

S U M M E R C A M P 2 0 2 6 · T H E D O C K E T I S C A L L E D

Building Science Moisture True Crimes

Welcome to **Moisture Court** — five cases, one thesis.

T H E D O C K E T

Case 1 — The Closed Crawlspace Felony

Case 2 — The Botched Install Burglary

Case 3 — The Ventilation Overdose Assault

Case 4 — The Variable Speed Moisture Misdemeanor

Case 5 — The Dehumidifier Sizing Double Homicide

**MOISTURE COURT
NOW IN SESSION**

PRESIDING Hon. Betsy Pettit

PROSECUTION N. Krueger — undefeated

DEFENSE C. Conway — very excited to be here

BUILDING SCIENCE MOISTURE TRUE CRIMES

The Closed Crawlspace Felony

*The People **vs.** Duke “Swamp Butt” McSealer*

THE CHARGES

Count I — Conditioning Without Intent to Condition

Count II — Dilution in the First Degree

Count III — Reckless Endangerment of a Dew Point

Building Science Moisture True Crimes · Summer Camp 2026



CASE FILE
No. 2026-CS-
408.3

**not a real guarantee. please consult a licensed HVAC / moisture-control pro.*

The Code Offered a Menu

2021 IRC R408.3 — Unvented Crawl Space. One of the following shall be provided:

2.1 Exhaust Ventilation

Continuous mechanical exhaust at 1 cfm per 50 sq ft, air pathway to the common area, perimeter walls insulated.

2.2 Conditioned Air Supply

DUKE'S PICK

Supply air at 1 cfm per 50 sq ft, including a return air pathway to the common area, perimeter walls insulated.

2.3 Plenum

In existing structures only: under-floor space used as a plenum, complying with Section M1601.5.

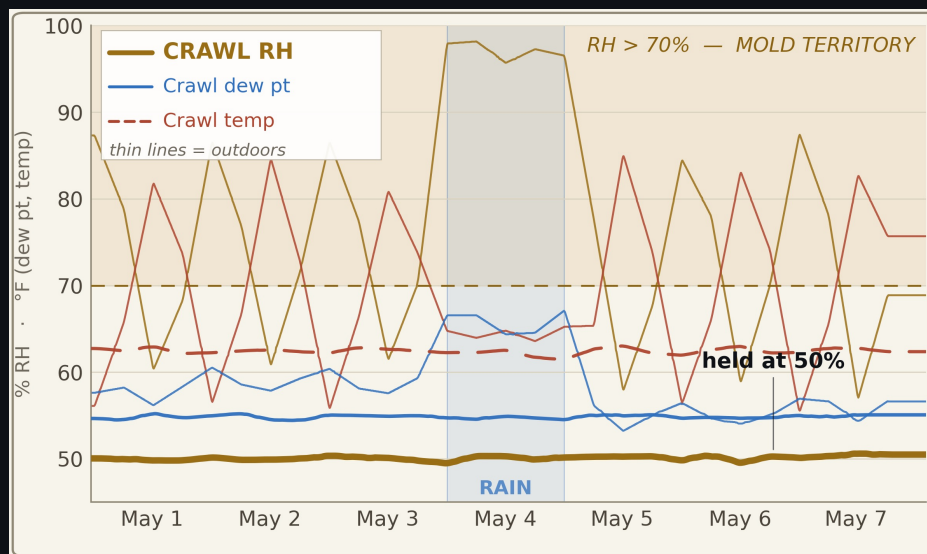
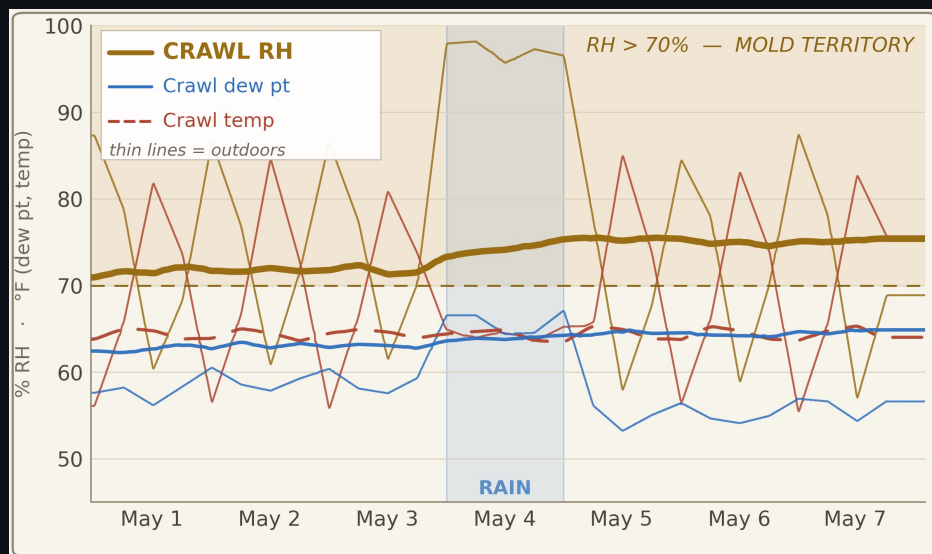
2.4 Dehumidification

BEST PRACTICE

Dehumidification sized in accordance with manufacturer's specifications.

*"The code offers a menu. **Duke always orders the dollar menu.**"*

The Witness That Cannot Lie



The smoking gun: the highest crawl RH — the number mold reads — occurs when the AC isn't running. *Duke's strategy takes the shoulder seasons off. Mold does not.*

Illustrative — pattern from NOVA monitoring sites 1 & 2

EXHIBIT B · THE CROSS-CONTAMINATION

He Plumbed the Crawlspace Into the Living Room



Real crawlspace, conditioned Duke's way. Pictured: the SUPPLY grille pushing house air in; the code-required RETURN pathway ducts it straight into the family's air.

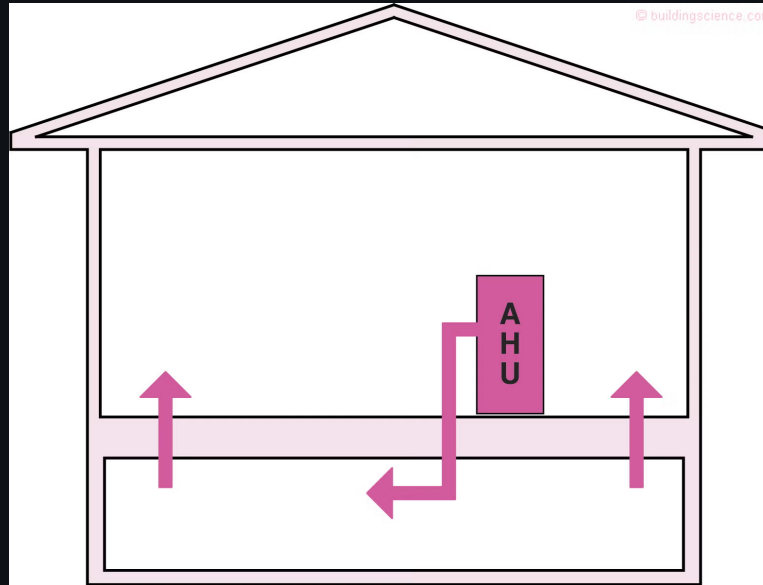


Illustration Source: Building Science Corp BSI-115: Crawlspaces - Either In or Out

Building Science Corporation notes that while a transfer grille helps circulate air, it does not replace the need for active moisture management.

That “return air pathway” the code requires?

It’s a transfer grille connecting the crawlspace directly to the family’s air.

Duke didn’t just fail to dry the crawl — he ducted it into the hallway.

What's Being Served Through That Grille

- Fungi
- Bacteria
- Actinomycetes
- Mycobacteria
- Mold
- Spores
- Mycotoxins
- Endotoxins
- Inflammagens
- Beta Glucans
- Hemolysins
- mVOCs



...plus the pesticides.

Crawlspace are termite-treatment territory — e.g., Fipronil applied as a soil barrier.

Most closed crawls are RETROFITS of existing homes — this biology and chemistry is already down there.

Sarwar, "Indoor risks of pesticide uses are significantly linked to hazards of the family members," Cogent Medicine 3 (2016).

All of it — sharing a hallway grille with the kids' bedrooms.

