Preliminary Assessment Report for
Washington, SPS-2 Experiment

Visit date: May 24, 2006

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1 Executive Summary

A visit was made to the Washington SPS-2 on May 24, 2006 for the purposes of conducting an assessment of the WIM system located on US-395 at milepost 93.01, approximately 2 miles south of Ritzville. The LTPP lane is the driving lane in the northbound direction and is identified as lane number 1 in the WIM controller.

This is a **preliminary** report since receipt of recent profile data from the region is pending. An amended report will be submitted when the profile data becomes available.

This site is not recommended for a site validation due to the required corrections to the system classification algorithm.

This site was installed in November 2005 as part of a sensor upgrade to improve weight accuracies and a relocation of the original site. The original site was installed in March of 1998 approximately 150 feet north of the current installation (which was located outside of the LTPP Test Section). The previously used piezo sensors remain in place. The original cabinet and electronics were relocated to the new site and are currently being used.

The site is instrumented with Kistler quartz sensors. These sensors are installed within test section 530205, approximately 50 feet from the end. The WIM utilizes an IRD 1067 WIM Controller. Auto-calibration is not being used at this site.

The equipment is in working order, however, adjustments are needed to correct observed operational deficiencies. The system algorithm needs to be reviewed and corrected to correct cross misclassification of Class 3, Class 5, and Class 8 vehicles. The agency uses the FHWA 13-bin classification scheme, modified by adding a Class 15 for unclassified vehicles.

Sufficient data was collected to provide a Sheet 16 for classification verification at this site. There are 0.7 percent unclassified vehicles. This is below the percentage of 2% defined as the criteria for research data. Class 3, 5, 8, 10 and 11 trucks had an error rate exceeding 2% of matches. The algorithm for classification should be reviewed and the classification verification repeated at the next assessment or evaluation.

The pavement condition appears to be satisfactory for conducting a performance evaluation. There were no distresses observed that would influence truck motions significantly. A visual survey determined that there is no discernable bouncing or avoidance by trucks in the sensor area.

A review of the speed information collected on-site indicates that the range of truck speeds to be covered during an evaluation is 50 to 60 mph. The speed limit at the site is 60 mph for trucks and 70 mph for cars.

This site has 8 years of classification data and 8 years of weight data. **Based on the available calibration information and review of the data submitted through last year, this site still needs 5 years of data to meet the need for 5 years of research quality classification and weight data.** The data for 2004 should be reviewed for possible inclusion as a valid year of research quality data.

2 Corrective Actions Recommended

Other than the recommended modification of the system classification algorithm, there are no corrective actions recommended for this site.

3 Equipment inspection and diagnostics

The site is instrumented with two, 6-foot quartz weighing sensors, installed in a staggered arrangement 10 feet apart. One 6-foot wide by 6-foot long loop sensor is installed directly preceding the leading quartz sensor. A second one the same size is located immediately following the trailing quartz sensor. Each quartz sensor is used for speed, spacing determination and weight, while the loops are used for vehicle presence detection. The WIM system utilizes an IRD 1067 WIM Controller for signal processing, data storage, user-interface and remote operation.

A complete electrical check of all support service components including the power service equipment and telephone service was performed. All support equipment appears to be operating properly.

An electronic check of all WIM components was performed. All WIM components appear to operating within acceptable tolerances.

A visual inspection of all system components, including in-road sensors, cabinet, pull boxes, power and telephone service equipment and conduit was conducted. All components appear to be in excellent physical condition.

4 Classification Verification with test truck recommendations

The agency uses a modified FHWA 13-bin classification scheme. A Class 15 has been added for unidentified trucks. The controller utilizes axle spacings and weight for determining vehicle classification.

A sample of 100 trucks was collected at the site. Video was taken at the site to provide ground truth for the evaluation. Based on a 100 percent sample it was determined that there are 0.0 percent unknown vehicles and 0.7 percent unclassified vehicles. The single unclassified vehicle was a mobile home transport truck with short-spaced quad axles on the trailer.

The second check is the ability of the algorithm to correctly distinguish between truck classes with no more than 2% errors in such classifications. The following are the classification error rates by class:

Table 4-1 Truck Misclassification Percentages for 530200 - 24-May-2006

Class	Percent Error	Class	Percent Error	Class	Percent Error
4	N/A	5	57	6	0
7	N/A				
8	43	9	2	10	17
11	40	12	0	13	0

There were 7 samples associated with the Class 5 and Class 8 results, 13 samples associated with the Class 10 results, and only 3 samples associated with the class 11 results. Many of the Class 5 and Class 8 errors were associated with 2 axle vehicles pulling light trailers. The errors in Class 10 and Class 11 vehicles were mainly associated with uncommon trailer axle configurations.

The misclassification percentage is computed as the probability that a pair containing the class of interest does NOT include a match. Thus if there are eight pairs of observations with at least one Class 9 and only six of them are matches, the error rate is 25 percent. The percent error and the mean differences reported below do not represent the same statistic. It is possible to have error rates greater than 0 with a mean difference of zero.

Table 4-2 Truck Classification Mean Differences for 530200 - 24-May-2006

Class	Mean Difference	Class	Mean Difference	Class	Mean Difference
4	N/A	5	86	6	0
7	N/A				
8	-43	9	-2	10	-17
11	67	12	0	13	0

These error rates are normalized to represent how many vehicles of the class are expected to be over- or under-counted for every hundred of that class observed by the equipment. Thus a value of 0 means the class is identified correctly on average. A number between –1 and –100 indicates at least that number of vehicles was either missed or not assigned to the class by the equipment. It is not possible to miss more than all or one hundred out of one hundred. Numbers 1 or larger indicate how many more vehicles are assigned to the class than the actual "hundred observed". Classes marked Unknown are those identified by the equipment but no vehicles of the type were seen the observer. There is no way to tell how many more are reported than actually present in the population. When vehicles of the class are not recorded by either the equipment or the observer the notation N/A is used.

A review of the site data both collected on site and previously submitted by the agency indicated that Class 9s and Class 10s constitute at least 10 percent of the truck population. Based on this information in addition to the air-suspension 3S2, the second vehicle used for evaluation should be a fully loaded Class 10 with a standard tridem axle configuration the trailer. Due to the length of the truck turn-around (19.2 miles, approximately 21 minutes), an additional vehicle is recommended. Due to the heavy truck distribution at this site, with Class 9s constituting over 50 percent of the truck population compared to 10 percent for Class 10 vehicles, it is recommended that the additional truck be a Class 9, partially loaded to approximately 65,000 pounds.

5 Profile Evaluation

Profile data collected in the year prior to the site visit does not exist. A site visit to collect profile data has been scheduled for 2006. An amended report will be submitted when the data is available.

As noted in the Executive Summary, at the time this site was installed it was relocated from just outside of Test Section 530205 to inside of the Test Section. Location of the WIM system within the Test Section limits the maintenance and remediation options should they become necessary.

6 Distress survey and any applicable photos

A distress survey of the pavement 300 feet in advance and 100 beyond the WIM site was conducted. No distresses that would affect the performance of the WIM system were noted. Figure 13-1 and Figure 13-2 illustrate the pavement condition in the downstream and upstream directions from the site, respectively.

7 Vehicle-pavement interaction discussion

There is no visible vertical or horizontal motion of trucks that can be discerned, immediately approaching, traversing or leaving the sensor area. Daylight cannot be readily seen between the tires indicating that the trucks are probably touching the sensors fully. All traffic appears to travel along the center of the lane.

8 Speed data with speed range recommendations for evaluation

Based on the data provided by the agency collected on site the 15th and 85th percentile speeds for Class 9s are 55 and 65 respectively. The upper end of the range exceeds the posted speed limit of 60 mph for trucks. This range does not vary significantly for other truck classes. As a result, the recommended speeds for test trucks in an evaluation are 50 and 60 mph. The deviation from the normal three speed testing is recommended for safety considerations. Running trucks at speeds significantly lower than the 15th percentile speed is a potential safety hazard.

Measurements of speeds on-site indicated that the equipment is currently measuring speeds with a bias of -0.1 mph and an associated standard deviation of 0.6 mph.

The review of drive axle spacings for Class 9 vehicles indicates that this is not affecting the measurements of length and therefore vehicle classification.

9 Traffic Data review: Overall Quantity and Sufficiency

As of May 24, 2006, this site does not have at least 5 years of research quality data.

Research quality data is defined to be at least 210 days in a year of data of known calibration meeting LTPP's precision requirements. The precision requirements are shown in Table 9-1. Records of annual calibration visits for years 2001 and 2004 were provided. Review of the data indicates that data for year 2004 has information available on the precision and bias of the weight data.

Table 9-1 Precision and Bias Requirements for Weight Data

Pooled Fund Site	**95 Percent Confidence Limit of Error**
Single Axles	± 20 percent
Axle groups	± 15 percent
Gross Vehicle Weight	± 10 percent
Vehicle Speed	±1 mph (2 kph)
Axle Spacing	± 0.5 ft (150 mm)

Data that has validation/calibration information available is reviewed in light of the patterns present in the two weeks immediately following a validation/calibration activity. A determination of research quality data is based on the consistency with the validation pattern. Data that follows consistent and rational patterns in the absence of calibration information may be considered nominally of research quality pending validation information with which to compare it. Data that is inconsistent with expected patterns and has no supporting validation information is not considered research quality.

