OPERATING AND SAFETY INSTRUCTIONS

Ohmart Mill Roll Scanner

for

Mobil Chemical Company
Shawnee, Oklahoma

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(6/17/80)

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COMPONENTS OF SYSTEM

A. One Model B-33981-24 Type Gage Frame for 120" Length and 24" Max Diameter Roll, each containing:

One (1) Model A-2102 Cs-137 Source, 3000 mCi
(1) Model NB-15 Detector (Harshaw)
(1) Reliance D.C. Gearmotor, TENV, 1/4 H.P., 56 RPM

B. One Model C-27258 Cabinet containing:

One (1) Model B-34053 Program Panel
(1) Model B-34055 PLC Interface
(1) Model B-27001, 2, 3, MC1 Motor Control
(1) Model B-21619 Programmable Logic Controller
(1) Esterline Angus Speed Servo II Recorder, 10 Speed
(1) Model B-34054 ASAC Panel
(1) Model NA-17 Amplifier (Harshaw)
(1) Model NC-22 Pulse Height Analyzer (Harshaw)
(1) Model NR-30 Rate Meter (Harshaw)
(1) Model NH-85 Bin and Power Supply (Harshaw)
(1) Model NV-26 High Voltage Power Supply (Harshaw)
(1) Model A 800CAM Autotron Photoelectric Control Unit

C. Photo Detectors

(2) Opcon #1410A-6501 Photo Detector
(2) Opcon #8526A Relay

D. Isolation Transformer, 3KVA Sola Electric, Type 23-26-230, 480V/120V

E. Miscellaneous

(1) Track and trolley for cables
(1) Scanner support frame structure
(1) Protective guarding, posts and warning sign
(1) Bulletin board

SPECIFICATION DATA

Gage Will Measure: Prifile Variations in Mill Roll.

Source Material: Cs-137

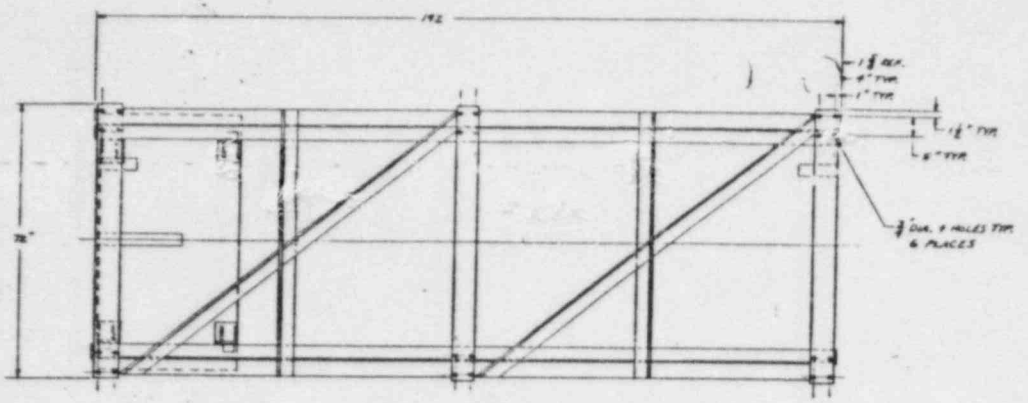
Measurement Precision Over Entire Range: ± 1% of span at 1.0 second Time Constant

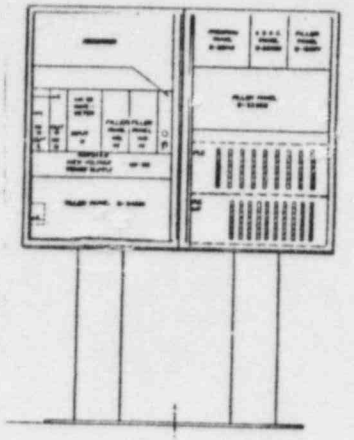
Readout: Profile Recorder 10"

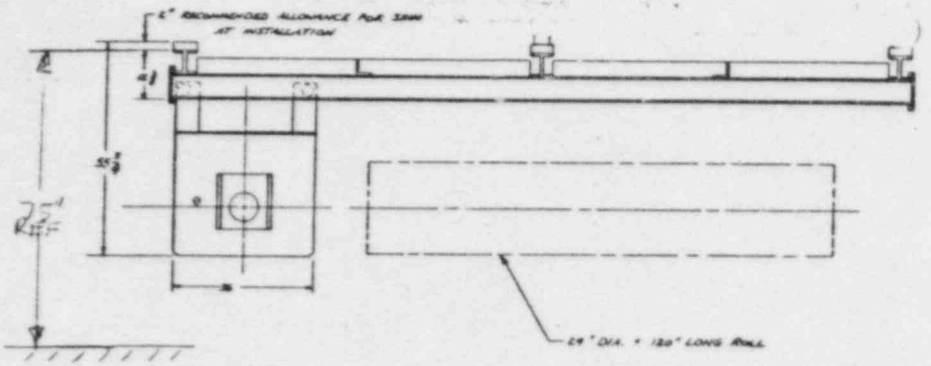
Length of Profile Charts: 20" for 120" Roll

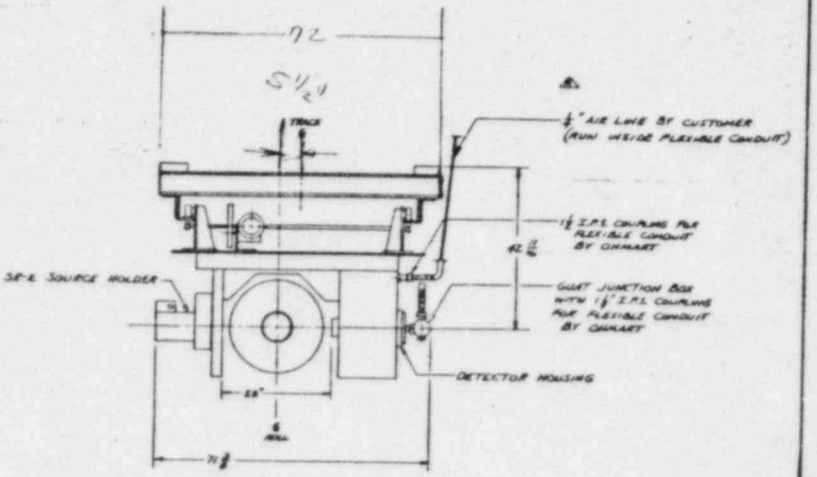
Maximum Allowable Ambient Temperature at Frame: 140°F

Maximum Allowable Ambient Temperature at Console: 100°F









34.177
40.688
0.125
75.012"
75" REF

CERTIFIED CORRECT

BY: RLB

DATE: 9/25/79

DRWG OE-0034049

THE OHMART CORPORATION
CINCINNATI OHIO

OUTLINE MILL ROLL
SCALE: ½"=1'-0"

MOBIL CHEMICAL CO

K 05878
9062-011

D-30-49

GENERAL THEORY OF NUCLEAR GAGING

1.0 GENERAL

The nuclear gage, equipped with either an alpha, beta, gamma or x-ray radiation source, typically measures the weight-per-unit area of a given sample. As the sample absorbs the radiation in proportion to its weight-per-unit area, the measuring detector current varies accordingly.

