HALLIBURTON SERVICES

71

GOVERNMENT REGULATIONS DEPARTMENT
RON BECHTEL
Manager
DAN KELLY
Regulatory Specialist

Writer's Direct Dial Number
(405)251-3569

DRAWER 1431, DUNCAN, OKLAHOMA 73536
Senior Environmental Engineers
STEVE BURFORD
RALPH HOUSER
BILL JONES
Environmental Engineer
JOHN PRESGROVE
Radiation Safety Officers
RICHARD LEONARDI
STEVE HOOK

MS-12

March 7, 1985

Mr. Jack E. Whitten
Nuclear Materials Safety Section
United States Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76011

Re: Response to correspondence of February 19, 1985

Gentlemen:

It is the desire of Halliburton Services to make an additional change to our Radioactive Material License 35-00502-02. This change was discussed on February 22, 1985 with Mr. Charles Cain of your office.

This change would be to applicants name listed in Item 2 of the original renewal application. We request it be changed to Halliburton Services - Otis Engineering Corporation. The mailing address would be the same as that shown on the renewal application.

A letter signed by Mr. Jerry B. Davis, Vice President, Domestic Operations, Otis Engineering Corporation, is submitted for your evaluation. This letter establishes authority of the present Radiation Safety Officer for the entire program.

This response will be made using the same format and lettering system as your correspondence dated February 19, 1985.

1. a. Attached is a copy of the index from our training manual with the approximate time per subject typed beside the subject. MS-12

b. Depending upon the educational and experience level of the personnel, both written (samples attached) and oral tests are given. Experience has proven oral questions and discussions with personnel a much better mechanism for measuring efficiency than written. An important requirement for our type of work is attitude. This is much easier to determine during questioning orally. The oral questions and discussions take place following the classroom instruction and on-the-job training.

c. A grade of 70% on written and an estimate of 70% on oral. More emphasis is placed on attitude during the oral. When the Radiation Safety Officer (Instructor) deems an individual not to have the proper attitude or aptitude, supervision is informed and that individual is not permitted to work with or around radioactive materials. This has happened numerous times even though personnel selected for the training are hand picked by supervisor.

d. It is requested that more consideration be given to this statement. Reason 1) Most locations perform only a single application, 2) Some locations could never qualify an operator due to Reason 1, 3) Thirty years with no major incident, accident or overexposure to personnel indicates an adequate training program 4) Why change a program that works well?

There is no reason to amend our training program since the items above are already part of our training program.

2. A corrected Attachment #1 (Item 5) is submitted.

3. Rather than expand our files with NRC by submitting plot plans of the District Camps indicating the structure and design of our radioactive storage facilities it would be more practical to provide written descriptions. Every District has a warehouse for storing supplies, chemicals and equipment. Each warehouse is a controlled access facility, permitting only warehouse personnel entrance. It is kept locked at all times when unoccupied. In each warehouse an area of little or no personnel traffic is dedicated to the storage of radioactive materials. This dedicated area is walled, fenced or roped off restricting movement of personnel through the area. Caution - Radiation Area and Caution - Radioactive Material signs are displayed to be visible from any direction of approach. The area is posted with NRC Form 3. Radiation levels are controlled by encasement with solid concrete blocks of sufficient thickness to

maintain the rad levels at the confinement to 0.6 mR/hr or less. Some locations use lockable lead lined casks for storage rather than concrete blocks.

4. Copies of the job descriptions for Richard A. Leonardi, Jr., Steve Hook and Dan G. Kelly are attached for your review.

5. I copied a page from the Abbeon Cal Inc., catalog that shows the handling tongs that is a warehouse item, available to all locations.

6. We use Controls For Environmental Pollutions, Inc., Post Office Box 5351, Santa Fe, New Mexico 87502, License Number NM-CEP-AN-09. It would be a very unusual situation for an individual to handle 50 millicuries of Iodine 131 in a week in any NRC State.

7.& 8. Halliburton has a written procedure outline which is used for both classroom and on-the-job instruction that cover these items. There are a few items addressed in the outline that will be incorporated into the Radiation Safety Manual at the next revision. It presently is a handout.

