

FORM NRC-313 I
(1-79)
10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

1. APPLICATION FOR:
(Check and/or complete as appropriate)

30-17517

☒ a. NEW LICENSE

☐ b. AMENDMENT TO:
LICENSE NUMBER

03120

☐ c. RENEWAL OF:
LICENSE NUMBER

646 19381

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

2. APPLICANT'S NAME (Institution, firm, person, etc.)

Consoweld Corporation (A subsidiary of Consolidated Papers, Inc.)

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
715-423-2900

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION

W.F. Waldorf
Consolidated Papers, Inc.
Wisconsin Rapids, WI 54494

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
715-422-3673

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)

700 Durabeauty Lane
Wisconsin Rapids, WI 54494

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED
(Include Zip Code)

700 Durabeauty Lane
Wisconsin Rapids, WI 54494

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL

(See Items 16 and 17 for required training and experience of each individual named below)

FULL NAME

TITLE

a. Lee A. Scanlan

Instrument Technician

b. See attachment (6) for list of Consolidated Papers, Inc. personnel available for backup

c.

7. RADIATION PROTECTION OFFICER

Walter F. Waldorf, Jr.
Manager Electronics & Instrumentation
Consolidated Papers, Inc.

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

L I N E NO.	ELEMENT AND MASS NUMBER A	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source) C	MAXIMUM NUMBER OF MILLCURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME D
(1)	The Kr85 sources presently in the possession of Consoweld covered under License #48-01117-01 issued to Consolidated Papers, Inc. are listed in attachment (8). We are applying for licensure to hold sealed sources of;			
(2)				
(3)	Kr85		(present 2 curies in 4 gauges)	4 curies
(4)	Cs137		(Future need is 2-4 gauges at 0.1 curies each)	0.5 curies

DESCRIBE USE OF LICENSED MATERIAL

E

(1) Kr - Gauges to measure mass/unit area of moving webs

(2) Cs137 - Gauges to sense liquid densities

(3)

(4) 8005168147 66 pp.

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	All gauges are purchased from the manufacturer as "self storing" sealed sources in a complete instrument assembly i.e. encased in shuttered shielded and armored		
(2)	cases which are never opened except under unusual circumstances and are then resealed.		
(3)			
(4)	See Attachment (8)		

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A.	MANUFACTURER'S NAME B.	MODEL NUMBER C.	NUMBER AVAILABLE D.	RADIATION DETECTED (alpha, beta, gamma, neutron) E.	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F.
(1)	"Cutie Pie"	Victoreen Cleveland, OH	740-f	2	Beta Gamma	1 mr/hr to 25 r/hr
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

<input checked="" type="checkbox"/> a. CALIBRATED BY SERVICE COMPANY NAME, ADDRESS, AND FREQUENCY Stan A. Huber, Consultants, Inc. 235 Esses Lane New Lenox, IL 60451	<input type="checkbox"/> b. CALIBRATED BY APPLICANT Attach a separate sheet describing method, frequency and standards used for calibrating instruments.
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-- and wipe tests as necessary.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A.	SUPPLIER (Service Company) B.	EXCHANGE FREQUENCY C.
<input checked="" type="checkbox"/> (1) FILM BADGE <input type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD) <input type="checkbox"/> (3) OTHER (Specify): _____ _____ _____	R.S. Landauer, Jr. & Co. Glenwood Science Park Glenwood, IL 60425	<input checked="" type="checkbox"/> MONTHLY <input type="checkbox"/> QUARTERLY <input type="checkbox"/> OTHER (Specify): _____ _____ _____

13. FACILITIES AND EQUIPMENT (Check where appropriate and attach annotated sketch(es) and description(s).)

- ☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC. None - all sources are sealed and self storing

14. WASTE DISPOSAL

- a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED
Industrial Nucleonics Inc, 650 Ackerman Road, Columbus, Ohio 43202
- b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE
- Not applicable.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

See attachments (15), (16), and (17)

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.
 - a. Principles and practices of radiation protection.
 - b. Radioactivity measurement standardization and monitoring techniques and instruments.
 - c. Mathematics and calculations basic to the use and measurement of radioactivity.
 - d. Biological effects of radiation.
17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.—18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

<p>a. LICENSE FEE REQUIRED (See Section 170.31, 10 CFR 170) \$190.00</p> <p>From 10CFR 170.31-3-e 811</p>	<p>b. CERTIFYING OFFICIAL (Signature) <i>Walter F. Waldorf, Jr.</i></p> <p>c. NAME (Type or print) Walter F. Waldorf, Jr.</p>
<p>(1) LICENSE FEE CATEGORY:</p>	<p>d. TITLE: Manager Electronics & Instrumentation, Consolidated Papers, Inc.</p>
<p>(2) LICENSE FEE ENCLOSED: \$ \$190.00</p>	<p>e. DATE April 15, 1980</p>

1. W. F. Waldorf - Research Physicist, Research & Development
Division
2. F. P. Arndt - Research Physicist, Research & Development
Division
3. W. King - Instrumentation Supervisor, Kraft Division and
Water Quality Center
4. D. R. Brewster - Maintenance Manager, Biron Division
5. L. Scanlan - Instrument Technician, Consoweld Corporation
6. D. Henke - Maintenance Manager, Stevens Point Division
7. V. G. Nash - Instrumentation Supervisor, Wisconsin Rapids
Division
8. J. Smolarek - General Electrical & Instrumentation Supervisor,
Wisconsin River Division
9. D. H. Middleton - Chief Instrumentation Engineer,
Engineering Division

