Biomass Waste for Energy Greenhouse Gas Offset Credit Project

Project Report

Project Name: Biomass to Energy - USFS TNF SSO Project

Report Date: November 13, 2013

Prepared by: Placer County Air Pollution Control District
TSS Consultants

APPLICATION SUMMARY

PROJECT						
Name	Biomass to Energy - USFS TNF SSO Project					
Type	Biomass Waste for Energy		Protocol	Biomass Waste for Energy, Ver. 6.1		
Date	Start	April 14, 2008	End	December 12, 2008		
Location	Foresthill and Lincoln, Placer County					
Developer	Placer County Air Pollution Control District					
AIR DISTRICT						
Name	Placer County Air Pollution Control District			County	Placer	
Contact	Bruce Springsteen	Phone	(530) 745-2337	Email	bsprings@placer.ca.gov	
LISTING						
Name	Placer County Air Pollution Control District			Type	Agency	
Contact	Bruce Springsteen	Phone	(530) 745-2337	Email	bsprings@placer.ca.gov	
VERIFICATION						
Company	South Coast Air Quality Management District					
Address	21865 Copley Dr., Diamond Bar, CA 91765					
Contact	Aaron Katzenstein, Program Supervisor, Climate and Energy, (909) 396-2000					
Contact Credentials	CARB GHG Offset Certified Verifier					
Verification Date	Ongoing (November 2013)					
CREDITS						
Amount Achieved	2,156	metric tons CO_{2e}				
Initial Owner	Placer County Air Pollution Control District					
Asking Price	22.00	$/metric ton CO_{2e}				
Type	Agency		Issuance	Annual		
Prospective	--	MT/yr	Year Until	--		

DETAILS

OFFSET PROJECT OPERATOR	
Name	Placer County Air Pollution Control District
Address	110 Maple Street, Auburn, California, 95603
Contact	Brett Storey, Project Manager, (530) 745-3011; Bruce Springsteen, Senior Engineer, (530) 745-2337; Tom Christofk, Air Pollution Control Officer, (530) 745-2330
OFFSET PROJECT CONSULTANT	
Name	TSS Consultants
Address	2724 Kilgore Road, Rancho Cordova, CA 95670
Contact	Tad Mason, Chief Executive Officer, Registered Professional Forester, (916) 266-0546; Steve Eubanks, USFS Tahoe National Forest, Forest Supervisor (retired), (530) 432-9821
BIOMASS WASTE GENERATOR	
Name	United States Forest Service, Tahoe National Forest
Address	American River Ranger District, 22830 Foresthill Road, Foresthill, CA 95631
Contact	Chris Fischer, Ranger, (530) 478-6254; Wayne Sindel, Fuels (530) 367-2224; Tom Quinn, Forest Supervisor, (530) 265-4531
BIOMASS WASTE	
Location	United States Forest Service, Tahoe National Forest, American River Ranger District -- SSO, Gorman Ranch, and BFP Forest Fuel Thinning Treatment Project Areas. Approximately 15 miles northeast of Foresthill, California. Project locations are shown on maps in Attachment 1.
Origin	Sierra Nevada mixed conifer forest slash byproducts from forest fuel treatment thinning / timber harvests, performed in year 2007.

	SSO Stewardship Project -- Thinning project on overcrowded forest stands with objective to improve tree health, reduce hazardous fuels, and enhance wildlife habitat. Thinning treated forest land on 1,309 acres. Prior to treatment, stands were heavily overcrowded with densities of 200-400 trees/acre. After treatment, densities were reduced to 70-125 trees/acre. The thinning prescription included no removal of trees larger than 20" diameter at breast height (DBH), removal of selected trees from 4-20" DBH, and recovery of sawlogs from all trees removed greater than 10' in length and greater than 6" DBH. BFP Project -- Thinning project on an overcrowded ponderosa pine plantation that was 45 years old. Thinning treated forest land on 1,585 acres. Prior to treatment, plantation stands had from 200-500 trees/acre, and basal area from 200-400 ft^2/acre. After treatment, plantation had 25' average spacing between the largest diameter trees. The thinning prescription was the same as that used for the SSO Project.	
Sustainability	United States Forest Service fuel treatment thinning and harvest projects were conducted after approval and review under the National Environmental Policy Act, and in compliance with all applicable federal, state, and local Forest Practice Rules and Regulations.	
Composition	Mixed conifer, primarily limbs, tops, and small diameter stems of ponderosa pine and douglas fir together with some woody brush, primarily manzanita.	
Heating Value	8,589 - 9,957 Btu/dry lb	Based on laboratory analysis of representative forest slash chip samples, results are shown in Attachment 5.
Quantity	6,714 bone dry tons (BDT)	Determined from SPI weight scale receipt tickets, shown in Attachment 6.
BIOMASS ENERGY FACILITY		
Name	Sierra Pacific Industries	
Location	1445 Highway 65, Lincoln, California, 95648	
Contact	David Harkus, Forester, (916) 645-1631; Ron Gaston, Co-gen Supervisor (deceased); Mark Pawlicki, Director Public Affairs, (530) 378-8104; Mike Hess, Co-gen Supervisor, (916) 645-1631 ext. 219	
Air District	Placer County Air Pollution Control District. Biomass boiler Permit to Operate included in Attachment 8.	
Manufacturer	McBurney	
Installation Date	June 2005	
Design / Controls	Stoker grate with underfire and overfire air. Multiclone and electrostatic precipitator. Selective Non-catalytic Reduction.	
Capacity	300 MMBtu/hr. Steam production of 64,000 kg/hr at 90 bar and 510^{o}C. Provides cogeneration -- 17 MW electricity and steam for on-site lumber drying kilns.	
Net Boiler Heat Rate	16,145 Btu/kWh_e	22% net efficiency. See Attachment 13 for documentation.
Fuel Types Used at This Facility	Lumber mill wood wastes (sawdust, bark, and trimmings), agricultural wastes (nut shells and orchard removal and thinning), wood wastes from timber operations, and urban wood waste (tree trimmings, yard wastes, and construction debris).	
CO_2 Emission Factor	1.8 tons CO_2/BDT	Representative of conifer biomass combustion. Protocol recommendation.
DISPLACED GRID ELECTRICITY		
CO_2 Emission Factor	800 lb CO_2/MWh_e	Based on that from a natural gas combined cycle gas turbine/boiler steam. This emission factor is lower than that from the local "marginal" supply of a single cycle gas turbine, and similar to that of the local servicing utility average considering all sources of electricity generation.
ADDITIONALITY ASSESSMENT		
Price at Energy	$30/BDT	Rate SPI was paying for biomass wastes. Consistent with

Facility		the market rate for biomass wastes in 2008 throughout the Sacramento Valley Region.			
Processing and Transport Cost	$58.23/BDT	Economic assessment calculations are shown in Attachment 2.			
Disposal Practice	Open pile burning was scheduled for all woody biomass wastes. Burn permits for Year 2008 were issued from Placer County Air Pollution Control District, copies included in Attachment 9. All waste woody biomass used in this project was already in piles at landings. Alternative disposal options for the thinning projects, including mastication, chip and scatter onto the forest floor, or leaving biomass on the forest floor, were not considered viable for meeting the fire hazard reduction objective of the thinning projects.				
PROCESSING AND TRANSPORT CONTRACTOR					
Name	Brushbusters				
Location	P.O. Box 691, Foresthill California, 95631				
Contact	Ben Wing, Carson Conover, (530) 367-5525				
PROCESSING AND TRANSPORT OPERATIONS					
Grinder Chipper	Make/Model	Bandit Beast, model 3680, manufactured in 2008. Engine: Caterpillar, model C18, 522 kW.			
	Operation	Operating Hours	265 hours	From operating logs in Attachments 7 and 4	
		Fuel Usage	7,405 gallons		
		Fuel Type	Diesel		
		Diesel Fuel CO_2 Emission Factor	22.23 lb CO_2/gal	Protocol standard	
Excavator Loader	Make/Model	Linkbelt, model 290, manufactured, in 2003. Engine: Isuzu CC-6BG1TC, 132 kW.			
	.	Linkbelt, model 135, manufactured in 2003. Engine: Isuzu BB-4BG1T, 66 kW			
	Operation	Operating hours	265 hours	From operating logs in Attachments 7 and 4	
		Fuel Usage	1,933 gallons		
		Fuel Type	Diesel		
Chip Vans	Make/Model	Kenworth, 2006, Caterpillar C13, 298 kW			
		Kenworth, 1997, Cummins N14, 324 kW			
	Operation	Miles Total	53,280 miles	# trips * miles/trip	
		Miles Per Round Trip	120 miles	Contractor measurement	
		Fuel Usage	11,840 gallons	miles total * van mileage	
		Fuel Type	Diesel		
		Trips	444	Contractor measurement	
		Van Mileage	4.5 miles/gallon	Contractor measurement	
OPEN PILE BURNING					
Open Pile Burn Fraction	100%	All material was destined to be open pile burned.			
Consumption Efficiency	95%	Estimated consumption efficiency observed for large open pile burns in central western Sierra Nevada.			
CO_2 Emission Factor	1.73 tons CO_2/BDT	Protocol recommendation, applicable to open pile burns of conifer biomass.			
CH_4 Emission Factor	0.005 tons CH_4/BDT	Protocol recommendation, representative of open pile burns of conifer biomass.			
GREENHOUSE GAS EMISSION SUMMARY					
Baseline	Open Pile Burning	11,704 tons CO_{2e}	Attachment 3, Item 24		
	Displaced Grid Electricity	2,994 tons CO_{2e}	Attachment 3, Item 10		
	Total	14,698 tons CO_{2e}			
Project	Processing	107.9 tons CO_{2e}	Attachment 3, Items 13+16		
	Transport	131.6 tons CO_{2e}	Attachment 3, Item 19		
	Biomass Energy Facility	12,085 tons CO_{2e}	Attachment 3, Item 6		

	Total	12,325 tons CO_{2e}	
Net Offset Credits		2,374 tons CO_{2e} 2,156 metric tons CO_{2e}	Attachment 3, Item 25

ATTESTATION

I certify under penalty of law that the statements and information in this document are true, accurate, and complete.

Offset Project Operator

Signature	Name	Title	Date
	Bruce Springsteen	Engineer	01/05/15

Verification

Signature	Name	Title	Date
see "Verification Summary and Statement" from Aaron Katzenstein dated 11/13/14			

ATTACHMENTS

1 Project Location Maps

2 Economic Assessment for Project Biomass Utilization

3 GHG Emission Calculations

4 Project Operation Production Summary

5 Biomass Composition Analysis Laboratory Results

6 SPI Boiler Fuel Receipt Weight Ticket Logs

7 Brushbuster Operations Logs

8 Air District Permit to Operate for SPI Biomass Boiler

9 Air District Permits to Burn Forest Slash Biomass Wastes

10 Project Photographs

11 Project Technical Peer Reviewed Publication in the Journal of Air and Waste Management Association

12 Project Video

13 SPI Lincoln Boiler Heat Rate

Attachment 1

Project Location Maps

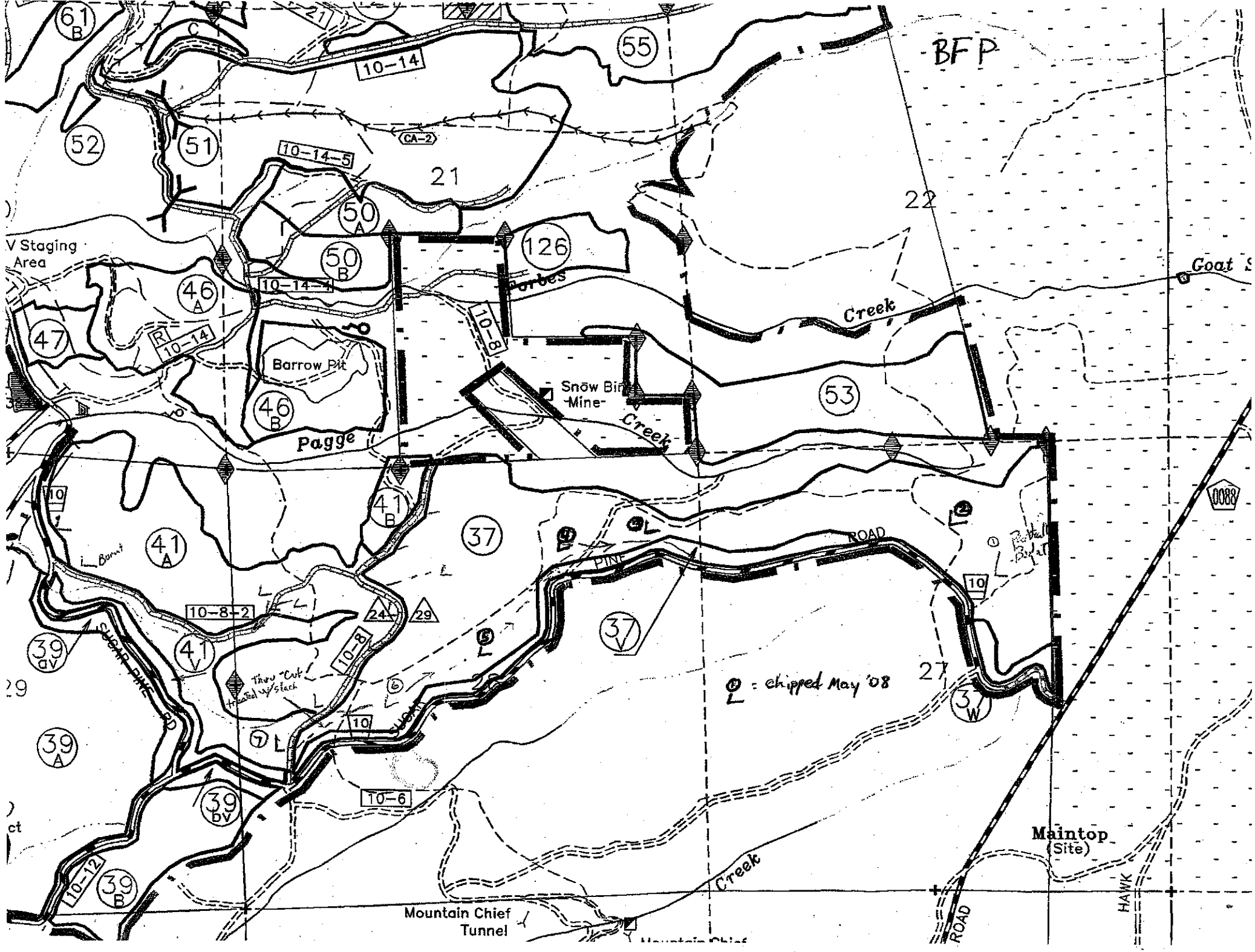
BFP
V Staging Area
Barrow Pit
Snow Bin Mine
Forbes Creek
Pagge Creek
Goat S
Maintop (Site)
Mountain Chief Tunnel
Creek
ROAD
PINE
HAWK
SUGAR PINE
10-14
10-14-5
10-14-4
10-8
10-8-2
10-6
10-12
CA-2
0088
= chipped May '08

EXHIBIT B2

Tahoe National Forest
American River Ranger District

Gorman Ranch Mechanical Fuels Reduction Project

Work Area Map

1:24,000

0 0.1 0.2 0.4 0.6 0.8 Miles

Sub-Items Exhibit B2

Treatment

Mast. & Thin

220-30 Sub-Item Label

Other Ownership

Legend

HaulRoute
BLM Boundary
Trail to Protect
Road Use Prohibited

Existing Transportation System

Secondary Highway
Improved Road
Local/Dirt Road
Trail

24 trucks/day × 80 loads/day = 1,920 green tons
× .10
= 192

LANDING PILES Creation 10 days
≈ 80 loads

Footnote: See Exhibit C

PAL: Westside

American River Ranger District Gis

C:gis/2007Projects/Gorman/mxddocs/GormanSAM3.mxd

Attachment 2

Economic Assessment for Project Biomass Utilization

Collection, Processing and Transport Costs

There are numerous opportunities throughout the Sierra Nevada Range to recover and utilize woody biomass material. However, the financial costs are generally much higher than the current market value of the wood fuel delivered to biomass power generation facilities. Findings from our Phase I analysis confirm this hypothesis. The financial costs to collect, process and transport biomass fuel from the SSO and BFP project sites to a biomass power generation facility were significantly higher than the current market value. Total costs (see Table 2) amount to approximately $58.43/bone dry ton[7] (BDT). Current market value of biomass fuel sourced from timber harvest residuals in the central Sierra Nevada region is about $30/BDT.

Table 2 summarizes the findings from 45 days of operational data as provided by Brushbuster, Inc. See Appendix C for the full dataset of daily production rates and operating performance.

Table 2. Financial Cost Estimate for Collection, Processing and Transport 4/14/08 to 7/24/08

EQUIPMENT	$/OPERATING HOUR	AVERAGE OPERATING HOURS/DAY	COST $/BDT[8]
Grinder – Bandit Beast	$400	4	$17.19
Excavator – Linkbelt 135	$125	3.7	$4.97
Excavator – Linkbelt 290	$150	3.7	$5.96
Chip Truck - Kenworth	$85	9	$27.13
Water Truck – Ford L9000	$60	3	$1.93
Service Truck – Ford F 350	$25	2	$0.54
Crew Truck – Ford F 250	$20	2	$0.43
Low Bed – Kenworth	$100	.27[9]	$0.29
TOTAL			**$58.43**

Additional Data Generated

Progress on-site was measured by the amount of biomass collected, processed, transported, and utilized as fuel at the biomass power generation facility (SPI – Lincoln). Phase I operations provided the empirical evidence of the potential baseline performance of a contractor on a site with similar conditions as the site studied. During Phase I, approximately 7,080 green tons of biomass were collected, processed, and transported. Given the moisture content of the fuel (41%), it was estimated that this was the

[7]Bone dry ton (BDT) equals 2,000 pounds of wood fiber at zero percent moisture. BDT is a common unit of measure in the biomass power generation market sector.
[8]Reported cost per bone dry ton is on the basis of daily average production rate which is reported in bone dry tons per day.
[9]Lowbed truck was utilized for a total of 12 hours to transport grinder and both excavators.

10/9/2007

Supplemental Environmental Project 9-Potential Biomass Projects

Project Name	Forest	Type of Contract	Termination	Slash disposal req.	Comments
Blue Heli.	Tahoe	Timber Sale 2400-6	3/31/2010	Whole tree yard/pile in landing	Almost complete; only one unit left
Oregon Plantation	Tahoe	Timber Sale 2400-6	10/15/2009	Whole tree yard/pile in landing	Almost complete; only two units left
SSO Stewardship	Tahoe	Integrated Res. 2400-13	12/31/2010	Whole tree yard/pile in landing	Half way done
Ruby Helicopter	Tahoe	Timber Sale 2400-6	3/31/2011	Whole tree yard/pile in landing	Half way done
North Divide	Tahoe	Integrated Res. 2400-13	9/18/2010	Whole tree yard/pile in landing	Not operated yet

Biomass Costs/Credits

	Est. *BDT's	Est**Chipping Cost/BDT	Est ***Haul Cost/BDT	Total Cost to Cogen/BDT	Market Value/BDT	LOSS or Extra Cost/BDT	Credits Available: BD Dep./BDT	Credits Available: REC	Credits Available: Other Credit	Credit/(Cost)per BDT	Credit/(Cost) $$$
Blue Heli.	1,000	$20	$35	$55	$30	-$25	$0.00	0	0	-25.00	-$25,000
Oregon Plantation	500	$20	$32	$52	$30	-$22	$0.00	0	0	-22.00	-$11,000
SSO Stewardship	10,000	$20	$29	$49	$30	-$19	$0.75	0	0	-18.25	-$182,500
Ruby Helicopter	5,000	$20	$38	$58	$30	-$28	$0.50	0	0	-27.50	-$137,500
North Divide	12,000	$20	$32	$52	$30	-$22	$0.30	0	0	-21.70	-$260,400
										Total	-$616,400
											-$442,900

* Bone Dry Ton's WAG

** Chipper/Grinder + Excavator = $3000/day @ 150BDT's per day =$20/BDT

*** Chip Van @ $80/Hr / 12.5 BDT's per load

Projects with the most bang for the $$$

BD Deposits as per S.Eubanks: SSO($7,500), Ruby($2,500), N.Divide($3,600).Converted to per BDT

Attachment 3

GHG Emission Calculations

Biomass Waste for Energy GHG Offset Credit Project Calculations

Project Title	Utilization of Forest Slash From Forest Fuel Treatment Thinning Projects on the United States Forest Service Tahoe National Forest American River Ranger District for Energy at Sierra Pacific Industries Lincoln Biomass Cogeneration Boiler as an Alternative to Open Pile Burning
Dates	April 14 - December 12, 2008

Parameter	Value	Units	Symbol	Source	Item
Biomass production	10,503	green tons	$BM_{T,W}$	Energy facility weight tickets	1
Biomass moisture content	36.1	%	M	Lab analysis of representative samples	2
Biomass production	6,714	bone dry ton (BDT)	$BM_{T,D}$	$BM_{T,W}$*(1-M)	3
Biomass heating value	9,000	Btu/dry lb	HHV_{BM}	Lab analysis of representative samples	4
Biomass boiler CO_2 emission factor	1.8	ton CO_2/BDT	EF_{BM}	Protocol default	5
Biomass boiler CO_2 emissions	12,085	ton CO2	GHG_{boil}	$BM_{T,D}$*EF_{BM}	6
Biomass boiler heat rate	16,145	Btu/kWh_e	f	Boiler measurements	7
Biomass boiler electricity production	7,485	MWh_e	E_{BM}	$BM_{T,D}$*HHV_{BM}/f/1000	8
Displaced electricity grid CO_2 emission factor	800	lb CO_2/MWh_e	EF_E	Natural gas combined cycle	9
Displaced electricity grid CO_2 emissions	2,994	ton CO_2	GHG_E	E_{BM}*E_{FE}/2000	10
Grinder fuel usage	7,704	gallons	F_{gr}	Fuel dispenser	11
Grinder fuel CO_2 emission factor	22.23	lb CO_2/gal	EF_{dies}	Default for diesel fuel	12
Grinder CO_2 emissions	85.6	ton CO_2	GHG_{gr}	F_{gr}*EF_{dies}	13
Loader fuel usage	2,010	gallons	F_{lo}	Fuel dispenser	14
Loader fuel CO_2 emission factor	22.23	lb CO_2/gal	EF_{dies}	Default for diesel fuel	15
Loader CO_2 emissions	22.3	ton CO_2	GHG_{lo}	F_{lo}*EF_{dies}	16
Chip van fuel usage	11,840	gallons	F_{van}	Fuel dispenser	17
Chip van CO_2 emission factor	22.23	lb CO_2/gal	EF_{dies}	Default for diesel fuel	18
Chip van CO_2 emissions	131.6	ton CO_2	GHG_{van}	F_{van}*EF_{dies}	19
Open pile burn fraction	100	%	X_{ob}	Disposal plan for biomass wastes	20
Open pile burn consumption factor	95	%	BF	Protocol default	21
Open pile burn CO_2 emission factor	1.73	ton CO_2/BDT	EF_{obCO2}	Protocol default	22
Open pile burn CH_4 emission factor	0.005	ton CH_4/BDT	EF_{obCH4}	Protocol default	23
Open pile burn CO_{2e} emissions	11,704	ton CO_{2e}	GHG_{ob}	$BM_{T,D}$*X_{ob}*BF*(ER_{obCO2}+EF_{obCH4}*21)	24
Net project CO_{2e} reduction	2,374	ton CO_{2e}	GHG_{Net}	(GHG_{ob}+GHG_E)-(GHG_{boil}+GHG_{gr}+GHG_{lo}+GHG_{van})	25

Attachment 4

Project Operation Production Summary

Brushbusters Daily Production for USFS SSO / SPI Biomass Project

Date	Chip Van Loads	Chip Production (bone dry tons)	Chip Production (green tons)	Landing #	Equipment Operation (hours)	Fuel Usage Total (gal)	Grinder Fuel Usage (gal)	Loader Fuel Usage (gal)	Excavator Fuel Usage (gal)
4/14/2008	2	23.5	43.3	2	2.5	93.5	75.0	6.5	12.0
4/15/2008	5	57.6	116.5	2	11.8	101.6	81.0	9.0	11.6
4/16/2008	6	80.1	148.7	2	2.8	105.0	84.0	7.0	14.0
4/17/2008	7	84.9	162.9	2	5.8	218.0	174.0	15.0	29.0
4/18/2008	1	12.9	23.0	2	0.6	20.0	16.0	1.7	2.3
4/21/2008	1	13.7	24.5	2	0.6	20.0	16.0	1.7	2.3
4/22/2008	5	73.2	124.0	2	1.8	68.0	54.0	5.0	9.0
4/23/2008	1	13.0	22.9	2	2.3	86.0	69.0	6.0	11.0
4/24/2008					3.3	124.0	99.0	9.0	16.0
4/25/2008	3	35.6	74.5	2	1.9	66.1	52.5	5.6	8.0
4/28/2008	1	13.4	25.4	2	0.6	20.0	16.0	2.0	2.0
5/5/2008	4	54.5	120.2	BFP	3.1	116.0	93.0	8.0	15.0
5/6/2008	8	123.6	195.8	BFP	2.2	83.0	66.0	6.0	11.0
5/7/2008	10	135.9	253.9	BFP	3.1	116.0	93.0	8.0	15.0
5/8/2008	8	103.4	211.6	BFP	2.6	98.0	78.0	7.0	13.0
5/9/2008	9	130.0	217.8	BFP	2.8	105.0	84.0	7.0	14.0
5/12/2008	7	107.7	166.5	BFP	3.5	132.0	105.0	9.0	18.0
5/13/2008	6	83.7	149.5	BFP	1.9	71.0	57.0	5.0	9.0
5/27/2008	4	71.1	102.4	BFP	1.7	63.0	51.0	4.0	8.0
5/28/2008	3	30.9	69.2	BFP	0.7	26.0	21.0	2.0	3.0
5/29/2008	8	118.0	213.4	BFP	4.8	180.0	144.0	12.0	24.0
5/30/2008	9	119.4	225.2	BFP	2.0	75.0	60.0	5.0	10.0
6/2/2008	8	102.9	185.3	BFP	3.1	116.0	93.0	8.0	15.0
6/3/2008	7	79.0	157.4	1	4.8	180.0	144.0	12.0	24.0
6/4/2008	1	11.7	21.3	1	0.5	18.8	15.0	1.7	2.1
6/5/2008	8	112.5	192.4	1	4.5	169.0	135.0	12.0	22.0
6/6/2008	7	91.4	183.3	1	5.1	191.0	153.0	13.0	25.0
6/9/2008	11	131.8	244.5	1	5.5	206.0	165.0	14.0	27.0
6/10/2008	6	83.8	138.0	1, 3	4.3	161.0	129.0	11.0	21.0
6/11/2008	10	152.6	234.4	3	5.2	196.0	156.0	14.0	26.0
6/12/2008	8	108.9	198.9	3	5.5	206.0	165.0	14.0	27.0
6/13/2008	7	110.0	170.4	3	4.7	176.0	141.0	12.0	23.0
6/16/2008	7	95.4	158.6	3	3.5	131.0	105.0	9.0	17.0
6/17/2008	7	96.3	156.8	4, 5	5.4	203.0	162.0	14.0	27.0
6/18/2008	8	109.6	178.8	4, 5	3.3	124.0	99.0	9.0	16.0
6/20/2008	5	73.7	104.1	6	6.3	236.0	189.0	16.0	31.0
6/23/2008	8	107.2	187.6	6	6.1	229.0	183.0	16.0	30.0
6/24/2008	2	29.0	47.2	6	3.4	128.0	102.0	9.0	17.0
6/25/2008	10	144.9	253.9	6	4.3	161.0	129.0	11.0	21.0
6/26/2008	8	116.1	196.4	6, 7	5.6	211.0	168.0	15.0	28.0
6/27/2008	9	127.8	227.8	7	3.7	139.0	111.0	10.0	18.0
7/9/2008	5	62.9	91.4	8	5.0	188.0	150.0	13.0	25.0
7/10/2008	8	114.8	169.6	8	4.9	184.0	147.0	13.0	24.0
7/11/2008	9	124.6	208.8	8	4.9	184.0	147.0	13.0	24.0
7/16/2008	7	116.0	152.0	8	5.5	206.0	165.0	14.0	27.0
7/17/2008	8	133.8	180.7	8	5.8	218.0	174.0	15.0	29.0
7/18/2008	5	78.0	107.2	8	4.5	169.0	135.0	12.0	22.0
7/21/2008	2	29.8	45.4	8	1.1	40.4	32.0	3.5	4.9
7/22/2008	4	76.9	99.6	8	2.1	78.0	63.0	5.0	10.0
7/23/2008	4	84.2	106.2	8	2.5	93.0	75.0	6.0	12.0
7/24/2008				8	0.1	4.0	3.0	0.5	0.5
8/1/2008	5	98.6	122.2	SSO	3.0	63.0	40.0	8.0	15.0
8/4/2008	5	88.3	118.7	SSO	3.2	70.0	46.0	8.0	16.0
8/5/2008	7	123.9	156.7	SSO	4.4	165.0	132.0	11.0	22.0
8/6/2008	4	71.0	96.3	SSO	2.1	78.0	63.0	5.0	10.0
9/8/2008	3	58.8	68.3	Gor Rnch	2.8	105.3	84.0	7.3	14.0

Brushbusters Daily Production for USFS SSO / SPI Biomass Project

Date	Chip Van Loads	Chip Production (bone dry tons)	Chip Production (green tons)	Landing #	Equipment Operation (hours)	Fuel Usage Total (gal)	Grinder Fuel Usage (gal)	Loader Fuel Usage (gal)	Excavator Fuel Usage (gal)
9/9/2008	4	74.2	89.5	Gor Rnch	4.2	157.9	126.0	10.9	21.0
9/10/2008	6	107.9	135.8	Gor Rnch	4.1	154.1	123.0	10.6	20.5
9/11/2008	3	59.3	71.6	Gor Rnch	1.4	52.6	42.0	3.6	7.0
10/20/2008	4	64.3	81.9	Gor Rnch	2.1	73.1	58.1	6.2	8.8
10/21/2008	1	15.6	22.3	Gor Rnch	0.6	19.9	15.8	1.7	2.4
10/22/2008	2	33.0	43.1	Gor Rnch	1.1	38.6	30.6	3.3	4.7
10/23/2008	1	20.0	25.3	Gor Rnch	0.6	22.6	18.0	1.9	2.7
10/22/2008	2	30.0	41.9	SSO	1.1	37.4	29.7	3.2	4.5
10/23/2008	4	68.4	86.8	SSO	2.2	77.6	61.6	6.6	9.4
10/27/2008	5	73.7	92.4	SSO	2.3	82.6	65.6	7.0	10.0
10/28/2008	6	105.8	132.4	SSO	3.3	118.4	94.0	10.1	14.3
10/29/2008	7	116.4	159.6	SSO	3.7	144.3	111.0	14.8	18.5
10/30/2008	3	50.2	68.8	SSO	2.1	81.9	63.0	8.4	10.5
11/11/2008	3	52.7	77.8	SSO	2.9	113.1	87.0	11.6	14.5
11/12/2008	5	88.9	128.0	SSO	3.0	117.0	90.0	12.0	15.0
11/13/2008	5	89.5	125.3	SSO	2.3	89.7	69.0	9.2	11.5
11/14/2008	7	108.4	162.6	SSO	2.1	81.9	63.0	8.4	10.5
11/17/2008	5	82.1	111.7	SSO	1.4	54.6	42.0	5.6	7.0
11/18/2008	6	103.2	148.1	SSO	3.2	124.8	96.0	12.8	16.0
11/19/2008	6	107.5	160.0	SSO	3.2	124.8	96.0	12.8	16.0
11/20/2008	5	79.5	124.1	SSO	3.2	124.8	96.0	12.8	16.0
11/21/2008	2	35.9	47.6	SSO	1.2	42.5	33.8	3.6	5.1
12/1/2008	2	33.4	52.7	SSO	2.7	102.6	81.0	21.6	0.0
12/2/2008	6	103.8	139.1	SSO	2.7	102.6	81.0	21.6	0.0
12/3/2008	4	65.3	86.4	SSO	2.7	102.6	81.0	21.6	0.0
12/8/2008	3	46.3	63.4	SSO	2.8	106.4	84.0	22.4	0.0
12/9/2008	5	90.1	121.3	SSO	2.6	98.8	78.0	20.8	0.0
12/10/2008	4	63.0	84.0	SSO	2.7	102.6	81.0	21.6	0.0
12/11/2008	5	83.4	119.8	SSO	2.8	106.6	84.0	22.6	0.0
12/12/2008	2	30.2	48.8	SSO	1.2	42.7	34.0	3.6	5.1
Total	444	6714	10503		271	9714	7704	829	1181

Shaded cells: Data not reported by biomass contractor. Data substituted the reported chip production (green tons) multipled by the averages of fuel usage from all available reported data -- grinder: 0.7 gal/green ton chips; loader: 0.08 gal/green ton chips; excavator: 0.1 gal/green ton chips.