If the density of the material is constant from sample to sample, the gage can be calibrated directly in terms of thickness. If, however, the thickness is constant, such as with liquid in a pipe, the gage can be calibrated in terms of density. Most nuclear gages using beta radiation are designed to read either thickness or weight-per-unit area.

Electrical zero "suppression" is used to provide a null system of measurement. The suppression voltage is applied to the low impedance side of the input load resistor to offset the current generated by the measuring detector for a given material weight chosen to represent the zero indication on the Indicator/Power Supply meter.

For example, to measure a weight-per-unit area from 20 oz. per sq. yd. to 40 oz. per sq. yd. of plastic, assume the detector generates 10 units of current for a weight of 20 oz. and 8 units of current for 40 oz. The zero suppression is then adjusted to "balance out" the current of 10 units. When the weight-per-unit area is changed to 40 oz. per sq. yd., the detector generates only 8 units while the zero suppression is fixed at 10 units. Thus, a change in current of 2 units results for 40 oz. The amplifier sensitivity is adjusted to produce full scale deflection for the 2 units of current. The result is that the meter indicates zero for 20 oz. and full scale for 40 oz. per sq. yd.

Beta radiation is considerably less penetrating than gamma radiation and is usually used for sheet processes. Some frequently used radiation sources are Krypton-85, Strontium-90 Beta and Strontium-90 Bremsstrahlung and Americium-241. For very thin materials, Krypton (half life: 10 years) is used, while Strontium-90 (half life: 28 years) is used for medium weight materials. Where greater weight-per-unit area or thickness is to be measured, Americium-241 is provided in a source designed to produce low energy x-radiation.

The beta source is contained in a welded stainless steel capsule with a thin stainless steel window, to virtually eliminate the possibility

of leakage of radioactive material. Since Krypton-85 is a chemically inert gas, rupture of the stainless steel window would immediately disperse the radioactive material in the atmosphere without hazard. Strontium-90 is absorbed in inert microspheres. Americium oxide is mixed with aluminum powder and pressed into a solid mass.

The source holder contains appropriate shielding around the radioactive source to protect personnel within the gage area from exposure to the radiation. When the source shutter is closed, shielding of the measuring path is provided. The shutter should be closed during periods when personnel are required to work very close to the source holder.

A yellow and purple warning tag is affixed to the gage base showing the quantity and type of radioactive material. In the event of the abandonment of the equipment, the source holder must be returned intact with the radioactive material to the OHMART Corporation for proper disposal.

2.0 GAGE CONFIGURATION

2.1 TRANSMISSION-TYPE GAGES

The transmission gage has the source located on one side of the product and the detector located on the opposite side. These two units, source and detector, can be located on one integral C-frame that can be moved as a unit, or on two individual tracts, geared together, in an O-frame configuration.

2.2 BACKSCATTER-TYPE GAGES (also called "Reflectance Gages")

The backscatter technique is utilized when space above or below the product to be measured does not exist, or when the product to be measured is a light coating on a heavy backing.

The source is located adjacent to the detector in the same housing. The amount of radiation reflected back to the detector is proportional to the weight-per-unit area of the coating.

If the entire web weight or thickness is desired, the web must be backed up by a heavy-walled roller or flat plate and the radiation then reflects off the heavy base material.

This type of measurement is successful only if the back-up material (the base material in the case of a coating measurement) is an "infinite thickness" for the radiation used. Thus, if all the energy of Krypton-85 is expended in 150 mg per sq. inch of material, the base material should exceed at least 300 mg per sq. inch to make a proper application for reflectance gaging.

OPERATION

1.0 GENERAL

The Operator's controls for selecting the operating mode of the system and for controlling the source shutter are located on the PROGRAM panel.

2.0 CONTROLS

2.1 STANDBY (Pushbutton and Amber Light)

Depressing the STANDBY pushbutton causes the scanner to retract to the off-roll position if it is not already there. (The amber light flashes until the gage reaches the off-roll position.) The recorder pen is made to read zero and the chart does not drive. The system remains in this condition until another mode of operation is selected.

2.2 SINGLE POINT (Pushbutton and White Light) REVERSE/FORWARD (Selector Switch)

Depressing the SINGLE POINT pushbutton interrupts any other mode of operation and places the scanner under control of the REVERSE/FORWARD selector switch. Safety limit switches prevent the scanner from being driven beyond its drive limits.

The recorder chart drive is activated when the roll is sensed by the photoelectric eye above the detector. The pen is activated five seconds after the chart. The recorder continues to operate as long as the roll is sensed by the photoelectric eye.

2.3 SCAN (Pushbutton and Blue Light)

Depressing the SCAN pushbutton interrupts any other mode of operation and causes the scanner to drive to the off-roll position if it is not already there. From this position the scanner drives forward until the roll is sensed by the photoelectric eye.

The scanner stops at this position and a five second time delay is begun.

(At this point, if the gage has not been standardized (calibrated) on the roll, one of the procedures in Section 8.3 of the manual is normally carried out.)

After the five second time delay, the recorder pen is activated and the chart begins to drive. Depressing the SCAN pushbutton again after

the time delay causes the gage to begin scanning the roll, while the recorder charts the weight profile of the roll.

At the end of the roll, the photoelectric eye signals the scanner control to return the scanner to the off-roll position. The recorder chart continues to drive for thirty seconds, with the pen lifted, to generate a leader for separating consecutive profiles. When the scanner reaches the off-roll position, the system automatically transfers to STANDBY mode.

2.4 OPERATE/OFF/SHUTTER OPEN Switch

This switch selects the operating mode of the source shutter. In the OPERATE position, the shutter opens automatically when the light beam to the photoelectric eye is broken. This shutter mode is to be used when a roll is in place and is about to be measured in SCAN or SINGLE POINT operating modes.

In the OFF position, the shutter remains closed.

In the SHUTTER OPEN position, the switch causes the source shutter to open regardless of the operating mode of the system. This position is provided for calibration and maintenance of the system. A spring returns the switch to the OFF position when it is released.

