

MAY 21 1992

Docket Nos. 030-05980
030-05982
030-08335
030-08444

License Nos. 37-00030-02
37-00030-08
37-00030-09G
37-00030-10G

Safety Light Corporation
ATTN: Larry Harmon
Plant Manager
4150-A Old Berwick Road
Bloomsburg, Pennsylvania 17815

Dear Mr. Harmon:

Subject: Combined Inspection Report No. 92-001

On April 20 and 21, 1992, Betsy Ullrich of this office conducted a routine safety inspection at the above address of activities authorized by the above listed NRC license. The inspection was an examination of your licensed activities as they relate to radiation safety and to compliance with the Commission's regulations and the license conditions. The inspection consisted of observations by the inspector, interviews with personnel, and a selective examination of representative records. The findings of the inspection were discussed with you and members of your staff at the conclusion of the inspection. A copy of the NRC inspection report is enclosed.

This also refers to the telephone conversation on May 20, 1992 between Larry Harmon and Betsy Ullrich of this office regarding the drums containing water and soil removed from new wells dug by Chem Nuclear. We understand from this conversation that you will provide covering for these drums to protect them from the weather until the contents can be characterized and properly disposed. We further understand that you plan to begin these activities by the end of July, 1992. We will review this matter during our next inspection.

Within the scope of this inspection, no violations were identified.

In accordance with Section 2.790 of the NRC's "Rules of Practice", Part 2, Title 10, Code of Federal Regulations, a copy of this letter will be placed in the Public Document Room. No reply to this letter is required.

SAFETY LIGHT OFFICIAL RECORD COPY Pg 1 May 20, 1992

RETURN ORIGINAL TO
REGION I

IE:07

Your cooperation with us is appreciated.

Sincerely,

**Original Signed By:
Francis M. Costello**

Francis M. Costello, Chief
Research, Development &
Decommissioning Section
Division of Radiation Safety
and Safeguards

Enclosure:

Combined Inspection Nos. 030-05980/92-001, 030-05982/92-001 and 030-08335/92-001
and 030-8444/92-001

cc:

Public Document Room (PDR)
Nuclear Safety Information Center (NSIC)
Commonwealth of Pennsylvania
Norman Fritz, Radiation Safety Officer

USR Industries, Incorporated
ATTN: Mr. Ralph T. McElvenny
Chairman and Chief Executive
550 Post Oak Boulevard
Suite 550
Houston, Texas 77027

bcc:

Region I Docket Room (w/concurrences)
F. Costello, RI
P. Vacca, NMSS

RI:DRSS
Ulrich

RI:DRSS
Costello

5/21/92

5/21/92

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 030-05982/92-001
030-05980/92-001
030-08335/92-001
030-08444/92-001

Docket Nos. 030-05982
030-05980
030-08335
030-08444

License Nos.	<u>37-00030-08</u>	Priority	<u>1</u>	Category	<u>B</u>
	<u>37-00030-02</u>		<u>3</u>		<u>E</u>
	<u>37-00030-09G</u>		<u>4</u>		<u>E</u>
	<u>37-00030-10G</u>		<u>4</u>		<u>E</u>

Licensee: Safety Light Corporation
4150-A Old Berwick Road
Bloomsburg, Pennsylvania 17815

Facility Name: Safety Light Corporation

Inspection At: Bloomsburg, Pennsylvania

Inspection Conducted: April 20 and 21, 1992

Inspector: Betsy Ullrich 5/21/92
Betsy Ullrich, Senior Health Physicist date

Approved by: Francis M. Costello 5/21/92
Francis M. Costello, Chief date
Research, Development &
Decommissioning Section

Inspection Summary: Inspection conducted April 20-21, 1992 (Combined Report Nos. 030-05980/92-001, 030-05982/92-001, 030-08335/92-001, and 030-08444/92-001).

Areas Inspected: Routine, unannounced inspection, including review of: organization and status of licensed activities; facilities and equipment; package receipt and inventory; airborne releases; environmental sampling; bioassays; routine surveys; and distribution of products.

Results: No violations were identified with respect to License Nos. 37-00030-08, 37-00030-09G, 37-00030-10G. With respect to License No. 37-00030-02, the apparent violations identified in Inspection No. 030-05980/86-001 apparently had not been corrected.