Two Options, One Physics

A/C SUPPLY AIR

The defendant's method

- Drying is driven by the HOME's thermostat set point — not by crawl RH.
- Dilutes at best — only when dry air happens to flow.
- Tighter homes + high-SHR variable-speed = less moisture removed.
- Peak humidity hits when cooling isn't running.
- Shares crawl air with the living space.

DEDICATED DEHUMIDIFICATION

Code option 2.4 — best practice

- Only way to confidently hold a sealed crawl under 60% RH year-round.
- Removes moisture — doesn't just move it around.
- Sized for the actual load; controlled by the actual crawl.
- Improves living-space comfort and air quality too.
- Enables maximum isolation of the crawlspace.
- *CONS: equipment + operating cost (stated honestly).*

THE VERDICT

Terms of Parole

The best practices Duke kept skipping.



1

Dedicated dehumidification Sized per manufacturer's specs — code option 2.4.

2

Sealed & insulated shell Sealed ground cover and perimeter insulation, detailed and taped.

3

Maximum isolation Air-seal the floor and minimize passive returns — crawl air stays in the crawl, house air stays in the house.

4

Commission & monitor Field-verify airflow, static pressure, and ongoing RH.

Sentence: *the defendant shall wear the Moist T-shirt. Court-supplied.*



BUILDING SCIENCE MOISTURE TRUE CRIMES

The Botched Install Burglary

*The People **vs.** Rico “Drip King” McLeak*

THE CHARGES

Count I — Grand Theft Latent

Count II — Re-Evaporation in the Second Degree

Count III — Assault with a Warm Discharge

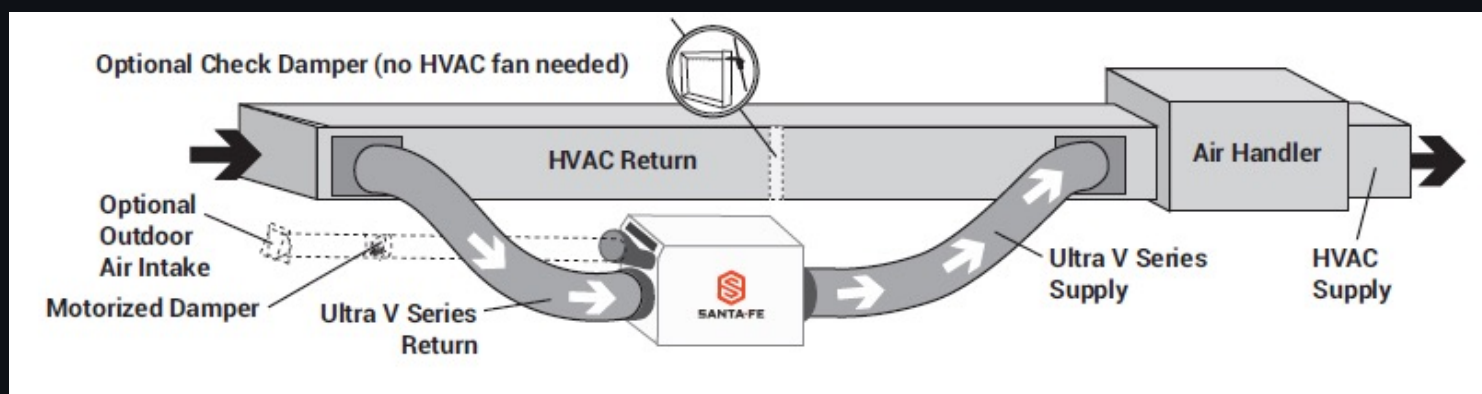
Count IV — Gaslighting a Thermostat

Building Science Moisture True Crimes · Summer Camp 2026

CASE FILE
No. 2026-DK-
403.13



The Return-to-Return Install



CRIME ONE — WARMS THE COIL

Warm, dry discharge enters the return upstream of the AC's cold coil — raising coil temperature and cutting the air conditioner's own moisture removal.

CRIME TWO — THE MOISTURE REFUND

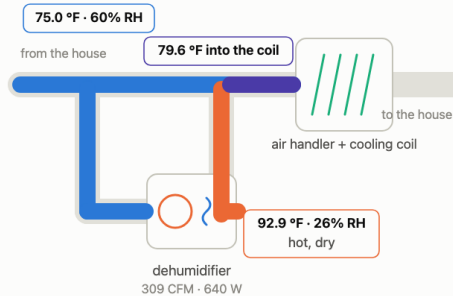
When the AC cycles off, that warm airstream blows across the wet coil and re-evaporates the water the AC just removed — sending it back to the family.

Follow the Air on the Chart

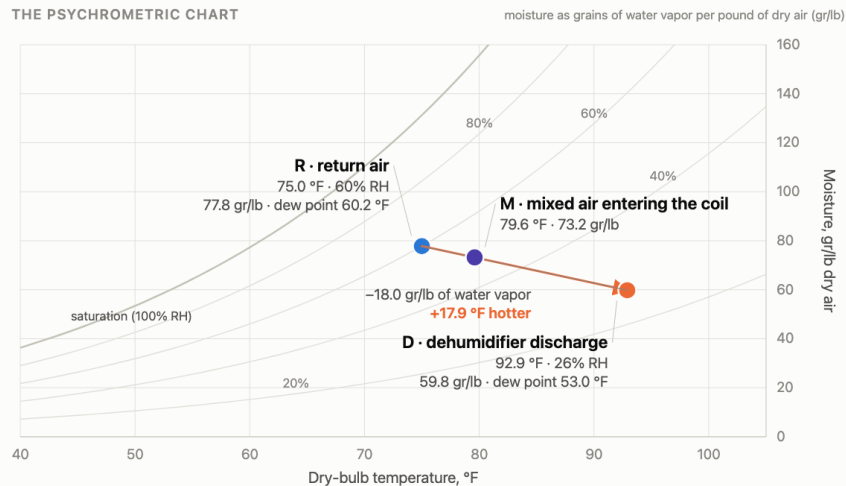
Return-to-return dehumidifier ducting: what the psychrometric chart says

A 3-ton air handler moving 1,200 CFM · a 90-pint ducted dehumidifier (309 CFM, 640 W) teed return-to-return · return air 75.0 °F, 60% relative humidity

THE DUCTING



THE PSYCHROMETRIC CHART



+4.6 °F

hotter air entering the coil

-4.6 gr/lb

drier air entering the coil

Backwards

exactly the wrong direction for
a cold coil you want condensing

That hot, dry discharge blends back into the return. The coil now sees 79.6 °F instead of 75.0 °F, at a dew point of 58.5 °F instead of 60.2 °F.

• coil entering air **+4.6 °F hotter**

• coil entering moisture **-4.6 gr/lb drier**

Analysis & chart: Todd Demonte · computed from published specs (3-ton AHU, 90-pint ducted dehumidifier) · return air 75°F / 60% RH

Two Machines Trade Water

The two machines trade water; the house barely gets drier

the dehumidifier removes

80 pints/day

the coil's removal drops by

70 pints/day

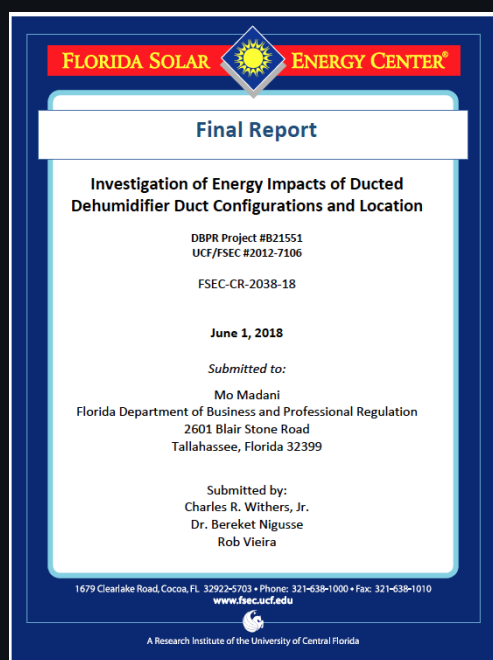
net gain for the house

10 pints/day

88% of the dehumidifier's water is substitution, not new drying: water the coil was already removing. Meanwhile the coil spends **5,186 Btu/hr** (0.43 tons of a 3-ton system) re-cooling the dehumidifier's own heat, and the dehumidifier draws **640 W** the whole time.

