

Date: March 23, 2015

Case: Notice of Proposed Rulemaking for Hearth Products Standards Meeting



Ace-Federal Reporters, Inc.
Phone: 202-347-3700
Fax: 202-737-3638
Email: info@acefederal.com
Internet: www.acefederal.com

U. S. DEPARTMENT OF ENERGY PUBLIC MEETING
NOTICE OF PROPOSED RULEMAKING FOR
HEARTH PRODUCTS STANDARDS MEETING

U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585
Room No. 8E-089

Monday, March 23, 2015
9:00 a.m.

1 Appearances for Department of Energy meeting.
2 Doug Brookman - Public Solutions
3 John Cymbalsky - DOE
4 Ashley Armstrong - DOE
5
6 Timothy Ballo - Earthjustice
7 Leslie S. Bortz - RH Peterson Co.
8 Robert J. Dischner - RH Peterson Co.
9 Michael A. Caldarera - National Propane Gas
10 Association
11 Ryan Carroll - Hearth, Patio & Barbecue Association
12 Rachel Feinstein - Hearth, Patio & Barbecue
13 Association
14 Jack H. Goldman - Hearth, Patio & Barbecue
15 Association
16 John A. Hodges - Wiley Rein LLP
17 Caroline Davidson-Hood - Air-Conditioning, Heating &
18 Refrigeration Institute
19 James E. Houck - Technical Consultant - Energy and
20 Environment
21 Jim Kupsh - SIT Controls USA Inc.
22 Daniel Lapato - American Public Gas Association

- 1 Jessica Lewis - Navigant
- 2 Adam Darlington - Navigant
- 3 Justin Elszasz - Navigant
- 4 Michael Rivest - Navigant
- 5 Barton Day - Law Offices of Barton Day, PLLC
- 6 David Delaquila - Aquila Consulting LLC
- 7 Dana Moroz - Napoleon Products
- 8 Tim Perrin - Polsinelli
- 9 Theodore E. (Rett) Rasmussen, III - Rasmussen Gas
- 10 Logs & Grills
- 11 Raymond T. Reott - Reott Law Offices, LLC
- 12 Steven J. Rosenstock - Edison Electric Institute
- 13 John Schlachter - Maxitrol Company
- 14 Harry A. Sporidis - Polsinelli
- 15 Frank Stanonik - Air-Conditioning, Heating, &
- 16 Refrigeration Institute
- 17 Sue Walker - Empire Comfort Systems
- 18 Gregory Rosenevist - Lawrence Berkeley National Lab
- 19 David Siap - Lawrence Berkeley National Lab
- 20
- 21
- 22

1 P R O C E E D I N G S

2 MR. BROOKMAN: Please take your seats we
3 will begin. Good morning everyone welcome, glad to
4 see you here this morning. This is the Notice of
5 Proposed Rulemaking Public Meeting on Energy
6 Conservation Standards for Hearth Products. Today is
7 March 23, 2015 here in the Forrestal Building in
8 Washington, D.C. at the Department of Energy.

9 My name is Doug Brookman of Public
10 Solutions Baltimore nice to see you here this
11 morning. We are going to start with welcoming
12 remarks from Ashley Armstrong.

13 MS. ARMSTRONG: Good morning everyone, I
14 would just like to welcome you to the public meeting.
15 We are glad to have such a good turnout and we hope
16 that everyone will participate throughout the date.
17 We are here to at least give you an overview of our
18 proposal and obviously we welcome you to speak up,
19 ask questions, say comments as that is the purpose of
20 this public meeting and we thank you all for coming
21 today.

22 MR. BROOKMAN: We always start with

1 introductions. Start to my immediate left and you
2 can get used to turning the microphone both on and
3 off please say your name and organizational
4 affiliation.

5 MR. GOLDMAN: Jack Goldman, Hearth, Patio
6 and Barbecue Association.

7 MR. CARROLL: Ryan Carroll with the
8 Hearth, Patio and Barbecue Association.

9 MR. DAY: Barton Day Counsel for HPBA.

10 MR. HODGES: John Hodges Wiley Rein,
11 Counsel for Natural Propane Gas Association.

12 MR. CALDARERA: Mike Caldarera, National
13 Propane Gas Association.

14 MR. DIRCKS: Peter Dircks with Hearth and
15 Home Technologies.

16 MR. RASMUSSEN: Ratt Rasmussen with
17 Rasmussen Gas Logs and Grills.

18 MR. BORTZ: Leslie Bortz with Robert H.
19 Peterson Company.

20 MR. SKOLNICK: Steve Skolnick, Skolnick
21 Associates and Mid Atlantic Hearth Products
22 Association.

1 MR. SCHLACHTER: John Schlachter with
2 Maxitrol Company.

3 MR. STANONIK: Frank Stanonik, Air
4 Conditioning Refrigeration Institute.

5 MR. LAPATO: Dan Lapato, American Public
6 Gas Association.

7 MS. WALKER: Sue Walker, Empire Comfort
8 Systems.

9 MR. ROSENSTOCK: Steve Rosenstock, Edison
10 Electric Institute.

11 MR. KUPSH: Jim Kupsh, SIT Controls.

12 MR. STAS: Eric Stas, DOE General
13 Counsel's office.

14 MS. ARMSTRONG: Ashley Armstrong, DOE.

15 MR. BROOKMAN: Let's see if that
16 microphone over there works.

17 MR. ROSENQUIST: Greg Rosenquist, Lawrence
18 Berkeley National Laboratory.

19 MR. RIVEST: Mike Rivest, Navigant
20 Consulting.

21 MR. SIAP: David Siap, Lawrence Berkeley
22 National Laboratory.

1 MR. DARLINGTON: Adam Darlington, Navigant
2 Consulting.

3 MR. ELSZASZ: Justin Elszasz, Navigant
4 Consulting.

5 MS. LEWIS: Jessica Lewis, Navigant
6 Consulting.

7 MR. BROOKMAN: If those of you in the back
8 if you will just stand and introduce yourself please
9 this will not be on the record but we will have
10 business cards so we will know who is here, please.

11 MR. HOUCK: Jim Houck, an Independent
12 Consultant.

13 MR. BROOKMAN: Thank you.

14 MR. DELAQUILA: Dave Delaquila, consultant
15 from Action Company.

16 MS. FEINSTEIN: Rachel Feinstein, Hearth,
17 Patio and Barbeque Association.

18 MR. REOTT: Raymont Reott, R. H. Peterson
19 Company

20 MR. PERRIN: Tim Perrin, Consultant for
21 ACE

22 MR. BALLO: Tim Ballo with EarthJustice.

1 MR. DISCHNER: Bob Dischner, RH Peterson
2 and Company.

3 MR. BROOKMAN: Okay and once again thanks
4 to all of you for being here for an early start on
5 this day. Nice to see so many folks here, all of you
6 received a packed of information I hope and if you
7 look on page 3 there is an agenda which I will do a
8 very brief review.

9 Immediately following this agenda review
10 and some preliminary information there is an
11 opportunity for opening comments, brief summary
12 statements here at the outset as we get this meeting
13 going. From there moving on to describing the
14 regulatory and authority rulemaking overview and then
15 moving on market technology assessment, we will take
16 a break mid-morning around about 10:15 or 10:30 or
17 so. Returning from the break engineering analysis,
18 markups, energy use characterization, lifecycle costs
19 and payback period analysis.

20 We will take lunch mid-day 12:30-ish.
21 Returning from lunch shipments, national impact
22 analysis, regulatory impact analysis, manufacturing

1 impact analysis and we will take a mid-afternoon
2 break and then following that or whenever we get
3 there utility impact analysis, environmental impact
4 analysis, indirect employment analysis and at the end
5 of the day whenever that is another opportunity for
6 closing remarks.

7 Issues that you wish to bring to the
8 floor, issues that haven't been covered sufficiently
9 during the course of this meeting today. That's the
10 general plan this is the framework that the
11 Department of Energy observes consistently.
12 Questions and comments on the agenda. Seeing none I
13 would ask for your consideration each time you speak
14 please say your name, please say your name each time
15 you speak.

16 There will be a complete transcript of
17 this meeting made available. I would ask you to
18 speak one at a time please if you could try to be
19 concise share the air time, there's a lot to be
20 covered here in this day. If you could keep the
21 focus here, please turn your cell phones on silent
22 mode.

1 You are already getting used to turning
2 these microphones on and off and webinar participants
3 we welcome you, so glad you could join us via the
4 web, the Department of Energy is trying hard to make
5 sure all of these meetings are accessible via the
6 web. If you would try to keep your telephone on mute
7 and raise your hand in the software provided to be
8 recognized to speak and then when we unmute you and
9 I'll recognize you to speak, then we should be able
10 to hear you in the room. That's been working fairly
11 well recently and hopefully we won't have any
12 glitches today with the technology.

13 I think that is the bulk of what I am
14 supposed to cover except that I would encourage all
15 participants, everyone here in the room and also
16 those joining us via the web to send written comments
17 following this meeting. I'm saying this especially
18 for those that are joining via the web. We want to
19 make certain that you participate as well as everyone
20 who made it here into the meeting room itself.

21 And for the purpose of the public meeting
22 to John Cymbalsky.

1 MR. CYMBALSKY: Thanks Doug, this is John
2 Cymbalsky from DOE, program manager for appliance
3 standards. The purpose of today's meeting is to
4 present the procedural and analytical approaches to
5 evaluate potential future energy conservation
6 standards for residential hearth products and of
7 course along the way we invite public comment on all
8 of the slides you will see here today and of course
9 any issue you might want to raise please feel free to
10 raise it as we go through the slides.

11 And then as we go through the deck you
12 will see the little issue boxes like you see up here
13 on the slide. Basically you can comment on anything
14 but these are the boxes you will see that DOE has
15 highlighted as important points that it wishes some
16 deeper comment on as we go along.

17 Comment period ends April 10th. Currently
18 I understand there may be a request for an extension
19 coming so please put that in writing and with reasons
20 why you need a comment extension. So at this time we
21 will take opening statements, I think we have a few
22 in the que.

1 MR. BROOKMAN: Yes, let's do that. Brief
2 opening statements, fairly brief I hope, summary
3 statements here at the outset who would like to
4 begin, okay is it Jack?

5 MR. GOLDMAN: Yes, my name is Jack
6 Goldman. Good morning I'm President and CEO of the
7 Hearth, Patio and Barbeque Association, the principal
8 trade association representing the hearth products
9 and barbeque industries in North America.
10 HPBA's experience with appliance efficiency
11 regulation has been difficult for both HPBA and DOE
12 in large part because of the unique characteristics
13 of hearth products and the fact that DOE has
14 proceeded on the basis of inadequate information
15 collection analysis and above all dialogue to inform
16 the rulemaking process.

17 DOE's current rulemaking is deficient for
18 the same basic reasons and it is my hope that this
19 can be corrected starting today. As we will explain
20 today significant errors compromise virtually every
21 aspect of DOE's preliminary regulatory analysis and
22 the proposed rule itself is premised on basic

1 misunderstandings with respect to the products and
2 the relevant technical and economic issues.

3 As a result, substantially more
4 information and analysis would be required to justify
5 any energy conservation standard and a new notice
6 providing an opportunity to comment on that new
7 information and analysis would be required before any
8 final rule could issue.

9 HPBA has thus requested that the proposed
10 rule be withdrawn and that the notice be treated as a
11 request for information. To facilitate comment for
12 that purpose HPBA is also requesting 1) clarification
13 of the range of products at issue 2) additional
14 information and documentation concerning the basis
15 for DOE's regulatory analysis and 3) an extension of
16 the comment period to allow time for adequate review
17 of and comment on the relevant issues.

18 To facilitate comment it is particularly
19 important that DOE clarify the range of products at
20 issue. HPBA does not believe that DOE can lawfully
21 define a variety of different products as a single
22 "covered product" under EPCA. But let's put that

1 issue aside for the moment. We can't even speak
2 intelligently about the issues raised by the proposed
3 rule without a clear understanding of the range of
4 products at issue. My hope is that we will be able
5 to achieve some clarify on that when we discuss the
6 first issue upon which DOE seeks comment, its
7 proposed hearth products definition.

8 We will need to understand the intended
9 scope of coverage before we can even begin to address
10 how best to define the scope of coverage, let alone
11 the technical and economic issues that may be
12 relevant to this rulemaking in view of that scope of
13 coverage.

14 There is one related point that I cannot
15 emphasize strongly enough. DOE is attempting to
16 regulate products that are unlike any appliances it
17 has ever sought to regulate before. It is also
18 seeking to regulate at one fell swoop products that
19 are materially different from each other in a variety
20 of ways that DOE has failed to recognize. This is a
21 critical problem because most of the basic data
22 required for regulatory analysis has never been

1 collected and DOE has again and again sought to
2 overcome critical information gaps by assuming
3 incorrectly that information with respect to one
4 product can reasonably be applied to others.

5 Basic misunderstandings concerning the
6 products and markets involved here have also been a
7 source of many areas that undermine virtually every
8 aspect of the technical and economic analysis
9 underlying the proposed rule. We will address a
10 number of these issues when we discuss the specific
11 issues upon which DOE has requested comment.

12 The basic point I would like to emphasize
13 now is that the technical and economic issues raised
14 by the proposal can only be considered on a product
15 by product basis. With that introduction I would
16 like to turn to some HPBA's central concerns with
17 respect to the proposed rule.

18 First the proposed rule is not directed at
19 the issue of appliance efficiency nor is it designed
20 to address standby mode energy consumption which as
21 defined by USC Section 629 Subsection 41 is energy
22 consumption that "cannot be switched off or

1 influenced by the user". Instead the proposed rule
2 is aimed solely at consumer behavior the presumed
3 tendency of consumers to leave pilot lights burning
4 unnecessarily.

5 It isn't clear that DOE has the authority
6 to regulate consumer behavior as an energy efficiency
7 issue and it certainly doesn't have the ability to do
8 so by sweeping a variety of different products
9 together in a single covered product category to be
10 regulated without any regard to the utility or
11 function because consumer behavior is the issue, two
12 of the specific "problems" that the rule is intended
13 to address do not even exist. In particular DOE's
14 review under Executive Orders 12866 and 13563 states
15 that the proposed rule is necessary because a "lack
16 of consumer information and difficulties in analyzing
17 relevant information" caused consumers to miss
18 opportunities to invest in more efficient products.
19 Similarly DOE suggests that misaligned incentives
20 between purchasers and users also result in failures
21 to invest in more efficient products.

22 In fact however, no investment in more

1 efficient products is required because consumers
2 already have the ability to turn their pilot lights
3 on and off as appropriate. DOE's only concern is
4 that they might not do so. As a result we have a
5 proposed rule that is designed not to make products
6 more efficient, but to take control of pilot light
7 operation completely out of the hands of consumers.

8 Second DOE simply presumes the existence
9 and magnitude of the consumer behavior problem it
10 seeks to address. I say presumes because there are
11 no credible data demonstrating the existence and
12 magnitude of the problem that DOE seeks to address.
13 Instead the proposed rule is justified on the basis
14 of a one page article citing data concerning a small
15 number of gas fireplaces in service 20 years ago.

16 DOE simply assumes without any data -- DOE
17 simply assumes without any data that the data cited
18 in this article are relevant to the fireplaces that
19 will be on the market five years in the future. Even
20 more remarkably DOE assumes that these cited data are
21 somehow relevant to completely different types of
22 products such as patio heaters which it should go

1 without saying they are not.

2 In this regard DOE has completely failed
3 to consider material differences in the ease of pilot
4 light control, a factor that the article it relies on
5 specifically identifies as important. There was a
6 time when pilot lights could only be operated on
7 hands and knees with a flashlight and screw driver,
8 but the prevalence of such products has declined
9 dramatically in the face of industry innovation and
10 consumer demand for more user friendly pilot light
11 controls.

12 Products with standing pilot lights are
13 increasingly being equipped with features such as
14 simple knob and push button controls and remote
15 controls that allow consumers to turn pilot lights on
16 or off with the touch of a button. The proposed rule
17 does not even consider the impact that such controls
18 have on consumer behavior nor does it consider the
19 changes in consumer attitudes that have been driving
20 increased demand for user-friendly pilot light
21 controls. Consumers only seek such controls because
22 they intend to use them.

1 Third, the proposed rule assumes that the
2 problem with consumer behavior can only be modified
3 by a federal design requirement completely
4 eliminating the consumer's ability to control pilot
5 light use. There is no basis for such an assumption
6 because consumers have a direct financial incentive
7 to avoid unnecessary energy consumption and the
8 products currently available give them the ability to
9 respond to that incentive without any need to accept
10 increased product costs or decrease product
11 performance because benefits can be obtained without
12 sacrifice there is no reason to assume that consumer
13 education would not be sufficient to induce consumers
14 to act in their own economic interest.

15 The message is a simple one and requires
16 easily prompted action. After all the products at
17 issue don't work all but forgotten in closets or
18 basement corners, instead they are prominently
19 located in frequently occupied areas such as living
20 rooms and family rooms where a burning pilot light
21 provides a visible reminder of its presence every
22 evening when the lights are turned off.

1 Others in the industry will speak more to
2 other issues but suffice it to say that HPBA has many
3 significant concerns about the proposed rule and the
4 regulatory analysis that have produced it. As a
5 result I am pleased that we are finally having an
6 opportunity to discuss the issues and information
7 relevant to the concerns that DOE seeks to address
8 and my hope is that we can now begin to have the kind
9 of dialogue required to address these concerns in a
10 constructive way.

11 Thank you very much and I look forward to
12 the rest of today's discussion.

13 MR. BROOKMAN: Okay any additional
14 comments too at the outset, yes Mike please.

15 MR. CALDARENA: Good morning my name is
16 Michael Caldarena. I am Vice-President of the
17 Regulatory and Technical Services with the National
18 Propane Gas Association. NPGA is the national trade
19 association representing the U.S. propane industry.
20 Our membership includes about 2800 companies in all
21 50 states about 2300 of those companies are retail
22 propane marketers who deliver the fuel to the end use

1 customer including those customers who use hearth
2 products.

3 Our members also are engaged in the
4 production and wholesale of propane equipment and
5 manufacturers and distributors of propane gas
6 appliances and equipment as well. NPGA believes that
7 DOE has issued this NOPR without observance of its
8 own rulemaking procedures and without pre-proposal
9 outreach and dialogue required by executive orders.
10 Due to this the proposed rule we believe and the
11 regulatory analysis, including the technical support
12 document cannot support the issuance of a final rule
13 at this time.

14 We therefore urge that DOE withdraw the
15 proposed rule and treat this NOPR as a request for
16 information. It should also clarify the potential
17 scope of the rulemaking and make additional
18 information and documentation available for review
19 and comment. In light of this DOE also should
20 suspend the April 10th deadline for public comment.

21 NPGA also urges that DOE eliminate
22 coverage of propane fueled products from this or any

1 other related rulemaking to the extent that DOE
2 conducts rulemaking it should limit its hearth
3 product definition to natural gas fueled products and
4 clarify that its proposed energy conservation
5 standard should not apply to the propane fueled
6 products.

7 In this regard DOE appears to recognize
8 that its proposed standard cannot be justified for
9 propane fueled products with its discussion on page
10 7101 of the NOPR where DOE acknowledges that propane
11 is a "relatively expensive fuel". In addition
12 propane is supplied for household use in cylinders or
13 tanks of limited size or capacity. So as DOE
14 recognizes in light of the discussion with regard to
15 consumer behavior, consumers with propane products
16 closely monitor their pilot light operation, hence
17 there's no reason to presume that propane fueled
18 products would be left with their pilot lights
19 burning unnecessarily.

20 If DOE includes propane fueled products in
21 the proposed hearth product definition the proposed
22 energy conservation standard would apply to them and

1 subject these products to a completely unjustified
2 regulatory burden. We intend to submit more
3 substantive written comments by the comment deadline
4 we thank you for your time.

5 MR. BROOKMAN: Thank you. Yes, please
6 Peter?

7 MR. DIRCKS: Good morning my name is Peter
8 Dircks, I'm Vice President of Marketing of Hearth &
9 Home Technologies. We are headquartered in
10 Lakeville, Minnesota and the market leader in the
11 manufacture of wood, pellet and gas burning
12 fireplaces, stoves and inserts. Our well-known
13 brands include Heatilator, Heat and Glow, Quadrifire,
14 Harmon and Pelpro. We employ over 1200 member owners
15 and have manufacturing plants and distribution
16 centers in Iowa, Minnesota, Pennsylvania, Washington,
17 North Carolina, California and Maryland.

18 At HHT we believe in the importance of
19 continuous improvement of our products for both our
20 end consumers and the environment and are proud of
21 our industry leading efforts in the areas of both
22 safety and innovation. On behalf of HHT we have the

1 following concerns about the proposed rule.

2 First we seek further clarification around
3 DOE's analyses that current energy consumption by the
4 products proposed to be covered by the NOPR meet
5 EPCA's jurisdictional threshold both for product
6 consumption per household in a 12 month period as
7 well as for the aggregate energy use within the
8 United States in a 12 month period.

9 Secondly we seek further clarification
10 around the scope of the proposed rule and there's
11 really three sections of this, first is delineating
12 the definition of hearth product to a reasonable
13 range of products, clarifying the narrative
14 description of the intended scope of this proposed
15 definition as well as eliminating coverage of
16 specific products entirely such as outdoor products,
17 propane fueled products and products that by
18 definition lack pilot ignition systems all together.

19 And then thirdly we object to the proposed
20 energy conservation standard calling for a
21 prescriptive design requirement that would completely
22 disallow the use of a standing pilot and standby mode

1 as defined in the NOPR as we believe it would have
2 the effect of a lessening competition within the
3 hearth product by reducing consumer choice for hearth
4 products of the kind that would still provide
5 substantially all of the reported energy savings from
6 the proposed prescription while providing significant
7 product utility that would be lost under the proposed
8 prescription.

9 And then secondly it would also eliminate
10 future potential designs and applications where the
11 use of a pilot in standby mode would be essential to
12 those designs or applications but could still be
13 designed to achieve substantially all of the
14 purported energy savings claimed by the NOPR. So we
15 at HHT also respectfully request that the proposed
16 rule be withdrawn, that the NOPR be treated as a
17 request for information and that DOE provide the
18 clarification information and documentation necessary
19 to facilitate comment and that the April 10, 2015
20 deadline for submission of comment be extended
21 pending clarification of the information and the
22 issues to be addressed here today. Thank you very

1 much.

2 MR. BROOKMAN: Okay thank you yes, I don't
3 believe I got your name the first time.

4 MR. DIRCKS: Sure I'm Peter Dircks Vice
5 President of Marketing at Hearth and Home
6 Technologies.

7 MR. BROOKMAN: Thank you and I was
8 referring to the gentleman next to you there, Peter
9 thanks for being complete that was good, your name
10 please?

11 MR. RASMUSSEN: Rett Rasmussen.

12 MR. BROOKMAN: Okay.

13 MR. RASMUSSEN: Good morning I am Rett
14 Rasmussen, President of Rasmussen Iron Works, Inc.,
15 also known as Rasmussen Gas, Logs and Grills. We are
16 a five generation family business founded in 1907.
17 We have been manufacturing gas logs since 1958,
18 infrared gas grills since 2000 and distributing
19 radiant patio heaters since 2011.

20 There is no monolithic hearth product.
21 The similarity between the products and our industry
22 start and end with their consumption of gas lumping

1 them together is ambiguous, overbroad and unworkable
2 as a definition. We submitted comments on this
3 definition last year. Why didn't DOE give us an
4 improved definition to comment on in this NOPR?

5 Gas logs are also not a monolithic
6 product. There are countless variations in the sizes
7 of wood burning fire places with differences in the
8 front width, rear width, depth, opening height, gas
9 line location, number of openings and all
10 combinations of these different factors. Gas log
11 sets are retrofit appliances to this vast variety of
12 fireplace sizes, restrictions and combinations.

13 If there were a one size fits all gas log
14 set my life would be much easier but there is no such
15 solution. Accordingly gas log sets are designed to
16 meet the market for these vast number of
17 combinations. Some manufacturers focus on the sweet
18 spot of sizes, 18 inch to 30 inch widths, but
19 Rasmussen is a specialty manufacturer, offers
20 standard solutions of up to 96 inches and custom
21 solutions for large and unusual fireplaces with a
22 variety of safety control systems.

1 Adding an electronic ignition system which
2 I will refer to as an EIS to a gas log set presents a
3 very challenging proposition. It is not as easy as
4 merely replacing the safety pilot control valve as
5 the NOPR suggests. EIS components are greater in
6 number, valve control module, wiring, battery pack
7 for transformer and greater in size than that for a
8 standing pilot.

9 Gas log sets are not constructed as part
10 of an entire enclosure like gas fireplaces. Gas log
11 manufacturers do not have the voids in the sides or
12 under the floor of the fireplace in which to hide the
13 EIS components. Accordingly unless the installation
14 is part of a new construction or an extensive remodel
15 both of which are very small proportions of the gas
16 log sales and the components can therefore be
17 installed outside of but adjacent to the fire box,
18 the EIS components must be installed in the fire box
19 along with the gas log set.

20 Unfortunately EIS components are also more
21 heat sensitive than those of standing pilot systems
22 further complicating the location of components

1 issue. If not located properly the components could
2 become damaged from the heat, potentially creating a
3 safety hazard. A further issue with EIS is that they
4 require outside power to operate. Since it is highly
5 unusual for a wood burning fireplace to have a 120
6 volt receptacle installed inside of it, batteries
7 must be used to power the functions of the EIS.

8 Unfortunately batteries are also very heat
9 sensitive, discharging at temperatures below that
10 which adversely affect the EIS components. Again it
11 is very challenging to include these large components
12 while maintaining the aesthetically pleasing
13 decorative effect of gas logs. This NOPR would
14 severely reduce our ability to provide solutions for
15 36 inch and large gas log set sizes. The EIS
16 controls are the least developed systems in the
17 hearth industry.

18 Battery powered electronic ignition
19 systems with variable flame height remote control, a
20 feature many people desire is only available with a
21 gas capacity that allows for the use in 30 inch and
22 smaller set sizes. Currently for these larger sets

1 there is only one safety control solution for
2 installation inside the firebox and that is with a
3 millivolt safety standard pilot system.

4 The only EIS solution is furnace controls
5 that must be installed outside of the fire box and
6 require 120 volt electricity. They are only
7 available with on/off control, no remote flame
8 modulation. My quest for over a dozen years and
9 every conversation I have with gas control
10 manufacturers is that they product a high BTU
11 capacity battery powered electronic ignition system
12 with variable flame height remote control but they
13 have always told me that they just don't anticipate
14 sufficient sales volume to warrant their extensive
15 costs of design, testing, certification, tooling,
16 marketing and other costs.

17 You see gas log manufacturers only have
18 available to us safety control systems that have been
19 made for other products or industries of greater
20 sales volume but unfortunately lesser BTU flow than
21 what our larger fireplaces need for gas log sets.
22 Accordingly eliminating the millable safety control

1 will severely lessen the utility of my products for
2 larger fireplaces, limiting them to match lighted
3 natural gas, extensive remodels and new construction
4 all of which would result in the virtual elimination
5 of this category for my company.

6 I do not see in the TSD that has taken
7 into account the cost of annually replacing batteries
8 over the life of the gas log set which greatly
9 reduces the economic benefit of switching to
10 electronic ignition. DOE has determined that 90
11 manufacturers would be impacted and that 66 of these
12 are U.S. based small businesses, less than 500
13 employees.

14 I know of only two large manufacturers in
15 this industry, those greater than 500 and only one of
16 which is U.S. based. Who are these other 22 large
17 businesses? The hearth products industry is a small
18 family business industry including not just the
19 manufacturers but the distributors and retailers who
20 sell their products to the consumer.

21 This NOPR strikes at the heart of free
22 enterprise which DOE admits on page 7115, table V.8

1 it projects up to a 58% decrease in production
2 workers as a result of the standard, ouch, how about
3 we cut out 58% of DOE's workers and contractors might
4 have evince a bit of empathy from DOE on the impact
5 of this proposal?

6 I also agree with the NOPR on page 7116
7 which states that the manufacturer product cost for
8 gas log sets are likely to see a greater increase
9 than for other products resulting in declining
10 consumer demand and negative impacts on gas log
11 manufacturer profitability.

12 I also agree with the NOPR on page 7125
13 that larger manufacturers will have a competitive
14 advantage due to their size and that this proposed
15 standard would have a significant impact on a
16 substantial number of small businesses. A dealer of
17 mine in Michigan wanted me to be sure to read this to
18 you. Rett please let Washington know that in the
19 northern states the pilot which costs about \$3.00 a
20 month to run actually keeps the cold air and moisture
21 out of the fireplace box.

22 Without a standing pilot the fireplace is

1 allowed to get cold and the cold actually travels
2 through the glass or screen and makes the room cold.
3 The furnace kicks on fully which uses up any savings
4 from not running the pilot. Also animals and insects
5 nest in the flus and venting which creates a
6 potential hazard for fire and carbon monoxide backup
7 with the blockage. This could potentially hurt or
8 kill people and cause damage to property. Pilots
9 reduce the chance of this occurring.

10 Lastly gas log sets are an excellent
11 source of emergency warmth in the case of a power
12 outage in areas where electric heat pumps are the
13 primary source of heat consumers would be cold and
14 dark during ice storms and hurricanes that knock out
15 power lines except for their gas log sets.

16 Bill from Maryland wrote to me "our power
17 was knocked out yesterday evening by Hurricane Sandy
18 and we used our Rasmussen unit to stay warm and even
19 do a little cooking. It was a big help to have the
20 unit which didn't need electricity to operate. No so
21 for many if this NOPR is adopted.

22 This proposed rule will have negative

1 impact on the safety, wellbeing and choice of
2 consumers as well as the financial and employment
3 health of many small businesses. I respectfully
4 request that gas log sets be excluded from a final
5 rule. Thank you for the opportunity to present.

6 MR. BROOKMAN: Okay thank you. Other
7 comments here at the outset, yes please and your name
8 again please?

9 MR. BORTZ: Leslie Bortz from the Robert
10 H. Peterson Company. I am Leslie Bortz, I am the
11 President of the R. H. Peterson Company. Peterson is
12 one of the larger manufacturers of gas logs in the
13 United States we employ approximately 235 people at
14 our manufacturing facility in California.

15 Can you hear?

16 MR. BROOKMAN: Yes.

17 MR. BORTZ: We sell our products through a
18 network of small specialty distribution businesses
19 across the country. We also manufacture other
20 products that would be affected by the proposed
21 rulemaking including gas barbeques, outdoor
22 fireplaces and pits and to a lesser extent other

1 hearth products.

2 Although our volume is a significant
3 portion of the gas log industry, we are still a
4 relatively small business which will be profoundly
5 affected by DOE's proposals. I have traveled here
6 today to speak to you again in the hope that the
7 Department of Energy would listen and re-evaluate its
8 overbroad proposal that would treat gas logs like all
9 other hearth products despite the acknowledged
10 differences between gas logs and those other hearth
11 products that would make the proposed rule
12 particularly burdensome to the gas log industry.

13 Peterson opposes DOE's proposed definition
14 of hearth products making gas logs a covered product
15 under EPCA. Peterson also opposed the proposed
16 regulation of hearth products to ban what DOE calls
17 constant burning pilot lights. First the definition
18 of hearth products is over broad. Currently there is
19 not a statutory definition of hearth products however
20 there is a proposed definition which states hearth
21 products means a gas fired appliance that simulates a
22 solid fuel fireplace or presents a flame pattern for

1 aesthetics or other purpose and that may provide
2 space heating directly to the space in which it is
3 installed.

4 Do you really intent to adopt the
5 definition of hearth products which does not include
6 wood burning fireplaces, coal burning fireplaces,
7 alcohol burning fireplaces, pellet burning
8 fireplaces, electric fireplaces, water, coal stoves,
9 these are all normally considered hearth products but
10 your definition does include gas ovens, gas cooking
11 ovens, outdoor gas lights, outdoor barbeques,
12 infrared heaters, garage heaters, and indoor gas
13 lights.

14 DOE's definition is unnecessarily
15 confusing because it mixes products designed to
16 provide heat with those designed only for aesthetics.
17 The DOE definition would include a variety of
18 products which serve very different purposes
19 including gas log sets and other decorative products
20 within the definition of a covered product, is not
21 consistent with EPCA's purpose. When you examine
22 EPCA's original product categories they are all

1 products designed to use energy to deliver functional
2 purposes to the consumers.

3 Decorative products are designed instead
4 for aesthetic experience. Next topic DOE is
5 designing different products into one category. At
6 several points in its analysis DOE concedes that gas
7 log sets are very different from other types of
8 hearth products. Gas log sets must be installed in
9 an existing solid fuel typically wood burning masonry
10 or factory built fireplace.

11 As DOE acknowledges the gas log set
12 manufacturer is not able to change the physical
13 environment in which the gas log must operate. Gas
14 logs also don't have an outside enclosure within
15 which to hide the components that DOE assumes would
16 replace standing pilots. The cumulative effect of
17 these differences is that gas log sets will face
18 severe challenges in complying with DOE's proposed
19 rules that will not be present for many other types
20 of hearth products.

21 Unlike other types of hearth products
22 intermittent ignition is still a relatively new and

1 infrequently used device to be able to be added to a
2 gas log set. For vented gas logs DOE estimates that
3 only 6% currently use intermittent products. The
4 reason for this low percentage is that it is
5 difficult to do, expensive to do under any scenario
6 and anything that adds to the cost of the products
7 which are at the lower end of the hearth products
8 market like gas logs has a disproportionate adverse
9 impact on sales of gas logs.

10 It's difficult to add intermittent
11 ignition system to gas log sets because anything that
12 can make the gas log sits off center within the
13 fireplace which interferes with the aesthetic
14 experience of the consumer. If batteries are
15 necessary it detracts from the appearance.

16 In addition DOE agrees that adding
17 sensitive electronic components within the industry,
18 within the masonry or factory build fireplace where
19 they are subject to high heat is often impossible.
20 There are also many varieties of masonry or factory
21 build fireplaces into which gas logs must adapt. The
22 entire market for gas logs is to retrofit

1 pre-existing masonry or factory built fireplaces.

2 Anything like DOE's proposed rule which
3 sharply limits the flexibility of gas log sets
4 unnecessarily makes installation of gas log sets
5 impossible in a significant portion of the available
6 masonry or factory built fireplace. To accommodate
7 this market we sell 20 different types of burners
8 with 10 -- 12 different sizes, 600 different log sets
9 and another several thousand add on options.

10 In the fact of this broad range of
11 installation requirements DOE is attempting to impose
12 a one size fits all solution which will severely
13 restrict consumer choice. In addition DOE has
14 significantly underestimated the cost of switching
15 from constant burning pilot lights to the
16 alternative.

17 DOE would increase the MSRP price of a
18 typical base log set not including installation these
19 are our numbers, from \$511.00 to \$891.00 I would
20 chart this. A roughly 75% increase. In turn there
21 would be little financial savings to the consumer for
22 change in pilot lights. As always the consumer can

1 simply choose to extinguish the pilot light when the
2 log set is not in use thereby achieving all of the
3 savings without any of the costs.

4 By the way there are gas companies all
5 over the south especially that seem to be educating
6 their consumers about doing this. Finally, all the
7 intermittent pilots options have a higher
8 installation cost than the constant burning standing
9 pilot. Every intermittent pilot option is more
10 expensive to install. Also if the unit could not use
11 a battery powered millivolt system an electrician
12 must also be hired to install a 110 volt suitable
13 electrical hookup in or near the fireplace which is
14 not designed to hold the electrical components.

15 In response to question 14 based on our
16 experience we conservatively estimate that the
17 additional cost of the electrical hookup alone is
18 \$335.00. At these costs given the limited energy
19 savings the additional costs to the consumer is more
20 than the three times value of the first year's energy
21 savings. Actually it's nearly 8 times the value of
22 the energy savings which violates the so-called EPCA

1 rebuttable presumption.

2 Based on prices of today using a constant
3 burning pilot light equipped with one of our actually
4 equipped with BTU's that you speak of for gas logs,
5 it costs the consumer less than \$50.00 a year to
6 operate the pilot year round, that is compared to
7 \$335.00 and the extra cost. DOE supposedly, our
8 national energy partner is using natural gas prices
9 from 1993 to 2012 to overstate the gas costs of
10 manual safety pilots.

11 Surely DOE understands that the world is
12 changed forever and gas reserves are expanding
13 rapidly.

14 Last week Morning Star the respected
15 financial analyst described the following natural gas
16 prices as the new normal for the United States.
17 Examining the impact of abundant low cost supply we
18 are reducing our estimate for natural gas prices by
19 25%. Residential natural gas prices are now less
20 than 90 cents a therm and falling fast.

21 Rather than the much higher numbers in
22 parts of DOE's chosen period used for setting prices.

1 By the time this rule takes effect in 2021 DOE's
2 analysis will be even more unrealistic. DOE
3 understands fully that taking the price of a product
4 and increasing it by roughly 75% will drive down
5 sales. DOE admits that this financial burden will
6 fall disproportionately on gas log manufacturers,
7 that's page 7116 of your NOPR.

8 Because gas logs are a product designed to
9 go into existing fireplaces, consumers will simply
10 stop buying and just continue to use wood in their
11 existing wood burning fireplaces. Sales of gas logs
12 will necessarily plummet.

13 My next topic is rulemaking. The
14 rulemaking will adversely affect small businesses.
15 Under the Regulatory Flexibility Act DOE must
16 consider the impact of its rulemaking on small
17 business. DOE has identified 66 businesses in its
18 rulemaking that are small business manufacturers of
19 gas logs.

20 That's better because we started with I
21 think 16. DOE is ignoring the impacts on hundreds
22 and possibly thousands of other small business

1 entities that will be adversely affected. The entire
2 gas log industry and the vast majority of hearth
3 industry are composed of small businesses. Anything
4 that makes gas log sets less attractive to purchase
5 will have an impact on hundreds or thousands of small
6 businesses.

7 I acknowledge that DOE believes that it
8 only needs to focus on manufacturers for purposes of
9 the Regulatory Flexibility Act Analysis, we will
10 outline in our written comments why we disagree with
11 that limitation. In any event, however, even if it
12 is not required by the Regulatory Flexibility Act,
13 the impact on these additional small businesses is
14 undeniable. Nothing prohibits DOE from considering
15 that impact, even if it is not required to consider
16 the impact.

17 Even if you limit the search for business
18 entities in the hearth industry to manufacturers
19 DOE's list is far too small. It is easy to pick up
20 any month's edition of Hearth and Home Magazine,
21 trade magazine, and find many additional small
22 businesses that are not on DOE's list that are

1 manufacturers in this industry. I found 20
2 additional manufacturers with ads in the March 2015
3 Hearth and Home Magazine.

4 I looked at another -- actually I looked
5 at an internet site called Woodland Direct and found
6 another 18 additional small business manufacturers,
7 almost all making outdoor fireplaces. These are
8 numbers that just blow me away. DOE identifies key
9 market participants, the manufacturers, wholesalers
10 and the entities into two types of distribution
11 channels.

12 100% of our gas log products are sold
13 through a distribution retailer marketing system or
14 what is commonly called a two-step distribution
15 system. If you look at your information and take a
16 look at those products and break them up as best you
17 can which we did, on a conservative basis 56 1/2% of
18 the hearth products in the DOE proposals are sold in
19 this system.

20 They are not sold to builders, 56 1/2% are
21 sold through distribution and retailing. For gas log
22 sets these key market participants are almost all

1 small businesses. I anticipate that there are over
2 150 small business manufacturers, another 200
3 specialty hearth product distributors and
4 representative companies, hundreds of retailers
5 throughout the country and as the gentleman from NPGA
6 mentioned, 2800 LP companies, I believe there are
7 thousands of small companies that will be affected by
8 this rule, not 66.

9 DOE has not cooperated with the industry.
10 At every step in this process DOE has had and ignored
11 numerous opportunities to sit down with the hearth
12 products industry and develop more accurate
13 information. DOE did attempt to gather some
14 information from the hearth products industry, excuse
15 me -- and for its part in the analysis Navigant was
16 reasonable responsive.

17 But DOE's other contractors would not
18 cooperate with the hearth industry and particularly
19 we tried several times to contact Lawrence Berkeley
20 National Labs by the way we did not know that they
21 were a part of this until we were told last summer
22 and the representatives from that entity which

1 performed important analysis -- important parts of
2 the analysis for DOE. They refused to return our
3 numerous telephone calls or emails or provide any
4 information about the process.

5 I don't know where they got their
6 information. DOE has ignored other technical options
7 in large part because of the lack of communication
8 with the industry DOE seems unaware that there are
9 products on the market that would address many of its
10 concerns. These products are pilot lights with a
11 so-called time out option, this is a constant burning
12 pilot light that is designed to shut itself off after
13 a specific period of time in the event the main
14 burner is not activated.

15 A time out pilot would address 98 to 99%
16 of DOE's energy savings. DOE's proposals will
17 actually cause consumers to use excess natural gas.
18 Presently the most common manual pilot light that we
19 sell allows the consumer to adjust the flame on the
20 log set and people want adjustable. This enables the
21 consumer to decide to use the log sets with different
22 flame heights depending upon the consumer's choice

1 for the aesthetic experience. There are some
2 significant gas savings from giving consumers the
3 ability to turn down the log sets rather than forcing
4 the consumer to run the gas log set at the maximum
5 possible BTU usage.

6 DOE's proposal will force many consumers
7 to run their logs at the maximum BTU usage even if
8 they otherwise would prefer not to. This is because
9 many battery powered intermittent ignition systems do
10 not allow for varying the size of the flame. The
11 intermittent system that DOE would require is a
12 binary on and off which forces the consumer to run
13 the gas log set at the maximum usage.

14 DOE's proposal will cause consumers to
15 waste considerable gas that they would otherwise not
16 and wipe out the limited savings.

17 There are limitations to the use of
18 intermittent pilots particularly with gas log sets.
19 We have tried to offer a battery powered intermittent
20 pilot capable of variable log flame height control.
21 It has not worked in the market so far. Last year
22 for example we added a battery powered intermittent

1 pilot capable of an adjustable log flame control to a
2 particular gas log product. We shipped many of these
3 units in 2014 a significant number of these units
4 came back to us because the intermittent pilots would
5 not work well within the confines that must be
6 addressed by gas log sets.

7 For this reason as DOE has acknowledged on
8 page 7103 intermittent pilots are an infrequently
9 used device added to a gas log set installation.
10 Where intermittent pilots are easier to install and a
11 hearth appliance such as a free-standing fireplace or
12 fireplace insert where the housing for the fireplace
13 can protect the intermittent pilot and also limit its
14 adverse aesthetic impact, intermittent pilots are a
15 growing part of the market and now save 50% of the
16 units sold. This kind of market penetration for
17 intermittent pilots is simply not happening for gas
18 log sets because of their physical limitation.

19 In addition the market penetration for
20 intermittent pilots is not happening for gas log sets
21 because the cost implication of adding intermittent
22 pilots is felt more strongly for gas log sets because

1 they have a lower initial price. DOE's forcing
2 consumers to add an expensive device that they really
3 have rejected so far only 6% of vented gas log sets
4 have an intermittent pilot.

5 The consumer faced with paying the
6 additional money to purchase a gas log set with an
7 intermittent pilot often will choose to simply fall
8 back and use its existing wood burning fire place as
9 it was originally designed with wood burning fires.

10 DOE is ignoring trends. In 2011 DOE
11 estimated that 75% of gas log users kept their pilots
12 on year round. In 2013 DOE estimated that 25% of
13 hearth products users kept their pilots on year
14 round. In the current proposal DOE estimates that
15 20% of the standing pilot users leave their pilot
16 ignited year round. As evidenced by DOE's own
17 estimates the percentage of users leaving their
18 pilots on year round is declining.

19 In the current proposal DOE estimates that
20 a far greater percentage of users 40% leave the
21 standing pilot ignited only seasonally during the
22 months when they are more likely to have a reason to

1 use the gas log set.

2 DOE acknowledges that the industry now
3 uses labelling to suggest users extinguish their
4 pilot kits when the log set is not in use. Our
5 systems are designed to make extinguishing the
6 standing pilot and closing the gas valve at the end
7 of the season if not more frequently, this is easy to
8 do. We also provide clear instructions for how to
9 reignite the pilot after the consumer has
10 extinguished it. It is clear from DOE's estimates
11 that consumers are responding to the industry's
12 labeling efforts.

13 DOE says labelling is not achieving the
14 maximum economically justified energy savings but
15 that conclusion is only supported by ignoring the
16 growing success of labeling inflating the costs of
17 gas usage, artificially under-estimating the cost of
18 intermittent pilots for gas log sets.

19 Recommending that consumers operate their
20 units in this manner would be a far more cost
21 effective solution than charging a seasonal user
22 \$380.00 extra to save them less than \$13.00 worth of

1 natural gas. DOE's overstated the energy savings in
2 its proposed rulemaking. This product will be
3 addressed by other witnesses. To avoid repetition I
4 will not focus on it any longer except to say that
5 the actual energy savings from DOE's proposal may in
6 fact be negative.

7 As DOE's own programs recognizes houses
8 with gas log sets are more whole home efficient than
9 the whole homes with the product with which they
10 compete which is wood and wood burning fireplace or
11 wax logs and wood burning fireplaces.

12 For many years the DOE has supported the
13 transition from consumers burning wood in their wood
14 burning fireplaces to instead using natural gas based
15 products. DOE recognizes that houses with gas log
16 sets and decorative fireplaces are more efficient
17 than those with wood burning fireplaces.

18 When a consumer has a wood burning fire
19 they consume more BTU's per hour, wood takes three
20 times the amount of oxygen, heat and home air to burn
21 to achieve the same aesthetic appeal. In addition
22 consumers will leave the flue fully open over night

1 following a wood burning fire, allowing the home to
2 vent heated indoor air to the outside. In contrast
3 gas logs and decorative fireplaces are instant on
4 instant off the flue does not stay fully open beyond
5 the period of usage.

6 In order to show more substantial energy
7 savings for the cost of upgrading to an intermittent
8 pilot, DOE also assumed that gas log sets would last
9 approximately 16 years. In our experience the
10 consumer who uses his gas log sets regularly will
11 replace them in 10 years. DOE estimates that 80% of
12 the consumers either turn their manual pilot units
13 off after each use, 40% or use the pilot seasonally,
14 another 40%.

15 This makes it unlikely that the average
16 consumer will ever recover the cost of the expensive
17 upgrade DOE is trying to force on unwilling
18 consumers. DOE uses the wrong housing measures to
19 estimate the energy saving, therefore overstating
20 those savings from its proposal. DOE's process for
21 estimating the energy savings is unduly complicated
22 but it is under any analysis unable to assess the

1 actual energy impact of prohibiting standing pilots.

2 To begin with DOE is using housing starts
3 with its analysis. We believe it should be using
4 housing completions, that is what is used by Bureau
5 of Census I suspect whatever. For many years there's
6 been a significant difference between housing starts
7 and housing completions. If you use housing
8 completions the numbers are smaller and all of the
9 energy savings in turn become smaller.

10 For gas log sets its wrong to use either
11 for housing starts or housing completion. A tiny
12 percentage of our sales go into new construction.
13 Gas logs are a retrofit product. Sales do not
14 correlate with housing starts at all. If you are
15 going to try to do an analysis using housing starts
16 or completions you also need to focus on single
17 family homes.

18 Housing start data that uses multi-family
19 construction ignores the reality that very few
20 multi-family dwellings will have suitable masonry,
21 fireplaces or factory built openings for gas log
22 sets. That's just a fact. When DOE does its

1 analysis it begins with a level of housing starts
2 starting in 2014 it uses a figure of approximately
3 1.25 million housing starts for 2014.

4 That number is roughly double the number
5 of single family housing completions in this country
6 last year. Then DOE projects outward to a distance
7 future using a typical level of housing starts of 1
8 million five. If you look at the level of housing
9 starts for single family homes cited by James Houck
10 in his article in Hearth and Home Magazine, there are
11 only isolated years in the last 40 where the U.S. has
12 it a level of 1.5 million housing starts in a given
13 year and that level has never continued for more than
14 a few years in a row.

15 DOE's analysis assumes that we reach that
16 level and sustain it for 30 consecutive years. These
17 factors combine to overstate the purported energy
18 savings.

19 DOE is ignoring a safety issue with its proposal. A
20 safety pilot kit uses a constant burning standing
21 pilot as a safety device. The pilot device will
22 block the flow of gas to the burner as a safety

1 mechanism is the pilot is not lit.

2 The pilot we sell prevents the homeowner
3 from turning on an unlit system and filling the home
4 with gas. Gas log sets are safer than their
5 alternative which is wood burning fireplaces.
6 Anything that discourages consumers from switching to
7 gas logs will only increase the number of home fires,
8 injuries and death. Gas logs are far safer than
9 their alternative which is burning wood in the
10 fireplace.

11 With respect to gas logs, DOE's proposal
12 will hurt the environment. Gas log sets are also far
13 cleaner from an environmental prospective than the
14 product they are replacing. As USEPA has recognized
15 in its burn-wise program, consumers would be well
16 advised to shift from wood burning fires to gas log
17 sets in terms of an overall reduction in critical air
18 pollutants.

19 In its analysis DOE is assuming there is
20 some environmental benefit from limiting gas log
21 sets. To the contrary, anything which discourages
22 people from making the transition to gas log sets

1 from wood burning fires will have an immediate and
2 major negative impact on the environment.

3 Many state environmental agencies and
4 other environmental and health groups like the NRDC
5 and American Lung Association have adopted the same
6 environmental position endorsed by U.S. EPA favoring
7 the transition to gas log sets. For example the
8 leading air quality agents in the country in charge
9 of improving air quality in the difficult Los Angeles
10 region has what it calls healthy hearth program. As
11 part of that program to improve public health, the
12 South Coast Air Quality Management District actually
13 pays consumers to change their wood burning
14 fireplaces and use gas log sets.

15 The agency adopted this position after
16 extensive rulemaking examining health and
17 environmental benefits of this transition to gas log
18 sets, using the analysis done by the very experts
19 cited by DOE and its NOPR Jim Hauck who will testify
20 here today.

21 DOE simply assuming a non-existent
22 environmental benefit in its analysis and ignored the

1 considerable environmental detriment that will come
2 about by making a gas log set three times as
3 expensive as they are now. When properly account for
4 the net environmental impact of the rule is negative
5 as applied to gas log sets and would trigger
6 requirements that DOE would evaluate the rule under
7 the National Environmental Policy Act.

8 Conclusion, natural gas is plentiful in
9 the United States. Natural gas reserves are higher
10 now than they have been any time in our history.
11 Natural gas prices are dropping each year as we find
12 more sources for natural gas at a rate that exceeds
13 consumption. In addition natural gas is a local fuel
14 with virtually all of the United States natural gas
15 consumption coming from sources within North America
16 in exchange for modest energy savings of a very
17 plentiful resource DOE's rulemaking would sharply
18 limit consumer's ability to afford gas log sets.

19 Based on our customer feedback, customers
20 like gas log sets because they look great but they
21 don't heat a room. If they want heat they buy a
22 different product. They also like the improved air

1 quality, improved health, lack of allergens, instant
2 on/off, no creosote build-up in the chimney, no
3 chimney fires, no sparks, ashes, relative in expense
4 to purchase and operate, cleaner operation, improved
5 safety, save trees and flexibility of use. The
6 proposed rule will interfere with these
7 characteristics by making the units prohibitively
8 expensive or too unattractive to replace the wood
9 burning fire.

10 Gas logs represent by far the lowest cost
11 alternative for consumers tired of the inefficiency
12 and pollution of their wood burning fireplace. DOE's
13 proposal would rob consumers of that low cost choice,
14 providing no offsetting financial benefit because of
15 the gas savings if any from the proposed rule.

16 As it applies to gas log set, DOE's
17 proposal does not achieve greater energy savings
18 because homes with gas logs in terms of whole home
19 efficiency are more efficient than the alternative.
20 Because the savings from the pilot restriction is
21 trivial it would be offset by the significant cost
22 that would be created by eliminating or discouraging

1 customers from switching from wood burning fireplaces
2 to gas logs.

3 The proposed rule would also undermine
4 consumer alternatives because it would limit severely
5 the number of available products on the market,
6 particularly for customers looking for low cost
7 alternatives to wood burning fireplaces. The
8 proposed rule only adds restrictions and
9 manufacturing burdens which would have dramatic and
10 negative impact on the gas log industry.

11 Thank you for allowing me to go through
12 that.

13 MR. BROOKMAN: Okay.

14 MR. BORTZ: I would like to present Jim
15 Houck is he on your speaking --

16 MR. BROOKMAN: We are taking opening
17 remarks, hopefully summary remarks and do you -- can
18 you make a brief summary remark here or will it fit
19 in the content in the presentation materials that are
20 coming, Jim?

21 MR. HOUCK: I can make it short.

22 MR. BROOKMAN: Okay briefly here, just

1 stand right up and use that microphone right there.

2 MR. HOUCK: Yes my name is James Houck.

3 Okay now can you hear me?

4 MR. BROOKMAN: Yeah.

5 MR. HOUCK: Okay my name is James Houck.

6 I am an independent consultant. I worked for about
7 25 years with the hearth industry, primarily on air
8 pollution and environmental issues and I guess my
9 short opening remark is that the rule as proposed
10 will do environmental damage rather than as quoted in
11 the proposed rule, in addition the proposed hearth
12 product standard would have significant environmental
13 benefits. It will not and I will discuss that in
14 more detail when we get to the environmental section.

15 MR. BROOKMAN: Thank you that's helpful
16 and let me note, maybe I wasn't clear at the outset.
17 No one wants to diminish your capacity to comment in
18 any way here. We are hoping though and it's
19 typically beneficial to get more detailed comments
20 during the course of the review of the packet itself,
21 that way all of these features line up in the record
22 you understanding my meaning here.

1 So now let me ask additional opening
2 remarks perhaps final opening remarks before we move
3 on to the content at hand? Yes is it Steve?

4 MR. SKOLNICK: It is Steve and I'm going
5 to be very, very short since I don't have prepared
6 remarks to read. I represent in addition to my own
7 company the mid-Atlantic Hearth Product Association
8 the local retailers and distributors and
9 manufacturers reps. We have about 800 small
10 businesses that we represent. We are very concerned
11 that you are not addressing the differences between
12 these products and just as you look between
13 discussions from HHT on their products and gas logs
14 there is a lot of differences just in the electronic
15 ignition so how electronic ignition works in a gas
16 fireplace is dramatically different than how it works
17 in a gas log versus outdoor so lumping these products
18 together are very concerning.

19 Also in a gas fireplace the electronic
20 ignition has challenges so while there are
21 differences in the challenges as you look through
22 each of the product categories challenges still exist

1 so in a gas fireplace or a direct vent fireplace, the
2 challenge primarily exists in cold climate so the
3 standing pilot while it has electronic ignition in
4 many of the applications, it also has that backup
5 standing pilot and the backup standing pilot is very
6 important in cold climate because the flue gets cold,
7 everything just doesn't work right if there isn't
8 that heat in that cold climate providing the
9 environment in the fireplace.

10 The other thing we are very concerned
11 about is that with your proposed rule we believe a
12 lot of the product in the marketplace will be
13 eliminated and many of our small businesses will
14 suffer dramatically thank you.

15 MR. BROOKMAN: Thank you. Are we ready to
16 move on now? Move on to the content at hand? Given
17 the detail and length of these opening remarks I am
18 hoping that as we go through these slides you can
19 apply the same level of specificity in your comments
20 to the Department as we are going along here, okay?
21 That would be helpful. So then let's proceed with
22 the packet and we are going to have an overview first

1 commencing with regulatory authority. Yes, Leslie?
2 Please take -- feel free to take your jacket off,
3 everybody make yourselves comfortable we are going to
4 be here for a while.

5 Dana you didn't get a chance to introduce yourself,
6 do you wish to do so, turn that microphone on, name
7 and organizational affiliation?

8 MR. MOROZ: My name is Dana Moroz I
9 represent Wolfe Steel Limited. I'm a foreign
10 national I understand. I would also point out that
11 we also have a manufacturing facility in Quinton,
12 Kentucky. We employ 96 U.S. citizens at that
13 facility so we are domestic as well.

14 MR. BROOKMAN: Thank you and I'm sorry for
15 the run around here this morning.

16 MR. MOROZ: It's nothing like being made
17 to feel special.

18 MR. BROOKMAN: Okay. So then we are going
19 to begin with the regulatory authority and this is on
20 slide number 10 in my packet here.

21 MR. CYMBALSKY: Okay so this is John
22 Cymbalsky from DOE. Thank you everyone for our

1 opening remarks, we definitely heard from you and I
2 think we can as Doug said pretty much map your
3 opening remarks to the particular slides but as we go
4 through it again if you can briefly again comment
5 when we get there that would be great.

6 So regulatory authority -- so as the slide
7 says EPCA of 1975 established the energy conservation
8 program for consumer products other than automobiles
9 so that is the program at hand here today that
10 granted DOE the authority to classify additional
11 types of consumer products as covered products,
12 there's the site to the statute.

13 And we can prescribe energy conservation
14 standards for those products if certain statutory
15 criteria are met and for those who read the proposed
16 coverage determination, DOE spelled out its calculus
17 there in terms of energy consumption and the mapping
18 to the statutory authority to cover hearth products.

19 EISA came along and required that any
20 final rule establishing or revising energy
21 conservation standards for a covered product must
22 incorporate standby mode and off mode energy use into

1 a single amended or a new standard and you could see
2 this site there.

3 As I mentioned DOE published a proposed
4 determination of coverage for hearth products on
5 December 31, 2013 there's the site to the Federal
6 Register. DOE used the definition for hearth product
7 as proposed in the notice of proposed determination
8 to define the scope for the notice of proposed
9 rulemaking that we are discussing here today and
10 there are currently no energy conservation standards
11 or test procedures for hearth products.

12 MR. BROOKMAN: Yes Steve Rosenstock?

13 MR. ROSENSTOCK: Steve Rosenstock, Edison
14 Electric Institute. I think it is important to talk
15 about the process because for many years after the
16 Process Improvement Rule was created by the
17 Department of Energy in 1996 for a long time every
18 product went through a process of having a framework
19 document with a public meeting and public input.

20 There's advanced notice of notice of
21 proposed rulemaking now also called the preliminary
22 analysis with notice and then public meeting and then

1 time for stakeholder input then the NOPR the proposed
2 rule with obviously seeking public input and then the
3 final rule, it was a four step process. Things have
4 changed over the last years where products that have
5 been regulated before we can you know a lot of times
6 the framework was skipped because you know it has
7 been done before. But I think that it seems like now
8 things have really been -- I guess it was starting
9 with the refrigerator proposed rule last December
10 that things have been I'll use the word streamlined
11 -- especially with a product that there have never
12 been regulations before to go from termination of
13 coverage all the way to proposed rule without those
14 intermediate steps for entities that have never been
15 regulated before.

16 I think in my view or again just speaking
17 of process I'm wondering if this is going a little
18 bit too far too fast. Again I'm saying this just as
19 a process geek. I've been involved with this process
20 for many, many years and especially to streamline the
21 process for a product that's never been regulated
22 before I think there are significant issues, thank

1 you.

2 MR. BROOKMAN: Thank you Dana? Turn the
3 microphone on thank you.

4 MR. MOROZ: I just wanted to comment on
5 that statement that I think is a little erroneous it
6 says that there is currently no energy conservations
7 standards or test procedures. I believe that test
8 standard to which fireplaces at least have fireplace
9 heaters are subjected to and the harmonized standards
10 do address efficiencies.

11 MR. BROOKMAN: Do you have a citation?

12 MR. MOROZ: Not with me no, it would be NC
13 2188.

14 MR. CYMBALSKY: That's an industry
15 standard. I'm sorry I should be more specific,
16 there's no federal U.S. test procedure that you must
17 comply to. You may comply to your industry standard.

18 MR. MOROZ: Okay.

19 MR. BROOKMAN: Okay thanks for raising
20 that. Frank Stanonik?

21 MR. STANONIK: Frank Stanonik, AHRI and
22 I'm going to join my process geek friend over here

1 and raise a procedural issue specifically with regard
2 to the undetermined definition of hearth product. In
3 fact when DOE came out with the proposed
4 determination it specifically stated in the federal
5 register notice and I am quoting here "if after
6 public comments DOE issues a final determination of
7 coverage for this type of product, DOE will consider
8 both test procedures and energy conservation
9 standards for all hearth products."

10 MR. BROOKMAN: And Frank what is that
11 source?

12 MR. STANONIK: That would be the federal
13 register December 31, 2013 page 79639.

14 MR. BROOKMAN: Thank you for that.

15 MR. STANONIK: And the point is that the
16 time that DOE came out with that proposal the
17 presentation to all stakeholders and interests were
18 that this issue of standards and test procedures for
19 whatever hearth products were determined to be
20 wouldn't occur until in fact the determination
21 rulemaking was completed and in this case DOE has
22 stepped back from that process. We think that is a

1 significant error and in fact is causing many people
2 to spend a lot of time that may or may not have been
3 required including the people doing the analysis if
4 there had been a final determination of what a hearth
5 product is and one final point on that is that as
6 presently proposed and we don't agree with the
7 definition that proposed definition does include
8 unvented products and in fact there is a DOE test
9 procedure on the books for unvented heaters.

10 And you can call an unvented gas, or
11 whatever you want to call it but it is undoubtedly a
12 heating product, unavoidable. They are unvented
13 heaters they have always been considered unvented
14 heaters and there is a DOE test procedure for
15 unvented heaters.

16 MR. BROOKMAN: Okay Dana you had a follow
17 up?

18 MR. MOROZ: I just in response to John
19 mentioned that there was no federal test procedure
20 the standard I referred to with said 2188 is an ANSI
21 standard which I believe is a national standard.

22 MR. BROOKMAN: Yeah okay thank you.

1 MR. MOROZ: I'm sorry that was my foreign
2 national.

3 MR. BROOKMAN: We are familiar with 2188,
4 yes please Sue?

5 MS. WALKER: Yes just to follow up very,
6 very, very briefly on Frank Stanonik's comment regard
7 vent free gas products and their inclusion in this
8 NOPR. And this is all regarding what is referred to
9 as a pallet but is in fact a very, very important
10 safety device called the oxygen detection safety
11 pallet or ODS and it's been required on these
12 products by ANSI standard since 1980.

13 All products on the market must be tested
14 and listed to this standard and this is the only
15 product in the U.S. market that incorporates this
16 important safety device. So to just call it a pallet
17 or standing pallet is a real mischaracterization
18 function of the product. It has a unique -- a
19 remarkable safety record. In the 34 years since the
20 product has been in the U.S. market the Consumer
21 Product Safety Commission confirms that there has
22 never been a documented death or carbon monoxide

1 poisoning attributed to a product using this
2 important device and also just briefly comment on the
3 standby heat -- emergency heat benefit of other
4 products, this is very, very important in the gas of
5 vent free gas products.

6 At this point almost no products on the
7 market require any electrical input to operate. They
8 are a primary resource to consumers during the event
9 of power outages whether brief or extended. In fact
10 one way you can tell that is right after a power
11 outage the sales of these products spike, people
12 basically say never again will I be in this
13 circumstance.

14 So to require the oxygen detection safety
15 pallet to somehow be contrived to have electrical
16 input and use batteries as backup would largely
17 defeat that very, very important consumer benefit.
18 One more brief point the controls from these products
19 are very visible, accessible, consumer friendly and
20 as others have pointed out you just can't miss it in
21 the room.

22 The people who buy these products are very

1 focused on the energy savings so they are going to
2 extinguish that pallet during periods of extended
3 non-use or at the end of a season. I think that
4 factor alone mischaracterizes these products in terms
5 of this NOPR thank you.

6 MR. BROOKMAN: Thank you, additional
7 comments here? Yes please go to the microphone and
8 make sure it is turned on.

9 MS. DAVIDSON-HOOD: I just wanted to --
10 I'm too short for this. Caroline Davidson-Hood from
11 AHRI -- I just wanted to raise a procedural issue
12 tacking on to what Frank mentioned before that the
13 fact that the determination has not yet been
14 finalized renders I think a problem under the
15 American -- the APA, the Administered Procedures Act
16 because you have no statutory authority for this
17 rulemaking and it probably raises potential due
18 process issues so I definitely think that the
19 determination needs to be finalized before a
20 rulemaking can be undertaken on products that are not
21 even included in the statute yet, thank you.

22 MR. BROOKMAN: Thank you. Okay so back to

1 John Cymbalsky.

2 MR. CARROLL: Ryan Carroll with HBPA.
3 Procedurally I would like to also say that we have
4 been frustrated to some extent in the process because
5 we have had over the course of the last 18 months or
6 so a number of requests one in writing to our
7 comments on the proposed coverage of determination.

8 We have had attorney to attorney contact
9 seeking meetings as well and you know we are exciting
10 to be here for dialogue but it has been a rough road
11 to get there.

12 MR. BROOKMAN: Okay thank you. Let's
13 proceed with the content and I think back to John
14 Cymbalsky.

15 MR. CYMBALSKY: Okay thank you Doug. This
16 slide shows the criteria for selecting standards
17 levels so EPCA directs DOE to consider to the
18 greatest extent practicable the following 7 factors
19 in determining whether potential energy conservation
20 standards are economically justified.

21 We refer to these as EPCA 7 factors and
22 you can read them here. I think Leslie did a good

1 job pretty much in his opening remarks going through
2 each and every one of these but -- and you could see
3 that there are things like the impact on consumer
4 utility or performance and lifetime operating costs,
5 the impact on both consumers and manufacturers so we
6 are going to go through all these here in the slide
7 packet one by one pretty much and so we will be able
8 to comment as we go through these factors.

9 Okay and here's a slide I think we have
10 heard a lot about already and we will give you a
11 chance to again comment upon. So here is the
12 proposed definition of hearth product and I'm going
13 to read it for you. A gas fired appliance that
14 simulates a solid wood fuel fireplace or presents a
15 flame pattern for aesthetics or other purpose and
16 that may provide space heating directly to the space
17 in which it is installed and so here's our first
18 comment box.

19 We have heard a lot of comment already but
20 if anyone else would like to comment on the proposed
21 definition here's your chance.

22 MR. BROOKMAN: It would be helpful whether

1 now or in your written comments, it is especially
2 instructive to be able to say what it should be, not
3 what you don't like about it okay so yes, over here
4 to is it Barton?

5 MR. DAY: Following directions diligently
6 I'll start by saying we can't offer any suggestion as
7 to what it should be for two reasons. One is we
8 still don't know what it is intended to cover and
9 until we figure that out there's no point in pursuing
10 language.

11 The second issue is that we just don't
12 think DOE has the legal authority to take completely
13 different products and bundle them together as a
14 single product. I mean
15 Congress didn't go in the statute and say you know
16 HVAC products are a covered product they said well
17 room heaters are a covered product and furnaces are a
18 covered product and water heaters are a covered
19 product.

20 DOE's proposal sweeps together products
21 that are far more different than those examples and
22 treats it all as a covered product and in the process

1 essentially renders the limitation on their authority
2 to impose standards irrelevant. Congress had a no
3 Twinkie rule it said that there has to be an
4 aggregate annual energy use of a certain level of a
5 product for it to be worthy of a regulation in the
6 first place. There are products covered in this
7 rulemaking that I think pretty clearly would never
8 meet that test and the fact that all of these
9 products are being combined together willy nilly has
10 the effect of aggregating the gas consumption of
11 different products in order to avoid the need to
12 justify regulating them individually.

13 I think that's not lawful but you know
14 we've got a number of legal issues and concerns.
15 What I would like to do is see if we can get some
16 clarity on the proposed definition and there are a
17 couple of issues I would like to raise in that
18 respect. One is just looking at the language. There
19 are a lot of disjunctions in here and if you look at
20 it -- it is a gas fired appliance that simulates a
21 solid fuel fireplace or presents a flame pattern
22 okay.

1 So you could pretty much cross out that
2 simulates a solid fuel fireplace because it's not
3 particularly meaningful. I mean it's that or
4 presents a flame pattern for aesthetics or other
5 purpose seems to mean any purpose so where are we
6 now? We have a gas fired appliance that presents a
7 flame pattern for any purpose and it may or
8 presumably may not provide space heating directly to
9 the space in which it is installed so that whole
10 clause is in parts no meaning.

11 So we are looking at a definition that
12 says a hearth product is a gas fired appliance that
13 presents a flame pattern for any purpose. And then
14 we see the TSD we wouldn't have guessed this from
15 looking at the proposed rule but in the TSD there are
16 specific references to patio you know, ready and
17 patio heaters that don't have a visible flame.

18 In plain English that doesn't present a
19 flame pattern, it has a flame so I guess we have to
20 read the definition as a gas fired appliance that
21 produces a flame for any purpose. That covers
22 everything under the sun, I mean it covers kitchen

1 stoves and ovens, it covers gas lights, it covers --
2 there's just no way to look at that definition and
3 have any reasonable sense of what products we have to
4 address.

5 And so we have struggled with that all
6 along and John if we could could we go on to the next
7 slide because you have got some pictures here that I
8 think you know it's helpful to look at examples and
9 try to understand what it is we are talking about.

10 MR. CYMBALSKY: Before we move on I should
11 probably take some more comment on the definition.

12 MR. BROOKMAN: Yeah, yes Frank.

13 MR. STANONIK: Again we obviously are not
14 in agreement with the definition but as proposed it
15 is difficult for us to understand how that definition
16 leads to a determination that unvented or vent free
17 gas logs whichever you choose to call them would be
18 included in this definition and I will point out that
19 it says may provide space heating in fact for
20 unvented vent free products the emphasis that's
21 presented in this definition is exactly the opposite.
22 Those are heating products that may simulate a flame

1 pattern but they primarily are developed, sold in the
2 market as heating products.

3 The fact that people may want to pick that
4 particular type because it looks like a fire is a
5 secondary issue but you take a vent free gas log,
6 install it, even though it's not vented that room
7 will be heated and it will be heated quickly and
8 hotly if you will and so there's no may about it.