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DETAILS

1. Persons Contacted

*Larry Harmon, Plant Manager
*Norman Fritz, Radiation Safety Officer
John MacHutchin, Consultant
Charles Berlin, Radiation Safety Technician

*Present at exit interview

2. Organization and Status of Licensed Activities

Safety Light Corporation is authorized by NRC License Nos. 37-00030-08, 37-00030-09G and 37-00030-10G to possess and use any form of hydrogen-3 for research and development, manufacturing, and general license distribution of luminous signs and other products and any byproduct material as sealed sources for use as reference standards. License No. 37-00030-07E which authorized the distribution of license-exempt items, was terminated in 1991. The licensee's current operations include the manufacturing and distribution of luminescent signs and markers, gas chromatograph foils and accelerator targets. One rotary tube-filling machine remains on site for production of tritium-filled tubes and this machine is used approximately once each month. Most tritium-filled tubes used in the production of luminescent signs are received from Shield Source, Inc. of Petersborough, Ontario, Canada. Assembly of signs is performed daily. Aircraft signs, foils and targets are distributed directly from Safety Light Corporation to the customer. Most other signs are distributed through Isolite Corporation, and some through Emergi-Lite Corporation. These companies have their own NRC licenses which authorize distribution to general licensees.

Jack Miller, the former president of Safety Light Corporation, sold his interests in the company, and only occasionally acts as consultant to Safety Light Corporation. John MacHutchin, now retired from his former position as Radiation Safety Officer, is a technical consultant for the licensee. Ed Kettyle, who is the president of Shield Source, Inc. is the General Manager for Safety Light Corporation. The Plant Manager is Larry Harmon and the Radiation Safety Officer is Norman Fritz. Two health physics technicians perform surveys, sampling and analysis. Nineteen employees are involved in the production of luminescent signs.

The Radiation Safety Committee meets routinely during the year. A review of minutes from meetings held in February, June, and October of 1991 and January, 1992 indicate that appropriate issues concerning current activities on site are discussed. Due to the great reduction in licensed activities and the amount of licensed material on site, the Committee is considering a request to modify or eliminate the current Contingency Plan.

Safety Light Corporation is also authorized by NRC License No. 37-00030-02 to possess any byproduct material as contaminated equipment and facilities for the decontamination, cleanup and disposal of such material. No current decontamination activities are being conducted under this license. The failure to perform decontamination activities was cited as an apparent violation in NRC Inspection Report No. 030-5980/86-001. This apparent violation has not been corrected. The licensee is continuing to monitor water from bore holes on site and at the perimeter of the licensee's property to evaluate the status of radioactive material that was buried on the property during the 1950's and 1960's. Analysis is performed for the licensee by a contractor.

3. Facilities and Equipment

Most licensed activities take place in the tritium production facility. This facility concludes the gas-fill area where tubes are filled with tritium gas, the tritium foil room where gas chromatograph foils are manufactured, the Exit Sign Assembly Room and Dark Room, and the Health Physics laboratory. The gas-fill area was reduced in size in June 1991, since only one fill line is in use. An ancillary Counting Laboratory was established in the Main Building in August, 1991 with a liquid scintillation counter and a portable tritium monitor available for use. In addition, licensed material is stored in the Liquid Waste Building, and the Solid Waste Building behind the tritium production facility. Various other buildings on the site were used in the past for activities involving cesium-137, strontium-90, and radium. Portions of the buildings and grounds remain contaminated from past activities.

Portable tritium monitors and other survey meters are available for monitoring for contamination. Air sampling equipment is used for in-place and portable measurements of airborne tritium. Analyses of urine samples and wipe samples are performed on a liquid scintillation counting system. Wipes are also counted using a gas-flow proportional counter. The equipment observed during the inspection appeared to be operable and in calibration. Analytical methods appeared to be sensitive for the types and quantities of isotopes measured.

No safety concerns were identified.

4. Package Receipt and Inventory

The licensee receives 10,000-curie shipments of tritium which originate at the Department of Energy Oak Ridge National Laboratory (ORNL). The shipments are sent from ORNL to the Department of Energy Mound Laboratory to determine the radioactivity content before arriving at the licensee. Due to reduction in the frequency of tube-filling at this facility, a 10,000-curie shipment is expected to last six months.

