SCADA – 00:00

So how much have you guys worked with SCADA so far? we can basically open it. That's about as far as we've gotten.

Okay, You can open it. And you know that these are the turbines here. Yes. Okay. Awesome. All right, so there's two. I just want to point this out right off the bat here. We have two different versions of Goldwin SCADA that we use so every project but Cooper Farms uses the version you see here, Cooper Farms uses the V5 version they call it.

It's like the updated version. So getting into that and the controls and pulling data is completely different on that project. So yeah, I think it'd probably be worth setting up another meeting to go over that one separately, but we'll just get you familiarized with this one here. So I got Haviland and pulled up here. So basically this is the screen that you will monitor the turbine when it's online producing power and it's happy is green.

And so there's a couple of modes that the turbine has. So it'll be either in run or online, fault, standby or Power limit. So those are all different states. So basically is what prompts these is the turbines PLC. You know, if it flags something wrong with it. the temperature, any variable in the turbine, it faults. So some of these are could be potential failures of components.

Some faults are caused by the grid. We have a majority of our faults, I would say are caused by grid issues or, you know, storms rolling through, causing problems with on the power grid. So anyway, so the turbine here. All three of these are happy. If you want to monitor an individual turbine, you can double click on it.

There. You double click on the icon there? Yeah I double clicked on the turbine itself. So so here's Turbine A at Haviland. So as you can see up here, it will tell you, you know, this is the rated power what it's capable of producing the current wind speed, which is constantly updating the power it's producing.

And It'll tell you, the Yaw position. So there's a few things we call this kind of call this the HMI, I guess, is what we call the human machine interface. So these are all the analog values here. Temperatures of the cabinets, basically every variable of the turbine lifetime energy yield. And It'll tell you at fault hours, service time, basically any anything you want to know about it, you guys, it'd be worth poking around in here. You guys can definitely browse around in here. There are control commands. You can start stop, yaw the turbine. So I will caution you to be careful in this control command here, but I don't think it would let you yaw the turbine or do anything like that. But so this is basically where you'll monitor everything. Pitch system shows all the different variables for that, you can go through the list of the different systems of the turbine.

So when a turbine does fault, it'll give you a specific fault code. I like to use SCADA for monitoring turbines and just kind of viewing the condition of different things when it comes to like really diving into actual faults, we go through the actual PLC which I'll, we'll get into that here in a minute. But as far as just general general monitoring and starting and stopping, this is what we use.

05:57

So say say we had a just for example, something that you guys will be dealing with a lot with this system. You can start them and stop them like I just showed you through there. There's a different way though, this is what you guys will be using here in this wind turbine batch control. I was so saying we wanted to stop all three turbines.

….well, I'm not sure what's up with this SCADA, but usually you'd be able to do them all, send all commands at the same time, maybe we'll jump into a different SCADA system. I don't know why it's not listed in this batch control or maybe the operator. we can log into a different there's a couple of different log ins that have different accesses.

Maybe this one doesn't have the access to the start and stop through SCADA in the batch control. But in any event, SCADA is basically used to monitor, start and stop, as well as pull data for our monthly reports wait this to load here. Okay, so all this data that's in the real time, it's listed in all this. So it's a lot of variables as you can see is stored.

So the turbine communicates back to what we call our CEE. Our control equipment and enclosure on site and there is SCADA servers inside of those. So that's what we're logged into right now, is we're logged into SCADA through those servers. So all these variables are stored in this server so you can pull up real time data.

So if you wanted to graph, you know, any one of those variables, that I had pulled up before, you know, if there was an issue you can look at all these not to say that this is what you're going to be doing right off the bat. I just kind of want to explain the whole system to you. give you better grasp of it so you can basically choose any day and time.

You can obviously modify the time there so you can pull it up here and it'll give you a graph on the top here and then it'll list them out in the bottom portion of this super handy when there's issues for sure. And all this data can be exported. So any one of these things, you can pull it up from up here to export.

You can export the chart or the data like you see down here so that if you had export data. If you have any questions at all with this, please stop me. I have a question real quick. Yeah. So how did you access this window again? Is it the bottom left? So, so this one was right under the real time.

