You Always Think it's Gonna be Easy?

The “Team”

Jim (building manager)

Mark (project manager)

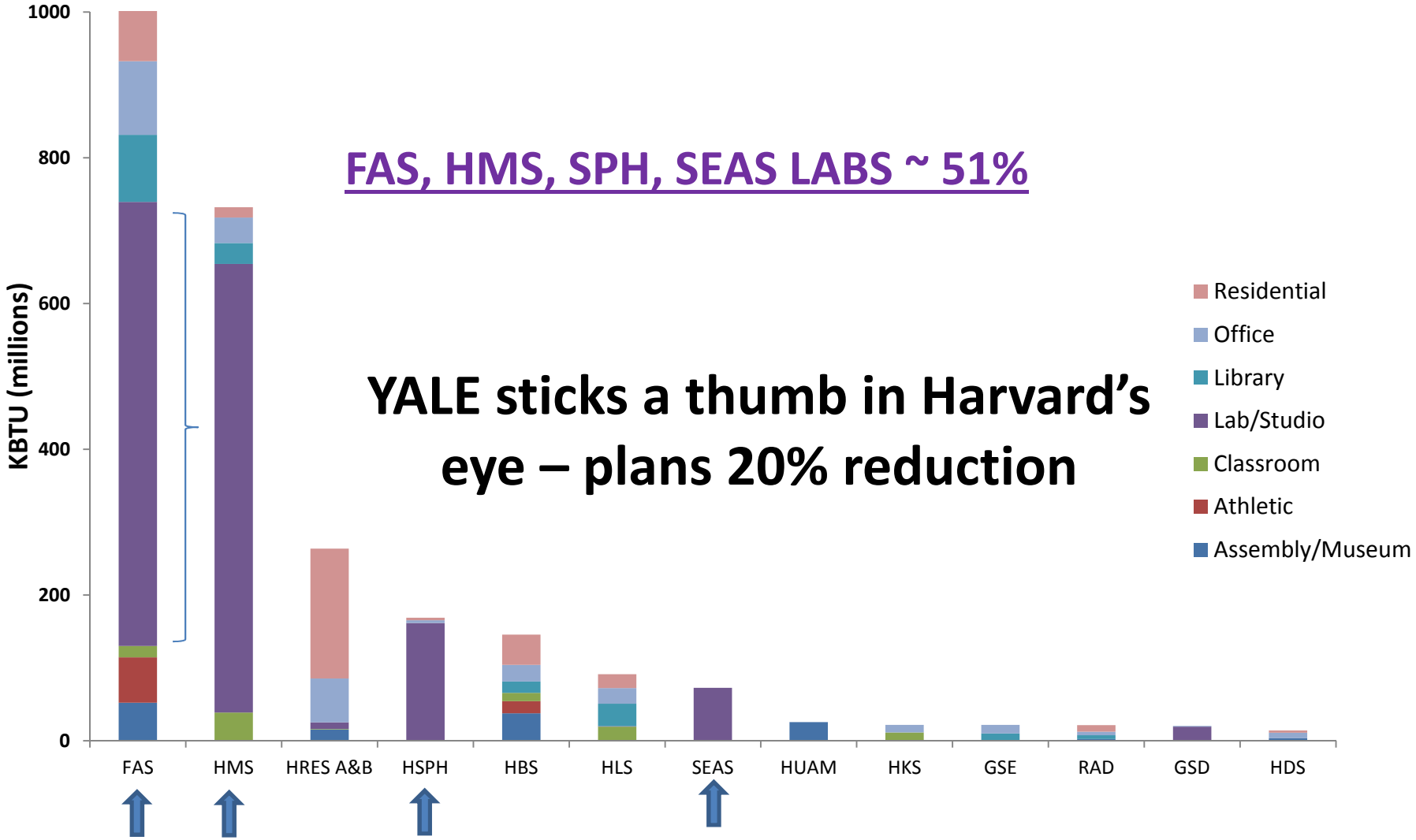
Tom

Hank (Siemens)

Harvard University Northwest Laboratory

Bigger than it looks. Four stories above grade and four stories below. Bigger below grade than above. Twenty percent is dedicated to laboratories.

