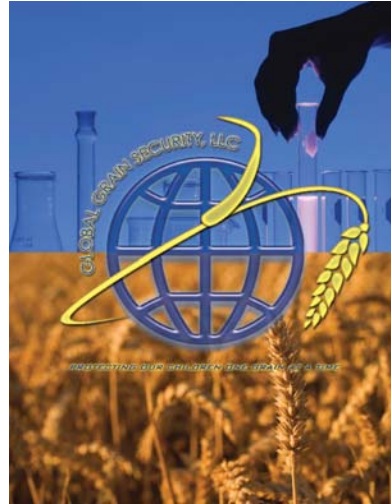


Hollison Technologies



Protecting the worlds food supply™

Manage contamination not recalls!

Anthony D. Bashall
EVP Technology & Corporate Development

Hollison Technologies – History

- Global Grain Security, LLC formed (GGS) October 2005
- GGS meets with US DHS in Washington, DC March 2006
- Initial patent filed October 2006
- Discussions with opinion leaders initiated June 2007
- GGS joins GEAPS January 2008

- GGS attends Food Safety Summit, Washington, DC March 2009
- Name change to reflect broader applicability March 2009
- Funding received from Owensboro Merging Ventures Fund March 2009
- Funding received from Angel sources June 2009 - present
- Funding awarded from State of Kentucky, KSTC June 2009
- Hollison Technologies website launched September 2009
- Hollison Technologies signs contract for software development September 2009
- Proof of concept verified by independent test lab October 2009
- Hollison Technologies website updated January 2010
- Hollison Technologies enters partnership agreements March 2010
- Hollison Technologies manufactures prototype collector April 2010
- Hollison Technologies occupies new facilities in Owensboro May 2010
- Hollison Technologies announces software availability May 2010

Hollison Technologies

- Company focused on providing breakthrough products and solutions for ensuring food safety and security. Hollison provides products and services for food protection by the detection of contaminants in the food supply chain including, but not limited to; farms, bulk storage facilities, commodity transportation, **food processing**, food distribution and ultimately point of consumption
 - Patent pending sampling technology to sample dry goods on a continuous basis in-field (out of lab) environments
 - Patent pending sampling technology to sample liquid / surfaces on a continuous basis in-field (out of lab) environments
 - Partnered with best-of-breed manufacturers for chemical, biological and radiological detection and identification
 - Proprietary secure web-based software for data management, reporting and visualization
 - Complete solution from collection and sample preparation through detection to data management

Food Contamination - Market

- Overall the US Center for Disease Control (CDC) estimates that the impact from food related illnesses are;
 - 76 million illnesses per year
 - 325,00 hospitalizations per year
 - 5,000 deaths per year
 - Economic impact of \$6.9B per year
- \$7B being spent annually on food safety
- \$1B being spent annually on pathogen detection

Impact

- Natural, Accidental or Intentional Contamination
 - Economic impact of \$1.24T (13% of GDP)
 - 2% of all jobs relate to agriculture
 - US exports of \$60B
- US Food Supply Chain Impact
 - 2.2 million US farms
 - 57,000 food processors
 - 164 import establishments
 - 1.2 million retail food facilities

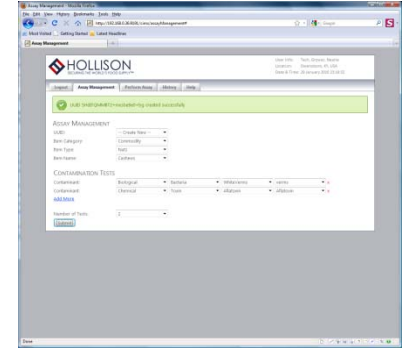
Reference USDA

The Problem

- Food contamination occurs throughout the food supply chain
- Food contamination occurs across entities
- No “contamination free” data across entities
- Many commodities & products are comingled
- Liability & responsibility with food manufacturer
- PTI does not address chain-of-custody across entities with contamination detection
- Current collection & sampling technologies are inadequate

Solutions Approach

Collect



Detect

Track



Food Chain

(The Problem)



Harvesting



Storage



Transportation



Intermediate processing



Final processing

Chain-of-custody
Across Entities

Food Chain

(The Solution)