1. W. F. Waldorf - Research and Development Division

Mr. Waldorf received his B.S. degree in physics from the University of London and his M.S. degree in nuclear physics from Massachusetts Institute of Technology. During the period of 1957 through 1959, Mr. Waldorf worked for the U.S. Naval Radiological Defense Laboratory in San Francisco, California. His duties there included aspects of radiation protection, health effects of radiation, nuclear criticality safety, and nuclear weapons development. He handled and directed the handling of uncontained fissile material including plutonium.

During the period of 1962 through 1964, Mr. Waldorf was employed by the Australian AEC. His duties there included research in and use of subcritical assemblies. He handled and directed the handling of fissile material, neutron sources, and byproduct material. Radiation safety cognizance was required during this work.

Since 1964, Mr. Waldorf has been involved with the use of nuclear gauges at Consolidated. He has performed research and testing studies in order to find appropriate gauge applications at Consolidated. He has also worked extensively with gauge electronics and computerized gauge interface. Mr. Waldorf has been involved with gauge installation, relocation, maintenance, modification, source change-out, leak testing, gauge survey, and source disposal while at Consolidated.

2. F. P. Arndt - Research and Development Division

Mr. Arndt received his B.S. degree in physics from the University of Minnesota and his M.S. degree in physics from Purdue. Mr. Arndt attended the LFE training course on November 7 and 8, 1978, described below [Item 8(3)]. He received academic training in college on areas of radiation protection such as biological effects of radiation, radioactivity measurement, and mathematics basic to the measurement of radioactivity. He has received on-the-job training on radiation protection principles, as they relate to gauges, from manufacturers' service personnel while they were at Consolidated to service or install gauges.

3. W. King - Instrumentation Supervisor, Kraft Division and Water Quality Center

Mr. King has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instruction associated with gauges. This training has been given by manufacturers' service representatives (Curtis Wright Co. and LFE Corporation) while servicing or installing gauges at Consolidated. He attended two training courses, which were specifically tailored to provide radiation safety background and methods, as applicable to gauges. These training sessions were given at Consolidated by Mr. W. Prendergast, Radiation Safety Officer for LFE Corporation, on May 16 and 17, 1973, and on November 7 and 8, 1978. The outlines of both courses are attached; however, it should be noted that practical applications (e.g., surveys) were stressed over academic subjects.

4. D. R. Brewster - Maintenance Manager, Biron Division

Mr. Brewster has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instruction associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended the first of the training courses described above [Item 8(3)].

5. L. Scanlan - Instrument Technician, Consoweld Corporation

Mr. Scanlan has received on-the-job training relating to the installation, maintenance, source change-out and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended both the training courses described above [Item 8(3)].

6. D. Henke - Maintenance Manager, Stevens Point Division

Mr. Henke has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated.

7. V. G. Nash - Instrumentation Supervisor, Wisconsin Rapids Division

Mr. Nash has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended both the training courses described above [Item 8(3)].

8. J. Smolarek - General Electric & Instrumentation
Supervisor, Wisconsin River Division

Mr. Smolarek has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended both the training courses described above [Item 8(3)].

9. D. H. Middleton - Chief Instrumentation Engineer, Engineering
Division, Company Radiation Safety Officer

Mr. Middleton received his BSME from the University of Wisconsin (Madison) and his MBA from the University of Wisconsin (Oshkosh). He is a P.E. in Wisconsin. He attended a five-week course, "ABC Warfare School," presented by the U.S. Navy. This course provided information relating to the biological effects of radiation, radioactive measurement and monitoring techniques, principles of radiation protection, and mathematics basic to the measurement of radioactivity.

He attended a formal, three-day course in radiation safety, as related to gauges, at Electronic Automation Systems, Inc., at Grand Island, New York, in October, 1969. He also attended both the training courses described above [Item 8(3)].

Mr. Middleton is supervisor over the engineering section, which is responsible for gauge applications. He has been primarily responsible for the purchase and installation of all gauges at Consolidated since 1972 (except those gauges listed for the Research & Development Division). He has directed the radiation safety program at Consolidated for 18 years. He has installed gauges, performed surveys and leak tests, changed out sources, shipped sources for disposal and interfaced with gauge manufacturers and NRC Inspectors. He has arranged for radiation safety training programs to be conducted at Consolidated.

ATTACHMENT #15

RADIATION SAFETY PROCEDURE - CPI-01

Nuclear Gauge Selection

APPROVAL:

Radiation Safety Officer Date

Vice President Date

1.0 SCOPE

This procedure delineates instructions to be followed when selecting a gauge for use in any Consolidated Paper, Inc. plant.

2.0 POLICY

Prior to selection and installation of any nuclear gauge at a Consolidated Paper, Inc. plant, the gauge model, source type and strength shall be verified as being in compliance with the requirements of the company's byproduct materials license. The RSO shall be responsible for ensuring compliance with this procedure.

