STATE OF ILLINOIS)
)SS
COUNTY OF BUREAU)

In the Matter of the Petition

of

Ladd Solar 2, LLC

Hall Township
Bureau County, Illinois

Testimony of Witnesses Produced, Sworn and Examined on this 26th day of August, A.D., 2024, before the Bureau County Zoning Board of Appeals

Present:

Troy Quest
Jim Forristall
Bill Jensen
Shirley Ann Smith
Barry Welbers, Chairman

Cecilia Nemeth, Secretary
Kristine Donarski, Zoning Enforcement Officer

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MR. WELBERS: Okay. We will do this a little bit differently, in that basically we put on the table --

MS. DONARSKI: Can you talk a little louder, please?

MR. WELBERS: As soon as I clear my throat out, I will.

MS. DONARSKI: Okay.

MR. WELBERS: The last time we were together, we put onto the table the application from Ladd Solar 2.

MS. DONARSKI: We recessed our meeting.

MR. WELBERS: We recessed our meeting.

MS. DONARSKI: Yup.

MR. WELBERS: So we're unrecessing.

MS. DONARSKI: Right.

MR. WELBERS: And as I recall, we had accomplished the Applicant, Reuben's, testimony and all the cross-examination of Reuben. So then it was time to move on with the Applicant, with their case, with the next witness.

So do you have a further witness tonight for this one?

MR. GRANDON: Yeah, we do. It's myself,

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I'm here, Reuben Grandon, and I'm joined by --

MS. DONARSKI: Come forward, please.

MR. GRANDON: Sure. Just start things off --

REUBEN GRANDON,

being first duly sworn, testified as follows:

MS. NEMETH: State your name and address for the record.

MR. GRANDON: Reuben Grandon, R-E-U-B-E-N, last name, Grandon, G-R-A-N-D-O-N, 3519 Northeast 15th Avenue, Number 325, Portland, Oregon, 97212.

MR. WELBERS: What would you like to do next?

MR. GRANDON: All right. So, thank you. Appreciate the ability to come back and present for the Ladd Solar 2 Conditional Use Permit application, as well as the two Variations from the Village of Ladd and the Village of Cherry.

I'll be here to testify tonight, but I believe my part of the testimony was already concluded last week, and so I have with me our engineer from Kimley-Horn, Mr. Kelten Sharp, and also our Counsel from Polsinelli, Mr. Mark

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Brady, in the back row. They are both here with me tonight, as well.

If I remember correctly, it was ready to be -- ready to be time for our second witness to testify --

MR. WELBERS: That is correct.

MR. GRANDON: The engineer, Mr. Kelten Sharp.

MR. WELBERS: That's the way I recall it as well. So if you would like to bring him forward.

MR. GRANDON: Sounds good. Thank you.

KELTEN SHARP,

being first duly sworn, testified as follows:

MS. NEMETH: Can you please state your name and address for the record.

MR. SHARP: Kelten Sharp, 2618 Queen Avenue North, Minneapolis, Minnesota, 55411.

MS. NEMETH: 55411?

MR. SHARP: Yup.

MS. DONARSKI: How do you spell your last name, Kelten.

MR. SHARP: Sharp, S-H-A-R-P. Kelten is K-E-L-T-E-N.

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MS. NEMETH: E-N?

MR. SHARP: Yup.

MR. WELBERS: Go ahead, sir, begin your presentation.

MR. SHARP: So Kelten Sharp here. I am here to answer questions and testify to kind of the experience I have. I have been in the solar industry for about six years. I focus on civil engineering and that field.

So my background here, graduated from college in Northern Minnesota, was very interested in renewables and knew that they were going to be a big impact on our, you know, future. Part of that included growing up in a rural farming community in Southern Minnesota and spending a lot of time in rural farming communities in Wisconsin and seeing that landscape change over time. So I wanted to make sure that the land was being taken care of in a good way, watching, you know, my elders take care of the land as well.

So similar to Reuben, I had my first job as a detasseler in Southern Minnesota. I have lots of friends from 4-H and State Fair time.

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All of those things have kind of shaped my experience, you know, developing solar in rural Illinois.

So my experience, specifically in Illinois, I have done about 30 of these hearings over the last six years for different solar projects across the whole state. Some of them have gone well and smoothly, some of them have lots of questions, and my job here is to just answer those questions for anybody, to make sure that you feel comfortable with this development happening.

Of those 30 projects, eight of those went to full construction and are currently in operation. In addition to those eight, an additional ten have, what we call, issued for construction documents, which means that they have all of the final engineering completed.

In addition to just my experience in Illinois, I have also done projects across the entire country, ranging from half a megawatt all the way to 800 megawatts. So lots of range of sites, lots of range of regulations that we have to meet. So part of my job is making sure that

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these projects meet those regulations from an engineering standpoint.

So one of the things that -- you know, I was able to attend last hearing. One of the things that I heard a lot about was stormwater concerns, and so I want to kind of start in on that. That's kind of my expertise when I am running, you know, the construction document creation of these projects. I am the one working with my team to develop the stormwater calculations for runoff.

And so we're looking at what the existing rainfall data is based on historic data from the different regions. Now, specifically here in Illinois, there are counties that require different specific rainfall data, and so we take the localized rainfall data and all of the information from your area, including wind speeds, including, you know, historic flood data. And all of that's documented online. We pull from those most up-to-date resources, and those resources continually get updated. But the most recent data is what's used and often required by the Code.

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So focusing on the stormwater, we're looking at taking agricultural land and turning it into permanent vegetation for the next 30 to 40 years, depending on the, you know, lifetime of this project. That is going to provide a couple benefits both for stormwater and for erosion.

So erosion happens when you have got bare soil over a long period of time. This solar site, while it's in operation, will have permanent vegetation cover 365 days a year. That changes from farming practices, which have open cropland for a portion of the year, depending on that specific field's, you know, crop rotation and cover crop planting.

With the type of vegetation that's selected for this site -- it's a native vegetation that has a pollinator mix with it -- those plants are very deep-rooted plants, and they are going to provide a much stronger, deep erosion control measure than what you would get from a turf grass or, you know, your annual crop rotation.

So benefits there, to hold the ground in

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place and make sure that that land is able to be returned to farmland in 30 to 40 years.

All of that is also documented in the AIMA. That AIMA makes sure that everybody involved in this project has their best interest covered from a state level. There's been a lot of input from many different parties that I have worked with specifically in Illinois, including drain tile companies that have created details to make sure that those drain tiles get repaired to an equivalent or functioning level, sometimes improving the existing condition.

So that's -- we'll start going into the stormwater then. So stormwater runoff is measured based on empirical data collected from different soil types and then the vegetation cover. So for example, your asphalt out in the parking lot is going to have a curve number that's close to a hundred. So we look at that as kind of a -- it's 98, is what we use.

What that means is, it's not actually soaking in any of the water that lands on it. It's all running off and having to find another spot to get into the ground and infiltrate. So

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there's four different soil groups that we work with, and then there's additionally lots of different land cover uses.

But when we look at cropland throughout all of those different soil conditions and then compare that to permanent vegetation after we plant, you know, the crop that will cover -- or the native vegetation that will cover the solar field for the life of it, that change actually reduces that number from that 98, and then for cropland it's right around 84, and then low 70s for anything with meadow grass on it. So what you're looking at is, you're assuming that that ground is then able to absorb more water where it lands.

One of the concerns I also heard was the solar modules preventing that from getting in there. So similar to your impervious surface, like asphalt or a roof, you are going to have water landing on a hard surface. The difference between your roof and the solar modules is that as you go -- I'm going to just visually do this quick. So you have got solar modules running throughout the day, but they're always going to

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have a drip edge that's adjacent to another solar module, and underneath that solar module there's vegetation growing. So as this water runs off, hits the ground, it's automatically going to hit that pervious surface, where there's grass growing that's going to absorb that water at that curve number that's improved from the row crop.

Then what we're looking at is, as each of those run off, it's going to also infiltrate through flow underneath the adjacent modules. So you're always going to have the equivalent of your solar panel surface in absorption next to it. So as we look at curve numbers and our soil and water calcs, you see improvements -- significant improvements between row crop to meadow grass.

The other part and component of that is that as a development project, solar facilities are subject to SWPPP permit, so Stormwater Pollution Prevention Plans. Those permits require us by law to not have any erosion that's happening on site leave the site. So we use things like a silt fence, a fiber log, sometimes

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temporary stormwater basins, to prevent any of that erosion from leaving the site.

That is all prescriptive of the stormwater pollution prevention plan, and it is site-specific conditions that we are required to meet. So this site, because it's been already signed into an AIMA and because the Bureau County regulations require it and the State level require -- State level requirements require that we have a SWPPP permit, this project will need to withhold and maintain those standards throughout the lifetime of the construction of the project.

Once the construction is done, that SWPPP is closed out. That is more so your erosion during construction, when you have bare ground. So once all the ground has been covered and we have significant enough ground cover, which is 70 percent coverage -- and that 70 percent coverage is not 70 percent of it's, you know, growing grass and then there's 30 percent that's completely bare. It's actually 70 percent density. So the whole site actually has to still have vegetation growing across it before

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that permit can be closed out.

