# REVIEW (PART 1)

of

ASSESSMENT OF EPA's RESIDENTIAL WOOD HEATER CERTIFICATION PROGRAM

Test Report Review: Stoves & Central Heaters

Written by NESCAUM, March 2021

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In March 2021, the Northeast States for Coordinated Air Use Management (NESCAUM) published a document entitled "Assessment of EPA's Residential Wood Heater Program" ("Assessment"). The "Assessment" is the result of a review conducted by NESCAUM "in collaboration with the Alaska Department of Environmental Conservation" (ADEC).

The "Assessment" is intended to influence "policymakers" by claiming 1) that the EPA Certification Program is dysfunctional and a systemic failure,[1] 2) that there are a significant number of discrepancies and omissions in test reports submitted to EPA for approval,[2] 3) that EPA has failed to conduct compliance audits,[3] and 4) that the NESCAUM and ADEC could do a better job than EPA in, a) determining which stoves are in fact the cleanest burning and, b) developing a test method for certifying wood burning appliances. NESCAUM has provided scant data to back up these major claims, and some of the data that it does present is riddled with discrepancies, omissions, bias errors, and conflict of interest, as detailed below. Bias is evident everywhere; in tone and use of language, in lack of transparency, in the selection of subjective criteria to attempt to discredit test methods and results, and in its attempt to advance NESCAUM's own agenda[4] with its "policy recommendations." The bias is so pervasive that it undermines much of the "Assessment."

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[1] Sweeping claims of dysfunction, systemic failure, and cheating appear IMMEDIATELY in the "Assessment," first appearing on page iii, in The Summary for Policy Makers. A reader of the "Assessment" needs to be mindful that the document is essentially political in nature (i.e., it aims explicitly to influence policy-makers) and not a scientific inquiry, or a dispassionate review. The "Assessment" is a political diatribe that attempts to advance a specific agenda. The "Assessment" describes methods used to collect evidence that are subjective and not evidence based, and it arrives at conclusions that are often biased, subject to conflicts of interest, and unsupported by the facts.

[2] The "Assessment" is a "screening level analysis" ("Assessment" pg xiii; pg. 16). Data was apparently collected by individual reviewers, each filling out an Excel spreadsheet while reviewing individual test reports online. The decision to use data accumulated by individual reviewers (without cross-checking, verification or other quality control) was apparently based on just one event where three people reviewed the same report and came to similar conclusions:

> "To assess the review tool (i.e., spreadsheet) performance, three people reviewed the same report independently. A comparison of the three reviews found that all three reviewers identified the same flags. All three reports obtained the same preliminary review determination. Based on this effort's findings, the team agreed that the tool (i.e., spreadsheet) was sufficient to allow multiple people to complete test report reviews." ("Assessment," page 16)

Quite remarkably, given the focus of the "Assessment", there appears to have been little quality control after this initial comparison of one report, by three people. The "Assessment", cites statistics from this "screening level analysis" as though they represent a thorough, objective, factual assessment of these reports, but there is scant evidence of thoroughness, objectivity, or quality control in collecting data for the "Assessment."

[3] EPA does routinely conduct unannounced audits of manufacturers' facilities and inspections of certified products. The claim that they do not conduct audits of test results by randomly selecting stoves and re-testing them at a different test facilities may be correct.

[4] The "Assessment" contains a disclaimer which states "NYSERDA, the States of Alaska and New York, and NESCAUM make no warranties or representations, express or implied, as to the fitness for a particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report." ("Assessment," Page iv, emphasis added). The authors of the "Assessment" make both express and implied representations about the "usefulness, completeness and accuracy" about EPA's test review processes, their own review process, and multiple test methods. They cannot disclaim what they explicitly set out to do. Failure to review their own claims and representations – in this case their disclaimer – is a recurring feature of the "Assessment", from beginning to end.

In addition to the "Assessment" of on-line woodstove test results, NESCAUM has developed its own entirely new woodstove test protocol called Integrated Duty-Cycle Test Method (IDCTM), along with a new method of measuring woodstove emissions using a Tapered Element Oscillating Measurement device (TEOM).[5] Changing two major variables in certification test procedure (the actual test procedure from the current method(s) to the IDCTM and the method of collecting particulates from the dilution tunnel method to TEOM) is a violation of the principle of "vary-one-thing-at-a-time" (VOTAT). The result of changing two major variables at the same time might well produce a tangle of results requiring significant time and effort to tease apart.

The New York State Energy Research and Development Authority (NYSERDA) funded NESCAUM's development of the IDCTM, and NYSERDA owns[6] this new, unused method. ADEC adopted the IDCTM test method as the only approved cordwood test method in Alaska, notwithstanding that it has never been used for certification testing of a single stove. Alice Edwards of ADEC applied to EPA for approval of this method as a broadly applicable alternative test method, for use in testing new wood stoves, and her request was approved on 4/9/21. In approving Ms. Edwards request for approval of this new test method, EPA stated the following:

> "You state that ADEC has recently reviewed wood heater certification test reports that used Alternate Test Method 125/127 which leverage ASTM E-3053 and that this review has raised serious concerns about certain aspects of the test method. Given your concerns regarding ASTM 3053 and the importance of having and advancing cordwood test methods for certifying wood heaters under the NSPS, you have requested an additional cordwood certification test method option" (Letter from Steffan M. Johnson, US EPA to Alice Edwards, ADEC, dated 4/11/21)

The only other approved cordwood test method is ASTM E-3053, referenced in the comment above, which was approved by EPA on February 28, 2018 (over 3 years ago). The ASTM E-3053 method has been used to test 85 of approximately 148 wood stoves currently on the EPA certified list, or 57% of all approved stoves. The 85 stoves approved using the ASTM E-3053 method have generated at least 255 fully documented data sets for individual test runs. The IDCTM method, developed by NESCAUM, owned by NYCERDA and adopted by ADEC has yet to be used even one time.

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[5] In the interest of full disclosure, NESCAUM donated a TEOM to Woodstock Soapstone Company for R&D work a number of years ago. and it was brilliant and indispensible for getting "real-time" results and expediting R&D efforts. However, whether this device is capable of providing the consistent emissions measurements required for certification testing and valid comparison between appliances is an open question.

[6] Each page of the IDCTM has a watermark that says "DO NOT COPY" and each page contains the following header:
THIS INTEGRATED-DUTY-CYCLE (IDC) PROTOCOL FOR WOOD STOVES IS THE PROPERTY OF THE NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY (NYSERDA) AND CAN BE USED TO TEST TECHNOLOGIES IN A LABORATORY SETTING. ANY DEVIATIONS OR CHANGES TO THIS IDC PROTOCOL FOR WOOD STOVES ARE NOT APPROVED OR SANCTIONED BY NYSERDA.
DO NOT CITE, COPY, or DISTRIBUTE THIS IDC PROTOCOL FOR WOOD STOVES WITHOUT THE WRITTEN PERMISSION OF NYSERDA

## Error, Bias, and Conflict of Interest in NESCAUM's Attack on ASTM E-3053

On its website, ADEC specifically says that it has not approved any stove tested with the ASTM E-3053 Method, and further states that it anticipates removing stoves approved by EPA using the ASTM E-3053 it from its own, state-approved woodstove list. The "Assessment" states:

> **5.2.4 Improving Certification Test Methods**
> Current cordwood test methods used to certify residential wood heaters are poorly designed and often lack the specificity to ensure viable and comparable emission results. **EPA should revoke or modify problematic test methods. The ASTM 3053 test should be revoked as a Broadly Applicable Test Method...**
> ("Assessment," page 70, emphasis added)

The "Assessment" is critical of the ASTM E-3053 method. However, most of the criticisms are based on subjective, and often completely false, characterizations of this method.

Much of the NESCAUM/ADEC criticism of this method is related to fueling protocols[7] used for testing. Specifically, NESCAUM/ADEC allege widespread "doctoring" of cordwood fuel by "debarking" the fuel, and "squaring" cordwood pieces before testing. Additional criticism is directed toward how the firebox volume is calculated, whether such calculations are consistent with owners' manuals, whether the length of the cordwood fuel for testing was correctly calculated, and whether the fuel was loaded in the correct direction.

An additional criticism was whether or not the medium burn rate in the test results corresponded to a rate *preferred by* the ADEC reviewers, but not required by the test.

In order to assess NESCAUM/ADEC's data analysis and conclusions, we need to first look carefully at its data collection methods and ask whether the underlying data is complete, credible, and unbiased. The main focus of this Part One of A Review of the "Assessment" is on how data was collected and tallied on "Summary Review Sheets" by ADEC.

On the following pages I raise concerns about quality control, bias, and conflict of interest in NESCAUM/ADEC's acquisition of data. It is clear that NESCAUM/ADEC reviewers lacked objectivity in assessing information, particularly with regards to the ASTM E-3053 method, and they reviewed individual test reports (knowingly or not) with the intent to discredit the ASTM E-3053 and advance their own interest in promoting the IDCTM method.

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[7]Oddly enough, the fueling protocols in the IDCTM are very similar to those in the ASTM E-3053, and the method for calculating the parameters for a fuel load are almost identical. In spite of its criticisms of ASTM E-3053, the IDCTM is remarkably similar.