School GHG Reduction Challenges by Space Type

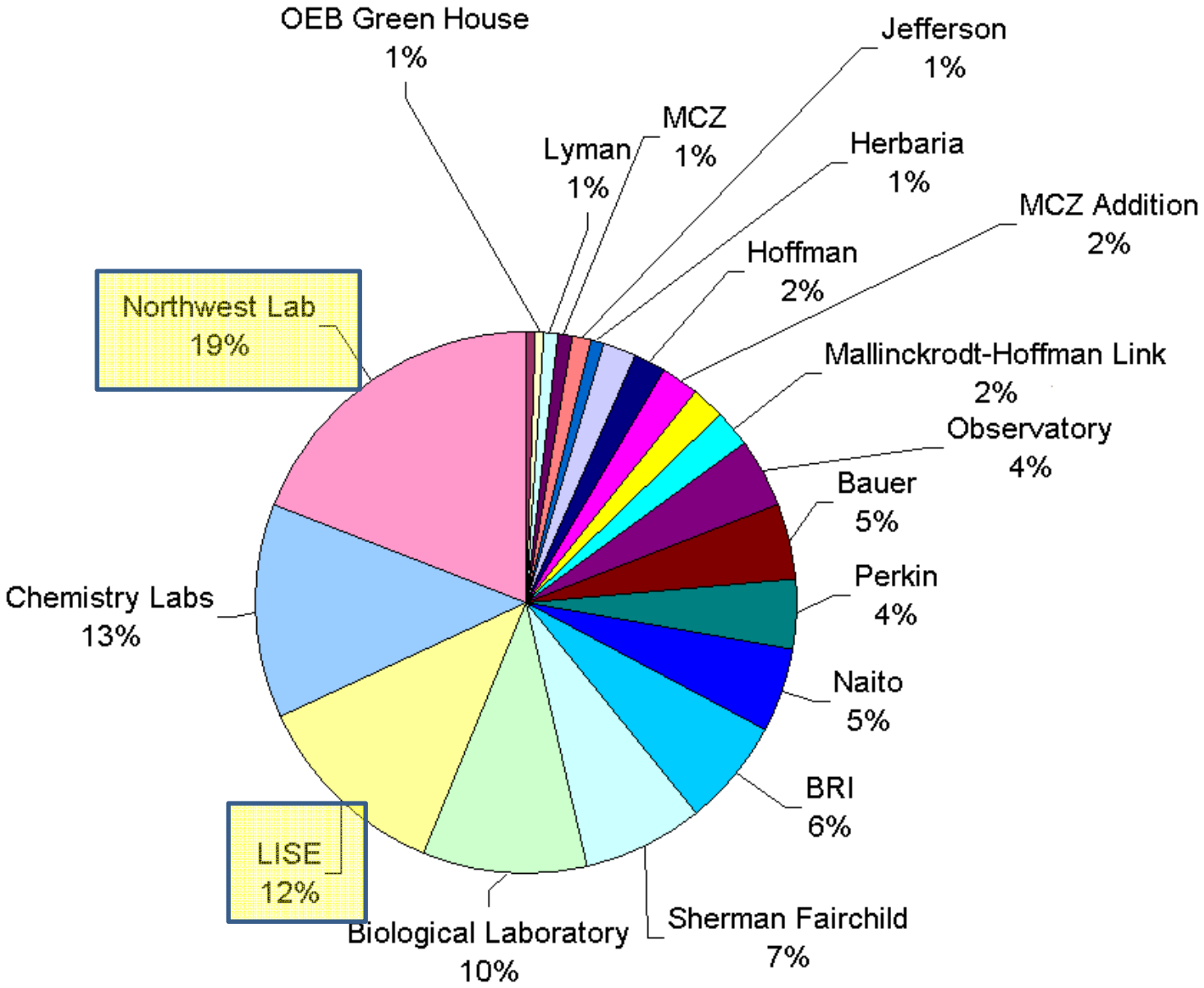


FAS, HMS, SPH, SEAS LABS ~ 51%

YALE sticks a thumb in Harvard's eye – plans 20% reduction

Building Energy Use by Space Type – FY10 All Buildings

Share of GHG emissions by building



My nervous tick was beginning to make others nervous too!