In addition to tritium gas from Mound Laboratory, the licensee receives filled tubes from Shield Source, Inc. for the production of signs, and the licensee accepts signs returned from general licensees for disposal. In the period of January 1992 through April 1992, the licensees received 14 shipments of tritium tubes for production, 19 shipments containing signs for disposal, and 11 shipments of signs returned for re-use. Incoming packages are surveyed for contamination.

No safety concerns are identified.

5. Airborne Releases

All building exhausts are combined for discharge through a single stack, 0.6m in diameter and 18m high. Continuous monitoring of this stack for particulate, aqueous and gaseous forms of tritium is performed using filters and ethylene glycol bubblers in conjunction with an oxidizer furnace. The filters and ethylene glycol solutions are changed and analyzed daily. The licensee has determined diffusion factors for the exhaust stream under predominant meteorological conditions (wind toward the southeast) and utilizes these factors to calculate the concentration of tritium released to unrestricted areas.

Licensee records indicate that, during 1991, 73.5 curies of tritium were released as tritiated water vapor and 46.4 curies were released as gaseous tritium. The licensee's summary of releases are included as Attachment 1. Using previously determined diffusion factors, the license determined that the concentration of tritium released to the unrestricted area was within the limits in 10 CFR 20.106.

The licensee performs air sampling at the site boundary using impingers. The measured concentrations were in the range 0.1-4.6 E-9 microcuries per cubic centimeter in 1991. The NRC limit for tritium in air released to unrestricted areas is 2 E-7 microcuries per cubic centimeter. Weekly results for the period December 27, 1990 through January 2, 1992 are included as Attachment 2.

No safety concerns were identified.

6. Environmental Sampling

The inspector reviewed bore hole and well water sampling results and noted that analyses of on-site subsurface water continue to indicate concentrations of radioactive material in excess of limits for unrestricted areas. The principal isotopes in the subsurface water are strontium-90 and tritium.

Well and bore holes are sampled routinely during the year. Residents who live near the facility provide a one quart sample of their well water to the licensee for analysis, and other wells are sampled by the licensee using a bailer. A one quart sample is

taken for onsite analysis by the licensee and 1-gallon samples are shipped to a contract laboratory for analysis. In January 1991, the contract laboratory was changed to Teledyne Isotopes. Monthly samples in 1991 and 1992 from bore holes 1, 2, and 3 which lie between the underground silos and the river, are reported having gross alpha concentrations of 1 E-9 to 1 E-8 microcuries per milliliters and gross beta concentrations were generally on the order of 1 E-6 to 1 E-5 microcuries per milliliters. For comparison, the NRC limit for releases to unrestricted areas are 3 E-3 microcuries of tritium per milliliter, 3 E-7 microcuries of strontium-90 per milliliter, and 3 E-8 microcuries of radium-226 per milliliter. Other bore holes are sampled one to four times each year and have lower gross alpha and gross beta concentrations.

River water samples were also sent to Teledyne for gross alpha, gross beta, and strontium-90 analysis. Results for January and March 1992 samples detected less than 2 E-9 microcuries gross alpha per milliliter; and 5 E-9 microcuries strontium-90 per milliliter.

7. Bioassays

A licensee representative stated that weekly urinalyses are performed on all individuals working with tritium. Additional bioassays are performed if a leak or spill occurs. The inspector reviewed the licensee's bioassay records for the period of January 1991 through April 1992 and determined that the maximum individual urine sample contained 24.42 microcuries of tritium per liter. This uptake was the result of work the employee performed at Shield Source, Inc., in Canada. This value is less than the excretion rate which would be expected from an exposure for 40 hours at the NRC occupational concentration limit (10 CFR 20, Appendix B, Table I, Column 1).

The typical sample contained less than 0.01 microcuries of tritium per liter. The minimum detectable activity for the licensee's method of analysis is 0.0036 microcuries per liter.

No safety concerns were identified.

8. Routine Surveys

The inspector reviewed samples of records of the licensee's routine surveys of the tritium production facility. Typical contamination levels do not exceed background in areas such as the lunch room, hallways, Exit Sign Assembly room and the Health Physics laboratory. Contamination levels in the tritium foil room and the solid waste building are typically on the order of 10,000 disintegrations per minute. These surveys have been performed at the frequencies required by the license application and that the licensee had taken prompt corrective actions when contamination levels in excess of its action limits were identified.

