

NATIONAL CENTER FOR
FOOD PROTECTION AND DEFENSE
A HOMELAND SECURITY CENTER OF EXCELLENCE

Food Production and Distribution: Threats, Vulnerabilities and Global Issues

Jon Seltzer, Assistant Director NCFPD

Alabama Food Safety and Defense Conference
Montgomery, Alabama
May 13 - 14, 2008

Food Production and Distribution: Threats, Vulnerabilities and Global Issues

- Distribution (Retailing/ Consumer)
- Food Production and Distribution:
Threats and Vulnerabilities
- Global Issues (Melamine)

The Food Industry at 35,000 Feet

**Jon Seltzer
Corporate Resource, Inc.**

**Montgomery, Alabama
May 13, 2008**

(952) 926-4602

seltz004@tc.umn.edu

Jon Seltzer



National Center for
Food Protection and Defense

The Consumer!

Today's Topic

- Consumer expectations and demands
are changing
- In response, retail, supermarkets and
restaurants are changing
- There is more square footage at retail
and more new items than before

Today's Topic

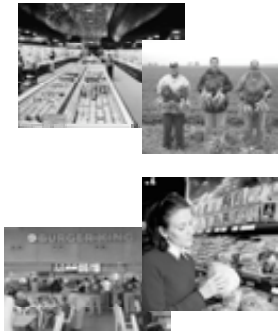
- Consumer expectations and demands are changing
- In response, retail, supermarkets and restaurants are changing
- There is more square footage at retail and more new items than before

Today's Topic

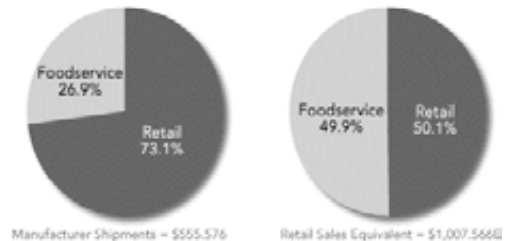
- In my opinion, increases in food prices and concerns about the economy will accelerate the impact of the above trends

Scale and Scope of the Food Industry

- \$1.24 trillion sector
- \$457.4 billion grocery (FMI)
- \$476 billion food service (NRA)
- \$60.5 billion exports
- \$58.5 billion imports
- 12% GDP
- 17% workforce



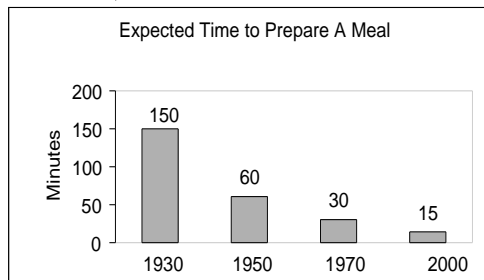
Manufacturer Shipments and Retail Sales Equivalent (2006)



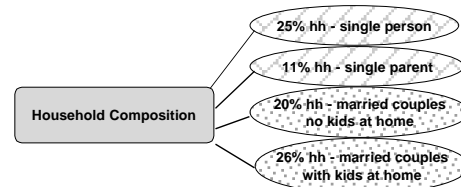
Source: U.S. Bureau of the Census; Technomic, Inc.



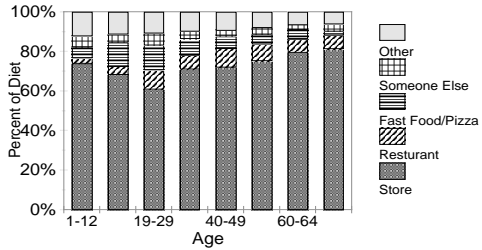
The Retail Food Industry Center



Lifestyle: Less Time for Cooking



Source of Food by Age



Evolution in How We Eat

- Eating occasions, not meals
 - 50% of people eat while working
 - 42% eat while watching TV
 - 19% eat in the car
- Strong desire for “simplification”

“Generally, America no longer “cooks.”
In fact many young Americans view
words like ‘menu’ and ‘recipe’ as
computer, not kitchen, terms.”

