

LOG OF MEETING

SUBJECT: Meeting of Z21 Ad Hoc Working Group on Rangetop Cooking Fires **CPSC/OFFICE OF THE SECRETARY**

DATE: April 18, 2000

PLACE: Radisson Hotel Southwest
Cleveland, OH

DATE OF LOG ENTRY: April 26, 2000

SOURCE OF LOG ENTRY: Andrew Trotta, ESEE (m)

2000 MAY 18 P 4: 08
CPSC 6 (b)(1) Cleared
No Mfrs/PvtLbrs or
Products Identified
____ Excepted by _____
____ Firms Notified, _____
Comments Processed _____

CPSC PARTICIPANTS:

Ron Medford, Office of Hazard Identification and Reduction
Andrew Trotta, Engineering Sciences Directorate
Han Lim, Laboratory Sciences Directorate

NON-CPSC PARTICIPANTS:

Sandeep Ahuja, Amana
Jim Beyreis, Underwriters Laboratories (UL)
Lee Bishop, General Electric
Tim Brooks, Whirlpool
Norman Chiu, General Electric
Joe Erdelsky, Siebe Appliance Controls
Rick Fort, CSA International
Sharon Franke, Good Housekeeping Institute
Donald Grob, UL

Joe Howver, Harper-Wyman
Sue McCarthy, CSA International
Wiley Miller, Frigidaire
Wayne Morris, Association of Home Appliance
Manufacturers
Issac Sargunam, Maytag
Bob Stack, CSA International
Marty Walsh, Thermador
Rick Seib, Whirlpool

SUMMARY:

This was the first meeting of the Z21/(Interim CSA) Joint Ad Hoc Working Group on Range Top Cooking Fires. The Working Group (WG) was established by the Z21 Subcommittee on Standards for Domestic Gas Ranges pursuant to an August 1999 request from CPSC to consider changes to the standards to address cooking fires. The WG chairman, Joe Erdelsky, started the meeting with a brief explanation of the position of the working group within the gas appliance standards-making hierarchy. After the WG completes its work, it passes its recommendations onto the Z21 Subcommittee. The Subcommittee then reports to the Z21/83 Committee on Performance and Installation of Gas-Burning Appliances and Related Accessories for action.

The Ad Hoc WG primarily consists of the same group of interested parties that met four times since June 1998 as an informal working group to discuss ways to address the hazard of cooking fires. The group last met on March 3, 1999. As the second item during the April 18, 2000 meeting, Wayne Morris (AHAM) presented a summary report on the previous four meetings of the informal working group (see attached). Then, CPSC staff presented a brief overview of the CPSC project on cooking range fires (see attached).

During ensuing discussions on the goals and objectives of the WG, industry members reiterated concerns related to long term durability of a safety system and expressed concerns

