor. So it already takes into account

what the air films are, gyp board, framing percentage. These are things that are already calculated within the tool based on ASHRAE fundamentals.

Then I would go down to my windows and define the window type that I have. So if I have wood frame, vinyl, double pane, low E and the rough opening. So if all the windows have the same U factor, I can look at my entire window schedule and put all the windows in.

So I've totaled them all up and if all the U factor's the same I can enter my U factor and then if the solar heat gain is applicable, I can enter my solar heat gain. So I'm gonna put .40 and anything special that I might wanna add to this. There is all my windows that I've put in for my project.

[1:14:00]

Same applicable as doors. Typically you'll see doors where you might have different ratings, especially if you have a glass door in the front, maybe a solid door or back door. You'll wanna go pull the applicable U factors for your doors and enter each one if they're different. Again, put the value in.

Then we get into basements. If I have a basement, this case study has a basement. So again, it has a dropdown list of assembly types you can choose from. Let's say that this one's solid concrete. I have the wall height so I could put in a nine-foot wall if it was nine feet high. The depth below grade. So let's say it's seven foot below grade.

Then my depth of insulation. If it's more than 50 percent that's when it becomes a basement wall. So if it was less than two feet – well, this is depth of insulation, excuse me.

[1:15:00]

Here's where you're looking at if you don't start a full height of insulation then you're having to make it up somewhere's else. It'll populate it up into these columns up above. So let's put that we're gonna insulate the entire height of this wall.

So up here I talked about colors. This is where it's showing something in red. Down below it says, "Invalid areas." It's like a little teaser for you that I'm missing the square footage for my basement. So as you start entering your project take a look at the colors, take a look at what could be missing and pay attention to

things that might show up and items down below as little informational tips. For this one, of course, it was quite easy and I hadn't entered the square footage for my basement walls yet.

Then what I'm insulating my basement walls to.

[1:15:59]

So if I'm furring them out and I'm putting in insulation in between the structural members, it would be cavity insulation and I'd enter it as cavity instead of continuous.

So now I get over to floor. Do I have a floor above a vented crawl. Then I would enter a floor over unconditioned space. Or do I have a cantilever floor over outside air. Do I have a slab on grade. Here's heated and then unheated. So really before you start your project, as I mentioned, that you wanna make sure you know where that building envelope is and then start running your take offs from there as you start entering the stuff into REScheck.

So with this one there were two floors. We had a floor over a vented crawl space for the case study and I had a walkout basement. So I had a floor over unconditioned space. It gives you a little thing that actually tells you some little warnings.

[1:17:00]

Don't double up your insulation values is another warning that might appear. You can click on "Don't show me this message again" if you don't wanna see it again as well.

So with this one I would enter up the floor area, enter my insulation and, again, with this one I also had a slab. So I click on the floor button again and I'm gonna show the slab on grade.

Heated means I have hydronics in the actual slab. I'm showing this as an unheated. So I click on heated and the diagram. This is where I take and I would total up the whole depth of the slab edge insulation. So if it's horizontal or horizontal plus vertical and you would tally that up and you would enter the depth in the box here.

So let's say I have four feet. I click Okay.

[1:18:00]

Then I would enter linear feet of that slab edge; not square footage.

Then the R value of that insulation. Another little pop-up warning comes up for you to say make sure you enter that in linear feet. So the continuous insulation would also get entered. I already entered the depth of insulation.

For crawl spaces, but the crawl on this case study was vented to the outside so I wouldn't be showing it, would be one more entry that I was showing you on the actual screenshot earlier that I have wall height, depth below grade and then the depth of insulation, then depth of inside grade for calculating that crawl wall, the U factor for that crawl wall. So a little bit more involved in the crawl wall if you have a conditioned crawl space.

[1:18:59]

Now let's go take a look at Mechanical. For this one there are no trade-offs and I talked about that. So you're not entering a system unless you go the simulated performance alternative. This it'll allow you to enter a mechanical system.

Let's go over to the Requirements tab. This is where I talked about all the other provisions that are in the code that you'll wanna go confirm, but before we start clicking through these, I wanna open up the actual data file for this case study.

So I go to File, Open Recent. I'm not gonna save any changes to the information that I just entered there. I'm gonna hit No. So now I have an actual data file in there and now it's populated. So if I can't see my components, I can grab a hold. It's almost like an Excel spreadsheet. I can grab a hold of that column and move it if I wanted to.