– Ira Blumenthal *Meal Solutions Mania*

Convenience



Private Label Share - World's Top 20 Grocers

Rank	Company	Retail Banner Sales, 2004 (USD mn)	Estimated Share of Private Labels, 2004 (%)	Estimated Private Label Sales (USD mn)
1	Wal-Mart	310,576	37.0	11,491,312
2	Carrefour	112,458	32.0	3,598,656
3	Ahold	88,179	23.0	2,028,117
4	Metro Group	80,621	13.0	1,048,073
5	Tesco	68,164	45.0	3,067,390
6	Seven & I	58,757	27.0	1,586,439
7	Kroger	58,647	24.6	1,442,716
8	Rewe	55,216	25.0	1,380,400
9	Target	53,949	46.0	2,481,654
10	Costco	51,199	12.0	614,398
11	Auchan	50,751	23.0	1,266,775
12	AEON	50,746	17.0	862,682
13	Casino	50,064	40.0	2,002,560
14	Schwarz Group	46,448	63.0	2,926,224
15	Aldi	46,430	95.0	4,410,850
16	ITM (Intermarche)	46,355	35.0	1,622,425
17	Supernak/Albertsons	41,976	17.0	713,575
18	Edeka	39,676	10.0	396,760
19	Walgreens	39,458	11.0	434,038
20	Safeway (USA)	39,112	24.0	938,688
	Total	1,388,781	31.9	44,315,712

Market Share and Growth

Country of Origin	Private Label % of Distribution/Share	Growth Rate
Worldwide	17%	5%
Europe	23%	4%
North America	16%	7%
Asian - Pacific	4%	5%
Latin America	2%	5%
Emerging Markets	6%	11%

Importance of a Retailer's Own Brand

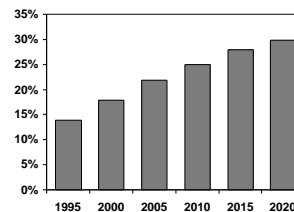
- All the experts agree
 - According to McKinsey, a “shift to value” among consumers should inspire retailers to differentiate with a “superior private label”
 - FMI recommends offering “multiple tiers to reach new consumers and build loyalty”

Importance of a Retailer's Own Brand

- M&M Planet Retail foresees almost 50% sales growth for private label in the food industry by the year 2020

Importance of a Retailer's Own Brand

Global Trends in Private Label Food Sales, 1995-2020



Concentration of Competition

- The Wal*Mart Influence
 - Wal*Mart's supply chain cost savings equate to saving U.S. customers \$20 billion/year
 - Now sells 30% of nation's household staples
 - Opening 335 new stores

Concentration of Competition

- Reaction of competition
 - Strive to match supply chain efficiency, cost cutting
 - Acquisitions and Mergers to gain critical mass



Concentration of Competition

- Result
 - Some real gains in efficiency – digital technology
 - Diminishing cost savings
 - Loss of innovation – new products, topline growth
 - Profitability crunch
 - Vicious cycle



Top 4/5 Retail Food Store Companies U.S.

	1930	1990	2000	2006
1.	A&P	Kroger	Kroger	Wal-Mart
2.	American	American	Wal-Mart	Supervalu
3.	Kroger	Safeway	Ahold	Kroger
4.	Safeway	Winn-Dixie	Safeway	Costco
5.		National Tea	Albertsons	Safeway
Total Sales (%)	17	16	41	50

Concentration

Concentration Plus Format Proliferation

Dollar Stores

- Dollar stores are experiencing unprecedented growth
- Most of the top consumer packaged goods manufacturers have incorporated them into regular sales planning and distribution
- About one-third of all U.S. households shop at a dollar store monthly