2.5 CHART RECORDER

Ten different chart speeds are available and may be selected on the chart recorder panel. The recommended chart speed is 7.5 inches per minute. The scanner will always travel at 60 inches per minute, therefore, at the 7.5 inch/min. speed, one inch of chart paper length equals 8 inches of mill roll length. The mill roll and Beta in-line scanners utilize the standard chart paper.

2.6 SOURCE SHUTTER OPERATION

The source shutter consists of a rectangular, lead and heavy metal-filled plate. The shutter is mounted in a position to slide in front of the source holder slotted window. The shutter is normally in the closed position, thus blocking the radiation from the source to the measurement area.

When "open" the shutter is positioned such that a slotted window in the source holder and a slotted window in the shutter are aligned and allow the radiation to pass, unobstructed, into the measurement area. Shielding around the source prevents radiation from being emitted to any other area.

The open and close action of the source shutter is accomplished by an air cylinder piston to which the shutter is attached. The air to thrust the piston forward is supplied through a solenoid-operated valve.

When the solenoid is energized through a keylock switch on the control console, the valve is opened and air pressure forces the cylinder piston forward, which in turn slides the source shutter and aligns the source shutter slot and the source holder window.

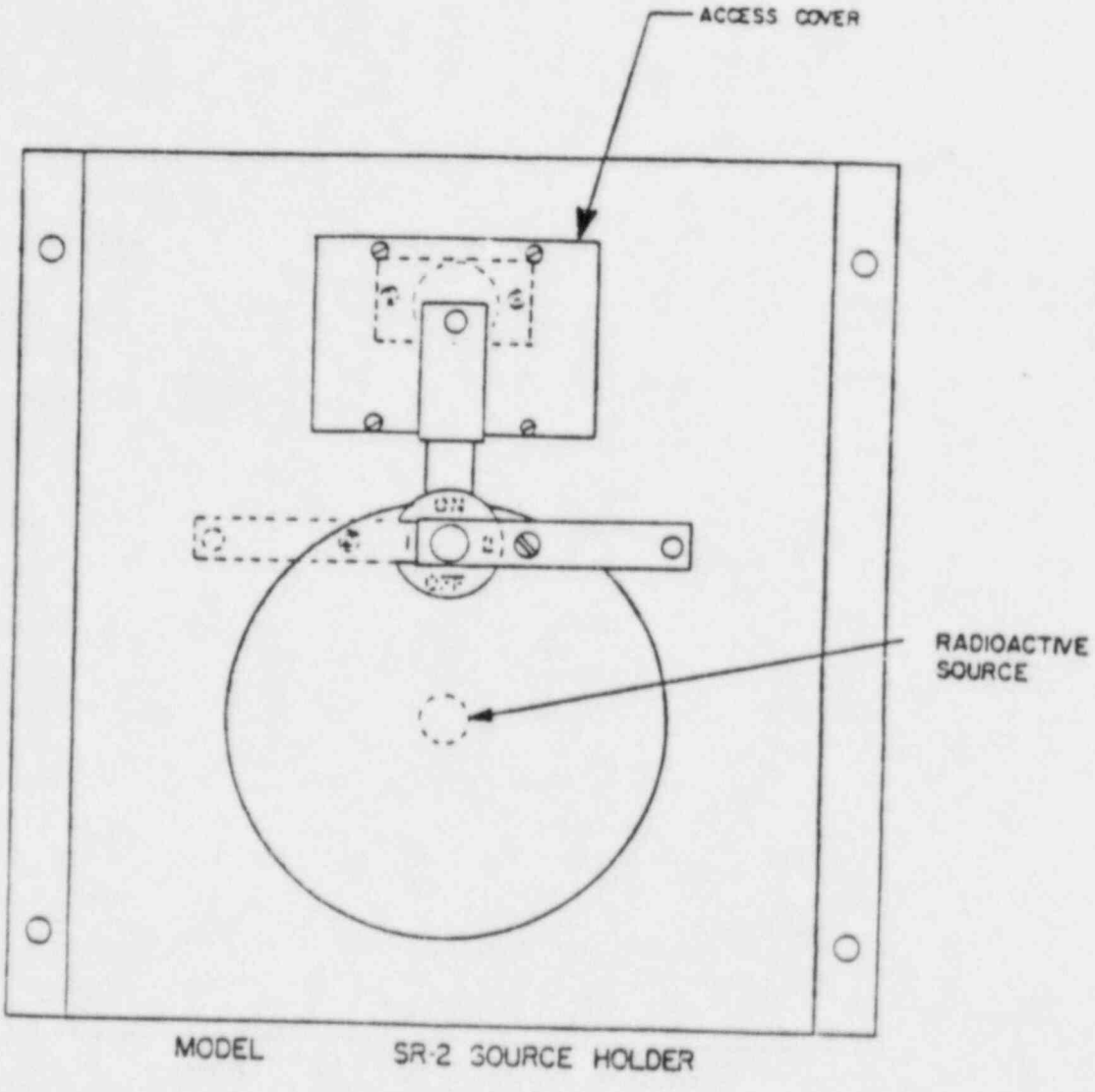
A heavy-duty compression spring is an integral part of the air cylinder and is used to force the piston back into the cylinder when air pressure is lost. Thus, if power to the gage fails, the valve will close and the source shutter will close automatically.

The air intake and exhaust are metered and can be adjusted to allow the shutter to open and close slowly and prevent damage to the air cylinder and shutter. The adjustments are set at the factory and should not be altered unless necessary.

An enclosed microswitch with front and back contacts is mounted near the end of shutter travel. When the shutter is driven forward the microswitch is tripped and the power to the source position indicator lights is switched.

Two lights are mounted at the gage frame and two are mounted at the control console. The Green lights indicate "Source Closed" and radiation is blocked from the measure area. The Red lights indicate "Source Open" and radiation is being emitted to the measure area.

SECTION 5 of this manual contains complete information on radiation safety.



HANDLE SHOWN IN CALIBRATE POSITION #1

Figure 3-1

"CALIBRATE" positions are not used in this application. Normal operation of gage is with source holder in "ON" position with external source shutter operated automatically by air cylinder. Source holder should be placed in "OFF" position only for maintenance conditions.

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3.0 SET-UP AND ROLL MEASUREMENT

3.1 Mill rolls ranging from 15" to 26" in diameter may be measured on the mill roll scanner for gauge variations.

3.2 Insure that all personnel are clear from inside the scanner perimeter guarding prior to positioning the mill roll cart for scanning.

3.3 The basic calibration of the scanner is established by the set-up of the Harshaw Electronics Control Panel. The setting of these controls were factory preset and should be considered permanent.

