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DITCH THE NEUTRAL
&
SIMPLIFY YOUR LIFE!

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By
Christopher M. Johnston, P.E.
Syska Hennessy Group
Atlanta, Georgia

FULL DISCLOSURE

Being a remarkably lazy fellow, I am always on the lookout for ways to simplify my life and those of my clients.

Raymond Daniell gave me this idea, and I'm certain somebody else gave it to him.

Albert Einstein also had the idea when he said, "Life should be as simple as possible…but not more simple."

WHAT THE NEUTRAL IS GOOD FOR

1. It can be grounded to stabilize the phase-to-ground voltage.

2. It increases the number of small loads that can be individually supplied by a panelboard.

3. It reduces wiring costs when two or three branch circuits share the same neutral conductor.

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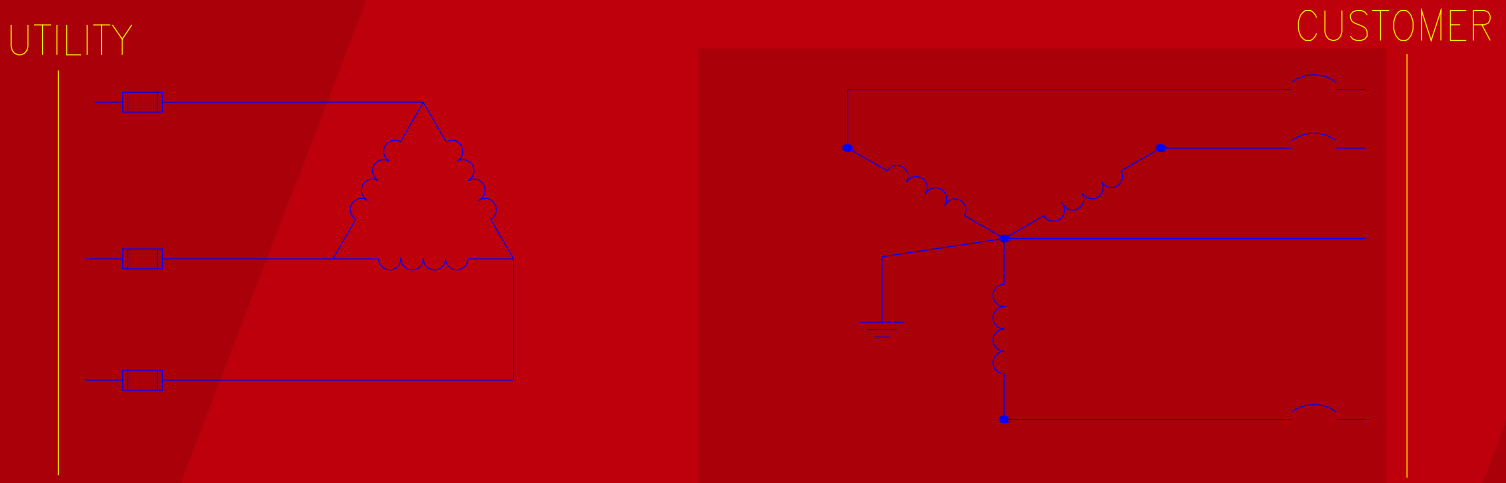