9 And so as we read that definition we could
10 not understand how that definition leads to a
11 conclusion that vent free gas logs wherever they are
12 installed are somehow included as a hearth product.
13 It's inconsistent.

14 MR. BROOKMAN: Let's hear additional
15 comments on the definition. I am going to turn to
16 you in a moment Barton. Other comments before? Okay
17 keep going Barton.

18 MR. DAY: The other puzzling thing about
19 the definition is just you know we have got a rule
20 that's directed at pilot lights and the definition
21 covers and is apparently intended to cover and that's
22 why I wanted to go on to the examples, we have got

1 the radiant patio heaters, well they don't present
2 the kind of product -- they don't present the kind of
3 issue that DOE is concerned about, the possibility of
4 pilot lights being left on indefinitely.

5 The other thing I would say about that
6 type of product is they are not in any normal English
7 sense a hearth product so I don't -- two things to
8 conclude either the word hearth doesn't mean anything
9 either well I guess that's the only answer if those
10 products are in and then it does lead to the question
11 if they are in what else don't we know about because
12 again we wouldn't have guessed that they would be
13 involved in this.

14 I guess one of the points I wanted to
15 emphasis is why do we have products included in this
16 that don't have pilot lights? I mean there are whole
17 categories of products, match lit log sets, whole
18 categories of outdoor products. I mean there's a
19 vast you know, herd of products that operate on small
20 propane tanks. They can't possibly have their pilot
21 lights be left on indefinitely and produce the kind
22 of gas usage that you are concerned about.

1 Are they intended to be covered or not? I
2 guess with patio heaters the answer has got to be
3 yes. So we are stumped and it is an issue that we
4 literally particularly with the apparent inclusion of
5 patio heaters that are so different from anything
6 else, what else is covered? What else is intended to
7 be covered? I mean the whole language would cover
8 anything.

9 MR. BROOKMAN: Ashley Armstrong?

10 MS. ARMSTRONG: This is Ashley from DOE.
11 I think what you see -- so I can appreciate the fact
12 that there is some confusion in the room. I think
13 what would be most helpful to the Department at this
14 point is suggestions. So what you see on the slide
15 examples of products currently on the market that we
16 feel meet our definition, our proposed definition of
17 hearth product.

18 Obviously this is not an exhaustive list,
19 it was not meant to be an exhaustive list of
20 pictures. Any product out there that would generally
21 speaking meet that definition on the last slide would
22 ultimately if we end up going forward with this and

1 finalizing be covered under the rule. So at this
2 point I think it's you know, Barton you listed some
3 examples of certain products you felt should or
4 shouldn't be on it and so I think what would be
5 helpful to us is how would you suggest that the
6 definition be changed and that's open to everyone.

7 But I think that's going to be and why,
8 that's more helpful to us than saying we don't
9 understand your definition. So I think that would
10 help us better understand your position and how it
11 compares to our definition going forward.

12 MR. DAY: We did put in, this is Barton
13 Day again, we did put in some suggestions on that and
14 I would you know I will go back just to the point
15 that we don't think it's legal to approach it this
16 way but let's put that aside because at least let's
17 figure out which products we are arguing about so
18 that we can have an intelligent conversation.

19 And for that purpose you know we have made
20 some suggestions. You have got a number of products
21 illustrated up there that are fireplaces. Fireplace
22 is a good plain English word, I think everybody knows

1 what a fireplace is so I would say if you want to
2 cover fireplaces say fireplaces.

3 You have got stoves, free standing gas
4 stoves up there, again good plain English, everybody
5 knows what that is. You have got an outdoor gas
6 fireplace presented there and plain English works
7 pretty well on that. You have got log sets -- I
8 think you have to identify the products because if
9 you use these general terms about presenting a flame
10 then you have the question of well why wouldn't that
11 cover gas lights? Why wouldn't that cover barbeque
12 grills? Why wouldn't it cover kitchen stoves?

13 And so I think you really you have to tell
14 us what products you are interested in rather than
15 having a broad definition that includes all kinds of
16 other things. And the other suggestions that we
17 have made are -- don't include products that aren't
18 relevant to what's animating this rule and I put
19 patio heaters in that category. They don't have
20 standing pilot lights that can be left on
21 indefinitely. They are just not relevant to this
22 discussion.

1 Most outdoor products, like fire tables
2 like that if you put a standing pilot light on that
3 it blows out I mean those products don't have
4 standing pilot lights, they are just not designed
5 that way.

6 MR. BROOKMAN: So that's another criterion
7 standing pilot lights?

8 MR. DAY: Well you know you are asking me
9 to guess. The comments that we put in limit the
10 scope of the definition to the scope of the problem
11 that you are trying to address. That would in my
12 view leave out essentially all outdoor products, it
13 would leave out propane products, it would leave out
14 products like mass log sets that by definition don't
15 have standing pilot lights. There is just no reason
16 to have them included in a rule where there's no
17 potential for energy conservation benefits because of
18 the inherent nature of the product.

19 MR. BROOKMAN: I saw Jack first.

20 MS. ARMSTRONG: Hang on one second and
21 this is actually for Jack so perhaps he could answer
22 this as he also makes his comments. Your association

1 broadly is HPBA hearth patio and barbeque so what
2 does hearth mean in your world?

3 MR. GOLDMAN: Well I would like to first
4 start by saying that we are being put in the position
5 of telling you what we think should be regulated when
6 it is your job to define what is being regulated.
7 You know, so we don't understand what you want to
8 cover and you are saying well we are not telling you
9 well so why don't you tell us? Why don't you do our
10 job for us? Okay

11 Hearth product -- excuse me, hearth
12 product is defined as the base, the bottom of a
13 fireplace. It's the stone or masonry bottom of a
14 fireplace only.

15 MR. STAS: Eric Stas, DOE I would just
16 point out that this is not a rule -- the purpose of
17 the product is not to ban standing pilot lights to I
18 think you are looking at it from a wrong perspective
19 in terms of what the products are generally, the
20 standing pilot light is a technology that we are
21 looking at here.

22 MR. GOLDMAN: I'm not sure I understand

1 that one.

2 MR. BROOKMAN: I'm going to keep up with
3 the que, Rett you are next.

4 MR. RASMUSSEN: Rett Rasmussen. Mr.
5 Suspect please tell me all of your transgressions so
6 I can properly charge you with all the crimes that
7 you should be charged with, that's what this is. And
8 I know this isn't a judicial proceeding but you know
9 this is the United States of America and you are just
10 you know saying hey tell us everything and with the
11 regard Mr. Stas to the standing pilot, this is your
12 gateway drug into regulating all of the industry here
13 and make sure you tell us everything you want to have
14 regulated.

15 Anything with a flame pattern well it
16 either has a decorative pattern or it doesn't have a
17 decorative pattern but that's a pattern if you do
18 that. It's such a broad definition the way you have
19 it there its kitchen sink. It's a fishing
20 expedition, it's ridiculous, it's a waste of time,
21 it's a waste of everybody's efforts, you folks need
22 to get down to business and you figure out what it is

1 that the issues are that you need to regulate on. I
2 mean I distribute radiant patio heaters, they are all
3 electronic ignition, they are the most efficient type
4 of burner systems you can get with infrared -- where
5 is the need for regulation?

6 Where is the you know, I'm just blown away
7 at what I consider to be just a lack of any type of
8 reasonableness in this and how things are done in
9 this country. I don't know about Canada but at least
10 in the United States that's how things are done here.

11 MR. BROOKMAN: Barton do you want in here?

12 MR. DAY: Yeah, again I think the key here
13 and Ashley I think one of the things that you said
14 that is most troubling for us is well anything that
15 meets the definition will be covered and I can tell
16 you that I think by statute the only thing that's
17 covered is what you analyze and justify a standard
18 for.

19 And the problem is that you -- in the
20 analysis there's so many assumptions that everything
21 is the same and that all of these products have these
22 homogenized characteristics I mean yeah you put

1 outdoor and you average an outdoor fireplace with a
2 patio heater which is like averaging a ping pong ball
3 with a light pickup. They are completely different
4 and the average tells you absolutely nothing and
5 again I think it's informative that from looking at
6 everything that was in the proposed rule in the NOPR
7 itself, we never would have guessed that radiant
8 patio heaters are in there if they hadn't been named
9 by name in the TSD and shipment numbers put together.

10 And so we wouldn't have even known to
11 comment, excuse me they don't have standing pilots.
12 Those products don't have standing pilots you
13 couldn't leave them on indefinitely if you wanted to
14 and they would be subject to this rule, they would be
15 subject to the paperwork requirements and everything
16 else and there's no way -- there is no way you can
17 justify the proposed standards for those products.

18 There's no way the standard could be
19 justified for match lit log sets and I understand
20 your point Eric that you are sort of viewing the
21 coverage determination as something separate but the
22 coverage determination can't be made without a

1 rational explanation as to why you think the product
2 is worthy of regulating and what you are focused on
3 is regulating pilot light use.

4 And I don't see how you can rationally
5 include in the definition products that by definition
6 don't have pilot lights. Do you see what I am
7 saying? And again you know if we can't agree on what
8 it is that you think you should be regulating let's
9 at least agree on what you think you should be
10 regulating so that we can understand what products we
11 have to focus on and provide an explanation about.

12 MR. BROOKMAN: Leslie you are next, use
13 the microphone.

14 MR. BORTZ: I'm sorry Eric I think you
15 mentioned that this isn't only about pilot kits?

16 MR. STAS: Eric Stas DOE I think the point
17 is when you are looking at the covered products it's
18 what do you see out in the market, in the real world,
19 that would be types of units that are out there.
20 It's the standing pilot is a technology that we are
21 looking as an option of improving energy savings.

22 MR. BORTZ: Right.

1 MR. STAS: So I think you're -- it doesn't
2 seem to fit this argument that you are sort of like
3 saying the product class is something with a standing
4 pilot light and that is sort of putting the cart
5 before the horse or what have you.

6 MR. BORTZ: I think that's what you are
7 doing, however let me ask you does that mean that a
8 barbeque is included in this?

9 MR. CYMBALSKY: So you would see the
10 definition so if it meets that definition.

11 MR. MOROZ: Does it? Does it? You are
12 the guy who makes the definition? Does it?

13 MR. CYMBALSKY: We will take your comment
14 on that, thanks.

15 MR. STANONIK: Frank Stanonik, AHRI
16 specific to that point and barbeque I assume we are
17 talking about a gas grill. I'm not aware that any
18 gas grills are designed to provide any type of
19 specific flame pattern. It's in no way shape or
20 form, there's a flame but nobody spends time
21 designing it to make a flame pattern.

22 MR. RASMUSSEN: It depends on your

1 definition of pattern.

2 MR. STANONIK: Well pattern in fact
3 suggests design and attempt to me but the point is
4 there is no way this definition should be inferred or
5 intended to cover a gas grill.

6 MR. BORTZ: Does it?

7 MR. BROOKMAN: Leslie back to you keep
8 going.

9 MR. BORTZ: Well I asked the question does
10 it.

11 MR. BROOKMAN: I saw Ryan first, Ryan you
12 want in here?

13 MR. CARROLL: Yeah I was just going to say
14 the first part of this comment box DOE seeks comment
15 on the proposed definition and here we are asking
16 does this fit and we are being told well tell us
17 whether or not it fits. I mean when I hear -- what I
18 hear now is that definition sounds like it is set in
19 stone and I thought there was an opportunity to
20 comment which everybody here has about the way we did
21 in January at the end of the comment period as well.

22 MS. ARMSTRONG: It's definitely still over

1 definition you are welcome to comment but --

2 MR. CARROLL: Then how can we tell you
3 what fits when that's so influx, if it is still
4 influx?

5 MR. BROOKMAN: Wait.

6 MR. STAS: You have seen the slide with
7 the photos of the general types of products that were
8 used as examples so perhaps you could help us craft a
9 better definition to capture that type of products,
10 maybe you think there's a better way to narrow it.
11 So I mean I think the people in this room can sort of
12 understand what we are trying to get at here I mean
13 without taking things to extremes.

14 MR. MOROZ: What are you trying to get at?

15 MR. BROOKMAN: Hang on, that was Eric Stas
16 now Steve.

17 MR. ROSENSTOCK: Steve Rosenstock, Edison
18 Electric Institute. You know I used to do stuff at
19 ASHRAE and ICC where we talk about definitions and
20 that's because it makes such a difference for those
21 codes. The way that it is written right now because
22 of the words or other purpose I am afraid to say that

1 yes, barbeques would be covered because that is an
2 "other purpose" so would gas lights, they are "other
3 purpose" to provide illumination.

4 Again just the way the definition reads
5 right now because it says other purpose it could be
6 any gas product that is not covered, stoves and
7 ovens, residential are covered in other DOE
8 rulemakings but the way it is written right now it
9 could cover barbeques it could cover gas lights and
10 I'm sure there are other products that I am thinking
11 about.

12 MR. BROOKMAN: So I'm hoping as several
13 commenters have suggested that we can continue to
14 provide useful comment on what this definition might
15 be Barton you are next.

16 MR. DAY: The last comment is absolutely
17 correct. I mean as I parched the language you know
18 at the beginning of this discussion that definition
19 covers every gas appliance that produces a gas flame
20 for every purpose. Any purpose at all, so it covers
21 water heaters, it covers central furnaces it covers
22 every gas product that you have already regulated,

1 every gas product that you ever might regulate. It
2 is not a useable definition.

3 You can't make any kind of regulatory
4 determination without having an intended target.
5 Tell us what the intended targets are so that we at
6 least know what we have to comment on and you know
7 again you have given us examples okay, we can comment
8 on fireplaces we know you want to talk about
9 fireplaces, great, let's talk about fireplaces but we
10 can't talk about you know shipment numbers.

11 For some category if you are secretly
12 including gas lights in there and we have no idea. I
13 mean I would presume that you are not intending to
14 include central furnaces but you have never said so
15 so I assume you are not covering kitchen cooking
16 stoves. But the words of the definition include them
17 and that's the problem is that you know we need to
18 understand what and you need to tell us you know the
19 various places that you know you raise the question
20 of well what's you know -- how do we address the
21 intended products?

22 What are the intended products? We are

1 not intending you are intending and you need to tell
2 us what you are intending so that we have an
3 opportunity to comment.

4 MR. BROOKMAN: Rett

5 MR. RASMUSSEN: Rett Rasmussen yes we
6 commented on this a year ago during the coverage
7 proposal and now it's the same question again without
8 any feedback, without any determination, without
9 anything from DOE so it's kind of all we can look at
10 it as is well you didn't give us the right answers we
11 are looking for so give us other answers. So that's
12 the frustration and we would like to see something
13 back from DOE other than thank you for your comments,
14 let's have a dialogue please.

15 MR. BROOKMAN: Frank.

16 MR. STANONIK: Frank Stanonik, AHRI. As
17 far as recommending a different or improved or
18 alternative definition I will indicate that in the
19 rulemaking that was conducted and mostly completed on
20 revising the standards for direct heating equipment
21 we at that time were on record indicating that DOE
22 should rely on and use the definition for various

1 types of vented, I'll use the word advisedly hearth
2 products that are presented in the Z21 series of
3 standards. Now we are here today because in fact DOE
4 is intending to address a different set of products
5 that are not included as direct heating equipment
6 that is what that proposed determination is about and
7 that's what this rulemaking is about.

8 And if that is the case okay, to me it
9 further emphasizes that they should rely on the long
10 established recognized industry definitions for
11 various types of I'm going to use the word decorative
12 gas fired products that are in the Z21 series of
13 safety standards. The reason back in the other
14 rulemaking the direct heating rulemaking where at
15 least one of the reasons were the suggestion was not
16 accepted was some concern that by if you will, gaming
17 the definitions one might avoid regulation from
18 federal standards.

19 But if in fact this all goes through that
20 issue avoiding regulation will go away because they
21 will either be regulated as a vented heating -- or
22 I'm sorry as a piece of direct heating equipment

1 which already exists or they will be regulated as
2 this new category of a new covered product whatever
3 it is going to be called.

4 So to me that really eliminates one of the
5 reasons not to use the industry definitions and if
6 you use the industry definitions we can get past this
7 point of -- well I will rephrase that. I believe it
8 will be much clearer as to what will be covered or
9 what is intended to be covered as opposed to as we
10 are getting back into discussing the same
11 conversation we had at the rulemaking on the proposed
12 determination rule.

13 MR. BROOKMAN: Yes Leslie?

14 MR. BORTZ: I believe right now there is
15 no standard or definition to these products.
16 Interestingly and I really don't know the answer to
17 this, I think I know the answer. Over the past few
18 years when there has been no standard I believe that
19 most products in the industry have become more
20 efficient without a standard.

21 More so than your standard would have
22 called for because your standard doesn't start for

1 several years. I think there are more heater
2 fireplaces than the numbers you gave in 2011 compared
3 to decorative fireplaces. I know our products use
4 less gas wherever we can and have Rett you have
5 products that you are losing less gas. The trend
6 toward making more efficient products has nothing to
7 do with the fact that you don't have a standard.

8 Is there anybody that would possibly like
9 to help me on this because --

10 MR. BROOKMAN: I would like to finish out
11 this segment and then we are going to go and take a
12 break so as I see it we are now on the regulatory
13 approach slide 15 and I think we are hearing again
14 from John Cymbalsky.

15 MR. CYMBALSKY: Okay so we are on slide 15
16 as Doug said the regulatory approach so DOE
17 considered two options for energy conservation
18 standards for hearth products and so number one would
19 be a performance based standard so that would be
20 either an efficiency level or a standard for the
21 maximum energy allowed or a design which is a
22 prescriptive standard pursuant to the definition of

1 energy conservation standard at 42 U.S.C. 6291(6).

2 DOE may establish either a performance
3 standard or a design standard for these products but
4 not both. So to assess these two options DOE
5 reviewed available technology options for performance
6 based standards and design standards, compared
7 options for reducing active and standby mode energy
8 consumption and considered these for all hearth
9 products meeting the proposed definition.

10 DOE concluded that a prescriptive design
11 requirement would be more effective than a
12 performance based requirement for the following
13 reasons. First of all there would be less burden on
14 manufacturers because testing for an efficiency
15 standard would not be required. There would be a
16 single requirement that would apply to all products
17 meeting the hearth product proposed definition and
18 that product classes are unnecessary because standing
19 pilot functionality components and energy use are
20 similar across all hearth products.

21 DOE notes that it did group different
22 product categories of hearth products commonly found

1 in the market for use in this analysis of potential
2 performance standards, Barton?

3 MR. DAY: A couple of times there John you
4 said that you would consider all hearth products.

5 MR. BROOKMAN: Your microphone.

6 MR. DAY: Oh sorry.

7 MR. BROOKMAN: Barton Day.

8 MR. DAY: Yeah Barton Day again, John a
9 couple of times in your comments there you said that
10 DOE considered some fact or another for all products
11 meeting the definition. That presupposes of course
12 that you have some concept of what is covered by the
13 definition. That's what we are asking to hear, we
14 have been around and around on that and we are not
15 getting any kind of clarity as to what you
16 considered. I would suggest and a way to try and
17 make this meeting constructive would it at least be
18 possible to hear from DOE what products it considered
19 in coming up with its justification for the proposed
20 rule.

21 I mean you have shipment data, shipment
22 data for what exactly? You have average efficiency

1 numbers for what exactly? I mean that's what we need
2 to know we can't comment on anything -- how do you
3 comment on shipment numbers without knowing shipment
4 of what, energy consumption of what. If we can at
5 least cabin the discussion enough.

6 I want to end up with a constructive
7 discussion here and you can see how we are flapping
8 around. We don't want to just sit here and say well
9 we don't know because you won't tell us what products
10 and that's not going to be very helpful. You've --
11 if you can articulate for us what products you looked
12 at in the regulatory analysis then at least we can
13 talk about that.

14 MR. CYMBALSKY: Okay I think this is a
15 good stopping point we will pick up on this but let
16 us take a few minutes to take a break.

17 MR. BROOKMAN: Yeah let's take a break we
18 are due for a break. It's now 5 minutes after 11.
19 We will resume in 15 minutes which means 20 minutes
20 after 11. Please make sure to wear your badge or
21 identification visible as you are walking around the
22 halls, there are restrooms at both ends of the hall.

1 There's a coffee shop down on the ground floor you
2 can get both water and coffee there at Dunkin Donuts
3 and please don't leave the building or anything you
4 will have to come back through security to get back
5 in so we will resume here in this room at 11:20 and I
6 appreciate everybody being so clear about their
7 wants, needs and expectations. See you back here at
8 11:20.

9 MR. BROOKMAN: Please start taking your
10 seats we are going to resume. All set, okay we are
11 going to pick up where we left off and I guess we are
12 going to hear from Ashley Armstrong. Hey folks let's
13 settle down please.

14 MS. ARMSTRONG: And unfortunately Barton
15 is not here but I was going to go back to start
16 addressing some of the things he raised earlier. So
17 at break what I did was and granted I didn't have a
18 whole lot of time but I did go back and quickly look
19 at a couple of the comments that have been previously
20 received in response to the proposed definition that
21 was in the proposed coverage determination and
22 actually Barton in his comments earlier raised a

1 couple of new points that hadn't previously been
2 provided and they give issue -- they provide I think
3 what I would call a pretty good foundation for DOE to
4 go back and at least reconsider some of the changes
5 that it would feel need to be made to the DOE -- to
6 the proposed definition of a hearth product to
7 address maybe some of the concerns.

8 But just to answer some of the questions
9 in terms of scope, what is the analysis based on
10 before we actually go forward and start talking about
11 the analysis. A while back when we kicked off this
12 effort one of the things that we did --

13 MR. BROOKMAN: Excuse me Ashley a few
14 individuals have just joined us, we are just getting
15 going here, we are just getting started please Ashley
16 go ahead.

17 MS. ARMSTRONG: So a while back when we
18 first kicked off some of these efforts one of the
19 first things we did was reached out to HPBmA and we
20 asked you guys for shipments information. And so DOE
21 HPBA was kind enough to provide shipments information
22 which subsequently can be found in the docket but it

1 is for these categories. So it's for vented
2 fireplace, both inserts and stoves. It's for
3 unvented fireplaces, both inserts and stoves, it was
4 for log sets, both unvented and vented log sets and
5 it was for outdoor products with the exception of
6 patio heaters which were subsequently added in
7 shipments data provided.

8 So to answer your question directly Barton
9 we have data, all of these products for which the
10 analysis is based on going forward. So I think you
11 can generally see that DOE believe its definition was
12 encompassing of this scope. You were out of the room
13 when I started this but I think what you seeded
14 earlier was pretty helpful to DOE.

15 I went back at the break and looked at
16 some of the comments that were received on the
17 proposed definition in response to the coverage
18 determination and some of the things that you have
19 said today in pointing out some of the confusion in
20 our definition I think is more detailed than had been
21 previously submitted and it is very helpful so we
22 thank you for that.

1 And in response to that I think DOE can
2 work with that going forward but this generally
3 speaking on the side is the entire coverage. So we
4 are hopeful that you will take this opportunity since
5 you have been seeking opportunities to work with the
6 Department and if you have specific comments about
7 how we can refine our definition, you will use this
8 as that opportunity to provide suggestions on how we
9 can revise the definition given this scope.

10 MR. BROOKMAN: Please go to a microphone
11 say your name.

12 MS. FEINSTEIN: Hi I'm Rachel Feinstein
13 with the Hearth, Patio and Barbeque Association. I'm
14 looking at the data that we provided to DOE and for
15 outdoor products it was that was specified as factory
16 built outdoor gas fireplaces, not outdoor products in
17 general.

18 MS. ARMSTRONG: Yes.

19 MS. FEINSTEIN: It was specifically that
20 thank you.

21 MR. BROOKMAN: Okay thanks for clarifying,
22 Barton do you want in here?

1 MR. DAY: Yeah Ashley thanks that's very
2 helpful. The picture still leaves some questions and
3 I think the one that we have had the most difficulty
4 trying to wrap our head around is outdoor products,
5 you know as indicated you know the data that you got
6 was you know related to built-in gas fireplaces. The
7 inclusion of patio heaters came as a real surprise
8 and sort of is a barn door thrown open and we just
9 have no idea you know what else may be -- what else
10 may be in there and again it's that outdoor category.

11 I mean what you have got shown in the
12 picture there looks like it's a built-in type of fire
13 table product, you know there are a lot of variations
14 on these that don't make any sense in this rule for
15 the same reason that I think the patio heaters don't
16 which is they just don't have pilot lights and so
17 they are not part of the issue that DOE is trying to
18 address.

19 The other categories again we don't agree
20 that they can all be lumped together but at least now
21 we can know what we are talking about so that helps
22 anything else that is not depicted there that we need

1 to worry about.

2 MS. ARMSTRONG: So I think what you will
3 hear when we move forward is that this is generally
4 the types of products that our analysis is based as
5 we step through and talk about the market intact,
6 some of the data we have collected, some of the
7 products that we purchased and we took apart and how
8 our analysis was based from the ground up was based
9 on this subset of products on the slide so generally
10 speaking we believed these were the subsets of
11 products that meet our proposed definition.

12 Obviously you know presents a flame
13 pattern to us that isn't anything that presents a
14 flame pattern, it is something that the consumer
15 would see a flame pattern, it is designed for that
16 flame pattern sorry you know, that's not a furnace, a
17 residential furnace. We will be talking about those
18 later this week.

19 Or that is not a water heater it was not a
20 residential cooking product that is otherwise
21 characterized. Those provide a different function.
22 This really was meant to be presented at least to us

1 present a clean pattern that that is what it's used
2 for that is what it was designed for so you know,
3 like I said we are open to any further suggestions
4 you may have on the definitions this is defined in
5 the scope and terms of what we analyze going forward
6 which I think will at least help you in concentrating
7 your comments for the rest of the days.

8 Some of the things that you have already
9 said, Barton I think were really helpful to us and
10 made us think a little further at break and go back
11 and look at some of the comments that were already
12 and talk about how we could further craft this to
13 help get rid of some of the ambiguity so we
14 appreciate you bringing those to our attention.

15 And that's the kind of constructive
16 feedback we are looking for throughout this process.
17 So we are hoping that is the way the rest of the day
18 will go.

19 MR. DAY: That's helpful thanks.

20 MR. BROOKMAN: Leslie? Get that
21 microphone close.

22 MR. BORTZ: I came in in the middle so

1 maybe you answered but she isn't here.

2 MR. BROOKMAN: Go ahead she can hear you.

3 MR. BORTZ: Do you intend to cover outdoor
4 gas lights as hearth products:?

5 MR. CYMBALSKY: No so what you see here in
6 our analysis this is what we contemplated for the
7 definition.

8 MR. BORTZ: Do you intend to cover indoor
9 gas lights? Does that mean that that's what you are
10 going to do or does that mean that is what you
11 contemplate now?

12 MS. ARMSTRONG: That is what at this point
13 this is Ashley from DOE that is what we propose to
14 do. Obviously our proposal is open for comment so if
15 you agree with that you can say you agree. If you
16 believe we should change course and include lights
17 you can also comment that way one way or the other.

18 Right now as you can see lights were not
19 expressly analyzed which means that's not something
20 DOE thought of as being in scope.

21 MR. BORTZ: Okay does that mean that you
22 will not regulate gas lights under this rule?

1 MS. ARMSTRONG: I cannot say will not
2 until we finalize something that's the determination
3 of will and won't. At this time they are not
4 proposed to be in scope. It's still a proposal it's
5 still out for comment. Nothing is final until we
6 finish the proceeding.

7 MR. BROOMAN: Rett?

8 MR. RASMUSSEN: Rett Rasmussen. In
9 looking at the intent of your coverage as depicted by
10 those photos one of these things is not like the
11 other and that's the patio heater. That's commonly
12 referred to as a mushroom type heater of which that
13 is one variety. The other variety is an infrared
14 type installed heater and those do not have -- they
15 have more heating function than they have aesthetic
16 appeal with regard to any flame pattern.

17 Their flame pattern is one of nondescript
18 pattern if you wanted to describe any type of pattern
19 it is not the same aesthetic appeal that simulates a
20 wood fire and so I would recommend that patio heaters
21 be taken out of this intent of coverage, thank you.

22 MR. CYMBALSKY: Thank you Rett, I just

1 want to point out that is exactly the feedback we are
2 looking for stated in that way, very helpful, well
3 addressed it's constructive so we can work with that
4 type of comment and you know go forward with that.
5 And if you say you agree with DOE not to analyze
6 lights, that's a constructive comment as well.

7 MR. BROOKMAN: Okay Barton?

8 MR. DAY: Yeah just a quick definitional
9 point. It is the patio heaters that threw us because
10 we couldn't see how they could fit in under a
11 definition that said flame pattern.

12 MR. BROOKMAN: I thought there were many
13 different things --

14 MR. DAY: I thought flame pattern meant
15 what you explained a minute ago until we saw patio
16 heaters.

17 MR. BROOKMAN: Are there many different
18 kinds of patio heaters?

19 MR. DAY: They are fairly generic they are
20 really suited to general types.

21 MR. RASMUSSEN: Actually you could put
22 there is at least three different types, there is

1 also one that doesn't put as much heat but it is the
2 spinning tube type one where it has a flame effect
3 but people expect to have heat off, this is Rett.

4 MR. BROOKMAN: Okay thank you were you
5 finished Barton? Okay you were. I really appreciate
6 this last series of comments and the exchange that
7 was there. Do we have additional comments based on
8 these photographs about products and definitions,
9 Leslie?

10 MR. BORTZ: It looks like you are
11 intending to cover outdoor fireplaces.

12 MS. ARMSTRONG: This is Ashley that is
13 correct.

14 MR. BORTZ: That is correct. How do you
15 intend -- what do you intend to consider? What's
16 going to be -- how are you going to -- I mean despite
17 what you say in your analysis that there are
18 extremely few outdoor fireplaces that have standing
19 pilots.

20 MS. ARMSTRONG: Okay so first I do want to
21 -- this is Ashley from DOE. So the definition of
22 as Eric pointed out earlier the definition and then

1 the proposed standards are really two separate things
2 for us. The presence of a standing pilot has nothing
3 to do with DOE's definition of scope. DOE was
4 defining the scope based on these characteristics of
5 products in a more broad term.

6 Obviously we have had a lot of discussion,
7 a very fruitful discussion and some suggestions about
8 how DOE could further potentially change that
9 definition to make it more clear. You know the
10 presence or absence of a pilot though has nothing to
11 do with whether products will or won't meet that
12 definition. The pilot is nowhere in that definition.

13 That isn't the coverage determination,
14 purely for defining what types of products are in in
15 terms of regulatory coverage for DOE to finalize its
16 coverage determination.

17 The second part of this and I think gets
18 to your question which I am going to say partially I
19 am going to answer throughout the day in terms of the
20 proposed standards you know the analysis we did for
21 standards is going to be presented through the rest
22 of the day. It starts all the way from the market

1 assessment we did, what types of products we chose
2 from the market. We took apart how we costed those
3 and then downstream of that the economic analysis fed
4 into lifecycle and national benefits and costs.

5 So I am going to hold your question in
6 terms of what exactly we considered in terms of
7 certain attributes and how we did that for the rest
8 of the day but obviously if you see something
9 throughout the day for any certain product that you
10 have data or you feel is different you should comment
11 on it, that's what this is all about.

12 MR. BROOKMAN: Leslie keep going.

13 MR. BORTZ: That outdoor fireplaces have
14 -- you have in your statistics that 26% of outdoor
15 fireplaces have a standing pilot. That's just not
16 true.

17 MR. BROOKMAN: Okay.

18 MR. CYMBALSKY: We would look forward to
19 the number that you think it is so data definitely
20 will help .

21 MR. BROOKMAN: Barton?

22 MR. DAY: Just one quick one before we get

1 off the definitional point and that is that I
2 understand what you are saying about coverage but
3 there is going -- there's a separate definitional
4 issue as to the scope of the standard because you are
5 basically saying well we want the coverage
6 determination to cover products whether they have got
7 standing pilots or not but the standard really can't
8 be justified for products that don't have standing
9 pilot lights to begin with so we will just need to
10 pick that up later.

11 MS. ARMSTRONG: So this is Ashley from
12 DOE. So you are absolutely right and our analysis
13 and all of our analysis there will be some fraction
14 of the market that is not impacted by our standards
15 and that usually means that they are at or above they
16 already meet our standards so our standard has no
17 impact on that percentage of the market and as we
18 march through today and we talk about shipments and
19 we talk about the distribution there will be some
20 fraction of the market that we are going to
21 acknowledge in these different categories that are
22 already shipped without a pilot thus would comply.

1 MR. DAY: Just to clarify and I agree with
2 what you just said I mean there are products that
3 some have pilot lights some don't. There are some
4 categories of products that don't have standing pilot
5 lights at all and so there is no you know, there is
6 no justification for having them subject to the
7 standard.

8 MS. ARMSTRONG: Right so this is Ashley
9 from DOE so if there are certain products as we march
10 through today that could never have a standing pilot
11 you know we welcome that feedback and we believe they
12 shouldn't be subject to at least a pilot light, the
13 consideration of a pilot that's something that you
14 are more than welcome to provide comment on.

15 MR. BROOKMAN: Are we ready to move on
16 now, I think we are ready to move to the market and
17 technology assessment yes.

18 MR. CYMBALSKY: So this slide just shows
19 you what we are all going to cover here in the next
20 few hours so.

21 MR. ELSZASZ: Good morning, I think it is
22 still morning. My name is Justin Elszasz. I'm a

1 managing consultant with Navigant Consulting and I
2 will be presenting the market assessment as well as
3 our engineering analysis. So to start off the
4 purpose of the market assessment is to both
5 qualitatively and quantitatively you know give really
6 the big picture of the hearth market, the hearth
7 product market and again this is using the proposed
8 definition of hearth products.

9 So when we say we are characterizing the
10 hearth industry we are talking about gas fired
11 products. We used a couple of different resources in
12 order to tackle the market assessment. One is
13 through product literature review you know this is
14 product literature that is generally available on
15 line. Another is through confidential manufacturer
16 interviews and another key resource was trade
17 association data in this case from Hearth Patio and
18 Barbeque Association.

19 As mentioned by John earlier additional
20 technology options were considered by given the focus
21 of the rule on a prescriptive standby you know
22 standard the technology that is relevant to this

1 assessment is obviously electronic ignition.

2 If I can change slides, okay. So the next
3 few slides are going to be the groups of products
4 that were analyzed as part of the hearth product
5 analysis going forward. So the first of these groups
6 again we saw these groups earlier on an earlier slide
7 during what John and Ashley were talking about.

8 The first of these groups was vented
9 fireplaces, inserts and stoves and that of course
10 includes both b-vent and direct vent styles. The
11 next in these groups is of course the unvented
12 variety so similar style products, fireplaces,
13 inserts and stoves but without the means for venting
14 byproducts of combustion outside of the building.

15 Unvented products both in this category as
16 well as unvented gas logs which we will see in a
17 moment of course include the oxygen depletion sensor.
18 The next group, these are the next two groups, vented
19 gas logs and unvented gas log oh I think Frank has a
20 --

21 MR. BROOKMAN: Frank Stanonik.

22 MR. STANONIK: Frank Stanonik AHRI. Since

1 you have identified it here I am going to take the
2 opportunity to point out you do show that unvented
3 products do require an oxygen depletion sensor which
4 is in fact built-in to the pilot system and in the
5 previous slide DOE explained or it was explained that
6 product classes are necessary because standing pilot
7 functionality is similar across all hearth products
8 and again I'm only dealing with the definition as
9 proposed but in fact the pilot on an unvented product
10 has a very unique functionality that is not found in
11 any other types of vented I'm sorry, any other types
12 of hearth products as defined here and you have
13 identified it it's the ODS which is part of the pilot
14 system so I think that has been overlooked in terms
15 of how DOE has been approaching this requirement.

16 MR. ELSZASZ: I actually have a follow up
17 question to that. Is there a specific difference
18 between the standing safety pilot and an electronic
19 ignition in terms of functionality or safety? So in
20 other words would you know you mentioned that the
21 oxygen depletion sensor has a safety component to it,
22 you know we would look for feedback as to whether the

1 electronic ignition system could sufficiently you
2 know supplant those functions I guess.

3 MR. STANONIK: Frank Stanonik AHRI okay
4 I'm not sure I understood the question because when
5 you say electronic ignition system to me are you
6 talking about a system that would light a pilot and
7 then the pilot would be there operating as opposed to
8 electronic ignition systems which just will directly
9 ignite the main gas.

10 MR. ELSZASZ: Yes so primarily we are
11 concerned with intermittent pilot ignitions as I will
12 mention later we found that that was the predominant
13 style of electronic emission in the hearth product
14 market so I guess the question here is whether or not
15 an IPI system could satisfy the safety and
16 functionality that a standing pilot would for
17 unvented products.

18 MR. STANONIK: Okay I understand the
19 question we will try and get you an answer.

20 MR. ELSZASZ: Okay, thank you.

21 MR. BROOKMAN: Leslie?

22 MR. BORTZ: I don't -- I believe in

1 today's world that yes it could but it couldn't do so
2 as reliably and of course reliability is critical.

3 MR. ELSZASZ: Okay thank you.

4 MR. BROOKMAN: Thank you Leslie.

5 MR. ELSZASZ: I will go ahead and move on.
6 So again the next two groups here that we have
7 identified are vented gas log sets and unvented gas
8 log sets. Of course as was mentioned earlier I think
9 we have kind of discussed some of the key features of
10 gas log sets earlier in opening statements but gas
11 log sets are typically installed and existing masonry
12 fireplaces. Of course a distinguishing feature
13 between these groups as well that are vented or
14 unvented or not and these products also, you know
15 what was mentioned before don't include an enclosure
16 or heat shielding so I guess on that there. And of
17 course the last product category that we kind of
18 analyzed and we have already discussed this quite a
19 bit are outdoor products.

20 MR. ROSENSTOCK: Steve Rosenstock, Edison
21 Electric Institute. For this particular sub-category
22 wouldn't the majority of a lot of these products --

1 I'm just more familiar with these products in
2 commercial settings rather than residential so did
3 you do that sort of break out, whether it is more
4 commercial versus residential because you know it
5 does make a difference in terms of type of product
6 coverage sometimes under DOE?

7 MR. ELSZASZ: Well so when it comes to I
8 guess the differences between how they are used and
9 energy use I guess I would defer to later portions of
10 the analysis specifically the energy use analysis.

11 MS. ARMSTRONG: But Steve to your point
12 for coverage the answer is no.

13 MR. CYMBALSKY: Move on.

14 MR. ELSZASZ: The products covered are not
15 based on if it goes in a commercial building or a
16 residential setting.

17 MR. BROOKMAN: Thank you Ashley and John
18 Cymbalsky both, proceed.

19 MR. ELSZASZ: So based on data that we
20 received from Hearth Patio and Barbeque Association
21 we were able to estimate market shares again of the
22 gas fired hearth product market and so these are the

1 -- you know estimates that we came up with. Again
2 outdoor product category was adjusted starting with
3 HPBA data as a starting point but was adjusted to
4 include patio heaters and I think we have a question?

5 MR. HOUCK: James Houck.

6 MR. BROOKMAN: Why don't you leave that on
7 James?

8 MR. HOUCK: Okay now can you hear me?

9 MR. BROOKMAN: Yeah.

10 MR. HOUCK: James Houck. Yeah I have a
11 couple points regarding your market assessment
12 slide. One is I'm not questioning the accuracy
13 although I don't have the numbers in front of me but
14 the division of how you categorize these different
15 types of appliances I think may cause considerable
16 confusion and if it was involved in DOE's projection
17 of future markets it's totally inappropriate and the
18 project that this shows in the rule in the technical
19 support document is quite an error.

20 What I'm referring to is you have
21 grouped vented fireplaces, inserts and stoves
22 together and unvented fireplaces, inserts and stoves

1 together and vented gas logs and unvented gas logs
2 off to the side. Inserts and gas logs are for a
3 retrofit market. Fireplaces and stoves are primarily
4 not entirely, but primarily for a new housing market
5 therefore the impact that it will have on the
6 prediction of future markets will be different if
7 they are categorized in this way.

8 For example you would not want to use a
9 new housing development for estimating of the gas log
10 sets or the inserts which appears to be the case.
11 Also what I want to talk about later I hope I have
12 the opportunity is the ramifications that these have
13 on safety and air quality.

14 MR. BROOKMAN: Okay thank you.

15 MR. ELSZASZ: Okay as far as the comments
16 you had regarding shipments those will be
17 particularly useful during the shipments analysis
18 discussion which is a bit later so if you have you
19 know, comments regarding what was used as far as
20 correlations go to predict shipments into the future
21 that I think would be the time to you know state
22 those comments.

1 MR. BROOKMAN: Dana?

2 MR. MOROZ: Dana Moroz, Wolf Steel. I
3 don't have numbers unfortunately to support it but I
4 am gravely concerned about the 15% of outdoor
5 products that your assessment has identified. I
6 think that's grossly exaggerated certainly based on
7 our production and our sales without having those
8 numbers in front of me to quote to you.

9 MR. ELSZASZ: Okay thank you. If there
10 aren't any more comments I am going to go ahead and
11 move on. So as we stated earlier you know this
12 rulemaking is focused on a prescriptive requirement
13 and so digging into the market assessment a little
14 bit further we are looking at the different types of
15 ignition systems that are in the market and generally
16 these fell into three different categories, match lit
17 which is essentially the lack of the ignition system,
18 the constant burning or standing pilot which we have
19 discussed earlier and the electronic ignition.

20 Again we will discuss this a little bit
21 further later but we found that as far as electronic
22 ignitions go intermittent pilot ignition systems are

1 the primary form found in the hearth product market
2 and so based on several resources including comments
3 we have gotten during confidential manufacturer
4 interviews these are the estimates that we came up
5 with for each of the hearth product groups, split out
6 by their ignition type.

7 So I think I'll pause here and leave this
8 up for a second if anyone has comments on these
9 estimate shares.

10 MR. BROOKMAN: Barton?

11 MR. DAY: Yeah one of the major issues is
12 that you missed a technology completely. The
13 industry developed a technology that was developed
14 solely to achieve greenhouse gas emission reductions
15 and its now being standardized under ANSI under the
16 name On Demand. Be careful with that terminology
17 because some people in the industry have used that
18 for other types of devices but it is a device that
19 was designed specifically to eliminate unnecessary
20 pilot use.

21 It's been in use in the industry for the
22 last several years. Its use is expanding and so you

1 know it is an important -- it's a very important
2 change in terms of the innovation that has gone on
3 and in the industry of which there has been quite a
4 bit. I would also point out that match lit
5 technology isn't legal for vented indoor products so
6 there is no such thing as a match lit indoor product
7 except for --

8 MR. ELSZASZ: Sorry was that vented or
9 unvented?

10 MR. DAY: Vented. The sole exception to
11 that is unvented I'm sorry vented gas log sets only
12 natural gas, only in some jurisdictions and for
13 outdoor it is the predominant, it's the predominant
14 approach in your standing pilot numbers for outdoor
15 products or probably or to magnitude high at least.

16 MR. ELSZASZ: Thank you.

17 MR. BROOKMAN: Frank Stanonik?

18 MR. STANONIK: Frank Stanonik AHRI. With
19 regard to your numbers here on unvented products
20 whether it is a gas log set or otherwise at least
21 from the perspective of the manufacturers we
22 represent the electronic ignition percentage is so

1 small it is practically zero so we think you have
2 certainly overestimated what percentage of these
3 products have electronic ignition as you have defined
4 it here.

5 MR. ELSZASZ: Thank you.

6 MR. STANONIK: We will try to get you a
7 more precise number but it is going to be small.

8 MR. ELSZASZ: Thanks.

9 MR. BROOKMAN: Yes please Barton?

10 MR. DAY: The other key point is that
11 these numbers if you had looked at these numbers five
12 years ago they would be totally different. If you
13 look at them five years from now without any DOE
14 activity they would be completely different. This is
15 an area where innovation in the industry has been a
16 major factor and these numbers are changing very
17 rapidly.

18 MR. ELSZASZ: Just to follow up when it
19 comes to the additional ignition type that you have
20 mentioned I think what would specifically help us
21 would be again shipments data so that we could
22 accurately reflect market shares here.

1 MR. DAY: Well you can't because the
2 picture is changing very rapidly.

3 MR. ELSZASZ: I see okay, thank you.

4 MR. CYMBALSKY: So this is John from DOE
5 could Barton or somebody else comment on what it
6 actually does in terms of the On Demand and how many
7 hours of non-active mode does it shut itself off
8 with? The way I understood it earlier that is what
9 it means to be On Demand. Is there a common out grid
10 on the set up of these things or?

11 MR. BROOKMAN: Ryan.

12 MR. CARROLL: Yeah Ryan Carroll with HPBA.
13 It's programmable so it could be as few as a handful
14 of hours that might be set by the controls
15 manufacturer I believe.

16 MR. CYMBALSKY: Factory set at some level?

17 MR. CARROLL: Maybe.

18 MR. CYBASKY: But is it shipped by the
19 manufacturer at some level of hours?

20 MR. SCHLACHTER: In our case yes.

21 MR. BROOKMAN: Is it John?

22 MR. SCHLACHTER: I'm sorry John

1 Schlachter, Maxitrol, yes the manufacturer determines
2 the length of time per the main burner not to be
3 active. After that time period times out it
4 extinguishes the pilot.

5 MR. CYMBALSKY: Can you tell us the hours?

6 MR. DAY: This is Barton Day again the key
7 point about it is that it is designed to eliminate
8 all pilot light gas consumption except during
9 relatively heavy periods of product use and so the
10 prospect of standing pilot lights being left on
11 outside the heating season or outside the intensive
12 use season it completely eliminates that.

13 MR. CYMBALSKY: Right so I guess what
14 would help us in our analysis is just two fold right
15 so we would like to make a more accurate depiction of
16 how the market is moving in terms of the shipments
17 and then at the same time be able to know how to
18 adjust our hourly -- our annual hours of non-use just
19 to get the energy correct to so that would -- both of
20 those things would be helpful.

21 MR. BROOKMAN: Okay John?

22 MR. SCHLACHTER: I just wanted to comment

1 that yeah it's programmed and shipped to the
2 manufacturer that way. It's not a user programmable
3 function so the consumer can't change that timing.

4 MR. BROOKMAN: Okay thank you, comment
5 from someone who is joining us online, Martin Thomas
6 says there is also a remote operated pilot which
7 makes it easy to turn the pilot on and off, Dana you
8 are next.

9 MR. MOROZ: I just wanted to comment that
10 this we are talking about new technology that is
11 evolving and these numbers as Barton has pointed out
12 shows a trend that the industry is working towards
13 developing new technology so I have asked for a
14 definitive timeline that these controls shut down is
15 it practical? There are new systems being developed
16 every day. We are going to our suppliers and we are
17 saying here's what we are looking at and what's
18 practical -- what works best and achieves the desired
19 effect which is a satisfied customer.

20 So to come up with a timeline and say this
21 specifically is what they are going to do today is
22 not practical, we haven't got there yet with our

1 technology. We have one on the market today the
2 standards for pilot controls are just being revised
3 by a technical committee to address this new type of
4 technology and so it would be premature for us to
5 come up with a definitive time line for them.

6 MR. BROOKMAN: Frank Stanonik?

7 MR. STANONIK: Frank Stanonik AHRI. Just
8 one other point in terms of what this particular NOPR
9 I can't help but note that although you presented in
10 a slide I'll say at least a pseudo-definition of
11 constant burning standing pilot no such definition
12 was provided in the regulation so I think for all of
13 us it might be helpful to at least see what DOE
14 proposed or what they believe is the definition of
15 constant burning pilot.

16 In the absence of that I am assuming it is
17 the common industry definition which is fairly
18 similar to what we see on the slide that being the
19 case the On Demand pilot shuts off the pilot not with
20 any additional user interaction, is not by definition
21 a constant burning standing pilot.

22 MS. ARMSTRONG: Right and this is Ashley.

1 So that brings up a good point and to both of yours
2 would you suggest that DOE analyze that as a design
3 option in this rule?

4 MR. STANONIK: Of course.

5 MR. DAY: I think I would suggest --

6 MR. BROOKMAN: Barton Day?

7 MR. DAY: Yes sorry I apologize. I think
8 I would suggest that the issue that you are trying to
9 address probably won't be around in five years.

10 MR. BROOKMAN: Yes Rett?

11 MR. RASMUSSEN: Rett Rasmussen. Just
12 since the last time we were here three and a half
13 years ago our gas logs sales were about 3 to 5%
14 electronic ignition systems. Last year it was up to
15 about 14% so we are working on it ourselves but as I
16 said in my comments with our types of products we
17 have a very hard limit with current technology or
18 even expected technology because of the extreme cost
19 to develop by the control manufacturers products with
20 electronic ignition that will accomplish what you
21 want for larger fireplaces that just isn't available
22 and I would be out of business in that segment if

1 this went through.

2 MR. BROOKMAN: Okay well thanks for that
3 specificity that is helpful and please hand that
4 microphone to Leslie.

5 MR. BORTZ: I don't mean to question you
6 Rett but I think there's a big difference between the
7 amount of electronic ignition systems on LP as
8 compared to natural. Do you see that?

9 MR. RASMUSSEN: Rett Rasmussen we sell
10 more natural gas sets than we do propane for vented
11 products, for vent free it's still a little bit more
12 skewed to the natural than propane but as far as the
13 electronic ignition system usage I haven't analyzed
14 it between the two gas types. I think it's still
15 skewed a little more towards natural just because it
16 is the larger proportion of our sales.

17 MR. BORTZ: Excuse me Leslie Bortz. I
18 believe that proportionately there is more sold to
19 the LP market because the LP market has a pilot that
20 costs more money to run.

21 MR. BROOKMAN: Okay.

22 MR. ELSZASZ: Thank you that's helpful.

1 MR. BROOKMAN: So we are going to keep
2 moving on with the market assessment.

3 MR. ELSZASZ: Actually we are moving on to
4 the engineering analysis. So the purpose of the
5 engineering analysis is basically you start to put
6 some numbers to this. So the idea here is to
7 determine what the cost difference is for the
8 proposed prescriptive requirement disallowing
9 standard pilots. So the methodologies used here,
10 it's kind of a combination of two approaches. One is
11 a design option approach which seeks to determine the
12 incremental cost of adding on a new technology or
13 design and the second methodology is reverse
14 engineering or in other words tearing down the
15 physical product, determining its bill of materials
16 and then assigning costs based on that bill of
17 materials.

18 Again focused on the prescriptive -- the
19 potential prescriptive standard here we have assumed
20 that a standing pilot model would need to convert to
21 an intermittent pilot ignition again. We found that
22 IPI or intermittent pilot ignitions are more

1 predominant in a hearth market. And also I will just
2 mention going forward that as it was mentioned
3 previously match lit systems you know, of course
4 don't have a standing pilot and so you know when it
5 comes to discussing the effects of the proposed
6 standard the match lit systems aren't really
7 considered.

8 So graphically and this could be sorry --

9 MR. BROOKMAN: Leslie?

10 MR. BORTZ: When we started talking to
11 Navigant you had four categories. You had match lit,
12 you had piezo you had standing pilot and you had
13 electronic ignition. We explained to you much to our
14 dis-benefit I think that piezo isn't a type of
15 ignition it is a part of an ignition system. If a
16 person buys which they do -- buys a piezo on a
17 standing pilot system it is because they want to be
18 able to turn it on and off so I think that I made a
19 mistake in not in the reality of the systems but I
20 made a mistake by telling you that's not a system
21 because certainly there's no reason to have a piezo
22 if you are not going to turn the unit on and off.

1 MR. BROOKMAN: Rett please?

2 MR. RASMUSSEN: Rett Rasmussen. Yeah a
3 piezo just replaces a match or an aim in flame.
4 That's all it does. It's just an easy means of
5 igniting the gas. It has nothing to do with the main
6 function of these control systems which is for safety
7 shutdown in the event of an interruption in the gas
8 supply or a flame out. You want to be able to shut
9 down that gas flow absolutely required on propane
10 because propane is heavier than air and sinks to the
11 ground, pools and lights off of the first spark.

12 Natural gas is lighter than air and vents
13 up the chimney so.

14 MR. BORTZ: So the point is we sell a
15 fairly significant amount of what you would call
16 standing pilot but with piezos and I don't know if
17 you take that into consideration when you say how
18 much energy wasted energy, there is because there is
19 no reason to buy the piezo accept it makes it an
20 awful lot easier than sticking your hand in the
21 fireplace with a match.

22 MR. BROOKMAN: Yeah okay thank you, Dana?

1 MR. MOROZ: Dana Moroz, Wolf Steel. In
2 your methodology and your reverse engineering
3 approach I am a little concerned about how you would
4 have identified your costs. There's a fundamental
5 difference between electronic ignition and standing
6 pilots. One uses a generator system and one uses a
7 flame as part of an electrical circuit. The problem
8 that arises is when it is applied inside of an
9 appliance is it becomes much more sensitive to air
10 movement and that air movement is governed by the
11 different applications of the installation whether it
12 be a fireplace or an insert or a stove.

13 Electronic ignition additionally will
14 suffer a microsecond of disconnect between the flame
15 and that sensor to shut off the gas. A standing
16 pilot system on the other hand that uses the
17 generator will operate up to 30 seconds without any
18 flame before it will shut off the gas. That makes it
19 much more tolerant of the many varying conditions and
20 each appliance and your tear down method of assessing
21 cost doesn't look at that development of each
22 individual product and how it interacts within that

1 environment.

2 It's like looking at simply taking this
3 component out and putting this component in and
4 there's a lot more detail and design that goes in
5 behind the scenes to make it function in each and
6 every application.

7 MR. BROOKMAN: Okay thank you.

8 MR. ELSZASZ: So again drilling down into
9 this engineering analysis a little further you know
10 I've mentioned this a couple of times already we
11 found intermittent pilot ignitions to be the
12 predominant form of electronic ignition systems in
13 the hearth market and so when comparing a standing
14 pilot unit and this applies to any of the groups that
15 we looked at, you know what we are trying to assess
16 is what the differences between a standing pilot and
17 having to convert it to an electronic ignition and so
18 in the case of the electronic ignition the general
19 assumption was that these would be converting to an
20 intermittent pilot.

21 As far as the standing pilot units are
22 concerned the baseline assumption varied by products

1 so in the case of vented and unvented fireplaces,
2 inserts and stoves we found that the millivolt gas
3 valve was more predominant for several reasons, not
4 the least of which being space constraints.

5 So fireplaces, inserts and stoves already
6 have an enclosure and heat shielding and make it more
7 readily available for the larger millivolt gas valve
8 whereas for vented and unvented gas log sets, outdoor
9 you know there are I guess additional space
10 constraints imposed as well as cost considerations
11 and we found that manual gas valves were more
12 predominant for those product groups.

13 MR. BROOKMAN: Leslie?

14 MR. BORTZ: I'll wait, yes sorry.

15 MR. ELSZASZ: You can go ahead.

16 MR. BORTZ: No I'm sorry I'm a talker so.

17 MR. ELSZASZ: This is the last slide of
18 the engineering analysis so you can go ahead and
19 comment anyways but so these are the results of that
20 engineering analysis. What you will find presented
21 here are you know each of the groups, for each of the
22 groups what is driving the cost are predominantly two

1 things, of course the components and labor that went
2 into the assembly but also the representative
3 shipment volumes.

4 So based on shipments data that we have
5 gotten from HPBA as well as a listing of
6 manufacturers we have assumed a certain shipment
7 volume for each of these product groups which you
8 know tend to scale the manufacturer production costs
9 and so I guess I will pause here as well for comments
10 on the manufacturer --

11 MR. KUPSH: Can I make a quick comment
12 going back?

13 MR. BROOKMAN: Jim please?

14 MR. KUPSH: Based on slide 30 if you take
15 a look at your information on slide 26 shouldn't IPI
16 be your representative baseline because it is the
17 system that has the highest percentage for the first
18 two categories?

19 MR. ELSZASZ: Right so I should have
20 explained here is what is meant by baseline is --

21 MR. KUPSH: Cost wise.

22 MR. ELSZASZ: What's that?

1 MR. KUPSH: You are saying cost wise
2 rather than yeah --

3 MR. ELSZASZ: Right.

4 MR. KUPSH: But I makes it seem as that is
5 the predominant system not what is for those two
6 categories the predominant system currently is IPI.

7 MR. ELSZASZ: I see right so back in the
8 market in tech assessment that's where we see it so
9 you are talking about vented fireplaces, inserts and
10 stoves so we do -- that is factored into the analysis
11 we know that electronic ignitions are more
12 predominant in that group. What we are seeing here
13 is that baseline is normally since there aren't
14 currently any heart product standards what we defined
15 as baseline is a product that consumes the most
16 energy in standby mode and so you know normally with
17 a product that already has an efficiency level
18 established, the baseline would be that unit which
19 just meets the minimum efficiency standard. But
20 since that isn't the case here the baseline is what
21 uses the most energy.

22 MR. CYMBALSKY: This is John from DOE so

1 just to follow up so when we get later in the
2 analysis the market shares of those technologies are
3 factored in when we do the impacts to consumers,
4 manufacturers, et cetera.

5 MR. ELSZASZ: Right.

6 MR. BROOKMAN: Let me see Rett?

7 MR. RASMUSSEN: Rett Rasmussen on the
8 slide that was just up with the chart what is max
9 tech in quotes is that a type of electronic?

10 MR. ELSZASZ: Maximum technology.

11 MR. RASMUSSEN: What does that mean?

12 MR. ELSZASZ: Or max tech option is the
13 design option that reduces the energy consumption of
14 the mode that you are looking at by the largest
15 amount.

16 MR. RASMUSSEN: Rett Rasmussen so are you
17 saying that the electronic ignition represents the
18 maximum technology for being able to have no gas
19 usage in the standby mode?

20 MR. ELSZASZ: Right, right.

21 MR. RASMUSSEN: Thank you.

22 MR. ELSZASZ: Yep.

1 MR. BROOKMAN: Frank and then back to
2 Leslie.

3 MR. STANONIK: Frank Stanonik AHRI. A
4 question and actually two questions but the first
5 question so your chart on slide 31 of the
6 representative shipment volume is that intended to
7 reflect the market assessment that is shown on slide
8 24?
9 Or based on that? And the reason I ask is because if
10 I look at slide 24 the total estimate of unvented
11 products is I'm going to round it to up 23% which is
12 certainly less than half of 56% which is the vented
13 fireplaces so if I maintain those proportions the
14 total of the two numbers in this slide for unvented
15 should be less than 5,000 and in fact if you actually
16 run the numbers it comes out to be about 4,100 and
17 yet you have got it at 7,000 so why is it -- the
18 question is why is it different?

19 MR. ELSZASZ: Yeah so the portions are
20 different because these take into account the number
21 of manufacturers that are making any one of these
22 types of products so that is why the difference in

1 purportions.

2 MR. STANONIK: But I venture --

3 MS. ARMSTRONG: No Frank it is purchasing
4 power right so in the cost model the cost of the
5 component will change based on the purchasing power
6 in terms of volume of the manufacturer that's what
7 this slide is trying to depict. It's not going to
8 match the shipments from the other, it is purchasing
9 power.

10 MR. STANONIK: So it is not intended to
11 match?

12 MS. ARMSTRONG: Correct it is not intended
13 to match.

14 MR. STANONIK: All right then I had one
15 more question and I'm going to go back to the
16 previous slide 30 your representative standing pilot
17 type for an unvented fireplace insert stove you have
18 a millivolt gas valve and for an unvented gas log you
19 have a manual gas valve, both of those products use
20 the same ODS pilot system, why the distinction? We
21 couldn't understand why that was there or I will
22 rephrase that. What do you think is different maybe,

1 it's the same.

2 MR. ELSZASZ: So the difference between
3 the millivolt and the manual we found was both the
4 space constraints and the cost so in the case of a
5 vented or unvented gas log sets by reviewing product
6 literature we found that manual gas valves were more
7 likely to be used in gas log sets as opposed to an
8 unvented one and it does effect the cost that we see
9 on slide I think 31.

10 MR. STANONIK: Ok excuse me so unvented
11 gas log sets you are including products that don't
12 have ODS systems?

13 MR. ELSZASZ: No. Unvented whether its
14 fireplace, inserts, stove or gas logs would include
15 the oxygen depletion sensor.

16 MR. STANONIK: They have the same control.

17 MS. ARMSTRONG: Perhaps the manufacturers
18 can answer.

19 MR. BROOKMAN: Jim Kupsh?

20 MR. KUPSH: Yes, you have for the unvented
21 systems you have both millivolt and manual
22 applications. Normally the manual application is not

1 anything but a log set because it is a more cost
2 effective lower price than the fireplace those have a
3 millivolt system on it.

4 MR. ARMSTRONG: So in answer to your
5 question Frank, that would affect our delta which is
6 why we did them more conservative.

7 MR. BROOKMAN: Thank you Ashley, Dana?

8 MR. MOROZ: Just if I can get a little bit
9 more clarity Jim are you saying it's not a millivolt
10 control then?

11 MR. KUPSH: No what I'm saying is that you
12 have for unvented systems you have both a manual
13 valve application and a millivolt valve application
14 but I doubt there are any stoves, fireplaces,
15 inserts, vent free that are being sold with just a
16 manual valve. It only really exists as a baseline
17 for the log set applications and on the more
18 expensive fireplace stoves they are using the
19 millivolt and so that would probably be the only
20 control application both using the ODS sensing pilot.

21 MR. BROOKMAN: Thanks Jim, Dana?

22 MR. MOROZ: This is Dana again just from

1 my clogged old mind what you are telling me then is
2 the manual does not employ millivolts?

3 MR. KUPSH: No when you -- a millivolt
4 valve has a separate millivolt operator for the main
5 burner.

6 MR. MOROZ: Right.

7 MR. KUPSH: A manual valve has simply an
8 electromagnet as a safety in the control.

9 MR. MOROZ: And what --

10 MR. KUPSH: And a millivolt does too but
11 it also has a second operator. A manual valve is
12 like pilot rotate to on.

13 MR. MOROZ: And what holds the gas flow
14 I'm sorry I'm just trying to get an understanding.

15 MR. KUPSH: The thermal couple on the
16 pilot.

17 MR. MOROZ: So it is millivolt?

18 MR. KUPSH: Correct but that's normally
19 not -- that's normally what's being considered a
20 millivolt valve.

21 MR. MOROZ: By point of definition and
22 that's why I'm trying to when you get down to it it

1 is a millivolt system then?

2 MR. BROOKMAN: So Rett please?

3 MR. RASMUSSEN: Rett Rasmussen what
4 distinguishes generally between a manual control from
5 a millivolt is the manual control uses a thermocouple
6 a single couple whereas for its heating element it is
7 electrical element and the millivolt uses a
8 multi-couple or thermopile.

9 So you need a lot more electricity, a lot
10 more millivoltage to operate a millivolt control
11 system because it has the dual operation of both
12 safety feature and operating the on and off of the
13 control valve as from what you need for a manual
14 control system where it is merely the safety function
15 that the pilot is being used for.

16 MR. MOROZ: Dana from Wolf Steel again.
17 And I just asked for that clarity Rett because here
18 we are identifying it as a different system. I think
19 traditionally in our industry we identified the one
20 with the thermopile as being a remote control
21 millivolt system and the manual was employing a
22 thermocouple but here we are calling it a manual

1 which would suggest it is just and on and off shut
2 off which it is not.

3 I think we should distinguish that in fact
4 it is a millivolt system as well.

5 MR. RASMUSSEN: Rett Rasmussen well I
6 distinguish millivolt systems as being really they
7 are operator device agnostic, you can put a wall
8 switch, you can put a remote control, you can put a
9 wall timer you can put any variety of external
10 switching devices on to that type of system that you
11 can't put on to a manual control valve.

12 MR. MOROZ: Agreed but we are defining --
13 we are distinguishing between a manual and a
14 millivolt and to Frank's point I think it is
15 misleading, it is a millivolt.

16 MR. RASMUSSEN: Rett Rasmussen what they
17 are actually putting here and correct me if I am
18 wrong, is they looked at all the different types of
19 products within that particular group and within the
20 unvented fireplace, inserts and stoves they found
21 that the predominant usage of valve type is the
22 millivolt gas valve whereas for gas log sets and

1 unvented gas log sets it is a manual control. And
2 from that that is where they made their cost
3 calculations that was the baseline they established.

4 I don't make unvented fireplaces, inserts
5 and stoves, perhaps a manufacturer of that would
6 better be suited to comment on what type of control
7 valve is the most predominant type.

8 MR. BROOKMAN: Yes Barton go ahead.

9 MR. DAY: Just a question, we are now
10 talking about which type is predominant. Going back
11 a couple of slides where you had the breakout in
12 market share that you referred to -- my question is
13 where did you get data to come up with the market
14 shares?

15 MR. ELSZASZ: You mean for the ignition
16 types?

17 MR. DAY: Yeah.

18 MR. ELSZASZ: Ignition type, a couple of
19 resources. One was through product literature review
20 so that that was an extensive review that resulted in
21 essentially a data base with model numbers, ignition
22 information and so those proportions for several of

1 these categories that was used as well as during the
2 confidential manufacturer interviews.

3 We got feedback during that interview
4 process that indicated you know typically what
5 percentage of their shipments you know were for each
6 ignition type I guess.

7 MR. BROOKMAN: Rett go ahead.

8 MR. RASMUSSEN: Yeah I'm a little -- well
9 I can tell you and I will be happy to divulge it in
10 my Navigant interview that I said that I have no idea
11 what the percentages are there is no you know, valid
12 clearing house for it where everybody in the industry
13 is divulging their sales numbers.

14 I don't know how they come up with these
15 and there is only I'm sorry how many manufacturers
16 did you interview for this assessment?

17 MR. ELSZASZ: I'll have to refer to
18 another member of my team for that.

19 MR. RASMUSSEN: More than 10?

20 MS. ARMSTRONG: No.

21 MR. RASMUSSEN: 5? Okay so just supposing
22 it was 7 take away me because I wouldn't do numbers,

1 Leslie did you do numbers for the industry?

2 MR. BORTZ: No, we did some numbers but
3 they weren't these. They weren't close to these. On
4 our manufacturer we did some guess on our
5 manufacturer interview and they are just value and --

6 MR. BROOKMAN: Okay so back to Barton.
7 Pardon me let's let Leslie follow on please go ahead
8 Leslie.

9 MR. BORTZ: It's a different question.

10 MR. BROOKMAN: Okay then Barton go ahead.

11 MR. DAY: I was just going to point out we
12 have been trying to figure out you know how to get
13 reasonable data on this and one of the issues is that
14 if you simply look at model numbers and so forth
15 without shipment data for the specific models it is
16 useless and the additional problem is that as I
17 mentioned there has been a lot of evolution and I
18 went to one major manufacturer at the show as you
19 probably know. I mean several major manufacturers
20 have completely shifted away from standing pilot
21 lights and others you ask them you know well what is
22 your design been like, what about the newly designed

1 products over the last few years and they are saying
2 you know we have one product that we have designed
3 that has a standing pilot, everything else doesn't.

4 But trying to get hard data on that I mean
5 we could see the enormous trend, we can see that
6 trend showing up when people are talking about the
7 products that are coming out now as opposed to
8 historical you know products that are still on the
9 market but trailing off. It's just -- I don't think
10 you can look at product literature review as being
11 informative as to what the percentages are and
12 frankly if you have figured out a way to get any
13 reliable data on that you are ahead of us.

14 MR. BROOKMAN: Leslie?

15 MR. BORTZ: Can I just ask you --

16 MR. BROOKMAN: Microphone.

17 MR. BORTZ: Back to page 23 and 24.

18 MS. ARMSTRONG: So this is Ashley from DOE
19 and while is he redoing the slides and getting back
20 to slide 23 I just want to point out that while the
21 distribution of the different types of pilot lights
22 will matter later when we talk about the shipments

1 and the energy use and the energy savings, it will
2 matter for the national impacts and the costs and
3 benefits yes. It doesn't necessarily matter so much
4 for the engineering.

5 The engineering is looking at what is the
6 cheapest product out there and then what can you do
7 to it to make it more efficient so what you are
8 seeing on the slide at least where Justin was is for
9 those different types of ignition systems, those are
10 the ones that we found that were in product
11 literature predominantly where we took apart products
12 that were the cheapest out there to build right now.

13 In other words so we are starting from the
14 bottom of the ground and working our way up in terms
15 of cost. As I think you would agree that we should
16 be doing. Now in terms of savings and how you accrue
17 savings that's going to depend a lot on your
18 distribution and we are not there yet. We are going
19 to get there but we are not there yet.

20 So I think for this point you know what
21 you are seeing on the slide is actually what you
22 would probably want us to do it is how you make sure

1 you accumulate costs in the best manner but we are
2 going to get to our distribution of what I would call
3 efficiencies which in this case is distribution of
4 different pilot lights later.

5 MR. BROOKMAN: Leslie?

6 MR. BORTZ: We are at slide 23 and 24.
7 Slide we is discussing market assessments and all the
8 slides before that you specifically I believe you
9 said this is trying to get us to a definition of what
10 we are covering or a definition of what hearth
11 products means, something to that effect. Is that --

12 MR. CYMBALSKY: It is the scope to which
13 we analyze the proposed definition yeah. So this is
14 the scope of the products that we included based on
15 the definition.

16 MR. BORTZ: Then you continued on 24 the
17 next one you have still market assessment, this is
18 estimated shares of overall hearth products market
19 but that's divided very differently. That looks like
20 it's divided by pilot kit types or pilot kits, not by
21 any definition that you have except pilot kits or how
22 pilot kits are run.

1 MR. CYMBALSKY: So what these numbers are
2 essentially these five numbers here add to 100 so
3 these are what were analyzed.

4 MR. BORTZ: Right but you are analyzing
5 them because they have different pilot kit types, you
6 have changed your market assessment from assessing
7 for a definition to assessing for pilot kits right?

8 MS. ARMSTRONG: No.

9 MR. CYMBALSKY: No, so the difference is
10 in the engineering analysis what we are looking at
11 here is the technology option.