Harvesting



Storage



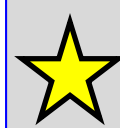
Transportation



Intermediate processing

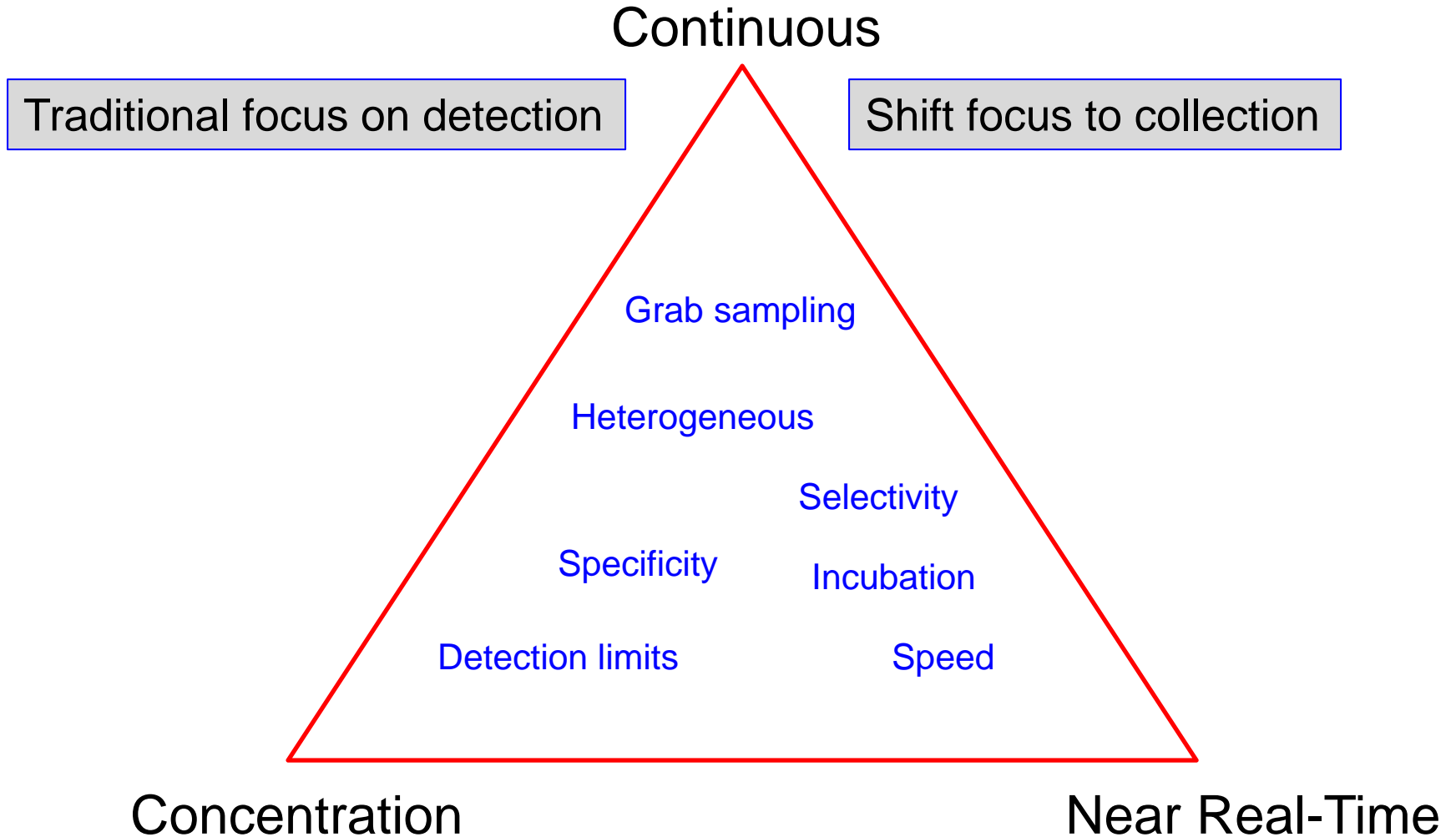


Final processing



Points of Contamination
Detection at Change of
Custody or Ownership
HACCPs within process

Collection + Sample Handling

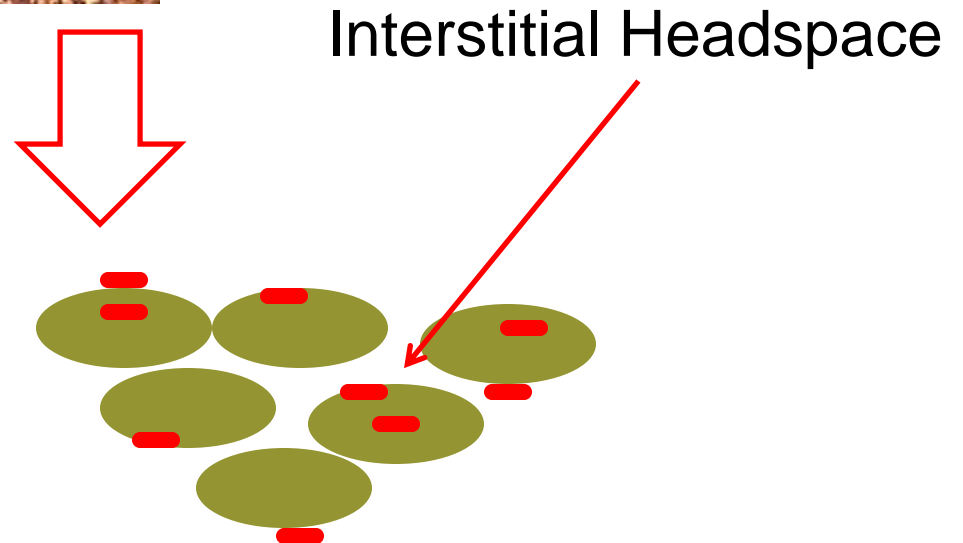


Microbiological Contamination

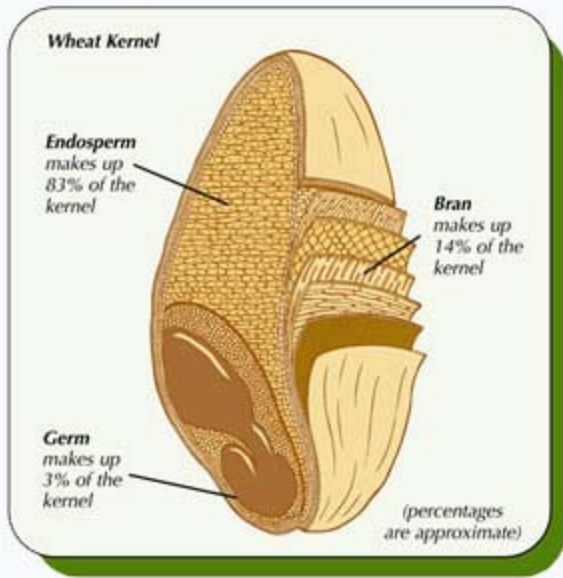


Surface based Contamination

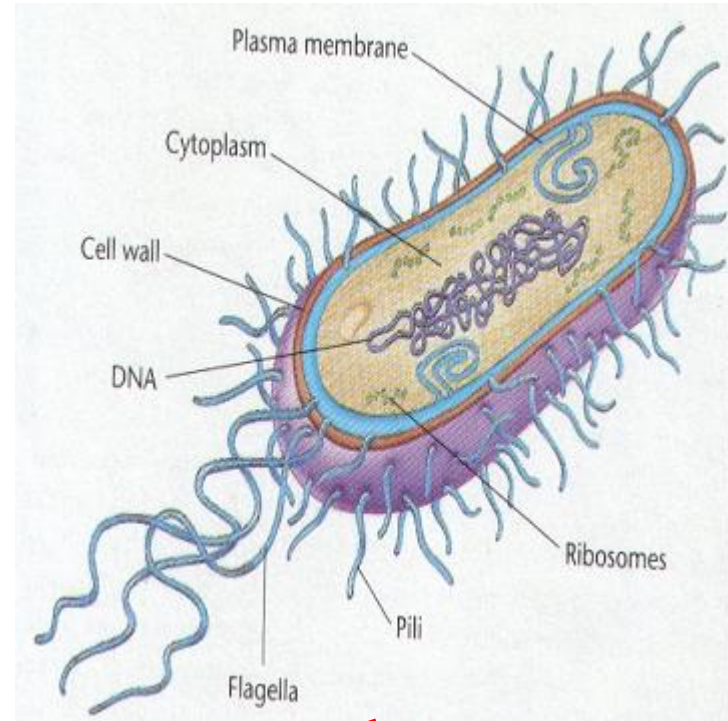
- Aspergillus
- E. Coli O157:H7
- Listeria L. monocytogenes
- Salmonella DT104



