

## FOOD SANITATION AND QUALITY CONTROL – FACTS AND FALLACIES<sup>1</sup>

PAUL E. LAUGHLIN

*National Biscuit Company, New York*

Is the cleanliness of an American food processing plant to be taken for granted because the quality of its products meets a standard or because there is an official inspector present? To what extent are the terms "sanitation" and "quality control" synonymous? In our efforts to capsule a description for these aspects of food processing in a few neat words, have we lost sight of their distinctions and differing functions within the food processing operation? Are we being deceived by forms of official approval for plants and products which may imply that all is perfect as to sanitation and quality? How can we distinguish between sanitation fact and the camouflage substituted for organized and managed sanitary maintenance? To answer these questions, it is necessary first of all to clarify the terms "sanitation" and "quality control" as applied to food processing operations.

### DISTINGUISHING THE DIFFERENCES

Quality control requires the application of all the physical sciences (and some which are not physical) to assure the desired flavor, consistency, appearance and tenderness of foods during and after processing. It employs mathematics, chemistry, physics, bacteriology, biology and microbiology in the manufacture, storage, distribution and merchandising of foods, including the control of raw materials and the minimizing of change in foods during processing and marketing. Quality control evaluates and applies desired standards to products; it is concerned primarily with things rather than people. It has only incidental interest in the total plant environment and then only as it may interfere with end-product objectives. It is, therefore, appropriate for all phases of quality control to operate as a laboratory function, wherein research activities may also be conducted since product development frequently is a customary part of quality control. These laboratory and quality control functions are essential to modern food production and are, therefore, a proper adjunct of the production management structure. On the other hand, industrial sanitation as applied to food processing, does not belong within this organizational pattern. The placing of the sanitation responsibility under

quality control and its laboratory service, an unfortunately common practice in many food firms, is neither logical organization nor effective in terms of efficient results.

To appreciate the distinctions between these two functions and to place industrial sanitation in its true perspective within the food manufacturing environment will require a broader concept of this term than many of you may have been willing to accept. While sanitation and quality control are interwoven in relation to the product, they are distinctly different in other respects. As we see it, there are just three basic elements in any manufacturing operation: the first being production; the second, engineering or mechanical maintenance; and the third, the maintenance of the physical environment in which the first two are carried on – and properly called industrial sanitation. Production and mechanical maintenance, being highly organized and well understood, need no explanation. Industrial sanitation is simply care of the industrial setting and includes the varied array of tasks to be done in and around a manufacturing plant that are neither production nor mechanical maintenance. Obviously, care of the work environment requires sizeable expenditures proportionate to those of production and mechanical maintenance and, therefore, justifies recognition by management even though it may not always get its just share of understanding and support.

### LOGICAL APPROACH

Regrettably, sanitation has remained unorganized, divided, and subordinate to other activities in far too many food plants. The result has usually been duplication of efforts, inconsistent and haphazard work performance, and a mediocre to poor level of cleanliness, with costs much higher than they should be. For maximum efficiency, sanitation must be organized as a separate and distinct function, properly managed and competently supervised. Decentralized sanitary maintenance is wasteful and inefficient. When sanitation is properly organized and managed, the benefits in terms of dollars and level of cleanliness are quite apparent. Such an approach to this essential function permits sanitation effort to deliver more value for the money allocated to it because its labor needs and costs can be determined and analyzed. Less money plus efficient supervision will provide a higher sanitation level than more money

<sup>1</sup>Presented at the 47th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., Chicago, October 26-28, 1960. Mr. Laughlin is Sanitarian in the Sanitation Department of National Biscuit Company.

and poor supervision.

