Question	Answer
Is the intention to get through the full multi year backlog and catch up to the present, so that this can move to ongoing analysis?	Yes MISO needs to get through the backlog of projects. The vision is that we'd be executing on the interconnection process in 1 year and therefore would only have one ongoing cycle each year. Getting through the backlog utilizing automation and SUGAR is critical to achieving that.
What is MISO's plan for using SUGAR or other automation tools in Phase 2 and 3 studies? Which parts of these phases are most time-consuming, and how does MISO intend to manage timing to meet the overall one-year study goal	There is no plans to date to utlize SUGAR in the Phase 2 and 3. We are currently focued on getting SUGAR implemented in Phase 1 studies. Some aspects of phase 2 and 3 are not currently performed in phase 1, specically stability and Affected System studies. Both those studies do add additional time to the phases. The idea is that we are able to perform the phase 1 studies quickly enough that phase 2 and 3 studies would be allocated more time in the overall 1 year timeline.
Please address how to reduce the backlog through increasing standards for demonstrating project viability and increasing payments, not just modeling.	As discussed on slide 3, MISO has been actively improving the manageability of its Queue. In particular the recent queue reform done in 2023/24 directly addressed increasing standards and project vaibility through increased site control, increase milestones etc.
Does MISO have a timeframe for when DPP-2023, DPP-2024, and DPP-2025 models will be available on the MISO extranet with the implementation of SUGAR?	Estimated schedule for DPP process is posted on the MISO website. https://www.misoenergy.org/planning/resource-utilization/GI_Queue/
Were any other "automation" solutions considered? If so, which ones?	MISO has some internally developed model building automation. However, SUGAR gives a more end to end integration approach.
Can you tell us about the origins of SUGAR? I think I heard it was derived from the SPICE integrated-circuit tool.	SUGAR was not derived directly from SPICE, but drew inspiration from the methods used to model, simulate, and optimize integrated circuits. The foundational academic papers of SUGAR can be found on Pearl Street's website: https://pearlstreettechnologies.com/articles/case-studies-publications/
Can SUGAR be used to analyze large load interconnection requests?	From a technical perspective, yes, in that SUGAR could automate the same general process (build power flow models, dispatch/solve them reliably, run a load flow study, identify constraints, select and validate network upgrades, estimate costs, etc.). But Pearl Street is not currently working with a transmission provider or utility to do so - if this of interest, reaching out through the website (https://pearlstreettechnologies.com/request/) or contacting David directly (bromberg@pearlstreettechnologies.com) is the best bet.
What information about large load projects do you currently lack that could improve the quality or speed of SUGAR's results?	MISO doesn't think we are missing anything from a large load project perspective that is limiting the quality or speed of SUGAR.
How do you handle transient stability or EMT studies?	Pearl Street does not currently automate transient stability or EMT studies, which are typically addressed in later phases of the interconnection process. MISO continues to conduct these analyses using traditional methods, industry-standard tools, and the expertise of its transmission planning specialists.
What level of granularity can you analyze to (ie. up to transmission level substation or to distribution substations and feeders)?	SUGAR is designed for transmission planning studies, which generally include transmission and subtransmission substations and lines.
To what extent are uncertainties accounted for in SUGAR?	Pearl Street's software deployment is intended to replicate MISO's DPP study process. It does not consider uncertainties that are not studied as part of the DPP process. To learn more about Pearl Street's software to evaluate uncertainty resulting from queue withdrawals and other changes, please reach out directly via the website (https://pearlstreettechnologies.com/request/).
For Model creation, how to decide current/previous cluster generators dispatch? Should all NRIS current/previous cluster projects output at their max power?	MISO's dispatch rules are outlined in BPM-015, which is available on the MISO website.
How structured was the input data already (loads, ratings, generators)? Does the tool organize and join the datasets for model or is this done outside of SUGAR?	Most data sources are "structured" in the sense they are provided in standard file formats or submitted online via a form with a standard backend schema, but the datasets are disparate and at times inconsistent. Pearl Street and MISO have built internal tooling to join these datasets for the study process.
Cost allocation automation could be easily implemented on top of TARA. Why did MISO switch to an entirely new solver just to solve that very simple step?	MISO's implementation of the SUGAR software is intended to automate the entire end-to-end study process, which comprises cost allocation as well as many other steps.
What power flow solver does SUGAR use? Have you benchmarked it towards other solvers?	SUGAR is its own power flow solver. It has been benchmarked several times over the years, most recently by MISO as part of this implementation effort. The report is linked in the slides.
What are the system sizes that are analyzed by SUGAR? Are smaller systems subject to an expedited review?	Apologies, but it is unclear what is meant by "system sizes" here. SUGAR can be deployed to run a power flow study for any size grid. If the question is referring to project size (i.e., MW capacity), SUGAR is a transmission power flow solution system - the software is appropriate for analysis of utility-scale projects that connect to the transmission grid.

How is MISO addressing any differences between SUGAR results and the traditional process, including identified mitgrations, the costs of those upgrades and cost distribution. How can MISO ensure that the results can be independently replicated?	There were very few differences between the output of SUGAR and other software solutions as noted in the whitepaper MISO published here: provide link. This analysis showed a 99.2% match rate between SUGAR and previous analysis. Feedback regarding specific mismatches between posted results and internal studies should be submitted to MISO for review.