4-18-00

Report of the 1998-99 Working Group on Cooking Fires

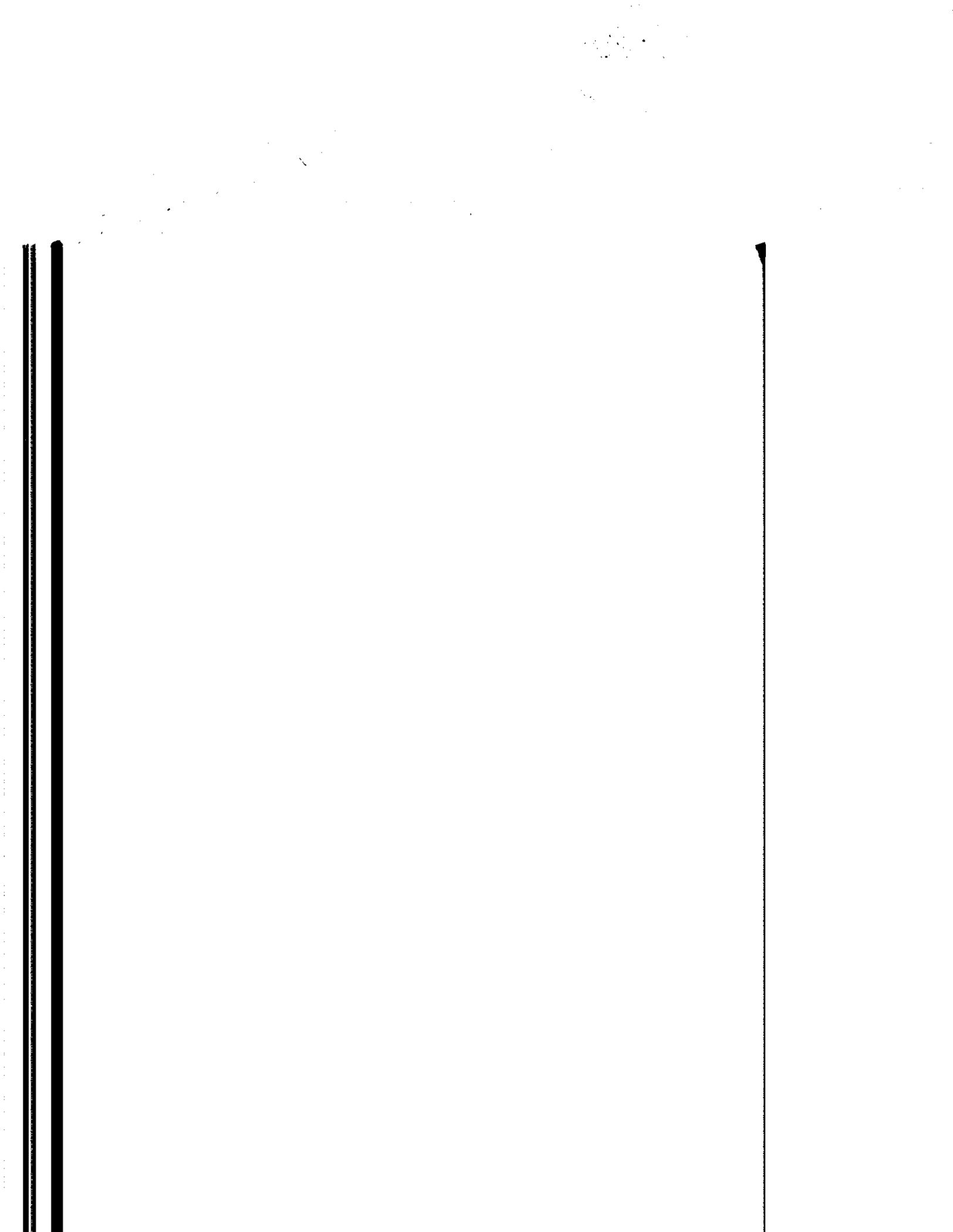
April 18, 2000

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Composition of Working Group

- ✓ The WG met two times in 1998-99
- ✓ Composed of Representatives from:
 - Range manufacturers
 - UL
 - CSA
 - Good Housekeeping Institute
 - Insurance
 - Component manufacturers
 - CPSC
 - USFA

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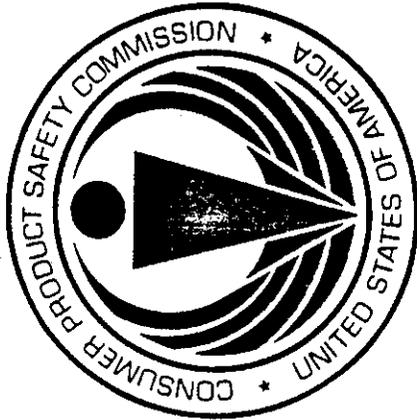
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Range Fires Project

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U.S. Consumer Product Safety Commission

Agenda

- Project Goal
- Hazard Data
- Review of CPSC Work
- CPSC Cooking Fire Test Program (1995 through 1997)
- Experimental Control System Development
- Interaction with Industry
- Ongoing Efforts (FY2000+)
- Summary

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Project Goal

- Through the 90's, range fires continued as a leading cause of residential fires
- Ignition of cooking materials are major share

Goal: Reduce deaths, injuries and property loss from cooking fires by making ranges more resistant to overheating food to ignition