Attachment 5

Biomass Waste Composition Analysis Laboratory Results

Hazen Research, Inc.
4601 Indiana Street
Golden, CO 80403 USA
Tel: (303) 279-4501
Fax: (303) 278-1528

Date June 13 2008
HRI Project 002-XN6
HRI Series No. E189/08-1
Date Rec'd. 05/21/08
Cust. P.O.#

Sierra Pacific Industries
Ron Gaston
PO Box 670
Lincoln, CA 95648

Sample Identification
BPF-1

Reporting Basis >	As Rec'd	Dry	Air Dry
Proximate (%)			
Moisture	50.07	0.00	6.57
Ash	0.63	1.26	1.18
Volatile	42.01	84.14	78.61
Fixed C	7.29	14.60	13.64
Total	100.00	100.00	100.00
Sulfur	0.01	0.02	0.02
Btu/lb (HHV)	4971	9957	9303
MMF Btu/lb	5005	10094	
MAF Btu/lb		10084	
Air Dry Loss (%)	46.56		
Ultimate (%)			
Moisture	50.07	0.00	6.57
Carbon	26.94	53.97	50.42
Hydrogen	2.82	5.66	5.28
Nitrogen	0.16	0.32	0.30
Sulfur	0.01	0.02	0.02
Ash	0.63	1.26	1.18
Oxygen*	19.37	38.77	36.23
Total	100.00	100.00	100.00
Chlorine**			

Forms of Sulfur (as S,%)

Sulfate		
Pyritic		
Organic		
Total	0.01	0.02

Water Soluble Alkalies (%)

Na2O
K2O

Lb. Alkali/MM Btu=
Lb. Ash/MM Btu= 1.27
Lb. SO2/MM Btu= 0.04
HGI= @ % Moisture
As Rec'd. Sp.Gr.=
Free Swelling Index=
F-Factor(dry),DSCF/MM BTU= 8,575

Report Prepared By:

Gerard H. Cunningham
Fuels Laboratory Supervisor

* Oxygen by Difference.
** Not usually reported as part of the ultimate analysis.

Hazen Research, Inc.
4601 Indiana Street
Golden, CO 80403 USA
Tel: (303) 279-4501
Fax: (303) 278-1528

Date June 13 2008
HRI Project 002-XN6
HRI Series No. E189/08-2
Date Rec'd. 05/21/08
Cust. P.O.#

Sierra Pacific Industries
Ron Gaston
PO Box 670
Lincoln, CA 95648

Sample Identification
BPF-2

Reporting Basis >	As Rec'd	Dry	Air Dry
Proximate (%)			
Moisture	42.97	0.00	4.07
Ash	1.31	2.30	2.21
Volatile	46.72	81.91	78.58
Fixed C	9.00	15.79	15.14
Total	100.00	100.00	100.00
Sulfur	0.02	0.03	0.03
Btu/lb (HHV)	4989	8748	8392
MMF Btu/lb	5061	8972	
MAF Btu/lb		8955	
Air Dry Loss (%)	40.55		
Ultimate (%)			
Moisture	42.97	0.00	4.07
Carbon	30.16	52.88	50.73
Hydrogen	3.22	5.64	5.41
Nitrogen	0.21	0.38	0.36
Sulfur	0.02	0.03	0.03
Ash	1.31	2.30	2.21
Oxygen*	22.11	38.77	37.19
Total	100.00	100.00	100.00
Chlorine**			
Forms of Sulfur (as S,%)			
Sulfate			
Pyritic			
Organic			
Total	0.02	0.03	
Water Soluble Alkalies (%)			
Na2O			
K2O			

Lb. Alkali/MM Btu=
Lb. Ash/MM Btu= 2.63
Lb. SO2/MM Btu= 0.07
HGI= @ % Moisture
As Rec'd. Sp.Gr.=
Free Swelling Index=
F-Factor(dry),DSCF/MM BTU= 9,567

Report Prepared By:

Gerard H. Cunningham
Fuels Laboratory Supervisor

* Oxygen by Difference.
** Not usually reported as part of the ultimate analysis.

Hazen Research, Inc.
4601 Indiana Street
Golden, CO 80403 USA
Tel: (303) 279-4501
Fax: (303) 278-1528

Date June 13 2008
HRI Project 002-XN6
HRI Series No. E189/08-3
Date Rec'd. 05/21/08
Cust. P.O.#

Sierra Pacific Industries
Ron Gaston
PO Box 670
Lincoln, CA 95648

Sample Identification
BPF-3

Reporting Basis >	As Rec'd	Dry	Air Dry
Proximate (%)			
Moisture	53.52	0.00	4.29
Ash	1.65	3.54	3.39
Volatile	38.09	81.95	78.43
Fixed C	6.74	14.51	13.89
Total	100.00	100.00	100.00
Sulfur	0.02	0.04	0.04
Btu/lb (HHV)	4045	8703	8330
MMF Btu/lb	4118	9050	
MAF Btu/lb		9023	
Air Dry Loss (%)	51.44		
Ultimate (%)			
Moisture	53.52	0.00	4.29
Carbon	24.75	53.24	50.96
Hydrogen	2.66	5.72	5.47
Nitrogen	0.15	0.32	0.31
Sulfur	0.02	0.04	0.04
Ash	1.65	3.54	3.39
Oxygen*	17.25	37.14	35.54
Total	100.00	100.00	100.00
Chlorine**			

Lb. Alkali/MM Btu=
Lb. Ash/MM Btu= 4.07
Lb. SO2/MM Btu= 0.10
HGI= @ % Moisture
As Rec'd. Sp.Gr.=
Free Swelling Index=
F-Factor(dry),DSCF/MM BTU= 9.796

Forms of Sulfur (as S,%)		
Sulfate		
Pyritic		
Organic		
Total	0.02	0.04

Water Soluble Alkalies (%)

Na2O
K2O

Report Prepared By:

Gerard H. Cunningham
Fuels Laboratory Supervisor

* Oxygen by Difference.
** Not usually reported as part of the ultimate analysis.

Hazen Research, Inc.
4601 Indiana Street
Golden, CO 80403 USA
Tel: (303) 279-4501
Fax: (303) 278-1528

Date July 10 2008
HRI Project 002-XU5
HRI Series No. F272/08-1
Date Rec'd. 06/25/08
Cust. P.O.# 10-591864

Sierra Pacific Industries-Corp
Ron Gaston
P.O. Box 670
Lincoln, CA 95648

Sample Identification
SSO 1-3

Reporting Basis >	As Rec'd	Dry	Air Dry
Proximate (%)			
Moisture	47.19	0.00	4.80
Ash	2.37	4.49	4.27
Volatile	41.89	79.32	75.51
Fixed C	8.55	16.19	15.42
Total	100.00	100.00	100.00
Sulfur	0.02	0.03	0.03
Btu/lb (HHV)	4535	8589	8176
MMF Btu/lb	4654	9026	
MAF Btu/lb		8992	
Air Dry Loss (%)	44.53		
Ultimate (%)			
Moisture	47.19	0.00	4.80
Carbon	27.05	51.22	48.76
Hydrogen	2.86	5.42	5.16
Nitrogen	0.11	0.21	0.20
Sulfur	0.02	0.03	0.03
Ash	2.37	4.49	4.27
Oxygen*	20.40	38.63	36.78
Total	100.00	100.00	100.00
Chlorine**			
Forms of Sulfur (as S,%)			
Sulfate			
Pyritic			
Organic			
Total	0.02	0.03	
Water Soluble Alkalies (%)			
Na2O			
K2O			

Lb. Alkali/MM Btu=
Lb. Ash/MM Btu= 5.22
Lb. SO2/MM Btu= 0.07
HGI= @ % Moisture
As Rec'd. Sp.Gr.=
Free Swelling Index=
F-Factor(dry),DSCF/MM BTU= 9,359

Report Prepared By:

Gerard H. Cunningham
Fuels Laboratory Supervisor

* Oxygen by Difference.
** Not usually reported as part of the ultimate analysis.

Attachment 6

SPI Boiler Fuel Receipt Weight Ticket Logs

SIERRA PACIFIC INDUSTRIES
Lincoln

SSO
Scale Date(s): 01/01/08 through 12/15/08

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Sale: 0152 - SSO															
Date: 04/14/08															
Load/Ticket: 0299937/0144459(C)			1	1	13.07	22.53									
Load/Ticket: 0299938/0144467(C)			1	1	10.38	20.75									
Totals.. Date: 04/14/08			2	2	23.45	43.28									
Date: 04/15/08															
Load/Ticket: 0299939/0144502(C)			1	1	10.95	23.29									
Load/Ticket: 0299940/0144507(C)			1	1	10.20	22.66									
Load/Ticket: 0299941/0144514(C)			1	1	14.00	25.93									
Load/Ticket: 0299942/0144531(C)			1	1	11.19	23.32									
Load/Ticket: 0299943/0144537(C)			1	1	11.29	21.31									
Totals.. Date: 04/15/08			5	5	57.63	116.51									
Date: 04/16/08															
Load/Ticket: 0299944/0144567(C)			1	1	11.48	22.95									
Load/Ticket: 0299945/0144579(C)			1	1	13.30	25.09									
Load/Ticket: 0299946/0144584(C)			1	1	15.73	25.78									
Load/Ticket: 0299947/0144606(C)			1	1	14.24	27.38									
Load/Ticket: 0299948/0144621(C)			1	1	13.04	25.08									
Load/Ticket: 0299949/0144620(C)			1	1	12.31	22.38									
Totals.. Date: 04/16/08			6	6	80.10	148.66									
Date: 04/17/08															
Load/Ticket: 0299701/0144680(C)			1	1	11.11	23.63									
Load/Ticket: 0299702/0144684(C)			1	1	13.24	22.44									
Load/Ticket: 0299703/0144696(C)			1	1	13.76	25.97									
Load/Ticket: 0299704/0144704(C)			1	1	12.44	24.40									
Load/Ticket: 0299705/0144712(C)			1	1	13.00	22.81									
Load/Ticket: 0299706/0144718(C)			1	1	9.89	19.77									
Load/Ticket: 0299950/0144674(C)			1	1	11.46	23.88									
Totals.. Date: 04/17/08			7	7	84.90	162.90									
Date: 04/18/08															
Load/Ticket: 0299707/0144744(C)			1	1	12.89	23.02									
Date: 04/21/08															
Load/Ticket: 0299936/0144905(C)			1	1	13.70	24.47									
Date: 04/22/08															
Load/Ticket: 0299708/0144965(C)			1	1	13.47	22.45									
Load/Ticket: 0299709/0144981(C)			1	1	14.53	26.90									
Load/Ticket: 0299710/0144984(C)			1	1	11.26	23.45									
Load/Ticket: 0299711/0145016(C)			1	1	14.08	24.71									

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0299712/0145035(C)			1	1	19.83	26.44									
Totals.. Date: 04/22/08			5	5	73.17	123.95									
Date: 04/23/08															
Load/Ticket: 0299713/0145041(C)			1	1	13.03	22.86									
Date: 04/25/08															
Load/Ticket: 0299714/0145110(C)			1	1	14.23	25.88									
Load/Ticket: 0299715/0145109(C)			1	1	10.36	22.52									
Load/Ticket: 0299716/0145114(C)			1	1	10.96	26.09									
Totals.. Date: 04/25/08			3	3	35.55	74.49									
Date: 04/28/08															
Load/Ticket: 0299717/0145203(C)			1	1	13.44	25.35									
Date: 06/03/08															
Load/Ticket: 0299718/0150853(C)			1	1	8.31	20.26									
Load/Ticket: 0299719/0150869(C)			1	1	13.33	20.20									
Load/Ticket: 0299720/0150876(C)			1	1	9.01	21.44									
Load/Ticket: 0299721/0150889(C)			1	1	10.35	18.82									
Load/Ticket: 0299722/0150963(C)			1	1	11.52	22.15									
Load/Ticket: 0299723/0150982(C)			1	1	14.02	29.21									
Load/Ticket: 0299724/0150992(C)			1	1	12.41	25.33									
Totals.. Date: 06/03/08			7	7	78.95	157.41									
Date: 06/04/08															
Load/Ticket: 0299725/0151103(C)			1	1	11.74	21.34									
Date: 06/05/08															
Load/Ticket: 0299726/0151397(C)			1	1	13.88	21.35									
Load/Ticket: 0299727/0151410(C)			1	1	12.63	22.96									
Load/Ticket: 0299728/0151429(C)			1	1	12.93	21.55									
Load/Ticket: 0299729/0151470(C)			1	1	16.01	24.63									
Load/Ticket: 0299730/0151517(C)			1	1	17.61	25.52									
Load/Ticket: 0299731/0151534(C)			1	1	13.88	25.24									
Load/Ticket: 0299732/0151551(C)			1	1	11.59	25.75									
Load/Ticket: 0299733/0151570(C)			1	1	13.98	25.41									
Totals.. Date: 06/05/08			8	8	112.51	192.41									
Date: 06/06/08															
Load/Ticket: 0299734/0151677(C)			1	1	13.60	27.19									
Load/Ticket: 0299735/0151697(C)			1	1	11.61	25.80									
Load/Ticket: 0299736/0151719(C)			1	1	12.66	25.83									
Load/Ticket: 0299737/0151742(C)			1	1	12.03	22.69									
Load/Ticket: 0299738/0151754(C)			1	1	14.22	29.01									

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0299739/0151767(C)			1	1	11.61	29.03									
Load/Ticket: 0299740/0151787(C)			1	1	15.66	23.73									
Totals.. Date: 06/06/08			7	7	91.39	183.28									
Date: 06/09/08															
Load/Ticket: 0299741/0151865(C)			1	1	12.07	23.67									
Load/Ticket: 0299742/0151899(C)			1	1	13.49	23.25									
Load/Ticket: 0299743/0151946(C)			1	1	12.24	23.10									
Load/Ticket: 0299744/0151956(C)			1	1	11.03	22.97									
Load/Ticket: 0299745/0151978(C)			1	1	11.14	23.21									
Load/Ticket: 0299746/0152003(C)			1	1	10.08	22.40									
Load/Ticket: 0299747/0152028(C)			1	1	16.33	20.67									
Load/Ticket: 0299748/0152042(C)			1	1	11.42	23.31									
Load/Ticket: 0299749/0152063(C)			1	1	11.40	22.79									
Load/Ticket: 0299750/0152111(C)			1	1	10.91	20.21									
Load/Ticket: 0299951/0152132(C)			1	1	11.71	18.88									
Totals.. Date: 06/09/08			11	11	131.82	244.46									
Date: 06/10/08															
Load/Ticket: 0299952/0152224(C)			1	1	14.00	23.34									
Load/Ticket: 0299953/0152247(C)			1	1	16.05	22.93									
Load/Ticket: 0299954/0152263(C)			1	1	14.62	28.66									
Load/Ticket: 0299955/0152334(C)			1	1	12.14	21.29									
Load/Ticket: 0299956/0152365(C)			1	1	11.36	17.75									
Load/Ticket: 0299957/0152373(C)			1	1	15.59	23.98									
Totals.. Date: 06/10/08			6	6	83.76	137.95									
Date: 06/11/08															
Load/Ticket: 0299958/0152463(C)			1	1	13.94	19.63									
Load/Ticket: 0299959/0152435(C)			1	1	15.65	23.71									
Load/Ticket: 0299960/0152525(C)			1	1	12.53	22.37									
Load/Ticket: 0299961/0152540(C)			1	1	17.26	24.65									
Load/Ticket: 0299962/0152555(C)			1	1	15.31	24.70									
Load/Ticket: 0299963/0152572(C)			1	1	14.57	20.82									
Load/Ticket: 0299964/0152616(C)			1	1	12.16	22.11									
Load/Ticket: 0299965/0152638(C)			1	1	15.59	26.88									
Load/Ticket: 0299966/0152666(C)			1	1	17.88	25.54									
Load/Ticket: 0299967/0152687(C)			1	1	17.72	23.94									
Totals.. Date: 06/11/08			10	10	152.61	234.35									
Date: 06/12/08															
Load/Ticket: 0299968/0152807(C)			1	1	14.43	25.77									
Load/Ticket: 0299969/0152829(C)			1	1	11.90	24.80									
Load/Ticket: 0299970/0152847(C)			1	1	14.58	28.04									
Load/Ticket: 0299971/0152859(C)			1	1	13.19	26.37									

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0299972/0152895(C)			1	1	16.05	27.21									
Load/Ticket: 0299973/0152935(C)			1	1	12.07	23.22									
Load/Ticket: 0299974/0153004(C)			1	1	15.11	21.28									
Load/Ticket: 0299975/0152986(C)			1	1	11.56	22.23									
Totals.. Date: 06/12/08			8	8	108.89	198.92									
Date: 06/13/08															
Load/Ticket: 0299976/0153035(C)			1	1	14.56	23.48									
Load/Ticket: 0299977/0153134(C)			1	1	13.28	25.54									
Load/Ticket: 0299978/0153155(C)			1	1	19.59	27.21									
Load/Ticket: 0299979/0153157(C)			1	1	19.22	24.64									
Load/Ticket: 0299980/0153229(C)			1	1	13.75	21.49									
Load/Ticket: 0299981/0153250(C)			1	1	16.70	25.31									
Load/Ticket: 0299982/0153274(C)			1	1	12.93	22.69									
Totals.. Date: 06/13/08			7	7	110.03	170.36									
Date: 06/16/08															
Load/Ticket: 0299983/0153401(C)			1	1	12.47	24.45									
Load/Ticket: 0299984/0153418(C)			1	1	16.07	21.72									
Load/Ticket: 0299985/0153428(C)			1	1	9.77	17.76									
Load/Ticket: 0299986/0153452(C)			1	1	14.68	21.59									
Load/Ticket: 0299987/0153497(C)			1	1	15.58	26.86									
Load/Ticket: 0299988/0153524(C)			1	1	18.64	26.63									
Load/Ticket: 0299989/0153552(C)			1	1	8.22	19.56									
Totals.. Date: 06/16/08			7	7	95.43	158.57									
Date: 06/17/08															
Load/Ticket: 0299990/0153641(C)			1	1	12.83	24.21									
Load/Ticket: 0299991/0153711(C)			1	1	15.44	20.32									
Load/Ticket: 0299992/0153727(C)			1	1	13.80	20.91									
Load/Ticket: 0299993/0153742(C)			1	1	10.64	18.35									
Load/Ticket: 0299994/0153768(C)			1	1	13.63	22.71									
Load/Ticket: 0299995/0153822(C)			1	1	14.14	25.70									
Load/Ticket: 0299996/0153842(C)			1	1	15.77	24.64									
Totals.. Date: 06/17/08			7	7	96.25	156.84									
Date: 06/18/08															
Load/Ticket: 0235401/0154072(C)			1	1	10.28	19.77									
Load/Ticket: 0235402/0154089(C)			1	1	15.53	22.50									
Load/Ticket: 0235403/0154135(C)			1	1	19.49	25.98									
Load/Ticket: 0235404/0154158(C)			1	1	10.10	21.95									
Load/Ticket: 0299997/0153947(C)			1	1	13.36	19.65									
Load/Ticket: 0299998/0153943(C)			1	1	14.12	20.77									
Load/Ticket: 0299999/0154022(C)			1	1	12.35	24.69									
Load/Ticket: 0300000/0154044(C)			1	1	14.33	23.49									

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Totals.. Date: 06/18/08			8	8	109.56	178.80									
Date: 06/20/08															
Load/Ticket: 0235405/0154679(C)			1	1	13.15	17.53									
Load/Ticket: 0235406/0154701(C)			1	1	14.44	20.93									
Load/Ticket: 0235407/0154727(C)			1	1	9.86	16.71									
Load/Ticket: 0235408/0154772(C)			1	1	19.97	24.96									
Load/Ticket: 0235409/0154790(C)			1	1	16.28	23.94									
Totals.. Date: 06/20/08			5	5	73.70	104.07									
Date: 06/23/08															
Load/Ticket: 0235410/0154826(C)			1	1	11.16	19.93									
Load/Ticket: 0235411/0154871(C)			1	1	13.75	23.71									
Load/Ticket: 0235412/0154900(C)			1	1	14.03	23.78									
Load/Ticket: 0235413/0154926(C)			1	1	14.19	24.46									
Load/Ticket: 0235414/0154948(C)			1	1	10.92	21.83									
Load/Ticket: 0235415/0154967(C)			1	1	13.15	24.82									
Load/Ticket: 0235416/0155018(C)			1	1	13.71	23.23									
Load/Ticket: 0235417/0155054(C)			1	1	16.26	25.81									
Totals.. Date: 06/23/08			8	8	107.17	187.57									
Date: 06/24/08															
Load/Ticket: 0235420/0155304(C)			1	1	15.16	21.65									
Load/Ticket: 0235421/0155279(C)			1	1	13.81	25.57									
Totals.. Date: 06/24/08			2	2	28.97	47.22									
Date: 06/25/08															
Load/Ticket: 0235418/0155385(C)			1	1	10.29	23.39									
Load/Ticket: 0235419/0155381(C)			1	1	19.58	26.10									
Load/Ticket: 0235422/0155422(C)			1	1	12.67	24.85									
Load/Ticket: 0235423/0155444(C)			1	1	14.03	22.27									
Load/Ticket: 0235424/0155474(C)			1	1	16.90	30.17									
Load/Ticket: 0235425/0155535(C)			1	1	14.98	25.83									
Load/Ticket: 0235426/0155501(C)			1	1	10.63	25.92									
Load/Ticket: 0235427/0155525(C)			1	1	13.17	23.52									
Load/Ticket: 0235428/0155548(C)			1	1	19.26	27.51									
Load/Ticket: 0235429/0155576(C)			1	1	13.40	24.36									
Totals.. Date: 06/25/08			10	10	144.91	253.92									
Date: 06/26/08															
Load/Ticket: 0235430/0155683(C)			1	1	17.50	26.51									
Load/Ticket: 0235431/0155711(C)			1	1	12.38	24.28									
Load/Ticket: 0235432/0155727(C)			1	1	17.71	27.67									
Load/Ticket: 0235433/0155740(C)			1	1	15.67	27.01									
Load/Ticket: 0235434/0155782(C)			1	1	17.83	30.22									

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0235435/0155840(C)			1	1	12.56	23.25									
Load/Ticket: 0235436/0155857(C)			1	1	10.43	18.63									
Load/Ticket: 0235437/0155863(C)			1	1	12.04	18.81									
Totals.. Date: 06/26/08			8	8	116.12	196.38									
Date: 06/27/08															
Load/Ticket: 0235438/0155904(C)			1	1	12.89	24.79									
Load/Ticket: 0235439/0155951(C)			1	1	12.42	23.89									
Load/Ticket: 0235440/0155978(C)			1	1	12.86	24.26									
Load/Ticket: 0235441/0155996(C)			1	1	17.97	24.29									
Load/Ticket: 0235442/0156011(C)			1	1	13.89	25.26									
Load/Ticket: 0235443/0156034(C)			1	1	12.68	25.36									
Load/Ticket: 0235444/0156062(C)			1	1	14.52	25.92									
Load/Ticket: 0235445/0156097(C)			1	1	16.40	28.78									
Load/Ticket: 0235446/0156112(C)			1	1	14.12	25.22									
Totals.. Date: 06/27/08			9	9	127.75	227.77									
Date: 07/09/08															
Load/Ticket: 0235448/0157711(C)			1	1	13.65	16.64									
Load/Ticket: 0235449/0157729(C)			1	1	12.91	18.99									
Load/Ticket: 0235450/0157748(C)			1	1	14.00	19.44									
Load/Ticket: 0235451/0157771(C)			1	1	10.40	17.05									
Load/Ticket: 0235452/0157794(C)			1	1	11.94	19.25									
Totals.. Date: 07/09/08			5	5	62.90	91.37									
Date: 07/10/08															
Load/Ticket: 0235453/0157821(C)			1	1	13.12	21.16									
Load/Ticket: 0235454/0157881(C)			1	1	14.47	20.67									
Load/Ticket: 0235455/0157900(C)			1	1	14.84	19.02									
Load/Ticket: 0235456/0157906(C)			1	1	14.07	24.25									
Load/Ticket: 0235457/0157918(C)			1	1	14.20	24.49									
Load/Ticket: 0235458/0157981(C)			1	1	16.58	20.72									
Load/Ticket: 0235459/0157995(C)			1	1	14.60	19.46									
Load/Ticket: 0235460/0158001(C)			1	1	12.87	19.80									
Totals.. Date: 07/10/08			8	8	114.75	169.57									
Date: 07/11/08															
Load/Ticket: 0235447/0158111(C)			1	1	12.10	25.20									
Load/Ticket: 0235461/0158036(C)			1	1	13.86	25.67									
Load/Ticket: 0235462/0158056(C)			1	1	16.26	21.97									
Load/Ticket: 0235463/0158079(C)			1	1	11.66	20.46									
Load/Ticket: 0235464/0158101(C)			1	1	17.22	24.60									
Load/Ticket: 0235465/0158138(C)			1	1	13.75	23.70									
Load/Ticket: 0235466/0158164(C)			1	1	9.68	22.51									
Load/Ticket: 0235467/0158179(C)			1	1	14.69	20.98									

