ALARA ANALYSIS 2002

COPY

Richland Facility

1.0 INTRODUCTION

In 2002 radiation exposure to facility personnel increased by approximately 3% over that received in 2001. This was due, in part, to an increase in the amount of time required inside trench 14 for ECB placement and waste disposal. A considerable percentage of exposure was received from non-offload exposures.

2.0 ALARA ANALYSIS

As required by the Facility Standards Manual, Section 2.1.3, the following areas are addressed in this report:

A. TOTAL FACILITY EXPOSURE RECEIVED AND EXPOSURE RECEIVED BY JOB CLASSIFICATION

1. As expected, operations personnel received the majority (64 %) of the total facility exposure in 2002, this is primarily due to:

   a) Operations personnel comprise approximately 38% of the facilities non-managerial/office staff.

   b) Operations personnel perform virtually all physical handling of waste material.

2. Table 1 lists total exposure by job classification and as a percentage of total facility exposure.

Table 1
TLD Exposures by Job Classification

Classification	Man-Rem Received	Percentage of Total
Operators	.38	64
Radcon	.185	30
Maintenance	0	0
Management	.34	6
Totals	.599	100

3. Figure 1 "Departmental exposures" is a graphical display of exposure by job class by month.

B. ANALYSIS OF EXPOSURES TO PERSONNEL DURING VARIOUS FACILITY OPERATIONS

1. Routine Off-loading Operations

12% of the facility exposure was received as a result of routine off-loading activities of which 0% was from the volume reduction project by our on site processing area in the form of super sac's.

Table 2 summarizes the type of shipments received, number of each and the exposure resulting from their handling.

Table 2
Exposure by Load Type

Load Type and Number Received		Percentage	Exposure (Man-Rem)	Percentage
Drums	(10)	8	0	0
Boxes	(69)	55	0.01	14.4
Box/Drum	(7)	6	0.005	7.1
Box/Tank	(2)	2	0	0
Box/Liners	(1)	1	0.005	7.1
Liners	(16)	12	0.040	57.1
SuperSac	(16)	12	0	0
Casks	(5)	4	0.010	14.3
Totals	126	100	0.070	100.0

Figure 2 "Offload Exposure History" graph compares the information in table 2 to previous years.

The "Offload Exposure History" graph is an 8-year breakdown of shipments received and average site exposure.

2. Non-Offloading Operations

a) Exposures received in this category resulted from:
- Maintenance operations within the controlled area
- Backfilling and associated surveys
- Trench maintenance/cleanup
- Routine surveys
- Environmental monitoring surveillance's
- Maintenance of the engineered barrier cell
- Disposal from storage

b) Exposure from non-offloading operations totaled 285 man-rem for 2002 of which 48% was received locating and placing ECB's into trench-14. 44% of the non-offloading exposure was from waste placement. Exposure received -

from waste handling was 125mr which is much lower than last year. To maintain ALARA exposures while working alongside filled ECB's for future ECB placement, was due largely to completing the lower level of ECB's and maintaining a sufficient number of empty ECBs on the upper level to supply shielding while working in trench 14W.

c) Exposure from routine package inspections account for 15 mr or 3% of the total facility exposure.

d) SRPD tracking on days of no waste handling accounted for 120 mr. This was added to the SRPD totals for incoming shipment surveys, daily trench surveys, and other routine surveys where exposure is below a level less than 5 mr. Every month SRPD's are re-zeroed, therefore do not take into account of exposures less than 5 mr accumulated over a 12 month period.

(Note SRPD data is 20 % lower than TLD data.)

Table 3 compares non-offloading exposure to total facility exposure for the last five years.