More Stores

- In 1995, 625 supermarkets and 818 convenience stores served the Chicago area
- Ten years later, groceries could be obtained at 781 supermarkets, 2,030 convenience stores, 338 mass merchandisers such as Wal-Mart and Target, and 29 wholesale clubs, such as Costco and Sam's Club

Non-Traditional Retailers Lower Average Food Prices



Specialty/Gourmet Food Stores Increase Health Food Options



How We Shop

- Grandparents went to a supermarket once a week and likely went back time and again to the same supermarket.
- Today we "shop on average more than twice a week and in a month, shop at seven different food distributors, from warehouse clubs to drugstore chains"

How We Shop

- "So even though we say we're busier than ever, we will make time to go to a secondary location for value."

Value and Quality

- \$100,000 households vs. < \$20,000
 - 2x as likely to patronize a warehouse club
 - 9% more likely to frequent a mass-merchant

Value and Quality

- \$20,000 households
 - 74% more likely to shop at dollar stores
 - 42% more likely to patronize a gas/c-store
 - 21% more likely to frequent a supercenter

Too Many Items to Fit on the Shelf

- 200,000 + UPC / Bar Codes
- 45,000 in most stores
- 500 in the average home

New Items Keep Coming

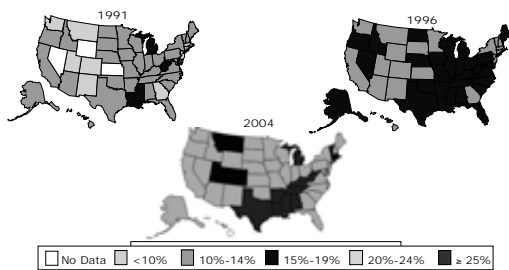
- 95% of the 15,000 plus new items introduced every year in the U.S. do not last 12 months

Trade Promotions in the U.S.

- Over a third of Consumer Packaged Goods volume is sold on promotion in the U.S.
- Both manufacturers and retailers have made it very clear that feature ads, displays, and temporary price reductions are a huge part of how goods are sold in the grocery, drug and mass merchandiser channels

Obesity Trends* Among U.S. Adults BRFSS, 1991, 1996, 2004

(*BMI ≥ 30 , or about 30 lbs overweight for 5'4" person)



Small is Big Today

- Down-sized packages of product that travel easily and contain fewer calories than traditional formats
- Earthbound Farms now makes a 2-oz. mini-pack in addition to their 12-oz. family pack

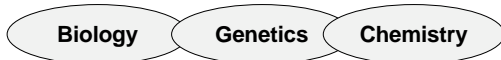
Small is Big Today

- Kraft Foods has begun selling 100-calorie packages of its Chips Ahoy! Sales of these mini-packs are brisk, with Kraft taking in \$75 million since introducing its 100-calorie line last summer
- I want it healthy, I want it delicious—and I want it now

Going for Satisfaction

- Single-serve portions can enjoy greater quality control, than a multi-serving bag that’s been open a while
- There’s something great about being able to say, “I ate the whole thing!” without then having to say, “Oops!”

Technology/Science



- Who benefits?
- Production/yield
 - BST/BGH
 - Roundup ready
 - BT corn
- Benefit “realized” by the consumer

It’s the Economy!

- Housing
- Property taxes/ municipal financing
- Credit availability
- The dollar

Concerns About Food Prices and Availability

- Rice prices on world markets have jumped 50% in the past two months and doubled since 2004
- Sam’s and COSTCO are limiting how much rice customers can buy because .. "recent supply and demand trends"

