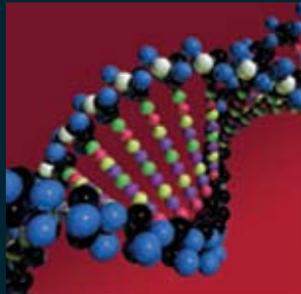
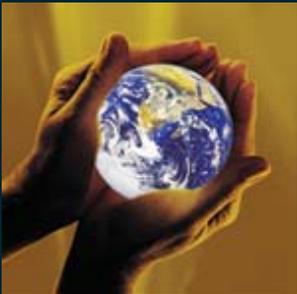


Air Quality



Grays Harbor Energy Center

Units 3 & 4



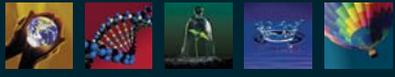
Outline

- Project Overview
- Basics
- Air quality permits
- Pollutant emissions
- Pollutant concentrations
 - Local air quality
 - Regional air quality
- Greenhouse gas emissions
- Questions?

 Project Description



Source: 3D Scape



Basics

- What does EFSEC regulate?
 - Criteria pollutants
 - Toxic air pollutants
- What is assessed in permit applications?
 - Emissions (what goes into the air)
 - Ambient concentrations (what we breathe)



Air Quality Preconstruction Permits

- Prevention of Significant Deterioration (PSD) permit
 - BACT
 - Local dispersion modeling
 - Regional dispersion modeling
- Notice of Construction
 - Opacity, nuisance issues
 - Address state listed toxic air pollutants (TAPs)
 - Modeling of certain TAPs



BACT SUMMARY

Pollutant	Combustion Turbines		Boiler		Firewater Pump Engine and Emergency Generator Engine		Cooling Tower	
	Best Available Control Technology	Emission Rate	Best Available Control Technology	Emission Rate	Best Available Control Technology	Emission Rate	Best Available Control Technology	Emission Rate
Nitrogen Dioxide (NO ₂)	Dry low NO _x combustor with SCR	2 ppmvd	Ultra-low NO _x burners	9 ppmvd	PC	No limit proposed	NA	NA
Carbon Monoxide (CO)	Turbine design, PC, oxidation catalyst	2 ppmvd	Boiler design, PC	50 ppmvd	PC	No limit proposed	NA	NA
Sulfur Dioxide (SO ₂)	Natural gas	1 ppmvd	Natural gas	No limit proposed	0.05% Sulfur fuel	No limit proposed	NA	NA
Particulate Matter (PM ₁₀)	Natural gas, proper combustion	19 lb/hr/HRSG	Natural gas	No limit proposed	PC	No limit proposed	High efficiency drift eliminators	0.0005% drift rate
Volatile Organic Compounds (VOCs)	Combustion control, oxidation catalyst	1 ppmvd at 100% load, 3 ppmvd at 60% load	Natural gas	No limit proposed	PC	No limit proposed	NA	NA
Ammonia (NH ₃)	Proper SCR Operation	5 ppmvd	NA	NA	NA	NA	NA	NA