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0235468/0158189(C)			1	1	15.42	23.72									
Totals.. Date: 07/11/08			9	9	124.64	208.81									
Date: 07/16/08															
Load/Ticket: 0235469/0158860(C)			1	1	14.76	21.08									
Load/Ticket: 0235470/0158877(C)			1	1	19.96	22.94									
Load/Ticket: 0235471/0158884(C)			1	1	12.90	21.15									
Load/Ticket: 0235472/0158915(C)			1	1	15.53	21.57									
Load/Ticket: 0235473/0158940(C)			1	1	19.81	23.87									
Load/Ticket: 0235474/0158957(C)			1	1	19.79	24.13									
Load/Ticket: 0235475/0158976(C)			1	1	13.28	17.25									
Totals.. Date: 07/16/08			7	7	116.03	151.99									
Date: 07/17/08															
Load/Ticket: 0235476/0159024(C)			1	1	13.44	19.48									
Load/Ticket: 0235477/0159041(C)			1	1	16.78	20.72									
Load/Ticket: 0235478/0159077(C)			1	1	14.90	21.28									
Load/Ticket: 0235479/0159110(C)			1	1	16.38	20.47									
Load/Ticket: 0235480/0159135(C)			1	1	18.40	25.56									
Load/Ticket: 0235481/0159148(C)			1	1	19.14	25.52									
Load/Ticket: 0235482/0159166(C)			1	1	17.92	25.24									
Load/Ticket: 0235483/0159196(C)			1	1	16.81	22.41									
Totals.. Date: 07/17/08			8	8	133.77	180.68									
Date: 07/18/08															
Load/Ticket: 0235484/0159262(C)			1	1	14.54	24.24									
Load/Ticket: 0235485/0159347(C)			1	1	15.04	19.28									
Load/Ticket: 0235486/0159360(C)			1	1	16.43	21.06									
Load/Ticket: 0235488/0159398(C)			1	1	15.42	20.84									
Load/Ticket: 0235489/0159452(C)			1	1	16.52	21.74									
Totals.. Date: 07/18/08			5	5	77.95	107.16									
Date: 07/21/08															
Load/Ticket: 0235487/0159493(C)			1	1	15.61	22.95									
Load/Ticket: 0235490/0159612(C)			1	1	14.14	22.44									
Totals.. Date: 07/21/08			2	2	29.75	45.39									
Date: 07/22/08															
Load/Ticket: 0235491/0159782(C)			1	1	19.26	24.07									
Load/Ticket: 0235492/0159808(C)			1	1	22.06	25.07									
Load/Ticket: 0235493/0159817(C)			1	1	18.94	27.05									
Load/Ticket: 0235494/0159857(C)			1	1	16.64	23.43									
Totals.. Date: 07/22/08			4	4	76.90	99.62									
Date: 07/23/08															

	Load Count 100%	Load Count SS	Load Count W/O	Load Count TTL	Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species PP	SP	WF	DF	IC	OC	TOTAL	Avg Load Mbf	Percent Defect
Load/Ticket: 0235495/0160019(C)			1	1	21.28	25.95									
Load/Ticket: 0235496/0160026(C)			1	1	17.13	25.57									
Load/Ticket: 0235497/0160090(C)			1	1	22.81	28.87									
Load/Ticket: 0235498/0160106(C)			1	1	22.97	25.81									
Totals.. Date: 07/23/08			4	4	84.19	106.20									
Date: 08/01/08															
Load/Ticket: 0235499/0161249(C)			1	1	19.38	22.80									
Load/Ticket: 0235500/0161242(C)			1	1	19.96	24.64									
Load/Ticket: 0235501/0161287(C)			1	1	19.08	26.50									
Load/Ticket: 0235502/0161300(C)			1	1	20.81	23.65									
Load/Ticket: 0235503/0161305(C)			1	1	19.40	24.56									
Totals.. Date: 08/01/08			5	5	98.63	122.15									
Date: 08/04/08															
Load/Ticket: 0235504/0161403(C)			1	1	16.59	23.70									
Load/Ticket: 0235505/0161378(C)			1	1	16.58	24.03									
Load/Ticket: 0235506/0161404(C)			1	1	18.47	23.38									
Load/Ticket: 0235507/0161429(C)			1	1	20.45	26.22									
Load/Ticket: 0235508/0161463(C)			1	1	16.25	21.38									
Totals.. Date: 08/04/08			5	5	88.34	118.71									
Date: 08/05/08															
Load/Ticket: 0235509/0161541(C)			1	1	20.16	25.20									
Load/Ticket: 0235510/0161548(C)			1	1	15.87	18.45									
Load/Ticket: 0235511/0161565(C)			1	1	16.16	22.45									
Load/Ticket: 0235512/0161575(C)			1	1	16.61	24.43									
Load/Ticket: 0235513/0161596(C)			1	1	19.20	23.41									
Load/Ticket: 0235514/0161616(C)			1	1	16.00	19.05									
Load/Ticket: 0235515/0161641(C)			1	1	19.91	23.70									
Totals.. Date: 08/05/08			7	7	123.91	156.69									
Date: 08/06/08															
Load/Ticket: 0235516/0161662(C)			1	1	21.57	26.31									
Load/Ticket: 0235517/0161711(C)			1	1	15.75	24.23									
Load/Ticket: 0235518/0161723(C)			1	1	15.96	21.28									
Load/Ticket: 0235519/0161748(C)			1	1	17.63	24.48									
Totals.. Date: 08/06/08			4	4	70.91	96.30									
Date: 10/22/08															
Load/Ticket: 0235528/0173625(C)			1	1	12.44	17.77									
Load/Ticket: 0235529/0173638(C)			1	1	17.59	24.10									
Totals.. Date: 10/22/08			2	2	30.03	41.87									
Date: 10/23/08															

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0235117/0173716(C)			1	1	21.88	24.31									
Load/Ticket: 0235530/0173709(C)			1	1	15.27	21.82									
Load/Ticket: 0235532/0173723(C)			1	1	16.61	20.25									
Load/Ticket: 0235533/0173763(C)			1	1	14.67	20.38									
Totals.. Date: 10/23/08			4	4	68.43	86.76									
Date: 10/27/08															
Load/Ticket: 0235534/0173907(C)			1	1	16.12	18.96									
Load/Ticket: 0235535/0173908(C)			1	1	13.00	15.47									
Load/Ticket: 0235536/0173913(C)			1	1	15.38	19.97									
Load/Ticket: 0235537/0173921(C)			1	1	16.97	22.62									
Load/Ticket: 0235538/0173957(C)			1	1	12.26	15.33									
Totals.. Date: 10/27/08			5	5	73.73	92.35									
Date: 10/28/08															
Load/Ticket: 0235539/0173990(C)			1	1	15.65	20.06									
Load/Ticket: 0235540/0173982(C)			1	1	14.69	21.60									
Load/Ticket: 0235541/0174013(C)			1	1	15.13	17.80									
Load/Ticket: 0235542/0174030(C)			1	1	18.35	23.23									
Load/Ticket: 0235543/0174037(C)			1	1	24.94	30.41									
Load/Ticket: 0235544/0174047(C)			1	1	17.01	19.33									
Totals.. Date: 10/28/08			6	6	105.77	132.43									
Date: 10/29/08															
Load/Ticket: 0235545/0174102(C)			1	1	17.63	24.15									
Load/Ticket: 0235546/0174123(C)			1	1	18.28	25.04									
Load/Ticket: 0235547/0174126(C)			1	1	13.00	18.57									
Load/Ticket: 0235548/0174135(C)			1	1	18.10	25.86									
Load/Ticket: 0235549/0174145(C)			1	1	17.67	23.56									
Load/Ticket: 0235550/0174157(C)			1	1	17.47	23.61									
Load/Ticket: 0235551/0174162(C)			1	1	14.48	18.80									
Totals.. Date: 10/29/08			7	7	116.63	159.59									
Date: 10/30/08															
Load/Ticket: 0235552/0174210(C)			1	1	16.50	22.91									
Load/Ticket: 0235553/0174235(C)			1	1	16.65	23.12									
Load/Ticket: 0235554/0174234(C)			1	1	17.05	22.73									
Totals.. Date: 10/30/08			3	3	50.20	68.76									
Date: 11/11/08															
Load/Ticket: 0235556/0174544(C)			1	1	19.54	27.92									
Load/Ticket: 0235557/0174549(C)			1	1	18.17	25.24									
Load/Ticket: 0235558/0174561(C)			1	1	15.01	24.60									
Totals.. Date: 11/11/08			3	3	52.72	77.76									
Date: 11/12/08															

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0235559/0174606(C)			1	1	15.31	23.19									
Load/Ticket: 0235560/0174610(C)			1	1	16.90	25.23									
Load/Ticket: 0235561/0174615(C)			1	1	21.78	29.83									
Load/Ticket: 0235562/0174641(C)			1	1	15.34	22.90									
Load/Ticket: 0235563/0174650(C)			1	1	19.59	26.84									
Totals.. Date: 11/12/08			5	5	88.92	127.99									
Date: 11/13/08															
Load/Ticket: 0235555/0174678(C)			1	1	20.34	25.43									
Load/Ticket: 0235564/0174675(C)			1	1	17.13	24.83									
Load/Ticket: 0235565/0174721(C)			1	1	16.43	27.39									
Load/Ticket: 0235566/0174727(C)			1	1	18.79	26.09									
Load/Ticket: 0235568/0174775(C)			1	1	16.79	21.52									
Totals.. Date: 11/13/08			5	5	89.48	125.26									
Date: 11/14/08															
Load/Ticket: 0235567/0174882(C)			1	1	17.26	23.65									
Load/Ticket: 0235569/0174795(C)			1	1	15.26	24.62									
Load/Ticket: 0235570/0174820(C)			1	1	14.60	20.85									
Load/Ticket: 0235571/0174827(C)			1	1	15.21	25.35									
Load/Ticket: 0235572/0174835(C)			1	1	14.43	20.91									
Load/Ticket: 0235573/0174851(C)			1	1	15.50	20.40									
Load/Ticket: 0235574/0174867(C)			1	1	16.10	26.84									
Totals.. Date: 11/14/08			7	7	108.36	162.62									
Date: 11/17/08															
Load/Ticket: 0235575/0174936(C)			1	1	16.41	17.84									
Load/Ticket: 0235576/0174942(C)			1	1	13.94	22.12									
Load/Ticket: 0235577/0174948(C)			1	1	19.57	27.95									
Load/Ticket: 0235578/0174970(C)			1	1	15.41	19.51									
Load/Ticket: 0235579/0174992(C)			1	1	16.78	24.32									
Totals.. Date: 11/17/08			5	5	82.11	111.74									
Date: 11/18/08															
Load/Ticket: 0235580/0175033(C)			1	1	20.09	30.91									
Load/Ticket: 0235581/0175053(C)			1	1	13.49	17.99									
Load/Ticket: 0235582/0175057(C)			1	1	19.56	26.08									
Load/Ticket: 0235583/0175060(C)			1	1	17.18	23.54									
Load/Ticket: 0235584/0175082(C)			1	1	15.51	26.74									
Load/Ticket: 0235585/0175106(C)			1	1	17.33	22.80									
Totals.. Date: 11/18/08			6	6	103.16	148.06									
Date: 11/19/08															
Load/Ticket: 0235586/0175148(C)			1	1	17.51	30.72									

SIERRA PACIFIC INDUSTRIES
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SSO
Scale Date(s): 01/01/08 through 12/15/08

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0235587/0175144(C)			1	1	16.39	24.46									
Load/Ticket: 0235588/0175161(C)			1	1	22.80	31.66									
Load/Ticket: 0235589/0175169(C)			1	1	14.02	24.17									
Load/Ticket: 0235590/0175173(C)			1	1	17.78	23.70									
Load/Ticket: 0235591/0175179(C)			1	1	18.99	25.32									
Totals.. Date: 11/19/08			6	6	107.49	160.03									
Date: 11/20/08															
Load/Ticket: 0235592/0175249(C)			1	1	14.57	23.88									
Load/Ticket: 0235593/0175263(C)			1	1	16.21	23.84									
Load/Ticket: 0235594/0175267(C)			1	1	17.32	28.86									
Load/Ticket: 0235596/0175271(C)			1	1	14.77	23.83									
Load/Ticket: 0235597/0175297(C)			1	1	16.58	23.68									
Totals.. Date: 11/20/08			5	5	79.45	124.09									
Date: 11/21/08															
Load/Ticket: 0235595/0175366(C)			1	1	21.71	28.94									
Load/Ticket: 0235598/0175368(C)			1	1	14.21	18.70									
Totals.. Date: 11/21/08			2	2	35.92	47.64									
Date: 12/01/08															
Load/Ticket: 0235599/0175655(C)			1	1	17.19	25.66									
Load/Ticket: 0235600/0175654(C)			1	1	16.20	27.00									
Totals.. Date: 12/01/08			2	2	33.39	52.66									
Date: 12/02/08															
Load/Ticket: 0235201/0175681(C)			1	1	19.53	28.30									
Load/Ticket: 0235202/0175679(C)			1	1	17.71	27.24									
Load/Ticket: 0235203/0175686(C)			1	1	15.33	18.47									
Load/Ticket: 0235204/0175692(C)			1	1	18.43	23.33									
Load/Ticket: 0235205/0175697(C)			1	1	17.96	23.02									
Load/Ticket: 0235206/0175699(C)			1	1	14.80	18.74									
Totals.. Date: 12/02/08			6	6	103.76	139.10									
Date: 12/03/08															
Load/Ticket: 0235207/0175724(C)			1	1	15.54	19.92									
Load/Ticket: 0235208/0175731(C)			1	1	16.58	20.99									
Load/Ticket: 0235209/0175732(C)			1	1	17.27	23.66									
Load/Ticket: 0235210/0175742(C)			1	1	15.94	21.83									
Totals.. Date: 12/03/08			4	4	65.33	86.40									
Date: 12/08/08															
Load/Ticket: 0235211/0175889(C)			1	1	16.39	20.75									
Load/Ticket: 0235213/0175902(C)			1	1	16.00	23.53									
Load/Ticket: 0235214/0175911(C)			1	1	13.94	19.10									

SIERRA PACIFIC INDUSTRIES
Lincoln

SSO
Scale Date(s): 01/01/08 through 12/15/08

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Totals.. Date: 12/08/08			3	3	46.33	63.38									
Date: 12/09/08															
Load/Ticket: 0235212/0175925(C)			1	1	15.24	20.59									
Load/Ticket: 0235215/0175924(C)			1	1	19.49	28.25									
Load/Ticket: 0235216/0175933(C)			1	1	20.67	27.56									
Load/Ticket: 0235217/0175947(C)			1	1	16.47	20.59									
Load/Ticket: 0235218/0175950(C)			1	1	18.26	24.34									
Totals.. Date: 12/09/08			5	5	90.13	121.33									
Date: 12/10/08															
Load/Ticket: 0235219/0175971(C)			1	1	16.42	21.89									
Load/Ticket: 0235220/0175978(C)			1	1	15.12	20.16									
Load/Ticket: 0235221/0175994(C)			1	1	16.72	21.44									
Load/Ticket: 0235222/0175998(C)			1	1	14.78	21.42									
Totals.. Date: 12/10/08			4	4	63.04	84.91									
Date: 12/11/08															
Load/Ticket: 0235223/0176027(C)			1	1	16.36	25.56									
Load/Ticket: 0235224/0176026(C)			1	1	17.91	25.96									
Load/Ticket: 0235225/0176034(C)			1	1	16.12	21.79									
Load/Ticket: 0235226/0176039(C)			1	1	16.44	23.48									
Load/Ticket: 0235227/0176042(C)			1	1	16.58	23.03									
Totals.. Date: 12/11/08			5	5	83.41	119.82									
Date: 12/12/08															
Load/Ticket: 0235228/0176075(C)			1	1	14.71	23.72									
Load/Ticket: 0235229/0176093(C)			1	1	15.53	25.05									
Totals.. Date: 12/12/08			2	2	30.24	48.77									
Totals.. Sale: 0152 - SSO			336	336	5100.12	7855.07									

Number of Loads with Weight	336	Tons for Weighed Loads	7855.07
Number of Dryed Loads	336	BDTONs for Dryed Loads	5100.12

Report Selections : Source = 10(S). Sale = 0152(S). Scale Type = M. Data Type = P

SIERRA PACIFIC INDUSTRIES
Lincoln

BFP
Scale Date(s): 01/01/08 through 06/15/08

BFP FINAL

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Sale: 0159 - BFP															
Date: 05/05/08															
Load/Ticket: 0235002/0146025(C)			1	1	12.65	30.12									
Load/Ticket: 0235003/0146073(C)			1	1	11.43	30.07									
Load/Ticket: 0235004/0146097(C)			1	1	13.56	25.59									
Load/Ticket: 0235005/0146072(C)			1	1	16.88	34.44									
Totals.. Date: 05/05/08			4	4	54.52	120.22									
Date: 05/06/08															
Load/Ticket: 0235006/0146181(C)			1	1	13.68	25.33									
Load/Ticket: 0235007/0146228(C)			1	1	20.24	28.51									
Load/Ticket: 0235008/0146219(C)			1	1	16.69	26.92									
Load/Ticket: 0235009/0146253(C)			1	1	12.57	22.05									
Load/Ticket: 0235010/0146284(C)			1	1	17.88	23.52									
Load/Ticket: 0235011/0146307(C)			1	1	15.27	22.45									
Load/Ticket: 0235012/0146315(C)			1	1	13.50	24.11									
Load/Ticket: 0235013/0146343(C)			1	1	13.75	22.91									
Totals.. Date: 05/06/08			8	8	123.58	195.80									
Date: 05/07/08															
Load/Ticket: 0235014/0146398(C)			1	1	20.12	30.49									
Load/Ticket: 0235015/0146441(C)			1	1	11.43	21.17									
Load/Ticket: 0235016/0146460(C)			1	1	13.95	29.69									
Load/Ticket: 0235017/0146477(C)			1	1	10.03	22.80									
Load/Ticket: 0235018/0146485(C)			1	1	15.09	27.94									
Load/Ticket: 0235019/0146504(C)			1	1	13.18	24.87									
Load/Ticket: 0235020/0146527(C)			1	1	16.39	25.61									
Load/Ticket: 0235021/0146539(C)			1	1	10.45	22.23									
Load/Ticket: 0235022/0146552(C)			1	1	14.13	24.36									
Load/Ticket: 0235023/0146575(C)			1	1	11.13	24.73									
Totals.. Date: 05/07/08			10	10	135.90	253.89									
Date: 05/08/08															
Load/Ticket: 0235024/0146641(C)			1	1	15.24	28.22									
Load/Ticket: 0235025/0146668(C)			1	1	13.42	26.83									
Load/Ticket: 0235026/0146684(C)			1	1	10.26	23.85									
Load/Ticket: 0235027/0146727(C)			1	1	12.49	31.23									
Load/Ticket: 0235028/0146742(C)			1	1	15.13	28.54									
Load/Ticket: 0235029/0146811(C)			1	1	15.03	23.12									
Load/Ticket: 0235030/0146823(C)			1	1	10.33	25.83									
Load/Ticket: 0235031/0146829(C)			1	1	11.52	23.99									
Totals.. Date: 05/08/08			8	8	103.42	211.61									
Date: 05/09/08															

BFP Landing # 2
27 Loads

Landing # 3

SIERRA PACIFIC INDUSTRIES
Lincoln

BFP
Scale Date(s): 01/01/08 through 06/15/08

	Load Count 100%	SS	W/O	TTL	Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species PP	SP	WF	DF	IC	OC	TOTAL	Avg Load Mbf	Percent Defect
Load/Ticket: 0235032/0146869(C)			1	1	18.31	25.43									
Load/Ticket: 0235033/0146893(C)			1	1	14.31	23.08									
Load/Ticket: 0235034/0146900(C)			1	1	17.93	26.36									
Load/Ticket: 0235035/0146927(C)			1	1	9.80	23.34									
Load/Ticket: 0235036/0146956(C)			1	1	14.64	27.62									
Load/Ticket: 0235037/0146962(C)			1	1	13.44	20.36									
Load/Ticket: 0235038/0146996(C)			1	1	14.98	24.97									
Load/Ticket: 0235039/0147030(C)			1	1	14.91	22.25									
Load/Ticket: 0235040/0147036(C)			1	1	11.71	24.40									
Totals.. Date: 05/09/08			9	9	130.03	217.81									
Date: 05/12/08															
Load/Ticket: 0235041/0147132(C)			1	1	14.10	23.50									
Load/Ticket: 0235042/0147139(C)			1	1	15.26	19.57									
Load/Ticket: 0235043/0147163(C)			1	1	16.53	25.05									
Load/Ticket: 0235044/0147195(C)			1	1	14.17	21.15									
Load/Ticket: 0235045/0147217(C)			1	1	17.13	26.77									
Load/Ticket: 0235046/0147233(C)			1	1	14.40	23.61									
Load/Ticket: 0235047/0147268(C)			1	1	16.10	26.83									
Totals.. Date: 05/12/08			7	7	107.69	166.48									
Date: 05/13/08															
Load/Ticket: 0235048/0147329(C)			1	1	11.41	26.54									
Load/Ticket: 0235049/0147339(C)			1	1	16.24	24.61									
Load/Ticket: 0235050/0147357(C)			1	1	11.74	24.97									
Load/Ticket: 0235051/0147448(C)			1	1	14.74	23.78									
Load/Ticket: 0235052/0147453(C)			1	1	15.96	26.17									
Load/Ticket: 0235053/0147502(C)			1	1	13.60	23.45									
Totals.. Date: 05/13/08			6	6	83.69	149.52									
Date: 05/27/08															
Load/Ticket: 0235054/0149596(C)			1	1	16.35	24.41									
Load/Ticket: 0235055/0149613(C)			1	1	12.68	22.25									
Load/Ticket: 0235056/0149651(C)			1	1	20.09	28.29									
Load/Ticket: 0235057/0149663(C)			1	1	21.95	27.44									
Totals.. Date: 05/27/08			4	4	71.07	102.39									
Date: 05/28/08															
Load/Ticket: 0235058/0149711(C)			1	1	9.30	20.66									
Load/Ticket: 0235059/0149747(C)			1	1	10.92	23.24									
Load/Ticket: 0235060/0149748(C)			1	1	10.63	25.31									
Totals.. Date: 05/28/08			3	3	30.85	69.21									
Date: 05/29/08															
Load/Ticket: 0235061/0150018(C)			1	1	15.59	25.98									

FUEL SAMPLES TAKEN 5/12/08

Landing # 3 25 Loads

Landing # 4

SIERRA PACIFIC INDUSTRIES
Lincoln

BFP
Scale Date(s): 01/01/08 through 06/15/08

	Load Count 100%	SS	W/O	TTL	Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species PP	SP	WF	DF	IC	OC	TOTAL	Avg Load Mbf	Percent Defect
Load/Ticket: 0235062/0150041(C)			1	1	16.45	23.84									
Load/Ticket: 0235063/0150053(C)			1	1	12.87	28.61									
Load/Ticket: 0235064/0150070(C)			1	1	13.28	26.56									
Load/Ticket: 0235065/0150098(C)			1	1	23.05	30.33									
Load/Ticket: 0235066/0150124(C)			1	1	14.77	31.42									
Load/Ticket: 0235067/0150146(C)			1	1	9.90	22.50									
Load/Ticket: 0235068/0150165(C)			1	1	12.06	24.11									
Totals.. Date: 05/29/08			8	8	117.97	213.35									
Date: 05/30/08															
Load/Ticket: 0235069/0150245(C)			1	1	10.70	25.47									
Load/Ticket: 0235070/0150275(C)			1	1	13.33	27.20									
Load/Ticket: 0235071/0150325(C)			1	1	13.86	20.38									
Load/Ticket: 0235072/0150354(C)			1	1	10.41	21.68									
Load/Ticket: 0235073/0150404(C)			1	1	14.84	23.56									
Load/Ticket: 0235074/0150381(C)			1	1	17.27	25.39									
Load/Ticket: 0235075/0150410(C)			1	1	12.11	27.53									
Load/Ticket: 0235076/0150442(C)			1	1	12.21	27.75									
Load/Ticket: 0235077/0150469(C)			1	1	14.41	26.20									
Totals.. Date: 05/30/08			9	9	119.14	225.16									
Date: 06/02/08															
Load/Ticket: 0235078/0150554(C)			1	1	12.90	32.25									
Load/Ticket: 0235079/0150567(C)			1	1	16.80	22.40									
Load/Ticket: 0235080/0150595(C)			1	1	15.64	25.23									
Load/Ticket: 0235081/0150598(C)			1	1	12.24	20.40									
Load/Ticket: 0235082/0150642(C)			1	1	8.45	21.12									
Load/Ticket: 0235083/0150656(C)			1	1	14.43	22.20									
Load/Ticket: 0235084/0150698(C)			1	1	13.41	20.63									
Load/Ticket: 0235085/0150679(C)			1	1	9.07	21.10									
Totals.. Date: 06/02/08			8	8	102.94	185.33									
Totals.. Sale: 0159 - BFP			84	84	1180.80	2110.77									

Landing # 4
17 Loads

Landing # 5
15 Loads

44% m.c.