NATIONAL CENTER FOR
FOOD PROTECTION AND DEFENSE
A HOMELAND SECURITY CENTER OF EXCELLENCE

Food Production and Distribution: Threats, Vulnerabilities and Global Issues

Jon Seltzer, Assistant Director NCFPD

Alabama Food Safety and Defense Conference
Montgomery, Alabama
May 13 - 14, 2008

NCFPD Vision

**DEFENDING the SAFETY of the
FOOD SYSTEM through
RESEARCH and EDUCATION**

Broad Academic Collaboration



Diverse Industry and Association Collaboration



Collaborating Across Agencies



Security/Safety/Defense

- Food Security
 - Supply sufficiency – access to nutritionally adequate and safe food
- Food Safety
 - System reliability – reducing exposure to natural hazards/errors/failures

Security/Safety/Defense

- Food Defense
 - System resiliency – reducing the impact of system attacks
- Food Protection
 - Global food supply system Safety/Defense “umbrella”

Food Safety vs. Defense

- | | |
|--|---|
| <ul style="list-style-type: none"> • Food Safety <ul style="list-style-type: none"> – System failure – Microbial and chemical agents – Known agents – Reasonably likely – Accidental – Low levels/ concentration – FDA / USDA | <ul style="list-style-type: none"> • Food Defense <ul style="list-style-type: none"> – System attack – Microbial and chemical agents – Unexpected agents – Unlikely – Intentional – High levels/ concentration – FBI |
|--|---|

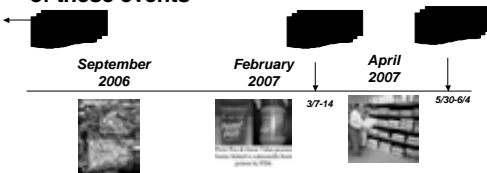
Food Safety Events

- Hundreds of food product recalls occur on an ongoing basis, but over the past year there have been several very high profile incidents that have captured national attention



Tracking Consumer Confidence

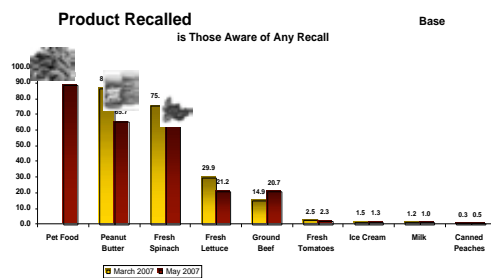
- Preliminary research consisted of *three surveys* conducted to measure the impact of these events



Some Findings

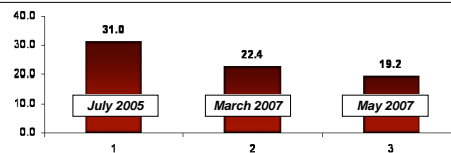
- The pet food incident had the highest level of consumer awareness, although the Peanut Butter and Fresh Spinach recalls also had high awareness – demonstrating they commanded national attention
- Awareness decreased somewhat in the two months following the specific incident in question

Some Findings



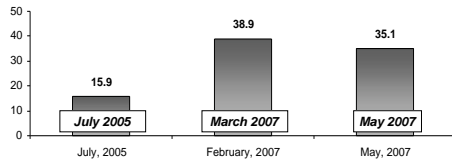
Consumer Confidence Trend

- Although awareness of specific recalls may wane, there seems to be an accumulating impact on consumer confidence in the food supply



Food Safety Concerns

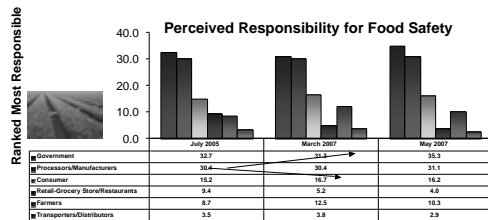
- And consumers during this time have experienced increasing concern over food safety in their household



Consumer Perceived Responsibility

- The government and food manufacturers are seen as most responsible for insuring food safety
- Since the spinach incident consumers view farmers as more responsible and retail stores as less.