12 MR. BORTZ: Vented fireplace, insert and
13 stove don't fit a definition that I know of except it
14 would fit a definition for pilot kits. It's the only
15 way you can do it, it's the only thing it could be
16 for isn't it?

17 MR. ELSZASZ: I guess I don't understand
18 the comment.

19 MS. ARMSTRONG: Yeah I'm not following but
20 I am happy to have a conversation with you at lunch
21 about what is going on here. You know when we go
22 back to the previous slide and the market assessment

1 that's just showing the breakdown of the different
2 categories of products based on the shipment data we
3 got on the market.

4 MR. RASMUSSEN: What's this breakdown for?

5 MS. ARMSTRONG: What's this? Which one
6 are we talking about?

7 MR. RASMUSSEN: 24.

8 MS. ARMSTRONG: Go back to 24 for me, the
9 percentage of projects?

10 MR. RASMUSSEN: Yeah.

11 MS. ARMSTRONG: We'll get to this but when
12 we talk about downstream analysis when you give us
13 overall shipment number you are going to see that
14 roughly 56% of the market is this category is a
15 vented fireplace.

16 MR. BORTZ: Why? Because of the use?

17 MS. ARMSTRONG: Because the cost and the
18 savings and the distribution of different pilot
19 lights in each of these categories is going to be
20 different.

21 MR. BORTZ: It has to do with pilot
22 lights.

1 MS. ARMSTRONG: It has to do with hours of
2 use, energy savings, cost benefit analysis and I
3 think we need to do our due diligence and analyze
4 these separately.

5 MR. KUPSH: Jim Kupsh. I'm just curious
6 is this simply the DOE statistics, I mean HPBA
7 statistics or did you account for non-reporting
8 industry sales?

9 MR. ELSZASZ: In the outdoor products we
10 accounted for non-HPBA. We had gotten further
11 information that for outdoor products specifically,
12 non-HPBA manufacturers were much more dominant.

13 MR. KUPSH: You might find that a few
14 other categories such as unvented gas logs is
15 affected by non-reporting sales also.

16 MR. ELSZASZ: Okay thank you.

17 MR. BROOKMAN: Yes please --

18 MS. ARMSTRONG: So why don't we go back to
19 the engineering past where we were and keeping going
20 because really what we are talking about here is the
21 cost benefit and until we get to that I don't think
22 it's going to really --

1 MR. BROOKMAN: Okay final question and
2 then we are going to move on, go ahead.

3 MR. DELAQUILA: Dave Delaquila, consultant
4 for Maxitrol Company. In our cost analysis when you
5 look at unvented heaters the market there you are
6 probably talking about for sure 90% plus currently
7 use let's say the continuous pilot ODS system. In
8 your analysis did you look at the certification cost
9 to re-certify every single model with the new
10 ignition device and what was the base cost analysis
11 that you used?

12 MR. ELSZASZ: I think that we will get to
13 later when we get to manufacturer impact analysis.

14 MR. BROOKMAN: Right so we have just
15 another slide or two that we should go through before
16 we break for lunch which will be shortly so let's
17 proceed.

18 MR. ELSZASZ: This is really the end of
19 the engineering analysis. What I am presenting here
20 is a manufacturer markup and what this represents is
21 essentially the amount of profit that a manufacturer
22 would get by selling one of these units so all it is

1 is a multiplication factor to the manufacturer
2 production costs.

3 So what we are talking about is
4 multiplying this you know, these manufacturer
5 production costs by what we estimated to be 1.45 and
6 this was derived through again through the
7 confidential manufacturer interview process so again
8 we can seek comment here on what the MPC's as well as
9 the markup number that would be there.

10 MR. BROOKMAN: Leslie?

11 MR. BORTZ: Leslie Bortz, can I apologize
12 once.

13 MR. BROOKMAN: Just leave it on.

14 MR. BORTZ: Okay then you will hear what I
15 don't want you to hear.

16 MR. CYMBALSKY: You are catching on.

17 MR. BORTZ: Yeah, let's say something
18 costs me \$10.00 that means I sell it to my
19 distributor for \$14.50.

20 MR. ELSZASZ: Yes.

21 MR. BORTZ: To my distributor for \$14.50.

22 MR. ELSZASZ: Right this is not the end

1 line right.

2 MR. BROOKMAN: Yes Dana?

3 MR. MOROZ: Just to confirm this number is
4 an average markup based on the 7 manufacturers you
5 interviewed and was it a cross section of all the
6 different types of products as well?

7 MR. ELSZASZ: Yes.

8 MR. MOROZ: Thank you.

9 MR. BROOKMAN: So you see the comment box
10 there embedded in this slide on manufacturer markup
11 slide 33 additional comments, questions here. As
12 Ashley already said we are going to get into greater
13 detail in a lot of this as we proceed. Let's break
14 for lunch. It's now 12:30 we have made good progress
15 on the day, covered a lot of ground more yet to
16 cover. 12:30 let's break for an hour, please make
17 sure to have this badge with you visible as you walk
18 around the Forrestal Building. This room will be
19 secured so you can leave your stuff here. If you go
20 to the big cafeteria which is down to the ground
21 floor and about a hundred yards in that direction you
22 will have to pass back through a security portal so

1 you will need an ID at least typically you will.

2 And there is a Dunkin Donuts, pardon me
3 there's a Subway sub shop where the Dunkin Donuts is
4 down on the ground floor. You know where the
5 restrooms are so we will resume in one hour which
6 will be 1:30 and we have a good start on it we will
7 pick up at 1:30 here.

8 MR. BROOKMAN: Okay let's resume please
9 take your seats. All set Linda? We are going to
10 pick up where we left off. Thanks for being back
11 here on time everyone we are going to pick up where
12 we left off, markups analysis.

13 MR. SIAP: Hello I'm David Siap from
14 Lawrence Berkeley National Laboratory. I'm going to
15 be going over the markups analysis, energy use as
16 well as lifecycle costs. Can you guys hear me? As
17 well as lifecycle costs, payback period, shipments,
18 national and regulatory impact analysis.

19 So the purpose of the markups analysis is
20 to determine the consumer price based on the
21 manufacturer selling price or MSP for both baseline
22 and high efficiency products. DOE also characterized

1 the distribution channels through which our products
2 move from the manufacturer to the consumer. DOE
3 identified two primary distribution channels shown
4 here, replacement and new construction.

5 The replacement has a wholesaler and a
6 mechanical contractor between the manufacturer and
7 the consumer and new construction is similar with a
8 general contractor before the consumer.

9 To Leslie's earlier point there were other
10 distribution channels including retailer analyzed as
11 well however for the retailer market and the
12 retailers function similar to the replacement market
13 except there was a retailer instead of a wholesaler.
14 But for the retailer market DOE wasn't able to --
15 didn't have enough data to formulate a markup for
16 that market participant, the retailer so it did not
17 go forward with a separate distribution channel at
18 this time.

19 MR. BORTZ: How did you get at that --

20 MR. BROOKMAN: Leslie please turn on the
21 microphone.

22 MR. BORTZ: I'm sorry here I am.

1 MR. BROOKMAN: Say your name for the
2 record.

3 MR. BORTZ: The missing Leslie Bortz,
4 Robert H. Peterson Company. How did you get data for
5 mechanical contractors?

6 MR. SIAP: That's coming up later in the
7 slide. It's through the ACCA 2005 report with the
8 census data.

9 MR. BORTZ: Maybe they are the same, you
10 know, you can look at them the same way.

11 MR. BROOKMAN: I didn't get your point
12 there Leslie, I'm sorry.

13 MR. BORTZ: Well if a wholesaler sells to
14 a mechanical contractor then sells to an end user
15 maybe the retailers is like the mechanical
16 contractor.

17 MR. BROOKMAN: Got you, okay.

18 MR. SIAP: Thanks for that. Okay so --

19 MR. BROOKMAN: The Department is looking
20 for a kind of patterns of use here, patterns of
21 distribution so if you are able to comment on what
22 would be a typical pattern.

1 MR. BORTZ: I did, yes what I said was we
2 independently came up with we broke out each of the
3 categories that you had before, in other words you
4 had three categories in vented products, three -- we
5 broke out each of them we figured out approximately
6 how much it was et cetera and we figured that 56
7 point some odd percent were sold through a
8 distribution channel to a retailer.

9 MR. BROOKMAN: Okay thank you.

10 MR. SIAP: Thanks, so to formulate these
11 markups DOE analyzed financial data from each market
12 participant and it's important to note that although
13 in practice the markups are applied to the entire
14 hearth product they apply to the ignition component,
15 each component as well.

16 The table at the bottom lists the data
17 sources for each market participant. The
18 manufacturer markup we have covered previously
19 because as a result of the input from manufacturers.
20 Wholesaler markup is formulated from the hearth
21 report, the mechanical contractor from the ACCA
22 report, general contractor from the latest 2007

1 census bureau data and sales tax from the 2013 sales
2 tax clearing house.

3 MR. BROOKMAN: Yes Rett?

4 MR. RASMUSSEN: The wholesaler markup does
5 the HARDI profit report include fireplace
6 distributors?

7 MR. SIAP: I am not sure on that one.

8 MR. RASMUSSEN: What does it include?

9 MR. BROOKMAN: Greg Rosenquist?

10 MR. ROSENQUIST: Hi this is Greg
11 Rosenquist to help him out. It mostly covers major
12 HVAC contractors and provides some level of detail on
13 their size. It doesn't explicitly call out you know
14 the distributors of the industry.

15 MR. RASMUSSEN: Distributors of these
16 products okay.

17 MR. ROSENQUIST: Specifically yeah. I
18 would certainly welcome any data.

19 MR. RASMUSSEN: I was going to say on what
20 basis do you provide equivalency between this and
21 fireplace distributors?

22 MR. ROSENQUIST: We just use the same

1 data. I mean we use that same data out of that
2 report and make the assumption that it is
3 representative of this industry as well.

4 MR. RASMUSSEN: And you could assume that
5 it's the same for toy distributors and for Twinkie
6 distributors and all of that?

7 MR. ROSENQUIST: I wouldn't go that far.

8 MR. RASMUSSEN: But not necessarily
9 specific to this.

10 MR. ROSENQUIST: Again absent any data
11 this is what we went with.

12 MR. RASMUSSEN: Thank you.

13 MR. BORTZ: Leslie Bortz again does this
14 mean that what you are saying is that the overall
15 market for -- or the overall markup for a replacement
16 product is 3.23 and for a new construction is 3.99?
17 Is that what you are saying?

18 MR. BROOKMAN: You are jumping ahead and
19 yes.

20 MR. BORTZ: That's ridiculous.

21 MR. BROOKMAN: Let's let him get to that
22 point and then we will get additional comments.

1 MR. BORTZ: Okay I just wanted to say it's
2 ridiculous.

3 MR. BROOKMAN: Okay we will capture that
4 in detail. Let's proceed with the presentation.

5 MS. ARMSTRONG: So wait I want to go back
6 to that point. This is Ashley from DOE. I think
7 your point is well taken that we didn't have
8 fireplace specific data but it was generally from
9 heating, ventilation, air conditioning, those types
10 of contractors that distribute the products so are
11 you telling me the distributors of fireplaces are
12 exclusive just to fireplaces they do not distribute
13 any other type of heating, ventilation or air
14 conditioning products or that they are always just
15 fireplaces?

16 MR. BORTZ: Often.

17 MR. RASMUSSEN: Rett Rasmussen yeah that
18 is correct. You have specific fireplace
19 distributors. They don't necessarily sell furnaces
20 or water heaters or things like that. Those are
21 different types of products with different margin
22 structures I would imagine than what our types of

1 products have in this industry. You know I am
2 jumping ahead but I agree I don't have hard fast
3 numbers, but they just seemed low and they are there
4 for the --

5 MR. KUPSH: Jim Kupsh, IT Controls. Yes
6 the HARDI members are normally not your fireplace
7 distributor type people, they are specific to HVAC
8 cell replacement parts and it's -- I'm trying to
9 think of people, not John Stone, but let's say Larson
10 in the Midwest, CC Dixon in the southeast, RE Michael
11 on the east coast, those are your HARDI type
12 wholesalers.

13 MR. RASMUSSEN: Yeah Rett Rasmussen they
14 are not fireplace distributors.

15 MS. ARMSTRONG: Okay.

16 MR. RASMUSSEN: They are different animals
17 and that's our whole point on definition is it is a
18 different animal.

19 MS. ARMSTRONG: I think that's fine and
20 your point is well taken except for do you have a
21 suggestion then on where we could look for data
22 that's more specific on you know in absence of that

1 we welcome your feedback, we are happy to revise the
2 analysis to consider a more specific distribution
3 chain but we need your help.

4 MR. RASMUSSEN: Rett Rasmussen. Again we
5 are a small mom and pop industry we don't have these
6 types of you know these types of data that you are
7 looking for in most cases. We just do our little job
8 and sell product and make people happy that's what we
9 do.

10 MS. ARMSTRONG: But you have enough of an
11 inclination to say we are wrong?

12 MR. BORTZ: Yes.

13 MS. ARMSTRONG: So that's where I'm trying
14 to or at least assert that we are wrong. So how do
15 we reconcile that you have the knowledge and the
16 expertise in your industry to assert we are wrong but
17 yet -- so can you help us connect the dots?

18 MR. BORTZ: Yes, we will try to help you.

19 MS. ARMSTRONG: Thank you.

20 MR. BROOKMAN: Okay thank you Leslie.

21 Dana you have a comment?

22 MR. MOROZ: It's private. I think what we

1 are not saying is it is the wrong assumption, that
2 doesn't suggest that we have that information. We
3 are saying that it is a different distribution
4 network and that is consistent with our product line
5 as well.

6 MR. BORTZ: What I am saying again Leslie
7 is the replacement market cannot be that much lower
8 than a builder market, it just can't be.

9 MS. ARMSTRONG: And is that specific to
10 log sets or is that specific to all the various
11 categories of fireplaces we are talking about.

12 MR. BORTZ: Fireplaces I believe you will
13 find fireplace people here that can answer that
14 question. I believe it is that if you sell direct to
15 builders there is a different markup than if you sell
16 to the replacement market. Somebody help me, can you
17 help?

18 MR. BROOKMAN: Dana go ahead.

19 MR. MOROZ: Dana Moroz from Wolf Steel. I
20 would agree with that there is a different markup
21 depending on who the customer is.

22 MS. ARMSTRONG: Sure.

1 MR. RASMUSSEN: Rett Rasmussen and we are
2 a manufacturer. I don't know; you would have to poll
3 the actual distributors and what you have shown is
4 here is just data from a distribution channel that is
5 not of what this proposed rule is about and that's
6 where I just go back to DOE and say shouldn't you
7 have some data specific to this industry that you
8 wish to regulate.

9 MR. BROOKMAN: Jim did you have a comment
10 here? I thought you were trying no okay, yes please
11 Barton?

12 MR. DAY: Yes this is Barton. Just a
13 general comment -- you know I think sometimes there's
14 a perception that you know that we've got all of this
15 data and information and we are not sharing it and
16 the truth of the matter is we don't have the
17 information. This industry is just as Rett said it's
18 an industry with two manufacturers that are not small
19 businesses and a lot of the issues that are in play
20 here, they are required pieces for the economic
21 analysis for the energy use nobody has ever collected
22 the data. It just doesn't exist.

1 We don't have it and I guess part of what
2 I think you hear people reacting to is just the ready
3 application okay there's a blank in our regulatory
4 analysis we have to have a number to put in the blank
5 so we will just find a number and in the absence of
6 data we will just make an assumption whether there is
7 a basis for the assumption or not and I think that is
8 the perception and I think that's what people are
9 responding to and really the point I wanted to make
10 is we don't have -- we are not sitting on a pile of
11 data.

12 We can't give you all the answers, we
13 don't know the answers, a lot of these issues just
14 have not been studied and that's the problem is that
15 you are going into a rulemaking where the basic data
16 is just not there.

17 MR. BROOKMAN: Press on.

18 MR. SIAP: So DOE developed two markups
19 for each product market participant, the baseline and
20 incremental market. We are on slide 36. The
21 replacement markup relates the MSP of the baseline
22 products to the consumer purchase price and the

1 baseline markup is applied to the baseline MSP only
2 to determine the baseline consumer purchase price.

3 Incremental markups relate to change in
4 the MSP of higher efficiency products to the change
5 in the consumer purchase price. This covers only
6 expenses that ferry with MSP such as operating
7 expenses and profit. Fixed costs such as overhead
8 and labor we do not scale with increased efficiency.

9 To clarify the incremental markup is
10 applied to the MSP difference only of higher
11 efficiency and baseline products.

12 MR. BORTZ: Leslie Bortz, if I have a
13 product that costs me a dollar can you explain what
14 this says?

15 MR. SIAP: Sure so if you had well if you
16 had one product that cost a dollar and another that
17 cost two dollars and so the base and the dollar is
18 the baseline product and the baseline markup applies
19 only to the baseline that first dollar.

20 MR. BORTZ: Okay.

21 MR. SIAP: For the higher efficiency
22 product, the two dollar product it would be the first

1 dollar is the baseline markup is applied to the first
2 dollar and the incremental markup is applied to the
3 second dollar and the sum is then your total consumer
4 price.

5 MR. BORTZ: So if I have a product that is
6 better or more efficient or whatever it costs me two
7 dollars I will get five dollars, my price will be
8 \$5.33?

9 MR. SIAP: That's correct.

10 MR. BORTZ: What's the use of making
11 things better?

12 MR. DAY: I have a really simple question
13 and that is as you were looking at these issues did
14 you look at the individual types of product
15 differently or did you just look at everything as
16 though they were the same?

17 MR. SIAP: There was consideration by type
18 but primarily just the hearth product was viewed as
19 the class so primarily the same.

20 MR. DAY: So one analysis for everything?

21 MR. SIAP: Yes.

22 MR. DAY: Yes, okay thank you.

1 MR. BROOKMAN: Leslie go ahead.

2 MR. BORTZ: I would like to say that we
3 need -- I'm not sure that we need because I don't --
4 we are not through this and I don't know how it is
5 being used but we need a two-step distribution markup
6 system. All of our products are sold that way and I
7 believe all of your products, no?

8 MR. BROOKMAN: When you say two step
9 Leslie you mean?

10 MR. BORTZ: Distributor to retailer.

11 MR. BROOKMAN: Gotcha, Rett?

12 MR. RASMUSSEN: Leslie, Rett Rasmussen
13 this brings up a good point. Is there are many
14 different ways that manufacturers get their products
15 to market. One company tends to do the two-step
16 distribution model. Some people go strictly to the
17 mass merchants, to your Lowe's and Home Depot and
18 people like that. Others go to internet retailers,
19 some go -- not as many in this industry consumer
20 direct, but some and some go dealer direct, some go
21 builder direct, a combination of all of these and
22 just as you have so many different small companies

1 they all find their little niche in the marketplace
2 that allows them to make payroll every week and
3 remain in business year after year and some of them
4 not.

5 So you know a one size fits all is very
6 difficult because there is not a one size fits all
7 company in this industry.

8 MR. BROOKMAN: Okay.

9 MR. RASMUSSEN: Thank you.

10 MR. SIAP: Okay so here we have the
11 results as I have already touched on a little bit.
12 The top table gives the results per market
13 participant for both replacement and new construction
14 distribution channel and baseline and incremental
15 markup. The manufacturer markup is the same as
16 discussed previously at 1.45 and the bottom table
17 gives the aggregated markup for both the baseline and
18 incremental case.

19 MR. BROOKMAN: Leslie?

20 MR. BORTZ: The bottom indicates that
21 there is like a ratio of like 3 to 1 more replacement
22 something like that?

1 MR. SIAP: Yes.

2 MR. BORTZ: What's that based on?

3 MR. SIAP: The ratio of replacement to new
4 construction was based on the ratio of the current
5 stock as listed in the residential energy consumption
6 survey, most recent data justified against the latest
7 shipment data.

8 MR. BORTZ: Okay.

9 MR. SIAP: For that same year.

10 MR. BORTZ: What does that have to do with
11 our industry?

12 MR. SIAP: Well the survey lists the year
13 the house was built and whether the so the ratio
14 there gives you the ratio of new construction to non.

15 MR. BORTZ: But if it is a furnace or
16 something like that or what products HVAC is that
17 what you said?

18 MR. SIAP: Sorry?

19 MR. BORTZ: Did you say that the products
20 that this is based on?

21 MR. SIAP: The residential energy
22 consumption, the REC survey gives hearth product --

1 lists hearth products exclusively for fireplaces.

2 MR. BORTZ: I'm just at a loss.

3 MR. ROSENQUIST: I agree are you getting
4 at the shipments to the replacement market versus the
5 new construction market?

6 MR. SIAP: Yes.

7 MR. ROSENQUIST: So generally speaking in
8 most products I'm either going to use round about
9 figures, 75 to 80% of shipments generally go into the
10 replacement market just because the sheer volume of
11 the unit that is in the stock --

12 MR. BORTZ: A refrigerator?

13 MR. ROSENQUIST: Yeah.

14 MR. BORTZ: Yeah okay.

15 MR. ROSENQUIST: If you have 10 million
16 refrigerators shipped each year, 8 million are going
17 into the existing stock, the rest going into new
18 construction, so he is getting at a 3 to 1 ratio
19 here.

20 MR. BORTZ: Yes, those are really also
21 done through a retailer, the replacement market.

22 It's not a contractor I don't understand when you say

1 mechanical contractor, that's just the guy who puts
2 it in. You buy it at Sears. I don't understand the
3 terminology.

4 MR. ROSENQUIST: Yeah if you look back at
5 the distribution channels again the assumption in
6 this analysis is that every party in that
7 distribution channel is marking up the equipment
8 until it finally gets to the consumer.

9 MR. BORTZ: Right.

10 MR. ROSENQUIST: And you are talking about
11 distribution channel where there is manufacturer to
12 retailer.

13 MR. BORTZ: I'm talking about manufacturer
14 to distributor to retailer.

15 MR. ROSENQUIST: To retailer and then to
16 consumer right?

17 MR. BORTZ: Right.

18 MR. ROSENQUIST: And in that distribution
19 channel we still say that there is going to be a
20 general contractor because someone has to install it.
21 We are not saying that the consumer is doing it
22 themselves.

1 MR. BORTZ: You are right.

2 MS. ARMSTRONG: So if you look on --

3 MR. ROSENQUIST: But the main thing is
4 here is this is what we use in the analysis, these
5 two distribution channels and what you are saying is
6 that something else, there is other distribution
7 channels that exist.

8 MR. BORTZ: Right and it seems like there
9 are other distribution channels than what you are
10 using.

11 MS. ARMSTRONG: So these are the two we
12 are using right, look at those channels, the flow
13 diagrams. So is there is a missing entity, so the
14 left is replacement and the right is new
15 construction, so are we missing an entity?

16 MR. BORTZ: Yes.

17 MS. ARMSTRONG: And what that entity is
18 called?

19 MR. BORTZ: The retailer.

20 MS. ARMSTRONG: So you think there should
21 be a retailer in between the wholesaler and the
22 contractor or between the contractor and the -- the

1 contractor you are saying is just the installer?

2 MR. BORTZ: Right.

3 MS. ARMSTRONG: So you are saying instead
4 of the contractor we should have a retailer there and
5 that after the consumer purchases it from a retailer
6 they will then get a contractor to install it did I
7 get it?

8 MR. BORTZ: No well close.

9 MS. ARMSTRONG: Okay.

10 MR. BORTZ: And that can happen but
11 normally what happens is the retailer also either
12 does himself or has contractors to do it.

13 MS. ARMSTRONG: Okay so what we are
14 calling --

15 MR. BORTZ: And mechanical contractor and
16 the contractor just makes a fee he doesn't mark up.

17 MS. ARMSTRONG: Okay so and generally
18 speaking do you all agree that these two change if
19 you change mechanical contractor to retailer are
20 generally the two chains that would govern you know
21 all the different categories of hearths we are
22 talking about here.

1 MR. DIRCKS: This is Peter Dircks from
2 HHT. I think what you are hearing from the group
3 here is it is very different based on what company
4 you are.

5 MS. ARMSTRONG: Yep.

6 MR. DIRCKS: What market you are serving,
7 what end consumer you are serving and how you go to
8 market, that's really what these two gentlemen are
9 saying. Some companies may use a two-step
10 distribution some of us used direct through retail it
11 also differentiates by replacement of new
12 construction. I think what you have probably done
13 there Greg is looked at the HVAC market based on what
14 your comments were earlier and assumed that there is
15 this two or three-step process. The hearth industry
16 is different, it's a specialty hearth channel because
17 of the distribution -- there's key skillsets required
18 in order to distribute and install.

19 So I think for us to give you some
20 guidance here today in order to clarify this is
21 probably quite difficult because there is a lot of
22 different paths to market. I think what you are

1 saying or I think what you are hearing is that is not
2 correct. And so we would need to come back to you
3 with other guidance at the appropriate time to figure
4 out exactly what was the arithmetic that you guys
5 used for this.

6 MS. ARMSTRONG: I think we would welcome
7 that guidance and we would be happy to incorporate it
8 if you would be willing to put it together.

9 MR. BROOKMAN: Leslie go ahead. Leslie on
10 the record go ahead.

11 MR. BORTZ: I think what you said is more
12 attuned to what we do and we are us we are not him
13 and him.

14 MR. BROOKMAN: Ashley's
15 re-characterization, yes okay thank you.

16 MR. BORTZ: Thanks.

17 MR. BROOKMAN: Okay now we are moving on.

18 MR. SAIP: The next section is the energy
19 use analysis slide 38. The purpose is to determine
20 annual energy consumption of the hearth product
21 technician system. Resulting energy costs are inputs
22 to the lifecycle costs and payback period analysis.

1 So here we have a brief summary of the energy's
2 methodology and I will be going over walking through
3 each point later on.

4 The energy use is determined through the
5 equation in the box there. The Q_p is either the
6 standing pilot or intermittent pilot ignition system
7 power as determined in the engineering analysis.
8 This is a fuel input for standing pilot and
9 electrical power for intermittent pilot. OHP is the
10 operating hours of the pilot the on-time of the
11 standing pilot or intermittent pilot ignition system.

12 For a standing pilot it is determined
13 through field studies and RECs 2009 household data
14 and for intermittent pilot based on the hearth
15 product main burner operation. The final term
16 secondary effects are the impact of ignition
17 operation on households space condition system energy
18 use. In the heating season the standing pilot is
19 counted as beneficial heat and reduces furnace
20 operating hours and in the non-heating season it is
21 counted as an additional cooling load and increases
22 cooling.

1 MR. BROOKMAN: Steve Rosenstock?

2 MR. ROSENSTOCK: Steve Rosenstock, Edison
3 Electric Institute. For the non-heating season I was
4 looking at the technical support document and I was
5 wondering what kind of diversity factor did you use
6 for pilot lights. In other words what percentage did
7 you assume were turned off during the cooling season?

8 MR. SIAP: That is coming up on slide 40
9 or 39 for the steady pilot operating hours. You will
10 see a distribution there.

11 MR. BROOKMAN: We are going to get to that
12 in a little bit.
13 Frank Stanonik?

14 MR. STANONIK: Frank Stanonik AHRI. I
15 think your equation at least as you have explained it
16 here is incorrect so you are defining ignition system
17 power as standing pilot or intermittent pilot
18 ignition system power and then you define the
19 intermittent pilot ignition system power only as the
20 electrical power okay, but if I have an intermittent
21 pilot ignition system okay what happens is I use
22 electrical power to ignite the pilot and then the

1 pilot is consuming gas during at least the burner
2 operating cycle.

3 So in that situation the overall energy
4 use of the pilot would be both the electrical power I
5 used to light it and whatever gas was burned during
6 the period it was on and yes your explanation says
7 the IPI I'm only going to count my electrical power.

8 MR. SIAP: This is the concern with the
9 standby use so that would be active mode energies.
10 So I tried to characterize the standby mode energy
11 use as opposed to --

12 MR. STANONIK: Wow Frank Stanonik AHRI I
13 mean I have this bad habit of just reading words. It
14 says is determined annual energy consumption of the
15 hearth product ignition system. Well I didn't see
16 standby in there at all. That tells me just how much
17 energy the pilot is going to use. If that's the case
18 you really need to rewrite this and be a little
19 clearer.

20 MR. BROOKMAN: Okay thank you Frank. Yes
21 Rett?

22 MR. RASMUSSEN: Rett Rasmussen. I assume

1 you are just for your electrical power consumed. You
2 are just taking into account 120 volt or your house
3 current electricity. Do you also have some allowance
4 for battery consumption and the cost from the
5 replacement of batteries?

6 MR. SIAP: For as far as cost that's kind
7 of more on the LCC analysis section we don't have a
8 cost for replacement of batteries.

9 MR. RASMUSSEN: So there's nothing within
10 this equation here that takes into account batteries,
11 you are just assuming it's line electricity?

12 MR. SIAP: We don't assume a different
13 power requirement for those two cases.

14 MR. RASMUSSEN: Rett Rasmussen so when we
15 get into the actual costing of it then we will see
16 that you are either doing it just with electricity or
17 also including batteries.

18 MR. BROOKMAN: Okay Barton?

19 MR. DAY: I wanted to comment on --

20 MR. BROOKMAN: Your mic.

21 MR. DAY: I was going to comment on the
22 use of the RECs data but we might be better to hold

1 that to the next one. You can either turn to me
2 later.

3 MR. BROOKMAN: Yes. Comments here before
4 we move on.

5 MR. CYMBALSKY: This is John from Doe. I
6 want to just go back to Leslie's point about how
7 these things are purchased so at least in this area
8 it's very common for the contractor to sell directly.
9 I mean they have huge I mean www.gaslogs.com takes
10 you to Cypress Air which is a very major contractor
11 here that does HVAC and fireplaces. They are also a
12 contractor.

13 MR. BORTZ: They are a retailer.

14 MR. CYMBALSKY: So I think we might be
15 talking about the same thing.

16 MR. BORTZ: We might be but I don't think
17 you are they are a retailer buying from a
18 distributor.

19 MR. CYMBALSKY: So will there be two steps
20 or one step if we go back to that chain, that's what
21 we are trying to --

22 MR. BORTZ: There will be the same

1 two-steps that there always are, excuse me, Leslie
2 Bortz, the retailer sells the product and then the
3 contractor, whether it is the same guy or not,
4 charges a fee to install it.

5 MR. CYMBALSKY: So if I go to gaslogs.com
6 they are having their big sale and I call them up.
7 They have actually been at my house before so I know
8 these guys but Cypress Air the guy comes in, he sold
9 me whatever it is he sold and he is installing it.
10 So is that two people or one person, in your mind?

11 MR. BORTZ: It is two people that can be
12 one, but it is two separate functions.

13 MR. CYMBALSKY: Two fees so.

14 MR. BORTZ: There are two fees there.
15 There is the markup he gets for selling the product
16 and the fee he gets for installing it.

17 MR. CYMBALSKY: Just to go back again to
18 re-emphasize Ashley's point so the mechanical
19 contractor should be a retailer before in the same
20 box or a different box?

21 MR. BORTZ: I don't know.

22 MR. BROOKMAN: Several people wish to

1 speak. Go ahead Mike Rivest?

2 MR. RIVEST: This is Mike Rivest. These
3 are intended to be an ownership flow as well so in
4 this case the contractor and his markup would be part
5 of an installation cost and not necessarily part of
6 the this distribution chain.

7

8 MR. RIVEST: In that case in that
9 situation, you know his retailer/contractor but it is
10 one step.

11 MR. BORTZ: Well not necessarily because
12 --

13 MR. RIVEST: What I mean by step is an
14 ownership step.

15 MR. BROOKMAN: Let's hear from this person
16 behind you.

17 MS. FEINSTEIN: Rachel Feinstsein, Hearth,
18 Patio, Barbeque Association. I have been -- I have
19 come into this issue of retailer/contractor licensing
20 in the last six months or so as it has become a
21 growing issue for our retailers. In some states
22 retailers who sell these products and then they want

1 to go out and install the products for their
2 customers they have to be a licensed contractor of
3 some kind within their state.

4 In Virginia right now the license is I
5 think it is alternative energy contractor and also
6 HVAC licensed contractors or mechanical contractors
7 can also install but they are usually contracted by a
8 retailer, so a retailer pays them an annual fee
9 almost an annual salary to be the contractor for
10 their location.

11 MR. BROOKMAN: Do they work for the
12 retailer?

13 MS. FEINSTEIN: In some cases yes.

14 MR. BROOKMAN: So from the consumer's
15 point of view they just see the one thing though
16 right?

17 MR. FEINSTEIN: The retailers, they see
18 the retailer the contractor who is hired by the
19 retailer to go out and install.

20 MR. BROOKMAN: So when the consumer gets
21 the bill let's say it's \$1,000.00 they don't know
22 that a cut went somewhere and one cut went somewhere

1 else.

2 MR. BORTZ: You can buy it and take it
3 home.

4 MR. BROOKMAN: You can, you can but.

5 MR. BORTZ: You won't follow our
6 instructions because you need to be a qualified
7 scholar to do it, but people do it they buy it and
8 take it home and they install it themselves or they
9 hire a plumber or a qualified installer.

10 MR. BROOKMAN: Okay.

11 MR. CYMBALSKY: So I guess obviously it
12 has been done differently in different places but I
13 guess what we are interested in is to try to get that
14 final price correct. I mean frankly if there is five
15 steps or three steps is the beginning to the end.

16 MR. BORTZ: Right it doesn't matter there
17 is a markup to the person who is selling it and there
18 is a cost to installing it.

19 MR. BROOKMAN: Okay, Rett final comment?

20 MR. RASMUSSEN: Rett Rasmussen. Right,
21 some of what you are saying John when you look at the
22 Cypress Air that's marketing but the functions within

1 that are multiple -- you have got the dealer
2 function, you have got the contractor function. Some
3 areas of the country require the mechanical
4 contractors Rachel said, some do not.

5 The whole United States is as varied in
6 their requirements for installation as there are
7 different manufacturers and different means of going
8 to market, further complicating the issue, so, yes.

9 MR. BORTZ: Matchless ones, easier ones to
10 install and harder ones to install.

11 MR. BROOKMAN: Okay are we ready to move
12 on now, I think so.

13 MR. SIAP: There's a question in the back.

14 MR. HOUCK: James Houck, I had a question
15 on your slide 38. How did you calculate the benefit
16 of the heating season?

17 MR. SIAP: That's going to be coming up in
18 about 3-4 slides.

19 MR. HOUCK: Okay I'll ask the question
20 then.

21 MR. SIAP: The secondary yeah.

22 MR. BROOKMAN: Yes Jack?

1 MR. GOLDMAN: Jack Goldman just a quick
2 question. If you were to put parenthesis around the
3 first step --

4 MR. SIAP: Yes.

5 MR. GOLDMAN: In that equation would it be
6 QP times OHP or QP times OHP plus secondary because
7 they could have different results depending on that.

8 MR. SIAP: It's yeah so you do the
9 multiplication first in this case, yes.

10 MR. BROOKMAN: Okay keep going.

11 MR. SIAP: So the buildings -- first I am
12 going to talk about the building sample before going
13 back into the depths of the energy use. The building
14 sample is how DOE characterizes the households which
15 have hearth products. Starting from the latest RECs
16 data which is the residential energy consumption
17 survey -- we first decided to get those which have a
18 fireplace and those which use either natural gas or
19 propane.

20 Finally if it has a flue we added to the
21 vented hearth product sample and if it is flue-less
22 we add it to the vent-less hearth product sample.

1 The vented sample was 541 households representative
2 of 4.67 million households nationally. When the
3 vent-less sample was 171 households representative of
4 1.83 households nationally, yes question?

5 MR. BROOKMAN: Barton?

6 MR. DAY: The issue with the RECs data as
7 near as I can tell the only gas hearth products that
8 are covered by the RECs data at all are fireplaces
9 that are used for secondary heating -- and there's no
10 data on inputs, there's no data on the presence or
11 absence of pilot lights. There is no information on
12 pilot light use patterns, there is some limited data
13 on product use patterns, product use frequency but to
14 me the issue that
15 leaps out is that fireplaces that are used for
16 secondary heating are a very small fraction of
17 fireplaces so the data is not even representative of
18 fireplaces and I can tell you that if there's any
19 resemblance between that and data for patio heaters
20 it's random.

21 I mean there is absolutely nothing to link
22 you know this data for any other product and I don't

1 understand, maybe I'm missing something in the RECs
2 data and there is all this information about other
3 products I don't know, there's nothing I can find and
4 my perception from looking at it is that you are
5 taking data set for an extremely narrow range of
6 products and just applying it to everything because
7 there is no other numbers, am I missing data?

8 MR. SIAP: Well RECs does include the
9 fireplace only but we use it to establish the house,
10 the characteristics of the households themselves, we
11 don't use it for studying pilot market share or
12 behavior, any of that so.

13 MR. BROOKMAN: Leslie?

14 MR. BORTZ: Leslie Bortz, Barton if you
15 are right -- Barton, if you are right doesn't that
16 mean this stops at the first diamond?

17 MR. DAY: Yeah.

18 MR. BORTZ: That's it.

19 MR. DAY: Yeah by definition well it's the
20 first diamond is yes.

21 MR. BORTZ: It's everything that there is.

22 MR. DAY: It's just that all the other

1 products drop out there.

2 MR. BORTZ: Everything's out then.

3 MR. DAY: Every category drops out because
4 fireplaces used for space heating is --

5 MR. BORTZ: Is the only thing they have.

6 MR. BROOKS: Can you restate how what the
7 specifics are in RECs?

8 MR. SIAP: So um although that's what's
9 the diamond says and that's strictly how the question
10 is asked the RECs provides a measurement of the fuel
11 consumed as well and if we look at the number of
12 units identified in RECs it's not a small portion of
13 all hearth product shipments, it's a large portion
14 relative to the shipment so maybe this document could
15 be labeled better.

16 MR. DAY: I looked at the questionnaire
17 and the questionnaire on residential energy use, the
18 only question that addresses any of the products we
19 are talking about is fireplaces used for heating.
20 The data summaries at the website that you linked us
21 to in the notice are just fireplaces used for
22 secondary heating.

1 If there's some data on any other product
2 --

3 MR. CYMBALSKY: That would probably be the
4 majority of what we are talking about here, I mean
5 it's houses that have a gas for example -- have a gas
6 furnace and they have a fireplace, a gas fireplace of
7 whatever type we sell out there.

8 RECs would consider that secondary heating
9 because their primary heater is their gas furnace.

10 MR. DAY: Well it actually doesn't you can
11 look at the total of single family homes --

12 MR. CYMBALSKY: Right.

13 MR. DAY: That are accounted for and
14 fireplaces used for secondary heating and you can add
15 up wood and gas and propane and you can add up all
16 the categories of fireplaces and I forget the total
17 single family households, like 78 million is what
18 the RECs data assumes and there's like 4 million
19 fireplaces total.

20 And for the last 30 years or more about
21 right at 50% of all newly constructed single family
22 homes have fireplaces so the 35 plus million

1 fireplaces all but like 4 and I don't remember the
2 numbers off the top of my head. I think that's right
3 all but 4 are missing from the data side.

4 Well they are not missing from the data
5 side because there is a category for products that
6 are used for secondary heating which is where the
7 vast majority of all the products that we are talking
8 about would fall.

9 MR. BROOKMAN: James go ahead with your
10 comment?

11 MR. HOUCK: This is James Houck. Yes
12 there is a couple of issues with the data set. One
13 is it's based on the consumer's response they are
14 asked if they use their fireplace for secondary heat.
15 The rule of thumb, working with fireplaces in
16 residential homes is about a third aren't used, about
17 a third are used for aesthetics and a third are truly
18 used for a secondary heat source. But very few
19 people use a fireplace for a cooling effect.

20 When you ask a person that uses it
21 primarily for aesthetics they say oh yes secondary
22 heat so that puts an incredible uncertainty in this

1 number because it is not really people that are using
2 the secondary heat. When someone asks you do you use
3 your fireplace for secondary heat source I say yes.
4 The other issue is it doesn't distinguish between
5 fireplaces that have an insert in them or not. Of
6 course a fireplace insert is more designed for
7 heating than I guess what you would call a true
8 fireplace so there is a pre-disposition for this
9 number to include fireplace inserts, not just the
10 whole universe of fireplaces.

11 MR. BROOKMAN: Okay thank you.

12 MR. ROSENQUIST: You have to remember,
13 this is Greg Rosenquist from LBNL is that we are
14 using RECs to create a building sample for all vented
15 hearth products and all unvented hearth products and
16 so we are using that same building sample for vented
17 gas logs and vented gas fireplaces as a basis for our
18 analysis when we do the lifecycle cost analysis.

19 Where we get that weighting correctly in
20 terms of the market share of each product is when we
21 go back into the shipments and national impact
22 analysis. Here with the lifecycle cost analysis we

1 are trying to determine what percentage of consumers
2 would benefit or burden from replacing their standing
3 pilot with intermittent pilot ignition device.

4 So I hope that's clear again we are just
5 trying to create what is a representative building
6 sample with sort of sparse information that we have
7 from RECs. So we can perform our lifecycle cost and
8 payback period.

9 MR. BROOKMAN: Leslie get close to that
10 microphone.

11 MR. BORTZ: You said you
12 are trying to figure out the percentage that would be
13 helped by going to an intermittent pilot system,
14 isn't that 100%?

15 MR. ROSENQUIST: I say benefit what I mean
16 is on a cost basis right. If the benefits of the
17 energy savings outweigh the increased cost of the
18 product.

19 MR. BORTZ: Okay.

20 MR. ROSENQUIST: That's what I mean.

21 MR. SIAP: Okay so moving on. In our
22 energy use determination the next term is the

1 ignition system representative power. This is
2 determined in the engineering analysis, we have a
3 table here listing the representative power used for
4 each hearth product type by standing pilot,
5 intermittent pilot and also for the hearth product
6 main burner, yes?

7 MR. ROSENSTOCK: Question Steve
8 Rosenstock, Edison Electric Institute. You are
9 showing an ignition wattage of 50 watts that's across
10 every single product, there is no variation, is that
11 like an average value. The reason I am asking is I
12 was over a neighbor's house and they had a huge
13 propane grill, gas grill, sorry don't want to get
14 anyone mad at me it was a gas grill and they were
15 having trouble with the ignition so they changed out
16 a AA battery as I recall so I see 50 watts, is that
17 the nameplate rating or is the actual wattage on
18 there when they are putting in the ignition when the
19 actual ignition is on?

20 MR. SIAP: That's an average it may be a
21 conservatively high average but yes it is meant to be
22 an average.

1 MR. ROSENSTOCK: Again Steve Rosenstock,
2 again was that based on nameplate or actually like a
3 watt meter?

4 MR. SIAP: I would have to defer to the
5 engineering analysis team to --

6 MR. ROSENSTOCK: Steve Rosenstock EEI. I
7 looked in the technical support document and I wasn't
8 finding anything, thanks.

9 MR. BROOKMAN: Jim?

10 MR. KUPSH: I think the actual opposite,
11 if you look at your unvented fireplace, inserts,
12 stoves, standing pilot and unvented gas log sets the
13 gas consumed by both of those applications is
14 effectively the same, more of the same pilot, they
15 cannot be different they use the same amount of gas.

16 And so the fact that you are off by 50% on
17 the unvented fireplace insert stove makes me believe
18 that there was not any true testing done because it
19 is unrealistic, those should be very, very close to
20 each other. It's effectively the same pilot, one has
21 an extra device attached to it but the burning is all
22 the same. So I have a hard time with the accuracy

1 there.

2 MR. SIAP: Okay.

3 MR. BROOKMAN: Yes Barton?

4 MR. DAY: Yes where did the main burner
5 BTU numbers come from and why do they matter? I'm
6 having a hard time understanding what the relevance
7 on this is?

8 MR. SIAP: Well the relevance of them is
9 coming up there is very important in determining the
10 intermittent pilot operating hours, it will come in a
11 couple of slides. As far as the magnitude how they
12 are determined I would defer to the engineering
13 analysis team.

14 MR. BROOKMAN: Microphone, Justin?

15 MR. ELSZASZ: Justin Elszasz, Navigant
16 Consulting. The main burner numbers are again
17 averages and there are two primary sources to that.
18 One was again the product data base that I mentioned
19 earlier that included the model name information as
20 well as ignition type and you know the number that
21 you see there, the main burner fuel input.

22 And the other was they were asking through

1 a confidential manufacturer of these.

2 MR. DAY: When you say I'm sorry this is
3 Barton Day, and you said data based are you referring
4 to just information you collected from literature?

5 MR. ELSZASZ: Yes.

6 MR. DAY: So no adjustment well obviously
7 no adjustment for product shipments and so forth it's
8 just how many products have this and how many have
9 that?

10 MR. ELSZASZ: Right and again it was also
11 refined during the interview process so manufacturers
12 were allowed the opportunity to comment on that
13 number.

14 MR. BROOKMAN: Leslie?

15 MR. BORTZ: Leslie, you have 50,000 I
16 don't know if it matters yet but you have 50,000 for
17 outdoor fireplaces I think somewhere else you had 25.
18 If you can find it back -- it's a different number.

19 MR. BROOKMAN: Are you following him?

20 MR. SIAP: I'm not sure what you are
21 referring to it might have been --

22 MR. BORTZ: An outdoor I'm sorry, Leslie.

1 The main burner in the outdoor fireplaces uses 50,000
2 BTU's. I think somewhere else you said it used 25.

3 MR. BROOKMAN: Oh I see, okay.

4 MR. CYMBALSKY: I've gone back in the
5 whole slide deck this is the first time I have seen
6 this number.

7 MR. BORTZ: It may have been in your TSD
8 or somewhere. I don't know if it matters.

9 MR. BROOKMAN: Okay let's move on.

10 MR. SIAP: Okay next here is the operating
11 hours of the pilot. First we are going to go over
12 the standing pilot operating hours. DOE identified
13 three modes for gas fired hearth products in the
14 field study. 40% of users left their standing pilot
15 on all year, 20% turned their pilot off daily when in
16 use and the remaining 40% mode three had higher
17 variation with many turning their standing pilot off
18 at the end of the heating season. Question Barton?

19 MR. DAY: Barton Day. The -- I mean the
20 obvious question is where did the data come from for
21 this. You site a study and I guess my first question
22 is do you actually have the study and if so can it be

1 made available for review and comment? The magazine
2 article just suggests that there are just suggests
3 numbers for fireplaces you know for what was on the
4 market, actually what was installed or in use 20
5 years ago.

6 MR. SIAP: So we have -- the numbers in
7 that article are what we have. We also found more
8 recent survey data, not field data 2007 housing
9 environment study shows that 44% of users turned
10 their standing pilot off at the end of the heating
11 season but --

12 MR. DAY: I'm sorry what's the additional
13 information I couldn't quite hear you.

14 MR. SIAP: The housing and environment
15 study in 2007.

16 MR. BORTZ: Leslie Bortz. It said in 2007
17 that 44% of people turned their pilots off at the end
18 of the season?

19 MR. SIAP: Yes.

20 MR. BORTZ: And you are going to say in
21 2021 that number is going to be 40%?

22 MR. SIAP: Well I bring that up as it is

1 consistent with the 1997 number but if you have
2 different data we would be happy to take it into
3 consideration.

4 MR. BROOKMAN: Barton?

5 MR. DAY: This is Barton Day and that's
6 the issue is there is no data. There is not a single
7 data point that I am aware of as to you know used
8 patterns of pilot lights on. Any products other than
9 this very limited data on fireplaces with an old
10 design. If there is a more recent study that
11 addresses any of these products it would be good to
12 see that but again you know a point we made early on
13 is these products, they are all different and a
14 pattern of consumer behavior with respect to one type
15 of product is not necessarily going to have anything
16 to do with a pattern of behavior as to other
17 products.

18 And one of the key issues here that looks
19 like was not considered at all is that the -- one of
20 the key factors influencing consumer behavior is ease
21 of pilot light control and you know it's obvious that
22 if you have to crawl on your hands and knees with a

1 screwdriver and a flashlight to operate a pilot
2 light, one could imagine that that's not going to
3 happen all the time.

4 If it takes the flip of a switch on a
5 handheld remote like turning off the light as you
6 leave a room, a whole different ballgame and those
7 controls are out there they exist, they are
8 increasingly prevalent and for some styles of product
9 you know the controls are so easy that the
10 presumption that pilots are going to be left on
11 indefinitely is just incredible.

12 And without having any data on any
13 products without any information on the configuration
14 of the pilot light controls I would say there is
15 absolutely no evidence to permit any analysis based
16 on pilot light use patterns and I understand in your
17 analysis you have got blanks to fill in but you can't
18 fill in blanks without data and there's not data.

19 MR. SIAP: So there is data and we are
20 presenting it here and so this is an ask of whoever
21 to provide more recent data. So you have asserted
22 that this new product is becoming more prevalent.

1 MR. DAY: This industry has no data.

2 MR. SIAP: Okay so to back up your
3 assertion there must be something.

4 MR. DAY: The assertion is there is no
5 data.

6 MR. SIAP: No but he asserted that this
7 new On Demand technology is running you know
8 penetrating into the market.

9 MR. CYMBALSKY: Why would people pay for
10 it if they weren't going to use it.

11 MR. BROOKMAN: Yeah, this gentleman here
12 please say your name. Do you want to get in here?

13 MR. REOTT: Raymond Reott. The slide that
14 is up on the board right now has the wrong numbers
15 according to the TSD. According to the TSD table 7
16 3.1 page 7-6 only 20% of the people leave their
17 standing pilot on all year and 40% turn them off
18 daily so those first two figures on the chart on the
19 wall there are reversed actually.

20 MR. BROOKMAN: Thank you, yes James?

21 MR. HOUCK: James Houck. I would like to
22 comment what Barton just talked about. I want to

1 point out that that study was done in Canada in 1997
2 and I don't have it in front of me but I believe
3 there was only 14 homes that did not turn their pilot
4 light off. Now the statistics on that --

5 MR. BROOKMAN: Was that the end of the
6 season?

7 MR. HOUCK: Yes, I believe that is how it
8 was in the study I would have to look at it again to
9 be sure on that. Something like that, the statistics
10 are staggering when you consider there is probably
11 around 14 million plus or minus gas fireplaces in the
12 United States so that's .0001 percent of the total
13 population that you are basing this assumption on.
14 In Canada in 1997 so I would say that means nothing.

15 MR. BROOKMAN: Thank you yes Dana?

16 MR. MOROZ: Dana Moroz, Wolf Steel. I
17 would also like to make the comment that based on
18 this information or the date this information was
19 accrued is like going back to caveman days. We live
20 in the information world. As a manufacturer I can
21 tell you we do a great deal to educate consumers
22 today of both the use of the pilot and how to turn it

1 off that wasn't available back then. You can go on
2 YouTube and find information on how to turn off
3 almost any pilot, that didn't exist in 1997 so to
4 just draw those numbers out and say they are still
5 valid today lacks credibility.

6 MR. BROOKMAN: Jim?

7 MR. KUPSH: Jim Kupsh. To add to what
8 Dana is saying is if you take a look at and as a
9 control manufacturer, the percentage of non-standing
10 pilot IPI appliances in 1997 I doubt it reach 1 or
11 2%. It is significantly higher today and all of
12 those appliances turn off the pilot on every single
13 cycle or have the ability to do that.

14 And so to in any way suggest that this
15 data from 1997 can be even considered as a framework
16 to what's occurring today is unrealistic.

17 MR. BROOKMAN: Okay yes
18 Peter?

19 MR. DIRCKS: Yes Peter HHT. You mentioned
20 that the study from 2007 is the housing and
21 environment study who was the actual source, I mean
22 what's the company that put it out?

1 MR. SIAP: StatCan distributed the report
2 citing that study.

3 MR. DIRCKS: I'm sorry I couldn't hear
4 you.

5 MR. SIAP: StatCan provided the source,
6 provided the report, the source.

7 MR. DIRCKS: All right and I have a
8 followed comment. I think what you are hearing from
9 most of the people in the room here not only on this
10 issue but even the one earlier on distribution and
11 even just based on the energy used by the consumers
12 is it really does go back to this definitional issue
13 of what is the definition of the products and what is
14 the intended scope of my opinion because consumers
15 are buying all of these products for different
16 reasons and that was articulated earlier.

17 There's a different between what a
18 consumer is looking for in a gas fireplace versus an
19 insert versus a gas log so I think there is actually
20 a theme here in the last three topics that we have
21 covered by lumping all of this together, over
22 simplifying and using data that's you know, 15, 18

1 years old is what's really giving us a lot of
2 questions with the integrity of the information as
3 well as how we can best respond.

4 MR. BROOKMAN: Okay James?

5 MR. HOUCK: Yes James Houck. Regarding
6 that Canadian data in 2007 again I don't have it in
7 front of me so my number is off a little bit but they
8 had three categories of responses in that survey they
9 turned their pilot light off in the summer, or they
10 didn't turn their pilot light off in the summer and
11 no response.

12 And there were more no responses I believe
13 or at least in the same magnitude of the other two so
14 again that data is very questionable.

15 MR. BROOKMAN: Frank Stanonik.

16 MR. STANONIK: One little comment, I'm
17 hearing a lot of references to Canadian studies. I
18 just want to make sure everyone is aware that when it
19 comes to vent-free gas fired products, those products
20 in fact are not allowed, or I will say they are not
21 allowed in Canada so any of the Canadian studies that
22 look at fireplace pilot use have no relevance to

1 vent-free products because in fact they are not a
2 Canadian product.

3 MR. BROOKMAN: Thanks Frank. Bart?

4 MR. DAY: Yeah I just wanted to make a
5 general comment about anecdotal evidence because you
6 know as we looked at this issue and tried to get some
7 sense of what is realistic we have concluded that we
8 -- that it's an incredible challenge because there is
9 substantial evidence that when you look at fireplaces
10 as a group that as many as half of all fireplaces are
11 used not at all or rarely.

12 Again we are talking about a product that
13 performs its primary function just by sitting there.
14 And that's what fireplaces are. They are an
15 architectural feature and the data on fireplaces in
16 general is right around 50%. 5-0 are not used
17 regularly at all. Either are used not at all or are
18 used rarely and the problem you have with anecdotal
19 evidence when we talk internally what any particular
20 manufacturer sees is experience with people that are
21 using the product, so they are only seeing half the
22 data set to start with so whatever impression they

1 get is going to overstate the issues with respect to
2 anything related to product use because they are not
3 seeing the substantial population of products that
4 aren't used.

5 Survey data is subject to the same
6 problem. Characteristically when you do survey data
7 the people who are actually using products are much
8 more likely to respond than the people who don't and
9 so everything is skewed in the direction of inflating
10 anecdotal or survey data and so you know reliable
11 data about issues like pilot light use is frankly
12 just wanting and I think the other significant issue
13 is that two of the major factors that control the
14 outcome there are consumer attitudes which have been
15 changing rapidly and continue to change.

16 And product design which has evolved
17 rapidly and continues to change and so to -- if we
18 had reliable data from you know a year ago it
19 wouldn't be reliable data for two years from now let
20 alone five years from now because we see the trends.

21 It's a very difficult issue to get at and
22 the sentiment of the industry is that you know

1 concerns based on this model of you know the pilot
2 lights that nobody changes is just -- it's not an
3 applicable model to products that are coming on the
4 market today or that will be on the market five years
5 from now and so there's a real question as to whether
6 there is any issue to address through regulation at
7 all.

8 MR. BROOKMAN: Okay moving on.

9 MR. SIAP: Still in the operating hours
10 now we move on to the intermittent pilot operating
11 hours covered by these two equations here. The
12 intermittent pilot hours are determined using the
13 main burner operating hours and the IPI on time per
14 main burner operating hours. This is determined by
15 the main burner cycles per hour and the operation per
16 main burner cycle.

17 The average main burner cycle time is
18 determined -- is assumed to be similar to similar
19 equipment, direct heating equipment where we assume
20 an average main burner cycle time of 20 minutes which
21 leads to three main burner cycles per hour. DOE
22 assumes that an IPI operation per cycle of 30 seconds

1 and this results in an average IPI operating hours of
2 3.9 hours per year.

3 MR. BROOKMAN: Barton?

4 MR. DAY: Yes these assumptions come out
5 of the test procedure for direct heating equipment.
6 Several years ago we submitted a submission and a
7 test procedure proceeding and we have submitted it to
8 DOE several times since then. This has absolutely no
9 relevance to hearth products. This is a strictly
10 utilitarian heating appliance operating on a
11 thermostat. This is absolutely has got nothing to do
12 with any hearth product, they just don't operate like
13 that.

14 MR. BROOKMAN: Dana?

15 MR. MOROZ: Dana from Wolf Steel. I would
16 agree with Barton on that point the fact is that most
17 homeowners use these as decorative appliances, they
18 don't turn it on to cycle the heat, they turn it on
19 because they want to enjoy the ambience, the cold
20 temperature outside allows them to do so and they
21 don't want to watch it come on and off for 20 minutes
22 every hour, they want to have it on for several hours

1 while they are sitting there enjoying it and that's
2 how fireplaces are used.

3 InterCan went through this recently in
4 Canada trying to evaluate the same usage and was
5 unable to define it. When they looked to themselves
6 and surveyed within their own organization they found
7 that was consistent with the proposed usage. That
8 most users leave it on for an extended period of time
9 to enjoy the ambience, not to heat.

10 MR. SIAP: Right so just briefly the we
11 realize that the hearth product and burner cycle may
12 be longer. Here we choose to kind of potentially
13 overstate the energy use of the IPI to be
14 conservative in our estimates.

15 MR. BROOKMAN: Frank?

16 MR. STANONIK: Frank Stanonik, AHRI. So
17 the slide says that the average main burner cycle
18 time is 20 minutes and I understand it to be the
19 burner on time?

20 MR. SIAP: Yes.

21 MR. STANONIK: Well by the fact you are
22 calling it a cycle that suggests that there is a

1 burner off time which there is if it is
2 thermostatically controlled and if that is the case
3 then you do not have -- the only way you get three
4 main burner cycles in an hour is in fact if you have
5 three consecutive burner cycles of 20 minutes which
6 is basically one burner operating of one hour.

7 So you have got a little flaw here in how
8 you have analyzed this because what you haven't
9 mentioned is okay if it is operating this way what is
10 the off cycle and if in fact and then one other point
11 that has just been brought up here okay. In the
12 discussion of how people use decorative equipment it
13 is totally appropriate. They just want to watch the
14 flame okay.

15 But if this is a vent-free product okay
16 they can't let it run forever because the room will
17 just get too hot. They will either open the window
18 and then I guess heat the outdoors or they in fact
19 will cycle the equipment or turn it down or whatever
20 because again there is no way around it, a vent-free
21 product will heat the room and it doesn't take very
22 long for going from comfortable hot to too hot and so

1 it's a whole different situation of how that main
2 burner is going to operate.

3 MR. BROOKMAN: Sue?

4 MS. WALKER: All I was just going to say
5 on the vent-free products overwhelmingly they are
6 thermostatically controlled and cycle automatically.

7 MR. BROOKMAN: Okay yes Rett?

8 MR. RASMUSSEN: Rett Rasmussen. The ANSI
9 standards for vented decorative appliances they do
10 not permit the use of thermostats so you will not
11 have this type of cycling with decorative products.

12 MR. BROOKMAN: Sue is that correct? Yeah
13 okay, Barton nothing there -- okay.

14 MR. SIAP: Next I have how we determine
15 the main burner operating hours. Now that the
16 previously stated cycles per hour is for main burner
17 operating hours not hours in general so the main
18 burner operating hours are determined using the
19 overall hearth product energy use as listed in RECs
20 2009. The main burner input capacity as determined
21 in the engineering analysis and several adjustment
22 factors where we adjust the heating and cooling load

1 to project -- to account for 2021 of rejected
2 building shell efficiency as well as 2021 average
3 climate conditions. Yes?

4 MR. ROSENSTOCK: Steve Rosenstock, EEI.
5 When you are saying building shell you are saying
6 residential or commercial or a combination of both?

7 MR. SIAP: Residential.

8 MR. DAY: This is Barton Day again the
9 whole issue of burner operating hours the appendix of
10 testimony that we are talking about a minute ago has
11 assumptions that are completely out of whack for
12 hearth products again I completely -- looking at a
13 different type of product. But these numbers you are
14 starting with the RECs data again so you are starting
15 with the small fraction of fireplaces that are used
16 for secondary heating you know for most of the
17 products we are talking about the pattern is going to
18 be different.

19 For fireplaces in general the pattern is
20 going to be different and so you know we don't --
21 this is not producing data that is going to be
22 representative of any of the products that we are

1 talking about and that's really the problem is that
2 the operational use data is way off and it doesn't
3 connect with pilot light use data anyway. It seems
4 like we are assuming some use pattern of pilot lights
5 without any evidence on the basis of product use
6 information for which we have no evidence.

7 MR. SIAP: The final term is the secondary
8 effects or the impact of the pilot heat on the base
9 heating or cooling. Secondary effects are determined
10 in these equations listed here the first term is the
11 energy use of the pilot, this is just the energy
12 consumed by the pilot as the product of the power
13 consumption and the operating hours.

14 Next is the fraction of useful heat from
15 the pilot which is the distribution based on another
16 field study and it's assumed to be more for unvented
17 units and less for decorative units and finally DOE
18 takes into account the efficiency of the main space
19 heating or cooling appliance depending on season.

20 MR. BROOKMAN: Steve Rosenstock?

21 MR. ROSENSTOCK: Steve Rosenstock, Edison
22 Electric Institute. When I looked in the technical

1 support document table 7.3.6 it talks about the
2 fraction of the heat of useful heat. I'm seeing
3 ranges depending on the product of 1 to 47% or 0 to
4 23% or for the unvented products 2 to 94% so you were
5 talking about a distribution based on a field study.
6 It's based on a Canadian field study and as Frank
7 said the unvented products aren't even allowed right
8 so in terms of the distributions how did you
9 determine -- or I'll ask what is the shape of the
10 distributions and how did you do it for unvented
11 products?

12 MR. SIAP: So I will start with vented and
13 then go to unvented. Vented products is a triangular
14 distribution where the upper bound is established as
15 the number determined in that study as that was one
16 household that had the furnace thermostat coincident
17 in the same room and basically right next to the
18 fireplace.

19 So we assumed that that is one of the most
20 impactful scenarios for a furnace and a hearth
21 product interacting. For the unvented units we
22 recognize that there is a potential for higher, much

1 higher impact on furnace use so we assumed double.
2 If that number should be something else we welcome
3 comment on that.

4 MR. ROSENSTOCK: Steve Rosenstock EEI. So
5 you said the unvented was -- you also assumed a
6 triangular distribution?

7 MR. SIAP: Also triangular yes.

8 MR. ROSENSTOCK: So where was the peak of
9 the triangle just out of curiosity within that?

10 MR. SIAP: It's symmetric so --

11 MR. ROSENSTOCK: By 23 and so in the first
12 case it would be -- Steve Rosenstock, EEI so it would
13 be 23 in the case of 1 to 47 and for the zero to 23
14 it might be 11 --

15 MR. SIAP: Right.

16 MR. ROSENSTOCK: And then 2 to 94 it might
17 be 48 or something like that, 48.

18 MR. SIAP: Right in that range.

19 MR. BROOKMAN: Go ahead Frank?

20 MR. STANONIK: Frank Stanonik with AHRI.
21 In the case specific case of unvented vent-free
22 products I would strongly urge you to essentially

1 scrap this analysis and just start by what I would
2 call first principals and the first principal is that
3 on a vent-free heater all of the pilot energy during
4 the heating season is going into the space. That is
5 installed in a room or wherever and it is intended to
6 provide heat to that area so in fact all of the pilot
7 energy because it can go nowhere else is going into
8 the space so it is all useful heat.

9 Now if you want to get into an analysis
10 and figure out what is going on with infiltration and
11 some other things you can do that but to suggest that
12 there is a range for a pilot on a vent-free heater is
13 to borrow a phrase from Leslie, ridiculous. There's
14 no place else for the heat to go but into the space.
15 It is 100% putting BTU's into that space.

16 Now during the heating season you could
17 you know, you could do some analysis that might look
18 at bins and say okay how many hours are in the
19 heating season, am I really wanting heat as opposed
20 to not wanting -- all those things but to take this
21 study that you have done in Canada and then make some
22 assumptions and look at some distributions just

1 doesn't fit.

2 MR. BROOKMAN: Barton? Okay, yes James
3 please.

4 MR. HOUCK: Yes I would like to expand on
5 that a little bit. First of all I think it would be
6 fair in your equation to have a plus or minus in the
7 secondary effects because I believe you would
8 probably have more benefits in the winter and losses
9 in the summer. A couple of other things about that,
10 one is I would be surprised and sometimes I am
11 surprised that you have taken into account the
12 magnitude of the heating benefit in the winter.

13 The standard in the industry used by the
14 U.S. weather service is heating degree days and
15 that's any day that has an average temperature below
16 65 degrees Fahrenheit that is deemed that heating is
17 needed. So I would argue anywhere a fireplace is
18 located and the number of days that are below 65
19 degrees the energy is not wasted, in fact it is used
20 to heat the dwelling.

21 The other component on that, is again it
22 was alluded to a little earlier, it is not a linear

1 fashion, in other words if there is a hundred million
2 BTU's of energy put out, used by the pilot light the
3 benefit to the home can be much greater than that.
4 Fireplaces to have open chimneys for example a gas
5 log set put in an old masonry fireplace -- if the
6 draft is lost and becomes negative and which you have
7 air infiltrating into the home that air can be very
8 cold and causing your main heating source such as a
9 forced air furnace to work a lot harder.

10 So I would argue that probably the
11 secondary benefits of a pilot light are not
12 adequately taken into consideration.

13 MR. BROOKMAN: Okay.

14 MR. SIAP: So finally we have the results
15 of the energy use analysis. The top table lists the
16 standing pilot fuel use by product type. The bottom
17 table lists the energy use by the intermittent pilot.
18 The first column is the energy use direct electricity
19 use directly by the intermittent pilot.

20 The third column is the space heating fuel
21 impact -- this is the increased energy use by the
22 furnace or the fuel used in heating appliance due to

1 the lack of useful heat from the standing pilot.
2 Similarly for those households which have an electric
3 resistant heat pump space heating appliance the
4 fourth column takes those electrical impacts into
5 account.

6 And finally the last column takes into
7 account, lists the benefits of the lack of the
8 additional cooling load from the standing pilot which
9 results in reduced air conditioning or other cooling
10 operating hours, yes?

11 MR. BROOKMAN: Yes Steve Rosenstock?

12 MR. ROSENSTOCK: Steve Rosenstock, Edison
13 Electric Institute. Again thank you for that, that
14 kind of the breakout. I guess my thought is again
15 just looking at table 731 it says that in your in a
16 technical support document it says year round
17 standing pilot is 20% of the population. So for
18 these numbers in the table these numbers are just
19 for, well I'll just start with the cooling, for the
20 space cooling that's only for the 20% of homes that
21 are actually running the pilot in the summer time.
22 Am I correct in that assumption?

1 MR. SIAP: For that part yes.

2 MR. ROSENSTOCK: Okay the next question I
3 was going to have is you know especially for a lot of
4 these products where you know the pilot is going to
5 be inside the fireplace and in many cases it is
6 behind a glass door as well I know you said the
7 fraction if like only 20% of the heat is actually
8 getting into the space and it starts out like I'll
9 say 700 to 1000 BTU's you are talking about you know
10 a couple hundred BTU's where the cooling load of the
11 house might be 36,000 BTU's per hour at a peak time
12 on a peak July day. That's kind of within the noise,
13 are you saying that the thermostat has to go on and
14 off just because of that extra couple of hundred
15 BTU's?

16 MR. SIAP: We acknowledge that it is a
17 really small portion of the cooling load but we
18 account for the analysis -- for the heat input into
19 this space the same as the cooling and the heating
20 season.

21 MR. KUPSH: Jim Kupsh. The 20% -- that
22 20% is it calculated off of 100% of the fireplaces or

1 is that 20% calculated off of 20% of the fireplaces
2 that have a standing pilot system? In other words
3 are you subtracting out all of the existing
4 fireplaces that currently have an IPI system?

5 MR. SIAP: So these results are presented
6 separately so this is for only the standing pilot or
7 intermittent pilot so that 20% is only standing
8 pilot.

9 MR. KUPSH: But the calculation was based
10 on 1997 when the entire market was standing pilot,
11 how 40% of the installations and it's growing as we
12 get to 2020 are not standing pilot, is that taken
13 into consideration?

14 MR. SIAP: So we used the 1997 report to
15 provide some kind of data point for the behavior with
16 standing pilot only. So we applied those modes to --

17 MR. KUPSH: I understand but my statement
18 or question is if you use 1997 as the 20% then you
19 have to use it only the appliances that are now
20 standing pilot. If you use it as a -- if you take
21 into account for all of them now you then have to
22 take into account that 40% of the appliances no

1 longer have standing pilot.

2 MR. CYMBALSKY: What he is saying is the
3 behavior is constant not the stock of standing
4 pilots.

5 MR. KAPSH: How can you say the behavior
6 is --

7 MR. CYMBALSKY: 40% of the lower number is
8 standing pilot.

9 MR. KAPSH: You have no data to say the
10 behavior is constant you are basing it on 1997 data
11 in which there was no IPI applications.

12 MR. CYMBALSKY: And that's fine no, no,
13 no. Let's just think about standing pilots. So in
14 2007 or '97 you had a population of people with
15 standing pilots. 40% of them said we don't turn it
16 off. Fast forward to now the number of people with
17 standing pilots is a lot lower but of that lower
18 number you still have 40% of them that keep the
19 standing pilot on.

20 Behavior is the same of people with
21 standing pilot unless --

22 MR. KAPSH: So are you saying the 20% is

1 only standing pilot applications?