84 Total Loads ; BFP Project

Number of Loads with Weight	84	Tons for Weighed Loads	2110.77
Number of Dryed Loads	84	BDTONs for Dryed Loads	1180.80

Report Selections : Source = 10(S). Sale = 0159(S). Scale Type = M. Data Type = P

SIERRA PACIFIC INDUSTRIES
Lincoln

Gorman Ranch chips
Scale Date(s): 01/01/08 through 12/15/08

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Sale: 0160 - GORMAN RANCH CHP															
Date: 09/08/08															
Load/Ticket: 0235101/0167168(C)			1	1	19.24	22.63									
Load/Ticket: 0235102/0167146(C)			1	1	20.41	23.19									
Load/Ticket: 0235103/0167211(C)			1	1	19.12	22.49									
Totals.. Date: 09/08/08			3	3	58.77	68.31									
Date: 09/09/08															
Load/Ticket: 0235104/0167352(C)			1	1	21.29	25.05									
Load/Ticket: 0235105/0167367(C)			1	1	23.61	27.14									
Load/Ticket: 0235106/0167444(C)			1	1	16.44	20.55									
Load/Ticket: 0235107/0167472(C)			1	1	12.90	16.75									
Totals.. Date: 09/09/08			4	4	74.24	89.49									
Date: 09/10/08															
Load/Ticket: 0235108/0167558(C)			1	1	15.06	17.93									
Load/Ticket: 0235109/0167628(C)			1	1	17.55	24.37									
Load/Ticket: 0235110/0167644(C)			1	1	15.53	20.70									
Load/Ticket: 0235111/0167672(C)			1	1	21.70	25.53									
Load/Ticket: 0235112/0167738(C)			1	1	22.27	26.20									
Load/Ticket: 0235113/0167758(C)			1	1	15.82	20.81									
Totals.. Date: 09/10/08			6	6	107.93	135.54									
Date: 09/11/08															
Load/Ticket: 0235114/0167828(C)			1	1	16.61	20.76									
Load/Ticket: 0235115/0167925(C)			1	1	21.79	25.63									
Load/Ticket: 0235116/0167930(C)			1	1	20.88	25.16									
Totals.. Date: 09/11/08			3	3	59.28	71.55									
Date: 10/20/08															
Load/Ticket: 0235520/0173399(C)			1	1	16.46	20.58									
Load/Ticket: 0235521/0173405(C)			1	1	16.70	21.41									
Load/Ticket: 0235522/0173411(C)			1	1	14.63	17.84									
Load/Ticket: 0235523/0173459(C)			1	1	16.54	22.05									
Totals.. Date: 10/20/08			4	4	64.33	81.88									
Date: 10/21/08															
Load/Ticket: 0235525/0173561(C)			1	1	15.58	22.25									
Date: 10/22/08															
Load/Ticket: 0235524/0173597(C)			1	1	18.93	24.27									
Load/Ticket: 0235527/0173660(C)			1	1	14.09	18.79									
Totals.. Date: 10/22/08			2	2	33.02	43.06									
Date: 10/23/08															

SIERRA PACIFIC INDUSTRIES
Lincoln

Gorman Ranch chips
Scale Date(s): 01/01/08 through 12/15/08

	Load Count				Ttl Dry Tons	Ttl Grn Tons	Net Volume By Species							Avg Load Mbf	Percent Defect
	100%	SS	W/O	TTL			PP	SP	WF	DF	IC	OC	TOTAL		
Load/Ticket: 0235526/0173682(C)			1	1	20.00	25.31									
Totals.. Sale: 0160 - GORMAN RANCH CHP			24	24	433.15	537.39									

Number of Loads with Weight	24	Tons for Weighed Loads	537.39
Number of Dryed Loads	24	BDTONs for Dryed Loads	433.15

Report Selections : Source = 10(S). Sale = 0160(S). Scale Type = M. Data Type = P

Attachment 7

Brushbuster Operations Logs

Month _____ Year 2008

	Day	Grinder		~~Loader~~ 135		Excavator 240		Chip Van				Biomass Fuel Delivered to Lincoln Green Tons	Project Name
		Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Trips Per Day	Miles Per Day		
4/14	1	2.5	75	2.5	6.5	2.5	12						550
4/15	2	11.8		11.8		11.8							
4/16	3	2.8	84	2.8	7	2.8	14						
4/17	4	5.8	174	5.8	15	5.8	29						
4/22	5	1.8	54	1.8	5	1.8	9						
4/23	6	2.3	69	2.3	6	2.3	11						
4/24	7	3.3	99	3.3	9	3.3	16						
5/5	8	3.1	93	3.1	8	3.1	15						Big Bes
5/6	9	2.2	66	2.2	6	2.2	11						
5/7	10	3.1	93	3.1	8	3.1	15						
5/8	11	2.6	78	2.6	7	2.6	13						
5/9	12	2.8	84	2.8	7	2.8	14						
5/12	13	3.5	105	3.5	9	3.5	18						
5/13	14	1.9	57	1.9	5	1.9	9						
5/27	15	1.7	51	1.7	4	1.7	8						
5/28	16	.7	21	.7	2	.7	3						
5/29	17	4.8	144	4.8	12	4.8	24						
5/30	18	2.0	60	2.0	5	2.0	10						
6/2	19	3.1	93	3.1	8	3.1	15						
6/3	20	4.8	144	4.8	12	4.8	24						550
6/5	21	4.5	135	4.5	12	4.5	22						
6/6	22	5.1	153	5.1	13	5.1	25						
6/9	23	5.5	165	5.5	14	5.5	27						
6/10	24	4.3	129	4.3	11	4.3	21						
6/11	25	5.2	156	5.2	14	5.2	26						
6/12	26	5.5	165	5.5	14	5.5	27						
6/13	27	4.7	141	4.7	12	4.7	23						
6/16	28	3.5	105	3.5	9	3.5	17						
6/17	29	5.4	162	5.4	14	5.4	27						
6/18	30	3.3	99	3.3	9	3.3	16						
6/20	31	6.3	189	6.3	16	6.3	31						

2 TRIPS/DAY PER TRUCK

AVG- 4.5 hr/LOAD

AVG- 120 MILE/TRIP

AVG- 4.5 MPG

Month _____ Year 2008

	Day	Grinder		~~Loader~~ 135		Excavator 290		Chip Van				Biomass Fuel Delivered to Lincoln Green Tons	Project Name
		Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Trips Per Day	Miles Per Day		
6/23	1	6.1	183	6.1	16	6.1	30						550
6/24	2	3.4	102	3.4	9	3.4	17						
6/25	3	4.3	129	4.3	11	4.3	21						
6/26	4	5.6	168	5.6	15	5.6	28						
6/27	5	3.7	111	3.7	10	3.7	18						
7/9	6	5.0	150	5.0	13	5.0	25						
7/10	7	4.9	147	4.9	13	4.9	24						
7/11	8	4.9	147	4.9	13	4.9	24						
7/16	9	5.5	165	5.5	14	5.5	27						
7/17	10	5.8	174	5.8	15	5.8	29						
7/18	11	4.5	135	4.5	12	4.5	22						
7/22	12	2.1	63	2.1	5	2.1	10						
7/23	13	2.5	75	2.5	6	2.5	12						
7/24	14	.1	3	.1	.5	.1	.5						
8/1	15	3.0	90	3.0	8	3.0	15						
8/4	16	3.2	96	3.2	8	3.2	16						
8/5	17	4.4	132	4.4	11	4.4	22						
8/6	18	2.1	63	21	5	2.1	10						
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	29												
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	31												

2 TRIPS/DAY PER TRUCK

AVG- 4.5 hr/LOAD

AVG- 120 MILE/TRIP

AVG- 4.5 MPG

Month Sept Year 2018

Bauchbuster Inc

Day	Grinder		135 Loader		290 Excavator		Chip Van				Biomass Fuel Delivered to Lincoln Green Tons	Project Name
	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Trips Per Day	Miles Per Day		
9/8 1	2.8	84	2.8	7.3	2.8	14						German Ranch
9/9 2	4.2	126	4.2	10.9	4.2	21						German Ranch
9/10 3	4.1	123	4.1	10.6	4.1	20.5						German Ranch
9/11 4	1.4	42	1.4	3.6	1.4	7						German Ranch
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Month oct, nov, Dec Year 2008

Brushbuster Inc

Day	Grinder		225 Loader		290 Excavator		Chip Van				Biomass Fuel Delivered to Lincoln Green Tons	Project Name
	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Operation Hours	Fuel Use Gallons	Trips Per Day	Miles Per Day		
10/29 1	3.7	111	3.7	14.8	3.7	18.5						SSO #12
10/30 2	2.1	63	2.1	8.4	2.1	10.5						SSO #12
11/11 3	2.9	87	2.9	11.6	2.9	14.5						SSO #13
11/12 4	3.0	90	3.0	12	3.0	15.0						SSO #13
11/13 5	2.3	69	2.3	9.2	2.3	11.5						SSO #14
11/14 6	2.1	63	2.1	8.4	2.1	10.5						SSO #14
11/17 7	1.4	42	1.4	5.6	1.4	7.0						SSO #15
11/18 8	3.2	96	3.2	12.8	3.2	16.0						SSO #16
11/19 9	3.2	96	3.2	12.8	3.2	16.0						SSO #16
11/20 10	3.2	96	3.2	12.8	3.2	16.0						SSO #16
[redacted] 11	[redacted]											[redacted]
[redacted] 12	[redacted]											
13												
12/1 14	2.7	81	5.4	21.6								SSO #16
12/2 15	2.7	81	5.4	21.6								SSO #17
12/3 16	2.7	81	5.4	21.6								SSO #17
12/8 17	2.8	84	5.6	22.4								SSO #18
12/9 18	2.6	78	5.2	20.8								SSO #18
12/10 19	2.7	81	5.4	21.6								SSO #18
12/11 20	2.8	84	5.6	22.6								SSO #17
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Attachment 8

Air District Permit to Operate for SPI Biomass Boiler

PLACER COUNTY APCD
110 Maple Street
Auburn, California 95603
(530) 745-2330 - Fax (530) 745-2373

PERMIT TO OPERATE

ISSUED TO:
SIERRA PACIFIC INDUSTRIES - LINCOLN
ATTN: DAN QUARTON
1445 STATE HIGHWAY 65
LINCOLN, CA 95648-9101

PERMIT NUMBER: SPAC-06-01

FACILITY LOCATION:
1445 NORTH HIGHWAY 65
LINCOLN, CA 95648

VALID FROM:
10/1/2012 - 9/30/2013

Thomas J. Christofk
Air Pollution Control Officer

10/22/2012
Issue Date

PROCESS DESCRIPTION: WOOD-WASTE BOILER

EQUIPMENT

No.	Equipment	Rating
1	Ash Reinjection System, 4" Venturi with 24" Rotary Sand/Char Classifier	
2	Forced Draft Fan, Drive Motor: 500 hp	HP-500
3	Gas Burners, 2 Total, Mfr: Coen, Model: HTE-24 Lo-NOx, Rating: 62.5 MMBtu/hr Each.	MBTU-125000
4	Induced Draft Fan, Drive Motor: 600 hp.	HP-600
5	Infeed Conveyor, 50' x 2'3", Drive Motor: 15 hp.	HP- 15
6	Multiclone Collector, Mfr: Clarage, Collector Tubes: 192 Total at 9" Diameter, Rotary Valves Mfr: Wm. W. Meyer & Sons, Inc., Size: 10' x 10", Drive Motor: 1 hp.	HP- 1
7	Selective Non-Catalytic Reduction System, Mfr: Sierra Pacific Industries, Reagent: Anhydrous Ammonia, Ammonia Storage: 1,000 Gallon Tank, Vaporizor: Ransome Model RE25, Injectors: Custom by SPI, 10 Total.	
8	Sub-Ash Conveyor, 44'6" x 2'2" Paddle Type Drag Chain, Drive Motor: 3 hp.	HP- 3
9	Wood-Waste Boiler, Mfr: McBurney, Model: WTSH23600, Heat Rating: 289 MMBtu/hr, Capacity: 170,000 Pounds per Hour Steam Production at 1,400 psig and 1,000 degrees F.	MBTU-289000

TOTAL RATINGS – HP- 1119 MBTU- 414000 .

OPERATING CONDITIONS

1. The air pollution control equipment for the exhaust of the new primary boiler shall include a new multicone collector, a new selective non-catalytic reduction (SNCR) system for NOx and the existing electrostatic precipitator in Permit to Operate SPAC-89-03. (Rule 501 § 405; 501 § 303; HSC 42301)

2. Sierra Pacific Industries, hereinafter referred to as "company", shall maintain an Operating Compliance Plan for the new boiler which will assure that the air pollution control equipment will be properly maintained and that necessary operational procedures are in place to continuously achieve the limits in Conditions 7 and 19 and the new boiler emission limitations commencing with condition 56:
   A. The Operating Compliance Plan shall include a description of the process monitoring program and devices to be provided.

   B. The plan shall specify the frequency of surveillance checks that will be made of process monitoring devices and indicators to determine continued operation within permit limits. A record or log of individual surveillance checks shall be kept to document performance of the surveillance.

   C. The plan shall include the frequency and methods of calibrating the process monitoring devices.

   D. The plan shall specify for each emission control device (multicone, SNCR, and ESP):
      i. Operation and maintenance procedures that will demonstrate continuous operation of the emission control device during emission-producing operations; and
      ii. Records that must be kept to document the performance of required periodic maintenance procedures.

   E. The plan shall identify what records will be kept to comply with air pollution control requirements and regulations and the specific format of the records. These records shall include at least the Recordkeeping information required by this permit. The information must include emission monitoring evaluations, calibration checks and adjustments, and maintenance performed on such monitoring systems.

   F. The plan must be implemented upon approval by the Air Pollution Control Officer.

   G. The plan shall be resubmitted to the District for approval upon any changes to compliance procedures described in the plan, or upon the request of the Air Pollution Control Officer. (Rule 501 § 405, 503; Rule 233 § 402;)

3. All three fields of the electrostatic precipitator shall normally be operating whenever a

boiler is fired. In the event of a failure of one of the fields, the company shall notify the Air Pollution Control Officer within 24-hours and initiate repairs. A failure which persists longer than one hundred and sixty-eight (168) hours shall constitute a violation unless the company has obtained an Emergency Variance pursuant to rule 404, Upset Conditions, Breakdown or Scheduled Maintenance. The company is to notify the District within 24 hours of completion of repairs. (Rule 501 § 405; 501 § 303; HSC 42301)

4. The differential pressure between the inlet of the primary boiler multicone collector and the outlet of the multicone will be monitored in the control room and recorded at least hourly in a manual or electronic log. (Rule 501 § 405; 501 § 303; HSC 42301)

5. The differential pressure between the inlet and outlet of the standby boiler multicone collectors will be monitored and recorded at least once per shift during emission producing operations.(Rule 501 § 405; 501 § 303; HSC 42301)

6. The existing Continuous Emissions Monitoring (CEMS) shall be installed, calibrated, operated and maintained in accordance with the applicable requirements of Appendices B and F of Title 40 Code of Federal Regulations Part 60 (40 CFR 60) to monitor oxygen, opacity, flow, carbon monoxide, carbon dioxide and nitrogen oxides in the boiler stack exhaust. (Rule 501 § 304; 233 § 502; HSC 42700 et seq.)

7. The steam output of the primary boiler shall not exceed a daily average of 170,000 pounds per hour. (Rule 501 § 405; 501 § 303; HSC 42301)

8. The maximum pressure of the output steam of the primary boiler shall not exceed 1,400 psig at the boiler drum and the temperature of the output steam of the primary boiler shall not exceed 1,000 degrees F. (Rule 501 § 405; 501 § 303; HSC 42301)

9. An ammonia injection system with 10 injectors will be installed in the primary boiler and all injectors shall be in-place whenever the boiler is operated. The ammonia injection system shall be designed for the injection rates to be automatically controlled. Injector nozzles are to be continuously installed in the injection positions. Two sets of injector positions are to be installed in the boiler to allow optimization of NOx reduction. (Rule 501 § 405; 501 § 303; HSC 42301)

10. Ammonia discharges shall be limited to 20 ppm or less in the boiler stack exhaust. Compliance with this condition is to be determined by initial engineering tests and, subsequently, to include at least 3 one hour runs to verify compliance. (Rule 501 § 405; 501 § 303; HSC 42301)

11. The ammonia injection system shall be designed and operated to automatically inject ammonia beginning at a set point determined during initial engineering tests. This set point has been established as 54 to 62 ppm NOx.

12. Alarms shall be programmed into the boiler control room to alert the boiler operator when NOx, CO or Opacity emissions are within 10% of their permit limits. (Rule 501 § 405; 501 § 303; HSC 42301)

13. Alarms shall be programmed into the boiler control system to alert the boiler operator when NOx, CO or Opacity permit limits have been exceeded. (Rule 501 § 405; 501 § 303; HSC 42301)

14. Alarms shall be provided in the control room for all process monitoring devices that are used to comply with emission limits at monitor values corresponding to the emission limit. (Rule 501 § 405; 501 § 303; HSC 42301)

15. Emissions Exceedence Notification:
    A. The company shall notify the District of any emissions exceedence within two business hours of the occurrence of the exceedence, including any emissions exceedence indicated by the continuous emission monitoring devices (HSC 42706).

16. The company may operate one of the two existing boilers (SPIN-89-01 or SPIN-89-02) for standby use. The standby use shall not operate more than 876 hours annually. Any hour the standby boiler is fired to a temperature above ambient shall be counted against this limit. (Rule 501 § 405; 501 § 303; 502 § 302; HSC 42301)

17. The company shall record the steam output of each boiler individually. This data shall be recorded electronically at any time either boiler is not shutdown. Data shall at least include one hour averages. (Rule 501 § 405; 501 § 303; HSC 42301)

18. Only the one boiler may be operated at any time, except that both the primary and standby boilers may both be operated contemporaneously when a transition from operating the new boiler to the standby boiler or from operating the standby boiler to the new boiler is occurring. If both boilers are operating, the emission limitations for the standby boiler apply.

19. The total steam output from all fired boilers shall not exceed a daily average of 170,000 pounds per hour of steam at any time. (Rule 501 § 405; 501 § 303; 502 § 302; HSC 42301)

20. Any boiler that is operated must be current on the performance testing. (Rule 501 § 405; 501 § 303; HSC 42301)

21. All equipment, facilities and systems installed or used to achieve compliance with the terms and conditions of this permit shall be maintained in good working order and be operated as efficiently as possible so as to minimize air pollutant emissions.

22. All wood waste conveying, transferring and storage operations shall be maintained to effectively control fugitive dust. (Rule 501 § 405; 501 § 303; 502 § 302; HSC 42301)

23. Fuel conveyors shall be covered, the fuel hog shall be enclosed in a steel building and a water fog system at the hog throat shall be used for control of fugitive dust emissions.

24. Revisions to this permit may be requested pursuant to District Rule 501, General Permit Requirements, Section 403. (Rule 501 § 403).

25. All vehicles hauling woodwaste and ash shall be filled, transferred and emptied in such a manner so as to prevent fugitive dust emissions into the atmosphere.

26. Boiler Fuels:

A. Approved Fuels

Biomass boiler fuels are limited to (1) wood, wood residue, bark, or any derivative fuel or residue thereof, including, but not limited to, sawdust, sanderdust, wood chips, millings, shavings, and processed pellets made from wood residue; and (2) agricultural crop residues, including almond shells and rice hulls, not to exceed 10% by weight of the fuel mix on an annual basis. (3) The burning of conditionally exempt controlled substances, as defined by Title 22, Division 4.5, Chapter 11, Article 1, Section 66261.4 of the California Code of Regulations, is allowed when conducted at the request of a public law enforcement agency (e.g. Placer County Sheriff) in full compliance with the requirements of Subsection (g), Controlled Substances, of Section 66261.4. (Rule 501 § 405; 501 § 303; HSC 42301)

Note: Processed pellets may include sandercubes containing medium density fiberboard by-products.

B. Prohibited Fuels

Paper products, painted wood, any non-wood material, chemically treated wood residue, and/or material containing toxic or hazardous materials which may be defined as "hazardous wastes" per Section 25117, California Health and Safety Code, Division 20, Chapter 6.5 and any material not totally free of any hazardous material as determined, or defined, in Title 22, California Code of Regulations, is prohibited from use as a fuel.

C. Fuel Subject to District Approval

i. Any boiler biomass fuel not identified in 2.C.2.a, above, including urban wood waste (e.g. industrial wood waste, or residential wood waste) is subject to the review and approval by the Air Pollution Control Officer pursuant to Section 42301of the California Health and Safety Code.

ii. Fuels proposed as Alternative Boiler Fuel in accordance with 5.B are subject to the review and approval by the Air Pollution Control Officer prior to use.

iii. The Air Pollution Control Officer may limit or prohibit the use of any fuel found to cause the exceeding of any emission limitation contained in this permit, District Rules or Regulations, or state or federal air pollution laws.

iv. The Air Pollution Control Officer may limit or prohibit the use of any fuel found to contribute to the production of discharged air contaminants in such quantities as to pose a hazard to public health or property.

Origin: PTO-6-1-97 Condition 20, Authority: Rule 502, New Source Review § 303 [amended 11-03-94]

27. The moisture content of the fuel shall not exceed 55% on an annual average. At least one composite sample of fuel to be burned shall be taken daily from fuel in the fuel house and moisture content measured and logged. Wet fuel is not a valid excuse for emission violations.(Rule 501 § 405; 501 § 303; HSC 42301)

28. Continuous Emission Monitoring Systems (CEMS)

A. A transmissometer shall be operated and maintained on the ESP exhaust stack in accordance with Performance Specification 1, Appendix B, 40 CFR 60, and tested and/or certified to the design and performance specifications of Performance Specification 1.

B. The transmissometer CEMS installation shall include a recording device(s) producing a permanent record of the monitor output. In the event the existing transmissometer is replaced, conformance test results and/or the Manufacturer's Certificate(s) of Conformance, and confirmation of the installed instrument calibration shall be submitted to the District.

C. The following monitors shall be operated and maintained as part of the continuous emission monitoring equipment: Opacity, Flowmeter, Oxygen, Oxides of Nitrogen (NOx), Carbon Dioxide (CO2), and Carbon Monoxide (CO).

D. The continuous emission monitoring systems shall be audited at least once each calendar quarter in accordance with the procedures contained in 40 CFR 60, Appendix F, and following any maintenance or repairs affecting monitor operability. Certification will be required following any replacement or repair affecting monitor operability.

E. In the event of a breakdown of monitoring equipment, the company shall notify the Air Pollution Control Officer and initiate repairs. The company shall notify the Air Pollution Control Officer of the intent to shut down any monitoring equipment at least 24 hours prior to the event. A breakdown of monitoring equipment or shutdown for scheduled maintenance which persists longer than ninety-six (96) hours shall constitute a violation of any applicable emission limitation or restriction prescribed by District Rules and Regulations, unless the company has obtained an Emergency Variance pursuant to Rule 404, Upset Conditions, Breakdown Or Scheduled Maintenance.

F. The CEMS monitors shall by tested annually by means of the Relative Accuracy Test Audit (RATA). (Rule 404 § C; Rule 501 § 303, 304.2.c; HSC 42706, 42301)

29. CEMS Remote Polling:

A. The company shall install and maintain equipment, facilities, software and systems at the facility and at the District office that will allow the District to poll or receive electronic data from the CEMS. The company shall make CEMS data available for automatic polling of the daily records. The company shall make hourly records available for manual polling within no more than a one hour delay. The basic elements of this equipment include a telephone line, modem and datalogger. Alternatively, an internet based system may be used. The costs of installing and operating this equipment, excluding District costs, shall be borne by the company.

B. Upon notice by the District that the facility's polling system is not operating, the

company shall provide the data by a District-approved alternative format and method for up to a maximum of 30 days.

C. The polling data is not a substitute for other required recordkeeping or reporting. (Rule 404 § C; Rule 501 § 304.2.c; HSC 42706)

30. The District notification, corrective action, and reporting and record keeping requirements for emissions exceedances that are determined through the use of continuous process monitoring devices shall be the same as specified for continuous emission monitoring systems. (Rule 501 § 405; 501 § 304.3; HSC 42301)

31. The capacity factor (as defined in 40 CFR 60.49b(d)) on natural gas shall be less than 10%.

RECORDKEEPING AND REPORTING

32. A log book or other record detailing the performance and date of preventive maintenance, as well as reporting breakdowns (per District Rule 404), shall be established and maintained. This log or record shall be made available to the District's inspector upon request. The occurrence and duration of any startups, shutdowns or malfunctions of the boiler; shutdowns or malfunctions of any air pollution control equipment; any periods during which a continuous monitoring system is inoperative; continuous monitor calibration checks, adjustments, and maintenance, shall be recorded. (Rule 501 § 405, 503; Rule 233 § 402)

33. Maintenance and breakdown records, steam production records, and production data shall be maintained and summary reports submitted to the District on forms or formats approved by the District. Records shall be kept by the Owner for a period of five (5) years, and shall be made available to the District's inspector upon request. For the purposes of this condition, production and other data shall include the following items:

A. Total woodwaste boiler fuel, in tons, for each boiler. If the estimate includes moisture, estimate the moisture content in percent by weight.

B. The total annual hours of operation of the primary boiler.

C. The date(s) and hours of operation of the standby boiler.

D. Typical operating schedule for each boiler (i.e. hours/day, days/week, weeks/year).

E. Average steam production rate, in pounds per hour, for each boiler. In addition, the number, duration, and extent of exceedances of the daily average steam production rate limit shall be reported to the District no less frequently than once every six (6) months.

F. Calendar date of record.

G. Number of hours the unit is operated during each day.

H. Fuel types, including supplementary gaseous or liquid fuels.

I. Duration of startups and shutdowns.

J. Type and duration of maintenance and repairs.

K. Results of compliance tests.

L. Three-hour rolling average NOx emission concentration (expressed as NO2 and corrected to 12 percent by volume stack gas CO2).

M. Three-hour rolling average CO emission concentration (corrected to 12 percent by volume stack gas CO2).

N. Identification of time periods during which NOx and CO emission limitations are exceeded, the reason for the exceedance, and a description of corrective action taken.

O. Identification of time periods during which operating condition and pollutant emission data were not obtained, the reason for not obtaining this information, and a description of corrective action taken.

P. Quarterly bone dry tons of biomass fuel burned in each boiler.

Q. Quarterly steam production in 1000 pounds of steam.

R. Quarterly NOx and CO emissions in pounds from the CEMS.

34. A summary of the subsections sections P, Q and R from the above condition shall be prepared no later than 30 days after the end of the calendar quarter. This information shall be made available to the District upon request. (Rule 501 § 405, 503; Rule 233 § 402)

35. An excess emissions and monitoring systems performance report shall be submitted to the Air Pollution Control Officer within 30 days after the end of each calendar quarter. (Rule 233 § 502)

36. The Air Pollution Control Officer may require recordkeeping to verify or maintain compliance. (Rule 501 § 503.1)

37. The Air Pollution Control Officer may require recordkeeping to verify or maintain any exemption. (Rule 501 § 503.2)

38. The Air Pollution Control Officer, at any time, may require such information, analyses, plans, or specifications which will disclose the nature, extent, quality, or degree of air contaminants which are, or may be, discharged by the source for which the permit was issued or applied. The Air Pollution Control Officer may require that such disclosures be certified by a professional engineer registered in the State of California. A responsible

official representing the owner or operator shall certify the truth, accuracy and completeness of disclosures. Studies necessary to provide such information, shall be at the expense of the owner or operator of the source for which a permit was issued or applied. (Rule 501 § 407; HSC 42303)

39. All startup and shutdowns periods during which NOx emissions exceed 115 ppmv corrected to 12% CO2 or CO emissions exceed 1000 ppmv corrected to 12% CO2 on a three hour rolling average shall be reported in the quarterly report, as specified in Condition 33.N. (Rule 233 § 302)

PERFORMANCE TESTING

40. Each emission test run shall be conducted while the unit is operating within 10% of the permitted steam output of 170,000 lbs/hr. (Rule 501 § 304, 307, 501; 233 § 503)

41. In years following the first two years of operation, an annual compliance test of the primary boiler shall be for NOx, CO, CO2, PM, PM10, and opacity. A RATA test shall also be conducted at that time.(Rule 501 § 304, 307, 501)

42. A compliance test for PM and PM-10 is required anytime the standby boiler is operated more than 168 hours since the last compliance test. This compliance test is to occur within 12 months of exceeding the 168 hours. No more than one compliance test of the standby boiler is required in any 12 month period, provided the test shows compliance with emission limits. (Rule 501 § 304, 307, 501

43. At least once during the first two years of primary boiler operations, and no later than thirty (30) months after startup of the new boiler, compliance testing shall be conducted on both the new and the standby boiler during the first quarter of the year (January, February or March) for NOx, CO, PM, PM10, VOC, and opacity. A RATA test shall also be conducted at that time. (Rule 501 § 304, 307, 405, 501; HSC 42301)

44. Soot Blowing: If the new primary boiler or standby boiler is operated with soot blowing on a continuous or semi-continuous basis, all source testing for PM and PM-10 shall be conducted when soot blowing is occurring. If soot blowing occurs on a non-continuous basis, one source test sample run shall include soot blowing during each annual test.

45. Testing for nitrogen oxides (NOX) shall use ARB Test Method 100, Title 17, CCR, Section 94114, Procedures for Continuous Emission Stack Sampling, or EPA Test Method 7E, 40 CFR 60, Appendix A. A violation determined by any of these test methods shall constitute a violation of permit conditions. (Rule 501 § 501, 307; 233 § 504)

46. Testing for carbon monoxide (CO) shall use ARB Test Method 10, Title 17, CCR, Section 94109, Determination of Carbon Monoxide Emissions from Stationary Sources, or ARB Test Method 100, or EPA Test Method 10, 40 CFR 60, Appendix A. A violation determined by any of these test methods shall constitute a violation of permit conditions. (Rule 501 § 501, 307; 233 § 504)

47. Testing for carbon dioxide (CO2) shall use ARB Test Method 100, Title 17, CCR, Section 94114, Procedures for Continuous Emission Stack Sampling, or EPA Test Method 3A, 40 CFR 60, Appendix A. A violation determined by any of these test methods shall constitute a violation of permit conditions. (Rule 501 § 501, 307; 233 § 504)

48. Testing for PM and PM-10 shall use EPA Test Method 5 and EPA Test Method 202, or equivalent methods approved by the State of California Air Resources Board (ARB) by reference in Title 17 of the California Administrative Code, or other methods specified by the company and approved in writing by the District.

49. Testing for ammonia shall use Test Method BAAQMD ST-1B, or equivalent methods approved by the State of California Air Resources Board (ARB) by reference in Title 17 of the California Administrative Code, or other methods specified by the company and approved in writing by the Air Pollution Control Officer.

50. At least thirty days prior to compliance testing, a written test plan shall be submitted for approval by the Air Pollution Control Officer detailing the sampling methods, analytical methods or detection principles to be used. The prior written approval of the Air Pollution Control Officer is required for the use of alternate test methods. The plan shall cite the test methods to be used for the determination of compliance with the emission limitations. The plan shall provide the proposed procedures for the characterization of the representative biomass materials to be burned during testing. (Rule 501§ 501, 307; 233 § 503)

51. A report of the compliance testing shall be submitted to the District no later than sixty (60) days after the compliance test is performed. This report shall include a record of operating conditions at the plant throughout the conduct of testing including pounds per hour of steam produced during the testing. (Rule 501 § 405; HSC 42301)

52. Compliance testing shall be performed by an independent testing contractor and analytical laboratory. The independent contractor shall be Air Resources Board certified for the test or analysis conducted. (Rule 501 § 405; HSC 42301)

53. Test and Sampling Platforms and Ports: Access to the exhaust stack(s) shall be provided by a test platform or other means, and sampling ports shall be installed in accordance with 40 CFR 60.8(e), and the Platform and Port Specification Sheet. (Rule 501 § 304, 405; HSC 42301)

54. The District may hire an independent contractor to conduct performance testing on an unannounced basis. (Rule 501 § 407; Rule 603; HSC 42303)

55. The District may require an analysis of the moisture content of the fuel used during source testing. (Rule 501 § 407; Rule 603; HSC 42303)

56. It is an emissions violation to not conduct required testing or if test results show emissions exceeding limits. If required testing is not completed, or emission limits are exceeded, corrective action and testing is required. In the case of an emissions exceedence, the company shall be considered to be in continuous violation of the

emission limit until test data or CEMS data demonstrates compliance with the emission limit.