Consumer Perceived Responsibility



Summary of Findings

- Although awareness of specific food safety incidents seems to wane over time, recent high profile incidents do appear to have had a profound cumulative impact on consumer perceptions of the safety of the food supply
 - Confidence in the food supply has dropped significantly

Summary of Findings

- Consumers have expressed increasing concern over food safety with respect to their individual households
- The impact may even have halved food defense
 - Consumers are willing to allocate more defense spending to the food supply chain

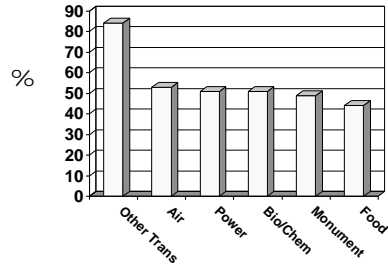
Summary of Findings

- Information with on product recalls is thought to be lacking with respect to adequacy
- Although consumers get their information from multiple sources, television has by far the greatest breadth reaching 9 out of 10 consumers

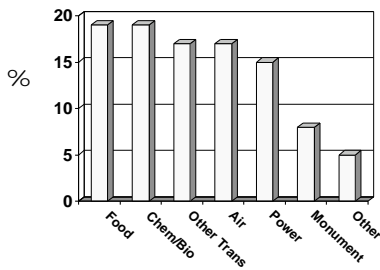
Summary of Findings

- The government and manufacturers are perceived to have the greatest responsibility for food safety, however the responsibility seems to follow the latest incident

How Many of You Expect a Serious Terrorist Act in the U.S. Within the Next 4 Years?

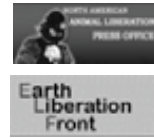


And Here's How They Want Their Defense \$ Spent...



Who Are We Concerned About?

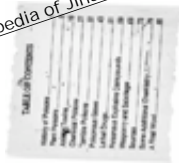
- Disgruntled employees
- Violent activist groups
- Criminals/subversives
- International/government supported or directed groups or individuals



Why Are We Concerned About Food Terrorism?

- No specific targeting information indicating attack on food supply is imminent

Encyclopedia of Jihad



Why Are We Concerned About Food Terrorism?

- Intelligence indicates that terrorists have discussed components of food sector
- Manuals for intentional contamination of food are widely available

Encyclopedia of Jihad



Why Are We Concerned About Food Terrorism?

- Food sector a huge economic engine: \$1.24 trillion/year
- Food system complexity makes it hard to protect
 - 2,128,000 farms
 - 29,000 food manufacturing sites
 - 224,300 retail food stores
 - 565,000 food service outlets

Why Are We Concerned About Food Terrorism?

- Even an ineffective attack could cause significant economic and psychological damage
- Efficient food distribution = potential for mass casualties
- Concern exists for exploitation of soft targets, such as the food supply

Why Are We Concerned About Food Terrorism?

- Attack severity depends on several factors, agent characteristics, attack scenario, and efficiency and effectiveness of detection and response
- **EVERYONE** eats and drinks!



Are Your Employees and Co-workers Aware?

- 1 in 6 Americans work in an occupation directly linked to food
- “It won’t happen to me” syndrome
- Lack of awareness, knowledge and/or concern about food defense
- “It’s not my job” syndrome
- Avoidance coping mechanism
- These contribute to the vulnerability of the food supply!

What Makes the Food Supply a Vulnerable Target?

- Potential devastating economic impact
 - Direct economic losses
 - Medical costs/lost wages
 - Containment, decontamination and disposal
 - International costs
 - Trade embargoes



What Makes the Food Supply a Vulnerable Target?

- Indirect multiplier effects
 - Compensation paid to affected producers
 - Losses suffered by affiliated industries



What Makes the Food Supply a Vulnerable Target?