Table 3
Non-Offloading Exposure Comparison

Year	(TLD) Total Facility Exposure	(SRPD) Non-Offloading Exposure	Percent
1998	1.237 man-Rem	0.952 man-Rem	77
1999	0.953 man-Rem	0.570 man-Rem	60
2000	2.319 man-Rem	1.040 man-Rem	45
2001	0.582 man-Rem	0.205 man-Rem	35
2002	0.599 man-Rem	0.285 man-Rem	48

C. COMPARISON OF 2001 EXPOSURES TO PREVIOUS YEARS

Total off-load exposure was down 25% as compared to 2001. This was primarily due to the reduced shipments received. In comparison to 2001, shipments for 2002 had a high percentage of very low dose rate packages.

Table 4 summarizes exposure, exposure per shipment and total shipments for the past five years.

Table 4
Five Year Exposure Comparison

Year	Shipments Received	Total OffLoad Exposure (Rem)	Man-Rem/Shipment
1998	296	.500	.0016
1999	227	.235	.001
2000	311	.215	.0007
2001	132	.220	.0016
2002	126	.070	.0007

Figure 3 "Site Exposure vs. Shipments " Graph (attached) displays the data from table 3 and 4.

D. IDENTIFICATIONS OF TRENDS

Cask shipments in 2002 are not a major single source of exposure at 11.1% of off-loading exposure and 1.7% of total facility exposure.

Figure 4 "ALARA Trends" graph (attached) displays monthly facility exposure in relation to the number of container type shipments and curies (excluding tritium) received.

Tracking of off-loading exposure vs. highest dose rate package in the shipment started in 1987. The results of this tracking for 2002 are:

1. 35.7% of exposure resulted from those less than 100 mr/hr. These are virtually all our drum and box loads which account for over 78% of our shipments and a majority of our physical handling of waste (25 mr)

2. 28.6% resulted from the 100-500 mr/hr range (20 mr).

3. 0% resulted from the 500-1000 mr/hr range (0 mr).

4. 7.1% resulted from the 1000-10,000 mr/hr range (5 mr).

5. 28.6% resulted from the greater than 10,000 mr/hr range (20 mr).

Figure 5 "Doserate vs Exposure" graph compares the dose verses doserate trended data for the previous nine years