3.4 Only those persons properly trained and authorized in writing, will operate the mill roll scanner.

3.5 ROLL MEASUREMENT

* Position mill roll and cart on V-groove tracks.

* With the roll in position, depress the SCAN pushbutton and allow the gage to travel onto the roll. Depress the SINGLE POINT pushbutton. When the recorder begins to measure, move the scanner along the roll to the approximate center by means of the FORWARD/REVERSE control. Adjust the SUPPRESSION dial on the program panel until the recorder trace averages zero (center line of chart paper).

* Refer to the posted suppression/calibration chart (Table 3-1) and read the CALIBRATE value which cooresponds to the SUPPRESSION dial reading. Set the CALIBRATE dial to this value.

* This completes the set-up procedure. To measure the roll, depress the SCAN pushbutton. Allow the scanner to retract and to return to the end of the roll. Depress SCAN again when the recorder pen is activated.

* The scanner will then begin scanning the mill roll, recording gauge profile on the chart recorder. After completion, the scanner will return to its standby position.

* The gauge profile scale is ± 10% (i.e. - 1% guage equals ½" on chart) and is the same scale used for the Beta in-line Ohmart Scanners. The length scale is typically set for 7.5 in/min. (i.e. - 1" chart length equals 8" of mill roll length).

* The chart paper may be indexed using the thumbwheel on the recording panel. A Safety Knife should be used to trim and remove the recorded scan. Identify the mill roll number, roll orientation, and percent gauge on the scan profile.

* After the Scanner gauge has returned to its standby position (source closed), remove the mill roll and cart. Attach the mill roll scan profile to the mill roll for future reference and evaluation.

3.6 SCAN PROFILE EVALUATION

* Comparison of Beta in-line and mill roll scan profiles should be evaluated by the Orientation Production Shift Supervisor. His comments concerning the similarity between the profiles should be annotated on the scan sheet.

* The Beta in-line and mill roll scans should display similar profiles. Maximum gauge profile variation will generally appear higher for the mill roll scanner, but in nearly all cases will not exceed twice that of the in-line scan. Examples of similar and dissimilar scan profiles are shown at Figures 3-2, 3-3, and 3-4.

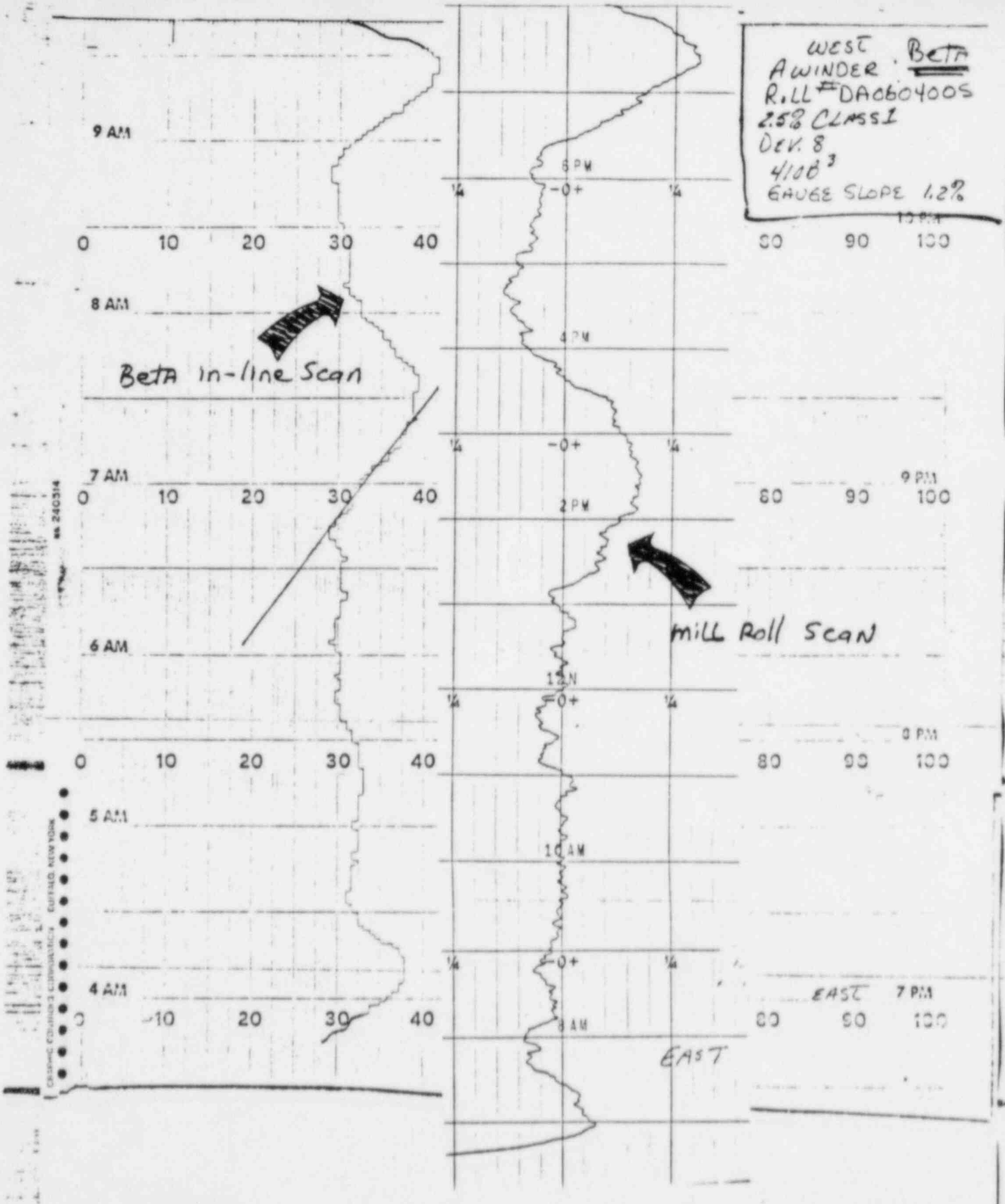
Roll Diameters 15 10 C1

TABLE 3-1

1×10^5 SCALE

Suppression	Calibrate
350	199
352	198
354	197
356	197
358	196
360	196
362	196
364	195
366	195
368	194
370	194
372	193
374	193
376	192
378	191
380	191
382	190
384	190
386	189
388	188
390	188
392	187
394	187
396	187
398	186
400	186
402	185
404	185
406	184
408	184
410	183
412	183
414	182
416	182
418	181
420	181
422	180
424	180
426	179
428	179
430	179
432	178
434	178
436	177
438	177
440	176
442	176
444	176
446	175
448	175
450	175
452	174
454	174
456	174
458	173
460	173
462	173
464	173
466	172
468	172
470	172
472	171
474	171
476	171
478	170
480	170
482	170
484	17[illegible]
486	16[illegible]
488	16[illegible]
490	16[illegible]
492	16[illegible]
494	16[illegible]
496	168
498	168
500	168

NOTE: The equivalence factors for steel and aluminum to film that were used are as follows: 1 inch aluminum = 3 inches of film; 1 inch steel = 8.58 inches of film.