Included in our broad concept of sanitation are duties which rarely have the coordinated supervision and control necessary for maximum efficiency such as grounds maintenance, plant security, floor maintenance, structural cleaning, pest control, and cleaning of machinery and equipment. The selection, testing and approval of tools and materials for sanitary maintenance are necessarily a part of this function and include everything from mechanical devices to detergent-sanitizers and toilet tissues. I know of one food firm that saved 6,000 dollars in detergent purchases alone the first year a competent sanitarian was employed. Effective short interval scheduling for maximum utilization of sanitation labor becomes an essential sanitation supervisory function, along with continuous study of time factors, methods and materials to improve the technique of performing each task. Planned use of sanitation labor is essential because sanitation is a service function, manually performed for the most part. Much of management has yet to realize that the recent and tremendous automation of production has not increased the productivity of sanitation labor, but has further burdened it with complex tasks. Where new automatic equipment reduces production labor, it usually increases the work of sanitation and mechanical maintenance because every highly mechanized production unit requires more precise cleaning and adjustment; this can rarely be done by pushing a button.

#### THE FOOD TECHNOLOGIST

Sanitation in a very narrow sense may be concerned with insect fragments in the product or the development of mold on processing equipment, which may require laboratory assistance for identification or isolation of such foreign material, but these and other similar joint interests are certainly not valid reasons for placing sanitation within or subordinate to the quality control function. Do you know of a food technologist or quality control supervisor that can tell you the procedures, materials, techniques and costs of the cleaning requirements within a sizeable operation; or who can supervise the labor necessary to perform this work and, at the same time, do the routine analytical work and interpret data essential to quality determinations? There are some but they are rare, indeed. My remarks are in no way intended to take anything from food technologists or to under-value their abilities and professional competence. My only purpose is to clarify the distinctions between sanitation and quality control functions. A food technologist is not necessarily equipped or capable of developing and administering

a sanitation program appropriate to a food plant by virtue either of his academic background or his laboratory experience. Furthermore, the demands and routines placed upon the usual quality control program are not conducive to its effective extension to the organization, planning and direct supervision of sanitary maintenance. These two functions may be combined under single supervision in a small plant for reasons of economy, but balanced handling is rarely the result. Almost inevitably, one becomes subordinate to the other and lapses into varying degrees of neglect.

Food technologists and food scientists have indeed made great contributions to the food industry and have played an important part in raising our standards of living. It is a fact that one-third of all food items now on supermarket shelves did not exist ten years ago and probably half of the food products which will be in supermarkets in 1970 are now in developmental stages. These remarkable accomplishments are worthy of commendation and as one writer has said of food researchers and technologists — "they have permitted the harvest of the field, the fruit of the orchard and the catch of the sea to be brought beyond the temporal confines of season and the limits of distance, to the table of even the poorest." Recognizing the importance of quality control and the professional stature of those who man it, may I suggest that these food technologists responsible for food quality are too busy in the thousands of laboratories, seeking better methods of preservation, freezing, dehydrating, processing, packaging — too busy developing new products and attempting to improve a host of existing ones — to devote the time and acquire the skills necessary to manage an industrial sanitation program.

#### SANITATION PERSPECTIVE

There are many distressing instances of industrial sanitation being crippled by being subordinate to other functions in the food industry, and there are many executives who cling stubbornly to their old beliefs only because they have not objectively studied the sanitation function in the same way that they have studied other plant operations. One fallacy in the quality control approach to sanitation is dependence on microbial indices. The only index of filth in some food plants has been bacteriological culturing. A low count within an established purity tolerance may be taken to mean all is well, even though employees may wade in dirt and debris up to their ankles. Many adherents of the quality control approach to sanitation relegate to "housekeeping" this incidental soil and its removal. This term "house-

keeping" is usually a down-grading reference to a general catch-all of seemingly unimportant tasks for janitors and porters. I can assure you that the proper maintenance of a variety of floors, the control of infestations, the cleaning of processing machinery and the effective handling of labor require as much or more skill than many of the tasks performed by technicians in a laboratory. Let me say that in the Nabisco approach to sanitation, we avoid the use of the term "janitor" and belittle no work involved in maintaining the work environment. We are indeed proud of our company's unique and distinguished position in the food industry and of the contributions made thereto by our sanitation function because it is rationally organized and is productive of the desired results.

