Report of the June-September, 2005 National Beef Quality Audit: A New Benchmark for the U. S. Beef Industry

Gary C. Smith, J.W. Savell, J.B. Morgan and T.E. Lawrence
Colorado State University (Fort Collins, CO); Texas A&M University (College Station, TX); Oklahoma State University (Stillwater, OK) and West Texas A&M University, (Canyon, TX)

"In truth, it is the value of our product to our consumers that determines what beef is worth—and our profitability. The National Beef Quality Audit provides valuable information to industry stakeholders regarding the monetary consequences of not truly delivering the quality and value to our consumers" (Terry Stokes, NCBA). "The forces shaping the beef industry in the 21st century (Daryl Tatum, Colorado State University) are: (a) continued consolidation in all beef sectors; (b) loss of export markets; (c) greater competition from other countries in the global market; (d) development and implementation of traceability/data-management systems, and; (e) growth of markets for natural and organic food products." "Beef in the US is now being sold based upon USDA grades, USDA brands, and industry brands; tremendous growth has occurred in the last ten years in USDA certified brands and USDA process verified brands, causing progressively greater emphasis on verifying marketing claims and on authenticity management for processes and products" (Cara Gerken, IMI Global, Inc.)." "Tracking cattle from the ranch to the packer is essential because export markets will require it, Wal-Mart and McDonald's want it, and producers can benefit from it" (John Paterson, Montana State University). "A partnership for quality (PFQ) can be formed between a beef finishing/ harvesting company and progressive producers who are strongly focused on the production of a consistent, high quality, consumer-driven product, with the strictest standards for food safety, environmental stewardship, economic sustainability and animal welfare. A PFQ makes possible PFQ Program Incentives for genetics, vaccination, weaning, seasonality, natural (hormone/antibiotic constraints) and carcass characteristics" (Mike Smith, Harris Ranch Beef). "Involvement in alliances allows beef supply-chain focus upon today's and tomorrow's targets—(a) a safe beef supply, (b) electronic IAID with age records, (c) balance in production performance and carcass merit, (d) management based upon individuals rather than on pen/lot averages, (e) avoidance of 'out cattle' (dark cutters, advanced maturity, etc.), (f) control of carcass weight (target=600 to 949 lb), (g) production of High Select or better, and Yield Grade 2 or better, carcasses with ribeye areas of 10.0 to 15.9 sq in, (h) adoption of instrument grading, and (i) tenderness testing to avoid tough beef" (Glen Dolezal, Cargill Meat Solutions). "Major trends and opportunities in the US beef industry include: (1) Globalization, and thus increased competition. (2) Retail and foodservice consolidation. (3) Coordinated production systems. (4) Increased product branding and value differentiation. (5) Accelerated development of new consumer-friendly and convenience-orientated beef products" (Randy Blach, Cattle·FAX).

"The National Beef Quality Audits provide: (1) A snapshot of the industry's current 'Quality Status.' (b) A 'Benchmarking Tool' for the industry's quality improvement strategy. (c) A 'Driver' for the industry's Beef Quality Assurance, Producer Education Programs" (Ran Smith, Smith Farms, Chairman of BQA Advisory Board). "The National Beef Quality Audits of 1991, 1995 and 2000 have provided

valuable industry benchmarks for use by beef industry stakeholders, and identified areas on which to place emphasis in local, state and national Beef Quality Assurance endeavors" (Gary C. Smith, Colorado State University). "Previous National Beef Quality Audits have identified Strategies, Tactics and Goals as vision directives for those in the production sector who wish to be more competitive and find marketing options—now or in the future, in domestic and/or international venues" (Tom Field, Colorado State University). "A panel of industry professionals assessed beef-industry progress in achieving the twelve 'Goals' identified by the National Beef Quality Audit—2000; individually, grades as low as D-plus (develop and implement electronic cattle identification) and as high as B-plus (eliminate injection-site lesions; 100% of seedstock producers have genetic data) were assigned, and the overall average grade for the beef industry was B-minus" (Clint Peck, Beef Magazine).

Based on questionnaires returned by those in the seedstock generation, cow/calf production, stocking/backgrounding and feedlot finishing sectors, the "Top Ten Greatest Quality Challenges," in NBQA—2005, ranked according to aggregated responses by those in all four production sectors were: (1st) Insufficient Marbling & Low Quality Grades; (2nd) Lack Of Uniformity In Cattle; (3rd) Inadequate Tenderness Of Beef; (4th) Yield Grades Too High; (5th-Tie) Low Cutability; (5th-Tie) Carcass Weights Too Heavy; (7th) Injection-Site Lesions; (8th) Inadequate Flavor; (9th) Inadequate Muscling, and; (10th) Excess Fat Cover (Deb Roeber, Oklahoma State University). Aggregated responses by those in all four production sectors revealed that 26.5%, 55.4% and 18.1% believed that past NBQAs had "strong," "moderate" or "weak" impact, respectively, on "changes made since 1991."