And so that protects the land, it protects adjacent landowners, and makes sure that during construction those practices are being followed; those best management practices.

Additionally, we have to meet the Bureau County requirements and the State law requirements that state that we cannot increase runoff leaving our site. So when I look at the site starting off, I'm going to go and I'm going to look at the different land covers and what the precondition is, which would be row crops currently, and the post-condition is, which would be permanent vegetation, and I'm going to compare those.

Then I'm going to see in our hydraulic tool that we use, called HydroCAD, I'm going to take that runoff and I'm going to calculate are we decreasing it and are we meeting the Code requirements? And if we are not, then we are going to look at other ways to reduce the runoff leaving the site. Those can include stormwater berms that hold water back and slow it down so that as you have the peak storm event, it's

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holding water on site and not leaving the site.

Or you can also do stormwater basins. The size of these projects, it's not likely to see those because they're most likely not going to be required based on the type of development.

So that covers stormwater. I'm going to get into a few other items that I heard brought up, because I want to make sure that all of the, kind of, topics that were brought up as topics of concern by the Village of Ladd are covered, and I want to make sure that you're able to hear, kind of, testimony from me, mostly because I have seen plenty of these projects and I am ultimately responsible for the engineering for a lot of these projects, and so want to make sure that you guys feel informed.

I think the next piece here is focusing on the initial comment from the Village of Ladd, which was that not a ton of information was made available. So part of the Conditional Use Permit lays out -- or all of the Conditional Use Permit lays out exactly what's required to be provided information-wise to get this Conditional Use Permit.

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The Conditional Use Permit is the very beginning stages of this project. The detailed engineering, where all of the equipment is selected, where all of the stormwater calcs that I just talked about are completed, that's the next step after you get this approval. But without this approval, we don't really have a project to even design because we're not legally able to do anything with the land until we get this Conditional approval.

I will say that this application has more information than a number of projects that I have seen go through that meet the requirements but don't necessarily provide the additional information that Reuben and GreenKey have gone out and actually gotten; things like going and seeing where mines are located within a radius from the project site; the actual signed, completed AIMA is oftentimes not required until a building permit application or until you're through the CUP.

So there's a lot of extra pieces here that go a long way in making sure that you have information to make a good decision here.

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Additionally, I heard some about soil compaction. Reuben addressed it really well last time. But essentially, those deep-rooted systems that we have from the vegetation management plan -- and again, the vegetation management plan is one of those, you know, more detailed things that were provided. Those specific vegetation types that are selected in there actually will help restore the soil and capture the nitrogen and phosphorus that have -- typically are fertilizers that you have to put on the land.

After that, you know, 25 to 40 years, depending on the project lifecycle -- and I have seen projects that are at 25; that's why I referenced that -- that land has been studied similar to how you would put a parcel into CRP. We actually see improvement in those soils long term.

So those soils have better nutrients built into them. It gives the land a little bit of time to rest and redevelop and it actually decompacts their natural processes. Just like your gardens over the years, you know, you have

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root systems and decaying plant matter, those all build up and create a really great biodiverse soil that actually reduces the compaction long term.

The next one I'll cover is noise. So there's been a number of projects that I have seen go through noise studies. My company, Kimley-Horn, has done a number of noise studies for projects across the state of Illinois. Those noise studies have resulted in the fact that all of those sites meet the Pollution Control Agency's levels of allowable background noise for the electrical equipment at the property line.

So there are State-level mandates that require solar projects to meet the noise levels at a certain distance from the facility. Those noise levels are measured before the facility's operating and after, at different intervals, to ensure that the project is in compliance. So those have been set at a State level.

Furthermore, I think the thing that helps people understand what those noise levels are, your dishwasher running in the next room is

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louder than what you're going to be able to hear at the edge of the property line with where these inverters are placed.

The inverters are very similar to the same inverters that sit outside of this building. So if you walk by those, you don't hear those. Those are mostly background noise in your everyday life. Those green boxes, same type of equipment.

So there are similar components to these solar facilities that are all around us in public that we just don't really pay attention to because they're just part of our everyday life.

The other piece is that these facilities are closed to the public. So when you're looking at actual access to get as close as you could get to an inverter sitting next to a building, you're actually not going to be able to get that close because they're required by Code to be protected with a security fence to keep public out.

Next one I'm going to touch on is EMF, and I actually have a report from the Journal of

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Occupational and Environmental Hygiene. This is essentially medical documentation available online that indicates that studies were done.

(Exhibit Number 8 marked for identification.)

MR. SHARP: Okay. So "Electromagnetic Fields Associated with Commercial Solar Photovoltaic Electric Power Generating Facilities." So long title. It is a medical article. Essentially what they have done is, they have gone out and they have tested the EMF levels on solar sites that are currently operational at different sizes. Those numbers in the report are compared to allowable levels of, essentially, that same EMF for professional workers, occupational workers, that would be working around this type of equipment.

And I want to just highlight, on Page 801 of that document, the last paragraph under Figure 9, it says: Measured DC fields did not exceed 0.3 mT, with readings at about this level adjacent to an inverter and a transformer.

So that's the largest, kind of, electric components of the site.

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IEEE's "controlled" limit for DC magnetic fields is 0.353 T.

Which means that: Thus, the maximum DC fields measured are about 1,200 times lower than IEEE's "controlled" limit, and 7,000 times lower than the occupational limit; these fields are also about 400 and 1300, respectively, times lower than the general public limits.

So again, similar to walking by an inverter outside, those levels are safe from both medical providers doing these studies and also industry standards set by occupational entities making sure that their workers are kept safe.

Next we're going to go into the decommissioning plan. So Kimley-Horn has done many decommissioning plans over the years, and I have personally done over two dozen of them specifically in Illinois. And I just wanted to put some, I guess, additional information out there to put your minds at ease around who's responsible for those costs and what the likelihood, essentially, of the project going under during that original 10-year step-up of

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Bureau County's and the AIMA's, kind of, decommissioning.

So the -- there's a couple, you know, pieces. One of them that was noted last week was just that project owners -- so the actual financial owners of these projects -- have very sophisticated financing agreements. It's part of the reason that in my industry we call it the solar coaster. Because projects come and go, you know, off of pause, essentially, because of lots of different financing factors.

So when you get these finally established, they are very, very well-thought out, very well-funded, and the probability of them, you know, not being funded by those exact owners is very, very unlikely.

The most critical solar component -- so the modules, the inverters, the big, expensive equipment on site -- has longer-term, what they call, original equipment manufacturer, OEM, warranties. So it would be like you sitting your microwave that you just paid, you know, however much for, and it has, you know, a three-year warranty on it, it would essentially

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say you're going to walk away from that because it's not working and is too much trouble to go get the warranty. Nobody's going to do that. You're going to go get the new microwave because you just dumped a bunch of money on it.

Similar case here. They have really, really expensive equipment that still has these warranties for, you know, 5, 10, 15 years throughout the lifetime of those different components of the system. So within that first 10-year step-up, the likelihood of major equipment failure not being covered automatically by warranty is very unlikely.

Additionally, on top of that, if one component of the solar facility stops working -- so let's say a module, for whatever reason, is showing on their monitoring system as not working -- that whole system doesn't just shut down. It's one module, so one panel. The rest of the system is still going to continue to generate power.

So the money that's being generated and the power that's being generated is still valuable to the asset owners. And so at the end

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of the day, that, you know, electricity isn't going to be, you know, fully decommissioned because one component is broken. They are going to come out and fix it, and they're going to replace it in kind so that that power production can be regained.

There's two more points here. Most of them -- most solar facilities are required to carry insurance, just like you're required to carry insurance on your home and your car. So they're required to maintain replacement value property damage insurance coverage and business interruption insurance coverages. So there's two insurance coverage that they are required to carry. Those are going to help pay for anything that would happen in that first ten years, where the site is not fully funded to the County.

Additionally, typical solar businesses have interruption insurance coverage that covers income loss for 12 months. So let's say that income loss happens because some component of this facility is not effectively working anymore, right, and there's interruption to their revenue stream. They are going to have

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coverage for 12 months of that income to be able to help pay for that decommissioning.

So there's multiple sources of income and revenue and funding that would make sure that in that first ten years, while that's being stepped up, there's plenty of coverage to make sure that the County isn't stuck with the bill.

Two more -- I guess one other item here. I did hear a reference to solar panels leaking. I want to just put that concern to rest for you. So similar to your cell phone, all of the metal components in your cell phone are solid state. There's no component of the solar modules that are going to be in a liquid state, where they could leak. They are all going to be solid. They are a solid state, just like a solid state drive in your computer and your cell phone.

Additionally, the only toxic metal in a solar module -- and it's toxic because it has to be recycled in a special avenue, right? It can't just be thrown in your recycling bin. So that's why it's considered hazardous. That lead is used for soldering the components of the module, and it's such a minuscule amount that

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one shotgun shell contains 700 solar modules' worth of lead in it.

So how many of you, you know, have multiple shotgun shells sitting at home that have lead in them? These solar modules have 700 times less than that.