3.0 INSTRUCTIONS

3.1 _____ Verify that the specific nuclide contained in
 RSO/date the gauge is authorized by the company's license
 (NRC BPM 48-01117-01).

Radiation Safety Procedure - CPI-01

- 3.2 Verify that the activity of the source does
RSO/date not exceed 2.0 Curies.
- 3.3 Verify that aquisition of this quantity of
RSO/date the nuclide will not result in the licensee
exceeding the total authorized quantity for
this nuclide.
- 3.4 Obtain written verification from the vendor
RSO/date that the gauge, source and source holder are
an NRC authorized configuration.

RADIATION SAFETY PROCEDURE - CPI-02

Installation, Removal and Maintenance of Nuclear Gauges

APPROVAL:

Radiation Safety Officer Date

Vice President Date

1.0 SCOPE

This procedure delineates instructions for installation, removal, or maintenance of nuclear gauges at any Consolidated Paper, Inc. plant.

2.0 POLICY

Installation, removal or maintenance activities involving the source container of any nuclear gauge shall be performed in accordance with written instructions which ensure that these activities are performed in a radiologically safe manner. Instructions should include manufacturer's installation or maintenance information and engineering diagrams and instructions. The Radiation Safety Officer shall be responsible for ensuring compliance with this procedure.

3.0 INSTRUCTIONS

3.1 _____ Verify that detailed written instructions are
RSO/date available and in use during installation,
removal or maintenance of nuclear gauges.

3.2 _____ Verify that personnel directing installation,
RSO/date removal or maintenance of nuclear gauges have
appropriate training or experience to ensure
radiological safety during these activities.

If this cannot be verified, complete 3.2a.

3.2a _____ The RSO shall personally direct installation,
RSO/date removal or maintenance of nuclear gauges
if step 3.2 cannot be verified.

3.3 _____ Verify that installation, removal or maintenance
RSO/date activities have been completed in accordance
with written instructions.

RADIATION SAFETY PROCEDURE - CPI-03

Radiation Level Surveys

APPROVAL:

Radiation Safety Officer Date

Vice President Date

1.0 SCOPE

This procedure delineates instructions for radiation surveys of nuclear gauges upon receipt, initial installation, source change-out, and maintenance.

2.0 POLICY

Radiation level surveys shall be performed, when appropriate, to ensure source integrity and that the gauge is fulfilling its design specification for radiation level. The Radiation Safety Officer shall be responsible for ensuring compliance with this procedure.

3.0 INSTRUCTIONS

- 3.1 _____ Verify that the survey meter to be used for
 RSO/date gauge survey has been calibrated within the
 past six months.

3.2 _____ Verify survey meter response with check source.
RSO/date

3.3 _____ Verify that the appropriate survey is performed
RSO/date (either 3.3a or 3.3b).

3.3a _____ For receipt of sealed sources, inventory
RSO/date and receipt survey should be performed in a timely manner. Kr-85 sources need not be surveyed for contamination on initial receipt. If removable contamination greater than 0.01 microcuries is found on the shipping container, or radiation levels greater than 200 mr/hr at the surface or 10 mr/hr at 3 feet are found, isolate the source, inform the carrier, sender and NRC. Consult 10 CFR 20.205 for further action. (Please note: Consolidated is exempted from 20.205 because no sources exceed Type A quantities.)

3.3b _____ For initial gauge installation, after significant
RSO/date maintenance, or source change-out, perform a survey of the gauge, taking level measurements at appropriate distances with shutter open and closed. Complete the attached form.

3.4 _____ Verify that radiation level readings are within
RSO/date shipping or manufacturer design specifications, as appropriate.

GAUGE SURVEY FORM

Gauge Manufacturer:

Surveyor:

Gauge Serial No:

Date:

Instrument:

Location:

Last Calibration Date:

RSO Concurrence:

Nuclide/Amount:

Date:

Source Exposed (Readings in mr/hr)

View AA'
Elevation

View BB'
Plan

Source Closed (Readings in mr/hr)

View AA'
Elevation

View BB'
Plan

RADIATION SAFETY PROCEDURE - CPI-04

Source Inventory & Leak Test

APPROVAL:

Radiation Safety Officer

Date

Vice President

Date

1.0 SCOPE

This procedure delineates instructions for routine inventory and leak testing of sealed sources in the possession of Consolidated Paper, Inc.

2.0 POLICY

All sealed sources in the possession of Consolidated Paper, Inc. shall be inventoried semi-annually (\pm 30 days). Each source containing byproduct material in any non-gaseous form shall be leak tested at intervals not to exceed six months. Leak test surveys shall be performed in accordance with the instructions of the leak test service consultant. The RSO shall be responsible for ensuring compliance with this procedure.

3.0 INSTRUCTIONS

3.1

RSO/Date

Verify, by sight inventory, that all sealed sources in the possession of Consolidated Paper, Inc. are accounted for. Inventory

records shall be stored in a safe place and be retained for not less than 5 years.

3.2

RSO/Date

For each non-gaseous sealed source, collect a swab of surfaces near the source where contamination may be expected to accumulate. Swabs will be taken in accordance with the instructions provided by the service consultant. Swabs are to be taken with clean cotton and sealed in individual envelopes immediately following collection. Each envelope shall be identified with; source location, source identification, date and time of survey, and name of person performing survey.