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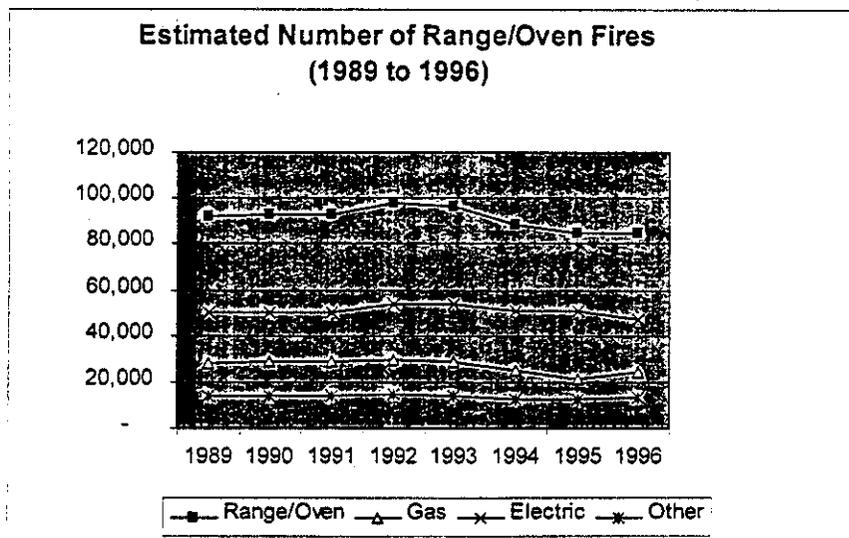
Hazard Data

- Annually an estimated 86,000 residential fires attended by fire departments involved ranges (includes both rangetops and ovens) [1994-1996]:
 - 245 deaths
 - 4,160 injuries
 - \$292.9 million in property loss

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Hazard Data (cont'd)

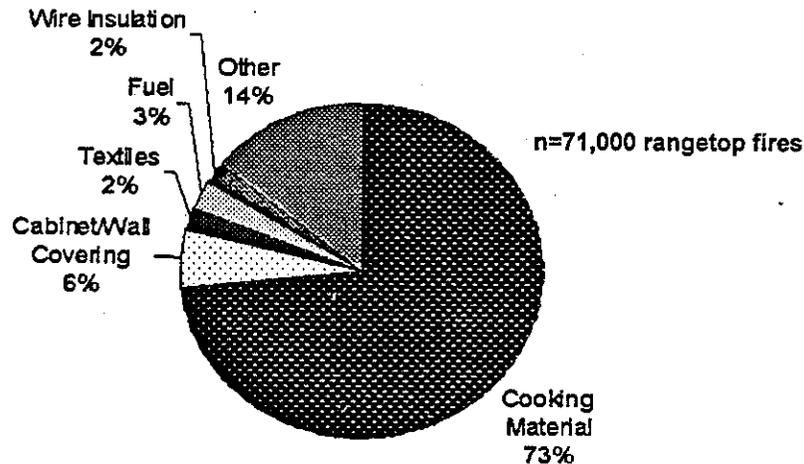
- No significant change in 8 years



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Hazard Data (cont'd)

Among rangetop fires, cooking materials were by far the most frequent materials ignited.



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Review of CPSC Work

- 1994 - project initiated
- FEMA/U.S. Fire Administration co-funded since 1994
- Four phases of testing completed
 - Cooking fire characterization (Phases I - III)
 - Experimental control system development (Phase IV)
- Demonstrated operation of control systems to limit both electric and gas burner heat output

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CPSC Cooking Fire Test Program

■ Phase I - NIST (1995)

- Tests to characterize cooking fires
- Literature/patent search on sensors and controls

Results

- Temperatures, smoke particulates and hydrocarbon gases are strong indicators of impending ignition
- Promising detection technologies identified:
 - Tin oxide (SnO_2) sensors or narrow band infrared absorption for hydrocarbon detection
 - Scattering or attenuation types of photoelectric devices for smoke particle detection
 - Thermocouples for thermometry of the burner, pan, range surface (top and below) or range hood

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CPSC Cooking Fire Test Program (cont'd)

■ Phase II - NIST (1996)

- Additional cooking fire tests with available sensors

Results

- Some standard cooking practices, e.g., blackening, mimic pre-ignition conditions
- Thermocouple on pan bottom and cooking alcohol gas sensor on range hood produced best pre-fire signals
 - Range type, range hood fan and pan material did not have strong effect on detection

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CPSC Cooking Fire Test Program (cont'd)

■ Phase III - CPSC (1996)

- Used same sensors as Phase II (NIST)
- Expanded test conditions with air flow, pan types, range types and more cooking scenarios

Results

- Temperature measured on bottom of cooking vessel appeared most reliable pre-fire indicator
- Airflow affected sensitivity of gas sensors
- Developed series of "standardized" tests with cooking oil, boiling water and normal cooking

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Experimental Electric Burner Control System Development (1998)

■ CPSC staff designed an experimental control system

- Measures temperature on cooking vessel bottom
- Controls burner heating cycle to limit food temperature
 - Three spring-loaded thermocouples sense temperature on pan bottom
 - Programmable microcontroller runs control algorithm and drives solid state relay connected to burner