No safety concerns were identified.

9. Waste Disposal and Inventory

The current Liquid Waste Storage Building is built directly on top of the old liquid waste facility destroyed during flooding in 1971. Liquid waste is stored in three tanks prior to discharge to the Susquehanna River in accordance with Safety Light Corporation's NPDES permit from the Commonwealth of Pennsylvania. The tanks hold up to 2.3 E7 milliliters (6,000 gallons) of liquid. Approximately 10 discharges are made each year. Samples are analyzed prior to release. Tritium releases in calendar year 1991 ranged from 9,859 to 31,948 microcuries per discharge in concentrations of 0.17 to 14 E-3 microcuries of tritium per liter. The 1991 annual average concentration released was 9.2 E-2 microcuries of tritium per milliliter, which is 31% of the maximum permissible concentration. Three discharges were made to date in 1992, the maximum release was 9,328 microcuries of tritium at 4.9 E-2 microcuries per milliliter.

Liquid scintillation vials are emptied into a container. Liquid is disposed of by evaporation. Empty vials are currently stored in ten drums awaiting disposal.

In November 1991, approximately 5,000 curies of tritium foils in 530-gallon waste drums were shipped for disposal at a licensed low-level waste facility. Three shipments were also made in 1991 of radioactive LSA (low specific activity) waste which contained a total of 1.4 curies of tritium in fifteen 55-gallon drums. Waste manifests appeared to contain correct classification and label information. Packages were wipe-tested prior to shipment. No shipments were made in 1992.

In addition, four cartons containing tritium in luminescent signs were shipped to Shield Source, Inc. in October 1991 for disposal. The signs were shipped in welded aluminum canisters, classified as Radioactive Material, N.O.S. UN 2982 and labelled with a White-I label.

The Solid Waste Building currently contains a large volume of paper waste in double plastic bags. Additional paper and solid waste is contained in 45 drums which will require re-packaging prior to disposal due to the condition of the drums and changes in required markings and labelings. More than 200 tube stub cans are also stored in this building. The licensee representative stated that, at the current rate of waste generation, enough storage space exists in the building to hold 7 to 10 years volume.

Forty-four drums of waste, generated by Chem Nuclear during the drilling of new wells, are also stored on site. The drums are on pallets outside the tritium facility but they are not covered to protect them from rain and bad weather. The waste, which is mostly water, came out of the bore holes of the wells, but has not yet been sampled to determine if it requires disposal as radioactive waste. During a telephone conversation on May 20, 1992, a licensee representative agreed to cover the drums to protect them against the weather.

No other safety concerns were identified.

10. Distribution of Products

Safety Light Corporation possesses License No. 37-00030-09G which authorizes distribution of approved luminescent sources to persons who are authorized to possess them by a general license pursuant to 10 CFR 31.5, and License No. 37-00030-10G which authorizes distribution of approved luminous safety devices for use in aircraft to persons authorized to possess them by a general license pursuant to 10 CFR 31.7. All of the aircraft devices are distributed directly to generally licensed customers by Safety Light Corporation. Quarterly reports for 1991 and the first quarter of 1992 were reviewed. Approximately 500 orders for aircraft devices were shipped in 1991, ranging from 1 to 130 devices per order. Approximately 900 orders for other luminous devices were shipped in 1991, ranging from 1 to 150 devices per order. The 1992 orders appear to be comparable to 1991 shipments. Most of these signs were shipped to Isolite Corporation of Berwyn, Pennsylvania (License No. 37-23527-01G) which has four regional sales representatives who provide the principle marketing of Safety Light Corporation signs. The Radiation Safety Officer for Isolite is C. Richter White, a principle of Safety Light Corporation. Isolite maintains a warehouse for its stock of tritium signs for ready distribution to general licensees. Safety Light Corporation also distributes tritium signs to Emergi-Light (License No. 06-28618-01G) who also distributes them to general licensees. Certain models, including all aircraft signs, are distributed to general licensees only by Safety Light Corporation.