Over here between Assembly and Gross Area, I can scroll that out more so I can see the rest of the assembly type.

[1:20:02]

When I talked about knee wall, I can double click with my mouse and change that. It'll keep adding up Wall 1, Wall 2, Wall 4, but I wanted to show the knee walls in my compliance report. So I can double click there and type knee wall in, which I've done.

The other thing that you could do is maybe there's an entry that I wanna delete. I could highlight it. I can come up and I can go Edit and delete that row or I could duplicate that row if I wanted to. So those are some functionality things. We're not gonna mess around

with that because I wanna keep this case study the way it is.

Over on Mechanical I would have to change my compliance options over to Not UA, which is showing down at the bottom. Compliance method is UA trade-off. My UA versus max UA and this one's showing I'm 14.6 better than code.

[1:20:58]

So why would I wanna go down the simulated performance route if I'm already passing by UA. I wouldn't. I'm good. I'm meeting code. I'm good to go.

But you do wanna click on the Requirements tab. These red X's mean I haven't confirmed the provision yet. One I confirm it, it'll show *[audio breaks up]* I said red's bad, green's good. So let's start going through these. I'm not gonna go through every one of them. It's all codependent as well.

Envelope and System, there's different requirements that will be under each one of these radio buttons.

So the first one that comes up is the air barrier. I talked about a continuous air barrier. Will this requirement be met. It gives you the code section. I click yes, it will. It shows up in green. Then I can also put if I want where is it specified on the plans. If you don't wanna put where the location of the plan's specified you don't have to. It's optional.

Then I just keep going down the list.

[1:22:01]

I also talked about fenestration has to be tested. Is the site listed and labeled. Am I gonna meet this applicable requirement if I have site built windows. If I don't have site built windows then this wouldn't apply. I would click Site Built Windows if that's applicable.

The next one, do I have any recessed cans. If I don't have any, I would put requirement is not applicable. If I have some, they have a provision that they have to be airtight and less than 2.0 CFM for leakage. I'm not gonna go into these code provisions 'cause this isn't a code training class, but this is where you would really wanna go through and make sure you're reviewing all of these other code provisions that are in the code that you've chosen.

You just go down the line and keep going through. As each one you go to, it's gonna change it from red to green as you have confirmed whether you meet it or it's not applicable.

[1:23:01]

Once I've done that then I can create my report. So I would come up to File and I would go View Print Report. Then you have the option and say yeah, my report's complete. So I'd click Yes. I click Okay and it's gonna create the compliance report. So I'm gonna give it a minute here.

It almost looks like the screenshot that I showed you earlier. Here is the report that has been entered for the case study that's part of the slide that I showed you.

This case study will be available out on energycode.gov. So if you are a trainer, it's a nice one to show. It has all the different features in it. What am I taking a look at here. I wanna make sure that it's passing. The max UA and your UA. Here's the area weighted averages. So I have the area weighted solar heat gain and then my proposed solar heat gain.

[1:24:03]

Then I go down the line. So if I'm a plan reviewer, I'm basically gonna start looking at each one of these assemblies, the square footage and what the proposed insulation value is and compare it to the plans.

If you have an assembly in here that does not have an insulation value and it only has a U factor, then the user has chosen Other in the software. That's where I mentioned that if one of those assembly types doesn't match your construction type, every one of them you have an option to choose Other.

However, you have to enter your calculated U factor and you need to back it up with paperwork on how you calculated that U factor. So keep that one in mind as well. If you see dot dot through the cavity and continuous R value column, then they've chosen other and they've calculated that U factor. That's not a problem. That's an option for you to do so. You can do that.

[1:25:00]

Just make sure that you've double checked and that you have your backup documentation on how you arrived at that U factor is all.

Anyway, as I scroll down a little further you'll see that there's a signature line. It has this entire case study in here. I keep scrolling down. It has the inspection checklist. I would wanna keep a copy. These are all the provisions that were in the Requirements tab and any notes if I had any notes would show up under the Comments and Assumptions as well.

That is about the basics of REScheck. So we've gone through. We've taken a look at the software. We looked at how you enter building envelope assembly. We've looked at a report, how you create a report, how you can e-mail a report.

Now I'm gonna go back over to the PowerPoint and we are going to finish up with some Q&A. So let's take a look at the questions that have came in.

