REGULATORY ASPECTS OF PERMANENT MILKING MACHINE PIPE-LINE INSTALLATIONS

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In the past, we have discouraged "in-place" washing and sterilizing of permanent pipe-line milking machines. However, it is being successfully done, and the installation of such equipment is rapidly increasing in California.

Several problems have resulted from "in-place" washing and sterilizing of pipe-line milking machines which need to be controlled. With this object in view, regulations governing the installation and operation based upon an investigation of the problems are being adopted.

When permanent pipe lines were first discussed, regulatory officials—speaking for our own department—were somewhat skeptical and were inclined to discourage them since it was felt that they could not be maintained in a clean and sanitary manner.

It is natural for regulatory officials to be somewhat cautious when something new is presented representing a decided departure from long established practices. That is the position we had taken when the permanent pipe-line installation made its appearance. When we are confronted with a situation of this nature, many questions must be considered, such as: "Are public health problems involved? What effect will it have on the quality of the product? What effect would the change have on the dairy industry as a whole?"

If the answers to most of these questions are favorable, we will determine the extent and nature of the investigation needed to arrive at a proper conclusion.

The question of permanent pipe lines was presented as somewhat of a challenge. Our position denying their use was weak from a legal standpoint, because the law does not specifically state that pipe lines must be disassembled. The finger was pointed at long rubber hoses used for removing milk from tankers since we did not interfere with their use and the quality of the milk was not impaired.

A few plant operators were finally told that the department would not interfere with the use of a permanent pipe line on an experimental basis so long as satisfactory results were obtained. These lines have been in satisfactory use for several months, and even years in the case of one or two.

Recently, hearings were held on the matter of amending rules and regulations pertaining to the pouring and handling of milk in the milking barn proper. The California Administrative Code required milk to be removed from the barn immediately but permits the pouring of milk from a milking machine pail to other properly protected containers which are moved immediately to the milkhouse. The question involved the pouring of milk into a dump tank installed in the barn and immediately pumping the milk into the milkhouse. As the result of the evidence introduced at the hearings and of observations on the handling of milk in this manner, the regulation was changed, and now it is permissible to pour milk into a dump tank within the barn, provided all precautionary steps are taken.

After the dump tank question was settled, it was logical to ask, "Why not go a step further and permit the washing and sterilization of the milk lines in place?" Since permanent lines were successful in milk plants, there appeared to be no valid argument against permitting permanent pipe lines in dairy farm milkhouses.

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He joined the staff of the Bureau of Dairy Service, California Department of Agriculture, in July, 1923, serving in the capacities of Factory Inspector; Manufacturing Cheese Specialist; Federal-State Representative of the Federal-State Dairy and Poultry Products Grading Service, Bureau of Agricultural Economics at Los Angeles; and now as Chief, Bureau of Dairy Service, and as Chief; a director in the California Cheese Association; Director of the California Dairy Council; and a charter member with life membership in the California Dairy Industry Association, a member of the committee on Milk Regulations and Ordinances, of the committee on Sanitary Procedures, and the committee on Frozen Foods Citations of the International Association of Milk and Food Sanitarians.
in an assembled position, the line must be capable of being disassembled for inspection.

We now have many permanent pipe lines in milk plants and in milkhouses giving very satisfactory results.

Following a further study of pipe-line installations in operation by our staff and local health departments involved with particular reference to "in-place" cleaning and sterilizing, sectional meetings composed of control officials and others interested in the problem were held throughout the State. The following recommendations on the subject were adopted and are being established as a part of the Administrative Code:

All pipe-line milking machines installations must comply with the following conditions and must have a satisfactory circulating system for washing and sterilizing, approved by the Director or such system must be disassembled, washed and sterilized after each time used:

1. ALL MILK PIPE-LINE AND SOLUTION-LINE FITTINGS AND VACUUM LINES FROM AIR SEPARATOR TO MOISTURE TRAP, AND WASH TANKS SHALL BE OF NON-CORROBORATIVE MATERIAL. (Pipes or tanks of corrosive material (i.e. black iron, galvanized iron, etc.) very readily rust and corrode from the detergent solutions used and leave these deposits in the milk lines. The cleaning compounds used vary greatly. They may be caustic solutions, wetting agents or acid cleaners. Stainless steel and glass sanitary lines have worked out very satisfactorily.)

2. ALL METAL HAVING ANY SURFACE IN CONTACT WITH THE MILK SHALL BE CONSTRUCTED OF DAIRY METAL CONSISTING OF STAINLESS STEEL, NICKEL ALLOY OR EQUALLY CORROSION RESISTANT MATERIAL THAT IS NON-TOXIC AND NON-ABSORBENT. (This is general practice in the dairy industry to preserve the quality and flavor of the milk.)