Can we have access to the details of SUGAR study, or some sort of Help to run the studies?	MISO posts the models and results of the study on its extranet, available to all interconnection customers. Please reach out to Pearl Street directly for help running internal studies (https://pearlstreettechnologies.com/request/).
How do you validate the input data, how do you deal with data errors (ie. missing grid asset characteristics / specs)?	MISO and Pearl Street have developed automated QA tools to check projects for common data errors that impact modeling as well as for consistency between internal datasets.
What tools or resources is MISO providing to help stakeholders better understand, validate, and replicate study results as part of ensuring transparency in the process?	The available models, business manuals, and whitepapers published by MISO can be used to replicate the output of the MISO DPP studies utilizing SUGAR or any other powerflow and contingency analysis software available on the market.
Can you walk through the process for validating study results and identifying potential mitigation alternatives? Specifically, what is MISO's responsibility in this process, and how does MISO collaborate with Transmission Owners and interconnection customers to review and refine the results?	All results are evaluated by MISO and MISO Transmission Owners for validation and potential mitigation alternatives. Additionally, upon delivery of the study results to interconnection customers, they have the ability to review the results and provide their own mitigation alternatives.
Your slide says you integrate contingency files. How does Sugar handle this as breaker diagrams are images and need manual review due to their importance?	Pearl Street and MISO worked together to define rules to automatically update contingency definitions, but similar to the study results, the updated definitions are available for transmission owner review, feedback, and modification. MISO develops breaker to breaker contingencies through coordination with Transmission Operators, which are then utilized not only in SUGAR but for use in all other planning studies
At what point in MISO's process using SUGAR are upgrade proposals vetted to ensure that they're realistic and buildable?	During each phase of the DPP process alternatives to the proposed upgrades are requested. The goal is that the white paper of Network Upgrade selection can recommend proposals that are realistic, from a phase 1 perspective, for the vast majority of the Network Upgrades. However, NUs identified in phase 1 with SUGAR will be evaluated by MISO and Transmission Owners.
Are Transmisison requirements publicly online or they are only shared with who has submitted an interconnection application?	The MISO Tariff and BPM documents are all publically posted on the MISO website. In addition, we have also publically posted our Network Upgrade white paper and cost estimation guide on the website for public review.
How are the Tranche projects being integrated with the system expansion solutions being implemented by SUGAR for consideration?	LRTP projects have either been baked into the base case model (i.e., already incorporated into the analysis) or evaluated as alternative mitigations (i.e., used to alleviate specific constraints if appropriate).
Does SUGAR consider Alternative Transmission Technologies or Grid Enhancing Technologies?	SUGAR directly implements MISO's network upgrade whitepaper (linked in the slides). It can consider certain GETs/ATTs that are suitable for representation in a power flow model, e.g., an SVC, or an advanced conductor. These types of GETs/ATTs can supplied as alternative mitigations to be evaluated by the system.
are there plans to include topology into SUGAR evaluations?	Apologies, but it is unclear what is meant by "topology" here. Project topology is modeled in detail in each study. If the question refers to topology optimization, this is not a part of MISO's network upgrade whitepaper but reconfigurations can be submitted as alternative upgrades.
In addition to reconductoring, what other categories of upgrades does SUGAR consider?	The network upgrade selection process is available on MISO's website and linked in the slides.
Isn't the major delay in MISO's queue processing due to late-stage withdrawals that trigger restudies? Was the load flow analysis +NU determination 600+ days?	The 600 day comparison point was the time to go from official Phase 1 kickoff to the final set of DPP 2021 Phase 1 results. It is not inclusive of DPP 2021 Phase 2 or any restudies.
Once the site is interconnected to MISO, is there a process that confirms what was built in the field matches what was modeled via SUGAR?	Transmission Owners and Operators are validating that MTEP projects, including Network Upgrades identified through the DPP process, are being built and any modeling discrepancies (e.g. resistance, inductance, ratings, etc.) are rectified through existing modeling practices.
Do you expect the penalties as laid out in FERC Order 2023 impacting interconnection applicants will improve process timelines appreciably?	MISO needs to work towards meeting its Tariff timeline of having an interconnection process to be 1 year and thus avoiding penalties under FERC Order 2023. As discussed in slide 3 of the presentation, MISO has been actively improving the manageability of its Queue to meet the 1 year timeline. As highlighted in webinar automation through SUGAR is a big piece of achieving that timeline.
What is MTEP?	MISO Transmission Expansion Plan - the "MTEP" models are the foundational transmission planning models MISO develops annually as part of its reliability analyses.
How does MISO envision the use of SUGAR with ERAS projects?	MISO does believe that SUGAR could help perform some of process steps needed under the MISO ERAS process.
If MISO wanted to shift to a "connect and manage" model for generation (similar to ERCOT's), how adaptable is this approach to that model?	MISO has no plans to shift to a "connect and manage" model. This approach with SUGAR could be adapted to really any Transmission Providers process. Fundamentally, what is being done here is automation, quality control and bringing consistency and transparency to Network Upgrade selection and cost information all at a much faster pace.