3.3

RSO/Date

Send the swabs (in their individual envelopes) to the service consultant for quantification.

3.3a

RSO/Date

- If the reading from any swab exceeds 0.005 microcuries, perform the following:
- Conduct a radiation survey in the vicinity of the gauge to evaluate the spread of contamination.
 - Collect additional swabs in the vicinity of the gauge and ship to an authorized leak test service for further analysis.
 - Remove the gauge from service.
 - Notify the NRC in accordance with the requirements of the byproduct materials license.

3.4

RSO/Date

Receive, record, and file the results of leak tests from the service consultant. Leak test records for each source shall be retained until the source is no longer possessed by Consolidated Papers, Inc.

Radiation Safety Procedure - CPI-05

Source Change Out and Disposal

APPROVAL:

Radiation Safety Officer

Date

Vice President

Date

1.0 SCOPE

This procedure delineates instructions for removing and installing sealed sources in nuclear gauges.

2.0 POLICY

Sealed sources shall be removed from nuclear gauges only when necessary to perform activities such as source replacement. To the extent possible, removal and replacement of sealed sources shall be performed by qualified vendor representatives. If vendor representatives are not available, removal or installation of

sealed sources shall be under the supervision of the Radiological Safety Officer or other personnel qualified to direct these activities. Under no circumstances shall sources be deliberately removed from their source holders by Consolidated Paper Inc. personnel. The Radiation Safety Officer shall be responsible for ensuring compliance with this procedure.

3.0 INSTRUCTIONS

- 3.1 _____ Verify that source removal or change out
RSO/date is necessary and explain necessity on the
Source Removal/Replacement Report.
- 3.2 _____ Verify that detailed, written, procedures
RSO/date are available and in use for source removal/
replacement. Manufacturer's instructions
are adequate.
- 3.3 _____ Verify a leak test (CPI-04) of the source
RSO/date has been performed in the last six months
(if nongaseous source).
- 3.4 _____ Verify that personnel directly involved in
RSO/date source removal and replacement are wearing film
badges or other appropriate dosimetry.

3.5 _____ Verify that the personnel who will direct
RSO/date source change out have appropriate training and
experience. If this can not be verified
complete step 3.5.a.

3.5.a _____ If qualified personnel are not
RSO/date available, the RSO shall personally
direct the operation.

3.6 _____ Verify that the source is placed in a lead
RSO/date container immediately upon removal and moved to
secure storage (e.g., a locked room) pending
replacement or disposal.

3.7 _____ If the source is to be disposed of, package
RSO/date the source for shipment in accordance with
10 CFR 71 and attach copies of the shipping
papers to the Source Removal/Replacement
Report.

3.8 _____ If a new source is to be installed, attach
RSO/date copies of the vendors shipping information
(e.g., nuclide, activity, leak test certifi-
cation) to the Source Removal/Replacement
Report following installation.

SOURCE REMOVAL/REPLACEMENT FORM

Explain the necessity of source change out. Provide other information as required by the Procedure. This form shall be kept as part of the records for the replacement source.

RSO Concurrence: _____

Date: _____

RSP-CPI-05 Page 4 of 4 Rev. 0 Date issued _____

CONSOLIDATED PAPERS, INC.
SAFETY PROCEDURES AND POLICY MANUAL
RADIO-ACTIVE MATERIAL CONTAINING
DEVICES

(10/8/79 REVO)

APPROVED

RSO _____ Date _____

V.P. _____ Date _____

General

1. Before doing any work with this or any other radiation emitting device, it is required that:
 - (a) You have undergone CPI's formal radiation safety course or its equivalent.
 - (b) You have substantial experience with this particular device, or are in the company of someone who has.
 - (c) You have the approval of both your supervisor and the Radiation Safety Officer.
 - (d) You have reviewed this safety procedure and all of the appropriate manufacturer's literature.

(Note: Safety glasses are required at all times when in working range of a radiation emitting device.)

2. To minimize radiation exposure, time is the critical factor. Thus:



- (a) Study and plan the job before approaching the equipment. Make sure you know whether shutter is open or closed - do not guess.
- (b) Have all tools, spare parts, diagrams, etc. close at hand. This includes lead apron and blanket and body and wrist film badges as required.
- (c) If help is needed, have a person standing by at a safe distance.
- (d) Whenever possible, work at arm's length from source. Do not crouch over gauge.
- (e) Go in, do the required work with deliberate speed, and get out promptly.

3. There are three levels of caution required:

- (a) Shutter closed and all shielding in place. No special precautions or record keeping is required. Dose rates at the surface of the source are around 1 to 5 mrem/hr. Do not linger. Drape lead blanket over source if job is to last over two hours.
- (b) Shutter open/shielding partly removed/both. Study the radiation survey sheet for the gauge at hand and limit exposure time accordingly. Wear film badge and lead apron on body, and use lead sheets where practical. Complete paper work as directed by RSO immediately upon completion. Dose rates at the gap opening are 50 to several hundred mrem/hr.