Microbiological Contamination



2-5mm

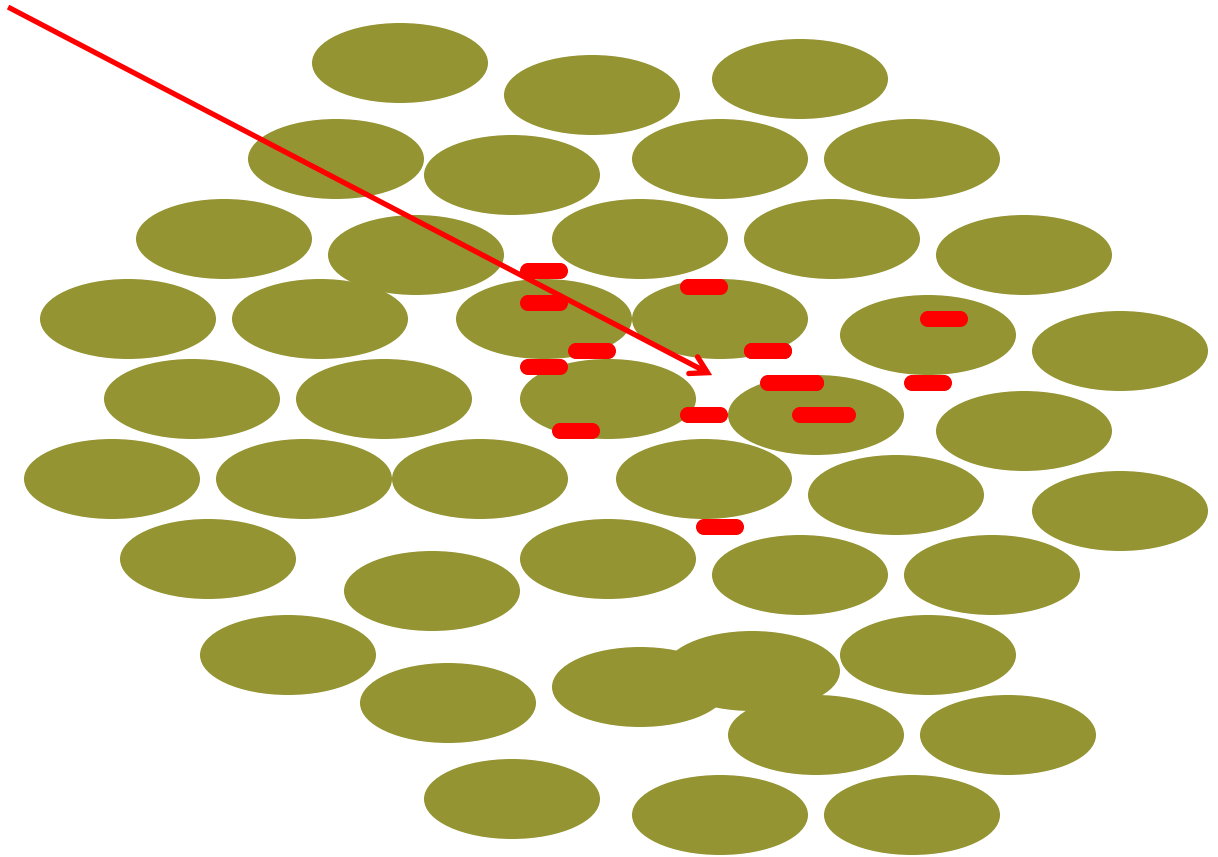


1-10um

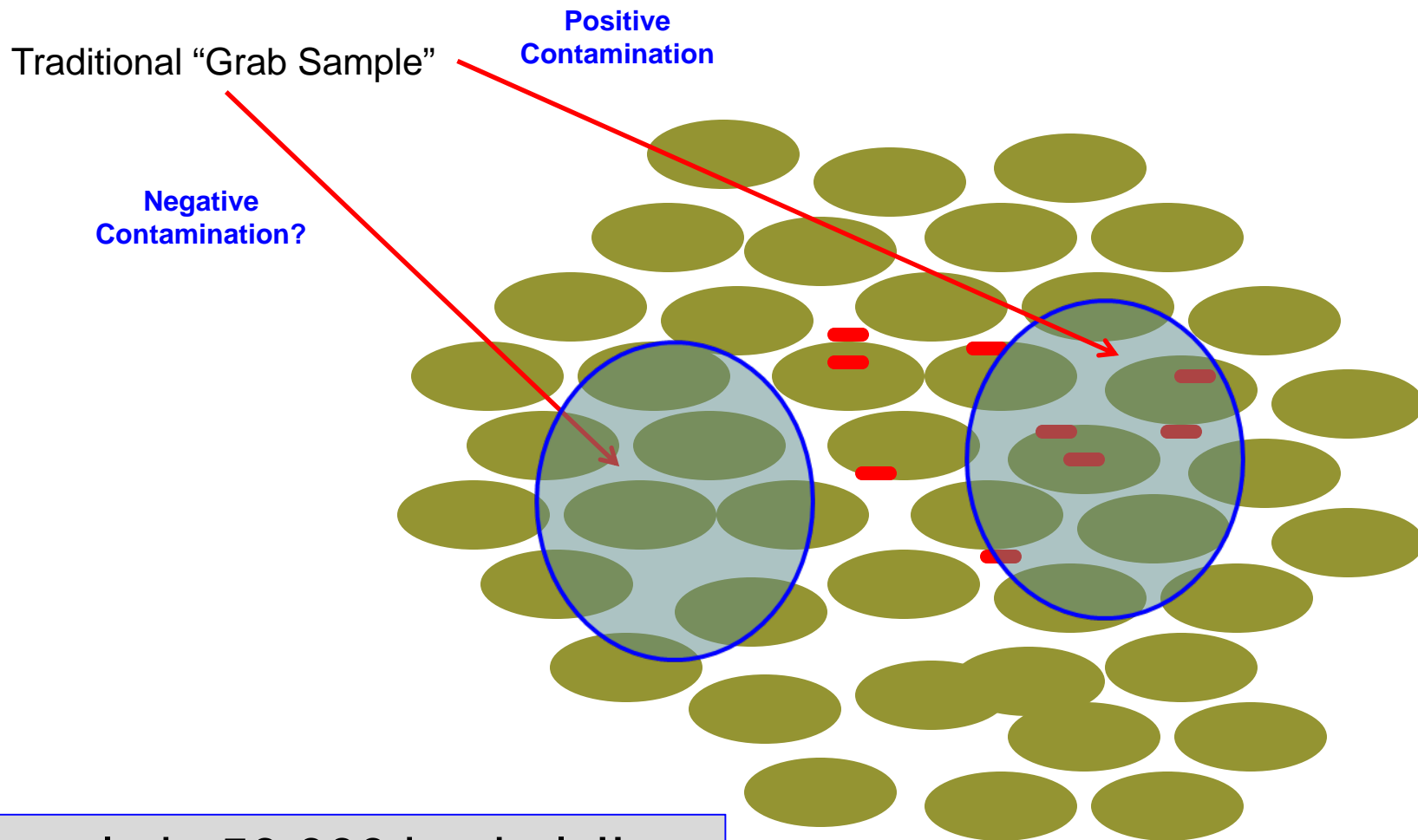