Engineering Professor Emeritus and Energy Guru Fred Abernathy said, “Go forth and seek energy reduction in air.”

Step 1: Measure what you have

- 510,000 GSF
- Air change rates: 12 $\longleftrightarrow$ 24 per hour
- Air cost calculated @ $10.00/CFM/year
- 500 Siemens venturi valves @ $2,000 per

Step 2: Figure out where you want to be

- 6 ACH occupied
- 4 ACH unoccupied
- Calculation based on net volume not gross
- How much money can you $ave?

Step 3: Be like me and Challenge your Engineers

Why didn't you design us for 6 and 4 ACH???

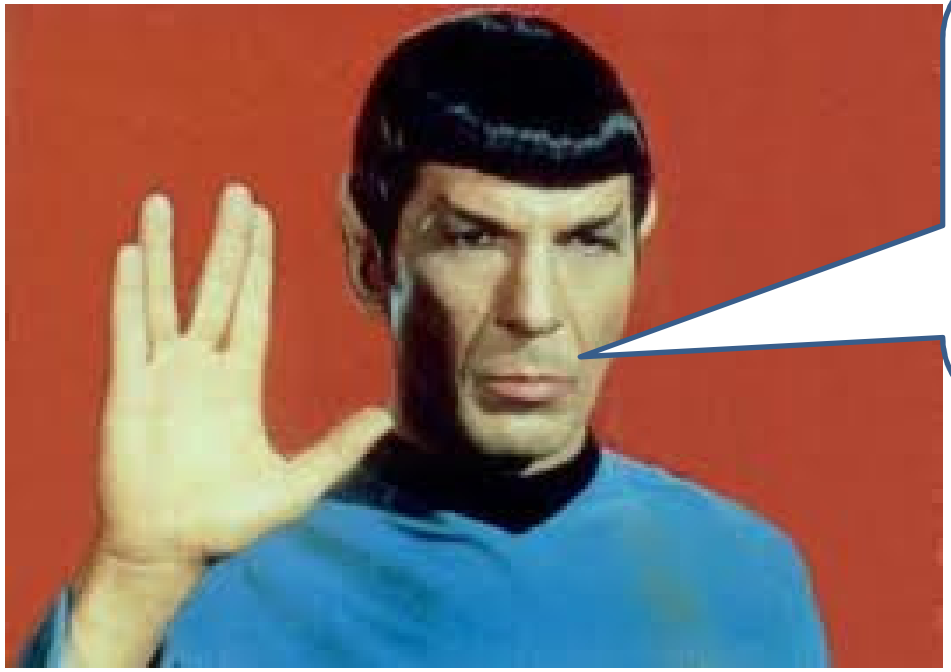
dumbass

We DID!!!

So I gave the order, Mark

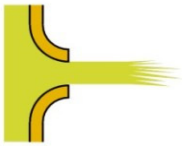
I’m sorry captain. We kenna do it.
We go outta control below 350 ft/min

First bump in the road. Wadda ya do?



I think an orifice applied to the existing valves might do the job!