All signs observed in the Exit Sign Assembly room appeared to be labelled correctly. Labels for the various type of signs were available for use. Labels and package inserts were in accordance with the licensee's commitments. All required material appeared to be included in packages being prepared for shipment.

No safety concerns were identified.

11. Exit Interview

The inspector and other NRC staff met with the individuals identified in Paragraph 1 at the conclusion of the inspection. The scope and findings of the inspection were summarized.

Attachment 1

Annual Summary of Tritium Processed and Tritium Released, 1986 through 1991

TRITIUM PROCESSED & TRITIUM RELEASED TO ENVIRONMENT

YEARS 1986 THRU 1991

TRITIUM PROCESSED:

OPERATION:		1991	1990	1989	1988	1987	1986
Rotary Fill I (Ci):		0	136,039	162,563	278,408	439,543	352,019
Rotary Fill II (Ci):		55,700	149,230	100,579	276,821	391,878	0
Static Fill (Ci):		0	0	0	0	16,646	30,660
Foils/Targets, etc. (Ci):		5,868	9,626	6,229	12,111	9,498	7,250
Application (Ci):		0	0	0	0	0	0
TOTALS (Ci):		61,567	294,895	269,371	567,340	857,475	389,929

TRITIUM RELEASED TO ENVIRONMENT:

A. Stack Emissions:

	1991		1990		1989		1988		1987		1986	
	Ci	X MPC*	Ci	X MPC*	Ci	X MPC*	Ci	X MPC*	Ci	X MPC*	Ci	X MPC*
3H(I) :	0.06	0.003	0.10	0.010	0.20	0.010	0.10	0.010	0.10	0.010	0.10	0.010
3H(S) :	73.50	4.100	209.80	11.680	241.80	13.500	172.60	9.640	148.50	8.300	95.70	5.350
3H(SUB) :	464.00	0.130	7774.40	2.170	6384.90	1.780	3634.20	1.020	4665.90	1.300	3669.90	1.030
TOTALS	538.00	(0.9%)¹	7983.60	(2.71%)¹	6626.9	(2.46%)¹	3806.80	(0.7%)¹	4814.50	(0.6%)¹	3765.70	(1.0%)¹

B. Liquid Discharges:

	1991	1990	1989	1988	1987	1986
Total 3H(S) Discharged (Ci):	0.21	0.51	1.30	0.16	0.62	0.33
Total H ₂ O Discharged (mL) :	2.3 X 10 ⁸	2.6 X 10 ⁸	6.3 X 10 ⁸	2.3 X 10 ⁸	4.3 X 10 ⁸	2.1 X 10 ⁸
Ave. µCi 3H(S)/mL H ₂ O :	0.92 X 10 ⁻³	1.9 X 10 ⁻³	2.1 X 10 ⁻³	.69 X 10 ⁻³	1.4 X 10 ⁻³	1.5 X 10 ⁻³
Ave. X MPC** :	0.31	0.64	0.69	0.23	0.47	0.50

* At point of release; Referred to MPC for 'Unrestricted' Areas. For 3H(I) & 3H(S) = 17.9 Ci/yr.

**Referred to MPC for 'Unrestricted' Areas

For 3H(SUB) = 3580 Ci/yr.