Non-Homogeneous Contamination

Localized “Pocket(s)” of Contamination

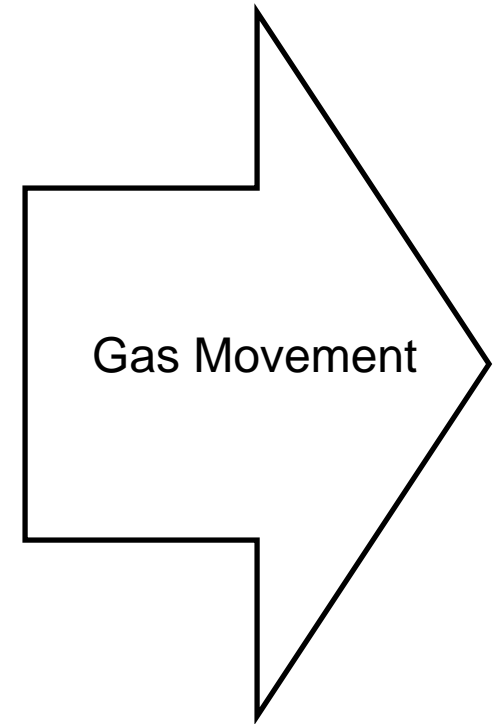
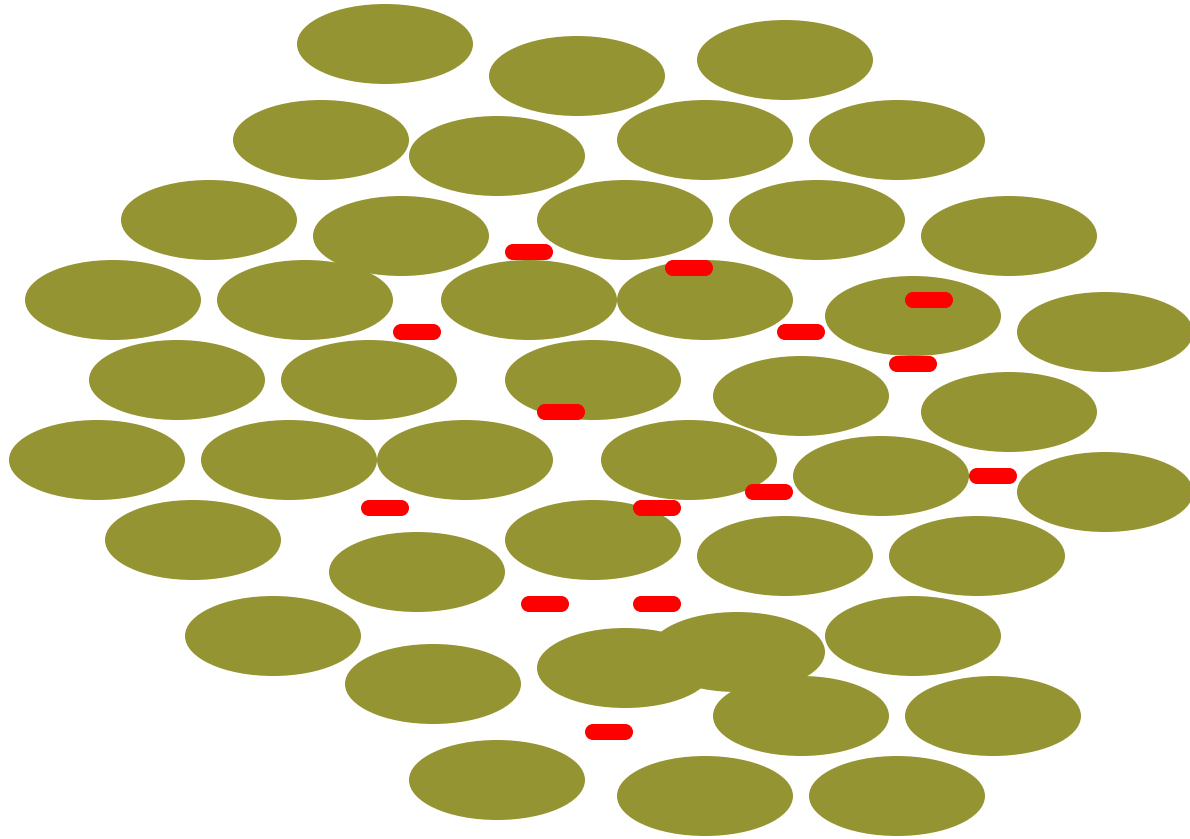