Nearly nine of every ten pints on Rico's invoice were already being removed — for free.

The People Call FSEC



"Investigation of Energy Impacts of Ducted Dehumidifier Duct Configurations and Location" — FSEC-CR-2038-18 · Withers, Nigusse & Vieira · June 1, 2018 · and Withers, ASHRAE Transactions 126(2), 2020 (FSEC-PF-479-20). Figures verified against primary sources, July 2026.

#1

Highest daily energy use of the duct configurations tested.

28%

Degradation of central AC latent (moisture) performance during simultaneous operation.

2–3 lb/hr

Moisture re-evaporated off the wet coil and returned to the living space after AC cycles off.

+4%

Annual energy penalty in Florida climates — roughly 308 kWh per year.

2023 FBC — R403.13.1 Ducted Dehumidifiers

2023 Florida Building Code, Energy Conservation, 8th Edition — R403.13 Dehumidifiers (Mandatory)

“A ducted dehumidifier shall not be ducted to or from a central ducted cooling system on the return duct side upstream from the central cooling evaporator coil.”

THE BIG ONE

Backdraft dampers required

Supply-side configurations (both ducts, or supply-only) require a backdraft damper in the specified duct segment.

R-6 duct insulation

Dehumidifier ductwork located in unconditioned space shall be insulated to a minimum of R-6.

Sensor in mixed house air

R403.13: the dehumidifier shall be controlled by a sensor installed where it is exposed to mixed house air.

“The physics got codified, Rico.”

PRIORS · PEOPLE'S EXHIBITS D-H

The Rap Sheet

Count V Reckless Endangerment of a Compressor

Count VI Negligent Listing

Count VII Gaslighting a Thermostat

Count VIII Crimes Against Gravity

Count IX Improper Trap Depth in the First Degree

Real photographs. Viewer discretion advised.

Reckless Endangerment of a Compressor



100% OUTDOOR AIR • 1,200 CFM INLINE FAN

A residential dehumidifier used as kitchen-hood make-up air — full outdoor air, driven by a 1,200 cfm inline duct fan. The unit was sized to sip humid house air. Rico connected it to a fire hose.

Photo Credit – Tobias the Spray Foam Man

Negligent Listing



UNLEVEL UNIT · NO DRAIN PAN · NO FLOAT SWITCH

Visibly out of level, with no secondary drain pan and no float switch to shut the unit down when the drain fails. When — not if — it leaks, the first alarm the homeowner gets is a ceiling stain shaped like Ohio.

Note: the original SC Installs 1 deck contains a video clip of this unit — keep that file handy if you want to roll tape.

Video Credit — Tobias the Spray Foam Man

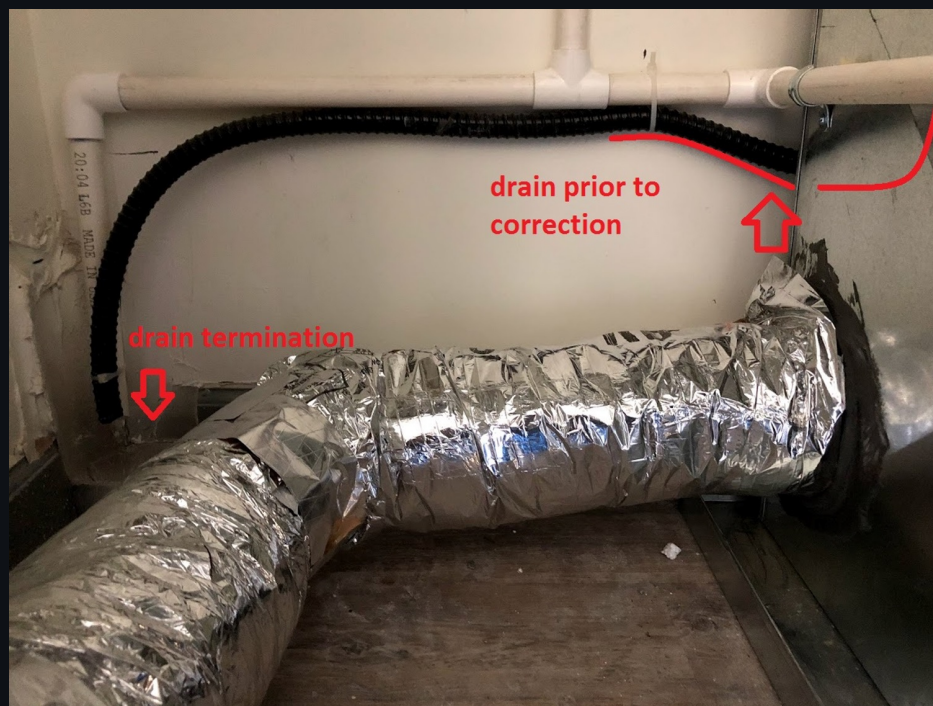
Gaslighting a Thermostat — Second Offense



WARM DISCHARGE AIMED AT THE THERMOSTAT

Dehumidifier discharge blowing directly onto the thermostat — which now believes it is July at all times and runs the AC accordingly. The thermostat has filed for a restraining order.

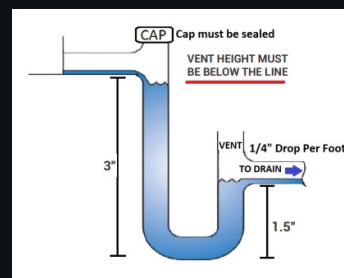
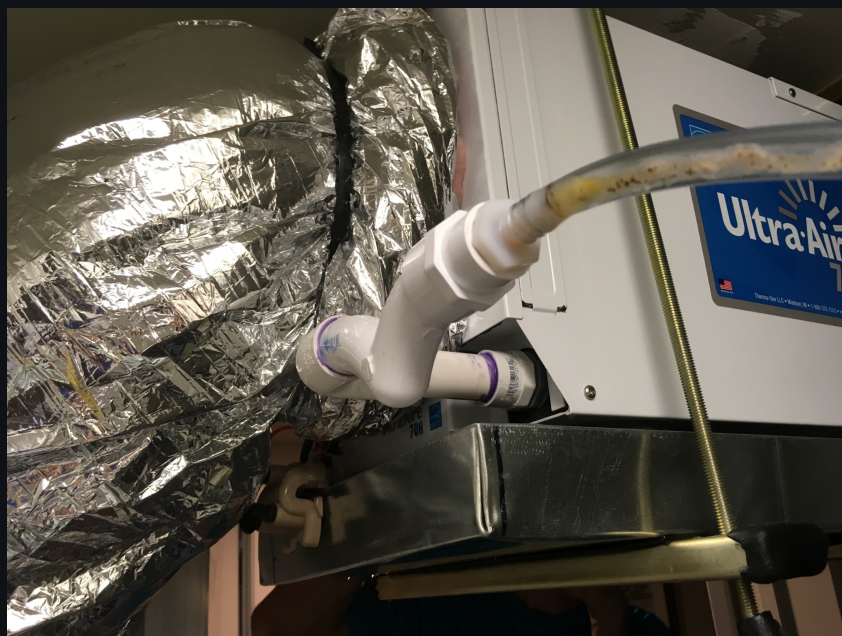
Crimes Against Gravity



THE CONDENSATE DRAIN THAT RUNS UPHILL

Condensate routed upward — “drain prior to correction” — on its way out of the unit. Water, Your Honor, does not do parkour. Standing condensate means leaks, corrosion, and biological growth in the line.

Improper Trap Depth in the First Degree



P-TRAP CUT TO THE WRONG DEPTH

An incorrectly sized P-trap lets the unit's casing pressure blow the trap dry (or hold water in the pan), so the "drained" unit leaks anyway. Trap depth comes from the manual — not from vibes. The P stands for physics. It always did.

THE VERDICT

Terms of Parole

If it runs, it is not done. It's done when it's verified.

GUILTY

- 1 The right configuration** Dedicated return from conditioned space; supply into the HVAC supply trunk with a backdraft damper.
- 2 Never return-to-return** No connection on the return side upstream of the evaporator coil — FBC R403.13.1.
- 3 Drain like you mean it** Level unit, secondary pan, float switch, P-trap at manual-specified depth — sloping down.
- 4 Commission it** Measure airflow, static pressure, and delivered RH before you call it done.