I think that's covered most of the concerns here. The last one that I want to touch on is a little more beefy. It's the concern about the vibration of the pile-driving during construction for the mines that are located as indicated on the documentation provided last or two weeks ago now.

So what I'm handing out now is the New Hampshire DOT Research Record on Ground Vibrations Emanating from Construction Equipment. So this is their final report, and it was developed in cooperation with the US DOT and the Federal Highway Administration. So the equations, the engineering data provided here in this document were developed from a federal level kind of requirement in engineering.

So there's a couple figures I want to pay attention to. One of them is going to be on

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Page 14, Figure 12.

And I want to just remind everybody that the solar facility, as it's designed currently and meeting the current specifications of Bureau County, the fence line has to be 50 feet away from the property line, the adjacent property line, and then an additional 20 feet is where the solar modules are installed, because per NEC Code you need to have enough space between the fence and the solar module to ensure that grounding can occur. So that's NEC Code that has to be met.

Then finally, within that, the piles are installed down the center of a row. So there's another 3 to 4 feet. So we're talking right now that we're at least 70 -- let's call it 70 feet even from the edge of a property line.

So in Figure 12, it has a table listed of the peak ground velocity of vibrations through the soil parameters and the construction sources. And at 1 inch -- less than 1 inch per second we have pile-driving at 50 feet away. So essentially at your fence line, 50 feet away.

The effects of the vibration on structural

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damage is very safe to buildings, it's -- you know, if you were standing at the property line while they're pile-driving and it was only 50 feet away, it might be strongly noticeable or unpleasant, similar to how you feel the trucks going by the house and shaking it.

And the human exposure limits are beyond 24 hours, which means that the amount of time that that pile-driving is going to be happening at iterations is much less than the safety level for human exposure to that vibration.

Additionally, we want to look at does that have an impact on the mines? So at 50 feet away, it's unpleasant but it's very safe to buildings. And that closest mine is 300-plus feet away. So by the time you get that far away from the actual pile-driving, the effects on the existing mine structures are well within limits of safety that have been, you know, put out by the Federal Highway Administration based on empirical data studying vibrations from a distance of different construction equipment.

I'm going to look a little bit further into this document. There is a couple more

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tables in here. There's the vibration levels for human reaction and effect on buildings at different levels of continuous vibrations. So that means that is going on and on and on and on.

So the threshold of perception is 0.019. The level at which continuous vibrations begin to annoy people is 0.1. And vibrations considered unpleasant is 0.4 to 0.6. So the 0.4 to 0.6 is the pile-driving kind of vibrations at 50 feet away.

So, again, anything that's at that property line is going to be unpleasant if you go stand by it, but it's not going to actually cause damage and it's not going to be detrimental to your health.

And then the last table I'm going to just bring -- or I guess the last piece of this that I'm going to bring up is that these are very, very conservative estimates. Actually doing the math behind the particle vibration through soil is extremely difficult. Because if you look at your soil composition, it can vary significantly. So what they have done is, they

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have gone a very conservative route, assuming that your ground is very stiff, which means it's going to carry more vibrations.

If you have clay soils or nice topsoil or sandy soils, those are all going to make fewer vibrations than what's listed here.

So when we are looking at the actual impact of those vibrations from the pile-driving, the other thing I want to just point out is that we have other facilities that have been installed with this same methodology, and we haven't seen any disturbance to things, like Reuben indicated, wells, neighboring properties; and much closer proximity than what we're talking here.

I think that covers everything I wanted to make sure that you got kind of right off the bat. But I believe I get questions now.

MR. WELBERS: Yes.

MS. DONARSKI: I do have a number of questions for you.

MR. SHARP: Yes.

EXAMINATION

BY MS. DONARSKI:

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Q. So starting out from the beginning. Kelten, what was name of the company that you work for?
A. Kimley-Horn.
Q. Okay. And --
A. And --
Q. Go ahead.
A. I'll just state, just to be fully transparent, my -- I also worked for a company called EBS. They do the same, exact type of work. That's where I have been at other testimony opportunities.
Q. Okay. Did you do -- personally do some of the engineering work, like for the stormwater calculations and things that you testified, for this project, Ladd 2 or Ladd 3?
A. Ladd 2 and Ladd 3 do not have that level of engineering completed to date. I was speaking to the process that will need to occur for any solar development and solar developments that I have completed to date.
Q. So kind of in general but not specific to this site --
A. Correct.
Q. -- at this time?

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A. Yeah, correct.
Q. Okay. How long -- when a new solar field like this is put up, how long -- after the support rods are put into the ground, how long does it take to actually establish a ground cover so that the erosion doesn't happen? What's that period of time for it to grow in there?
A. Yup. So specifically for Ladd 2 and Ladd 3, the vegetation management plan specifies a cover crop be put in place immediately before construction starts. That cover crop includes oats and some other deep-rooted cover crops that will be able to be kind of beat out by the native vegetation when that gets established as permanent.

It's very standard to do that temporary cover. It actually benefits a ton, because it makes sure that you're starting from something that's not bare earth. Just like if you were to drive through your muddy yard versus your grassy yard, that's going to provide a lot more stability for that soil.

So this establishment period, essentially they'll start construction once they have that

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temporary cover crop done. Then as the, you know, piles are driven and different components are completed, they'll spot treat for any bare spots, which is highlighted in that vegetation management plan.

Then the cover crop, again, we can't remove those BMPs, or best management practices, as part of the SWPPP. So the silt fence, the fiber log, whatever we kind of prescriptively put out there to make sure erosion isn't happening, we can't remove those until the vegetation is completely established.

Typically I see that happening within six months, and that is very typical of a solar project of this size.

Q. And do they ever do any kind of, like -- how would I say this -- specialized plantings, like for, like, visual barriers or things like that around people's homes and things like that, to kind of minimize, like, EMFs that you talked about and some of the other possible effects? Is that something that's commonly used with a solar project like this?

A. So I would call that a vegetative screen. I

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have seen them established on a number of projects as an option. I would say that when it comes to EMF, they are not necessarily going to impact that. Again, the levels are so miniscule that even -- they are 700 times less than the safe operating level.

The vegetative screen, the thing that it will help with is viewshed. What I would say is that more often than not I have seen successful visual impact mitigation happen when a developer, like GreenKey, and the landowner come to an agreement between themselves where those vegetation components can be planted at an optimal location that actually blocks the viewshed and it's not just put kind of at the edge of the fence.

You think about it, if I hold -- you know, a similar impact when people are holding, you know, the Mount Rushmore. As you get further away, you're going to have more visual impact if there's something blocking you right there. Versus if it's way by the edge of the fence, the solar array, it's not going to block your viewshed to the same level that you're going to

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want it to.

Additionally, we can speck out trees at 6 feet at time of planting. That is very standard practice. It ensures that you have a tree that can survive and grow. What I have seen is that those trees do take a little while to establish. So those first couple years, you're not really getting that viewshed blocking that I think a lot of people are looking for.

So I think there's a mixed bag on kind of how effective they are. And, again, the most successful situations I have seen is where landowners that want their, you know, viewshed taken care of work with the developer.

Q. Okay. And now on the stormwater runoff, if there's, like, a condition -- let's say the ditch along, let's say, Route 89, that needs to be addressed -- do you work with the State then to address those drainage issues? Or how does that work, when there's, like, the State involved?

A. So are you -- can I get a clarification on the question? Are you talking about drainage improvements for that ditchway because it floods

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frequently and the culvert needs to be upsized, or are you talking about, like, the -- you know, the culvert needs to make sure it's meeting the conditions because it's included in the project parcel?

Q. I was talking about putting the culvert in and facilitating drainage through that culvert --

A. Existing drainage.

Q. -- or if something came off of the land, that it naturally drains to the ditch --

A. Yup.

Q. -- if there are improvements made on the right-of-way to try to help facilitate that drainage.

A. Yup. So within the right-of-way, we, as the engineer, have to aid in applying for essentially that access permit. That access permit is the responsibility of the EOR to design -- EOR is engineer of record -- and then they have to work with whoever's right-of-way that is.

So if we have multiple entrances -- which I have had projects where we have had entrances off of County roads, State roads, local roads --

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we have had to work with each of those entities individually to make sure that their access meets their, you know, local requirements.

Q. Okay.

A. So in this case I believe the Illinois DOT would be the right-of-way owner there.

Q. Okay. Moving on to your -- talk about your exhibit here there you gave with this, App Number 8, "Electromagnetic Fields Associated with Commercial Solar Photovoltaic Electric Power Generating Facilities."

A. Okay.

Q. I noticed that that was dated November 2015. Does the -- the solar fields and equipment of today, are they about the same as the equipment that was studied for this report? Are they bigger or more powerful? Are they less? What's today's equipment versus what was studied in 2015?

A. So I would say the equipment is very, very similar in size and components. I know you're probably going to hear, you know, solar modules are, you know, 400 megawatts -- or 400-watt modules versus 700-watt modules. What I'll say

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about that is, the actual efficiency of those solar cells has not improved that much since 2015.

What they have done is, they have optimized the panel size and structural integrity of those modules to ensure that they can fit more solar within that module and panel. Because where you save costs then is, you know, replacing that larger component is a lot less, you know, effort from manual laborers.