Grab Sampling



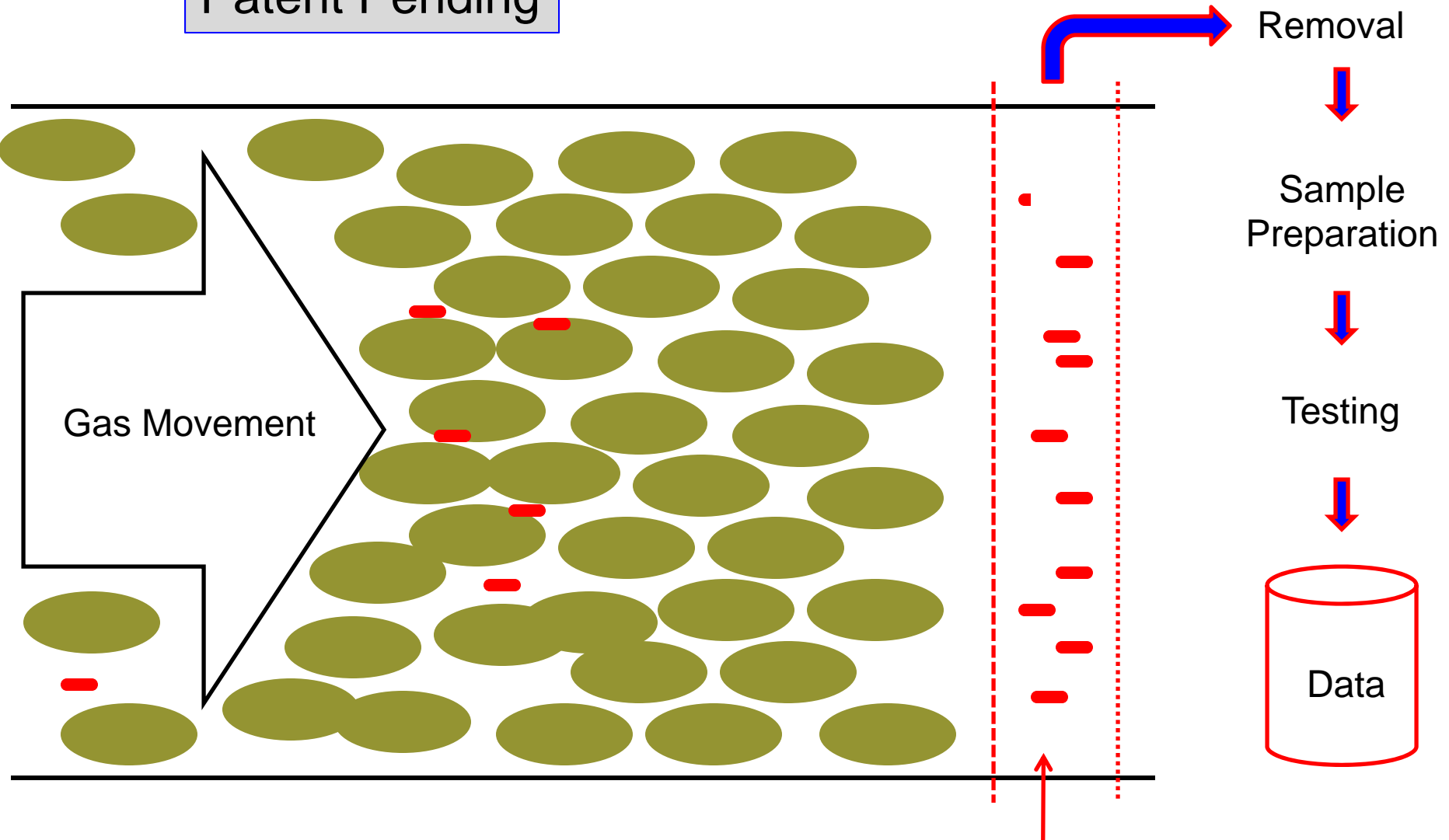
30lb sample in 50,000 bushels!!
1:100,000 Probability of detection!!

Continuous Sampling



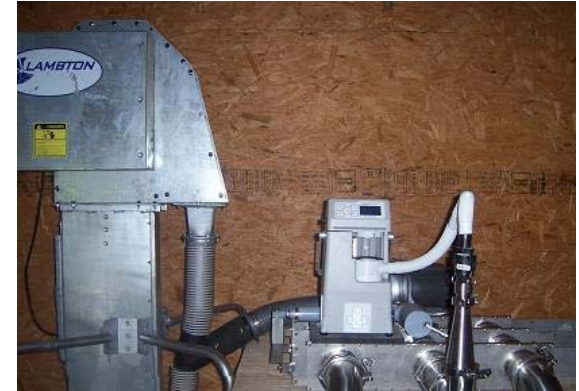
Contamination Sampling

Patent Pending



Dry Goods Collector Validation

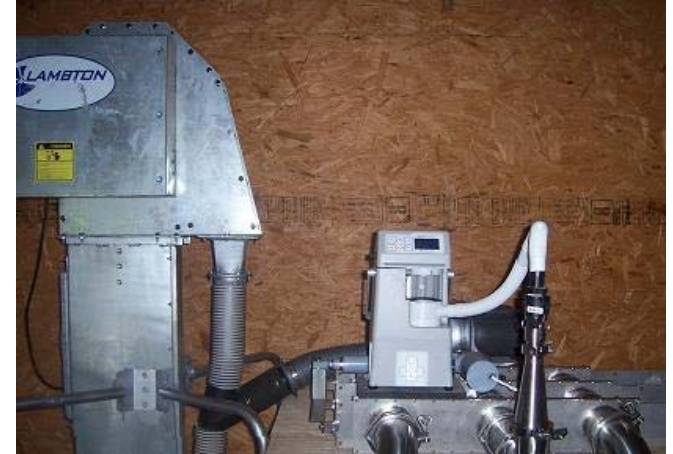
- Proof Of Concept
 - Grain spiked with Glo Germ
 - Collected 1-10um particles
 - Wetted cyclone sample preparation
 - Positive detection - fluorescence
- Validation
 - Grain inoculated with E. coli, Listeria, Salmonella
 - Collected 1-10um particles
 - Wetted cyclone sample preparation
 - Positive detection - PCR