E. PROGRAM IMPROVEMENT RECOMMENDATIONS

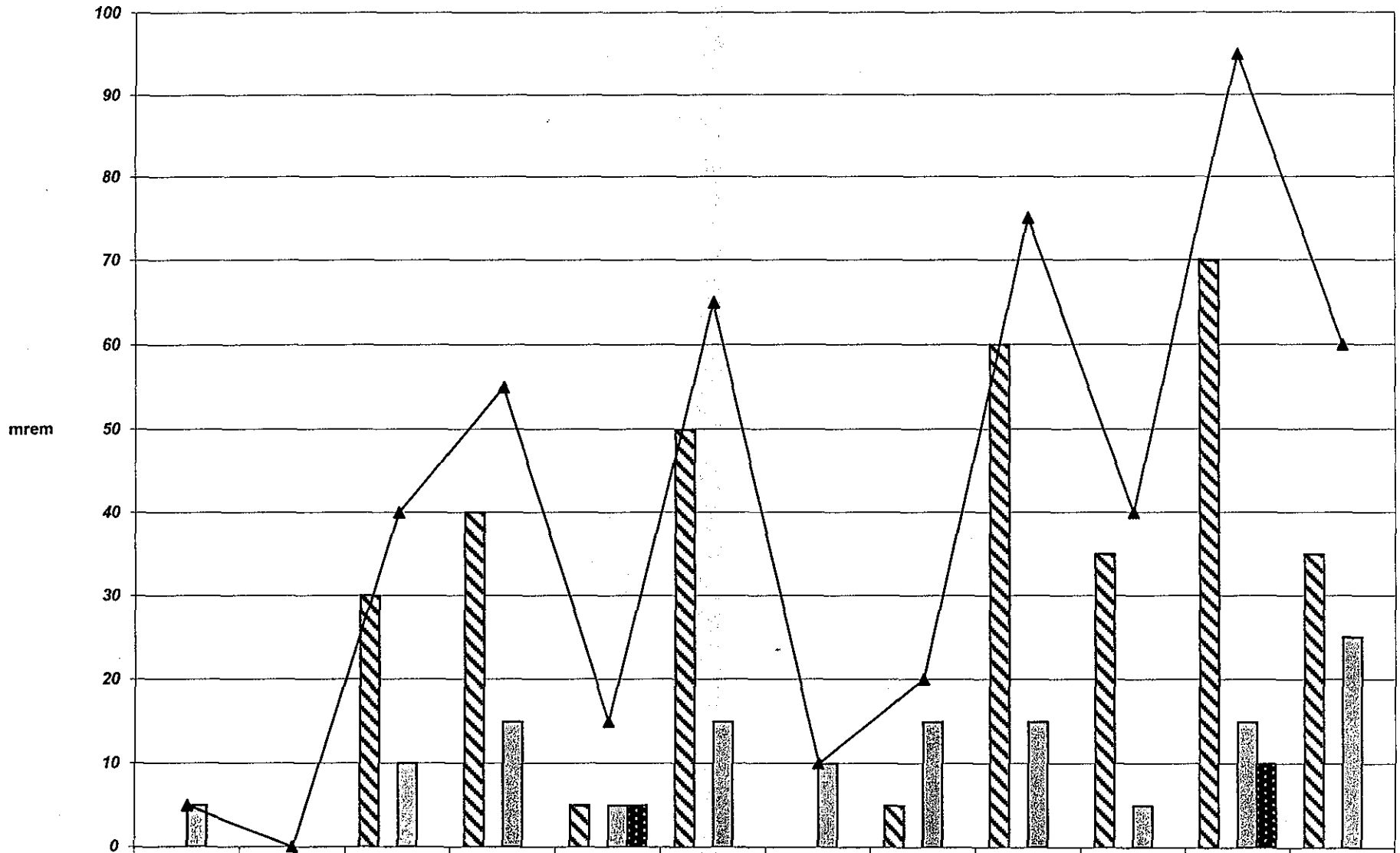
In 2003, changing waste streams and ECB projects will again affect site doses. Dose rates from waste and the amount of time required inside Trench 14 is also - expected to increase and Trench 14 work may also increase due to increased loads requiring ECB placement.

The number of shipments has decreased slightly to a level where forecasting decreases or increases in specific areas of exposure have limited use. The 2003 ALARA Program Goal is to maintain exposures below two (2) man-rem and individual exposures below 200 millirem for calendar year 2003. In order to achieve this goal the following ALARA actions will be implemented.

1. ALARA techniques and requirements will continue to be discussed periodically during safety meetings.
2. Techniques for trench 14 ECB placement and disposal that reduce the amount of physical handling will continue to be evaluated and implemented as appropriate.
3. ALARA planning and work controls will continue to be implemented on high dose rate tasks such as cask handling or any task with dose rates > 50 mr/hr to minimize exposure from higher dose rate tasks.
4. Individual and collective doses will be tracked. If individual or collective doses approach 75% of the above goals, the Radiation Safety Committee will evaluate trends to identify possible additional methods to minimize radiation exposure.

In conclusion, US Ecology Richland will continue to take a proactive approach to maintaining radiation exposure ALARA.