The amount and coverage for the site is shown in Table 9-2. The value for months is a measure of the seasonal variation in the data. The indicator of coverage indicates whether day of week variation has been accounted for on an annual basis. As can be seen from the table only years 1999, 2002, 2003 and 2004 have a sufficient quantity of classification data and only years 2003 and 2004 have sufficient weight data to be considered complete years of data. Together with the previously gathered calibration information, 5 additional years of research quality data are needed to meet the goal of a minimum of 5 years of research weight data.

Table 9-2 Amount of Traffic Data Available

Year	**Class Days**	**Months**	**Coverage**	**Weight Days**	**Months**	**Coverage**
1997	30	1	Full Week	28	1	Full Week
1998	160	7	Full Week	141	6	Full Week
1999	**216**	**10**	**Full Week**	173	6	Full Week
2000	161	10	Full Week	152	5	Full Week
2001	135	5	Full Week	172	6	Full Week
2002	**297**	**10**	**Full Week**	117	4	Full Week
2003	**358**	**12**	**Full Week**	**242**	**8**	**Full Week**
2004	**232**	**8**	**Full Week**	**237**	**8**	**Full Week**

To evaluate the consistency of the existing data and determine its probable quality a series of reports and graphs have been generated. They include the SPS Summary report, vehicle distribution graphs, GVW distributions both over all years and by month within years, average daily steering axle weights for Class 9 vehicles, and ESAL graphs.

Based on this review it is recommended that further investigation be done for 2004 to determine if it can be verified as providing research quality data.

9.1 SPS Summary Report

The overall report is the SPS Summary Report. This report uses sets of benchmark data based on calibration information or consistent, rational data patterns. The report shows the trend in some basic statistics at the site over time. It provides a numeric equivalent to the graphs typically run for the comparison evaluation process. It includes the number of days of data and statistics associated with Class 9 vehicles. They include the average volumes, average ESALs, the average steering axle weight and mean loaded and unloaded weight on a monthly basis. Class Days and Percent Class 9s are generated from classification data submissions. All other values come from the weight data submissions. Counts derived from weight data are available for all months. Steering axle and weight statistics are only present when that data was loaded through LTPP's new traffic analysis software, since it is the only software that calculates them. The data is separated into blocks that depend on when the site was validated. Where there is no validation record an initial time point has been picked at which continuous data exists and that data is used as the basis for comparison. Excluded months have no data.

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Washington 0200

North Lane 1

Comparison Date Weight - Classification - 09-April-1998

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		15.2						
APR 1998	22	15.7						
MAY 1998	23	14.9						

Comparison Date Weight - 01-May-1998 Classification - 09-April-1998

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		15.2		393	1.89	11,304	65,598	34,220
MAY 1998	23	14.9	25	376	1.89	11,068	74,123	34,257
JUN 1998	30	13.6	30	359	1.71	10,925	73,627	34,144
JUL 1998	30	12.3	31	387	1.73	10,981	73,524	34,158
AUG 1998	31	12.5	31	357	1.34	10,319	69,857	34,064
SEP 1998	7	11.7	7	302	1.41	10,464	69,714	34,407
NOV 1998	17	14.0	17	307	1.39	10,835	76,906	34,189
JAN 1999	15	19.5						
FEB 1999	7	16.9	21	315	1.37	10,638	69,728	33,756
MAR 1999	25	16.7						
APR 1999	23	15.9						
MAY 1999	27	14.9	31	365	1.31	10,177	69,498	33,715
JUN 1999	25	13.2	30	388	1.12	9,897	66,143	33,788
JUL 1999	26	12.0	31	409	1.22	10,094	66,322	33,938
AUG 1999	27	13.1						
SEP 1999	22	12.9	30	239	0.85	8,360	65,800	34,150

Comparison Date Weight - 01-May-1998 Classification - 09-April-1998

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		15.2		393	1.89	11,304	65,598	34,220
NOV 1999	19	13.4	30	351	1.52	10,712	81,258	34,786
JAN 2000	14	11.5						
MAR 2000	14	15.7						
APR 2000	14	15.3	30	402	1.73	10,195	57,900	34,225
MAY 2000	24	14.5	31	406	0.65	8,382	73,439	34,311
JUN 2000	25	13.2	30	430	1.10	9,727	78,163	34,592
JUL 2000	26	12.3	31	414	1.14	9,829	57,518	34,570
SEP 2000	24	14.2	30	268	0.76	8,203	57,698	34,073
NOV 2000	17	14.3						
DEC 2000	5	22.2						
FEB 2001	18	17.7						
APR 2001			30	223	0.77	9,424	62,009	34,196
MAY 2001			31	436	0.59	8,144	65,710	34,131
JUN 2001			30	422	0.87	9,165	65,537	33,876
AUG 2001			23	376	1.02	9,452	61,921	34,036
SEP 2001	29	13.7	29	383	0.85	8,495	57,498	34,126
OCT 2001	27	13.2	29	318	2.48	11,379	73,769	34,403

Comparison Date Weight - 04-October-2001 Classification - 09-April-1998

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		15.2		323	2.48	10,546	61,774	34,303
OCT 2001	27	13.2	29	318	2.48	11,379	73,769	34,403
NOV 2001	30	13.9						
DEC 2001	31	17.3						
JAN 2002	31	18.7	31	369	0.85	8,737	57,901	33,897
FEB 2002	27	17.2	28	383	1.30	9,759	61,838	34,035
MAR 2002	31	16.3	31	419	1.22	9,710	73,494	34,159
APR 2002	29	17.0						
MAY 2002	31	15.2						
JUN 2002	30	13.3						
JUL 2002	31	13.0						
AUG 2002	30	13.3						
OCT 2002	30	14.8						
NOV 2002	27	16.0	27	389	0.47	8,819	57,422	30,297

Comparison Date Weight - 04-October-2001 Classification - 03-November-2002

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		16.2		323	2.48	10,546	61,806	34,385
NOV 2002	27	16.0	27	389	0.47	8,819	57,422	30,297
JAN 2003	31	17.6	31	376	0.81	10,018	65,702	34,572
FEB 2003	28	16.4	28	384	0.86	10,195	65,940	34,827
MAR 2003	30	15.2	31	387	0.80	10,368	65,273	34,558
APR 2003	28	15.5	30	425	0.73	10,385	61,824	34,717
MAY 2003	31	13.4	31	392	0.62	10,010	61,256	34,489
JUN 2003	30	12.3	30	412	0.62	9,718	61,047	34,358

Comparison Date Weight - 04-October-2001 Classification - 03-November-2002

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		16.2		323	2.48	10,546	61,806	34,385
JUL 2003	30	11.8						
AUG 2003	29	11.4						
SEP 2003	30	13.3	30	340	0.49	9,595	57,153	33,847
OCT 2003	30	13.8						
NOV 2003	30	13.7						
DEC 2003	31	16.4	31	390	0.72	9,708	64,683	34,451

Comparison Date Weight - 06-May-2004 Classification - 06-May-2004

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		15.8		457	1.33	10,807	74,288	37,078
MAY 2004	30	14.9	31	416	1.33	10,916	73,189	36,849
JUN 2004	30	13.8	30	458	1.71	11,030	73,572	36,824
JUL 2004	21	12.4	23	431	1.58	10,343	73,970	37,010
AUG 2004	31	13.5	31	478	1.73	10,695	77,445	36,992
SEP 2004	30	15.0	30	464	1.70	10,635	77,410	37,120
OCT 2004	29	15.5	31	436	1.59	10,350	77,039	37,217
NOV 2004	30	15.4	30	426	1.61	10,305	77,364	37,107
DEC 2004	31	16.8	31	415	1.56	10,919	77,384	37,427

It appears from the table that steering axle and loaded and unloaded weights for this site have remained reasonably constant until year 2004, when all weights appear to have increased. ESAL values progressively decreased from years 1998 to 2003, then sharply increased for year 2004.

9.2 Vehicle Distribution

The vehicle distribution graphs indicate whether the fleet mix is stable over time and if any day of week or seasonal patterns may exist. The vehicle distribution graphs contain two types of comparisons, one for heavy trucks and one for all trucks. The heavy truck comparison is used to remove potential problems in Class 4 and Class 5 determination. The all trucks comparison is used to make the between equipment review simpler. Whether or not the data is equivalent, is perhaps more important than the variation over time.

Figure 14-1 shows a typical by week pattern for heavy truck classification data. The individual weeks show essentially the same heavy truck mix. Every vehicle in Classes 6 through 13 that constitutes at least 10 percent of the population is expected to stay within plus or minus 5 percent of the value observed during the two weeks following validation. This range is shown by the darker band inside the lighter band to the right of the weekly data. Weeks that go outside more than plus or minus 10 percent of the expected value will fall above or below the light gray areas of the band. These are weeks that should have been subjected to additional scrutiny prior to accepting the data as reasonable.