EMISSIONS LIMITATIONS

57. No emissions are permitted, from any source, which are a nuisance per District Rule 205, Nuisance.

58. Except as outlined in District Rule 203, Exceptions to Rule 202, emissions opacity as dark or darker than Ringleman No. 1 (20% Opacity) for a period or periods aggregating more than three (3) minutes in any hour is prohibited as per Rule 202, Visible Emissions. Compliance shall be determined by a visible emissions evaluation by a CARB Certified observer or the reading from the CEMS opacity monitor.

59. The emissions of PM shall not exceed 0.2 grains per cubic foot of gas calculated to 12 percent carbon dioxide (CO2) at standard conditions pursuant to Rule 210, Specific Contaminants.

60. Rule 203, Exceptions to Rule 202, (Visible Emissions), exempts visible emissions from the boilers from being deemed a violation of Rule 202, Visible Emission only when such emissions result from the startup or shutdown of the combustion process or from the malfunction of emission control equipment.
    A. For the purposes of this condition, startup is the period of time a unit is heated to normal operating temperature (900 degrees F) as registered at the superheater outlet and recorded electronically.

    B. For the purposes of this condition, shutdown is the period of time when fuel feed is curtailed and the unit begins cooling from normal operating temperature (900 degrees F) as registered at superheater outlet and recorded electronically. A shutdown ends when the unit is 150 degrees F, or less, for at least one hour, registered at the superheater outlet and recorded electronically, 24 hours has elapsed since the start of shutdown, or fuel feed resumes, whichever occurs first. A shutdown is differentiated from normal operational variations by the separation of the generator from the electrical grid.

    C. Rule 203 does not allow exemptions for visible emissions which exceed a period or periods of time aggregating more than 30 minutes in any 24-hour period (For the purposes of this exemption, “any 24-hour period” means a rolling 24-hour period, incremented by the clock hour).

    D. Rule 203 shall not apply to emissions which result from the failure to operate and maintain in good working order any emission control equipment.

    E. Rule 203 only applies to Rule 202, Visible Emissions, violations. It does not apply to other emission limits.

61. Fugitive Emissions:

A. The company shall not cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area (including disturbance as a result of the raising and/or keeping of animals or by vehicle use), such that the presence of such dust remains visible in the atmosphere beyond the boundary line of the emission source. (Rule 228, Fugitive Dust)

B. In addition to the requirements of Rule 202, Visible Emissions, a person shall not cause or allow fugitive dust generated by active operations, an open storage pile, or a disturbed surface area, such that the fugitive dust is of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke as dark or darker in shade as that designated as No. 2 on the Ringelmann Chart (i.e. 40% opacity), as published by the United States Bureau of Mines. (Rule 228, Fugitive Dust)

62. Any use of Hexavalent Chromium in the cooling towers is prohibited per District Rule 904, Airborne Toxic Control Measure, Hexavalent Chromium Emissions from Cooling Towers.

63. Ammonia slip shall not exceed 20 ppmv.

64. PM-10 emission limits are the sum of the filterable and condensable fractions (front and back half.)

65. PM-10 emission shall not exceed 0.015 grains per dscf @ 12% CO2. PM-10 values are the sum of filterable and condensable fractions (front and back half).

66. The emissions from the new primary wood-waste boiler shall not exceed the rates in the following table:

	POLLUTANT	PPMV @12% CO2 (twenty-four hour block average) (Effective 1/1/13)	PPMV @12% CO2 (three hour rolling average)	POUNDS/HOUR (three-hour rolling average)	POUNDS/QUARTER
a.	Carbon Monoxide (CO):	-	1000	170	325,000
b.	Nitrogen Oxides (NOx)	68 (Effective 1/1/13)	91	37.6	82,278
c.	PM-10:	-	NA	5.5	12,025
d.	Sulfur Oxides (SOx)	-	NA	2.6	5,696
e.	Volatile Organic Compounds (VOCs):	-	NA	5.5	12,025

The ppmv limits listed in the table do not apply during startup or shutdown provided the following requirements are met.

A. Startup includes the period of time a unit is heated to the normal operating temperature, as specified by the manufacturer, following a shutdown. (Rule 233 § 212)

B. A shutdown starts when fuel feed is curtailed and the unit begins cooling from the unit's normal operating temperature, as specified by the manufacturer, and ends

when the unit is 150 degrees F or less for at least one hour, 24 hours has elapsed since the start of the shutdown, or fuel feed resumes, whichever occurs first. (Rule 233 § 211)

C. CO2 emissions are 10 percent or less by volume stack gas on a one-hour average dry basis. If any of the one hour CO2 averages meets this requirement, then the PPMV limitations do not apply. (Rule 233 § 302)

67. The number of startups during which NOx emissions exceed 115 ppmv corrected to 12% CO2 or CO emissions exceed 1000 ppmv corrected to 12% CO2 shall be limited to fifty (50) per calendar year. (Rule 233 § 302)

68. The number of shutdowns during which NOx emissions exceed 115 ppmv corrected to 12% CO2 CO emissions exceed 1000 ppmv corrected to 12% CO2 shall be limited to fifty (50) per calendar year. (Rule 233 § 302)

STANDBY BOILER PERMIT LIMITS

69. Standby Boiler nitrogen oxide (NOx) Limit: The company shall not discharge or cause the discharge of NOx into the atmosphere from the Wellons boiler in excess of the more stringent of 46.0 lbs/hr or 115 ppmv at 12% CO2 averaged over a 3-hour period. (Origin: PSD_7_8_93 Condition IX.E Authority: 40 CFR § 52.21 PSD)

70. Standby Boiler nitrogen oxide (NOx) Limit: The company shall not discharge or cause the discharge of NOx into the atmosphere from the Wellons boiler in excess of the more stringent of 40.0 lbs/hr or 100 ppmv at 12% CO2 averaged over a 24-hour period. (Origin: PSD_7_8_93 Condition IX.E Authority: 40 CFR § 52.21 PSD)

71. Standby Boiler Carbon Monoxide (CO) Limit: The company shall not discharge or cause the discharge of CO into the atmosphere from the Wellons boilers in excess of the more stringent of:
    A. 360 lbs./hr or 1500 ppm at 12% CO2 averaged over an 8-hour period or

    B. 240 lbs./hr or 1000 ppm at 12% CO2 averaged over a 24-hour period.
    (Origin: PSD_7_8_93 Condition IX.F Authority: 40 CFR § 52.21 PSD)

72. The ppmv limits for NOx and CO limits for the standby boiler do not apply during startup or shutdown provided the following requirements are met.

    A. Startup includes the period of time a unit is heated to the normal operating temperature, as specified by the manufacturer, following a shutdown.

    B. A shutdown starts when fuel feed is curtailed and the unit begins cooling from the unit's normal operating temperature, as specified by the manufacturer, and ends when the unit is 150 degrees F or less for at least one hour, 24 hours has elapsed since the start of the shutdown, or fuel feed resumes, whichever occurs first.

    C. CO2 emissions are 10 percent or less by volume stack gas on a one-hour average dry basis. If any of the one hour CO2 averages meets this requirement, then the

PPMV limitations do not apply.

73. The particulate emissions concentration shall not exceed 0.012 grains per dry standard cubic foot of gas corrected to 12% CO2 for solid particulate matter, front half only.

74. The company shall not discharge or cause the discharge of PM10 in excess of the more stringent of 7.25 lbs./hr or 0.015 gr./dscf at 12% CO2 from the Wellons boiler. (Origin: PSD_7_8_93 Condition IX.G.1 Authority: 40 CFR § 52.21 PSD)

GENERAL CONDITIONS

75. Authorization to construct the equipment listed and as prescribed in the approved plans and specifications is hereby granted, subject to the specified permit conditions. The construction and operation of listed equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted in the conditions. Deviation from the approved plans is not permissible without first securing approval for the changes from the Air Pollution Control Officer. (Rule 501)

76. This permit shall be maintained on the premises of the subject equipment. (Rule 501)

77. The authorized District agents shall have the right of entry to any premises on which an air pollution emission source is located for the purpose of inspecting such source, including securing samples of emissions therefrom, or any records required to be maintained therewith by the District. (Rule 402)

78. In the event of any violation of the District Rules and Regulations, the company shall take action to end such violation. (Rule 502)

79. The company shall notify the District within two hours of any upset conditions, breakdown or scheduled maintenance which cause emissions in excess of limits established by District Rules and Regulations. (Rule 404)

80. Any alteration of the subject equipment, including a change in the method of operation, shall be reported to the District. Such alternations may require an Authority to Construct Permit. (Rule 501)

81. Exceeding any of the limiting condition is prohibited without prior application for, and the subsequent granting of a permit modification pursuant to District Rule 501, General Permit Requirements, Section 400.

82. In the event of a change of ownership, an application must be submitted to the District. Upon any change in control or ownership of facilities constructed, operated, or modified under authority of this permit, the requirements contained in this Authority to Construct shall be binding on all subsequent owners and operators.(Rule 501)

83. Compliance of the permitted facility is required with the provisions of the "Air Toxics `Hot Spots' Information and Assessment Act" of 1987 (Health and Safety Code Sections

44300 et seq.)

84. Performance Test Requirements: If the District finds that performance tests are required to determine compliance with District Rules and Regulations and Conditions of this Authority to Construct, reasonable written notice shall be provided to the Company. The performance tests shall be subject to the following restrictions:
    A. At least thirty (30) days prior to the actual testing, a written test plan shall be submitted to the Air Pollution Control Officer detailing the sampling methods, analytical methods or detection principles to be used. The prior written approval of the Air Pollution Control Officer is required for the use of alternate test methods.
    B. The District may require, upon reasonable written notice, the conduct by the company of such emissions testing or analysis as may be deemed necessary by the District to demonstrate compliance with District Rules and Regulations and the limiting conditions of this permit.
    C. Testing shall be conducted in accordance with 40 CFR 60, Appendix A, Methods , or equivalent methods approved by the State of California Air Resources Board (ARB) by reference in Title 17 of the California Administrative Code, or other methods specified by the company and approved in writing by the Air Pollution Control Officer. Independent testing contractors and analytical laboratories shall be Air Resources Board certified for the test or analysis conducted. Particulate matter testing, if requested, shall include both filterable and condensed particulate matter (e.g. Method 5 modified to include impinger catch).
    D. A report of the testing shall be submitted to the District no later than sixty (60) days after the source test is performed.

85. The applicant/Permittee has an obligation to defend and indemnify the District against third party challenges in accordance with District Rule 411.

Attachment 9

Air District Permits to Burn Forest Slash Biomass Wastes

Placer County
POLLUTION CONTROL DISTRICT

3091 County Center Drive, Ste 240, Auburn 95603 - (530) 745-2330 - (530) 745-2373
www.placer.ca.gov/apcd Thomas J. Christofk, Air Pollution Control Officer

APPLICATION AND PERMIT TO BURN

PERMIT # 4436

PLEASE CHECK TYPE OF BURNING

- ☐ Development of Land for Commercial or Residential Purposes
- ☐ Forest Management (inc. Harvesting Activities)
- ☒ Wildland Vegetation Management (Public Agency)
- ☐ Levee, Ditch and Reservoir Maintenance Activities
- ☐ Fire Hazard Reduction
- ☐ Agricultural (Prunings or Field Crops)
- ☐ Landfill
- ☐ Range Improvement
- ☐ Public Officer/Fire Training

PLEASE PRINT

Name: Wayne Sindel / Jeb Pronto Phone Number: 530-367-2224

Business Name (if applicable): USFS - AMERICAN RIVER RANGER DISTRICT

Mailing Address: 23830 FORESTHILL RD. City: FORESTHILL Zip: 95631

Location of Burn: See SMP - various areas on the Foresthill R.D. City: Foresthill Zip:
(Street/Road, Cross Roads or Other Identity) or (Section-Township-Range)

Distance to Nearest Populated Area: See SMP

Fire Agency: USFS - AMERICAN RIVER RANGER DISTRICT

BURN PERMIT CONDITIONS	STREET MAP WITH CROSS ROADS
1. Burn only on a "Burn Day". 2. Make sure your smoke does not become a nuisance to neighbors . Only vegetative material may be burned. 4. Observe the rules on the back of this permit. 5. Contact your fire agency prior to burning. 6. _____	

Type of Material to be Burned: Residual logging slash, Forest litter - Hand and Grapple Piles

Estimated Amount of Material to Burn: 60 acres out of 200 from the orignial permit #3950 to still burn
(Dimensions in Acres, Cubic Yards, Pile Size, or Tons)

Reason for Burning: To dispose of Vegetative and Residual Logging Slash

By signing this permit, I or my agent is responsible for burning under the conditions of this permit. I or my agent is not excused from liability in the event the fire creates a nuisance, hazard or escapes control. If I am not the property owner, I understand that both the owner and myself are liable for violating applicable burn rules. In addition, I have verified with all jurisdictions that there are no restrictions for the above location. I attest that all information given on this permit is accurate.

Applicant's Signature: Wayne H Sindel Date: 3-26-07

FOR AIR DISTRICT USE ONLY

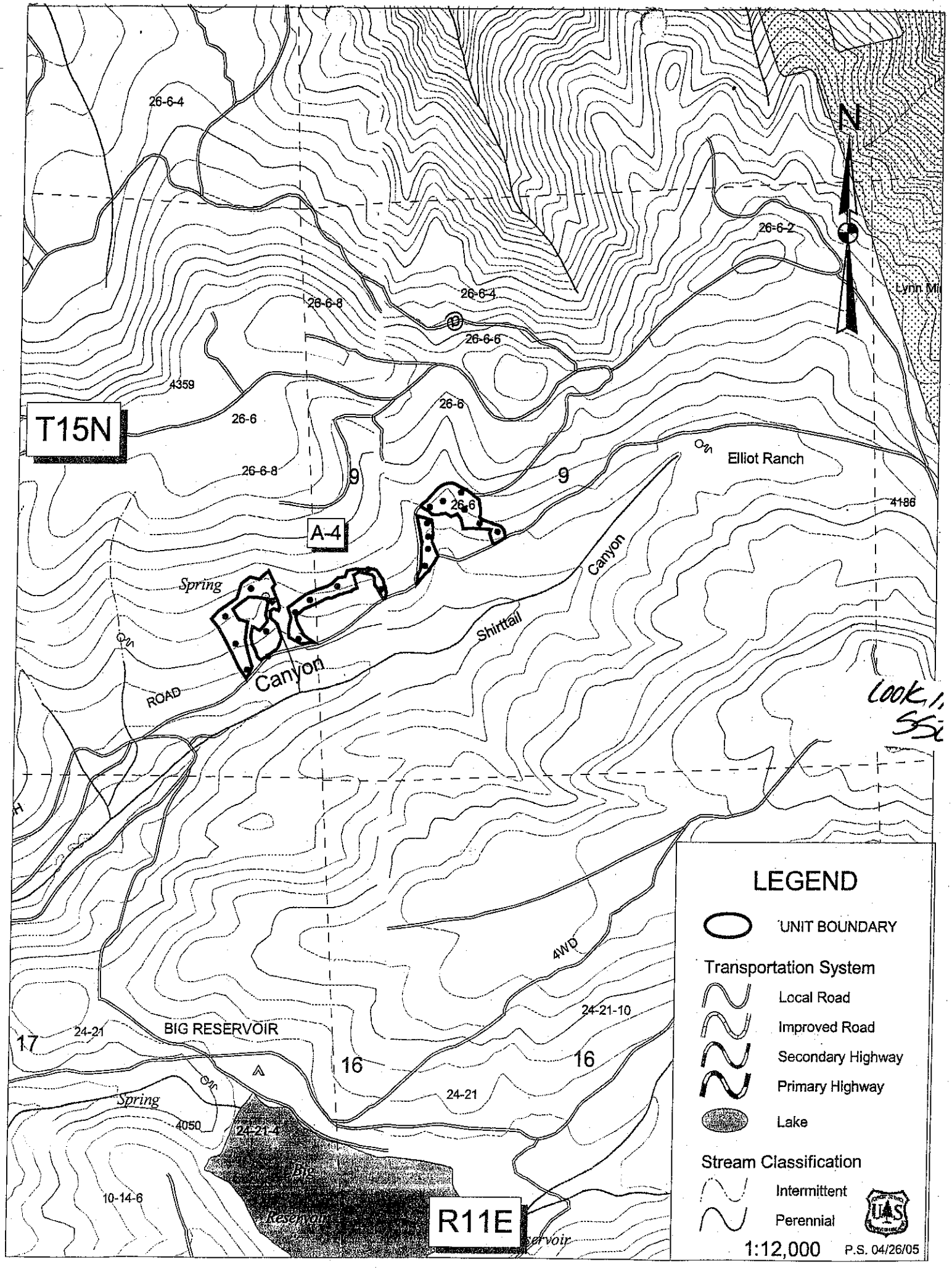
Issue Date	2/4/2007
Expiration Date	2/4/2008
Issued By	Ann Hobbs

Burn Permit Fees

Burn Permit	$	$ 0.00
Acreage	acres @ $ /acre	$
Inspection	hours @ $ /hour	$
Smoke Plan Review	hours @ $ /hour	$
Sac Valley Fee		$ 0
Additional Fees		$ 36.25
Total Burn Fees		$ 36.25

BURN DAY INFORMATION

Within a 12 mile radius of Auburn **889-6868**	All other areas in Placer County **1-800-998-2876**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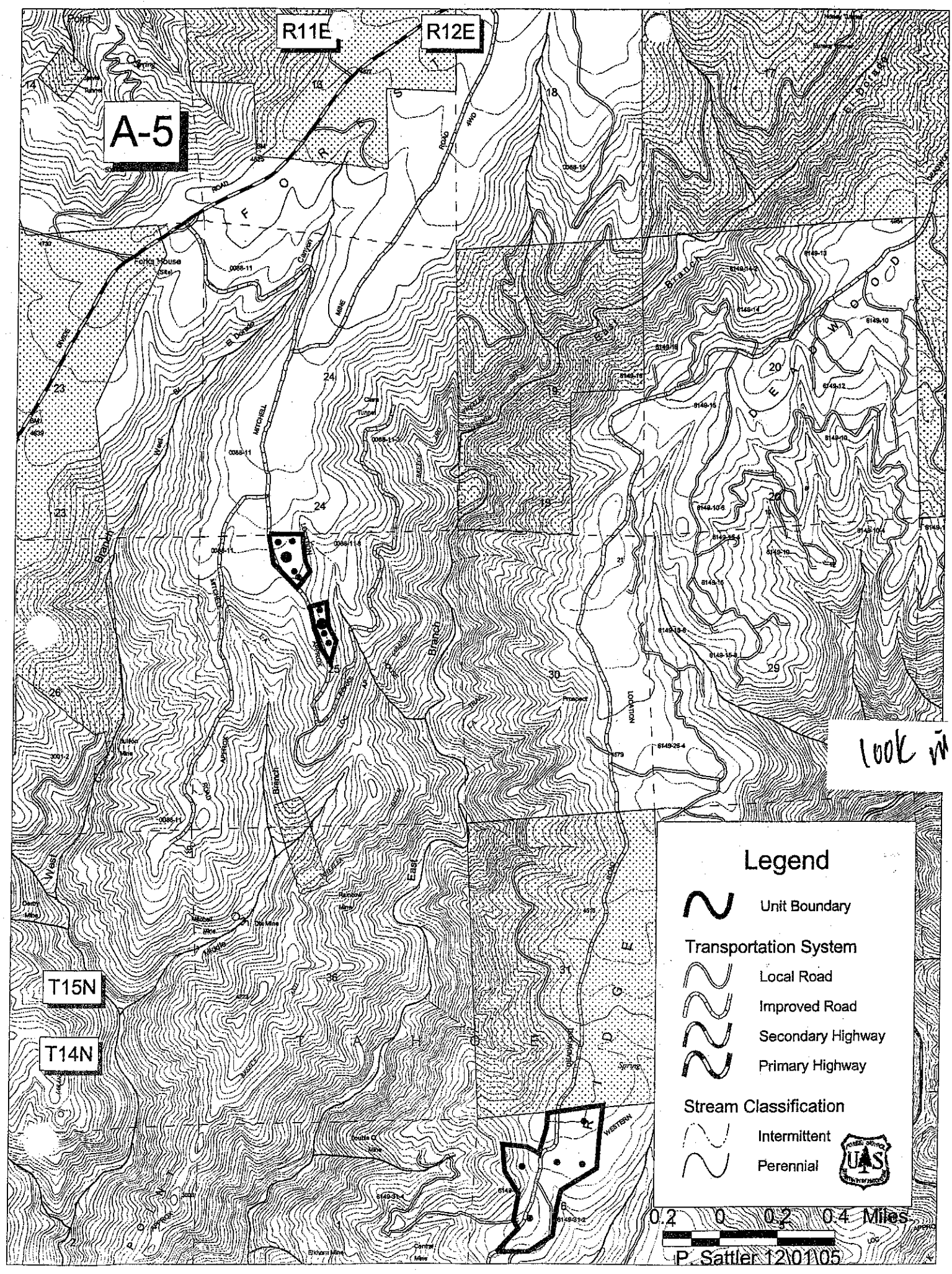
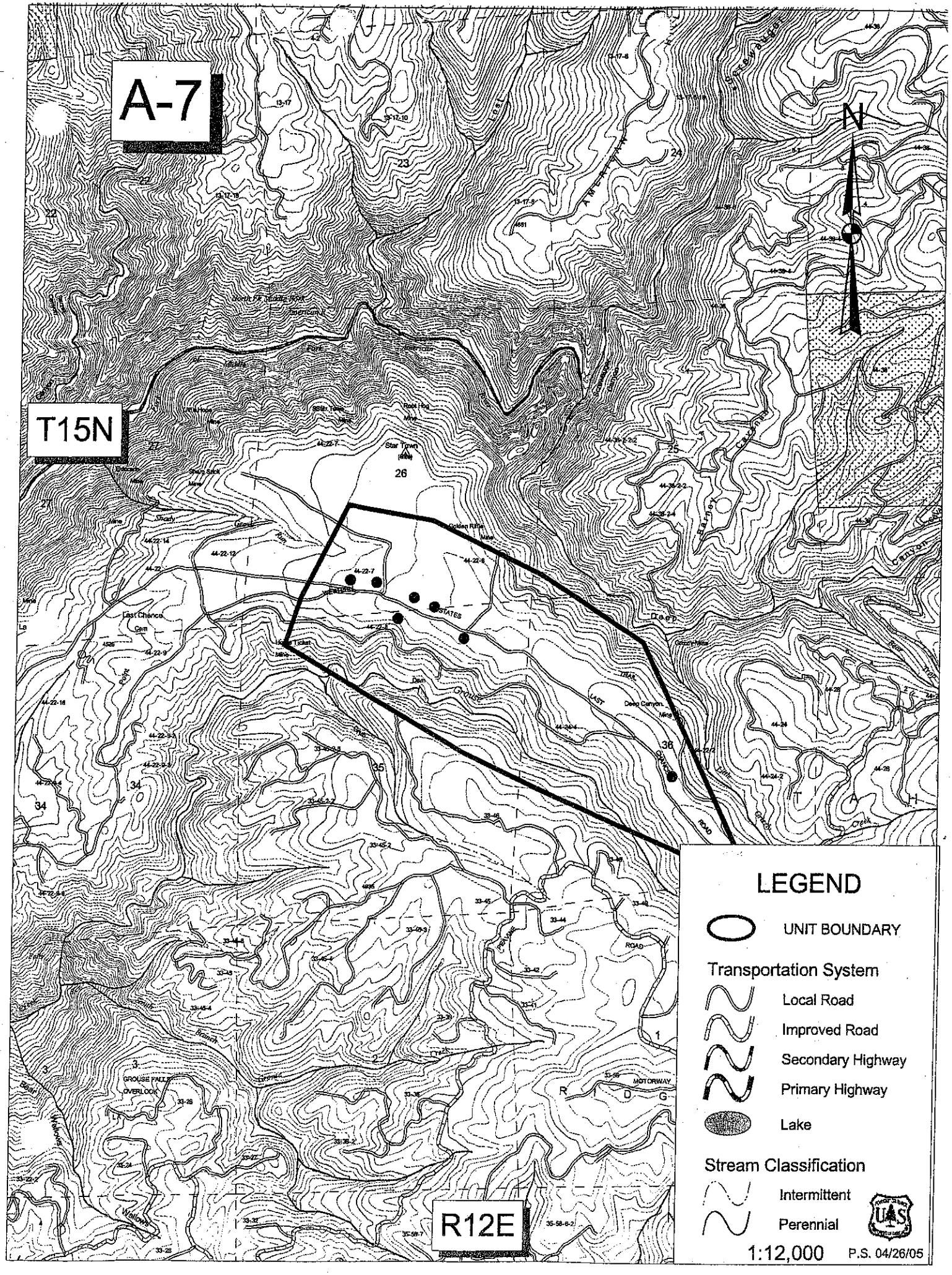
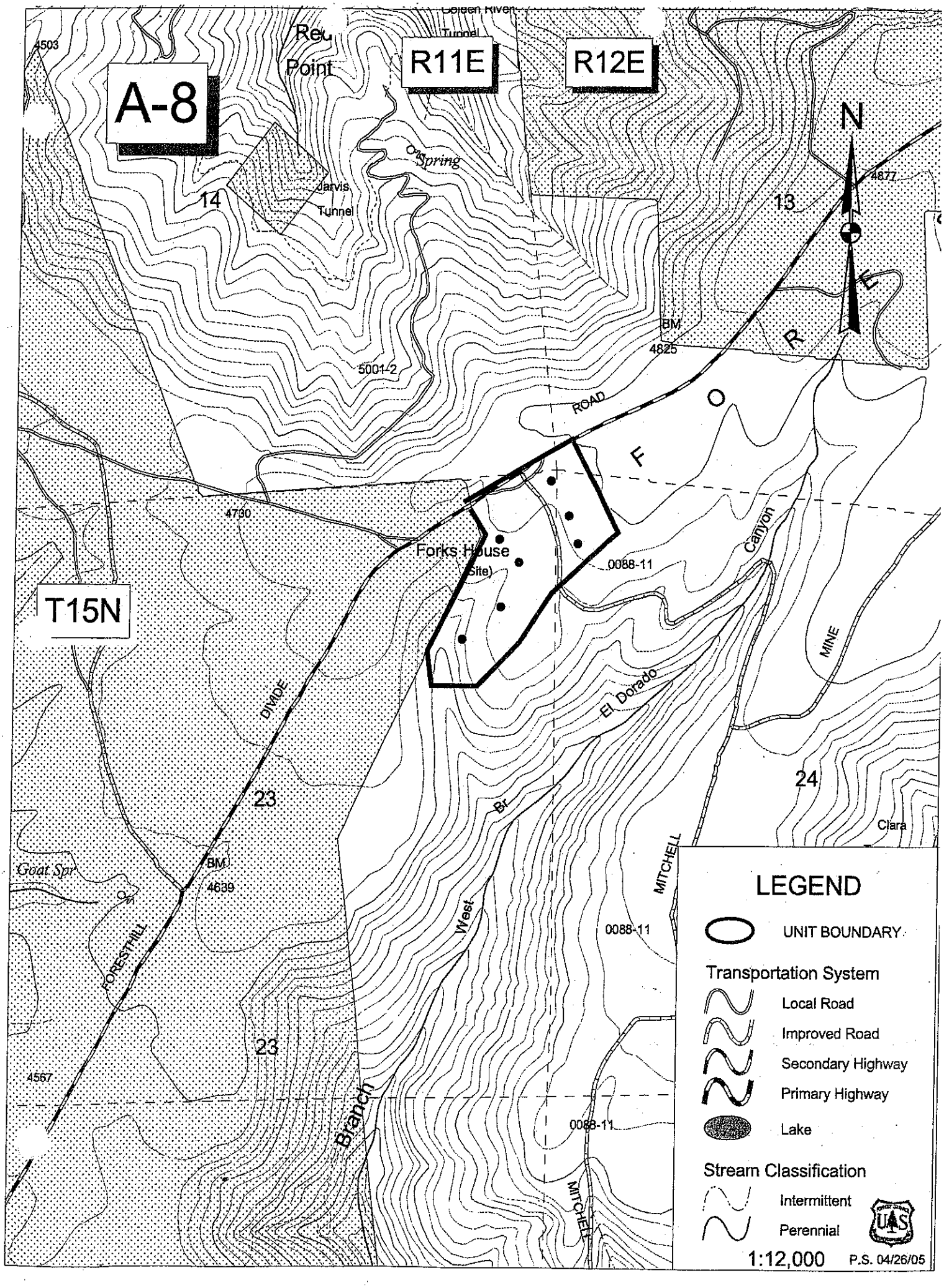
T15N
R11E
A-4
26-6-4
26-6-8
26-6-6
26-6-2
26-6
4359
4186
Elliot Ranch
Spring
Canyon
Shirttail
ROAD
BIG RESERVOIR
24-21
24-21-10
24-21-4
4050
10-14-6
4WD
9
16
17
LEGEND
UNIT BOUNDARY
Transportation System
Local Road
Improved Road
Secondary Highway
Primary Highway
Lake
Stream Classification
Intermittent
Perennial
1:12,000
P.S. 04/26/05


A-5
R11E
R12E
T15N
T14N
Legend
Unit Boundary
Transportation System
Local Road
Improved Road
Secondary Highway
Primary Highway
Stream Classification
Intermittent
Perennial
0.2 0 0.2 0.4 Miles
P. Sattler 12\01\05


A-7
T15N
R12E
N
LEGEND
UNIT BOUNDARY
Transportation System
Local Road
Improved Road
Secondary Highway
Primary Highway
Lake
Stream Classification
Intermittent
Perennial
1:12,000
P.S. 04/26/05


A-8
R11E
R12E
T15N
Point
Jarvis
Tunnel
Spring
14
13
23
24
4503
4677
4825
5001-2
4730
4639
4567
BM
ROAD
Forks House
(Site)
0088-11
Canyon
MINE
El Dorado
DIVIDE
FORESTHILL
Goat Spr
West
Br
Branch
MITCHELL
Clara
N
LEGEND
UNIT BOUNDARY
Transportation System
Local Road
Improved Road
Secondary Highway
Primary Highway
Lake
Stream Classification
Intermittent
Perennial
1:12,000
P.S. 04/26/05

Placer County
POLLUTION CONTROL DISTRICT

3091 County Center Drive, Ste 240, Auburn 95603 - (530) 745-2330 - (530) 745-23[illegible]3
www.placer.ca.gov/apcd Thomas J. Christofk, Air Pollution Control Officer

APPLICATION AND PERMIT TO BURN

PERMIT # 4423

PLEASE CHECK TYPE OF BURNING

- ☐ Development of Land for Commercial or Residential Purposes
- ☐ Forest Management (inc. Harvesting Activities)
- ☒ Wildland Vegetation Management (Public Agency)
- ☐ Levee, Ditch and Reservoir Maintenance Activities
- ☐ Fire Hazard Reduction
- ☐ Agricultural (Prunings or Field Crops)
- ☐ Landfill
- ☐ Range Improvement
- ☐ Public Officer/Fire Training

PLEASE PRINT

Name: WAYNE SINDEL Phone Number: 367-2224

Business Name (if applicable): USFS - AMERICAN RIVER RANGER DISTRICT

Mailing Address: 23830 FORESTHILL RD. City: FORESTHILL Zip: 95631

Location of Burn: Michigan Bluff Road and Gorman Ranch Road City: FORESTHILL Zip: 95631
(Street/Road, Cross Roads or Other Identity) or (Section-Township-Range)

Distance to Nearest Populated Area: WITHIN 1 MILE

Fire Agency: USFS - AMERICAN RIVER RANGER DISTRICT

BURN PERMIT CONDITIONS	STREET MAP WITH CROSS ROADS
1. Burn only on a "Burn Day". 2. Make sure your smoke does not become a nuisance to neighbors 3. Only vegetative material may be burned. 4. Observe the rules on the back of this permit. 5. Contact your fire agency prior to burning. 6. _____	Mad Skunk

Type of Material to be Burned: BRUSH, TIMBER LITTER, AND SMALL DIAMETER TREES >6 IN dbH

Estimated Amount of Material to Burn: 25 ACRES
(Dimensions in Acres, Cubic Yards, Pile Size, or Tons)

Reason for Burning: REDUCE HAZARDOUS FUELS

By signing this permit, I or my agent is responsible for burning under the conditions of this permit. I or my agent is not excused from liability in the event the fire creates a nuisance, hazard or escapes control. If I am not the property owner, I understand that both the owner and myself are liable for violating applicable burn rules. In addition, I have verified with all jurisdictions that there are no restrictions for the above location. I attest that all information given on this permit is accurate.