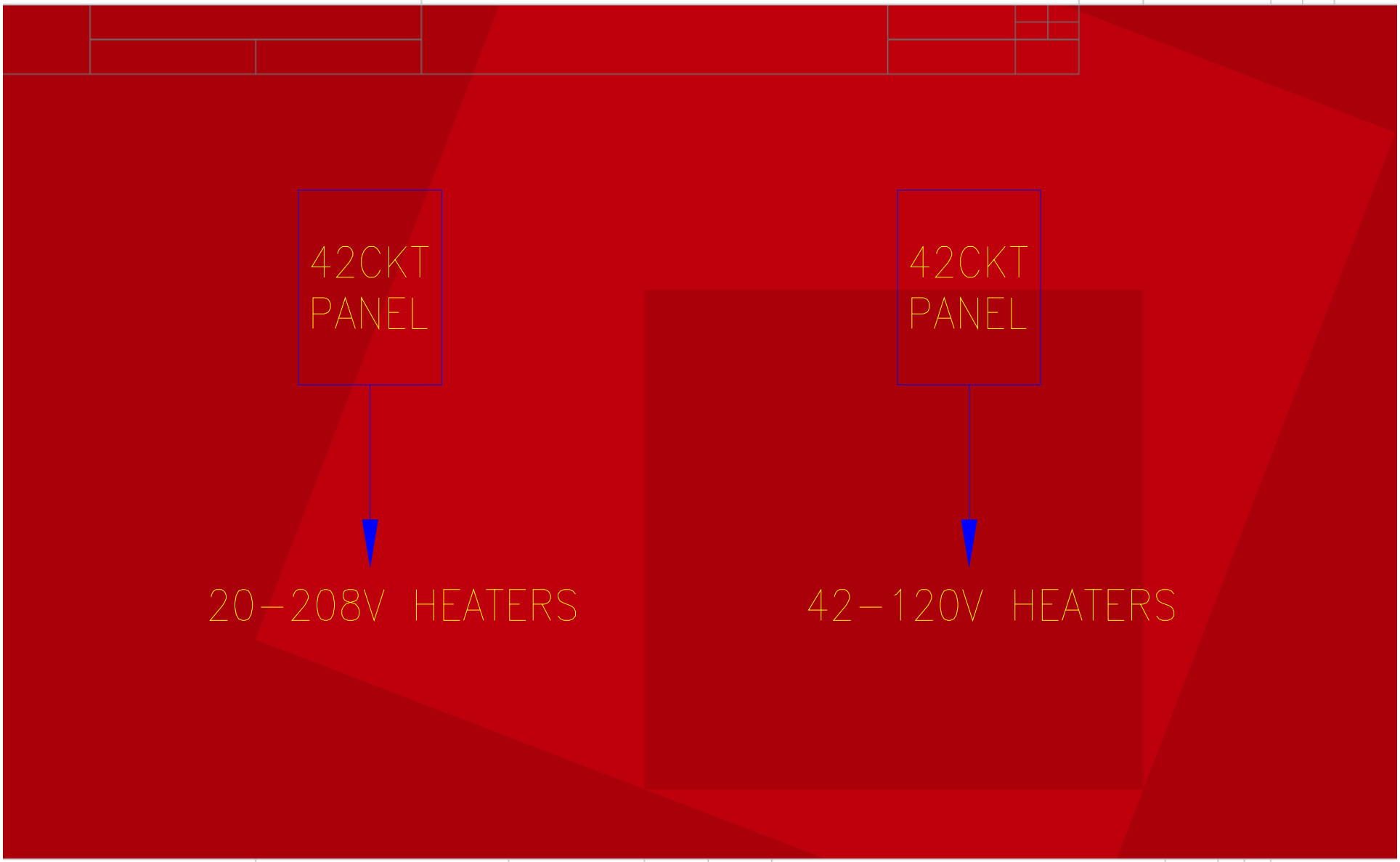
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20-208V HEATERS
42-120V HEATERS