3. ALL MILK CONTACT SURFACES SHALL BE FINISHED TO AN EQUIVALENT OF NOT LESS THAN 120 GRIT FINISH, PROPERLY APPLIED. (This smoothness was found necessary to permit satisfactory cleaning. One hundred and twenty grit finish is a required 3-A standard finish.)

4. THE MILK PIPE LINE MUST BE CAPABLE OF BEING DISASSEMBLED FOR INSPECTION. (Visual inspection is also necessary to determine the effectiveness and efficiency of a cleaning system.)

5. SANITARY MILK PIPES SHALL BE NO LONGER THAN THE WASHING AND STERILIZING FACILITIES WILL ACCOMMODATE, WHEN MILK LINES ARE DISASSEMBLED, OR IF WASHED IN ASSEMBLED POSITION, THE LENGTH OF MILK PIPE DEPENDS ON TYPE OF STALL COCKS USED, WHETHER THEY CAN BE CLEANED, STERILIZED AND INSPECTED. (This permits necessary flexibility in the installation. It is rare for two installations to have all conditions exactly alike.)

6. THE ENTIRE MILK LINE IN THE BARN SHALL BE INSTALLED SO AS TO HAVE A POSITIVE DRAIN. (This permits free rinsing and draining. It also prevents water or a sanitizing solution from remaining in the line and mixing with the milk at the start of the milking operation.)

7. THE VACUUM LINE FROM THE AIR SEPARATOR SHALL HAVE A POSITIVE DRAIN TO A MOISTURE TRAP. (The warm air leaving the top of the separator via a vacuum line causes a considerable amount of condensation. Sloping of this line toward the moisture trap prevents this condensation from draining into the milk supply.)

8. THE VACUUM LINE FROM THE AIR SEPARATOR SHALL NOT EXTEND IN A VERTICAL POSITION ABOVE THE SEPARATOR. (Experiments have shown that even a short line in a vertical position above the air separator forms condensation on the inside which drips down into the milk supply. A six inch rise in a vertical position permits the installation of a standard sanitary ell and still holds the vertical rise to a minimum.)

9. THE ENTIRE MILK PIPE LINE AND SOLUTION PIPE LINE SHALL BE OF THE SAME DIAMETER. (This has been found necessary to obtain thorough cleaning of the lines.)

10. NO CONNECTING VALVES ARE PERMITTED BETWEEN THE SOLUTION AND MILK LINES. SOLUTION LINE MUST BE DISCONNECTED DURING MILKING PERIOD. (Valves used between the milk line and solution or water lines may leak or may not be fully closed. This condition cannot be observed while milking is in progress; and since the milk line in most all cases is under a vacuum, this leakage could be considerable.)

(Prohibiting valves necessitates breaking the connection and emptying the milk line.)

11. ALL MILK PUMPS AND ATTACHMENTS, EXCEPT DUMP TANKS AND PUMPS ATTACHED TO DUMP TANKS LOCATED IN PASSAGE WAY SHALL BE ELEVATED AT LEAST 2 FEET OFF FLOOR. (This is necessary for general sanitation. Many pumps are installed in a permanent manner and cannot be moved for cleaning of the walls or floor. Since this is milk handling equipment, it must be protected from animals (i.e. dogs, cats) manure or urine splash from the cows, etc.)

12. WHEN A DUMP TANK IS USED, IT MUST BE LOCATED IN ACCORDANCE WITH 481.5 (g) OF THE ADMINISTRATIVE CODE AND MUST BE KEPT COVERED EXCEPT WHEN MILK IS BEING POURED. ALL MILK SUCH AS STRIPPINGS AND MILK ON TEST DAYS SHALL ENTER THE MILK LINE THROUGH THE DUMP TANK. (Barn dump tanks are defined and sanitary standards prescribed for in Section 481.5 (g) of the California Administrative Code. If the dump tank is in the alley next to the barn wall, this six-foot height requirement prevents possibility of contamination from cows adjacent to the wall.)

13. THE WASH TANK SHALL BE LOCATED IN THE WASH ROOM IF THE TEAT CUP ASSEMBLY IS A PART OF THE CIRCULATING SYSTEM. IF THE PIPE LINE IN THE MILKING BARN IS THE ONLY EQUIPMENT TO BE WASHED AND STERILIZED BY CIRCULATION, THEN A COVERED WASH TANK IS PERMISSIBLE IN THE PASSAGE WAY: ANY OTHER METHOD MUST BE APPROVED BY THE DIRECTOR. (Test cup assembly buckets, parts, etc., must be washed, sanitized and stored in the wash room, where adequate washing and sanitizing facilities are available and the equipment is protected against contamination (flies, dust, etc.).)

(Provision for the solution tank, if located in the passageway, it is necessary to protect the interior of the tank from flies, insects, dust, etc., since this solution is pumped into the milk lines.)