2 MR. CYMBALSKY: Right.

3 MR. KAPSH: And you subtracted out from
4 the whole population.

5 MR. CYMBALSKY: Yes.

6 MR. KAPSH: Okay thank you.

7 MR. BROOKMAN: Yes?

8 MR. RASMUSSEN: Rett Rasmussen. I would
9 like to point out that since that is a Canadian study
10 Canada is north of the United States of America. If
11 you recall in my comments -- opening comments I had a
12 dealer from Michigan which is just south of Canada
13 but still in the northern part of the United States
14 that suggested that standing pilot usage is going to
15 be greater in the northern climates and what it would
16 be in the southern part of the United States so I
17 would like to just point out that this is what I
18 consider to be a discrepancy in the use of these
19 Canadian numbers for making policy for the United
20 States.

21 MR. BROOKMAN: Barton?

22 MR. DAY: Yeah I just want to go back to

1 the point John when you were commenting a moment ago
2 you said but the behavior is the same and there's no
3 reason to believe that is the case and the reason for
4 that is in the article itself and again if you guys
5 have the study we would love to see the study, all we
6 had access to was the article that you linked to in
7 the notice.

8 And the notice states as one of its
9 principal conclusions that the ease of pilot light
10 control has a significant effect on consumer behavior
11 and they picture a product as part of the art for the
12 article and say well if you have easy controls like
13 this product it has a significant effect on pilot use
14 guess what, that product is now the norm.

15 MR. CYMBALSKY: And it's not a standing
16 pilot light in your mind.

17 MR. DAY: No it is a standing pilot light.
18 I'm saying of standing pilot light products now and
19 this is why it would have been great if you guys
20 could have come to the expo because if you had walked
21 around the expo you would have seen you know you flip
22 open a panel there's a dial, there's a button -- it's

1 as easy as a barbeque grill and this is the bulk of
2 the product now. It's not -- it's not crawling
3 around on your hands and knees with a screwdriver and
4 a flashlight anymore so behavior is going to be
5 completely different.

6 MR. CYMBALSKY: We are happy to take the
7 data, the bulk of the product is different so tell us
8 what the bulk is and we will implement it.

9 MR. DAY: There is no data, that's the
10 problem.

11 MR. CYMBALSKY: Well there's a showroom
12 full of it.

13 MR. DAY: You mean in terms of model.

14 MR. CYMBALSKY: I mean before you
15 criticized and I don't mean in a negative way you
16 know the product offerings and models available was a
17 bad way of gathering data but you are also saying if
18 we went to the HPBA show which we tried to the
19 weather actually screwed it up.

20 MR. DAY: I didn't mean anything --

21 MR. CYMBALSKY: But if we walked around
22 the floor and just took a survey of the product there

1 to use your point would that be okay to do, you know
2 we collect data --

3 MR. DAY: It would at least have given you
4 a flavor.

5 MR. CYMBALSKY: I mean we use product
6 literature, everything that we can get our hands on.

7 MR. BROOKMAN: Leslie please?

8 MR. BORTZ: I have mentioned to you
9 several times that we have piezos on some of our
10 pilot systems and the only reason people would buy
11 them and spend the extra money would be to turn the
12 pilot on and off, you haven't considered that at all
13 and we didn't have that in 1997 and we had started in
14 2007.

15 MR. BROOKMAN: Let's go to the comment
16 boxes. Here you see two comment boxes I think
17 perhaps we have covered both of these.

18 MS. ARMSTRONG: So we kind of have to move
19 a little bit quicker, some of us because I know there
20 are certain areas especially when we get to the
21 shipments analysis that some people have already
22 commented that they wanted to highlight so we are

1 going to go pretty quick through some of these, just
2 highlight major points. If there are certain things
3 you want please stop us but we are -- all of our
4 information is documented in the notice and in the
5 technical support documents.

6 We will always welcome your data. We are
7 happy to revise our analysis and/or our assumptions
8 that were explained in response to new data that
9 becomes available or any data that you are willing to
10 submit whether it be on the record or confidentially
11 through a contractor we have ways of doing that. And
12 since many of you have pointed out today that you
13 know you don't necessarily agree with some of the
14 data sources that have been used or some of the
15 assumptions however you can't just state disagreement
16 you actually have to explain why and perhaps you may
17 have data to back that up.

18 So if you don't might proceed but
19 highlight the high points, thanks.

20 MR. SIAP: Okay thanks. Okay so the next
21 section is a lifecycle cost and payback period
22 analysis. The purpose is to provide an economic

1 evaluation from the consumer's perspective.
2 Lifecycle costs or LCC's are the total consumer cost
3 over the life of the product. Payback period or PBP
4 is the time required to recover the increased
5 purchase price through reduced operating costs. The
6 LCC's determined using the equations and the
7 methodology -- the LCC and the PBP are determined on
8 those equations. The LCC's the sum of the total
9 installed cost and the lifetime operating cost.

10 The LCC savings is the difference of the
11 LCC and the standard in the base case and the payback
12 period is the portion of the change of the total
13 installed cost and the first year operating cost.

14 The same consumer sample is developed in
15 the building sample a few slides ago were used for
16 this LCC analysis.

17 So the graphic to walk you through the
18 lifecycle cost, the top bracket here kind of shows
19 how the total cost installed cost is developed, it is
20 the sum of the consumer price and the installation
21 costs and the lifetime operating cost is developed on
22 the lower half as the sum of the annual operating

1 expenses over the lifetime discounted to the
2 appropriate rate and with the appropriate energy
3 prices.

4 The consumer price is determined using the
5 manufacturer cost and the markup. The manufacturing
6 and markup were discussed manufacturing costs and the
7 markup were discussed earlier and the results for the
8 average price are listed in the table below for both
9 standing pilot and intermittent pilot.

10 MR. BROOKMAN: Leslie?

11 MR. BORTZ: Leslie Bortz, can I assume
12 from page --

13 MR. BROOKMAN: Is your microphone on?
14 Leave it on Leslie.

15 MR. BORTZ: I can't I'm swearing. Can I
16 assume from this bottom of that chart that the cost
17 at some point -- that the consumer price that you
18 have here is \$82.08?

19 MR. SIAP: So the consumer price is broken
20 up there for each ignition type so for a standing
21 pilot the consumer price is \$165.00 and for
22 intermittent pilot it's \$247.00.

1 MS. ARMSTRONG: So this is Ashley from DOE
2 just to clarify when I first saw this slide I was a
3 little and you still may not necessarily agree which
4 we welcome your data and comments on but this is just
5 the ignition system so we have isolated the ignition
6 system. We are not saying this is the cost of your
7 product so take that shock factor away.

8 But there still might be a shock factor
9 associated with the ignitions of some but this is
10 what that is meant to show. This is the ignition
11 system only.

12 MR. BORTZ: Yes ma'am.

13 MS. ARMSTRONG: We welcome comment, like I
14 said we welcome comments and feedback or it's you
15 know and data and if anyone who wants to continue
16 discussions through our manufacturer process or
17 whatever we are welcome to that, we are open to that.

18 MR. BROOKMAN: Dana?

19 MR. MOROZ: I appreciate the invitation
20 Ashley but again it is data that we don't necessarily
21 have why look at oh what have I got right now about
22 60 different gas appliances and applying that product

1 to each and every one of them will require different
2 diligences so I can't capture that cost. I can't
3 give you a nice round figure and say this is what it
4 is going to cost on an average, I'm sorry. I would
5 like to be able to but it is not available.

6 MR. BROOKMAN: Okay thank you moving on.

7 MR. SIAP: Okay so next is the
8 installation cost. The purpose is to represent the
9 labor for material necessary to install the hearth
10 product ignition system.

11 MR. BROOKMAN: Martin Thomas has a comment
12 and his comment is some of the IPI pilots have a
13 switch that converts them to a standing pilot. The
14 product literature recommends leaving the pilot on in
15 cold weather, okay.

16 MR. SIAP: So this installation cost is
17 meant to represent the incremental and installation
18 costs of the ignition system only. For some standing
19 pilot users switching to IPI they may require an
20 electrical connection that is considered for a house
21 build prior to 1990 in addition for grounding for
22 older houses prior to 1960. The labor costs and

1 mechanical cost data were sourced from 2013 RS Means.
2 The results by task -- the average cost by task are
3 listed there as well as the percent of households.
4 Yes Barton?

5 MR. BROOKMAN: Yes Barton?

6 MR. DAY: I would like to go back to that
7 point that just blew by so quickly and I apologize if
8 it is out of order but it really is essentially an
9 important point and that is that the proposed
10 standard doesn't do what the NOPR suggests that it
11 would do and one of either two ways and I think the
12 fundamental problem is that in the technical analysis
13 there was not an adequate appreciation of the
14 function that a standing pilot light performs and in
15 particular and this is a broader point, there was not
16 adequate appreciation for the importance of being
17 able to warm up the vent system to get proper draw on
18 a product before main burners are ignited and it's --
19 the short answer is that's you can expect a lot of
20 operational problems if you simply put an IPI on a
21 product that's designed to operate with a standing
22 pilot.

1 And it's a significant issue. The point
2 that was made a moment ago is I believe almost every
3 manufacturer in the industry that offers IPI offers
4 IPI with the ability to put a standing pilot function
5 on and the reason for that is to prevent these
6 operational problems that are typically characterized
7 as cold weather problems but there is a switch or a
8 button setting on the remote control and so the idea
9 that the IPI devices that are used by most of the
10 manufacturers would eliminate all gas consumption
11 except when the main burners are on is incorrect and
12 so the gas savings you are assuming is overstated for
13 that reason.

14 And on the flipside on the cost side the
15 assumption well most of your manufacturers are using
16 products that will satisfy the standards, that's not
17 true either and so you know there's the basic issue
18 of if you are going to allow a standing pilot
19 function on an IPI unit then your gas savings are
20 high and if you are not then your economic impacts
21 are way, way, way low so it is a very important point
22 and I apologize for taking it out of order but as we

1 got to this point I just realized we hadn't gotten to
2 that yet and it's a critical point.

3 MR. BROOKMAN: Okay.

4 MS. ARMSTRONG: So I have one follow up to
5 that. Do you have an estimated fraction that the
6 manufacturers recommend must leave the standing pilot
7 on?

8 MR. BROOKMAN: Anybody?

9 MS. ARMSTRONG: So his point is that our
10 savings are overstated because there is a fraction of
11 the market that even if you switch to an electronic
12 ignition would still require some type of pilot or
13 some type to remain on.

14 MR. KUPSH: As a control manufacturer I
15 will tell you that every customer we have every
16 fireplace manufacturer who makes a fireplace and uses
17 our IPI system includes a switch to be able to allow
18 the homeowner to deal with issues of cold climate and
19 so every IPI system has this capability, every
20 manufacturer is using it.

21 MS. ARMSTRONG: That's allowance versus
22 I'm wondering what fraction actually recommends, what

1 are the terms for which you recommend because that is
2 what is going to impact our savings.

3 MR. BROOKMAN: Dana?

4 MR. MOROZ: Dana from Wolf Steel. I guess
5 this really demonstrates how this is an evolving
6 technology you know the assumption here that we are
7 talking about today is hey we have got this great new
8 system we could drop it in and save a bunch of gas
9 which is great I love it but the reality is we are
10 trying to make it fit into a system that has a lot of
11 variables that influence it that make it effective or
12 not effective, whereas we are an industry trying to
13 manage and develop that, our suppliers are working
14 with us but there has been no clear answer and this
15 what we call an anti-condensation switch, this
16 accessory really essentially bypass intermittent
17 pilots has become necessary because of the failing of
18 an intermittent system in some applications and so we
19 don't prescribe it, we don't say use it all the time
20 but we need to have it available so when our
21 customers experience the failing of our product using
22 an IPI system there had to be a solution.

1 Our market is very delicate, you know we
2 talk about is it a heater is it not a heater, is it
3 decorative? We have cultivated a market that
4 appreciates the product we have, we can damage it
5 severely if we force technology on to it that isn't
6 effective yet and so this is a step for us, this ACS
7 switch helps us get to that next level but that
8 technology is not here today.

9 MR. BROOKMAN: Okay, we are going to move
10 on.

11 MR. SIAP: So next we have energy prices
12 I'll go over this briefly. The purpose is to develop
13 the average marginal monthly prices by geographic
14 area. DOE calculates these prices by multiplying the
15 current average annual energy prices by the monthly
16 price factors and the marginal price factors. The
17 annual energy prices are listed -- the sources are
18 listed there for the electricity, natural gas and oil
19 as well as the monthly energy price factors and the
20 marginal energy price factors.

21 MR. BROOKMAN: Steve Rosenstock?

22 MR. ROSENSTOCK: Steve Rosenstock, EEI.

1 I'm looking at this slide and I needed to double
2 check what about the marginal prices for the propane
3 products, what are those based on?

4 MR. SIAP: The monthly energy price
5 factors for propane LPG is listed there EIA 2009
6 short term outlook.

7 MR. ROSENSTOCK: Steve Rosenstock EEI, you
8 don't have any more recent data to use?

9 MR. SIAP: I believe that's the most
10 recent data, 2012? 2009?

11 MR. CYMBALSKY: We will update it as the
12 EIA puts it out but we use by rule we will use the
13 most recent EIA data so it's not like we are ignoring
14 a more recent year when it comes out we will use it.

15 MR. BROOKMAN: It takes a while for them
16 to assemble it all.

17 UNIDENTIFIED: I've worked there for 20
18 years so I can tell you it's not an overnight thing.

19 MR. DAY: Did we accidentally skip slide
20 51 on installation costs or did I just miss it.

21 MR. BROOKMAN: We didn't skip it but we
22 went quickly through it.

1 MR. DAY: Okay I was just wondering if
2 anybody had to say about it.

3 MR. BROOKMAN: Do you wish to say
4 something about installation costs?

5 MR. DAY: My understanding anecdotally is
6 that the installation costs are and obviously it
7 depends on the product but for fireplace inserts, for
8 gas log sets yeah the installation costs are
9 significant, a significant concern.

10 MR. BROOKMAN: Okay, yes Leslie?

11 MR. BORTZ: Leslie, we provide that to you
12 in our -- we will provide it to you in our -- I'll
13 give it to you today but I will provide it to you in
14 the written comments.

15 MR. BROOKMAN: Thank you that's helpful.
16 Thank you Dana?

17 MR. MOROZ: I don't have that information
18 but I can say that in most states and certainly in
19 Canada you require a qualified technician to put any
20 electrical in which now brings a whole other factor
21 another contractor into the installation. I also
22 think in some applications such as inserts or even

1 logs, in some states there might be some conflict as
2 to putting an electrical component in that cavity
3 with the fireplace.

4 MR. BROOKMAN: Okay.

5 MR. SIAP: Thanks, the next slide is the
6 energy price trends. These are the average monthly
7 marginal -- these are how we determine the average
8 monthly marginal energy prices by geographical area.
9 These price trends come from EIA's AEO 2014 by Census
10 division. After 2040 they are extrapolated according
11 to fed guidelines.

12 The projected energy prices are shown in there for
13 both electricity, natural gas and propane are listed
14 there.

15 MR. BROOKMAN: Steve Rosenstock?

16 MR. ROSENSTOCK: Steve Rosenstock, EEI.
17 Again just for clarification the value shown these
18 are nominal prices not inflation adjusted these are
19 the nominal projections?

20 MR. CYMBALSKY: No they are real prices.

21 MR. ROSENSTOCK: Okay thank you Steve
22 Rosenstock, EEI. Again at least on the electricity

1 side if you look at the EIA data over the last 50
2 years the price for electricity has not increased, it
3 has flat lined or gone down, again if you look at the
4 basically 1960 through 2012 EIA when you look at some
5 of those tables this history has shown at least for
6 electricity that the real prices over time does not
7 increase.

8 So again if it is showing it as real
9 prices increasing again at least on the electricity
10 side it is going to overstate the actual dollar
11 impacts on the electricity side, thank you.

12 MR. BROOKMAN: Yes Leslie?

13 MR. BORTZ: Leslie from RHP. What's your
14 start for residential LP or residential natural gas
15 price? Where do you start from? What's a number, a
16 real dollar number?

17 MR. SIAP: Well the number listed on the
18 slide there at the beginning so for natural gas it's
19 around \$10.00.

20 MR. BORTZ: \$10.00 for what?

21 MR. CYMBALSKY: Per million BTU, straight
22 from EIA. This is not a standards program.

1 MR. BORTZ: It will be in a couple of
2 months but it is not now.

3 MR. CYMBALSKY: We are not in the gas
4 price forecasting business here in our shop.

5 MR. SIAP: Okay next is the repair and
6 maintenance.

7 MR. BROOKMAN: Let's linger on the price
8 trends just for a moment and see if there are any
9 additional comments there? Okay let's go.

10 MR. SIAP: These are the labor and
11 material required to ensure hearth products
12 operation. DOE did not identify specific maintenance
13 requirements for either hearth product ignition
14 system and we assumed no maintenance cost. The
15 repair costs were equal to the cost of replacing or
16 repairing the failed component because the ignition
17 system is a component of the hearth product. DOE
18 assumed that the repair and the replaced cost are the
19 same so the frequency for this was determined based
20 on warranty information and product lifetime and the
21 cost was equal to the component cost of the module.
22 The results are shown there.

1 MR. BROOKMAN: Barton?

2 MR. DAY: This is Barton Day a quick
3 question. Did you assume a different repair
4 frequency for electronic ignition versus standing
5 pilot?

6 MR. SIAP: In our research we saw similar
7 warranty information and so we have the same ignition
8 repair year so we have the same failure rate, we
9 welcome comment data on that.

10 MR. DAY: Did you not receive comment
11 indicating that there's a significantly different
12 rate of repair?

13 MR. SIAP: Not yet.

14 MR. BROOKMAN: The comment period is open
15 so go for it. Rett?

16 MR. RASMUSSEN: Rett Rasmussen. I'd like
17 to point out that warranties are more of a marketing
18 tool than an indication of failure of the product.

19 MR. BROOKMAN: Okay Leslie?

20 MR. BORTZ: Our experience with
21 intermittent pilot repair cost is that it didn't take
22 a month. It wasn't 9.6 years and our experience with

1 safety pilot kits they just about never fail.

2 MR. BROOKMAN: Yeah interesting, we have a
3 comment from Martin Thomas who is joining us online
4 and Martin's comment is when there is a switch on an
5 IPI system it is no longer an IPI and the energy
6 losses will be higher. End users may forget that
7 their fireplace has the permitted pilot set. Okay.

8 MR. KUPSH: Jim Kupsh just a quick
9 question, your intermittent pilot repair costs
10 includes both components, both the valve and the
11 ignition control?

12 MR. SIAP: This is for the entire
13 intermittent pilot that was costed out in the
14 engineering analysis.

15 MR. KUPSH: Because you basically have a
16 valve that is similar in cost in both plus the
17 ignition module and --

18 MR. BORTZ: These costs are just --

19 MR. SIAP: Thanks. Next is the lifetime
20 which is the age when the hearth product is retired
21 from service. This information was again based on
22 warranty information, manufacturer literature,

1 published studies from lifetime distributions for
2 residential appliances and similar products for the
3 average lifetime. The result is a median lifetime of
4 15 years.

5 Moving on -- discount rates are used to
6 determine the present value of lifetime operating
7 expenses when a product is retired from service. DOE
8 used data based on interest to return rates for
9 various types of debt and equity to calculate a real
10 effective discount rate for each household. DOE
11 sampled a discount rate that accounts for
12 distribution of 6 income groups.

13 DOE used as its data source the survey of
14 consumer finances from 1995 to 2010 which resulted in
15 an average discount rate of 4.2%. The overall
16 distribution of discount rates as shown there on the
17 bottom by income group and discount rate.

18 MR. BROOKMAN: Steve Rosenstock?

19 MR. ROSENSTOCK: Steve Rosenstock, Edison
20 Electric Institute. Again that discount rate it's
21 nominal or real?

22 MR. SIAP: That one is real.

1 MR. ROSENSTOCK: Okay.

2 MR. SIAP: Not inflation.

3 MR. ROSENSTOCK: I appreciate that so and
4 again just looking at this chart I know from the
5 technical support document. Because you have such
6 widely scattered data do you know what the median
7 value was?

8 MR. SIAP: I only have the average at this
9 point I don't have it off the top of my head the
10 median.

11 MR. ROSENSTOCK: Thank you.

12 MR. SIAP: Okay finally we have the base
13 case efficiency distribution which reflects the
14 projected market share of the products at the
15 different efficiency levels, standing pilot or
16 intermittent pilot in the base case in 2021. This
17 reflects that not all consumers purchase products at
18 the minimum standards standing pilot and consumers
19 already purchasing intermittent pilot are not
20 impacted by this standard so this used primarily
21 historical model data as well as the data from the
22 engineering analysis.

1 So the second column there gives the
2 market share for each hearth product type and for
3 each hearth product type the third and fourth column
4 gives the fraction of standing pilot and intermittent
5 pilot.

6 MR. BORTZ: What is this?

7 MR. BROOKMAN: Leslie go ahead.

8 MR. CYMBALSKY: So what this chart
9 explains is that when the standard comes into effect
10 in 2021 we project the market to be already at 42%
11 IPI so the standard effects 58% of the market
12 starting in 2021 of the units being sold.

13 MR. BORTZ: Do you take into consideration
14 that 90% of the outdoor and 50% of the vented are
15 match lit?

16 MR. SIAP: Match lit yes we take both of
17 these adjusted numbers here as well as shipping
18 studies you will see later have match lit just
19 aggregated from them so we don't take into account
20 match lit.

21 MR. BORTZ: Okay because these are the
22 exact same numbers that you have now they are just

1 doubled, you know.

2 MR. DAY: Just quickly the point that I
3 have made previously is that I question whether these
4 numbers are representative now but the main point is
5 that there is a very significant trend line that you
6 are ignoring and I think that certainly for a number
7 of those categories those assumptions just based on
8 the trends on the market are reasonable and you will
9 see far fewer --

10 MS. ARMSTRONG: And that's great and we
11 welcome the data you manufacturers have their
12 shipment data and their shipment weighted sales by
13 the different ignition types, we would welcome that
14 type of data and obviously we would use that if we
15 were to do any reanalysis in the absence of providing
16 the data to back-up your claims it's hard to tell one
17 way or the other.

18 MR. DAY: The issue is fairly obvious in
19 some respects as I have indicated. There are major
20 manufacturers who have completely eliminated their
21 use of standing pilot lights already. You know the
22 question is and one of the questions we will come

1 back to this at the end but we are going to need
2 additional time to comment if you want us to pull
3 together data. I mean we have been working on it but
4 the data is not there and it needs to be assembled.

5 MR. BROOKMAN: Leslie?

6 MR. BORTZ: You have seemed to indicate
7 that there is a trend toward IPIs which you are
8 trying to notice in this the trend is there but then
9 you say in all your documentation you saw no trends
10 of anything at all, none. Should I get --

11 MR. CYMBALSKY: So provide us with
12 supporting data we will include it in the analysis.

13 MR. BROOKMAN: Next slide.

14 MR. SIAP: Yeah here we have just talked
15 about all of these already so I am going to go to
16 yeah, so okay, here they are. The results are
17 presented here you can see this aggregated the
18 installed cost, future operating costs, and the LCC
19 as well as the payback period for an IPI system and
20 here's the bottom table there shows the results of
21 TSL1 which means the entire standing pilot market is
22 switched over to intermittent pilot.

1 This takes into account all of the
2 consumers which currently have intermittent pilot and
3 it also takes into account those consumers which
4 would have a net cost.

5 MR. BROOKMAN: Comments on the table, two
6 tables yes Barton?

7 MR. DAY: Barton. Sorry just to clarify
8 what did you assume as the lifetime number?

9 MR. SIAP: So the lifetime was that
10 distribution shown on slide 53 which had a median
11 value of roughly 15 years, 55 sorry.

12 MR. DAY: For all products?

13 MR. SIAP: Yes.

14 MR. CYMBALSKY: John from DOE you can see
15 that the distribution takes us out to 30 years.

16 MR. DAY: For all products, thank you.

17 MR. BROOKMAN: Let's take a break, we have
18 been going almost 2 hours, 10 minutes only so go grab
19 a break to wherever you need to go and get back here
20 okay, which means we will resume at 3:35 by that
21 clock up there.

22 MR. BROOKMAN: Okay we are going to resume

1 where we left off.

2 MR. SIAP: Okay so now we are starting
3 with the shipments.

4 MR. BROOKMAN: Shipments here we go.

5 MR. SIAP: Shipment analysis. So the
6 purpose of the shipments is to forecast the hearth
7 products that would be expected to be shipped between
8 2021 and 2050 both with and without energy
9 conservation standard. DOE formulates both the
10 shipment projections and price elasticity. The
11 shipment projections estimate the number of hearth
12 products shipped.

13 DOE has found that historical hearth
14 product shipments are highly correlated with housing
15 starts. DOE uses housing starts as opposed to
16 housing completions because that is the number that
17 AEO provides. DOE does not have housing completions
18 projections.

19 MR. BROOKMAN: Barton?

20 MR. DAY: Just the point that the only
21 product that actually is tied to new housing starts
22 is fireplaces. You know some of the products like

1 inserts and log sets, they have to have an existing
2 house to go into and so the you know, the correlation
3 to new home starts for most of these products is
4 pretty random.

5 MR. BROOKMAN: Okay, yes James?

6 MR. HOUCK: Yes I would like to talk about
7 that a little bit. When I read in the federal
8 register the proposed rule that says because DOE
9 observed a strong correlation between housing starts
10 and product shipments you use a 10 year average of
11 the ratio of hearth product shipments to housing
12 starts, along with the forecasted housing starts from
13 AEO 2014 to project future hearth product shipments,
14 I was astounded. That can't be, something is wrong
15 here and I don't know what it is but for a couple of
16 reasons.

17 One is as Barton just pointed out I looked
18 at shipment records from 2009 to 2013 of hearth
19 products and almost half, 48.5% were either inserts
20 or gas log sets, they have nothing to do with new
21 housing starts.

22 Another 9% fireplaces and gas stoves,

1 freestanding fireplaces and gas stoves, typical
2 fireplaces, one normally assumes you know things of
3 as a fireplace. Now I am going to remodeling so
4 there is 57.5% of the products that have nothing to
5 do with new housing starts, that's the first thing.

6 The second thing even ignoring -- even
7 ignoring that fraction that doesn't seem to be
8 correlatable to new housing starts or at least only
9 in the very general sense, perhaps as the economy
10 gets better -- I'll just read this paragraph even
11 ignoring retrofitting and remodeling there is a very
12 large uncertainty and inherent in using housing
13 starts to predict new gas heart products, number one.
14 I beg your pardon?

15 MR. BROOKMAN: What is the paragraph from?

16 MR. HOUCK: From me.

17 MR. BROOKMAN: Okay this is from you?

18 MR. HOUCK: Yes.

19 MR. BROOKMAN: Okay.

20 MR. HOUCK: Number one the fraction of
21 fireplaces shipped that are wood fueled, gas fueled
22 or electric which is a reflection of consumer

1 preferences influenced in turn by many economic and
2 social issues historically has changed and most
3 certainly will change in the future. It has changed
4 significantly over the years and one would need a
5 crystal ball to figure out how that would change in
6 the future.

7 Number two -- the fraction of new homes
8 that have a new fireplace has historically changed
9 and again almost certainly will change in the future.
10 It's over the last decade, a couple of decades, it
11 has gone up and down 10 to 20% I believe it is a slow
12 trend down right now. Again one would have
13 difficulty predicting that in the future.

14 Number three -- the volatility seen since
15 2005 in new housing starts is yet a prediction of
16 future housing starts is fundamentally uncertain. I
17 don't probably need to dwell on what happened in 2005
18 and 2006 time period.

19 Number four -- the number of fireplaces
20 installed in multi-family units. Completed in 2013
21 represents only about 1% of the total installed in
22 new housing in that year. A future shift in

1 proportion to single family as opposed to the
2 multi-housing starts will add complexity to a
3 prediction based on new housing starts.

4 MR. BROOKMAN: Okay.

5 MR. SIAP: In addition to shipment
6 projections DOE uses price elasticity to account for
7 the impacts of increased prices due to a standard on
8 shipments. So we will go to housing -- hearth
9 product shipments prediction method as I stated
10 previously DOE has seen a high correlation in housing
11 starts and shipment projections, correlation
12 coefficient of 0.98. Core 1 is a perfect
13 correlation.

14 DOE then takes AEO's 2014 housing start
15 projections through 2050 and applies the historical
16 ratio seen in the historical data to the shipment
17 projections that allows us to make the hearth product
18 shipment projections and finally the DOE uses price
19 list to account for decreased shipments due to the
20 increase in price in the standard year.

21 MR. BROOKMAN: Barton?

22 MR. DAY: Yeah, Barton Day I was

1 surprised to see that your assumption in terms of
2 price elasticity is that hearth products are like
3 water heaters and other standard home appliances that
4 are present in virtually every home. None of the
5 products we are talking about are present in even
6 half of homes and products like gas log sets and
7 inserts the consumer is sitting there with a
8 fireplace already, you know.

9 It is a highly discretionary purchasing
10 decision and to think that price elasticity I think
11 that that hit on these products from increased costs
12 is going to be a little blip like it would be for
13 products pretty much everyone has to have is
14 completely unrealistic and it reflects a
15 misunderstanding of the market.

16 The presumption at the beginning as well
17 as all of these products are part of one market, no
18 they are not. There's a fireplace market in which
19 gas competes with wood and electric and it is right
20 on down the line for every one of these products. So
21 the cost impact in terms of what that will do to
22 sales I think is seriously out of whack.

1 MR. BROOKMAN: Steve Rosenstock?

2 MR. ROSENSTOCK: Steve Rosenstock, EEI.

3 And again if you go back to slide 65 where it shows
4 the AEO projection, thank you. As I recall doesn't
5 AEO project a higher percentage of multi-family going
6 to -- it's going back to 1.4 million, you know a huge
7 increase but isn't the part most of that bump in the
8 increase is really for multi-family building rather
9 than single family building?

10 Because I think that the trend over the
11 last few years has been a rise but the rise has been
12 because of multi-family rather than single family.

13 MR. CYMBALSKY: This is John from DOE. My
14 understanding is the correlation coefficient still
15 holds over the historical time period.

16 MR. ROSENSTOCK: Steve Rosenstock, EEI.
17 Well but the thing is though if it is going to be
18 more multi-family following up with what Mr. Houck
19 said there is a lower likelihood of products going
20 in, that's just the new ones, that is just the
21 fireplaces again.

22 MR. CYMBALSKY: If they had created the

1 correlation coefficient on just single family but
2 then applied multi-family starts to it then I would
3 see your point and I don't believe they did that
4 here.

5 MR. ROSENSTOCK: Steve, I was wondering
6 about what they did the correlation to?

7 MR. SIAP: The statistical analysis is
8 pretty clean there but we will take comment if you
9 think there is a better way to correlate it.

10 MR. DIRCKS: This is Peter from HHT. I
11 would concur with both of the gentlemen's comments.
12 I mean look at the U.S. Census Bureau data that is
13 where you are looking for some input. They have been
14 tracking incident rates of fireplaces for about the
15 past four years. It's about 50% the last 40 years
16 just on fireplaces, so I think just to kind of to
17 combine all the comments here just to straight line
18 that across all the products I think is an issue I
19 think that Barton raised but in terms of your --
20 Steve's comments on single-family versus multi-family
21 that is typically broken on the Census Bureau and it
22 would still be lower than what you are showing here

1 at 50% or less so thank you.

2 MR. BROOKMAN: Thank you. Yes?

3 MR. RASMUSSEN: Rett Rasmussen, nice to
4 see the business cycle has been eliminated and also
5 you know the NOPR talks about a disproportionate
6 impact on gas log manufacturers due to increased
7 price of the product, that there is price elasticity
8 or at least there's consumer demand elasticity based
9 on the higher price that gas log sets would be if
10 they had to go to all electronic ignition systems so
11 I can't see how you can have straight line growth or
12 straight line projected shipments at infinitum.

13 MS. ARMSTRONG: Go to the next slide.

14 MR. BROOKMAN: There's the bump down.

15 MR. SIAP: Okay, the next section --

16 (CABLE ON COMPUTER WITH THE POWER POINT'S
17 DISCONNECTED).

18 MR. RASMUSSEN: Rett Rasmussen just for
19 the record my last comment was sarcastic with regard
20 to the business cycle.

21 MR. BROOKMAN: Thanks for clarifying.

22 MR. RASMUSSEN: I just want to clarify for

1 the record.

2 MR. BROOKMAN: Leslie?

3 MR. BORTZ: You say that you haven't seen
4 any difference in trend in multi-family compared to
5 single-family I've got numbers here that show a
6 trend. I will send them.

7 MR. BROOKMAN: Please submit those yeah.

8 MR. BORTZ: Here from the Census Bureau.

9 MR. BROOKMAN: Yes submit them thank you.

10 MR. BORTZ: They are the numbers that you
11 have.

12 MR. CYMBALSKY: All I said is the analysis
13 was done and the correlation coefficient applies. If
14 there is a better method you think we could use feel
15 free to suggest it.

16 MR. BROOKMAN: Barton?

17 MR. DAY: I'm sorry it's not a
18 correlation, there's no causal connection okay it's
19 like predicting the stock market based on skirt
20 length, okay.

21 MR. BORTZ: It works.

22 MR. DAY: It's exactly what it is if you

1 crunch the numbers and get the lines to go together
2 it doesn't mean that there is a correlation.

3 MR. BROOKMAN: We need to move on.

4 MR. DAY: For fireplaces yes, okay but you
5 have to look at each product.

6 MR. BROOKMAN: We have to keep going here.

7 MR. SIAP: So the purpose of the national
8 impact analysis or NIA is to estimate the impacts of
9 an energy conservation standard over the lifetime of
10 the hearth product shipped between 2021 and 2050
11 essentially this takes the LCC and the shipments
12 analysis and provides a national impact analysis.

13 The national energy savings or the NES is
14 the difference in the lifetime energy consumption of
15 hearth products for the base case compared to the
16 standards case and the net present value is the
17 difference in the present value of installed cost and
18 the present value of the operating costs over the
19 analysis period. In the interest of time I will skip
20 to the graphics showing these as opposed to the text.

21 From the shipments here we calculate the
22 energy use in both the base case and the standards

1 case, applying a full fuel of cycles and taking the
2 difference gives the national energy savings.

3 The net present value is formulated
4 similarly, we calculate the operating costs savings
5 in the base case and the standards case, take the
6 difference and that is the cumulative operating cost
7 savings, the difference in the product costs of the
8 base case and standards case gives the cumulative
9 total consumer cost increase.

10 The difference of that discounted to the
11 present value gives the net present value.

12 Okay so the summary of the NIA impact
13 inputs. We went over all of these before except for
14 the full fuel cycle of energy factors which
15 essentially accounts -- this converts the site of
16 electricity to primary power plant energy
17 consumption, accounting for resource extraction,
18 distribution losses, et cetera.

19 Here are the actual input values for the
20 NIA. Again we went over most of these discount
21 factors 3 and 7% and the base case is 58% standing
22 pilot, 42% intermittent pilot and the standards case

1 distribution will be all intermittent pilot. Just to
2 go over briefly the base case and the standard level
3 how that interacts.

4 The products that are below the standard
5 in this case, standing pilot will roll up to comply
6 with the standard means that they will switch to
7 intermittent pilot. Products and or above the
8 standard will not be affected.

9 Okay so this is the results of the NIA
10 primary national energy savings of .62 quads. .69
11 quads is the full fuel cycle energy savings. The net
12 present value, discounted at 3% is 3.12 billion
13 dollars in 2013 dollars and the net present value of
14 consumer benefit discount at net 7% is 1.03 billion
15 dollars.

16 MR. ROSENSTOCK: Steve Rosenstock real
17 quick sorry. That's until 2040 or 2050 what's the
18 time?

19 MR. SIAP: Well so that's in the lifetime
20 of products shipped during that year so that's from
21 2021 until the end of life of the last product
22 shipped in 2050.

1 MR. BROOKMAN: Yes Barton?

2 MR. DAY: So it's the 30 years of
3 shipments and then in the 30th year you are going to
4 make up a number, a million of these things and then
5 that 30 year distribution for all of them to die out
6 so roughly you add 30 years to the end, so the last
7 bit of savings after you discount is probably a very
8 small number when you discount over 60 years.

9 MR. SIAP: Yeah it's very small.

10 MR. DAY: This is Barton, I think I feel
11 compelled to point out that you are assuming products
12 absent to rule. The technology for pilot lights and
13 pilot light operation would be exactly the same in
14 2040 as it is today, correct? I mean that's how you
15 are crunching your numbers?

16 MR. SIAP: Yes our distributions are
17 constant with time in the absence of data.

18 MR. DAY: Well I would just point out that
19 if technology were that static I would be preparing
20 comments on a typewriter and sending them in by snail
21 mail.

22 MR. BROOKMAN: Okay thank you, additional

1 comments here?

2 MS. ARMSTRONG: So I guess would you like
3 us to -- perhaps the manufacturers can give us
4 information on historical model availability, how
5 their model offerings have changed over time because
6 seeing as you have said over and over at this forum
7 that shipment data is sparse at least for your
8 industry and not actually collected.

9 Certainly they know how their model
10 offerings have changed over time and maybe that's a
11 good proxy of the shift of how potentially models
12 have evolved with technology changes over time. We
13 would welcome that type of data and we would welcome
14 using it in our analysis for the industry.

15 MR. BORTZ: We gave it to you, you don't
16 even have it, we handed it to you.

17 MR. BROOKMAN: Okay we are moving on.

18 MR. SIAP: Okay the last slide in this
19 section is the regulatory impact analysis or RIA
20 slide 76. The purpose is to investigate national
21 impacts of non-regulatory alternatives to the
22 mandatory amended energy conservation standard. DOE

1 used a modified NIA spreadsheet to calculate -- to
2 evaluate several non-regulatory alternatives to the
3 proposed standard listed here including no action,
4 consumer rebates, consumer tax rebates, manufacturer
5 tax credits, voluntary energy efficiency targets and
6 government purchases.

7 DOE calculated the resulting NES and NPV
8 for each non-regulatory alternative and no
9 alternative was found to be as beneficial as the
10 proposed standard.

11 MR. DAY: This is Barton. Since the whole
12 issue here is consumer behavior you know I would
13 suggest that you consider you know public education
14 and information. Consumers have a direct financial
15 interest, they don't have to buy more expensive
16 products, they don't have to have inconvenience or a
17 lack of performance in their products.

18 Pilot lights can be turned on and off.
19 Today many products can have their pilots turned on
20 and off literally with the flip of a switch. The
21 failure to consider the non-regulatory options for
22 dealing with this I think really needs to be

1 rethought.

2 MR. BROOKMAN: Thank you.

3 MR. RASMUSSEN: Rett Rasmussen, also with
4 these other regulatory alternatives or non-regulatory
5 alternatives, perhaps there is some of these that
6 would not have the impact on production workers in
7 the gas hearth industry as shown on page 7115 of the
8 NOPR that could lead to up to 58% decrease in the
9 number of production workers and the impacts that
10 that has on employment of the economy and the impact
11 on people's lives.

12 MR. BROOKMAN: Thank you, moving on to
13 manufacture impact analysis.

14 MS. LEWIS: Hi my name is Jessica Lewis
15 from Navigant Consulting and I will be discussing the
16 manufacturer impact analysis or MIA that was
17 conducted in this part of the NOPR. The main purpose
18 of the MIA is to assess the impacts of a proposed
19 standard on manufacturers. A second purpose is to
20 identify sub-groups of manufacturers that may be
21 differently impacted by a standard and to evaluate
22 potential impacts on those manufacturers. In the

1 slides that follow I will discuss impacts on two
2 sub-groups, small businesses and manufacturers of gas
3 log sets.

4 And finally the MIA looks at the effects
5 of a standard on factors like domestic direct
6 employment, manufacturing capacity and the cumulative
7 regulatory burden facing the industry. The primary
8 tool DOE uses to conduct the manufacturer impact
9 analysis is a discounted cash flow model known as the
10 government regulatory impact model, also fondly
11 referred to as the GRIM.

12 The major output of the model is the
13 industry net present value or INPV which is a metric
14 used to quantify financial impacts on the industry.
15 As part of the MIA we also conducted interviews with
16 manufacturers which helped us to refine inputs to the
17 cash flow model and to better understand the
18 qualitative effects of the proposed standard.

19 In general the MIA process takes place in
20 three phases. In the first phase we develop an
21 industry profile using publicly available information
22 such as SEC filings and manufacturers' annual

1 reports. In the second phase we developed an
2 interview guide to gather targeted information from
3 manufacturers and we also prepare the cash flow
4 spreadsheets used to estimate financial impacts on
5 the industry.

6 In the final phase we conduct interviews
7 with manufacturers and use feedback to further
8 develop and refine the analysis, finalize inputs to
9 the cash flow model and examine the potential
10 qualitative impacts of a standard.

11 To build the cash flow model for the
12 industry we relied on content from several of the
13 analyses that have been discussed earlier today.
14 These inputs include financial and product
15 information from the market and technology
16 assessment, manufacturer production costs from the
17 engineering analysis and annual shipment projections
18 from the shipments analysis.

19 In addition to that we developed two key
20 pieces of information as part of the MIA. The first
21 is a set of multiple manufacturer markup scenarios
22 which allows us to model a range of potential

1 financial impacts on the industry and the second is a
2 set of conversion costs that enable us to account for
3 various one-time costs manufacturers might incur in
4 order to comply with the requirements of the
5 standard.

6 On the qualitative side one of the primary
7 outputs of the MIA is a set of key issues
8 manufacturers raised during the course of interviews.
9 We have touched on most of this today but to walk
10 through quickly. First manufacturers raised concerns
11 regarding impacts on profitability. They indicated
12 that units with electronic ignitions systems tend to
13 be more expensive to manufacture than units with
14 standing pilot lights and expressed concern that a
15 rise in prices can lead to a drop in sales.

16 Second manufacturers indicated that the
17 proposed standard could potentially impact the
18 competitive dynamics of the market. On this front
19 small manufacturers specifically expressed concern
20 about their ability to compete with larger
21 manufacturers who may see advantages when sourcing
22 components for electronic ignition systems at higher

1 volumes and we will discuss that more later.

2 And finally several manufacturers
3 indicated that electronic ignition systems represent
4 a more complicated technology and may be less
5 reliable. On that point several manufacturers
6 indicated that units with electronic ignition systems
7 tend to require more servicing and repair than some
8 of the units with standing pilot lights. Others
9 mentioned factors like we have heard today about how
10 units with standing pilot lights may in some cases be
11 better suited to colder climates and also are able to
12 operate during power outages.

13 Moving on to the next few slides, we will
14 walk through the quantitative analysis in more
15 detail. First as I mentioned one of the key inputs
16 to the cash flow model is a set of markup scenarios.
17 The markup is a multiplier applied to the
18 manufacturing production costs to capture all
19 non-production costs so this includes things like
20 R&D, selling general and administrative expenses,
21 interest expenses and also profit.

22 By varying the markup in our model we are

1 able analyze a range of potential impact on the
2 industry. In the NOPR we modeled two markup
3 scenarios, the preservation of gross margin
4 percentage markup scenario and the preservation of
5 pre-unit operating profit markup scenario.

6 And the preservation of gross margin
7 percentage scenario represents an upper bound, or
8 less severe set of impacts. It assumes that
9 manufacturers maintain the same markup after
10 standards take effect as they had beforehand which
11 implies that as production costs increase
12 manufacturers are able to raise their prices and
13 increase their operating profit in absolute dollars
14 on a per unit basis.

15 In contrast the preservation of operating
16 profits scenario assumes manufacturers cannot
17 maintain the same markup after standards take effect.
18 Instead they maintain the same operating profit but
19 must reduce their markup in order to do so and by
20 lowering the markup after standards take effect this
21 scenario estimates a more severe set of impacts on
22 manufacturer profitability.

1 In addition to markups the other key input
2 we developed as part of the MIA is a set of
3 conversion cost estimates to account for any one-time
4 costs manufacturers face in order to comply with the
5 standard. We typically break these costs down into
6 two primary categories, product conversion costs and
7 capital conversion costs and in bottom three rows of
8 this table you can see that we have estimated total
9 industry conversion costs under the proposed standard
10 to be 8.7 million dollars and this consists of
11 \$900,000.00 in capital conversion costs and 7.8
12 million dollars in product conversion costs.

13 Earlier someone raised a question about
14 how we accounted for testing and certification of
15 redesigned models and things of that nature and for
16 many products the requirements -- the conversion cost
17 requirements of the standard may be heavily focused
18 on new tooling and equipment to fulfill the new
19 requirements for compliant products.

20 In this case as we have all discussed
21 today the proposed standard largely entails a
22 component swap. So the capital conversion costs,

1 which are one time investments in equipment, tooling
2 and other physical assets are relatively low. We
3 assigned a nominal conversion cost of \$10,000 per
4 manufacturer for any adjustments to their production
5 lines or facilities that they might undertake.

6 And then for the product conversion costs
7 which are one-time investments in things like R&D
8 testing, certification and related costs we reviewed
9 product literature and came up with an estimate of
10 total models available in the industry as well as the
11 percentage of those models currently offered only
12 with standing pilot lights. So many models out there
13 may have an option of electronic ignition or a
14 standing pilot light and we focused specifically on
15 those models only offered with standing pilot lights
16 under the assumption that models offered with an
17 option would not require any further investment in
18 R&D or testing and certification, the standing pilot
19 option would simply no longer be available.

20 So we identified 781 models that we
21 thought would require potential conversion and
22 assigned a \$10,000 per model fee to account for

1 additional R&D and testing and certification costs.
2 We developed those numbers based on manufacture
3 feedback but certainly we would be very open to
4 further feedback and comment if folks feel that you
5 know there's additional data to share there.

6 MR. BROOKMAN: Yes Dana?

7 MR. MOROZ: Dana Moroz from Wolf Steel. I
8 would like to sideline a moment if I could. I have a
9 plane to catch so unfortunately I'm not going to be
10 able to stay for the rest of this. I wanted to first
11 of all thank the DOE for allowing me to participate
12 today and be part of this. It has been very
13 informative. And I certainly appreciate going
14 through the whole process being a foreign national.

15 You know I think we have all voiced in
16 different ways, I think we all agree with the concept
17 of what is trying to be achieved here and to quote
18 Barton we are not trying to be difficult. There's a
19 lot of data we don't have, our customers don't know
20 what they have and what they don't so it's hard to
21 ask them questions sometimes too.

22 I guess my biggest concern is that we move

1 MR. BROOKMAN: Don't forget your detailed
2 written comments.

3 MS. WALKER: Thank you.

4 MR. BROOKMAN: Gotcha.

5 MS. ARMSTRONG: Sorry I am going to ask
6 one question. For those that have to go please feel
7 free to go and perhaps you can follow up later but
8 over the course of the day we have heard a variety of
9 things that you know this industry is evolving, its
10 moving to a more energy efficiency options. DOE over
11 the analysis period you need to take into account the
12 trends that this industry is voluntarily, there is a
13 good percentage of the market that already is
14 offering EI systems safely and reliably -- so I guess
15 as a broader, bigger picture question you know --
16 what prevents the rest of that industry or that
17 particular -- are there particular products or
18 categories of products where there are technology
19 issues or I mean in other words.

20 You say it is evolving anyway, you say it
21 is going to get there in time. You say DOE should
22 acknowledge that over time in its analysis period but

1 yet we are also hearing that DOE, you can't set a
2 standard that adopts it because the technology is not
3 there but yet there are products out there, there's a
4 good percentage of the market doing it so are there
5 certain categories where it is limited?

6 Is there certain categories where it is
7 right for moving to and there are no technology issue
8 I'm just asking you, you know what are those lines?

9 MR. BROOKMAN: Go ahead Rett.

10 MR. RASMUSSEN: Rett Rasmussen. While I
11 spoke in my opening comments about the limitations of
12 electronic ignition systems with gas log sets and I
13 don't see that in five years' time that the issue of
14 having acceptable electronic ignition systems like
15 are used on smaller sets to be able to use on larger
16 sets is going to come on to the marketplace.

17 It's an economic issue that the gas valve
18 manufacturers will not overcome because the volume
19 isn't there to make it economically feasible and
20 rewarding to them to do so so if you were to push
21 this through for larger gas log sets I'm out of
22 business essentially in that and I am not willing to

1 give up on that easy. I view that I am in the
2 happiness business, I tell my staff that -- that's
3 what we do, we are in the happiness business so we
4 try to make the best products we can for the market,
5 what they want, deliver it consistently and this is
6 not a happy process so gas logs are definitely there
7 are bright lines there that we just cannot accomplish
8 with what you want to accomplish here.

9 The other side of it too is there isn't a
10 whole lot of fireplaces that are in that large area,
11 but by the same token the folks that put them in they
12 want what they want. They want to be able to enjoy
13 the gas log set like the guy in the lesser house you
14 know in the other neighborhood can do in his house.

15 But you know, so we try to accommodate
16 that because we are in the happiness business and
17 that is how we stay in business is providing products
18 that will with the best available technology for what
19 there is, there are just fewer options as we get
20 bigger.

21 MR. BROOKMAN: Leslie do you want in here?

22 MS. ARMSTRONG: So I think that's really

1 helpful so thank you for that.

2 MR. BROOKMAN: No, okay Peter.

3 MR. DIRCKS: I also have to leave so I
4 will make a couple of quick closing comments so --
5 first of all thank you, this was a step in the right
6 direction to get the dialogue going on the issues so
7 I think this was very productive today and good back
8 and forth.

9 So basically I just want to kind of
10 reiterate my opening comments. You know from our
11 view one of the big things that we came here today is
12 really seeking further clarification on the scope of
13 the proposed rule, delineating the definition of a
14 hearth product to a reasonable range. I think you
15 gave us some insights much more so than we have had
16 before.

17 You have asked for further opportunity by
18 us and the industry to respond and we will do that
19 and I think so of the comments that we have already
20 provided, both written and verbal today has
21 accomplished that and we can do more on that ground.
22 I know a number of us have already given you some

1 feedback into some of the specific products that we
2 would recommend that you eliminate entirely and the
3 reasons for that so that's fairly logical.

4 I think in closing you know as I mentioned
5 before as a manufacturer that has moved to IPI in the
6 fast majority of our fireplaces we have done that, my
7 comment earlier this morning was we just simply
8 object to the proposed standard calling for the
9 prescription design requirement that would completely
10 disallow the use of standing pilots for a lot of the
11 reasons we have already talked about today.

12 Because we do feel that affects lessening
13 competition especially by reducing consumer choice
14 for those use and installation conditions like we
15 have talked about like "climate" situations that are
16 real. And then secondly because we are very proud at
17 HHT of our history of innovation both in safety and
18 performance and we say that with pride and
19 humbleness.

20 And so because of that we really would
21 recommend that you be very careful considering
22 eliminating future designs and applications where the

1 use of the pilot in a standby mode would still be
2 essential to those designs or applications but we
3 could still design to achieve substantially all of
4 the purported energy savings that you are looking to
5 do because there are companies, large and small, that
6 can still get to that without formal regulation.

7 So with all that in mind thank you and I
8 will just reiterate really kind of the final comment
9 today because this was a step in the right direction
10 that's really why we are you know, asking you to look
11 at the NOPR and treating it as a request for
12 information. You guys have been very helpful in
13 saying that we can provide more information that
14 might aid you in your efforts and I think that's why
15 at the outset this morning I request that the April
16 10th deadline be extended so that we could possibly
17 do that.

18 Help you in how you want to shape this for
19 the betterment of all, so thanks very much.

20 MR. BROOKMAN: Frank Stanonik. I don't
21 think we are quite ready to close yet but Frank keep
22 going.

1 MR. STANONIK: I was assuming everyone had
2 to leave and giving their closing remarks. Just
3 something that I wanted to point out on this question
4 of the industry net present value.

5 MR. BROOKMAN: Thank you for bringing us
6 back.

7 MR. STANONIK: And although the analysis
8 here seems relatively mild I can't help but notice,
9 and I would hope the DOE notices that in this
10 particular case in the shipment information you have
11 been given, this industry in the last 8 years is
12 still in an extremely rough ride. I just looked at
13 the numbers and it almost bottomed out where the
14 shipments were about almost one fifth of what they
15 were at the peak in '05 or whatever year you started
16 with.

17 And so my point of that is I started with
18 this because I was trying to see what you are
19 projecting for future shipments but my point is that
20 in this particular case I think it is worth noting
21 that again the shipments for this product have in the
22 last 8 years have decreased significantly and so for

1 the people, especially most of them being small
2 businesses to even suggest any kind of change where
3 there is a negative impact on a net present value is
4 a lot worse than let's say where they have been
5 having average shipments for the last 7 or 8 years or
6 maybe even a couple of high years, they are in a very
7 different situation that I think warranted special
8 consideration.

9 MR. BROOKMAN: Thank you, Leslie?

10 MR. BORTZ: I would just like to make sure
11 that we get to the environmental --

12 MR. BROOKMAN: Right I was going to
13 suggest that we press on here, okay just to get
14 through the rest of these slides.

15 MS. LEWIS: Okay so just quickly as the
16 results demonstrate we estimated a range of impacts
17 on INPV between negative 2.6 and 0.4 percent for the
18 industry.

19 MR. SKOLNICK: You can sit at the table.

20 MR. RIVEST: This is Mike Rivest, Navigant
21 Consulting. I'm always a little concerned when I see
22 that the magnitude of the impacts is not consistent

1 with the magnitude of the reaction of the
2 manufacturers. So there are three drivers to the
3 manufacturing impacts. There's the magnitude of the
4 investments that are needed to comply to the
5 regulations so that's the capital costs, the figure
6 of 8.7 million dollars that Jessica mentioned.

7 It would be really important that we get
8 that number right so the figures that were mentioned
9 earlier about the \$10,000.00 of product R&D and
10 certification, you know, that is something that we
11 would definitely like to have comment on. The other
12 big driver is shipments. I saw some reactions
13 earlier to price elasticity and you know to the
14 extent that we can have comments on your expected
15 change in shipments due to the price changes that we
16 are anticipating and the rationale for those changes,
17 that would be very useful because that's a key driver
18 to the manufacturing impacts on the log sets in
19 particular if the prices are going to go up, your
20 comments?

21 All right but --

22 MR. BORTZ: But you got it.

1 MR. RIVEST: Navigant got it from you.

2 MR. BORTZ: Yeah.

3 MR. RIVEST: But I think what we need is
4 to have something to the docket from a broader
5 spectrum of the industry and then have Lawrence
6 Berkeley National Lab you know prepare their
7 shipments analysis okay. Really the other -- well
8 you guys have been repeating stuff all day I can
9 repeat a little bit too.

10 MR. BORTZ: Just as long as get to Jim's
11 comments because he has got some important stuff to
12 say.

13 MR. RIVEST: All right I have nothing more
14 to say, thank you.

15 MR. BROOKMAN: Okay we are going to return
16 to Jessica who will press on and take comments as we
17 go along and we will make sure we get to Jim's
18 comments on emissions Jessica?

19 MS. LEWIS: Thank you. Another thing to
20 note about these results is that they are intended to
21 capture impacts on the industry as a whole and don't
22 necessarily reflect differential impacts on different

1 subgroups of manufacturers or individual
2 manufacturers.

3 MR. BROOKMAN: Before you move on Mike
4 made a special plea for comments on conversion costs
5 and also anything additional in shipments, so let's
6 see if there is anything additional at this time on
7 those subjects before we move on. Yes, Rett?

8 MR. RASMUSSEN: Rett Rasmussen. My
9 company has never been faced with having to make such
10 a drastic change in a relatively short period of
11 time. I don't know what it is going to cost and I'm
12 one of the more sophisticated, more experienced guys
13 in the industry with regard to design of product.
14 There's a whole host of other guys that are newer to
15 the industry or not very good at what they do already
16 without having to go to something as sophisticated as
17 electronic ignition systems.

18 You know, I don't know and here's the gas
19 log guys. There's a whole lot of other folks out
20 there, we are the ones that are here. I welcome you
21 to try to get the data out of them. As far as
22 shipments go the same thing I you know, who knows

1 what it is going to be, it's a crap shoot, we have
2 never been down this path before and as far as data
3 goes it's not what our companies do, that's what you
4 guys do, you guys are in the numbers business on
5 that, our numbers are sales of product, shipping
6 product, manufacturing product, but it is based on
7 consumer demand and not you know, as far as
8 projecting out, it is making sure we have enough to
9 go for the next couple of months of raw materials,
10 not necessarily way down in for what you are doing, I
11 don't know, the data doesn't exist, that's the
12 problem.

13 MR. BROOKMAN: Yeah go ahead Leslie?

14 MR. BORTZ: I'm sorry I can't get all
15 three things together at one time. Cost, you
16 mentioned \$10,000 as a cost number that was
17 discussed. We have mentioned that the cost of
18 certification alone is 12 to 15 thousand dollars for
19 each product and we have an ANSI certified lab which
20 costs us a lot of money and Rett doesn't.

21 Most gas log guys don't so the cost is
22 going to be a heck of a lot more than \$10,000.00.

1 MR. BROOKMAN: Thank you --

2 MR. BORTZ: \$16,312.00.

3 MR. BROOKMAN: Jessica?

4 MS. LEWIS: Thank you so to jump ahead and
5 look at some of the impacts on subgroups of
6 manufacturers DOE first looked at the impacts on
7 small businesses. Out of 90 total hearth
8 manufacturers identified, DOE identified 66 as
9 domestic small businesses. This classification is
10 based on the Small Business Administration's small
11 business size standards which set a cap of 500
12 employees or fewer for a manufacturer in the hearth
13 industry to be considered a small business.

14 We use publicly available information to
15 research small business, contacted small businesses
16 directly and also asked other manufacturers for
17 information about small business during the course of
18 interviews. As mentioned repeatedly over the course
19 of the day manufacturers have expressed concern that
20 a standard eliminating standard pilot lights would
21 impact their ability to compete with large
22 manufacturers.

1 This concern stems largely from a
2 difference in purchasing power between small and
3 large manufacturers and the idea that because large
4 manufacturers produce at higher volumes they would be
5 able to source components at a lower per unit price.

6 To evaluate these concerns we modeled the
7 difference in cost that small manufacturers might
8 face when sourcing electronic ignition system
9 components at lower volumes. The regulatory
10 flexibility analysis included in section 6B of the
11 NOPR and also discussed in chapter 12 of the TSD
12 presents the results of that analysis and in short it
13 suggests that a standard eliminating standing pilot
14 lights could lead to a higher increase in per unit
15 MPC's for manufacturers producing at lower volumes
16 relative to manufacturers producing at higher
17 volumes.

18 Would anyone like to comment on that
19 before I move on to the discussion of gas log set
20 manufacturers, yes?

21 MR. GOLDMAN: Yes this is Jack Goldman of
22 HPBA. I guess this comment was made earlier but I

1 guess we would like to know who the other large
2 manufacturers are, we count one or two and I'm the
3 trade association president, I know my members, I
4 know the players in the industry I just don't know
5 who those other companies are and I think if a third
6 of the companies are considered large and they are
7 really just one or two I think it really changes the
8 results of this analysis so I would like to know who
9 they are.

10 MR. BORTZ: Who are of the --

11 MR. GOLDMAN: The 22 large companies.

12 MR. BORTZ: They actually have a list and
13 some of the 90 that they had at the beginning were
14 foreign owned companies.

15 MS. LEWIS: That does include foreign
16 manufacturers.

17 MR. GOLDMAN: Even with that I don't see
18 the numbers.

19 MR. BORTZ: Well I said that the number is
20 more like 3,000 entities affected by it and I changed
21 my mind now I think it's more like 4,000 and I am
22 being honest, Leslie Bortz again. By 90 is a

1 specific number that you have, I went through it and
2 there were so many that were large, and there are so
3 many that were foreign and you came up with 66 out of
4 90, that part is right, the 90 isn't right.

5 MR. BROOKMAN: Okay thank you Leslie,
6 yeah?

7 MS. LEWIS: Thank you.

8 MR. GOLDMAN: Where is the list?

9 MS. LEWIS: The list is published in I
10 believe chapter 3 of the technical support document
11 and to clarify how we determine the number of
12 manufacturers, we are focused on manufacturers of the
13 final product that would be tested and sort of
14 certified to comply with this standard so we are
15 looking at manufacturers of a gas fireplace or a gas
16 log set as opposed to the components.

17 We also don't count multiple subsidiaries
18 of the same parent company, some manufacturers may
19 have a wide variety of brands but we would only count
20 those based on the one parent company.

21 MR. GOLDMAN: If a large company in Europe
22 sells a little bit in this country are they

1 considered a large manufacturer for this analysis?

2 MS. LEWIS: They would be.

3 MR. GOLDMAN: That's just absolutely
4 wrong.

5 MS. LEWIS: Well I would definitely invite
6 you to look at the list included in chapter 3 of the
7 TSD and please come back to us with comments you know
8 if you feel we have mischaracterized anything.

9 MR. GOLDMAN: There are two major European
10 companies that sell in the U.S. through U.S.
11 subsidiaries and they aren't major and their U.S.
12 operations are small. And that's it, after that
13 there might be a company that sells a handful of
14 stoves and if they are considered large and not
15 affected then the effect you are having is to have
16 more foreign ownership and production of stoves at
17 the cost of U.S. operations. I just think if that is
18 your assumption you are absolutely false.

19 MS. ARMSTRONG: So I don't think anyone
20 this is Ashley, I think you mischaracterized that
21 because I don't think we are saying they are not
22 going to be affected, I don't think that's fair to

1 say that the Department's analysis at all suggests
2 that, it is just that we are required to look
3 specifically at small businesses and the small
4 businesses are set up by definition and the
5 definition is not something that DOE creates of
6 itself, it is something that is a size standard that
7 is created by SBA and includes subsidiaries and all
8 that kind of stuff, it has nothing to do with sales.

9 So I'm not here to argue with you.

10 MR. GOLDMAN: I've resisted saying this --

11 MS. ARMSTRONG: Please let me finish
12 because I sat here and let you finish all day.

13 MR. GOLDMAN: I've spoken twice.

14 MS. ARMSTRONG: Well you don't have to be
15 rude.

16 MR. GOLDMAN: Oh so I'm rude, you have
17 never been rude today?

18 MR. BROOKMAN: Let's let Ashley finish,
19 let's let Ashley finish, go ahead.

20 MS. ARMSTRONG: My point was that we have
21 our list, its publicly available we would welcome
22 your input on it but it has nothing to do with sales

1 so that is all I was trying to say and clarify.

2 MR. BROOKMAN: Jack do you wish to
3 continue?

4 MR. GOLDMAN: I think if you had talked
5 with us at our offer to talk with you years ago we
6 wouldn't be having this discussion now.

7 MR. BROOKMAN: Okay I'm going to take
8 final comments here because we have to get through
9 the rest of these slides, Rett?

10 MR. RASMUSSEN: Yes on the list that is in
11 chapter 3 you have either got a single asterisk, two
12 asterisks or no asterisk. It shows that all the
13 foreign manufacturers therefore would be -- or you
14 didn't classify them by size or they are all large
15 manufacturers according to your asterisk chart here,
16 the way that you have applied the asterisk, so I
17 would find that that is probably hard to believe that
18 every foreign manufacturer is greater than 500
19 employees.

20 MS. LEWIS: I believe most of them were
21 large, I don't know the number off the top of my
22 head and I think often it has to do with a parent

1 company so you have a smaller subsidiary that might
2 in itself appear to be a small company but it is
3 owned by some multi-national firm.

4 MR. BROOKMAN: I think we are gaining
5 ground on this --

6 MR. RIVEST: Mike Rivest isn't the issue
7 -- excuse me.

8 MR. BORTZ: Take a look at my list of
9 3,000 and you will decide how many there are but
10 there are more than 66 names that are going to be
11 seriously affected by this rule.

12 MS. LEWIS: And the last point to that is
13 that 66 also does exclude distributors and retailers
14 and that may account for part of the difference in
15 the numbers we are discussing.

16 MR. BORTZ: That causes a big jump of
17 making up the difference there are still entities
18 that will be affected by this rule, whatever you call
19 them they are still businesses, small businesses in
20 the United States.

21 MS. LEWIS: Thank you, moving on to the
22 subgroup analysis for manufacturers of gas log sets.

1 In researching the market we identified 23 gas log
2 set manufacturers including 17 small businesses
3 during interviews manufacturers stressed that gas log
4 sets represent a distinct market segment.

5 MR. BORTZ: Wait a second -- I'm sorry.

6 MS. LEWIS: Unlike many other hearth
7 products they are designed for use in existing wood
8 burning fireplaces. They compete with wood and wax
9 logs and unlike some other hearth products as we have
10 discussed today their sales do not follow trends in
11 new housing construction.

12 Manufacturers also noted that electronic
13 ignition systems take up more space than standing
14 pilot lights and cannot be as easily concealed in gas
15 log sets which are not sold as part of packaged units
16 in the same way many other products are.

17 Manufacturers also indicated that electric
18 outlets may not be located in close enough proximity
19 to existing wood-burning fireplaces to easily
20 accommodate installation which could require the use
21 of batteries or extension cords or else drive up
22 installation costs.

1 Finally manufacturers expressed concern
2 that a transition to electronic ignition systems
3 could drive up the price of gas log sets and in doing
4 so lead to a decline in consumer demand.

5 To address that concern we looked at the
6 increase in MPC that a switch to electronic ignition
7 systems would likely entail. This table shows the
8 percentage increase in MPC for different types of gas
9 hearth products estimated to result from a switch
10 from standing pilot light units to units with
11 electronic ignition systems and as we can see impacts
12 are most severe for gas log sets, for vented gas log
13 sets we are looking at an increase of 37% of MPC, for
14 unvented gas log sets, 27% of MPC which compares to
15 9% and 11% increases for vented and unvented
16 fireplaces, inserts and stoves respectively.

17 Outdoor hearth products also fall in the
18 same range as the gas log sets however there were a
19 few factors that would likely mitigate impacts on
20 outdoor hearth products including the fact that they
21 would have the option to transition to less expensive
22 matchless systems which unvented gas log sets are not

1 allowed under ANSI standards.

2 At this time I would like to request
3 comment and feedback on this analysis or anything
4 else we discussed as part of the manufacturer impact
5 analysis.

6 MR. BROOKMAN: Leslie.

7 MR. BORTZ: Leslie. It says that your
8 vented gas log set price of going up 37% our price is
9 up by 71%, that's our price on our price list, that's
10 what we charge. We are not in business to overcharge
11 for stuff because they we can't sell it. Our price
12 is up 71% for doing that.

13 MR. BROOKMAN: Okay thank you. Additional
14 comments before we move on?

15 MR. BORTZ: Which doesn't include the cost
16 of installation which is probably another 250 bucks
17 or more additionally, the price has more than
18 doubled.

19 MR. BROOKMAN: Yes Rett?

20 MR. RASMUSSEN: Rett Rasmussen. I would
21 like to bring up that the incremental -- when you buy
22 a car they sell you on the base and then they go up

1 in incremental amount to sell you the sport package
2 or the luxury package or things like that and your
3 incremental cost to go to that additional benefit is
4 a small portion. You have already been sold on the
5 big part.

6 The problem you have with unvented gas log
7 sets is right now they have manual safety controls,
8 millivolt controls with wall switches, go up to
9 remotes and then electronic ignition. This proposal
10 would take then from zero not buying an unvented gas
11 log set to the full enchilada up to with an
12 electronic ignition system.

13 With vented gas log sets some people will
14 be able to continue to buy natural gas, match lighted
15 ones and then make the full leap to electronic
16 ignition systems. For propane vented ones they are
17 in the same boat as the vent free propane ones, it's
18 all or nothing so you don't have that ability to ease
19 somebody into the higher price.

20 That is going to severely impact the
21 consumers buying decisions because they have to
22 swallow the big pill. Some of the other savings that

1 come up as far as you know environmental savings and
2 this and that, that's not money that they can take
3 off of the purchase price that's just vapor savings,
4 that has nothing that influences consumer choice and
5 consumer demand, thank you.

6 MR. BROOKMAN: Leslie, keep that
7 microphone close.

8 MR. BORTZ: We answered a question from
9 Navigant how would energy conservation standards
10 impact the companies' manufacturing capacity in both
11 the short and long term. In the short term we would
12 have a lot of excess capacity and in the long term we
13 would likely be out of business.

14 MR. BROOKMAN: Moving on to emissions
15 analysis and James is this where you want to comment?

16 MR. HOUCK: Yes.

17 MR. BROOKMAN: Get ready.

18 MR. ROSENQUIST: I am Greg Rosenquist
19 stepping in David Siap who had to catch an airplane.
20 Next analysis is the emissions analysis. This is
21 where we take energy savings from the national impact
22 analysis and convert them to emission savings for

1 carbon dioxide, NOx, N2O methane, SO2 and mercury and
2 we do this by DOE does this by looking at the annual
3 energy outlook and deriving emission factors for each
4 one of these emissions that you see there.

5 This is the results of the analysis this
6 is the amount of savings that come as a result of the
7 energy savings that we will calculate from the
8 national impact analysis.

9 And then the next step is to--

10 MR. BROOKMAN: James, please.

11 MR. HOUCK: James Houck. The reason that
12 I am sort of slow to start -- I don't know where to
13 start it is so complex and there is so much
14 information here but I will say this. I would ask
15 you why are we doing this, what is the most important
16 thing here and I say what's paramount is human health
17 and welfare. This has been neglected in this role.

18 Air quality as measured by the standard
19 air quality metrics in the United States has this air
20 pollutants criteria air pollutants, climate change
21 agents will all be impacted negatively by this rule.
22 And going along with this will be the health and

1 safety not really the air quality, but the health and
2 safety of residential occupants and I'll explain why.

3 Really there are two categories of hearth
4 products here. There is a gas log sets and the gas
5 fireplace inserts at least for this analysis on air
6 pollution there is two categories. These are
7 retrofitted in the wood burning fireplaces if you got
8 a gas log set you should put it into a wood
9 fireplace. No longer do you have a wood fire, now
10 you have a gas fire that's one category.

11 The other category are free-standing
12 fireplaces sometimes called gas stoves and also the
13 traditional gas fireplace everything thinks about
14 wall mounted or inserted into the wall. In the
15 future these are in new homes or remodeling. A
16 consumer has a choice, they can choose wood or they
17 can choose gas results in some electric, but
18 primarily the two choices are wood and gas.