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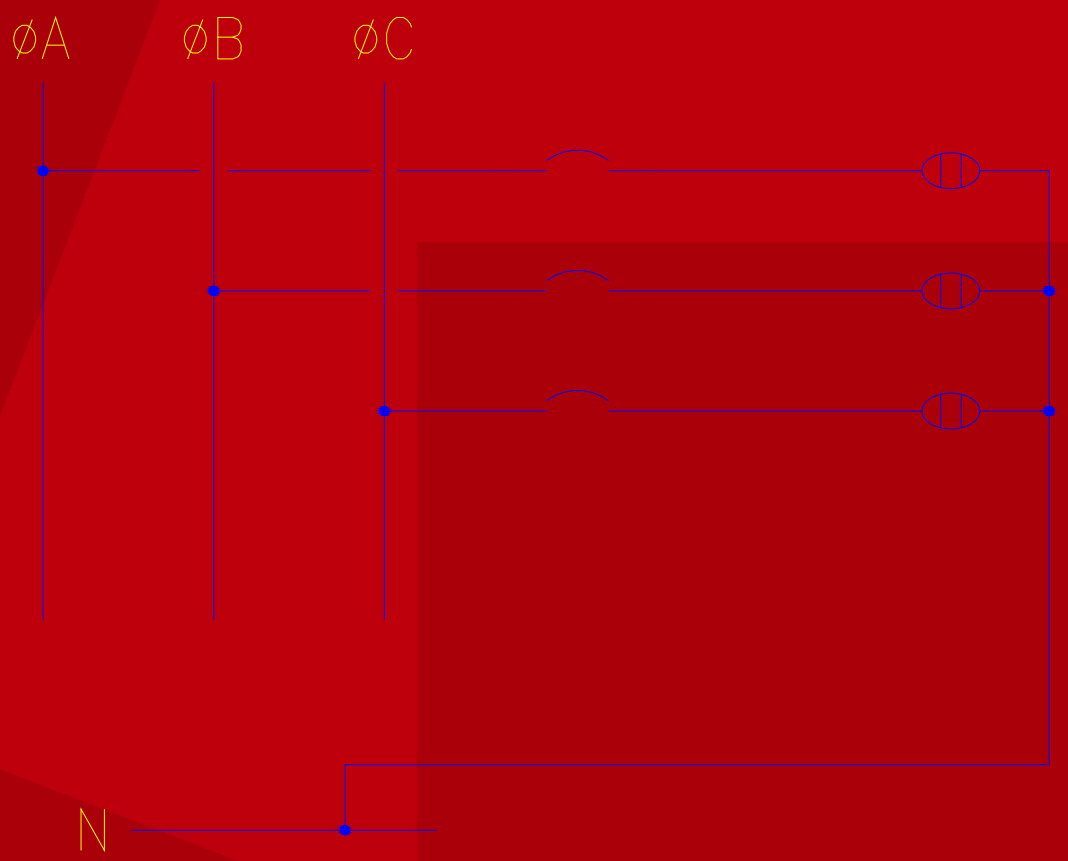
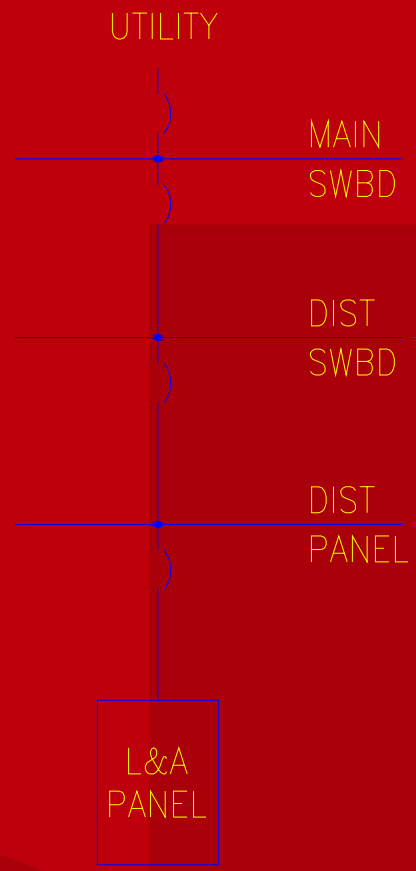


THE FLEAS THAT COME WITH THE DOG

1. It must be run from the service to every lighting and appliance panelboard, or separately derived in a transformer ahead of the panelboard.