- Potential for loss of public confidence
- Just-in-time production
- Brand image
- Lack of adequate response systems

High Risk Factors

- Large batch size
 - high number of contaminated servings, potential affected individuals
 - Uniform mixing
 - efficient agent distribution into servings
 - Short shelf life
 - rapid turnaround at retail, rapid consumption

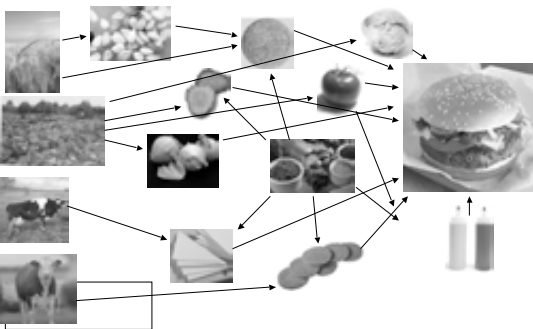
High Risk Factors

- Easy access
 - Ability to reach process at high risk points
 - Poorly supervised food production areas, processes
- Widely disseminated foods
 - Decreased chance of public health recognition, intervention

Additional Vulnerability, Risk Factors

- Serving size - sufficient agent delivery
- Consumption frequency
- Ability to disguise the contaminant
- High impact consumer = children, elderly
- Import from country of concern
- Lack of processing/preparation steps to inactivate, reduce agent

Supply Chain Complexity



NATIONAL CENTER FOR
FOOD PROTECTION AND DEFENSE
A HOMELAND SECURITY CENTER OF EXCELLENCE

Food Production and Distribution: Threats, Vulnerabilities and Global Issues

Jon Seltzer, Assistant Director NCFPD

Alabama Food Safety and Defense Conference
Montgomery, Alabama
May 13 - 14, 2008

Recent Food System Events



Early Warning

- February 20, 2007
 - Menu Foods receives first report of a food-related pet death
 - Three cats reported, two had access to the outdoors and may have ingested antifreeze, which can damage kidneys

Early Warning

- Alarms don't go off, company says. (Anecdotal data puts first reports back as far as December, 2006)
- February 27, 2007
 - Menu Foods starts testing reported tainted food on cats and dogs

Questions at This Time....

- What information did Menu Foods need?
- What else could Menu Foods have done?
- What would be different if it had been a human food with a similar complaint?

Questions at This Time....

- What risk management decisions can a company make with this level of information?

Pet Food Recall

- March 8, 2007
 - ChemNutra learns that wheat gluten it imported from China is among suspect ingredient, quarantines inventory
- March 12, 2007
 - Menu learns that nine cats in trials have died; verifies they ate Menu's foods

Pet Food Recall

- **March 16, 2007**
 - Menu recalls more than 60 million cans and pouches of wet food, manufactured between December 3 and March 6
- **March 17, 2007**
 - First report of tainted wheat gluten being identified as possible source of pet food contamination

Pet Food Recall

- **March 20, 2007**
 - FDA confirms 14 dead pets
- **March 23, 2007**
 - New York state lab says it found aminopterin, a rat poison, in samples of cat food from Menu

Deconstructing The Event

- **March 26, 2007**
 - FDA tells Cornell that another lab found melamine, Cornell confirms finding
- **March 30, 2007**
 - FDA issues 'import alert' and announces melamine is leading suspect

Deconstructing The Event

- Restricts wheat gluten from China's Xuzhou Anying Biologic Technology Development
- Hill's Pet Nutrition, Nestlé Purina PetCare and Del Monte Pet Products announce small recalls

Deconstructing The Event

- **April 2, 2007**
 - Chinese exporter (Xuzhou Anying Biologic) and U.S. Distributor (ChemNutra) of tainted wheat gluten revealed
 - ChemNutra recalls wheat gluten from 3 pet-food makers and 1 distributor, says no Xuzhou gluten went to human food production

Deconstructing The Event

- FDA stops imports from Xuzhou
- ChemNutra stated that it shipped the 791 metric tons of gluten to pet food facilities, no human food facilities

Deconstructing The Event

- April 5, 2007
 - FDA acknowledged that the wheat Gluten contamination could be intentional
- April 9, 2007
 - A suspect container of possibly contaminated wheat gluten (700 bags) arrived at the LA/LB Seaport