There is no necessarily direct relationship between quality control and plant sanitation. In fact, a product may be considered to be of high quality as to color, texture, taste and appearance, and yet be dirty. It is a fallacy to gear all sanitation to microbial indices or to relate all factors of quality and sanitation to the product. Certainly, an unclean food cannot be considered high in quality nor should a food product processed in a dirty plant bear a seal or certificate indicative of purity and cleanliness. The confusion has led many people to believe that as long as the product is reasonably clean and of acceptable quality the rest doesn't matter. Honest and sincere food processors, as well as the federal Food and Drug Administration, feel that both the plant and product should actually and consistently be clean and sound. There is a clear distinction between *clean* and *cleaned* foods and just because garbage can be sterilized does not make it acceptable to the American consumer. In this day of miracle drugs and easy remedies, the tendency is toward corrective rather than preventive action. To rely on chemicals, or other short-cuts to sanitary maintenance can prove damaging. An example of how such complacency can backfire is the problem of antibiotic-resistant staphylococci in hospitals where cleanliness had been relaxed in favor of the prophylactics. Many serious infections have stimulated investigations to determine the real nature of the problem, and our hospitals are now undertaking to restore aseptic objectives in their sanitation maintenance practices regardless of how many wonder drugs there are to kill the organisms responsible for specific infirmities. Accepting the modern approach to sanitary maintenance in combating this problem, many hospitals now have established distinct sanitation programs headed by sanitarians. Hospitals are learning, as the food industry should have by this time, that the best results in maintaining a clean institutional or industrial environment cannot be ob-

tained by dividing sanitation responsibilities among nurses, housekeepers, dieticians, building maintenance supervisors, purchasing agents, administrators, and committees.

Sanitation cannot be taken for granted nor can it be made the responsibility of everyone simply by endeavoring to so motivate all supervision and employees, as some would like to think. To instill sanitation consciousness in all employees in a food plant becomes a part of any good sanitation program, but it is to be effected chiefly through supervision, with the continuing stimulus coming from those with the full-time sanitation responsibility. Sanitation is a constantly fluctuating relative condition requiring hour-to-hour, day-to-day attention, supervision and control. To establish and schedule the frequency for cleaning the complex of machinery, equipment and structural surfaces in a food plant becomes a sizeable task in itself. Frequency and degree of cleanliness depend on many factors relating to soil load and they vary considerably with food products and plant locations. These factors account for the emphasis on bacterial control in an industry such as milk, while dust control becomes more important in industries such as milling and film processing. Therefore, it makes good sense to recognize and approach sanitation from its total environmental situation rather than from the narrow perspective of one or two scientific disciplines.

#### GOVERNMENT INSPECTION SERVICES

What about grade standards, official inspections and seals of approval as they relate to industrial sanitation? One might wonder just what the designation "packed under continuous inspection" really means. The distinct differences between sanitation and quality control as discussed thus far should not be confused with official inspection or the actions of official agencies which provide neither of these essential food plant requirements.

The production, processing and marketing of our foods are regulated and controlled by various federal, state and local laws. Important among these are the federal Food, Drug, and Cosmetic Act, the Meat Inspection Act, and the Poultry Products Inspection Act. These laws contain all the provisions necessary for enforcing good sanitation and quality, leaving no doubt as to the objectives that plants operating under them shall be maintained in a sanitary condition. The sanitation sections are replete with words such as "sanitary," "abundant," "sufficient" and "adequate," which terms are of little help in indicating just what degree of anything is expected. Our questions are — what constitutes a sanitary condition, what is required to maintain this condition, and to what extent are

food plants actually maintaining such conditions, with or without the aid of an official inspector? It will serve no purpose here for us to embark upon a discussion of "how clean is clean?" in an effort to answer this question, but it is important to keep in mind that desirable sanitation is not accomplished by the mere passage of a law, regardless of its detail as to design, construction, or operating conditions.