2. It complicates grounding, ground fault tripping, and switching when the system has multiple power sources. Going forward, we'll assume that this is a standby generator.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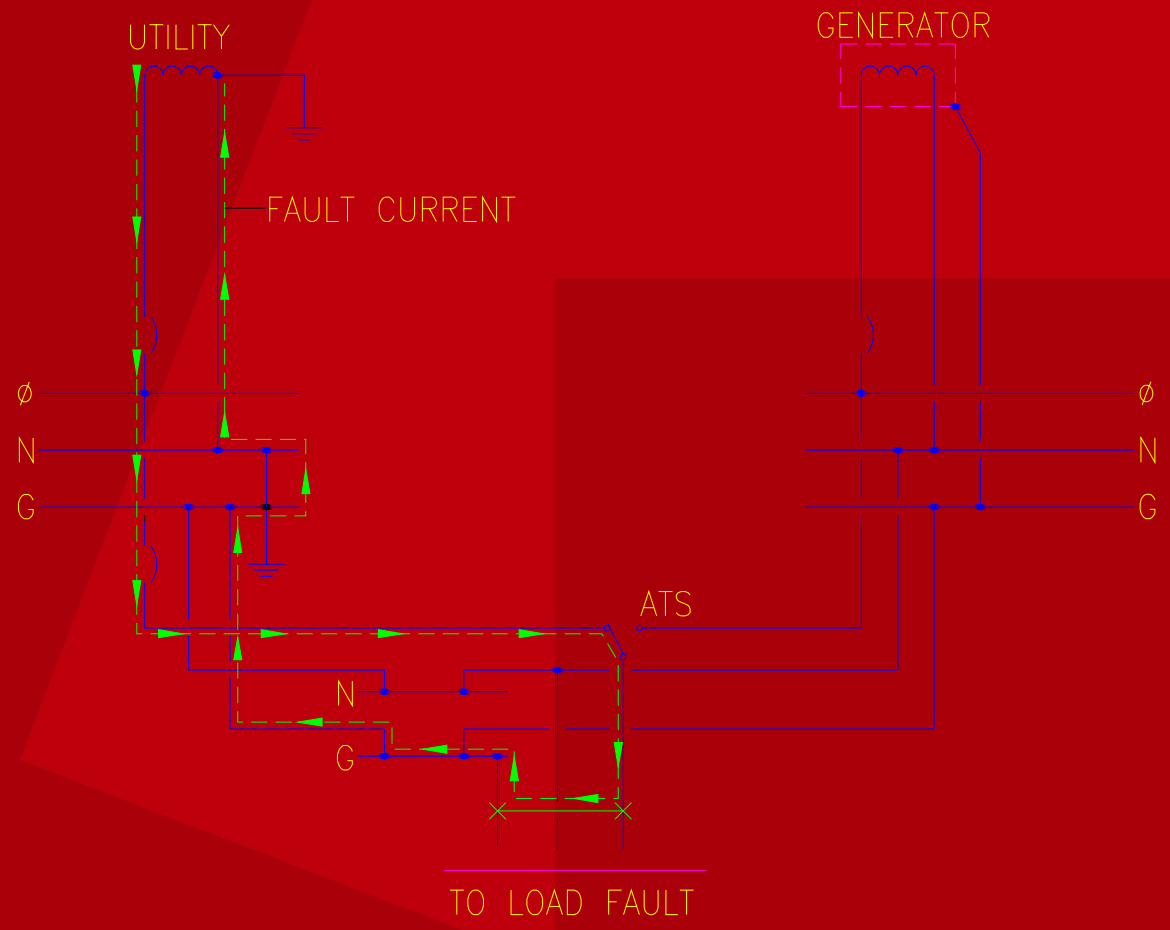
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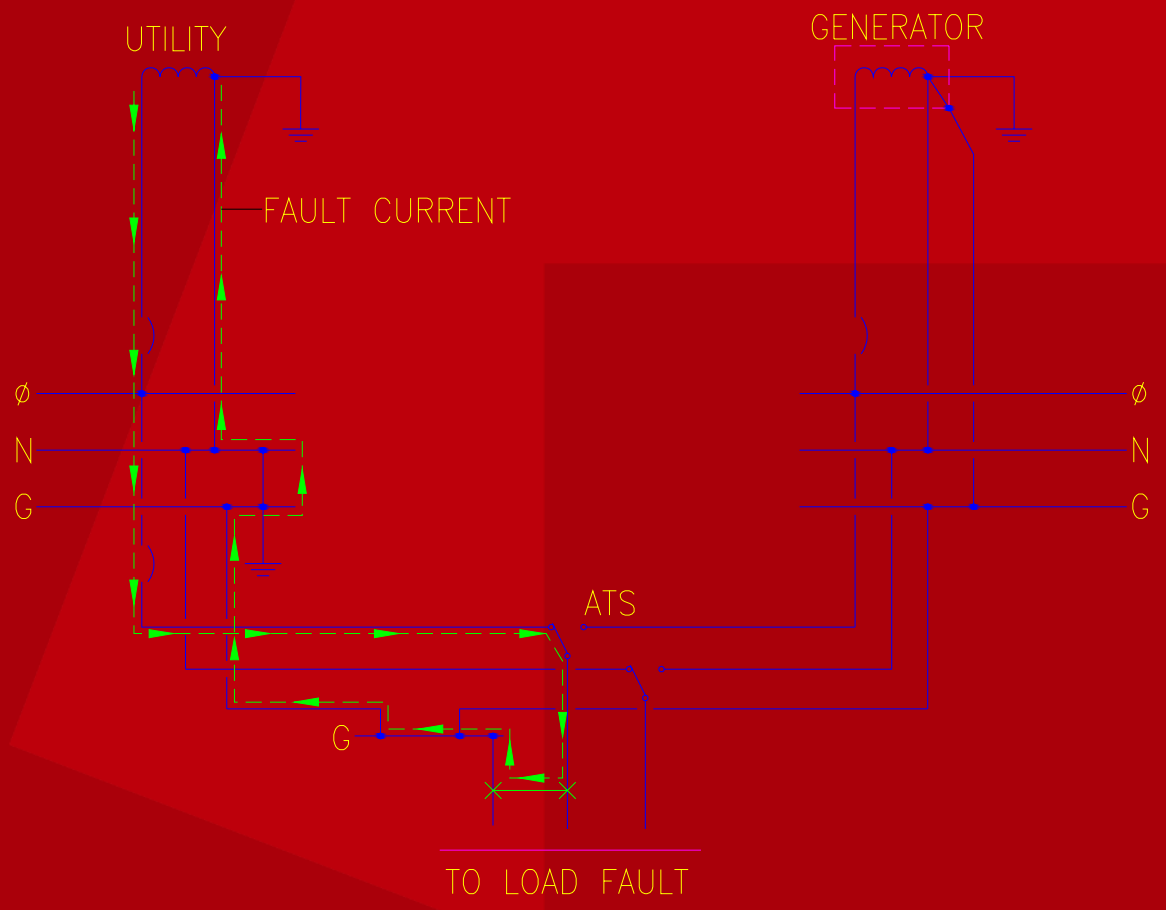