- (c) Source holder exposed or removed. Note: Source is never removed from source holder. Plan work carefully to avoid time consuming fumbles and mistakes. Keep lead apron on and use as much lead or iron shielding as possible. Use tongs for handling and mirrors for inspection as much as possible. Wear body film badge and wear wrist badge on right or left hand as appropriate. Always position your body relative to the source so that its rays shine away from you. Have the area cleared and posted with proper signs. Have a shielded container nearby large enough to hold largest assembly involved - and use it. Call RSO to perform survey immediately after completion of work. Complete all required paper work at once. Dose rates could be about 1 r/hr directly in the beam.
4. If fire, explosion, or mechanical damage to the instrument is found or suspected, evacuate area, post guards, and call the RSO immediately.
5. Should any circumstances arise that you feel you are unqualified to deal with, abandon the effort and consult the RSO. If this manual is found to be incorrect or incomplete, notify RSO and your supervisor in writing immediately.

OPERATIONS

The following operations are to be performed depending on the particular gauge involved:

- (a) Installation of new gauge.
- (b) Reinstallation of old gauge that has been removed for repair, factory modification, relocation, etc.

- (c) Removal of source module for repair or disposal.
- (d) Static alignment of fixed source/receiver pairs.
- (e) Dynamic alignment of traversing gauges, maintenance of traverse mechanisms.
- (f) Calibrations.
- (g) Mechanical and electrical maintenance of receiver modules.
- (h) Mechanical and electrical maintenance of source modules.
- (i) Source changeouts and operations under (h) above requiring removal of or exposure of sources holder assemblies.

CATEGORIES

The gauges owned by CPI fall into the following general categories. Gauges in any given category are in all practical matters identical. Details of mounting, traverse mechanisms, source strength, electronics, etc. exist, but do not have radiological safety significance. They must be accounted for in the job planning stage as different tools/parts/diagrams may be needed.

- (a) Industrial Nucleonics TLK series. These contain Kr 85 sources and do not require wipe tests. They are located at:

Wisconsin Rapids Mill

65-1 Coater 1st Coater
65-1 Coater 2nd Coater
#11 Machine Base Sheet

Biron

#24 Machine Base Sheet
#25 Machine Base Sheet

Stevens Point

#31 Machine Base Sheet
#31 Machine After Coater
#32 Machine Base Sheet
#32 Machine After Coater

Wiscon in River

#63 Machine Reel
#64 Machine Base Sheet
#64 Machine Reel

(b) LFE BG/LMC series. These contain Kr85 sources and do not require wipe tests. ✓

Wisconsin Rapids

64-1 Coater Base Sheet
64-1 Coater 1st Coater
64-1 Coater 2nd Coater
#11 Machine After Size
#12 Machine Base Sheet
#14 Machine Base Sheet
#14 Machine After Size
#15 Machine Base Sheet

Biron

#23 Machine Base Sheet

Wisconsin River

#63 Machine Base Sheet

Research & Development

Paper Testing Laboratory

(c) Ohmart 1000/2000 series. These are Cs137 and do require wipe tests. ✓

Biron

TMP line 1
TMP line 2 (2 gauges)

Wisconsin River

TMP steaming tube (2 gauges)

Kraft

Digester discharge

Digester Pre-steamer (2 gauges)

- (d) Industrial Nucleonics RTLK, DTLK, STLK and LTLK models. These are ✓
KR-85 sources and do not require wipe tests.

Wisconsin Rapids

#12 Machine after size

#15 Machine after size

Biron

#25 Machine prime coat

#25 Machine Base Sheet

#24 Machine prime coat

#65-1 Coater reel

- (e) Foxboro 735M. Kr85 source, no wipe test required. ✓

Wisconsin Rapids

Laboratory (2 gauges)

Laboratory

Stevens Point

Laboratory

Wisconsin River

Laboratory

(f) Industrial Nucleonics 7633201. Cs137, require wipe tests. ✓

Stevens Point

Blade Coater (blades)

Blade Coater (air knife)

✓ ✓ ✓
(g) Ohmart U6V and CL-12, Texas Nuclear S6F. Cs137 wipe tests required.

Kraft

Kamyr Digester

Water Quality Center

✓ ✓ ✓
(h) Ohmart BW-30, BW-42, HM8A

Kraft

Woodroom (2 gauges)

Chip Chute

Boilerhouse

- (i) New England Nuclear. Fe55 wipe test required.

Research & Development

Paper Testing Laboratory

PROCEDURES AND INSTRUCTIONS

In all of the following procedures, the actual physical operations to be done (remove/insert bolts, rotate assemblies, adjust screws or shims and the like) are determined by a careful review of the manufacturer's literature and diagrams. The procedures listed below are in addition to those above and are intended to avoid accidents and errors and to reduce the exposure and exposure time necessary to do the required work.

1. General (all categories)

Make certain that you have correct and complete manufacturer's literature including any variations on the basic model. Use hoists and hand trucks for moving source modules; they are heavy, awkward and easily dropped. If source module must be hand carried, use lead apron. Do not "cuddle" source module against stomach. Never move source module with shutter open or shielding removed. Be careful of forcing tools or parts. Be alert for visible signs of damage. Do not hesitate to call RSO for advice or surveying if you think it a wise precaution.