Our written procedures address the following items:

a. Packaging
b. Package markings
c. Package labelling
d. Transportation
e. Vehicle placarding
f. Cargo security
g. Rad level control
h. Driver responsibilities
i. Loading & off loading
j. Protective clothing
k. Emergency
l. Personnel monitoring
m. Safety in handling
n. Safety in using
o. Safety in storage
p. Equipment for surveys
q. Conducting surveys
r. Record maintenance
s. Emergency
t. Receipt of packages
u. Opening containers
v. Smear tests

9. Halliburton Services, Graphics Department, has produced a film titled "Radiation Safety" having a program length of 9.22 minutes. This film is shown to all employees during their initial two week orientation process. It is also viewed at scheduled safety meetings on occasion as a reminder. This technique has proven very beneficial to our radiation safety program.

10. Protective gloves are required at any time an individual is to handle radioactive material. The zipped front coveralls and boot covers are strongly recommended for on-the-job usage of solid tracers and required for use of liquid tracers. Respirators are required for users of liquid iodine-131. The tongs previously described are required for handling all isotopes except the densometer. The tongs are a warehouse item in Duncan,

Oklahoma under part number 70.79227 and available to all locations. Due to the cost some locations have elected to build their own in their shop. In such case approval of the Radiation Safety Officer is required.

11. A copy of the certificate provided by the manufacturer of the calibration source listed on our renewal application is attached. This certificate verifies the accuracy and the traceability to an NBS standard source. Halliburton has been licensed to perform survey meter calibrations for nearly thirty years. It was one of the original assignments of Dan G. Kelly in 1955 until 1964. In 1965 through 1980 it was performed under Dan Kelly's supervision. The other two individuals presently performing calibrations under our Texas, Louisiana, New Mexico, Mississippi and Alabama license are Richard A. Leonardi, Jr. and Steve Hook. Both have received training in equipment calibration and have several years experience as indicated by perviously submitted resume's.

12. No amendment of the Radiation Safety Manual is necessary. This is standard procedure and reported in writing on our "Radioactive Treatment Report". Please refer to this title on the back of Figure 3 in our Radiation Safety Manual.

If you require additional information or have questions, please contact this office at the above address or telephone number.

Respectfully submitted,

Dan G. Kelly

Dan G. Kelly

DGK/cdd
Enclosures

cc: Mr. Richard A. Leonardi, Jr.
Mr. Steve Hook

OTIS

P O BOX 819052 · DALLAS, TEXAS 75381-9052
AREA CODE: 214-323-3000

JERRY B. DAVIS
VICE PRESIDENT
DOMESTIC OPERATIONS

March 13, 1985

Mr. Jack Whitten
Nuclear Materials Safety Section
U. S. Nuclear Regulatory Commission
Region IV
611 Rayn Plaza Drive
Suite 1000
Arlington, TX 76011

Dear Mr. Whitten:

In the meeting held Friday, February 22, 1985 in your Arlington office between Mr. Charles Cain, N.R.C.; Mr. Dan G. Kelly, Halliburton Services, and Mr. Don Connick, Otis Engineering Corporation, a discussion was held concerning the feasibility of Otis Engineering Corp. operating in Alaska under the present Halliburton Services radioactive materials license #35-00502-02. Mr. Cain advised that it would be possible for Otis Engineering Corporation to operate under the Halliburton Services license and suggested that the following authorization be directed to your attention:

Full authority is provided to Radiation Safety Officers Dan G. Kelly, Richard A. Leonardi, and Steve E. Hook, Halliburton Services to coordinate and manage the Radiation Program for Otis Engineering under Radioactive Materials License 35-00502-02.

Yours truly,

Jerry B. Davis

JBD:bp

cc:
Spike Dunlop
Al Baker
John Cook
Joe McCullough
Ron Bechtel
Richard A. Leonardi
Steve Hook
Dan G. Kelly
P. J. Thrash
D. Y. Fisher
Al Crutchfield
Ken Fortner
Burt Hidalgo
Earl Smith
Don Connick

Dupe ~~8603...~~ 14pp

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THIS SOURCE WAS TESTED FOR
EXTERNAL CONTAMINATION OR LEAKAGE
DATE 7-13-83 MICROCURIES 4.005 BY RLK
DATE 7-13-83 MICROCURIES 5.005 BY RLK
TECH/OPS

Standards Laboratory Report

Tech/Ops

Tech/Ops, Inc.

