ENERGY STAR® for Computers

Verification Testing Guidelines and Procedures Manual
Version 1.0

February 20, 2009
NOTE: Verification testing under the following guidelines and procedures manual will begin no sooner than July 1, 2009, pending the availability of at least three accredited laboratories available to test product configurations as described in this document.

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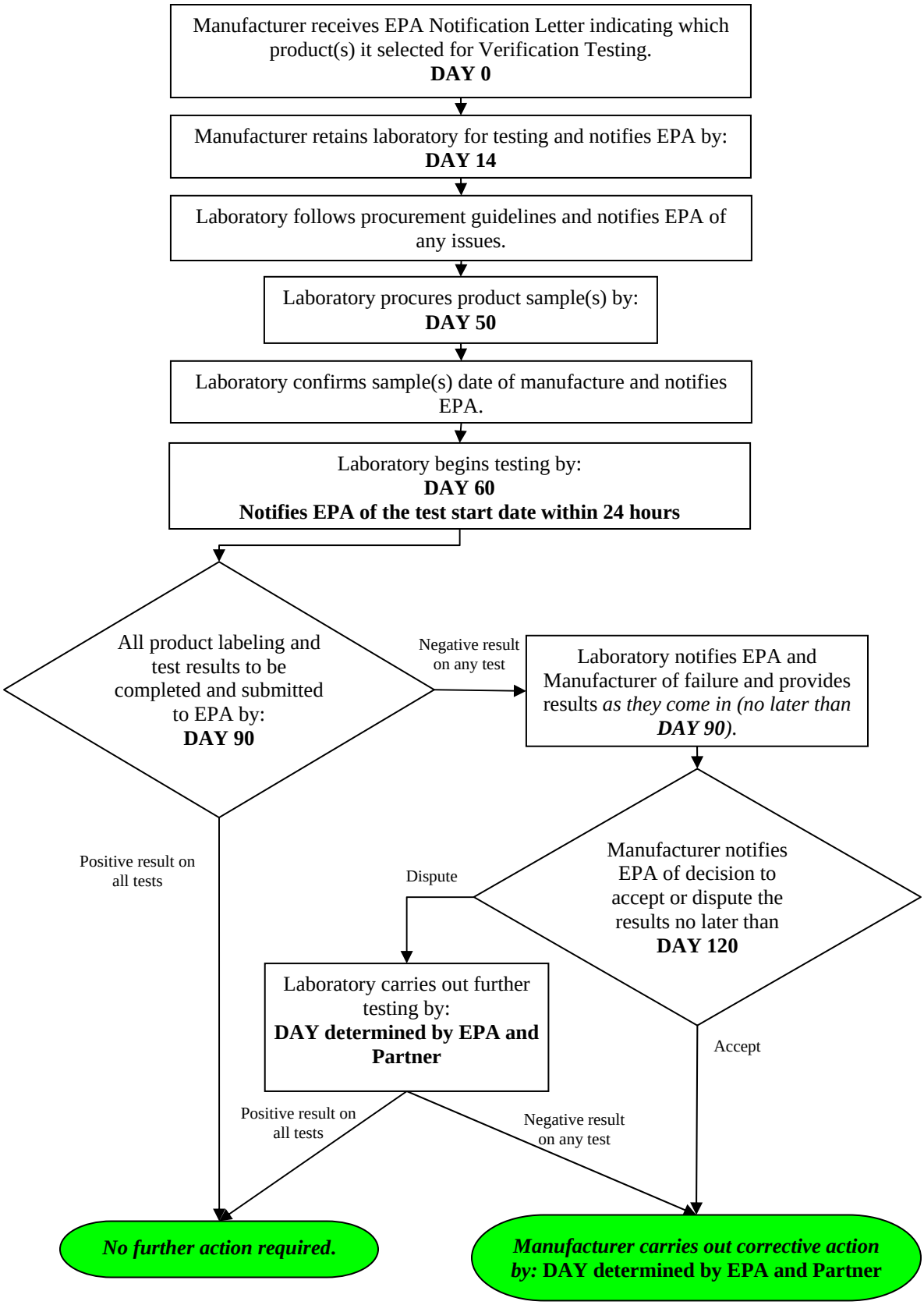
I. Summary