## The Attempt at Regime Change

NESCAUM also recommends in its "Assessment" a federal policy which would require that any stove qualifying for the 26% Federal Tax Credit should have NESCAUM/ADEC approval as a qualification for the tax credit. The "Assessment" states:

> **5.2.3 Targeting Public Funding to Cleanest Appliances**
> "Taxpayer-supported incentive programs, such as the 26 percent federal tax credit created under the BTU Act, EPA Targeted Airshed grants, and state supported activities should only apply to those appliances included on the list of approved models developed by the Alaska Department of Environmental Conservation. This is currently the only thorough review of certification test reports applying the 2015 RWH NSPS requirements. ("Assessment," page 70)

In effect, the triumvirate of NESCAUM/ADEC/NYSERDA want to create a "super EPA" to supplant the existing federal EPA for the testing and certifying woodstoves.

The "Assessment" proposes that if New Hampshire residents, or residents of any of the other lower 48 states, wish to purchase low-emitting, high efficiency stoves from my New Hampshire factory, these stoves would have to be approved by EPA ***and*** ADEC. Woodstock Soapstone Company would have to comply with the Alaska regulatory scheme (which currently only recognizes the NYSERDA ICDTM test method and the unproven TEOM measuring devices). The "Assessment" proposes that buyers should be punished (by being excluded from the federal 26% tax rebate) unless they buy stoves tested with the new IDCTM method. Currently there are no such tested stoves.

The triumvirate (NESCAUM/ADEC/NYSERDA) would use the Alaska regulatory scheme to coerce manufacturers to use their test method, because they propose to revoke the current cordwood method, and replace it with their own method. In this way, the "Assessment" is breathtakingly arrogant, hubristic, and self-serving. The conceit of the "Assessment" is risible.

## The "Assessment" Contains Serious, Nontrivial Errors That Ruin Trust In Its Research Practices and Conclusions

All ADEC data sheets that I have reviewed are undated and unsigned. Most have few, if any comments. Many have unfilled spreadsheet boxes (data not collected). All of the ADEC reports of stoves made by Woodstock Soapstone Company have serious omissions, errors of fact, misreporting, and untrue statements. Of six Woodstock Soapstone Company models approved to the EPA 2020 Standards, two models were missing entirely, and one model was reviewed twice, on separate data sheets that were inconsistent and did not match (i.e., different reviewers looking at the same data, or the same reviewer on different dates looking at the same data). The fact that ADEC reviewed the same data twice, and the two completed spreadsheets are markedly different, speaks to the concern (also noted in footnote #2) about quality control.

On the pair of summary sheets where NESCAUM/ADEC inadvertently reviewed the same test report twice, there were 25 discrepancies between the two reports, including errors of transcription, opposing claims that data was or was not reported, rounding errors, conflicting or inconsistent "flags" and numeric/arithmetic errors. This is not reassuring in terms of NESCAUM's claimed consistency in generating the summary results, and raises the issue of whether NESCAUM's own consistency and repeatability should be the subject of an audit.

These two ADEC Summary Reports are reproduced on page 6, and an explanation of most of the errors on page 7. For simplicity sake, I refer to the report that is captioned Model 210a (but really Model 210) as Report A, and the Report that was (correctly) reviewing Model 210 as Report B. Both reports were posted and properly labeled on the Woodstock Soapstone website. But that's not the point; ***these two reviews of the same report should produce similar, if not identical results, but they did not***.

These two Summary Sheets, which review the same test report,[8] disclose obvious problems in the research and reporting methods employed by NESCAUM/ADEC, and the ability/willingness of NESCAUM/ADEC to impose meaningful quality controls on their inquiry. As noted early in this review (see footnote 2), there is little, if any, evidence of NESCAUM/ADEC cross-checking or vetting of the reviews or data in the "Assessment". The task of auditing the "Assessment" and validating its so-called "data" and its various claims will now, probably, fall squarely on EPA.

This is the central irony of this situation; NESCAUM's own data and reporting is guilty of the same failures it attributes to EPA, namely failures in transparency, documentation, and auditing its own work product for consistency, impartiality, and accurateness. The EPA will now become responsible for cleaning up the NESCAUM mess.

8 Precise replication of the "Test Run Data" from one summary sheet to the other, as well as the precise replication of other data (firebox size, load density, etc.) indicates conclusively that these two summary sheets were completed using the same test report.

Here are two "Summary Data Sheets filled out by NESCAUM/ADEC which review the same test report (that's why the "Test Run Data" is transcribed exactly from one summary to the other, for example). But there is no consistency from one report to the other. The pattern of mistakes and errors is common throughout ADEC's Summary Sheets

## Report A

| Summary of Review | | | | | |
|---|---|---|---|---|---|
| Manufacturer | Woodstock Soapstone Company | | | | |
| Model | 210 Ideal Steel | | | Control approach | Hybrid |
| AK List Status | Disapproved List | | | | |
| **Testing Information** | **Determination** | | | | **Notes** |
| Test method | ASTM E3053 | | | | ATM |
| Test Lab | Polytests Inc. | | | | tested at polytest facility |
| Third-party certifier | PFS-TECO | | | | |
| Report certified | PFS-TECO | | | | |
| **Test Report Elements** | **Determination** | | | | **Notes** |
| Wght Avg PM emissions (g/h | 2.14 | PM Highest 1-hr (g/hr) | | 7.3 | |
| Wght Avg HHV Efficiency (%) | 73.7 | | | | |
| Wght Avg CO (g/hr) | OK 35.5 | Wght Avg CO (g/min) | | 0.591666667 | X No Match |
| Max heat output (Btu/hr) | 42,360 | | | | |
| Manufacturers Instructions t | Reported | | | | |
| Firebox vol. test report | 3.22 | | | | |
| Firebox dimensions | Reported | Longest dim. (in) | 22.5 | Firebox dimension | |
| Firebox calculations | OK Reported/matched | | | | |
| Efficiency calculations | Reported | | | | |
| Burn rate calculations | Reported | | | | |
| Raw data sheets | Reported | | | | |
| Conditioning completed by | Lab | | | | Report states that preliminary tests were done. data for these runs [illegible] the report. |
| Conditioning data | Partially reported | | | | 1) Data does not meet test method requiremetr Data insufficient to determine conformance wit medium burn rate requiremetns. |
| Lab technician notes | Reported | | | | |
| Doc. of run appropriateness | Not reported | | | | |
| Doc. of run validity | Not reported | | | | |
| Doc. of run anomolies | Not reported | | | | |
| Doc. of run burn rates | Reported | | | | |
| Photos of the fuel loaded | Reported | | | | |

| Test Run Data | Determination | | | | |
|---|---|---|---|---|---|
| Run # | 1.1 | 1.2 | 2.1 | 2.2 | |
| Run Category | H | L | H | M | |
| Burn rate (kg/hr) | 3.3 | 0.64 | 2.72 | 1.03 | |
| PM emissions by run (g/hr) | 6.74 | 2.46 | 3.19 | 0.41 | |
| PM 1-hr filter pull (g/hr) | 7.3 | 2.3 | 3.6 | 1.3 | |
| Filter data | yes | yes | yes | yes | |
| Train precision (%) | 3.54 | 0.32 | 2.87 | 1.62 | |
| Negative weights | no | no | no | no | |
| Negs handled appropriately | Yes | | | | |
| Heat output by run (Btu/hr) | 42,360 | 9465 | 32806 | 15121 | |
| CO by run (g/hr) | 38 | 58.5 | 11.1 | 18 | |
| HHV efficiency (%) | 65.62 | 75.6 | 62.56 | 76.59 | |
| Lowest burn rate tested | Reported | | | | |
| All run data | Not reported | | | | Missing data for [illegible] on second day. Requir to determine compliance with the methods. |

| Appliance Fueling | Determination | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| Fuel species | Oak | | | | | | | |
| Log length (in) | 20 | 20 | 20 | 20 | | | | |
| Direction of longest dimensi | East-West | | | | | | | |
| Log direction for testing | Cannot be determined | | | | | | | |
| Debarked (ASTM test only) | Less than 50% | | | | | | | |
| Load density (lb/ft3) | 9.85 | 11.7 | 9.64 | 11.89 | | | | |
| Fuel moisture content load (%wb) | 23.13 | 21.93 | 21.74 | 23.76 | | | | |
| Fuel piece configuration | More than 50% | | | | | | | |

| Owners Manual Req. | Determination | Notes |
|---|---|---|
| Stack height | Included | |
| Location recommendation | Included | |
| Guidance on proper draft | Included | |
| Fuel loading & reloading | Included | |
| Fuel selection recomm. | Included | |
| Improper fuels warnings | Not included | |
| Fire starting procedures | Included | |
| Proper use of air controls | Included | |
| Proper operation low | Not included | |
| Ash removal procedures | Included | |
| Replacement parts | Included | |
| Federal warning (C or NC) | Not included | |
| Warranty rights | Included | |
| Catalytst operation | Included | |
| Cat maintenance procedures | Included | |
| Determining catalyst det. or | Included | |

| Reporting | Determination | Notes |
|---|---|---|
| Summary tables complete | All reported | |
| All run data submitted | All reported | |
| Test report complete | Partially reported major | |
| Owner manual complete | | |
| Test dates | 1/6-9/2020 | |
| 30 Day notice submitted to E | Cannot be determined | |
| Tested on the proposed date | Cannot be determined | |
| Tested in consecutive days | Yes | |
| 60 Day report to EPA | Cannot be determined | report date 1/16/2020 |