For this site, the fleet mix is comparatively stable for classification for years 1998 through 2004.

In 2001, a change in the dominant trucks for the weight data was observed when the 2001 comparison set was created for weight data. Until then the distributions and comparison data sets for classification and weight data were very similar. The 2001 comparison data set was created based on the existence of a site calibration record, LTPP Traffic Data Sheet 16. The presence of Class 8 vehicles as more than 10 percent of the population varies from that point.

Data from 1997 provides a significantly different distribution of trucks for both classification and weight. A graph illustrating the differences for this period is shown in Figure 14-3.

The between types comparison for all trucks is represented by two columns for every time unit present. The column on the left labeled with a 4 is for classification data. The right hand column of the pair is for weight data. Figure 14-4 shows the pattern for vehicle distribution by month by year for the data collected from the classifier versus the data collected by the WIM equipment. Truck traffic at this location is dominated by Class 9s. The data collected for all of the months in periods 1998 through 2004 appear to be similar; however, for year 1997, truck distribution is significantly different, when only Class 5 and Class 6 vehicles were present. Due to the limited amount of data and its inconsistency with all other information, this year is recommended for removal from the database.

9.3 GVW Distributions for Class 9s

The Class 9 GVW graph is a generally accepted way to evaluate loading data reported at a site. A typical graph has two peaks, one between 28,000 and 36,000 pounds and the other between 72,000 and 80,000 pounds. The first is the unloaded peak. The second, the loaded peak, reflects the legal weight limit for a 5-axle tractor-trailer vehicle on the interstate highway system. Additionally, it is expected that less than 3 percent of the trucks will be excessively light (less than 12,000 pounds) and less than 5 percent will be significantly overweight (in excess of 96,000 pounds). Data that falls outside of the expected conditions needs a record of validation to verify that the pattern is in fact correct for the location. Data meeting the expected patterns is not automatically considered to be of research quality, merely rational as bias in scale measurements may shift the peaks in the data from their true values.

The overall assessment of loading patterns is done using a Class 9 GVW graph by year over the available years. In Figure 14-5 the typical pattern is shown in the red line with squares. It can be seen from the graph that the bimodal pattern for GVW peaks shown for 1998 progressively becomes less distinguishable through 2001. In 2002, it appears that the bimodal aspect to the graph returns to nearly the same display given in 1998.

9.4 Axle Distributions

To investigate any seasonal variations the Class 9 GVW distributions are graphed by month by year. As shown in Figure 14-7 and Figure 14-8 the determination of seasonality is dependent on the year selected. It is more likely that the variation in GVW curves is related to equipment operation than seasonality since the same quarter in each year has different shapes and peaks for the distributions.

9.5 ESALs per year

Average ESALs for Class 9 vehicles are a very crude method of identifying loading shifts. Figure 14-9 shows the average Class 9 ESALs per month for this location. To remove the influence of changing pavement structure all ESAL values have been computed with a structural number, SN, equal to 5 and a terminal serviceability, $p_{t,}$ of 2.5. Average ESALs per Class 9 are not used as an indicator of research quality data. ESAL values for this site have progressively decreased from year 1997 to year 2003.

9.6 Average Daily Steering Axle Weight

A frequently used statistic for checking scale calibration and doing auto-calibration of WIM equipment is the weight of the front axle. This value is site specific and should be relatively constant particularly for loaded Class 9s (vehicles in excess of 60,000 lbs.). Typically, when auto calibration is used this value either cycle repeatedly or with very large truck volumes results in an essentially straight line for the mean. As shown in Figure 14-10 the pattern at this site is erratic. The variation and gaps are representative of the data for all years.

10 Updated Handout Guide and Sheet 17

A copy of the post-visit handout guide has been included following page 17. It includes a current Sheet 17 with all applicable maps and photographs. The test truck scale location that will be utilized for validation has changed since the handout guide was prepared.

11 Updated Sheet 18

A current Sheet 18 indicating the contacts, conditions for assessments and evaluations has been attached following the updated handout guide.

12 Traffic Sheet 16(s) (Classification Verification only)

Sufficient classification information was collected between time and time on date to complete a Sheet 16. A copy is attached following the current Sheet 18 information.

13 Distress Photographs

Figure 13-1 – Downstream_TO_13_53_1.58_0200_ 05_24_06.jpg

Figure 13-2 – Upstream_TO_13_53_1.58_0200_ 05_24_06.jpg

14 Traffic Graphs

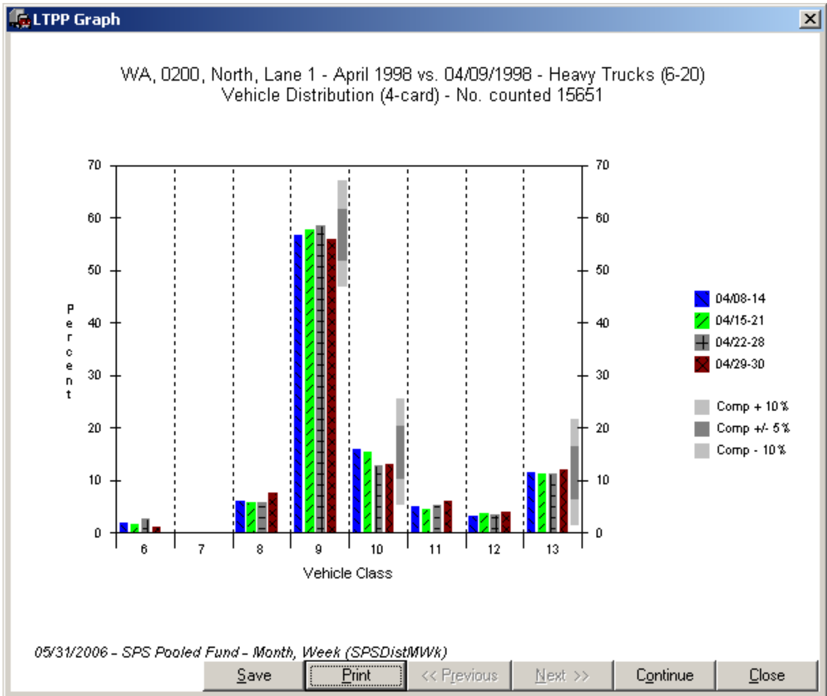


Figure 14-1 Typical Heavy Truck Distribution Pattern for Classification Data - 530200

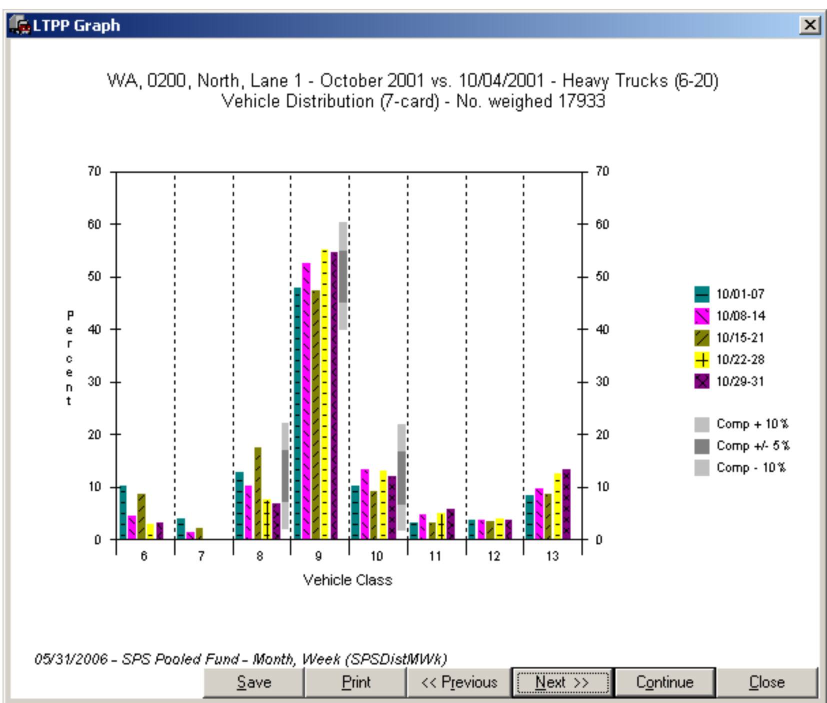


Figure 14-2 Typical Heavy Truck Distribution Pattern for Weight Data - 530200 based on the 2001 Comparison Data