Sentence: *the defendant shall wear the Moist T-shirt. His very own. The court keeps a supply.*



BUILDING SCIENCE MOISTURE TRUE CRIMES

The Ventilation Overdose Assault

*The People **vs.** Lady Gail Force*

THE CHARGES

Count I — Ventilation Overdose Assault

Count II — Depressurization in the First Degree

Count III — Aggravated Infiltration (incl. Secondhand Hobbies)

Count IV — Impersonating a Dehumidifier

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EXHIBIT A · THE CRIME SCENE

EXHIBIT A

A LEED-Certified Townhouse, Washington DC



Built 2012 · LEED certified · 4 stories · ~1,900 sq ft · two central AC units · mixed-humid climate. The owner was desperate enough to write to Ken Gehring. Indoor RH: 70%+. Water pouring from the third-floor bedroom supply vent.

Rusted, Sweating Ducts — In At Least 11 Homes



THE PATTERN

Homeowners ripped out ceilings to expose condensing ductwork.

At least 10 other townhouses in the complex: same rusted ducts, same third-floor bedroom.

Sticky rooms, damp bedding, ruined finishes — families living at 70% RH.

THE INVESTIGATION

The Big Guns: Expert Diagnostics



Expert witness:
Anthony Cox

Blower door, pressure mapping, moisture diagnostics — forensics, not guesses.

Fiberglass Doesn't Get Dirty Sitting Still



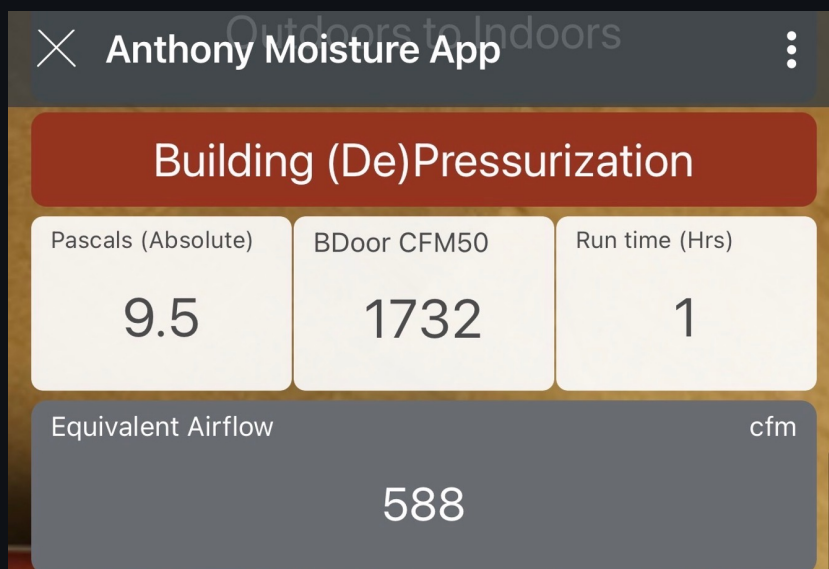
PULLED FROM THE RIM AND BAND

Filthy fiberglass = air moving through it.

That is what a house under negative pressure looks like from the inside: continuous exhaust fans pull the house negative, and replacement air arrives through every rim, band, and crack — carrying outdoor moisture, the neighbors' air, and the neighbors' recreational botany.

Exhaust-only ventilation is ordering air off a mystery menu. In a humid climate, the mystery is always moisture.

The House Was Sucking



WORST-CASE DEPRESSURIZATION

9.5 Pa negative — equivalent to 588 cfm of uncontrolled infiltration.

Outdoor dew point 67.2°F vs. indoor 55.2°F.

Moisture direction:
OUTDOORS → INDOORS.

The fans chose the flow. The enclosure chose the path. Nobody chose the moisture — it came anyway.

What That Air Costs in Pints



☰

i

Inlet

Outlet

Flow

°F

% RH

Dew Pt

88

50

67

75

50

55

CFM

Pts Day

140

79.3

CFM	Pints / Day
110	76
120	77
130	78
140	79
150	80
160	81
170	82



☰

i

Inlet

Outlet

Flow

°F

% RH

Dew Pt

70

100

70

75

50

55

CFM

Pts Day

140

104.7

°F	% RH	Dew Pt
67	97	67
68	98	68
69	99	69
70	100	70
71		71
72		72
73		73

79.3

pints per day — infiltration at 140 cfm of 88°F / 50% RH summer air.

104.7

pints per day on a rainy 70°F / 100% RH day. The dehumidifier hasn't even met the shower yet.

How a Certified Strategy Drowned a Townhouse

The “ventilation strategy”

Two bath exhaust fans totaling ~140 cfm, running 45 minutes of every hour — continuously depressurizing the house.

The leaky enclosure

Rim-and-band leakage pulling in outdoor air and the neighbors’ air — secondhand hobbies included.

The uninsulated ducts

Cold supply ducts below dew point, sweating into the ceiling below.

The “fix” that made it worse

An HVAC tech turned DOWN the blower speed — colder coil, colder ducts, more condensation.

“A certificate is a promise. Physics is a performance review.”

COUNT IV · PEOPLE'S EXHIBITS F-I

ERV Crimes

Impersonating a Dehumidifier

No RH controller. No drain. No shame.

"The marketing says it reduces moisture, darling."

EXHIBIT F · THE SUSPECT, UP CLOSE

Cross-Examination of an ERV



THE CROSS

“Does it have a relative humidity controller?” — No.

“Does it have a drain, for all that water it’s removing?” — No.

“So technically... it is not a dehumidifier. Correct?”

“...I guess technically not, darling.”

52.7% — Under Conditions That Barely Exist



Performance Report

Report			
Project Name	Nikki Summer Camp Example - Houston		
Weather Station	HOUSTON BUSH, TX, USA		
Climate Zone	2A	Heating Percentile Day	99.6%
Cooling Percentile Day	1%	Elevation	95 feet
Model	BLP150E75NS-PC	Brand	Broan
ASHRAE Version	2019	ASHRAE 90.1 Compliance	True
Net Supply Air Flow Rate	100 SCFM	Net Supply Design ESP	0.4 in W.C
Net Exhaust Air Flow Rate	100 SCFM	Net Exhaust Design ESP	0.4 in W.C
Summer Design			
Outdoor Air Dry Bulb	82.4 °F		
Outdoor Air Wet Bulb	78.3 °F		
Outdoor Air Relative Humidity	85.3 %		
Return Air Dry Bulb	75 °F		
Return Air Wet Bulb	62.4 °F		
Return Air Relative Humidity	50 %		
Summer - Sensible Effectiveness:	72.1 %		
Summer - Latent Effectiveness:	52.7 %		
Summer - Total Effectiveness:	55.3 %		
Summer Supply Air Dry Bulb:	77 °F		
Summer Supply Air Wet Bulb:	70.3 °F		
Summer Supply Air Enthalpy:	26.8 BTU/lb		
Summer Supply Air Relative Humidity:	72.9 %		
Summer Enthalpy Recovery Ratio:	55.3 %		

52.7%

Summer latent effectiveness — the headline number on the Houston performance report.

75°F / 50%

The return-air test condition behind that number: a home already conditioned and dried — peak-AC-runtime conditions.

82.4°F / 85%

The outdoor design air the ERV is actually processing. Shoulder seasons, nights, low-load days: the test assumptions vanish, the moisture doesn't.

Source: Broan performance report, "Nikki Summer Camp Example — Houston," BLP150E75NS-PC, ASHRAE 2019.

Five Pints a Night in the Master Bedroom

EQUIPMENT SPECIFICATIONS				
SF 70	pints/day 73F/60%	cfm (0.4 iwc)	pint/cfm	
	52.45	130	0.00028	
ERV LATENT LOAD BASED ON DESIGN CONDITIONS				
ERV Lat Eff	ERV (cfm)	pints/hour	pints/day	pints/night
0.500	100	2.39	57.48	19.16
	20	0.48	11.50	3.83
NET LATENT LOAD SUMMARY				
Excess Latent Load Considered for a 350 ft2 Master Bedroom Receiving 20 cfm of ERV SA and 20 cfm Dehu SA				
Dehumidifier Latent Capacity @ 73F/60% RH and 140 cfm				
0.00028 pint/cfm				
Assuming a 2,500 ft2 home with a 350 ft2 master bedroom where dehumidified air is evenly distributed. This means the master receives 18.2 cfm				
The latent capacity delivered to this master bedroom by a SF 70U with these assumptions in pints/hr is 0.30596				
The latent load from 2 people/ hr in pints/hr is 0.455				
The design ERV cfm to the master is 20 cfm. The latent load from the ventilation air at this rate is 0.48 pints/hour.				
People Load		Dehu Capacity	Net Latent	Net LL 8 hrs
pints/hr	ERV Load pints/hr	pints/hr	Load pint/hr	pint/hr
0.45500	0.48	0.30596	0.62904	5.0323

PEOPLE + ERV ONLY

2,500 sq ft home · 350 sq ft master bedroom · 20 cfm ERV supply · 18.2 cfm dehumidified air.