## Report B (same test report)

| Summary of Review | | | | | |
|---|---|---|---|---|---|
| Manufacturer | Woodstock Soapstone | | | | |
| Model | Model 210a Ideal Steel Hybrid | | | Control approach | Hybrid |
| AK List Status | Disapproved List | | | | |
| **Testing Information** | **Determination** | | | | **Notes** |
| Test method | ASTM E3053 | | | | |
| Test Lab | Polytests Inc. | | | | AT LAB |
| Third-party certifier | Not reported | | | | |
| Report certified | Not reported | | | | |
| **Test Report Elements** | **Determination** | | | | **Notes** |
| Wght Avg PM emissions (g/hr) | 2.14 | PM Highest 1-hr (g/hr) | | 7.3 | |
| Wght Avg HHV Efficiency (%) | 73.7 | | | | |
| Wght Avg CO (g/hr) | 33.6 | Wght Avg CO (g/min) | | OK 0.56 | X No Match CO g/hr reported as 33.5 while arithmetic CO g/min reported as .56 |
| Max heat output (Btu/hr) | Discrepancy OK From EPA List | | | 37,583 | |
| Manufacturers Instructions to lab | Partially reported | | | | notes on pg. 236 labeled as operating instructions. However lab operating procedures (appendix 10) not included in report |
| Firebox vol. test report | 3.22 | | | | |
| Firebox dimensions | Reported | Longest dim. (in) | 22.5 | Firebox dimension | |
| Firebox calculations | Reported/matched | | | | pg. 234 |
| Efficiency calculations | Reported | | | | |
| Burn rate calculations | Reported | | | | |
| Raw data sheets | Reported | | | | |
| Conditioning completed by | Not reported | | | | Report states that preliminary tests were done No data for these runs included in the report. |
| Conditioning data | Partially reported | | | | 1) Data does not meet test method requiremetns. 2) Data insufficient to determine conformance with medium burn rate requiremetns. |
| Lab technician notes | Reported | | | | |
| Doc. of run appropriateness | Not reported | | | | |
| Doc. of run validity | Not reported | | | | |
| Doc. of run anomolies | Not reported | | | | |
| Doc. of run burn rates | Not reported | | | | |
| Photos of the fuel loaded | Partially reported | | | | does not meet 3053 requirements |

| Test Run Data | Determination | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| Run # | 1.1 | 1.2 | 2.1 | 2.2 | | | | |
| Run Category | High | Low | High | Med | | | | |
| Burn rate (kg/hr) | 3.3 | 0.64 | 2.72 | 1.03 | | | | |
| PM emissions by run (g/hr) | 6.74 | 2.46 | 3.19 | 0.41 | | | | |
| PM 1-hr filter pull (g/hr) | 7.3 | 2.3 | 3.6 | 1.3 | | | | |
| Filter data | Yes | Yes | Yes | Yes | | | | |
| Train precision (%) | 3.54 | 0.32 | 2.87 | 1.62 | | | | |
| Negative weights | no | no | no | no | | | | |
| Negs handled appropriately | Yes | | | | | | | |
| Heat output by run (Btu/hr) | Reproted | 42,360 | 9,465 | 32,806 | 15,121 | | | |
| CO by run (g/hr) | | 38 | 58.5 | 11.1 | 18 | | | |
| HHV efficiency (%) | | 65.62 | 75.6 | 62.56 | 76.59 | | | |
| Lowest burn rate tested | Not reported | | | | | | | |
| All run data | Reported | | | | | | | |

| Appliance Fueling | Determination | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| Fuel species | OAK | | | | | | | |
| Log length (in) | 20 | 20 | 20 | 20 | | | | |
| Direction of longest dimension | East-West | | | | | | | |
| [illegible] | Not reported | | | | | | | |
| [illegible] only) | Less than 50% | | | | | | | |
| [illegible] | More than 50% | | | | | | | |
| [illegible] | 9.9 | 11.7 | 9.6 | 11.9 | | | | |
| [illegible] | 18 | 18 | 19.2 | 19.2 | | | | |
| [illegible] piece configuration | Within specified limit | | | | | | | |

| Owners Manual Req. | Determination | Notes |
|---|---|---|
| Stack height | Included | |
| Location recommendation | Included | |
| Guidance on proper draft | Included | |
| Fuel loading & reloading | Included | |
| Fuel selection recomm. | Included | |
| [illegible] | Not included | |
| Fire starting procedures | Included | |
| Proper use of air controls | Included | |
| [illegible] | Not included | |
| [illegible] removal procedures | Included | |
| Replacement parts | Included | |
| [illegible] | Not included | |
| Warranty rights | Included | |
| Catalytst operation | Included | |
| Cat maintenance procedures | Included | |
| Determining catalyst det. or failure | Included | |

| Reporting | Determination | Notes |
|---|---|---|
| Summary tables complete | All reported | |
| All run data submitted | All reported | |
| [illegible] st report complete | Partially reported minor | |
| [illegible] wner manual complete | Partially reported minor | |
| [illegible] | 1/6 & 1/8 | cover page states testing was done 1/6 - 1/8 while test summary states testing was only done on 1/6 & 1/7 |
| 30 Day notice submitted to EPA | | |
| Tested on the proposed date | | |
| [illegible] | | |
| 60 Day report to EPA | | |

ERROR, BAD MATH
1.03-0.64 = 0.39

wow! data identically-transcribed twice!

rounding convention?

Totally False
See photos in this Review

one is wb; one is db

both incorrect
Manual, inside cover

both incorrect
Manual, pg15

both incorrect
Manual, pg 18

major or minor?

even something simple like dates?

most of these "Cannot be determined" dates were included in Certification Letter 257-20, which was posted with the Test Report on line

On these and other test reports, ADEC explicitly asks manufacturers, test labs, and third party certifiers to hold ADEC's hand while it goes through these Summary Reports and corrects it's errors, under the threat of being excluded from selling wood stoves in Alaska.

## Discrepancies between Report A and Report B, which look at the same test report

1. Report B indicates incorrectly that Third Party Certifier and Report Certified were unreported. Report A correctly identifies both as PFS-TECO;

2. Report A correctly reports CO in g/hr, but not in g/min; Report B incorrectly reports CO in g/hr and and incorrectly in g/min) Report B reports g/min to 9 decimal places but neither test report calculates to that degree of specificity;

3. Report A correctly states that "Manufacturer's instructions to lab" are reported; Report B indicates incorrectly that they are partially reported;

4. Both reports indicate that the longest firebox dimension is 22.5", however only on Report B is an ORANGE FLAG assigned to this dimension;

5. Report B incorrectly says "Conditioning completed by" was not reported (RED FLAG), while report A states correctly that "Conditioning completed by" ("Lab") with NO FLAG;

6. Report B says that "Doc. Of burn rates" was Not Reported (RED FLAG), but Report A looks at the same information and CORRECTLY indicated "Reported" (NO FLAG);

7. Report B indicates "Photos of fuel loaded was "Partially Reported"(ORANGE FLAG), while Report A indicates "Reported" (NO FLAG)

8. Both reports transcribe exactly the same numeric test data under "Test Run Data", but Report A assigns an ORANGE FLAG to the Medium Burn Rate of 1.03 kg/hr, presumably because the difference between the low burn rate (0.64 kg/hr) and the medium burn rate (1.03 kg/hr) violates the completely arbitrary determination by ADEC that there should be a difference of at least 0.30 kg/hr. between low and medium burn rates. So there is a double error here: a) failure to correctly calculate the burn rate differential (which is 0.39 kg/hr) and b) the assignment of an orange flag. Report B has no orange flag, presumably because the reviewer did better arithmetic.

9. There is another problem with the 0.30 kg/hr differential, which is that this review criteria is arbitrary. This is discussed later.

10. Report B incorrectly states that "Lowest burn rate tested" was not reported (RED FLAG); Report A indicates that "Lowest Burn rate tested was "Reported"

11. Report B states that "All run data" was "Reported," while Report A states (incorrectly) that "All run data" was "Not Reported" (RED FLAG).

12. Report B says that "Log direction for testing" was "Not reported" (ORANGE FLAG), while Report A says that the log direction "Cannot be determined" and has NO FLAG. Notwithstanding these two comments, both reports indicate that the fuel was 20" and the maximum firebox dimension is 22.5." Based on that information and the photos provided, there is only one direction that the logs can be loaded into the stove. Photos are also included in the test report which clearly indicate the direction in which the wood is inserted into the stove.

13. Both reports state that "Wood was squared" "Less than 50%". This is completely false. The wood used for testing was split cordwood. Wood was not squared at all; it wasn't <50%; it was 0%.

14. Both reports state that Wood was debarked "More than 50%". The statement that wood was "debarked" more than 50% is completely baseless and false, and contradicted by photographs of the test fuel.

15. The "Load density" reporting has similar numbers, but rounded to different values (i.e., Report B has values of 9.9, 9.6, 11.9; Report A has the same results indicated as 9.85, 9.64, 11.89). Given the nitpicky posture of the "Assessment" this failure to adopt a rounding protocol is an error.

16. In Fuel Moisture Content load (%wb), Report A correctly reports Wet Basis, and Report B incorrectly reports Dry basis for all four loads;

17. Under "Test report complete," Report B indicates "Partially reported minor " (YELLOW FLAG), but Report A indicates "Partially reported major" (ORANGE FLAG).