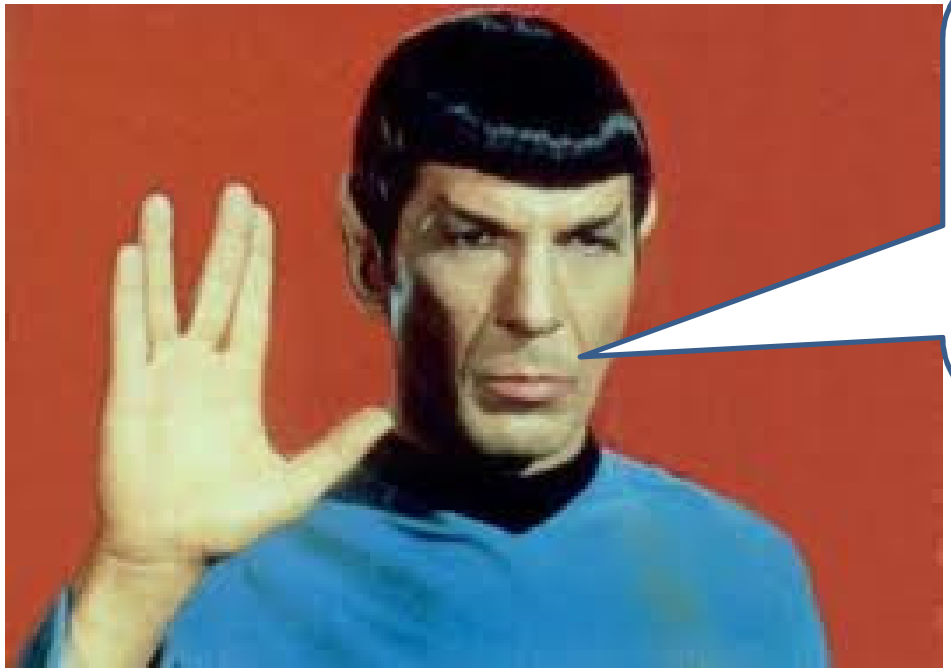
Parois minces
$C_c = 0{,}61$



Orifice à bords profilés
$C_c = 1{,}00$

I’m sorry Cdr. Spock. We kenna do it. Now we have control below 350 ft/min, but it’s too *LOUD*.

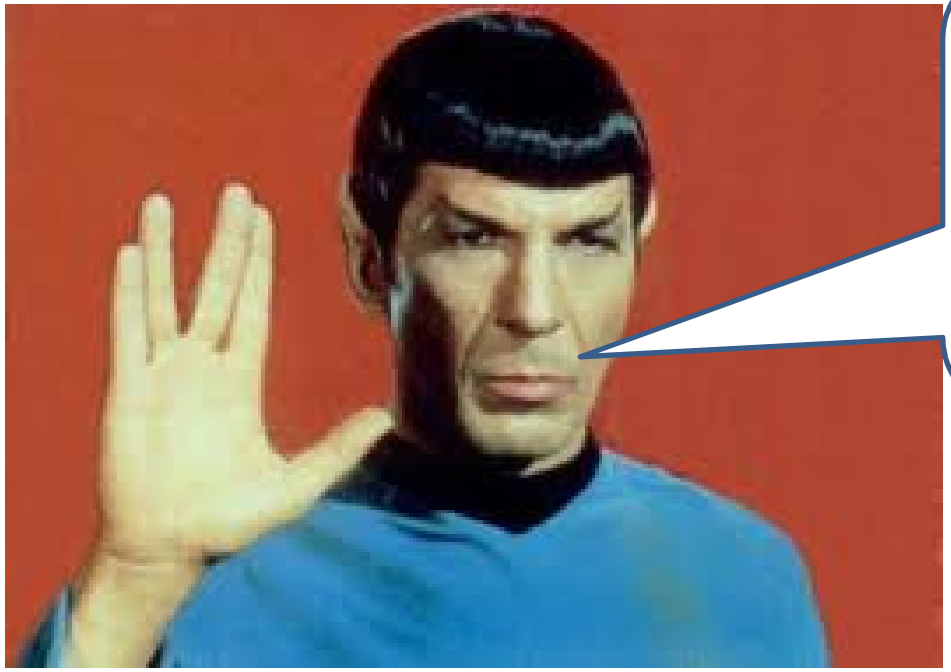
Second bump in the road. Wadda ya do?