FIGURE 1 DEPARTMENTAL EXPOSURE 2002

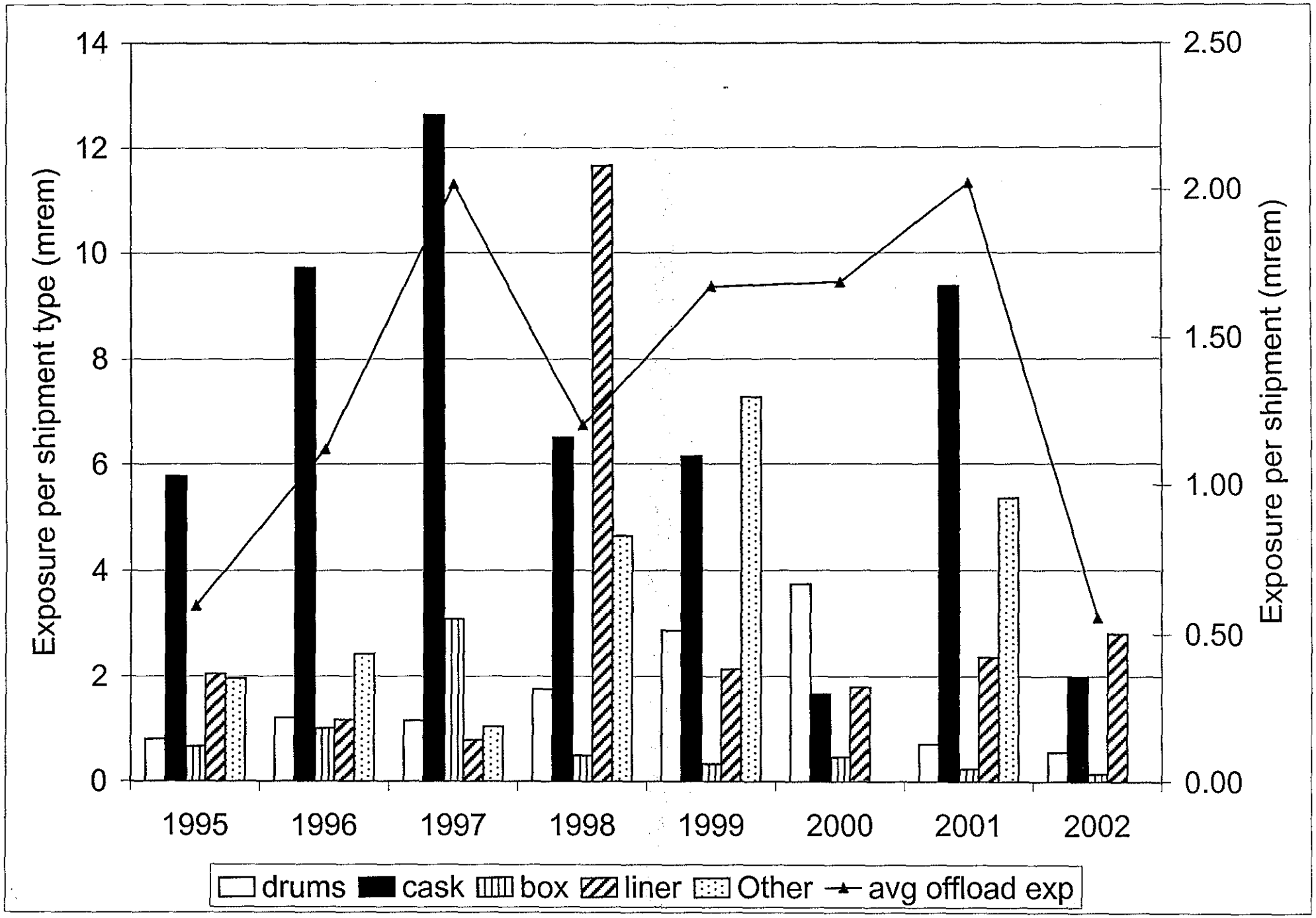


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ops	0	0	30	40	5	50	0	5	60	35	70	35
maintance	0	0	0	0	0	0	0	0	0	0	0	0
rad	5	0	10	15	5	15	10	15	15	5	15	25
management	0	0	0	0	5	0	0	0	0	0	10	0
Total	5	0	40	55	15	65	10	20	75	40	95	60