The Food and Drug Administration (FDA), Department of Health, Education and Welfare, has jurisdiction over all food plants shipping in interstate commerce except those processing meat and poultry. The Meat Inspection Division, Agricultural Research Service, U. S. Department of Agriculture (USDA), inspects, grades and certifies meat and meat products, and the Agricultural Marketing Service, USDA, performs the same function for poultry products. In addition, there are federal marketing orders which establish minimum grade standards for various agricultural commodities. These marketing orders are instruments to facilitate the distribution of the product; they are not essentially for purposes of quality control as might be implied. Product inspection is required under a federal marketing order and while it is not mandatory for the USDA to act as the inspection agency, it is common for the commodity under a Federal Marketing Order to accept USDA inspection. Trade associations also have acted as a third party inspection agency and in my experience this arrangement has been superior to government inspection. The USDA offers (a) continuous inspection, in which an inspector is present at all times while the food is processed, (b) plant inspection, wherein the plant is checked and product certified but an inspector is not present at all times, and (c) lot inspections, in which a single lot is sampled, tested, and recorded.

It is not uncommon for food processors to rely on one or more of these official inspection agencies for their sanitation counsel and control. Some plant operators seem to derive immense satisfaction from declaring to all interested parties that their plants and products are under official inspection and, therefore, must be pure and above question. Some owners have even gone so far as to request and obtain testimonial letters from the USDA inspection service to support their claims of purity, as being a certain consequence of the continuous inspection contract with the USDA. With regard to plant sanitation, this is essentially ridiculous. There were recently 84,000 plants under FDA regulation and the present inspection force, taking each plant in turn until all have been visited, could inspect each plant about once every five and a half years. This cannot be considered a sanitation service even if constructive sugges-

tions are made with each visit. The FDA, by far the superior government inspection agency, is not intended to be a handmaid for reluctant units of industry, nor does it pretend to take the place of full-time organized and supervised sanitation within each plant, or to offer sanitation consulting service. Its job is to protect the American consumer by finding, abating, and preventing violations of the Food, Drug and Cosmetic Act.

#### SOME DISCREPANCIES

The USDA appears to offer a complete sanitation service under its "continuous inspection contract," for which a food processor pays a fee; usually no more than a cent or two per case. These plants contracting for this service can display the official shield designating, "Packed Under Continuous Inspection of the U. S. Dept. of Agriculture." Mr. F. L. Southerland, Chief, Fruit and Vegetable Division, Agricultural Marketing Service, Processed Products Standardization and Inspection Branch of USDA, has said (Agriculturing Marketing, July 1958), "Processed fruits and vegetables that wear this shield give consumers the assurance that they are getting products that are clean and wholesome . . . . . the shield means that the processor has a plant, equipment and operating methods which meet USDA requirements and that he is packing a good quality product . . . . . to qualify for continuous inspection the plant meets rigid requirements for construction, equipment and sanitation." I challenge these statements and the pseudo-sanitation service offered by USDA as being misleading and not entirely in accordance with the facts.

A plant under such continuous inspection has one or more inspectors assigned to it on a full-time basis. These inspectors are not routinely rotated but remain in the same plant indefinitely, being normally present whenever the plant operates. In addition to product grading, they are officially obliged to make a daily sanitary inspection of the plant before operations begin. This inspection is usually made using a check list on which items are marked as either "Satisfactory" or "Needs Attention." In theory, if a plant fails to receive approval in all departments its product cannot receive the USDA grade certification, but strangely enough, the instances of such failure or interruption of production are so rare as to invalidate the law of probabilities. USDA inspectors have actually reported that, even if several insanitary conditions are found, no action is taken other than to report the condition to the plant management. A USDA inspector may get little backing from his superiors and will be inclined to avoid situations which would cause disagreement with plant management. I am sure you will agree that one representative being

in one plant for a long period breeds a familiarity which is not altogether favorable to good, unbiased and objective inspection by an outside agency.