Radiation Products Division
Burlington, Massachusetts 01803

GAMMA RAY SOURCE CALIBRATION

Isotope	Test No.	Date Measured
CS-137	25356	29 JUNE 1983

Source Identification	Roentgens/Hr. at 1 Meter	Curies
S-433	0.0522	0.163

DUPLICATE

Source decay correction factors

Age in:	Cobalt-60 years	Cobalt-60 mos	Iridium-192 weeks	Iridium-192 days	Cesium-137 years
0	1.000	1.000	1.000	1.000	1.000
1	.877	.989	.937	.991	.977
2	.768	.978	.877	.981	.955
3	.674	.967	.821	.972	.933
4	.590	.957	.769	.963	.912
5	.518	.946	.721	.954	.892
6	.454	.936	.675	.945	.871
7	.398	.926	.632	.937	.852
8	.349	.916	.592		.832
9	.306	.905	.554		.813
10	.268	.895	.519		.795
11	.235	.886	.486		.777
12	.206	.877	.455		.759
$T_{\frac{1}{2}}$	5.26y		74.0d		30.2y
Rhm/ci	1.30		0.55		0.32

Model 773, S/N 126

The gamma-ray emission of the sealed source herein described was intercompared with the radiation from a reference standard cobalt-60 source whose intensity had been established relative to a National Bureau of Standards calibrated cobalt-60 source. Comparison was made either with an uncollimated plastic-lined ionization chamber encased in a 3-mm thick aluminum container sealed against atmospheric pressure, or with an NBS-calibrated Victoreen R-meter whose readings were compensated for atmospheric pressure and temperature. All readings were corrected for air scattering and absorption. The source was measured with its axis of symmetry parallel with/perpendicular to the line joining source and detector. The reported output is believed to be accurate within ± 3 percent, the stated uncertainty of the reference NBS sources. Precision is believed to be better than ± 1 percent.

Signed Robert L. Kelly

Calibration performed for: NUCLEAR ASSOCIATES
Div. of Victoreen
100 Voice Road
Carle Place, NY 11514

ATTACHMENT #1 (Item 5)

The licensed radioactive material will be used and/or stored at the Halliburton Services, Duncan, Oklahoma facilities at the following addresses:

1. Halliburton Services, North 40, Osage Road
2. Research Center, 1500 South Second Street
3. RAYFRAC Building, 1409 South 13 Street

The licensed material will also be used at temporary oil and gas wellsite any where in the United States and offshore locations, where U. S. Nuclear Regulatory Commission maintain jurisdiction for regulating the use of licensed material.

Licensed material will also be stored at our Casper, Wyoming facility at the Division Warehouse, 6900 Nugget Road, Post Office Box 1510, Evansville, Wyoming. The following Halliburton facilities will store licensed radioactive material occasionally so are considered temporary storage facilities. This means the procured licensed material may be stored over night awaiting a tracer job or for as long as a week in the case of a job postponement.