Questionnaires returned by packers revealed that: (a) 92.1% of their carcasses weighed 600 to 1,000 lb; (b) 66.2% of their carcasses graded Prime or Choice; (c) 86.5% of their carcasses were of Yield Grades 1, 2 plus 3; (d) Incidences of "calloused ribeye," "dark cutter" and "blood splash" were 0.3%, 1.5% and 1.7%, respectively; (e) 31.5% of their purchased harvest-cattle were individually identified; (f) the average number of branded-beef programs marketed by these packers was 5.3, with 37%, 62%, 48% and 42% of those programs having specifications for breed, marbling, hide color and Yield Grade, respectively, and; (g) percentages of packers using specific food-safety interventions of hide-on carcass washing, steam pasteurization of carcasses, hot (>165°F) water carcass washing, pre-evisceration carcass washing, steam vacuuming of carcasses, and organic-acid rinsing/washing of carcasses were 16.7, 16.7, 66.7, 83.3, 100.0 and 100.0, respectively (Deb Roeber, Oklahoma State University). The "Top Five Greatest Quality Challenges," in NBQA-2005, identified by packers were: (1st) Reduced Grade & Tenderness Due To Use Of Implants; (2nd) Lack Of Uniformity In Live Cattle; (3rd-Tie) Carcass Weights Too Heavy; (3rd-Tie) Yield Grades Too High; (5th-Tie) Presence Of Bruises On Carcasses, and; (5th-Tie) Hide Damage Due To Hot-Iron Brands. Among packers, 33%, 67%, and none (0.0%) believed that past NBQAs had "strong," "moderate" or "weak" impact, respectively, on "changes made since 1991."

Based on questionnaires returned by those in the purveyor, restaurateur and supermarket operator sectors, "Special Concerns/Desires Of Customers/Consumers" were: (1st) *E. coli* O157:H7; (2nd) Hormone Residues; (3rd) Desire For "Natural" Products; (4th) Antibiotic Residues; (5th) Desire For Traceback; (6th) Concerns About Animal Welfare; (7th) *Salmonella*; (8th) *Listeria monocytogenes*; (9th) Desire For "Organic" Products; (10th) Price; (11th) Concerns About The Environment, and; (12th) BSE (Deb Roeber, Oklahoma State University). The "Top Ten Greatest Quality Challenges," in NCBA—2005, ranked according to aggregated responses by those in the three end-user sectors were; (1st) Insufficient Marbling; (2nd) Cut Weights Too Heavy; (3rd)

Lack Of Uniformity In Cuts; (4th) Inadequate Tenderness; (5th) Excess Fat Cover; (6th) Inadequate Juiciness; (7th) Inadequate Flavor; (8th) Inadequate Overall Palatability; (9th) Low Cutability, and; (10th) Too Large Ribeyes. Among end-users, 15%, 85% and none (0.0%) believed that past NBQAs had "strong," "moderate" or "weak" impact, respectively, on "changes made since 1991."

Brad Morgan (Oklahoma State University) reported results of a US Meat Case Benchmark Study which determined that: (1) 68% of the average self-service meat case was comprised of "fresh" meat items; fresh beef (29%), chicken (16%) and pork (14%) had the highest proportions of meat department case footage. (2) 43% of fresh beef cut packages and 34% of ground beef packages had cooking instructions on the package; 9% of all fresh beef packages had nutrition labels. (3) Of the 87% of all fresh beef packages (13% was as offals, ingredients, miscellaneous), 43 percentage points (pp) was steaks, 30 pp was ground and 14 pp was roasts. (4) 3% of beef packages were "value added" compared to 14%, 10% and 7% for chicken, pork and turkey, respectively. (5) 1.5% of beef packages were "Natural" or "Organic," compared to 6.5% for chicken. (6) 82% of beef steak packages, and 93% of beef roast packages, were "boneless." (7) 62%, 21%, 6% and 10% of ground beef packages were designated by leanness percentage (e.g., 85% lean), by cut source (e.g., ground round), by both leanness percentage and cut source, and as just "ground beef" with no designation/source, respectively. (8) Beef had the lowest case-ready penetration at 27%; pork, chicken and turkey had 37%, 83% and 85%, respectively, case-ready penetration. (9) 46%, 56% and 20% of all steak, roast and ground beef items (SKUs), respectively, were out-of-stock (00S); for all three kinds of fresh beef products, case-ready products were less likely to be OOS than store-wrapped products.

