V-F

TOWN OF SIGNAL MOUNTAIN

BRUSH COLLECTION AND DISPOSAL REPORT

MAY 1997

Signal Mountain's City Manager asked MTAS to review collection and disposal methods of the Town's brush. The sole focus of this report is **brush collection and disposal.** This report examines current methods of brush collection and disposal, and presents options for alternative methods.

The Town of Signal Mountain includes approximately 7,408 persons (2,874 houses) and about 17.52 square miles. In its provision of a full range of municipal services, the Town maintains 57.16 street miles.

Brush Collection

The Town of Signal Mountain operates brush collection 12 months annually. A brush crew collects brush in three ways:

1. A crew (of two people) collects brush using a 1986 brush truck (converted garbage truck) daily. They follow a circular route throughout the town (same route used for leaf collection) -- stopping where brush is left. The truck stops and both persons get out of the truck and manually load the brush into the garbage truck. When the truck is full, they drive to the disposal site. It takes the crew approximately eight days to complete one circular trip through the town.

   This crew operates daily except during loose leaf pick-up season (October 15 through January 15). During loose leaf pick-up season, the only brush that is collected is on Wednesdays. On these Wednesdays, the members of the regular garbage crews join the brush crew and brush is collected by three different crews in garbage trucks. If necessary, these Wednesday brush days are canceled to accommodate leaf pick-up.

   During heavy brush season (Spring and Fall clean up times), this two person crew is increased as employees and vehicles are available. Typically, this can mean that from four to six persons operating three garbage trucks can pick up brush on Wednesdays during March, April, and September.

2. A roll-off truck hauls brush from the stockpile of brush located at the transfer station on Mississippi Avenue. This stockpile has accumulated over time, and it primarily is the result of Hurricane Opal in the Fall of 1995. The roll-off truck is loaded at the garage, and one person drives to the disposal site.

3. Residents can drop off waste at Signal Mountain's transfer station during the week and all day on Saturday. Public works employees estimate that about 3 tons per week are dropped off at the transfer station.

Equipment used in brush collection includes:

TABLE 1
TOWN OF SIGNAL MOUNTAIN BRUSH COLLECTION EQUIPMENT (1997)

Description of Equipment	Town ID Number	Year Purchased
Brush truck/reserve garbage truck (Ford)	SA 425	1986
Roll-off truck (White GMC Volvo)	SA 427	1990
Chipper truck/leaf truck/dump truck (GMC 5 ton)	ST 307	1978
Eager Beaver Brush Chipper	ST 633	1989

Cost of operating this equipment is:

TABLE 2
Signal Mountain Brush Annual Equipment Operating Cost Summary

Item	SA 425	SA 427	ST 307	ST 633
Depreciation	$3,000	$2,590	$ 400	$ 860
Fuel	1,650	1,000	160	1,000
Maintenance	1,800	1,800	700	450
Tires	700	700	450	25
Total	$7,150	$6,090	$1,710	$2,335

The amount of staff time involved in brush collection is approximately two person years (4,000) hours. Table 3 summarizes months by activity, by hours per week and by number of staff involved in each activity. Simplifying these data into person years involves:

TABLE 3
SUMMARY OF SIGNAL MOUNTAIN BRUSH WORK SCHEDULE

Month	Activity	# of staff	Hours/ week	Activity	Staff	Hours/ week	Activity	Staff	Hours/ week	Activity	Staff	Hours/ week
January	Wed pick up only	4	8	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
February	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
March	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
April	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
May	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
June	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
July	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
August	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
September	Regular brush pick up	2	40	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
October	Wed pick up only	4	8	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
November	Wed pick up only	4	8	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2
December	Wed pick up only	4	8	Sat. drop off at the transfer station	1	8	Loading brush from stock pile	2	6	Christmas tree mulching	2	2

WEDNESDAY OPERATION	=	4 months x 4 days/month = 16 days x 4 staff = 64 days x 8 hours = 512 hours (per year)
REGULAR PICK UP	=	9 months x 4.33 weeks = 38.97 weeks x 5 days = 195 days x 2 staff = 390 days x 8 hours = 3,120 hours (per year)
CHRISTMAS MULCHING	=	2 staff x 40 hours = 80 hours (per year)
TOTAL LABOR	=	512 + 3,120 + 80 = 3,712 hours (or 2 person years)

Figure 1 presents a comparison by year (1993 - 1996) of person hours to collect brush. Though some data were not available for every year, a review of the bar chart shows expected seasonal fluctuations in picking up brush. The effect of Hurricane Opal is visible during October and November of 1995 (as would be expected). The number of hours involved in brush collection appears stable over the four year time period. If the method of brush collection stays the same, the Town should not expect to spend additional staff time in this activity. However, dedicating two full person years to brush collection for a town of Signal Mountain's size is excessive.