So I would say the equipment and levels of EMF are very similar.

Q. Okay. So my next question is about the types of solar equipment. Are there different types of solar equipment for different climates? For example, if you're putting it in a dessert, where it's very high temperatures, versus arctic or subzero temperatures, is there different types of equipment for those different climates?

A. So the types of equipment are going to say the same that are required: inverters, transformers, modules, your poles for your interconnection equipment.

What's going to change is the actual

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specifications of those equipment on cooling capabilities and thermal capabilities for, you know, up north, right. But as we can see, there are inverters in Arizona, there's inverters here. The inverters here have to withstand the hundred degrees that's out there today and the subzero temperatures we get frequently.

So, you know, just like any type of equipment, they are needing to meet the requirements of, you know, the National Code. Oftentimes that National Code covers all of those temperature ranges.

So as far as specific equipment, I would say no. There are different erosion control-type best management practices depending on where you are regionally. But for, you know, actual electrical components, I don't know that there will be.

Q. So is there some kind of a sensor -- I'm going to use a word I'm making up here -- that lets you know at the monitoring center that there's, like, an ice -- say there's an ice storm and they are covered with ice and they can't rotate or something like that. Is there sensors that

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send that information? How does that work?
A. So there's a weather station that almost every single facility has at least one, sometimes two or three, depending on the size. Those monitor the, you know, weather conditions on site and take that weather condition and have proprietary programming pieces that are software oriented, They are not hardware; they are software oriented.

It would essentially be like you, you know, modifying your phone to look a certain way and have a certain picture, right? Like, it's going to operate for you. Each owner of a solar facility kind of has that proprietary background.

What it does do is take those inputs -- so sensor is an appropriate word -- and takes that data, analyzes it and then says, Hey, it's getting really windy, let's put the solar modules into a certain, you know, tilt, right, to manage that wind load at that time.

Not necessarily to, you know, prevent breakage of anything. It's to make sure that everything can flow through at a, you know,

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optimal way and have less impact.

I would say the, you know, other component, like you -- an ice storm, those things your homes are subject to, everything that's put onto a solar field has to meet that International Building Code, just like your home does, just like a commercial building does.

So, you know, an ice dam, they are going to melt eventually, just like the ice melts off of your house. If it needed to actually get broken off, they would send maintenance crews out to do that. But more often than not they're going to leave it.

Q. Okay. So this solar equipment, does it need electricity to operate?

A. There are components of the racking, which is the actual structural system that it sits on, that need power to rotate. Then you're powering, you know, the weather station and some very small electronic components and sensors.

That electricity is oftentimes produced by the facility during operation. Then as Reuben alluded to, at night it's a very silent neighbor. It sits and kind of just stays there,

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very still, just like your house with all the lights off, right.

So, you know, from that component, yes, it is connected to the grid, both to provide power and then there is oftentimes a small source power coming into the site to power those small electronics, but during operation it's running off of its own power production.

Q. Okay. And so then these panels and the racking system, it is meant to withstand a certain wind load then as part of its design --

A. Correct.

Q. -- from the manufacturer?

A. Correct. So not even -- well, so part of the design of the structural engineer from the racking manufacturer.

Additionally, the distance that the piles are embedded into the ground vary row to row, depending if it's an exterior row or an interior row. Just like you would have, you know, your exterior crops in a windstorm would be damaged but your interior ones are more protected. Same thing with solar. So those outer piles, you'll tend to see more of them on those rows or

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slightly bigger. When I say "bigger," they are oftentimes the same size, they are just either a little bit denser material, for strength-wise, or there's, you know, millimeters of difference between, you know, the different pile sizes. That's all structurally engineered for these things.

The wind loads for this site in particular you can actually go online and look up. It's call ASCE, American Society of Civil Engineering. That has the latest and greatest ASCE 7, and then there's two codes in there; there's 10 and there's 16. Both are very similar.

We would use 16 because it's the most updated wind load data we have. And that wind load I believe was 120 miles per hour for Risk Category 2. That Risk Category 2 is what I have seen solar facilities most often lumped into. Level 1 is really what they are because they are not posing a public risk. Nobody is standing in them.

This structure that we're in right now is a Risk Category 3 or 4 because it has enough,

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you know, space to hold multiple people. So those wind loads are slightly bigger.

Nobody is standing on these solar modules. You're not allowed within 20 feet of the solar modules, you know, with the fence. So the risk to public safety is very, very low when it comes to that risk category.

Q. Okay. Thank you.

So now I have some questions about this DOT research report that you did, Applicant Exhibit Number 9. So my question is, does the soil type affect the distance the ground vibration would travel?

A. Yes. And soil type, soil composition, you could have a rock halfway through that and it's going to impact it. So what I alluded to is, this research and this testing was done on a more conservative design assumption.

Q. Okay. Does the amount of moisture in the soil affect the distance?

A. Depends on the type of soil.

Q. Okay.

A. So clay, for example, when it gets wet, tends to like to move around a lot more. Just like if

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you're throwing clay on a wheel or it becomes dry and solid then. Same thing happens when it's out in nature. Sand has a very similar effect.

So it does have an impact. The variability in that is somewhat identified in here as, you know, a source of additional, you know, testing, essentially. But that's what that equation is for, is we're taking the curve of the amount of all these different parameters and trying to put a mathematical equation into it, right.

And that's really all we can, you know, ask for when it comes to engineering in an environment that varies significantly. Vibration, for example, has more input variables than I could count. You just brought up two, right? There's probably at least 500 more.

What we have done is, we have been able to study specific situations, put them on a curve of data points and say, Here's what we are going to call our fitted curve. It's a lot of calculus differential equation stuff that isn't a ton of fun.

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Q. What about if the soil is frozen?
A. That will have different effects as well. I will say that they are not going to pile drive while the soil is frozen.
Q. Okay. Just checking.
A. Yeah.
Q. So when you were testifying, did I hear you say that you thought that the closest mine shaft was 300 feet away? Is that what I thought I heard you say?
A. I think the distance -- and I guess I don't have the report in front of me. So if you have the actual distance --
Q. I don't have that. I didn't hear what you were saying. Your voice kind of went low, so I wanted to make sure I had written it down.
MR. SHARP: So, Reuben, I'm going to take a peek at that.
A. This was put into evidence last time. It's the Western Land Services document. I believe that the distance to the closest edge of mine, when I measured it, was 300 feet from the subject parcel.
Q. (By Ms. Donarski:) Okay. So did you do any

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studies of the actual mine or type of mine that sits in this vicinity of the Village of Ladd?
A. As far as testing of vibrations?
Q. Like, did you study anything about the mine or how deep it is, how far away it is or anything like that?
A. Based off of the data that was provided by Western Land Services, that's what I have gone off of.
Q. Okay.
A. That's what's most readily available. If there are County records, I'm sure Reuben and myself would be interested in those if you have them.
Q. Sure.
A. I would say that I did talk to our structural engineer. In the case that a mine is located within the subject parcel, we would find that out during the geotechnical investigation.
Q. Okay.
A. That geotechnical investigation would then tell us how deep that is. We would be required to report it and have a bunch of people come out and look at it and determine what the depth is and what the safe -- safe impact we can have

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above it is. Based off of that, we can still do this project. We would just use an alternative foundation design.

Q. So you used an actual report of the actual area and the location of the actual mine to come up with your testimony?

A. Correct.

Q. That's kind of where I --

A. So yes, the distances provided in the Western Land Services and then the vibration distances from the New Hampshire DOT research record are what I looked at to testify that the likelihood of it impacting a mine is negligible.

Q. Okay. So I just have a couple -- a few more questions. So what type of pile-driving is generally done? I'm not an expert in this, but I have seen them when they are kind of like boom, boom, boom, like kind of slow, and other times it's kind of like a jackhammer, that it's like bah, bah, bah, bah, bah, bah, like that.

A. So the pile drivers that are used on solar facilities most often are going to have kind of a calibrated resistance. So as they hit more resistance, that frequency or the power put into

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that hammer is going to increase.

So some of what you're seeing -- like, I drove by pile-driving activities by a bridge construction site on my way down here today. It, you know, was going fairly slow. Those piles are a lot bigger and they are sticking out of the ground a lot further than the piles we're talking about.

So the frequency of that hammering is going to change both on the load or the resistance of the pile and then the height out of the ground it is. As they're getting closer to their elevation they're trying to hit, they are going to make them smaller and a lot less impactful because they're trying to hit that target elevation.

MS. DONARSKI: Okay. That's all I have on my questions. Thank you.

MR. SHARP: You're welcome.

MR. NOLL: Chris Noll. I also have a number of questions.

EXAMINATION

BY MR. NOLL:

Q. In your stormwater system, you mentioned taking

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a lot of rain data. How did you account for snow melt?

A. Snow melt is accounted for in most of the Atlas 17 rainfall data. In the case that it's not accounted for, we run the hundred-year design storm. The hundred-year design storm is going to be the most conservative design storm. It's widely recognized by FEMA, by the Federal Government, by the State of Illinois as "the" design storm to ensure that your stormwater management can handle it.