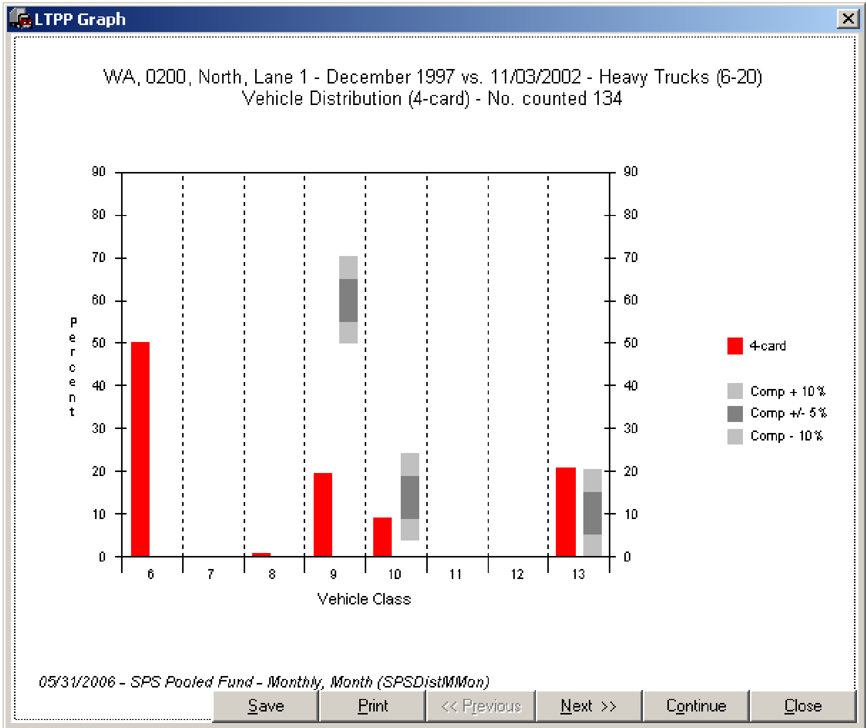


Figure 14-3 Vehicle Distribution Pattern for 1997 - 530200

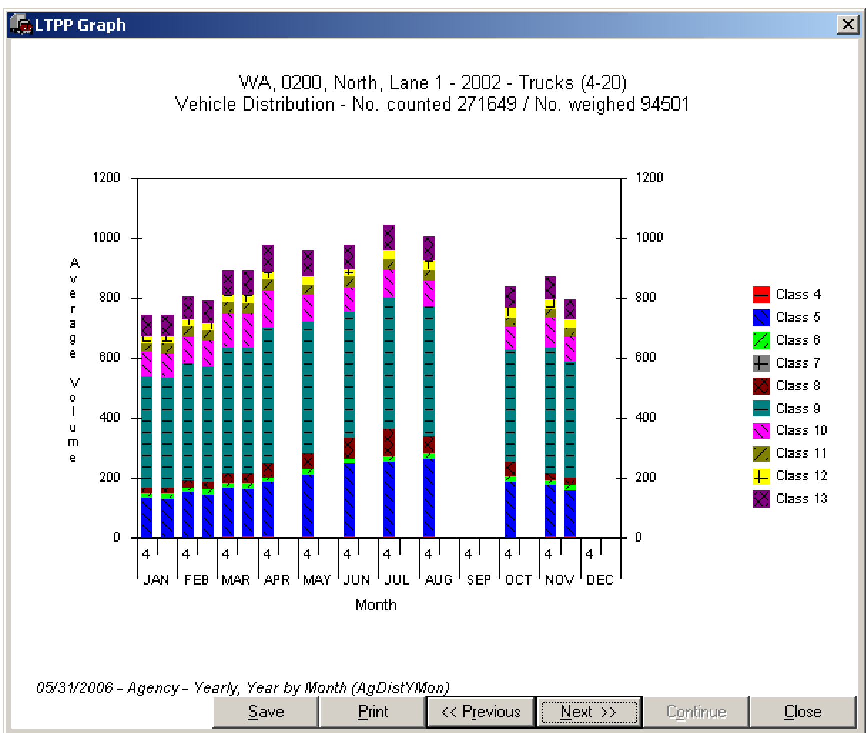


Figure 14-4 Truck Distribution by Month for the Year 2002 - 530200

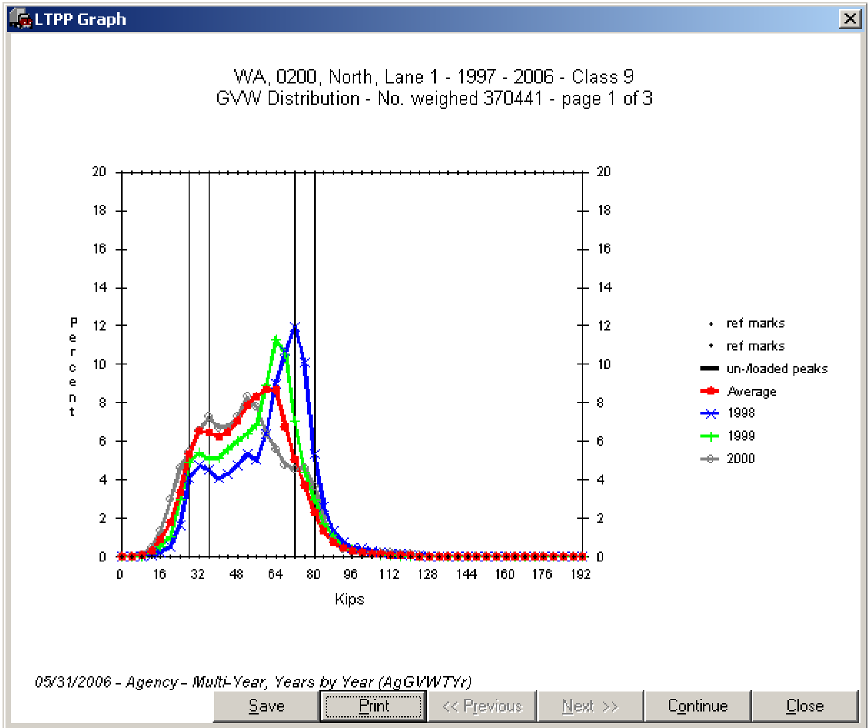


Figure 14-5 Class 9 GVW Distribution 1998 to 2000 - 530200

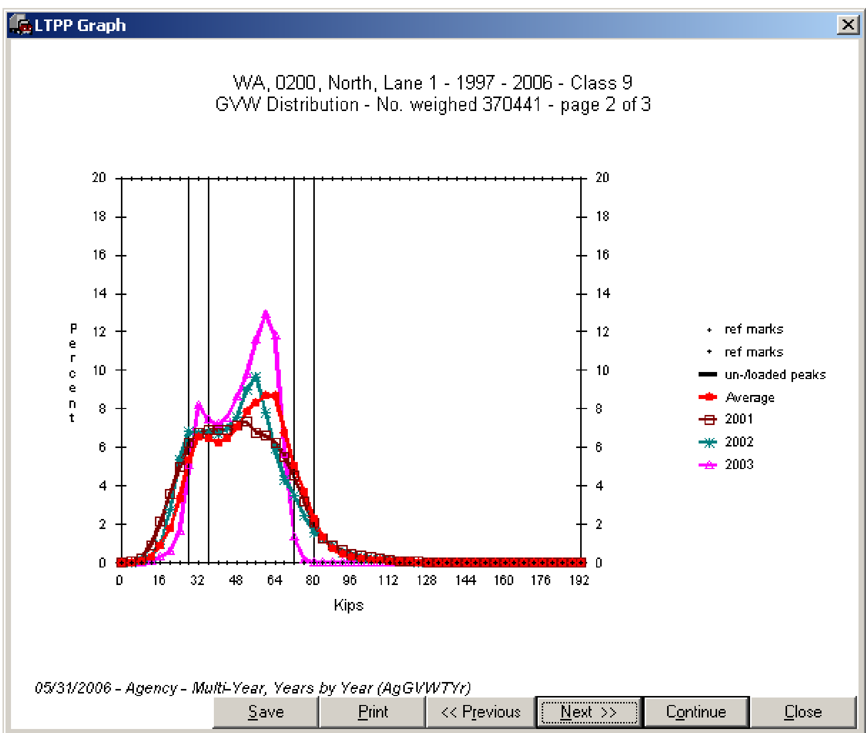


Figure 14-6 Class 9 GVW Distribution 2001 to 2003 - 530200

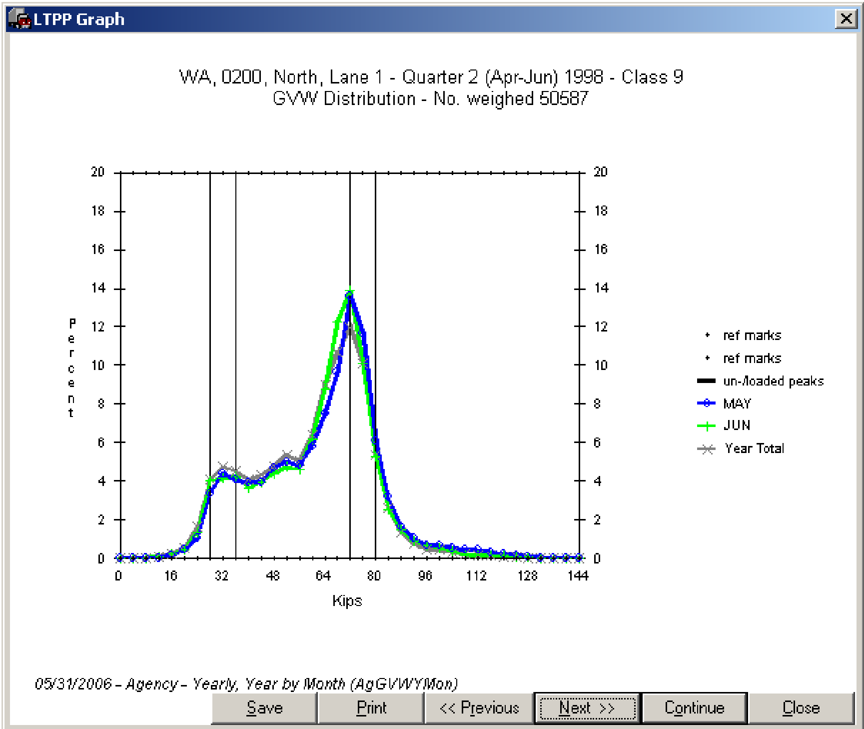


Figure 14-7 Class 9 GVW Distribution – April to June 1998 - 530200

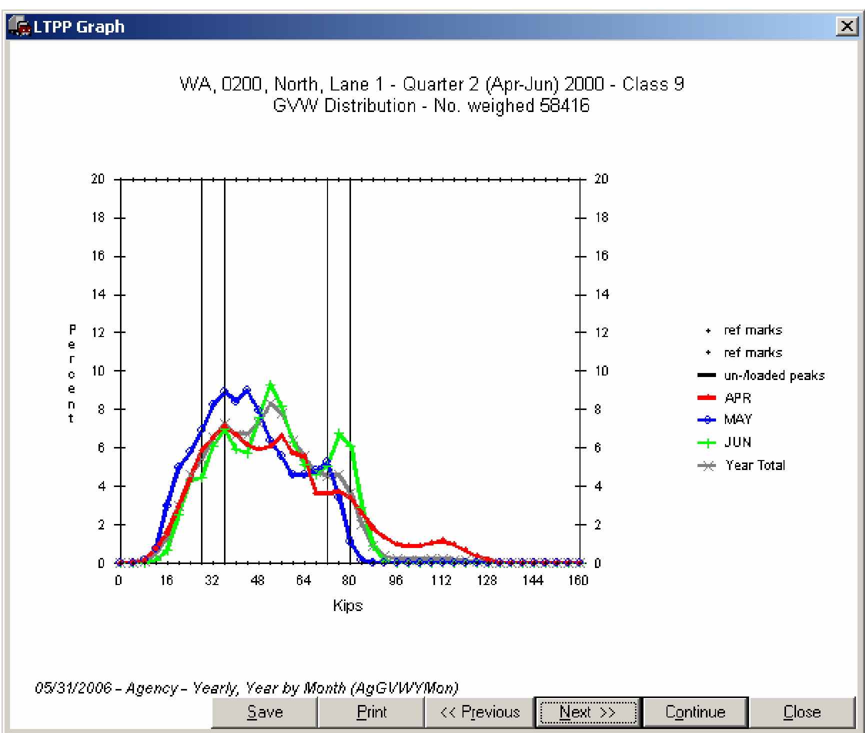


Figure 14-8 Class 9 GVW Distribution – April to June 2000 - 530200

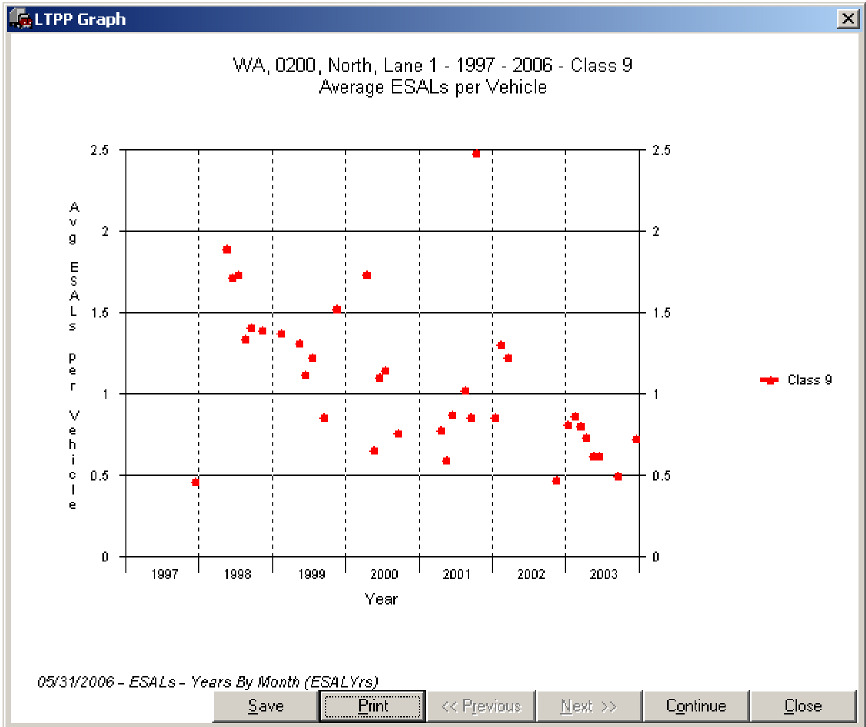


Figure 14-9 Average Class 9 ESALs for site from 1997 to 2003 - 530200

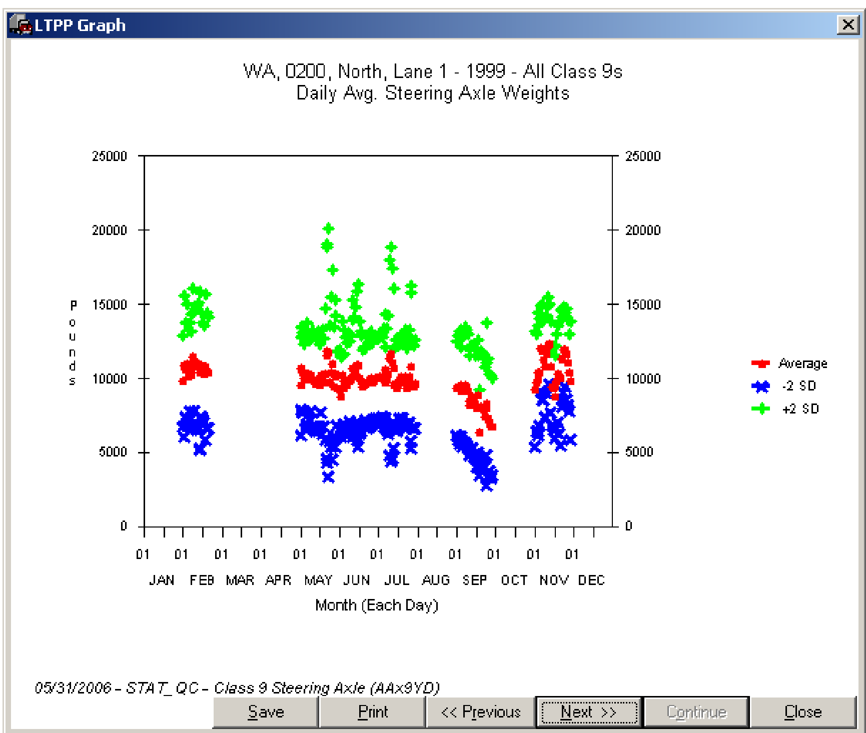


Figure 14-10 Average Daily Class 9 Steering Axle Weight – 1999 - 530200

POST-VISIT HANDOUT GUIDE FOR SPS WIM FIELD ASSESSMENT

STATE: Washington

SHRP ID: 530200

Figures

1. General Information

SITE ID: *530200*

LOCATION: *US-395, milepost 93.01, near Ritzville*

VISIT DATE: *May 24, 2006*

VISIT TYPE: *Assessment*

2. Contact Information

POINTS OF CONTACT:

Assessment Team: *Dean J. Wolf, 301-210-5105, djwolf@mactec.com*

Randy Plett, 775-825-5885, rwplett@mactec.com

Highway Agency: *Linda Pierce, 360-709-5470, piercel@wsdot.wa.gov*

John Livingston, 360-561-3409, livingj@wsdot.wa.gov

John Rosen, 360-570-2373, rosenj@wsdot.wa.gov

Ken Lakey, 360-570-2374, lakeyk@wsdot.wa.gov

Hoang Nguyen, 360-570-2389, nguyehv@wsdot.wa.gov

FHWA COTR: *Debbie Walker, 202-493-3068, deborah.walker@fhwa.dot.gov*

FHWA Division Office Liaison: *Cathy Nicholas, 360-753-9412, cathy.nicholas@fhwa.dot.gov*