14. A THERMOMETER MUST BE INSTALLED ON WASH TANKS AND WHEN HOT WATER IS USED FOR STERILIZING, A THERMOMETER MUST BE INSTALLED ON DISCHARGE END OF MILK LINE. (Temperature of the solution while circulating is a very important factor in proper cleaning of these lines. Since some systems have very long lines, the discharge end of the line is the point where the solution would be the coldest.)

15. MILK TANKS, DUMP TANKS, RELEASERS, WHEN LOCATED IN PASSAGEWAY, SHALL BE CONSTRUCTED SO AS TO PROTECT MILK FROM FLIES, DUST AND CONTAMINATION. (The passageway...
and milk barns are not screened against flies.)

16. ENDS OF MILK LINE AND STALL COCKS SHALL BE CAPPED OR OTHERWISE PROTECTED, AFTER STERILIZATION. (These openings could be contaminated very easily by dust and flies. Flies will crawl inside these openings for shelter and could be drawn into the system when milking begins. Dust will collect on this equipment; if ends of milk lines and stall cocks are left open, it will settle on surfaces that come in direct contact with the milk.)

17. SIGHT GLASSES ON MILK LINES SHALL BE DISMANTLED FOR CLEANING AFTER EACH TIME USED. (These will not satisfactorily clean themselves by the circulation method. Many types of these sight glasses will not withstand both vacuum and pressure; they are of no material aid to good milking.)

18. THE CIRCULATING PUMP SHALL BE OF A SIZE SUFFICIENT TO FILL THE PIPE LINES AND CAUSE ENOUGH TURBULENCE TO INSURE ADEQUATE CLEANING. (This volume was arrived at after many checks of various washing systems throughout the state; many systems circulate a much greater volume than required here. This volume was the lowest that would give sufficient turbulence for satisfactory cleaning.)

19. AIR LINE TO MILK RELEASER OR AIR SEPARATOR SHALL BE WASHED AND STERILIZED AFTER EACH TIME USED. (These air lines must be of a sanitary type as they come in direct contact with the air separator. Sometimes they contact the milk itself, should the air separator overfill.)

20. OUTSIDE OF MILK PIPE LINES AND EQUIPMENT SHALL BE KEPT CLEAN. (General sanitary practice of food handling equipment.)

21. VACUUM PUMPS, MOTORS OR ANY MACHINERY THAT MAY EMIT OIL, FUMES, GREASE, ODORS OR OTHER OBJECTIONABLE MATERIAL SHALL NOT BE LOCATED OVER OR NEAR MILK EQUIPMENT. (Motor shelves, brackets, etc., soon become dusty and greasy and may contaminate the product. In any case, they do not lend themselves to the types of cleaning that is necessary of milk handling equipment.)

22. MILK PIPE LINES CONNECTED BY THE SO-CALLED SLIP JOINT METHOD WITH "O" RING GASKETS SHALL BE DISASSEMBLED FOR CLEANING. (The slip joint fitting using the "O" ring has deep crevices in each joint. This will not clean by the circulating system.)

23. ANY TYPE GASKET USED IN MILK LINES MUST NOT INTERFERE WITH PROPER CLEANING BY CIRCULATION. (Many gaskets, such as the standard fiber gasket, will extend into the inside area of the pipe causing a pocket or groove between the gasket and the pipe, this area will not clean by circulation. The inside diameter of the gasket and the pipe must be the same and the gasket must be perfectly centered to be satisfactorily cleaned by circulation.)

SYRACUSE EXTRANEOUS MATTER IN FOOD SCHOOL

The school for the detection of extraneous matter in foods was held with an attendance of ten students, representing rather diversified interests in the food field. Four food manufacturing companies, a municipal food and drug department, a container manufacturer, a foreign government and a national association dealing in part with food problems were represented.

The school covered in outline form the various methods of recovering extraneous materials from foods. Specimens of known materials were prepared for comparison purposes and practice was obtained in locating particulars as unknowns.

The history of the development of the methods and present day developments in the field were covered in lecture. Special attention was given to the examination of flour.

Another conference is scheduled for next January. Address inquiries to Dr. J. D. Wildman, Department of Plant Science, Syracuse University, Syracuse, N. Y.

DAIRY PLANT OPERATORS CONFERENCE TO FEATURE MILK TANK TRUCK PICKUP

A panel discussion on tank truck pickup of milk from dairy farms will be a feature of the 1952 Vermont Dairy Plant Operators and Milk Distributors Conference at the University of Vermont, October 22-23.

Moving pictures on the actual pickup operation will be shown, Alec Bradfield, associate professor of dairy manufacturers at the University of Vermont, announced today.

Other subjects on the program of the 31st annual conference are weigh pan sampling, cleaning and sanitation, production of quality cream, milk pricing and discussion of methods for measuring plant efficiency.

There will be two papers on new developments in the dairy industry. One will deal with equipment and the other on processes and products.

The two-day conference will close with the annual banquet on October 23.