Evanston, Wyoming 82930
Sage Industrial Part #1
Box 950

Gillette, Wyoming 82716
901 Lincoln
Box 1029

Powell, Wyoming 82435
East North Street
Box 983

Riverton, Wyoming 82901
2400 North Federal Blvd.
Box 191

Rock Springs, Wyoming 82901
1709 Elk Street
Box 369

Worland, Wyoming 82401
Highway 20 North
Box 229

Elkview, West Virginia
Route 4 & 119-15 miles NE
Box 418 25071

Weston, West Virginia
Jackson Mill Road
Box 592 26452

Oneida, Tennessee 37841
U. S. 27 South
Route 2, Box 75-C

Davisville, Rhode Island
Box 977 02845

Indiana, Pennsylvania
Route 119 South
Box 427 15701

Bradford, Pennsylvania
350 High Street Ext.
Box 228 16701

Seminole, Oklahoma 74868
Highway 270 East
Box 1220

Woodward, Oklahoma 73801
510 East Oklahoma Street
Box 429

Oklahoma City, Oklahoma
4607 S. MaCarthur Blvd.
Box 82727 73148

Healdton, Oklahoma 73438
Highway 76 South
815 S.E. 8th Street

Enid, Oklahoma 73701
30th & Willow Street
Box 1147

Burns Flat, Oklahoma
Bldg. 701, Dispensary Rd.
Box 69

Bristow, Oklahoma 74010
300 West First Street
Box 628

Reno, Ohio 45773-0179
Highway 7
Box 179

Havre, Montana 59501
Highway 2 East
Box 1489

Kalkaska, Michigan 49646
U.S. 131 North
Box 519

Henderson, Kentucky 42420
U.S. 60 West
Box 437

North Slope, Alaska
Deadhorse Community
Pouch 340026, Prudhoe Bay
99734-0026

Fairbanks, Alaska 99701
1429 Minnie Street

Anchorage, Alaska 99502
Box 6287
Airport Annex

Pauls Valley, Oklahoma
Highway 77 South
Box 619 73075

Fairfax, Oklahoma 74637
610 West Oak Street
Box 128

Duncan, Oklahoma 73533
East Highway 7
Route 3, Box 1A

Davis, Oklahoma 73030
Industrial Park
P. O. Box 510

Zanesville, Ohio
9350 East Pike
Box 989 43701-0366

Wooster, Ohio 44691
503 Freedlander Road
Box 796

Cortland, Ohio 44410
Highway 46 North
Box 116

Glendive, Montana 59330
Highway 16 West
Box 350

Albion, Michigan 49224
404 North Albion
Box 331

Flora, Illinois 62839
South Stanford Road
Box 459

Kenai, Alaska
Kenai Industrial Park
P. O. Box 637

Each facility has an area designated for Rayfrac materials that is properly secured against unauthorized removal with proper Caution - Radioactive Material and Caution - Radiation Area signs properly displayed.

HALLIBURTON SERVICES
Dan G. Kelly

JOB TITLE: REGULATORY SPECIALIST SYMBOL: U1119

ORGANIZATIONAL UNIT: GOVERNMENT REGULATIONS

REPORTS TO: GOVERNMENT REGULATIONS MANAGER WRITTEN BY: WT

DATE: 05/84 APPROVED BY: RB

JOB SUMMARY: Coordinates all activities related to radioactive services including the distribution of information, methods, processes, and materials necessary to adequately perform the services, comply with applicable regulations, and provide personnel safety.

PRINCIPAL DUTIES AND RESPONSIBILITIES:

1) Researches regulatory agencies' actions to provide information and support in the implementation of practical procedures to comply with regulations and enhance personnel safety for the Company and customers.

2) Conducts classroom and on-the-job training involving the procurement, handling, use, transportation and storage of radioactive materials.

3) Assists by telephone or travels to supervise non-routine and emergency actions as necessary.

4) Establishes and maintains required licenses, authorizations, and permits from the applicable regulatory agencies concerning the implementation of the systems, processes, and procedures used in operations.

5) Supervises the activities of Radiation Safety Officers in field locations.

6) Responds, assists in collecting data, and replies to items of noncompliance following a regulatory agency inspection.

7) Authors and maintains manuals dealing with radiation safety for use in classroom instruction and operational guidance.

8) Assists Research personnel with equipment and process design and evaluates new or special applications.

9) Recommends and supplies personnel monitoring devices and radiation measuring equipment.

10) Inventories and maintains records for radioactive densometers.
11) Assists with design of radioactive storage facilities and disposal of waste.
12) Provides shipping documents for transporting radioactive materials.
13) Performs other similar or related duties as assigned.

JOB SPECIFICATIONS:

Requires a Bachelor's degree in technical field such as Chemistry, Environmental Engineering, etc.
Requires 6-8 years experience in applied health physics with comparable radiation safety problems.

HALLIBURTON SERVICES
Richard A. Leonardi, Jr.
Steve Hook

JOB TITLE: RADIATION SAFETY OFFICER SYMBOL: U1122

ORGANIZATIONAL UNIT: GOVERNMENT REGULATIONS

REPORTS TO: REGULATORY SPECIALIST WRITTEN BY: WT

DATE: 05/84 APPROVED BY: RB

JOB SUMMARY: Implements and monitors the radiation safety programs in an assigned area for the safe handling and use of radioactive material in field operations.