Applicant's Signature: Wayne H Sindel Date: 2-22-07

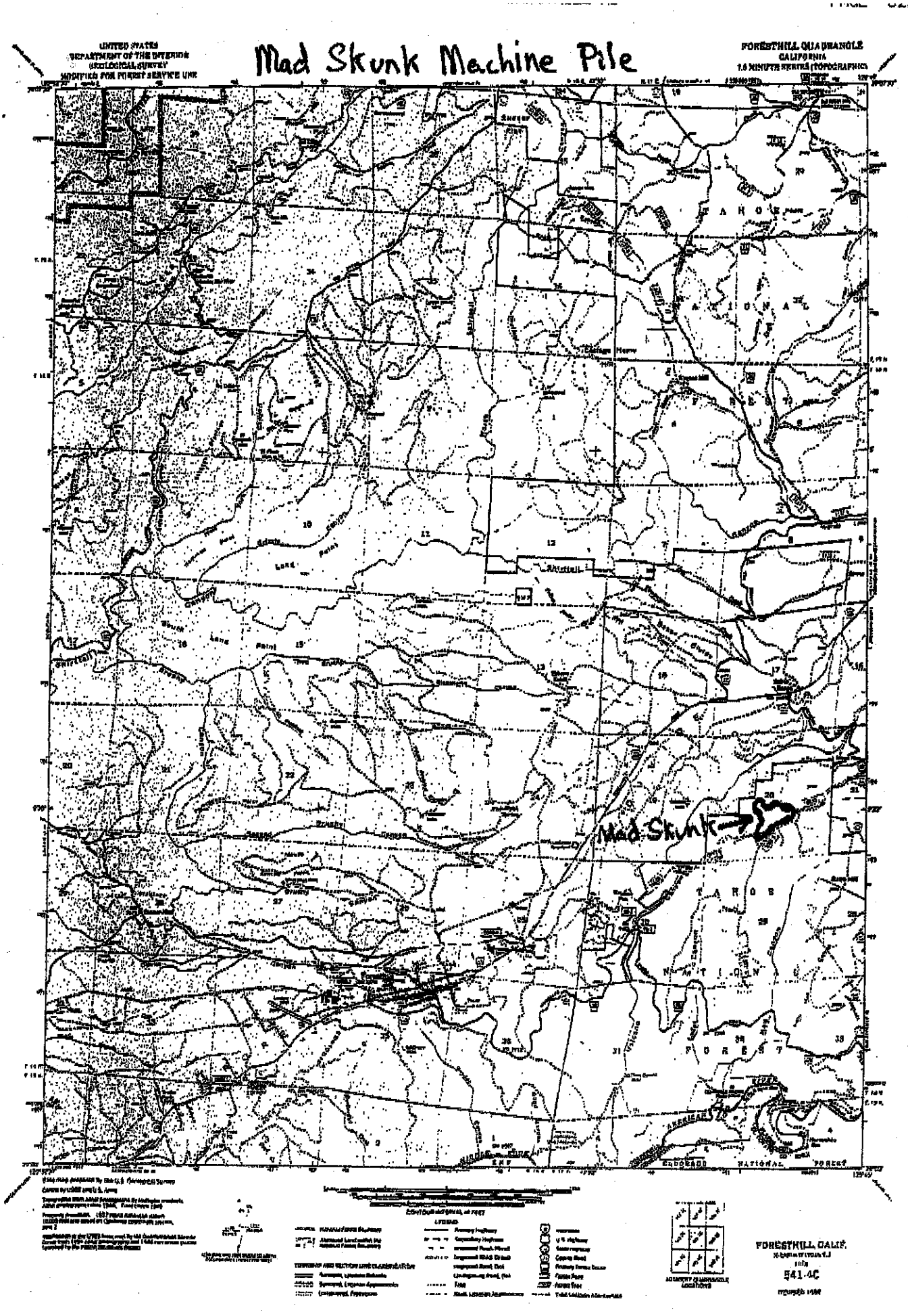
FOR AIR DISTRICT USE ONLY

Issue Date 02/22/2007
Expiration Date 2/22/2008
Issued By Ann Hobbs

Burn Permit Fees		
Burn Permit	$	$ 60.25
Acreage	25 acres @ $ 1.80 /acre	$ 45.00
Inspection	hours @ $ /hour	$
Smoke Plan Review	.5 hours @ $ 72.26 /hour	$ 36.13
Sac Valley Fee		$ 0
Additional Fees		$ 0.00
Total Burn Fees		$ 141.38

BURN DAY INFORMATION

Within a 12 mile radius of Auburn **889-6868**	All other areas in Placer County **1-800-998-2876**


Mad Skunk Machine Pile
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
PREPARED FOR FOREST SERVICE USE
FORESTHILL QUADRANGLE
CALIFORNIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
Mad Skunk
TAHOE
NATIONAL
FOREST
FORESTHILL, CALIF.
541-4C

53

Placer County
AIR POLLUTION CONTROL DISTRICT

3091 County Center Drive, Ste 240, Auburn, California 95603 - (530) 745-2330 - (530) 745-2373
www.placer.ca.gov/apcd Thomas J. Christofk, Air Pollution Control Officer

RECEIVED
OCT 27 2008
PLACER COUNTY AIR POLLUTION CONTROL DISTRICT

APPLICATION AND PERMIT TO BURN

PERMIT #4628

PLEASE CHECK TYPE OF BURNING

- ☐ Development of Land for Commercial or Residential Purposes
- ☐ Forest Management (inc. Harvesting Activities)
- ☒ Wildland Vegetation Management (Public Agency)
- ☐ Levee, Ditch and Reservoir Maintenance Activities
- ☐ Fire Hazard Reduction
- ☐ Agricultural (Prunings or Field Crops)
- ☐ Landfill
- ☐ Range Improvement
- ☐ Public Officer / Fire Training

PLEASE PRINT

Name: Wayne Sindel Phone Number: 367-2224

Business Name (if applicable): USFS - AMERICAN RIVER RANGER DISTRICT

Mailing Address: WAYNE SINDEL City: FORESTHILL Zip: 95631

Location of Burn: See SMP, District Wide Burn Piles Zip:
(Street / Road, Cross Roads or Other identity) or (Section - Township - Range)

Distance to Nearest Populated Area Various Areas in the American River Ranger District

Fire Agency: USFS - AMERICAN RIVER RANGER DISTRICT

BURN PERMIT CONDITIONS	STREET MAP WITH CROSS ROADS
1. Burn only on a "Burn Day"	
2. Make sure your smoke does not become a nuisance to neighbors	
3. Only vegetative material may be burned	
4. Observe the rules on the back of this Permit	
5. Contact your fire agency prior to burning	
6. _____	

Type of Material to be Burned Brush, Residual Timber Slash, small standing conifers

Estimated Amount of Material to Burn 313 acres
(Dimensions in Acres, Cubic Yards, Pile Size, or Tons)

Reason for Burning To dispose of vegetative and residual Logging slash.

By signing this permit, I or my agent is responsible for burning under the conditions of this permit. I or my agent is not excused from liability in the event the fire creates a nuisance, hazard or escapes control. If I am not the property owner, I understand that both the owner and myself are liable for violating applicable burn rules. In addition, I have verified with all jurisdictions that there are no restrictions for the above location. I attest that all information given on this permit is accurate.

Applicant's Signature: Wayne H Sindel Date: 10-31-08

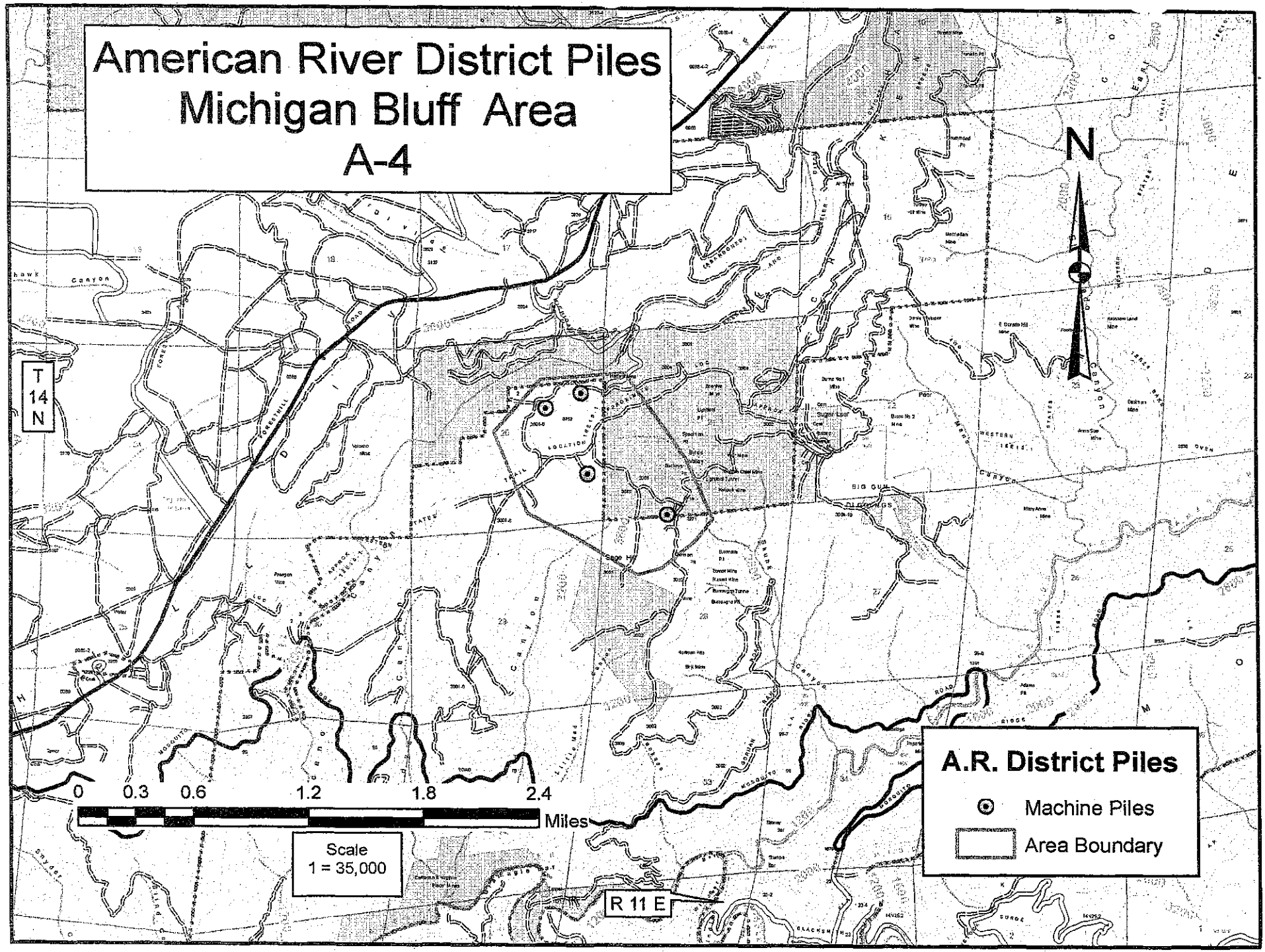
FOR AIR DISTRICT USE ONLY

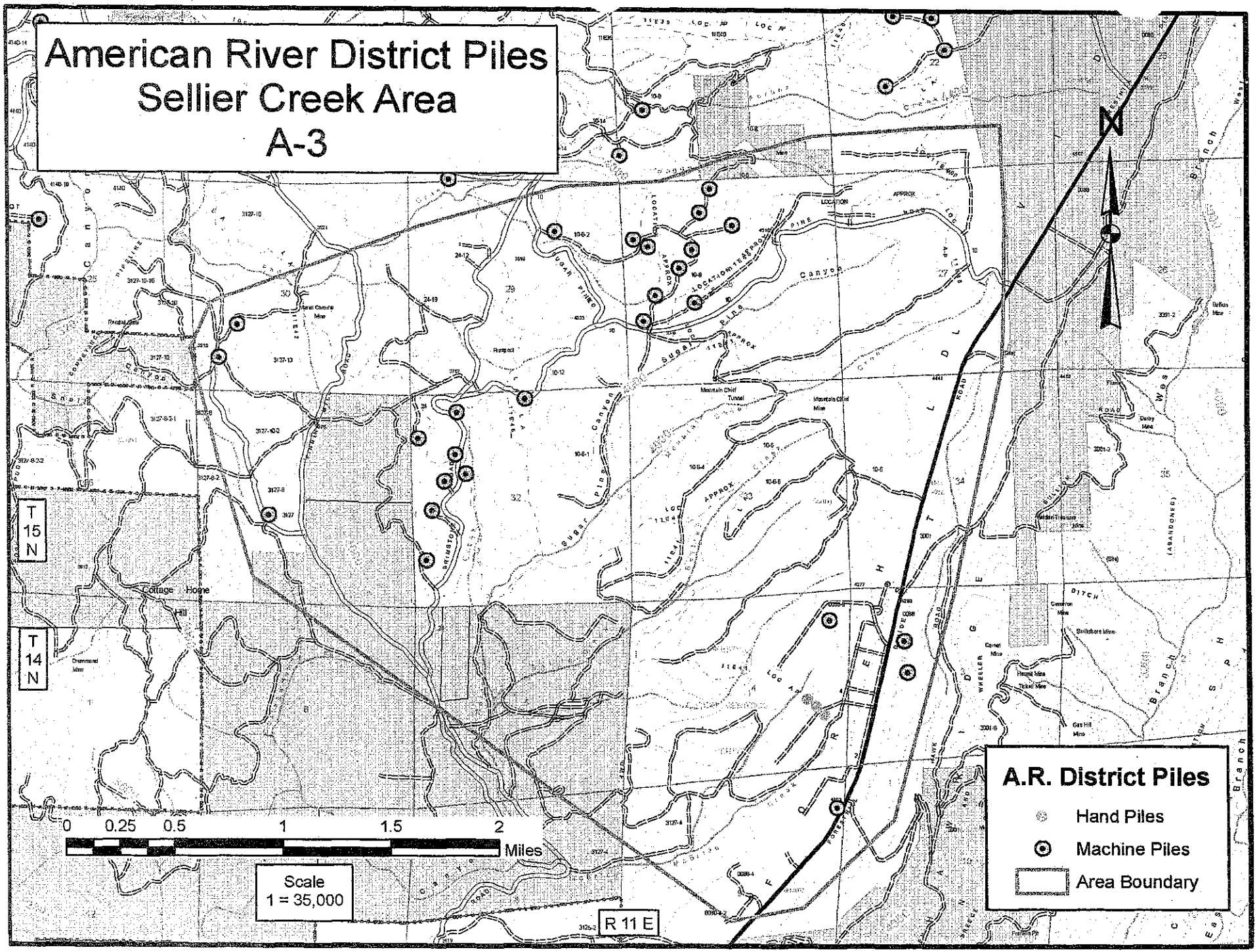
Issue Date 10/27/2008
Expiration Date 10/27/2009
Issued By Ann Hobbs

Burn Permit Fees		
BurnPermit	$	$ 64.75
Acreage	313 acres @ $ 1.95/acre	$ 610.35
Inspection	hours @ $ 77.75/hour	$ 0.00
Smoke Plan Review	1 hours @ $ 77.75/hour	$ 77.75
SAC Valley Fee		$ 0.00
Additional Fees		$
Total Burn Fees		$ 752.85

BURN DAY INFORMATION

Within a 12 mile Radius of Aurburn **889-6868**	All other Areas in Placer County **1-800-998-2876**


American River District Piles
Michigan Bluff Area
A-4
N
T
14
N
R 11 E
0 0.3 0.6 1.2 1.8 2.4
Miles
Scale
1 = 35,000
A.R. District Piles
Machine Piles
Area Boundary


American River District Piles
Sellier Creek Area
A-3
T 15 N
T 14 N
R 11 E
0 0.25 0.5 1 1.5 2
Miles
Scale
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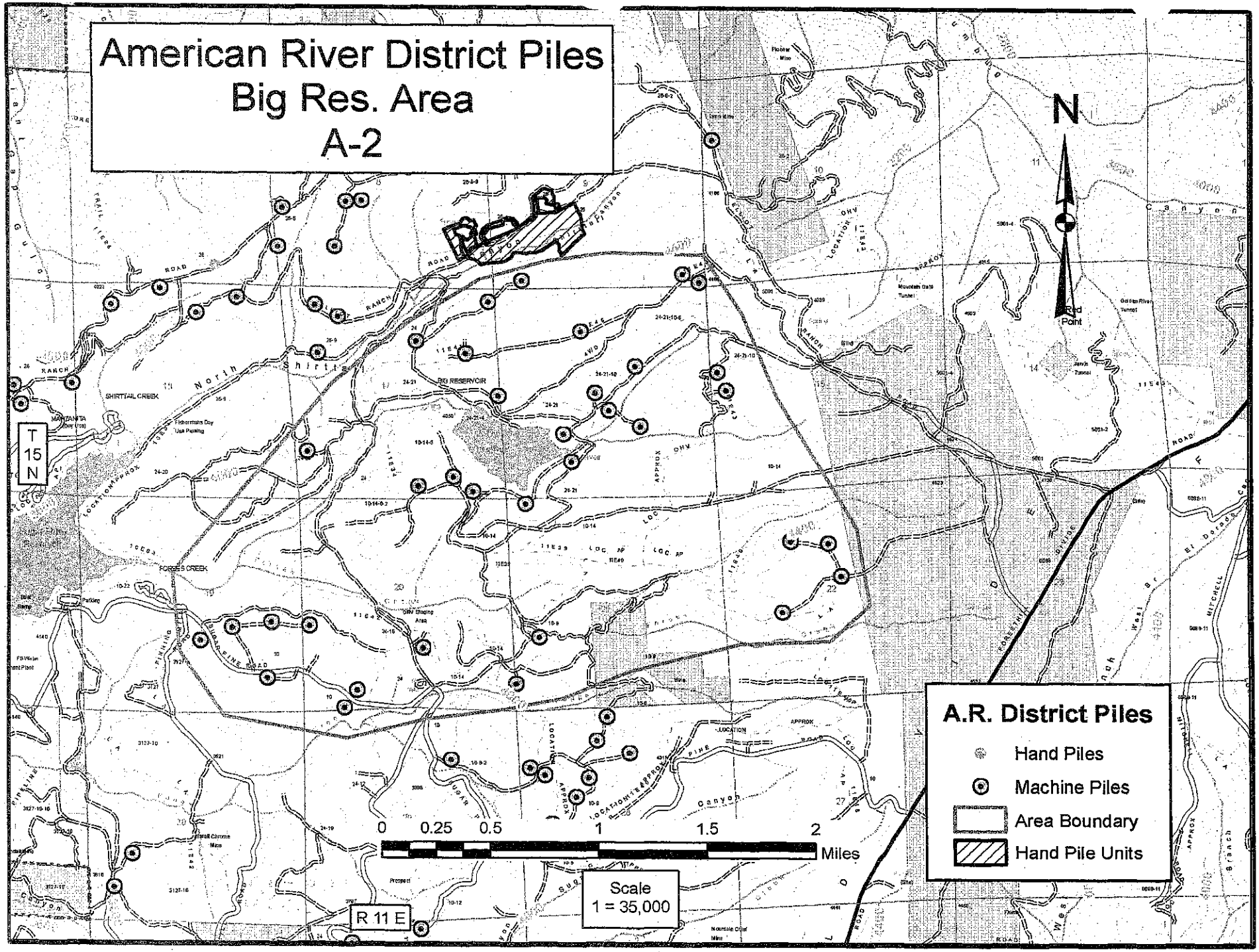
A.R. District Piles
Hand Piles
Machine Piles
Area Boundary


American River District Piles
Big Res. Area
A-2
N
Red Point
T 15 N
R 11 E
BIG RESERVOIR
SHIRTTAIL CREEK
FORDS CREEK
SUGARPINE ROAD
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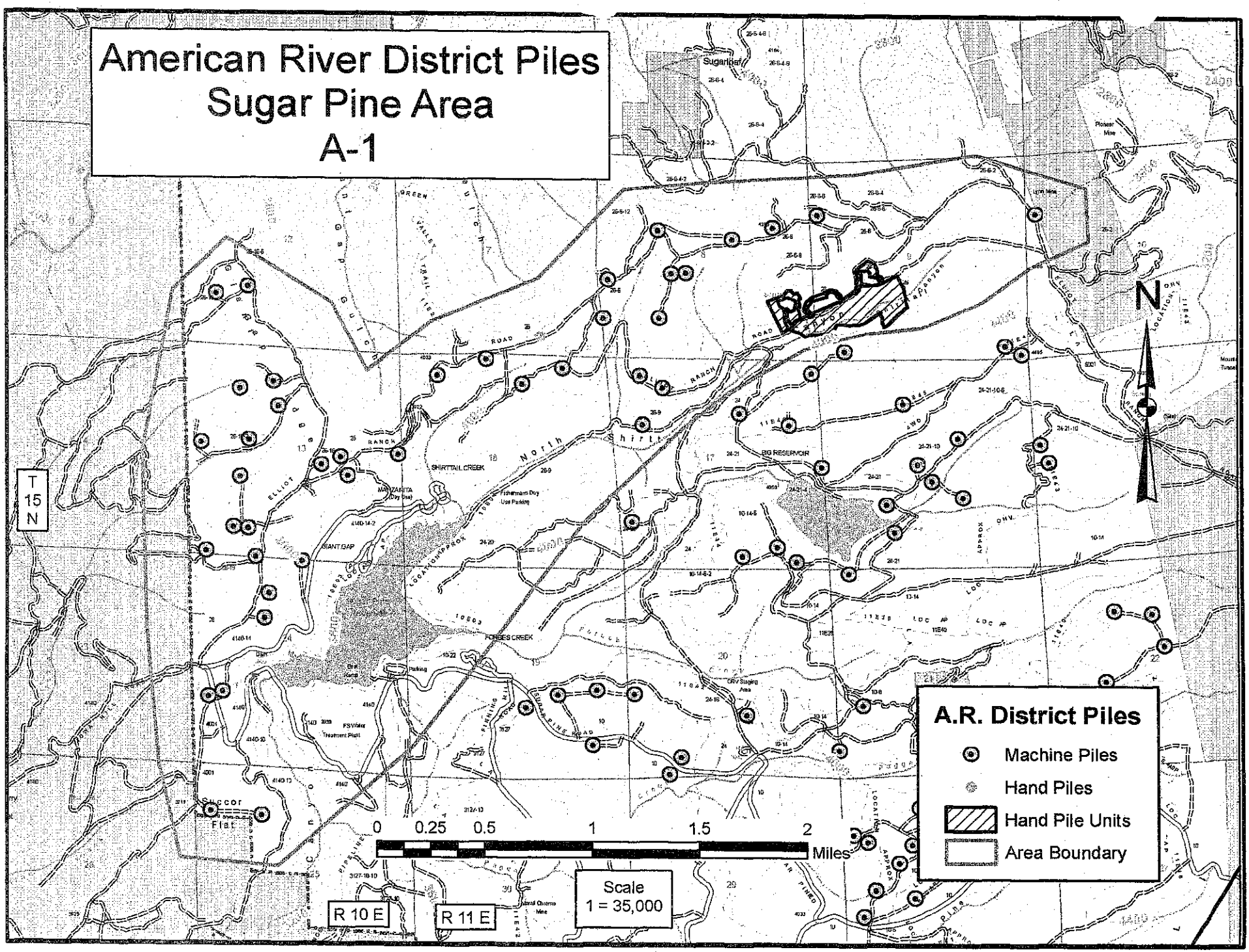
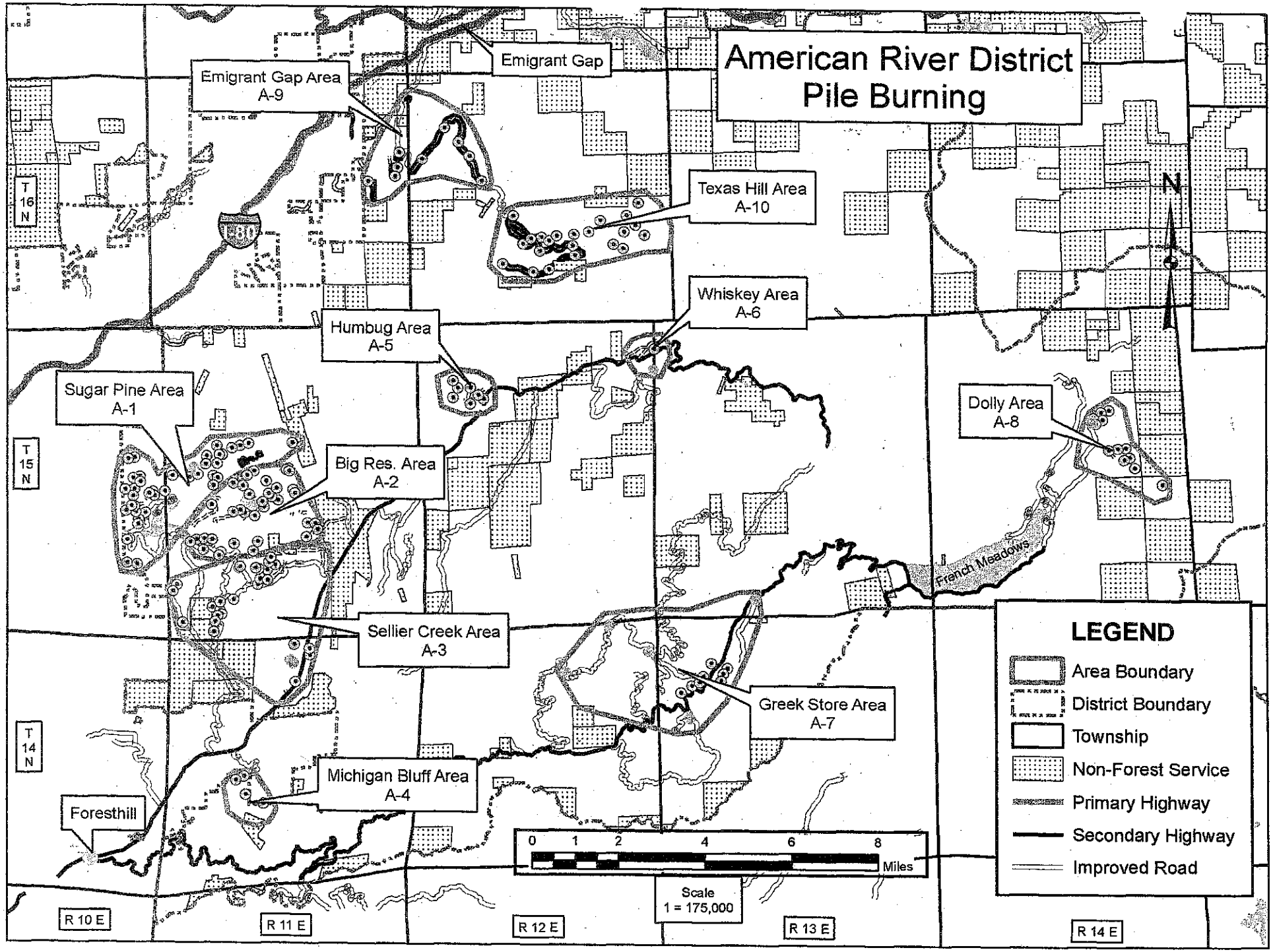
Miles
Scale 1 = 35,000
A.R. District Piles
Hand Piles
Machine Piles
Area Boundary
Hand Pile Units


