BRIEFING PACKET

Advanced Energy Phase III

No-Wall-Liner Crawl Space Results

What the DOE-supported field study tested, what it found, and why it matters

Key takeaway

Phase III showed that a closed crawl with **no wall vapor retarder** and **unsealed ground-liner seams** quickly reached wood-moisture performance similar to the fully sealed closed-crawl designs, once the vents were sealed and 35 CFM of conditioned supply air was provided.

1. What was the Advanced Energy crawl-space study?

A U.S. Department of Energy-supported field study of crawl-space performance in the humid Southeast. Advanced Energy did the work under DOE Award DE-FC26-00NT40995 and submitted the final report, *A Field Study Comparison of the Energy and Moisture Performance Characteristics of Ventilated Versus Sealed Crawl Spaces in the South*, to DOE's National Energy Technology Laboratory on June 22, 2005.

The study followed 12 owner-occupied, all-electric, detached houses with the same floor plan on one cul-de-sac in Princeville, North Carolina. The houses were split into matched groups so crawl-space strategies could be compared under the same building and weather conditions.

Researchers measured crawl-space and indoor relative humidity, dew point, wood moisture content, heat-pump energy use, duct and house leakage, temperature, radon, and bioaerosol/mold conditions.

Source: Advanced Energy, Field Study Final Report (2005), pp. i–iii and Abstract.

Why Phase III matters

The earlier phases compared vented crawls with fully sealed closed crawls. Phase III tested a different question: does a closed crawl need a wall-sealed vapor retarder?

Three former vented control homes were converted to a new Group 3 configuration. The vents were sealed and conditioned supply air was added, but the ground-liner seams were left overlapped and unsealed, and no vapor retarder was installed on the perimeter walls.

2. What Phase III Group 3 used

Component	Phase III Group 3
Foundation vents	Plugged and sealed
Ground vapor retarder	6-mil polyethylene covering all exposed ground
Ground-liner seams	Overlapped 6–12 inches; **not sealed**
Wall vapor retarder	**None**
Ground attachment	Pinned with 6-inch turf staples
Floor insulation	R-19 fiberglass retained
Drying mechanism	35 CFM conditioned air from the HVAC supply trunk

This was not a model. It was a field conversion of occupied homes. The study changed the two major moisture-control variables, venting and active drying, while deliberately leaving the wall liner off and the ground seams unsealed.

Source: Advanced Energy Final Report, Phase III setup, pp. 15–16; Figure 9, p. 21.

3. What it found: wood moisture

At the August 2, 2004 Phase III measurement, the no-wall-poly group was in essentially the same wood-moisture range as the sealed crawls, and well below the vented control.

Group (Aug 2, 2004)	Average WMC	Maximum WMC
Vented + R-19 floor (control)	≈ 14.5%	≈ 16.8%
Closed, no wall poly, unsealed seams (Group 3)	**≈ 11.0%**	**≈ 12.4%**
Closed, sealed liner + R-19 floor	≈ 10.7%	≈ 12.6%
Closed, sealed liner + R-13 wall foam	≈ 10.4%	≈ 13.9%

The report states that the converted Group 3 homes “quickly exhibited performance similar to that of the other closed crawl space designs.”