PRINCIPAL DUTIES AND RESPONSIBILITIES:

1) Provides initial and refresher training courses on use of radioactive material and radiation safety to personnel utilizing sources of radiation.

2) Develops and reviews standard operating and emergency procedures for radiation safety at locations utilizing sources of radiation.

3) Conducts regular audits of field locations by reviewing records, posting procedures, and conducting area surveys and contamination studies.

4) Designs and implements record keeping systems to document compliance with regulatory requirements.

5) Provides emergency assistance when accidents involving the use or transportation of radioactive material occur.

6) Investigates excessive exposures, misuse of radioactive material and loss of radiation sources.

7) Corresponds with regulatory agencies regarding license amendments, required investigation reports, and inspection findings responses.

8) Monitors personnel radiation exposure records and reports as per regulations.

9) Coordinates the purchase, training, and use of radioactive material and protective devices and conducts quality control checks on suppliers.

10) Assists in the design of facilities and systems utilizing radioactive material.

11) Research regulatory agency changes that may affect operations.

12) Performs other similar or related duties as assigned.

JOB SPECIFICATIONS:

Requires a Bachelor's degree in a technical field such as Chemistry, Environmental Engineering, etc.
Requires 4 years of applied health physics experience with comparable radiation safety problems.

ADJUSTABLE FREEZER/COOLER ALARM

Protect fresh or frozen foods • Laboratory & medical supplies

Piercing audible alarm, 100 dbs, sounds up to 7 days . . . adjustable temperature range from -20° to +70°F (-29 to +21C) accuracy of " 2°F . . . easily installed, no complicated wiring, drilling or tools required . . . a small sensor goes inside freezer, thin wire connects sensor to alarm that adheres to [illegible] door gasket closes over thin connecting wire . . . standard 9 Volt battery operates [illegible] years . . . test button for checking battery, [illegible] circuitry . . . low battery indicator . . . solid state design and circuit boards . . . complete with [illegible] wire, probe and battery . . . alarm sounds if probe is broken or disconnected . . . optional 50 ft. wire available, also available with 100 hr. visible timer that shows how long freezer was off.

Please ship:

- ☐ #200 Alarm with 10 ft. [illegible] & battery @ **$57.00** Delivered Price.
- ☐ #210 Alarm with 100 hr. timer, probe & battery @ **$100.00** Delivered Price.
- ☐ #202 "Y" connector for additional probe @ **$5.00**
- ☐ #203 50 ft. extension with probe @ **$[illegible].60**

WORLD WIDE GUARANTEE

No ifs, ands or buts in our guarantee - here it is - 100% absolute satisfaction is guaranteed or your money back within [illegible] days without question or [illegible].

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Company _____

Street _____

City _____ State _____ Zip _____

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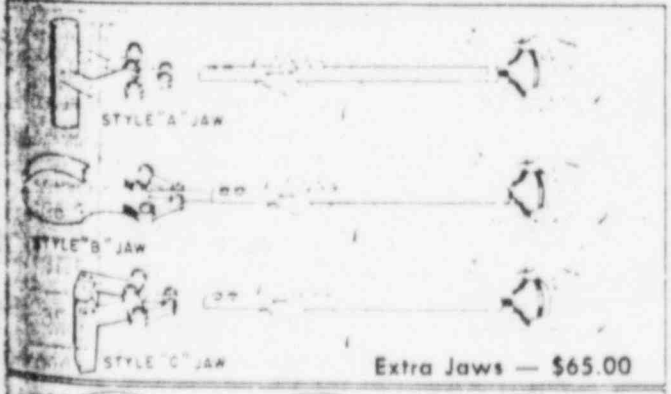
PERMANENT LOCKING POSI-GRIP TONG (PLPGT)

the finest in handling equipment for General Laboratory, Radiation, and Industrial use!



Extra Jaws — $65.00

	STYLE "A" JAW	STYLE "B" JAW	STYLE "C" JAW

Length	18"	24"	30"	36"	42"	48"
	$94.00	109.00	124.00	139.00	154.00	200.00
Length	60"	72"	84"	96"	108"	120"
	$250.00	300.00	350.00	400.00	450.00	500.00

CP-Chrome Plated Body SPECIFY LENGTH & JAW STYLE

F.O.B. Fact N.Y.