This manual contains verification testing guidelines and procedures for conducting product testing as specified in the ENERGY STAR Program Requirements for Computers. These procedures include:

- Computer Verification Testing Milestones and Reporting Deadlines
- EPA Selection of Computer Manufacturing Partners and Products
- Partner Selecting of Testing Laboratory
- Laboratory Computer Procurement and Sampling
- Laboratory Sample Receiving and Handling
- Sample Testing and Reporting
- Submission of Final Report
- Product Failure and Delisting Process

The purpose of verification testing is to provide regular checks on the ENERGY STAR self-qualification process by requiring impartial testing of ENERGY STAR qualified products in accredited laboratories. The guidelines and procedures set forth in this document are intended to ensure appropriate testing and will enhance ongoing ENERGY STAR program integrity efforts.

Computer Verification Testing Milestones and Reporting Deadlines



II. EPA Selection of Computer Manufacturing Partner and Products

The Environmental Protection Agency (EPA) may select computer products for Verification Testing (testing) at any time, but it is anticipated EPA will select products in batches once per year. Initial product nomination begins with product configurations recommended for testing by EPA. Additional product configurations may be nominated by retailers, manufacturers, or other industry stakeholders, or selected randomly from the ENERGY STAR Qualified Product list. Computer products currently covered by this verification testing process include Desktop, Integrated, and Notebook Computers and Workstations. Verification testing for game console, small-scale server and thin client products will be discussed in continued discussions on product verification testing.

To alleviate the burden on any one manufacturing Partner (Partner), none shall have more than five (5) product configurations selected for testing per year. Further, EPA will not select for testing any products the Partner has discontinued.

EPA shall notify each Partner in writing which of its product configurations have been selected for testing, and provide 14 days[1] for the Partner to contract with an accredited testing laboratory. The 14 days shall begin upon Partner receipt of the EPA Notification Letter as verified by express mail delivery notification. An example of the EPA Notification Letter is available in *Appendix B.*

III. Partner Selection of Testing Laboratory

Within 14 days from the date of receipt of the EPA Notification Letter, the Partner shall retain an accredited testing laboratory, authorize the laboratory to share all test data and results with EPA, and notify EPA[2] it has done so.

In order to conduct verification testing to determine whether product configurations meet ENERGY STAR requirements, the product configuration must be tested in a laboratory that is accredited by an accreditation body that is a signatory, in good standing, to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) that verifies, by evaluation and peer assessment, that its signatory members are in full compliance with ISO/IEC 17011 and that their accredited laboratories comply with ISO/IEC 17025.

NOTE: Per ISO/IEC 17025, accredited laboratories must be "able to demonstrate that they are impartial and that the personnel are free from any undue commercial, financial and other pressures which might influence their technical judgment." Where the accredited "laboratory is part of a larger organization, the organizational arrangements should be such that departments having conflicted interests, such as production,

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[1] All timeframe data is to be considered in calendar days. If a reporting date falls on a weekend or holiday, then the required information must be reported on the next business day.

[2] In all cases throughout this document, unless otherwise indicated, the laboratory shall send all communications to EPA or its contractor at computers@icfi.com. Any reference to sending deliverables to EPA shall be read to include EPA's contractor.

commercial marketing or financing do not adversely influence the laboratory's compliance with the requirements" of the ISO standard.

A laboratory's Scope of Accreditation must reflect its specific competence to carry out the test procedures as outlined in the ENERGY STAR Program Requirements for Computers. Specific test procedures are described in *Appendix A.*

Manufacturers may use qualified in-house labs to perform verification testing. Following the requirements of ISO 17025 will ensure that the testing facility is independent from financial or other organizational pressures that may impact testing and reporting.