18. Report B indicates that "Owner manual complete" is "Partially reported minor" (YELLOW FLAG), while Report B States that Owner manual complete is "blank" (NO FLAG). What is interesting about this discrepancy is that the "Assessment" claims the following about its so-called spreadsheet "tool":

> "Both the review tool and summary reports automatically generated warning flags, *which provide an objective identification of significant problems with the reporting or testing*" (emphasis added, Assessment page 19)
>
> In this case reviews of the "Owners Manual Requirements" was the same for both reports, but the spreadsheet "tool" generated a YELLOW FLAG for Report B and nothing at all (NO FLAG) for Report A. This is, obviously, an error either in reporting or spreadsheet design.

19. Under "Test dates" Report B says "1/6 and 1/8, While Report A says 1/6-1/9/2020.

20. As to whether the unit was "Tested in consecutive days, Report B says "No" and Report A says "Yes."

21. A to whether the report was submitted to EPA within 60 days, both Report A and B say "Cannot be determined" (YELLOW FLAG). However, the report application to EPA is attached, signed, and dated 2/17/20 – obviously within 60 days,

## The ADEC Summary Sheets:
## Lots and Lots and Lots of Errors

For the purpose of this initial review, I will focus mainly on stoves made by Woodstock Soapstone Company. Next, I will examine the ADEC Summary Sheet for our Model 202/204. This is a "plain vanilla" Summary Sheet, compared to Model 210, on pages 6 and 7, above.

ADEC encourages manufacturers to "review their certification test report summaries and submit corrections, and that any substantiated errors or corrections will be applied to the summary sheet." So, I'll just make the corrections here. On our Model 202/204, the ***initial*** ADEC summary sheet (see next page, LEFT COLUMN) makes the following errors (WHICH CUMULATIVELY TOTAL 13 FLAGS). I intend to address THREE ADDITIONAL RED FLAGS (related to Documentation of 1) run appropriateness, 2) run Validity, and 3) run anomolies on Part 2 of this Review.

What is facinating is that between early April 2021, when I downloaded the original Summary Review Sheet, and today (mid-May, 2021), ADEC performed an additional review and corrected some of its original errors, and made some new errors. Here are comments on the initial ADEC SUmmary Sheet. Comments on the revised Summary Sheet are on the next page.

1: The Model 202/204 summary sheet assigns 3 YELLOW FLAGS (each labeled "Cannot be determined") for a) whether a 30 day notice of testing was submitted, b) whether the stove was Tested on the Proposed Dates, and c) whether the test report was submitted to EPA within 60 days.

Certification Letter #267-20 was posted on our website along with the test report itself. This letter states:

"Based on the April 8, 2020 test report prepared by Services Polytest Inc. demonstrating compliance with the February 28, 2018, EPA-approved Cord Wood Alternative Test Method 125 (ATM-125) and the information provided in your April 17, 2020 application, the above referenced models are certified as meeting the 2015 NSPS. Under the 2015 NSPS and based on PFS TECO's April 23,2020, certification of conformity, the models' emission rate of 0.85 g/hr meets the 2020 NSPS cordwood particulate matter emissions limit of 2.5 g/hr. The heat output range and overall heating efficiency for the above referenced models are 9,989 – 46,437 BTU/hr and 80%, respectively. The carbon monoxide emission rate for this model is 0.34 g/min. (EPA Certification Letter Number 267-20)

Note that the relevant dates sought by NESCAUM/ADEC are italicized above, and note also that this letter referenced CO emissions data that ADEC claimed was missing (see #2 below).

2: The ADEC review for Model 202/204 gives 2 ORANGE FLAGS for not reporting CO emissions, either in CO weighted average g/h or CO average g/min. However, both of these CO calculations are reported on page 9 of the Test Report on Woodstock Soapstone Company's website, along with CO emissions for each individual run.

3: The ADEC review for Model 202/204 gives a 1 RED FLAG claiming that "Manufacturer's Instructions" are "Not Reported". The instructions are clearly printed on page 194 of the test report, which is published on line at our website.

4 : The ADEC review for Model 202/204 assigns 2 RED FLAGS for Squaring and Debarking wood, which is completely and totally false. Photographs of the test fuel appear on page 23.

5. The ADEC summary sheet gives a 1 YELLOW FLAG for "Log Direction for Testing." Notwithstanding that there are photos of the fuel burning in the firebox, the line above the YELLOW FLAG says the longest firebox dimension is East-West. The firebox is 18.75" long x 10.75" deep, and the fuel is 16" long. As a practical matter, there is only one way it will fit.

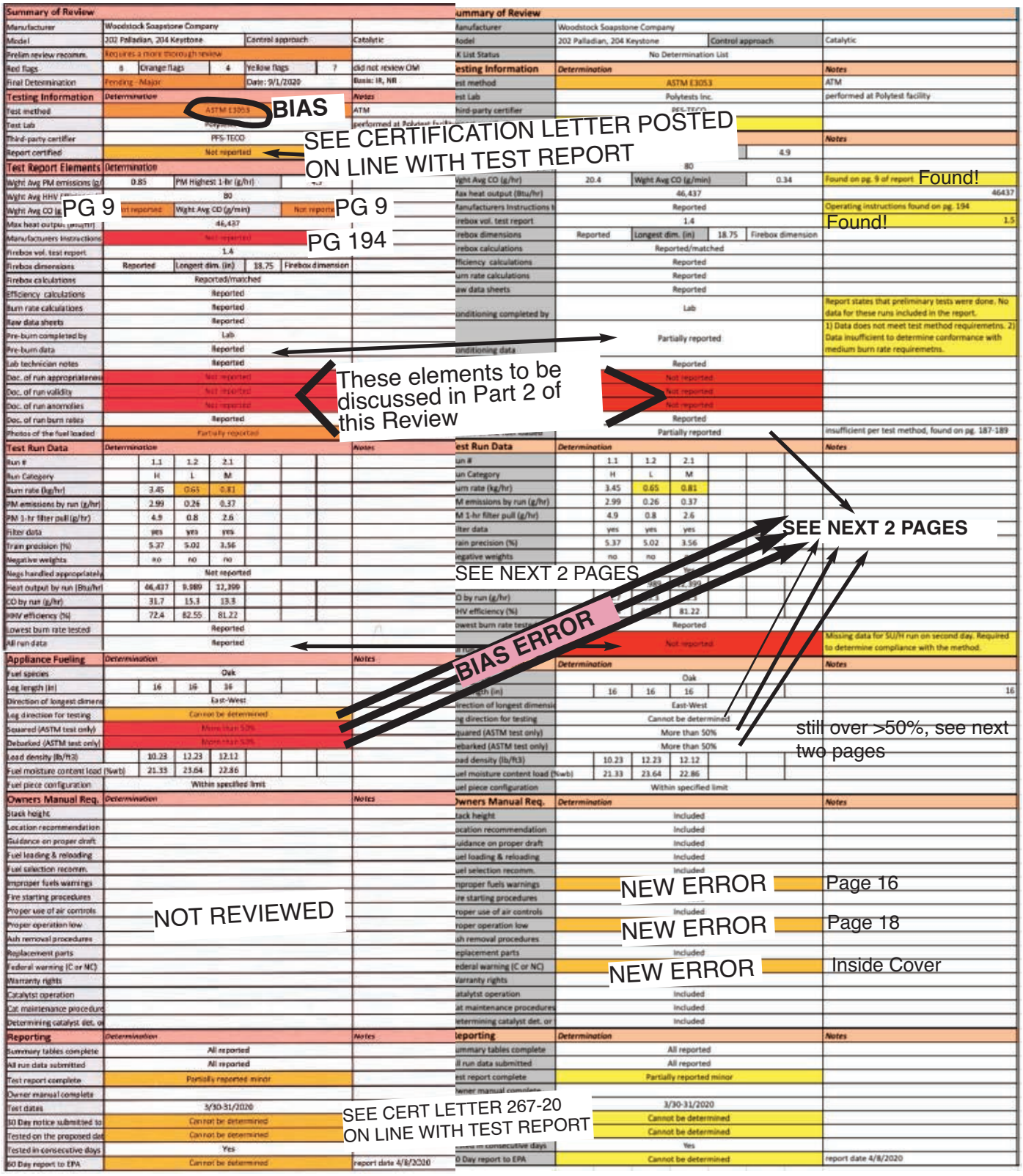
6. However, according to the ADEC review "method" the three flags in 4. and 5. above give rise to an 1 ORANGE FLAG for the ASTM Method E3053, as explained below (basically if a unit gets 3 flags related to Appliance Fueling, and it uses Method E3053, it is disqualified).

7. In this case this model also gets an additional 2 ORANGE FLAGS, one for "Needs a More Thorough Review" and one for "Pending-Major" on a final determination.

8. Just for fun, this Model gets a 1 YELLOW FLAG for "Report Certified" even though the certification letter indicates it was certified by PFS-ATECO on April 23, 2020.