American River District Piles
Sugar Pine Area
A-1
T 15 N
R 10 E
R 11 E
N
0 0.25 0.5 1 1.5 2
Miles
Scale 1 = 35,000
A.R. District Piles
Machine Piles
Hand Piles
Hand Pile Units
Area Boundary
SHIRTTAIL CREEK
GIANT GAP
FORDES CREEK
BIG RESERVOIR
Sugarloaf
Slicker Flat


American River District
Pile Burning
Emigrant Gap
Emigrant Gap Area
A-9
Texas Hill Area
A-10
Whiskey Area
A-6
Humbug Area
A-5
Sugar Pine Area
A-1
Dolly Area
A-8
Big Res. Area
A-2
French Meadows
Sellier Creek Area
A-3
Greek Store Area
A-7
Michigan Bluff Area
A-4
Foresthill
T 16 N
T 15 N
T 14 N
R 10 E
R 11 E
R 12 E
R 13 E
R 14 E
N
0 1 2 4 6 8
Miles
Scale
1 = 175,000
LEGEND
Area Boundary
District Boundary
Township
Non-Forest Service
Primary Highway
Secondary Highway
Improved Road

Placer County
AIR POLLUTION CONTROL DISTRICT

3091 County Center Drive, Ste 240, Auburn 95603 - (530) 745-2330 - (530) 745-2373
www.placer.ca.gov/apcd Thomas J. Christofk, Air Pollution Control Officer

APPLICATION AND PERMIT TO BURN PERMIT # 4480

PLEASE CHECK TYPE OF BURNING

- ☐ Development of Land for Commercial or Residential Purposes
- ☐ Forest Management (inc. Harvesting Activities)
- ☒ Wildland Vegetation Management (Public Agency)
- ☐ Levee, Ditch and Reservoir Maintenance Activities
- ☐ Fire Hazard Reduction
- ☐ Agricultural (Prunings or Field Crops)
- ☐ Landfill
- ☐ Range Improvement
- ☐ Public Officer/Fire Training

PLEASE PRINT

Name: Wayne Sindel Phone Number: 367-2224

Business Name (if applicable): USFS - AMERICAN RIVER RANGER DISTRICT

Mailing Address: WAYNE SINDEL City: FORESTHILL Zip: 95631

Location of Burn: T14N, R11E, S20 & 29 City: Michigan Bluff Zip:
(Street/Road, Cross Roads or Other Identity) or (Section-Township-Range)

Distance to Nearest Populated Area: Michigan Bluff

Fire Agency: USFS - AMERICAN RIVER RANGER DISTRICT

BURN PERMIT CONDITIONS	STREET MAP WITH CROSS ROADS
1. Burn only on a "Burn Day". 2. Make sure your smoke does not become a nuisance to neighbors 3. Only vegetative material may be burned. 4. Observe the rules on the back of this permit. 5. Contact your fire agency prior to burning. 6. _____	

Type of Material to be Burned: mp/hp/lp Brush

Estimated Amount of Material to Burn: 111 acres
(Dimensions in Acres, Cubic Yards, Pile Size, or Tons)

Reason for Burning: Clean up

By signing this permit, I or my agent is responsible for burning under the conditions of this permit. I or my agent is not excused from liability in the event the fire creates a nuisance, hazard or escapes control. If I am not the property owner, I understand that both the owner and myself are liable for violating applicable burn rules. In addition, I have verified with all jurisdictions that there are no restrictions for the above location. I attest that all information given on this permit is accurate.

Applicant's Signature: Wayne H Sindel Date: 11-2-07

FOR AIR DISTRICT USE ONLY

Issue Date	10/30/2007
Expiration Date	10/30/2008
Issued By	Ann Hobbs

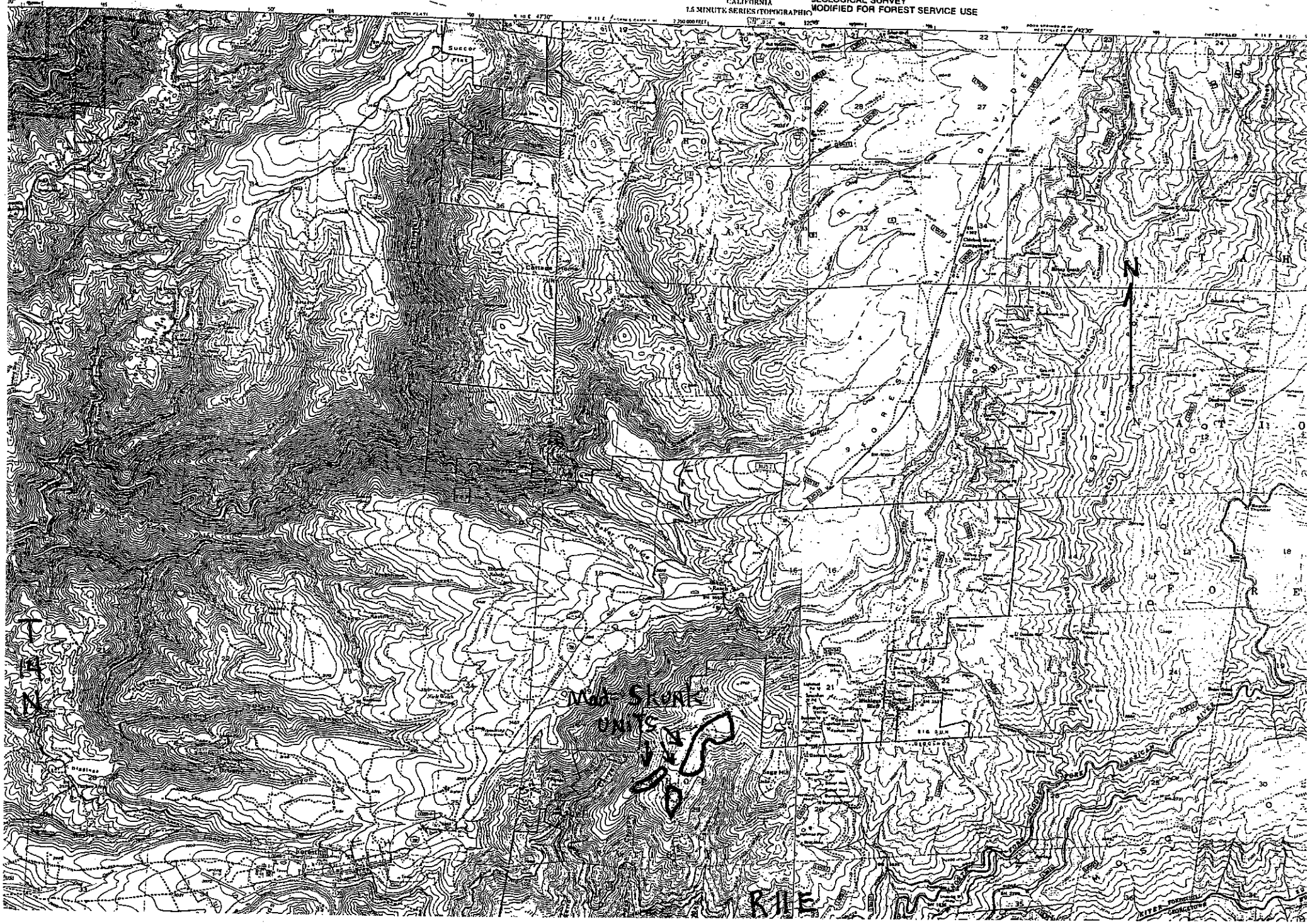
Burn Permit Fees

Burn Permit	$	$ 62.75
Acreage	111 acres @ $ 1.90 /acre	$ 210.90
Inspection	hours @ $ /hour	$
Smoke Plan Review	1.0 hours @ $ 75.25 /hour	$ 75.25
Sac Valley Fee		$ 0
Additional Fees		$ 0.00
Total Burn Fees		$ 348.90

BURN DAY INFORMATION

Within a 12 mile radius of Auburn **889-6868**	All other areas in Placer County **1-800-998-2876**

Mad Skunk Grapple Pile 2008



Placer County
POLLUTION CONTROL DISTRICT

3091 County Center Drive, Ste 240, Auburn, California 95603 - (530) 745-2330 - (530) 745-2373
www.placer.ca.gov/apcd Thomas J. Christofk, Air Pollution Control Officer

APPLICATION AND PERMIT TO BURN

PERMIT #4627

PLEASE CHECK TYPE OF BURNING

- ☐ Development of Land for Commercial or Residential Purposes
- ☐ Forest Management (inc. Harvesting Activities)
- ☒ Wildland Vegetation Management (Public Agency)
- ☐ Levee, Ditch and Reservoir Maintenance Activities
- ☐ Fire Hazard Reduction
- ☐ Agricultural (Prunings or Field Crops)
- ☐ Landfill
- ☐ Range Improvement
- ☐ Public Officer / Fire Training

PLEASE PRINT

Name: Wayne Sindel Phone Number: 367-2224

Business Name (if applicable): USFS - AMERICAN RIVER RANGER DISTRICT

Mailing Address: WAYNE SINDEL City: FORESTHILL Zip: 95631

Location of Burn: T14N, R11E, S9 & 10, Zip:
(Street / Road, Cross Roads or Other identity) or (Section - Township - Range)

Distance to Nearest Populated Area 1 mile from Baker Ranch

Fire Agency: USFS - AMERICAN RIVER RANGER DISTRICT

BURN PERMIT CONDITIONS	STREET MAP WITH CROSS ROADS
1. Burn only on a "Burn Day"	
2. Make sure your smoke does not become a nuisance to neighbors	
3. Only vegetative material may be burned	
4. Observe the rules on the back of this Permit	
5. Contact your fire agency prior to burning	
6.	

Type of Material to be Burned Brush, Residual Timber Slash, small standing conifers

Estimated Amount of Material to Burn 105 acres (20 acres left)
(Dimensions in Acres, Cubic Yards, Pile Size, or Tons)

Reason for Burning To reduce hazardous fuels.

By signing this permit, I or my agent is responsible for burning under the conditions of this permit. I or my agent is not excused from liability in the event the fire creates a nuisance, hazard or escapes control. If I am not the property owner, I understand that both the owner and myself are liable for violating applicable burn rules. In addition, I have verified with all jurisdictions that there are no restrictions for the above location. I attest that all information given on this permit is accurate.

Applicant's Signature: Wayne H Sindel Date: 5-4-09

FOR AIR DISTRICT USE ONLY

Issue Date 11/8/2008
Expiration Date 11/8/2009
Issued By Ann Hobbs

Burn Permit Fees		
BurnPermit	$	$ 0.00
Acreage	0 acres @ $ NaN/acre	$ 0.00
Inspection	hours @ $ 77.75/hour	$ 0.00
Smoke Plan Review	hours @ $ 77.75/hour	$ 0.00
SAC Valley Fee		$ 0.00
Additional Fees		$ 38.75
Total Burn Fees		$ 38.75

BURN DAY INFORMATION

Within a 12 mile Radius of Aurburn **889-6868**	All other Areas in Placer County **1-800-998-2876**

Attachment 10

Project Photographs

Pictures

USFS Tahoe National Forest American River District SSO/BFP Biomass Waste for Energy Project

Biomass waste piles from SSO and BFP forest fuel treatment projects.

Open pile burning for disposal of biomass wastes from forest fuel treatments.

Chipping of biomass wastes from forest fuel treatments for use in SPI Lincoln energy recovery facility.

Biomass waste chipping and transport operations.

Biomass chipping operations.

SPI Lincoln Biomass energy recovery cogeneration recovery steam boiler facility.

Attachment 11

Project Technical Peer Reviewed Publication in the Journal of Air and Waste Management Association

TECHNICAL PAPER

ISSN:1047-3289 *J. Air & Waste Manage. Assoc.* **61**:63–68
DOI:10.3155/1047-3289.61.1.63

Emission Reductions from Woody Biomass Waste for Energy as an Alternative to Open Burning

Bruce Springsteen, Tom Christofk, and Steve Eubanks
Placer County Air Pollution Control District, Auburn, CA

Tad Mason and Chris Clavin
TSS Consultants, Rancho Cordova, CA

Brett Storey
Placer County Planning Department, Auburn, CA

ABSTRACT

Woody biomass waste is generated throughout California from forest management, hazardous fuel reduction, and agricultural operations. Open pile burning in the vicinity of generation is frequently the only economic disposal option. A framework is developed to quantify air emissions reductions for projects that alternatively utilize biomass waste as fuel for energy production. A demonstration project was conducted involving the grinding and 97-km one-way transport of 6096 bone-dry metric tons (BDT) of mixed conifer forest slash in the Sierra Nevada foothills for use as fuel in a biomass power cogeneration facility. Compared with the traditional open pile burning method of disposal for the forest harvest slash, utilization of the slash for fuel reduced particulate matter (PM) emissions by 98% (6 kg PM/BDT biomass), nitrogen oxides (NO_x) by 54% (1.6 kg NO_x/BDT), nonmethane volatile organics (NMOCs) by 99% (4.7 kg NMOCs/BDT), carbon monoxide (CO) by 97% (58 kg CO/BDT), and carbon dioxide equivalents (CO_2e) by 17% (0.38 t CO_2e/BDT). Emission contributions from biomass processing and transport operations are negligible. CO_2e benefits are dependent on the emission characteristics of the displaced marginal electricity supply. Monetization of emissions reductions will assist with fuel sourcing activities and the conduct of biomass energy projects.

INTRODUCTION

Woody biomass waste material is generated as a byproduct throughout Placer County portions of the Sacramento Valley, foothills, and Sierra Nevada mountains from forest management projects, defensible space clearing, tree trimming, construction/demolition activities, and agricultural operations.

Forest management projects that produce woody biomass byproducts (tree stems, tops, limbs and branches, and brush) include fuel hazard reduction, forest health and productivity improvement, and traditional commercial harvest. These projects take place on private land and lands managed by various public agencies including the U.S. Forest Service (USFS), Bureau of Land Management, and state/federal parks. Forest fuel hazard reduction activities involving selective, targeted thinning treatments are implemented to lessen wildfire severity and improve forest-fire resiliency through reducing hazardous fuel accumulations resulting from a century of successful wildfire suppression efforts. Commercial timber harvests include thinning to improve health and productivity, and intensive management to optimize the yield of merchantable material for lumber production.

Defensible space clearings and fuel breaks in an expanding wildland urban interface area, including residential and commercial structures, produce woody biomass that typically includes deciduous and coniferous trees and brush.

Agricultural operations such as fruit and nut orchards and grape vineyards are a source of biomass wastes from annual pruning and periodic removal and replacement with more productive varieties or growing stock.

Open burning (in piles or broadcast burning) near the site of generation is the usual method of disposal for a significant quantity of the excess woody waste biomass throughout much of the western United States. A forest slash pile burn in the Lake Tahoe Basin is shown in Figure 1. The cost to collect, process, and transport biomass waste is often higher than its value for fuel or wood products because of the distance of the forest treatment activity location from the end user (e.g., mill, biomass energy facility), lack of infrastructure, and/or economics of biomass energy compared with fossil fuel generation. This limits the feasibility of using biomass waste for energy production although such use has significant environmental benefits.

IMPLICATIONS

Economic considerations frequently dictate the disposal of woody biomass wastes by open burning. The alternative use for energy provides significant reduction in criteria air pollutant and greenhouse emissions. Valuing these reductions will improve the economic viability and increase the use of biomass for energy as well as assist with forest and agricultural management objectives.

Figure 1. Open pile burn of forest fuel treatment woody biomass in Lake Tahoe Basin.

The Placer County Air Pollution Control District (PCAPCD), with responsibility for managing air quality in Placer County, shares regulatory authority over open burning with local fire agencies. Open burning is problematic because of the limited time of year it can be conducted, subsequent monitoring of smoldering piles for days after they are lit, and the production of significant quantities of air pollutant emissions and esthetically unpleasing residuals (blackened logs and woody debris). The PCAPCD expends significant resources reviewing smoke management plans, issuing burn permits, inspecting burn piles, and responding to complaints from smoke.

PCAPCD[1,2] and others[3,4] report that the utilization of woody biomass waste for energy as an alternative to open burning can provide significant air emissions mitigation for criteria pollutants, air toxics, and greenhouse gases, along with energy benefits through production of renewable energy in a well-controlled conversion process. To quantitatively value these benefits, PCAPCD is developing an emission reduction accounting framework and has sponsored several biomass waste-for-energy field operations to evaluate alternatives to minimize open burning.

EMISSION REDUCTION ACCOUNTING FRAMEWORK

The emission reduction framework is intended to provide a basis for financial support for the utilization of biomass wastes for energy in which the biomass waste under "baseline, business as usual" conditions would have been open-burned. This requires an evaluation of the economics of the biomass management alternatives and institutional and regional practices to demonstrate that the biomass waste would be open-burned without the additional financial contributions from a biomass project proponent. Biomass must also be shown to be a byproduct of forest or agricultural harvest projects that meet local, state, and federal environmental regulations, including the National Environmental Policy Act, the California Environmental Quality Act, and/or Best Management Practices. The biomass must also be demonstrated to be excessive to ecosystem needs.

Net emission reductions are considered to be the difference between the biomass energy project and the open burning baseline. As shown in Figure 2, the biomass project boundary includes processing (loading and chipping), transport, and the energy conversion plant. The baseline considers biomass open burning and the marginal generation of energy that was displaced by the biomass project. Table 1 details the project activities and data requirements for emissions reduction determinations that are real, permanent, quantifiable, verifiable, and enforceable.

Emissions from the forest management projects and agricultural operations that generate the excess biomass waste (e.g., chain saws and yarders) are not considered in the accounting framework because biomass removal is required for management purposes and will occur regardless of which biomass disposal option is pursued. Biomass waste that falls under the framework must have economic value that is less than the cost to process and transport (it must be a disposal burden). The biomass removal operations must be required for reasons (e.g., fire hazard reduction, forest management, timber production, or food production) that are unrelated to any potential biomass value. Furthermore, emission contributions from the biomass removal operations are minor compared with processing, transport, or open burning.[3,4]

Emissions from operations to process and transport fossil fuels, which are used in the baseline to provide equivalent energy and in the biomass project to facilitate wood chip transport and biomass processing/loading equipment, are not considered because of the difficulty of accurately defining their energy usage and emission characteristics.

It is anticipated that reductions resulting from biomass utilization projects may be banked or sold for air emissions and/or greenhouse gas mitigation obligations.

DEMONSTRATION PROJECT

PCAPCD and the County of Placer Biomass Program teamed with USFS, Sierra Pacific Industries (SPI), and the Sierra Nevada Conservancy to sponsor an on-the-ground biomass waste-for-energy demonstration project. The project targeted woody biomass waste piles that were originally generated from two USFS fuel reduction stewardship contracts implemented in 2007 on the Tahoe National Forest, American River Ranger District, which is located above Foresthill, CA. The stewardship contracts involved the thinning treatment of over 1215 ha of mixed conifer and ponderosa pine stands with 500-1000 trees/ha (preharvest). The thinning prescription had a target of

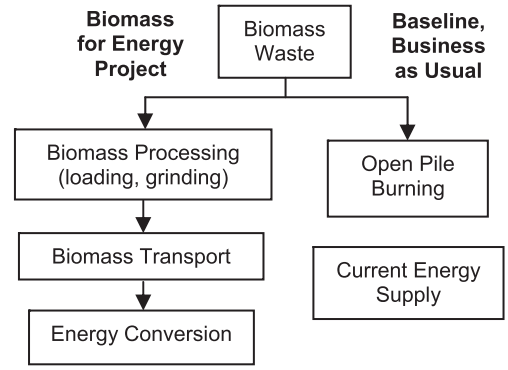


Figure 2. Biomass-for-energy project emission reduction procedure.

Table 1. Project data and monitoring.

Parameter	Method, Frequency
Biomass weight delivered to energy conversion facility	Transport vehicle weight scale, each separate delivery
Biomass moisture	Representative sample, when biomass source changes
Biomass heating value	Representative sample, when biomass source changes
Transport vehicle miles traveled and gas mileage	Vehicle odometer, fuel dispensing
Processing equipment diesel engine operating hours and fuel usage	Engine hour meter, fuel dispensing
Energy production efficiency of energy conversion facility	Fuel input and useful energy output
Emission factors for open pile burning	Literature review
Emission factors for fossil fuel combustion engines	Engine manufacturer, literature
Emission factor for grinding	Literature review
Emission factor for transport over unpaved roads	Literature review
Emission factors for biomass energy conversion facility	Source testing, annual
Emission factors for displaced energy	Marginal energy supply analysis, source testing

180–250 trees/ha at 7.6-m spacing through selected removal of trees 10–51 cm in diameter at breast height (DBH). Removed biomass that was greater than 15 cm DBH and greater than 3.1 m long was transported to a sawmill for processing into lumber products. The stewardship contracts called for unmerchantable slash to be piled at the site for later open burning, the traditional method of disposal.

For the demonstration project, a forest products contractor, Brushbusters, Inc., was retained to process and transport the woody biomass waste piles for use as fuel in a cogeneration facility located at a SPI lumber mill in Lincoln, CA. At each landing slash pile location, excavators were used to transfer the piles into a horizontal grinder. Wood chips from the grinder were conveyed directly into chip vans and transported to the SPI Lincoln mill, a 97-km one-way trip. Equipment and engines used for the chipping and transport operations are described in Table 2.

The SPI Lincoln sawmill facility includes a wood-fired boiler that produces steam for use in lumber drying kilns and a steam turbine that produces up to 18 MW of electricity. The boiler is a McBurney stoker grate design with a firing rate capacity of 88 MW that produces 63,560 kg of steam at 90 bar and 510 °C. It is fueled by biomass wastes including lumber mill wood wastes generated on-site (primarily sawdust), agricultural wastes including nut shells and orchard removals and prunings, wood waste from timber operations, and urban wood waste (tree trimmings and construction debris). The boiler utilizes selective noncatalytic reduction for control of nitrogen oxides (NO_x), multiclones, and a three-field electrostatic precipitator for particulate matter (PM) control. The net boiler heat rate is 16.8 MJ of heat input per kWh electric net, a net efficiency of 22%.

Table 2. Equipment and engines for biomass processing and transport.

Equipment	Vendor, Model, Year	Engine, Model, Horsepower
Horizontal grinder	Bandit Beast, model 3680, 2008	Caterpillar C18, Tier III, 522 kW
Excavator	Linkbelt, model 290, 2003	Isuzu CC-6BG1TC, 132 kW
Excavator	Linkbelt, model 135, 2003	Isuzu BB-4BG1T, 66 kW
Chip van	Kenworth, 1997	Cummins N14, 324 kW
Chip van	Kenworth, 2006	Caterpillar C13, 298 kW

During the period of April 14, 2008 through December 12, 2008, on 86 separate work days, 6096 bone-dry metric tons (BDT) (9537 green tons [GT]) of forest slash were collected, processed, and transported. A total of 444 separate chip vanloads were delivered to the SPI boiler, with each delivery averaging 13.7 BDT (21.5 GT).

The biomass processing machines (a grinder and two excavators) each worked a total of 265 hr and produced biomass fuel at the rate of 36.3 GT per hour of equipment operation. Diesel engine fuel consumption for the grinder and two excavators averaged 2.92 and 0.79 L/GT, respectively. This is comparable with the grinder fuel usage of 2.1 and 3.1 L/GT reported in other studies.[3,4] Chip transport truck/trailer diesel fuel usage averaged 1.9 km/L over the 193-km round trip (4.6 L/GT), also comparable to other studies.[3,4]

Biomass fuel delivered to the boiler had an average heating value of 20.9 MJ/kg, a moisture content of 36.1%, and an ash content of 2% dry weight. The boiler produced 7710 MWh of electricity utilizing biomass fuel from this project.

The biomass project significantly reduced the utilization of fossil fuels. The project required 511 MJ of diesel/BDT, but it displaced the need for 9806 MJ of natural gas/BDT for electricity generated by the biomass-fired cogeneration facility. Energy benefits would be greater if the fossil fuel energy required to collect, refine, and deliver fossil fuel to market (with added fossil fuel energy penalty on the order of 20%) was considered.[3]

Table 3 shows the emission factors used to calculate project and baseline operations, including NO_x, PM, carbon monoxide (CO), nonmethane volatile organics (NMOCs), methane (CH_4), and carbon dioxide (CO_2). Open pile burning factors considering numerous laboratory-, pilot-, and full-scale studies on conifer biomass are compiled in Table 4.[5–21] The burn pile emission factor was used with a burn pile consumption efficiency rate of 95%. Diesel engine combustion, chipping, and unpaved road travel emission factors are from the California Air Resources Board and the U.S. Environmental Protection Agency (EPA).[24–28] Biomass boiler factors are from annual

Table 3. Emission factors for project and baseline operations.

Process/Reference	Units	NO_x	PM	NMOC	CO	CO_2	CH_4
Open pile burning[5–20]	g/dry kg wood	3	6.5	5	63	1833	3
Chip van engine[24]	g/km traveled	10.6	0.25	0.31	25	1381	0.6
Chip van[25]	g/km unpaved road	–	300	–	–	–	–
Grinder engine[26]	g/kWh	3.1	0.18	0.16	4.0	530[b]	0.32
Excavator engine[26]	g/kWh	5.6	0.17	0.25	5.4	350[b]	0.51
Excavator engine[26]	g/kWh	6.4	0.26	0.31	6.7	370[b]	0.62
Grinder[27]	g/green kg wood	–	0.05	–	–	–	–
Biomass boiler[22]	g/GJ	52	7.7	1.7	73	88,000	4
Natural gas combined cycle[23]	Kg/MWh	0.016	0.011	0.002	0.005	384	–
California in-state electricity production[a28]	Kg/MWh	0.08	0.025	0.01	0.13	250	–

Notes: [a]Shown for comparison purposes; [b]Determined from engine diesel fuel usage, operating hours, and rated power output.

manual method stack sampling test programs and continuous emission monitors that are required by PCAPCD to demonstrate compliance with permit limits.[22] Electricity production factors are from the displacement of marginal power from a local utility natural gas combined cycle 120-MW plant that uses selective catalytic reduction and oxidation catalysts for NO_x and CO control.[23] For comparison, overall California state electricity generation emissions factors are also shown.[28]

Table 5 compares biomass project emissions with baseline (open pile burning) emissions. The project reduced PM emissions by 98% (6 kg PM/BDT biomass), NO_x emissions by 54% (1.6 kg NO_x/BDT), NMOC emissions by 99% (4.7 kg NMOCs/BDT), CO emissions by 97% (58 kg CO/BDT), and CO_2 equivalent (CO_2e; determined as $CO_2 + 21 \times CH_4$) emissions by 17% (0.38 t CO_2e/BDT).

The cost to process and transport the piles to the SPI cogeneration facility averaged $64.40/BDT, including $33/BDT to process and $31/BDT to transport the piles. The competitive market value at the time of the project for biomass sourced from timber harvest residual in the central Sierra Nevada region was approximately $33/BDT. The cost to dispose of the biomass wastes at the site of generation with open pile burning is relatively small. Thus, the demonstration program operated with a cost deficit of $31.30/BDT biomass processed.