That design storm intensity, when you have looked at snow melt with a spring thaw rain event, are typically a back-to-back storm event. When we have studied that, the actual peak that happened -- so when you have got, you know, two storm events that happened kind of in iteration, back to back, you have that initial saturation that's happened and then you have additional rain on top of it.

That second storm is how we mimic that snow melt event, right? So you have got that first flush of the rain, and then that second is that additional snow melt because of all the

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rain.

What we see is that the peak runoff event from that isn't actually impacted significantly when you're looking at the design criteria of our, I guess, regulated components of the solar system.

What I will say is that if that needs to be run, it's been explicitly put into a Code, and the documentation that I have reviewed from various, different local and national regulatory bodies is that it's a negligible event to run because of that.

Q. It's not negligible for me. And this goes to Kris's question about the culvert, is that snow melt from the entire eastern side of Route 89 and rainwater from that side flows through a culvert underneath the highway, onto the proposed site and through the proposed site.

And if your construction in any way blocks that flow, it will flood my house and flood Route 89 by the elevator.

A. So we're not allowed to do that, by law. By law, we have to prove that we are not backing up water for a hundred-year storm event onto

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anybody else's property.

The AIMA agreement that GreenKey signed states that we will not negatively impact -- so flooding would be a negative impact -- negatively impact neighboring properties. So we have to design that culvert to ensure flow for the design storm event to maintain the same existing flow that's there right now.

So if you have flooding issues right now, we haven't done anything out there, and we can monitor that, but that --

Q. No, I'm saying that if anything changes that culvert or changes the flow across the site, I will have a flooding issue.

A. You will actually see improvement to any flooding issue that you might have, because more of that water is staying within the ground because more of that -- that curve number that I was talking about, that curve number means that more of that water is staying within the plant root systems, the soil. All of that's being absorbed more readily than during the spring thaw where most cropland currently is bare.

Q. You mentioned that it takes six months for the

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vegetation to root. Is that to the 70 percent efficiency?

A. That's the 70 percent coverage, and that coverage means that you have -- you know, it would be like me balding versus me being bald, right. There's not bald spots across the land for that coverage to be met. It just means it's not very thick. So that coverage still has to have coverage over across the entire --

Q. You're saying in six months it's at that 70 percent and it's fully effective for handling all water across the site?

A. It is fully effective to meet the requirements and ensure that there's the improvement that we're talking about in the curve number runoff.

Now, we run -- as engineers, we run a two- and a five-year storm often for our contracting partners to determine what a bare soil model would look like, assuming that they're going out there and opening up the entirety of the field.

We don't have to do that on these sites because that is our starting base model assumption, is a bare crop field, so bare soil.

The vegetation management plan for this

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site in particular has an oat cover crop, and that will be in place before construction starts. So that effectiveness, added to the temporary veg- -- so that's the temporary cover, added to the permanent cover, you'll have that 70 percent coverage. And when we're looking at the effectiveness of the ground cover, we are looking at the 0.1 inches, essentially, of ground cover, is what the hydraulic calculations are based off of.

Q. And that's the same even in the springtime when the ground is frozen?

A. The ground's frozen condition is not studied oftentimes, because that's not when we're going to be out there constructing it, right.

Q. But I'm saying that's when the water is flowing across.

A. Which in the improved condition, bare, frozen soil versus vegetative cover, just like your lawn, is going to be better.

Q. It can't sink in. It's got to go across.

A. Correct. That's the same as it is right now, right? As the land sits right now, it's bare earth in the winter. The difference is that it

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has ridges through it from tilling, and it doesn't have any stubble, oftentimes, equivalent to turf grass or deeper-vegetation grass, right. So with the deeper vegetation, have much more coverage year round and you don't have the row iteration of the soil.

What that row -- what the row crops do is it provides channelized flow. Channelized flow means that water is going to be more erosive. When it can stay sheet flow, it's going to be less erosive. When you have more stubble, essentially, on the earth, even in a frozen condition, it's going to slow down that water and make its flow variability increase versus when you have row crops. So you're going to see a net improvement.

So I guess what I am saying is, when you're looking at the ground as it's been used for the last however many years as farmland, you're going to see a net improvement for stormwater runoff from an engineering standpoint. The thing that would negate that is if we were going to go out and pave the whole thing, but we're not going to do that.

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Q. But it's not going to be -- it's not bare earth now. It's no till land. So there's lots of stubble and --
A. Which still you're going to have --
Q. -- which slows down the water.
A. You're going to have bare chunks of earth though, right.
Q. The point I was making is that when the ground is frozen and you're having snow melt and heavy rains, you're still going to have water flowing across that site.
A. I'm not saying that water is not going to flow. I'm not saying we're stopping water flow, right. I'm saying that the net improvement to the land from the standpoint of ground cover -- all I'm saying is ground cover improvements, that improvement is going to result in better stormwater and erosion control than you currently see in its current state. It doesn't mean we're going to stop water from running across there. It doesn't mean that the thaw and freeze conditions are going to be any different.
We're comparing apples to apples, site to site, same square footage, same ground cover.

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We're just changing the ground cover in the proposed condition to what we're planting.

Q. You talked about noise levels being measured. Were those before or after the State reduced the distances from the site to other people's property?

A. The State mandates the Pollution -- the Pollution Control Agency mandates the noise levels allowed.

Q. Were those levels changed when they reduced the distances?

A. The setback distances?

Q. Yes.

A. I don't believe so. I believe the noise level was matched up with the distance that was seen historically. So that 150-foot setback from residential structure to a solar module --

Q. But that is --

A. -- is that what you're talking about?

Q. That's the new distance though.

A. So that's the new distance --

Q. Historically the distances were greater.

A. The State level distances, no. The local distances, yes.

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So that 150 foot that the State set as a setback distance was based off of empirical data from them measuring sound levels from solar facilities. So that's how they kind of -- they set that number to make sure that your noise levels were met.

Additionally, what they're saying in the AIMA is that you have to prove that those noise levels are met. So if the 150 foot isn't enough to get those noise levels down, that means that you have to still meet that requirement. So what most solar facilities, both from an efficiency standpoint and from a noise barrier standpoint, they are centrally locating that larger equipment. They are putting it in the center of the array or they're putting it in the center adjacent to a roadway, where they are not next to a property.

The intent of that is to reduce the length of cable that has to go out to all those array, and then also provide some barrier, to insulate you, from those noises. Because, you know, we're working with all the different landowners across the state, and that's what the intent of

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that AIMA is.
Q. On the EMF levels, were you aware that the World Health Organization considers EMF still an issue and that they are doing long-term studies on low-level EMF at close proximity?
A. Are there results of that?
Q. No.
A. And have they been compared to the EMF levels from your microwave, your cell phone and --
Q. No. They are doing the studies to see if there's long-term effects.
A. So without specific data, just like I'm not going to ask you to have that data, I can't have that data for you, right? What I do have is --
Q. No, I just asked if you are aware of that.
A. Am I aware that they are doing long-term studies? Yes, I am. I'm aware that they're doing long-term studies on cell phones and all of our other electrical equipment that we use in our daily life as well. I'm more concerned about the cell phones personally because we have them by our head every day.
Q. They did those.
On decommissioning, you talked a great

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deal about what happens if there's damage to equipment.

A. Yup.

Q. What happens if the company itself goes out of business?

A. So, again, the company that's holding that has financial owners that are in those agreements. I'm not going to get into the legal aspect of it, but essentially they still have those insurance policies that are created for this specific situation, where if they do go under those insurance policies still kick in.

Q. I'm not aware of an insurance that --

A. These insurance policies are based off of the actual facility. They are insuring the actual facility. They are not insuring the company. So the company still has the insurance covering the actual physical facility.

Just like your house, if you sell your house --

Q. But I'm not worried about the equipment. I'm worried about what happens to that solar farm if the owner goes bankrupt and can't pay the decommissioning expenses?

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A. That's what all of the legal agreements are for. They are to protect that whole component.

So I guess my understanding of the decommissioning process is limited to what I do as an engineer, which is determine what needs to be done to decommission a site to the AIMA requirements. And my understanding, from my experience, is that I have not seen a company go under, and there are lots of legal protections in place through the AIMA to ensure -- we wouldn't be here with an AIMA that has a decommissioning plan at all if it wasn't there to protect the County from having, you know, essentially a financial risk in this entity.

I will say that most solar projects outside of Illinois, I don't see decommissioning plans happening. There are just -- there's lots of legal protections with these sites.

And I guess my question back to all of you is, would you be asking the same question about a car wash or a Taco Bell or a KFC going under? Because I have a KFC in my own town that's been sitting there, and it went under, and the building is super ugly and it sits there and the

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County and the City just leave it. But we're not asking those same questions about facilities and developments like that, right?

Q. No, the question is, in the first ten years there's only half of the decommissioning that's going to sit in a bond or some type of financial document. And if the company goes bankrupt, only half the cost of taking that equipment out to cover the owners, you know, so that they can get back to farming --

A. So if you went bankrupt, what would they do with your assets?

Q. I don't know. I'm asking.

A. Well, you would have them sold, right, for the value. Or what happens in a divorce when you separate assets? You have a value associated with those.