Initial review (downloaded 4/2021

Subsequent review (downloaded 5/2021

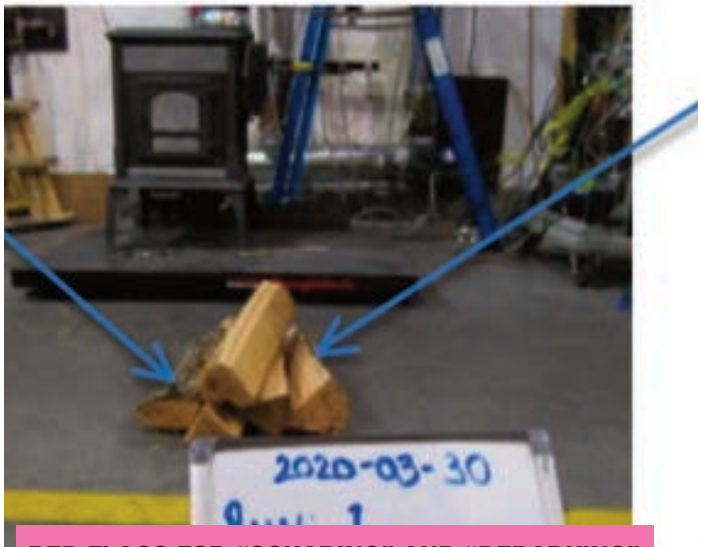


According to the ADEC "PROCESS", I am supposed to address all of these "issues" by discussing them with ADEC, and maybe submitting modified or reformed test reports. Then ADEC will makes changes as it deems appropriate. Or not.

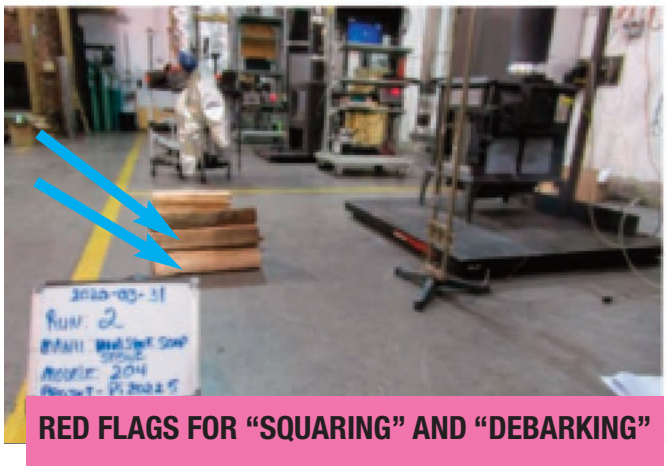
Below are photographs of the test fuel loads used for Model 202/204 that NESCAUM/ADEC reported were "debarked" over 50%, and "squared "over 50%".


RED FLAGS FOR "SQUARING" AND "DEBARKING"

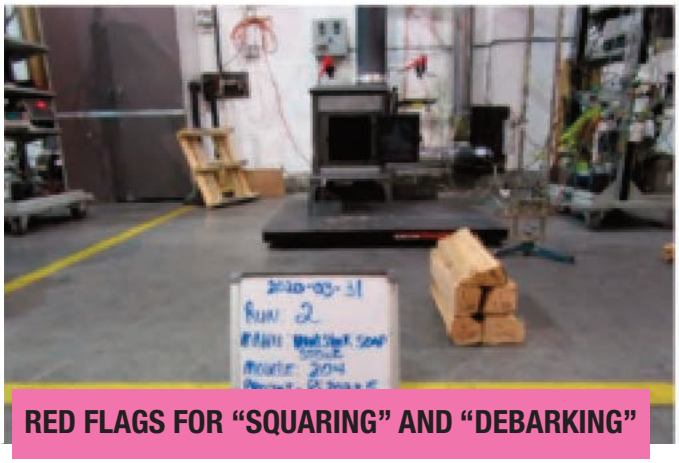

RED FLAGS FOR "SQUARING" AND "DEBARKING"




RED FLAGS FOR "SQUARING" AND "DEBARKING"



RED FLAGS FOR "SQUARING" AND "DEBARKING"



RED FLAGS FOR "SQUARING" AND "DEBARKING"

Both the "Assessment" and the "ADEC REGULATORY BASIS FOR CRITERIA AND FINDINGS" ("BASIS") contain email correspondence from Steffan Johnson of EPA MTG (Johnson Emails) as appendices to their reports. Both documents cite the comments from the Johnson Emails with respect to Mr. Johnson's opinion that manufacturers may not give instructions for the certification tests that "stray from typical homeowner operation." He further states that:

> "examples of such instructions (*from manufacturers to test labs*) with respect to a cord wood compliance test include (but are not limited to):
> •Removing bark prior to use as a test fuel.
> •Shaping or extreme sorting to constitute preference for a particular shape of fuel load (not to emulate crib fuel (sic) or create triangular crib fuel).
> •Loading and lighting fuel inconsistent with instructions in the appliance owners manual.
> •Complicated fuel placement instructions that would not ever be followed by a homeowner.
> •Manipulation of the ash bed inconsistent with, or otherwise in addition to, instructions included in the owner's manual, or in a manner that a homeowner is unlikely to ever follow. Failure to meet the method required fuel loading specifications (shortened fuel, partial loading, or not using the full firebox area to calculate fuel loading).
> •Limiting fuel loading during complaince testing that will easily be overridden by a home owner seeking a longer burn time.
> •Instructions that specifically override specified sections of the test method OR the subpart rule language (inside or outside the test method requirements."

Notwithstanding that the "Assessment" and the "BASIS" cite this particular list more than a dozen times in support of their repeated findings that manufacturers violate some opague requirements for barking and wood splitting, ***both the "Assessment" and the "BASIS" inexplicably never cite the next paragraph in the Johnson Emails. It reads as follows:***

> "For reference, we have put together what we feel reasonably describes cord wood fuel:
> A cross sectional end view should not form a perfect (or near perfect) square (except occasionally) but to be of a triangular or trapezoid shape with ill regular lines, some curvy, some zig zag. But not all having the same length (pie shape is fine). *It is acceptable to have some bark but not having all the bark stripped off. It is not acceptable to have a test fuel load to consist of bark being stripped off of every piece*. We expect to have wood pieces that are torsion shaped or pieces that are rounds, semi-rounds, have rounded edges, or are larger at one end and smaller at the opposite end. No fuel load should consist of pieces all chosen to be the same size/shape characteristics." (Emphasis Added)

I submit that the pictures above show cord wood loads that meet the explicit terms defined in the Johnson Emails, as well as the (similar) characteristics defined in ASTM E-3053. I also submit that the findings of NESCAUM/ADEC that these loads have been "debarked" and "squared" is evidence of bias and misconduct in their data collection method.

The ADEC Summary sheets show all but one stove tested with ASTM E-3053 received "warning flags" for "Squared" or "Debarked" cordwood fuel. The "BASIS," dated March 2, 2021 describes "squared" or "debarked" wood as follows:

> **Squared:** "If the unit was tested with wood that the reviewer determined had more than 50% of the pieces shaped or squared, this resulted in the generation of a red flag... If the photos from testing reflected typical cordwood, the tool did not generate a flag.
>
> "The definition of cordwood contained in ASTM 3053 does not define squared wood as cordwood. Therefore ADEC has determined that if the fuel charge is composed of pieces using squared wood, the pieces do not meet the definition of cordwood contained in the test method." (BASIS, pg 32)

> **Debarked:** "This element identifies the amount of bark on the fuel pieces used in the certification test. If the unit was tested with wood that the reviewer determined had more than 50% of the pieces without bark, the review tool generated a red flag. If this information could not be determined from reviewing the data report and/or photos were deemed insufficient, a determination of "cannot be determined" with a yellow flag was generated."
>
> "Evidence of purposeful debarking was defined as more than 50% of the pieces appearing to have bark removed, and a flag was generated... **The group interpreted the method to require bark based on the requirements in section 8.4.2.2, where the method provides direction for fuel moisture measurement when adhered thick bark conditions are encountered**." (BASIS, pg 33, **emphasis added**)

Unfortunately for NESCAUM/ADEC, it cannot *just "interpret" section 8.4.2.2*[9] *cited above (captioned "Test Fuel Load Moisture Content") for the proposition that ASTM E3053 requires bark.* It cannot ignore the plain language in the Johnson Emails cited at the bottom of page 11, where he "reasonably describes cord wood fuel," while repeatedly citing what comes *immediately above* (the summary bullet points). NESCAUM/ADEC cannot ignore it's hand-picked authority (the Johnson Emails) when it is convenient. (Johnsone Emails: "It is acceptable to have some bark but not having all the bark stripped off. It is not acceptable to have a test fuel load to consist of bark being stripped off of every piece.") Finally, it cannot do this and claim to be a serious and credible assessment worthy of influencing "policy."

But the fact is that *ADEC has adopted this posture*, and then has *disqualified nearly every stove that tested with ASTM E3053 on the basis that each stove runs afoul of ADEC's "Squaring" and "Debarking" criteria.* All one has to do in most cases is look at photographs of the test fuel, read the definition of cord wood test fuel in the Johnson Emails, and then apply the "reasonableness" principle (also described in the Johnson emails) to realize that severe bias has driven the "Assessment" right off the rails.