Deconstructing The Event

- April 10, 2007
 - Chinese government reported 1 dead and 202 people ill after consuming a breakfast cereal laced with rat poison
- April 18, 2007
 - Pet food recall expanded to include Natural Balance products (Pacoima, CA) containing rice protein laced with melamine

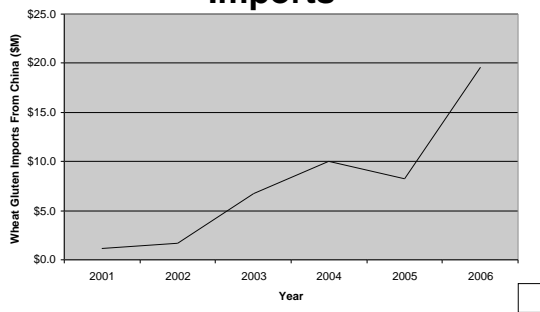
Deconstructing The Event

- April 19, 2007
 - Royal Canin and Hill's pet foods recalled in South Africa due to the potential of melamine in the wheat gluten ingredients
 - Wilbur-Ellis (grain importer) recalls Chinese sourced, contaminated rice protein (Binzhou Futian) that was shipped to 5 pet-food firms

Deconstructing The Event

- U.S. officials investigating reports that Binzhou Futian rice protein had been used in hog feed, but declined to specify where
- The California Department of Food and Agriculture placed American Hog Farm in Ceres, California under quarantine, after melamine was found in the urine of the hogs on the farm

Step Change In Chinese Imports



Questions at This Time....

- What is the impact of the change in implicated contaminant?
- What is the impact of the expansion to include human food system exposure?
- How does the potential for intentional contamination change the response?
- How could the trace-back have been accomplished faster?

Moving Forward

- April 21, 2007
 - Detained 700 bags of wheat gluten tested positive for melamine and seized
- April 24, 2007
 - FDA confirms melamine in feed given to hogs in California, New York, North Carolina, South Carolina, Utah, Missouri (chicken feed too) and possibly Ohio

Moving Forward

- FDA expands melamine testing of imported ingredients/finished products beyond wheat/rice gluten to cornmeal, corn gluten, rice bran & soy protein

Moving Forward

- April 26, 2007
 - Over 6,000 hogs quarantined on farms in California, New York, South Carolina, North Carolina, Utah, Kansas, Oklahoma and Ohio
 - USDA announced that the meat of 345 hogs that had eaten contaminated feed entered the U.S. food supply

Moving Forward

- April 30, 2007
 - FDA blocks all food and feed grade ingredients/products from China that are not sampled for contaminants

Moving Forward

- May 1, 2007
 - Indiana reports that contaminated pet food was added to feed for 30 broiler poultry and 8 breeder poultry farms in Indiana that have already gone into the human food chain

Moving Forward

- The feed was used in early February, affected breeders on voluntary hold, broilers already processed
- May 9, 2007
 - FDA/Dept of State investigation finds evidence of melamine at originating company in China

Moving Forward

- **May 10, 2007**
 - CBP initiates testing of all feed ingredients from Canada, creating feed supply problems in the border states

Moving Forward

- **May 15, 2007**
 - 56,000 swine cleared for processing without being individually tested after FDA/USDA risk assessment suggests "very low" risk to humans
- **May 17, 2007**
 - USDA allows 80,000 birds held on farms in Indiana to be released/processed

New Food Concerns

- **May 22, 2007**
 - Melamine detected in imported Asian catfish for human food (not health hazard)
- **May 24, 2007**
 - FDA warning on imported Chinese monkfish as actually puffer fish

New Food Concerns

- **May 30, 2007**
 - FDA announces two US-based animal feed manufacturers had been adulterating livestock feed and fish/shrimp feed with melamine, adding melamine to improve the binding properties of pelleted food

New Import Concerns

- **FDA: Throw Away Toothpaste Made in China**
 - Consumers warned of potentially tainted toothpaste from China
 - Suspect products may contain diethylene glycol, or DEG, used in antifreeze

New Import Concerns

- DEG found in Cooldent Fluoride, Cooldent Spearmint, Cooldent ICE
- FDA unaware of any poisoning from toothpaste in the United States

Other Import Concerns?