Brush Disposal

Brush disposal has been through two methods:

1. Signal Mountain delivered brush to the pit burner owned and operated by the City of Red Bank. This trip was about 6 miles one-way and took about 30 minutes to complete (round trip). Red Bank no longer accepts brush from Signal Mountain and closed the pit burner permanently on April 1, 1997. The charge for disposal was $28.72 per load from Signal Mountain's roll-off truck and $32.24 per load from Signal Mountain's compactor truck. I talked with Tim Donberry (with Red Bank) on March 19, 1997, requesting that he provide me the per ton cost for disposal along with a breakdown of monthly charges to Signal Mountain. The invoices I have for these disposal costs are dated by variable month interval (3/6/96 - 10/30/96 (8 months)) (8/22/95 - 3/6/96 (7 months)) (6/9/95- 8/17/95 (2 months)) (4/21/94 - 6/30/94 (2 months)) (2/8/94 - 4/20/94 (2.5 months)). From an internal memorandum dated January 31, 1994, it appears that the approximate disposal cost was $4.00 per ton.

2. Signal Mountain hauls brush to Chattanooga's wood waste disposal site on North Hawthorne Street (just off Amnicola Highway, behind the Police Service Center). The North Hawthorne Street site is 12 miles from Signal

FIGURE 1

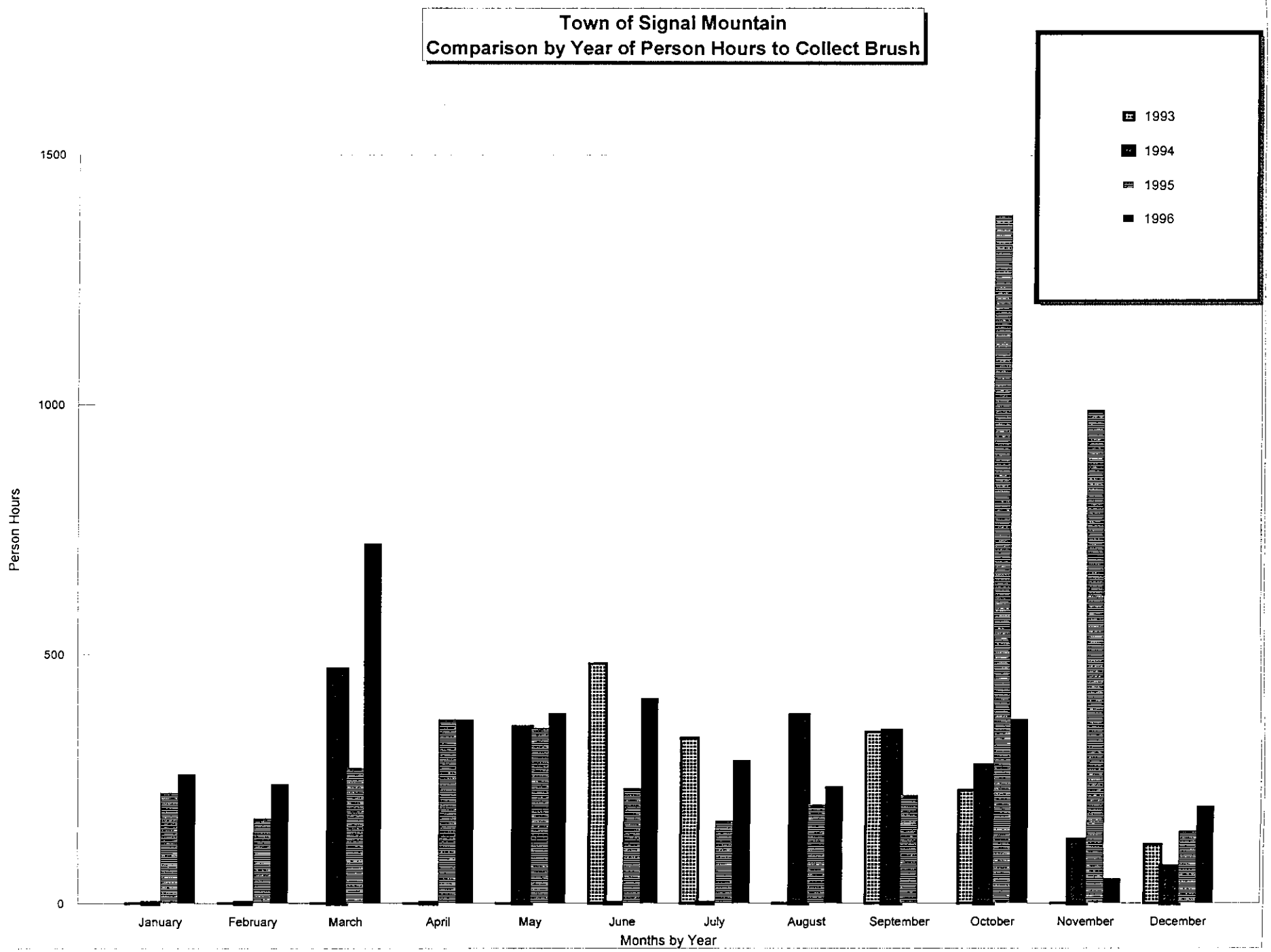
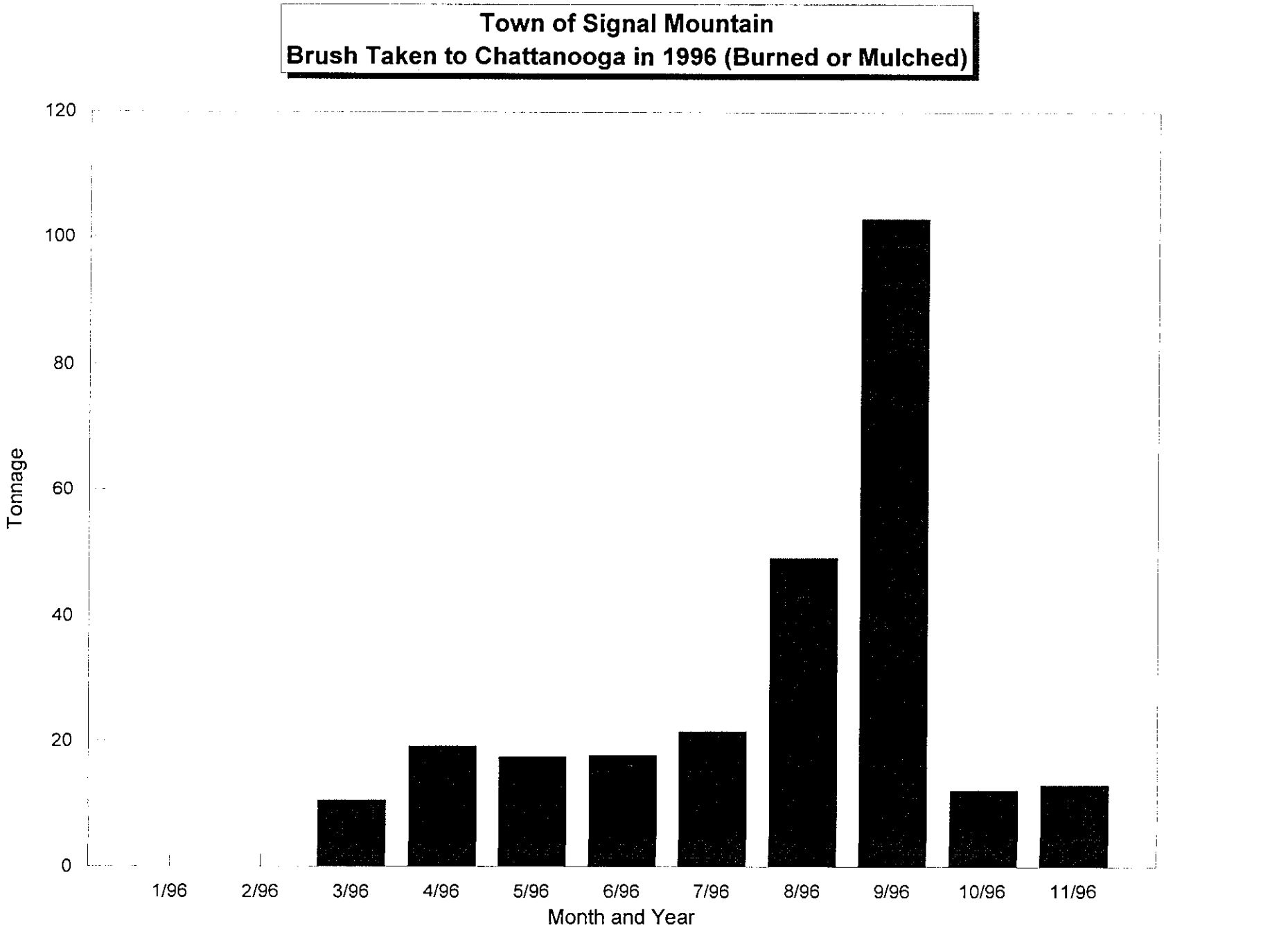

Town of Signal Mountain
Comparison by Year of Person Hours to Collect Brush
1993
1994
1995
1996
1500
1000
500
0
Person Hours
January
February
March
April
May
June
July
August
September
October
November
December
Months by Year

FIGURE 2


Town of Signal Mountain
Brush Taken to Chattanooga in 1996 (Burned or Mulched)
120
100
80
60
40
20
0
Tonnage
1/96
2/96
3/96
4/96
5/96
6/96
7/96
8/96
9/96
10/96
11/96
Month and Year

Mountain and takes Signal Mountain employees approximately 1 hour and 15 minutes (round trip) to dispose of waste. This disposal site contains a stump master grinding machine and a pit burner. Signal Mountain's waste is either burned or mulched. The disposal fee is $10.00 per ton. Figure 2 shows the total amount of waste taken to Chattanooga from January to June 1996.