Similar Profiles

FIGURE 3-2

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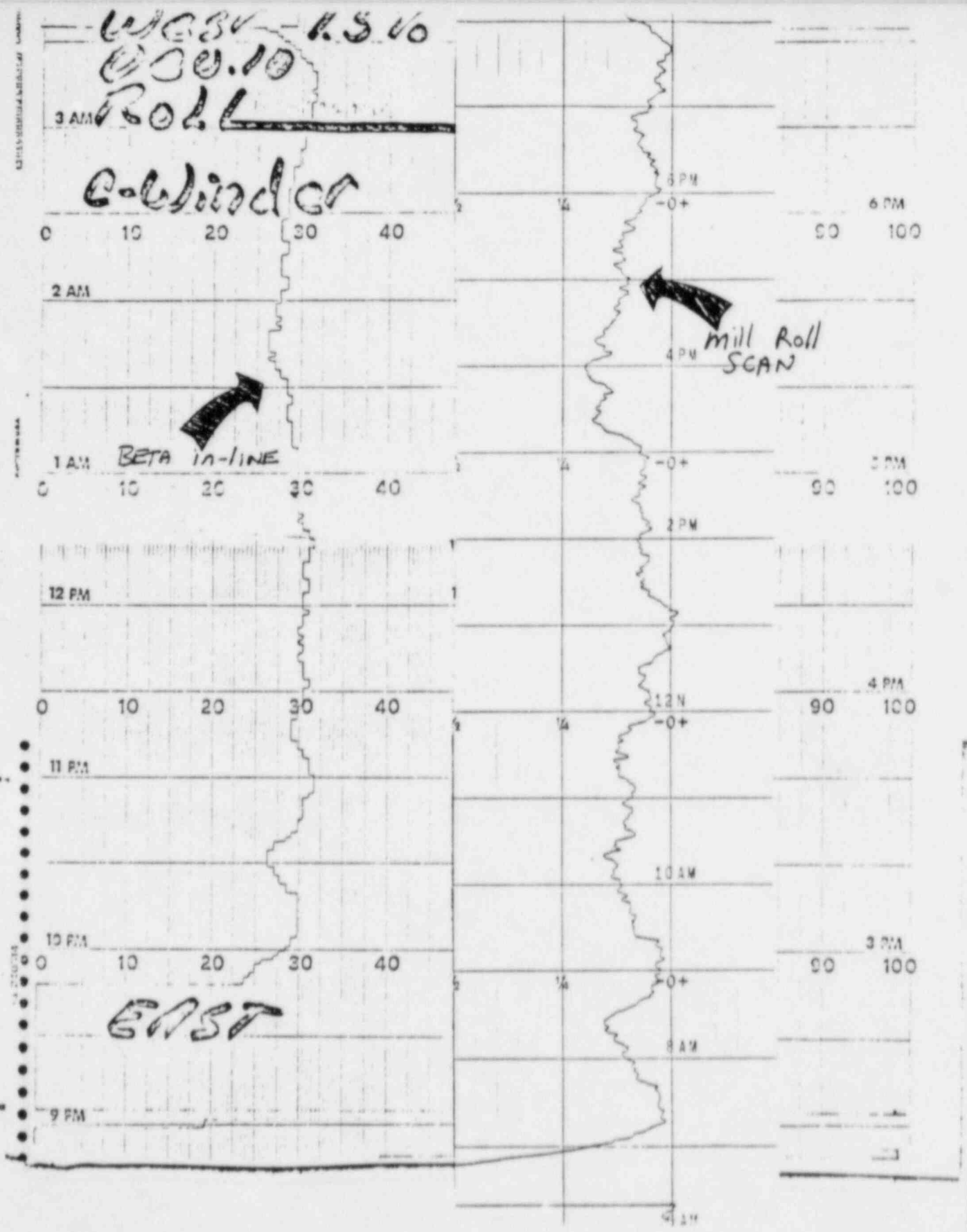
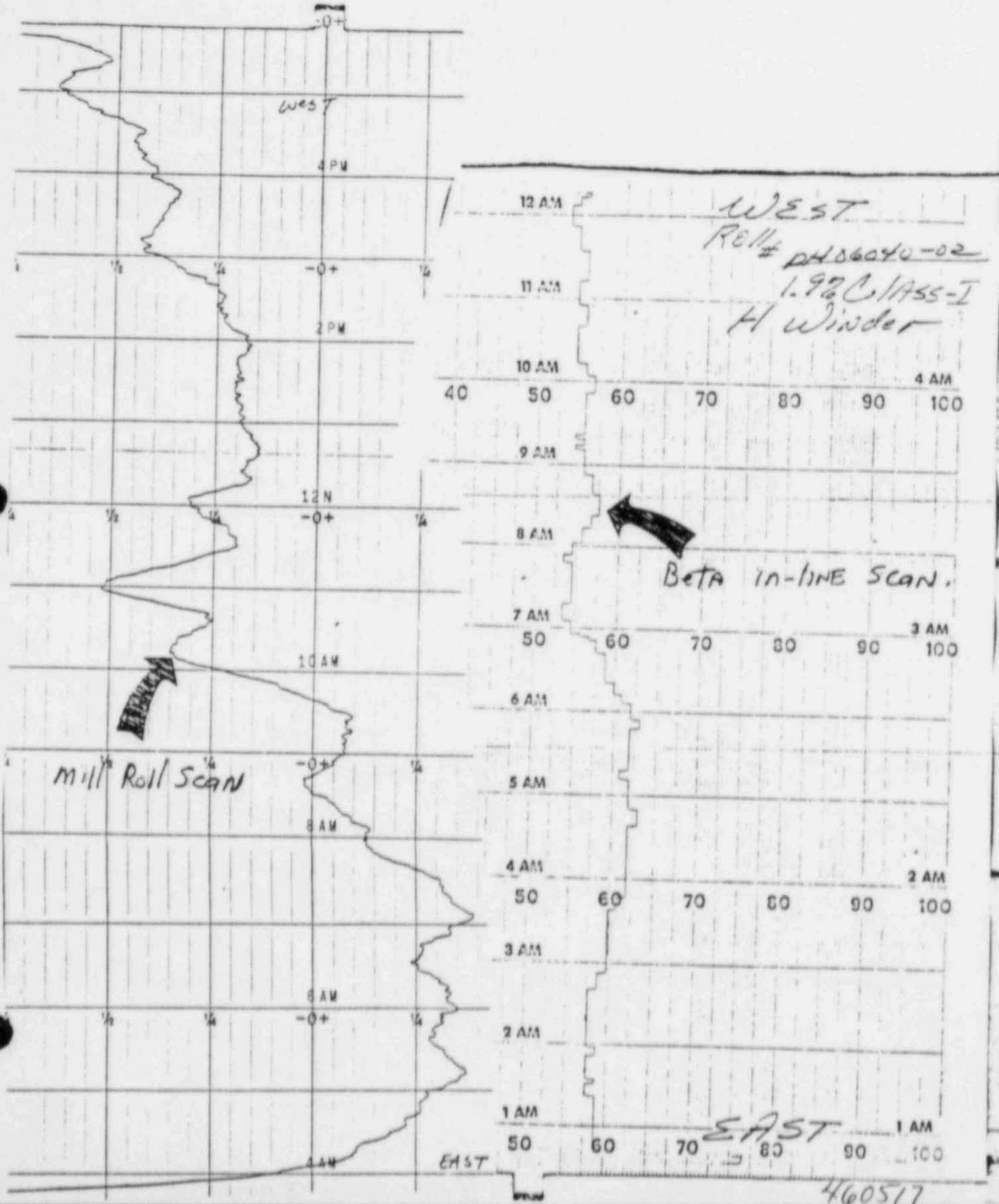