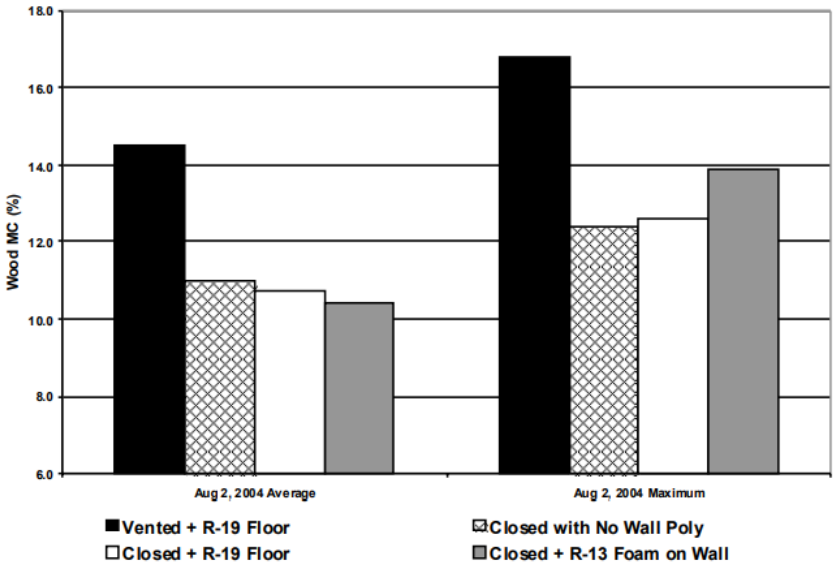


Figure 50 (report): Phase III average and maximum wood moisture content

Source: Advanced Energy Final Report, Figure 50 and accompanying text, p. 88.

> **Note on these values**
>
> The percentages above are approximate readings from Figure 50. The report does not print them in a numeric table.

4. Crawl-air humidity: higher without the wall liner, but controlled

Configuration	Average daily crawl RH	Dew point
Closed Groups 1 & 2 (sealed liner)	Below ~60%	~55–60°F
Group 3 (no wall poly, unsealed seams)	Below ~70%	Just above 60°F
Wall-vented control	Extended periods above 80%	Mid-70s°F

The wall-sealed systems did run drier in the air. But the large change was between vented and closed. The no-wall-poly group settled into a controlled mid-60% summer RH range, while the vented control repeatedly ran much wetter and had condensation

episodes.

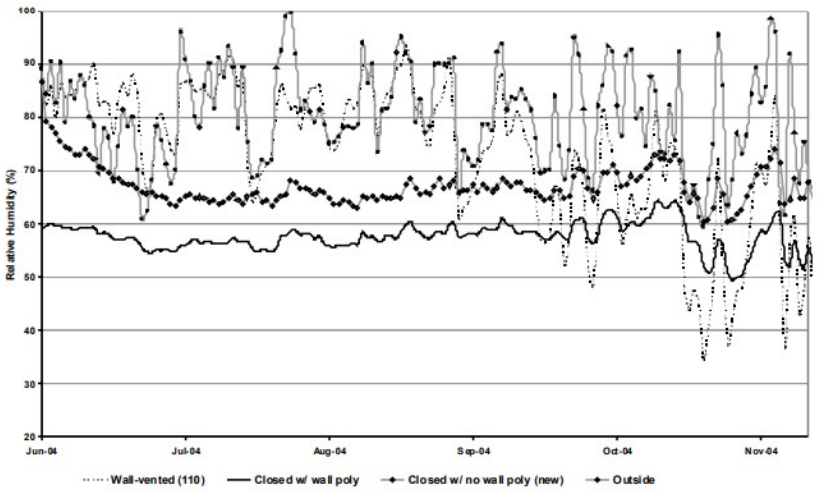
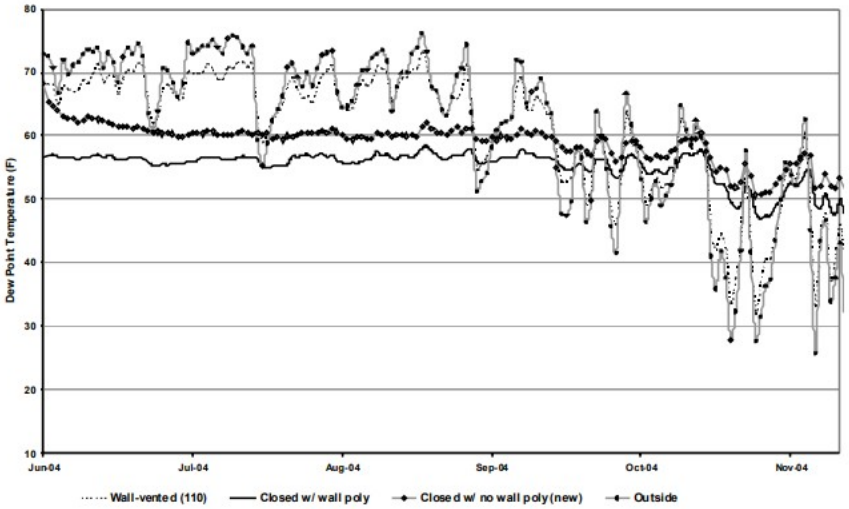


Figure 35 (report): Phase III crawl-space relative humidity, rolling weekly average

Source: Advanced Energy Final Report, Moisture Findings, pp. 109–110; Figure 35. Group 3 is the "Closed w/ no wall poly (new)" series.

