Emission Reduction Techniques – Applicability Rules for Projection EI

(Day 2 – 815-1000)

Phase III/IV Project

Technical Workshop #2

November 1-2, 2005 – San Diego, CA

Desired Outcome

3. Agreement on methods to apply Emission Reduction Techniques (ERT) to the projection emission inventories.

ERT's – What do we need?

- Relatively simple set of rules to quantitatively account for the application of ERT's on Rx fire events in the projection inventories.

ERT APPLICATION RULES
Implementation

Entire EI	Controllable Portion of the EI	Regulatory Will of the Agencies - % of Contollable Acres to which ERT's are applied	Emission reductions due to ERTs	Technical Implementation
Rx Events	ANTH Portion of Rx Events	AGGRESSIVE		FOR EACH EVENT TO WHICH ERT'S ARE APPLIED:
		ANTH Events Subject to ERT Rules	ANTH Events to which ERT's are applied (a function of the Freq of Use of the ERT in the sub-region)	**EMISSIONS X (1-ERF)**
		LIKELY		
		ANTH Portion of Rx Events	ANTH Events to which ERT's are applied	
		LEAST AGGRESSIVE		
		ANTH Portion of Rx Events	ANTH Events to which ERT's are applied	

Table 1 - ERT Emission Reduction Factors

Emissions Reduction Method	Percent PM2.5 Emission Reduction SOUTHWEST (CA, NV, UT, AZ, NM)							
	Primary Fuel Type							
	Grass	Ref	Brush	Ref	Timber	Ref	Crop (ag)	Ref
Pre-Burn Fuel Removal	% rem		% rem		% rem		% rem	
Firewood Sales					% rem			
Mechanical Processing	% rem		% rem		% rem		% rem	
Biomass Utilization (exept for Elect Gen)	% rem		% rem		% rem		% rem	
Mosaic Burning	% nb		% nb		% nb			
Ungulates	67%	1						
Burn More Frequently			83%	1				
Underburn Before Litter Fall								
Burn Before Green Up	46%	4					46%	4
Backing Fire (grass, pine needle litter)	67%	2	45%	2	45%	2	50%	3
Maintain fire line intensity (grass, PNL, other)	50%	2	50%	2	50%	2	50%	2
Isolating Fuels					10%	2		
Concentration Burning					70%	2		
Chemical Treatment								
High Moisture in Large Fuels					43%	1		
Moist Litter and Duff					26%	1		
Burn Before Large Activity Fuels Cure					44%	1		
Aerial Ignition/Mass Ignition	10%	1	10%	1	10%	1	10%	1
Rapid Mop-Up			10%	2	10%	2		
Windrow Burning			13%	1	13%	1	13%	1
Pile Burning			70%	2	70%	2	70%	2
Air Curtain Incinerators							85%	3

	Grass	Ref	Brush	Ref	Timber	Ref	Crop (ag)	Ref
Seasonal ERT Suites:								
Spring suite (list ERT's using brief terms)								
Summer suite (list ERTs)								
Fall suite (list ERTs)								
Winter suite (list ERTs)								

	Emission reduction factor References
% rem	Enter % (by mass) of fuel removed due to ERT application
% nb	Enter % of acres not blackened due to ERT application
	Emission Reduction Method not applicable to veg type
	ERT NEVER/RARELY used in region
	ERT OCCASSIONALLY used, most approp ERT used
	ERT COMMONLY/VERY COMMONLY used, ERT for any veg type used
	ERT COMMONLY/VERY COMMONLY used, most approp ERT used

Table 1 - ERT Emission Reduction Factors

Emissions Reduction Method	Percent PM2.5 Emission Reduction NORTHWEST (OR, WA, AK)								Percent PM2.5 Emission Reduction INTERMOUNTAIN WEST (CO, MT, WY, ID)							
	Primary Fuel Type								Primary Fuel Type							
	Grass	Ref	Brush	Ref	Timber	Ref	Crop (ag)	Ref	Grass	Ref	Brush	Ref	Timber	Ref	Crop (ag)	Ref
Pre-Burn Fuel Removal	% rem		% rem		% rem		% rem		% rem		% rem		% rem		% rem	
Firewood Sales					% rem								% rem			
Mechanical Processing	% rem		% rem		% rem		% rem		% rem		% rem		% rem		% rem	
Biomass Utilization (exept for Elect Gen)	% rem		% rem		% rem		% rem		% rem		% rem		% rem		% rem	
Mosaic Burning	% nb		% nb		% nb				% nb		% nb		% nb			
Ungulates	67%	1							67%	1	67%	1	67%	1	67%	1
Burn More Frequently			83%	1					83%	1	83%	1	83%	1		
Underburn Before Litter Fall																
Burn Before Green Up	46%	4					46%	4	46%	4					46%	4
Backing Fire (grass, pine needle litter)	67%	2	45%	2	45%	2	50%	3	67%	2	45%	2	45%	2	50%	3
Maintain fire line intensity (grass, PNL, other)	50%	2	50%	2	50%	2	50%	2	50%	2	50%	2	50%	2	50%	2
Isolating Fuels					10%	2							10%	1		
Concentration Burning			70%	2	70%	2					70%	2	70%	2	70%	2
Chemical Treatment																
High Moisture in Large Fuels					43%	1							43%	1		
Moist Litter and Duff					26%	1							26%	1		
Burn Before Large Activity Fuels Cure					44%	1							44%	1		
Aerial Ignition/Mass Ignition	10%	1	10%	1	10%	1	10%	1	10%	1	10%	1	10%	1	10%	1
Rapid Mop-Up			10%	2	10%	2					10%	2	10%	2		
Windrow Burning			13%	1	13%	1	13%	1			13%	1	13%	1	13%	1
Pile Burning			70%	2	70%	2	70%	2			70%	2	70%	2	70%	2
Air Curtain Incinerators							85%	3							85%	3