Figure 3 presents a comparison by year (1993 - 1996) of brush taken to Red Bank. Again, a review of these charts shows that the quantity of brush collected by Signal Mountain is fairly constant over the four years (excluding the large volume generated during the aftermath of Hurricane Opal and the existing stockpile of waste at the Town's transfer station). A disposal fee of $10.00 per ton (at Chattanooga's Hawthorne Street Facility) is competitive. However, the haul time involved (over one hour) for each load of waste collected dramatically impacts the labor time and cost involved in brush collection and disposal. If a comparable per ton can be identified that reduces the haul distance, disposal cost (as well as collection cost) can be reduced.

Existing Cost of Brush Collection

Table 4 presents Signal Mountain's existing brush collection cost. Salaries in Table 4 include wages at $33,571 for two person years; $12,589 in fringe benefits for two persons; administrative costs at 5% of $65,000.00; actual vehicle cost; and an estimated travel cost to the disposal site. Estimated current collection cost is $71,695. More than 64% of the total cost of collection is labor cost. If Signal Mountain wants to reduce collection cost, a shift to a less labor intensive method of collection would be necessary. An additional consideration is equipment. The 1986 garbage truck used for brush collection is over 10 years old. The 1986 unit will need to be replaced soon.

Existing Cost of Brush Disposal

It's commendable that the Town of Signal Mountain doesn't send brush to a Class I landfill. Current practices are that the Town takes brush to Chattanooga where it is either burned or mulched (in a tub grinder) and pays $10.00 per ton. In addition to regularly collected brush, the Town works (when time and labor are available) to reduce the stockpile of brush at the Mississippi Avenue Transfer Station. The Town contracted with Asplundh Inc. in 1995/1996 to grind part of the stockpile.

Existing Brush Policy

Signal Mountain's solid waste ordinance contains the following information on brush collection:

FIGURE 3

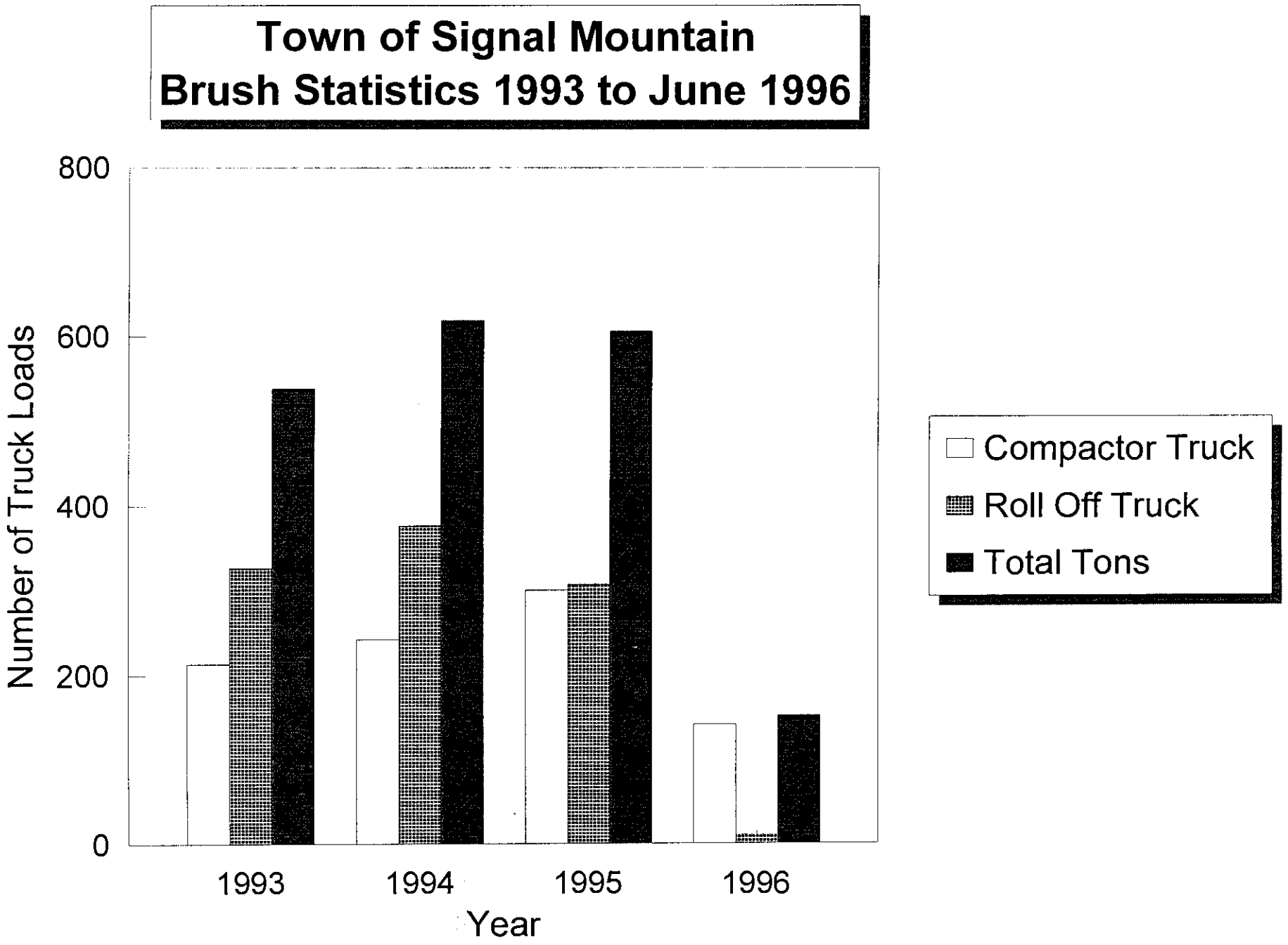

Town of Signal Mountain
Brush Statistics 1993 to June 1996
800
600
400
200
0
Number of Truck Loads
1993
1994
1995
1996
Year
Compactor Truck
Roll Off Truck
Total Tons

TABLE 4

TOWN OF SIGNAL MOUNTAIN
COMPARISON OF BRUSH COLLECTION ALTERNATIVES
EXISTING COLLECTION METHOD (4/97)

Salaries		$ 33,571
Benefits		12,589
Vehicle		
Depreciation	6,850	
Fuel	3,810	
Maintenance	4,750	
Tires	1,875	
Total Vehicle Cost		17,285
Travel Cost to Disposal Site		5,000
Administrative Cost		3,250
Total		$ 71,695

1. Brush must be cut into approximately 6 foot lengths, no larger than 6 inches in diameter and be placed on or at the curb and will normally be picked up about every two weeks. These size restrictions also apply to brush delivered to the transfer station by residents. Brush not conforming to these size restrictions will not be picked up. Stumps are not acceptable and cannot be taken at the transfer station.

2. Twigs, trimmings, and grass must be in a covered garbage can or bagged.

3. No brush, tree trimmings, or building materials are accepted from contractors.

4. Brush or trees cut by a contractor will not be picked up by the Town.

5. Brush may be burned by residents with prior approval by the Chattanooga/Hamilton County Air Pollution Bureau.

Assumptions Included in any Changes to Brush Collection or Disposal Methods

Should Signal Mountain want to change any methods of brush collection or disposal it should consider the following:

1. The amount of brush collected by the Town appears fairly consistent. Generation of brush by town residents is highest in March, April, and September (during Spring and Fall clean up times). Several Tennessee cities the size of Signal Mountain (Gatlinburg, Harriman, and LaFollette) do not pick up brush year round. Instead, they schedule special clean up days during the year (typically during March, April, and September). During the remaining portion of the year, residents call the city and request a brush pick up. Brush pick up crews are routed accordingly.

2. Existing brush regulations state that the Town will not pick up waste generated by private contractors. This regulation is not consistently followed.

3. Grass clippings are to be bagged (unless they are placed in a trash receptacle), according to the Town's solid waste ordinance. Again, this is not consistently practiced.

4. For any change to be successful, the Town's Council; the residents of Signal Mountain and the public works department need to be involved. Cleveland, TN, implemented a brush collection and disposal change two

and half years ago (see attached). This change succeeded because of buy-in by all parties, and an aggressive public relations campaign on the part of the City.

5. If equipment or methods change, public works employees will need additional training. MTAS, as well as Maryville and Cleveland are willing to help.

6. The brush crew needs to receive training in worker safety precautions.

Alternatives

Alternative A, change the method of disposal into one of the following:

1. Contract with a third party to grind brush.

Currently, Cleveland, Elizabethton, and Cookeville contract with a third party to grind brush. Cleveland contracts with Williams Construction Co. in Cleveland at $16.00 per ton and is exploring contracting with a firm to burn brush for $10.00 per ton. Cleveland delivers brush to the contractor.