NA = NOT EMITTED

SCR = SELECTIVE CATALYTIC REDUCTION

PC = PROPER COMBUSTION

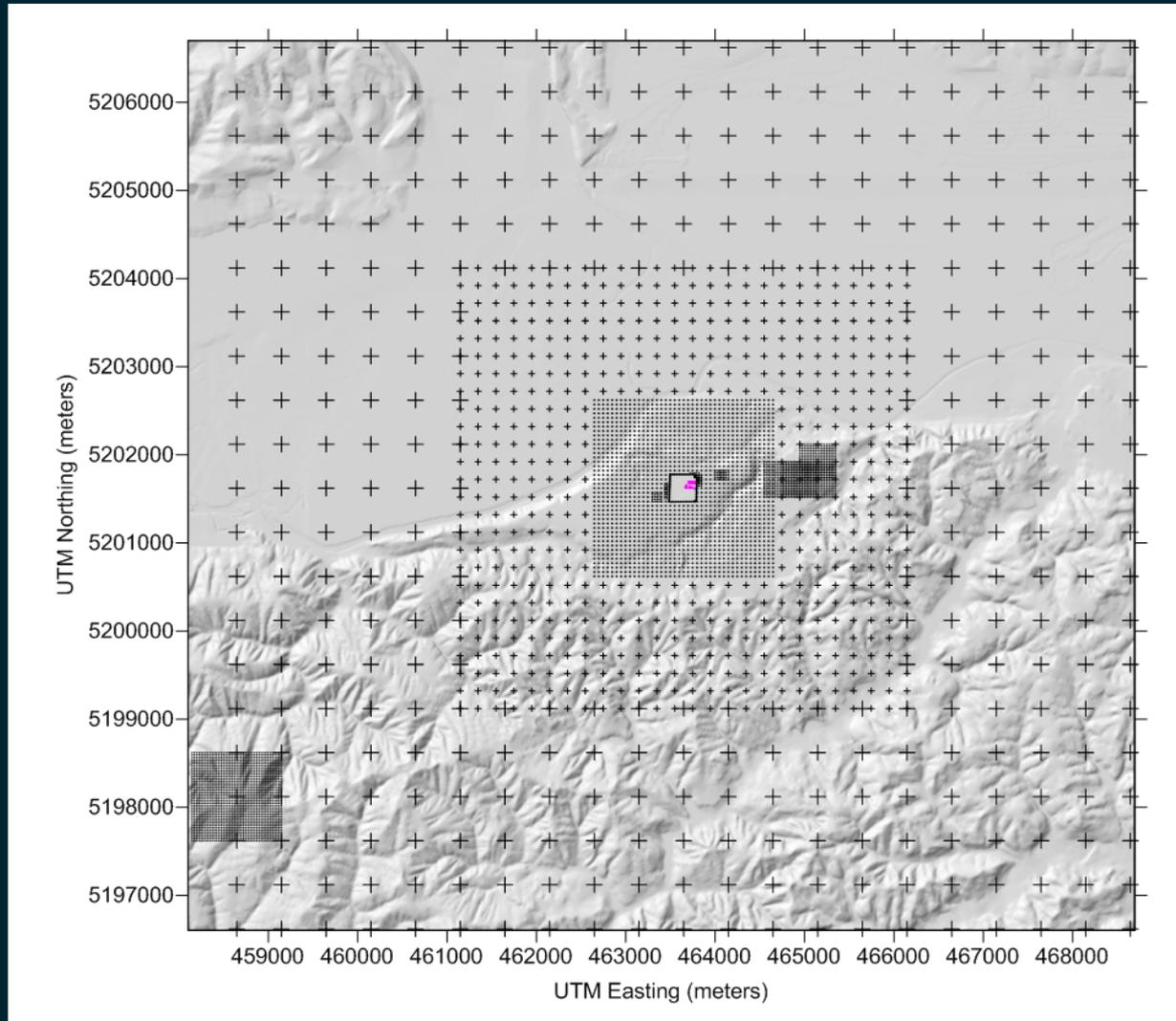


Local Dispersion Modeling

- AERMOD for local dispersion modeling
 - Calculate hourly concentrations based on a year of local meteorological data
 - Evaluate concentrations at more than 5,000 locations in a 11x11 kilometer grid