We might expect the sanitation surveillance to be poor and the reports to be less than accurate when amateurs attempt to engage in a function with which they are largely unfamiliar, whereas application of grade standards precisely written into the regulations could be expected to be well done. In my judgment, such grading can be subject to wide variations. The constant pressure to get along with plant management and to be a "good guy" make it difficult for an inspector to determine grades accurately and to judge plant conditions objectively, assuming he is qualified to do so. The complaints of plant management can make life very unpleasant for a USDA inspector who is not a "good guy." Let me relate several actual examples which have come under my observation. A frozen food processor was packing lima beans and, due to unseasonable rains, there was excessive mold so extensive it was not economically feasible for this plant to put up a Grade A pack. The USDA inspector, in accordance with grade standards, recorded a Grade C on this pack. The plant complained to the inspector's supervisor who in turn is reported to have told the inspector "he knew the beans were not Grade A but it was a tough year and he should ease up a little." Since it was the "politic" thing to do, the inspector complied, thus putting a sizeable tonnage of lima beans on the market with an incorrect grade. Another instance involved a cauliflower freezer. Adverse growing conditions resulted in more head mold than was allowed in the standards for a Grade A pack. The inspector was reported to have been instructed to overlook this condition under the pretense that maybe it wasn't mold. One other prime example of such grading variation deserves mention, not because of its being a more flagrant violation but because there are documented proofs of the results. In the raisin industry, the USDA provides both incoming and outgoing inspection. Recently, rain during the drying season caused a great deal of mold which was an inspection problem. An inspector grading incoming raisins accepted a lot as meeting the standards. The raisins were subsequently packed and given a G.N.C. (grade not certified) classification by the USDA processed-fruit inspector. The processed-fruit inspector was told the lot had been accepted by his agency and it would not look right if they were now graded as being high in mold. The inspector refused to comply with his supervisor's request to change the grade and was subsequently relieved of his duties. The pity of such a situation is not that incoming raisins might have been improperly graded but that representa-

tives of an official agency would rather have misrepresented raisins placed on the market than to admit an error in grading.

Such discrepancies in grading are detrimental to the processor, consumer, and the inspection agency. To give you an idea of the far reaching ramifications of such inspection laxity, I refer to an item and editorial comment published in the "California Fruit News," June 27 and August 1, 1959. By letter to the editor, a prominent exporter raised strong criticism of the inspection laxity on export shipments, making reference to the very inferior quality of Natural Thompson Seedless raisins which had been shipped abroad. He said that while his firm appreciated the difficulties encountered in a bad crop year, they nevertheless felt there should have been an even more stringent quality control in a year when quality was so diverse in order that the normal high reputation of California raisins should be preserved in the foreign market, even if some sacrifices were necessary to achieve this. It seems that this export firm had 50 tons of such raisins rejected at dockside by one customer because of poor quality and could not dispose of them at a price well below replacement level. These raisins were delivered with a USDA quality certificate that insulates the packer against any quality claim whatsoever, whereas the exporter could not contract with his customers in a similar fashion. It was further stated by this exporter that this shipment of raisins would not have passed our own FDA if they were to be shipped back to this country. My sentiments are with the editor who concluded his comment by stating that, "A quality certificate issued by an agency of the U. S. Government should be as dependable as the one dollar bill is of value."

#### GRADE VERSUS BRAND

The American consumer has been urged for years to purchase by grade with the implication that a Grade A product of one brand selling for a few pennies less than a Grade A name brand results in money saved, while the products are exactly the same in quality. Considering the lima bean, cauliflower and raisin incidents, it is possible that USDA grades are not always as represented to the consumer. The fact remains that grade determinations may vary by inspectors and as the result of crop and seasonal conditions. A marketing order is intended primarily to distribute the product and not necessarily to improve its quality. In surplus crop years, the grades are likely to be high; in short crop years, the inferior products become passable. Buying by brand is to be considered a more reliable guide to quality than grade because a processor of quality brand prod-

ucts is not likely to permit significant fluctuations in quality which could destroy the hard-earned public acceptance of quality brand food products. In lean years, rather than jeopardize the brand, the prudent processor will refrain from packing under the quality brand label when a product of nature fails to meet his quality specifications.