Posi-Grip Tongs are constructed of .049 structural steel tubing, copper and nickel flashed, with a brite chrome finish. Jaws and control rod are of 2024-T6 aluminum alloy. All bearing and pivot points are heat hardened steel. Rubber sleeves are supplied for the Style "B" black anodized Jaws. The control knob is a 2" diameter, solid black plastic molded mushroom shape, with a non-slip coarse straight knurl, to insure a firm finger grip.

FEATURES:

- Choice of three types of interchangeable gripping jaws.
- Will hold objects from 1/32" to 7".
- All instrument lengths are off the shelf items.
- Foils and Wafers are securely held.
- Jaws will not release its hold on objects until technician deliberately turns control knob in a counter clockwise direction.
- Precision machined heads are easily interchanged.
- Jaws are non-magnetic.
- Jaws will not mar or scratch surface of object picked up or held.
- Comfortable hand operation **light in weight.**
- Available lengths 18" to 120".
- All components parts (of the same length) are replaceable and interchangeable. The only tool required is a Phillips #2 Screw Driver.
- Rapid instant **release** of object when control knob is turned in a **counter clockwise** direction.
- Decontamination techniques will not harm jaws.

ADJUSTABLE FREEZER/COOLER ALARM

Protect fresh or frozen foods • Laboratory & medical supplies

Piercing audible alarm, 100 dbs, sounds up to 7 days . . . adjustable temperature range from -20° to +70°F (-29 to +21C) accuracy of " 2°F . . . easily installed, no complicated wiring, drilling or tools . . . sensor to alarm that adheres to outside of freezer cabinet with pressure sensitive tape and mounting clips . . . door gasket closes easily over thin connecting wire . . . standard 9 Volt battery operates 1 year . . . test button for checking battery, solid state circuitry . . . low battery indicator . . . solid state design and circuit boards . . . complete with 10 ft. wire, probe and battery . . . alarm sounds if probe is broken or disconnected . . . optional 50 ft. wire available, also available with 100 hour visible timer that shows how long freezer was off.

Please Ship:

- ☐ #20[illegible] Alarm with 10 ft. probe & battery @ **$87.00** Delivered Price.
- ☐ #21[illegible] Alarm with 100 hr. timer, probe & battery @ **$100.00** Delivered Price.
- ☐ #20[illegible] "Y" connector for additional probe @ **$[illegible].00**
- ☐ #20[illegible] 50 ft. extension with probe @ **$12.50**

IRONCLAD GUARANTEE

No ifs, ands or buts in our guarantee - here it is - 100% absolute satisfaction is guaranteed or your money back within 30 days without question or trouble.

Name _____ Title _____

Company _____

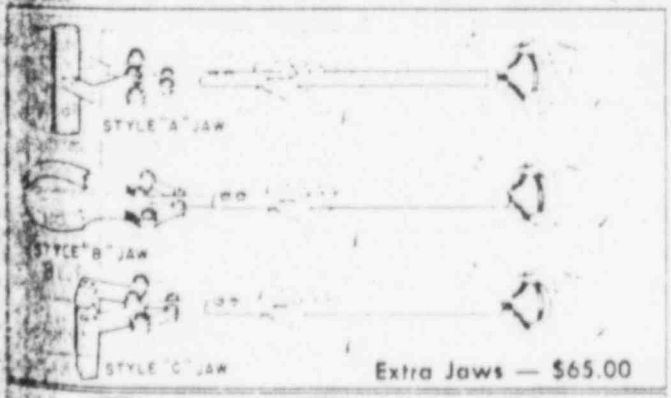
Street _____

City _____ State _____ Zip _____

IMMEDIATE SERVICE (805) 966-0810

PERMANENT LOCKING POSI-GRIP TONG (PLPGT)

the finest in handling equipment for General Laboratory, Radiation, and Industrial use!



Extra Jaws — $65.00

Length	18"	24"	30"	36"	42"	48"
	$94.00	109.00	124.00	139.00	154.00	200.00

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F.O.B. Fort N.Y.