Net latent load: 5.03 pints overnight —

with no showers, no infiltration, no cooking counted.

An over-promised ERV and an undersized dehumidifier. Two crimes in one closet.

Building Science Corporation Concurs

“This system will not dehumidify house air but will lessen the need for dehumidification.”

Field research in occupied Houston homes — six integrated dehumidification & ventilation systems, monitored.



Dr. Steve Brick

What ERVs do: reduce the ventilation latent load. Real, useful, energy-efficient.

What they don't do: control indoor humidity on their own. In humid climates, the ERV needs a partner — a whole-house dehumidifier with a controller and a drain.

A. Rudd, Building Science Corporation — BA-0505: Residential Dehumidification Systems Research for Hot-Humid Climates (20 occupied Houston homes, six systems); BA-1310: Supplemental Dehumidification in Warm-Humid Climates.

THE VERDICT

Terms of Parole

People need to breathe. Houses need a climate-specific strategy.

GUILTY

- 1 Design for the climate** In humid & mixed-humid climates: no exhaust-only as the primary strategy — balanced or supply-side ventilation, with that air conditioned.
- 2 Enclosure first** Seal the rim and band. Ventilation is not a substitute for airtightness.
- 3 Every ERV gets a partner** A whole-house dehumidifier with the two features she couldn't name: a controller and a drain.
- 4 Bath fans as needed** Spot exhaust on demand — not 45 minutes of every hour.
- 5 Commission it** Measure the flows, the pressures, and the humidity. Certificates don't sweat. Houses do.

Sentence: *the defendant shall wear the Moist T-shirt. Her very own. The court buys in bulk now.*



The Variable-Speed Moisture Misdemeanor

*The People **vs.** Vinny “Half-Speed” Humidini*

THE CHARGES

Count I — Operating a Coil Above the Dew Point

Count II — Abandonment of Latent Duty at Part Load

Count III — SEER-Washing

MISDEMEANOR*
*felony
consequences



Sensible Heat Factor (SHF)

How cooling equipment splits its work — between cooling the air and wringing out water. The HIGHER the number, the less water removed. SHF is the equipment's number; the house's side of the ledger is SHR. (The field charts ahead label it SHR — same machine number.)

SHF 0.70

30% of the machine's work is pulling water out of the air. A coil doing its job in a humid climate.

SHF 1.00

Zero water removed. All temperature, no moisture — cooling the clam, keeping the clam.

“Keep your eye on that number. It's about to do a magic trick.”

As the Trophy Grows, the Water Vanishes

Rated Cooling Capacity (Btu/h) [95F]	SEER	Sensible Heat Factor
18000	20.5	0.87
22400	20.5	0.75
30600	14.5	0.64
33200	14.5	0.62
6000	33.1	0.96
6000	33.1	0.96
9000	30.5	0.92
9000	30.5	0.92
12000	26.1	0.83

SEER 33.1

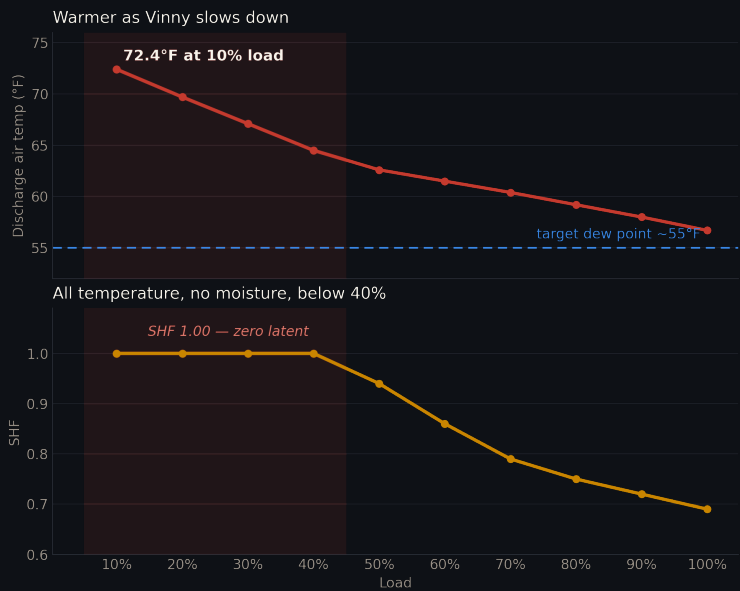
Sensible Heat Factor 0.96 — four percent of its capacity removes moisture. A trophy that can't sweat.

SEER 14.5

SHF 0.62 — nearly forty percent of its capacity wrings out water. The humble unit does the wet work.

Source: manufacturer listings (rated cooling capacity @ 95°F) — table on screen. Verify listing source before camp.

Warm Coil, Zero Latent



PUZ-30 — warmer discharge, higher SHF, as the load falls

Load	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Discharge temp °F	72.4	69.7	67.1	64.5	62.6	61.5	60.4	59.2	58.0	56.7
Total BTU	2,463	4,926	7,389	9,852	12,316	14,779	17,242	19,705	22,168	24,631
Sensible BTU	2,463	4,926	7,389	9,852	11,623	12,641	13,695	14,786	15,914	17,083
Latent BTU	0	0	0	0	693	2,138	3,547	4,919	6,254	7,548
SHF	1.00	1.00	1.00	1.00	0.94	0.86	0.79	0.75	0.72	0.69

zero latent removal at 40% load and below

Read the latent row — zero at 40% load and below

THE DEW-POINT PROBLEM

Target dew point:
~55°F.

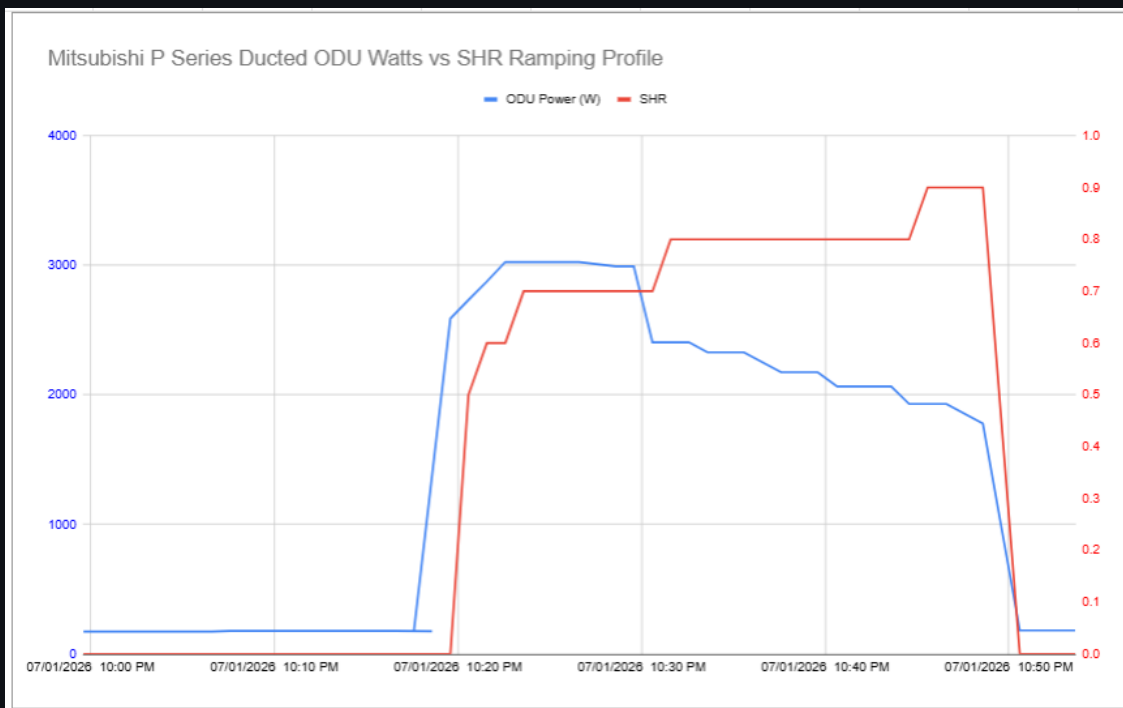
Coil at 10% load:
72.4°F.