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Experimental Electric Burner Control System Development (cont'd)

■ CPSC conducted design validation tests

Results

- System prevented food ignition using “standardized” tests
- Normal cooking on high-setting took slightly longer

■ Good Housekeeping Institute performed more tests

Results

- Medium-high heat cooking results satisfactory with some increases in cooking times
- High-heat cooking produced varying results
 - Control system allowed searing and blackening with less quality

■ CPSC Phase IV Final Report published 3/00

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Experimental Gas Burner Control System Development

■ In Sept 1999, CPSC contracted Energy International (EI) to design and build gas range control system

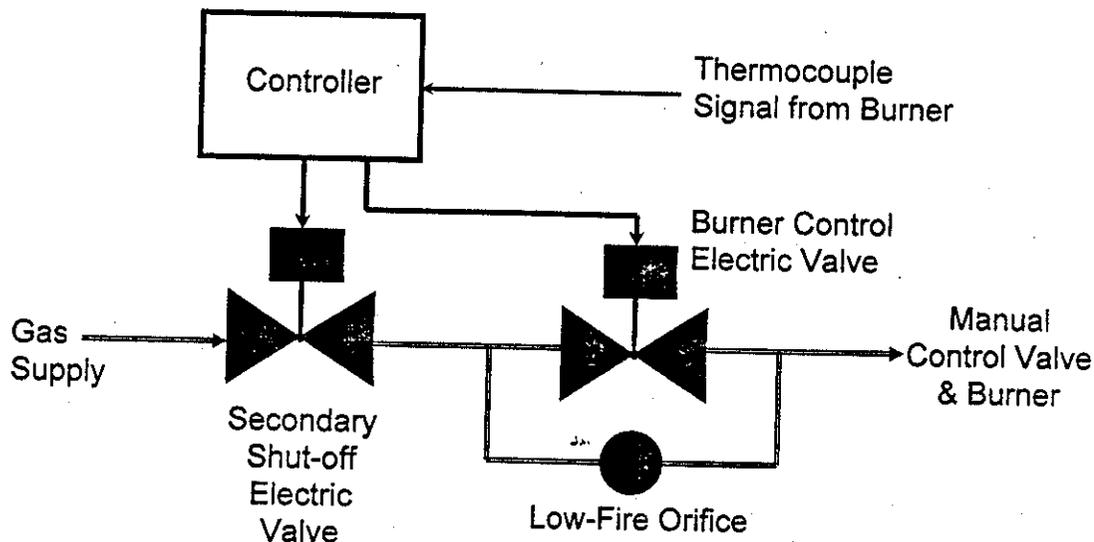
- Temperature sensing on pan bottom with spring-loaded type K thermocouple
- Two-stage electrically-actuated gas flow control system
- Control system implemented through computer control

Preliminary Results (final report due in 5/00)

- System prevented food ignition using “standardized” tests
- System permits normal cooking operations such as boiling water and browning meats
- Tested a non-contact, radiantly-coupled temperature sensor that may work on an electric range also

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Experimental Gas Burner Control System Development (cont'd)



Simplified Diagram of Two-stage Gas Flow Control System

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Interactions with Industry

- Met with range manufacturers in January 1995 to "kick off" project
- Association of Home Appliance Manufacturers (AHAM) and range industry started a consumer awareness campaign to address cooking fires in 1995; distributed video and brochure in 1997
- In 1995 AHAM and National Association of State Fire Marshals established a task group to study cooking fires
 - Published results of ten-community fire study in 1996

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Interactions with Industry (cont'd)

- AHAM/industry provided input on test plans for all phases of test work
- Commission held a national meeting in March 1998 to discuss progress and direction of CPSC project
- Met with industry, standards developers and interested parties as part of Working Group (June 98, Oct 98, Nov 98, March 99)

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Ongoing Efforts (FY2000+)

- In Aug 99, requested standards developers revise voluntary safety standards for gas and electric ranges to add performance requirements to prevent cooking fires from food ignition
 - Participate in standards process
- EI finalizing report on gas burner control system
- CPSC will continue technology assessment
 - Infrared sensing cooktop
 - Electric range replacement burner w/ temperature sensing
 - Glass cooktop thermal limit system
 - “Standardized” tests at CPSC and GHI on EI system

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Summary

- Range designs can be modified to significantly reduce cooking fires
- Voluntary Standards for ranges should be revised to address the cooking fire hazard