19 So if a person does not choose gas the
20 alternative is probably wood. We have all heard
21 today that this is going to cause a significant
22 increase in the cost of particularly gas log sets but

1 other gas hearth appliances as well. Therefore a
2 consumer, like most consumers, are going to be
3 discouraged in purchasing a gas fireplace in a new
4 construction or retro-fitting their existing wood
5 fireplace.

6 Now why is this important? The emissions
7 from solid fuel combustion, solid fuel fireplaces are
8 dramatically, dramatically higher than they are from
9 gas appliances. This is why they are recognized by
10 many state and local air quality regulators, many of
11 them either specifically require, encourage, specify
12 whatever adjective you would like for people to use
13 gas fireplaces rather than wood fireplaces.

14 So when I saw in the federal register in
15 addition the proposed hearth products standards would
16 have significant environmental benefits I kind of
17 went oh my goodness this is not right.

18 Specifically in terms of health impacts is
19 fine particles. Now this has been a big issues in
20 the United States and is often referred to as PM2.5.
21 A number of state and local regulatory agencies are
22 struggling with obtaining national ambient air

1 quality standards.

2 A national air quality standards are
3 mandated under the Clean Air Act. U.S. EPA requires
4 state and local air quality jurisdictions to obtain
5 national quality standards. They are required to
6 come up with the state implementation plan if they
7 don't and a maintenance plan if they are marginal.

8 Frequently again frequently state and
9 local air quality agencies say you should you have
10 to, again there are various adjectives as a way to
11 discourage wood burning and encourage gas burning
12 because they all recognize that the air quality
13 issues associated with wood is more serious than gas.

14 So criteria pollutants, okay criteria
15 pollutants are set forth under Section 109 of the
16 Clean Air Act, 40 CFR Part 50 requires the
17 administrator of the EPA to do things about it, I'm
18 simplifying things because I know we are all tired
19 here. There are 6 criteria air pollutants two of
20 which are very important here and one is carbon
21 monoxide and the other as I alluded to is fine
22 particles.

1 I managed to work and there is very little
2 work out there, we actually compared in a realistic
3 fashion air emissions from wood combustion fireplace
4 used in a typical fashion and gas combustion in a
5 typical fireplace, actually several fireplaces and we
6 found that again consistent with pretty much
7 everyone's intuitive understanding that there were
8 148 times more carbon monoxide emitted in a typical
9 fireplace used with wood burning wood than there was
10 with natural gas.

11 And amazingly, amazingly 568 times more
12 particles, fine particles emitted from wood
13 combustion than with natural gas and even more
14 significant particles -- fine particles less than 2
15 and microns that are produced from combustion are
16 very small particles, they are sub-micron, they call
17 these sub-microns and those are the most health
18 injurious of all particles.

19 So wood combustion in the fireplace turns
20 to criteria pollutants, again regulated in the Clean
21 Air Act, a problem for many state and local air
22 quality jurisdiction, widely recognized as an impact

1 to human health and welfare are going to be very
2 negatively affected by this proposed rule, simply
3 because people are going to choose less gas
4 appliances because they are going to cost more and I
5 would argue what I am hearing of gas log set with
6 some kind of unattractive box they are going to be
7 less attractive.

8 The criteria pollutants are just one, the
9 other is hazardous air pollutants, known as HAPS, the
10 acronym HAPS that is also defined under the Clean Air
11 Act, actually the Clean Air Act Amendments of 1990,
12 at Section 122 and I'll read this sentence because it
13 is easier to read it:

14 HAPS are also known as toxic air
15 pollutants or air toxins and are those air pollutants
16 that cause or may cause cancer or other serious
17 health effects, such as reproductive effects or birth
18 defects or adverse environmental and ecological
19 effects.

20 Originally the list was 187 that has gone
21 up and down a little bit. Many of them are organic
22 compounds and I know most of you are not organic

1 chemists but when you look at the chemical makeup of
2 wood, cellulose, lignin, hemicellulose, resins you
3 would expect a number of the compounds specifically
4 listed on the HAPS list to be emitted by the
5 incomplete combustion of wood and this includes and
6 you will recognize some of these as bad actors:

7 Cetalaldehyde, benzene, catechol, cresol
8 (o,m and p) dibenzofurans, ethyl benzene,
9 formaldehyde, hexane, methanol which is also known as
10 wood alcohol by the way and there is a reason for
11 that name, naphthalene, phenol, propionaldehyde,
12 styrene, toluene, xylenes (o,m,p) isomers and
13 polycyclic organic matter.

14 And that's just a few. EPA selected this
15 list because these are the kinds of things that are
16 common and common industry in North America but I
17 would always say there are more of any compounds than
18 there are stars in the universe so there would
19 probably be many other toxic air pollutants, organic
20 compounds emitted from wood combustion that are not
21 on this list.

22 We specifically measured some of these

1 HAPS compounds. Formaldehyde there were 64 times
2 more masses of formaldehyde emitted from wood
3 combustion than there was gas combustion, 13 times
4 more benzene and 107 times more of polycyclic organic
5 matter.

6 Again as I noted that there is both --
7 there are many organic compounds that are on the list
8 that are toxic and these would be in a particular
9 phase or in the vapor phase and petition between the
10 two. As I noted there was 568 times more particles
11 emitted, particles, wood combustion are 70 to 90%
12 organic compound saw a lot of them are in there and
13 also we measured vapor in this test and there was a
14 parameter called non-methane vault or organic
15 compound MVOC and we found that there were 30 times
16 more mass of MVOC emitted from wood combustion then
17 there was from gas combustion.

18 So the two regulatory metrics of local air
19 quality degradation compound pollutants that are
20 found in the United States unquestionably residential
21 wood combustion emits a tremendous amount more.

22 Now climate change, well climate change in

1 the past people have said well you know buy a mass
2 combustion the carbon dioxide emitted from that is
3 biomass neutral people plants photosynthesis it and
4 take it back. That may be true there is some
5 argument on that.

6 Also methane is 80% excuse me natural gas
7 is 80% to 90% methane and so people say well there is
8 periods of losses from natural gas, notwithstanding
9 the fact that there might be a credit for the carbon
10 dioxide from biomass combustion and that methane from
11 the leakage of our transmission system of natural gas
12 may contribute to greenhouse gas, still wood
13 combustion in a fireplace produces more of a climate
14 impact than does natural gas combustion.

15 And the reason being recent and I say
16 recent in the last decade recognition that black
17 carbon is a serious greenhouse gas agent and it's a
18 pretty complicated story but I refer anyone who wants
19 to research this EPA's 2012 report to Congress on
20 black carbon which is readily available on the web
21 gives a pretty good description of the whole issue.

22 One thing I want to point out though that

1 may not be apparent in reading this document is there
2 are two reasons that black carbon is considered a bad
3 greenhouse gas actor. One is basically absorption of
4 energy because it is black in the atmosphere. The
5 other is changing to snow, makes snow black and that
6 causes light energy to absorbed rather than to be
7 reflected. This is particularly relevant and bad for
8 residential wood combustion because a smokestack
9 chimney from a fireplace is close to the ground, it's
10 15 to 30 feet off the ground and by the very nature
11 fireplaces are often used where there is ice and snow
12 so you have something that directly impacts the ice
13 and snow and it is there when the ice and snow is
14 there.

15 So I would argue that the black carbon is
16 even a bigger issue than one would thing from
17 residential fireplace combustion, so that's the air
18 quality issues. But hand in hand with that is there
19 is home safety. And I cite from the notes here the
20 National Fire Protection Association, in their
21 document which again you could find there are many of
22 them on the web you can find.

1 In the time period 2004 to 2008 they cited
2 26 times more structural fires from solid fuel
3 fireplaces than they did from gas fireplaces. The
4 primary reason is creosol accumulation. The very
5 same thing that produces fine particles produces
6 organic vapors that condense on the walls of a
7 chimney when a chimney is cold and I think many of
8 you have heard of chimney fires and that's what
9 causes the structural fires.

10 Now this 26 times more structural fires is
11 real because when you add up the number of using VO
12 numbers, the number of fireplaces that are used for
13 secondary heat that are natural gas and propane it's
14 pretty close the number of wood fireplaces used for
15 secondary heat, so there is 26 times more fires is a
16 pretty good reflection of the bigger risk in terms of
17 safety in the home.

18 That 22,500 fires caused 17 that's what
19 the number is for residential wood combustion, 22,500
20 fires caused 17 civilian deaths, 96 civilian injuries
21 and 172 million dollars in direct property damage as
22 compared to the 860 fires that were caused by natural

1 gas fireplaces which was 0 civilian deaths, 13
2 civilian injuries and 30 million dollars in direct
3 property damage.

4 And then there is one more thing and it
5 relates to the air quality. Because residential wood
6 combustion produces much more air pollutants and
7 because you have with a wood fire place an open
8 chimney situation where you have a smoldering fire at
9 the end of the burn the draft lessens as the fire box
10 temperature cools yet you are still producing
11 particulates and carbon monoxide, particularly carbon
12 monoxide.

13 And anecdotally and I can finish this up
14 when you go to a person's home that has a wood
15 fireplace you often smell the wood smoke smell,
16 that's a manifestation of the back spill of
17 pollutants into the home, thank you.

18 MR. BROOKMAN: Okay thank you yes Leslie.

19 MR. BORTZ: Can I ask Jim was some of that
20 work done on our products?

21 MR. HOUCK: Yes this is Jim Houck, yes it
22 was. I can tell you the brief specifics there were 3

1 different natural gas products and 1 LPG product that
2 was compared against residential fireplaces.

3 MR. BORTZ: I can only say that in our
4 products he didn't use enough wood to compare it to
5 because 11 - 15 pounds or whatever it was a small
6 amount of wood a guy who builds a real fire builds it
7 with 18 to 20 pounds of wood so his number is off by
8 another third there would be much more problem with
9 wood.

10 MR. BROOKMAN: Okay.

11 MR. BORTZ: Because a guy who builds a big
12 fire doesn't build an 11-15 pound.

13 MR. CYMBALSKY: So this is John from DOE
14 and I want to thank you for that -- that was actually
15 informative to me. Getting back to I think the part
16 of the argument you made that is of most interest to
17 our analysis is the presumption that the wood and the
18 gas are perfect substitutes for one another.

19 So my question to you is you have
20 mentioned how the maybe not so much for log sets, but
21 the industry has been moving towards the ignition and
22 we have gone through some periods lately where

1 natural gas prices have had some pretty big ups and
2 volatility to say the least. Some years it was
3 really, really high gas prices in the not too distant
4 past.

5 I was wondering if you can correlate these
6 economic impacts to your consumers with switching
7 from wood to gas over that same time period so that
8 we could potentially build this sort of fuel
9 switching model that you are suggesting by you know
10 making the price of your product a little bit more
11 expensive. The presumption is they will switch to
12 wood but I guess I would like to know how or if you
13 have data or anything like that to support it.

14 MR. BROOKMAN: Leslie?

15 MR. BORTZ: I have data on our sales and
16 there is no correlation at all that I can see.

17 MR. CYMBALSKY: Very helpful.

18 MR. BORTZ: The correlations that I saw
19 were after September 11, 2001 the whole place shut
20 down but after events Sandy whatever where ice
21 storms, whatever we would get a big pickup in sales
22 of both vented and unvented, I think probably more

1 unvented logs because of

2 MR. CYMBALSKY: The lack of electricity or

3 --

4 MR. BORTZ: But I don't see any

5 correlation.

6 MR. CYMBALSKY: And that was my question

7 to press or to build in a fuel switching model would

8 be nice to have some economic behavior that suggests

9 that that actually exists because my thinking with

10 the wood is that it is generally not marketed in the

11 people that are using wood primarily are in areas

12 where they are not actually paying for the fuel, they

13 have wood at their disposal so.

14 MR. BORTZ: Go out and take a look at the

15 people who are selling wood.

16 MR. CYMBALSKY: No there are some but I

17 think there has been a long trend of that declining

18 here in the northeast anyway.

19 MR. BORTZ: Wood burning fireplaces.

20 MR. BROOKMAN: Jim do you want to make an

21 additional comment?

22 MR. HOUCK: Yes in response to that.

1 MR. CYMBALSKY: Again it's just another
2 data request. I'm not saying what you are saying is
3 incorrect I'm just -- I would like to see some data
4 that would allow us to actually do an analysis over
5 the fuel switching here because we do it for other
6 products because we see it.

7 MR. BORTZ: You want data that shows.

8 MR. CYMBALSKY: I mean HEA a long time
9 ago, because you know I have been in this business I
10 hate to say it for over 25 years now, they used to do
11 a fuel switching survey that actually included wood
12 and natural gas and they did look at fireplaces as
13 well at one point in time.

14 MR. BORTZ: I think that when gas is
15 plentiful and as you know since the beginning of the
16 1970's gas has been either going to be out of --
17 there's going to be no gas in three years or we are
18 going to have 100 years supply or there's no gas, you
19 know it has gone up and down.

20 Obviously when gas is plentiful it is
21 easy, you get more buy because the gas companies want
22 it.

1 MR. CYMBALSKY: And I think for the
2 consumer it's a convenience thing right, the gas
3 product is much easier to use than the wood product.

4 MR. BORTZ: Right now if you compare and I
5 think our log sets would be comparable on this the
6 cost of natural gas compared to the gas of wood, the
7 cost of natural gas is one-quarter per hour in Los
8 Angeles, I didn't do it everywhere but -- in Los
9 Angeles it has high prices for wood and reasonably
10 high prices for gas but higher for wood.

11 MR. BROOKMAN: Jim a follow up?

12 MR. HOUCK: Yes in response to John's
13 questions, comments there. First of all your thought
14 about the purchase of wood and that's not entirely
15 true there is some fraction of people that do both
16 and actually its very outdated but it is one of your
17 REC studies is back in the days before there were
18 electronic and I can't remember the exact date I
19 think it's like 1993 or something like that.

20 There's actually a question as to why do
21 you buy wood and it's a substantial fraction I think
22 over half that buy their wood so that's one thing.

1 The other thing is fuel switching. It is very
2 difficult to get a direct correlation, just like my
3 comment was on the correlating thing that's how these
4 are because there are so many things going on.

5 But one only gets by looking at the
6 Department of Energy records you need to look at for
7 example the fraction of people that heat their home
8 with coal. In 1949 over half the people in this
9 country heated with coal as natural gas network
10 because more prevalent and inexpensive that went away
11 with other issues too but now less than a tenth of a
12 percent heat with coal and over 70% heat with natural
13 gas first air furnace.

14 Similarly during the 70's there was a big
15 influx in the number of wood burning excuse me wood
16 burning stoves because of the concern of the
17 availability and cost of fossil fuels so yes there
18 are certainly trends that get an exact one you could
19 use in modeling I'm not sure about that.

20 MR. BROOKMAN: Tim Ballo?

21 MR. BALLO: Tim Ballo with Earth Justice
22 and just to follow along here because I do care about

1 what happens in the air. There's a couple of points
2 though I think we need to get to the bottom of the
3 relative use duty cycles for a fireplace versus gas
4 logs. I mean obviously if I have to flick a switch I
5 am going to you know, and I don't have to stack wood
6 and build a fire it's somewhat easier to use the
7 appliance that might be used more often.

8 The other thing that I just want to
9 encourage the Department to consider if you do want
10 to go down the path of doing this kind of detailed
11 analysis which I think you know would definitely help
12 inform the analysis for the proposal is to consider
13 as you do sort of the full fuel cycle approach to
14 energy throughout the rest of the analysis do so here
15 as well because you know the production and the
16 extraction of natural gas imposes a lot of
17 environmental harms but I don't necessarily -- that I
18 think are different from the environmental harms
19 created by wood, production of wood for heating
20 including some of the same HAP air toxic issues that
21 were discussed that original from wood burning.

22 A lot of that same nasty stuff is produced

1 when gas is produced.

2 MR. BROOKMAN: Frank Stanonik.

3 MR. STANONIK: I'm just going to because
4 we are getting close to 5 I'm just going to jump here
5 because there's a point I want to make that was kind
6 of alluded to but I think it's important because at
7 the moment DOE's analysis has totally discounted it
8 and that's the fact that the analysis assumes there
9 is no change in the utility of the product by this
10 requirement and I think it needs to be recognized
11 that if these products do have a utility -- let me
12 rephrase that.

13 Those models of these products that don't
14 require any external electric supply have a very real
15 utility that when those customers, those homeowners
16 lose electric power they have a source of heat and
17 that is for the people who have those products and
18 are in that situation that's a very real and very
19 important utility and I think DOE at the moment the
20 analysis is just discounted that this proposal might
21 have any effect on utility and I think that's
22 incorrect.

1 MS. ARMSTRONG: So I have a question, this
2 is Ashley and Frank can follow up and this is purely
3 from my own experiences but I actually have a
4 fireplace it's vented though that has EI and its
5 fully functional when the power is off so I guess I'm
6 asking you is there a certain part of the market that
7 you know either without electricity would be impacted
8 because mine is fully functional when the hurricane
9 hit my house and I had several days without it, the
10 battery is fine, it worked fine.

11 So is there something with the EI that
12 prevents it in certain situations? I'm just trying
13 to understand that. Mine was made by someone here.

14 MR. STANONIK: Frank Stanonik so actually
15 my point was that okay so if you are going to go down
16 -- if you are doing this analysis okay and let's say
17 your options no -- let me rephrase that. The options
18 you should look at would be EI that requires an
19 external power supply okay or EI that doesn't okay.

20 Now obviously the ones that don't still
21 have the utility but I think and again your products
22 are obviously working very well but I think for the

1 manufacturers there are significant questions and
2 issues still about reliability and whatever else with
3 those types of systems and then you still have to get
4 to that issue of okay so again I don't know how often
5 do you have to change your battery I don't know, it's
6 another cost, right.

7 MR. RASMUSSEN: Rett Rasmussen, Ashley is
8 your fireplace a wood burning fireplace or a gas
9 fireplace -- it's a gas fireplace unit. There are
10 all different types of electronic ignition systems
11 out there. There are ones that are battery powered
12 only there are some that have their 120 with battery
13 backup --

14 MS. ARMSTRONG: They are both.

15 MR. RASMUSSEN: Alone so you know there is
16 all those variety of types. I did want to mention
17 one thing you know in response to Tim. In switching
18 from wood to gas that there is quite a bit of usage
19 due to the convenience of gas -- there is for the
20 first month until they get the first gas bill and
21 then it's pretty self-regulating. People enjoy the
22 convenience of it until they realize that there is a

1 cost of actually having to pay for all of that gas
2 and then they temper themselves back to what their
3 budgets are and what they really -- the impact they
4 want to feel of their usage of that product so yes,
5 big spike first month tails off after that, okay.

6 MR. BROOKMAN: So as it is almost just a
7 few minutes before five, we should take final remarks
8 briefly for closure here.

9 MR. DAY: I want to make one comment on
10 the battery issue and that is you know there are
11 products that are sold with IPI with battery backup
12 for power outages and so forth and that's great but
13 if you know one of the President's points in his
14 climate plan is that we need to be resilient as a
15 society we are seeing more and more extreme weather
16 events and the studies that have been done on that to
17 really look at what went wrong in Katrina and what
18 could we do better.

19 One of the first things that comes out of
20 that is batteries are almost the first thing to go
21 and it's just -- that has been the experience
22 whenever there is a problem and you know the short

1 answer I think is that having a system that requires
2 batteries in a major power outage situation can't
3 compete with having a product that requires no
4 external source of electricity, it is not equivalent,
5 thank you.

6 MR. BROOKMAN: So then closing remarks
7 from John Cymbalsky.

8 MR. CYMBALSKY: Thanks everyone for coming
9 I really do appreciate the dialogue that we did, we
10 gained a lot of useful insight from you and we hope
11 we continue to throughout the comment period. We
12 have heard from a few of you about an extension and
13 so obviously we are open to that we just need a
14 letter and a reason why you need an extension and of
15 course DOE will consider that upon receipt. Yes, a
16 PDF letter to me would be perfectly acceptable and
17 then we will consider that comment extension based on
18 the reasons given within.

19 So for those of you traveling get home
20 safe and again we really do appreciate your
21 attendance and your conversation today, bye.

22 (Whereupon at 5:01 p.m. the meeting

1 adjourned)

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

<p style="text-align: center;">A</p> <p>a.m 1:12</p> <p>AA 204:16</p> <p>ability 16:7 17:2 19:4,8 29:14 47:3 57:18 214:13 245:4 281:20 300:21 311:18</p> <p>able 10:9 14:4 37:12 38:1 74:7 75:2 122:21 130:17 136:18 137:8 143:18 164:14 165:21 243:5 244:17 246:17 282:11 283:1,12 286:10 287:21 289:15 290:12 301:5 311:14</p> <p>absence 113:10 132:16 170:22 174:5 197:11 259:15 275:17</p> <p>absent 168:10 275:12</p> <p>absolute 283:13</p> <p>absolutely 88:4 93:16 115:12 137:9 197:21 211:15 220:8,11 304:3,18</p> <p>absorbed 322:6</p> <p>absorption 322:3</p> <p>abundant 41:17</p> <p>ACCA 165:7 166:21</p> <p>accept 19:9 137:19</p> <p>acceptable 289:14 336:16</p> <p>accepted 96:16</p> <p>access 236:6</p> <p>accessible 10:5 71:19</p> <p>accessory 247:16</p> <p>accidentally 249:19</p> <p>accommodate 39:6 290:15 308:20</p> <p>accomplish 133:20 290:7,8</p> <p>accomplished 291:21</p> <p>account 31:7 57:3 144:20 159:7 189:2,10 224:1 225:18 229:11 231:5,7 232:18</p>	<p>233:21,22 258:19 261:1,3 266:6,19 281:2 284:3 285:22 288:11 307:14</p> <p>accounted 159:10 200:13 284:14</p> <p>accounting 273:17</p> <p>accounts 256:11 273:15</p> <p>accrue 155:16</p> <p>accrued 213:19</p> <p>accumulate 156:1</p> <p>accumulation 323:4</p> <p>accuracy 123:12 205:22</p> <p>accurate 45:12 130:15</p> <p>accurately 128:22</p> <p>ACE 7:21</p> <p>achieve 14:5 25:13 51:21 58:17 126:14 293:3</p> <p>achieved 286:17</p> <p>achieves 131:18</p> <p>achieving 40:2 50:13</p> <p>acknowledge 43:7 115:21 232:16 288:22</p> <p>acknowledged 35:9 48:7</p> <p>acknowledges 22:10 37:11 50:2</p> <p>acronym 318:10</p> <p>ACS 248:6</p> <p>act 19:14 42:15 43:9 43:12 57:7 72:15 316:3,16 317:21 318:11,11</p> <p>action 7:15 19:16 277:3</p> <p>actions 287:7</p> <p>activated 46:14</p> <p>active 99:7 130:3 188:9</p> <p>activity 128:14</p> <p>actor 322:3</p> <p>actors 319:6</p> <p>actual 51:5 53:1 173:3 189:15 204:17,19 205:10 214:21 252:10 273:19</p> <p>Adam 3:2 7:1</p> <p>adapt 38:21</p>	<p>add 38:10 39:9 49:2 157:2 196:22 200:14,15 214:7 266:2 275:6 323:11</p> <p>added 38:1 47:22 48:9 104:6 196:20</p> <p>adding 28:1 38:16 48:21 135:12</p> <p>addition 22:11 38:16 39:13 48:19 51:21 57:13 60:11 61:6 243:21 266:5 280:19 284:1 315:15</p> <p>additional 13:13 20:13 21:17 40:17 40:19 43:13,21 44:2,6 49:6 61:1 64:10 72:6 79:14 112:7 117:19 128:19 132:20 140:9 153:16 162:11 168:22 186:21 209:12 231:8 253:9 260:2 275:22 286:1,5 298:5,6 310:13 311:3 327:21</p> <p>additionally 138:13 310:17</p> <p>address 14:9 15:9 15:20 16:13 17:10 17:12 20:7,9 46:9 46:15 67:10 78:4 84:11 94:20 96:4 103:7 106:18 132:3 133:9 219:6 309:5</p> <p>addressed 25:22 48:6 51:3 111:3</p> <p>addresses 199:18 210:11</p> <p>addressing 61:11 102:16</p> <p>adds 38:6 59:8</p> <p>adequate 13:16 244:13,16</p> <p>adequately 230:12</p> <p>adjacent 28:17</p> <p>adjective 315:12</p> <p>adjectives 316:10</p> <p>adjusted 337:1</p> <p>adjust 46:19 130:18 223:22</p> <p>adjustable 46:20</p>	<p>48:1</p> <p>adjusted 123:2,3 251:18 258:17</p> <p>adjustment 207:6,7 223:21</p> <p>adjustments 285:4</p> <p>Administered 72:15</p> <p>Administration's 300:10</p> <p>administrative 282:20</p> <p>administrator 316:17</p> <p>admits 31:22 42:5</p> <p>adopt 36:4</p> <p>adopted 33:21 56:5 56:15</p> <p>adopts 289:2</p> <p>ads 44:2</p> <p>advanced 65:20</p> <p>advantage 32:14</p> <p>advantages 281:21</p> <p>adverse 38:8 48:14 318:18</p> <p>adversely 29:10 42:14 43:1</p> <p>advised 55:16</p> <p>advisedly 96:1</p> <p>AEO 251:9 262:17 263:13 268:4,5</p> <p>AEO's 266:14</p> <p>aesthetic 37:4 38:13 47:1 48:14 51:21 110:15,19</p> <p>aesthetically 29:12</p> <p>aesthetics 36:1,16 74:15 77:4 201:17 201:21</p> <p>affect 29:10 42:14 147:5</p> <p>affiliation 5:4 63:7</p> <p>afford 57:18</p> <p>afraid 92:22</p> <p>age 255:20</p> <p>agencies 56:3 315:21 316:9</p> <p>agency 56:15</p> <p>agenda 8:7,9 9:12</p> <p>agent 321:17</p> <p>agents 56:8 313:21</p> <p>aggregate 24:7 76:4</p> <p>aggregated 178:17 258:19 260:17</p> <p>aggregating 76:10</p> <p>agnostic 150:7</p> <p>ago 17:15 95:6</p>	<p>111:15 128:12 133:13 209:5 218:18 220:6 224:10 236:1 240:15 245:2 306:5 328:9</p> <p>agree 32:6,12 69:6 89:7,9 106:19 109:15,15 111:5 116:1 155:15 170:2 172:20 180:3 183:18 220:16 239:13 242:3 286:16</p> <p>Agreed 150:12</p> <p>agreement 78:14</p> <p>agrees 38:16</p> <p>ahead 103:16 109:2 121:5 125:10 140:15,18 151:8 152:7 153:7,10 154:13 160:2 168:18 170:2 172:18 177:1 185:9,10 192:1 201:9 227:19 258:7 289:9 299:13 300:4 305:19</p> <p>AHRI 67:21 72:11 90:15 95:16 118:22 120:3 127:18 132:7 144:3 187:14 188:12 221:16 227:20</p> <p>aid 293:14</p> <p>aim 137:3</p> <p>aimed 16:2</p> <p>air 6:3 9:19 32:20 51:20 52:2 55:17 56:8,9,12 57:22 60:7 124:13 137:10,12 138:9 138:10 169:9,13 190:10 191:8 194:22 230:7,7,9 231:9 313:18,19 313:19,20 314:1,5 315:10,22 316:2,3 316:4,9,12,16,19 317:3,21,21 318:9 318:10,11,14,15 318:15 319:19 320:18 322:17 324:5,6 330:13</p>
---	---	---	---	--

331:1,20 Air-Conditioning 2:17 3:15 airplane 312:19 alcohol 36:7 319:10 allergens 58:1 allow 13:16 18:15 47:10 245:18 246:17 328:4 allowance 189:3 246:21 allowed 33:1 98:21 207:12 216:20,21 226:7 310:1 allowing 52:1 59:11 286:11 allows 29:21 46:19 178:2 220:20 266:17 280:22 alluded 229:22 316:21 332:6 alternative 39:16 55:5,9 58:11,19 95:18 193:5 277:8 277:9 314:20 alternatives 59:4,7 276:21 277:2 278:4,5 amazingly 317:11 317:11 ambience 220:19 221:9 ambient 315:22 ambiguity 108:13 ambiguous 27:1 amended 65:1 276:22 Amendments 318:11 America 12:9 57:15 86:9 235:10 319:16 American 2:22 6:5 56:5 72:15 amount 51:20 134:7 137:15 143:15 160:21 205:15 311:1 313:6 320:21 325:6 analyses 24:3 280:13 analysis 8:17,19,22 8:22 9:1,3,4,4 12:15,21 13:4,7 13:15 14:22 15:8 20:4 21:11 37:6	42:2 43:9 45:15 46:1,2 52:22 53:3 53:15 54:1,15 55:19 56:18,22 65:22 69:3 87:20 100:1 101:12 103:9,11 104:10 107:4,8 109:6 112:17 113:20 114:3 115:12,13 117:3 118:5 122:10,10 124:17 130:14 135:4,5 139:9 140:18,20 142:10 143:2 157:10 158:12 159:2 160:4,8,10 160:13,19 163:12 163:15,18,19 171:2 173:21 174:4 176:20 181:6 182:4 185:19,22 186:7 189:7 202:18,18 202:22,22 204:2 205:5 206:13 211:15,17 223:21 228:1,9,17 230:15 232:18 238:21 239:7,22 240:16 244:12 255:14 257:22 260:12 262:5 269:7 271:12 272:8,12 272:12,19 276:14 276:19 278:13,16 279:9 280:8,17,18 282:14 288:11,22 294:7 297:7 301:10,12 302:8 304:1 305:1 307:22 310:3,5 312:15,20,20,22 313:5,8 314:5 325:17 328:4 331:11,12,14 332:7,8,20 333:16 analyst 41:15 analytical 11:4 analyze 87:17 108:5 111:5 133:2 156:13 159:3 283:1 analyzed 109:19 118:4 121:18 134:13 157:3	164:10 166:11 222:8 analyzing 16:16 157:4 and/or 239:7 anecdotal 217:5,18 218:10 anecdotally 250:5 324:13 Angeles 56:9 329:8 329:9 animal 170:18 animals 33:4 170:16 animating 83:18 annual 76:4 130:18 185:20 188:14 193:8,9 240:22 248:15,17 279:22 280:17 313:2 annually 31:7 ANSI 69:20 70:12 126:15 223:8 299:19 310:1 answer 80:9 81:2 84:21 97:16,17 103:8 104:8 113:19 120:19 122:12 146:18 147:4 172:13 244:19 247:14 287:15 336:1 answered 109:1 312:8 answers 95:10,11 174:12,13 anti-condensation 247:15 anticipate 30:13 45:1 anticipating 296:16 anybody 98:8 246:8 250:2 anymore 237:4 anyway 225:3 288:20 327:18 anyways 140:19 APA 72:15 apart 107:7 114:2 155:11 apologize 133:7 161:11 244:7 245:22 apparent 81:4 322:1 apparently 79:21 appeal 51:21	110:16,19 appear 307:2 appearance 38:15 Appearances 2:1 appears 22:7 124:10 appendix 224:9 appliance 11:2 12:10 15:19 35:21 48:11 74:13 76:20 77:6,12,20 93:19 138:9,20 220:10 225:19 230:22 231:3 331:7 appliances 14:16 21:6 27:11 123:15 214:10,12 220:17 223:9 233:19,22 242:22 256:2 267:3 315:1,9 318:4 applicable 219:3 application 139:6 146:22 147:13,13 147:20 174:3 applications 25:10 25:12 62:4 138:11 146:22 147:17 205:13 234:11 235:1 247:18 250:22 292:22 293:2 applied 15:4 57:5 138:8 166:13 175:1,10 176:1,2 233:16 269:2 282:17 306:16 applies 58:16 139:14 175:18 266:15 271:13 apply 22:5,22 62:19 99:16 166:14 applying 198:6 242:22 273:1 appreciate 81:11 102:6 108:14 112:5 242:19 257:3 286:13 336:9,20 appreciates 248:4 appreciation 244:13 244:16 287:20 approach 82:15 98:13,16 127:14 135:11 138:3 331:13	approaches 11:4 135:10 approaching 119:15 appropriate 17:3 185:3 222:13 241:2,2 approximately 34:13 52:9 54:2 166:5 April 11:17 21:20 25:19 293:15 Aquila 3:6 architectural 217:15 area 128:15 190:7 228:6 248:14 251:8 290:10 areas 15:7 19:19 23:21 33:12 195:3 238:20 327:11 argue 229:17 230:10 305:9 318:5 322:15 arguing 82:17 argument 90:2 321:5 325:16 arises 138:8 arithmetic 185:4 Armstrong 2:4 4:12 4:13 6:14,14 81:9 81:10 84:20 91:22 102:12,14 103:17 105:18 107:2 109:12 110:1 112:12,20 115:11 116:8 122:11 132:22 145:3,12 146:17 147:4 152:20 154:18 157:8,19 158:5,8 158:11,17 159:1 159:18 169:5 170:15,19 171:10 171:13,19 172:9 172:22 182:2,11 182:17,20 183:3,9 183:13,17 184:5 185:6 238:18 242:1,13 246:4,9 246:21 259:10 270:13 276:2 288:5 290:22 304:19 305:11,14 305:20 333:1 334:14
--	--	--	---	--

<p>art 236:11 article 17:14,18 18:4 54:10 209:2 209:7 236:4,6,12 articulate 101:11 articulated 215:16 artificially 50:17 ashes 58:3 Ashley 2:4 4:12 6:14 81:9,10 87:13 102:12 103:13,15 106:1 109:13 112:12,21 115:11 116:8 118:7 122:17 132:22 147:7 154:18 162:12 169:6 242:1,20 304:20 305:18,19 333:2 334:7 Ashley's 185:14 191:18 ASHRAE 92:19 aside 14:1 82:16 asked 91:9 103:20 131:13 149:17 199:10 201:14 291:17 300:16 asking 84:8 91:15 100:13 204:11 206:22 289:8 293:10 333:6 asks 202:2 aspect 12:21 15:8 assembled 249:16 assembled 260:4 assembly 141:2 assert 171:14,16 asserted 211:21 212:6 assertion 212:3,4 assess 52:22 99:4 139:15 278:18 assessing 138:20 157:6,7 assessment 8:15 114:1 116:17 117:2,4,12 118:1 123:11 125:5,13 135:2 142:8 144:7 152:16 156:17 157:6,22 280:16 assessments 156:7 assets 285:2 assigned 285:3,22 assigning 135:16</p>	<p>associated 242:9 316:13 Associates 5:21 association 2:10,11 2:13,15,22 5:6,8 5:11,13,22 6:6 7:17 12:7,8 20:18 20:19 56:5 61:7 84:22 105:13 117:17,18 122:20 192:18 302:3 322:20 assume 19:12 90:16 94:15 168:4 187:7 188:22 189:12 219:19 241:11,16 254:3 261:8 assumed 52:8 135:19 141:6 184:14 219:18 225:16 226:19 227:1,5 253:14,18 assumes 17:16,17 17:20 19:1 37:15 54:15 200:18 219:22 264:2 283:8,16 332:8 assuming 15:2 55:19 56:21 132:16 189:11 225:4 245:12 275:11 294:1 assumption 19:5 139:19,22 168:2 172:1 174:6,7 181:5 213:13 231:22 245:15 247:6 267:1 285:16 304:18 assumptions 87:20 220:4 224:11 228:22 239:7,15 259:7 asterisk 306:11,12 306:15,16 asterisks 306:12 astounded 263:14 Atlantic 5:21 atmosphere 322:4 attached 205:21 attempt 45:13 91:3 attempting 14:15 39:11 attendance 336:21 attention 108:14 attest 287:10</p>	<p>attitudes 18:19 218:14 attorney 73:8,8 attractive 43:4 318:7 attributed 71:1 attributes 114:7 attuned 185:12 authority 8:14 16:5 63:1,19 64:6,10 64:18 72:16 75:12 76:1 automatically 223:6 automobiles 64:8 availability 276:4 330:17 available 9:17 19:8 21:18 29:20 30:7 30:18 39:5 59:5 99:5 117:14 133:21 140:7 209:1 214:1 237:16 239:9 243:5 247:20 279:21 285:10,19 290:18 300:14 305:21 321:20 Avenue 1:6 average 52:15 88:1 88:4 100:22 162:4 204:11,20,21,22 219:17,20 220:1 221:17 224:2 229:15 241:8 243:4 244:2 248:13,15 251:6,7 256:3,15 257:8 263:10 295:5 averages 206:17 averaging 88:2 avoid 19:7 51:3 76:11 96:17 avoiding 96:20 aware 90:17 210:7 216:18 awful 137:20</p> <hr/> <p style="text-align: center;">B</p> <hr/> <p>b-vent 118:10 back 7:7 48:4 49:8 68:22 72:22 73:13 82:14 91:7 95:13 96:13 97:10 102:4 102:4,7,15,18 103:4,11,17 104:15 108:10</p>	<p>141:12 142:7 144:1 145:15 151:10 153:6 154:17,19 157:22 158:8 159:18 162:22 163:10 169:5 173:6 181:4 185:2 190:6,20 191:17 195:13 196:13 202:21 207:18 208:4 212:2 213:19 214:1 215:12 235:22 239:17 244:6 260:1 261:19 268:3,6 291:7 294:6 304:7 321:4 324:16 325:15 329:17 335:2 back-up 259:16 backup 33:6 62:4,5 71:16 334:13 335:11 bad 188:13 237:17 319:6 322:2,7 badge 101:20 162:17 ball 88:2 265:5 ballgame 211:6 Ballo 2:6 7:22,22 330:20,21,21 Baltimore 4:10 ban 35:16 85:17 Barbecue 2:11,12 2:14 5:6,8 barbeque 7:17 12:7 12:9 83:11 85:1 90:8,16 105:13 117:18 122:20 192:18 237:1 barbeques 34:21 36:11 93:1,9 barn 106:8 Bart 217:3 Barton 3:5,5 5:9 75:4 79:16,17 82:2,12 87:11 93:15 100:2,7,8 102:14,22 104:8 105:22 108:9 111:7 112:5 114:21 126:10 128:9 129:5 130:6 131:11 133:6 151:8 153:6,10</p>	<p>173:11,12 189:18 197:5 198:14,15 206:3 207:3 208:18,19 210:4,5 212:22 220:3,16 223:13 224:8 229:2 235:21 244:4,5 254:1,2 261:6,7 262:19 263:17 266:21,22 269:19 271:16 275:1,10 277:11 286:18 base 39:18 85:12 151:21 160:10 175:17 206:18 225:8 240:11 257:12,16 272:15 272:22 273:5,8,21 274:2 310:22 based 31:12,16 40:15 41:2 51:14 57:19 98:19 99:6 99:12 103:9 104:10 107:4,8,8 112:7 113:4 122:15,19 125:6 126:2 135:16 141:4,14 144:9 145:5 156:14 158:2 162:4 163:20 179:2,4,20 184:3,13 186:14 201:13 205:2 207:3 211:15 213:17 215:11 219:1 225:15 226:5,6 233:9 249:3 253:19 255:21 256:8 259:7 266:3 270:8 271:19 286:2 299:6 300:10 303:20 336:17 baseline 139:22 141:16,20 142:13 142:15,18,20 147:16 151:3 163:21 174:19,21 175:1,1,2,11,18 175:18,19 176:1 178:14,17 basement 19:18 basic 12:18,22 14:21 15:5,12 174:15 245:17</p>
---	---	--	--	--

<p>basically 11:13 71:12 115:5 135:5 222:6 226:17 252:4 255:15 291:9 322:3 basing 213:13 234:10 basis 12:14 13:14 15:15 17:13 19:5 44:17 167:20 174:7 202:17 203:16 225:5 283:14 batteries 29:6,8 31:7 38:14 71:16 189:5,8,10,17 308:21 335:20 336:2 battery 28:6 29:18 30:11 40:11 47:9 47:19,22 189:4 204:16 333:10 334:5,11,12 335:10,11 becoming 211:22 beg 264:14 beginning 93:18 194:15 252:18 267:16 302:13 328:15 begins 54:1 behalf 23:22 behavior 16:2,6,11 17:9 18:18 19:2 22:15 198:12 210:14,16,20 233:15 234:3,5,10 234:20 236:2,10 237:4 277:12 327:8 believe 13:20 21:10 23:18 25:1 26:3 45:6 53:3 62:11 67:7 69:21 97:7 97:14,18 104:11 109:16 116:11 120:22 129:15 132:14 134:18 156:8 172:12,14 177:7 205:17 213:2,7 216:12 229:7 236:3 245:2 249:9 265:11 269:3 303:10 306:17,20 believed 107:10</p>	<p>believes 21:6 43:7 beneficial 60:19 186:19 277:9 benefit 31:9 55:20 56:22 58:14 71:3 71:17 159:2,21 195:15 203:2,15 229:12 230:3 274:14 311:3 benefits 19:11 56:17 60:13 84:17 114:4 155:3 203:16 229:8 230:11 231:7 315:16 benezene 319:8 benzene 319:7 320:4 Berkeley 3:18,19 6:18,21 45:19 163:14 297:6 best 14:10 44:16 131:18 156:1 216:3 290:4,18 better 42:20 82:10 92:9,10 151:6 176:6,11 189:22 199:15 264:10 269:9 271:14 279:17 282:11 335:18 betterment 293:19 beyond 52:4 big 33:19 117:6 134:6 162:20 191:6 291:11 296:12 307:16 311:5,22 315:19 325:11 326:1,21 330:14 335:5 bigger 288:15 290:20 322:16 323:16 biggest 286:22 bill 33:16 135:15,16 193:21 334:20 billion 274:12,14 binary 47:12 bins 228:18 biomass 321:3,10 birth 318:17 bit 32:4 66:18 121:19 124:18 125:14,20 127:4 134:11 147:8 178:11 187:12 216:7 229:5</p>	<p>238:19 263:7 275:7 297:9 303:22 318:21 326:10 334:18 black 321:16,20 322:2,4,5,15 blank 174:3,4 blanks 211:17,18 blew 244:7 blip 267:12 block 54:22 blockage 33:7 blow 44:8 blown 87:6 blows 84:3 board 212:14 boat 311:17 Bob 8:1 books 69:9 borrow 228:13 Bortz 2:7 5:18,18 34:9,9,10,17 59:14 89:14,22 90:6 91:6,9 97:14 108:22 109:3,8,21 112:10,14 114:13 120:22 134:5,17 134:17 136:10 137:14 140:14,16 153:2,9 154:15,17 156:6,16 157:4,12 158:16,21 161:11 161:11,14,17,21 164:19,22 165:3,3 165:9,13 166:1 168:13,13,20 169:1,16 171:12 171:18 172:6,12 175:12,12,20 176:5,10 177:2,10 178:20 179:2,8,10 179:15,19 180:2 180:12,14,20 181:9,13,17 182:1 182:8,16,19 183:2 183:8,10,15 185:11,16 190:13 190:16,22 191:2 191:11,14,21 192:11 194:2,5,16 195:9 198:14,14 198:18,21 199:2,5 203:11,19 207:15 207:22 208:7 209:16,16,20 238:8 241:11,11</p>	<p>241:15 242:12 250:11 252:13,20 253:1 254:20 255:18 258:6,13 258:21 260:6 271:3,8,10,21 276:15 295:10 296:22 297:2,10 299:14 300:2 302:10,12,19,22 307:8,16 308:5 310:7,15 312:8 324:19 325:3,11 326:15,18 327:4 327:14,19 328:7 328:14 329:4 bottom 85:12,13 155:14 166:16 178:16,20 230:16 241:16 256:17 260:20 284:7 331:2 bottomed 294:13 bound 226:14 283:7 box 28:17,18 30:5 32:21 74:18 91:14 162:9 186:5 191:20,20 318:6 324:9 boxes 11:12,14 238:16,16 bracket 240:18 brands 23:13 303:19 break 8:16,17 9:2 44:16 98:12 101:16,17,18 102:17 104:15 108:10 122:3 160:16 162:13,16 261:17,19 284:5 breakdown 158:1,4 breakout 151:11 231:14 brief 8:8,11 12:1,2 59:18 71:9,18 186:1 324:22 briefly 59:22 64:4 70:6 71:2 221:10 248:12 274:2 335:8 bright 290:7 bring 9:7 209:22 310:21 bringing 108:14 294:5</p>	<p>brings 133:1 177:13 250:20 broad 35:18 39:10 83:15 86:18 113:5 broader 244:15 288:15 297:4 broadly 85:1 broke 166:2,5 broken 241:19 269:21 Brookman 2:2 4:2,9 4:22 6:15 7:7,13 8:3 12:1 20:13 23:5 26:2,7,12 34:6,16 59:13,16 59:22 60:4,15 62:15 63:14,18 65:12 67:2,11,19 68:10,14 69:16,22 70:3 72:6,22 73:12 74:22 78:12 79:14 81:9 84:6 84:19 86:2 87:11 89:12 91:7,11 92:5,15 93:12 95:4,15 97:13 98:10 100:5,7 101:17 102:9 103:13 105:10,21 108:20 109:2 111:7,12,17 112:4 114:12,17,21 116:15 118:21 120:21 121:4 122:17 123:6,9 124:14 125:1 126:10 127:17 128:9 129:11,21 130:21 131:4 132:6 133:6,10 134:2,21 135:1 136:9 137:1,22 139:7 140:13 141:13 143:6 144:1 146:19 147:7,21 149:2 151:8 152:7 153:6 153:10 154:14,16 156:5 159:17 160:1,14 161:10 161:13 162:2,9 163:8 164:20 165:1,11,17,19 166:9 167:3,9 168:18,21 169:3 171:20 172:18</p>
--	--	---	---	--

173:9 174:17 177:1,8,11 178:8 178:19 185:9,14 185:17 187:1,11 188:20 189:18,20 190:3 191:22 192:15 193:11,14 193:20 194:4,10 194:19 195:11,22 196:10 197:5 198:13 201:9 202:11 203:9 205:9 206:3,14 207:14,19 208:3,9 210:4 212:11,20 213:5,15 214:6,17 216:4,15 217:3 219:8 220:3,14 221:15 223:3,7,12 225:20 227:19 229:2 230:13 231:11 235:7,21 238:7,15 241:10 241:13 242:18 243:6,11 244:5 246:3,8 247:3 248:9,21 249:15 249:21 250:3,10 250:15 251:4,15 252:12 253:7 254:1,14,19 255:2 256:18 258:7 260:5,13 261:5,17 261:22 262:4,19 263:5 264:15,17 264:19 266:4,21 268:1 270:2,14,21 271:2,7,9,16 272:3,6 275:1,22 276:17 278:2,12 286:6 287:18 288:1,4 289:9 290:21 291:2 293:20 294:5 295:9,12 297:15 298:3 299:13 300:1,3 303:5 305:18 306:2,7 307:4 310:6,13,19 312:6,14,17 313:10 324:18 325:10 326:14 327:20 329:11 330:20 332:2 335:6 336:6 BROOKS 199:6	BROOMAN 110:7 brought 222:11 BTU 30:10,20 47:5 47:7 206:5 252:21 BTU's 41:4 51:19 208:2 228:15 230:2 232:9,10,11 232:15 bucks 310:16 budgets 335:3 build 38:18,21 155:12 243:21 280:11 325:12 326:8 327:7 331:6 build-up 58:2 builder 172:8 177:21 builders 44:20 172:15 building 4:7 102:3 118:14 122:15 162:18 196:12,13 202:14,16 203:5 224:2,5 240:15 268:8,9 buildings 196:11 builds 325:6,6,11 built 37:10 39:1,6 53:21 105:16 179:13 built-in 106:6,12 119:4 bulk 10:13 237:1,7 237:8 bump 268:7 270:14 bunch 247:8 bundle 75:13 burden 23:2 42:5 99:13 203:2 279:7 burdens 59:9 burdensome 35:12 bureau 53:4 167:1 269:12,21 271:8 burn 51:20 324:9 burn-wise 55:15 burned 188:5 burner 46:14 54:22 87:4 130:2 148:5 186:15 188:1 204:6 206:4,16,21 208:1 219:13,14 219:15,16,17,20 219:21 221:11,17 221:19 222:1,4,5 222:6 223:2,15,16 223:18,20 224:9	burners 39:7 244:18 245:11 burning 16:3 19:20 22:19 23:11 27:7 29:5 35:17 36:6,6 36:7,7 37:9 39:15 40:8 41:3 42:11 46:11 49:8,9 51:10,11,13,14,17 51:18 52:1 54:20 55:5,9,16 56:1,13 58:9,12 59:1,7 125:18 132:11,15 132:21 205:21 308:8 314:7 316:11,11 317:9 327:19 330:15,16 331:21 334:8 business 7:10 26:16 31:18 35:4 42:17 42:18,22 43:17 44:6 45:2 86:22 133:22 178:3 253:4 270:4,20 289:22 290:2,3,16 290:17 299:4 300:10,11,13,15 300:17 310:10 312:13 328:9 businesses 31:12,17 32:16 34:3,18 42:14,17 43:3,6 43:13,22 45:1 61:10 62:13 173:19 279:2 295:2 300:7,9,15 305:3,4 307:19,19 308:2 button 18:14,16 236:22 245:8 buy 57:21 71:22 137:19 181:2 194:2,7 238:10 277:15 310:21 311:14 321:1 328:21 329:21,22 buying 42:10 190:17 215:15 311:10,21 buys 136:16,16 bye 336:21 bypass 247:16 byproducts 118:14	cabin 101:5 CABLE 270:16 cafeteria 162:20 calculate 195:15 256:9 272:21 273:4 277:1 313:7 calculated 232:22 233:1 277:7 calculates 248:14 calculation 233:9 calculations 151:3 calculus 64:16 Caldarena 20:15,16 Caldarera 2:9 5:12 5:12 California 23:17 34:14 call 69:10,11 70:16 78:17 103:3 137:15 156:2 167:13 191:6 202:7 228:2 247:15 307:18 317:16 called 44:5,14 65:21 70:10 97:3,22 182:18 314:12 320:14 calling 24:20 149:22 183:14 221:22 292:8 calls 35:16 46:3 56:10 Canada 87:9 213:1 213:14 216:21 221:4 228:21 235:10,12 250:19 287:3 Canadian 216:6,17 216:21 217:2 226:6 235:9,19 cancer 318:16 cap 300:11 capability 246:19 capable 47:20 48:1 capacity 22:13 29:21 30:11 60:17 223:20 279:6 312:10,12 capital 284:7,11,22 296:5 capture 92:9 169:3 243:2 282:18 297:21 car 310:22 carbon 33:6 70:22	313:1 316:20 317:8 321:2,9,17 321:20 322:2,15 324:11,11 cards 7:10 care 330:22 careful 126:16 292:21 Carolina 23:17 Caroline 2:17 72:10 Carroll 2:11 5:7,7 73:2,2 91:13 92:2 129:12,12,17 cart 90:4 case 33:11 68:21 96:8 117:17 124:10 129:20 132:19 139:18 140:1 142:20 146:4 156:3 178:18 188:17 192:4,8 196:9 222:2 227:12,13 227:21,21 236:3 240:11 257:13,16 272:15,16,22 273:1,5,5,8,8,21 273:22 274:2,5 284:20 294:10,20 cases 171:7 189:13 193:13 232:5 282:10 cash 279:9,17 280:3 280:9,11 282:16 catch 286:9 312:19 catching 161:16 catechol 319:7 categories 36:22 61:22 80:17,18 99:22 104:1 106:19 115:21 116:4 125:16 136:11 141:18 142:6 152:1 158:2 158:19 159:14 166:3,4 172:11 183:21 200:16 216:8 259:7 284:6 288:18 289:5,6 314:3,6 categorize 123:14 categorized 124:7 category 16:9 31:5 37:5 83:19 94:11 97:2 106:10 118:15 121:17
--	---	---	--	--

123:2 158:14 199:3 201:5 314:10,11 causal 271:18 cause 33:8 46:17 47:14 123:15 314:21 318:16,16 caused 16:17 323:18,20,22 causes 307:16 322:6 323:9 causing 69:1 230:8 cautiously 287:1 caveman 213:19 cavity 251:2 CC 170:10 cell 9:21 170:8 cellulose 319:2 census 53:5 165:8 167:1 251:9 269:12,21 271:8 center 38:12 centers 23:16 central 15:16 93:21 94:14 cents 41:20 CEO 12:6 certain 10:19 64:14 76:4 82:3 114:7,9 116:9 141:6 238:20 239:2 289:5,6 333:6,12 certainly 16:7 125:6 128:2 136:21 144:12 167:18 250:18 259:6 265:3,9 276:9 286:3,13 287:10 330:18 certification 30:15 160:8 284:14 285:8,18 286:1 296:10 299:18 certified 299:19 303:14 Cetaldehyde 319:7 cetera 143:4 166:6 273:18 CFR 316:16 chain 171:3 190:20 192:6 chains 183:20 challenge 62:2 217:8 challenges 37:18	61:20,21,22 challenging 28:3 29:11 chance 33:9 63:5 74:11,21 change 37:12 39:22 56:13 109:16 113:8 118:2 127:2 131:3 145:5 175:3 175:4 183:18,19 218:15,17 240:12 265:3,5,9 295:2 296:15 298:10 313:20 320:22,22 332:9 334:5 changed 41:12 66:4 82:6 157:6 204:15 265:2,3,8 276:5 276:10 302:20 changes 18:19 103:4 219:2 276:12 296:15,16 302:7 changing 128:16 129:2 218:15 322:5 channel 164:17 166:8 173:4 178:14 181:7,11 181:19 184:16 channels 44:11 164:1,3,10 181:5 182:5,7,9,12 chapter 301:11 303:10 304:6 306:11 Characteristically 218:6 characteristics 12:12 58:7 87:22 113:4 198:10 characterization 8:18 characterize 188:10 characterized 107:21 163:22 245:6 characterizes 196:14 characterizing 117:9 charge 56:8 86:6 310:10 charged 86:7 charges 191:4 charging 50:21	chart 39:20 143:8 144:5 212:18 241:16 257:4 258:8 306:15 cheapest 155:6,12 check 249:2 chemical 319:1 chemists 319:1 chimney 58:2,3 137:13 322:9 323:7,7,8 324:8 chimneys 230:4 choice 25:3 34:1 39:13 46:22 58:13 292:13 312:4 314:16 choices 314:18 choose 40:1 49:7 78:17 221:12 314:16,17,19 318:3 chose 114:1 chosen 41:22 circuit 138:7 circumstance 71:13 citation 67:11 cite 322:19 cited 17:17,20 54:9 56:19 323:1 citing 17:14 215:2 citizens 63:12 civilian 323:20,20 324:1,2 claimed 25:14 claims 259:16 clarification 13:12 24:2,9 25:18,21 251:17 291:12 clarify 13:19 14:5 21:16 22:4 116:1 175:9 184:20 242:2 261:7 270:22 303:11 306:1 clarifying 24:13 105:21 270:21 clarity 76:16 100:15 147:9 149:17 class 90:3 176:19 classes 99:18 119:6 classification 300:9 classify 64:10 306:14 clause 77:10 clean 108:1 269:8 316:3,16 317:20	318:10,11 cleaner 55:13 58:4 clear 14:3 16:5 50:8 50:10 60:16 102:6 113:9 203:4 247:14 clearer 97:8 188:19 clearing 152:12 167:2 clearly 76:7 climate 62:2,6,8 224:3 246:18 292:15 313:20 320:22,22 321:13 335:14 climates 235:15 282:11 clock 261:21 clogged 148:1 close 108:21 153:3 183:8 203:9 205:19 293:21 308:18 312:7 322:9 323:14 332:4 closely 22:16 closets 19:17 closing 9:6 50:6 291:4 292:4 294:2 336:6 closure 335:8 coal 36:6,8 330:8,9 330:12 coast 56:12 170:11 codes 92:21 coefficient 266:12 268:14 269:1 271:13 coffee 102:1,2 coincident 226:16 cold 32:20 33:1,1,2 33:13 62:2,6,6,8 220:19 230:8 243:15 245:7 246:18 323:7 colder 282:11 collect 238:2 collected 15:1 107:6 173:21 207:4 276:8 collection 12:15 column 230:18,20 231:4,6 258:1,3 combination 135:10 177:21 224:6 combinations 27:10	27:12,17 combine 54:17 269:17 combined 76:9 combustion 118:14 315:7 317:3,4,13 317:15,19 319:5 319:20 320:3,3,11 320:16,17,21 321:2,10,13,14 322:8,17 323:19 324:6 come 57:1 102:4 131:20 132:5 151:13 152:14 185:2 192:19 206:5,10 208:20 220:4,21 236:20 251:9 259:22 289:16 304:7 312:1 313:6 316:6 comes 122:7 128:19 136:5 144:16 191:8 216:19 249:14 258:9 335:19 Comfort 3:17 6:7 comfortable 63:3 222:22 coming 4:20 11:19 57:15 59:20 100:19 154:7 165:6 187:8 195:17 206:9 219:3 336:8 commencing 63:1 comment 11:7,13 11:16,17,20 13:6 13:11,16,17,18 14:6 15:11 21:19 21:20 23:3 25:19 25:20 27:4 60:17 64:4 67:4 70:6 71:2 74:8,11,18 74:19,20 78:11 88:11 90:13 91:14 91:14,20,21 92:1 93:14,16 94:6,7 95:3 101:2,3 109:14,17 110:5 111:4,6 114:10 116:14 129:5 130:22 131:4,9 140:19 141:11 151:6 157:18 161:8 162:9
--	--	---	---	--

165:21 171:21 173:9,13 189:19 189:21 194:19 201:10 207:12 209:1 212:22 213:17 215:8 216:16 217:5 227:3 238:15,16 242:13 243:11,12 254:9,10,14 255:3 255:4 260:2 269:8 270:19 286:4 292:7 293:8 296:11 301:18,22 310:3 312:15 327:21 330:3 335:9 336:11,17 commented 95:6 238:22 commenters 93:13 commenting 236:1 comments 4:19 8:11 9:12 10:16 20:14 23:3 27:2 34:7 43:10 60:19 62:19 68:6 72:7 73:7 75:1 79:15,16 84:9,22 95:13 100:9 102:19,22 104:16 105:6 108:7,11 112:6,7 124:15,19,22 125:10 126:2,8 133:16 141:9 162:11 168:22 184:14 190:3 235:11,11 242:4 242:14 250:14 253:9 261:5 269:11,17,20 275:20 276:1 288:2 289:11 291:4,10,19 296:14,20 297:11 297:16,18 298:4 304:7 306:8 310:14 329:13 commercial 122:2,4 122:15 224:6 Commission 70:21 committee 132:3 common 46:18 129:9 132:17 190:8 319:16,16 commonly 44:14 99:22 110:11	communication 46:7 companies 20:20,21 40:4 45:4,6,7 177:22 184:9 293:5 299:3 302:5 302:6,11,14 304:10 328:21 companies' 312:10 company 3:13 5:19 6:2 7:15,19 8:2 31:5 34:10,11 61:7 160:4 165:4 177:15 178:7 184:3 214:22 298:9 303:18,20 303:21 304:13 307:1,2 comparable 329:5 compare 325:4 329:4 compared 41:6 98:2 99:6 134:8 271:4 272:15 317:2 323:22 325:2 329:6 compares 82:11 309:14 comparing 139:13 compelled 275:11 compete 51:10 281:20 300:21 308:8 336:3 competes 267:19 competition 25:2 292:13 competitive 32:13 281:18 complete 9:16 26:9 completed 68:21 95:19 265:20 completely 17:7,21 18:2 19:3 23:1 24:21 75:12 88:3 126:12 128:14 130:12 153:20 224:11,12 237:5 259:20 267:14 292:9 completion 53:11 completions 53:4,7 53:8,16 54:5 262:16,17 complex 313:13 complexity 266:2 compliant 284:19	complicated 52:21 282:4 321:18 complicating 28:22 195:8 comply 67:17,17 115:22 274:5 281:4 284:4 296:4 303:14 complying 37:18 component 119:21 139:3,3 145:5 166:14,15 229:21 251:2 253:16,17 253:21 284:22 components 28:5,13 28:16,18,20,22 29:1,10,11 37:15 38:17 40:14 99:19 141:1 255:10 281:22 301:5,9 303:16 composed 43:3 compound 320:12 320:15,19 compounds 318:22 319:3,17,20 320:1 320:7 compromise 12:20 COMPUTER 270:16 concealed 308:14 concedes 37:6 concentrating 108:6 concept 100:12 286:16 concern 17:3 96:16 188:8 250:9 281:14,19 286:22 300:19 301:1 309:1,5 330:16 concerned 61:10 62:10 80:3,22 120:11 125:4 138:3 139:22 295:21 concerning 13:14 15:5 17:14 61:18 concerns 15:16 20:3 20:7,9 24:1 46:10 76:14 103:7 219:1 281:10 301:6 concise 9:19 conclude 80:8 concluded 99:10 217:7 conclusion 50:15	57:8 79:11 conclusions 236:9 concur 269:11 condense 323:6 condition 186:17 conditioning 6:4 169:9,14 231:9 conditions 138:19 224:3 292:14 conduct 279:8 280:6 conducted 95:19 278:17 279:15 conducts 22:2 confidential 117:15 126:3 152:2 161:7 207:1 confidentially 239:10 configuration 211:13 confines 48:5 confirm 162:3 confirms 70:21 conflict 251:1 confusing 36:15 confusion 81:12 104:19 123:16 Congress 75:15 76:2 321:19 connect 171:17 225:3 connection 243:20 271:18 consecutive 54:16 222:5 conservation 4:6 11:5 13:5 22:4,22 24:20 64:7,13,21 65:10 68:8 73:19 84:17 98:17 99:1 262:9 272:9 276:22 312:9 conservations 67:6 conservative 44:17 147:6 221:14 conservatively 40:16 204:21 conserving 287:5 consider 18:3,17,18 42:16 43:15 68:7 73:17 87:7 100:4 112:15 171:2 200:8 213:10 235:18 277:13,21 287:6,16 331:9,12	336:15,17 considerable 47:15 57:1 123:15 consideration 9:13 116:13 137:17 176:17 210:3 230:12 233:13 258:13 295:8 considerations 140:10 considered 15:14 36:9 69:13 98:17 99:8 100:10,16,18 114:6 117:20 136:7 148:19 210:19 214:15 238:12 243:20 300:13 302:6 304:1,14 322:2 considering 43:14 292:21 consistent 36:21 172:4 210:1 221:7 295:22 317:6 consistently 9:11 290:5 consists 284:10 constant 35:17 39:15 40:8 41:2 46:11 54:20 125:18 132:11,15 132:21 234:3,10 275:17 constraints 140:4 140:10 146:4 constructed 28:9 200:21 construction 28:14 31:3 53:12,19 164:4,7 168:16 178:13 179:4,14 180:5,18 182:15 184:12 308:11 315:4 constructive 20:10 100:17 101:6 108:15 111:3,6 consultant 2:19 7:12,14,20 60:6 117:1 160:3 Consulting 3:6 6:20 7:2,4,6 117:1 206:16 278:15 295:21 consume 51:19 consumed 189:1
--	---	--	--	---

199:11 205:13 225:12 consumer 16:2,6,11 16:16 17:9 18:10 18:18,19 19:2,12 22:15 25:3 31:20 32:10 38:14 39:13 39:21,22 40:19 41:5 46:19,21 47:4,12 49:5 50:9 51:18 52:10,16 59:4 64:8,11 70:20 71:17,19 74:3 107:14 131:3 163:20 164:2,7,8 174:22 175:2,5 176:3 177:19 181:8,16,21 183:5 184:7 193:20 210:14,20 215:18 218:14 236:10 240:2,14,20 241:4 241:17,19,21 256:14 264:22 267:7 270:8 273:9 274:14 277:4,4,12 292:13 299:7 309:4 312:4,5 314:16 315:2 329:2 consumer's 19:4 46:22 57:18 193:14 201:13 240:1 consumers 16:3,17 17:1,7 18:15,21 19:6,13 22:15 23:20 33:13 34:2 37:2 40:6 42:9 46:17 47:2,6,14 49:2 50:11,19 51:13,22 52:12,18 55:6,15 56:13 58:11,13 71:8 74:5 143:3 203:1 213:21 215:11,14 257:17,18 261:2,3 277:14 311:21 315:2 326:6 consumes 142:15 consuming 188:1 consumption 15:20 15:22 19:7 24:3,6 26:22 57:13,15 64:17 76:10 99:8 101:4 130:8	143:13 179:5,22 185:20 188:14 189:4 196:16 225:13 245:10 272:14 273:17 contact 45:19 73:8 contacted 300:15 contemplate 109:11 contemplated 109:6 content 59:19 61:3 62:16 73:13 280:12 continue 42:10 93:13 218:15 242:15 306:3 311:14 336:11 continued 54:13 156:16 continues 218:17 continuous 23:19 160:7 contracted 193:7 contractor 164:6,8 165:14,16 166:21 166:22 180:22 181:1,20 182:22 182:22 183:1,4,6 183:15,16,19 190:8,10,12 191:3 191:19 192:4 193:2,5,9,18 195:2 239:11 250:21 contractors 32:3 45:17 165:5 167:12 169:10 183:12 193:6,6 195:4 contrary 55:21 contrast 52:2 283:15 contribute 321:12 contrived 71:15 control 17:6 18:4 19:4 27:22 28:4,6 29:19 30:1,7,9,12 30:18,22 47:20 48:1 133:19 137:6 146:16 147:10,20 148:8 149:4,5,10 149:13,14,20 150:8,11 151:1,6 210:21 214:9 218:13 236:10 245:8 246:14 255:11	controlled 222:2 223:6 controls 2:21 6:11 18:11,14,15,17,21 18:21 29:16 30:4 71:18 129:14 131:14 132:2 170:5 211:7,9,14 236:12 311:7,8 convenience 329:2 334:19,22 conversation 30:9 82:18 97:11 157:20 336:21 conversion 281:2 284:3,6,7,9,11,12 284:16,22 285:3,6 285:21 298:4 convert 135:20 139:17 312:22 converting 139:19 converts 243:13 273:15 cooking 33:19 36:10 94:15 107:20 cooling 186:21,22 187:7 201:19 223:22 225:9,19 231:8,9,19,20 232:10,17,19 cools 324:10 cooperate 45:18 cooperated 45:9 cords 308:21 Core 266:12 corners 19:18 correct 93:17 112:13,14 130:19 145:12 148:18 150:17 169:18 176:9 185:2 194:14 223:12 231:22 275:14 corrected 12:19 correctly 202:19 correlatable 264:8 correlate 53:14 269:9 326:5 correlated 262:14 correlating 330:3 correlation 263:2,9 266:10,11,13 268:14 269:1,6 271:13,18 272:2 326:16 327:5 330:2	correlations 124:20 326:18 cost 31:7 32:7 38:6 39:14 40:8,17 41:7,17 48:21 50:17,20 52:7,16 58:10,13,21 59:6 133:18 135:7,12 138:21 140:10,22 141:21 142:1 145:4,4 146:4,8 147:1 151:2 155:15 158:17 159:2,21 160:4,8 160:10 175:16,17 189:4,6,8 192:5 194:18 202:18,22 203:7,16,17 239:21 240:2,9,9 240:13,13,18,19 240:19,21 241:5 241:16 242:6 243:2,4,8,16 244:1,2 245:14 253:14,15,18,21 253:21 254:21 255:16 260:18 261:4 267:21 272:17 273:6,9 284:3,16 285:3 298:11 299:15,16 299:17,21 301:7 304:17 310:15 311:3 314:22 318:4 329:6,7 330:17 334:6 335:1 costed 114:2 255:13 costing 189:15 costs 8:18 19:10 30:15,16 32:19 40:3,18,19 41:5,9 50:16 74:4 114:4 134:20 135:16 138:4 141:8 155:2 156:1 161:2,5,18 163:16,17 175:7 175:13 176:6 185:21,22 240:2,5 240:21 241:6 243:18,22 249:20 250:4,6,8 253:15 255:9,18 260:18 267:11 272:18 273:4,7 280:16 281:2,3 282:18,19	283:11 284:4,5,6 284:7,9,11,12,22 285:6,8 286:1 296:5 298:4 299:20 308:22 Counsel 5:9,11 Counsel's 6:13 count 188:7 302:2 303:17,19 counted 186:19,21 countless 27:6 country 34:19 45:5 54:5 56:8 87:9 195:3 303:22 330:9 couple 76:17 100:3 100:9 102:19 103:1 117:11 123:11 139:10 148:15 149:6 151:11,18 201:12 206:11 229:9 232:10,14 253:1 263:15 265:10 291:4 295:6 299:9 331:1 course 9:9 11:7,8 60:20 73:5 100:11 109:16 118:9,11 118:17 121:2,8,12 121:17 133:4 136:3 141:1 202:6 281:8 288:8 300:17,18 336:15 cover 10:14 64:18 75:8 79:21 81:7 83:2,11,11,12 85:8 91:5 93:9,9 109:3,8 112:11 115:6 116:19 162:16 coverage 14:9,10,13 21:22 24:15 64:16 65:4 66:13 68:7 73:7 88:21,22 95:6 102:21 104:17 105:3 110:9,21 113:13 113:15,16 115:2,5 122:6,12 covered 9:8,20 13:22 16:9 24:4 35:14 36:20 64:11 64:21 75:16,17,18 75:18,22 76:6 81:1,6,7 82:1
---	---	--	---	--