Patent Pending

Core Technology

- Current
 - Grab samples followed at lab by;
 - Biological identification in 72hrs
 - Chemical identification in 48 hrs
 - Toxin identification in 48 hrs
- Paradigm Shift enabled by Hollison
 - Continuous sampling followed by;
 - Biological identification in <30 mins
 - Chemical identification in <5 mins
 - Toxin identification in <30 mins



Time-to-answer = near real-time detection on site

Applicability

- Verification of “contamination free” chain-of-custody within;
 - Grain facilities (farms, commercial grain elevators & end users)
 - Bulk handling facilities (co-mingling)
 - Food processors
 - Food services
 - Cargo ships
 - Transportation providers
- Addresses the problem associated with co-mingling of agricultural products;
 - Food quality
 - Value retention
 - Regulatory compliance
 - Liability protection

The Process – Hollison Technologies

- 
- **Commodities** ★
 - Grain
 - Peanuts
 - Pepper
 - Coffee / Tea
 - Rice
 - Vegetables
 - Meat
 - Poultry
 - Fish
 - **Contaminants**
 - Salmonella
 - E-coli ★
 - Listeria
 - Aspergillus
 - Pesticides
 - Fumigants
 - Radiation
 - Toxins

The Solution – Hollison Technologies

Manage Contamination, Not Recalls™

- Collection & Sample Preparation
 - Dry Goods & Solids
 - Patent Pending Process
 - Liquids
 - Partnerships
 - Surfaces
 - Partnerships
- Contamination Detection
 - Partnerships for chemical, biological & radiological detection
- Data Storage
 - Proprietary Software
 - Collection
 - Storage
 - Reporting
 - Visualization

Total Integrated Solution

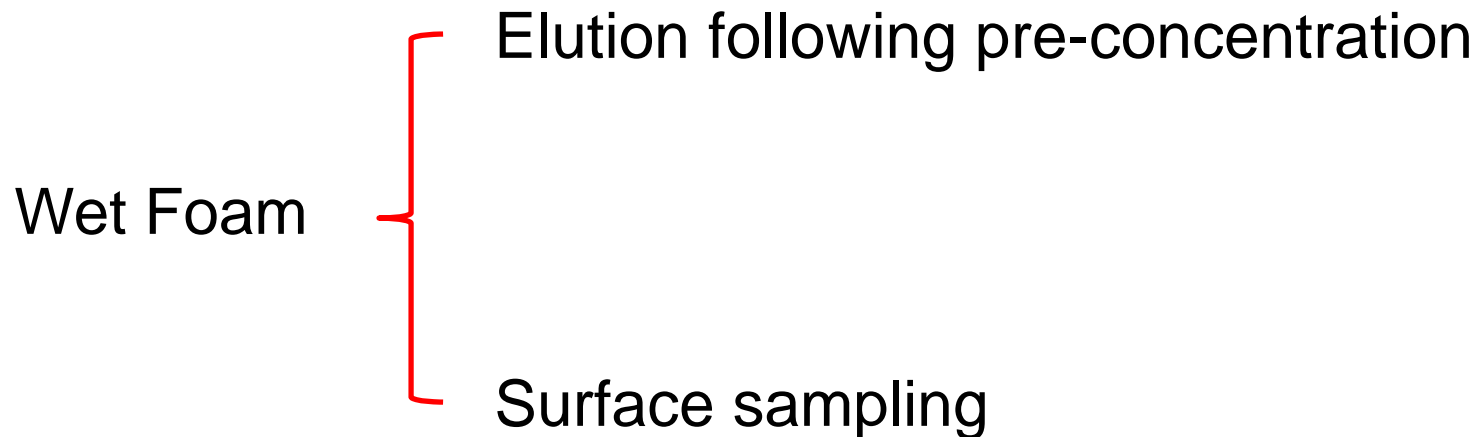
Core Technology

- Patent Pending; “Method & Systems for Ensuring the safety of grain stores. USPTO 11/553, 163
 - Aero-based sampling technology
 - Capture media discrimination
 - Compatibility with aerosol based detection systems
 - PCR based
 - CANARY based
 - ELISA based
 - Gas chromatography
 - Electrochemical detection
 - IMS/DMS detection
 - FTIR detection
- Biological**
- Chemical**
- NaI
 - Plastic scintillators
 - GM based
- Radiological**

Overall Collection Strategy

- Dry goods (grain, pepper, nuts, cereal, feeds...)
- Liquids (washings, beverages, ingredients...)
- Surfaces (produce, meat, poultry...)
- Surfaces (cleaning validation, process...)

Wet Foam
TRIS
Triton X100

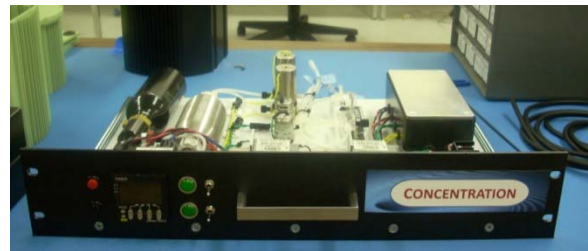


Advanced Collection / Sampling

Pre-concentration —————→ Wet Foam Elution
(Concentration factor $10^3 - 10^6$)



Liquid-to-Liquid
Concentration &
Automated
Sample
Preparation
(Patents Pending)