So right here I'm in, I don't know if you see that on the left. So you got real time. What I was looking at at first, then control command then this is the historical data query. Gotcha. Yeah. So we'll get into the start down here because you can pull up pretty much the same information here. They just kind of call it different things they grouped some of these things together.

So yeah, this is what I'm using right now is this historical data query, which is more used kinda on the spot if there's a fault or a grid issue, you know, so I'll just get through this, here. question for you. Shoot. Is it is it possible to zoom in just a little bit, if that's a possibility, only I can barely read it.

really? Yeah. If you need to scoot up... I don't know that I can zoom, but let me see if I can change my computer settings real quick. It should be all good if you can't do it. I'll just move closer. well, I'm curious… I'm sorry about that. That's all right. Can you see it well enough to.

13:16

Yeah. I can now. He moved closer to the screen. Closer. Okay. Okay. So, so basically, any of these variables here, you can graph and export the data. You know, if there's ever a fault, somebody might ask or, you know, can you send me the, you know, the winds, the ten minute average wind speed, you know, and the power or whatever, you know, for whatever situation we might have, you know, and they might ask you to export know the last couple of days.

So this is kind of handy. So it saves it a ten minute, 10 minutes as well. All the same information. This is kind of nice. The real time just gives it. You can only do it a day at a time, 10 minutes and you can select, you know, months, you can export months at a time. So that's kind of nice daily and a fault query here as well.

So we asked about the bottom and that star command there, So we'll just get out of this. But that's basically everything you can look at through the individual turbine, through this. And then down here in the Start, there's all kinds of stuff, power curve. We use that a lot in the winter when we have icing conditions, blades get covered in ice, and, you know, we use that to decide if there's still ice in remote projects that we don't have cameras that we can look at and log in and see if there's ice on them.

So file data, browse to the turbine every time the turbine faults, it produces a fault file out of the PLC. there's a better way to get to these. These. I don't think these are very reliable. I've logged in and tried to pull them out of here after turbines have faulted and there's been nothing in there, so we won't use that very often.

Data statistic report. So we don't use this much. We might in the future. I have no idea. What we do use are the data query reports. So every month after the first of the month, it's currently myself and Kurt that's doing it. I don't know I'm, I'm, I'm sure you all get involved in doing this. Probably not right off the bat, but I'm so as what we do is pull a CommStat which is basically the communication status of the turbine.

It's kind of a status of whether the turbines talking back to the server. So we pull that for the month. So the first through whatever month it is the 30th, 31st, we pull CompStat stop mode, ten minute data query and daily data query. So just for an example, pull this up here and so in our so there's a lot of good information here.

Basically the same stuff that I was showing you before, but just for example, so monthly we'll pull the wind speed. We don't care about the theory stuff here. Pull average active power, the max and the minimum. We'll do reactive. Then we'll do a total active power just for example so for October. We pull this data here, come up here, export the data asks you.

Yes. So that first one allow access man my internets slow today. Where are you based out of? What's that? Where are you based out of, if I can ask? Oh so, I live in Missouri. Yeah, I live outside of Jefferson City, Missouri. Very cool. Yeah, I've lived in Findlay, so I worked for Goldwin for a couple of years before coming on energy and ended up in Missouri.

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So I assume you guys can see, well, maybe you can't anyway, so it exports this file, this Excel file. And then basically what we do is we just save it specific product project folders. We'll get into that more going down the line. But basically every turbine… you guys can't see that excel? Okay, I don't want to do that.

Okay. So any questions about like the data that gets pulled or anything? Who actually reads through the data when we pull it. So so the data is used monthly to run the production reports for the customers. Let me see if I can get one of these pulled up here. So if a turbine, there's a couple of reasons we would use the data.

So we use it monthly to pull energy yield and production for all the turbines that gets put into reports that we send to our customers monthly. And then then the other is utilizing the data for faults. So I would be the one looking at it. Mark, just depending on what it is, I'm sure you guys, as time goes on, you know, I'm sure the goal is to have you all be able to recognize, you know, in a perfect world, the more information you guys can give to us, the better.