Cookeville also contracts with Williams Construction Co. However, Cookeville hauls to a centralized mulch site in the city. The contractor brings the grinder to Cookeville at least twice a year to grind waste. The contractor is paid an hourly rate (not to exceed a predetermined limit). Cookeville does not pay for any equipment down time. Ground brush and separately ground leaves are given away to residents.

Elizabethton contracts with another third party contractor. The contractor brings a tub grinder to the city's composting facility quarterly, grinds brush and leaves (separately), and the city uses these bulking agents in its sludge composting operation. The contractor is paid by the ton.

The advantages of contracting with a third party to grind brush are: avoiding the cost of procuring costly, sophisticated grinding equipment; avoiding operating and maintenance cost of grinding equipment; avoiding accidents; controlling cost (by negotiating an agreement for a lump sum, cubic yard, ton, or hourly cost); taking advantage of economies of scale; reducing the number of times brush must be handled; flexibility (if a better method of disposal becomes available, the community hasn't invested in one disposal method); the equipment can handle a mixture of waste (limbs, stumps, and small brush items); and avoiding hauling cost to off-site facilities.

For Signal Mountain one disadvantage of this method is storage of brush. The Town estimates that it can collect and store 1,685 cubic yards of brush over 15 weeks. ***Rick,

this is where we'll include the cost estimate from Williams Construction Co. ****Since the Town already disposes of brush in Chattanooga at $10.00 per ton (plus haul cost), a contract to grind brush and give it away (or perhaps dispose of the residual with leaves in the National Forest) could reduce disposal cost further. Signal Mountain does not generate huge volumes of brush, therefore, investing in a tub grinder (approximately $250,000 +/-) is cost prohibitive.

The attached article, *Is there a tub grinder in your future?* from Resource Recycling, August 1995 (30-36), discusses the pros and cons of purchasing a tub grinder.

2. Purchase grinding equipment.

The City of Maryville experimented with pull-behind grinders several years ago. Maryville leased chipping equipment for a month to see how it affected operations. What the City found was:

1. Pull-behind chippers slowed down brush collection operations. In order to achieve the same level of productivity (six productive working hours per person per day), the City would have to purchase seven times as much equipment.

2. The potential for equipment malfunction was high. Chippers are sensitive machines. Brush presents no problem for chippers. However, nails in wood, wires, and other pieces of metal caused excessive down time. Chippers handle tree limbs well, but can not handle other types of brush.

3. The potential for operator malfunction was even higher (than equipment). If a crew wanted a easy day, all someone had to do was feed a rake or shovel into the grinder.

4. It was more efficient to use knucklebooms to collect brush, and dispose of the waste in a Class III/IV facility or grind at a centralized location.

5. Chippers are noisy. Some residents did not like chippers in their neighborhoods.

6. Chippers are hard to fit down some streets.

If Signal Mountain switches to pull-behind chippers, there would be little additional capital cost (about $15,000 to $20,000 per chipper). It is difficult to predict how a shift to using a chipper system would affect the brush crew's productivity. It seems unlikely that the current method of hand collection and hauling to Chattanooga would be faster than using pull behind chippers. However, the collection portion of brush operations might slow down. And, of course, Maryville's experience has been that using a pull-behind chipper dramatically lessened its crews' productivity.

If the Town changes its collection method to a less labor intensive method (like shifting from daily collection to seasonal collection with call-in collection between seasons or using a knuckleboom/shuttle system), using a pull-behind chipper could dramatically change the person years dedicated to brush collection.

According to the TML Risk Management Pool (contact Judy Housely), there are a few areas of worker's safety that need to be considered with using a pull-behind chipper. These include using safety goggles and hearing protection. It is not necessary to use a two person crew with a pull-behind chipper. Most of the newer chippers do not kick and pull while they are chipping. However, the crew should at least be in radio communication if there is a problem.

A disadvantage of using pull behind chippers is that this type of chipper cannot accommodate all brush. Chippers are excellent in mulching tree limbs and large twigs, but they do not handle other forms of brush well. The remaining brush could be co-collected with limbs, but would still need to be disposed of in some manner (like periodic grinding or hauling to the Chattanooga facility).

3. Continue contracting with Chattanooga, and try negotiating an even better per ton disposal fee.

Ten dollars per ton disposal fee is very competitive. It might be possible to reduce this further. However, Signal Mountain will continue paying the haul cost to the disposal site.

Staying tied with Chattanooga also makes Signal Mountain's disposal method (and subsequent cost) less flexible. If Chattanooga changes anything about the operation of the Hawthorne Street facility, Signal Mountain will be impacted.

4. Work with Red Bank.

Red Bank plans a switch to a grinding operation. It might be possible to join with Red Bank in a joint grinding operation. This could be sharing the cost of a disposal site and renting or purchasing grinding equipment. Again, Signal Mountain would haul brush. However, the distance and down-time would be reduced.