Hollison Technologies - Roadmap

All isotopes

Contaminant

Fumigants
Volatiles
Aflatoxin

Mycotoxins
Pesticides
Herbicides

Melamine

E. coli
Salmonella
Listeria

Aspergillus

GMO



Matrix

Dry Goods
•Grains
•Nuts
•Pepper
•Rice
•Tea
•Coffee
•Cereal

Liquids
•Washings
•Water
•Beverages

Surfaces
•Cleaning validation

Surfaces
•Meat
•Poultry
•Swine

Surfaces
•Produce

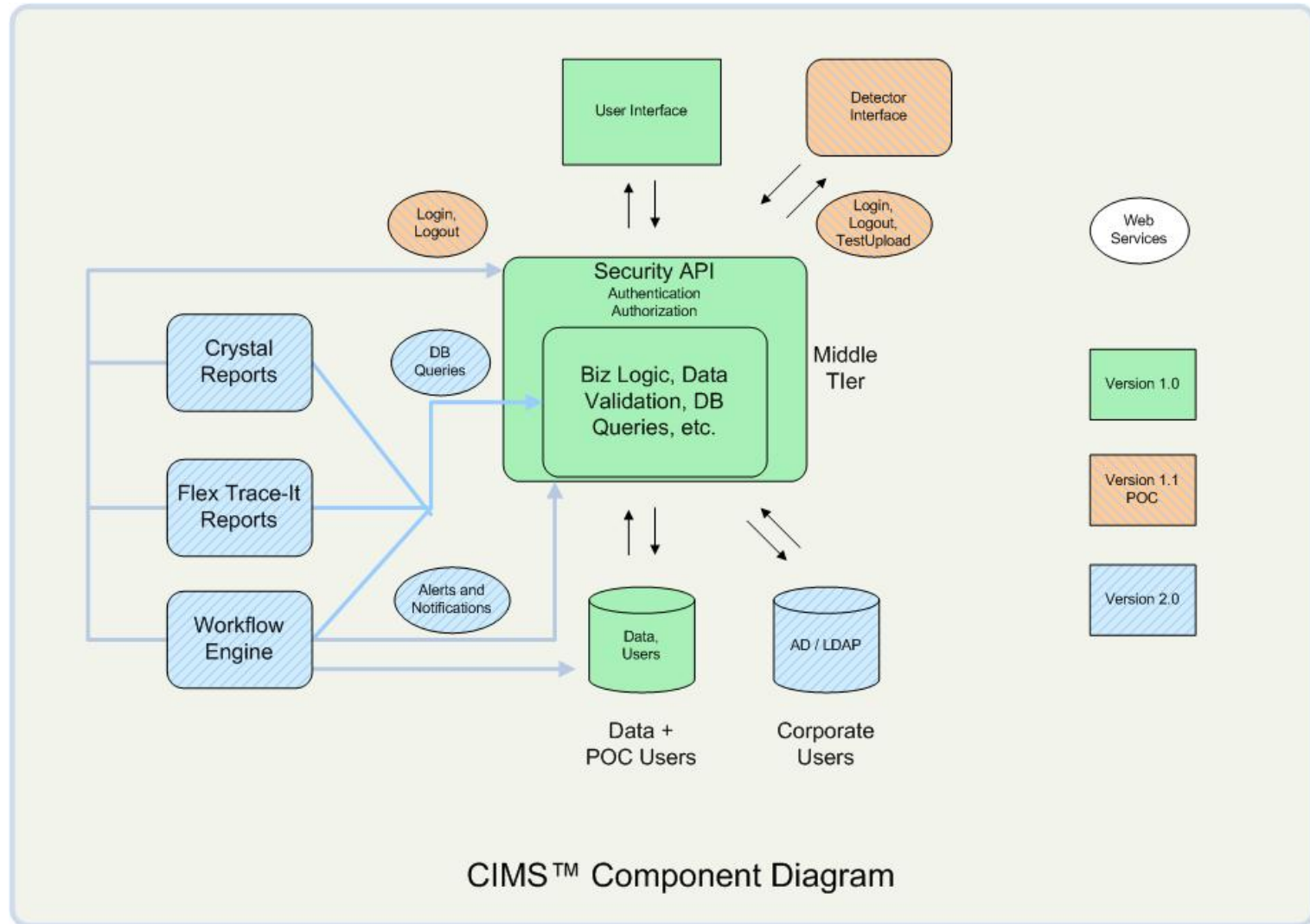
CIMS™ Software Specification

- Contamination Information Management System
 - Secure SaaS hosted application
 - Database driven – Enterprise ORACLE®
 - 256 bit SSL/TLS
 - EV-SSL certificates
 - Strong passwords
 - Multi-factor authentication
 - AD/LDAP user management
 - Web Service interface (SAP®)Chain of custody
 - Analytical data

Contamination Information Management System – CIMS™

- Graphical Trace with Chain-of-Custody
- Analytical data entry (upload)
- Existing data import (web service)
- Permission based log-in & viewing
- Information availability
 - Client log-in
 - Contamination alerts
 - RSS feed
 - CAP
 - Mobile capability
 - Push notification

CIMS™ Software Architecture



CIMS™

Assay Management - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://192.168.0.36:9191/cims/assayManagement#

Assay Management

HOLLISON
SECURING THE WORLD'S FOOD SUPPLY™

User Info: Tech, Grower, Nestle
Location: Owensboro, KY, USA
Date & Time: 29 January 2010 23:19:32

Logout Assay Management Perform Assay History Help

ASSAY MANAGEMENT

UUID: -- Create New --

Item Category: Commodity

Item Type: Nuts

Item Name: Cashews

CONTAMINATION TESTS

Contaminant:	Biological	Bacteria	WhiteVerms	verms	x
Contaminant:	Chemical	Toxin	Aflatoxin	Aflatoxin	x

[Add More](#)

Number of Tests: 2

Submit

Done

CIMS™

The screenshot shows a web browser window titled "Assay Management - Mozilla Firefox" with the URL <http://192.168.0.36:9191/cims/assayManagement#>. The page header features the HOLLISON logo with the tagline "SECURING THE WORLD'S FOOD SUPPLY™" and user information: "User Info: Tech, Grower, Nestle", "Location: Owensboro, KY, USA", and "Date & Time: 29 January 2010 23:19:32". A navigation menu includes "Logout", "Assay Management", "Perform Assay", "History", and "Help". A green success message states: "UUID SHdI7QMMBT2+mxsbeBe0+bg created successfully". The "ASSAY MANAGEMENT" section contains dropdown menus for "UUID:" (set to "-- Create New --"), "Item Category:" (set to "Commodity"), "Item Type:" (set to "Nuts"), and "Item Name:" (set to "Cashews"). The "CONTAMINATION TESTS" section includes two rows of dropdown menus: the first row has "Biological", "Bacteria", "WhiteVerms", and "verms" (with a red 'x'); the second row has "Chemical", "Toxin", "Aflatoxin", and "Aflatoxin" (with a red 'x'). Below this is an "Add More" link and a "Number of Tests:" dropdown set to "2". A "Submit" button is located at the bottom of the form. The browser's status bar at the bottom shows "Done".