¹Total 3H Emissions as % of Total 3H Processed

Attachment 2

Results of Weekly Air Samples for Tritium in Environmental Air

ENVIRONMENTAL MONITORING FOR $\text{H}(S)$

DATE	NORTH uCi/ml H(S)	CENTER uCi/ml H(S)	SOUTH uCi/ml H(S)	WEST uCi/ml H(S)
12-27-90 To 1-3-91	* 0.0024 x 10 ⁻⁷	≤ 0.0022 x 10 ⁻⁷	0.0019 x 10 ⁻⁷	
1-3-91 To 1-10-91	* 0.0046 x 10 ⁻⁷	0.0018 x 10 ⁻⁷	0.0028 x 10 ⁻⁷	
1-10-91 To 1-17-91	* 0.0062 x 10 ⁻⁷	0.0025 x 10 ⁻⁷	0.0029 x 10 ⁻⁷	
1-17-91 To 1-24-91	* 0.0137 x 10 ⁻⁷	0.0079 x 10 ⁻⁷	0.0051 x 10 ⁻⁷	
1-24-91 To 1-31-91	* 0.0046 x 10 ⁻⁷	0.0019 x 10 ⁻⁷	0.0030 x 10 ⁻⁷	
1-31-91 To 2-7-91	* 0.0058 x 10 ⁻⁷	0.0029 x 10 ⁻⁷	0.0030 x 10 ⁻⁷	
2-7-91 To 2-14-91	* 0.0070 x 10 ⁻⁷	0.0020 x 10 ⁻⁷	0.0042 x 10 ⁻⁷	
2-14-91 To 2-21-91	* 0.0077 x 10 ⁻⁷	0.0021 x 10 ⁻⁷	0.0041 x 10 ⁻⁷	
2-21-91 To 2-28-91	* 0.0042 x 10 ⁻⁷	≤ 0.0021 x 10 ⁻⁷	0.0027 x 10 ⁻⁷	
2-28-91 To 3-7-91	* 0.0060 x 10 ⁻⁷	0.0010 x 10 ⁻⁷	0.0035 x 10 ⁻⁷	
3-7-91 To 3-14-91	* 0.0058 x 10 ⁻⁷	0.0023 x 10 ⁻⁷	0.0053 x 10 ⁻⁷	
3-14-91 To 3-21-91	* 0.0044 x 10 ⁻⁷	0.0021 x 10 ⁻⁷	0.0033 x 10 ⁻⁷	
3-21-91 To 3-28-91	* 0.0041 x 10 ⁻⁷	0.0028 x 10 ⁻⁷	0.0048 x 10 ⁻⁷	
3-28-91 To 4-4-91	* 0.0455 x 10 ⁻⁷	0.0265 x 10 ⁻⁷	0.0351 x 10 ⁻⁷	
4-4-91 To 4-11-91	* 0.0436 x 10 ⁻⁷	0.0227 x 10 ⁻⁷	0.0289 x 10 ⁻⁷	
4-11-91 To 4-18-91	* 0.0436 x 10 ⁻⁷	0.0095 x 10 ⁻⁷	0.0149 x 10 ⁻⁷	
4-18-91 To 4-25-91	* 0.0152 x 10 ⁻⁷	0.0047 x 10 ⁻⁷	0.0099 x 10 ⁻⁷	
4-25-91 To 5-2-91	* 0.0173 x 10 ⁻⁷	0.0081 x 10 ⁻⁷	0.0091 x 10 ⁻⁷	
5-2-91 To 5-9-91	* 0.0219 x 10 ⁻⁷	0.0039 x 10 ⁻⁷	0.0073 x 10 ⁻⁷	
5-9-91 To 5-16-91	* 0.0203 x 10 ⁻⁷	0.0068 x 10 ⁻⁷	0.0094 x 10 ⁻⁷	
5-16-91 To 5-23-91	* 0.0178 x 10 ⁻⁷	0.0064 x 10 ⁻⁷	0.0077 x 10 ⁻⁷	
5-23-91 To 5-30-91	* 0.0354 x 10 ⁻⁷	0.0078 x 10 ⁻⁷	0.0125 x 10 ⁻⁷	
5-30-91 To 6-6-91	* 0.0240 x 10 ⁻⁷	0.0047 x 10 ⁻⁷	0.0059 x 10 ⁻⁷	
6-6-91 To 6-13-91	* 0.0280 x 10 ⁻⁷	0.0101 x 10 ⁻⁷	0.0154 x 10 ⁻⁷	
6-13-91 To 6-20-91	* 0.0180 x 10 ⁻⁷	0.0049 x 10 ⁻⁷	0.0055 x 10 ⁻⁷	