LTPP SPS WIM WEB PAGE: *http://www.tfhrc.gov/pavement/ltpp/spstraffic/index.htm*

3. Agenda

BRIEFING DATE: *May 24, 2006, beginning at 8:00 a.m.*

ON SITE PERIOD: *May 24, 2006 immediately following the briefing.*

TRUCK ROUTE CHECK: *Completed.*

4. Site Location/ Directions

NEAREST AIRPORT: *Spokane International Airport*

DIRECTIONS TO THE SITE: *US-395, approximately 2 miles south of I-90.*

MEETING LOCATION: *On site beginning at 8:00 a.m.*

WIM SITE LOCATION: *US-395, milepost 93.01; GPS = N 47.0737°, W 118.4095°.*

WIM SITE LOCATION MAP: *See Figure 4.1*

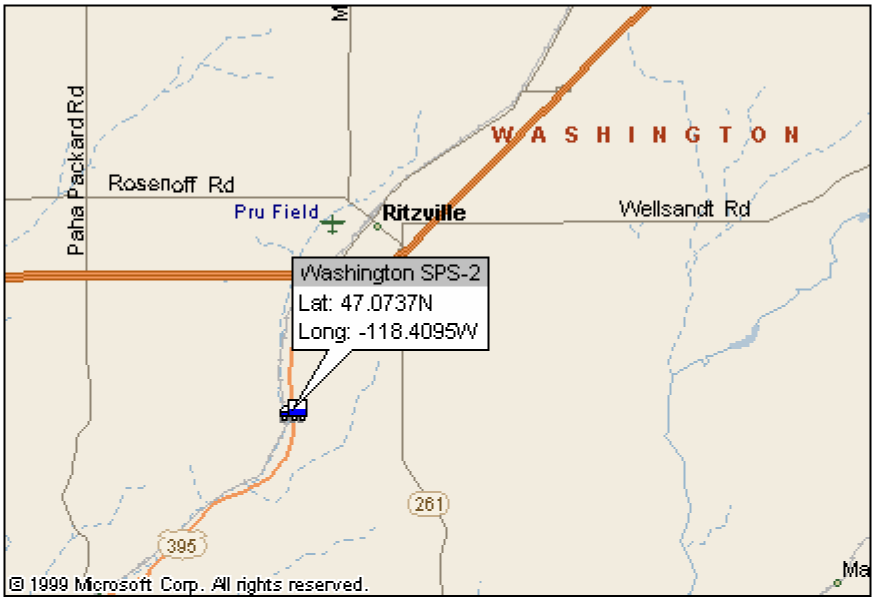


Figure 4-1 – Site 530200 in Washington

5. Truck Route Information

ROUTE RESTRICTIONS: *None*

SCALE LOCATION: *I-90 at exit 231, Tokio Weigh Station; GPS = N 47.2115°, W 118.2242.*

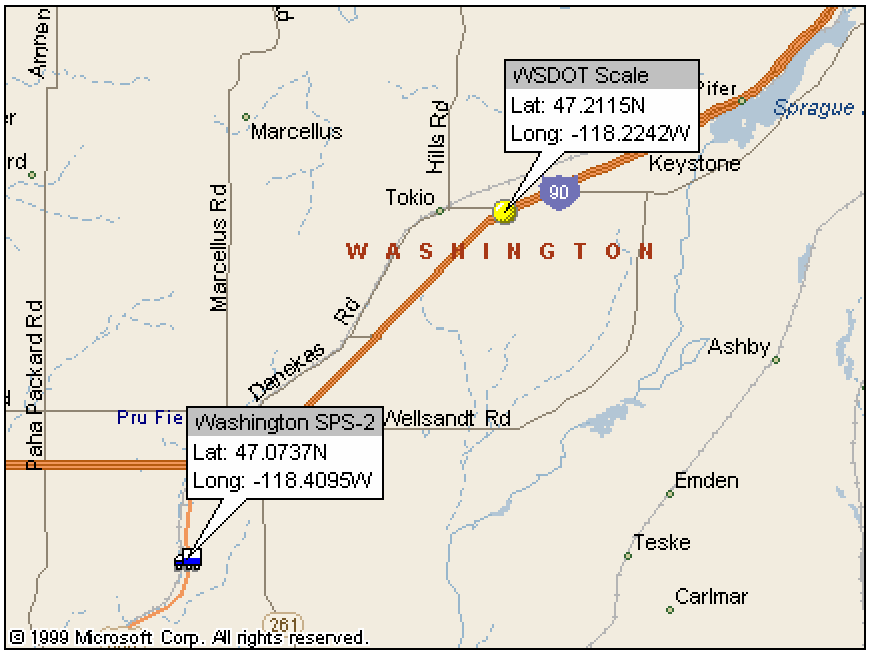


Figure 5-1 – Truck Scale Location for 530200 in Washington

TRUCK ROUTE: *See Figure 5.1*

NB on I-395 1.8 miles, merge on to I-90 East for 2 miles, exit 221, left turn to I-395 SB ramp. SB 5.0 miles on I-395 to PAHA/PACKARD exit, left to I-395 NB ramp.

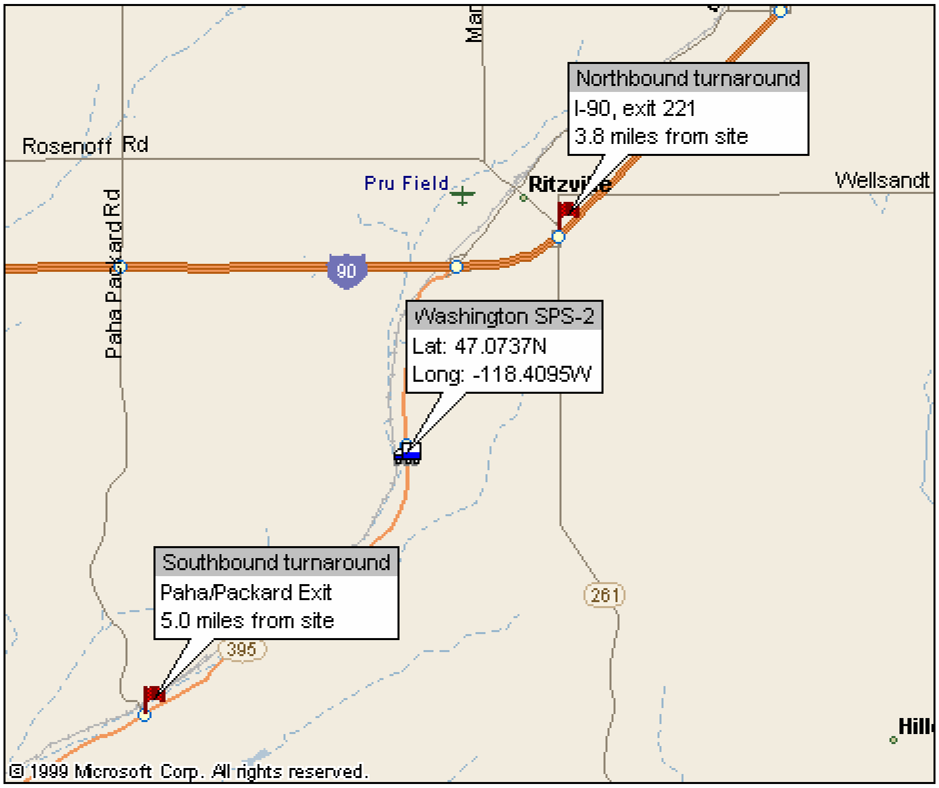


Figure 5-2 – Truck Route at 530200 in Washington

SB distance = 10.8 miles
NB distance = 8.4 miles

Total distance = 19.2 miles (21 minutes)

6. Sheet 17 – Washington (530200)

1.* ROUTE ____I-395____ MILEPOST __93.01__ LTPP DIRECTION - <u>N</u> S E W

2.* WIM SITE DESCRIPTION - Grade __1_____ % Sag vertical Y / <u>N</u>
Nearest SPS section upstream of the site ___0_2_0_5___
Distance from sensor to nearest upstream SPS Section ___ __0___ ___ ft
(site installed between station 4+00 and 5+00, 50' from end)

3.* LANE CONFIGURATION
Lanes in LTPP direction __2_ Lane width _1_2_ ft

Median - 1 – painted
2 – physical barrier
<u>3</u> – grass
4 – none

Shoulder - 1 – curb and gutter
<u>2</u> – paved AC
3 – paved PCC
4 – unpaved
5 – none

Shoulder width __1_0__ ft

4.* PAVEMENT TYPE ___PCC__________________

5.* PAVEMENT SURFACE CONDITION – Distress Survey
Date __5/24/06__ Photo: __Downstream_TO_13_53_1.58_0200_05_24_06.jpg__
Date __5/24/06__Photo: __Upstream_TO_13_53_1.58_0200_05_24_06.jpg____
Date ____

6. * SENSOR SEQUENCE _______Loop – Kistler – Kistler -Loop_____________

7. * REPLACEMENT AND/OR GRINDING __ __ __ / __ __ / __ __ __ __
REPLACEMENT AND/OR GRINDING __ __ __ / __ __ / __ __ __ __
REPLACEMENT AND/OR GRINDING __ __ __ / __ __ / __ __ __ __