CIMS™

The screenshot shows a Mozilla Firefox browser window titled "Perform Assay - Mozilla Firefox". The address bar displays the URL "http://192.168.0.36:9191/cims/performAssay". The browser's navigation bar includes "Most Visited", "Getting Started", and "Latest Headlines".

The main content area features the HOLLISON logo with the tagline "SECURING THE WORLD'S FOOD SUPPLY™" on the left. On the right, user information is displayed: "User Info: Tech, Grower, Nestle", "Location: Owensboro, KY, USA", and "Date & Time: 29 January 2010 23:19:32".

Below the header is a navigation menu with tabs for "Logout", "Assay Management", "Perform Assay" (which is active), "History", and "Help".

A green notification box at the top of the main content area contains a checkmark icon and the text "Test performed successfully".

The "PERFORM ASSAY" section contains the following form fields:

- UUID: SHdI7QMMBT2+mxst
- TestID: T+/PnZWWsTaKEu7CC
- Item Category: Commodity
- Item Type: Nuts
- Item Name: Cashews
- Notes: Tested by Exogen

The "CONTAMINANT TESTS" section includes a table with the following data:

Contaminant #	Category	Sub-category	Specific Contaminant	Value	Unit	Result
Contaminant #1	Biological	Bacteria	WhiteVerms	verms		<input checked="" type="radio"/> Positive <input type="radio"/> Negative
Contaminant #2	Chemical	Toxin	Aflatoxin	Aflatoxin	10	ppb

A "Submit" button is located below the table.

The browser's status bar at the bottom shows "Done" and various system icons.

CIMS™

History - Mozilla Firefox
 http://192.168.0.36:9191/cims/history

HOLLISON
 SECURING THE WORLD'S FOOD SUPPLY™

User Info: Tech, Grower, Nestle
 Location: Owensboro, KY, USA
 Date & Time: 29 January 2010 23:19:32

Logout Assay Management Perform Assay **History** Help

HISTORY

UUID:
 Item Category: --All--
 Item Type: --All--
 Item Name: --All--
 Start Date: 01/22/2010
 End Date: 01/29/2010

Contaminant Category: --All--
 Contaminant Type: --All--
 Contaminant Name: --All--
 Contaminant Identity: --All--
 Test Result: --All--

Re-Test	UUID	Test ID	Item Category	Item Type	Item Name	Cont. Category	Cont. Type	Cont. Name	Cont. Identity	Test Result	Test Date&Time
<input type="checkbox"/>	STzuRDFeNQfG2exDeLz2YA	T81+iskPQu8fu+HTN9J1w	Produce	Fruit	Apples	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-22 10:29:45.943
<input type="checkbox"/>	STzuRDFeNQfG2exDeLz2YA	TZNUID/X6QZmt/CR15Rd5/Q	Produce	Fruit	Apples	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-22 10:29:45.943
<input type="checkbox"/>	S8LzV40/+TMcf9FD5IW6hQ	Ts9QqcrL5uyfCbCXEGh4A	Produce	Roots	Potatoes	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 11:45:42.797
<input type="checkbox"/>	5e09QU5mx5dmb4A5MmbgBXQ	TZxioRLQsKFVfQ839Qw8Q	Produce	Vegetables	Brussels Sprouts	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 11:50:02.97
<input type="checkbox"/>	5e09QU5mx5dmb4A5MmbgBXQ	TZxioRLQsKFVfQ839Qw8Q	Produce	Vegetables	Brussels Sprouts	Chemical	Toxin	Aflatoxin	Aflatoxin	Negative	2010-01-25 11:50:02.97
<input type="checkbox"/>	SolyyYTNMqyCCwSjAwHivg	TsNZ2gdt5kyQ6GW0R3c2IA	Commodity	Nuts	Cashews	Chemical	Toxin	Aflatoxin	Aflatoxin	Negative	2010-01-25 18:09:33.105
<input type="checkbox"/>	SolyyYTNMqyCCwSjAwHivg	TsNZ2gdt5kyQ6GW0R3c2IA	Commodity	Nuts	Cashews	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 18:09:33.105
<input type="checkbox"/>	SolyyYTNMqyCCwSjAwHivg	TaJvVw3h7T22vDg6N9ejd+Q	Commodity	Nuts	Cashews	Chemical	Toxin	Aflatoxin	Aflatoxin	Negative	2010-01-25 18:09:33.105
<input type="checkbox"/>	SolyyYTNMqyCCwSjAwHivg	TaJvVw3h7T22vDg6N9ejd+Q	Commodity	Nuts	Cashews	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 18:09:33.105
<input type="checkbox"/>	SEIe7DvbtQeGbc23aa5ufw	Tfz2BifRnm7qG1WicFdw	Produce	Roots	Potatoes	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 18:36:38.527
<input type="checkbox"/>	SEIe7DvbtQeGbc23aa5ufw	Tfz2BifRnm7qG1WicFdw	Produce	Roots	Potatoes	Chemical	Toxin	Aflatoxin	Aflatoxin	Negative	2010-01-25 18:36:38.527
<input type="checkbox"/>	SEIe7DvbtQeGbc23aa5ufw	Tfz2BifRnm7qG1WicFdw	Produce	Roots	Potatoes	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 18:36:38.527
<input type="checkbox"/>	SP207V7jQdSok8uZE2CCBw	TYNAnkOBSI6tshY75L7GWG	Commodity	Grain	Corn	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 21:08:43.0
<input type="checkbox"/>	SP207V7jQdSok8uZE2CCBw	TYNAnkOBSI6tshY75L7GWG	Commodity	Grain	Corn	Chemical	Toxin	Aflatoxin	Aflatoxin	Negative	2010-01-25 21:08:43.0
<input type="checkbox"/>	SP207V7jQdSok8uZE2CCBw	TYNAnkOBSI6tshY75L7GWG	Commodity	Grain	Corn	Biological	Bacteria	WhiteVerms	verms	Negative	2010-01-25 21:08:43.0

Done

CIMS™ Graphical Trace



Manage Contamination not recalls!

Collect

Detect



Track

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