The computer Partner is responsible for the laboratory meeting all deadlines, sending deliverables to EPA within the allotted time, and providing accurate and complete reports. Failure by the laboratory or the computer Partner to meet the deadlines or provide accurate and complete reports may result in EPA immediately delisting the computer model from the ENERGY STAR Qualified Product list.

EPA recommends Partners establish agreements with one or more laboratories to expedite verification testing. The Partner is responsible for sending the testing request to the laboratory and ensuring that the laboratory has the qualifications, capacity, and appropriate staff to meet the testing and scheduling requirements for verification testing required in the ENERGY STAR Program Requirements for Computers.

If the Partner refuses to engage with a qualified laboratory to conduct the testing, EPA will de-list the Partner's specific product(s) selected for testing. This action will include, but may not be limited to, sending a notification letter to the Partner and notifying retailers that the product has been de-listed. The Partner will be required to take actions required under EPA's standard operating procedure for delisting products in *Appendix E*.

If the Partner continues to refuse to engage in verification testing in the next round, then the following will occur:

- The manufacturer's ENERGY STAR Partnership Agreement shall be terminated;
- all of its qualified products shall be removed from the Qualified Product list;
- the manufacturer shall be removed as a Computers Partner on the ENERGY STAR Web site;
- retail partners shall be notified the manufacturer is no longer a Partner and its computers are no longer recognized by ENERGY STAR; and,
- after a minimum of a six (6) month period, the manufacturer may be considered for rejoining the program and signing a new Partnership Agreement.

IV. Laboratory Computer Procurement and Sampling

Upon laboratory retention, the Partner shall provide the laboratory with a list of the names and URLs or off-line addresses of at least one retailer from which the sample may

be purchased, including the manufacturer website and sales call center if relevant. The Partner shall verify at the time it creates this list that the product configurations to be tested are available through those retailers. In the case that the product configuration is prohibitively expensive through direct purchase, the Partner must first notify EPA and then provide a randomly selected production representative product for testing. Product configurations which cost greater than US $5000 will qualify for this provision. For in-house laboratories, units may be obtained from the production line, but must be representative of other units coming off the manufacturing line.

The Partner shall also provide details on proprietary test setups, including specific equipment, as appropriate. For example, smart power supplies may require specific proprietary test equipment for which only the manufacturer has access.

The Partner shall authorize the laboratory to share all test data and results with EPA, as well as purchase documentation. An example of purchase documentation would be a copy of the invoice with the unit serial number to indicate proof of purchase and source of purchase. The Partner shall also request that the laboratory notify the Partner when they have successfully purchased the sample for testing and not provide any details on the specific product configuration obtained (e.g., order number, serial number). The laboratory may, at their discretion, include the Partner in all other communications between the laboratory and EPA.

Within 50 days from the date the Partner receives the EPA Notification Letter, the laboratory shall procure one sample of each product configuration to undergo testing from a retailer on the Partner-supplied list, or an alternate source of the laboratory's choosing. In-house laboratories may obtain the unit from their manufacturing line, but take full responsibility to ensure the unit is representative of all other units. For third-party laboratories, if within 30 days from the date the Partner receives the EPA Notification Letter, the laboratory is unable to locate samples on the open market, it shall inform EPA of this via email. Prohibitively expensive product configurations provided by the Partner must be shipped to the laboratory within 30 days from the date the Partner receives the EPA Notification Letter. In this case, the product configuration provided must be a randomly selected production representative product.

The laboratory shall require two-day shipping to ensure the receipt of samples in a timely manner and minimize the risk of lost or damaged samples. Note that while the laboratory shall be responsible for sample purchasing, failure to meet the 50-day deadline shall be the responsibility of the computer Partner. If the laboratory has ordered a sample but it has not arrived within the 50-day deadline or it is damaged upon receipt, the laboratory shall notify EPA via email of the details of the cause of the delay. If EPA does not receive this detailed notification of a delayed, lost or damaged sample, and there is no further communication from the laboratory or manufacturer, EPA may at its discretion begin delisting the computer model. EPA will inform the Partner prior to taking this action.