2. Receipt of New Gauge (all categories)

- (a) Alert RSO for survey of unopened container.
 - (b) Inspect shipping container for damage.
 - (c) Inspect shipping documents, purchase orders and manufacturer's literature for model and serial numbers.
 - (d) Survey unopened container in accordance with radiation safety procedure CPI-03.
 - (e) Open container (do not destroy) resurvey and wipe test as required. Verify visually that device is as described in literature and invoices with all identification plates and caution labels in place. Verify that shutter is closed. Verify that all vendor supplied accessories (brackets, bolts, etc.) are present.
 - (f) Store (preferably in original shipping container) in a secure place until further action is required. Do not discard shipping container.
 - (g) Initialize all internal CPI paperwork and inventory forms.
3. Disposal of Old Gauge (all categories) in accordance with radiation safety procedure CPI-05.

All disposals of old gauges are done through the original manufacturer or a licensed disposal agent. Ask for instructions for packaging and follow them. Have the agent inspect and survey and wipe test before shipping. Have the agent prepare shipping paperwork. Enter disposal into company records. Obtain receipts from agent and carrier.

4. Moving Between Divisions/Extended Storage (all categories)

Proceed as in disposal (3 above) but have the RSO survey and prepare shipping documents. Conduct actual shipping in accordance with all D.O.T. regulations. Upon receipt at destination, treat as newly arrived gauge in 2 above, OR, store in a secure place and treat as a newly arrived gauge upon removal from storage.

5. Work on Associated Equipment (all categories)

Any work to be done on equipment associated with the gauges, i.e., traverse mechanisms, moisture gauges mounted on the same carriage and the like, must be done with the shutter closed and locked out with a DANGER tag. If such work is to require more than two hours, the source module must be draped with shielding material. Before doing any work near the gauge involving possible mechanical damage to the source module, the module must be dismantled and moved to a secure place.

6. Installing New Gauge (all categories)

After the gauge has been received as in 2 AND the installation site and equipment has been fully prepared mount the gauge according to manufacturer's instructions. (Note: the gauge is in the "as shipped" condition with shutters locked in the closed position.) At this time, all external equipment is tested for proper operation, and power is connected to the source module. A survey is made by the RSO with shutter closed and then with shutter open. Proper shutter operation should be verified by the warning lights and radiation levels and by direct observation with a long handled dental mirror if doubt exists. A precision open shutter alignment (see below) is then done and a

resurvey made for record purposes. The gauge is now ready for calibration and use. Make sure all required warning labels and signs are posted.

7. Mounting and Demounting Source Modules (Categories (a), (b) and (c))

- (a) Shutter closed, module undamaged - no special precautions.
- (b) Shutter opened or damaged - lead apron and lead sheets required. Place in shielded container at once. Handle so that beam shines away from body. Mirrors must be used if it is necessary to look toward the source opening.

In both cases, take great care that module is not dropped, use hand cart, do not carry source module. Limit time severely if case (b). Upon remounting a new survey is required only if shutter assembly/source holder assembly has been taken apart.

8. Static Alignment (Categories (a), (b) and (c))

For all categories of gauges when first installed and after either source or receiver module has been demounted the source and receiver modules are visually aligned as closely as possible with shutter closed. Leave mounting bracket screws finger tight. Open shutter and post helper at output meter or recorder. Approach gauge so that beam shines away from body. Keep hands and eyes out of plane of gap. Adjust side to side movement until helper finds maximum output. Mark position and then rotate and steer source module until a new maximum is found. Tighten all bracket bolts securely.

9. Dynamic Alignment categories (a) and (b) only

This is required only on "O" frame gauges within each category.

This done with no web running. The gauge is traversed with an empty gap. Chart recorder readings are observed. If reading varies less than the specified amount, no alignment is necessary.

If an alignment is required, place a micrometer gauge in cross direction and observe relative movement between source and receiver heads during the traverse. Adjust, repair or replace drive chains to eliminate such movement. Retest and repeat. This is done with shutter closed.

For machine direction alignment, place micrometer in that direction. Observe traverse and adjust rails or mounting bolts as needed. This is also done with shutter closed.

10. Calibration (excluding categories (c), (f) and (g))

The shutter is always closed when approaching gauge.

- (a) Clean windows if necessary with a long handled swab wetted with alcohol before calibration is attempted.
- (b) Insert empty sample holder into gap. Retire to control panel, open shutter and observe reading. Adjust electronics for standard reading. Close shutter, approach gauge, insert first of calibrated samples and retire to control panel.

(c) Repeat above until gain and offset of readout are at spec.

(d) Categories (c), (f), and (g) are pipe gauges and their calibration entails no special procedures from a safety standpoint.

11. Mechanical and electrical maintenance of receiver module. This is always done with shutter closed. If the job is prolonged, more than 2 hours, you must:

(a) leave area and hand off job to someone else.

(b) drape source with shielding material.

(c) remove receiver head from area.

At the end of such maintenance perform calibrations or alignments as above.

12. Mechanical and Electrical Maintenance of Source Modules

(a) Categories (a), (b) and (d) for source operations all category (a) gauges are worked on while mounted, and (b) and (d) are dismantled and taken to the shop. In both cases, the work area is cleared and warning signs posted. Shutters are closed.

To gain access, remove front panel and use lead sheet to cover opening temporarily.