Face-To-Face Interviews of representatives of six government agencies (FSIS, AMS, GIPSA, FAS, APHIS, FDA/CVM) and representatives of eight trade organizations (AMI, USMEF, FMI, NAMP, NRA, SMA, NMA, NBCA) identified the following "Quality Defects/Challenges": (1st) Lack Of Mandatory Traceability, ID System And NAIS Compliance; (2nd-Tie) Product Inconsistency; (2nd-Tie) Food Safety: Pathogens/Bacteria/EHEC/*Salmonella*/*Listeria monocytogenes*; (4th-Tie) BSE; (4th-Tie) Growing Concern About Humane Handling, Animal Welfare/Husbandry, And The Environment; (6th-Tie) Inadequate Tenderness/Palatability, & Too Low Quality Grade; (6th-Tie) Appropriate SRM Removal/Disposal & Lack Of 4-D Animal Disposal; (8th-Tie) Growing Concern About Chemical Residues; (8th-Tie) Carcass/Cut Weights Too Heavy And Inconsistent; (10th-Tie) Shelf-Life; (10th-Tie) Lack Of Age/Source Verified Cattle; (10th-Tie) Growing Concern About Antimicrobial Resistance; (10th-Tie) Poor Meat Color And pH Variation In Ground Beef And Beef Trimmings, and; (10th-Tie) Susceptibility To Foreign Animal Disease, Agroterrorism And Bioterrorism (Keith E. Belk, Colorado State University).

Martin E. O'Connor (Standardization Branch, AMS-USDA) reported that, of all beef carcasses officially graded by AMS-USDA (not all of the total carcass population), percentages of Prime, Choice, Select and Standard were 5%, 79%, 15% and 0.7%, respectively, in 1975 and 3%, 57.5%, 39% and 0.4%, respectively, in 2004. Percentages *per se* of carcasses officially graded as Prime or Choice have decreased over time—from 1975 to 2004. However, in 1975 only about 30% of the carcasses that would have qualified for Select—had they been officially stamped—were actually graded Select (then named "Good")—the remainder were sold ungraded (as "No Rolls").

Once "Good" was changed to "Select," a market developed for beef of that grade and, now, almost all beef qualifying for Select is officially graded as such. If percentages of carcasses qualifying for Prime or Choice in the two index

years are adjusted to account for the fact that the numerators are not equivalent (use of "all carcasses officially graded" as numerators, to determine percentages, results in an apples vs. oranges contrast in 1975 vs. 2004), the apparent differences of a 2 percentage point (pp) decline in Prime and a 21.5 pp decline in Choice, from 1975 to 2004, become 1 pp in Prime and 6.2 pp in Choice. Martin E. O'Connor (Standardization Branch, AMS, USDA) also reported that of all beef carcasses officially graded by AMS-USDA, percentages of Yield Grades 1, 2, 3, 4 and 5 were 2%, 31%, 64%, 3% and 0.2%, respectively, in 1975 and 10%, 42%, 41%, 7% and 0.3%, respectively, in 2004. Again though, not all carcasses are officially assigned Yield Grades so the meaning of such comparisons is unclear. For example, AMS-USDA performed a "consist study," covering parts of 1973 and 1974, in which the percentages (based upon grading a random population of carcasses) of Yield Grades 1, 2, 3, 4 and 5 were 0.4%, 26%, 43%, 21% and 6%, respectively.

John Scanga (Colorado State University) presented results of carcass data contributed by cooperating packing companies, which demonstrated that from 1995 to 2005 YTD: (a) Average hot carcass weight increased from 740, to 749 lb; (b) Average number of branded-beef programs increased from 1.33, to 6.25; (c) Average number of "Angus" programs increased from 0.67, to 3.00; (d) Average number of grade-based, but not Angus-based, programs increased from 0.33, to 1.25; (e) Average number of "Natural"/"Grass-Fed" programs increased from 0.50, to 2.25; (f) Percentage of harvest cattle purchased on a "grid" increased from 15%, to 34%; (g) Percentage of harvest cattle purchased "in the beef" increased from 20%, to 26%; (h) Percentage of harvest cattle purchased as "source verified" increased from 0.4%, to 1.5%; (i) Percentage of harvest cattle purchased as "age verified" increased from none, to 1.0%; (j) Percentages of carcasses grading Prime, Upper Two-Thirds Choice and Lower One-Third Choice changed from 1.7%, 21.7% and 35.3%, respectively, in 1995, to 7.3%, 27.9% and 34.9%, respectively, in 2005; (k) Percentages of carcasses grading Yield Grade 1, 2, 3, 4 and 5 changed from 7.2%, 44.1%, 41.1%, 7.4% and 0.2%, respectively, in 1995, to 9.4%, 37.7%, 41.6%, 9.9% and 1.6%, respectively, in 2005, and; (l) Percentages of carcasses that were A vs. B maturity were 97.8% and 2.2%, respectively, in 1995, and 86.1% and 13.9%, respectively, in 2005.