8. RAMPS OR INTERSECTIONS
Intersection/driveway within 300 m upstream of sensor location Y / <u>N</u>
distance ______
Intersection/driveway within 300 m downstream of sensor location Y / <u>N</u>
distance ____
Is shoulder routinely used for turns or passing? Y / <u>N</u>

9. DRAINAGE (*Bending plate and load cell systems only)*
1 – Open to ground
2 – Pipe to culvert
3 – None

Clearance under plate ___ ___ . ___ in
Clearance/access to flush fines from under system Y / N

10. * CABINET LOCATION

Same side of road as LTPP lane Y / N Median Y/ N Behind barrier Y / N
Distance from edge of traveled lane _8_3__ ft
Distance from system __9_0__ ft
TYPE _____M_____________________

CABINET ACCESS controlled by LTPP / STATE / JOINT ?
Contact - name and phone number __Ken Lakey_ 360-570-2374_____
Alternate - name and phone number __Hoang Nguyen__360-570-2389___

11. * POWER

Distance to cabinet from drop ___1_6_0___ ft Overhead / underground / solar / AC in cabinet?
Service provider __Big Ben Electric____ Phone number ___________________

12. * TELEPHONE

Distance to cabinet from drop ___1_6_0___ ft Overhead / under ground / cell?
Service provider __Century Tel______ Phone Number __800-533-4171______

13.* SYSTEM (software & version no.)- ___IRD 1068_______________________
Computer connection – RS232 / Parallel port / USB / Other _______________

14. * TEST TRUCK TURNAROUND time __21minutes__Distance _19.2__ mi.

15. PHOTOS FILENAME

Power source	_ Power_BoxTO_13_53_1.58_0200_05_24_06.jpg________
Phone source	_ Telephone_Box_TO_13_53_1.58_0200_05_24_06.jpg________
Cabinet exterior	_ Cabinet_Exterior_TO_13_53_1.58_0200_05_24_06.jpg______
Cabinet interior	_ Cabinet_Interor_TO_13_53_1.58_0200_05_24_06.jpg________
Weight sensors	_Leading_WIM_Sensor_TO_13_53_1.58_0200_05_24_06.jpg__
	_Trailing_WIM_Sensor_TO_13_53_1.58_0200_05_24_06.jpg___
Classification sensors	____
Other sensors	Leading_Loop_Sensor_TO_13_53_1.58_0200_05_24_06.jpg
	Trailing_Loop_Sensor_TO_13_53_1.58_0200__05_24_06.jpg

Description _____loop sensors_________________________

Downstream direction at sensors on LTPP lane
Downstream_TO_13_53_1.58_0200_05_24_06.jpg

Upstream direction at sensors on LTPP lane
Upstream_TO_13_53_1.58_0200_05_24_06.jpg

COMMENTS ______Site phone # - 509-659-4100_____________________________

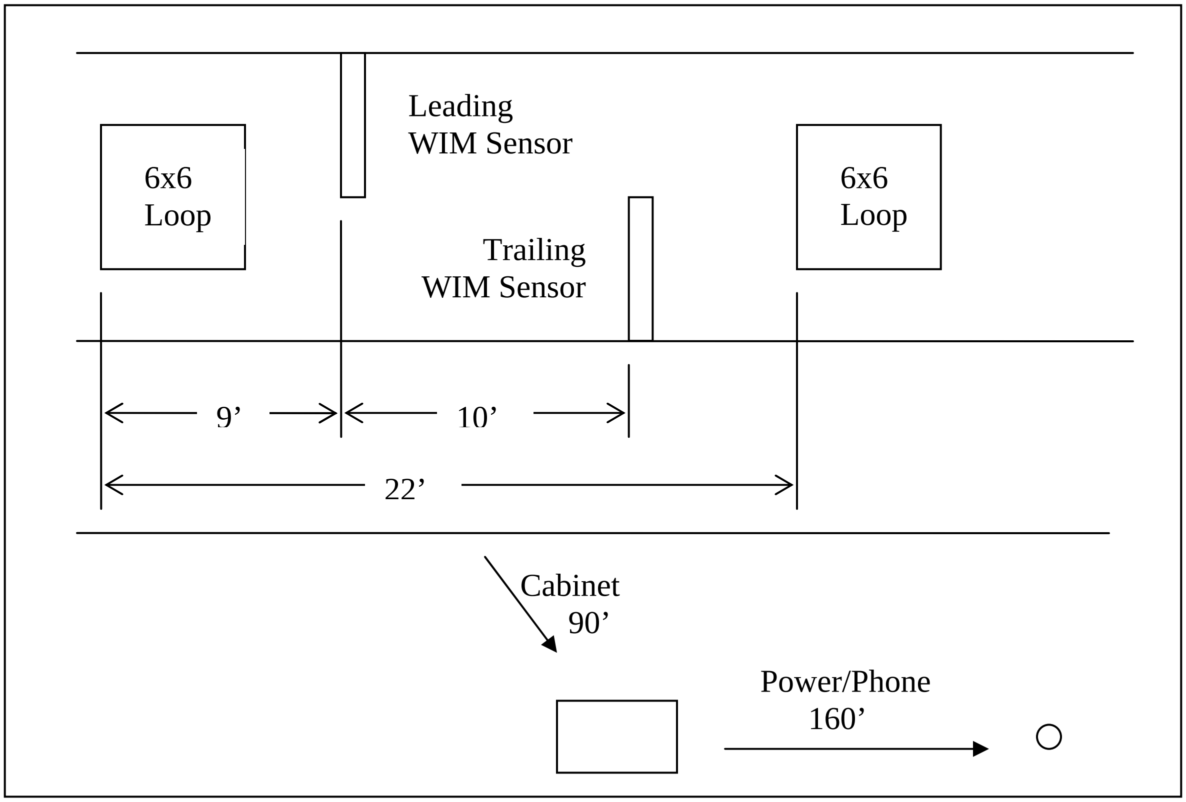
____

________all amenities 2 miles north in Ritzville, including La Quinta Inn, McDonalds, Subway, Shell Gas ____

COMPLETED BY ____Dean J. Wolf__________________

PHONE _301-210-5105______ DATE COMPLETED _0_5_ /_2_4_ / _2_0_0_6__

Sketch of equipment layout



Site Map

Figure 6-1 – Leading_Loop_Sensor_TO_13_53_1.58_0200_05_24_06.jpg

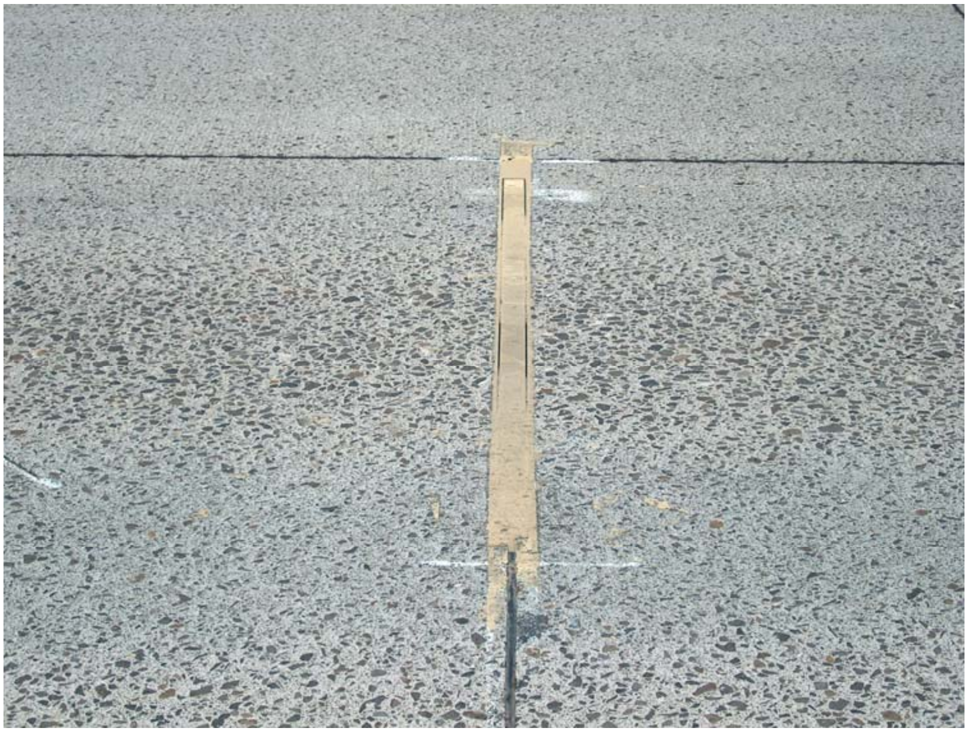


Figure 6-2 – Leading_WIM_Sensor_TO_13_53_1.58_0200_ 05_24_06.jpg

Figure 6-3 – Trailing_WIM_Sensor_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-4 – Trailing_Loop_Sensor_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-5 – WIM_Site_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-6 – Downstream_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-7 – Upstream_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-8 – Power_Box_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-9 – Telephone_Box_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-10 – Cabinet_Exterior_TO_13_53_1.58_0200_05_24_06.jpg