Similar Profiles

FIGURE 3-3

- Dissimilar Profiles -

FIGURE 3-4



STANDARDIZATION AND CALIBRATION

* The basic calibration of the scanner is established by the set-up of the Harshaw Electronics Control Panel. The setting of these controls were factory preset and should be considered permanent.

* In addition to the need for occassional adjustment due to normal component aging and varying ambient conditions, radioactive gaging systems require periodic recalibration due to the natural decay of radioactive source material. The amount of time between calibrations depends upon the rate at which the source decays, and upon the accuracy required of the measurement. The cesium 137 source used in this system decays at a rate of approximately 0.2%/month, equivalent to a loss of one percent of source strength in five months. Without recalibration, the lessening of source strength appears as a gradual increase in the apparent weight of measured material.

* Since this system is standardized on each roll to be measured, the effect of source decay calibration is minimized.

* Any recalibration will be accomplished by a trained and qualified technician.

SECTION 5

RADIATION SAFETY

5.1 INTRODUCTION

The information in this section is intended primarily for Specific Licensees. The regulations and instructions herein contain leak test and other procedures which General Licensees are not permitted to perform. For General Licensees this section is included for information purposes only.

Most radioactive material used in gaging devices is regulated by the U.S. Nuclear Regulatory Commission (formerly USAEC). The NRC issues licenses to users and manufacturers of gaging devices utilizing radioactive materials and inspects sites where materials are used to determine compliance with the terms of the license.

The NRC has issued rules on: 1. instructions to employees (10 CFR part 19); 2. the licensing of radioactive materials and devices (10 CFR part 30); and 3. radiation safety (10 CFR part 20). A copy of these regulations follows this section. A brief outline of the regulations is given in NRC REGULATIONS.

During 1962, the USAEC began entering into agreements with individual states to transfer regulatory authority to them. Known as Agreement States, their regulations closely parallel those of the USNRC and are essentially identical except that the Agreement States usually regulate the use of ALL radiation producing devices. Thus, the NRC regulations are generally applicable.

NOTE: Only those individuals specially licensed to mount, repair, relocate and/or remove the part of the gage containing the radioactive source may do so. Each specific licensee should carefully read his particular license to determine the exact conditions of his license. (SEE ATTACHED LICENSE).

5.2 GENERAL

High-energy gamma-emitting radioactive material radiates electromagnetic energy very similar to light except that it readily penetrates opaque materials and readily passes through several inches of steel or other dense material.

The ability to penetrate dense material can be used to advantage in the measurement of process variables such as density, level and thickness where a change in detected radiation indicates a change in process variable.

GENERAL (CONT'D)

WebART measurement and control systems utilize the energy of beta radiation or low energy gamma photons for the measurement of density, thickness and coating of light weight materials. Beta radiation consists of the emission of negatively charged particles which are actually electrons. Gamma radiation is radiation of pure electromagnetic energy emitted in decay of the radioactive material.

Radiated energy is harmful to the human body only when absorbed at an excessive rate. For example, a glowing incandescent lamp cannot be held in the hand without severe discomfort or a painful burn resulting. The hand can be held close to the lamp for seconds, at a few inches for hours, or several feet away continuously. By use of an insulating jacket about the lamp or with an insulated glove, the lamp could be held indefinitely without discomfort or injury.

Radioactive energy and radiation is analogous to light energy and radiation, with the radioactive source taking the place of the incandescent lamp. Permissible human exposure to a radioactive source is dependent upon:

1. The number of millicuries of radioactive material in the source (similar to the wattage rating of a lamp).
2. Distance from the source.
3. Amount of absorber between source and body.
4. Amount and portion of the body receiving the radiation.

The term "milliroentgen per hour," abbreviated mr/hr, is a measure of the radiation field intensity in air. When radiation is absorbed by the body, the term "rem" or millirem" (0.001 rem abbreviated mrem) is used. This distinction is necessary because not all radiation affects the body in the same manner. For gamma radiation, the millirem is equal to the milliroentgen.

The Nuclear Regulatory Commission limits the amount of radiation which a person should receive to 1.25 rem per calendar quarter. This is an average of about 100 mrem per week.

The 1.25 rem per calendar quarter limitation is a dose at which there is no possibility of injury. However, since the use of gamma radiation is relatively new, the history of injury is not complete. Thus, it is wise to receive as little radiation as possible. To guard against possible overexposure and to maintain a record of personnel routinely exposed to radiation, the

GENERAL (CONT'D)

NRC requires personnel monitoring of persons who are likely to receive more than an average of 24 mrem per week or who are exposed to a radiation field greater than 100 mr/hr. When personnel monitoring is required, a record must be kept showing the dose received. When records are kept, and if the employee requests it, the employer must furnish a written report of radiation exposure annually and on termination of employment.