Brad Morgan (Oklahoma State University) summarized assessments of cattle on harvest floors—hide on, reporting that: (a) 49.5%, 39.5%, 13.8% and 2.6% had no brands, butt brands, side brands, and shoulder brands, respectively; (b) 49.5%, 42.5%, 6.5% and 1.5% had 0, 1, 2 and 3 or more brands, respectively; (c) 76.3% of cattle had no horns; (b) Percentages of cattle with predominant (≥51%) hide color of black, red, yellow, Holstein, grey, white, brown and brindle were 56.2%, 18.1%, 5.1%, 8.7%, 5.2%, 2.1%, 3.7% and 1.0%, respectively; (e) Cattle with no manure on their body vs. manure on their legs, belly, side, topline or tail were 19.6% vs. 69.8%, 61.9%, 21.4%, 10.5% and 20.8%, respectively; (f) Amounts of manure on the bodies of cattle characterized as "none," "small," "moderate," "large" or "extreme" were 19.6%, 63.9%, 16.4%, 2.7% and 0.1%, respectively. (g) Cattle with manure in 1, 2, 3, 4, 5 or 6 locations were 18.9%, 18.7%, 34.2%, 18.6%, 6.8% and 2.9%, respectively, and; (h) 11.3% of harvest cattle had no visible form of identification, while 2.5%, 0.5%, 33.5%, 62.4%, 12.7% and 3.3% had electronic, barcode, individual visual, lot tag, metal clip or "other" forms of identification.

Jeff Savell (Texas A&M University) summarized assessments of carcass and offal on harvest floors, reporting that: (a) 24.8%, 10.6%, 7.8%, 4.8%, 8.9% and none (0.0%) of livers, lungs, tripe, heads, tongues and carcasses, respectively, were condemned on the harvest floor; (b) 0.47% of all cattle contained a fetus; (c) 54.2%, 18.5%, 0.3%, 6.6% and 20.3% of

condemned livers were due to abscess, flukes, >30 MOA, contamination or "other" causes, respectively; (d) 40.7%, 2.9%, 0.4%, 20.5% and 35.6% of condemned lungs were due to pneumonia, abscess, >30 MOA, contamination or "other" causes, respectively; (e) 28.4%, 2.8%, 0.8%, 24.0% and 43.9% of tripe condemnations were due to abscess, ulcer, >30 MOA, contamination or "other" causes, respectively; (f) 19.3%, 0.4%, 3.2%, 9.0% and 68.1% of head condemnations were due to inflamed lymph nodes, abscess, >30 MOA, contamination or "other" causes, respectively; (g) 12.3%, 27.8%, 22.5%, 2.5%, 0.3% and 34.7% of tongue condemnations were due to inflamed lymph nodes, hair sores, cactus tongues, contamination, >30 MOA or "other" causes, respectively; (h) 64.2%, 25.4%, 7.9%, 1.9%, 0.5% and 0.01% of cattle had no, 1, 2, 3, 4 or 5 or more bruise(s), respectively; (i) Of bruises on carcasses, 9.9%, 35.5%, 21.2%, 23.6% and 9.3% were located on the round, loin, rib, chuck or flank/plate/brisket, respectively; (j) Percentages of cattle with 0, 1, 2, 3, 4, 5, 6, 7 or 8 permanent incisors were 83.1%, 5.5%, 8.7%, 0.6%, 1.5%, 0.1%, 0.3%, 0.03% and 0.05%, respectively.