Figure 6-11 – Cabinet_Interior_TO_13_53_1.58_0200_05_24_06.jpg

SHEET 18	STATE CODE [_53_ _]
LTPP MONITORED TRAFFIC DATA	SPS PROJECT ID [__ _0_2_0_0]
WIM SITE COORDINATION	DATE: (mm/dd/yyyy) _0_5_ / __2_4 _ / _2_0 _0_5

Rev. 05/25/04

1. DATA PROCESSING –
   a. Down load –
      x State only
      ☐ LTPP read only
      ☐ LTPP download
      ☐ LTPP download and copy to state

   b. Data Review –
      x State per LTPP guidelines
      ☐ State – ☐ Weekly ☐ Twice a Month ☐ Monthly ☐ Quarterly
      ☐ LTPP

   c. Data submission –
      x State – ☐ Weekly ☐ Twice a month x Monthly ☐ Quarterly
      ☐ LTPP

2. EQUIPMENT –
   a. Purchase –
      x State
      ☐ LTPP

   b. Installation –
      ☐ Included with purchase
      ☐ Separate contract by State
      x State personnel
      ☐ LTPP contract

   c. Maintenance –
      ☐ Contract with purchase – Expiration Date ________
      ☐ Separate contract LTPP – Expiration Date ________
      ☐ Separate contract State – Expiration Date ________
      x State personnel

   d. Calibration –
      ☐ Vendor
      x State
      x LTPP

   e. Manuals and software control –
      x State
      ☐ LTPP

   f. Power –
      i. Type –
         ☐ Overhead
         x Underground
         ☐ Solar
      ii. Payment –
         x State
         ☐ LTPP
         ☐ N/A

g. Communication –
   i. Type –
      x Landline
      □ Cellular
      □ Other
   ii. Payment –
      x State
      □ LTPP
      □ N/A

3. PAVEMENT –
   a. Type –
      x Portland Concrete Cement
      □ Asphalt Concrete
   b. Allowable rehabilitation activities –
      □ Always new
      □ Replacement as needed
      □ Grinding and maintenance as needed
      x Maintenance only
      □ No remediation
   c. Profiling Site Markings –
      □ Permanent
      x Temporary

4. ON SITE ACTIVITIES –
   a. WIM Validation Check - advance notice required ___2____ □ days x weeks
   b. Notice for straightedge and grinding check - 2 □ days x weeks
      i. On site lead –
         □ State
         x LTPP
      ii. Accept grinding –
         □ State
         x LTPP
   c. Authorization to calibrate site –
         x State only
         □ LTPP
   d. Calibration Routine –
         □ LTPP – □ Semi-annually □ Annually
         x State per LTPP protocol – □ Semi-annually □ Annually
         □ State other – ___________________________

e. Test Vehicles
   i. Trucks –
      1st – Air suspension 3S2 ☐ State x LTPP
      2nd – ________________ ☐ State x LTPP
      3rd – ________________ ☐ State x LTPP
      4th – ________________ ☐ State x LTPP
   ii. Loads – ☐ State x LTPP
   iii. Drivers – ☐ State x LTPP

f. Contractor(s) with prior successful experience in WIM calibration in state:

   _______International Road Dynamics

   (IRD)____

g. Access to cabinet
   i. Personnel Access –
      ☐ State only
      x Joint
      ☐ LTPP
   ii. Physical Access –
      x Key
      ☐ Combination

h. State personnel required on site – xYes ☐No

i. Traffic Control Required – ☐Yes xNo

j. Enforcement Coordination Required – ☐Yes xNO

5. SITE SPECIFIC CONDITIONS –
   a. Funds and accountability –

      __N/A____

   b. Reports –

      ____N/A____

   c. Other –

      ______N/A____

   d. Special Conditions –

   __N/A____

6. CONTACTS –

a. Equipment (operational status, access, etc.) –

Name: ___TDO Ken Lakey_______ Phone: ___360-570-2374________

Agency: __WSDOT____

b. Maintenance (equipment) –

Name: ___TDO Ken Lakey_______ Phone: ___360-570-2374________

Agency: __WSDOT____

c. Data Processing and Pre-Visit Data –

Name: __Tony Niemi_____________ Phone: _360-570-2392__________

Agency: ____WSDOT__________________________________

d. Construction schedule and verification –

Name: ___TDO John Rosen________Phone:_360-570-2373_________

Agency: _WSDOT_____________________________________

e. Test Vehicles (trucks, loads, drivers) –

Name: ________________________ Phone: _________________

Agency: ___LTPP____

f. Traffic Control –

Name: ____TDO_Matt Heathscott___ Phone:_360-570-2390_________

Agency: ____

g. Enforcement Coordination –

Name: __N/A______________________ Phone: __________________

Agency: ____

h. Nearest Static Scale

Name:__Tokio Weigh Station____ Location: Ritzville______________________

Phone: ____

SHEET 16 LTPP MONITORED TRAFFIC DATA SITE CALIBRATION SUMMARY	*STATE ASSIGNED ID [__P_7_C__] *STATE CODE [_5_3_] *SHRP SECTION ID [_0_2_0_0__]

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [_0_5_ / _2_4_ / _2_0_0_6__]

2. * TYPE OF EQUIPMENT CALIBRATED __ WIM _X_ CLASSIFIER ___ BOTH

3. * REASON FOR CALIBRATION
____ REGULARLY SCHEDULED SITE VISIT ____ RESEARCH
____ EQUIPMENT REPLACEMENT ____ TRAINING
____ DATA TRIGGERED SYSTEM REVISION ____ NEW EQUIPMENT INSTALLATION
__X_ OTHER (SPECIFY) __LTPP Site Assessment____

4. * SENSORS INSTALLED IN LTPP LANE AT THIS SITE (CHECK ALL THAT APPLY):
____ BARE ROUND PIEZO CERAMIC ____ BARE FLAT PIEZO ____ BENDING PLATES
____ CHANNELIZED ROUND PIEZO ____ LOAD CELLS __X_ QUARTZ PIEZO
____ CHANNELIZED FLAT PIEZO __X_ INDUCTANCE LOOPS ____ CAPACITANCE PADS
____ OTHER (SPECIFY) ____

5. EQUIPMENT MANUFACTURER _____Controller – IRD; Sensors - Kistler___________________________

WIM SYSTEM CALIBRATION SPECIFICS**

6.** CALIBRATION TECHNIQUE USED:
____ TRAFFIC STREAM -- ____STATIC SCALE (Y/N) ____ TEST TRUCKS

__ __ __ NUMBER OF TRUCKS COMPARED __ __ __ NUMBER OF TEST TRUCKS USED

__ __ __ PASSES PER TRUCK

	TRUCK	TYPE	SUSPENSION
TYPE PER FHWA 13 BIN SYSTEM	1	________	___________________
SUSPENSION: 1 - AIR; 2 - LEAF SPRING	2	________	___________________
3 - OTHER (DESCRIBE)	3	________	___________________

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)
MEAN DIFFERENCE BETWEEN ---
DYNAMIC AND STATIC GVW ___ ___ ___ . __ STANDARD DEVIATION __ __ . __
DYNAMIC AND STATIC SINGLE AXLES ___ ___ ___ . __ STANDARD DEVIATION __ __ . __
DYNAMIC AND STATIC DOUBLE AXLES ___ ___ ___ . __ STANDARD DEVIATION __ __ . __

8. ___ ____ NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED

9. DEFINE THE SPEED RANGES USED (MPH) ______ ______ ______ ______ ______ ______ ______ ______
______ ______ ______ ______ ______ ______ ______ ______ ______ ______

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) ___ ___ ___ . ___ ___

11.** IS AUTO-CALIBRATION USED AT THIS SITE? (Y/N) _____
IF YES, LIST AND DEFINE AUTO-CALIBRATION VALUE: _______________________________
____
____

CLASSIFIER TEST SPECIFICS***

12.*** METHOD FOR COLLECTING INDEPENDENT VOLUME MEASUREMENT BY VEHICLE CLASS:
___ VIDEO _X_ MANUAL ___ PARALLEL CLASSIFIERS

13. METHOD TO DETERMINE LENGTH OF COUNT ____ TIME _X__ NUMBER OF TRUCKS

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:
*** FHWA CLASS 9 ____ - 1.9____ FHWA CLASS _10_ ____- 1 6.7__ ____
*** FHWA CLASS 8 ____ ____ ____ FHWA CLASS ____ ____ ____ ____ ____
FHWA CLASS ____ ____ ____ ____ ____
FHWA CLASS ____ ____ ____ ____ ____
*** PERCENT “UNCLASSIFIED” VEHICLES: ____ ___0 . 7 ____

PERSON LEADING CALIBRATION EFFORT: ___Dean J. Wolf, MACTEC Engineering & Consulting, Inc._______
CONTACT INFORMATION: ___(301) 210-5105_____________________________________ rev. November 9, 1999