Departmental exposure by month

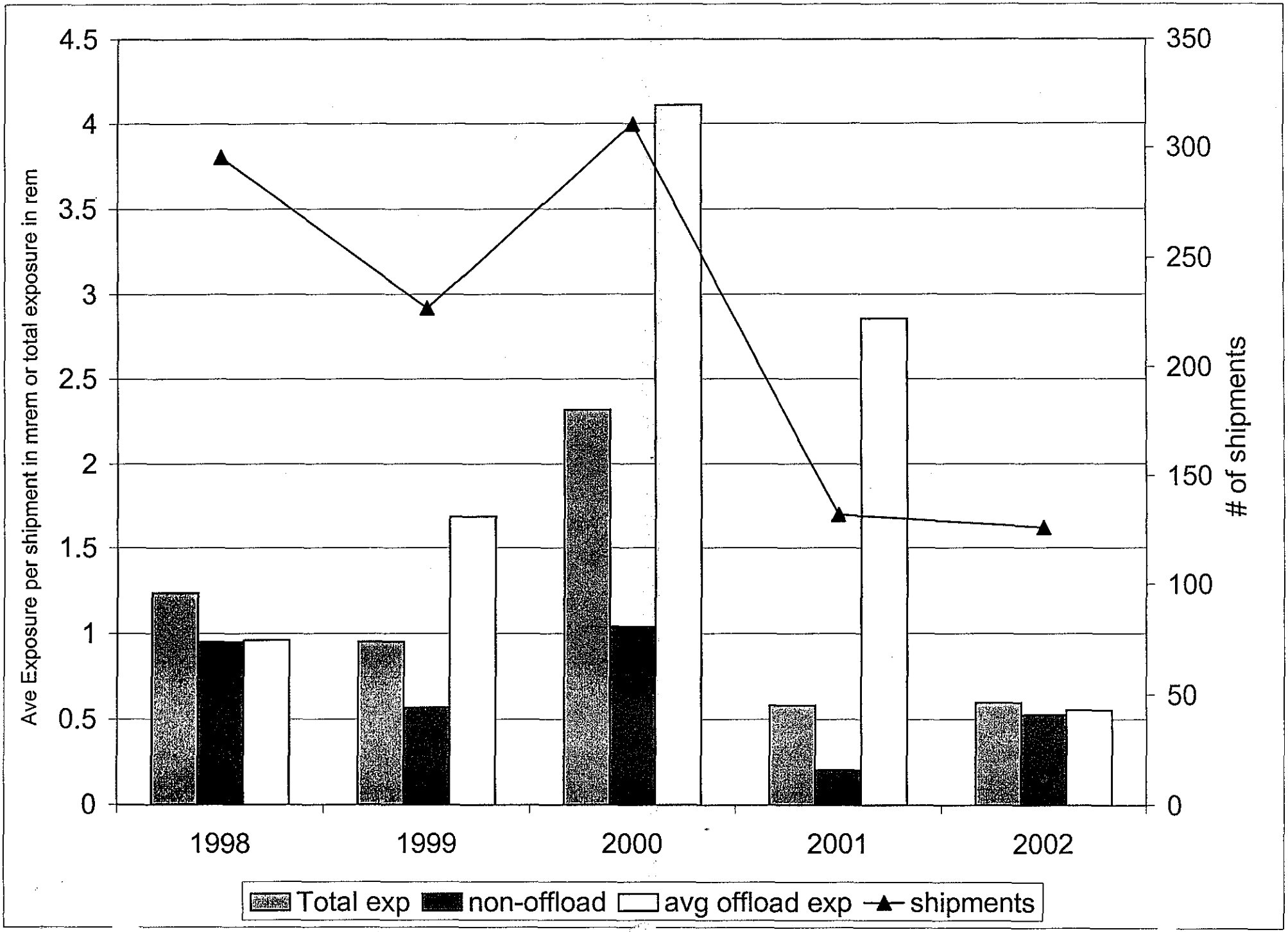
Departmental exposure by month

FIGURE 2 OFFLOAD EXPOSURE HISTORY



The osure per shipment type is offload exposure received by site pers el for that type of shipment divided by the number of shipments re ed of that type. Average is total site exposure received divided by the total shipments received.