5. Dew point shows the same mechanism

The no-wall-poly group generally ran only a few degrees higher in dew point than the fully sealed crawl. The vented crawl tracked outdoor moisture closely and was frequently far wetter.



Phase III dew-point temperatures, rolling weekly averages

Source: Advanced Energy Final Report. The report's own labels for this chart are inconsistent (Figure 37/38); confirm the figure number against the report.

Dew point reflects the actual moisture content of the air. The chart supports the study's broader conclusion: vented crawls tracked the outdoor climate, while closed crawls tracked indoor conditions.

6. What Advanced Energy concluded

- Group 3 had no wall vapor retarder and no sealed ground-liner seams, yet kept average daily crawl RH below 70% and dew point just above 60°F.
- The Phase III crawl with the pinned, unsealed ground liner and no wall vapor retarder (Group 3) averaged **11.0% wood moisture** on August 2, 2004, with a maximum of 12.4%. That was comparable to the sealed-liner crawls at 10.4–10.7% average and 12.6–13.9% maximum. The vented control averaged 14.5%.
- Moisture performance of the closed crawls improved enough to "almost eliminate the risk of rot," except for plumbing leaks.
- In the vented control crawl spaces, a ground vapor barrier alone did not control RH and mold growth. Those crawls already had 100% ground coverage, so the variable that needed to be eliminated was outdoor air intrusion through vents and air openings, not ground moisture. Advanced Energy concluded that these observations supported the need for air-moisture control to build dry crawl-space assemblies.

Source: Advanced Energy Final Report, Moisture Findings, pp. 109–110.

7. Why Phase III matters to the pinned-liner question

Phase III does not show that a wall liner has zero effect. It clearly lowered crawl-air RH and dew point further. What it shows is that the extra air-moisture reduction did not produce a comparably large improvement in measured framing moisture.

The no-wall-poly group reached about the same wood-moisture range as the sealed groups. That is the structurally important outcome, and it happened with unsealed ground seams and no wall vapor retarder.

The strongest reading: sealing the vents and providing controlled drying produced the dominant moisture-control improvement. Full wall and seam sealing further reduced crawl-air humidity, but Phase III did not show a meaningful additional reduction in wood moisture at the August 2004 measurement.

For briefing purposes

In a DOE-supported field study, Advanced Energy directly tested a closed crawl with sealed vents, complete ground coverage, unsealed liner seams, no wall vapor retarder, and 35 CFM of conditioned supply air. That configuration quickly produced wood-moisture performance similar to the fully sealed closed-crawl groups.

8. Important limits

- Group 3 kept R-19 floor insulation, so it was not identical to a modern no-floor-insulation pinned-liner assembly.
- The wood-moisture percentages here are approximate visual readings from Figure 50, not values printed in a table.
- The sealed groups did maintain lower crawl-air RH and dew point, so the study does not support saying wall and seam sealing had no moisture effect.
- The study supports a performance comparison, not a claim that every site should omit wall liners. Groundwater, wall seepage, radon, or drainage needs can justify different assemblies.

Source

Advanced Energy (B. Davis, C. Dastur, and W. E. Warren). *A Field Study Comparison of the Energy and Moisture Performance Characteristics of Ventilated Versus Sealed Crawl Spaces in the South.* Field Study Final Report, DOE Award DE-FC26-00NT40995. Submitted to the U.S. Department of Energy, National Energy Technology Laboratory, June 22, 2005. OSTI ID 850459. https://www.osti.gov/biblio/850459