Local dispersion modeling area





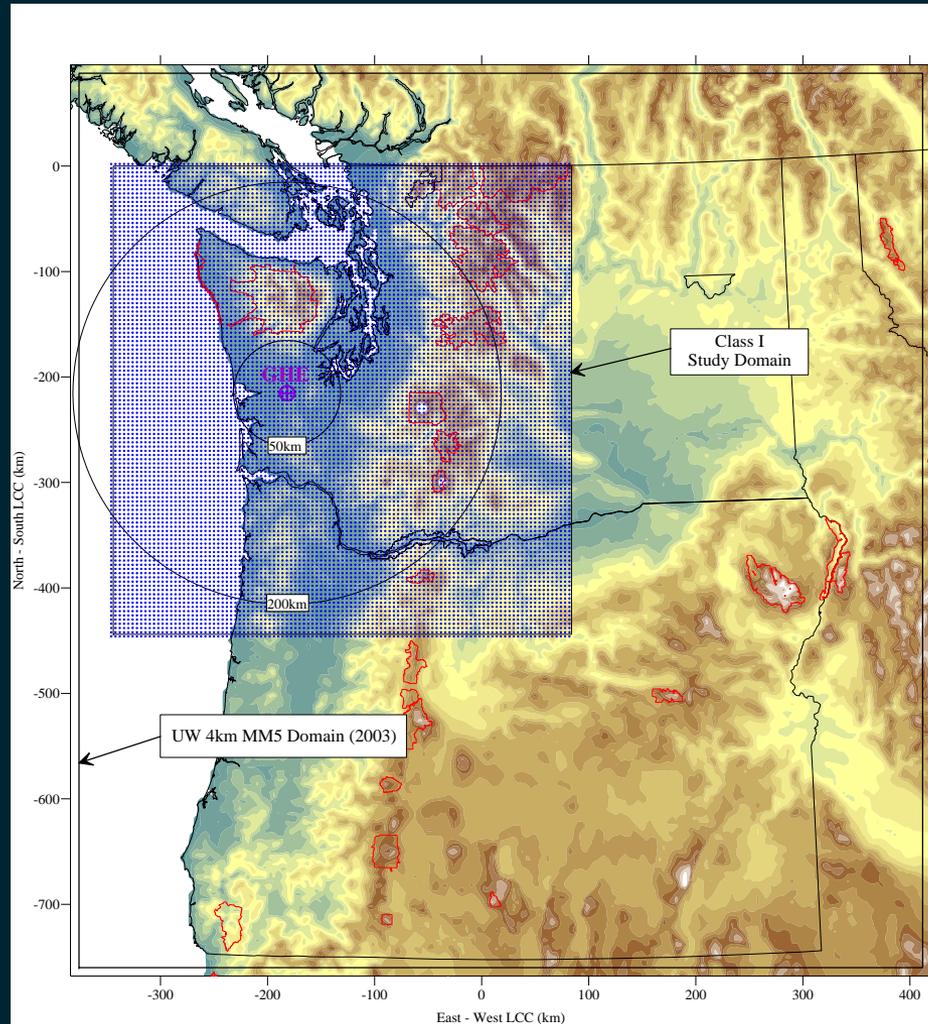
Model results

Pollutant	Averaging Period	Maximum Modeled Concentration	Significant Impact Level	PSD Class II Increments	NAAQS/WAAQS
NO ₂	Annual	0.0889	1	25	100
CO	1-hour	365	2,000	None	40,000
	8-hour	18.1	500	None	10,000
SO ₂	1-hour	29.9	30	-	196
	3-hour	9.99	25	512	1,300
	24-hour	1.38	5	91	262
	Annual	0.0311	1	20	52
PM ₁₀	24-hour	2.71	5	30	150
	Annual	0.127	1	17	50
PM _{2.5}	24-hour	0.836	NA ^c	None	35
	Annual	0.0485	NA ^c	None	15