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- Jaws are non-magnetic.
- Jaws will not mar or scratch surface of object picked up or held.
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Please ship:

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- ☐ #210 Alarm with 100 hr. timer, probe & battery @ **$100.00** Delivered Price.
- ☐ #202 "Y" connector for additional probe @ **$5.00**
- ☐ #203 50 ft. extension with probe @ **$12.50**

California Orders add 6% Sales Tax. Rated firms shipped open account NET 10 days or check with order.

IRONCLAD GUARANTEE

No ifs, ands or buts in our guarantee - here it is - 100% absolute satisfaction is guaranteed or your money back within 10 days without question or quibble.

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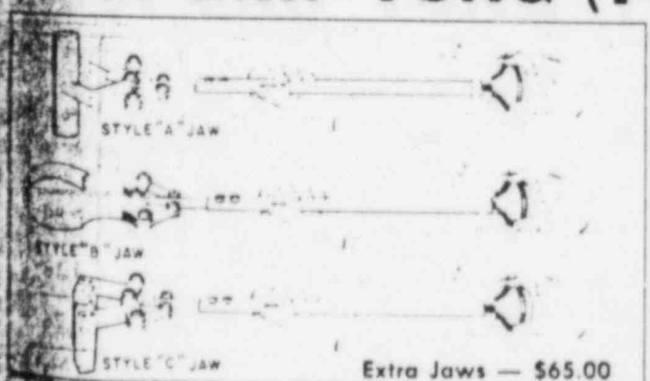
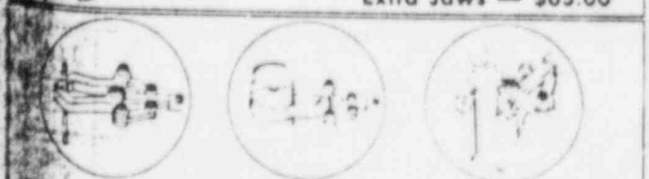
PERMANENT LOCKING POSI-GRIP TONG (PLPGT)

the finest in handling equipment for General Laboratory, Radiation, and Industrial use!



Extra Jaws — $65.00



Length	18"	24"	30"	36"	42"	48"
	$94.00	109.00	124.00	139.00	154.00	200.00

Length	60"	72"	84"	96"	108"	120"
	$250.00	300.00	350.00	400.00	450.00	500.00

SP-Chrome Plated Body SPECIFY LENGTH & JAW STYLE

F.O.B. Fact N.Y.

Posi-Grip Tongs are constructed of .049 structural steel tubing, copper and nickel flashed, with a brite chrome finish. Jaws and control rod are of 2024-T6 aluminum alloy. All bearing and pivot points are hear hardened steel. Rubber sleeves are supplied for the Style "B" black anodized Jaws. The control knob is a 2" diameter, solid black plastic molded mushroom shape, with a non-slip coarse straight knurl, to insure a firm finger grip.

FEATURES:

- Choice of three types of interchangeable gripping jaws.
- Will hold objects from 1/32" to 7".
- All instrument lengths are off the shelf items.
- Foils and Wafers are securely held.
- Jaws will not release its hold on objects until technician deliberately turns control knob in a counter clockwise direction.
- Precision machined heads are easily interchanged.
- Jaws are non-magnetic.
- Jaws will not mar or scratch surface of object picked up or held.
- Comfortable hand operation **light in weight.**
- Available lengths 18" to 120".
- All components parts (of the same length) are replaceable and interchangeable. The only tool required is a Phillips #2 Screw Driver.
- Rapid instant **release** of object when control knob is turned in a **counter clockwise** direction.
- Decontamination techniques will not harm jaws.

Ribeon Cal. Inc. 123 Gray Ave., Santa Barbara, Ca. 93101 Phone (805) 963-7545

ADJUSTABLE FREEZER/COOLER ALARM

Protect fresh or frozen foods • Laboratory & medical supplies

Piercing audible alarm, 100 dbs, sounds up to 7 days . . . adjustable temperature range from -20° to +70°F (-29 to +21C) accuracy of " 2°F . . . easily installed, no complicated wiring, drilling or tools required . . . a small sensor goes inside freezer, thin wire connects sensor to alarm that adheres to outside of freezer cabinet with pressure sensitive tape and mounting clips . . . door gasket closes easily over the thin connecting wire . . . standard 9 Volt battery operates 1½ years . . . test button for checking battery, horn and circuitry . . . low battery indicator . . . solid state design and circuit boards . . . complete with 10 ft. wire, probe and battery . . . alarm sounds if probe is broken or disconnected . . . optional 50 ft. wire available, also available with 100 hr. visible timer that shows how long freezer was off.