To repair strap heaters or windows, proceed with work and replace front plate as quickly as possible. Use lead apron and temporary shielding as much as possible.

To repair shutter solenoids or interlock switches remove source holder, hold so that beam shines away from body and place in shielded box previously located near at hand. Close box and proceed with work at your leisure. After thoroughly and repeatedly testing result, open box and replace source holder. Close front plate and remount gauge.

IMPORTANT: The above procedure must be planned and rehearsed before hand. A fumble or jam at this point could be serious.

A resurvey is mandatory upon completion of work.

(b) Category (e). The only procedure here is a window change. Open back of cabinet, close source holder, remove from mount. The source is now closed and locked. Work at leisure and then replace source and open shutter. No resurvey is required.

(c) No repairs are ever required to source modules in other categories.

13. Source Change Out

This operation is rarely, if ever, done at CPI. It is to be strenuously avoided. Sources do not die out by surprise. Ample time is available to call in a service engineer from the manufacturer to do the job. (Note: The source and holder never separated.) The general procedure is:

(a) Receive the new source and holder as in (2) above, keep it in shipping container until needed.

- (b) Change old source and holder for new as in 13(a); use shipping container for storage of old source.
 - (c) Dispose of old source and holder as in 3 above.
- 14. Category (i) is an experimental sealed source for Research and Development use only. It is always handled by degreed nuclear physicists with radiation safety experience. There are no set operations or procedures.
- 15. This manual must be updated immediately upon new gauge installation or major modification of existing gauge.

ATTACHMENT #16

02567

RADIATION TRAINING PROGRAM

CONSOLIDATED PAPERS

Prepared and Presented by

WILLIAM R. PRENDERGAST

LFE CORPORATION

May 15 and 16, 1973

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Protons
Electrons

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Identification of Isotopes
Naturally Radioactive Materials

3) Types of Radiation

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Beta Rays
X-Rays
Gamma Rays
Neutrons

4) Penetrating Power of Radioisotopes

Alpha Particles
Beta Rays
Gamma or X-Rays

5) Important Characteristics of Radioisotopes

Energy Level
Decay

6) Units of Measurement

Curie
Millicurie 2.22×10^9 DPM
REM
REM/HR and MR/HR

7) Detection of Radiation

Ion Chambers
Geiger Tubes
Scintillation Crystals
Film Badges
Dosimeters

8) Detailed Study of 10 CFR 20

Standards for Protection
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9) Detailed Study of Consolidated License

10) Radiation Dosage

Standards in 1957
Present Standards
Safe Lifetime Dose
Lethal Dose

11) Radiation Hazards

Acute - Blood Change
Burn
Radiation Sickness

Chronic - Life Shortening
Genetic Effects
Leukemia

12) Existence of Radiation Hazards

External
Internal

13) Detection of Radiation Damage

Blood Test
Urine Samples

14) The Site Survey

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Level and Time Calculations
Generation of X-Rays
Unrestricted Area
Restricted Area When Source Removed from Mount
Typical Radiation Levels

15) The Source Check

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Records Must be Maintained
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Calibration of the Instrument
System Sensitivity
Performing the Leak Test
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LFE Radiation Report

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Normal Operation
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18) Radiation, AEC, and OSHA

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LFE CORPORATION

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Periodic Table of Elements
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Properties of Radioisotopes
Alpha Radiation
Beta Radiation
Gamma Radiation
Electron Capture
Sequential Decay
Equilibrium

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Efficiency
Continuous Spectrum (Bremsstrahlung)
Characteristic X-Rays
Fluorescence
Auger Electrons

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Transmutation
Neutron Capture
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Daughter Products
Neutron Sources

6) Half Life of Radioisotopes

Definition
General Formula
Use of Semilog Graph Paper

7) Energy Level

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The Electron Volt
Kinetic Energy of Particles
Photon Energy

8) Interaction of Beta Radiation with Matter

Interaction with Nucleus
Interaction with Orbital Electrons
Range of Beta Particles
Absorption Characteristics
The Beta Spectrum

9) Interaction of Photons with Matter

Photoelectric Effect
Compton Scattering
Pair Production
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Time Constants
Use of This Meter
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16) Units of Radiation

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17) Ion Chamber Survey Meter

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19) Output of Gamma Sources

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10 CFR Part 20
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22) Other Important Regulations

10 CFR Part 19
10 CFR Part 21

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Dosimeters
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Time, Distance, Shielding

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Chronic Effects

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ANSI Standard

26) Testing of Sealed Sources

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ATTACHMENT #17

1. W. F. Waldorf - Research and Development Division

Mr. Waldorf received his B.S. degree in physics from the University of London and his M.S. degree in nuclear physics from Massachusetts Institute of Technology. During the period of 1957 through 1959, Mr. Waldorf worked for the U.S. Naval Radiological Defense Laboratory in San Francisco, California. His duties there included aspects of radiation protection, health effects of radiation, nuclear criticality safety, and nuclear weapons development. He handled and directed the handling of uncontained fissile material including plutonium.

During the period of 1962 through 1964, Mr. Waldorf was employed by the Australian AEC. His duties there included research in and use of subcritical assemblies. He handled and directed the handling of fissile material, neutron sources, and byproduct material. Radiation safety cognizance was required during this work.