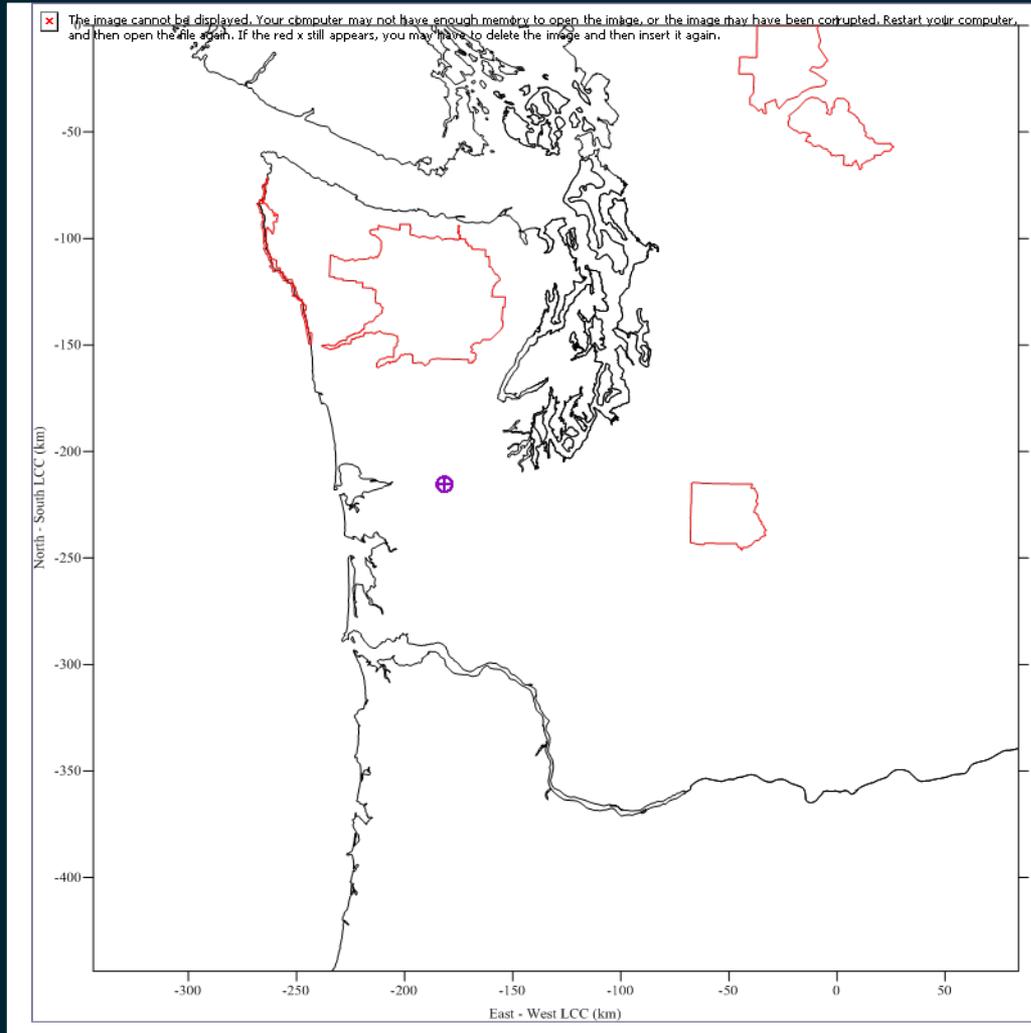
Regional Analysis

- CALPUFF for regional dispersion modeling
 - Calculate hourly concentrations for three years
 - Large modeling domain





Class I areas





Class I concentrations

Area of Interest	NO ₂	PM ₁₀		SO ₂		
	Annual Average	24-Hour Average	Annual Average	3-Hour Average	24-Hour Average	Annual Average
Alpine Lakes WA	0.0004	0.0392	0.0023	0.0205	0.0068	0.0003
Glacier Peak WA	0.0001	0.0199	0.0012	0.0089	0.0031	0.0001
Goat Rocks WA	0.0002	0.0238	0.0013	0.0185	0.0055	0.0001
Mt. Adams WA	0.0001	0.0146	0.0009	0.0175	0.0033	0.0001
Mt. Hood WA	0.0000	0.0244	0.0006	0.0060	0.0031	0.0001
Mt. Rainier NP	0.0006	0.0619	0.0029	0.0291	0.0099	0.0004
Olympic NP	0.0018	0.1074	0.0044	0.1596	0.0313	0.0007
Columbia River Gorge ¹	0.0002	0.0287	0.0012	0.0145	0.0048	0.0001
Class I Area Max. Conc.	0.0018	0.1074	0.0044	0.1596	0.0313	0.0007
EPA Proposed SIL	0.1	0.3	0.2	1	0.2	0.1
FLM Recommended SIL	0.03	0.27	0.08	0.48	0.07	0.03
Class I Area PSD Increment	2.5	8	4	25	5	2

¹The Columbia River Gorge National Scenic Area is not a Class I area, but is included in the analysis at the request of Ecology and the FLMs.



Air quality related values

- Deposition of nitrogen and sulfur
 - Reviewed to protect soils, vegetation and aquatic resources
 - Predictions less than U.S. Forest Service thresholds of concern



Sulfur and Nitrogen Deposition

Area of Interest	Maximum Nitrogen Deposition	Maximum Sulfur Deposition
Alpine Lakes WA	0.0010	0.0007
Glacier Peak WA	0.0007	0.0005
Goat Rocks WA	0.0003	0.0003
Mt. Adams WA	0.0002	0.0001
Mt. Hood WA	0.0001	0.0001
Mt. Rainier NP	0.0010	0.0008
Olympic NP	0.0018	0.0018
Columbia River Gorge ¹	0.0010	0.0008
Maximum	0.0018	0.0018
USFS Threshold of Concern	0.005	0.005

¹The Columbia River Gorge National Scenic Area is not a Class I area, but is included in the analysis at the request of the U.S. Forest Service.



Regional haze

- A perceptible change is a 5% change in light extinction
- No perceptible change in any Class I areas except Olympic National Park
- In southern side of Olympic, a “just perceptible” change on two days out of three simulated years.



Regional haze

Area	Date	Light extinction			Delta b_{ext} (%)
		Project	Background	Total	
Alpine Lakes	10/05/03	0.387	17.201	17.587	2.25
Glacier Peak	11/22/04	0.220	16.904	17.124	1.30
Goat Rocks	10/05/03	0.245	15.791	16.036	1.55
Mount Adams	02/27/03	0.146	15.676	15.822	0.93
Mount Hood	09/26/04	0.192	15.415	15.607	1.25
Mount Rainier	10/05/03	0.666	17.946	18.612	3.71
Olympic	11/21/03	1.278	18.615	19.894	6.87
Columbia River Gorge	10/02/03	0.240	16.065	16.306	1.50



Greenhouse gas emissions

- Natural gas is the lowest carbon fossil fuel
- Combined cycle very efficient
- Advanced regulation in Washington
- Units 3 and 4 meet the performance specification of 1100 pounds of greenhouse gas/MW-hour
- Grays Harbor Energy to pay a mitigation fee of \$11.75 million



Odors

- Current cooling tower issue
- Chemistry being addressed



Summary

- PSD and NOC permits
- BACT to be applied
- Insignificant increases in ambient pollutant concentrations locally and regionally
- Greenhouse gases
- Questions?