Please ship:

- ☐ #200 Alarm with 10 ft. probe & battery @ **$87.00** Delivered Price.
- ☐ #210 Alarm with 100 hr. timer, probe & battery @ **$100.00** Delivered Price.
- ☐ #202 "Y" connector for additional probe @ **$5.00**
- ☐ #203 50 ft. extension with probe @ **$12.50**

California Orders add 6% Sales Tax. Rated firms shipped open account NET 10 days or check with order.

IRONCLAD GUARANTEE

No ifs, ands or buts in our guarantee . . . here it is - 100% absolute satisfaction is guaranteed or your money back within 10 days without question or quibble.

Name _____ Title _____

Company _____

Street _____

City _____ State _____ Zip _____

IMMEDIATE SERVICE (805) 966-0810

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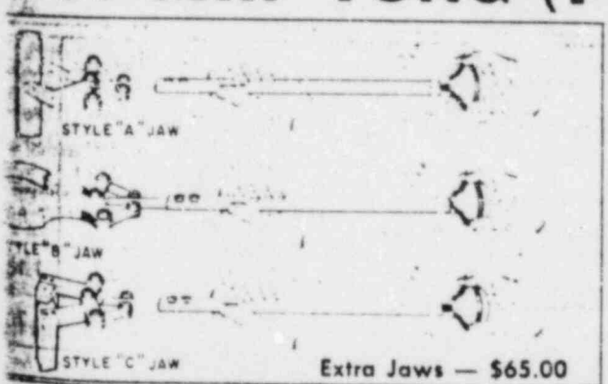

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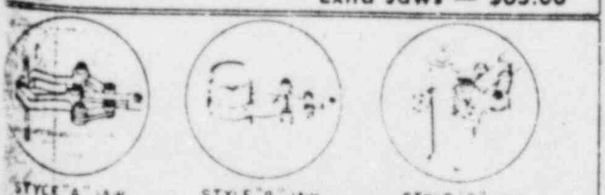

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RADIATION SAFETY QUIZ

1. What are the basic particles comprising an atom?

2. Name three kinds of radiation?

3. What kinds of radiation are we most concerned with?

4. What kinds of radition are emitted by Cesium-137?

5. What would be the dose rate of a 10 millicurie encapsulated source of cesium-137 at 4 feet? 55 millicurie, Cs-137 at 4 feet?

6. In problem 5., how much lead shielding would be required to reduce the dose rate to 2.0 mR/hr at 1 foot?

7. What is the frequency rate for calibration of survey meters?

8. What is the exchange rate for TLD inserts?

9. What is the maximum annual occupational exposure limit?

RADIATION SAFETY QUIZ

1. An exposure of 1.5 hours at 250 mR was estimated. What is the total exposure in rems?

2. A survey meter (Geiger Counter) has a maximum rang of 20 mR. How can exposure of 250 mR be estimated with this?

3. Does this constitute an allowable exposure? Why?

4. You have ten 3 pound cans containing 10 millicuries Iridium 192 each. (a) What is the exposure that can be estimated for this at 24"? (b) How much fracturing sand will this tag?

5. You have 25 millicuries Iodine 131. (a) What precautions should be followed in handling this? (b) How much tagging can this handle?

6. You have 50 millicuries Scandium 46. (a) What is the half life? (b) What is the exposure potential?

7. You have 50 millicuries Iridium 192. (a) What is the exposure potential? (b) What is the half life?

8. You have 20 millicuries Iodine 131. It is 12 days old. (a) How should it be handled? (b) How many barrels of cement will this tag?

9. What is indicated by half life?

10. You have material calculated to emit 400 mR at 12 inches. What are the restrictions to be observed in transporting the materials?

11. What restrictions apply to the storage of materials?