For the demonstration project to be economically viable, the cost to process and deliver the biomass must be reduced, the price paid at the cogeneration facility must be increased, and/or emission reduction credits must be sold. To break even, emission reduction credits would need to be valued for CO_2e at $83/t CO_2e, NO_x at

Table 4. Emission factors for open pile burning of woody biomass.

Source, Reference, Test Conditions, Material Type	Material Type	Emission Factor (g/kg dry biomass burned)				
		PM	CO	CH_4	NMOC	NO_x
EPA AP-42,[18] conifer logging slash, piled	Flaming	4	28	1.0	–	–
	Smoldering	7	116	8.5	–	–
	Fire	4	37	1.8	–	–
EPA AP-42,[17] pile burn	Unspecified	14	116	4.7	15	–
	Fir, cedar, hemlock	3.4	75	1	3.4	–
	Ponderosa pine	10	164	2.9	9	–
Ward et al.,[19] Hardy,[10] consume model, 90% consumption efficiency	Dozer piled	6	77	6	4	–
	Crane piled	13	93	11	8	–
	Consume 90% consumption efficiency	9	80	3.8	3.1	–
Jenkins et al.,[12] wind tunnel simulator	Almond	5	53	1.3	10	4
	Douglas fir	7	56	1.5	6	2
	Ponderosa pine	6	43	0.9	4.4	3
	Walnut tree	5	71	2.0	7	5
Lutes and Kariher,[14] pilot, land clearing piles		7–22	19–29	–	4–16[a]	0.2–2
Andreae and Merlet,[5] literature compilation		5–17	81–100	–	–	–
Janhall et al.,[11] literature compilation, forest residues		8	–	–	–	–
Chen et al.,[7] laboratory	Ponderosa pine wood	4	17	–	0.5[a]	0.8
	Ponderosa pine needles	3.3	32	–	3.5[a]	4.1
Freeborn et al.,[8] laboratory, pine, fir, aspen		7	50	–	–	4
McMeeking et al.,[16] laboratory, pine, fir		–	90	3.7	5	2.2
Yokelson et al.,[20] pilot	Broadcast	8	–	–	2[a]	3
	Slash	4	–	–	2[a]	2
	Crowns	–	–	–	4[a]	3

Notes: [a]Total hydrocarbons.

Table 5. Emissions comparison: open pile burning vs. biomass energy.

	Air Emissions (t)						
Operation	**NO_x**	**PM**	**NMOC**	**CO**	**CO_2**	**CH_4**	**CO_2e[a]**
Baseline, open pile burning							
Open pile burning	17.37	37.65	28.96	362	10,618	17.37	10,983
Displaced power from grid	0.47	0.28	0.06	1	2,733		2,733
Total	17.84	37.93	29.02	363	13,352	17.37	13,717
Biomass project							
Boiler	6.58	0.98	0.22	9	11,178	0.55	11,189
Process and transport							
Grinding	0.43	0.52	0.02	1	73	0.04	74
Loading	0.31	0.01	0.01	0	19	0.03	19
Chip van transport	0.91	0.02	0.03	2	118	0.05	119
Total	8.23	1.53	0.28	12	11,388	0.70	11,402
Emissions reductions	9.62	36.39	28.74	350	1,965	16.7	2,315
Percent reduction	54%	96%	99%	97%	15%	96%	17%

Notes: [a]CO_2e determined as $CO_2 + 21 \times CH_4$.

$19,570/t NO_x, or at a lower price if a combination of pollutant credits is sold. Biomass market fuel prices are trending upward partly because of an increased demand for renewable energy (resulting from the California Renewable Portfolio Standard).

Opportunities were identified to significantly reduce future biomass waste processing costs through maximizing equipment productive work time (minimizing equipment downtime and mobilization) by careful formation of piles, creation of larger piles, and efficient scheduling and coordination of truck transport and grinding equipment. In particular, the grinder (the most expensive cost center) was frequently idle while waiting for the arrival of chip truck transport. Cost reductions can be achieved through operating the grinder closer to full time by using additional chip trucks or grinding into piles that are subsequently loaded into chip trucks at a later time with less expensive equipment such as front-end loaders.

The largest source of uncertainty in the emissions determinations is from the biomass open pile burning emissions factor. Open pile burn emission factors vary depending on woody biomass chemical composition (moisture, ash), physical characteristics (pile packing size and arrangement, biomass particle size), and atmospheric conditions (temperature, humidity, wind speed). Variability in the biomass open pile burn emissions factor will impact the magnitude of the emission reductions, but it will not alter the conclusion that emissions from the biomass energy project are lower compared with open pile burning. Variability for emissions from the diesel engines, biomass boiler, and displaced electricity grid operations are not significant to the project results because emissions factors from the processes are well established, process operating rates are accurately measured and monitored, the processes are inherently steady, and contributions from these sources are generally much smaller than those from open pile burning.

The demonstration project results are readily applicable to a very broad range of potential forest sourced biomass projects throughout the West and the entire United States. The biomass energy recovery boiler design, operation, and performance used for the demonstration project are representative of existing plants that are in commercial service throughout the United States. Emission contributions from biomass processing and transport are very small in comparison with traditional open pile burning. Thus variations in grinding efficiency, transportation distance, and engine emission characteristics will have very little impact on emission reductions. Transportation distance has a significant impact on the economic viability of biomass energy projects, adding approximately $0.13/BDT per additional kilometer traveled, but it has very little impact on emission benefits.

CO_2 benefits are strongly dependent on the CO_2 emissions profile from the displaced marginal electricity source. Reductions will be much greater than achieved in the demonstration project for biomass projects in areas where coal firing is prevalent, whereas benefits will be minimal in areas where production is from lower CO_2-emitting sources such as hydroelectric and/or nuclear sources.

NO_x benefits are somewhat dependent on biomass boiler performance. NO_x reductions will be significantly greater than in the demonstration program for low NO_x-emitting systems including emerging energy conversion technologies such as gasification, pyrolysis, and fuel cells and recently constructed or modified biomass boilers that use selective catalytic reduction.

CONCLUSIONS

A framework is developed to quantify air emission reductions for projects that utilize woody biomass waste as fuel for energy production as an alternative to open burning. A demonstration project was conducted involving the grinding and 97-km transport of forest slash in the Sierra Nevada foothills for use in a biomass-fired cogeneration boiler. Significant air emission benefits were obtained: PM emissions were reduced by 98% (6 kg PM/BDT), NO_x emissions by 54% (1.6 kg NO_x/BDT), NMOC emissions by 99% (4.7 kg NMOC/BDT), CO emissions by 97% (58 kg CO/BDT), and CO_2e emissions by 17% (0.38 t CO_2e/BDT).

PM, NO_x, CO, and volatile organic emission reductions result from the utilization of biomass wastes in an

energy conversion process that provides efficient combustion and uses add-on control methods for PM and NO_x emissions compared with the inefficient and uncontrolled disposal of biomass wastes using traditional open burning techniques. CO_2e benefits result from the production of renewable energy that displaces marginal supply and elimination of CH_4 emissions from open burning.

Biomass processing (grinding) and transport operations have a significant cost burden on the biomass energy project but a negligible contribution to air emissions. CO_2e benefits are strongly dependent on the CO_2e emission characteristics of the displaced marginal energy generation; benefits will be much greater for projects in regions where coal firing is predominant. Recognition of the value of emission benefits through sale of emission reduction credits will improve the financial performance of biomass power generation facilities and allow them to access more forest- and agricultural-sourced biomass waste fuel.

ACKNOWLEDGMENTS

Project success was the result of the extraordinary efforts of Ben Wing and Carson Conover (Brushbusters, Inc.), Karen Jones (retired; USFS Tahoe National Forest), Mark Pawlicki and David Harcus (SPI), and Julie Griffith-Flatter (Sierra Nevada Conservancy).

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About the Authors

Bruce Springsteen is an associate engineer, Tom Christofk is director and an air pollution control officer, and Steve Eubanks is a forest consultant with PCAPCD in Auburn, CA. Tad Mason is chief executive officer and a registered professional forester with TSS Consultants in Rancho Cordova, CA. Chris Clavin is a senior engineer with TSS Consultants. Brett Storey is a senior management analyst and biomass program manager with the Placer County Planning Department. Please address correspondence to: Bruce Springsteen, Placer County Air Pollution Control District, 3091 County Center Drive, Suite 240, Auburn, CA 95603; phone: +1-530-745-2337; fax: +1-530-745-2373; e-mail: bsprings@placer.ca.gov.

Attachment 12

Project Video

A video was produced to document the biomass waste for energy GHG offset credit project. It can be accessed and viewed through the Placer County website by clicking on the link below:

http://www.placer.ca.gov/Departments/CommunityDevelopment/Planning/Biomass.aspx

Attachment 13

SPI Lincoln Boiler Heat Rate

The SPI Lincoln co-generation boiler burns lumbermill, forest, urban wood, and agricultural biomass wastes to produce steam. The steam is used in an on-site steam turbine to produce electricity. A fraction of the steam is extracted from the back end stages of the steam turbine and supplied to a lumber drying kiln. The extraction rate fluctuates and is dependent on the lumber drying kiln thermal drying requirements, which changes based on factors including lumber load, desired kiln drying temperature, and ambient temperature and humidity.

Boiler heat rate, assuming the steam supplied to the lumber drying kilns is instead routed to a steam turbine to produce electricity, has been reported as 16,145 Btu/kWh based on discussion with turbine and boiler vendor and manufacturer, see attached email from Bob Ellery (SPI) to Bruce Springsteen (PCAPCD) dated June 18, 2008. This heat rate is consistent with those reported from other California biomass boilers of the same size which solely produce electricity.

As a separate and independent confirmation, the SPI Lincoln boiler heat rate has been calculated based on reporting required under the CARB AB32 Greenhouse Gas Mandatory Reporting Regulation. The 2013 report is attached. Electricity production that would be possible if the extracted steam sent to the lumber drying kilns is instead sent to a steam turbine has been estimated using the US Department of Energy, Energy Efficiency and Renewable Energy Department, Steam Turbine Calculator. As documented in the attached spreadsheet, the projected heat rate is 16,158 Btu/kWh.

Bruce Springsteen

From: Bruce Springsteen
Sent: Wednesday, June 18, 2008 5:10 PM
To: 'Bob Ellery'
Cc: Ron Gaston; 'Frederick Tornatore'; 'Tad Mason'
Subject: RE: Heat Rate for Lincoln Boiler

Bob: Thanks for taking the time to track down this info – is this from the boiler and/or turbine manufacturer.

Bruce Springsteen
Associate Engineer
Placer County Air Pollution Control District
3091 County Center Drive, Suite 240
Auburn, CA 95603
Direct: (530) 745-2337
Main Office: (530) 745-2330
Fax: (530) 745-2373
E-Mail: bsprings@placer.ca.gov
==========

From: Bob Ellery [mailto:BEllery@spi-ind.com]
Sent: Wednesday, June 18, 2008 3:10 PM
To: Bruce Springsteen
Cc: Ron Gaston
Subject: RE: Heat Rate for Lincoln Boiler

Bruce,
Power output assuming no steam to dry kilns would be 19,530 kW gross or about 17,900 kW net. Assuming 289 MMBTu/hr gives a heat rate of 14,800 gross or 16,145 net.
Bob

> -----Original Message-----
> **From:** Bruce Springsteen [mailto:BSprings@placer.ca.gov]
> **Sent:** Wednesday, June 11, 2008 8:19 AM
> **To:** Bob Ellery
> **Subject:** Heat Rate for Lincoln Boiler
>
> Bob: We are estimating the CO2 benefits from the SEP project work on USFS land above Foresthill -- moving chipped slash piles to the Lincoln boiler (targeting 10,000 tons of materials). To do this, we need the heat rate (electricity generation efficiency) of the Lincoln boiler. Ron has given us the total boiler heat input, and electricity prod of about 18 MW, but because of the co-gen aspect, I'm struggling to get a heat rate that would be achieved if all steam when to the steam turbine. Do you have a well documented heat rate for the McBurney boiler. Thanks for you time. Bruce
>
> Bruce Springsteen
> Associate Engineer
> Placer County Air Pollution Control District
> 3091 County Center Drive, Suite 240
> Auburn, CA 95603
> Direct: (530) 745-2337
> Main Office: (530) 745-2330
> Fax: (530) 745-2373

Have a great weekend.

Tad

From: Ron Gaston [mailto:RGaston@spi-ind.com]
Sent: Friday, May 23, 2008 3:25 PM
To: Tad Mason
Subject: RE: Heat Rate for SPI Lincoln Boiler

Hello Tad,

I will see what I can find. I don't know if you are looking for what the manufacturer put forth or an actual calculation from process data.

Ron Gaston
Power Plant Supervisor
Sierra Pacific Industries
Lincoln Division
(916) 434-2319
rgaston@spi-ind.com

-----Original Message-----
From: Tad Mason [mailto:tmason@tssconsultants.com]
Sent: Friday, May 23, 2008 3:11 PM
To: Ron Gaston
Cc: David Harcus
Subject: Heat Rate for SPI Lincoln Boiler

Ron – Dave Harcus provided your email address.

I am working with Placer County, helping them track CO2 with regards to sourcing biomass fuel from the woods (Foresthill area) and from biomass power plants.

In order to complete some of the CO2 calculations, we need to know the heat rate (BTU/kWh of output) for the new McBurney boiler at Lincoln.

Could you send along this info?

Thanks

Tad

Tad Mason, CEO
TSS Consultants
2724 Kilgore Road
Rancho Cordova, CA 95670

Office: 916.638.8811 ext. 112
Fax: 916.638.9326
Cell: 916.600.4174

Heat Rate Calculation

Plant: Sierra Pacific Industries, Lincoln Lumbermill, cogen boiler

			Notes
Wood Fuel			
Feedrate	137100	tons/yr	CARB AB32 GHG MRR line # 179
Heating value	8700	Btu/lb	average SPI plant biomass heating value
Heat input	2.39E+12	Btu/yr	consistent with QFER CEC-1304
Natural Gas	1.79E+04	MMBtu/yr	CARB AB32 GHG MRR line # 82
Steam Turbine			
Net plant electricity production	104548	MWh/yr	CARB AB32 GHG MRR line # 145, consistent with QFER CEC-1304
Kiln Steam			
Energy content of steam to kilns	894599	MMBtu/yr	CARB AB32 GHG MRR line # 111
Average mass of steam to kilns	87926	lb/hr	steam enthalpy of 1197 Btu/lb at 300F and 42 psig
Electricity Potential of Kiln Steam			
Electricity from condensing steam turbine	5.2	MW	US DOE EERE Steam Turbine Calculator, exhaust pressure = 2 in HgA
Total electricity	44200	MWh/yr	
Heat Rate	16158	Btu/kWh	

Facility Name: Sierra Pacific Industries (SPI) - Lincoln

Facility ARB ID: 101680
Facility Reporting Year: 2013

Certification Statement: The designated representative or alternate designated representative must sign (i.e., agree to) this certification statement. If you are an agent and you click on "SUBMIT", you are not agreeing to the certification statement, but are submitting the certification statement on behalf of the designated representative or alternate designated representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on behalf of the designated representative, not to sign (i.e., agree to) the certification statement.

Facility Representatives

Designated Representative: Dan Quarton
Agent: Mike Hess
Alternate Designated Representative: Anton Jaegel
Agent: David Brown

Facility Location

Physical Address: 1440 Lincoln Boulevard
City: Lincoln
State / Province: CA
ZIP / Postal Code: 95648
Country: USA

Latitude: 38.90432
Longitude: -121.31102

County: PLACER
Air Basin: SACRAMENTO VALLEY
District: PLACER COUNTY APCD

Mailing Address: 1440 Lincoln Boulevard
City: Lincoln
State / Province: CA
ZIP / Postal Code: 95648
Country: USA

Payment Information (required if subject to AB 32 Cost of Implementation Fee Regulation)

Responsible Party for Payment:
Responsible Party Email:
Responsible Party Phone:
Billing Address:
City:
State / Province:
ZIP / Postal Code:
Country:

Owners / Operators

Name: Sierra Pacific Industries

GHG Quantity

CO2 equivalent emissions (excluding biogenic) from subpart C - AA: 5,552.7348 Metric Tons
CO2 equivalent quantity from supplier categories, including biogenic (subparts MM - PP): 0 Metric Tons
Exempt Biogenic CO2 emissions from subpart C - AA: 218,620 Metric Tons
CO2 equivalent emissions from electric power entities: 0 Metric Tons
Covered CO2 equivalent emissions: 5,552.7 Metric Tons

De Minimis CO2 equivalent emissions: 5,553.1 Metric Tons
Maximum allowable De Minimis emissions: 6,725.2 Metric Tons

General Facility Reporting Information

NAICS Codes

Primary: 321113 (Sawmills)
Second Primary: 221119 (Other Electric Power Generation)
Additional:

U.S. Parent Companies

Parent Company Name: Sierra Pacific Industries
Address: 19794 Riverside Avenue, Redding, CA 96049
Percentage of Ownership Interest: 100%

GHG Report Start Date: 2013-01-01
GHG Report End Date: 2013-12-31
Explanation of any calculation methodology changes during the reporting year:

EPA e-GGRT Facility IDs

101680

Full or Abbreviated GHG Report: Full
Company or Entity qualifies for Small Business Status: No
Confidential Data and Other Comments:

Electricity Purchases/Acquisitions for Reporting Facilities (95104(d))

Electricity Provider's Name: Pacific Gas and Electric Company (PG&E)
Provider's ARB ID: 3002
Purchases/Acquisitions (MWh): 4,128

Natural Gas Purchases/Acquisitions for Reporting Facilities [95115(k), 95103(a)(1)]

Natural Gas Provider Name: BP
Provider's ARB ID:
Customer Number: 90078008
Purchases/Acquisitions (MMBtu): 17,943

Increases and Decreases in Facility Emissions [95104(f)]:

Have facility emissions increased or decreased more than five percent in relation to the previous data year? No
Note: This section is not subject to the third-party verification requirements

Electricity Generation

Facility has the capacity to generate electricity: Yes
CEC ID (if applicable): E0004
EIA ID (if applicable): 10144
FERC QFID (if applicable): QF96-76-000
CAISO ID (if applicable): 29500
Total Facility Nameplate Generating Capacity: 18.4 MW
Facility Type: Independently operated and sited cogeneration facility
Facility's Energy Disposition: Grid-dedicated facility

Disposition of Generated Electricity [95112(a)(4)]

Generated Electricity for Grid Disposition [95112(a)(4)(A)]

Unit, System Or Group Name SPI Lincoln
Retail Provider/Marketer Name Pacific Gas and Electric Company (PG&E)
Electricity Provided or Sold (MWh) 69,750

Generated electricity used for other on-site industrial processes that are not in support of or a part of the power generation system: 35,028 MWh

Reported emissions include emissions from a cogeneration/bigeneration unit: Yes
Parasitic Steam Use: Generated thermal energy used for supporting power production (excluding steam used directly for generating electricity) [95112(a)(5)(B)]: 2,012,628 MMBtu

Generated thermal energy for on-site industrial applications not related to electricity generation [95112(a)(5)(C)]: 894,599 MMBtu

Description of the excluded data and an estimated magnitude of the excluded product(s) using best available methods [95103(l)]:

Subpart C: General Stationary Fuel Combustion

Gas Information Details

Gas Name	**Gas Quantity** (Metric Tons)
Methane	74.6003
Nitrous Oxide	9.7907
Carbon Dioxide	951
Exempt Biogenic Carbon dioxide	218,620

Total Covered CO2e Emissions: 5,552.7 (Metric Tons)

Emissions shown above that are claimed as De Minimis (CO2e): 5,553.0727 Metric Tons

Unit Details
Unit Name: McBurney Boiler
Configuration Type: Single Unit Using Tiers 1, 2, or 3
Unit Type: S (Stoker Boiler)
Unit Description: McBurney Boiler with air fuel distributors to grate
Individual Unit Details
Maximum Rated Heat Input Capacity: 289.3 mmBtu/hr
Electricity Generation Unit Information
Does this configuration have the capacity to generate electricity? Yes
Is this configuration a Part 75 unit? Yes
Nameplate Generating Capacity: 18.4 MW
Prime Mover Technology: Boiler with Steam Turbine
Type of Thermal Energy Generation: Cogeneration Topping Cycle
95112(b)(2): Gross Generation: 119,069 MWh
95112(b)(2): Net Generation: 104,548 MWh
95112(b)(3): Total Thermal Output (for Cogeneration or Bigeneration): 1,583,505 MMBtu
95112(b)(8): Other Steam Used for Electricity Generation:
95112(b)(8): Input Steam to the Steam Turbine (for bottoming cycle cogeneration units only)
95112(b)(8): Output of the Heat Recovery Steam Generator (for bottoming cycle cogeneration units only)
95112(e): Geothermal Steam Utilized:

95112(f): Stationary Hydrogen Fuel Cell: Fuel Type and Provider (if not reported elsewhere)
Additional Comments and Information

Emission Details: Configuration-Level Summary (User entered values)

Total exempt annual biogenic CO2 mass emissions (must equal the sum of calculated annual exempt biogenic CO2) (metric tons): 218,619.7
Annual CO2 emissions from sorbent (metric tons): 0

Fuel-Specific Emissions Information

Fuel: Forest-derived Wood and Wood Waste - Biomass-Derived Fuels - Solid
Calculation Methodology: Tier 2 (Equation C-2c, steam generation)
Methodology Start Date: 2013-01-01
Methodology End Date: 2013-12-31
Frequency of HHV determinations:

Fuel Emission Details

Total CO2 emissions: 218,619.66 Metric Tons
Total CH4 emissions: 74.5824 Metric Tons (Claimed as de minimis)
Total N2O emissions: 9.7889 Metric Tons (Claimed as de minimis)
Total CH4 emissions CO2e: 1,566.2304 Metric Tons (Claimed as de minimis)
Total N2O emissions CO2e: 3,034.5714 Metric Tons (Claimed as de minimis)

Equation Inputs

Mass of steam generated by MSW or solid fuel combustion: 1,371,000,000 Pounds

Ratio of the boiler's max rated heat input capacity to its design rated steam output capacity: 0.0017 mmBtu/lb steam
Fuel Specific CO2 Emissions Factor: 93.8 kg CO2/MMBtu
Fuel Specific CH4 Emissions Factor: 0.032 kg CH4/MMBtu
Fuel Specific N2O Emissions Factor: 0.0042 kg N2O/MMBtu
Annual Mass or Volume of Fuel Combusted: 137,100 short tons

HHV Substitute Data Information - Identify each month for which the monthly HHV value is calculated using one or more substitute data values.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N	N	N	N	N	N	N	N	N	N	N	N

Fuel: Natural Gas - Natural Gas
Calculation Methodology: Tier 1 (Equation C-1a, natural gas billing in therms)
Methodology Start Date: 2013-01-01
Methodology End Date: 2013-12-31

Fuel Emission Details

Total CO2 emissions: 951.3379 Metric Tons (Claimed as de minimis)
Total CH4 emissions: 0.0179 Metric Tons (Claimed as de minimis)
Total N2O emissions: 0.0018 Metric Tons (Claimed as de minimis)
Total CH4 emissions CO2e: 0.3768 Metric Tons (Claimed as de minimis)
Total N2O emissions CO2e: 0.5562 Metric Tons (Claimed as de minimis)

Equation Inputs

	A	B	C	D	E	F	G	H	I	J	K	L
202	Annual Natural Gas Usage: 179,430 therms											
203	Fuel Specific CO2 Emissions Factor: 53.02 kg CO2/MMBtu											
204	Fuel Specific CH4 Emissions Factor: 0.001 kg CH4/MMBtu											
205	Fuel Specific N2O Emissions Factor: 0.0001 kg N2O/MMBtu											
206	Annual Volume of Fuel Combusted: 17,458,539 scf											
207	**Time And Date Report Generated**: 08/22/2014 08:27											

U.S. Department of Energy - Energy Efficiency and Renewable Energy
Advanced Manufacturing Office

Steam Turbine Calculator

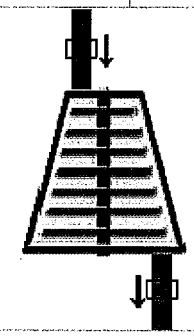
Calculates the energy generated or steam outlet conditions for a steam turbine.

Solve for:	
Outlet Properties	
Inlet Steam	
Pressure*	42 *psig*
Temperature *	300 *°F*
Turbine Properties	
Selected Turbine Property	Mass Flow
Mass Flow *	88 *klb/hr*
Isentropic Efficiency *	80 %
Generator Efficiency *	97 %
Outlet Steam	
Pressure*	-13.7 *psig*
** Required*	Enter [reset]

WARNING:

- Steam Condensing in Turbine

Inlet Steam		Mass Flow	88.0 *klb/hr*
Pressure	42.0 *psig*	**Sp. Enthalpy**	1,182.7 *btu/lbm*
Temperature	300.0 *°F*	**Sp. Entropy**	1.657 *btu/lbm/R*
Phase	Gas	**Energy Flow**	104.1 *MMBtu/hr*



Isentropic Efficiency	80.0 %
Energy Out	18.1 *MMBtu/hr*
Generator Efficiency	97.0 %
Power Out	5,155.6 *kW*

Outlet Steam		Mass Flow	88.0 *klb/hr*
Pressure	-13.7 *psig*	**Sp. Enthalpy**	976.7 *btu/lbm*
Temperature	101.6 *°F*	**Sp. Entropy**	1.749 *btu/lbm/R*
Saturated	0.88	**Energy Flow**	85.9 *MMBtu/hr*

Calculation Details and Assumptions below

Calculation Details

Step 1: Determine Inlet Properties
Using the Steam Property Calculator, properties are determined using Inlet Pressure and the selected second parameter (Temperature Specific Enthalpy, Specific Entropy, or Quality). The Specific Enthalpy is then multiplied by the Mass Flow to get the Energy Flow:

- **Pressure** = 42.0 *psig*
- **Temperature** = 300.0 *°F*
- [Steam Property Calculator] => **Specific Enthalpy** = 1,182.7 *btu/lbm*

- **Inlet Energy Flow = Specific Enthalpy * Mass Flow**
  [**Inlet Energy Flow** = 104.1 *MMBtu/hr* = 1,182.7 *btu/lbm* * 88.0 *klb/hr*]

Step 2: Calculate Ideal Outlet Properties (Inlet Entropy equals Outlet Entropy)

- **Pressure** = -13.7 *psig*
- **Specific Entropy** = 1.657 *btu/lbm/R*
- [Steam Property Calculator] => **Specific Enthalpy** = 925.1 *btu/lbm*

Step 3: If solve for 'Isentropic Efficiency', Determine Outlet Properties
Using the outlet specific enthalpy, calculate the isentropic efficiency:

- **Isentropic Efficiency = (Inlet Specific Enthalpy - Outlet Specific Enthalpy) / (Inlet Specific Enthalpy - IDEAL Outlet Specific Enthalpy)**

Step 3: If solve for 'Outlet Properties', Determine Outlet Specific Enthalpy

Examples: *Mouse Over*

1. **Isentropic Efficiency = (Inlet Specific Enthalpy - Outlet Specific Enthalpy) / (Inlet Specific Enthalpy - IDEAL Outlet Specific Enthalpy)**
2. **Isentropic Efficiency * (Inlet Specific Enthalpy - IDEAL Outlet Specific Enthalpy) = (Inlet Specific Enthalpy - Outlet Specific Enthalpy)**
3. **Outlet Specific Enthalpy = Inlet Specific Enthalpy - Isentropic Efficiency * (Inlet Specific Enthalpy - IDEAL Outlet Specific Enthalpy)**
   [**Outlet Specific Enthalpy** = 976.7 *btu/lbm* = 1,182.7 *btu/lbm* - 80.00 *%* * (1,182.7 *btu/lbm* - 925.1 *btu/lbm*)]

Using the outlet specific enthalpy, calculate the outlet properties:

- **Pressure** = -13.7 *psig*
- **Specific Enthalpy** = 976.7 *btu/lbm*
- [Steam Property Calculator] => **Temperature** = 101.6 *°F*

Step 4: Calculate Steam Turbine Energy Out and Generation (Power Out)

- **Energy Out = (Inlet Specific Enthalpy - Outlet Specific Enthalpy) * Mass Flow**
  [**Energy Out** = 18.1 *MMBtu/hr* = (1,182.7 *btu/lbm* - 976.7 *btu/lbm*) * 88.0 *klb/hr*]

- **Power Out = Energy Out * Generator Efficiency**
  [**Power Out** = 5,155.6 *kW* = 18.1 *MMBtu/hr* * 97.00 *%*]

Assumptions

- Inlet Mass Flows equal Outlet Mass Flow.

QFER CEC-1304 Power Plant Owner Reporting Database

Category	v 2013 ^	Company Name	Plant ID	Plant Name	Net MWh	Main MMBTU	Heat Rate
E	2013	Sierra Pacific Industries Inc	E0004	SPI - Lincoln	104548	2467800	23.60446876