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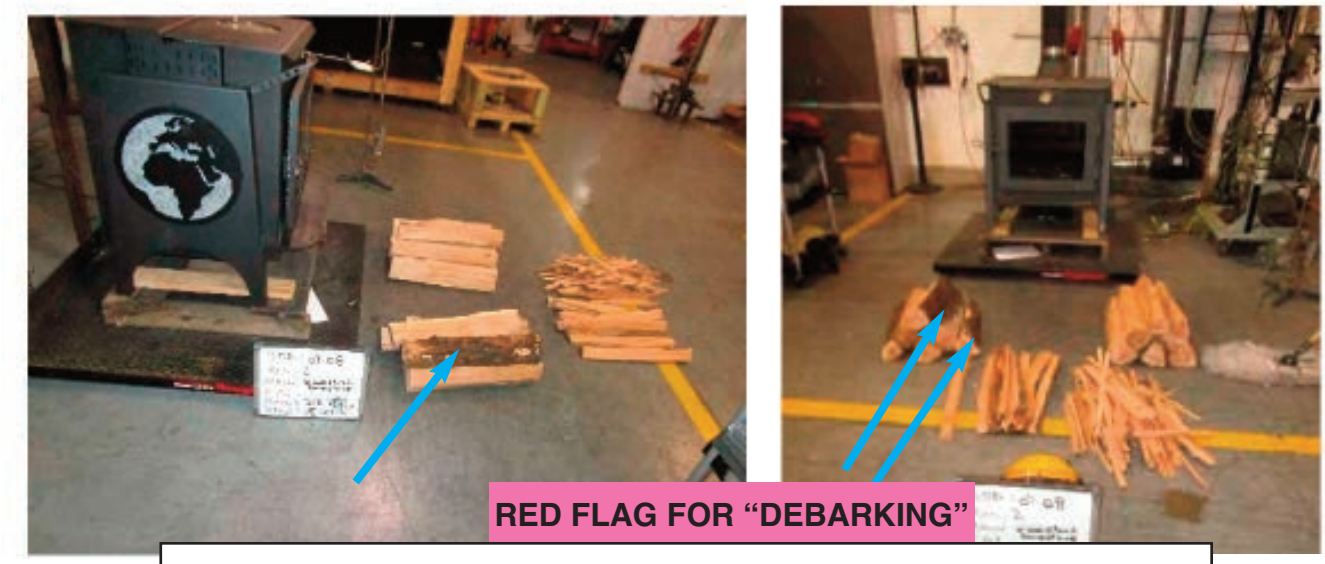
[9]"For fuel pieces with tightly adhered tight bark (defined as more than 1/8 in (3.2mm) thick), the thickness of the bark shall be added to the electrode penetration depth or the bark shall be removed in the area where the moisture readings are taken." ASTM E3053, page 7

Below is a chart showing ADEC's summaries for "Squaring" and "Debarking" of 69 stoves it reviewed that used ASTM E3053. The red cells = red flags; the yellow cells = yellow flags, the orange cells = orange flags, and the green cells = conforming to the method. Two of the green cells contain the word "No" which is not in the drop down menu provided to reviewers using this spreadsheet, and may be errors or anomalies.

| Tab # | Manufacturer | Model | Test Method | Squared | Debarked | Lab | Test Loc |
|---|---|---|---|---|---|---|---|
| 1 | FPI / Regency Fireplace Products | F2450 | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 2 | FPI / Regency Fireplace Products | I2450M, HI2450M | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 3 | FPI / Regency Fireplace Products | CI2700, HI500 | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 4 | FPI / Regency Fireplace Products | F2500 | ASTM E3053 | <50% | >50% | PFS-TECO | PFS Lab |
| 5 | FPI / Regency Fireplace Products | F3500 | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 6 | FPI / Regency Fireplace Products | F5200 | ASTM E3053 | All | >50% | PFS-TECO | PFS Lab |
| 7 | FPI / Regency Fireplace Products | I2500 | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 8 | FPI / Fireplace Products International | F1150, I1150 | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 9 | Kuma Stove and Iron Works | LE, Abderdeen LE, Alpine LE | ASTM E3053 | <50% | >50% | OMNI | Myren |
| 10 | Kuma Stove and Iron Works | Classic LE, Cambridge LE, Cascade | ASTM E3053 | <50% | >50% | OMNI | Myren |
| 11 | Innovative Hearth | | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 12 | Innovative Hearth | | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Auburn |
| 13 | Innovative Hearth | | ASTM E3053 | >50% | >50% | PFS-TECO | MFG Fac |
| 14 | Travis Industries | | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 15 | Travis Industries | | ASTM E3053 | >50% | >50% | OMNI | Travis Fac |
| 16 | Travis Industries | | ASTM E3053 | >50% | No | OMNI | Travis Fac |
| 17 | Travis Industries | | ASTM E3053 | >50% | >50% | OMNI | Travis Fac |
| 18 | Travis Industries | | ASTM E3053 | >50% | >50% | OMNI | Travis Fac |
| 19 | Travis Industries | | ASTM E3053 | >50% | >50% | OMNI | |
| 20 | Travis Industries | 44 Elite | ASTM E3053 | >50% | <50% | OMNI | Travis Fac |
| 21 | Travis Industries | 36 Elite | ASTM E3053 | >50% | >50% | OMNI | Travis Fac |
| 23 | Travis Industries | Insert | ASTM E3053 | >50% | >50% | OMNI | Neilke Consu |
| 24 | Travis Industries | Large Flush Hybrid Frye | ASTM E3053 | >50% | >50% | OMNI | Travis Fac |
| 25 | HHT/Hearth & Home Technologies | Quadra Fire Pioneer - III | ASTM E3053 | >50% | No | OMNI | ?? |
| 26 | Stove Builder International Inc. | and Monaco XL, WFP100 | ASTM E3053 | CBD | CBD | Intertek | SBI |
| 27 | Stove Builder International Inc. | 2100, HT-3000, Osburn 3500, | ASTM E3053 | ALL | >50% | Intertek | SBI |
| 28 | Stove Builder International Inc. | Stratford II, FP10 Lafayette II, FP12 | ASTM E3053 | CBD | CBD | Intertek | SBI |
| 29 | Stove Builder International Inc. | FW2900-SD, Gateway 2300, and | ASTM E3053 | CBD | CBD | Intertek | SBI |
| 30 | Stove Builder International Inc. | Myriad III, Legend III, Escape 1900, | ASTM E3053 | ALL | >50% | Intertek | SBI |
| 31 | Stove Builder International Inc. | Everest II, St. Clair 3000 | ASTM E3053 | >50% | >50% | Intertek | SBI |
| 32 | Stove Builder International Inc. | 1800-I Insert, 2000 Stove, 2000-I | ASTM E3053 | CBD | CBD | Intertek | SBI |
| 33 | Dovre | Lynwood W76, SBI Cape Town 1800 | ASTM E3053 | ALL | >50% | Danish Tech | DTI |
| 34 | Jotul | F602 v2 | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 35 | Jotul | F45 V2 | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 36 | Arada Stoves Ltd | Farringdon 12 | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 37 | United State Stove Company | CH11, NM680, SW1.2, and | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 38 | United State Stove Company | CH18, NM690, SW1.8, AHWS1820 | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 39 | United State Stove Company | CH20, NM890, SW2.0, and | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 40 | United State Stove Company | CH25, NM1190, SW2.5, and | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 41 | Hussong Manufacturing Co. | Kozy Heat Z42, Kozy Heat Albany | ASTM E3053 | <50% | >50% | PFS-TECO | PFS Lab |
| 42 | Spartherm | S 600 ZC, Spartherm S 600 Module | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 43 | Spartherm | M 700 ZC, Spartherm M 700 Module | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 44 | Wolf Steel | Napoleon S20, Napoleon S20-I, | ASTM E3053 | CBD | CBD | Polytests | Poly Lab |
| 46 | Morso | B | ASTM E3053 | ALL | >50% | Danish Tech Ir | DTI |
| 61 | Morso Jernstoberi A/S | 7110b | ASTM E3053 | >50% | >50% | Danish Tech Ir | DTI |
| 77 | Hearthstone Quality Home Heating Pr | WFP100 | ASTM E3053 | >50% | Yes | Intertek | Hearthstone |
| 81 | Travis Industries | Medium Flush | ASTM E3053 | >50% | >50% | OMNI | Neilke Consu |
| 101 | A.J. Wells and Sons | Charnwood Skye E700 | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 103 | England's Stoves | 50TRW06, 15-W08, 50-SHW08, 50- | ASTM E3053 | CBD | CBD | PFS-TECO | PFS Lab |
| 104 | England's Stoves | 32-NC, 50-SNC32, 50-TNC32 | ASTM E3053 | >50% | <50% | PFS-TECO | PFS Lab |
| 109 | Jotul North America | F55V2 | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 110 | New Buck Coporation | Model 74 | ASTM E3053 | >50% | >50% | PFS-TECO | Neilke Consu |
| 111 | New Buck Coporation | Model 91 | ASTM E3053 | >50% | >50% | OMNI | Neilke Consu |
| 112 | Pacific Energy Fireplaces | FP25LE, FP25AR LE | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 113 | Pacific Energy Fireplaces | NEOSTONE 2.5 LE | ASTM E3053 | >50% | >50% | PFS-TECO | PFS Lab |
| 117 | Stove Builders International | 1700, Columbia II, Savannah II, | ASTM E3053 | Not Reported | Not Reported | Intertek | SBI |
| 119 | United States Stove Company | AW3200E | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 120 | HHT/Hearth and Home Technologies | Flexburn Catalytic Model | ASTM E3053 | <50% | <50% | OMNI | at VC, Bethe |
| 121 | HHT/Hearth and Home Technologies | FlexBurn Model | ASTM E3053 | <50% | <50% | OMNI | |
| 122 | Woodstock Soapstone Company | 202 Palladian, 204 Keystone | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 123 | Woodstock Soapstone | 205 Fireview Catalytic | ASTM E3053 | >50% | >50% | Polytests | Poly Lab |
| 124 | Woodstock Soapstone Company | 210 Ideal Steel | ASTM E3053 | <50% | >50% | Polytests | Poly Lab |
| 127 | Stove Builders International | 1.7, Solution 1.7, Osburn 1700, | ASTM E3053 | Not Reported | Not Reported | Intertek | SBI |
| 128 | Morso Jernstoberi A/S | 2B Stardard 2020 | ASTM E3053 | >50% | >50% | Danish Tech Ir | DTI |
| 129 | United State Stove Company | US2941EB, VG4020, AW40E, AW40 | ASTM E3053 | <50% | >50% | Polytests | Poly Lab |
| 130 | Woodstock Soapstone Company | 209a Progress Hybrid | ASTM E3053 | <50% | >50% | Polytests | Poly Lab |
| 131 | Woodstock Soapstone Company | 210a Ideal Steel Hybrid | ASTM E3053 | DUPLICATE REVIEW | | Polytests | Poly Lab |
| | Travis Industries | Large Flush Wood Insert | ASTM E3053 | >50% | >50% | OMNI | Travis Fac |

The ADEC reviews of "Squaring" and "Debarking" generated 89 red flags, 26 yellow flags, and 2 orange flags (117 flags total) Nearly every stove failed to conform to the method, or at least to ADEC's interpretation of the method.