China shuts 180 food factories for using illegal chemicals
POSTED: 2:58 a.m. EDT, June 27, 2007

BEIJING, China (AP) -- China has closed 180 food factories after inspectors found industrial chemicals being used in products from candy to seafood, state media said Wednesday. The closures came amid a nationwide crackdown on shoddy and dangerous products launched in December that also uncovered use of recycled or expired food, the China Daily said. Formaldehyde, illegal dyes, and industrial wax were found being used to make candy, pickles, crackers and seafood, it said, citing Han Yi, an official with the General Administration of Quality Supervision, Inspection and Quarantine

Event Summary

- In 2006 imports of protein enhancement products from China surged
- In February, pet foods discovered to be contaminated with melamine
 - An estimated 30,000+ pets have become sick or died

Event Summary

- Contamination was apparently for economic gain, 'enhance' the apparent level of protein
- Until April, FDA/USDA stated that there was no evidence human food chain was impacted



Event Summary

- Human consumption confirmed on April 28, 2007
- FDA & USDA have stated that there is no significant risk to those who consumed melamine or cyanuric acid contaminated pork, poultry or fish products

Event Summary

- Extent of contaminated pet food use in feed is not fully known and, while the risk appears low, the extent and long term consequence of human exposure is not known

Event Summary

- Swine/poultry industry routinely use expired pet food in feed
 - Initial checks in mid April confirmed presence of melamine in livestock feed used in six states

Event Summary

- By early May 2007 it became evident that the contaminated pet food materials had spread into the feed of a wide variety of food animals:
 - Swine
 - Poultry
 - Farm Raised Fish

Event Summary

- By May it was clear that not all of the protein products shipped by the Chinese firms were as labeled:
 - Rice protein was actually wheat flour
 - Some of the wheat gluten was actually wheat flour!

Event Summary

- Late May the Chinese admitted that the firms involved had intentionally contaminated the products as acts of international economic fraud

Event Summary

- It is not known if China sold similar products to other foreign suppliers of food products to the U.S. market, such as Thai shrimp farmers
- This event demonstrates a potentially significant vulnerability that results from the global nature of our food and agriculture systems

Event Summary

- Primary issue is not the toxicity of the melamine, cyanuric acid, amilorine and amiloride contaminates
- Real issue is that adulterants found their way into our pet and human food supply chains and were not detected until there was morbidity and mortality in pets

Event Summary

- Global channels of food/feed ingredient movement into the U.S. are not consistently, adequately monitored

Event Summary

- Even if they were more closely monitored, in this case one would have had to be looking specifically for melamine to have detected it
- Actual extent of livestock feed applications for pet food products were not fully appreciated by some federal and state agencies

Event Summary

- Many stakeholders were unaware of the risk exposed by this event and the scale of the consequences across industry and government

Take Home Messages

- This was a very unsophisticated act, yet the consequences have been substantial and not yet fully understood
- Event such as this provide potential 'roadmaps', so we must address such newly identified vulnerabilities rapidly

Take Home Messages

- This event suggests that we are not fully prepared to effectively manage and rapidly mitigate the effects of a major food system contamination event

"Fighting terrorism is like being a goalkeeper. You can make a hundred brilliant saves but the one shot that people remember is the one that gets past you."
Paul Wilkinson, Daily Telegraph, London



NATIONAL CENTER FOR
FOOD PROTECTION AND DEFENSE
A HOMELAND SECURITY CENTER OF EXCELLENCE

Thank you!