And I'm sure you want to be involved, you know in it so hopefully to answer your question, hopefully you and then everybody else. Right. So I'm going to stop. See if I can't get this to work. Okay. So say we pull all those, you know, the daily data, the ten minute stop mode, and the comms stat for whatever project do all three turbines.

And I don't think you'd all be doing this straight at the beginning. I just want to show you, you know, what's where it ends up. So this is for Haviland. We'll just use that as an example. So in each project's operating folder, sorry, I should be explaining this a little more, each project has its own folder with everything you can think of from reports to permits to the contracts.

So in this instance, so we use all this data mainly for this data report section, specifically one energy production reports. Okay. So here's a report that will go out to our customers here. So this one here is for Haviland. So I've already ran the production for the month. So that's where that comes. Right here is where this ends up getting populated.

So say you run the daily data query, you'll end up with your Excel file pulled from. This is just an example this isn't actually that file, but you'll end up with your Excel file. You would save it in SCADA unsecured all projects have their own file and then whatever you pulled all the com stats are stored here SCADA unsecured project.

So it's important to keep the naming conventions all the same. So this specific so the specific energy data that I was just talking about will end up coming from the file located in SCADA data will come from this file right here. So this is the file we exported from SCADA say out of that menu. Then the query which I can pull back up here is for reference.

So say we pulled it from daily data query for this month. So we end up with this file a file for all three turbines. excuse me just a second sorry. So we end up with that file. So I'll just run through the whole process here for you pull this back up, which oops, so after you've pulled all three files for all three turbines.

28:13

what you do is you open up the last the prior month. You would save it as the month you were working on. So if I was doing October, I would open up the September folder like I have here. The file I have here. You save it as the October file. I'm switching the names to October you'd come up here.

This is just I'm not going to save this file. You come up here, put in October because now we have we're in October file, not September. So it will automatically open this up here. This energy production tab here. This is what you do is you come over here and you hit update and it pulls the file out of the SCADA unsecured folder, puts that information so that information I can pull it up here so it pulls it out of the SCADA unsecured folder.

so then it's going to pull from the daily query right here. So that's this data right here. So that's specifically this spot right here is calculating, oops from right here. So this is this is your data is where it ends up from that daily data file. So turbine one energy yield, you know, so this this data here is what is that some 381773381773 which is originating from here which is your energy yield right here.

And it's obviously important to have the selections you see here selected. If I was to, you know, accidentally click the minimum theory, it's going to throw the whole macro off and it'll throw the whatever next column number in. And, you know, so it's important to kind of as these are done I don't know the specifics on what you guys are going to get into right off the bat.

I don't I know I doubt you'll be doing this, you know, the first week, but this is just, you know, I was asked to show you guys what SCADA was all about and this is kind of a huge part of it. Well, so that is kinda the turbine data aspect, the condition. I guess. So. Do you have any questions about what the data is used for and like specifics on the data, it's a lot to throw at you I know. so that's kind of the data that we use when it faults. You know, we don't really use much of this other stuff unless there's a fault someone might ask Mark or myself if we're out in the field, you know, troubleshooting and maybe we don't have the ability to just pull it up, we can call you and ask you, you know what?

You know, the prior days pitch, you know, angles were and if you see any spikes in the graph or see anything wonky and mainly that kind of stuff, when we have people on site the majority of the time is what we've been using is that the turbine is specifically looking at the real time. So say we had a crew out it, you know, Turbine three and it was in service mode.

I don't think I mentioned that. So the turbine could be in service mode if someone was actually there. I mentioned it can be in run standby fault service mode is one of those. So say we have like turbine three in service mode crew up tower. They might call and ask what the current yaw position is or what their current wind speed is.

There could be multitude of things that somebody'd want to know doing a maintenance or troubleshooting so we'll wait eternity here for my internet. Pull it up and I'll show you. Thanks for sharing all this. Yeah, absolutely. I can be available for questions if you ever run into. So somebody might call and for example, they might ask you what the wind speed is.