WHAT TO DO – PART 1

If the project has a single power source at 208Y120 volts, then:

- **Minimize the number of lighting and appliance panelboards. Don't supply 208V loads from these panelboards.**
- **Supply the lighting and appliance panelboards directly from the service.**
- **Don't extend the neutral downstream of the service, except for the lighting and appliance panelboards.**

WHAT TO DO – PART 2

If the project has a single power source at 480Y277 volts, then:

- **Minimize the number of 277V lighting and appliance panelboards. Don't supply 480V loads from these panelboards.**
- **Supply the 277V lighting and appliance panelboards directly from the service.**
- **Don't extend the neutral downstream of the service, except for the 277V lighting and appliance panelboards.**

WHAT TO DO – PART 3

If the project has utility service and a standby generator at 208Y120 volts, then:

- **Follow the PART 1 recommendations for the normal portion of the system.**
- **Ground the generator neutral but do not extend it.**
- **Provide an automatic transfer switch with 3 pole switching.**
- **Supply the automatic transfer switch with a 3 phase/3 wire feeders.**
- **Follow the PART 1 recommendations for the standby portion of the system, except provide delta/wye isolation transformers to supply the lighting and appliance panelboards.**

WHAT TO DO – PART 4

If the project has utility service and a standby generator at 480Y277 volts, then:

- **Follow the PART 2 recommendations for the normal portion of the system.**
- **Ground the generator neutral but do not extend it.**
- **Provide an automatic transfer switch with 3 pole switching.**
- **Supply the automatic transfer switch with a 3 phase/3 wire feeders.**
- **Follow the PART 2 recommendations for the standby portion of the system, except provide delta/wye isolation transformers to supply the 277V lighting and appliance panelboards.**

FRINGE BENEFIT

- **Today's rampant growth of non-linear electronic loads produces increased harmonic voltage distortion in electrical systems.**
- **The voltage distortion increases as the source becomes "softer" – higher impedance and less available fault current.**
- **Most often, the standby power system is much "softer" than the utility, so problems due to harmonic voltage distortion may only be noticed when on standby power.**
- **Much of the non-linear electronic load in a commercial facility is 277V lighting and 120V computer equipment. Providing delta/wye isolation transformers to supply these loads will eliminate the triplen harmonics and reduce upstream harmonic voltage distortion.**

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Syska Hennessy Group

•900 Circle 75 Parkway

•Suite 400

•Atlanta, GA 30339

•Main: 678-401-0200

•Christopher M. Johnston, PE

•Associate Partner

•Direct: 770-563-1567

•cjohnston@syska.com

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QUESTIONS/COMMENTS?