6-20-91 To 6-27-91	* 0.0114 x 10 ⁻⁷	0.0057 x 10 ⁻⁷	0.0039 x 10 ⁻⁷	
6-27-91 To 7-3-91	* 0.0247 x 10 ⁻⁷	0.0038 x 10 ⁻⁷	0.0085 x 10 ⁻⁷	
7-3-91 To 7-10-91	* 0.0069 x 10 ⁻⁷	0.0399 x 10 ⁻⁷	0.0113 x 10 ⁻⁷	
7-10-91 To 7-17-91	* 0.0252 x 10 ⁻⁷	0.0087 x 10 ⁻⁷	0.0079 x 10 ⁻⁷	
7-17-91 To 7-24-91	* 0.0095 x 10 ⁻⁷	0.0225 x 10 ⁻⁷	0.0118 x 10 ⁻⁷	
7-24-91 To 8-1-91	* 0.0159 x 10 ⁻⁷	0.0039 x 10 ⁻⁷	0.0039 x 10 ⁻⁷	
8-1-91 To 8-8-91	* 0.0262 x 10 ⁻⁷	0.0049 x 10 ⁻⁷	0.0029 x 10 ⁻⁷	
8-8-91 To 8-15-91	* 0.0221 x 10 ⁻⁷	0.0086 x 10 ⁻⁷	0.0119 x 10 ⁻⁷	
8-15-91 To 8-22-91	* 0.0210 x 10 ⁻⁷	0.0076 x 10 ⁻⁷	0.0115 x 10 ⁻⁷	
8-22-91 To 8-29-91	* 0.0159 x 10 ⁻⁷	0.0069 x 10 ⁻⁷	0.0097 x 10 ⁻⁷	
8-29-91 To 9-5-91	* 0.0118 x 10 ⁻⁷	0.0056 x 10 ⁻⁷	0.0068 x 10 ⁻⁷	
9-5-91 To 9-12-91	* 0.0208 x 10 ⁻⁷	0.0070 x 10 ⁻⁷	0.0081 x 10 ⁻⁷	
9-12-91 To 9-19-91	* 0.0120 x 10 ⁻⁷	0.0051 x 10 ⁻⁷	0.0086 x 10 ⁻⁷	
9-19-91 To 9-26-91	* 0.0222 x 10 ⁻⁷	0.0060 x 10 ⁻⁷	0.0077 x 10 ⁻⁷	
9-26-91 To 10-3-91	* 0.0195 x 10 ⁻⁷	0.0046 x 10 ⁻⁷	0.0043 x 10 ⁻⁷	
10-3-91 To 10-10-91	* 0.0159 x 10 ⁻⁷	0.0033 x 10 ⁻⁷	0.0053 x 10 ⁻⁷	
10-10-91 To 10-17-91	* 0.0187 x 10 ⁻⁷	0.0045 x 10 ⁻⁷	0.0082 x 10 ⁻⁷	
10-17-91 To 10-24-91	* 0.0119 x 10 ⁻⁷	0.0059 x 10 ⁻⁷	0.0041 x 10 ⁻⁷	
10-24-91 To 10-31-91	* 0.0134 x 10 ⁻⁷	0.0065 x 10 ⁻⁷	0.0055 x 10 ⁻⁷	
10-31-91 To 11-7-91	* 0.0169 x 10 ⁻⁷	0.0021 x 10 ⁻⁷	0.0039 x 10 ⁻⁷	
11-7-91 To 11-14-91	* 0.0164 x 10 ⁻⁷	0.0022 x 10 ⁻⁷	0.0043 x 10 ⁻⁷	
11-14-91 To 11-21-91	* 0.0165 x 10 ⁻⁷	0.0031 x 10 ⁻⁷	0.0039 x 10 ⁻⁷	
11-21-91 To 11-27-91	* 0.0116 x 10 ⁻⁷	0.0017 x 10 ⁻⁷	0.0029 x 10 ⁻⁷	
11-27-91 To 12-5-91	* 0.0128 x 10 ⁻⁷	0.0046 x 10 ⁻⁷	0.0083 x 10 ⁻⁷	
12-5-91 To 12-12-91	* 0.0086 x 10 ⁻⁷	0.0048 x 10 ⁻⁷	0.0050 x 10 ⁻⁷	
12-12-91 To 12-19-91	* 0.0071 x 10 ⁻⁷	0.0004 x 10 ⁻⁷	0.0032 x 10 ⁻⁷	
12-19-91 To 12-26-91	* 0.0102 x 10 ⁻⁷	0.0017 x 10 ⁻⁷	0.0044 x 10 ⁻⁷	
* AREA OF BARGE RM 12-26-91 To 1-2-92	* 0.0053 x 10 ⁻⁷	0.0030 x 10 ⁻⁷	0.0035 x 10 ⁻⁷	