5. Site and operate a pit burner.

The Town of Signal Mountain could site and operate a pit burner. Pit burning is an approved disposal (approved by the State of Tennessee) method. One problem with pit burning is that only untreated wood waste can be burned. Any treated wood waste must be disposed of otherwise. Pit burning requires a large initial investment in terms of time (to permit the facility and money to construct), but subsequent per ton costs are fairly low.

Due to the strong environmentally sensitive history of Signal Mountain's residents, locating a pit burner in the Town of Signal Mountain does not seem likely.

Alternative B, change the method of collection into one of the following:

1. Contract with a third party to collect brush.

The Town of Signal Mountain could develop a request for proposals asking firms to submit proposals to collect brush (and possibly disposal cost). This would give the Town an idea of the market rate for brush collection. The Town knows what it currently costs to collect brush. A third party contract might be lower than the Town can provide. The only way to discover if this is a viable option, is to seek proposals.

2. Automate collection.

Switching to autornated collection (a knuckleboom system) is more efficient than the hand method used by the Town. If a productivity level of six working hours per person per day is used, a knuckleboom collection method should cover the entire Town in less than 2 1/2 days per week. Depending on the disposal method used (a centralized site where brush is brought and periodically ground or driving the brush to Chattanooga), it's likely that a one or two person crew could collect brush in two days.

There are basically two types of knuckleboom systems used by cities:

a) A knuckleboom loader and trailer attached to the chassis of a truck. In this case the knuckleboom equipment can only be used as a knuckleboom. The cost of the truck chassis is $31,000 - $35,000. The knuckleboom loader is $26,000. The trailer is $10,000 - $15,000.

b) A knuckleboom loader not permanently attached to the chassis of a truck -- with a detachable trailer. This type unit can be disassembled, and the knuckleboom loader

stored when not in use. The cost of the truck chassis is $35,000. The cost of the knuckleboom loader is $26,000. The cost of the trailer is $10,000 - $15,000.

Table 5 presents an amortization schedule for purchasing knuckleboom equipment using a cost of $84,000 at a 5.5% interest rate over seven years. The annual loan payments are $14,484.96. The monthly loan payments are $1,207.08.

Depending on hourly rate paid employees and whether Signal Mountain assigns one (or two) crew member to the knuckleboom truck, the cost savings of automated collection will be seen immediately. Table 6 (tcst523) presents a scenario of Signal Mountain dedicating one person a year to brush collection (paying $9/hour) -- a total cost of $51,140 (compared with $71,695 for current operations).

Maryville uses one person on its knuckleboom trucks, other cities use two person crews. If Signal Mountain uses one person on a knuckleboom truck and takes the brush to a centralized site for periodic grinding, that person could collect all brush in less than 2 1/2 days.

3. Change frequency of collection

Based on MTAS observations (see Appendix A) and detailed records kept by the town (see Figures 1, 2, and 3), residents of Signal Mountain do not generate enough brush to warrant a two person year brush collection operation. Signal Mountain (like Harriman, LaFollette, and Gatlinburg -- Tennessee cities of similar size) could change the frequency that it collects brush. Gatlinburg sponsors "Sparkle Days," an intense number of weeks that it collects brush. Otherwise, residents call Gatlinburg's public works department to let them know they have brush ready for pick up. Harriman schedules brush pick up solely on a call-in basis. Brush pick up crews (using a pull behind chipper) are dispatched in Harriman based on the location of calls. LaFollette uses knuckleboom in its brush collection. Again, brush crews are dispatched based on residents calling for brush pick up.

If a change in collection frequency is implemented, town residents should be notified of the shift in operation, what options are available to them (ie, special pick ups during targeted months; calling the public works department when they generate a volume of yard waste; or taking brush directly to the Mississippi Avenue facility). The two person years currently dedicated to continuous brush pick up could be redirected to other public works functions (like hanging street signs or helping with other street projects). The public works director already redirects the brush collection crew if there is little or no brush set out by residents.