87:15,17 89:17 93:1,6,7 97:2,8,9 100:12 122:14 162:15 166:18 197:8 215:21 219:11 238:17 covering 94:15 156:10 covers 77:21,22 78:1,1 79:21 93:19,20,21,21 167:11 175:5 craft 92:8 108:12 crap 299:1 crawl 210:22 crawling 237:2 create 202:14 203:5 created 58:22 65:16 268:22 305:7 331:19 creates 33:5 305:5 creating 29:2 credibility 214:5 credible 17:11 credit 321:9 credits 277:5 creosol 323:4 creosote 58:2 cresol 319:7 crimes 86:6 criteria 64:15 73:16 313:20 316:14,14 316:19 317:20 318:8 criterion 84:6 critical 14:21 15:2 55:17 121:2 246:2 criticized 237:15 cross 77:1 162:5 crunch 272:1 crunching 275:15 crystal 265:5 cultivated 248:3 cumulative 37:16 273:6,8 279:6 curiosity 227:9 curious 159:5 current 12:17 24:3 49:14,19 133:17 179:4 189:3 248:15 currently 11:17 19:8 29:22 35:18 38:3 65:10 67:6 81:15 142:6,14 160:6 233:4 261:2	285:11 custom 27:20 customer 21:1 57:19 131:19 172:21 246:15 customers 21:1 57:19 59:1,6 193:2 247:21 286:19 332:15 cut 32:3 193:22,22 CYBASKY 129:18 cycle 188:2 214:13 219:16,17,20,22 220:18 221:11,17 221:22 222:10,19 223:6 270:4,20 273:14 274:11 331:13 cycles 219:15,21 222:4,5 223:16 273:1 331:3 cycling 223:11 cylinders 22:12 Cymbalsky 2:3 10:22 11:1,2 63:21,22 67:14 73:1,14,15 78:10 90:9,13 98:14,15 101:14 109:5 110:22 114:18 116:18 122:13,18 129:4,16 130:5,13 142:22 156:12 157:1,9 161:16 190:5,14,19 191:5 191:13,17 194:11 200:3,12 208:4 212:9 234:2,7,12 235:2,5 236:15 237:6,11,14,21 238:5 249:11 251:20 252:21 253:3 258:8 260:11 261:14 268:13,22 271:12 325:13 326:17 327:2,6,16 328:1 328:8 329:1 336:7 336:8 Cypress 190:10 191:8 194:22	daily 208:15 212:18 damage 33:8 60:10 248:4 323:21 324:3 damaged 29:2 Dan 6:5 Dana 3:7 63:5,8 67:2 69:16 125:1 125:2 131:7 137:22 138:1 147:7,21,22 149:16 162:2 171:21 172:18,19 213:15,16 214:8 220:14,15 242:18 247:3,4 250:16 286:6,7 287:20 Daniel 2:22 dark 33:14 Darlington 3:2 7:1 7:1 data 14:21 17:11,14 17:16,17,17,20 53:18 100:21,22 104:7,9 105:14 106:5 107:6 114:10,19 117:17 122:19 123:3 128:21 141:4 151:13,21 153:13 153:15 154:4,13 158:2 164:15 165:4,8 166:11,16 167:1,18 168:1,1 168:10 169:8 170:21 171:6 173:4,7,15,22 174:6,11,15 179:6 179:7 186:13 189:22 196:16 197:6,8,10,10,12 197:17,19,22 198:2,5,7 199:20 200:1,18 201:3,4 201:12 206:18 207:3 208:20 209:8,8 210:2,6,7 210:9 211:12,18 211:18,19,21 212:1,5 214:15 215:22 216:6,14 217:15,22 218:5,6 218:10,11,18,19 224:14,21 225:2,3 233:15 234:9,10 237:7,9,17 238:2	239:6,8,9,14,17 242:4,15,20 244:1 249:8,10,13 252:1 254:9 256:8,13 257:6,21,21 259:11,12,14,16 260:3,4,12 266:16 269:12 275:17 276:7,13 286:5,19 298:21 299:2,11 326:13,15 328:2,3 328:7 date 4:16 213:18 329:18 Dave 7:14 160:3 David 3:6,19 6:21 163:13 312:19 Davidson-Hood 2:17 72:9,10 day 3:5,5 5:9,9 8:5 9:5,20 75:5 79:18 82:12,13 84:8 87:12 93:16 100:3 100:6,7,8,8 106:1 108:17,19 111:8 111:14,19 113:19 113:22 114:8,9,22 116:1 126:11 127:10 128:10 129:1 130:6,6 131:16 133:5,6,7 151:9,17 153:11 162:15 173:12 176:12,20,22 189:19,21 197:6 198:17,19,22 199:3,16 200:10 200:13 206:4 207:2,3,6 208:19 208:19 209:12 210:5,5 212:1,4 217:4 220:4 224:8 224:8 229:15 232:12 235:22 236:17 237:9,13 237:20 238:3 244:6 249:19 250:1,5 254:2,2 254:10 259:2,18 261:7,12,16 262:20 266:22,22 271:17,22 272:4 275:2,10,18 277:11 288:8 297:8 300:19 305:12 335:9	days 108:7 213:19 229:14,18 329:17 333:9 deadline 21:20 23:3 25:20 293:16 deal 213:21 246:18 dealer 32:16 177:20 195:1 235:12 dealing 119:8 277:22 death 55:8 70:22 deaths 323:20 324:1 debt 256:9 decade 265:10 321:16 decades 265:10 December 65:5 66:9 68:13 decide 46:21 307:9 decided 196:17 decision 267:10 decisions 311:21 deck 11:11 208:5 decline 309:4 declined 18:8 declining 32:9 49:18 327:17 decorative 29:13 36:19 37:3 51:16 52:3 86:16,17 96:11 98:3 220:17 222:12 223:9,11 225:17 248:3 decrease 19:10 32:1 278:8 decreased 266:19 294:22 deemed 229:16 deeper 11:16 defeat 71:17 defects 318:18 defer 122:9 205:4 206:12 deficient 12:17 define 13:21 14:10 65:8 85:6 187:18 221:5 defined 15:21 25:1 85:12 108:4 119:12 128:3 142:14 318:10 defining 113:4,14 150:12 187:16 definitely 64:1 72:18 91:22 114:19 290:6
--	--	---	---	--

D

D 4:1
D.C 1:7 4:8

296:11 304:5 331:11 definition 14:7 22:3 22:21 24:12,15,18 27:2,3,4 35:13,17 35:19,20 36:5,10 36:14,17,20 65:6 68:2 69:7,7 74:12 74:21 76:16 77:11 77:20 78:2,11,14 78:15,18,21 79:9 79:10,15,19,20 81:16,16,21 82:6 82:9,11 83:15 84:10,14 86:18 87:15 89:5,5 90:10,10,12 91:1 91:4,15,18 92:1,9 93:4,14,18 94:2 94:16 95:18,22 97:15 98:22 99:9 99:17 100:11,13 102:20 103:6 104:11,17,20 105:7,9 107:11 109:7 111:11 112:21,22 113:3,9 113:12,12 117:8 119:8 132:11,14 132:17,20 148:21 156:9,10,13,15,21 157:7,13,14 170:17 198:19 215:13 291:13 305:4,5 definitional 111:8 115:1,3 215:12 definitions 92:19 96:10,17 97:5,6 108:4 112:8 definitive 131:14 132:5 degradation 320:19 degree 229:14 degrees 229:16,19 Delaquila 3:6 7:14 7:14 160:3,3 delicate 248:1 delineating 24:11 291:13 deliver 20:22 37:1 290:5 delta 147:5 demand 18:10,20 32:10 126:16 129:6,9 132:19	212:7 270:8 299:7 309:4 312:5 demonstrate 295:16 demonstrates 247:5 demonstrating 17:11 Department 1:1,5 2:1 4:8 9:11 10:4 35:7 62:20 65:17 81:13 105:6 165:19 330:6 331:9 Department's 305:1 depend 155:17 depending 46:22 172:21 196:7 225:19 226:3 depends 90:22 250:7 depict 145:7 depicted 106:22 110:9 depiction 130:15 depletion 118:17 119:3,21 146:15 Depot 177:17 depth 27:8 depths 196:13 derived 161:6 deriving 313:3 describe 110:18 described 41:15 describing 8:13 description 24:14 321:21 design 19:3 24:21 30:15 91:3 98:21 99:3,6,10 133:2 135:11,13 139:4 143:13 153:22 210:10 218:16 292:9 293:3 298:13 designed 15:19 17:5 25:13 27:15 36:15 36:16 37:1,3 40:14 42:8 46:12 49:9 50:5 84:4 90:18 107:15 108:2 126:19 130:7 153:22 154:2 202:6 244:21 308:7 designing 37:5 90:21 designs 25:10,12	292:22 293:2 desire 29:20 desired 131:18 despite 35:9 112:16 detail 60:14 62:17 139:4 162:13 167:12 169:4 282:15 detailed 60:19 104:20 288:1 331:10 detection 70:10 71:14 determination 64:16 65:4,7 68:4 68:6,20 69:4 72:13,19 73:7 78:16 88:21,22 94:4 95:8 96:6 97:12 102:21 104:18 110:2 113:13,16 115:6 203:22 determine 135:7,11 163:20 175:2 185:19 203:1 223:14 226:9 251:7 256:6 303:11 determined 31:10 68:19 186:4,7,12 188:14 204:2 206:12 219:12,14 219:18 223:18,20 225:9 226:15 240:6,7 241:4 253:19 determines 130:1 determining 73:19 135:15 206:9 detracts 38:15 detriment 57:1 develop 45:12 133:19 247:13 248:12 279:20 280:8 developed 29:16 79:1 126:13,13 131:15 174:18 240:14,19,21 280:1,19 284:2 286:2 287:15 developing 131:13 development 124:9 138:21 device 38:1 48:9	49:2 54:21,21 70:10,16 71:2 126:18 150:7 160:10 203:3 205:21 devices 126:18 150:10 245:9 diagrams 182:13 dial 236:22 dialogue 12:15 20:9 21:9 73:10 95:14 291:6 336:9 diamond 198:16,20 199:9 dibenzofurans 319:8 die 275:5 difference 53:6 92:20 119:17 122:5 134:6 135:7 138:5 144:22 146:2 157:9 175:10 240:10 271:4 272:14,17 273:2,6,7,10 301:2,7 307:14,17 differences 18:3 27:7 35:10 37:17 61:11,14,21 122:8 139:16 different 13:21 14:19 16:8 17:21 27:10 36:18 37:5 37:7 39:7,8,8 46:21 57:22 61:16 75:13,21 76:11 81:5 88:3 95:17 96:4 99:21 107:21 111:13,17,22 114:10 115:21 117:11 123:14 124:6 125:14,16 128:12,14 138:11 144:18,20 145:22 149:18 150:18 153:9 154:21 155:9 156:4 157:5 158:1,18,20 162:6 169:21,21 170:16 170:18 172:3,15 172:20 177:14,22 183:21 184:3,16 184:22 189:12 191:20 194:12 195:7,7 196:7 205:15 207:18	210:2,13 211:6 215:15,17 223:1 224:13,18,20 237:5,7 242:22 243:1 254:3,11 257:15 259:13 286:16 295:7 297:22 309:8 325:1 331:18 334:10 differential 297:22 differentiates 184:11 differently 156:19 176:15 194:12 278:21 difficult 12:11 38:5 38:10 56:9 78:15 178:6 184:21 218:21 286:18 330:2 difficulties 16:16 difficulty 106:3 265:13 digging 125:13 diligence 159:3 diligences 243:2 diligently 75:5 287:12 diminish 60:17 dioxide 313:1 321:2 321:10 Dircks 5:14,14 23:7 23:8 26:4,4 184:1 184:1,6 214:19 215:3,7 269:10 291:3 direct 19:6 44:5 62:1 95:20 96:5 96:14,22 118:10 172:14 177:20,20 177:21 184:10 219:19 220:5 230:18 277:14 279:5 323:21 324:2 330:2 directed 15:18 79:20 direction 162:21 218:9 291:6 293:9 directions 75:5 directly 36:2 74:16 77:8 104:8 120:8 190:8 230:19 300:16 322:12 directs 73:17
--	---	--	---	--

<p>dis-benefit 136:14 disagree 43:10 disagreement 239:15 disallow 24:22 292:10 disallowing 135:8 discharging 29:9 Dischner 2:8 8:1,1 disconnect 138:14 DISCONNECTED 270:17 discount 256:5,10 256:11,15,16,17 256:20 273:20 274:14 275:7,8 discounted 241:1 273:10 274:12 279:9 332:7,20 discourage 316:11 discouraged 315:3 discourages 55:6,21 discouraging 58:22 discrepancy 235:18 discretionary 267:9 discuss 14:5 15:10 20:6 60:13 125:20 279:1 282:1 discussed 121:9,18 125:19 178:16 241:6,7 280:13 284:20 299:17 301:11 308:10 310:4 331:21 discussing 65:9 97:10 136:5 156:7 278:15 307:15 discussion 20:12 22:9,14 83:22 93:18 101:5,7 113:6,7 124:18 222:12 301:19 306:6 discussions 61:13 242:16 disjunctions 76:19 disposal 327:13 disproportionate 38:8 270:5 disproportionately 42:6 distance 54:6 distant 326:3 distinct 308:4 distinction 145:20 distinguish 150:3,6</p>	<p>202:4 distinguishes 149:4 distinguishing 121:12 150:13 distribute 87:2 169:10,12 184:18 distributed 215:1 distributing 26:18 distribution 23:15 34:18 44:10,13,14 44:21 115:19 154:21 155:18 156:2,3 158:18 164:1,3,10,17 165:21 166:8 171:2 172:3 173:4 177:5,16 178:14 181:5,7,11,18 182:5,6,9 184:10 184:17 187:10 192:6 215:10 225:15 226:5,14 227:6 256:12,16 257:13 261:10,15 273:18 274:1 275:5 distributions 226:8 226:10 228:22 256:1 275:16 distributor 161:19 161:21 170:7 177:10 181:14 190:18 distributors 21:5 31:19 45:3 61:8 167:6,14,15,21 168:5,6 169:11,19 170:14 173:3 307:13 District 56:12 diversity 187:5 divided 156:19,20 division 123:14 251:10 divulge 152:9 divulging 152:13 Dixon 170:10 docket 103:22 297:4 document 21:12 65:19 123:19 187:4 199:14 205:7 226:1 231:16 257:5 303:10 322:1,21 documentation 13:14 21:18 25:18</p>	<p>260:9 documented 70:22 239:4 documents 239:5 Doe 2:3,4 6:12,14 11:2,14 12:11,13 13:19,20 14:6,15 14:20 15:1,11 16:5,19 17:8,12 17:16,16,20 18:2 20:7 21:7,14,19 21:21 22:1,7,10 22:13,20 25:17 27:3 31:10,22 32:4 35:16 36:17 37:4,6,11,15 38:2 38:16 39:11,13,17 41:7,11 42:2,5,15 42:17,21 43:7,14 44:8,18 45:9,10 45:13 46:2,6,8 47:11 48:7 49:10 49:10,12,14,19 50:2,13 51:12,15 52:8,11,17,18 53:2,22 54:6,19 55:19 56:19,21 57:6 63:22 64:10 64:16 65:3,6 68:3 68:6,7,16,21 69:8 69:14 73:17 75:12 80:3 81:10 85:15 89:16 91:14 93:7 95:9,13,21 96:3 98:16 99:2,4,10 99:21 100:10,18 103:3,5,20 104:11 104:14 105:1,14 106:17 109:13,20 111:5 112:21 113:3,8,15 115:12 116:9 119:5,15 122:6 128:13 129:4 132:13 133:2 142:22 154:18 159:6 163:22 164:2,14 166:11 169:6 173:6 174:18 190:5 196:14 208:12 219:21 220:8 225:17 242:1 248:14 253:12,17 256:7 256:10,13 261:14 262:9,13,15,17</p>	<p>263:8 266:6,10,14 266:18 268:13 276:22 277:7 279:8 286:11 288:10,21 289:1 294:9 300:6,8 305:5 313:2 325:13 332:19 336:15 DOE's 12:17,21 13:15 16:13 17:3 24:3 32:3 35:5,13 36:14 37:18 39:2 41:22 42:1 43:19 43:22 45:17 46:16 46:16 47:6,14 49:1,16 50:10 51:1,5,7 52:20 54:15 55:11 57:17 58:12,16 75:20 113:3 123:16 332:7 doing 40:6 69:3 90:7 155:16 181:21 189:16 239:11 289:4 299:10 309:3 310:12 313:15 331:10 333:16 dollar 175:13,16,17 175:19,22 176:1,2 176:3 252:10,16 dollars 175:17 176:7,7 274:13,13 274:15 283:13 284:10,12 296:6 299:18 323:21 324:2 domestic 63:13 279:5 287:2 300:9 dominant 159:12 don' 306:21 Donuts 102:2 163:2 163:3 door 106:8 232:6 dots 171:17 double 54:4 227:1 249:1 doubled 259:1 310:18 doubt 147:14 214:10 Doug 2:2 4:9 11:1 64:2 73:15 98:16 downstream 114:3 158:12</p>	<p>dozen 30:8 draft 230:6 324:9 dramatic 59:9 dramatically 18:9 61:16 62:14 315:8 315:8 drastic 298:10 draw 214:4 244:17 drilling 139:8 drive 42:4 308:21 309:3 driver 18:7 296:12 296:17 drivers 296:2 driving 18:19 140:22 drop 199:1 247:8 281:15 dropping 57:11 drops 199:3 drug 86:12 dual 149:11 due 21:10 32:14 72:17 101:18 159:3 230:22 266:7,19 270:6 296:15 334:19 Dunkin 102:2 163:2 163:3 duty 331:3 dwelt 265:17 dwelling 229:20 dwelling 53:20 dynamics 281:18</p> <hr/> <p style="text-align: center;">E</p> <hr/> <p>E 2:19 3:9 4:1,1 earlier 102:16,22 104:14 112:22 117:19 118:6,6 121:8,10 125:11 125:19 129:8 164:9 184:14 206:19 215:10,16 229:22 241:7 280:13 284:13 292:7 296:9,13 301:22 early 8:4 210:12 Earth 330:21 Earthjustice 2:6 7:22 ease 18:3 210:20 236:9 311:18 easier 27:14 48:10 137:20 195:9</p>
---	--	---	--	--

<p>318:13 329:3 331:6 easily 19:16 308:14 308:19 east 170:11 easy 28:3 43:19 50:7 131:7 137:4 211:9 236:12 237:1 290:1 328:21 ecological 318:18 economic 13:2 14:11 15:8,13 19:14 31:9 114:3 173:20 239:22 245:20 265:1 289:17 326:6 327:8 economically 50:14 73:20 289:19 economy 264:9 278:10 Edison 3:12 6:9 65:13 92:17 121:20 187:2 204:8 225:21 231:12 256:19 edition 43:20 educate 213:21 educating 40:5 education 19:13 277:13 EEl 205:6 224:4 227:4,12 248:22 249:7 251:16,22 268:2,16 effect 25:2 29:13 37:16 42:1 76:10 112:2 131:19 146:8 156:11 201:19 236:10,13 258:9 283:10,17 283:20 304:15 332:21 effective 50:21 99:11 147:2 247:11,12 248:6 256:10 effectively 205:14 205:20 effects 136:5 186:16 225:8,9 229:7 258:11 279:4,18 318:17,17,19 efficiencies 67:10 156:3</p>	<p>efficiency 12:10 15:19 16:6 58:19 98:20 99:14 100:22 142:17,19 163:22 175:4,8,11 175:21 224:2 225:18 257:13,15 277:5 288:10 efficient 16:18,21 17:1,6 51:8,16 58:19 87:3 97:20 98:6 155:7 176:6 effort 103:12 efforts 23:21 50:12 86:21 103:18 293:14 EI 288:14 333:4,11 333:18,19 EIA 249:5,12,13 252:1,4,22 EIA's 251:9 EIS 28:2,5,13,18,20 29:3,7,10,15 30:4 EISA 64:19 either 52:12 53:10 80:8,9 86:16 96:21 98:20 99:2 180:8 183:11 186:5 189:16 190:1 196:18 217:17 222:17 244:11 245:17 253:13 263:19 306:11 315:11 328:16 333:7 elasticity 262:10 266:6 267:2,10 270:7,8 296:13 electric 3:12 6:10 33:12 36:8 65:14 92:18 121:21 187:3 204:8 225:22 231:2,13 256:20 264:22 267:19 308:17 314:17 332:14,16 electrical 40:13,14 40:17 71:7,15 138:7 149:7 186:9 187:20,22 188:4,7 189:1 231:4 243:20 250:20 251:2 electrician 40:11 electricity 30:6 33:20 149:9 189:3</p>	<p>189:11,16 230:18 248:18 251:13,22 252:2,6,9,11 273:16 327:2 333:7 336:4 electromagnet 148:8 electronic 28:1 29:18 30:11 31:10 38:17 61:14,15,19 62:3 87:3 118:1 119:18 120:1,5,8 120:13 125:19,21 127:22 128:3 133:14,20 134:7 134:13 136:13 138:5,13 139:12 139:17,18 142:11 143:9,17 246:11 254:4 270:10 281:12,22 282:3,6 285:13 289:12,14 298:17 301:8 308:12 309:2,6,11 311:9,12,15 329:18 334:10 element 149:6,7 eliminate 21:21 25:9 126:19 130:7 245:10 292:2 eliminated 62:13 259:20 270:4 eliminates 97:4 130:12 eliminating 19:4 24:15 30:22 58:22 292:22 300:20 301:13 elimination 31:4 Elszasz 3:3 7:3,3 116:21,22 119:16 120:10,20 121:3,5 122:7,14,19 124:15 125:9 127:8,16 128:5,8 128:18 129:3 134:22 135:3 139:8 140:15,17 141:19,22 142:3,7 143:5,10,12,20,22 144:19 146:2,13 151:15,18 152:17 157:17 159:9,16 160:12,18 161:20 161:22 162:7 206:15,15 207:5</p>	<p>207:10 emails 46:3 embedded 162:10 emergency 33:11 71:3 emission 120:13 126:14 312:22 313:3 emissions 297:18 312:14,20 313:4 315:6 317:3 emits 320:21 emitted 317:8,12 319:4,20 320:2,11 320:16 321:2 empathy 32:4 emphasis 78:20 80:15 emphasize 14:15 15:12 emphasizes 96:9 Empire 3:17 6:7 employ 23:14 63:12 148:2 employee 34:13 employees 31:13 300:12 306:19 employing 149:21 employment 9:4 34:2 278:10 279:6 enable 281:2 enables 46:20 enchilada 311:11 enclosure 28:10 37:14 121:15 140:6 encompassing 104:12 encourage 10:14 315:11 316:11 331:9 endorsed 56:6 ends 11:17 101:22 energies 188:9 energy 1:1,5 2:1,19 4:5,8 8:18 9:11 10:4 11:5 13:5 15:20,21 16:6 19:7 22:4,22 24:3 24:7,20 25:5,14 35:7 37:1 40:18 40:20,22 41:8 46:16 50:14 51:1 51:5 52:6,19,21 53:1,9 54:17 57:16 58:17 64:7</p>	<p>64:13,17,20,22 65:10,17 67:6 68:8 72:1 73:19 76:4 84:17 89:21 98:17,21 99:1,7 99:19 101:4 122:9 122:10 130:19 137:18,18 142:16 142:21 143:13 155:1,1 159:2 163:15 173:21 179:5,21 185:18 185:20,21 186:4 186:17 188:3,10 188:14,17 193:5 196:13,16 199:17 203:17,22 215:11 221:13 223:19 225:11,11 228:3,7 229:19 230:2,15 230:17,18,21 241:2 248:11,15 248:17,19,20 249:4 251:6,8,12 255:5 262:8 272:9 272:13,14,22 273:2,14,16 274:10,11 276:22 277:5 288:10 293:4 312:9,21 313:3,7 322:4,6 330:6 331:14 energy's 186:1 engaged 21:3 engineering 8:17 117:3 135:4,5,14 138:2 139:9 140:18,20 155:4,5 157:10 159:19 160:19 186:7 204:2 205:5 206:12 223:21 255:14 257:22 280:17 English 77:18 80:6 82:22 83:4,6 enjoy 220:19 221:9 290:12 334:21 enjoying 221:1 enormous 154:5 ensure 253:11 entail 309:7 entails 284:21 enterprise 31:22 entire 28:10 38:22 43:1 105:3 166:13</p>
---	---	--	--	---

233:10 255:12 260:21 entirely 24:16 124:4 292:2 329:14 entities 43:1,18 44:10 66:14 302:20 307:17 entity 45:22 182:13 182:15,17 environment 2:20 23:20 37:13 55:12 56:2 62:9 139:1 209:9,14 214:21 environmental 9:3 55:13,20 56:3,4,6 56:17,22 57:1,4,7 60:8,10,12,14 295:11 312:1 315:16 318:18 331:17,18 EPA 56:6 316:3,17 319:14 EPA's 321:19 EPCA 13:22 35:15 40:22 64:7 73:17 73:21 EPCA's 24:5 36:21 36:22 equal 253:15,21 equation 186:5 187:15 189:10 196:5 229:6 equations 219:11 225:10 240:6,8 equipment 21:4,6 95:20 96:5,22 181:7 219:19,19 220:5 222:12,19 284:18 285:1 equipped 18:13 41:3,4 equity 256:9 equivalency 167:20 equivalent 336:4 Eric 6:12 85:15 88:20 89:14,16 92:15 112:22 erroneous 67:5 error 69:1 123:19 errors 12:20 especially 10:17 40:5 66:11,20 75:1 232:3 238:20 292:13 295:1 essential 25:11 293:2	essentially 76:1 84:12 125:17 151:21 157:2 160:21 227:22 244:8 247:16 272:11 273:15 289:22 establish 99:2 198:9 established 64:7 96:10 142:18 151:3 226:14 establishing 64:20 estimate 40:16 41:18 52:19 122:21 126:9 144:10 262:11 272:8 280:4 285:9 estimated 49:11,12 156:18 161:5 246:5 284:8 295:16 309:9 estimates 38:2 49:14,17,19 50:10 52:11 123:1 126:4 221:14 283:21 284:3 estimating 52:21 124:9 et 143:4 166:6 273:18 ethyl 319:8 Europe 303:21 European 304:9 evaluate 11:5 57:6 221:4 277:2 278:21 301:6 evaluation 240:1 evening 19:22 33:17 event 43:11 46:13 71:8 137:7 events 326:20 335:16 everybody 63:3 82:22 83:4 91:20 102:6 152:12 everybody's 86:21 everyone's 317:7 Everything's 199:2 evidence 211:15 217:5,9,19 225:5 225:6 evidenced 49:16 evince 32:4 evolution 153:17 evolved 218:16 276:12	evolving 131:11 247:5 288:9,20 exact 258:22 329:18 330:18 exactly 78:21 100:22 101:1 111:1 114:6 185:4 271:22 275:13 exaggerated 125:6 examine 36:21 280:9 examining 41:17 56:16 example 47:22 56:7 124:8 200:5 230:4 330:7 examples 75:21 78:8 79:22 81:15 82:3 92:8 94:7 exceeds 57:12 excellent 33:10 exception 104:5 127:10 excess 46:17 312:12 exchange 57:16 112:6 exciting 73:9 exclude 307:13 excluded 34:4 exclusive 169:12 exclusively 180:1 excuse 45:14 85:11 88:11 103:13 134:17 146:10 191:1 287:19 307:7 321:6 330:15 executive 16:14 21:9 exhaustive 81:18,19 exist 16:13 61:22 173:22 182:7 211:7 214:3 299:11 existence 17:8,11 existing 37:9 42:9 42:11 49:8 121:11 180:17 233:3 263:1 308:7,19 315:4 exists 62:2 97:1 147:16 327:9 expand 229:4 expanding 41:12 126:22 expect 112:3 244:19	319:3 expectations 102:7 expected 133:18 262:7 296:14 expects 287:9 expedition 86:20 expense 58:3 expenses 175:6,7 241:1 256:7 282:20,21 expensive 22:11 38:5 40:10 49:2 52:16 57:3 58:8 147:18 277:15 281:13 309:21 326:11 experience 12:10 37:4 38:14 40:16 47:1 52:9 217:20 247:21 254:20,22 335:21 experienced 298:12 experiences 333:3 expertise 171:16 experts 56:18 explain 12:19 175:13 239:16 314:2 explained 111:15 119:5,5 136:13 141:20 187:15 239:8 explains 258:9 explanation 89:1,11 188:6 explicitly 167:13 expo 236:20,21 express 287:20 expressed 281:14 281:19 300:19 309:1 expressly 109:19 extended 25:20 71:9 72:2 221:8 293:16 extension 11:18,20 13:15 308:21 336:12,14,17 extensive 28:14 30:14 31:3 56:16 151:20 extent 22:1 34:22 73:4,18 296:14 external 150:9 332:14 333:19 336:4 extinguish 40:1	50:3 72:2 extinguished 50:10 extinguishes 130:4 extinguishing 50:5 extra 41:7 50:22 205:21 232:14 238:11 extraction 273:17 331:16 extrapolated 251:10 extreme 133:18 335:15 extremely 112:18 198:5 294:12 extremes 92:13 <hr/> F <hr/> face 18:9 37:17 284:4 301:8 faced 49:5 298:9 facilitate 13:11,18 25:19 facilities 285:5 facility 34:14 63:11 63:13 facing 279:7 fact 12:13 16:22 39:10 51:6 53:22 68:3,20 69:1,8 70:9 71:9 72:13 76:8 78:19 79:3 81:11 91:2 96:3 96:19 98:7 100:10 119:4,9 144:15 150:3 205:16 216:20 217:1 220:16 221:21 222:4,10,18 228:6 229:19 309:20 321:9 332:8 factor 18:4 72:4 128:16 161:1 187:5 242:7,8 250:20 factored 142:10 143:3 factors 27:10 54:17 73:18,21 74:8 210:20 218:13 223:22 248:16,16 248:19,20 249:5 273:14,21 279:5 282:9 309:19 313:3 factory 37:10 38:18 38:20 39:1,6
---	--	---	--	--

53:21 105:15 129:16 Fahrenheit 229:16 fail 255:1 failed 14:20 18:2 253:16 failing 247:17,21 failure 254:8,18 277:21 failures 16:20 fair 229:6 304:22 fairly 10:10 12:2 111:19 132:17 137:15 259:18 292:3 fall 42:6 49:7 201:8 309:17 falling 41:20 false 304:18 familiar 70:3 122:1 family 19:20 26:16 31:18 53:17 54:5 54:9 200:11,17,21 266:1 268:9,12 269:1 far 43:19 47:21 49:3 49:20 50:20 55:8 55:12 58:10 66:18 75:21 95:17 124:15,19 125:21 134:12 139:21 168:7 189:6 206:11 259:9 298:21 299:2,7 312:1 fashion 230:1 317:3 317:4 fast 41:20 66:18 170:2 234:16 292:6 favoring 56:6 feasible 289:19 feature 29:20 121:12 149:12 217:15 features 18:13 60:21 121:9 fed 114:3 251:11 federal 19:3 65:5 67:16 68:4,12 69:19 96:18 263:7 315:14 fee 183:16 191:4,16 193:8 285:22 feedback 57:19 95:8 108:16 111:1	116:11 119:22 152:3 171:1 242:14 280:7 286:3,4 292:1 310:3 feel 11:9 63:2,17 81:16 103:5 114:10 271:14 275:10 286:4 288:6 292:12 304:8 335:4 fees 191:13,14 feet 322:10 Feinstein 2:12 7:16 7:16 105:12,12,19 192:17 193:13,17 Feinstsein 192:17 fell 14:18 125:16 felt 48:22 82:3 ferry 175:6 fewer 259:9 290:19 300:12 field 186:13 208:14 209:8 225:16 226:5,6 fifth 294:14 figure 54:2 75:9 82:17 86:22 153:12 185:3 203:12 228:10 243:3 265:5 296:5 figured 154:12 166:5,6 figures 180:9 212:18 296:8 filings 279:22 fill 211:17,18 filling 55:3 final 13:8 21:12 34:4 61:2 64:20 66:3 68:6 69:4,5 110:5 160:1 186:15 194:14,19 225:7 280:6 293:8 303:13 306:8 335:7 finalize 110:2 113:15 280:8 finalized 72:14,19 finalizing 82:1 finally 20:5 40:6 181:8 196:20 225:17 230:14 231:6 257:12 266:18 279:4 282:2 309:1	finances 256:14 financial 19:6 34:2 39:21 41:15 42:5 58:14 166:11 277:14 279:14 280:4,14 281:1 find 43:21 57:11 140:20 159:13 172:13 174:5 178:1 198:3 207:18 214:2 306:17 322:21,22 finding 205:8 fine 170:19 234:12 315:19 316:21 317:12,14 323:5 333:10,10 finish 98:10 110:6 305:11,12,18,19 324:13 finished 112:5 fire 27:7 28:17,18 30:5 33:6 49:8 51:18 52:1 58:9 79:4 84:1 106:12 110:20 314:9,10 322:20 324:7,8,9 325:6,12 331:6 firebox 30:2 fired 35:21 74:13 76:20 77:6,12,20 96:12 117:10 122:22 208:13 216:19 fireplace 27:12 28:12 29:5 32:21 32:22 35:22 37:10 38:13,18 39:6 40:13 48:11,12,12 51:10 55:10 58:12 61:16,19 62:1,1,9 67:8 74:14 76:21 77:2 82:21 83:1,6 85:13,14 88:1 104:2 137:21 138:12 145:17 146:14 147:2,18 150:20 157:12 158:15 167:5,21 169:8,18 170:6,14 172:13 196:18 198:9 200:6,6 201:14,19 202:3,6 202:8,9 205:11,17 215:18 216:22 226:18 229:17	230:5 232:5 246:16,16 250:7 251:3 255:7 264:3 265:8 267:8,18 303:15 314:5,9,13 315:3,5 317:3,5,9 317:19 321:13 322:9,17 324:15 331:3 333:4 334:8 334:8,9,9 fireplaces 17:15,18 23:12 27:21 28:10 30:21 31:2 34:22 36:6,6,7,8,8 38:21 39:1 42:9,11 44:7 51:11,14,16,17 52:3 53:21 55:5 56:14 59:1,7 67:8 82:21 83:2,2 94:8 94:9,9 98:2,3 104:3 105:16 106:6 112:11,18 114:13,15 118:9 118:12 121:12 123:21,22 124:3 133:21 140:1,5 142:9 144:13 147:14 151:4 169:11,12,15 172:11,12 180:1 190:11 197:8,15 197:17,18 199:4 199:19,21 200:14 200:16,19,22 201:1,15 202:5,10 202:17 207:17 208:1 209:3 210:9 213:11 217:9,10 217:14,15 221:2 224:15,19 230:4 232:22 233:1,4 262:22 263:22 264:1,2,21 265:19 268:21 269:14,16 272:4 290:10 292:6 308:8,19 309:16 314:7,12 315:7,13,13 317:5 322:11 323:3,3,12 323:14 324:1 325:2 327:19 328:12 fires 49:9 55:7,16 56:1 58:3 323:2,8 323:9,10,15,18,20 323:22	firm 307:3 first 14:6 15:18 24:2 24:11 26:3 35:17 40:20 62:22 74:17 76:6 84:19 85:3 91:11,14 99:13 103:18,19 112:20 118:5,8 137:11 141:17 144:4 175:19,22 176:1 196:3,9,11,17 198:16,20 208:5 208:11,21 212:18 225:10 227:11 228:2,2 229:5 230:18 240:13 242:2 264:5 279:20 280:20 281:10 282:15 286:10 291:5 300:6 329:13 330:13 334:20,20 335:5,19,20 fishing 86:19 fit 59:18 90:2 91:16 111:10 157:13,14 229:1 247:10 fits 27:13 39:12 91:17 92:3 178:5 178:6 five 17:19 26:16 54:8 128:11,13 133:9 157:2 176:7 194:14 218:20 219:4 289:13 335:7 Fixed 175:7 flame 29:19 30:7,12 35:22 46:19,22 47:10,20 48:1 74:15 76:21 77:4 77:7,13,17,19,19 77:21 78:22 83:9 86:15 90:19,20,21 93:19 107:12,14 107:15,16 110:16 110:17 111:11,14 112:2 137:3,8 138:7,14,18 222:14 flapping 101:7 flashlight 18:7 211:1 237:4 flat 252:3 flavor 238:4 flaw 222:7
--	--	--	--	--

flexibility 39:3 42:15 43:9,12 58:5 301:10	222:16 forget 200:16 255:6 288:1	70:6 72:12 78:12 90:15 95:15,16 118:19,21,22	51:22 52:4 333:5 333:8	27:13,15 28:2,9 28:10,10,15,19
flick 331:4	forgotten 19:17	120:3 127:17,18	function 16:11 70:18 107:21	29:13,15,21 30:9 30:17,21 31:3,8
flip 211:4 236:21 277:20	form 90:20 126:1 139:12 202:13 235:3	132:6,7 144:1,3 145:3 147:5 187:13,14 188:12	110:15 131:3 137:6 139:5 149:14 164:12	32:8,10 33:10,15 34:4,12,21 35:3,8 35:10,12,14,21
flipside 245:14	formal 293:6	188:20 216:15	195:2,2 217:13 244:14 245:4,19	36:10,10,11,12,19 37:6,8,11,13,13 37:17 38:2,2,8,9
floor 9:8 28:12 102:1 162:21 163:4 237:22	formaldehyde 319:9 320:1,2	217:3 221:15,16 226:6 227:19,20 293:20,21 332:2 333:2,14	functional 37:1 333:5,8	38:11,12,21,22 39:3,4 40:4 41:4,8 41:9,12,15,18,19
flow 30:20 54:22 137:9 148:13 182:12 192:3 279:9,17 280:3,9 280:11 282:16	formulate 164:15 166:10	Frank's 150:14	functionality 99:19 119:7,10,19 120:16	42:6,8,11,19 43:2 43:4 44:12,21 46:17 47:2,4,13
flue 51:22 52:4 62:6 196:20	formulated 166:20 273:3	frankly 154:12 194:14 218:11	functions 29:7 120:2 191:12 194:22	47:15,18 48:2,6,9 48:17,20,22 49:3 49:6,11 50:1,6,17 50:18 51:1,8,14
flue-less 196:21	formulates 262:9	free 11:9 31:21 63:2 70:7 71:5 78:16	fundamental 138:4 244:12	51:15 52:3,8,10 53:10,13,21 54:22 55:4,4,7,8,11,12
flus 33:5	Forrestal 4:7 162:18	free-standing 48:11 314:11	fundamentally 265:16	55:16,20,22 56:7 56:14,17 57:2,5,8 57:9,11,12,13,14 57:18,20 58:10,15
focus 9:21 27:17 43:8 51:4 53:16 89:11 117:20	forth 153:14 207:7 291:8 316:15 335:12	freestanding 264:1	furnace 30:4 33:3 107:16,17 179:15 186:19 200:6,9 226:16,20 227:1 230:9,22 330:13	58:16,18 59:2,10 61:13,15,17,19 62:1 69:10 70:7 71:4,5 74:13 76:10,20 77:6,12 77:20 78:1,17 79:5,11 80:22 83:3,5,11 90:17
focused 72:1 89:2 125:12 135:18 284:17 285:14 303:12	forum 276:6	frequently 19:19 50:7 316:8,8	furnaces 75:17 93:21 94:14 169:19	90:18 91:5 93:2,6 93:9,19,19,22 94:1,12 96:12 98:4,5 105:16 106:6 109:4,9,22 117:10 118:16,19 118:19 120:9 121:7,7,10,10 122:22 124:1,1,2 124:9 126:14 127:11,12,20 130:8 133:13 134:10,14 137:5,7 137:9,12 138:15 138:18 140:2,7,8 140:11 143:18 145:18,18,19 146:5,6,7,11,14 148:13 150:22,22 151:1 159:14 188:1,5 196:18
fold 130:14	forward 20:11 81:22 82:11 103:10 104:10 105:2 107:3 108:5 111:4 114:18 118:5 136:2 164:17 234:16 287:1,21,22	friend 67:22	further 24:2,9 28:22 29:3 96:9 108:3 108:10,12 113:8 125:14,21 139:9 159:10 195:8 280:7 285:17 286:4 291:12,17	
folks 8:5 86:21 102:12 286:4 290:11 298:19	forward 20:11 81:22 82:11 103:10 104:10 105:2 107:3 108:5 111:4 114:18 118:5 136:2 164:17 234:16 287:1,21,22	friendly 18:10 71:19	future 11:5 17:19 25:10 54:7 123:17 124:6,20 260:18 263:13 265:3,6,9 265:13,16,22 292:22 294:19 314:15	
follow 69:16 70:5 119:16 128:18 143:1 153:7 194:5 246:4 279:1 288:7 308:10 329:11 330:22 333:2	found 44:1,5 99:22 103:22 119:10 120:12 125:21 126:1 135:21 139:11 140:2,11 146:3,6 150:20 155:10 209:7 221:6 262:13 277:9 317:6 320:15,20	front 27:8 123:13 125:8 213:2 216:7 281:18	G	
followed 215:8	foundation 103:3	fruitful 113:7	G 4:1	
following 8:9 9:2 10:17 24:1 41:15 52:1 73:18 75:5 99:12 157:19 207:19 268:18	founded 26:16	frustrated 73:4	gained 336:10	
fondly 279:10	four 66:3 136:11 265:19 269:15	frustration 95:12	gaining 307:4	
force 47:6 52:17 248:5	fourth 231:4 258:3	fuel 20:22 22:11 35:22 37:9 57:13 74:14 76:21 77:2 186:8 199:10 206:21 230:16,20 230:22 273:1,14 274:11 315:7,7 323:2 326:8 327:7 327:12 328:5,11 330:1 331:13	gaming 96:16	
forced 230:9	fraction 115:13,20 197:16 224:15 225:14 226:2 232:7 246:5,10,22 258:4 264:7,20 265:7 329:15,21 330:7	fuels 330:17	gaps 15:2	
forces 47:12	framework 9:10 65:18 66:6 214:15	fulfill 284:18	garage 36:12	
forcing 47:3 49:1	Frank 3:15 6:3 67:20,21 68:10	full 237:12 273:1,14 274:11 311:11,15 331:13	gas 2:9,22 3:9 5:11 5:13,17 6:6 17:15 20:18 21:5 22:3 23:11 26:15,17,18 26:22 27:5,8,10	
forecast 262:6		fully 33:3 42:3		
forecasted 263:12				
forecasting 253:4				
foreign 63:9 70:1 286:14 302:14,15 303:3 304:16 306:13,18				
forever 41:12				

197:7 200:5,5,6,9 200:15 202:17,17 204:13,14 205:12 205:13,15 208:13 213:11 215:18,19 216:19 230:4 242:22 245:10,12 245:19 247:8 248:18 250:8 251:13 252:14,18 253:3 263:20,22 264:1,13,21 267:6 267:19 270:6,9 278:7 279:2 289:12,17,21 290:6,13 298:18 299:21 301:19 303:15,15 307:22 308:1,3,14 309:3 309:8,12,12,14,18 309:22 310:8 311:6,10,13,14 314:4,4,8,10,12 314:13,17,18,19 314:22 315:1,3,9 315:13 316:11,13 317:4,10,13 318:3 318:5 320:3,17 321:6,8,11,12,14 321:17 322:3 323:3,13 324:1 325:1,18 326:1,3 326:7 328:12,14 328:16,17,18,20 328:21 329:2,6,6 329:7,10 330:9,13 331:3,16 332:1 334:8,9,18,19,20 335:1 gaslogs.com 191:5 gateway 86:12 gather 45:13 280:2 gathering 237:17 geek 66:19 67:22 general 6:12 9:10 83:9 92:7 105:17 111:20 139:18 164:8 166:22 173:13 181:20 217:5,16 223:17 224:19 264:9 279:19 282:20 generally 81:20 85:19 104:11 105:2 107:3,9 117:14 125:15	149:4 169:8 180:7 180:9 183:17,20 327:10 generation 26:16 generator 138:6,17 generic 111:19 gentleman 26:8 45:5 212:11 gentlemen 184:8 gentlemen's 269:11 geographic 248:13 geographical 251:8 getting 10:1 97:10 100:15 103:14,15 154:19 180:3,18 232:8 325:15 332:4 give 4:17 19:8 27:3 74:10 95:10,11 103:2 117:5 158:12 174:12 184:19 243:3 250:13 276:3 290:1 given 40:18 54:12 62:16 94:7 105:9 117:20 238:3 287:11 291:22 294:11 336:18 gives 178:12,17 179:14,22 258:1,4 273:2,8,11 321:21 giving 47:2 216:1 294:2 glad 4:3,15 10:3 glass 33:2 232:6 glitches 10:12 Glow 23:13 go 11:10,11,16 17:22 42:9 53:12 59:11 62:18 64:3 66:12 72:7 74:6,8 75:15 78:6 79:22 82:14 96:20 98:11 102:15,18 103:4 103:10,16 105:10 108:10,18 109:2 111:4 121:5 124:20 125:10,22 140:15,18 145:15 151:8 152:7 153:7 153:10 157:21 158:8 159:18 160:2,15 162:19 164:17 168:7 169:5 172:18	173:6 177:1,16,18 177:19,20,20 180:9 184:7 185:9 185:10 190:6,20 191:5,17 192:1 193:1,19 201:9 202:21 208:11 214:1 215:12 226:13 227:19 228:7,14 232:13 235:22 238:15 239:1 244:6 248:12 253:9 254:15 258:7 260:15 261:18,19 262:4 263:2 266:8 268:3 270:10,13 272:1 274:2 288:6 288:7 289:9 296:19 297:17 298:16,22 299:9 299:13 305:19 310:22 311:3,8 324:14 327:14 331:10 333:15 335:20 goes 96:19 122:15 139:4 299:3 going 4:11 8:13 53:15 61:4 62:20 62:22 63:3,18 66:17 67:22 72:1 74:1,6,12 79:15 79:17 81:22 82:7 82:11 86:2 91:8 91:13 96:11 97:3 98:11 101:10 102:10,11,12,15 103:15 104:10 105:2 108:5 109:10 112:16,16 113:18,19,21 114:5,12 115:3,20 116:19 118:3,5 119:1 125:10 128:7 131:16,21 135:1 136:2,22 141:12 144:11 145:7,15 151:10 153:11 155:17,18 156:2 157:21 158:13,19 159:19 159:22 160:2 162:12 163:9,11 163:14,15 167:19 174:15 180:8,16	180:17 181:19 186:2 187:11 188:7,17 189:21 195:7,17 196:10 196:12,12 203:13 208:11 209:20,21 210:15 211:2,10 212:10 213:19 218:1 222:22 223:2,4 224:17,20 224:21 228:4,7,10 232:3,4 235:14 237:4 239:1 243:4 245:18 247:2 248:9 252:10 260:1,15 261:18 261:22 264:3 267:12 268:5,6,17 268:19 272:6 275:3 286:9,13 287:19 288:5,21 289:16 291:6 293:22 295:12 296:19 297:15 298:11 299:1,22 304:22 306:7 307:10 310:8 311:20 313:22 314:21 315:2 318:1,3,4,6 328:16,17,18 330:4 331:5 332:3 332:4 333:15 Goldman 2:14 5:5,5 12:5,6 85:3,22 196:1,1,5 301:21 301:21 302:11,17 303:8,21 304:3,9 305:10,13,16 306:4 good 4:3,13,15 12:6 20:15 23:7 26:9 26:13 73:22 82:22 83:4 101:15 103:3 116:21 133:1 162:14 163:6 177:13 210:11 276:11 288:13 289:4 291:7 298:15 321:21 323:16 goodness 315:17 Gotcha 177:11 288:4 gotten 126:3 141:5 159:10 246:1	govern 183:20 governed 138:10 government 277:6 279:10 grab 261:18 granted 64:10 102:17 graphic 240:17 graphically 136:8 graphics 272:20 gravely 125:4 great 57:20 64:5 94:9 213:21 236:19 247:7,9 259:10 287:4 335:12 greater 28:5,7 30:19 31:15 32:8 49:20 58:17 162:12 230:3 235:15 306:18 greatest 73:18 greatly 31:8 greenhouse 126:14 321:12,17 322:3 Greg 6:17 167:9,10 184:13 202:13 312:18 Gregory 3:18 grid 129:9 grill 90:17 91:5 204:13,13,14 237:1 grills 3:10 5:17 26:15,18 83:12 90:18 GRIM 279:11 gross 283:3,6 grossly 125:6 ground 102:1 107:8 137:11 155:14 162:15,20 163:4 291:21 307:5 322:9,10 grounding 243:21 group 99:21 118:18 142:12 150:19 184:2 217:10 256:17 grouped 123:21 groups 56:4 118:3,5 118:6,8,11,18 121:6,13 126:5 139:14 140:12,21 140:22 141:7 256:12
---	---	--	--	--

<p>growing 48:15 50:16 192:21 233:11 growth 270:11 guess 60:8 66:8 77:19 80:9,14 81:2 84:9 102:11 120:2,14 121:16 122:8,9 130:13 140:9 141:9 152:6 153:4 157:17 174:1 194:11,13 202:7 208:21 222:18 231:14 236:14 247:4 276:2 286:22 288:14 301:22 302:1 326:12 333:5 guessed 77:14 80:12 88:7 guidance 184:20 185:3,7 guide 280:2 guidelines 251:11 guy 90:12 181:1 191:3,8 290:13 325:6,11 guys 103:20 163:16 185:4 191:8 236:4 236:19 293:12 297:8 298:12,14 298:19 299:4,4,21</p> <hr/> <p style="text-align: center;">H</p> <hr/> <p>H 2:14 5:18 7:18 34:10,11 165:4 habit 188:13 half 133:12 144:12 217:10,21 240:22 263:19 267:6 329:22 330:8 hall 101:22 halls 101:22 hand 10:7 61:3 62:16 64:9 134:3 137:20 138:16 322:18,18 handed 276:16 handful 129:13 304:13 handheld 211:5 hands 17:7 18:7 210:22 237:3 238:6 Hang 84:20 92:15</p>	<p>HAP 331:20 happen 183:10 211:3 happened 265:17 happening 48:17,20 happens 183:11 187:21 331:1 happiness 290:2,3 290:16 happy 152:9 157:20 171:1,8 185:7 210:2 237:6 239:7 290:6 HAPS 318:9,10,14 319:4 320:1 hard 10:4 133:17 154:4 170:2 205:22 206:6 259:16 286:20 306:17 harder 195:10 230:9 HARDI 167:5 170:6,11 Harmon 23:14 harmonized 67:9 harms 331:17,18 Harry 3:14 hate 328:10 Hauck 56:19 hazard 29:3 33:6 hazardous 318:9 HBPA 73:2 HEA 328:8 head 106:4 201:2 257:9 306:22 headquartered 23:9 health 34:3 56:4,11 56:16 58:1 313:16 313:22 314:1 315:18 317:17 318:1,17 healthy 56:10 hear 10:10 34:15 60:3 79:14 91:17 91:18 100:13,18 102:12 107:3 109:2 123:8 161:14,15 163:16 174:2 192:15 209:13 215:3 287:14 heard 64:1 74:10,19 282:9 288:8 314:20 336:12 hearing 98:13 184:2</p>	<p>185:1 215:8 216:17 289:1 318:5 heart 31:21 142:14 264:13 323:8 hearth 1:3 2:11,12 2:14 4:6 5:5,8,14 5:21 7:16 11:6 12:7,8,13 14:7 21:1 22:2,21 23:8 24:12 25:3,3 26:5 26:20 29:17 31:17 35:1,9,10,14,16 35:18,19,20 36:5 36:9 37:8,20,21 38:7 43:2,18,20 44:3,18 45:3,11 45:14,18 48:11 49:13 54:10 56:10 60:7,11 61:7 64:18 65:4,6,11 68:2,9,19 69:4 74:12 77:12 79:12 80:7,8 81:17 85:1 85:2,11,11 96:1 98:18 99:8,17,20 99:22 100:4 103:6 105:13 109:4 117:6,6,8,10,17 118:4 119:7,12 120:13 122:20,22 126:1,5 136:1 139:13 156:10,18 166:14,20 176:18 179:22 180:1 184:15,16 185:20 186:14 188:15 192:17 196:15,21 196:22 197:7 199:13 202:15,15 204:4,5 208:13 220:9,12 221:11 223:19 224:12 226:20 243:9 253:11,13,17 255:20 258:2,3 262:6,11,13 263:11,13,18 266:8,17 267:2 272:10,15 278:7 291:14 300:7,12 308:6,9 309:9,17 309:20 314:3 315:1,15 hearths 183:21 heat 23:13 28:21</p>	<p>29:2,8 33:12,13 36:16 38:19 51:20 57:21,21 62:8 71:3,3 112:1,3 121:16 140:6 186:19 201:14,18 201:22 202:2,3 220:18 221:9 222:18,21 225:8 225:14 226:2,2 228:6,8,14,19 229:20 231:1,3 232:7,18 323:13 323:15 330:7,12 330:12 332:16 heated 52:2 79:7,7 330:9 heater 88:2 98:1 107:19 110:11,12 110:14 200:9 228:3,12 248:2,2 heaters 17:22 26:19 36:12,12 67:9 69:9,13,14,15 75:17,18 77:17 80:1 81:2,5 83:19 87:2 88:8 93:21 104:6 106:7,15 110:20 111:9,16 111:18 123:4 160:5 169:20 197:19 267:3 Heatlator 23:13 heating 2:17 3:15 36:2 69:12 74:16 77:8 78:19,22 79:2 95:20 96:5 96:14,21,22 110:15 130:11 149:6 169:9,13 186:18 195:16 197:9,16 199:4,19 199:22 200:8,14 201:6 202:7 208:18 209:10 219:19 220:5,10 223:22 224:16 225:9,19 228:4,16 228:19 229:12,14 229:16 230:8,20 230:22 231:3 232:19 331:19 heavier 137:10 heavily 284:17 heavy 130:9 heck 299:22</p>	<p>height 27:8 29:19 30:12 47:20 heights 46:22 Hello 163:13 help 33:19 82:10 92:8 98:9 108:6 108:13 114:20 128:20 130:14 132:9 167:11 171:3,17,18 172:16,17 293:18 294:8 331:11 helped 203:13 279:16 helpful 60:15 62:21 74:22 78:8 81:13 82:5,8 101:10 104:14,21 106:2 108:9,19 111:2 130:20 132:13 134:3,22 250:15 291:1 293:12 326:17 helps 106:21 248:7 hemicellulose 319:2 herd 80:19 hexane 319:9 hey 86:10 102:12 247:7 HHT 23:18,22 25:15 61:13 184:2 214:19 269:10 292:17 Hi 105:12 167:10 278:14 hide 28:12 37:15 high 30:10 38:19 127:15 163:22 204:21 239:19 245:20 266:10 295:6 326:3 329:9 329:10 higher 40:7 41:21 57:9 175:4,10,21 208:16 214:11 226:22 227:1 255:6 268:5 270:9 281:22 301:4,14 301:16 311:19 315:8 329:10 highest 141:17 highlight 238:22 239:2,19 highlighted 11:15 highly 29:4 262:14 267:9</p>
---	---	---	---	---

<p>hire 194:9 hired 40:12 193:18 historical 154:8 257:21 262:13 266:15,16 268:15 276:4 historically 265:2,8 history 57:10 252:5 292:17 hit 267:11 333:9 Hodges 2:16 5:10 5:10 hold 40:14 114:5 189:22 holds 148:13 268:15 home 5:15 23:9 26:5 43:20 44:3 51:8 51:20 52:1 54:10 55:3,7 58:18 177:17 194:3,8 230:3,7 263:3 267:3,4 322:19 323:17 324:14,17 330:7 336:19 homeowner 55:2 246:18 homeowners 220:17 332:15 homes 51:9 53:17 54:9 58:18 200:11 200:22 201:16 213:3 231:20 265:7 267:6 314:15 homogenized 87:22 honest 302:22 hookup 40:13,17 hope 4:15 8:6 12:2 12:18 14:4 20:8 35:6 124:11 203:4 294:9 336:10 hopeful 105:4 hopefully 10:11 59:17 hoping 60:18 62:18 93:12 108:17 horse 90:5 host 298:14 hot 222:17,22,22 hotly 79:8 Houck 2:19 7:11,11 54:9 59:15,21 60:2,2,5,5 123:5,5 123:8,10,10 195:14,14,19 201:11,11 212:21</p>	<p>212:21 213:7 216:5,5 229:4 263:6 264:16,18 264:20 268:18 312:16 313:11,11 324:21,21 327:22 329:12 hour 51:19 162:16 163:5 219:15,21 220:22 222:4,6 223:16 232:11 329:7 hourly 130:18 hours 116:20 129:7 129:14,19 130:5 130:18 159:1 186:10,20 187:9 206:10 208:11,12 219:9,11,12,13,14 220:1,2,22 223:15 223:17,17,18 224:9 225:13 228:18 231:10 261:18 house 152:12 167:2 179:13 189:2 191:7 198:9 204:12 232:11 243:20 263:2 290:13,14 333:9 household 22:12 24:6 186:13 226:16 256:10 households 186:17 196:14 197:1,2,3 197:4 198:10 200:17 231:2 244:3 houses 51:7,15 200:5 243:22 housing 48:12 52:18 53:2,4,6,7,7,11,11 53:14,15,18 54:1 54:3,5,7,8,12 124:4,9 209:8,14 214:20 262:14,15 262:16,17,21 263:9,11,12,21 264:5,8,12 265:15 265:16,22 266:3,8 266:10,14 308:11 HPBA 5:9 12:11 13:9,12,20 20:2 85:1 103:21 123:3 129:12 141:5 159:6 237:18</p>	<p>301:22 HPBA's 12:10 15:16 HPBmA 103:19 huge 190:9 204:12 268:6 human 313:16 318:1 humbleness 292:19 hundred 162:21 230:1 232:10,14 hundreds 42:21 43:5 45:4 hurricane 33:17 333:8 hurricanes 33:14 hurt 33:7 55:12 HVAC 75:16 167:12 170:7 179:16 184:13 190:11 193:6</p> <hr/> <p style="text-align: center;">I</p> <hr/> <p>ICC 92:19 ice 33:14 322:11,12 322:13 326:20 ID 163:1 idea 94:12 106:9 135:6 152:10 245:8 301:3 identification 101:21 identified 42:17 119:1,13 121:7 125:5 138:4 149:19 164:3 199:12 208:12 285:20 300:8,8 308:1 identifies 18:5 44:8 identify 83:8 253:12 278:20 identifying 149:18 ignite 120:9 187:22 ignited 49:16,21 244:18 igniting 137:5 ignition 24:18 28:1 29:18 30:11 31:10 37:22 38:11 47:9 61:15,15,20 62:3 87:3 118:1 119:19 120:1,5,8 125:15 125:17,19,22 126:6 127:22 128:3,19 133:14</p>	<p>133:20 134:7,13 135:21 136:13,15 136:15 138:5,13 139:12,17,18 143:17 151:15,18 151:21 152:6 155:9 160:10 166:14 186:6,11 186:16 187:16,18 187:19,21 188:15 203:3 204:1,9,15 204:18,19 206:20 241:20 242:5,5,10 243:10,18 246:12 253:13,16 254:4,7 255:11,17 259:13 270:10 281:22 282:3,6 285:13 289:12,14 298:17 301:8 308:13 309:2,6,11 311:9 311:12,16 325:21 334:10 ignitions 120:11 125:22 135:22 139:11 142:11 242:9 281:12 ignored 45:10 46:6 56:22 ignores 53:19 ignoring 42:21 49:10 50:15 54:19 249:13 259:6 264:6,7,11 III 3:9 illumination 93:3 illustrated 82:21 imagine 169:22 211:2 immediate 5:1 56:1 Immediately 8:9 impact 8:21,22 9:1 9:3,3 18:17 32:4 32:15 34:1 38:9 41:17 42:16 43:5 43:13,15,16 48:14 53:1 56:2 57:4 59:10 74:3,5 115:17 124:5 160:13 163:18 186:16 202:21 225:8 227:1 230:21 247:2 267:21 270:6 272:8,12 273:12 276:19 278:6,10</p>	<p>278:13,16 279:8 279:10 281:17 283:1 287:6 295:3 300:21 310:4 311:20 312:10,21 313:8 317:22 321:14 335:3 impacted 31:11 115:14 257:20 278:21 313:21 333:7 impactful 226:20 impacts 32:10 42:21 143:3 155:2 231:4 245:20 252:11 266:7 272:8 276:21 278:9,18 278:22 279:1,14 280:4,10 281:1,11 283:8,21 295:16 295:22 296:3,18 297:21,22 300:5,6 309:11,19 315:18 322:12 326:6 implement 237:8 implementation 316:6 implication 48:21 implies 283:11 importance 23:18 244:16 important 11:15 13:19 18:5 46:1,1 62:6 65:14 70:9 70:16 71:2,4,17 127:1,1 166:12 206:9 244:9 245:21 287:6 296:7 297:11 313:15 315:6 316:20 332:6,19 impose 39:11 76:2 imposed 140:10 imposes 331:16 impossible 38:19 39:5 impression 217:22 improve 56:11 improved 27:4 57:22 58:1,4 95:17 improvement 23:19 65:16 improving 56:9 89:21 inadequate 12:14</p>
--	---	--	---	---

<p>inappropriate 123:17 intensive 19:6,9 incentives 16:19 inch 27:18,18 29:15 29:21 inches 27:20 incident 269:14 inclination 171:11 include 23:13 29:11 36:5,10,17 69:7 83:17 89:5 94:14 94:16 109:16 118:17 121:15 123:4 146:14 167:5,8 198:8 202:9 260:12 280:14 302:15 310:15 included 72:21 78:18 79:12 80:15 84:16 90:8 96:5 156:14 206:19 301:10 304:6 328:11 includes 20:20 22:20 83:15 118:10 246:17 255:10 282:19 305:7 319:5 including 21:1,11 31:18 34:21 36:19 39:18 69:3 94:12 126:2 146:11 164:10 189:17 277:3 308:2 309:20 331:20 inclusion 70:7 81:4 106:7 income 256:12,17 incomplete 319:5 inconsistent 79:13 inconvenience 277:16 incorporate 64:22 185:7 incorporates 70:15 incorrect 187:16 245:11 328:3 332:22 incorrectly 15:3 increase 32:8 39:17 39:20 55:7 252:7 266:20 268:7,8 273:9 283:11,13 301:14 309:6,8,13</p>	<p>314:22 increased 18:20 19:10 175:8 203:17 230:21 240:4 252:2 266:7 267:11 270:6 increases 186:21 309:15 increasing 42:4 252:9 increasingly 18:13 211:8 incredible 201:22 211:11 217:8 incremental 135:12 174:20 175:3,9 176:2 178:14,18 243:17 310:21 311:1,3 incur 281:3 indefinitely 80:4,21 83:21 88:13 211:11 Independence 1:6 independent 7:11 60:6 independently 166:2 indicate 95:18 260:6 indicated 106:5 152:4 259:19 281:11,16 282:3,6 308:17 indicates 178:20 indicating 95:21 254:11 indication 254:18 indirect 9:4 individual 138:22 176:14 298:1 individually 76:12 individuals 103:14 indoor 36:12 52:2 109:8 127:5,6 induce 19:13 industries 12:9 30:19 287:2 industry 18:9 20:1 20:19 23:21 26:21 29:17 31:15,17,18 35:3,12 38:17 43:2,3,18 44:1 45:9,12,14,18 46:8 50:2 59:10 60:7 67:14,17</p>	<p>86:12 96:10 97:5 97:6,19 117:10 126:13,17,21 127:3 128:15 131:12 132:17 149:19 152:12 153:1 159:8 167:14 168:3 170:1 171:5,16 173:7,17,18 177:19 178:7 179:11 184:15 212:1 218:22 229:13 245:3 247:12 276:8,14 278:7 279:7,13,14 279:21 280:5,12 281:1 283:2 284:9 285:10 288:9,12 288:16 291:18 294:4,11 295:18 297:5,21 298:13 298:15 300:13 302:4 319:16 325:21 industry's 50:11 inefficiency 58:11 inexpensive 330:10 inferred 91:4 infiltrating 230:7 infiltration 228:10 infinitum 270:12 inflating 50:16 218:9 inflation 251:18 257:2 influence 247:11 influenced 16:1 265:1 influences 312:4 influencing 210:20 influx 92:3,4 330:15 inform 12:15 331:12 information 8:6,10 12:14 13:4,7,11 13:14 15:2,3 16:16,17 20:6 21:16,18 25:17,18 25:21 44:15 45:13 45:14 46:4,6 103:20,21 141:15 151:22 159:11 172:2 173:15,17 197:11 198:2 203:6 206:19</p>	<p>207:4 209:13 211:13 213:18,18 213:20 214:2 216:2 225:6 239:4 250:17 253:20 254:7 255:21,22 276:4 277:14 279:21 280:2,15 280:20 293:12,13 294:10 300:14,17 313:14 informative 88:5 154:11 286:13 325:15 infrared 26:18 36:12 87:4 110:13 infrequently 38:1 48:8 inherent 84:18 264:12 initial 49:1 injuries 55:8 323:20 324:2 injurious 317:18 innovation 18:9 23:22 127:2 128:15 292:17 input 65:19 66:1,2 71:7,16 166:19 186:8 206:21 223:20 232:18 269:13 273:19 284:1 305:22 inputs 185:21 197:10 273:13 279:16 280:8,14 282:15 INPV 279:13 295:17 insects 33:4 insert 48:12 138:12 145:17 157:12 202:5,6 205:17 215:19 inserted 314:14 inserts 23:12 104:2 104:3 118:9,13 123:21,22 124:2 124:10 140:2,5 142:9 146:14 147:15 150:20 151:4 202:9 205:11 250:7,22 263:1,19 267:7 309:16 314:5 inside 29:6 30:2</p>	<p>138:8 232:5 insight 336:10 insights 291:15 install 40:10,12 48:10 79:6 181:20 183:6 184:18 191:4 193:1,7,19 194:8 195:10,10 243:9 installation 28:13 30:2 39:4,11,18 40:8 48:9 138:11 192:5 195:6 240:20 243:8,16 243:17 249:20 250:4,6,8,21 292:14 308:20,22 310:16 installations 233:11 installed 28:17,18 29:6 30:5 36:3 37:8 74:17 77:9 79:12 110:14 121:11 209:4 228:5 240:9,13,19 260:18 265:20,21 272:17 installer 183:1 194:9 installing 191:9,16 194:18 instant 52:3,4 58:1 Institute 2:18 3:12 3:16 6:4,10 65:14 92:18 121:21 187:3 204:8 225:22 231:13 256:20 instructions 50:8 194:6 instructive 75:2 intact 107:5 integrity 216:2 intelligent 82:18 intelligently 14:2 intend 18:22 23:2 109:3,8 112:15,15 intended 14:8 16:12 24:14 75:8 79:21 81:1,6 91:5 94:4,5 94:21,22 97:9 144:6 145:10,12 192:3 215:14 228:5 297:20 intending 94:13 95:1,1,2 96:4</p>
--	--	---	---	--

112:11	intuitive 317:7	153:13 173:19	131:5 255:3	238:18 240:18
intensive 130:11	invest 16:18,21	174:13 176:13	judicial 86:8	269:16 291:9
intent 36:4 110:9,21	investigate 276:20	201:12 210:18	July 232:12	293:8 295:2 305:8
interacting 226:21	investment 16:22	218:1,11 246:18	jump 300:4 307:16	315:16 318:6
interaction 132:20	285:17	265:2 281:7	332:4	331:10 332:5
interacts 138:22	investments 285:1,7	288:19 291:6	jumping 168:18	kinds 83:15 111:18
274:3	296:4	315:19 316:13	170:2	319:15
InterCan 221:3	invitation 242:19	322:18 330:11	jurisdiction 317:22	kit 54:20 156:20
interest 19:14 256:8	invite 11:7 304:5	331:20 334:2	jurisdictional 24:5	157:5
272:19 277:15	involved 15:6 66:19		jurisdictions 127:12	kitchen 77:22 83:12
282:21 325:16	80:13 123:16		316:4	86:19 94:15
interested 83:14	Iowa 23:16	J	Justice 330:21	kits 50:4 89:15
194:13	IPI 120:15 135:22	J 2:8 3:12	justification 100:19	156:20,21,22
interesting 255:2	141:15 142:6	Jack 2:14 5:5 12:4,5	116:6	157:7,14 255:1
Interestingly 97:16	188:7 214:10	84:19,21 195:22	justified 17:13 22:8	knees 18:7 210:22
interests 68:17	219:13,22 220:1	196:1 301:21	50:14 73:20 88:19	237:3
interfere 58:6	221:13 233:4	306:2	115:8 179:6	knob 18:14
interferes 38:13	234:11 243:12,19	jacket 63:2	justify 13:4 76:12	knock 33:14
intermediate 66:14	244:20 245:3,4,9	James 2:19 54:9	87:17 88:17	knocked 33:17
intermittent 37:22	245:19 246:17,19	60:2,5 123:5,7,10	Justin 3:3 7:3	know 7:10 31:14
38:3,10 40:7,9	247:22 255:5,5	195:14 201:9,11	116:22 155:8	32:18 45:20 46:5
47:9,11,18,19,22	258:11 260:19	212:20,21 216:4,5	206:14,15	66:5,6 73:9 75:8
48:4,8,10,13,14	287:13 292:5	229:2 263:5		75:15 76:13 77:16
48:17,20,21 49:4	335:11	312:15 313:10,11	K	78:8 79:19 80:11
49:7 50:18 52:7	IPIs 260:7	January 91:21	KAPSH 234:5,9,22	80:19 82:2,14,19
120:11 125:22	Iron 26:14	Jessica 3:1 7:5	235:3,6	84:8 85:7 86:8,8
135:21,22 139:11	irrelevant 76:2	278:14 296:6	Katrina 335:17	86:10 87:6,9 89:7
139:20 186:6,9,11	isolated 54:11 242:5	297:16,18 300:3	keep 9:20 10:6	92:18 93:17 94:6
186:14 187:17,19	isomers 319:12	Jim 2:21 6:11 7:11	79:17 86:2 91:7	94:6,8,10,17,18
187:20 203:3,13	issuance 21:12	56:19 59:14,20	114:12 135:1	94:19,20 97:16,17
204:5 206:10	issue 11:9,12 13:8	141:13 146:19	196:10 234:18	98:3 101:2,9
219:10,12 230:17	13:13,20 14:1,4,6	147:9,21 159:5	272:6 293:21	106:5,5,6,9,13,21
230:19 233:7	15:19 16:7,11	170:5 173:9 205:9	312:6	107:12,16 108:2
241:9,22 247:16	19:17 29:1,3	214:6,7 232:21	keeping 159:19	111:4 113:9,20
247:18 254:21	54:19 68:1,18	255:8 324:19,21	keeps 32:20	116:5,11 117:5,13
255:9,13 257:16	72:11 75:11 79:5	327:20 329:11	Kentucky 63:12	117:21 119:20,22
257:19 258:4	80:3 81:3 96:20	Jim's 297:10,17	kept 49:11,13	120:2 121:14
260:22 261:2	103:2 106:17	job 74:1 85:6,10	key 44:8,22 87:12	122:4 123:1
273:22 274:1,7	115:4 133:8	171:7	117:16 121:9	124:19,21 125:11
internally 217:19	192:19,21 195:8	jobs 287:6	128:10 130:6	127:1 130:17
internet 44:5	197:6,14 202:4	John 2:3,16 3:13	184:17 210:18,20	136:3,4 137:16
177:18	210:6 215:10,12	5:10 6:1 10:22	280:19 281:7	139:9,15 140:9,21
interruption 137:7	217:6 218:12,21	11:1 63:21 69:18	282:15 284:1	141:8 142:11,16
interview 152:3,10	219:6 224:9 245:1	73:1,13 78:6	296:17	152:4,5,11,14
152:16 153:5	245:17 259:18	98:14 100:3,8	kicked 103:11,18	153:12,19,21
161:7 207:11	269:18 277:12	117:19 118:7	kicks 33:3	154:2,8 155:20
280:2	289:7,13,17 307:6	122:17 129:4,21	kill 33:8	157:13,21 161:4
interviewed 162:5	321:21 322:16	129:22 130:21	kind 20:8 25:4	163:4 165:10
interviews 117:16	334:4 335:10	142:22 170:9	48:16 80:2,2,21	167:13 170:1,22
126:4 152:2	issued 21:7	190:5 194:21	94:3 95:9 100:15	171:6 173:2,13,14
279:15 280:6	issues 9:7,8 13:2,17	236:1 261:14	103:21 108:15	174:13 177:4
281:8 300:18	14:2,11 15:10,11	268:13 325:13	121:9,17 135:10	178:5 183:20
308:3	15:13 20:2,6	336:7	165:20 187:5	191:7,21 192:9
introduce 7:8 63:5	25:22 60:8 66:22	John's 329:12	189:6 193:3	193:21 197:22
introduction 15:15	68:6 72:18 76:14	join 10:3 67:22	221:12 231:14	198:3 206:20
introductions 5:1	76:17 87:1 126:11	joined 103:14	232:12 233:15	207:16 208:8
		joining 10:16,18		