[1:26:00]

One question that came in is, "Can you access the software from a smartphone?" It's not setup to operate on a smartphone. We are looking at changing the tools within the next couple years. It will probably be all web-based software and the function will look a little bit different, but we do not have that feature. It's not equipped to have a feature that would work with a smartphone right now. You could try it, but it's not setup that way.

Another question is, "If an owner adds, for example, a bedroom is compliance with REScheck required?" Yes. So if I'm adding conditioned space to an already existing house, such as a bedroom, a family room, that's considered an addition.

[1:27:00]

Whether you use REScheck or another method, if within your location you have to show compliance to the energy code, you're gonna be submitting something for documentation. So if REScheck can be used, I would use REScheck 'cause it's an easy way to create a compliance report that you could submit to the building department.

Another question that came in is, "Will you have a webinar on COMcheck?" Yes, we will. We're going to have a webinar on how to use the commercial software application, COMcheck. That will

be later on. So Pete, go back out to the energycode.gov website and periodically look at the resources under Training and we will list the topics of webinars out there and you can register.

The next one that's coming up next month will be on lighting, commercial lighting requirements.

[1:27:59]

Another question came in. "In your example you did not mention the windows that are facing at an angle, like southwest, northeast, et cetera. How do you enter those?" That's a really good question because in REScheck you can customize the orientation. So if you have orientation on, you can actually specific degrees north and face your building at an angle if you wanted to.

Keep in mind this little nice feature that's in the desktop tool where you can put your building at an angle, a north facing angle from north degrees, the tool's still not a performance-based tool, but if you're doing the simulated performance approach, it's gonna look at that angle and your orientation. You might get some credit for good orientation and how your windows are facing. If not, again, you don't even need to show orientation.

[1:29:00]

Another one, "Is it possible or necessary to sign an e-mailed report?" As I mentioned earlier, as long as the building department allows you to electronically submit your compliance report, that's what you wanna confirm. That you can submit electronically a compliance report. Maybe they have your stamp on file or your professional designer that's registered with the building department and they know you. Then they're like, "Yeah, we know so-and-so. He can submit those electronically." You wanna confirm that with them before you start submitting anything to the building department. Definitely do that.

Another question that came in, "Would you enter the square footage of an entire house or just the square footage of the addition in the conditioned floor area?"

[1:29:59]

So I think what this is asking is on the Project tab of REScheck, the only time you'd enter every floor if you have more than one floor that's conditioned, meaning it's heated and cooled is under

the Project tab and it's asking for conditioned floor area.

If you just have an addition, you would only enter and you're just doing the take offs for the addition, then it's just the square footage of the addition. Not the part of the house, the existing part of the house. Just the addition only. So *[audio breaks up]* let's say it's a big bedroom. Couple hundred square feet in the bedroom with on suite bath or whatever it might be. Only that floor area is what you would enter in the Project tab.

Another question came in. "When you enter a wall area do you subtract out the fenestration?" Another very good question. No, you do not. The software automatically does.

[1:31:00]

When you choose wall you're doing the opaque areas. So it's the height times the length of that wall no matter how many windows or doors are in that because once you enter the window or doors underneath that wall, it subtracts out the window and doors automatically.

So let's say when I said like for like components, if you're gonna tally up all your exterior walls in one line item, then you gotta enter all those windows and doors under that one line item. You could have additional, more than one window and door under that one wall if you wanted, but when you start breaking out your walls, then you really need to have the appropriate windows and doors under each appropriate wall 'cause it does subtract out that area. If you don't you might see something come up in red because if you have more window area than wall, it's gonna ding at you because you can't do that 'cause it's trying to subtract from a wall area that – where's the wall.

[1:32:03]

So keep that in mind.

Here's another question that came in. "When it comes to slab on grade insulation it is only applicable by zone. If I'm in Climate Zone 3A I will require slab insulation only if it is a heated slab. Is that correct?" Well it depends on what code, for one. Then if it's heated, in the most recent code, if you have a heated slab that there is a footnote, but that's for the insulation and fenestration table. REScheck uses the equivalent U factor table and that's different, but it does require that heated slabs have in the insulation table,

this is now code driven, insulation underneath the entire slab because you're gonna have heat loss if you have hydronic heating and that's what the intent is –

[1:33:00]

is to prevent that heat loss 'cause you have that hydronic system in the slab.

If you are in a climate zone that requires insulation. So probably didn't answer that one completely for this person. If not they could submit the question in through the Help Desk and we can get more specific for them.