What we're saying is that the value associated with the equipment in those first ten years is high enough that it covers the remaining portion of the decommissioning costs.

Q. Isn't that netted out in the --

A. That's the salvage cost at the end of life. So what we're looking at is 25 years from now.

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That salvage value assumes that the usable life of that equipment is no longer of value. We're looking at the scraps, the actual recycled components. So we're looking at steel costs, we're looking at cable, and how much money you can get poundage-wise. We're not looking at the actual equipment components.

So there's more value -- just like if your car was, you know, brand-new versus 20 years old, there's more value in that brand-new car, just like there is in a brand-new solar module than it is in a 20-year-olf solar module. We're accounting for the 20-year-old value, right?

Q. Have you ever done a glare analysis on solar farms?

A. I personally have not run a glare analysis. I have had glare analyses done on solar facilities, or as part of a solar development. They come back as non- -- you know, seasonally nonglare concern, insignificant glare to impact aviation and, you know, passersby essentially.

The other thing is, these solar modules are coated in an antireflective coating. The whole -- I mean, the whole industry developed

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that. Because you don't want that solar energy being reflected away. You want it absorbing into the photovoltaic cells to create -- be creating that power.

And then, additionally, the FAA has released guidance publicly that they do not require glare studies because they don't have concerns about solar facilities creating glare that would impact their ability to do their job.

Q. Even though the glare analysis people claim that the nonglare -- it isn't a hundred percent?

A. Can I ask a question? I guess, I don't know, am I out of turn asking questions? I think I probably am.

MR. WELBERS: He's supposed to ask you questions, which for the most part he's doing. He lays a little foundation for some of his questions, but for the most part he is asking questions.

MR. SHARP: I'm just wondering, can I ask questions back?

MR. WELBERS: He's not the witness. Now, you will have --

Q. (By Mr. Noll:) My concern is this, if the

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solar panel is at its -- facing east at its -- whatever you call it when --

A. Tilt.

Q. -- it's leaning, at its angle, highest angle, and the sun is shining directly from the east into it, is there going to be glare off of that to whoever is on the west side of that panel?

A. I will tell you right now that I have solar on my home on the side facing the garage. So if I was going to have glare coming into me while I was driving in, I would have that. I do not. From experience, from a solar module in front of me at the full tilt with the sun directly on it, there is not glare. So that's my personal experience.

I would also say that the glare study folks are out of a job if we have fully-effective antiglare. So their interest in saying that it's not fully effective may be slightly tainted. I will leave it at that.

Q. What happens to all of your sensors and your powering of your panels if Ameren loses power?

A. That is part of the --

Q. Say there's an ice storm, which we have

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frequently, and Ameren loses power. How do you know your site's out of commission?

A. So all of that is part of their power purchase agreement and their interconnection agreement.

Oftentimes, just like you may have a generator at home or battery backup on a device, those solar facilities oftentimes have backup devices to power those critical items.

I guess the overall thing that I would say about concerns about power loss and natural -- naturally-occurring weather events is that the International Building Code, the National Electrical Code and IEEE all set standards for safety, right, and for operation. This facility has to meet those same things.

So just like you can lose power at home, a solar facility can lose power at home and still survive and be just fine. It's actually probably more resilient because it doesn't have water pipes that might freeze if you don't get power back to run your heat.

So I would say that the solar facility's impact of not having power is not going to detrimentally affect the long-term functioning

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of that facility. And if it doesn't operate for the duration of that ice storm, it is not negatively going to impact you sitting there, silent and still, right?

Q. I'm going to have power.

A. Which is great.

Q. But my question was, how will you know?

A. They won't potentially, right? They'll either have backup power or they won't. They'll just know that the system is down, and then they'll work with Ameren, just like everybody else would work with Ameren, to get power back.

Q. Is this proposed facility having -- does it have battery backup?

A. I'm not aware of what the current configuration is. I do know that the interconnection agreement will specify things like if power loss occurs, what happens.

MR. NOLL: That's all my questions.

MR. WELBERS: Connie.

MS. STETSON: Connie Stetson.

EXAMINATION

BY MS. STETSON:

Q. Do you have a study on soil testing underneath

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these solar panels?
A. The current Ladd 2 and 3 solar facilities have not had a geotechnical investigation completed. That is very standard for this level of development of a project.
Q. Solar has been around for a while, and there's not a study whatsoever for underneath what happens? Because you're saying minimal lead, but there's other components that could possibly be going down into the ground.
Are you willing -- here's a question. Are you willing to do a yearly soil test as a stipulation --
A. I guess --
Q. -- from the Board?
A. I guess, what is the intent of that? Because I --
Q. To make sure that the soil is staying correct and not being poisoned.
A. Okay. So my understanding of your question was, had a geotechnical investigation been done for this specific site? That means the soils specifically on this site.
Has there been soil studies done under

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solar facilities in general? Yes, there has.
Q. Do you have studies to show that there's no contamination?
A. I would need to go and pull those studies. I don't have them with me tonight. I am happy to do that and get that information for you.
I have not seen any documentation saying that the facility, itself, is contaminating that soil.
Q. But you don't have proof? There's no proof to say anything in -- tonight you have no proof, but yet solar has been around, and I would think that would be something that should have been done and started when these solar panels are on farmland.
A. So --
Q. Because you're saying that this is supposed to be the best farmland in 40 years, but we don't know how poisoned it is from these things.
A. What's the question?
Q. Are you willing to do -- is GreenKey willing to do a soil test on a yearly basis?
A. I do not have --
Q. And send those soil tests before you start

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every year to the County to make sure that there's -- the soil is still good?

A. I do not have authorization to provide that.

MS. STETSON: Kris Donarski, can I ask you a question?

MS. DONARSKI: Sure.

MS. STETSON: Is this something that you can stipulate, that a soil test be done on a yearly basis?

MS. DONARSKI: I will check into that and find that out. I don't know the answer to that.

MS. STETSON: Before this is approved --

MS. DONARSKI: Yeah, I'll check into that.

MS. STETSON: -- I think a soil test should be done.

And I would think that you would have a study, but there is no study.

MR. SHARP: Well, do you have a study showing that there is, I guess?

Q. (By Ms. Stetson:) What about a maintenance sheet? Do you do yearly maintenance sheets? And do you put those --

A. There's an operation and maintenance plan associated with solar facilities, and those are

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required as part of your AIMA and they are required for operation of the facility, right.

Q. I would think soil testing would be within that.

A. So soil testing -- I guess my question is, if we have studied soil over time and there's not contamination from the thousands of solar facilities, would we continue to study soil to see if it's contaminated?

I'm also going to state that there are multiple solar facilities that are located on landfills and brown fields. Those are contaminated soils and they are --

Q. Well, I would like the before you start and a yearly soil test done under all. I think it all should be done, not just with solar. It needs to be done with wind.

A. What are you going to study though? What components are you looking for specifically?

Q. What damage is the soil being done? You know, we don't know. You don't have -- there's no proof of studies or anything. I think we all need to know if the soil is testing --

MR. WELBERS: He's the witness. You're

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the questioner. He's actually interrogating you. Now, he'll get his chance.

MR. SHARP: I won't take it.

MR. WELBERS: Follow the procedure. Don't get me in trouble.

Q. (By Ms. Stetson:) I'm just saying, can there be a soil test done? And I did ask Ms. Donarski if we could put that down as a stipulation.

MR. WELBERS: And she was going to research that.

A. And I said I don't have the authority to put that in there.

MR. WELBERS: And that was your answer, yes.

Q. (By Ms. Stetson:) All right. Now I have another question. You are an engineer?

A. Yes.

Q. You're not financial?

A. No.

Q. Why are you talking about the financial agreements?

A. Because I have completed the decommissioning plans, and my company put out the documentation on -- and it's publicly available -- on the

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topics that I covered, which were the typical agreements that are associated with a solar facility, because my company does do entitlement and permitting compliance work.

Q. Okay. The financial agreements, who are they with, the County or a landowner or --

A. Again --

Q. Who are they with?

A. I'm not going to speak to that, because that is the component of it that is legal. I'm telling you the financial documents and components that are typical of a solar facility, including insurance agreements.

Q. But you're saying that there's financial agreements, but you don't know with whom?

A. They vary between sites, and I don't have the knowledge or the documentation in front of me to tell you who those agreements are with.

Q. It's because you're --

A. I also know that most of that information does not need to be made publicly available as part of this Conditional Use.

Q. Well, it does. I do believe it should be because, again, you could go bankrupt -- and

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when I say -- you know, this gentleman behind me said, If you go bankrupt, who's going to pay the balance? Well, you said, We're insured.

If you're going bankrupt, you're not going to have enough money -- you may not have even paid your insurance bill, is what I'm saying.

So who's paying for it?

A. I am not the person who can answer that for you.

Q. Exactly.

A. I believe Reuben did a great job of informing you of what he is aware of with the current project on the table.

What I will say is that from a Conditional Use Permit, it is not required that all of that is laid out on which insurance policies they have. I was providing that information to provide peace of mind that most typical solar facilities have these insurance policies in place, along with the OEM warranties.