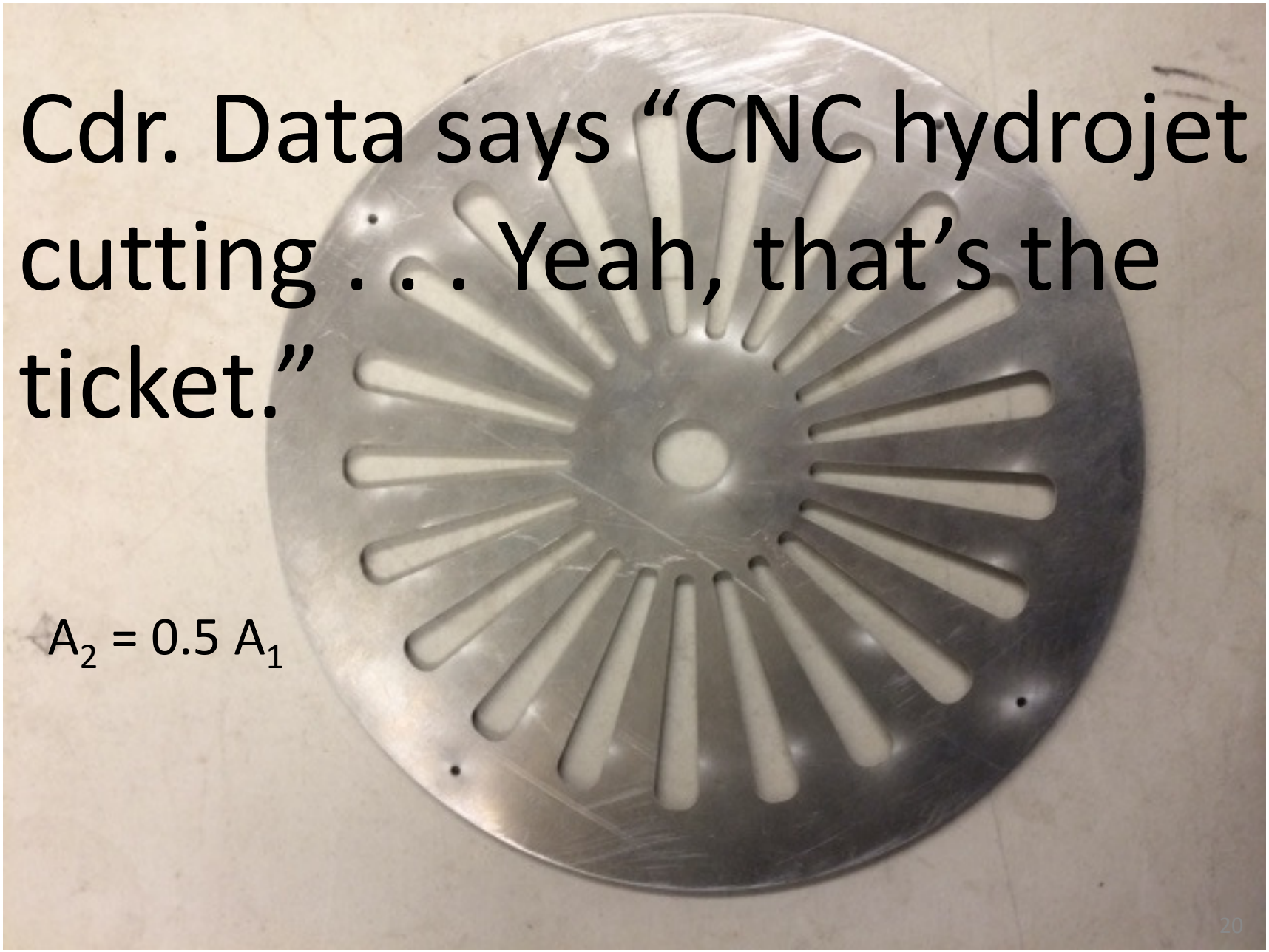
Try distributing the orifice. Drill holes. Might do the job!