Another question that came in. "Have you had an addition where there was only three walls and how do you resolve that?" That's fine. You're not penalized. If you choose additions, the software's already assuming that you don't have four walls. You typically would only have two to three walls for an addition onto an existing house or you might be dealing with one wall entry 'cause you're doing it all under one wall because it's the same construction type and that's fine. You're not gonna get penalized for doing so.

This is another question that came in. "Does your case example show –

[1:34:00]

the calculated U factor values when the R value was left out?" So if you choose one of the assemblies in the software from the dropdown list it's gonna calculate a U factor automatically 'cause it makes some assumptions based upon the assembly chosen. Whether it's steel frame. Whether it's wood frame. It's all based upon the typical components that would be involved in that assembly that you've chosen in the software.

If you don't enter an R value for insulation, then it just stays at the U factor without any insulation for that assembly. If you enter an R value it recalculates. So it's doing the reciprocal. R value is reciprocal of a U factor. It takes that R value, recalculates it as a U factor, recalculates that entire assembly as an overall U factor and then UA.

[1:35:00]

Another question that came in. "Should a knee wall have sheathing

on an unconditioned side of the wall?" This will depend on the construction. So again, this is going a little bit more into code than it is the basics of REScheck, but the software will assume you have gyp board if you choose and you have a knee wall. If you have insulated sheathing, you need to enter that as a continuous R value 'cause it automatically will remove the gyp board component from the calculation and put in the continuous R value that you've added as insulated sheathing if that is the case.

For this one it will depend on the unconditioned side of the wall.

[1:35:58]

So if you have sheathing 'cause your other side is a conditioned space, it can depend. I'm not gonna go any further on that one.

The requirements do not appear – I don't know –

Jennifer Williamson: It's a question. Do the requirements not appear in the printed report.

Pam Cole: Well, they're reported separately from the inspection checklist. So you'll wanna tie the two together really because all the other applicable code provisions are on the inspection checklist. I recommend you always click on both those buttons. That's why they're defaulted to be clicked on when you get to where it says View Print Report. You'll see that the three little buttons and the panel certificate is defaulted to be clicked on.

You don't wanna forget the inspection checklist. It should go hand-in-hand to tell you the truth.

I think we have time for one more question. Actually we only have one more question so we will get done – oh.

[1:37:03]

Two more and we'll get done a little early.

"Would it matter for a basement walkout wall whether you use a regular wall or basement without" –

Jennifer Williamson: With _____ _____.

Pam Cole: I'm reading it and I'm at the same time. So would it matter for a basement walkout whether you would use the regular wall or" – it

does matter because if you have a walkout that front portion of the walkout is considered an above grade wall.

The code is it's a basement wall if that overall wall is more than 50 percent below. Then it looks at below grade walls as the baseline. If it's not and you don't have more than 50 percent below grade, it's gonna look at above grade walls as the minimum baseline and those insulation values –

[1:38:00]

are different in the prescriptive table and that's where the baseline starts is that U factor table, that prescriptive table. Not the insulation table, but the U factor table. There is a below grade wall, basement wall column, in those prescriptive tables. So you need to be really careful about that. So for a walkout you're gonna have one wall that will be totally above grade and you just choose it as an above grade wall.

The next question came in. "How does exterior rigid insulation affect the moisture on a basement wall? Isn't insulation supposed to be installed on the warm in winter side?" Depends on what climate Zone. I definitely refer you over to the IRC basements and insulation and moisture can be a big deal depending on the location that you're in and how you insulate and do you have an air film in between like concrete masonry.

[1:39:01]

Do you have an air film to let that wall breathe and where are you insulating that wall. Do you have water management for that wall. A lot of that comes from the IRC.

I would go to the IRC for more provisions on water management insulation placement and the climate zone that you're in. The IECC addresses some of this, but the IRC really goes into a lot more detail.

I believe that is one of the last questions that we have. Thank you gentlemen. Let's turn it back over to Jennifer.

Jennifer Williamson: So thanks, Pam, for sharing all of your knowledge on REScheck with us.

Just one final announcement before we sign off for the day. If you have any ideas or suggestions for more webinars since we haven't

quite filled our calendar yet, please, again, send those in to the e-mail that's included in your webinar reminder e-mail.

[1:39:58]

Thank you for participating in today's webinar brought to you by the U.S. Department of Energy's Building Energy Codes Program and we hope to see you next month.

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