If a sample is damaged during shipment, the laboratory shall immediately begin the return goods authorization process, order a replacement, and inform EPA via email of the damage and expected new arrival date.

The Partner is responsible for the laboratory obtaining the correct product. It is recommended that the Partner stay in frequent communication with the laboratory to make sure the models procured by the laboratory are the models selected by EPA.

Upon sample receipt, the laboratory shall confirm with the Partner the date the sample was manufactured and inform EPA via email of that date.

V. Sample Testing and Reporting

A. Testing and Reporting Timeline

The laboratory shall commence testing **no later than 60 days** from the date the Partner receives the EPA Notification Letter, and notify EPA of the test start date, via email, within 24 hours of the testing start date. If there are delays in obtaining the product, EPA and the Partner shall agree upon a date by which testing shall commence.

The laboratory shall review product packaging, product literature (e.g., instruction manual, specification sheet), the product itself, and the Partner's Web site to determine if ENERGY STAR Labeling and User Information requirements have been met (as outlined in "ENERGY STAR Program Requirements for Computers").

EPA will provide the *Test Reporting Template*, including a customized "milestone" reporting calendar, to the Partner upon Partner receipt of the EPA Notification Letter as verified by express mail delivery notification, and the Partner shall forward this form to the laboratory upon its retention. The Partner is responsible for ensuring that the laboratory uses this form to submit results to EPA, per the guidelines and timeframe detailed in *Section VI*, below. See *Appendix B* for a sample of this form. The laboratory shall also attach digital photograph files of the sample, packaging, and product literature to the email message to EPA.

The laboratory shall share preliminary test results with EPA via email, within two days of conducting testing. Requirements for the laboratory to keep the unit beyond completion of testing are at the discretion of the Partner.

Upon completion of testing, the Partner may request the tested product from the laboratory.

B. Testing Guidelines

Testing should be carried out as described in the ENERGY STAR Program Requirements for Computers.

VI. Submission of Final Report

The laboratory shall submit the final test report to EPA, via email, **within 90 days** from the date the Partner receives the EPA Notification Letter, unless a separate date is agreed upon by EPA and the Partner. This final report shall include the information included on the Test Reporting Template.

Failure of the laboratory to submit the final report by the agreed upon deadline will result in EPA notifying the Partner via phone and email. If no extension is established between EPA and the Partner, EPA may at its discretion begin the process for delisting the computer model.

VII. Product Failure and Delisting Process

EPA follows standard operating procedures (SOP) for addressing product performance failures supported by laboratory test documentation. First, EPA determines whether the product fails to meet ENERGY STAR requirements by following the standard operating procedure for product failure and dispute resolution in *Appendix D*. If EPA determines that the product fails, then EPA and the Partner take the steps outlined in the standard operating procedure for delisting products in *Appendix E*.

EPA will make public information about the number of models and samples tested, the characteristics of these models, and the number of models that passed.

Appendix A: Test Procedures for Scope of Accreditation

The following test procedures should be included in the laboratory's Scope of Accreditation to reflect specific competence to carry out the ENERGY STAR Program Requirements for Computers.

Test:	Test Methods
Power Supply Efficiency	IPS Generalized Internal Power Supply Efficiency Test Protocol Rev. 6.4.2; EPS Energy Star Test Method for External Power Supplies (April 2004)
E_{TEC} (from measurements of Off Mode, Sleep Mode, and Idle state	Energy Star Computer Test Method (Version 5.0), Section 3 (Appendix A)
P_{TEC} Off Mode, Sleep Mode, and Idle State	Energy Star Computer Test Method (Version 5.0),Section 3 (Appendix A)
Maximum Power	Energy Star Computer Test Method (Version 5.0), Section 3 (Appendix A)