I’m sorry Cdr. Spock. We kenna do it. We have control below 350 ft/min, it’s not too loud, but it’s too slow and expensive to make. The Klingons will get us before the fiscal year us done.

Third bump in the road. Wadda ya gonna do? What?



See if Commander Data in the machine shop has any ideas!



Cdr. Data says “CNC hydrojet cutting . . . Yeah, that’s the ticket.”

$A_2 = 0.5\ A_1$

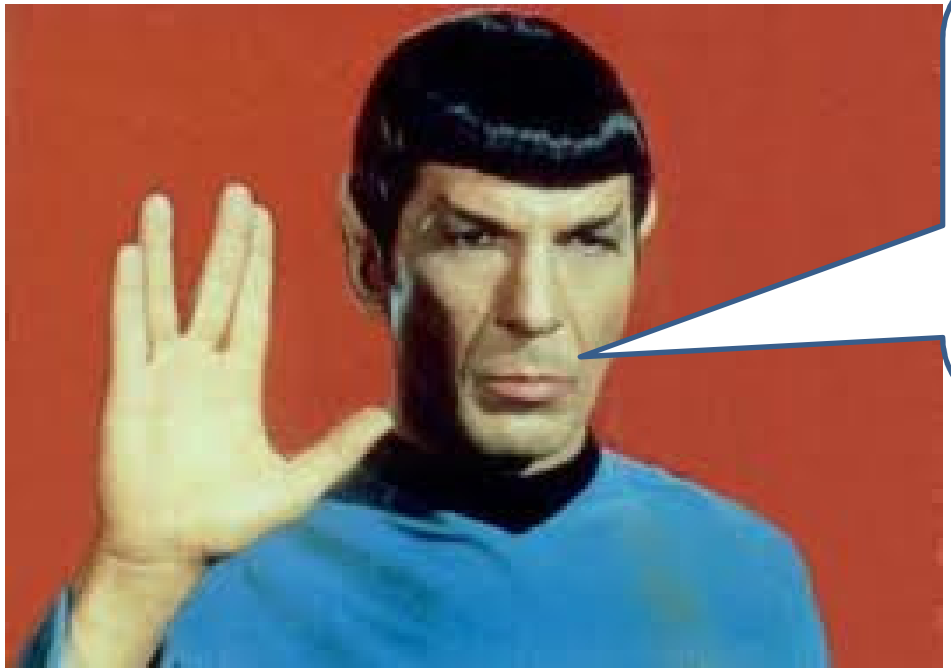
Captain. We kenna do it. I am only an engineer. We have control below 350 ft/min. It's not too loud. It's not too slow or too expensive to make. But maybe we should talk to Siemens before we modify *their* air valve?

Siemens Speaks . . .

Bastids! I wish I had thought of this. Could ‘ve cut our SKU’s in half.

Never it will work!

Fourth bump in the road. Do we give up?



Captain, my hand is getting tired! But I say we go for it.

NOT an option

~~FAILURE~~

+ PERSISTENCE =

SUCCESS

Siemens speaks (again later)

First, I coulda bought Apple at $4, now this . . . .

Okay**! Okay!** It works.

My Boss

You want how much money? To do what?

$625,000 to modify 500 valves, add occupancy sensors, SCRAM override buttons, modify control programming, rebalance and document everything.

You saw the pain, here's the gain:

- The tenants prefer the modified environment.
- Siemens got us a utility rebate of over $400 of the $625K capital cost.
- With only half a year of operation, NWL building utility budget is trending to be $900,000 lower than the previous and milder year [6M → 5M]. We should double the savings next year.
- The building environment us safer because we added safety features to the 'demand ventilation.'

A million here! A million there! Pretty soon we'll be talking REAL money. Henh! Henh! Henh!

My Boss

Thank You

Mark Pimentel, Henry O'Brien, Jim Sheehan, & Tom Tribble

Special thanks to Siemens Energy Engineer Tom Scott for the nomination