I can't really leave the debarking debacle without providing some more photographs. All of these are from Woodstock Soapstone Company test reports, but I have looked at a number of test reports for stoves manufactured by other companies, and can state that these are NOT isolated accidents of interpretation; rather they are the rule.



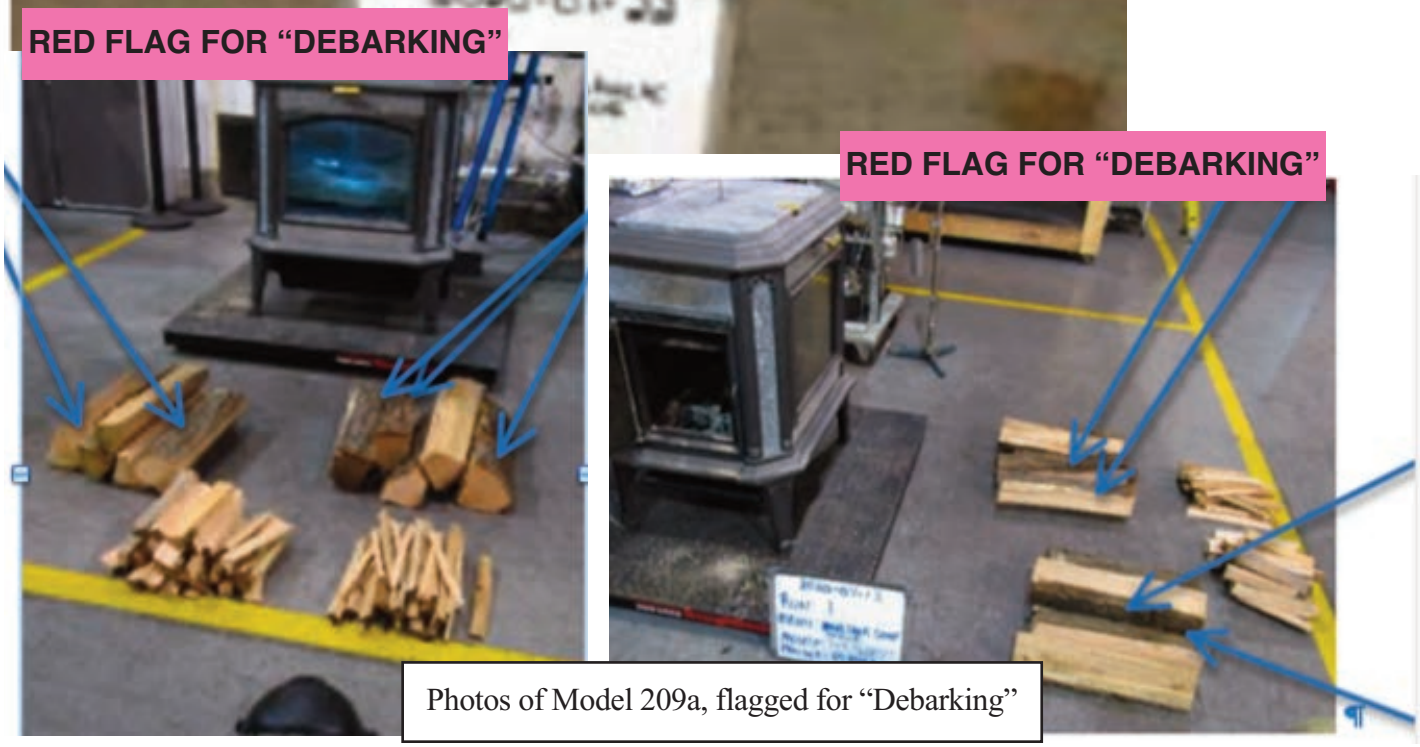

Photos of Model 210 (reviewed earlier, twice) and flagged for "Debarking".


Photos of Model 205, flagged for "Debarking" AND "Squaring"

The "Assessment" claims that "90% of the stoves tested using ASTM E-3053 used debarked wood or failed to provide information about whether there was bark on the fuel." (Assessment page 38) The "Assessment further claims that "61% of the stoves tested with ASTM E-3053 used squared wood for more than 50% of the pieces" (Assessment page 33), including the stove immediately above (Model 205) and the fuel for Model 202/204, pictured on pp 10-11.

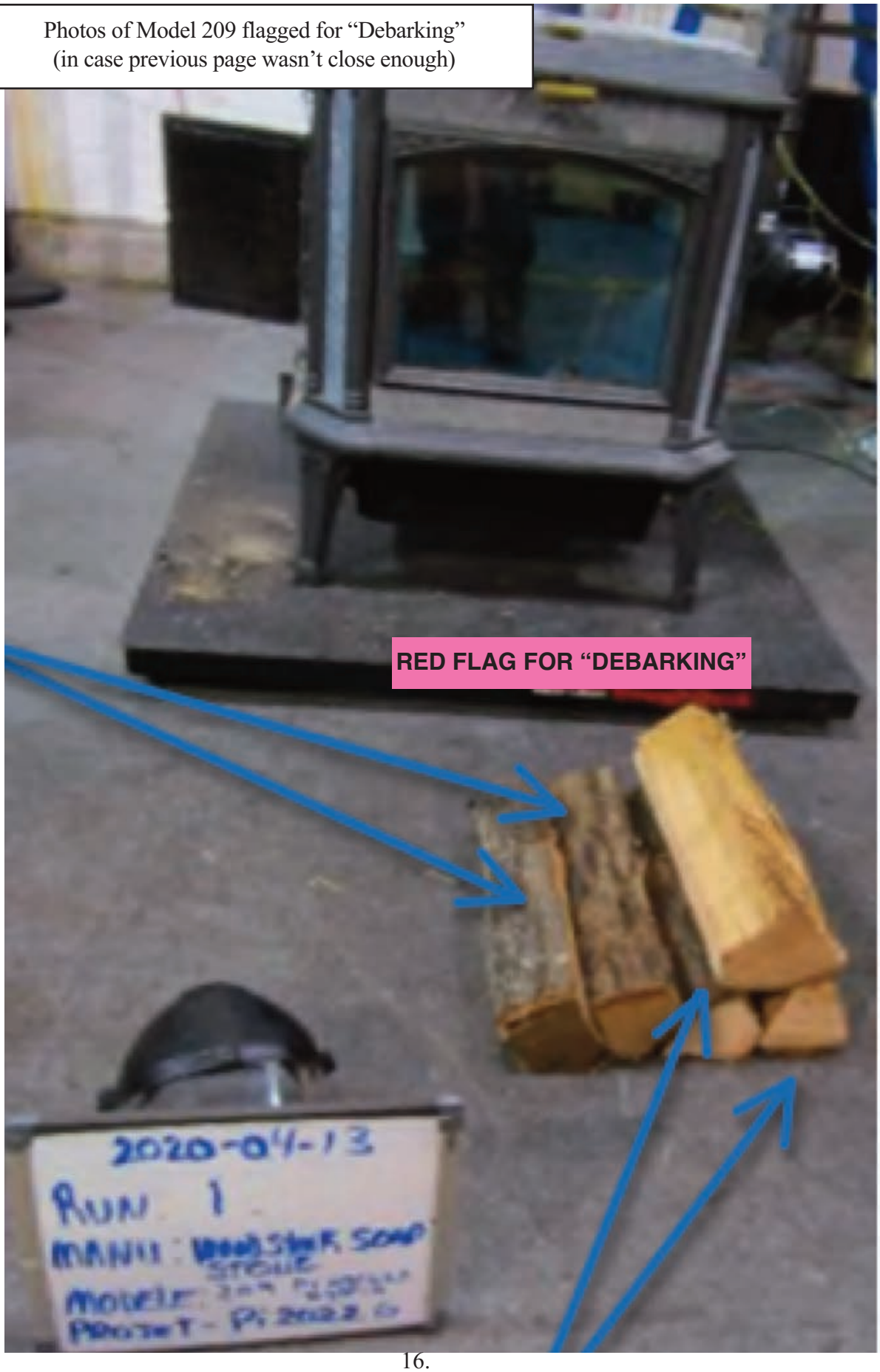
Based on my review, I cannot believe either of these claims. If the basic data underlying the "Assessment" is defective, then it's claims of numerous deficiencies in testing and reporting, and it's criticisms of ASTM E-3053 are suspect, because they are based on bad data.