Appendix B: Test Reporting Template

Laboratory Information	
Laboratory Name	
Contact Name	
Phone Number	
Fax Number	
Mailing Address	
Email Address	
Date of Agreement between Laboratory and Manufacturing Partner	
Date Sample Testing Began	
Date Sample Testing Completed	
Test Equipment Information	
Meter Manufacturer and Model #	
AC Line Voltage Source Manufacturer and Model #	
Network Connection Description	
Computer Purchasing Information	
Purchase Date	
Purchase From (Full Company Name)	
Purchase Location (city and state, or Web site URL)	
Computer Information	
Computer Manufacturer/Brand	
Computer Model Number	
Computer Serial Number	
Computer Type (Desktop, Notebook, etc.)	
Computer Configuration Information	
Processor Make	
Processor Type/Model	
Processor Speed per Core (GHz):	
Number of CPU Cores per Processor Package:	
Number of Discrete Processor Packages Installed	
Operating System	
Installed Hard Drives	
Number of Hard Disk Drives	
RPMs for Hard Disk Drives	
Number of Solid State Drives	
System Memory (GB)	
# of DIMMs Installed	
Size of Display (Notebooks and Integrated Computers, Only)	
Video Card (GPU) Brand	
Video Card (GPU) Model Number	
Discrete GPU, as defined in the ENERGY STAR Specification? (Y/N)	
Discrete GPU Frame Buffer Width	
Video Card Dedicated Non-Shared Memory (MB)	
Ethernet capable system? (Y/N)	
Consumer Information Parameters (pass/fail)	
Product Packaging	

EPA will provide an electronic copy of the reporting template to each manufacturer upon manufacturer receipt of the EPA Notification Letter as verified by express mail delivery notification. It is the manufacturer's responsibility to make sure the laboratory uses the EPA template for reporting test results.

Product Literature (electronic or hard copy)		
Product Itself		
Computer Test Data – General		**Meets ENERGY STAR Requirements?**
WOL Enabled From Sleep		
WOL Enabled From Off		
Power Management Default Setting - Display		
Power Management Default Setting - Computer		
Computer Test Data – Desktop, Integrated Desktop, Notebook		**Meets ENERGY STAR Requirements?**
Category for TEC Criteria		
Eligible Capability Adjustments (kWh)		
TEC Requirement (with adjustments)		
Power in Off		
Power in Sleep		
Power in Idle		
TEC		
Computer Test Data – Workstation		**Meets ENERGY STAR Requirements?**
Power in Off		
Power in Sleep		
Power in Idle		
Maximum Power		
P_{TEC}		
Power Supply Information		
Power Supply Manufacturer		
Power Supply Model Number		
Power Supply Test Data		**Meets ENERGY STAR Requirements?**
Computer Uses an External Power Supply? (Y/N)		
EPS – Nameplate Output Power		
EPS – Nameplate Output Voltage		
EPS – Nameplate Output Current		
EPS – No Load power		
EPS - Average Active Efficiency		
EPS – Power Factor at 100% Output		
Computer Uses an Internal Power Supply? (Y/N)		
IPS – Nameplate Output Power		
IPS – Power Factor @ 100% rated output		
IPS – Efficiency @ 20% rated output		
IPS – Efficiency @ 50% rated output		
IPS – Efficiency @ 100% rated output		

Appendix C: Computer Verification Testing Notification Letter – Example

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
AIR AND RADIATION

Date

Name
Title
Company
Address
City, State Zip

Dear [Name]:

As you are aware, *ENERGY STAR® Program Requirements for Computers: Version 5.0* includes a Verification Testing Protocol. The purpose of this letter is to notify you that the Environmental Protection Agency (EPA) has selected [company name] computer model(s) [XXX] for verification testing.