	Grass	Ref	Brush	Ref	Timber	Ref	Crop (ag)	Ref	Grass	Ref	Brush	Ref	Timber	Ref	Crop (ag)	Ref
Seasonal ERT Suites:																
Spring suite (list ERT's using brief terms)																
Summer suite (list ERTs)																
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Winter suite (list ERTs)																

	Emission reduction factor References
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ERT Table “Boiled-up” -- Seasonal Suites of ERTs --

- List common combinations of ERT’s applied during each season for the four vegetation types (Grass, Brush, Timber, Crop).
- From available Emission Reduction Factor (ERF) information, assign a single ERF to each seasonal suite of ERTs.
- From the Regional Use of ERTs information, assign a Frequency of Use (FOU) to each ERF.
- Prepare the Seasonal Suite table for each sub-region.

Seasonal ERT Suites

	Northwest OR, WA, AK			
	ERT Suite			
	Grass	Brush	Timber	Crop
Spring	5,6,7,8,10,11,14,18	3,8,9,12,13,	1,12,15,16,18,19,22	
Summer	18,6	6,7,10,11,18	1,2,3,4,22	1,2,3,10
Fall	9,10,11	3,10,11,13,18	1,2,4,12,13,17,18,21,22	20,21,22
Winter	5,9,12	2,5,17,19	12,13,15,16,17,20,21,22	20,21,22

Seasonal ERT Suites

	Northwest OR, WA, AK ERT Suite Grass	Brush	Timber	Crop
Spring	5,6,7,8,10,11,14,18	3,8,9,12,13,	1,12,15,16,18,19,22	
Summer	18,6	6,7,10,11,18	1,2,3,4,22	1,2,3,10
Fall	9,10,			
Winter	5,9,1			

	Northwest OR, WA, AK ERT Suite Description			
Spring	burning techniques and burn pre-max loading	careful control of what is burned	high moisture and limited consumption	intense burning of relatively low fuel-load fuels
Summer	burning techniques and burn pre-max loading	burn pre-max loading	high moisture before new fuels appear	n/a
Fall	grazing	burning techniques	fuels reduction	fuel reduction low intensity burning
Winter	low moisture; low intensity burns	manage fuels and burning techniques	true combinations of multiple strategies; control from fuel reduction and burning method	intense burning of relatively low fuel-load fuels

Seasonal ERT Suites

	Northwest OR, WA, AK			
	ERT Suite			
	Grass	Brush	Timber	Crop
Spring	5,6,7,8,10,11,14,18	3,8,9,12,13,	1,12,15,16,18,19,22	
Summer	18,6	6,7,10,11,18		
Fall	9,10,11	3,10,11,13,18		
Winter	5,9,12	2,5,17,19		

	Northwest OR, WA, AK			
	ERT Suite Description			
Spring	burning techniques and burn pre-max loading	careful control of what is burned	high moisture and limited consumption	intense burning of relatively low fuel-load fuels
Summer	burning techniques and burn pre-max loading	burn pre-max loading	high moisture before new fuels appear	n/a

	Northwest OR, WA, AK							
	Grass		Brush		Timber		Crop	
	ERF	FOU	ERF	FOU	ERF	FOU	ERF	FOU
Spring	10%	25%	70%	25%	25%	60%	75%	25%
Summer	55%	25%	70%	10%	40%	60%	0%	0%
Fall	65%	10%	45%	75%	45%	10%	30%	60%
Winter	65%	25%	65%	75%	53%	75%	70%	75%

ERT Aggressiveness Scalars STRAWMAN

- Most aggressive – 100% of ANTH acres
- Likely – 309 states apply ERT's to 80% of ANTH acres; 308 states apply to 60%
- Least aggressive – 309 states apply to 40% of ANTH acres; 308 states to 30%

Emission Preview Tool