Q. Okay. So what we need is the financial person up there talking about this information and not an engineer.

MR. WELBERS: Is that a question?

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MS. STETSON: Yes.

A. Yes, you had a financial person previously, the developer of the project, and he answered your questions, I believe.

Q. (By Ms. Stetson:) I don't think he did, not that question, because you brought it up.

A. I can't answer that question specifically.

Q. Who has the proof of insurance? Who has a copy of that?

A. I cannot answer that question as my testimony.

Q. Okay. Then you shouldn't have talked about it.

A. I was providing reference material in relation to typical solar facilities and the agreements that are part of the final building permit and permitting process of a typical solar facility.

Q. Okay. Well, financial agreements maybe should be talked about with the financial person, not the engineer. So maybe we should have somebody else talk about that.

MR. WELBERS: You'll get a second chance with Reuben when he presents Ladd Solar 3, and you can add that to your questions for him. He's the financial person.

Q. (By Ms. Stetson:) Just, you know, there's also

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the government subsidies. Do you know anything about that?

A. It is not part of my testimony that I am here for today.

Q. You shouldn't have brought up financial agreements if you don't have all the information to talk about it.

MR. WELBERS: Are you good, Connie?

MS. STETSON: Yes, I am done. Thank you.

MR. WELBERS: Mr. Noll.

MR. NOLL: I have got a couple more follow-ups.

EXAMINATION

BY MR. NOLL:

Q. We queried Reuben about the panel -- source of panels, and you talked about there being a very minute amount of lead, although, from what we understood from Reuben's testimony, you don't know where those panels are coming from at this time.

A. I am not part of the procurement process of the solar facility.

Q. Then how do you know how much lead was in them?

A. I was speaking to the amount of lead used in a

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typical solar module that is procured for the solar facilities that I have worked on the engineering for.

Q. Okay. And those panels are normally made where?

A. I do not have all of that documentation, and they vary across solar facilities. I can get that information for you though. I think it's also publicly available for any Illinois project that's been completed.

Q. From doing some research, the German firm that is mentioned in the application went bankrupt and was acquired by a South Korean firm, and those panels are now made in Asia. And recent MSDS sheets have been tested, and the lead content from an independent lab has come back higher than on the MSDS sheets.

A. I am not part of the procurement process of this solar facility, and that part has not been completed. The documentation provided as part of the application meets the requirements of the Conditional Use Permit application.

Q. I was going to ask, in your experience then, are you finding that solar panels are all coming

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with more lead than are stated?
A. My personal experience, no.
Q. On vegetative screening, you mentioned that that's something that's usually negotiated between the landowner and GreenKey?
A. I said the most successful situations that I have seen to get viewshed impact mitigated happens when a developer and the individual landowner come to an agreement.
Q. There were real estate documents or a report handed out at the last meeting, and were you aware that every one of those that reported, like, a -- not a decline in home value, was screened, vegetatively or with buildings?
A. I have reviewed those reports, and I understand that. My testimony was to the fact that I have seen varying degrees of success in vegetative screening, and that the most impactful happens when a landowner works to get vegetation on their own parcel where the mitigation is improved.

I believe many of the studies around the home values are the -- associated with the screening type where they wrap essentially the

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solar facility with.
Q. With vegetation?
A. With vegetation.
Q. Yeah.
A. That typically is the best vegetation screening for those situations because they're backing up to a subdivision. So in rural areas, where your home is further away from the solar facility, your viewshed mitigation -- if the tree is planted at the back of the room versus if the tree is planted here, it's going to be -- I guess from your standpoint, if it's planted right where that chair is versus back by me, you're going to have a lot more viewshed mitigation if the tree is planted closer to you.

So my testimony was indicating that yes, vegetation management can be successful, but in rural areas such as this, it's more impactful when a landowner can come to an agreement where you fill in any gaps in the current screening -- or vision mitigation with the trees at the property versus at the solar project.
Q. Has GreenKey used vegetative screening on any of the sites?

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A. Has GreenKey?
Q. GreenKey.
A. I don't personally have any of that information. I believe Reuben would be able to speak to that.
Q. Because that would be a major concern for the residences that are located near the site, to have screening for that landscape. I understand that can be stipulated also by the County.
A. I was just testifying as to what I have seen be most successful in previous solar projects. I am not saying yes or no to vegetative screening. I don't have that power.

MR. WELBERS: Are you good?

MR. NOLL: Yeah.

MR. WELBERS: Dave. Tell the court reporter -- state your name.

MR. FLAHERTY: David Flaherty.

EXAMINATION

BY MR. FLAHERTY:

Q. You are going into all these studies about what's under the rows. Do you find any fingers from the glacial lakes that -- you know, the glacial water basin?

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A. Did we find any glacial erosion?
Q. Fingers.
A. Erosion fingers, not actual human fingers?
Q. Yes. Some of that comes up -- the water comes up closer to the ground.
A. So the actual geotechnical investigation has not been completed.
Q. Okay.
A. If there were those glacial fingers in the soil profile, we would see those in the geotechnical report. So when that's completed, we would then address those.
Q. Okay. If there is, I would like a report of it.

MR. SHARP: Reuben, is that something that we can provide?

I guess I will let Reuben indicate whether or not that's something he can provide when he comes back up here.

MR. FLAHERTY: Okay.

MR. WELBERS: Are you good?

MR. FLAHERTY: That's it.

MR. WELBERS: Any other questions? Are you good?

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(No verbal response.)

MR. WELBERS: Jim, were you -- you had questions?

MR. NERAD: No, I think they answered them.

MR. WELBERS: He answered all that.

Other questions from our Board specifically?

MS. SMITH: I had a couple.

MR. WELBERS: Go ahead.

EXAMINATION

BY MS. SMITH:

Q. I just wanted a clarification of, when you were talking about decommissioning, you just mentioned that you have done over two dozen. Were you talking about actual decommissions or reports?

A. Yeah.

Q. That wasn't clear for me.

A. The decommissioning plan.

Q. Okay. The plan.

A. So the actual document.

Q. I assumed that, but I know what happens when you assume something.

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A. Yeah.
Q. And my second question is, these reports, the report, the DOT research report, is 12 years old as well. I mean, it's older than the other.
A. Yeah.
Q. There's been a lot of advancement in vehicles and solar, you know, all these things. Are some of the advancements in the equipment that you will be using for these pile-drivings, would they be improved to do less noise? Would they be the same roughly? I mean, is there any other updated report with regard to that issue?
A. Yeah, I am not aware of one. This is the documentation associated with, I guess, the construction equipment study that was done.

What I will say is that the equipment for pile-driving that I have seen on sites, the improvement has been in the technology aspect of it in the sense of getting much closer to the elevation they want to hit and the actual locating of the pile with GPS, not so much the actual mechanics that would have impacts on the vibrations.

Q. Then actually that might make it less of a

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problem?
A. Potentially, yes.
Q. Potentially, correct?
A. It could.
MS. SMITH: Okay. That's what -- my question is answered. Thank you.
MR. SHARP: Yup.
MR. WELBERS: Any other questions?
MR. GRANDON: I would like to ask just a couple of clarifying question, if I may.
Don't worry, I won't be too hard on you.
MR. SHARP: Perfect.

EXAMINATION

BY MR. GRANDON:
Q. So taking, you know, very seriously what the Village of Ladd had expressed as some other concerns about the solar project. One of those I don't think we have covered quite yet by your testimony, so I just wanted to get it on record.
One of the concerns sited was concerns of electromagnetic fields elevating the risk of fire. So based on your experience working with solar and your review of the EMF report that you submitted, do you see there being any elevated

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risk of fire from this facility?
A. No. Again, all of the, I guess, fire protection components of a solar facility have to meet the same building standard codes from the National Electric Code and IEEE.
Q. Then just one other follow-up question, speaking about the NH DOT study that you referenced and testified to.

Can you just, for clarity, reiterate if there will be any impact beyond the footage that you talked about, but also can you talk about the pile-driving equipment that is cited in the study and how that might compare to what you see as pile-driving equipment to your point on a solar facility?
A. Yeah. So I guess I'll take the latter question, and I might have to have you re-ask the first question.

So the latter is, the pile equipment that's associated with this document is the larger bridge construction-type pile-driving equipment. So the pile that we are talking about on a solar facility, to your point, is much smaller typically. They're not going to go

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out there with larger equipment than required to drive the size of pile that they need. So the mechanical power required to drive that pile is much less than what you would see at a bridge or, you know, a typical road construction project.

What was the first part?

Q. So in your testimony you pointed out the table on Page 14.

A. Yup.

Q. And we're looking at the pile-driving at a certain number of feet?

A. Yeah.

Q. So just piggy-backing off of the point that was just made, we could expect that to be even less because of the pile driver?

A. From my experience, both from engineering school and in practice and then review of this document, the impacts of the pile-driving activities at this solar facility as part of the construction at 50 feet away, which is outside of the subject parcel, will not have impacts that would negatively impact structures and, in fact, are most likely less than what's listed

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here.

MR. GRANDON: Thank you.

MR. WELBERS: You're good.