Per the requirements of the Verification Testing Protocol, [company name] shall retain a qualified manufacturer-independent, accredited testing laboratory within **14 calendar days** of this notification. [company name] shall authorize the laboratory to share all test data and results with EPA. The following performance parameters shall be tested and consumer information verified:

Performance Parameters:
Computer Test Data:
- Idle Category
- WOL Enabled From Sleep
- WOL Enabled From Off
- Idle Power
- Sleep Power
- Off Power
- Power Management Default Setting - Display
- Power Management Default Setting – Computer

Power Supply Test Data:
- EPS – No Load power

EPS - Average Active Efficiency
EPS – Power Factor (where applicable)
IPS – Power Factor @ 100% rated output
IPS – Efficiency @ 20% rated output
IPS – Efficiency @ 50% rated output
IPS – Efficiency @ 100% rated output

Consumer Informational Parameters
Product Packaging (applicable only when product is obtained through a retail channel)
Product Literature (one piece of collateral material in the box – hard copy or electronic - should include the ENERGY STAR certification mark)
Product Itself

[company name] shall provide the laboratory a list of at least three (3) locations where it may purchase this product configuration. These locations may include on- or off-line retailers and may also include the manufacturer website or sales call center. If this product configuration is prohibitively expensive and you choose to supply the product for testing, please notify EPA within 30 days and provide a randomly selected production representative computer to the laboratory.

The laboratory shall procure the sample and begin testing **no later than 60 calendar days** from the date this EPA Notification Letter is received. If the sample fails to meet the same informational or performance parameters of the ENERGY STAR specification, the model(s) and all related models (where listed under a product family) will be considered for corrective action or delisted. Further, in accordance with EPA's *Standard Operating Procedure for Product Failure and Dispute Resolution,* the model may be removed from the ENERGY STAR Qualified Product list as addressed under EPA's *Standard Operating Procedure for Delisting Products*. Both of these documents are included below.

In addition, [Company Name] is responsible for the laboratory meeting all deadlines, sending deliverables to EPA or its contractor within the allotted time, and providing accurate and complete reports as defined below *and* in the *Verification Testing Guidelines and Procedures Manual Version 1.0*. Failure by the laboratory to meet the deadlines or provide accurate and complete reports may result in EPA immediately disqualifying the computer(s) being tested.

[Company Name] shall complete the following NEXT STEPS:
Note: all email correspondence to EPA listed below shall be directed to computers@icfi.com.

1. **Within 14 calendar** days of this notification, commission an accredited testing laboratory and direct the laboratory to begin testing. [Company Name] is required to authorize the laboratory to release all test data and results to EPA. Receipt of this letter by [Company Name], verified through Express Mail tracking, begins the 14-

day period.

2. Instruct the laboratory to notify EPA, via email, the date that testing begins **within 60 calendar days** from the date of this notification letter. The email shall be sent out within 24 hours of testing start date.

3. Instruct the laboratory to send all test results and consumer informational parameter results directly to EPA, via email, **within 90 calendar days** of this notification letter.

4. In the event of retesting, instruct the laboratory to send the FINAL test report directly to EPA, via email, **within 120 calendar days** from the date of this notification letter.

Attached to this letter are the *Verification Testing Guidelines and Procedures Manual Version 1.0* and a *Test Reporting Template*. Please provide these documents to the manufacturer-independent accredited laboratory that is performing the tests, and instruct the laboratory to send all correspondence to EPA, via email to computers@icfi.com.

Should you have any questions, please contact Josh Forgotson at jforgotson@icfi.com. Your prompt attention to this important process is appreciated.

Sincerely,
[EPA personnel]
[EPA address]

Appendix D: Standard Operating Procedure for Product Failure and Dispute Resolution

This Standard Operating Procedure (SOP) describes EPA's process for determining qualified product failures based on documented testing conducted by an accredited laboratory.

A. Review and compare the laboratory test results with product information already submitted by the ENERGY STAR Partner.
   i. Obtain clarification on the data, test results, and testing methods from the third party source, if necessary.
   ii. Develop a summary of non-compliance issues for internal ICF/EPA review.

B. Determine whether the test results are sufficient to conclude that the model did not meet ENERGY STAR performance requirements.