In the majority of OHMART installations, the source is contained in a lead-filled source holder with an OFF and ON position. The holder is designed so that the radiation field is 5 mr/hr (or less) at a distance of 12 inches from the surface of the holder when it is in the OFF position. When the source holder is mounted on the pipe or vessel and turned to the ON position, the pipe walls, the process material and the mounting brackets absorb most of the radiation. Again, the field intensity is about 5 mr/hr at a distance of 12 inches from the surface of the gage. Thus, a person would have to be within 12 inches of the gage for 20 hours per week to receive 100 mrem. A person would have to be within 12 inches of the gage for 5 hours per week before he would be required to have a personnel monitoring device, such as a film badge or a dosimeter.

Long experience with hundreds of gages, where the source is contained in a source holder, indicates that the dose received by operators, maintenance personnel and supervisors is less than an average of 24 mrem per week. Thus, for gages where the source is contained in source holder, it is usually not necessary to provide any personnel with monitors.

Whether or not monitoring devices are needed should be determined at the gage site at the time of installation in the form of an "occupancy evaluation." Only those persons specially licensed by the NRC or an Agreement State to install a radioactive device are qualified to make an occupancy evaluation.

5.3
NRC REGULATIONS

A copy of the Title 10 Code of Federal Regulations Parts 19, 20 and 30 is posted. These should be read thoroughly to become familiar with the laws governing the use of radioactive materials.

Some of the most important aspects of these regulations are given below. The federal regulations paragraph number is shown in parentheses.

NRC REGULATIONS (CONT'D)

1. The "Individual User" listed on the "Application for By-product Material License" (Form NRC-313) is responsible for the source. If this person is transferred or is changed to a position where he no longer is responsible for the source, the license must be amended prior to the assignment of the new "User." (30.32, 30.33, 30.34 & 30.38)

2. Use of the source is usually licensed for a particular plant site. If the source is transferred to a different plant site the license must be amended prior to the transfer. (30.34c, 30.38)

3. A record of the initial radiation survey must be kept for reference. (20.401b)

4. Records of the periodic leakage test must be maintained. (20.401b)

5. A label must be attached to the source holder, or source-well, stating the type and quantity of radioactive material and the date of manufacture. The label must bear the conventional radiation symbol. An NRC-approved label is attached to the source holder by The OHMART Corporation prior to shipment. For sources in sourcewells, an NRC approved tag is placed inside of the source shipping and storage container. This tag should be removed and attached to the sourcewell. (20.203)

6. The area in the vicinity of the source must be posted with a radiation warning sign if the radiation field is greater than 5 mr/hr at a distance of 12 inches from the surface of the gage. (20.204a & 20.203)

7. Personnel monitoring is required when personnel are likely to receive a dose in excess of 24 mrem/wk or when they enter a radiation field greater than 100 mr/hr. (20.202a)

8. Whenever the source is not needed, it must be returned to The OHMART Corporation for proper disposal. The OHMART Corporation must be contacted for detailed shipping instructions. (20.301a)

9. The regional Operations Office of the NRC must be notified of any incident, such as a fire or explosion, which involves the radioactive material used in the gage. (20.403) The OHMART Corporation should also be notified.

NRC REGULATIONS (CONT'D)

10. If personnel monitoring is required (20.202a), a record of the radiation exposure must be kept on Form NRC-5 (20.401a & c) and, if the employee requests it, written notification must be given annually or on termination of employment. (19.13)

11. If a person receives more than 1.25 rem per calendar quarter, he must be notified in writing of the exposure and the NRC must be notified. (20.405)

12. A restricted area is defined in 10CFR20.3A(14) and the permissible exposure to individuals in a restricted area is given in 10CFR20.101. An unrestricted area is defined in 10CFR20.3A(17) and the permissible level of radiation in an unrestricted area is given in 10CFR20.105 (b).

    Any area where an individual, if continuously present, can receive a dose in excess of 2 millirem in any one hour or where he can receive more than 100 millirem in any seven consecutive days must be treated as a restricted area and access thereto be under the control of the licensee.

13. Employees working in, or frequenting, a restricted area must be advised of the restricted area by posting of Form NRC-3 19.11 (c). The NRC regulations state that this form must be posted so that employees can "observe a copy on the way to or from their place of employment" in the restricted area. Thus, Form NRC-3 could be posted at or near the entry into the restricted area.

    If personnel do not work in, or frequent, a restricted area, Form NRC-3 need not be posted.

5.4 PERIODIC LEAKAGE TEST

Information about the periodic leakage test is covered in the attached "Leak Test Procedure for Sealed Sources."

5.5 PUBLICATIONS

For those who desire further information on radiation safety and the handling of radioactive material, the following publication is recommended.

Radiation Dosimetry, Hine and Brownell

Academic Press, Inc.
111 5th Avenue
New York, New York 10003

PUBLICATIONS (CONT'D)

The following publications and National Bureau of Standards Handbooks are available from the Superintendent of Documents, Washington 25, D.C.

NUMBER	TITLE
92	Safe Handling of Radioactive Materials
73	Protection Against Radiation from Sealed Gamma Sources

5.6

LEAK TEST PROCEDURE FOR SEALED SOURCES

Ohmart sealed sources are usually double-encapsuled in Monel or stainless steel and are usually silver solder sealed or welded. Because of this rugged construction, the possibility of the radioactive material leaking from the source capsule is very remote. This source capsule is enclosed in a source holder to provide shielding for the radiation and to permit an OFF and an ON position. Thus, even if the source capsule leaked, the possibility of the radioactive material migrating to the outside of the source holder is extremely remote.

In addition to the above precautions and rugged construction, the sealed source is leak-tested during a 30-day period prior to shipment. Sources showing the slightest evidence of radioactive material on the external surface of the source capsule are discarded or repaired.

However, since industrial use of sealed sources dates primarily from the general availability of radioactive isotopes for industrial gaging use after about 1947, the Nuclear Regulatory Commission requests that sources be tested for leakage at specified intervals. Only Kr85 and Tritium sources are exempt from leak testing. Certain sources of very small activity are exempt from any testing (10CFR30.18(a)). The leak testing procedure detailed in these instructions applies only to The OHMART Model LT leak testing kit supplied with the OHMART "Leak Testing Service."

This service may be purchased from The OHMART Corporation on a five (5) year contract basis when the wipe tests must be performed every six (6) months. Or, it can be purchased on a one-time basis, in the case of three (3) year wipe test intervals. The service must be purchased for each individual source. If this service is purchased, The OHMART Corporation will: send leak test materials (a cotton tipped wooden stick, called a Q-Tip) at required intervals; analyze the leak test materials for the presence of radioactive material; issue a report on the results of the leak test.

Sealed Sources in Ohmart Source Holders - The source holder must not be disassembled to test the source capsule. Testing of the external surface of the source holder is adequate.