MR. GRANDON: Yeah, thank you.

MS. SMITH: I have another question.

EXAMINATION

BY MS. SMITH:

Q. Regarding fire --

A. Yes.

Q. -- we recently heard about, you know, some electric cars catching on fire, and they're still burning, you know.

What would happen if there were a fire? Lightning strike, something caused a fire, can you kind of explain what would happen? I mean, we're out in the country; fire trucks don't get there real quick?

A. Yeah, I grew up in rural Minnesota. The closest fire department was 15 minutes away. So I get the concern.

The, I guess, good news is that most of the solar facilities, at least the major components, have the, you know, fire-resistant components to them as, you know, just part of

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their manufacturing data sheet, right?

I guess the reference point I would provide would be, I have full confidence in our electrical and building code to the point that I have those same solar modules that we're talking about and micro versions of those inverters on my own home. And my comfort level with that is the same if I were in rural Minnesota or here.

As far as what would actually happen with the four components, what the arrays are made of, at least the soil modules are made of, are aluminum and silicon, sand; components that aren't super flammable. Then on top of that, the vegetation that lies underneath of it, with the type of vegetation it is, it tends to hold a lot more moisture. So the fire resistance of that, just surrounding it, is going to be better than, say, a home with structures nearby.

Then the, you know, inverters, for example, would be similar to, you know, if an inverter caught on fire as part of a house fire, right, or an electrical component. You can put those out in a similar manner.

I would say, you know, the time it takes

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for them to get out to the solar facility is going to be similar to many of these residents. I would say that I would treat it similarly, although the risk of fire for a brand-new electrical facility with the updated building codes, and specific to a commercial facility, are higher than that of, like, a residential structure that was built, you know, 50 to a hundred years ago.

Q. Another question with regard to the same issue. Most of the -- not most. A lot of the fire departments are volunteer. Are those people going to be trained? Is there going to be some special, you know, knowledge for them to know how to deal with it?

A. I will let Reuben speak to that, as the developer. But I will say, from my experience I have also seen developers partner with local fire departments for trainings specifically.

MR. WELBERS: Are you good?

MS. SMITH: Uh-huh, good.

MR. WELBERS: Any other questions?

State your name, please.

MS. NERAD: Karen Nerad.

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EXAMINATION

BY MS. NERAD:

Q. So you're talking about fires, okay, that she had asked about, about catching fires. Isn't there a wire that goes to these modules or, you know, something? Isn't there some kind of wire?

A. Yeah.

Q. Okay. Can't they have faulty -- you know, a faulty design or faulty -- when they're put in, that they can catch fire, like make a spark off of it?

A. I'm not specifically an electrical engineer. And in my experience of developing solar facilities, the Electrical Code requires detailed studies of solar facilities to ensure that they meet the NEC Code requirements, which means that the risk of those starting on fire is equivalent or less than the same type of error happening in the construction of a home.

Q. Okay. So say, what if there is a fire? I'm just saying, what if there is? And you have got firemen that come out there, you're putting water on electrical. That -- doesn't that just expand, you know, make the fire go more? Don't

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they have to use foam?

And are these, you know, fire departments -- I don't know if Ladd -- because we're in Ladd Fire District. I don't know if Ladd's equipped to have this equipment, the foam, to put these fires out.

A. So my understanding of a solar facility is there are safety protocols put in place as far as an operation and maintenance plan as part of that emergency response plan, and those include emergency shutoff locations.

My residential solar has an emergency shutoff location in case of a fire or anything going wrong with the system. Similar case with these facilities.

As far as the foam, I'm not aware of the specifics of the firefighting equipment required for that. What I will say is that fire departments have been partnering with developers to determine what the, you know, emergency response plan needs to be and their comfort level with that.

MR. WELBERS: Are you good, Karen?

MS. NERAD: Yeah.

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MR. NOLL: Chris Noll.

EXAMINATION

BY MR. NOLL:

Q. Even with the emergency shutoff though, aren't the cells still producing DC electricity?

A. I'm not an electrical engineer and I'm not part of the fire -- I guess I don't have expertise in firefighting of a solar facility fire.

What I will say is that part of the operation and maintenance plan and part of the emergency response plan clearly lays out safe ways to put out fires for solar facilities.

MR. WELBERS: State your name.

MS. FLAHERTY: Pam Flaherty.

EXAMINATION

BY MS. FLAHERTY:

Q. Can you speak to any place that you are familiar with that has had a fire on a solar farm?

A. I am not familiar with any.

Q. You have never seen a fire in a solar farm?

A. Of the ones that I have been part of, no. I have watched the news, just like anybody else has.

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MR. WELBERS: Go ahead, Tim. Tim Pratt.

EXAMINATION

BY MR. PRATT:

Q. What did you see in the news that everybody else is seeing?

A. I have seen solar facilities on fire.

Q. Okay. Thank you very much.

A. Just like a house can start on fire, just like a commercial facility can start on fire.

And the intent of my testimony is to say that there is an emergency response plan and an operation and maintenance plan, just like any commercial building would be required to have as part of their occupancy.

MR. WELBERS: Are we good for questions now?

(No verbal response.)

MR. WELBERS: Your testimony is complete on this application. Thank you very much.

MR. SHARP: I appreciate the opportunity.

MR. WELBERS: What would you like to do next, Reuben?

MR. GRANDON: Can I talk to Mark real quick?

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MR. WELBERS: Go ahead.

MR. GRANDON: So, Mr. Welbers, we had submitted a Property Value Report to the record. We were here previously, and the author -- or coauthor of that report is not here to testify tonight, but they will be if the date works out for the next selected hearing. Which we have been with the Zoning Administrator. If this is, in fact, continued, we have a date in mind where she can be available.

So with that, could we go ahead and continue with the public testimony and public comment on the application, since there are folks here tonight to testify?

MR. WELBERS: You have got a real estate witness that is not available tonight that you want to put into the record?

MR. GRANDON: Yeah, that's correct. We could not get everybody here at the same date.

MR. WELBERS: I understand.

Are there other witnesses that you have, or is the real estate expert the last one on this application?

MR. GRANDON: Yeah, we don't have any

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additional witnesses on Ladd 2 here tonight or on -- you know, intending to bring anybody else for Ladd 2.

MR. WELBERS: So after the real estate witness, you would then rest, and then, of course, the public could then begin their testimony, subject to cross-examination.

Now, your request is we let them start theirs now?

MR. GRANDON: Yeah, my request is --

MR. WELBERS: We don't traditionally do that. We traditionally finish this and then we'll go to the rest.

That's correct, right?

MS. DONARSKI: Correct, because it would rob them of their opportunity to comment on the witnesses that have not been -- so the Applicant, you rest yours, and then they comment and then -- that we do that, you know, for cross-examination purposes.

MR. WELBERS: Now, we could table this, which we're going to have to do for the real estate. And my opinion, if you would like to start to present Ladd Solar 3, you are the

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witness that starts that off and you are here. We could probably do that. You know, take a break for a minute, and then you could begin that presentation and maybe could complete it. We have two hours to go.

MR. GRANDON: That would be fantastic, yeah.

MR. WELBERS: So if you didn't hear what I just said, they do have one other witness they want to present. And our procedure is to let the Developer make their case and all their witnesses subject to all the cross-examination, and then we then turn to the public for their testimony, which, of course, is subject to cross-examination.

So what we would like to do is table this case until their real estate expert could come, but then we would open up the application for Ladd Solar 3, Reuben being the witness. I would read into the record all the things I read in on Ladd Solar 2, and then he would make his presentation, subject to all your cross-examination. Is that clear?

Okay. Now, we talked about a date of

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Monday night, September 16th, at 7:00 p.m.

Is that when your real estate person could be here?

MR. GRANDON: Yes, that works for us.

MR. WELBERS: So I would move to table Ladd Solar 1 -- Ladd Solar 2, Ladd Solar 2, until September 16th, Monday night, 7:00 p.m., here at the Bureau County Courthouse.

MR. FORRISTALL: 7:00 or 6:00?

MS. DONARSKI: It's at 7:00.

MR. WELBERS: 7:00.

Second to that?

MS. SMITH: I second it.

MR. WELBERS: Okay. All in favor.

(All those simultaneously responded.)

MR. WELBERS: Okay. We're going to table this. Then we'll come back on September 16th, listen to the real estate expert, and then we'll go to all your testimony, subject to cross-examination.

Just take five minutes, something like that, and then I will begin to read into the record. We will open up Ladd Solar 3, and

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Reuben will testify. So there are questions regarding fire response and things that are fresh in everyone's mind, and Reuben will be here to talk about that.

This one is Ladd Solar 2. This one is Ladd Solar 3. So yeah, we'll get back together at 8 o'clock or just a few minutes after.

(The hearing was recessed at 6:00 p.m.)

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Now on this 26th day of August, A.D., 2024, I do signify that the foregoing testimony was given before the Bureau County Zoning Board of Appeals.

Barry Welbers, Chairman

Kristine Donarski,
Zoning Enforcement Officer

Callie S. Bodmer
Certified Shorthand Reporter
Registered Professional Reporter
IL License No. 084-004489
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