Water cannot
condense on a coil
warmer than the
dew point.

“A fan with a
marketing budget.”

Source: Mitsubishi P-Series (PUZ-30) performance data per Diamond System Builder, Houston climate, 75°F/50% RH — Ryan Rush.

July 1, Night Run: The Ramp-Down



Source: field monitoring — Tim De Stasio

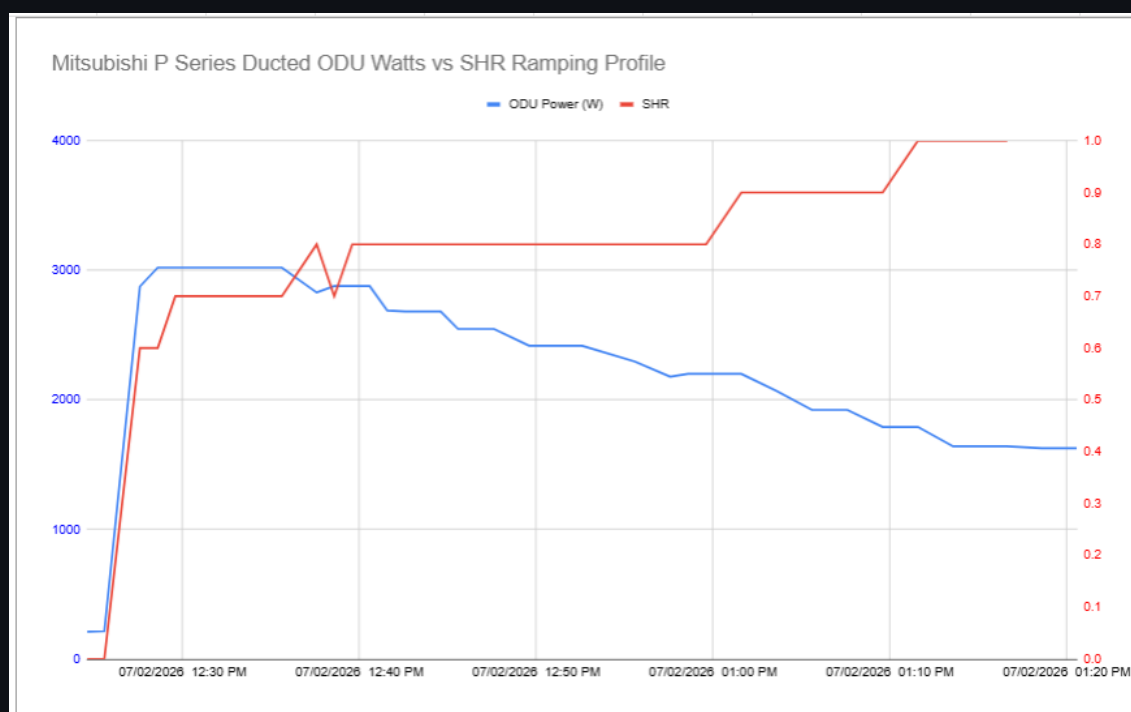
READ THE RED LINE

First five minutes: full ramp — SHF $\approx$ 0.7. Real moisture removal. Vinny at his best.

Then the inverter does what inverters do: watts fall, and SHF climbs — 0.8... 0.9.

Latent removal disappears while the system hums along, removing nothing but temperature.

July 2, Afternoon: An Hour of Nothing



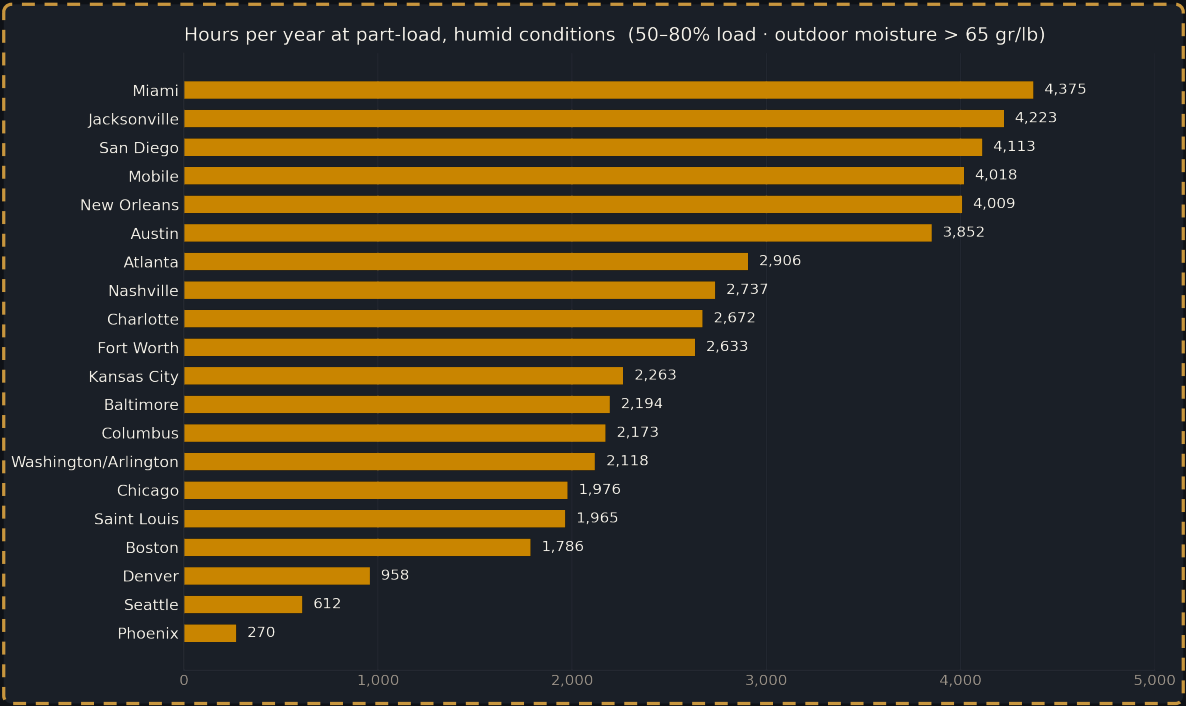
Source: field monitoring — Tim De Stasio

THREE LESSONS FOR THE JURY

1. Inverters don't always run continuously.
2. Running is not removing — SHF climbs to 1.0 and holds.
3. Equipment sized for heating is oversized for cooling — parked at part load all summer.

It LOOKED diligent. By the back half of the hour, it removed nothing.

Humid Partial-Load Annual Frequency



THE POINT

Part load isn't the edge case. In humid climates it's most of the cooling season —
exactly when the latent load stays high and Vinny drops to half speed.

"It isn't the exception, Your Honor. It's the schedule."

Analysis credit: Kimberly Llewellyn

THE VERDICT

“A King Needs a Queen”

GUILTY

*“The A/C is the king... but the king needs a queen — a whole-house dehumidifier.” — **Ken Gehring***

- 1 **Aggressive low fan-speed & dehumidification settings** Make the coil cold when latent matters.
- 2 **A dedicated dehumidifier** True latent control — moisture removal at EVERY load.
- 3 **Aggressively size for cooling, not heating** An oversized inverter lives at part load.
- 4 **Demand part-load SHF data** The rating point is not the summer.
- 5 **Calibrate thermostats; log humidity over time** A satisfied thermostat is not a dry house.