209:3 210:7,12,21 211:9 212:7 215:22 217:6 218:10,18,22 219:1 224:16,20 228:17 232:3,4,6 232:9 236:21 237:16 238:1,19 239:13 242:15 245:17 247:6 248:1 257:4,6 259:1,21 262:22 263:2,15 264:2 267:8 268:6 270:5 276:9 277:12,13 286:5,15,19 287:1 287:2,8 288:9,15 289:8 290:14,15 291:10,22 292:4 293:10 296:10,13 297:6 298:11,18 298:18,22 299:7 299:11 302:1,3,4 302:4,8 304:7 306:21 312:1 313:12 316:18 318:22 321:1 326:9,12 328:9,15 328:19 331:5,11 331:15 333:7 334:4,5,15,17 335:10,13,22 knowing 101:3 knowledge 171:15 known 26:15 88:10 279:9 318:9,14 319:9 knows 82:22 83:5 298:22 Kupsh 2:21 6:11,11 141:11,14,21 142:1,4 146:19,20 147:11 148:3,7,10 148:15,18 159:5,5 159:13 170:5,5 205:10 214:7,7 232:21,21 233:9 233:17 246:14 255:8,8,15	labeling 50:12,16 labelling 50:3,13 labor 141:1 175:8 243:9,22 253:10 Laboratory 6:18,22 163:14 Labs 45:20 lack 16:15 24:18 46:7 58:1 87:7 125:17 231:1,7 277:17 327:2 lacks 214:5 Lakeville 23:10 language 75:10 76:18 81:7 93:17 Lapato 2:22 6:5,5 large 12:12 27:21 29:11,15 31:14,16 46:7 199:13 264:12 290:10 293:5 300:21 301:3,3 302:1,6 302:11 303:2,21 304:1,14 306:14 306:21 largely 71:16 284:21 301:1 larger 29:22 30:21 31:2 32:13 34:12 133:21 134:16 140:7 281:20 289:15,21 largest 143:14 Larson 170:9 Lastly 33:10 lately 325:22 latest 166:22 179:6 196:15 Law 3:5,11 lawful 76:13 lawfully 13:20 Lawrence 3:18,19 6:17,21 45:19 163:14 297:5 LBNL 202:13 LCC 189:7 240:7 240:10,11,16 260:18 272:11 LCC's 240:2,6,8 lead 80:10 278:8 281:15 301:14 309:4 leader 23:10 leading 23:21 56:8 leads 78:16 79:10 219:21	leakage 321:11 leap 311:15 leaps 197:15 leave 16:3 49:15,20 51:22 84:12,13,13 88:13 102:3 123:6 126:7 161:13 162:19 211:6 212:16 221:8 241:14 246:6 287:20 291:3 294:2 leaves 106:2 leaving 49:17 243:14 left 5:1 22:18 80:4 80:21 83:20 102:11 130:10 163:10,12 182:14 208:14 211:10 262:1 legal 75:12 76:14 82:15 127:5 length 62:17 130:2 271:20 Leslie 2:7 5:18 34:9 34:10 63:1 73:22 89:12 91:7 97:13 108:20 112:9 114:12 120:21 121:4 134:4,17 136:9 140:13 144:2 153:1,7,8 154:14 156:5 161:10,11 164:20 165:3,12 168:13 171:20 172:6 175:12 177:1,9,12 178:19 185:9,9 191:1 198:13,14 203:9 207:14,15 207:22 209:16 228:13 238:7 241:10,11,14 250:10,11 252:12 252:13 254:19 258:7 260:5 271:2 290:21 295:9 299:13 302:22 303:5 310:6,7 312:6 324:18 326:14 Leslie's 164:9 190:6 lessen 31:1 lessening 25:2 292:12	lessens 324:9 lesser 30:20 34:22 290:13 let's 6:15 12:1 13:22 62:21 73:12 79:14 82:16,16 89:8 94:9 95:14 101:17 102:12 153:7 160:7,16 161:17 162:13,16 163:8 168:21 169:4 170:9 192:15 193:21 208:9 234:13 238:15 253:7,9 261:17 295:4 298:5 305:18,19 333:16 letter 336:14,16 level 54:1,7,8,12,13 54:16 62:19 76:4 98:20 129:16,19 142:17 167:12 248:7 274:2 levels 73:17 257:15 Lewis 3:1 7:5,5 278:14,14 295:15 297:19 300:4 302:15 303:7,9 304:2,5 306:20 307:12,21 308:6 license 193:4 licensed 193:2,6 licensing 192:19 life 27:14 31:8 240:3 274:21 lifecycle 8:18 114:4 163:16,17 185:22 202:18,22 203:7 239:21 240:2,18 lifetime 74:4 240:9 240:21 241:1 253:20 255:19 256:1,3,3,6 261:8 261:9 272:9,14 274:19 light 17:6 18:4,10 18:20 19:5,20 21:19 22:14,16 40:1 41:3 46:12 46:18 84:2 85:20 88:3 89:3 90:4 116:12 120:6 130:8 188:5 197:12 210:21 211:2,5,14,16 213:4 216:9,10	218:11 225:3 230:2,11 236:9,16 236:17,18 244:14 275:13 285:14 309:10 322:6 lighted 31:2 311:14 lighter 137:12 lights 16:3 17:2 18:6,12,15 19:22 22:18 35:17 36:11 36:13 39:15,22 46:10 78:1 79:20 80:4,16,21 83:11 83:20 84:4,7,15 85:17 89:6 93:2,9 94:12 106:16 109:4,9,16,18,22 115:9 116:3,5 130:10 137:11 153:21 154:21 156:4 158:19,22 187:6 197:11 210:8 219:2 225:4 259:21 275:12 277:18 281:14 282:8,10 285:12 285:15 300:20 301:14 308:14 lights,that's 111:6 lignin 319:2 likelihood 268:19 limit 22:2 43:17 48:13 57:18 59:4 84:9 133:17 limitation 43:11 48:18 76:1 limitations 47:17 289:11 limited 22:13 40:18 47:16 63:9 197:12 210:9 289:5 limiting 31:2 55:20 limits 39:3 Linda 163:9 line 27:9 60:21 117:15 132:5 162:1 172:4 189:11 259:5 267:20 269:17 270:11,12 linear 229:22 lined 252:3 lines 33:15 272:1 285:5 289:8 290:7 linger 253:7 link 197:21
<hr/> L <hr/> I 13:12 1/2 44:17,20 lab 3:18,19 297:6 299:19 labeled 199:15				

linked 199:20 236:6	229:18 308:18	124:2 133:13	215:18 224:12	luxury 311:2
list 43:19,22 81:18	location 27:9 28:22	146:14 159:14	231:15 249:1	
81:19 266:19	193:10	202:17 251:1	257:4 269:13	<hr/> M <hr/>
302:12 303:8,9	log 27:10,13,15 28:2	290:6 308:9 327:1	293:4 303:15	ma'am 242:12
304:6 305:21	28:16,19 29:15	331:4	309:13 313:2	mad 204:14
306:10 307:8	30:17,21 31:8	long 28:9,10 65:17	330:5	magazine 43:20,21
310:9 318:20	32:8,10 33:10,15	96:9 222:22	looks 79:4 106:12	44:3 54:10 209:1
319:4,15,21 320:7	34:4 35:3,12	297:10 312:11,12	112:10 156:19	magnitude 17:9,12
listed 70:14 82:2	36:19 37:7,8,11	327:17 328:8	210:18 279:4	127:15 206:11
179:5 223:19	37:13,17 38:2,11	longer 51:4 221:12	Los 56:9 329:7,8	216:13 229:12
225:10 241:8	38:12 39:3,4,8,18	234:1 255:5	lose 332:16	295:22 296:1,3
244:3 248:17,18	40:2 42:6 43:2,4	285:19 314:9	losing 98:5	mail 275:21
249:5 251:13	44:12,21 46:20,21	look 8:7 20:11 44:15	loss 180:2	main 46:13 120:9
252:17 277:3	47:3,4,13,18,20	44:16 54:8 57:20	losses 229:8 255:6	130:2 137:5 148:4
319:4	48:1,2,6,9,18,20	61:12,21 76:19	273:18 321:8	182:3 186:15
listen 35:7	48:22 49:3,6,11	78:2,8 95:9	lost 25:7 230:6	204:6 206:4,16,21
listing 141:5 204:3	50:1,4,18 51:8,15	102:18 108:11	lot 9:19 61:14 62:12	208:1 219:13,14
lists 166:16 179:12	52:8,10 53:10,21	114:18 119:22	66:5 69:2 74:10	219:15,16,17,20
180:1 230:15,17	55:4,12,16,20,22	128:13 138:21	74:19 76:19	219:21 221:17
231:7	56:7,14,17 57:2,5	141:15 144:10	102:18 106:13	222:4 223:1,15,16
lit 55:1 80:17 88:19	57:18,20 58:16	153:14 154:10	113:6 121:22	223:17,20 225:18
125:16 127:4,6	59:10 61:17 79:5	160:5,8 165:10	137:20 139:4	230:8 244:18
136:3,6,11 258:15	80:17 83:7 84:14	170:21 176:14,15	149:9,9 153:17	245:11 259:4
258:16,18,20	88:19 104:4,4	181:4 182:2,12	155:17 162:13,15	278:17
literally 81:4 277:20	118:19 121:7,8,10	194:21 199:11	173:19 174:13	maintain 144:13
literature 117:13,14	121:11 124:9	200:11 205:11	184:21 216:1,17	283:9,17,18
146:6 151:19	127:11,20 140:8	213:8 214:8	230:9 232:3	maintaining 29:12
154:10 155:11	145:18 146:5,7,11	216:22 217:9	234:17 244:19	maintenance 253:6
207:4 238:6	147:1,17 150:22	228:17,22 242:21	247:10 286:19	253:12,14 316:7
243:14 255:22	151:1 172:10	252:1,3,4 269:12	290:10 292:10	major 56:2 126:11
285:9	205:12 215:19	272:5 287:21	295:4 298:19	128:16 153:18,19
little 11:12 33:19	230:5 250:8 263:1	293:10 300:5	299:20,22 312:12	167:11 190:10
39:21 66:17 67:5	263:20 267:6	304:6 305:2 307:8	320:12 331:16,22	218:13 239:2
108:10 125:13,20	270:6,9 279:3	319:1 327:14	336:10	259:19 279:12
134:11,15 138:3	289:12,21 290:13	328:12 330:6	love 236:5 247:9	304:9,11 336:2
139:9 147:8 152:8	296:18 298:19	333:18 335:17	low 38:4 41:17	majority 43:2
171:7 178:1,11	299:21 301:19	looked 44:4,4	58:13 59:6 170:3	121:22 200:4
187:12 188:18	303:16 307:22	101:11 104:15	245:21 285:2	201:7 292:6
216:7,16 222:7	308:1,3,15 309:3	128:11 139:15	Lowe's 177:17	makeup 319:1
229:5,22 238:19	309:12,12,14,18	150:18 184:13	lower 38:7 49:1	making 35:14 44:7
242:3 263:7	309:22 310:8	199:16 205:7	147:2 172:7 234:7	55:22 57:2 58:7
267:12 295:21	311:6,11,13 314:4	217:6 221:5	234:17,17 240:22	98:6 144:21
297:9 303:22	314:8,22 318:5	225:22 263:17	268:19 269:22	176:10 235:19
317:1 318:21	325:20 329:5	294:12 300:6	301:5,9,15	299:8 307:17
326:10	logical 292:3	309:5	lowering 283:20	326:10
live 213:19	logs 3:10 5:17 26:15	looking 59:6 76:18	lowest 58:10	manage 247:13
lives 278:11	26:17 27:5 29:13	77:11,15 85:18,21	LP 45:6 134:7,19,19	managed 317:1
living 19:19	34:12 35:8,10,14	88:5 89:17,21	252:14	Management 56:12
LLC 3:6,11	37:14 38:2,8,9,21	95:11 105:14	LPG 249:5 325:1	manager 11:2
LLP 2:16	38:22 41:4 42:8	108:16 110:9	lumped 106:20	managing 117:1
load 186:21 223:22	42:11,19 47:7	111:2 125:14	lumping 26:22	mandated 316:3
231:8 232:10,17	51:11 52:3 53:13	131:17 139:2	61:17 215:21	mandatory 276:22
local 57:13 61:8	55:7,8,11 58:10	143:14 155:5	lunch 8:20,21	manifestation
315:10,21 316:4,9	58:18 59:2 61:13	157:10 165:19	157:20 160:16	324:16
317:21 320:18	78:17 79:11	171:7 176:13	162:14	manner 50:20 156:1
located 19:19 29:1	118:16,19 124:1,1	187:4 198:4	Lung 56:5	manual 41:10 46:18

52:12 140:11	283:9,12,16 284:4	180:21 184:6,8,13	136:11 137:3,21	260:21 261:20
145:19 146:3,6,21	289:18 296:2	184:22 195:8	145:8,11,13	274:6
146:22 147:12,16	298:1,2 300:6,8	198:11 202:20	258:15,16,18,20	meant 81:19 107:22
148:2,7,11 149:4	300:16,19,22	209:4 212:8 219:4	311:14	111:14 141:20
149:5,13,21,22	301:3,4,7,15,16	219:4 233:10	matchless 195:9	204:21 242:10
150:11,13 151:1	301:20 302:2,16	246:11 248:1,3	309:22	243:17
311:7	303:12,12,15,18	257:14 258:2,10	material 18:3 243:9	measured 313:18
manufacture 23:11	306:13,15 307:22	258:11 259:8	253:11	319:22 320:13
34:19 278:13	308:2,3,12,17	260:21 267:15,17	materially 14:19	measurement
281:13 286:2	309:1 334:1	267:18 271:19	materials 59:19	199:10
287:3,4	manufacturers'	280:15 281:18	135:15,17 299:9	measures 52:18
manufacturer	279:22	287:13 288:13	matter 154:22	mechanical 164:6
27:19 32:7,11	manufacturing 8:22	289:4 290:4 308:1	155:2,3 173:16	165:5,14,15
37:12 117:15	23:15 26:17 34:14	308:4 333:6	194:16 206:5	166:21 181:1
126:3 129:15,19	59:9 63:11 241:5	marketed 327:10	319:13 320:5	183:15,19 191:18
130:1 131:2 141:8	241:6 279:6	marketers 20:22	matters 207:16	193:6 195:3 244:1
141:10 145:6	282:18 296:3,18	marketing 23:8	208:8	mechanism 55:1
151:5 152:2 153:4	299:6 312:10	26:5 30:16 44:13	max 143:8,12	median 256:3 257:6
153:5,18 160:13	map 64:2	194:22 254:17	maximum 47:4,7,13	257:10 261:10
160:20,21 161:1,4	mapping 64:17	marketplace 62:12	50:14 98:21	meet 24:4 27:16
161:7 162:10	march 1:11 4:7 44:2	178:1 289:16	143:10,18	76:8 81:16,21
163:21 164:2,6	115:18 116:9	markets 15:6	Maxitrol 3:13 6:2	107:11 113:11
166:18 173:2	margin 169:21	123:17 124:6	130:1 160:4	115:16
178:15 181:11,13	283:3,6	marking 181:7	mean 75:14 77:3,5	meeting 1:1,3 2:1
207:1 213:20	marginal 248:13,16	markup 160:20	77:22 80:8,16,18	4:5,14,20 8:12 9:9
214:9 217:20	248:20 249:2	161:9 162:4,10	81:7 84:3 85:2	9:17 10:17,20,21
241:5 242:16	251:7,8 316:7	164:15 166:18,20	87:2,22 90:7	11:3 65:19,22
245:3 246:14,16	mark 183:16	167:4 168:15	91:17 92:11,12	99:9,17 100:11,17
246:20 255:22	market 8:15 17:19	172:15,20 174:21	93:17 94:13	336:22
277:4 278:16	23:10 27:16 38:8	175:1,9,18 176:1	100:21 101:1	meetings 10:5 73:9
279:8 280:16,21	38:22 39:7 44:9	176:2 177:5	106:11 109:9,10	meets 87:15 90:10
283:22 285:4	44:22 46:9 47:21	178:15,15,17	109:21 112:16	142:19
287:10 292:5	48:15,16,19 59:5	191:15 192:4	116:2 134:5	member 23:14
300:12 304:1	70:13,15,20 71:7	194:17 241:5,6,7	143:11 151:15	152:18
306:18 310:4	79:2 81:15 89:18	280:21 282:16,17	153:19 154:4	members 21:3
manufacturers 21:5	100:1 107:5	282:22 283:2,4,5	159:6 168:1,14	170:6 302:3
27:17 28:11 30:10	113:22 114:2	283:9,17,19,20	177:9 188:13	membership 20:20
30:17 31:11,14,19	115:14,17,20	markups 8:18	190:9,9 192:13	mention 120:12
32:13 34:12 42:6	116:16 117:2,4,6	163:12,15,19	194:14 197:21	136:2 334:16
42:18 43:8,18	117:7,12 120:14	166:11,13 174:18	198:16 200:4	mentioned 45:6
44:1,2,6,9 45:2	122:21,22 123:11	175:3 284:1	203:15,20 208:19	65:3 69:19 72:12
61:9 74:5 99:14	124:3,4 125:13,15	Martin 131:5	214:21 237:13,14	89:15 117:19
127:21 133:19	126:1 128:22	243:11 255:3	237:15,20 238:5	119:20 121:8,15
141:6 143:4	130:16 132:1	Martin's 255:4	260:3 269:12	128:20 136:2
144:21 146:17	134:19,19 135:2	Maryland 23:17	272:2 275:14	139:10 153:17
152:15 153:19	136:1 139:13	33:16	287:11 288:19	206:18 214:19
159:12 162:4	142:8 143:2 144:7	masonry 37:9 38:18	328:8 331:4	222:9 238:8 282:9
166:19 173:18	151:12,13 154:9	38:20 39:1,6	meaning 60:22	282:15 292:4
177:14 195:7	156:7,17,18 157:6	53:20 85:13	77:10	296:6,8 299:16,17
207:11 245:10,15	157:22 158:3,14	121:11 230:5	meaningful 77:3	300:18 325:20
246:6 259:11,20	160:5 164:11,12	mass 84:14 177:17	means 35:21 101:19	merchants 177:17
270:6 276:3	164:14,16 166:11	320:16 321:1	109:19 115:15	mercury 313:1
278:19,20,22	166:17 168:15	masses 320:2	118:13 129:9	merely 28:4 149:14
279:2,16 280:3,7	172:7,8,16 174:19	match 31:2 80:17	137:4 156:11	message 19:15
281:3,8,10,16,19	174:20 177:15	88:19 125:16	161:18 195:7	met 64:15
281:21 282:2,5	178:12 180:4,5,10	127:4,6 136:3,6	213:14 244:1	meter 205:3

<p>methane 313:1 321:6,7,10 methanol 319:9 method 138:20 266:9 271:14 methodologies 135:9 methodology 135:13 138:2 186:2 240:7 metric 279:13 metrics 313:19 320:18 MIA 278:16,18 279:4,15,19 280:20 281:7 284:2 mic 189:20 Michael 2:9 3:4 20:16 170:10 Michigan 32:17 235:12 microns 317:15 microphone 5:2 6:16 60:1 63:6 67:3 72:7 89:13 100:5 105:10 108:21 134:4 154:16 164:21 203:10 206:14 241:13 312:7 microphones 10:2 microsecond 138:14 Mid 5:21 mid-afternoon 9:1 mid-Atlantic 61:7 mid-day 8:20 mid-morning 8:16 middle 108:22 Midwest 170:10 Mike 5:12 6:19 20:14 192:1,2 295:20 298:3 307:6 mild 294:8 millable 30:22 million 54:3,8,12 180:15,16 197:2 200:17,18,22 213:11 230:1 252:21 268:6 275:4 284:10,12 296:6 323:21 324:2 millivolt 30:3 40:11 140:2,7 145:18</p>	<p>146:3,21 147:3,9 147:13,19 148:3,4 148:10,17,20 149:1,5,7,10,21 150:4,6,14,15,22 311:8 millivoltage 149:10 millivolts 148:2 mind 148:1 191:10 236:16 293:7 302:21 mine 32:17 333:8 333:13 minimum 142:19 257:18 Minnesota 23:10,16 minus 213:11 229:6 minute 111:15 224:10 minutes 101:16,18 101:19,19 219:20 220:21 221:18 222:5 261:18 335:7 misaligned 16:19 mischaracterizati... 70:17 mischaracterized 304:8,20 mischaracterizes 72:4 misleading 150:15 missed 126:12 missing 165:3 182:13,15 198:1,7 201:3,4 mistake 136:19,20 misunderstanding 267:15 misunderstandings 13:1 15:5 mitigate 309:19 mixes 36:15 mode 9:22 15:20 24:22 25:11 64:22 64:22 99:7 129:7 142:16 143:14,19 188:9,10 208:16 293:1 model 135:20 145:4 151:21 153:14 160:9 177:16 206:19 219:1,3 237:13 257:21 276:4,5,9 279:9 279:10,12,17</p>	<p>280:9,11,22 282:16,22 285:22 326:9 327:7 modeled 283:2 301:6 modeling 330:19 models 153:15 237:16 276:11 284:15 285:10,11 285:12,15,16,20 332:13 modes 208:13 233:16 modest 57:16 modified 19:2 277:1 modulation 30:8 module 28:6 253:21 255:17 moisture 32:20 mom 171:5 moment 14:1 79:16 118:17 236:1 245:2 253:8 286:8 332:7,19 Monday 1:11 money 49:6 134:20 238:11 299:20 312:2 monitor 22:16 monolithic 26:20 27:5 monoxide 33:6 70:22 316:21 317:8 324:11,12 month 24:6,8 32:20 254:22 334:20 335:5 month's 43:20 monthly 248:13,15 248:19 249:4 251:6,8 months 49:22 73:5 192:20 253:2 299:9 morning 4:3,4,11 4:13 12:6 20:15 23:7 26:13 41:14 63:15 116:21,22 292:7 293:15 Moroz 3:7 63:8,8,16 67:4,12,18 69:18 70:1 90:11 92:14 125:2,2 131:9 138:1,1 147:8,22 148:6,9,13,17,21 149:16 150:12</p>	<p>162:3,8 171:22 172:19,19 213:16 213:16 220:15 242:19 247:4 250:17 286:7,7 mounted 314:14 move 61:2 62:16,16 78:10 107:3 116:15,16 121:5 122:13 125:11 160:2 164:2 190:4 195:11 208:9 219:10 238:18 248:9 272:3 286:22 298:3,7 301:19 310:14 moved 292:5 movement 138:10 138:10 moving 8:13,15 130:16 135:2,3 185:17 203:21 219:8 243:6 256:5 276:17 278:12 282:13 288:10 289:7 307:21 312:14 325:21 MPC 309:6,8,13,14 MPC's 161:8 301:15 MR.SIAP 180:6 MSP 163:21 174:21 175:1,4,6,10 MSRP 39:17 multi-couple 149:8 multi-family 53:18 53:20 265:20 268:5,8,12,18 269:2,20 271:4 multi-housing 266:2 multi-national 307:3 multiple 195:1 280:21 303:17 multiplication 161:1 196:9 multiplier 282:17 multiplying 161:4 248:14 mushroom 110:12 mute 10:6 MVOC 320:15,16</p>	<p>N20 313:1 Nagivant 7:1 name 4:9 5:3 9:14 9:14 12:5 20:15 23:7 26:3,9 34:7 60:2,5 63:6,8 88:9 105:11 116:22 126:16 165:1 206:19 212:12 278:14 319:11 named 88:8 nameplate 204:17 205:2 names 307:10 naphthalene 319:11 Napoleon 3:7 narrative 24:13 narrow 92:10 198:5 nasty 331:22 national 2:9 3:18,19 5:12 6:18,22 8:21 20:17,18 41:8 45:20 57:7 63:10 69:21 70:2 114:4 155:2 163:14,18 202:21 272:7,12 272:13 273:2 274:10 276:20 286:14 297:6 312:21 313:8 315:22 316:2,5 322:20 nationally 197:2,4 natural 5:11 22:3 31:3 41:8,15,18 41:19 46:17 51:1 51:14 57:8,9,11 57:12,13,14 127:12 134:8,10 134:12,15 137:12 196:18 248:18 251:13 252:14,18 311:14 317:10,13 321:6,8,11,14 323:13,22 325:1 326:1 328:12 329:6,7 330:9,12 331:16 nature 84:18 284:15 322:10 Navigant 3:1,2,3,4 6:19 7:3,5 45:15 117:1 136:11 152:10 206:15 278:15 295:20 297:1 312:9</p>
---	---	---	---	--

N

N 4:1

<p>NC 67:12 near 40:13 197:7 nearly 40:21 necessarily 42:12 155:3 168:8 169:19 192:5,11 210:15 239:13 242:3,20 297:22 299:10 331:17 necessary 16:15 25:18 38:15 119:6 243:9 247:17 need 11:20 14:8 19:9 30:21 33:20 53:16 76:11 86:21 87:1,5 94:17,18 95:1 101:1 103:5 106:22 115:9 135:20 149:9,13 159:3 163:1 171:3 177:3,3,5 185:2 188:18 194:6 247:20 260:1 261:19 265:4,17 272:3 288:11 297:3 330:6 331:2 335:14 336:13,14 needed 229:17 249:1 296:4 needs 43:8 72:19 102:7 260:4 277:22 287:15 332:10 negative 32:10 33:22 51:6 56:2 57:4 59:10 230:6 237:15 295:3,17 negatively 313:21 318:2 neglected 313:17 neighbor's 204:12 neighborhood 290:14 NES 272:13 277:7 nest 33:5 net 57:4 261:4 272:16 273:3,11 274:11,13,14 279:13 294:4 295:3 network 34:18 172:4 330:9 neutral 321:3 never 14:22 54:13 66:11,14,21 70:22 71:12 76:7 88:7</p>	<p>94:14 116:10 255:1 298:9 299:2 305:17 new 13:5,6 28:14 31:3 37:22 41:16 53:12 65:1 97:2,2 103:1 124:4,9 131:10,13,15 132:3 135:12 160:9 164:4,7 168:16 178:13 179:3,14 180:5,17 182:14 184:11 211:22 212:7 239:8 247:7 262:21 263:3,20 264:5,8,13 265:7 265:8,15,22 266:3 268:20 284:18,18 287:14 308:11 314:15 315:3 newer 298:14 newly 153:22 200:21 NIA 272:8 273:12 273:20 274:9 277:1 nice 4:10 8:5 243:3 270:3 327:8 niche 178:1 night 51:22 nilly 76:9 noise 232:12 nominal 251:18,19 256:21 285:3 non 179:14 non-active 129:7 non-existent 56:21 non-heating 186:20 187:3 non-HPBA 159:10 159:12 non-methane 320:14 non-production 282:19 non-regulatory 276:21 277:2,8,21 278:4 non-reporting 159:7,15 non-standing 214:9 non-use 72:3 130:18 nondescript 110:17 NOPR 21:7,15 22:10 24:4 25:1</p>	<p>25:14,16 27:4 28:5 29:13 31:21 32:6,12 33:21 42:7 56:19 66:1 70:8 72:5 88:6 132:8 244:10 270:5 278:8,17 283:2 293:11 301:11 norm 236:14 normal 41:16 80:6 normally 36:9 142:13,16 146:22 148:18,19 170:6 183:11 264:2 north 12:9 23:17 57:15 235:10 319:16 northeast 327:18 northern 32:19 235:13,15 note 60:16 132:9 166:12 297:20 noted 308:12 320:6 320:10 notes 99:21 322:19 notice 1:2 4:4 13:5 13:10 65:7,8,20 65:20,22 68:5 199:21 236:7,8 239:4 260:8 294:8 notices 294:9 noting 294:20 notwithstanding 321:8 NOx 313:1 NPGA 20:18 21:6 21:21 45:5 NPV 277:7 NRDC 56:4 number 15:10 17:15 27:9,16 28:6 32:16 48:3 54:4,4 55:7 59:5 63:20 73:6 76:14 82:20 98:18 114:19 128:7 144:20 158:13 161:9 162:3 174:4 174:5 199:11 202:1,9 206:20 207:13,18 208:6 209:21 210:1 216:7 226:15 227:2 229:18 234:7,16,18</p>	<p>252:15,16,17 259:6 261:8 262:11,16 264:13 264:20 265:7,14 265:19,19 275:4,8 278:9 291:22 296:8 299:16 302:19 303:1,11 306:21 315:21 319:3 323:11,12 323:14,19 325:7 330:15 numbers 39:19 41:21 44:8 53:8 88:9 94:10 98:2 101:1,3 123:13 125:3,8 127:14,19 128:11,11,16 131:11 135:6 144:14,16 151:21 152:13,22 153:1,2 153:14 157:1,2 170:3 198:7 201:2 206:5,16 209:3,6 212:14 214:4 224:13 231:18,18 235:19 258:17,22 259:4 271:5,10 272:1 275:15 286:2 294:13 299:4,5 302:18 307:15 323:12 numerous 45:11 46:3</p>	<p>occupants 314:2 occupied 19:19 occur 68:20 occurring 33:9 214:16 odd 166:7 ODS 70:11 119:13 145:20 146:12 147:20 160:7 offer 47:19 75:6 306:5 offered 285:11,15 285:16 offering 288:14 offerings 237:16 276:5,10 offers 27:19 245:3,3 office 6:13 Offices 3:5,11 offset 58:21 offsetting 58:14 oh 100:6 118:19 201:21 208:3 242:21 305:16 315:17 OHP 186:9 196:6,6 oil 248:18 Ok 146:10 okay 8:3 12:4 20:13 26:2,12 34:6 59:13,22 60:3,5 62:20 63:18,21 67:18,19 69:16,22 72:22 73:12,15 74:9 75:3 76:22 79:16 85:10 94:7 96:8 98:15 101:14 102:10 105:21 109:21 111:7 112:4,5,20 114:17 118:2 120:3,18,20 121:3 123:8 124:14,15 125:9 129:3 130:21 131:4 134:2,21 137:22 139:7 152:21 153:6,10 159:16 160:1 161:14 163:8 165:17,18 166:9 167:16 169:1,3 170:15 171:20 173:10 174:3 175:20 176:22 178:8,10 179:8 180:14 183:9,13</p>
--	---	---	---	--

183:17 185:15,17 187:20,21 188:20 189:18 194:10,19 195:11,19 196:10 202:11 203:19,21 206:2 208:3,9,10 212:2 214:17 216:4 219:8 222:9 222:11,14,15 223:7,13,13 228:18 229:2 230:13 232:2 235:6 238:1 239:20,20 243:6,7 243:15 246:3 248:9 250:1,10 251:4,21 253:5,9 254:19 255:7 257:1,12 258:21 260:16 261:20,22 262:2 263:5 264:17,19 266:4 270:15 271:18,20 272:4 273:12 274:9 275:22 276:17,18 287:18 291:2 295:13,15 297:7,15 303:5 306:7 310:13 316:14 324:18 325:10 333:15,16 333:19,19 334:4 335:5 old 148:1 210:9 216:1 230:5 older 243:22 on-time 186:10 on/off 30:7 58:2 once 8:3 161:12 one-quarter 329:7 one-time 281:3 284:3 285:7 ones 155:10 195:9,9 195:10 268:20 298:20 311:15,16 311:17 333:20 334:11 online 131:5 255:3 open 51:22 52:4 82:6 106:8 108:3 109:14 222:17 230:4 236:22 242:17 254:14 286:3 324:7 336:13 opening 8:11 11:21	12:2 27:8 59:16 60:9 61:1,2 62:17 64:1,3 74:1 121:10 235:11 289:11 291:10 openings 27:9 53:21 operate 29:4 33:20 37:13 41:6 50:19 58:4 71:7 80:19 138:17 149:10 211:1 220:12 223:2 244:21 282:12 operated 18:6 131:6 operating 74:4 120:7 149:12 175:6 186:10,20 187:9 188:2 206:10 208:10,12 219:9,10,13,14 220:1,10 222:6,9 223:15,17,18 224:9 225:13 231:10 240:5,9,13 240:21,22 256:6 260:18 272:18 273:4,6 283:5,13 283:15,18 operation 17:7 22:16 58:4 149:11 186:15,17 219:15 219:22 253:12 275:13 operational 225:2 244:20 245:6 operations 304:12 304:17 operator 148:4,11 150:7 opinion 215:14 opportunities 16:18 45:11 105:5 opportunity 8:11 9:5 13:6 20:6 34:5 91:19 95:3 105:4 105:8 119:2 124:12 207:12 291:17 opposed 35:15 97:9 120:7 146:7 154:7 188:11 228:19 262:15 266:1 272:20 303:16 opposes 35:13 opposite 78:21 205:10	option 40:9 46:11 89:21 133:3 135:11 143:12,13 157:11 285:13,17 285:19 309:21 options 39:9 40:7 46:6 98:17 99:4,5 99:7 117:20 277:21 288:10 290:19 333:17,17 order 52:6 76:11 117:12 184:18,20 244:8 245:22 281:4 283:19 284:4 orders 16:14 21:9 organic 318:21,22 319:13,19 320:4,7 320:12,14 323:6 organization 221:6 organizational 5:3 63:7 original 36:22 331:21 originally 49:9 318:20 ouch 32:2 outage 33:12 71:11 336:2 outages 71:9 282:12 335:12 outcome 218:14 outdated 329:16 outdoor 24:16 34:21 36:11,11 44:7 61:17 80:18 83:5 84:1,12 88:1 88:1 104:5 105:15 105:16,16 106:4 106:10 109:3 112:11,18 114:13 114:14 121:19 123:2 125:4 127:13,14 140:8 159:9,11 207:17 207:22 208:1 258:14 309:17,20 outdoors 222:18 outlets 308:18 outline 43:10 outlook 249:6 313:3 output 279:12 outputs 281:7 outreach 21:9 outset 8:12 12:3 20:14 34:7 60:16	293:15 outside 28:17 29:4 30:5 37:14 52:2 118:14 130:11,11 220:20 outward 54:6 outweigh 203:17 ovens 36:10,11 78:1 93:7 overall 55:17 156:18 158:13 168:14,15 188:3 223:19 256:15 overbroad 27:1 35:8 overcharge 310:10 overcome 15:2 289:18 overestimated 128:2 overhead 175:7 overlooked 119:14 overnight 249:18 overstate 41:9 54:17 218:1 221:13 252:10 overstated 51:1 245:12 246:10 overstating 52:19 overview 4:17 8:14 62:22 overwhelmingly 223:5 owned 302:14 307:3 owners 23:14 ownership 192:3,14 304:16 oxygen 51:20 70:10 71:14 118:17 119:3,21 146:15	71:15 72:2 panel 236:22 paperwork 88:15 paragraph 264:10 264:15 parameter 320:14 paramount 313:16 parched 93:17 pardon 153:7 163:2 264:14 parent 303:18,20 306:22 parenthesis 196:2 part 12:12 28:9,14 45:15,21 46:7 48:15 56:11 91:14 106:17 113:17 118:4 119:13 136:15 138:7 174:1 192:4,5 232:1 235:13,16 236:11 267:17 268:7 278:17 279:15 280:20 284:2 286:12 303:4 307:14 308:15 310:4 311:5 316:16 325:15 333:6 partially 113:18 participant 164:16 166:12,17 174:19 178:13 participants 10:2 10:15 44:9,22 participate 4:16 10:19 286:11 287:21 particles 315:19 316:22 317:12,12 317:14,14,16,18 320:10,11 323:5 particular 16:13 48:2 64:3 79:4 121:21 132:8 150:19 217:19 244:15 288:17,17 294:10,20 296:19 320:8 particularly 13:18 35:12 45:18 47:18 59:6 77:3 81:4 124:17 314:22 322:7 324:11 particulates 324:11 partner 41:8
--	---	--	---	--

<p>parts 41:22 46:1 77:10 170:8 party 181:6 pass 162:22 path 299:2 331:10 paths 184:22 patio 2:11,12,14 5:5 5:8 7:17 12:7 17:22 26:19 77:16 77:17 80:1 81:2,5 83:19 85:1 87:2 88:2,8 104:6 105:13 106:7,15 110:11,20 111:9 111:15,18 117:17 122:20 123:4 192:18 197:19 pattern 35:22 74:15 76:21 77:4,7,13 77:19 79:1 86:15 86:16,17,17 90:19 90:21 91:1,2 107:13,14,15,16 108:1 110:16,17 110:18,18 111:11 111:14 165:22 210:14,16 224:17 224:19 225:4 patterns 165:20,20 197:12,13 210:8 211:16 pause 126:7 141:9 pay 212:9 335:1 payback 8:19 163:17 185:22 203:8 239:21 240:3,11 260:19 paying 49:5 327:12 payroll 178:2 pays 56:13 193:8 PBP 240:3,7 PDF 336:16 peak 227:8 232:11 232:12 294:15 pellet 23:11 36:7 Pelpro 23:14 pending 25:21 penetrating 212:8 penetration 48:16 48:19 Pennsylvania 23:16 people 29:20 33:8 34:13 46:20 55:22 69:1,3 71:11,22 79:3 92:11 112:3 126:17 154:6</p>	<p>170:7,9 171:8 172:13 174:2,8 177:16,18 191:10 191:11,22 194:7 201:19 202:1 209:17 212:9,16 215:9 217:20 218:7,8 222:12 234:14,16,20 238:10,21 295:1 311:13 315:12 318:3 321:1,3,7 327:11,15 329:15 330:7,8 332:17 334:21 people's 278:11 percent 166:7 213:12 244:3 295:17 330:12 percentage 38:4 49:17,20 53:12 115:17 127:22 128:2 141:17 152:5 158:9 187:6 203:1,12 214:9 268:5 283:4,7 285:11 288:13 289:4 309:8 percentages 152:11 154:11 perception 173:14 174:8 198:4 perfect 266:12 325:18 perfectly 336:16 perform 203:7 performance 19:11 74:4 98:19 99:2,5 99:12 100:2 277:17 292:18 performed 46:1 performs 217:13 244:14 period 8:19 11:17 13:16 24:6,8 41:22 46:13 52:5 91:21 130:3 163:17 185:22 188:6 203:8 221:8 239:21 240:3,12 254:14 260:19 265:18 268:15 272:19 288:11,22 298:10 323:1 326:7 336:11 periods 72:2 130:9</p>	<p>321:8 325:22 permit 211:15 223:10 permitted 255:7 Perrin 3:8 7:20,20 person 136:16 191:10 192:15 194:17 201:20 314:19 person's 324:14 perspective 85:18 127:21 240:1 Peter 5:14 23:6,7 26:4,8 184:1 214:18,19 269:10 291:2 Peterson 2:7,8 5:19 7:18 8:1 34:10,11 34:11 35:13,15 165:4 petition 320:9 phase 279:20 280:1 280:6 320:9,9 phases 279:20 phenol 319:11 phones 9:21 photographs 112:8 photos 92:7 110:10 photosynthesis 321:3 phrase 228:13 physical 37:12 48:18 135:15 285:2 pick 43:19 79:3 101:15 102:11 115:10 163:7,10 163:11 pickup 88:3 326:21 picture 106:2,12 117:6 129:2 236:11 288:15 pictures 78:7 81:20 piece 96:22 pieces 173:20 280:20 piezo 136:12,14,16 136:21 137:3,19 piezos 137:16 238:9 pile 174:10 pill 311:22 pilot 16:3 17:2,6 18:3,6,10,12,15 18:20 19:4,20 22:16,18 24:18,22 25:11 28:4,8,21</p>	<p>30:3 32:19,22 33:4 35:17 39:15 39:22 40:1,9,9 41:3,6 46:10,12 46:15,18 47:20 48:1,13 49:4,7,15 49:15,21 50:4,6,9 52:8,12,13 54:20 54:21,21 55:1,2 58:20 62:3,5,5 79:20 80:4,16,20 83:20 84:2,4,7,15 85:17,20 86:11 89:3,6,15,20 90:4 99:19 106:16 113:2,10,12 114:15 115:9,22 116:3,4,10,12,13 119:4,6,9,13,18 120:6,7,11,16 125:18,22 126:20 127:14 130:4,8,10 131:6,7 132:2,11 132:15,19,19,21 134:19 135:20,21 135:22 136:4,12 136:17 137:16 138:16 139:11,14 139:16,20,21 145:16,20 147:20 148:12,16 149:15 153:20 154:3,21 156:4,20,20,21,22 157:5,7,14 158:18 158:21 160:7 186:6,6,8,9,10,11 186:11,12,14,18 187:6,9,17,17,19 187:21,22 188:1,4 188:17 197:11,12 198:11 203:3,3,13 204:4,5 205:12,14 205:20 206:10 208:11,12,14,15 208:17 209:10 210:8,21 211:1,14 211:16 212:17 213:3,22 214:3,10 214:12 216:9,10 216:22 218:11 219:1,10,12 225:3 225:4,8,11,12,15 228:3,6,12 230:2 230:11,16,17,19 231:1,8,17,21 232:4 233:2,6,7,8</p>	<p>233:10,12,16,20 234:1,8,19,21 235:1,14 236:9,13 236:16,17,18 238:10,12 241:9,9 241:21,22 243:13 243:14,19 244:14 244:22 245:4,18 246:6,12 254:5,21 255:1,7,9,13 257:15,16,18,19 258:4,5 259:21 260:21,22 261:2 273:22,22 274:1,5 274:7 275:12,13 277:18 281:14 282:8,10 285:12 285:14,15,18 293:1 300:20 301:13 308:14 309:10 pilots 33:8 37:16 40:7 41:10 47:18 48:4,8,10,14,17 48:20,22 49:11,13 49:18 50:18 53:1 88:11,12 112:19 115:7 135:9 138:6 209:17 211:10 234:4,13,15,17 243:12 247:17 277:19 292:10 ping 88:2 pits 34:22 place 49:8 76:6 228:14 279:19 324:7 326:19 places 27:7 94:19 194:12 plain 77:18 82:22 83:4,6 plan 9:10 316:6,7 335:14 plane 286:9 plant 273:16 plants 23:15 321:3 play 173:19 players 302:4 plea 298:4 please 4:2 5:3 7:8 7:10 9:14,14,18 9:21 11:9,19 20:14 23:5 26:10 32:18 34:7,8 63:2 70:4 72:7 86:5 95:14 101:20</p>
---	--	---	--	---

102:3,9,13 103:15 105:10 128:9 134:3 137:1 141:13 149:2 153:7 159:17 162:16 163:8 164:20 173:10 212:12 229:3 238:7 239:3 271:7 287:16 288:6 304:7 305:11 313:10 pleased 20:5 pleasing 29:12 plentiful 57:8,17 328:15,20 PLLC 3:5 plumber 194:9 plummet 42:12 plus 160:6 196:6 200:22 213:11 229:6 255:16 PM2.5 315:20 point 14:14 15:12 63:10 68:15 69:5 71:6,18 75:9 78:18 81:14 82:2 82:14 85:16 88:20 89:16 90:16 91:3 97:7 101:15 109:12 111:1,9 115:1 119:2 122:11 123:3 127:4 128:10 130:7 132:8 133:1 137:14 148:21 150:14 153:11 154:20 155:20 164:9 165:11 166:7 168:22 169:6,7 170:17,20 174:9 177:13 186:3 190:6 191:18 193:15 210:7,12 213:1 220:16 222:10 233:15 235:9,17 236:1 238:1 241:17 244:7,9,15 245:1,21 246:1,2 246:9 254:17 257:9 259:2,4 262:20 269:3 275:11,18 282:5 294:3,17,19 305:20 307:12	321:22 328:13 332:5 333:15 POINTS 270:16 pointed 71:20 112:22 131:11 239:12 263:17 pointing 104:19 points 11:15 37:6 80:14 103:1 123:11 239:2,19 331:1 335:13 poisoning 71:1 policy 57:7 235:19 poll 173:2 pollutants 55:18 313:20,20 316:14 316:15,19 317:20 318:8,9,15,15 319:19 320:19 324:6,17 pollution 58:12 60:8 314:6 Polsinelli 3:8,14 polycyclic 319:13 320:4 pong 88:2 pools 137:11 pop 171:5 population 213:13 218:3 231:17 234:14 235:4 portal 162:22 portion 35:3 39:5 199:12,13 232:17 240:12 311:4 portions 122:9 144:19 position 56:6,15 82:10 85:4 possibility 80:3 possible 47:5 100:18 possibly 42:22 80:20 98:8 293:16 potential 11:5 21:16 25:10 33:6 72:17 73:19 84:17 100:1 135:19 226:22 278:22 280:9,22 283:1 285:21 potentially 29:2 33:7 113:8 221:12 276:11 281:17 326:8 pound 325:12 pounds 325:5,7	power 29:4,7 33:11 33:15,16 71:9,10 145:4,5,9 186:7,9 187:17,18,19,20 187:22 188:4,7 189:1,13 204:1,3 225:12 270:16 273:16 282:12 301:2 332:16 333:5,19 335:12 336:2 powered 29:18 30:11 40:11 47:9 47:19,22 334:11 practicable 73:18 practical 131:15,18 131:22 practically 128:1 practice 166:13 pre-disposition 202:8 pre-existing 39:1 pre-proposal 21:8 pre-unit 283:5 precise 128:7 predict 124:20 264:13 predicting 265:13 271:19 prediction 124:6 265:15 266:3,9 predominant 120:12 127:13,13 136:1 139:12 140:3,12 142:5,6 142:12 150:21 151:7,10 predominantly 140:22 155:11 prefer 47:8 preferences 265:1 preliminary 8:10 12:21 65:21 premature 132:4 premised 12:22 prepare 280:3 297:6 prepared 61:5 preparing 275:19 prescribe 64:13 247:19 prescription 25:6,8 292:9 prescriptive 24:21 98:22 99:10 117:21 125:12	135:8,18,19 presence 19:21 113:2,10 197:10 present 11:4 34:5 37:19 59:14 77:18 80:1,2 108:1 256:6 267:4,5 272:16,17,18 273:3,11,11 274:12,13 279:13 294:4 295:3 presentation 59:19 68:17 169:4 presented 78:21 83:6 96:2 107:22 113:21 132:9 140:20 233:5 260:17 presenting 83:9 117:2 160:19 211:20 presently 46:18 69:6 presents 28:2 35:22 74:14 76:21 77:4 77:6,13 107:12,13 301:12 preservation 283:3 283:4,6,15 president 12:6 23:8 26:5,14 34:11 302:3 President's 335:13 press 174:17 295:13 297:16 327:7 presumably 77:8 presume 22:17 94:13 presumed 16:2 presumes 17:8,10 presumption 41:1 211:10 267:16 325:17 326:11 presupposes 100:11 pretty 64:2 74:1,7 76:7 77:1 83:7 103:3 104:14 239:1 263:4 267:13 269:8 317:6 321:18,21 323:14,16 326:1 334:21 prevalence 18:8 prevalent 211:8,22 330:10 prevent 245:5	prevents 55:2 288:16 333:12 previous 119:5 145:16 157:22 previously 102:19 103:1 104:21 136:3 166:18 178:16 223:16 259:3 266:10 price 39:17 42:3 49:1 147:2 163:20 163:21 174:22 175:2,5 176:4,7 194:14 240:5,20 241:4,8,17,19,21 248:16,16,19,20 249:4 251:6,9 252:2,15 253:4,7 262:10 266:6,18 266:20 267:2,10 270:7,7,9 296:13 296:15 301:5 309:3 310:8,8,9,9 310:11,17 311:19 312:3 326:10 prices 41:2,8,16,18 41:19,22 57:11 241:3 248:11,13 248:14,15,17 249:2 251:8,12,18 251:20 252:6,9 266:7 281:15 283:12 296:19 326:1,3 329:9,10 pride 292:18 primarily 60:7 62:2 79:1 120:10 124:3 124:4 176:18,19 201:21 257:20 314:18 327:11 primary 33:13 71:8 126:1 164:3 200:9 206:17 217:13 273:16 274:10 279:7 281:6 284:6 323:4 principal 12:7 228:2 236:9 principals 228:2 prior 243:21,22 private 71:22 probably 172:17 78:11 127:15 133:9 147:19 153:19 155:22 160:6 184:12,21
---	--	---	---	---

200:3 213:10	19:10,10 22:3,21	248:4 250:7	87:21 88:12,17	284:16,19 288:17
229:8 230:10	24:5,12 25:3,7	253:13,17,20	89:5,10,17 92:7,9	288:18 289:3
265:17 275:7	26:20 27:6 30:10	254:18 255:20	93:10 94:21,22	290:4,17 292:1
306:17 310:16	32:7 35:14 36:20	256:7 258:2,3	96:2,4,12 97:15	308:7,9,16 309:9
314:20 319:19	36:22 42:3,8 45:3	262:14,21 263:10	97:19 98:3,5,6,18	309:17,20 314:4
326:22	48:2 51:2,9 53:13	263:11,13 266:9	99:3,9,16,20,22	315:15 324:20
problem 14:21 17:9	55:14 57:22 60:12	266:17 270:7	100:4,10,18 101:9	325:1,4 328:6
17:12 19:2 72:14	61:7,22 62:12	272:5,10 273:7	101:11 104:5,9	332:11,13,17
84:10 87:19 94:17	64:21 65:6,18	274:21 280:14	105:15,16 106:4	333:21 335:11
138:7 153:16	66:11,21 68:2,7	284:6,12 285:6,9	107:4,7,9,11	profile 279:21
174:14 217:18	69:5,12 70:15,18	291:14 294:21	109:4 112:8 113:5	profit 160:21 167:5
218:6 225:1	70:20,21 71:1	296:9 298:13	113:11,14 114:1	175:7 282:21
237:10 244:12	74:12 75:14,16,17	299:5,6,6,19	115:6,8 116:2,4,9	283:5,13,18
299:12 311:6	75:18,19,22 76:5	303:13 325:1	117:8,11 118:3,12	profitability 32:11
317:21 325:8	77:12 79:12 80:2	326:10 329:3,3	118:15 119:3,7,12	281:11 283:22
335:22	80:6,7 81:17,20	332:9 335:4 336:3	120:17 121:14,19	profits 283:16
problems 16:12	84:18 85:11,12,17	production 21:4	121:22 122:1,14	profoundly 35:4
244:20 245:6,7	89:1 90:3 93:6,22	32:1 125:7 141:8	125:5 127:5,15,19	program 11:2 55:15
procedural 11:4	94:1 97:2 99:17	161:2,5 278:6,9	128:3 133:16,19	56:10,11 64:8,9
68:1 72:11	99:18,22 103:6	280:16 282:18	134:11 139:22	252:22
Procedurally 73:3	106:13 107:20	283:11 285:4	144:11,22 145:19	programmable
procedure 67:16	114:9 117:7,13,14	304:16 331:15,19	146:11 150:19	129:13 131:2
69:9,14,19 220:5	118:4 119:6,9	productive 291:7	154:1,7,8 155:11	programmed 131:1
220:7	120:13 121:17	products 1:3 3:7 4:6	156:11,14,18	programs 51:7
procedures 21:8	122:5,22 123:2	5:21 11:6 12:8,13	158:2 159:9,11	progress 162:14
65:11 67:7 68:8	126:1,5 127:6	13:1,13,19,21	162:6 163:22	prohibiting 53:1
68:18 72:15	130:9 135:15	14:4,7,16,18 15:6	164:1 166:4	prohibitively 58:7
proceed 62:21	138:22 140:12	16:8,18,21 17:1,5	167:16 169:10,14	prohibits 43:14
73:13 122:18	141:7 142:14,15	17:22 18:8,12	169:21 170:1	project 123:18
160:17 162:13	142:17 146:5	19:8,16 21:2,22	174:22 175:4,11	224:1 258:10
169:4 239:18	151:19 154:2,10	22:3,6,9,15,18,20	177:6,7,14 179:16	263:13 268:5
proceeded 12:14	155:6,10 166:14	23:1,19 24:4,13	179:19 180:1,8	projected 251:12
proceeding 86:8	168:16 171:8	24:16,16,17,17	192:22 193:1	257:14 270:12
110:6 220:7	172:4 174:19	25:4 26:21 30:19	196:15 197:7	projecting 294:19
process 12:16 45:10	175:13,16,18,22	31:1,17,20 32:9	198:3,6 199:1,18	299:8
46:4 52:20 65:15	175:22 176:5,14	34:17,20 35:1,9	201:5,7 202:15,15	projection 123:16
65:16,18 66:3,17	176:18 179:22	35:11,14,16,18,19	207:8 208:13	268:4
66:19,19,21 67:22	185:20 186:15	35:21 36:5,9,15	210:8,11,13,17	projections 251:19
68:22 72:18 73:4	188:15 191:2,15	36:18,19 37:1,3,5	211:13 215:13,15	262:10,11,18
75:22 108:16	196:21,22 197:13	37:8,20,21 38:3,6	216:19,19 217:1	266:6,11,15,17,18
152:4 161:7	197:13,22 199:13	38:7 44:12,16,18	218:3,7 219:3	280:17
184:15 207:11	200:1 202:20	45:12,14 46:9,10	220:9 223:5,11	projects 32:1 54:6
242:16 279:19	203:18 204:4,5,10	49:13 51:15 59:5	224:12,17,22	158:9
286:14 290:6	206:18 207:7	61:12,13,17 64:8	226:4,7,11,13	prominently 19:18
produce 80:21	210:15 211:8,22	64:11,11,14,18	227:22 232:4	prompted 19:16
301:4	217:2,12,21 218:2	65:4,11 66:4 68:9	236:18 245:16	propane 2:9 5:11,13
produced 20:4	218:16 220:12	68:19 69:8 70:7	249:3 253:11	20:18,19,22 21:4
317:15 331:22	221:11 222:15,21	70:12,13 71:4,5,6	256:2 257:14,17	21:5,22 22:5,9,10
332:1	223:19 224:13	71:11,18,22 72:4	261:12,16 262:7	22:12,15,17,20
produces 77:21	225:5,12 226:3,21	72:20 75:13,16,20	262:12,22 263:3	24:17 80:20 84:13
93:19 321:13	230:16 236:11,13	76:6,9,11 78:3,20	263:19 264:4,13	134:10,12 137:9
323:5,5 324:6	236:14 237:2,7,16	78:22 79:2 80:10	267:2,5,6,11,13	137:10 196:19
producing 224:21	237:22 238:5	80:15,17,18,19	267:17,20 268:19	200:15 204:13
301:15,16 324:10	240:3 242:7,22	81:15 82:3,17,20	269:18 272:15	249:2,5 251:13
product 13:22 15:4	243:10,14 244:18	83:8,14,17 84:1,3	274:4,7,20 275:11	311:16,17 323:13
15:14,15 16:9	244:21 247:21	84:12,13,14 85:19	277:16,17,19	proper 244:17

<p>properly 29:1 57:3 86:6</p> <p>property 33:8 323:21 324:3</p> <p>propionaldehyde 319:11</p> <p>proportion 134:16 266:1</p> <p>proportionately 134:18</p> <p>proportions 28:15 144:13 151:22</p> <p>proposal 4:18 15:14 32:5 35:8 47:6,14 49:14,19 51:5 52:20 54:19 55:11 58:13,17 68:16 75:20 95:7 109:14 110:4 311:9 331:12 332:20</p> <p>proposals 35:5 44:18 46:16</p> <p>propose 109:13</p> <p>proposed 1:2 4:5 12:22 13:9 14:2,7 15:9,17,18 16:1 16:15 17:5,13 18:16 19:1 20:3 21:10,15 22:4,8 22:21,21 24:1,4 24:10,14,19 25:6 25:7,15 32:14 33:22 34:20 35:11 35:13,15,20 37:18 39:2 51:2 58:6,15 59:3,8 60:9,11,11 62:11 64:15 65:3 65:7,7,8,21 66:1,9 66:13 68:3 69:6,7 73:7 74:12,20 76:16 77:15 78:14 81:16 88:6,17 91:15 96:6 97:11 99:9,17 100:19 102:20,21 103:6 104:17 107:11 110:4 113:1,20 117:7 119:9 132:14 135:8 136:5 156:13 173:5 221:7 244:9 263:8 277:3,10 278:18 279:18 281:17 284:9,21 291:13 292:8 315:15 318:2</p>	<p>proposition 28:3</p> <p>prospect 130:10</p> <p>prospective 55:13</p> <p>protect 48:13</p> <p>Protection 322:20</p> <p>proud 23:20 292:16</p> <p>provide 25:4,17 29:14 36:1,16 46:3 50:8 74:16 77:8 78:19 89:11 90:18 93:3,14 103:2,21 105:8 107:21 116:14 167:20 211:21 228:6 233:15 239:22 250:11,12 250:13 260:11 293:13</p> <p>provided 10:7 103:2 104:7 105:14 132:12 215:5,6 291:20</p> <p>provides 19:21 167:12 199:10 262:17 272:12</p> <p>providing 13:6 25:6 58:14 62:8 259:15 290:17</p> <p>proximity 308:18</p> <p>proxy 276:11</p> <p>pseudo-definition 132:10</p> <p>public 1:1 2:2,22 4:5,9,14,20 6:5 10:21 11:7 21:20 56:11 65:19,19,22 66:2 68:6 277:13</p> <p>publicly 279:21 300:14 305:21</p> <p>published 65:3 256:1 303:9</p> <p>pull 260:2</p> <p>pump 231:3</p> <p>pumps 33:12</p> <p>purchase 43:4 49:6 58:4 174:22 175:2 175:5 240:5 257:17 312:3 329:14</p> <p>purchased 107:7 190:7</p> <p>purchasers 16:20</p> <p>purchases 183:5 277:6</p> <p>purchasing 145:3,5 145:8 257:19</p>	<p>267:9 301:2 315:3</p> <p>purely 113:14 333:2</p> <p>purported 25:14 54:17 293:4</p> <p>purportions 145:1</p> <p>purpose 4:19 10:21 11:3 13:12 36:1 36:21 74:15 77:5 77:5,7,13,21 82:19 85:16 92:22 93:2,3,5,20,20 117:4 135:4 163:19 185:19 239:22 243:8 248:12 262:6 272:7 276:20 278:17,19</p> <p>purposes 36:18 37:2 43:8</p> <p>pursing 75:9</p> <p>pursuant 98:22</p> <p>push 18:14 289:20</p> <p>put 11:19 13:22 82:12,13,16 83:18 84:2,9 85:4 87:22 88:9 111:21 112:1 135:5 150:7,8,8,9 150:11 174:4 185:8 196:2 214:22 230:2,5 244:20 245:4 250:19 290:11 314:8</p> <p>puts 181:1 201:22 249:12</p> <p>putting 90:4 139:3 150:17 204:18 228:15 251:2</p> <p>puzzling 79:18</p>	<p>quantify 279:14</p> <p>quantitative 282:14</p> <p>quantitatively 117:5</p> <p>que 11:22 86:3</p> <p>quest 30:8</p> <p>question 40:15 80:10 83:10 91:9 94:19 95:7 104:8 113:18 114:5 119:17 120:4,14 120:19 123:4 134:5 144:4,5,18 145:15 147:5 151:9,12 153:9 160:1 172:14 176:12 195:13,14 195:19 196:2 197:4 199:9,18 204:7 208:18,20 208:21 219:5 232:2 233:18 254:3 255:9 259:3 259:22 284:13 288:6,15 294:3 312:8 325:19 327:6 329:20 333:1</p> <p>questionable 216:14</p> <p>questioning 123:12</p> <p>questionnaire 199:16,17</p> <p>questions 4:19 9:12 103:8 106:2 144:4 162:11 216:2 259:22 286:21 329:13 334:1</p> <p>quick 111:8 114:22 141:11 196:1 239:1 254:2 255:8 274:17 291:4</p> <p>quicker 238:19</p> <p>quickly 79:7 102:18 244:7 249:22 259:2 281:10 295:15</p> <p>Quinton 63:11</p> <p>quite 121:18 123:19 127:3 184:21 209:13 293:21 334:18</p> <p>quote 125:8 286:17</p> <p>quoted 60:10</p> <p>quotes 143:9</p> <p>quoting 68:5</p>	<p style="text-align: center;">R</p> <hr/> <p>R 4:1 7:18 34:11</p> <p>R&D 282:20 285:7 285:18 286:1 296:9</p> <p>Rachel 2:12 7:16 105:12 192:17 195:4</p> <p>radiant 26:19 80:1 87:2 88:7</p> <p>raise 10:7 11:9,10 68:1 72:11 76:17 94:19 283:12</p> <p>raised 14:2 15:13 102:16,22 269:19 281:8,10 284:13 287:13</p> <p>raises 72:17</p> <p>raising 67:19</p> <p>ramifications 124:12</p> <p>random 197:20 263:4</p> <p>range 13:13,19 14:3 24:13 39:10 198:5 227:18 228:12 280:22 283:1 291:14 295:16 309:18</p> <p>ranges 226:3</p> <p>rapidly 41:13 128:17 129:2 218:15,17</p> <p>rarely 217:11,18</p> <p>Rasmussen 3:9,9 5:16,16,17 26:11 26:11,13,14,14,15 27:19 33:18 86:4 86:4 90:22 95:5,5 110:8,8 111:21 133:11,11 134:9,9 137:2,2 143:7,7 143:11,16,16,21 149:3,3 150:5,5 150:16,16 152:8 152:19,21 158:4,7 158:10 167:4,8,15 167:19 168:4,8,12 169:17,17 170:13 170:13,16 171:4,4 173:1,1 177:12,12 178:9 188:22,22 189:9,14,14 194:20,20 223:8,8 235:8,8 254:16,16 270:3,3,18,18,22</p>
		<p>Q</p> <hr/> <p>Qp 186:5 196:6,6</p> <p>Quadrifire 23:13</p> <p>quads 274:10,11</p> <p>qualified 194:6,9 250:19</p> <p>qualitative 279:18 280:10 281:6</p> <p>qualitatively 117:5</p> <p>quality 56:8,9,12 58:1 124:13 313:18,19 314:1 315:10 316:1,2,4 316:5,9,12 317:22 320:19 322:18 324:5</p>		

278:3 289:10,10 298:8,8 306:10 310:20,20 334:7,7 334:15 RASMUSSEN 278:3 rate 57:12 241:2 254:8,12 256:10 256:11,15,17,20 rates 256:5,8,16 269:14 rating 204:17 ratio 178:21 179:3,4 179:13,14 180:18 263:11 266:16 rational 89:1 rational 296:16 rationality 89:4 Ratt 5:16 raw 299:9 Raymond 3:11 212:13 Raymont 7:18 re-certify 160:9 re-characterization 185:15 re-emphasize 191:18 re-evaluate 35:7 reach 54:15 214:10 reached 103:19 reacting 174:2 reaction 296:1 reactions 296:12 read 32:17 61:6 64:15 73:22 74:13 77:20 79:9 263:7 264:10 318:12,13 readily 140:7 321:20 reading 188:13 322:1 reads 93:4 ready 62:15 77:16 116:15,16 174:2 195:11 293:21 312:17 real 70:17 89:18 106:7 219:5 251:20 252:6,8,16 256:9,21,22 274:16 292:16 323:11 325:6 332:14,18 realistic 217:7 317:2	reality 53:19 136:19 247:9 realize 221:11 334:22 realized 246:1 really 24:11 36:4 49:2 66:8 83:13 97:4,16 107:22 108:9 111:20 112:5 113:1 115:7 117:5 136:6 147:16 150:6 159:20,22 160:18 174:9 176:12 180:20 184:8 188:18 202:1 215:12 216:1 225:1 228:19 232:17 244:8 247:5,16 268:8 277:22 290:22 291:12 292:20 293:8,10 296:7 297:7 302:7,7 314:1,3 326:3,3 335:3,17 336:9,20 reanalysis 259:15 rear 27:8 reason 19:12 22:17 38:4 48:7 49:22 84:15 96:13 106:15 136:21 137:19 144:9 204:11 236:3,3 238:10 245:5,13 313:11 319:10 321:15 323:4 336:14 reasonable 24:12 45:16 78:3 153:13 259:8 291:14 reasonableness 87:8 reasonably 15:4 329:9 reasons 11:19 12:18 75:7 96:15 97:5 99:13 140:3 215:16 263:16 292:3,11 322:2 336:18 rebates 277:4,4 rebuttable 41:1 REC 179:22 329:17 recall 204:16 235:11 268:4 receipt 336:15	receive 254:10 received 8:6 102:20 104:16 122:20 receptacle 29:6 recognition 321:16 recognize 10:9 14:20 22:7 226:22 316:12 319:6 recognized 10:8 55:14 96:10 315:9 317:22 332:10 recognizes 22:14 51:7,15 recommend 110:20 246:6 247:1 292:2 292:21 recommending 50:19 95:17 recommends 243:14 246:22 reconcile 171:15 reconsider 103:4 record 7:9 60:21 70:19 95:21 165:2 185:10 239:10 270:19 271:1 records 263:18 330:6 recover 52:16 240:4 RECs 186:13 189:22 196:15 197:6,8 198:1,8 199:7,10,12 200:8 200:18 202:14 203:7 223:19 224:14 redesigned 284:15 redoing 154:19 reduce 29:14 33:9 283:19 reduced 231:9 240:5 reduces 31:9 143:13 186:19 reducing 25:3 41:18 99:7 292:13 reduction 55:17 reductions 126:14 refer 28:2 73:21 152:17 321:18 references 77:16 216:17 referred 69:20 70:8 110:12 151:12 279:11 315:20 referring 26:8	123:20 207:3,21 refine 105:7 279:16 280:8 refined 207:11 reflect 128:22 144:7 297:22 reflected 322:7 reflection 264:22 323:16 reflects 257:13,17 267:14 Refrigeration 2:18 3:16 6:4 refrigerator 66:9 180:12 refrigerators 180:16 refused 46:2 regard 16:10 18:2 22:7,14 68:1 70:6 86:11 110:16 127:19 270:19 298:13 regarding 70:8 123:11 124:16,19 216:5 281:11 region 56:10 register 65:6 68:5 68:13 263:8 315:14 regularly 52:10 217:17 regulate 14:16,17 14:18 16:6 87:1 94:1 109:22 173:8 regulated 16:10 66:5,15,21 85:5,6 86:14 93:22 96:21 97:1 317:20 regulating 76:12 86:12 89:2,3,8,10 regulation 12:11 35:16 76:5 87:5 96:17,20 132:12 219:6 293:6 regulations 66:12 296:5 regulators 315:10 regulatory 8:14,22 12:21 13:15 14:22 20:4,17 21:11 23:2 42:15 43:9 43:12 63:1,19 64:6 94:3 98:12 98:16 101:12 113:15 163:18	174:3 276:19 278:4 279:7,10 301:9 315:21 320:18 reignite 50:9 Rein 2:16 5:10 reiterate 291:10 293:8 rejected 49:3 224:1 relate 175:3 related 14:14 22:1 106:6 218:2 285:8 relates 174:21 324:5 relative 58:3 199:14 301:16 331:3 relatively 22:11 35:4 37:22 130:9 285:2 294:8 298:10 relevance 206:6,8 216:22 220:9 relevant 13:2,17 14:12 16:17 17:18 17:21 20:7 83:18 83:21 117:22 322:7 reliability 121:2 287:8 334:2 reliable 154:13 218:10,18,19 282:5 reliably 121:2 288:14 relied 280:12 relies 18:4 rely 95:22 96:9 remain 178:3 246:13 remaining 208:16 remark 59:18 60:9 remarkable 70:19 remarkably 17:20 remarks 4:12 9:6 59:17,17 61:2,2,6 62:17 64:1,3 74:1 294:2 335:7 336:6 remember 201:1 202:12 329:18 reminder 19:21 remodel 28:14 remodeling 264:3 264:11 314:15 remodels 31:3 remote 18:14 29:19 30:7,12 131:6 149:20 150:8
---	---	---	--	---