The USDA Fruit and Vegetable Division publishes a booklet entitled "Plants Approved to Pack Processed Fruits and Vegetables Under Continuous Inspection," which lists the names, addresses, and products handled by these plants so honored. For anyone familiar with the environment, physical facilities, and operational levels within some of these approved establishments, it becomes obvious that the claims regarding requirements for approval by USDA are not always met either physically or operationally. Among the approved are plants known in the trade and by regulatory agencies to be inferior as to plant sanitation, fluctuating in quality, and involved in questionable practices. Conspicuously absent from this list are plants known to have the best physical facilities, well organized in-plant sanitation, and high quality products marketed under quality brand names. A comparison of these USDA-approved plants with the Notices of Judgment listing violators of the Food, Drug, and Cosmetic Act makes very interesting reading. Some approved plants have appeared more than once for violations due both to adulteration of product (Section 402, a, 3) and insanitary plant conditions, (Section 402, a, 4) of the Act. It, therefore, seems possible for plants listed as meeting all USDA sanitary requirements and having continuous inspection to be prosecuted for insanitary conditions and adulterated products, whereas many plants not listed as approved have operated for years without being subjected to FDA action. In view of these circumstances, it would be extremely interesting if the FDA were routinely to inspect both meat and poultry plants under somewhat similar USDA inspection.

Federal Food and Drug inspectors are required by the Administration agreement with USDA to identify themselves to USDA inspectors when visiting plants under continuous inspection. The USDA man is then invited to accompany the FDA inspector while he is in the plant. In theory, such a practice should enable the USDA to rate a plant as satisfactory or actionable on the basis of the FDA inspector's findings and to take the necessary follow-up action. In practice it does not appear to work that way. An FDA inspector may discover insect or rodent evidence in storage areas or mold and slime on processing lines which are violative conditions. Contrary to what we would expect, the USDA inspector may continue to certify the products and disregard the in-

sanitary conditions called to his attention by the FDA inspector. A specific example known to me is the following case: A small raisin packer recently complained that because he couldn't afford the advertising costs of a name brand he has relied on the USDA stamp to sell his products and has had continuous inspection for several years. Recently, the FDA sampled shipments of USDA-certified raisins from this plant and subsequently seized them. One regretfully concludes, therefore, that the continuous inspection program is not all that it is represented to be and that variable grading occurs, while assurance is given to subscribers and consumers alike that this program satisfies all food laws and regulations.

#### NO SUBSTITUTES FOR PLANT-ORGANIZED SANITATION

Let none of us be deceived by these claims of "continuous inspection." With all due respect to this official arrangement, under a federal marketing order or otherwise, the assigned personnel are not necessarily qualified nor do they in fact perform the function of an industrial sanitarian. In contrast to the sanitary engineers and sanitarians who long have been practitioners in environmental sanitation, acquiring this status by meeting academic and professional requirements plus considerable experience, there is this group of heterogeneous individuals recruited at random, exposed to short courses on how to count raisin stems and read moisture machines, given a USDA stamp, and then presumed to be able to find, evaluate, correct and prevent recurrence of complex sanitary deficiencies within a food processing operation. It is indeed a fallacy for such "quality control" inspectors to be represented as dealing competently with plant sanitation.

Sanitation and quality control are not synonymous; they do represent distinct and separate functions and should be so organized in food plant operation. Quality control is essential to production with regard to the product, and industrial sanitation is essential to the entire operation with regard to maintenance of the total work environment. The cleanliness of a plant, its premises and personnel facilities, and the aesthetic factors conducive to a good operation, including employee welfare, comfort and appearance, all reflect the degree of organization for sanitation. These desirable objectives hardly can be realized by any number of "Sanitary Sams," outside consulting services, official inspections, plaques, awards, or seals of approval, official or otherwise. A high level of industrial food sanitation can only be achieved by establishing sanitation in each individual plant and firm as a managed function, organized and supervised at a management-supported level comparable to the other basic elements of manufacturing.