Since 1964, Mr. Waldorf has been involved with the use of nuclear gauges at Consolidated. He has performed research and testing studies in order to find appropriate gauge applications at Consolidated. He has also worked extensively with gauge electronics and computerized gauge interface. Mr. Waldorf has been involved with gauge installation, relocation, maintenance, modification, source change-out, leak testing, gauge survey, and source disposal while at Consolidated.

2. F. P. Arndt - Research and Development Division

Mr. Arndt received his B.S. degree in physics from the University of Minnesota and his M.S. degree in physics from Purdue. Mr. Arndt attended the LFE training course on November 7 and 8, 1978, described below [Item 8(3)]. He received academic training in college on areas of radiation protection such as biological effects of radiation, radioactivity measurement, and mathematics basic to the measurement of radioactivity. He has received on-the-job training on radiation protection principles, as they relate to gauges, from manufacturers' service personnel while they were at Consolidated to service or install gauges.

3. W. King - Instrumentation Supervisor, Kraft Division and Water Quality Center

Mr. King has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instruction associated with gauges. This training has been given by manufacturers' service representatives (Curtis Wright Co. and LFE Corporation) while servicing or installing gauges at Consolidated. He attended two training courses, which were specifically tailored to provide radiation safety background and methods, as applicable to gauges. These training sessions were given at Consolidated by Mr. W. Prendergast, Radiation Safety Officer for LFE Corporation, on May 16 and 17, 1973, and on November 7 and 8, 1978. The outlines of both courses are attached; however, it should be noted that practical applications (e.g., surveys) were stressed over academic subjects.

4. D. R. Brewster - Maintenance Manager, Biron Division

Mr. Brewster has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instruction associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended the first of the training courses described above [Item 8(3)].

5. L. Scanlan - Instrument Technician, Consoweld Corporation

Mr. Scanlan has received on-the-job training relating to the installation, maintenance, source change-out and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended both the training courses described above [Item 8(3)].

6. D. Henke - Maintenance Manager, Stevens Point Division

Mr. Henke has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated.

7. V. G. Nash - Instrumentation Supervisor, Wisconsin Rapids Division

Mr. Nash has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended both the training courses described above [Item 8(3)].

8. J. Smolarek - General Electric & Instrumentation
Supervisor, Wisconsin River Division

Mr. Smolarek has received on-the-job training relating to the installation, maintenance, source change-out, and radiation survey of gauges and radiation safety instructions associated with gauges. This training has been given by manufacturers' service representatives while servicing or installing gauges at Consolidated. He attended both the training courses described above [Item 8(3)].

9. D. H. Middleton - Chief Instrumentation Engineer, Engineering
Division, Company Radiation Safety Officer

Mr. Middleton received his BSME from the University of Wisconsin (Madison) and his MBA from the University of Wisconsin (Oshkosh). He is a P.E. in Wisconsin. He attended a five-week course, "ABC Warfare School," presented by the U.S. Navy. This course provided information relating to the biological effects of radiation, radioactive measurement and monitoring techniques, principles of radiation protection, and mathematics basic to the measurement of radioactivity.

He attended a formal, three-day course in radiation safety, as related to gauges, at Electronic Automation Systems, Inc., at Grand Island, New York, in October, 1969. He also attended both the training courses described above [Item 8(3)].

Mr. Middleton is supervisor over the engineering section, which is responsible for gauge applications. He has been primarily responsible for the purchase and installation of all gauges at Consolidated since 1972 (except those gauges listed for the Research & Development Division). He has directed the radiation safety program at Consolidated for 18 years. He has installed gauges, performed surveys and leak tests, changed out sources, shipped sources for disposal and interfaced with gauge manufacturers and NRC Inspectors. He has arranged for radiation safety training programs to be conducted at Consolidated.

RADIOACTIVE SOURCE INVENTORYDIVISION - CONSOWELD

<u>LOCATION</u>	<u>USE</u>	<u>MANUFACTURE</u>	<u>ISOTOPE</u>	<u>STRENGTH</u>	<u>GAUGE</u>		<u>SOURCE HOLDER</u>		<u>SOURCE</u>	
					<u>MODEL</u>	<u>SERIAL NO.</u>	<u>MODEL</u>	<u>SERIAL NO.</u>	<u>MODEL</u>	<u>SERIAL NO.</u>
No. 1 Treater "A"	Basis Weight	Industrial Nucleonics	KR-85	500 mci	TLK2-03BA -68	672262931	AP-0491-15	SKL-4649543	BB 12112	K-3767-X
No. 1 Treater "B"	Basis Weight	Industrial Nucleonics	KR-85	500 mci	TLK2-03BA -68	672263031	AP-0491-15	SKL-56683015	BB 12112	K-4118-X
No. 4 Treater "A"	Basis Weight	Industrial Nucleonics	KR-85	500 mci	TLK2-03BA -118	672263121	AP-0491-15	SKL-86765014	BB 12112	K-4133-X
No. 4 Treater "B"	Basis Weight	Industrial Nucleonics	KR-85	500 mci	TLK2-03BA -118	672263231	AP-0491-15	SKL-66923911	BB 12112	K-4134-X