<p>211:5 245:8 remotes 311:9 renders 72:14 76:1 Reott 3:11,11 7:18 7:18 212:13,13 repair 253:5,15,18 254:3,8,12,21 255:9 282:7 repairing 253:16 repeat 297:9 repeatedly 300:18 repeating 297:8 repetition 51:3 rephrase 97:7 145:22 332:12 333:17 replace 37:16 52:11 58:8 replaced 253:18 replacement 164:4 164:5,12 168:15 170:8 172:7,16 174:21 178:13,21 179:3 180:4,10,21 182:14 184:11 189:5,8 replaces 137:3 replacing 28:4 31:7 55:14 203:2 253:15 report 165:7 166:21 166:22 167:5 168:2 215:1,6 233:14 321:19 reported 25:5 reports 280:1 represent 58:10 61:6,10 63:9 127:22 243:8,17 282:3 308:4 representative 45:4 141:2,16 144:6 145:16 168:3 197:1,3,17 203:5 204:1,3 224:22 259:4 representatives 45:22 representing 12:8 20:19 represents 143:17 160:20 265:21 283:7 reproductive 318:17 reps 61:9</p>	<p>request 11:18 13:11 21:15 25:15,17 34:4 293:11,15 310:2 328:2 requested 13:9 15:11 requesting 13:12 requests 73:6 require 29:4 30:6 47:11 71:7,14 119:3 195:3 243:1 243:19 246:12 250:19 282:7 285:17,21 308:20 315:11 332:14 required 13:4,7 14:22 17:1 20:9 21:9 43:12,15 64:19 69:3 70:11 99:15 137:9 173:20 184:17 240:4 253:11 305:2 316:5 requirement 19:3 24:21 99:11,12,16 119:15 125:12 135:8 189:13 292:9 332:10 requirements 39:11 57:6 88:15 195:6 253:13 281:4 284:16,17,19 requires 19:15 316:3,16 333:18 336:1,3 research 254:6 300:15 321:19 researching 308:1 resemblance 197:19 reserves 41:12 57:9 residential 11:6 41:19 93:7 107:17 107:20 122:2,4,16 179:5,21 196:16 199:17 201:16 224:6,7 252:14,14 256:2 314:2 320:20 322:8,17 323:19 324:5 325:2 resilient 335:14 resins 319:2 resistant 231:3 resisted 305:10 resource 57:17 71:8 117:16 273:17</p>	<p>resources 117:11 126:2 151:19 287:5 respect 13:1 15:3,17 55:11 76:18 210:14 218:1 respected 41:14 respectfully 25:15 34:3 respectively 309:16 respects 259:19 respond 19:9 216:3 218:8 291:18 responding 50:11 174:9 response 40:15 69:18 102:20 104:17 105:1 201:13 216:11 239:8 327:22 329:12 334:17 responses 216:8,12 responsive 45:16 rest 20:12 108:7,17 113:21 114:7 180:17 286:10 288:16 295:14 306:9 331:14 restate 199:6 restrict 39:13 restriction 58:20 restrictions 27:12 59:8 restrooms 101:22 163:5 result 13:3 16:20 17:4 20:5 31:4 32:2 166:19 256:3 287:14 309:9 313:6 resulted 151:20 256:14 resulting 32:9 185:21 277:7 results 140:19 178:11,12 196:7 220:1 230:14 231:9 233:5 241:7 244:2 253:22 260:16,20 274:9 295:16 297:20 301:12 302:8 313:5 314:17 resume 101:19 102:5,10 163:5,8 261:20,22</p>	<p>retail 20:21 184:10 retailer 44:13 164:10,11,13,14 164:16 166:8 177:10 180:21 181:12,14,15 182:19,21 183:4,5 183:11,19 190:13 190:17 191:2,19 193:8,8,12,18,19 retailer/contractor 192:9,19 retailers 31:19 45:4 61:8 164:12 165:15 177:18 192:21,22 193:17 307:13 retailing 44:21 rethought 278:1 retired 255:20 256:7 retro-fitting 315:4 retrofit 27:11 38:22 53:13 124:3 retrofitted 314:7 retrofitting 264:11 Rett 3:9 26:11,13 32:18 86:3,4 95:4 95:5 98:4 110:7,8 110:22 112:3 133:10,11 134:6,9 137:1,2 143:6,7 143:16 149:2,3,17 150:5,16 152:7 167:3 169:17 170:13 171:4 173:1,17 177:11 177:12 188:21,22 189:14 194:19,20 223:7,8 235:8 254:15,16 270:3 270:18 278:3 289:9,10 298:7,8 299:20 306:9 310:19,20 334:7 return 46:2 256:8 297:15 Returning 8:17,21 reverse 135:13 138:2 reversed 212:19 review 8:8,9 13:16 16:14 21:18 60:20 117:13 151:19,20 154:10 209:1 reviewed 99:5 285:8</p>	<p>reviewing 146:5 revise 105:9 171:1 239:7 revised 132:2 revising 64:20 95:20 rewarding 289:20 rewrite 188:18 RH 2:7,8 8:1 RHP 252:13 RIA 276:19 rid 108:13 ride 294:12 ridiculous 86:20 168:20 169:2 228:13 right 60:1,1 62:7 71:10 89:22 92:21 93:5,8 95:10 97:14 109:18 115:12 116:8 130:13,14 132:22 141:19 142:3,7 143:5,20,20 145:4 145:14 148:6 155:12 157:4,7 160:14 161:22 162:1 181:9,16,17 182:1,8,12,14 183:2 193:4,16 194:16,20 198:15 198:15 200:12,21 201:2 203:16 207:10 212:14 215:7 217:16 221:10 226:7,17 227:15,18 235:2 242:21 265:12 267:19 289:7 291:5 293:9 295:12 296:8,21 297:13 303:4,4 311:7 315:17 329:2,4 334:6 rise 268:11,11 281:15 risk 323:16 Rivest 3:4 6:19,19 192:1,2,2,8,13 295:20,20 297:1,3 297:13 307:6,6 road 73:10 rob 58:13 Robert 2:8 5:18 34:9 165:4 role 313:17</p>
--	--	---	--	--

<p>roll 274:5 room 1:8 10:10,15 10:20 33:2 57:21 71:21 75:17 79:6 81:12 92:11 102:5 104:12 162:18 211:6 215:9 222:16,21 226:17 228:5 rooms 19:20,20 Rosenevist 3:18 Rosenquist 6:17,17 167:9,10,11,17,22 168:10 180:3,7,13 180:15 181:4,10 181:15,18 182:3 202:12,13 203:15 203:20 312:18,18 Rosenstock 3:12 6:9 6:9 65:12,13,13 92:17,17 121:20 121:20 187:1,2,2 204:7,8 205:1,1,6 205:6 224:4,4 225:20,21,21 227:4,4,8,11,12 227:16 231:11,12 231:12 232:2 248:21,22,22 249:7,7 251:15,16 251:16,21,22 256:18,19,19 257:1,3,11 268:1 268:2,2,16,16 269:5 274:16,16 ROSENQUIST 168:7 rotate 148:12 rough 73:10 294:12 roughly 39:20 42:4 54:4 158:14 261:11 275:6 round 41:6 49:12 49:14,16,18 144:11 180:8 231:16 243:3 row 54:14 rows 284:7 RS 244:1 rude 305:15,16,17 rule 12:22 13:8,10 14:3 15:9,17,18 16:1,12,15 17:5 17:13 18:16 19:1 20:3 21:10,12,15 24:1,10 25:16</p>	<p>33:22 34:5 35:11 39:2 42:1 45:8 57:4,6 58:6,15 59:3,8 60:9,11 62:11 64:20 65:16 66:2,3,9,13 76:3 77:15 79:19 82:1 83:18 84:16 85:16 88:6,14 97:12 100:20 106:14 109:22 117:21 123:18 133:3 173:5 201:15 249:12 263:8 275:12 291:13 307:11,18 313:21 318:2 rulemaking 1:2 4:5 8:14 12:16,17 14:12 21:8,17 22:1,2 34:21 42:13,14,16,18 51:2 56:16 57:17 65:9,21 68:21 72:17,20 76:7 95:19 96:7,14,14 97:11 125:12 174:15 rulemakings 93:8 rules 37:19 run 32:20 47:4,7,12 63:15 134:20 144:16 156:22 222:16 running 33:4 212:7 231:21 Ryan 2:11 5:7 73:2 91:11,11 129:11 129:12</p> <hr/> <p style="text-align: center;">S</p> <hr/> <p>S 1:1 2:7 4:1 sacrifice 19:12 safe 336:20 safely 288:14 safer 55:4,8 safety 23:22 27:22 28:4 29:3 30:1,3 30:18,22 34:1 41:10 54:19,20,21 54:22 58:5 70:10 70:10,16,19,21 71:14 96:13 119:18,19,21 120:15 124:13 137:6 148:8</p>	<p>149:12,14 255:1 292:17 311:7 314:1,2 322:19 323:17 SAIP 185:18 salary 193:9 sale 191:6 sales 28:16 30:14,20 38:9 42:5,11 53:12,13 71:11 125:7 133:13 134:16 152:13 159:8,15 167:1,1 259:12 267:22 281:15 299:5 305:8,22 308:10 326:15,21 sample 196:12,14 196:21,22 197:1,3 202:14,16 203:6 240:14,15 sampled 256:11 Sandy 33:17 326:20 sarcastic 270:19 sat 305:12 satisfied 131:19 satisfy 120:15 245:16 save 48:15 50:22 58:5 247:8 saving 52:19 savings 25:5,14 33:3 39:21 40:3 40:19,21,22 46:16 47:2,16 50:14 51:1,5 52:7,20,21 53:9 54:18 57:16 58:15,17,20 72:1 89:21 155:1,16,17 158:18 159:2 203:17 240:10 245:12,19 246:10 247:2 272:13 273:2,4,7 274:10 274:11 275:7 293:4 311:22 312:1,3,21,22 313:6,7 saw 84:19 91:11 111:15 118:6 242:2 254:6 260:9 296:12 315:14 320:12 326:18 saying 10:17 18:1 66:18 75:6 82:8 85:4,8 86:10 89:7</p>	<p>90:3 115:2,5 131:17 142:1 143:17 147:9,11 154:1 168:14,17 172:1,3,6 181:21 182:5 183:1,3 184:9 185:1 194:21 214:8 224:5,5 232:13 234:2,22 236:18 237:17 242:6 293:13 304:21 305:10 328:2,2 says 50:13 64:7 67:6 77:12 78:19 93:5 131:6 175:14 188:6,14 199:9 221:17 231:15,16 263:8 310:7 SBA 305:7 scale 141:8 175:8 scattered 257:6 scenario 38:5 283:4 283:5,7,16,21 scenarios 226:20 280:21 282:16 283:3 scenes 139:5 Schlachter 3:13 6:1 6:1 129:20,22 130:1,22 scholar 194:7 scope 14:9,10,12 21:17 24:10,14 65:8 84:10,10 103:9 104:12 105:9 108:5 109:20 110:4 113:3,4 115:4 156:12,14 215:14 291:12 scrap 228:1 screen 33:2 screw 18:7 screwdriver 211:1 237:3 screwed 237:19 search 43:17 Sears 181:2 season 50:7 72:3 130:11,12 186:18 186:20 187:3,7 195:16 208:18 209:11,18 213:6 225:19 228:4,16 228:19 232:20</p>	<p>seasonal 50:21 seasonally 49:21 52:13 seats 4:2 102:10 163:9 SEC 279:22 second 17:8 75:11 84:20 113:17 126:8 135:13 148:11 176:3 258:1 264:6 278:19 280:1 281:1,16 308:5 secondary 79:5 186:16 195:21 196:6 197:9,16 199:22 200:8,14 201:6,14,18,21 202:2,3 224:16 225:7,9 229:7 230:11 323:13,15 secondly 24:9 25:9 292:16 seconds 138:17 219:22 secretly 94:11 section 15:21 60:14 162:5 185:18 189:7 239:21 270:15 276:19 301:10 316:15 318:12 sections 24:11 secured 162:19 security 102:4 162:22 see 4:4,10 6:15 8:5 11:8,12,12,14 30:17 31:6 32:8 65:1 74:2 76:15 77:14 81:11,14 89:4,6,18 90:9 95:12 98:12 101:7 102:7 104:11 107:15 109:5,18 111:10 114:8 118:16 129:3 132:13,18 134:8 142:7,8 143:6 146:8 154:5,5 158:13 162:9 187:10 188:15 189:15 193:15,17 204:16 206:21 208:3 210:12 218:20 236:5</p>
---	---	--	--	--

238:16 253:8 258:18 259:9 260:17 261:14 267:1 269:3 270:4 270:11 281:21 284:8 287:12 289:13 294:18 295:21 298:6 302:17 309:11 313:4 326:16 327:4 328:3,6 seeded 104:13 seeing 9:12 142:12 155:8,21 217:21 218:3 226:2 276:6 335:15 seek 18:21 24:2,9 161:8 seeking 14:18 66:2 73:9 105:5 291:12 seeks 14:6 17:10,12 20:7 91:14 135:11 seen 92:6 208:5 236:21 265:14 266:10,16 271:3 sees 217:20 segment 98:11 133:22 308:4 selected 319:14 selecting 73:16 self-regulating 334:21 sell 31:20 34:17 39:7 46:19 55:2 134:9 137:14 161:18 169:19 171:8 172:14,15 190:8 192:22 200:7 304:10 310:11,22 311:1 selling 160:22 163:21 191:15 194:17 282:20 327:15 sells 165:13,14 191:2 303:22 304:13 send 10:16 271:6 sending 275:20 sense 78:3 80:7 106:14 217:7 264:9 sensing 147:20 sensitive 28:21 29:9 38:17 138:9 sensor 118:17 119:3	119:21 138:15 146:15 sentence 318:12 sentiment 218:22 separate 88:21 113:1 115:3 148:4 164:17 191:12 separately 159:4 233:6 September 326:19 series 96:2,12 112:6 serious 316:13 318:16 321:17 seriously 267:22 307:11 serve 36:18 service 17:15 229:14 255:21 256:7 Services 20:17 servicing 282:7 servicing 184:6,7 set 27:14 28:2,19 29:15,22 31:8 37:11 38:2 39:18 40:2 46:20 47:4 47:13 48:9 49:6 50:1,4 57:2 58:16 91:18 96:4 102:10 127:20 129:10,14 129:16 147:1,17 163:9 198:5 201:12 217:22 230:5 255:7 280:21 281:2,7 282:16 283:8,21 284:2 289:1 290:13 300:11 301:19 303:16 305:4 308:2 310:8 311:11 314:8 316:15 318:5 sets 27:11,15 28:9 29:22 30:21 32:8 33:10,15 34:4 36:19 37:7,8,17 38:11 39:3,4,8 43:4 44:22 46:21 47:3,18 48:6,18 48:20,22 49:3 50:18 51:8,16 52:8,10 53:10,22 55:4,12,17,21,22 56:7,14,18 57:5 57:18,20 80:17 83:7 84:14 88:19	104:4,4 121:7,8 121:10,11 124:10 127:11 134:10 140:8 146:5,7,11 150:22 151:1 172:10 205:12 250:8 263:1,20 267:6 270:9 279:3 289:12,15,16,21 296:18 307:22 308:4,15 309:3,12 309:13,14,18,22 311:7,13 314:4,22 325:20 329:5 setting 41:22 122:16 245:8 settings 122:2 settle 102:13 severe 37:18 283:8 283:21 309:12 severely 29:14 31:1 39:12 59:4 248:5 311:20 shape 90:19 226:9 293:18 share 9:19 151:12 198:11 202:20 257:14 258:2 286:5 287:13 shares 122:21 126:9 128:22 143:2 151:14 156:18 sharing 173:15 sharply 39:3 57:17 sheer 180:10 shell 224:2,5 shielding 121:16 140:6 shift 55:16 265:22 276:11 shifted 153:20 shipment 88:9 94:10 100:21,21 101:3,3 141:3,6 144:6 153:15 158:2,13 179:7 199:14 259:12,12 262:5,10,11 263:18 266:5,11 266:16,18 276:7 280:17 294:10 shipments 8:21 103:20,21 104:7 115:18 124:16,17 124:20 128:21 130:16 141:4	145:8 152:5 154:22 163:17 180:4,9 199:13 202:21 207:7 238:21 262:3,4,6 262:14 263:10,11 263:13 266:8,9,19 270:12 272:11,21 275:3 280:18 294:14,19,21 295:5 296:12,15 297:7 298:5,22 shipped 48:2 115:22 129:18 131:1 180:16 262:7,12 264:21 272:10 274:20,22 shipping 258:17 299:5 shock 242:7,8 shoot 299:1 shop 102:1 163:3 253:4 short 59:21 60:9 61:5 72:10 244:19 249:6 298:10 301:12 312:11,11 335:22 shortly 160:16 show 52:6 119:2 153:18 237:18 242:10 271:5 showing 154:6 158:1 204:9 252:8 269:22 272:20 shown 106:11 144:7 164:3 173:3 251:12,17 252:5 253:22 256:16 261:10 278:7 showroom 237:11 shows 73:16 116:18 123:18 131:12 209:9 240:18 260:20 268:3 306:12 309:7 328:7 shut 46:12 129:7 131:14 137:8 138:15,18 150:1 326:19 shutdown 137:7 shuts 132:19 Siap 3:19 6:21,21 163:13,13 165:6 165:18 166:10	167:7 174:18 175:15,21 176:9 176:17,21 178:10 179:1,3,9,12,18 179:21 187:8 188:8 189:6,12 195:13,17,21 196:4,8,11 198:8 199:8 203:21 204:20 205:4 206:2,8 207:20 208:10 209:6,14 209:19,22 211:19 212:2,6 215:1,5 219:9 221:10,20 223:14 224:7 225:7 226:12 227:7,10,15,18 230:14 232:1,16 233:5,14 239:20 241:19 243:7,16 248:11 249:4,9 251:5 252:17 253:5,10 254:6,13 255:12,19 256:22 257:2,8,12 258:16 260:14 261:9,13 262:2,5 266:5 269:7 270:15 272:7 274:19 275:9,16 276:18 312:19 side 105:3 124:2 201:3,5 245:14 252:1,10,11 281:6 290:9 sideline 286:8 sides 28:11 significant 12:20 20:3 25:6 32:15 35:2 39:5 47:2 48:3 53:6 58:21 60:12 66:22 69:1 137:15 218:12 236:10,13 245:1 250:9,9 259:5 314:21 315:16 317:14 334:1 significantly 39:14 214:11 254:11 265:4 294:22 silent 9:21 similar 99:20 118:12 119:7 132:18 164:7,12 219:18,18 254:6
---	--	--	---	--

<p>255:16 256:2 similarity 26:21 similarly 16:19 231:2 273:4 330:14 simple 18:14 19:15 176:12 simplifying 215:22 316:18 simply 17:8,16,17 40:1 42:9 48:17 49:7 56:21 139:2 148:7 153:14 159:6 244:20 285:19 292:7 318:2 simulate 78:22 simulates 35:21 74:14 76:20 77:2 110:19 single 13:21 16:9 53:16 54:5,9 65:1 75:14 99:16 149:6 160:9 200:11,17 200:21 204:10 210:6 214:12 266:1 268:9,12 269:1 306:11 single-family 269:20 271:5 sink 86:19 sinks 137:10 sit 2:21 6:11 45:11 101:8 295:19 site 44:5 64:12 65:2 65:5 208:21 273:15 sits 38:12 sitting 174:10 217:13 221:1 267:7 situation 188:3 192:9 223:1 295:7 324:8 332:18 336:2 situations 292:15 333:12 six 192:20 size 22:13 27:13 28:7 32:14 39:12 47:10 167:13 178:5,6 300:11 305:6 306:14 sizes 27:6,12,18 29:15,22 39:8 skewed 134:12,15</p>	<p>218:9 skillsets 184:17 skip 249:19,21 272:19 skipped 66:6 skirt 271:19 Skolnick 5:20,20,20 61:4 295:19 slide 11:13 63:20 64:6 73:16 74:6,9 78:7 81:14,21 92:6 98:13,15 107:9 116:18 118:6 119:5 123:12 132:10,18 140:17 141:14,15 143:8 144:5,7,10 144:14 145:7,16 146:9 154:20 155:8,21 156:6,7 157:22 160:15 162:10,11 165:7 174:20 185:19 187:8 195:15 208:5 212:13 221:17 242:2 249:1,19 251:5 252:18 260:13 261:10 268:3 270:13 276:18,20 slides 11:8,10 62:18 64:3 118:2,3 151:11 154:19 156:8 195:18 206:11 240:15 279:1 282:13 295:14 306:9 slow 265:11 313:12 small 17:14 28:15 31:12,17 32:16 34:3,18 35:4 42:14,16,18,22 43:3,5,13,19,21 44:6 45:1,2,7 61:9 62:13 80:19 128:1 128:7 171:5 173:18 177:22 197:16 199:12 224:15 232:17 275:8,9 279:2 281:19 293:5 295:1 300:7,9,10 300:10,13,15,15 300:17 301:2,7 304:12 305:3,3 307:2,19 308:2</p>	<p>311:4 317:16 325:5 smaller 29:22 53:8 53:9 289:15 307:1 smell 324:15,15 smoke 324:15 smokestack 322:8 smoldering 324:8 snail 275:20 snow 322:5,5,11,13 322:13 so-called 40:22 46:11 SO2 313:1 social 265:2 society 335:15 software 10:7 sold 44:12,18,20,21 48:16 79:1 134:18 147:15 166:7 177:6 191:8,9 258:12 308:15 311:4 335:11 sole 127:10 solely 16:2 126:14 solid 35:22 37:9 74:14 76:21 77:2 315:7,7 323:2 solution 27:15 30:1 30:4 39:12 50:21 247:22 solutions 2:2 4:10 27:20,21 29:14 somebody 129:5 172:16 311:19 somewhat 331:6 sophisticated 298:12,16 sorry 63:14 67:15 70:1 89:14 96:22 100:6 107:16 119:11 127:8,11 129:22 133:7 136:8 140:14,16 148:14 152:15 164:22 165:12 179:18 204:13 207:2,22 209:12 215:3 243:4 261:7 261:11 271:17 274:17 288:5 299:14 308:5 sort 88:20 90:2,4 92:11 106:8 122:3 203:6 303:13 313:12 326:8</p>	<p>331:13 sought 14:17 15:1 sounds 91:18 source 15:7 33:11 33:13 68:11 201:18 202:3 214:21 215:5,6 230:8 256:13 301:5 332:16 336:4 sourced 244:1 sources 57:12,15 166:17 206:17 239:14 248:17 sourcing 281:21 301:8 south 40:5 56:12 235:12 southeast 170:10 southern 235:16 space 36:2,2 74:16 74:16 77:8,9 78:19 140:4,9 146:4 186:17 199:4 225:18 228:4,8,14,15 230:20 231:3,20 232:8,19 308:13 spark 137:11 sparks 58:3 sparse 203:6 276:7 speak 4:18 9:13,15 9:18 10:8,9 14:1 20:1 35:6 41:4 192:1 speaking 59:15 66:16 81:21 105:3 107:10 180:7 183:18 special 63:17 295:7 298:4 specialty 27:19 34:18 45:3 184:16 specific 15:10 16:12 24:16 46:13 67:15 77:16 90:16,19 105:6 119:17 153:15 168:9 169:8,18 170:7,22 171:2 172:9,10 173:7 227:21 253:12 292:1 303:1 specifically 18:5 68:1,4 105:19 122:10 126:19</p>	<p>128:20 131:21 156:8 159:11 167:17 281:19 285:14 305:3 315:11,18 319:3 319:22 specificity 62:19 134:3 specifics 199:7 324:22 specified 105:15 specify 315:11 spectrum 297:5 spelled 64:16 spend 69:2 238:11 spends 90:20 spike 71:11 335:5 spill 324:16 spinning 112:2 split 126:5 spoke 289:11 spoken 305:13 Sporidis 3:14 sport 311:1 spot 27:18 spreadsheet 277:1 spreadsheets 280:4 stack 331:5 staff 290:2 staggering 213:10 stakeholder 66:1 stakeholders 68:17 stand 7:8 60:1 standard 13:5 22:5 22:8,22 24:20 27:20 30:3 32:2 32:15 60:12 65:1 67:8,15,17 69:20 69:21,21 70:12,14 87:17 88:18 97:15 97:18,20,21,22 98:7,19,20,22 99:1,3,3,15 115:4 115:7,16 116:7 117:22 135:9,19 136:6 142:19 229:13 240:11 244:10 257:20 258:9,11 262:9 266:7,20 267:3 272:9 274:2,4,6,8 276:22 277:3,10 278:19,21 279:5 279:18 280:10 281:5,17 284:5,9 284:17,21 289:2</p>
--	--	--	---	--

292:8 300:20,20 301:13 303:14 305:6 313:18 standardized 126:15 standards 1:3 4:6 11:3,6 64:14,21 65:10 67:7,9 68:9 68:18 73:16,20 76:2 88:17 95:20 96:3,13,18 98:18 99:6,6 100:2 113:1,20,21 115:14,16 132:2 142:14 223:9 245:16 252:22 257:18 272:16,22 273:5,8,22 283:10 283:17,20 300:11 310:1 312:9 315:15 316:1,2,5 standby 15:20 24:22 25:11 64:22 71:3 99:7 117:21 142:16 143:19 188:9,10,16 293:1 standing 18:12 24:22 28:8,21 32:22 37:16 40:8 49:15,21 50:6 53:1 54:20 62:3,5 62:5 70:17 83:3 83:20 84:2,4,7,15 85:17,20 86:11 88:11,12 89:20 90:3 99:18 112:18 113:2 114:15 115:7,8 116:4,10 119:6,18 120:16 125:18 127:14 130:10 132:11,21 135:20 136:4,12 136:17 137:16 138:5,15 139:13 139:16,21 145:16 153:20 154:3 186:6,8,11,12,18 187:17 203:2 204:4 205:12 208:12,14,17 209:10 212:17 230:16 231:1,8,17 233:2,6,7,10,12 233:16,20 234:1,3 234:8,13,15,17,19 234:21 235:1,14	236:15,17,18 241:9,20 243:13 243:18 244:14,21 245:4,18 246:6 254:4 257:15,18 258:4 259:21 260:21 273:21 274:5 281:14 282:8,10 285:12 285:14,15,18 292:10 301:13 308:13 309:10 Stanonik 3:15 6:3,3 67:20,21,21 68:12 68:15 78:13 90:15 90:15 91:2 95:16 95:16 118:21,22 118:22 120:3,3,18 127:17,18,18 128:6 132:6,7,7 133:4 144:3,3 145:2,10,14 146:10,16 187:13 187:14,14 188:12 188:12 216:15,16 221:16,16,21 227:20,20 293:20 294:1,7 332:2,3 333:14,14 Stanonik's 70:6 Star 41:14 stars 319:18 start 4:11,22 5:1 8:4 26:22 53:18 75:6 85:4 97:22 102:9 102:15 103:10 117:3 135:5 163:6 217:22 226:12 228:1 231:19 252:14,15 266:14 313:12,13 started 42:20 103:15 104:13 136:10 238:13 294:15,17 starting 12:19 54:2 66:8 123:2,3 155:13 196:15 224:14,14 258:12 262:2 starts 53:2,6,11,14 53:15 54:1,3,7,9 54:12 113:22 232:8 262:15,15 262:21 263:3,9,12 263:12,21 264:5,8	264:13 265:15,16 266:2,3,11 269:2 Stas 6:12,12 85:15 85:15 86:11 89:16 89:16 90:1 92:6 92:15 StatCan 215:1,5 state 56:3 124:21 193:3 239:15 315:10,21 316:4,6 316:8 317:21 stated 68:4 111:2 125:11 223:16 266:9 statement 67:5 233:17 statements 8:12 11:21 12:2,3 121:10 states 16:14 20:21 24:8 32:7,19 34:13 35:20 41:16 57:9,14 86:9 87:10 192:21 195:5 213:12 235:10,13,16,20 236:8 250:18 251:1 287:3 307:20 313:19 315:20 320:20 static 275:19 statistical 269:7 statistics 114:14 159:6,7 213:4,9 statute 64:12 72:21 75:15 87:16 statutory 35:19 64:14,18 72:16 stay 33:18 52:4 286:10 290:17 steady 187:9 Steel 63:9 125:2 138:1 149:16 172:19 213:16 220:15 247:4 286:7 stems 301:1 step 45:10 66:3 107:5 177:8 190:20 192:10,13 192:14 196:3 248:6 291:5 293:9 313:9 stepped 68:22 stepping 312:19 steps 66:14 190:19	194:15,15 287:22 Steve 5:20 6:9 61:3 61:4 65:12,13 92:16,17 121:20 122:11 187:1,2 204:7 205:1,6 224:4 225:20,21 227:4,12 231:11 231:12 248:21,22 249:7 251:15,16 251:21 256:18,19 268:1,2,16 269:5 274:16 Steve's 269:20 Steven 3:12 sticking 137:20 stock 179:5 180:11 180:17 234:3 271:19 stone 85:13 91:19 170:9 stop 42:10 239:3 stopping 101:15 stops 198:16 storms 33:14 326:21 story 321:18 stove 138:12 145:17 146:14 157:13 205:17 stoves 23:12 36:8 78:1 83:3,4,12 93:6 94:16 104:2 104:3 118:9,13 123:21,22 124:3 140:2,5 142:10 147:14,18 150:20 151:5 205:12 263:22 264:1 304:14,16 309:16 314:12 330:16 straight 252:21 269:17 270:11,12 streamline 66:20 streamlined 66:10 stressed 308:3 strictly 177:16 199:9 220:9 strikes 31:21 strong 263:9 strongly 14:15 48:22 227:22 structural 323:2,9 323:10 structures 169:22 struggled 78:5	struggling 315:22 studied 174:14 studies 186:13 216:17,21 256:1 258:18 329:17 335:16 study 208:14,21,22 209:9,15 210:10 213:1,8 214:20,21 215:2 225:16 226:5,6,15 228:21 235:9 236:5,5 studying 198:11 stuff 92:18 162:19 297:8,11 305:8 310:11 331:22 stumped 81:3 style 118:12 120:13 styles 118:10 211:8 styrene 319:12 sub 163:3 sub-category 121:21 sub-groups 278:20 279:2 sub-micron 317:16 sub-microns 317:17 subgroup 307:22 subgroups 298:1 300:5 subject 23:1 38:19 88:14,15 116:6,12 218:5 subjected 67:9 subjects 298:7 submission 25:20 220:6 submit 23:2 239:10 271:7,9 submitted 27:2 104:21 220:6,7 Subsection 15:21 subsequently 103:22 104:6 subset 107:9 subsets 107:10 subsidiaries 303:17 304:11 305:7 subsidiary 307:1 substantial 32:16 52:6 217:9 218:3 329:21 substantially 13:3 25:5,13 293:3 substantive 23:3 substitutes 325:18
---	---	---	---	--

subtracted 235:3	326:13	38:11 40:11 44:13	tails 335:5	217:12 224:10,17
subtracting 233:3	supported 50:15	44:15,19 47:11	take 4:2 8:15,20 9:1	225:1 226:5 232:9
Subway 163:3	51:12	55:3 119:4,14	11:21 17:6 44:15	247:7 267:5
success 50:16	supporting 260:12	120:1,5,6,15	63:2,2 75:12	talks 226:1 270:5
Sue 3:17 6:7 70:4	supposed 10:14	125:17 134:13	78:11 79:5 90:13	tanks 22:13 80:20
223:3,12	supposedly 41:7	136:15,17,20	98:11 101:16,16	target 94:4
suffer 62:14 138:14	supposing 152:21	138:6,16 141:17	101:17 105:4	targeted 280:2
suffice 20:2	sure 10:5 26:4	142:5,6 145:20	119:1 137:17	targets 94:5 277:5
sufficient 19:13	32:17 72:8 85:22	147:3 149:1,11,14	141:14 144:20	task 244:2,2
30:14	86:13 93:10	149:18,21 150:4	152:22 163:9	tax 167:1,2 277:4,5
sufficiently 9:8	101:20 120:4	150:10 160:7	194:2,8 210:2	team 152:18 205:5
120:1	155:22 160:6	177:6 185:21	214:8 222:21	206:13
suggest 50:3 82:5	162:17 167:7	186:6,11,17	228:20 233:20,22	tear 138:20
100:16 133:2,5,8	172:22 175:15	187:16,18,19,21	237:6 242:7	tearing 135:14
150:1 172:2	177:3 207:20	188:15 203:13	254:21 258:13,16	tech 142:8 143:9,12
214:14 228:11	213:9 216:18	204:1 233:2,4	258:19 261:17	technical 2:19 13:2
271:15 277:13	295:10 297:17	242:5,6,11 243:10	269:8 273:5	14:11 15:8,13
295:2,13	299:8 330:19	243:18 244:17	283:10,17,20	20:17 21:11 46:6
suggested 93:13	Surely 41:11	246:17,19 247:8	288:11 297:16	123:18 132:3
235:14	surprise 106:7	247:10,18,22	306:7 307:8	187:4 205:7
suggesting 326:9	surprised 229:10,11	253:14,17 255:5	308:13 311:10	225:22 231:16
suggestion 75:6	267:1	260:19 301:8	312:2,21 321:4	239:5 244:12
96:15 170:21	survey 179:6,12,22	311:12 321:11	327:14 335:7	257:5 303:10
suggestions 81:14	196:17 209:8	336:1	taken 31:6 110:21	technician 185:21
82:13,20 83:16	216:8 218:5,6,10	systems 3:17 6:8	169:7 170:20	250:19
105:8 108:3 113:7	237:22 256:13	24:18 27:22 28:21	229:11 230:12	technologies 5:15
suggests 16:19 28:5	328:11	29:16,19 30:18	233:12	23:9 26:6 143:2
91:3 209:2,2	surveyed 221:6	47:9 50:5 87:4	takes 42:1 51:19	287:14
221:22 244:10	suspect 53:5 86:5	120:8 125:15,22	189:10 190:9	technology 8:15
301:13 305:1	suspend 21:20	131:15 133:14	211:4 225:18	10:12 85:20 89:20
327:8	sustain 54:16	134:7 136:3,6,19	231:4,6 249:15	99:5 116:17
suitable 40:12 53:20	SW 1:6	137:6 139:12	261:1,3,15 266:14	117:20,22 126:12
suited 111:20 151:6	swallow 311:22	146:12,21 147:12	272:11 279:19	126:13 127:5
282:11	swap 284:22	150:6 155:9	talk 65:14 92:19	131:10,13 132:1,4
sum 176:3 240:8,20	swearing 241:15	238:10 270:10	94:8,9,10 101:13	133:17,18 135:12
240:22	sweeping 16:8	281:12,22 282:3,6	107:5 108:12	143:10,18 157:11
summaries 199:20	sweeps 75:20	287:13 288:14	115:18,19 124:11	212:7 247:6 248:5
summary 8:11 12:2	sweet 27:17	289:12,14 298:17	154:22 158:12	248:8 275:12,19
59:17,18 186:1	switch 150:8 211:4	308:13 309:2,7,11	196:12 217:19	276:12 280:15
273:12	243:13 245:7	309:22 311:16	248:2 263:6 306:5	282:4 287:9
summer 45:21	246:11,17 247:15	334:3,10	talked 212:22	288:18 289:2,7
216:9,10 229:9	248:7 255:4 274:6		260:14 292:11,15	290:18
231:21	277:20 309:6,9	T	306:4	telephone 10:6 46:3
sun 77:22	326:11 331:4	t 3:11 306:21	talker 140:16	tell 71:10 83:13
supplant 120:2	switched 15:22	table 31:22 106:13	talking 78:9 90:17	85:9 86:5,10,13
supplied 22:12	260:22	166:16 178:12,16	103:10 106:21	87:15 91:16 92:2
suppliers 131:16	switches 311:8	204:3 212:15	107:17 117:10	94:5,18 95:1
247:13	switching 31:9	226:1 230:15,17	118:7 120:6	101:9 130:5 152:9
supply 41:17 137:8	39:14 55:6 59:1	231:15,18 241:8	131:10 136:10	197:7,18 213:21
328:18 332:14	150:10 243:19	260:20 261:5	142:9 151:10	237:7 246:15
333:19	326:6,9 327:7	284:8 295:19	154:6 158:6	249:18 259:16
support 21:11,12	328:5,11 330:1	309:7	159:20 160:6	290:2 324:22
123:19 125:3	334:17	tables 84:1 252:5	161:3 172:11	telling 85:5,8
187:4 205:7 226:1	swoop 14:18	261:6	181:10,13 183:22	136:20 148:1
231:16 239:5	symmetric 227:10	tacking 72:12	190:15 199:19	169:11
257:5 303:10	system 28:1 30:3,11	tackle 117:12	200:4 201:7	tells 88:4 188:16

<p>temper 335:2 temperature 220:20 229:15 324:10 temperatures 29:9 tend 141:8 281:12 282:7 tendency 16:3 tends 177:15 tenth 330:11 term 113:5 186:15 203:22 225:7,10 249:6 312:11,11 312:12 termination 66:12 terminology 126:16 181:3 terms 55:17 58:18 64:17 72:4 83:9 85:19 103:9 108:5 113:15,19 114:6,6 119:14,19 122:5 127:2 129:6 130:16 132:8 145:6 155:14,16 202:20 226:8 237:13 247:1 267:1,21 269:19 315:18 323:16 test 65:11 67:7,7,16 68:8,18 69:8,14 69:19 76:8 220:5 220:7 320:13 tested 70:13 303:13 testify 56:19 testimony 224:10 testing 30:15 99:14 205:18 284:14 285:8,18 286:1 text 272:20 thank 4:20 7:13 20:11 23:4,5 25:22 26:2,7 34:5 34:6 59:11 60:15 62:14,15 63:14,22 66:22 67:2,3 68:14 69:22 72:5 72:6,21,22 73:12 73:15 95:13 104:22 105:20 110:21,22 112:4 120:20 121:3,4 122:17 124:14 125:9 127:16 128:5 129:3 131:4 134:22 137:22 139:7 143:21</p>	<p>147:7 159:16 162:8 166:9 168:12 171:19,20 176:22 178:9 185:15 188:20 202:11 212:20 213:15 231:13 235:6 243:6 250:15,16 251:21 252:11 257:11 261:16 268:4 270:1,2 271:9 275:22 278:2,12 286:11 287:16,18 288:3 291:1,5 293:7 294:5 295:9 297:14,19 300:1,4 303:5,7 307:21 310:13 312:5 324:17,18 325:14 336:5 thanks 8:3 11:1 26:9 67:19 90:14 105:21 106:1 108:19 128:8 134:2 147:21 163:10 165:18 166:10 185:16 205:8 217:3 239:19,20 251:5 255:19 270:21 293:19 336:8 theme 215:20 Theodore 3:9 therm 41:20 thermal 148:15 thermocouple 149:5 149:22 thermopile 149:8,20 thermostat 220:11 226:16 232:13 thermostatically 222:2 223:6 thermostats 223:10 thing 62:10 79:18 80:5 87:16 127:6 157:15 182:3 190:15 193:15 199:5 249:18 264:5,6 268:17 297:19 298:22 313:16 321:22 322:16 323:5 324:4 329:2,22 330:1,3 331:8 334:17 335:20</p>	<p>things 66:3,8,10 74:3 80:7 83:16 87:8,10,13 92:13 102:16 103:12,19 104:18 108:8 110:10 111:13 113:1 129:10 130:20 141:1 169:20 176:11 190:7 228:11,20 229:9 239:2 264:2 275:4 282:19 284:15 285:7 288:9 291:11 299:15 311:2 316:17,18 319:15 330:4 335:19 think 10:13 11:21 42:21 64:2 65:14 66:7,16,22 67:5 68:22 72:3,14,18 73:13,22 74:9 75:12 76:7,13 78:8 81:11,12 82:2,4,7,9,15,22 83:8,13 85:5,18 87:12,13,16 88:5 89:1,8,9,14,16 90:1,6 92:10,11 97:17 98:1,13 101:14 103:2 104:10,13,20 105:1 106:3,15 107:2 108:6,9,10 113:17 114:19 116:16,21 118:19 119:14 121:8 123:4,15 124:21 125:6 126:7 128:1 128:20 132:12 133:5,7 134:6,14 136:14,18 145:22 146:9 149:18 150:3,14 154:9 155:15,20 159:3 159:21 160:12 169:6 170:9,19 171:22 173:13 174:2,7,8 182:20 184:2,12,19,22 185:1,6,11 187:15 190:14,16 193:5 195:12 201:2 205:10 207:17 208:2 215:8,19 218:12 229:5</p>	<p>234:13 238:16 244:11 250:22 259:6 267:10,10 267:22 268:10 269:9,16,18,19 271:14 275:10 277:22 286:15,16 287:5,9 290:22 291:7,14,19 292:4 293:14,21 294:20 295:7 297:3 302:5 302:7,21 304:17 304:19,20,21,22 306:4,22 307:4 323:7 325:15 326:22 327:17 328:14 329:1,5,19 329:21 331:2,11 331:18 332:6,10 332:19,21 333:21 333:22 336:1 thinking 93:10 327:9 thinks 314:13 third 19:1 201:16 201:17,17 230:20 258:3 302:5 325:8 thirdly 24:19 Thomas 131:5 243:11 255:3 thought 91:19 109:20 111:12,14 173:10 231:14 285:21 329:13 thousand 39:9 299:18 thousands 42:22 43:5 45:7 three 24:11 40:20 51:19 57:2 111:22 125:16 133:12 166:4,4 194:15 208:13,16 215:20 216:8 219:21 222:3,5 265:14 279:20 284:7 296:2 299:15 328:17 three-step 184:15 threshold 24:5 threw 111:9 thrown 106:8 thumb 201:15 tied 262:21 Tim 3:8 7:20,22 330:20,21 334:17</p>	<p>time 9:13,14,18,19 11:20 13:16 18:6 21:13 23:4 26:3 42:1 46:11,13,15 57:10 65:17 66:1 68:16 69:2 86:20 90:20 95:21 102:18 110:3 124:21 130:2,3,17 132:5 133:12 163:11 164:18 185:3 205:22 206:6 208:5 211:3 219:13,17,20 221:8,18,19 222:1 231:21 232:11 240:4 247:19 252:6 260:2 265:18 268:15 272:19 274:18 275:17 276:5,10 276:12 285:1 288:21,22 289:13 298:6,11 299:15 310:2 323:1 326:7 328:8,13 timeline 131:14,20 timer 150:9 times 40:20,21 45:19 51:20 57:2 66:5 100:3,9 130:3 139:10 196:6,6 220:8 238:9 317:8,11 320:1,3,4,10,15 323:2,10,15 timing 131:3 Timothy 2:6 tiny 53:11 tired 58:11 316:18 to-- 313:9 today 4:6,21 9:9 10:12 11:8 12:19 12:20 25:22 35:6 41:2 56:20 64:9 65:9 96:3 104:19 115:18 116:10 131:21 132:1 184:20 213:22 214:5,11,16 219:4 239:12 247:7 248:8 250:13 275:14 277:19 280:13 281:9 282:9 284:21 286:12 291:7,11</p>
---	---	--	--	---

291:20 292:11	treated 13:10 25:16	63:6 67:2 79:15	170:7,11 176:17	underlying 15:9
293:9 305:17	treating 293:11	131:7 136:18,22	200:7 204:4	undermine 15:7
308:10 314:21	treats 75:22	164:20 190:1	206:20 210:14	59:3
336:21	trees 58:5	212:17 213:3,22	223:11 224:13	understand 11:18
today's 11:3 20:12	tremendous 320:21	214:2,12 216:10	230:16 241:20	14:8 63:10 78:9
121:1	trend 98:5 131:12	220:18,18 222:19	246:12,13 258:2,3	78:15 79:10 82:9
token 290:11	154:5,6 259:5	234:15 238:11	259:14 276:13	82:10 85:7,22
told 30:13 45:21	260:7,8 265:12	265:1	types 17:21 37:7,19	88:19 89:10 92:12
91:16	268:10 271:4,6	turned 19:22 72:8	37:21 39:7 44:10	94:18 115:2
tolerant 138:19	327:17	187:7 208:15	64:11 89:19 92:7	120:18 145:21
toluene 319:12	trends 49:10 218:20	209:9,17 216:9	96:1,11 107:4	157:17 180:22
tool 254:18 279:8	251:6,9 253:8	277:18,19	111:20,22 113:14	181:2 198:1
tooling 30:15	259:8 260:9	turning 5:2 10:1	114:1 119:11,11	211:16 221:18
284:18 285:1	288:12 308:10	55:3 208:17 211:5	123:15 125:14	233:17 279:17
top 178:12 201:2	330:18	turnout 4:15	126:18 133:16	333:13
230:15 240:18	triangle 227:9	turns 317:19	134:14 144:22	understanding 14:3
257:9 306:21	triangular 226:13	twice 305:13	150:18 151:16	60:22 148:14
topic 37:4 42:13	227:6,7	Twinkie 76:3 168:5	154:21 155:9	206:6 250:5
topics 215:20	tried 45:19 47:19	two 16:11 31:14	156:20 157:5	268:14 317:7
total 144:10,14	188:10 217:6	44:10 75:7 80:7	162:6 169:9,21,22	understands 41:11
176:3 200:11,16	237:18	98:17 99:4 113:1	171:6,6 176:14	42:3
200:19 213:12	trigger 57:5	118:18 121:6	256:9 259:13	understood 120:4
240:2,8,12,19	trivial 58:21	130:14 134:14	309:8 334:3,10,16	129:8
265:21 273:9	trouble 204:15	135:10 140:22	typewriter 275:20	undertake 285:5
284:8 285:10	troubling 87:14	141:18 142:5	typical 39:18 54:7	undertaken 72:20
300:7	true 114:16 202:7	144:4,14 160:15	165:22 264:1	undetermined 68:2
totally 123:17	205:18 245:17	164:3 173:18	317:4,5,8	undoubtedly 69:11
128:12 222:13	321:4 329:15	174:18 175:17,22	typically 37:9 60:19	unduly 52:21
332:7	truly 201:17	176:6 177:8 182:5	121:11 152:4	unfortunately 28:20
touch 18:16	truth 173:16	182:11 183:18,20	163:1 245:6	29:8 30:20 102:14
touched 178:11	try 9:18 10:6 53:15	184:8,15 189:13	269:21 284:5	125:3 286:9
281:9	78:9 100:16	190:19 191:10,11		UNIDENTIFIED
toxic 318:14 319:19	120:19 128:6	191:12,13,14	U	249:17
320:8 331:20	171:18 194:13	206:17 212:18	U 1:1	unique 12:12 70:18
toxins 318:15	290:4,15 298:21	216:13 218:13,19	U.S 1:5 20:19 31:12	119:10
toy 168:5	trying 10:4 52:17	219:11 238:16	31:16 54:11 56:6	unit 33:18,20 40:10
tracking 269:14	84:11 92:12,14	244:11 261:5	63:12 67:16 70:15	136:22 139:14
trade 12:8 20:18	106:4,17 133:8	265:7 279:1	70:20 229:14	142:18 180:11
43:21 117:16	139:15 145:7	280:19 283:2	269:12 304:10,10	245:19 283:14
302:3	148:14,22 153:12	284:6 302:2,7	304:11,17 316:3	301:5,14 334:9
traditional 314:13	154:4 156:9 170:8	304:9 306:11	U.S.C 99:1	United 24:8 34:13
traditionally 149:19	171:13 173:10	314:3,6,18 316:19	ultimately 81:22	41:16 57:9,14
trailing 154:9	190:21 203:1,5,12	320:10,18 322:2	um 199:8	86:9 87:10 195:5
transcript 9:16	221:4 247:10,12	two-step 44:14	unable 52:22 221:5	213:12 235:10,13
transformer 28:7	260:8 286:17,18	177:5,15 184:9	unattractive 58:8	235:16,19 287:3
transgressions 86:5	294:18 306:1	two-steps 191:1	318:6	307:20 313:19
transition 51:13	333:12	type 68:7 79:4 80:6	unavoidable 69:12	315:20 320:20
55:22 56:7,17	TSD 31:6 77:14,15	87:3,7 90:18 92:9	unaware 46:8	units 48:3,3,16
309:21	88:9 208:7 212:15	106:12 110:12,14	uncertain 265:16	50:20 52:12 58:7
transitions 309:2	212:15 301:11	110:18 111:4	uncertainty 201:22	89:19 139:21
transmission	304:7	112:2 122:5 126:6	264:12	160:22 199:12
321:11	TSL1 260:21	128:19 132:3	undeniable 43:14	225:17,17 226:21
traveled 35:5	tube 112:2	136:14 143:9	under-estimating	258:12 265:20
traveling 336:19	turn 9:21 15:16	145:17 150:10,21	50:17	281:12,13 282:6,8
travels 33:1	17:2 18:15 39:20	151:6,7,10,18	underestimated	282:10 308:15
treat 21:15 35:8	47:3 52:12 53:9	152:6 169:13	39:14	309:10,10

universe 202:10 319:18	46:17,21 47:17 49:8 50:1,4 52:13 52:13 53:7,10 56:14 58:5 60:1 64:22 66:10 71:16 76:4 83:9 89:3,12 95:22 96:1,11 97:5,6 98:3 99:19 100:1 105:7 122:9 122:10 124:8 126:20,21,22 130:9,12 145:19 155:1 158:16 159:2 160:7 163:15 165:20 167:22 168:1 173:21 176:10 180:8 182:4 184:9 185:19 186:4,18 187:5,21 188:4,9 188:11,17 189:22 196:13,18 197:12 197:13,13 198:9 198:11 199:17 201:14,19 202:2 203:22 205:15 208:16 209:4 211:16 212:10 213:22 216:22 218:2,11 220:17 221:13 222:12 223:10,19 225:2,3 225:4,5,11 227:1 230:15,16,17,18 230:19,21 233:18 233:19,20 235:18 236:13 238:1,5 247:19 249:8,12 249:12,14 259:14 259:21 263:10 271:14 272:22 280:7 289:15 292:10,14 293:1 300:14 308:7,20 315:12 325:4 329:3 330:19 331:3,6	132:20 165:14 user-friendly 18:20 users 16:20 49:11 49:13,15,17,20 50:3 208:14 209:9 221:8 243:19 255:6 uses 33:3 50:3 52:10 52:18 53:18 54:2 54:20 138:6,6,16 142:21 149:5,7 201:20 208:1 246:16 262:15 266:6,18 279:8 usually 115:15 193:7 utilitarian 220:10 utility 9:3 16:10 25:7 31:1 74:4 332:9,11,15,19,21 333:21	16:8 27:11,22 36:17 110:13,13 118:12 150:9 288:8 303:19 334:16 various 94:19 95:22 96:11 172:10 256:9 281:3 316:10 varying 47:10 138:19 282:22 vast 27:11,16 43:2 80:19 201:7 vault 320:14 vent 52:2 62:1 70:7 71:5 78:16,20 79:5,11 118:10 134:11 147:15 244:17 311:17 vent-free 216:19 217:1 222:15,20 223:5 227:21 228:3,12 vent-less 196:22 197:3 vented 38:2 49:3 79:6 96:1,21 104:1,4 118:8,18 119:11 121:7,13 123:21 124:1 127:5,8,10,11 134:10 140:1,8 142:9 144:12 146:5 157:12 158:15 166:4 196:21 197:1 202:14,16,17 223:9 226:12,13 258:14 309:12,15 310:8 311:13,16 326:22 333:4 ventilation 169:9,13 venting 33:5 118:13 vents 137:12 venture 145:2 verbal 291:20 versus 61:17 122:4 180:4 215:18,19 246:21 254:4 269:20 331:3 Vice 23:8 26:4 Vice-President 20:16 view 14:12 66:16 84:12 193:15 290:1 291:11	viewed 176:18 viewing 88:20 violates 40:22 Virginia 193:4 virtual 31:4 virtually 12:20 15:7 57:14 267:4 visible 19:21 71:19 77:17 101:21 162:17 VO 323:11 voiced 286:15 voids 28:11 volatility 265:14 326:2 volt 29:6 30:6 40:12 189:2 volume 30:14,20 35:2 141:7 144:6 145:6 180:10 289:18 volumes 141:3 282:1 301:4,9,15 301:17 voluntarily 288:12 voluntary 277:5
		V	W	
unusual 27:21 29:5 unvented 69:8,9,10 69:12,13,15 78:16 78:20 104:3,4 118:11,15,16,19 119:2,9 120:17 121:7,14 123:22 124:1 127:9,11,19 140:1,8 144:10,14 145:17,18 146:5,8 146:10,13,20 147:12 150:20 151:1,4 159:14 160:5 202:15 205:11,12,17 225:16 226:4,7,10 226:13,21 227:5 227:21 309:14,15 309:22 311:6,10 326:22 327:1 unwilling 52:17 unworkable 27:1 update 249:11 upgrade 52:17 upgrading 52:7 upper 226:14 283:7 ups 326:1 urge 21:14 227:22 urges 21:21 USA 2:21 usage 47:5,7,13 50:17 52:5 80:22 134:13 143:19 150:21 221:4,7 235:14 334:18 335:4 USC 15:21 use 8:18 18:22 19:5 20:22 21:1 22:12 24:7,22 25:11 29:21 37:1 38:3 40:2,10 42:10	46:17,21 47:17 49:8 50:1,4 52:13 52:13 53:7,10 56:14 58:5 60:1 64:22 66:10 71:16 76:4 83:9 89:3,12 95:22 96:1,11 97:5,6 98:3 99:19 100:1 105:7 122:9 122:10 124:8 126:20,21,22 130:9,12 145:19 155:1 158:16 159:2 160:7 163:15 165:20 167:22 168:1 173:21 176:10 180:8 182:4 184:9 185:19 186:4,18 187:5,21 188:4,9 188:11,17 189:22 196:13,18 197:12 197:13,13 198:9 198:11 199:17 201:14,19 202:2 203:22 205:15 208:16 209:4 211:16 212:10 213:22 216:22 218:2,11 220:17 221:13 222:12 223:10,19 225:2,3 225:4,5,11 227:1 230:15,16,17,18 230:19,21 233:18 233:19,20 235:18 236:13 238:1,5 247:19 249:8,12 249:12,14 259:14 259:21 263:10 271:14 272:22 280:7 289:15 292:10,14 293:1 300:14 308:7,20 315:12 325:4 329:3 330:19 331:3,6 useable 94:2 useful 93:14 124:17 225:14 226:2 228:8 231:1 296:17 336:10 useless 153:16 USEPA 55:14 user 16:1 18:10 50:21 131:2	V.8 31:22 valid 152:11 214:5 value 40:20,21 153:5 204:11 251:17 256:6 257:7 261:11 272:16,17,18 273:3,11,11 274:12,13 279:13 287:5,12 294:4 295:3 values 273:19 value 28:4,6 50:6 140:3,7 145:18,19 147:13,13,16 148:4,7,11,20 149:13 150:11,21 150:22 151:7 255:10,16 289:17 valves 140:11 146:6 vapor 312:3 320:9 320:13 vapors 323:6 variable 29:19 30:12 47:20 variables 247:11 variation 204:10 208:17 variations 27:6 106:13 varied 139:22 195:5 varieties 38:20 variety 13:21 14:19	16:8 27:11,22 36:17 110:13,13 118:12 150:9 288:8 303:19 334:16 various 94:19 95:22 96:11 172:10 256:9 281:3 316:10 varying 47:10 138:19 282:22 vast 27:11,16 43:2 80:19 201:7 vault 320:14 vent 52:2 62:1 70:7 71:5 78:16,20 79:5,11 118:10 134:11 147:15 244:17 311:17 vent-free 216:19 217:1 222:15,20 223:5 227:21 228:3,12 vent-less 196:22 197:3 vented 38:2 49:3 79:6 96:1,21 104:1,4 118:8,18 119:11 121:7,13 123:21 124:1 127:5,8,10,11 134:10 140:1,8 142:9 144:12 146:5 157:12 158:15 166:4 196:21 197:1 202:14,16,17 223:9 226:12,13 258:14 309:12,15 310:8 311:13,16 326:22 333:4 ventilation 169:9,13 venting 33:5 118:13 vents 137:12 venture 145:2 verbal 291:20 versus 61:17 122:4 180:4 215:18,19 246:21 254:4 269:20 331:3 Vice 23:8 26:4 Vice-President 20:16 view 14:12 66:16 84:12 193:15 290:1 291:11	wait 92:5 140:14 169:5 308:5 walk 162:17 240:17 281:9 282:14 walked 236:20 237:21 Walker 3:17 6:7,7 70:5 223:4 287:19 288:3 walking 101:21 186:2 wall 150:7,9 212:19 311:8 314:14,14 walls 323:6 want 10:18 11:9 46:20 57:21 69:11 79:3 83:1 85:7 86:13 87:11 91:12 94:8 101:6,8 105:22 111:1 112:20 115:5 124:8,11 133:21 136:17 137:8 154:20 155:22 161:15 169:5 190:6 192:22 204:13 212:12,22 216:18 220:19,21

220:22 222:13	108:17 109:17,17	wholesale 21:4	327:13,15,19	wrong 52:18 53:10
228:9 235:22	111:2 113:22	wholesaler 164:5,13	328:11 329:3,6,9	85:18 150:18
239:3 260:2	124:7 129:8 131:2	165:13 166:20	329:10,14,21,22	171:11,14,16
270:22 290:5,8,12	154:12 155:14	167:4 182:21	330:15,15 331:5	172:1 212:14
290:12,12,21	157:15 165:10	wholesalers 44:9	331:19,19,21	263:14 304:4
291:9 293:18	177:6 214:14	170:12	334:8,18	335:17
312:15 321:22	222:3,9,20 225:2	wide 303:19	wood-burning	wrote 33:16
325:14 327:20	237:15,17 245:21	widely 257:6 317:22	308:19	www.gaslogs.com
328:7,21 331:8,9	245:21,21 259:17	width 27:8,8	Woodland 44:5	190:9
332:5 334:16	269:9 299:10	widths 27:18	word 37:9 66:10	
335:4,9	306:16 308:16	Wiley 2:16 5:10	80:8 82:22 96:1	
wanted 32:17 67:4	316:10 319:10	willing 185:8 239:9	96:11	X
72:9,11 79:22	ways 14:20 177:14	289:22	words 92:22 94:16	xylenes 319:12
80:14 88:13	239:11 244:11	willy 76:9	119:20 135:14	
110:18 130:22	286:16	window 222:17	155:13 166:3	Y
131:9 169:1 174:9	We'll 158:11	winter 229:8,12	187:6 188:13	yards 162:21
189:19 217:4	we've 76:14 173:14	wipe 47:16	230:1 233:2	yeah 60:4 69:22
238:22 286:10	wear 101:20	wiring 28:6	288:19	78:12 87:12,22
294:3	weather 229:14	wise 141:21 142:1	work 19:17 48:5	91:13 100:8
wanting 218:12	237:19 243:15	wish 9:7 63:6 173:8	62:7 105:2,5	101:17 106:1
228:19,20	245:7 335:15	191:22 250:3	111:3 193:11	111:8 123:9,10
wants 60:17 102:7	web 10:4,6,16,18	306:2	230:9 317:1,2	126:11 129:12
242:15 321:18	321:20 322:22	wishes 11:15	324:20	131:1 137:2,22
warm 33:18 244:17	webinar 10:2	withdraw 21:14	worked 47:21 60:6	142:2 144:19
warmth 33:11	website 199:20	withdrawn 13:10	249:17 287:12	151:17 152:8
warrant 30:14	week 41:14 107:18	25:16	333:10	156:13 157:19
warranted 295:7	178:2	witnesses 51:3	workers 32:2,3	158:10 161:17
warranties 254:17	weighted 259:12	Wolf 125:2 138:1	278:6,9	167:17 169:17
warranty 253:20	weighting 202:19	149:16 172:19	working 10:10	170:13 180:13,14
254:7 255:22	welcome 4:3,14,18	213:16 220:15	131:12 133:15	181:4 195:21
Washington 1:7 4:8	10:3 92:1 116:11	247:4 286:7	155:14 201:15	196:8 198:17,19
23:16 32:18	116:14 167:18	Wolfe 63:9	247:13 260:3	212:11 217:4
wasn't 60:16 164:14	171:1 185:6 227:2	wondering 66:17	333:22	223:12 235:22
205:7 214:1	239:6 242:4,13,14	187:5 246:22	works 6:16 26:14	250:8 255:2
254:22	242:17 254:9	250:1 269:5 326:5	61:15,16 83:6	260:14,16 266:22
waste 47:15 86:20	259:11,13 276:13	wood 23:11 27:7	131:18 271:21	271:7 275:9 297:2
86:21	276:13 298:20	29:5 36:6 42:10	world 41:11 85:2	299:13 303:6
wasted 137:18	305:21	42:11 49:8,9	89:18 121:1	year 27:3 41:5,6
229:19	welcoming 4:11	51:10,10,11,13,13	213:20	47:21 49:12,13,16
watch 220:21	welfare 313:17	51:17,18,19 52:1	worry 107:1	49:18 54:6,13
222:13	318:1	55:5,9,16 56:1,13	worse 295:4	57:11 95:6 133:14
water 36:8 75:18	well-known 23:12	58:8,12 59:1,7	worth 50:22 294:20	178:3,3 179:9,12
93:21 102:2	wellbeing 34:1	74:14 110:20	worthy 76:5 89:2	180:16 208:15
107:19 169:20	went 65:18 104:15	200:15 264:21	wouldn't 68:20	212:17 218:18
267:3	134:1 141:1	267:19 308:7,8	77:14 80:12 83:10	220:2 231:16
watt 205:3	153:18 168:11	314:7,8,9,16,18	83:11,12 88:10	240:13 249:14
wattage 204:9,17	193:22,22 221:3	314:20 315:4,13	121:22 152:22	254:8 263:10
watts 204:9,16	237:18 249:22	316:11,13 317:3,9	168:7 218:19	265:22 266:20
wax 51:11 308:8	273:13,20 303:1	317:9,12,19 319:2	306:6	274:20 275:3,5
way 11:7 20:10 40:4	315:17 330:10	319:5,10,20 320:2	Wow 188:12	294:15
45:20 60:18,21	335:17	320:11,16,21	wrap 106:4	year's 40:20
66:13 71:10 78:2	weren't 153:3,3	321:12 322:8	writing 11:19 73:6	years 17:15,19 30:8
82:16 84:5 86:18	212:10	323:14,19 324:5,7	written 10:16 23:3	51:12 52:9,11
88:16,16,18 90:19	whack 224:11	324:14,15 325:4,6	43:10 75:1 92:21	53:5 54:11,14,16
91:4,20 92:10,21	267:22	325:7,9,17 326:7	93:8 250:14 288:2	60:7 65:15 66:4
93:4,8 100:16	whichever 78:17	326:12 327:10,11	291:20	66:20 70:19 97:18
				98:1 126:22

128:12,13 133:9 133:13 154:1 200:20 209:5 216:1 218:19,20 219:4 220:6 249:18 252:2 254:22 256:4 261:11,15 265:4 268:11 269:15,15 275:2,6,8 294:11 294:22 295:5,6 306:5 326:2 328:10,17,18 years' 289:13 Yep 143:22 184:5 yesterday 33:17 YouTube 214:2	100 157:2 328:18 100% 44:12 203:14 228:15 232:22 1000 1:6 232:9 107 320:4 109 316:15 10th 11:17 21:20 293:16 11 101:18,20 227:14 325:5 326:19 11-15 325:12 11% 309:15 11:20 102:5,8 110 40:12 12 24:6,8 39:8 299:18 301:11 12:30 162:14,16 12:30-ish 8:20 120 29:5 30:6 189:2 334:12 1200 23:14 122 318:12 12866 16:14 13 320:3 324:1 13.00 50:22 13563 16:14 14 40:15 213:3,11 14% 133:15 14.50 161:19,21 148 317:8 15 98:13,15 101:19 215:22 256:4 261:11 299:18 322:10 325:5 15% 125:4 150 45:2 16 42:21 52:9 16,312.00 300:2 165.00 241:21 17 308:2 323:18,20 171 197:3 172 323:21 18 27:18 44:6 73:5 215:22 325:7 187 318:20 1907 26:16 1949 330:8 1958 26:17 1960 243:22 252:4 1970's 328:16 1975 64:7 1980 70:12 1990 243:21 318:11 252:20 1993 41:9 329:19 1995 256:14 1996 65:17	1997 210:1 213:1,14 214:3,10,15 233:10,14,18 234:10 238:13 <hr/> 2 <hr/> 2 13:13 226:4 227:16 261:18 317:14 2% 214:11 2.6 295:17 20 17:15 39:7 44:1 101:19 209:4 219:20 220:21 221:18 222:5 249:17 325:7 20% 49:15 208:15 212:16 231:17,20 232:7,21,22 233:1 233:1,7,18 234:22 265:11 200 45:2 2000 26:18 2001 326:19 2004 323:1 2005 165:7 265:15 265:17 2006 265:18 2007 166:22 209:8 209:15,16 214:20 216:6 234:14 238:14 2008 323:1 2009 186:13 223:20 249:5,10 263:18 2010 256:14 2011 26:19 49:10 98:2 2012 41:9 249:10 252:4 321:19 2013 49:12 65:5 68:13 167:1 244:1 263:18 265:20 274:13 2014 48:3 54:2,3 251:9 263:13 266:14 2015 1:11 4:7 25:19 44:2 2020 233:12 2021 42:1 209:21 224:1,2 257:16 258:10,12 262:8 272:10 274:21 2040 251:10 274:17 275:14	2050 262:8 266:15 272:10 274:17,22 20585 1:7 2188 67:13 69:20 70:3 22 31:16 302:11 22,500 323:18,19 23 1:11 4:7 154:17 154:20 156:6 227:11,13,13 308:1 23% 144:11 226:4 2300 20:21 235 34:13 24 144:8,10 154:17 156:6,16 158:7,8 247.00 241:22 25 60:7 207:17 208:2 328:10 25% 41:19 49:12 250 310:16 26 141:15 323:2,10 323:15 26% 114:14 27% 309:14 2800 20:20 45:6 <hr/> 3 <hr/> 3 8:7 13:15 133:13 178:21 180:18 273:21 303:10 304:6 306:11 324:22 3-4 195:18 3% 274:12 3,000 302:20 307:9 3.00 32:19 3.1 212:16 3.12 274:12 3.23 168:16 3.9 220:2 3.99 168:16 3:35 261:20 30 27:18 29:21 54:16 138:17 141:14 145:16 200:20 219:22 261:15 275:2,5,6 320:15 322:10 324:2 30th 275:3 31 65:5 68:13 144:5 146:9 33 162:11 335.00 40:18 41:7 34 70:19	35 200:22 36 29:15 174:20 36,000 232:11 37% 309:13 310:8 38 185:19 195:15 380.00 50:22 39 187:9 <hr/> 4 <hr/> 4 200:18 201:1,3 4,000 302:21 4,100 144:16 4.2 256:15 4.67 197:2 40 54:11 187:8 269:15 316:16 40% 49:20 52:13,14 208:14,16 209:21 212:17 233:11,22 234:7,15,18 41 15:21 42 99:1 42% 258:10 273:22 44% 209:9,17 47 227:13 47% 226:3 48 227:17,17 48.5 263:19 <hr/> 5 <hr/> 5 101:18 152:21 332:4 5-0 217:16 5% 133:13 5,000 144:15 5.33 176:8 5:01 336:22 50 20:21 204:9,16 252:1 316:16 50% 48:15 200:21 205:16 217:16 258:14 269:15 270:1 50,000 207:15,16 208:1 50.00 41:5 500 31:12,15 300:11 306:18 51 249:20 511.00 39:19 53 261:10 541 197:1 55 261:11 56 44:17,20 166:6 56% 144:12 158:14 568 317:11 320:10
--	--	---	--	--

<p>57.5 264:4 58% 32:1,3 258:11 273:21 278:8</p> <hr/> <p style="text-align: center;">6</p> <p>6 256:12 316:19 6% 38:3 49:3 60 242:22 275:8 600 39:8 62 274:10 629 15:21 6291(6) 99:1 64 320:1 65 229:16,18 268:3 66 31:11 42:17 45:8 300:8 303:3 307:10,13 69 274:10 6B 301:10</p> <hr/> <p style="text-align: center;">7</p> <p>7 73:18,21 152:22 162:4 212:15 295:5 7-6 212:16 7% 273:21 274:14 7,000 144:17 7.3.6 226:1 7.8 284:11 70 320:11 70's 330:14 70% 330:12 700 232:9 71% 310:9,12 7101 22:10 7103 48:8 7115 31:22 278:7 7116 32:6 42:7 7125 32:12 731 231:15 75 180:9 75% 39:20 42:4 49:11 76 276:20 78 200:17 781 285:20 79639 68:13</p> <hr/> <p style="text-align: center;">8</p> <p>8 40:21 180:16 294:11,22 295:5 8.7 284:10 296:6 80% 52:11 180:9 321:6,7 800 61:9 82.08 241:18</p>	<p>860 323:22 891.00 39:19 8E-089 1:8</p> <hr/> <p style="text-align: center;">9</p> <p>9% 263:22 309:15 9.6 254:22 9:00 1:12 90 31:10 41:20 300:7 302:13,22 303:4,4 90% 160:6 258:14 320:11 321:7 900,000.00 284:11 94 227:16 94% 226:4 96 27:20 63:12 323:20 97 234:14 98 46:15 99% 46:15</p>			
---	--	--	--	--

TRANSCRIPTION CERTIFICATE

As a professional transcriber, I certify that the attached document(s) are, to the best of my abilities, an accurate transcription of audio recordings provided to the company, given the quality of the provided audio recording(s), and that I have no financial or other interest in the proceedings to which they pertain.

Helen Venturini

TRANSCRIBER

TRANSCRIPTION CERTIFICATE

As a professional transcriber, I certify that the attached document(s) are, to the best of my abilities, an accurate transcription of audio recordings provided to the company, given the quality of the provided audio recording(s), and that I have no financial or other interest in the proceedings to which they pertain.

Helen Venturini

TRANSCRIBER