Ty Lawrence (West Texas A&M University) summarized assessments of carcasses in coolers, reporting that: (a) 92.0%, 7.2% and 0.8% of carcasses were characterized as of native, dairy or Brahman (>4 in hump) genetic type, respectively; (b) 62.7%, 37.3% and 0.06% of carcasses were of steer, heifer or bullock gender, respectively; (c) No (0.0%), no, 2%, 5%, 14%, 37%, 37%, 2% and no carcasses had USDA marbling scores of abundant, moderately abundant, slightly abundant, moderate, modest, small, slight, traces, or practically devoid, respectively; (d) 97%, 2%, 1%, no (0.0%) and no carcasses had USDA maturity scores of A, B, C, D or E, respectively; (e) Of A maturity carcasses, no (0.0%), no, 1%, 13%, 30%, 25%, 18%, 6% and 3% were A^{10}, A^{20}, A^{30}, A^{40}, A^{50}, A^{60}, A^{70}, A^{80} or A^{90}, respectively; (f) 2.9%, 17.0%, 36.2%, 38.5%, 4.2%, 0.7% and 0.5% of carcasses had USDA quality grades of Prime, Upper Two-Thirds Choice, Lower One-Third Choice, Select, Standard, Commercial or Utility, respectively; (g) 0.2%, 0.4%, 1.4%, 84.3%, 8.9%, 3.7% and 1.1% of carcasses had hot carcass weights of <500, 501 to 550, 551 to 600, 601 to 900, 901 to 950, 951 to 1,000 or >1,000 lb, respectively; (h) 15%, 37%, 33%, 13% and 2% of carcasses were assigned Yield Grades of 1, 2, 3, 4 or 5, respectively; (i) 70.0% of all carcasses had no discounts; (j) 1.1%, 13.0%, 5.4%, 2.6%, 2.2%, 2.0%, 1.4%, 1.1%, 0.8% and 0.5% of all carcasses had discounts for excess weight, Yield Grade 4, Standard or lower, dark cutter, Yield Grade 5, insufficient weight, >30 MOA, C maturity, blood splash or yellow fat, respectively.

At the Strategy Workshop, industry representatives offered suggestions regarding Strategies, Tactics and Goals for reducing quality defects and nonconformities; contributing ideas were Jeff Windett (Circle A Ranches), John Edwards (Express Ranches), Tom Woodward (Broseco Ranches), Charles Nichols (Nichols Ranches), Mike Engler (Cactus Feeders), Tony Bryant (Five Rivers Cattle Feeders), Rod Bowling (Smithfield Beef Company), Bruce Bass (Tyson, Inc.), Paul Heinrich (Sysco, Inc.), Fred Ray (OutWest Meat Company), Molly McAdams (HEB Supermarkets) and Greg Henderson (Drovers Journal).

Participants ranked "Quality Challenges," periodically, during conduction of the Strategy Workshop and ultimately identified the industry's "Top Ten Quality Challenges" as: (1^{st}) Lack Of Traceability/Individual Animal ID/Source & Age Verification/Chronological Age. (2^{nd}) Low Overall Uniformity Of Cattle, Carcasses & Cuts. (3^{rd}) Need For Implementation Of Instrument Grading. (4^{th}) Inappropriate Market Signals. (5^{th}) Segmentation Of Groups Within The Beef Industry. (6^{th}) Carcass & Cut Weights Too Heavy. (7^{th}) Yield Grades Too High/Low Cutability. (8^{th}) Inappropriate Ribeye Size (Too Small Or Too Large). (9^{th}) Reduced Quality

Grade & Tenderness Due To Use Of Implants. (10th) Insufficient Marbling (Deb Roeber, Oklahoma State University).

With regard to "What Is The Beef Industry Doing Well?", Ty Lawrence (West Texas A&M University) reported that the beef industry was doing a good job of: (a) Developing "story" beef. (b) Reducing *E. coli* O157:H7, (c) Merchandising "quick" (to prepare) beef. (d) Merchandising new beef "value" cuts. (e) Reducing excess fat cover, at the end-user level. (f) Developing "brands" of beef. (g) Increasing beef demand. (h) Making the industry profitable.

Daryl Tatum (Colorado State University) described "Key Messages From The NBQA—2005 Strategy Workshop" as: (1) Deliver product attributes that meet consumer needs/expectations for safety, taste, color and convenience. (2) Improve the cattle supply by implementing instrument grading; reducing numbers of carcass grading Yield Grade 4 or 5; controlling weight; increasing marbling; decreasing variation, and; maximizing profitability. (3) Expand marketing opportunities (in domestic and global markets) by developing traceability systems; verifying source and age; reducing costs and waste in the beef value chain, and; continuing new product development. (4) Strengthen connections among segments of the beef supply chain via communication and targeted educational programs.

Tom Field (Colorado State University) described the "Goals" for improving the quality of beef as: (1) Deliver Product Attributes That Meet Consumer Needs and Expectations & Build Global Beef Demand. (2) Improve The Market Cattle Supply. (3) Expand Market Opportunities For US Beef. He also described the means for increasing beef's competitiveness as: (a) Prevent food safety and animal disease problems, (b) Maximize quality; eliminate variation, and (c) Optimize net consumer value; eliminate waste.