FIGURE 3 AVG SITE EXPOSURE PER SHIPMENT



Ave of exp is total offload exposure in mrem divided by the number of shipments, Tld e he total site exposure in rem, non-offload is total site exposure from non-offloadin rations in rem and shipments is the total shipments received

FIGURE 4 ALARA TRENDS

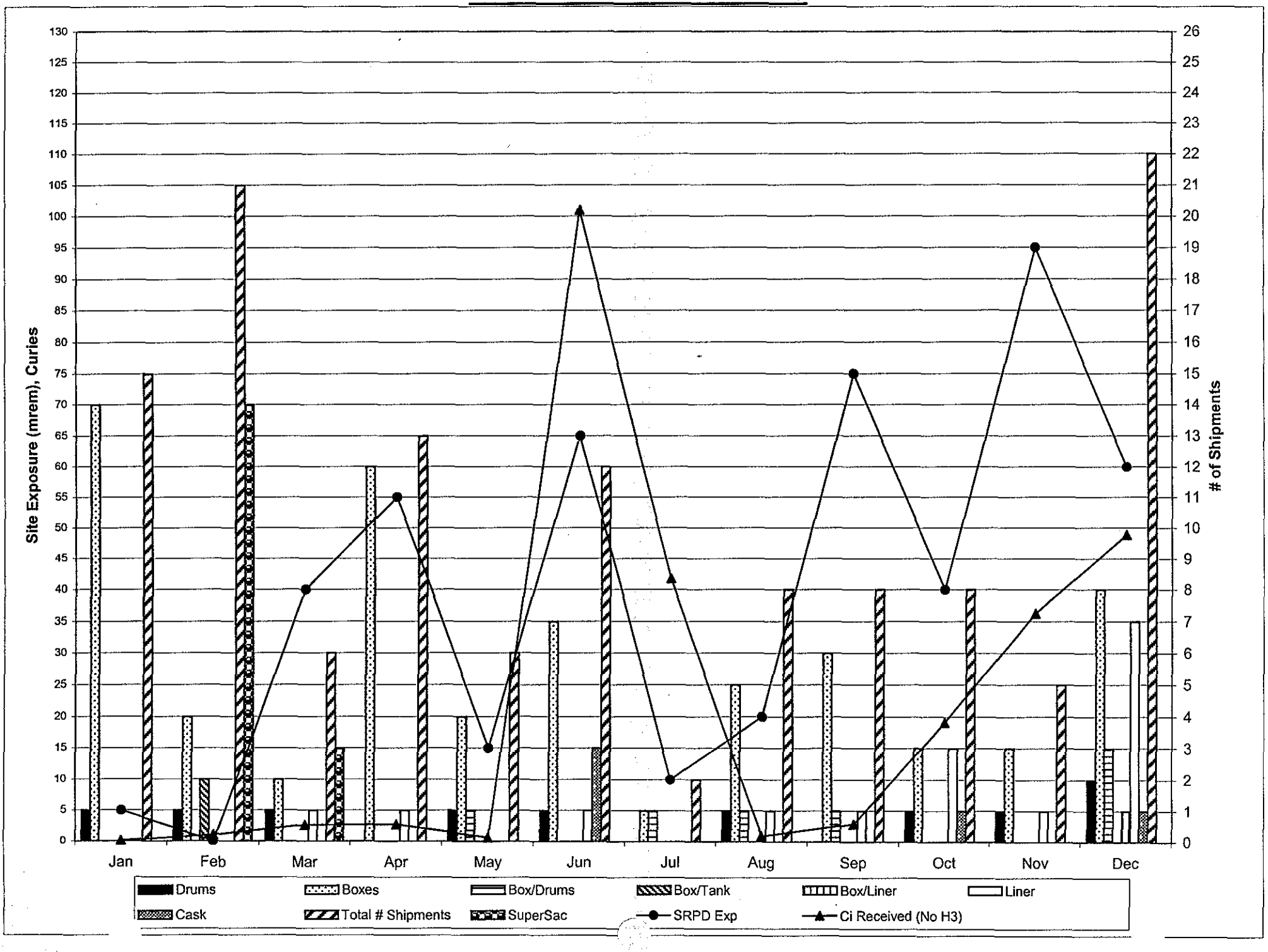


FIGURE 5 DOSERATE VS EXPOSURE