Sentence: *the defendant shall wear the Moist T-shirt. His very own.*



BUILDING SCIENCE MOISTURE TRUE CRIMES • THE FINALE

The Dehumidifier Sizing Double Homicide

*The People **vs.** Professor Biggie-Smallz*

THE CHARGES

Count I — Dehumidifier Sizing Double Homicide

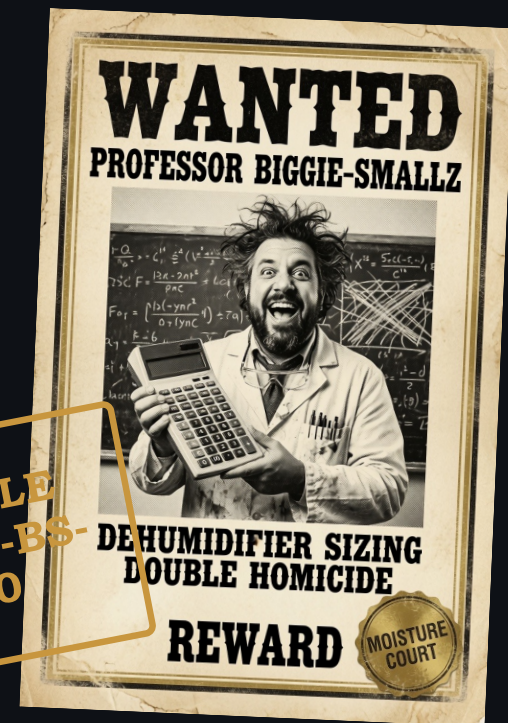
Count II — Fraudulent Misrepresentation of Pints

Count III — Depraved Indifference to Static Pressure

Count IV — Conspiracy to Commit Moisture (the Moist Bandits)

Building Science Moisture True Crimes • Summer Camp 2026

CASE FILE
No. 2026-BS-
73/60



The Two Victims

VICTIM ONE — THE OVERSIZED UNIT

Sized by square footage and vibes — twice the load.
Short-cycles: on, off, on, off. Never runs long enough to wring the air out.

Cause of death: a thousand starts.

VICTIM TWO — THE UNDERSIZED UNIT

Sized off a marketing number that never survives contact with a real house. Runs forever, never reaches setpoint, and the home never gets dry.

Cause of death: worked to death.

Two units. Two deaths. One professor.

What Actually Drives High Humidity

Tight construction	Leaky construction	Construction moisture still drying
Wood & porous materials	Low sensible loads	Mechanical ventilation
High-SEER / high-SHR AC	High outdoor dew points	Mild temperatures
People — every occupant	Lifestyle & operation	...and combinations of all of it

A little from each adds up to a lot — and square footage measures exactly none of them.

What Are We Missing?

1

Dehumidification design day: Houston: 82°F · 142 grains per pound outdoors. Target: 65 gpp (75°F / 50% RH).

2

The ventilation load: 77 gpp removed × 100 cfm × 0.0148 = ~114 pints/day too wet.

3

Credit the ERV core: Rejects roughly half → 57 ppd of dehumidification needed. Shop a 70-ppd unit, ducted.

MISSING:

THE PEOPLE

~0.25 lb of water per person, per hour
— around the clock. A family of four is
nearly three gallons a day, just existing.

“He sized the house and forgot the family.”

The Intercepted Emails

From: ProfBSmallz@perfectlysized.edu

To: LadyGail@freshairislife.biz

Cc: swampbutt · dripping · half-speed

Subj: re: re: re: THE OPERATION

Gail — brilliant as always. You bring in the humid air and over-promise the ERV. I undersize the unit that's supposed to catch it. The house never stands a chance. Nobody audits the pints.

— *Professor B. Smallz, PhD, Perfectly Sized*



**THE MOIST
BANDITS**

She brings the moisture. He guarantees it stays.

The Pint Depends on the Courtroom

▶ SANTA FE ULTRA70



PERFORMANCE		
	@ 80°F and 60%RH	@ 73°F and 60%RH
Water Removal	70 Pints / 8.75 Gallons	55 Pints / 6.875 Gallons
Efficiency	5.0 Pints/kWh	4.79 Pints/kWh
Energy Factor	2.4 L/kWh	2.27 L/kWh

▶ SANTA FE COMPACT 70



PERFORMANCE		
	@ 80°F and 60%RH	@ 65°F and 60%RH
Water Removal	70 Pints / 8.75 Gallons	40 Pints / 5 Gallons
Efficiency	5.0 Pints/kWh	4.2 Pints/kWh
Energy Factor	2.4 L/kWh	2.0 L/kWh

70 ppd

The label — rated at 80°F / 60% RH. Marketing conditions.

55 ppd

The SAME 70-pint unit at the DOE whole-house standard: 73°F / 60% RH.

40 ppd

A “70-pint” unit at the portable standard: 65°F / 60% RH. Same label. Almost half the pints.

Source: manufacturer spec sheets on screen (Ultra70 @ 73°F/60% = 55 ppd; Compact70 @ 65°F/60% = 40 ppd). Verify standard names/conditions before camp.

Higher Static, Lower Removal

Performance
Summary:

		Static Pressure									
		0"		0.2"		0.4"		0.6"		0.8"	
TEMP	RH	PPD		PPD		PPD		PPD		PPD	
60	40%	13.8		5.2		4.4		3		0	
60	50%	38.5		33.8		26.3		19.8		-4.4	
60	60%	64.2		62		54		57.4		49.8	
65	40%	43.3		36.5		33.1		32		19.1	
65	50%	64.3		64.2		62.6		52		48.5	
65	60%	86.6		85.1		81.5		80.2		68.2	
70	40%	52.2		52.2		52.3		42.7		43.6	
70	50%	76.2		73.7		71.1		69.5		67.3	
70	60%	96.2		96.2		91.1		91.3		82.8	
80	40%	69.8		70		68.5		67.6		67	
80	50%	98.9		100.5		94.7		94		87.7	
80	60%	125.2		126		121		118		109.4	

READ IT ACROSS

Same temperature. Same RH.

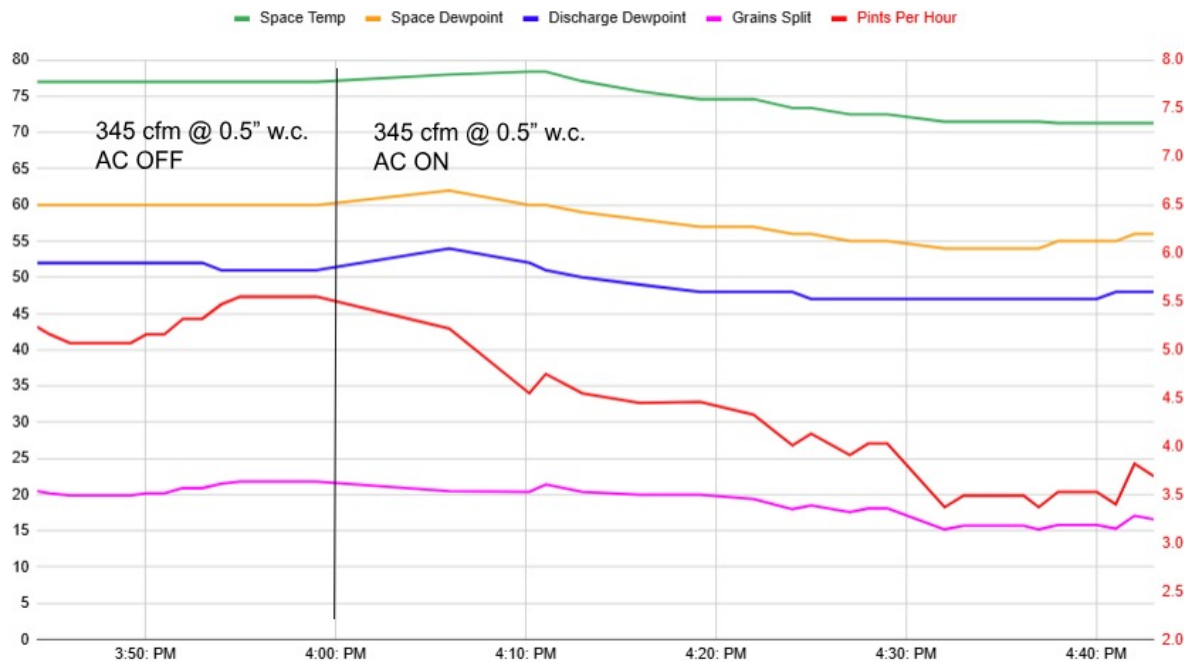
As static pressure climbs, airflow falls — and 20–30% of the rated pints can vanish into the ductwork — field-verified in Exhibit I.

Less moisture in the entering air does the same thing.

“The unit was innocent. The duct system was the accomplice.”