C. Provide written notification to Partner via FedEx indicating that their model did not meet ENERGY STAR performance requirements. Upon notification of a product failure, the Partner may:
   - Accept the test results and:
     - **within 30 days** of the laboratory sending the final test report to EPA, notify EPA of its decision to accept the test results; and,
     - immediately upon informing EPA of its decision to accept the results, take the actions required for delisting products under the Standard Operating Procedure for Delisting Products in Appendix E:
   - Dispute the test results:
     - The Partner may dispute the test results if it has evidence that the laboratory:
       - misinterpreted the ENERGY STAR specifications by selecting inappropriate tests;
       - performed a test incorrectly;
       - contaminated the sample during testing; or,
       - misinterpreted the results of a test.
     - The Partner shall submit the dispute in writing to EPA **within 30 days** of the laboratory sending the final test report to EPA. After the 30-day period, the Partner shall lose the right to dispute the laboratory findings. The written dispute shall include:
       - clear reason for the dispute; and,
       - documentation supporting the dispute claim.
     - EPA will review the dispute within 30 days upon receipt of documentation, and respond with a decision that may include any of the following actions:
       - reject the dispute and uphold the laboratory findings;
       - reverse the outcome and determine that the product meets the performance requirements; or,
       - find that the laboratory test results may be incorrect and grant the Partner the option to conduct additional testing to prove the product meets the

qualification requirements of ENERGY STAR. The Partner would be responsible for any additional testing fees.

- If the Partner takes no action **within 30 days** of the laboratory sending the final test report to EPA, EPA will consider the Partner to have accepted the test results. Further, the Partner shall be required to follow the steps contingent upon accepting the test results, as outlined in the Standard Operating Procedure for Delisting Products in Appendix E:.

D. Testing information indicating performance failures supplied to EPA by a third party will be handled on a case-by-case basis as it relates to this SOP. A third Party is any organization other than EPA or one of its contractors. Third parties include, but are not limited to utilities, energy efficiency program sponsors, energy efficiency program administrators, manufacturers, and retailers.

Appendix E: Standard Operating Procedure for Delisting Products

EPA has established the following protocol to delist "unqualified" products on the ENERGY STAR Qualified Product List. An unqualified product is a product that does not meet the current ENERGY STAR program and specification requirements.

1) EPA or DOE notifies the product manufacturer that the product will be removed from the ENERGY STAR Qualified Product List on the Web site and requests a corrective action plan from the manufacturer.

2) Upon notification, the manufacturer must immediately

- stop shipment of the model with the ENERGY STAR mark;
- suspend the labeling of the unqualified product with the ENERGY STAR mark;
- remove or obscure the ENERGY STAR mark on product units within its control; and
- remove or obscure the ENERGY STAR mark on all collateral materials such as product packaging, Web pages and other marketing materials associated with the product.

Depending on the amount of mislabeled product in the distribution chain and the nature of the mislabeling and distribution, EPA may require the Partner to remove or obscure labels on products already shipped. Within 30 days upon receiving written notification from EPA that such actions must be taken, the Partner must provide EPA with a corrective action plan that confirms the above actions were/are being taken and informs EPA as to whether the Partner plans to re-qualify the product at a later date. EPA and/or an ENERGY STAR representative will work with the Partner throughout the process until it is considered resolved by the Agency.

For products that are commonly sold through retail channels and/or subject to financial incentives, EPA may notify retail partners and Energy Efficiency Program Sponsors (EEPS) that a product is considered "unqualified," and has been de-listed from the ENERGY STAR Web site. In the case that issues cannot be resolved through the actions listed above, delisted models may be posted at www.energystar.gov along with the Partner name, model number, date of delisting, and a standardized note explaining why the models were delisted (e.g., "Retired Model - Removed from Web site per Partner request," or, "Unqualified Model - Removed from Web site due to failure to meet ENERGY STAR specification.")

At any time, the Partner may resubmit products with appropriate test data for re-qualification. Products submitted to EPA for re-qualification must be submitted with a new model number or unique identifier.

As the ENERGY STAR name and logo are registered marks belonging to the U.S. government, EPA must ensure they are used correctly in order to protect the integrity of the program they represent. Any Partner that uses the name and/or logo improperly and fails to take corrective action upon EPA request may be subject to termination of its ENERGY STAR Partnership Agreement, and legal action through EPA's Office of General Counsel.