33:57

So I don't know how small it is on your screen up here in the top left. It shows you in real time what the wind speed is. And so you can look at that this way. Well, they might ask you to what the ten minute average was for the last hour. A lot of times we'll kind of go off, you know, historical data, short term historical data, where we have different wind limits for activities out on site.

So, for example, we can't lock the router out and get out in the hubs of the turbines over 11 meters a second. So we would want to know, you know, what the wind speed was for. Maybe, you know, the last half hour, you know, or the day. So this is kind of nice. I like looking at this kind of stuff and the grid grid voltage and wind speeds on the graph, that kind of stuff is easier to see spikes than clicking through, you know, hitting next and going through these numbers.

It's kind of cumbersome and easy to miss. Stuff like this shows you, you know, this is showing us from basically midnight last night until right now. You know, currently, I mean, if you want to zoom in and kind of pull this stuff up, you know, depending on whatever the variable is, say at 5:00, the timestamp down at the bottom there, you want to look at that in more detail.

You don't have to change the timestamp on the top here. Once you have this full window open, you can click and create a box, you know, and whatever you want to look at. So it'll zoom you way in and it makes it easier to look at like the variable on this access and see, you know, depending on what it is.

So then obviously, as you can see down here, it'll pull up only that timestamp, you know, for the data you have. So then if you just wanted to export, you know, 04:40 to 05:10 you could just export that data So you can go up here, like I said before, you can export either the chart, you know, or the data.

And a lot of times, you know, people might just within like the system. Operator chat, just ask for a screenshot and you can just pull up a snap on your computer, whatever is easier and just do that. So to back back out of that, you just click and move to the left. And I don't know, if you have to move the box that make it that big, but you know, move it to the left and then It'll zoom you back out.

you can look fault query within this to within each turbine this is kind of handy. A lot of times we will kind of raise red flags on stuff if we have a storm come through or an issue. And we we have a few faults. For example, maybe like a grid active power fault, you know, that can be caused by, you know, the grid or the PLC. We'll reset it.

You know, it faults again you know, maybe we'll try again do a hard reset which we'll get into the details of that eventually. But then if we have a fault, you know, we have a list of like, you know, 20 faults or whatever. It's kind of like it's time to put the turbine in, you know, stop and let you know, contact goldwind if goldwind is taking care of that project or, you know, or our crew on the ones we're taking care of now.

But so you can graph the faults or not graph but list them out. So a lot of information here in SCADA. So that's kind of the rundown on the turbine data. general condition. Yeah, I guess questions on this you know it's a lot lot a lot of information so we kind of got through those commands these graphics I think you can set I've never really messed around with these I'm sure you all will once you get SCADA pulled up in the control room on all those, you'll want the graphics to however you like them.

You can pull different. I have no idea what you can do. I'll leave that to, you know, to play with.

Safety – 39:48

Logs I think SCADA logs, commands. So once you get familiar with resetting turbines and starting and stopping, when the storms roll through, you'll be getting more into resetting faults and knowing what you can and can't reset. That's probably an important point to bring up is that, you know, if there are many instances where people are at turbines and you know, the wrong button could potentially be clicked within SCADA and somebody could get hurt.

So that's, you know, it's important to communicate this stuff. And now I'm a big three way communication kind of person, like when, you know, depending on who it is, they might just assume that you, you know, are in the right turbine or you know, it's always good to with this kind of stuff and these commands when people are calling you from sites is to be like, okay, you want me to pull up you know, you want me to yaw turbine B right?

And then, you know, make people repeat this stuff back to you and ensure they know, you know, like three way communication is huge. So yeah, so safety aspect, these controls, this stuff is, you know, when hit yaw and you send these commands and hit start it's starting up like you know some serious equipment, you know out in the field so just keep in mind how critical it is when you're starting and stopping.

And I just wanted to bring that up. I mean, I'm sure you are all aware of that. So we covered that we covered all this business. it logs. You know who is starting and stopping things and logs, whatever. So like down here in the left, you can see I'm in OE operator account. We have some different accounts. I don't know if you guys played around with keepass too much and so on the SCADA.

Do you know, I know you haven't really logged into it much or done much, but you guys know, like where all the passwords and all the URLs and stuff. So you do know that so far. Okay.