Capacity Falls as the House Dries

Entering Air Conditions Effect On V155 Dehumidifier Performance



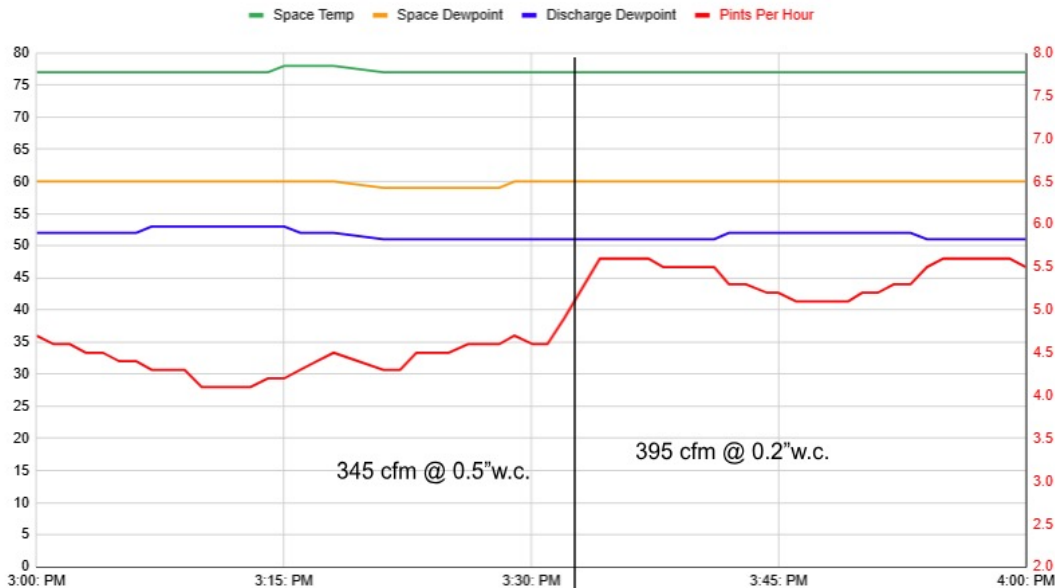
THE CURVE IN ACTION

As space temperature and humidity fall, the grains-per-pound split between return and supply narrows — and capacity drops all the way to 3.5 pints per hour.

The closer the house gets to setpoint, the less the unit removes. The label never mentions this.

The V155 Field Test

Static Pressure Effect On V155 Dehumidifier Performance



DEDICATED RETURN · SUPPLY INTO A 5-TON TRUNK

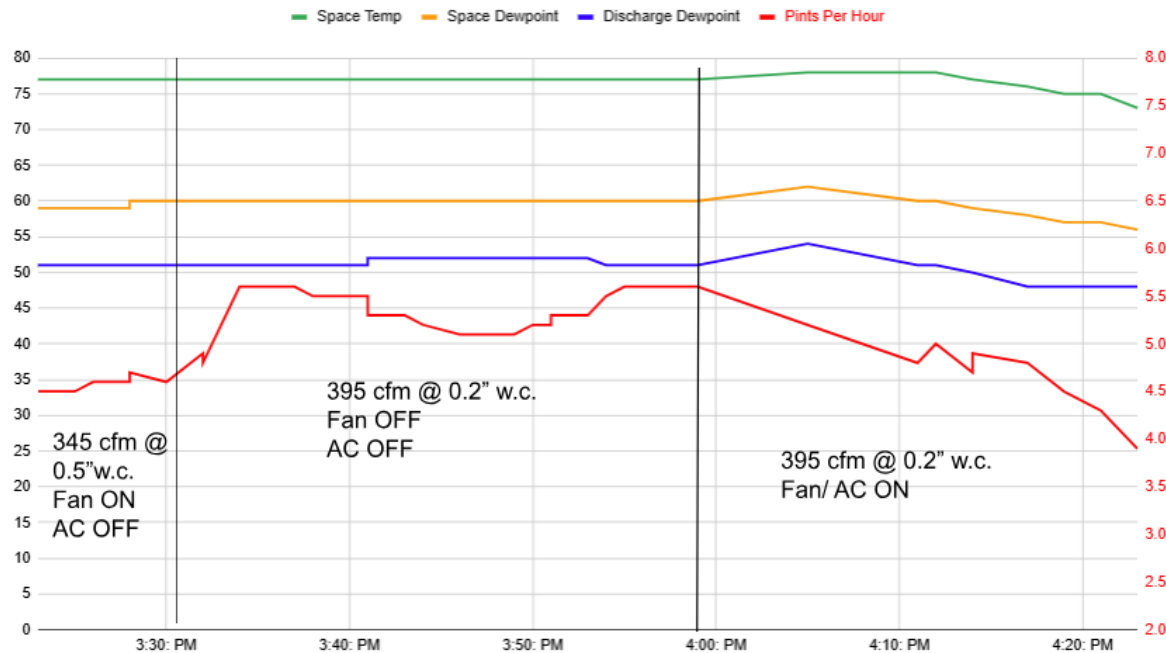
HVAC fan RUNNING: 0.5" w.c. total static → 345 cfm → 4.0–4.5 pints per hour.

HVAC fan OFF: static falls to 0.2" → 395 cfm → 5.0–5.5 pints per hour.

Same machine. Same house. Same day. The only defendant left is the static.

13% Less Airflow, Up to 27% Less Performance

Static Pressure & Entering Air Conditions Effect on Dehumidifier Performance



-13% airflow → -27% pints

Static pressure doesn't shave performance. It amputates it — and it never shows up in a square-footage chart.

Professor Biggie-Smallz's sizing chart accounts for:

Square feet. *That's it. That's the chart.*

THE VERDICT • THE MOIST BANDITS: RING BROKEN

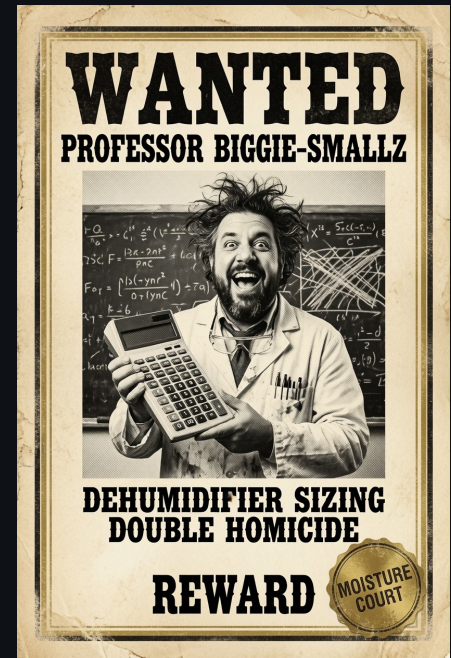
Terms of Parole

GUILTY

The Moist Bandits — Duke · Rico · Lady Gail · Vinny · the Professor — all convicted. The ring is broken.

- 1 **Size from entering air conditions** Capacity is a curve, not a label.
- 2 **Count the occupants** ~0.25 lb of water per person, per hour — the family is part of the load.
- 3 **Read the rating's test standard** Marketing, DOE whole-house, and portable pints are not the same pint.
- 4 **Include installed static pressure** Duct it properly — or budget the capacity you're about to lose.
- 5 **Account for ALL the drivers** Ventilation, enclosure, climate, lifestyle — not one number.
- 6 **Test & verify installed performance** If you didn't measure it, you guessed with confidence.

Sentence: *the defendant shall wear the Moist T-shirt.*



THE DOCKET IS CLOSED · THE JURY IS PAROLED

Five Cases. Five Convictions. One Ring Broken.

GUILTY × 5

I — *Capacity is a curve, not a label.*

II — *A running machine is not a removing machine.*

III — *A certificate is a promise; physics is the performance review.*

IV — *If you didn't measure it, you didn't size it.*

Defense record: 0–5 in this courtroom — undefeated in the next one.

C O U R T I S A D J O U R N E D — G O D R Y S O M E O N E ' S H O U S E

THE COURT RECESSES

Join Us on the **Mystic Mountain Ridge** Journey

We're building the house these five cases were warning us about — a home build and homestead on a Southwest Virginia ridge. Sheep, chickens, big machines, and building science practiced in the field.

Come watch us practice what the prosecution preaches.



SCAN TO FOLLOW THE BUILD

@MysticMountainRidge

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