Photo of Model 205, flagged for “Debarking” AND “Squaring”




Photos of Model 209a, flagged for “Debarking”

Photos of Model 209 flagged for “Debarking”
(in case previous page wasn’t close enough)



Photos of Model 209a again, this time showing fuel load for day 2; medium burn load to the right of the stove (in case previous page

RED FLAG FOR "DEBARKING"

Run 2.1 ¶ ¶

RED FLAG FOR "DEBARKING"

Run 2.1 ¶

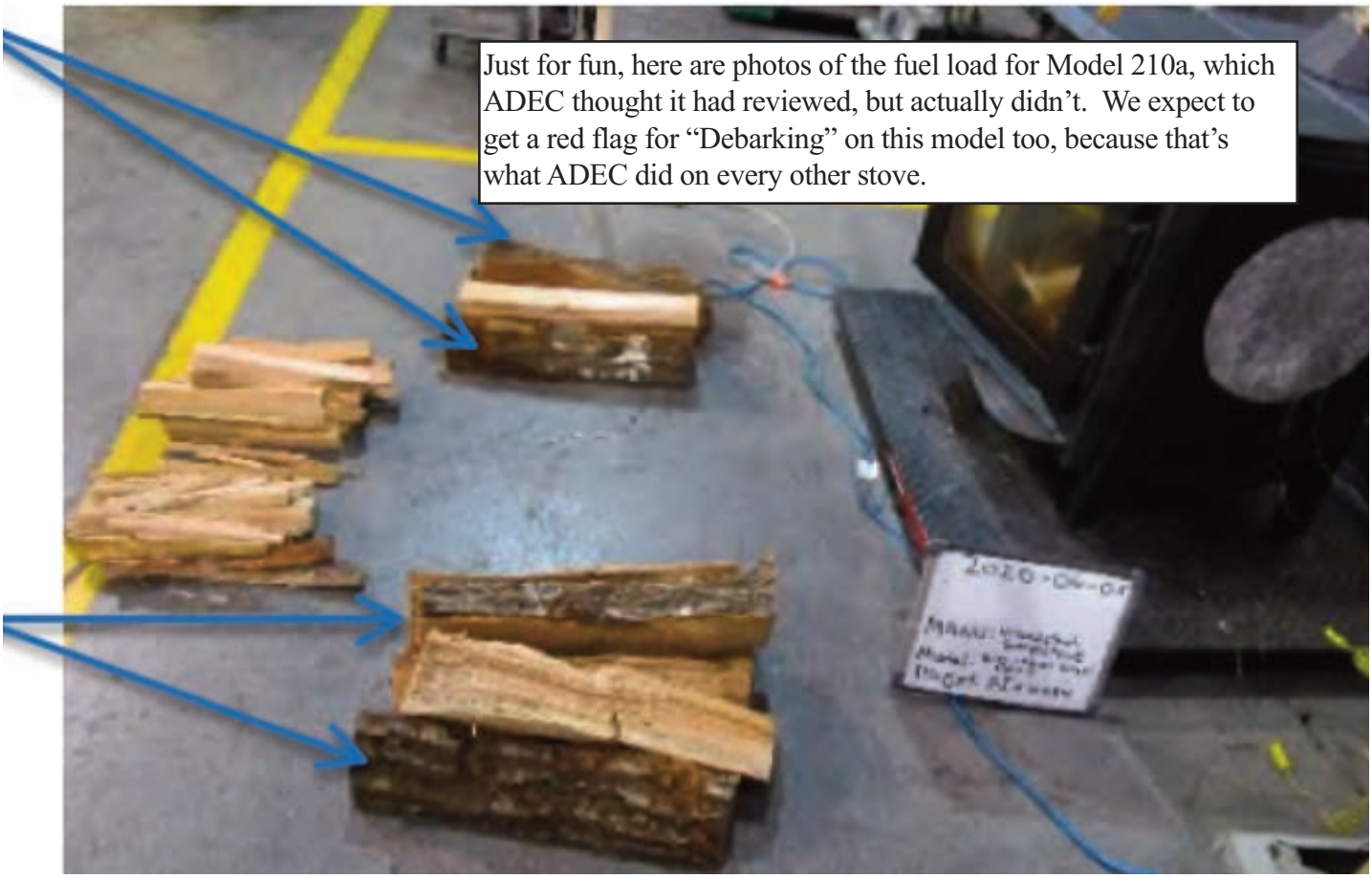
RED FLAG FOR "DEBARKING"

¶

Run 2.1 ¶

All of the red flags pictured here, and in dozens of additional Summary Sheets compiled by ADEC, are used to discredit ASTM E-3053, and paint a negative picture of EPA, woodstove test labs, third party certifiers, and woodstove manufacturers.

These pictures are not what NESCAUM/ADEC represent them to be - i.e., evidence of tampering with test fuel by stripping off the bark and squaring it to resemble dimensional lumber. You can see it with your own eyes.




The ADEC "Decision Matrix", developed in concert with NESCAUM, identifies 6 disqualifying elements associated with the ASTM E-3053 Method. Four of these six disqualifying elements have to do with preparation and loading of the test fuel. These four pertain to 1) whether the cordwood pieces were "squared" to approximate dimensional lumber, 2) whether the cordwood pieces have been "de-barked,"3) the length of the cordwood, and 4) the direction in which the pieces are loaded. Evaluation of these 4 elements often relies on a subjective review of photographs in test reports. A fifth element has to do with: 5) whether "manufacturers used the "full firebox volume to calculate fuel volumes." The final disqualifying element is: 6) a "concern" that if the burn rate differential is less than 0.30 kg/hr between the low and medium burns, then the medium burn "is a non-representative test that impacts emission outcomes." I am not aware of any factual basis for this 6th concern.

ADEC openly states that it does not anticipate approving stoves that were tested using ASTM E-3053:

> "The highlighted devices are either devices that were tested using a method that was not referenced in the federal rule or whose certification test report deficiencies may be uncorrectable without a retest that conforms to test method and rule requirements. ADEC has not approved the alternative method used, ASTM 3053, in accordance with 18 AAC 50.077(c)(3)(iii). ***It is anticipated that these devices are expected to be removed from the approved list when their milestone date (a date given to address test report issues) expires unless the manufacturer addresses their report issues."*** (ADEC website, emphasis added)

Based on a preliminary review of ADEC's application of the 6 disqualifying elements it applies to ASTM E-3053, it appears to this reviewer that ADEC will approve few, if any, stoves tested with ASTM E-3053. But ADEC would, however, approve stoves tested with cordwood if they use the IDCTM Method developed by its partner, NESCAUM. The IDCTM is ADEC's only approved method. This is naked bias error, plain and simple.

Consistent with it's arbitrary teatment of "Squaring" and "Debarking," ADEC also established a penalty (i.e. assigment of a flag) for stoves that have a medium burn rate that is separated from their low burn rate by less than 0.30 kg/hr. ADEC makes this judgment without considering the overall relationship between low and high burn, particularly in stoves with small fireboxes. ADEC chooses a metric of kg/hr, rather than burn time or BTU output and describes its imposition of a 0.30 kg/hr separation as a "more representative" medium burn than a rate that is closer than 0.3 kg/hr to the low burn rate.

Authors of the "Assessment" are cetainly aware that for the medium burn rate on ASTM E3053, a burn that is *too high* (more than the mid-point between low and high) is punished financially by having to repeat the test again to achieve a lower burn rate. The financial incentive is to aim well under the mid-point. But in any event, the selection of 0.30 kg/hr is completely arbitrary, not required by the ASTM E-3053 method, and has no regulatory basis whatsoever.

The "Assessment claims that there is more separation between between low and medium burns on the crib method, but it also remarks that on the cordwood method stove temperatures are higher, burn times are longer, and so on. That's because *it is a different method.* Maybe the method needs to be reviewed or altered, but the "Assessment" is certainly not the way to do it.

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I hope to have Part 2 in mid-June. There is a lot more to unpack in the "Assessment," including:

- The overall "Assessment" review strategy, and whether it is a credible basis for proceeding to the conclusions that the "Assessment" tries to comes to. This strategy is basically to make a list of each and every requirement imposed by the NSPS, and then see if each and every item on the list can be identified in test reports, no matter how obscure or irrelevant the requirement might be. Otherwise, deficiencies are claimed by NESCAUM/ADEC without any apparent oversight or review, or any basis in fact.

- The nexus of firebox size and calculation, loading direction, fuel length, and loading density. These are the second set of elements that the "Assessment" uses to criticize ASTM E-3053.

- I'll review this sentence, and how it has spawned innumerable "flags" (i.e., claims of violations of the NSPS) in the "Assessment"'s flag-collection effort:

"Documentation must include discussion of each test run and its appropriateness and validity, and it must include detailed discussion of all anomalies, whether all burn rate categories were achieved, any data not used in the calculations and, for any test runs not completed, the data collected during the test run and the reason(s) that the test run was not completed and why."

This single sentence has been used to generate hundreds of RED flags. The interpretation, expansion and application of this sentence, along with the multitude of flags it has generated, needs a serious review

- Once we finish looking at NESCAUM/ADEC's data collection methods and results, we can look at their statistical analysis and conclusions. Maybe in Part 3.