TABLE 5

TOWN OF SIGNAL MOUNTAIN
COMPARISON OF BRUSH COLLECTION ALTERNATIVES
KNUCKLEBOOM COLLECTION (4/97)

Salaries		$ 18,000
Benefits		6,750
Vehicle		
Annual Payment	14,485	
Fuel	1,905	
Maintenance	2,375	
Tires	1,875	
Total Vehicle Cost		20,640
Travel Cost to Disposal Site		2,500
Administrative Cost		3,250
Total		$ 51,140

TABLE 6

TOWN OF SIGNAL MOUNTAIN

Key Figures	
Annual Loan Payments	$14,484.96
Monthly Payments	$1,207.08
Interest in First Calendar Year	$2,253.13
Interest Over Term of Loan	$17,394.72
Sum of All Payments	$101,394.72

Inputs	
Loan Principal Amount	$84,000.00
Annual Interest Rate	5.50%
Loan Period in Years	7
Base Year of Loan	1997
Base Month of Loan	July

Payments in First 12 Months

Year	Month	Beginning Balance	Payments	Principal	Interest	Cumulative Principal	Cumulative Interest	Ending Balance
	Jul	$84,000.00	$1,207.08	$822.08	$385.00	$822.08	$385.00	$83,178
	Aug	83,177.92	1,207.08	825.85	381.23	1,647.93	766.23	82,352
	Sep	82,352.07	1,207.08	829.63	377.45	2,477.56	1,143.68	81,522
	Oct	81,522.44	1,207.08	833.44	373.64	3,311.00	1,517.32	80,689
	Nov	80,689.00	1,207.08	837.26	369.82	4,148.26	1,887.14	79,852
	Dec	79,851.74	1,207.08	841.09	365.99	4,989.35	2,253.13	79,011
1998	Jan	79,010.65	1,207.08	844.95	362.13	5,834.30	2,615.26	78,166
	Feb	78,165.70	1,207.08	848.82	358.26	6,683.12	2,973.52	77,317
	Mar	77,316.88	1,207.08	852.71	354.37	7,535.83	3,327.89	76,464
	Apr	76,464.17	1,207.08	856.62	350.46	8,392.45	3,678.35	75,608
	May	75,607.55	1,207.08	860.55	346.53	9,253.00	4,024.88	74,747
	Jun	74,747.00	1,207.08	864.49	342.59	10,117.49	4,367.47	73,883

Yearly Schedule of Balances and Payments

Year	Beginning Balance	Payments	Principal	Interest	Cumulative Principal	Cumulative Interest	Ending Balance
1998	$79,010.65	$14,484.96	$10,399	4,086	$15,388.53	6,338.91	$68,611
1999	68,611.47	14,484.96	10,986	3,499	26,374.04	9,838.36	57,626
2000	57,625.96	14,484.96	11,605	2,880	37,979.22	12,718.14	46,021
2001	46,020.78	14,484.96	12,260	2,225	50,239.03	14,943.29	33,761
2002	33,760.97	14,484.96	12,951	1,534	63,190.38	16,476.90	20,810
2003	20,809.62	14,484.96	13,682	803	76,872.30	17,279.94	7,128
2004	7,127.70	7,242.48	7,128	115	84,000.00	17,394.72	0

Conclusions

The Town of Signal Mountain's brush collection method involves two person years. The volume of brush generated by Town residents is fairly constant. This report reviews the Town's current brush collection methods and offers several options for changes in collection and disposal methods. A shift in brush collection and disposal will involve the endorsement of Council, the acceptance of Town residents, and successful implementation by the public works department.

If no change takes place, the Town will continue to dedicate an enormous amount of staff time to brush collection. Equipment currently used in brush collection needs to be scheduled for replacement in the next year. Purchasing automated collection equipment will show immediate cost savings (about $20,000 per year). Changing to another disposal method like contracting to have brush ground periodically will save collection costs and possibly disposal costs.

It is advised that the Town at least explore changing the frequency of brush collection and disposing of the brush on Signal Mountain either by contracting to having the brush chipped or using a pull-behind chipper. Combining some of the options suggested in this report, the Town of Signal Mountain should be able to develop a more efficient system of brush collection and disposal.

MTAS FIELD NOTES ON BRUSH TRUCK
(May 12, 1997)

Observations about crew:

1. No gloves (though the driver put gloves on when he helped pick up brush).
2. No safety vests.
3. No hard hats.
4. One crew member had boots on (steel toed?); One had on tennis shoes.
5. No lumbar support belts (Not a requirement by TML Risk Management Pool, but a good idea is accompanied by training in proper way to lift).
6. Truck picked up brush facing wrong way along street (no emergency flashers).
7. No radio (or other communication device) on truck.
8. Crew members had their hands in the back of the truck underneath the compactor while the compactor was operating.
9. The truck pulled off from a pick up before the crew member was securely holding on to the back of the truck.

Observations about system:

1. Crew could not be located (Supervisor was in the field, but did not know exact location of the brush crew).
2. A lot of residents dispose of brush on undeveloped,vacant wooded lots.
3. There was little brush set out by residents.
4. Crew passed by (without picking up brush) several sites where brush was set out (perhaps it was contractor generated waste).
5. Waste generated by residents varied a lot in size (large tree limbs, smaller limbs, leaves, twigs) -- making manual pick up slow and making it hard for the crew to fit the waste into the compacting garbage truck .
6. Crew appeared friendly and cordial with Town residents.