Sheet No. 82-13

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES SAFETY EVALUATION OF DEVICE

NO.: CA 457D101S DATE: November 3, 1982

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DEVICE TYPE: Backscatter Probe Model JLK

MODEL: JLK

MANUFACTURER/DISTRIBUTOR:

Mettronix Company 1450 E. Third Street Pomona, CA 91766

## SEALED SOURCE MODEL DESIGNATION:

Amersham/Searle Corp. AMC.66

ISOTOPE:

MAXIMUM ACTIVITY:

Americium-241

30 Millicuries

LEAK TEST FREQUENCY: 6 months

PRINCIPAL USE: Gamma Gauges

CUSTOM DEVICE X Yes No

CUSTOM USER: Kraft , Inc. Kraft Court Glenview, Ill. 60025

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### DESCRIPTION:

The Backscatter Probe Model JLK is a device to measure thickness/density of processed cheese. The probe housing and all external surfaces are of stainless steel, with the exception of the detection unit and associated electrical connectors. The sealed source is press fit into a tungsten collimator which is mounted in an evacuated chamber within the probe. A solid state pressure transducer is mounted within the probe to sense the vacuum (less than 2 psia). An alarm signal is present in the event of a loss of vacuum (2 psia). A lockable 3/8 inch lead shutter can be used for installation, storage or shipping purposes. The inside surface is painted expoxy red to clearly indicate when the shutter is open. O-ring scals are used on the end blocks and all connectors to provide moisture resistance. The device housing is approximately 11 inches long and 3 inches in diameter.

### LABELING:

The words "Caution-Radioactive Material" as well as Isotope, Amount and Date are supplied and affixed to the device in the form of an aluminized Mylar label with a permanent adhesive backing (see Figure 1).

### DEVICE DIAGRAM:

See Figure 1.

### CONDITIONS OF NORMAL USE:

The Model JLK is intended for use with a process control system and is mounted in close proximity (.75 to 1.25 inches) to the chilled roll machinery in a temperature controlled environment.

#### PROTOTYPE TESTING:

The Model JLK has been tested for integrity after stabilization for two (2) hours at each of the following temperatures: 32, 50, 70, 100 and 120° F. The integrity of the vacuum was maintained throughout the temperature range tested. The appropriate ANSI classification was given to the devices and is listed under "External Radiation Levels" (ANSI N538-1979).

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Figure 1

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## EXTERNAL RADIATION LEVELS:

The external radiation levels were measured as prescribed in NBS handbook No. 129, and conform to the ANSI N538-1979 standards. Tests were made using an energy dependence corrected survey meter at specified distances. With the shutter closed, the maximum radiation levels detected was less than 0.025 mR/hr at the surface. With the shutter open and installed for use, the levels at 5, 30, and 100 cm were 5 mR, 0.25 mR, and 0.05 mR/hr respectively. The maximum level just in front of the source (not accessible) was 75 mR/hr. The ANSI classification for this device as specified by the ANSI N538-1979 Standard is ANSI 23-685-985-R-1.

## QUALITY ASSURANCE AND CONTROL:

A quality control program is maintained by the appointment of a Quality Control Supervisor to inspect all components for workmanship prior to assembly. This individual has the authority to reject or accept all components and finished devices. This individual will keep all records of performance standards for sealed sources, materials, and components used in the manufacturing process. Quality assurance is provided by the following tests:

- (1) All probe assemblies are temperature tested for stability and integrity from  $32^{\circ}$  to  $122^{\circ}$  F.
- (2) Leak tests on all incoming sealed sources and at six months thereafter.
- (3) Leak tests on all finished probe assemblies.
- (4) Electrical and mechanical tests, particularly with the shutter mechanism.
- (5) Test the operation of the vacuum system and sensor used in continuously monitoring source containment.

# LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- A. This device whall be distributed only to the custom user identified on Page 1 of this registry document.
- B. The device should not be subjected to environmental conditions other than specified by the ANSI 23-685-985-R-1 Classification (32<sup>o</sup> - 122<sup>o</sup> F).
- C. Installation, disposal, relocation and repair will be provided by the manufacturer.

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(limitations and/or other considerations of use) cont'd

- D. If at any time source containment is suspect, the licensee must be specifically instructed to shut down the production line and isolate food product currently being manufactured.
- E. Periodic maintenance at six month intervals including leak tests, surveys and mechanical tests of the safety features will be performed by the runufacturer in accordance with the instruction manual.
- F. Leak tests shall be performed at six (6) month intervals using techniques capable of detecting 0.005 microcuries of removable contamination.

## SAFETY ANALYSIS SUMMARY:

Based on our review of the information and test data contained in references listed below, we conclude that the Model JLK probe can be safely operated by, or under the supervision of those personnel who have had the four (4) hour training session provided by the manufacturer, or equivalent health physics training. A source containment monitor allows continuous monitoring of source integrity so that accidentally contaminated food does not reach the public. The sealed source will remain in the holder even under adverse conditions of use, due to the physical arrangement of the housing and collimator. It is unlikely that any person will receive external radiation doses or dose commitments in excess of the limits specified in 17 CAC Section 30268.

### **REFERENCES**:

This Certificate of Registration is based on information and test data contained in the following supporting documents which are hereby incorporated by reference and made a part of this registry document:

- (a) Mettronix Company application dated May 17, 1982, with enclosures including a quality assurance program.
- (b) Mettronix Company letter dated September 20, 1982, with attachemnts.
- (c) NBS handbook 129
- (d) ANSI N538-1979, Classification of Industrial Ionizing Radiation Gauges.

DATE: NOV 3, 1982 DATE: NOV 3, 1982

CONCURRENCE: Oprand - Omg

ISSUING AGENCY: California Department of Health Services