LEAK TEST PROCEDURE FOR SEALED SOURCES (CONT'D)

Take the cardboard mailing tube containing the Q-Tip to the source holder to be tested. Remove the top from the mailing tube. Remove the cap from the vial which holds the Q-Tip. Tilt the mailing tube and grasp the Q-Tip by the wooden end.

Wipe the external surface of the source holder with the cotton-tipped end. Wipe all seams and around rotor shafts. These areas are most likely to be contaminated if the source leaks. Do not touch the cotton-tipped end or allow it to touch other objects as this would spread contamination if the source leaks.

After making the wipe test, replace the Q-Tip in the vial with the cotton-tipped end at the bottom. Replace the cap on the vial and the top on the mailing tube.

Attach an address label reading "The OHMART Corporation, 4241 Allendorf Drive, Cincinnati, Ohio 45209." Return the mailing tube via Railway or Air Express. Do not send the mailing tube by conventional mail as the Postal Regulations prohibit mailing radioactive material in this form.

Upon receipt of the wipe, The OHMART Corporation will perform a very sensitive test to determine the presence of radioactive material. If the wipe is free from contamination a notice will be sent, via mail, that the source is leak-free. If the wipe has a significant amount of radioactive material, an emergency notification will be sent, via telegram or telephone, advising that the source holder must be taken out of service and returned for repair. The emergency notification will contain detailed instructions for removal and shipment of the source holder.

Export - For installations outside the United States, consult local government regulations for proper procedures and leak test intervals.

EMERGENCY ACTIONS AND MEASURES

6.1 Fire or Explosion:

In case of emergency such as fire or explosion involving apparent damage to the source holder, take the following action:

* Barricade area 50 ft. around source holder.
* Notify Security at ext. #231.
* Notify one of the individuals listed in paragraph 12 of the NRC License.
* Notify the radiation Safety officer (Safety Supervisor). He will notify the appropriate Regional Office of Inspection and Enforcement USNRC as necessary.
* The Safety Supervisor has a survey meter for detecting radiation levels from radioactive sources. A survey taken in the event of an emergency can be campared to the initial survey taken at installation on 6/5/80. (See Figure 6-1)
* The services of an Ohmart representative will be obtained to assist in inspection for damage and local health authorities will also be notified.

6-2 Malfunction:

* In case of malfunction of the source holder or damage thereto, the services of an Ohmart representative will be obatined for repair or to supervise removal and proper packaging for return to the Ohmart Corporation for repair as required.

* In case of an electrical or mechanical malfunction not involving the source holder, notify a trained plant technician and the production shift supervisor.

6-3 Tamper:

* There is the possibility, although remote, of an employee(s) tampering with the source. It is understood that the Mobil employees will not touch or handle the source head; the only people authorized to work on the source head are qualified Ohmart employees.

* No individual should pass through the air gap between the source head and detector. Safety devices have been installed which will minimize or eliminate the possibility of an individual accidently passing through the air gap. Radiation levels in the air gap are shown at Figure 6-1.

6-4 Wipe Test Procedure:

A test will be performed on the surface of the source holder every three years by the radiation safety officer in accordance with the instructions of the man-

ufacturer's representative and contained in the gage instruction manual. The wipe test kit to be used is the Ohmart Model LT. The wipe will be evaluated for leakage by the Ohmart Corporation. Should the presence of 0.005 microcuries of removable contamination be detected, the source holder will be withdrawn from service, the Regional Office of the USNRC notified and the device repaired or replaced by the manufacturer.

6-5 Waste Disposal:

Whenever the source holder is no longer needed, it will be either:

(a) Removed and stored in a locked cupboard or room properly labeled. It will not be placed in service without prior wipe testing, or

(b) Removed and returned to the manufacturer (Ohmart Corporation) for disposal.

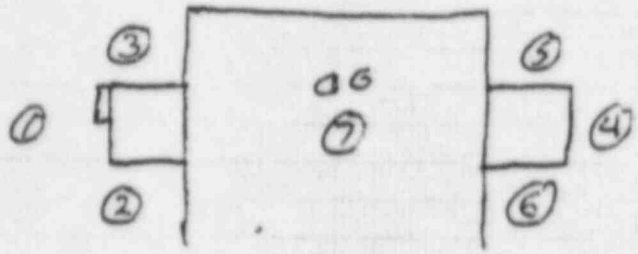
In either case, the services of the manufacturer's representative will be obtained to supervise removal, reinstallation, and/or packaging for return to the manufacturer.

460517

Ohmart Corporation
Cincinnati, Ohio

Field Service Report
Serial No. 1234
Sheet 2 of 2

MODEL A-2102 CS-137 3000 MC 1



SURVEY
MILLROLL, SCANNER
SO# 9062-011

	OPEN	CLOSED
①	.02	.02
②	1.5	1.5
③	1.5	1.5
④	.5	.00
⑤	.5	.00
⑥	.5	.00
⑦	900	1.5

Jim Page 6/6/80

12" = .00

Tom Page OHMART Field Service 6/6/80

Service Information SURVEY METER VICTOREEN
MODEL # 05-571
SER # 10051

FIGURE 6-1

7/25/83

To: Jay Breslin
From: Jim Parr cc: Dave Oldaker, Mac Dimiceli

On 7/11/83, a wipe test and shutter test was performed on the Mill-roll Scanner. The results of the wipe test analysis recieved from Chmart shows the source to be free from radioactive leakage.

Jim Parr

Jim Parr

The Ohmart Corporation
4241 Allendorf Drive • Cincinnati, Ohio 45209
Phone (513) 272-0131 • TWX 810 461-2255

ohmart radiation SAFETY

Wipe Test Kit

Mobil Chemical Co.
555 Wolverine Rd.
Shawnee, OK 74801

Attn: Jay Breshin

Kit No. 1653 | Date 7/6/83

Customer P.O. No. RP-4472

FILE

Caution: This kit is to be used only for the source holder described below. The information below appears on the metallic label on the actual OHMART source holder. Supply similar information if holder not OHMART.

S.O. No.	Isotope	Serial No.	m.C.i.	Source Holder
9062-011	CS-137	63815	3000	SR-2

Date Shipped	User Identification	Other
	Mill Roll Scanner	

Date of Test: 7/11/83

Tested By (Tester's Signature): Jim Parr

This kit is to be used only by those whose license permit them to perform wipe tests. (Per CFR-10 Part 20)

OHMART ANALYSIS
The following are analysis results:

Source is O.K. ☑ (Activity less than 0.005μCi) ☐ Rewipe Required ☐ Defective

lbm 15

M Evans
Tested By/Authorized Signature

7-14-83
Date

460517