From: Dana Siegfried
To: John White
Date: Wed, Nov 9, 2005 2:42 PM
Subject: Re: Fwd: Klondike III Wind Power Project

John -

White River State Park occurs just within the analysis area for Scenic and Aesthetic Values (30 miles from the project area). However, the park is not identified in a federal land management plan or local land use plan so, per DOE rules, it is not included as a significant or important scenic or aesthetic value in Revised Exhibit R.

White River State Park would meet the criteria to be a Protected Area, but occurs well beyond the Protected Areas analysis area (20 miles from the project area).

Dana Siegfried
David Evans and Associates
503.499.0369

>>> "John White" <John.White@state.or.us> 11/8/2005 9:07 AM >>>
Dana,
Please see the attached email from Jan Houck at Oregon Parks and Recreation Department concerning White River Falls State Park. The park may fall just outside (or just inside) the 30-mile Scenic analysis area.
I believe it is well outside the 20 mile Protected Areas analysis area.
Please confirm.

Thanks,
John

John G. White
Oregon Department of Energy
625 Marion St., NE
Salem, Oregon 97301-3742
john.white@state.or.us

CC: jesse.gronner@ppmenergy.com

SHERMAN COUNTY
SHERIFF'S OFFICE
500 Court St. / PO Box 424
Moro, OR 97039
(541) 565-3622/Fx (541) 565-3312
Sheriff Brad Lohrey

November 21st, 2005

Alex Dupey
David, Evans, & Associates
2100 SW River Parkway
Portland, OR 97201

Dear Alex Dupey,

I am writing this letter to advise you that currently the Klondike windmill projects do not have an adverse effect on the Sherman County Sheriff's Office. I do not anticipate the proposed project will have an adverse effect on services.

Should you wish to discuss this matter further please feel free to contact me anytime.

Sincerely,

Brad Lohrey
Sherman County Sheriff

Sherman County Emergency Services
Shawn Payne, Director
309 Dewey Street
P.O. Box 139
Moro, Oregon 97039-0139
541.565.3100 541.565.3024 Fax

July 29, 2005

Alex Dupey
David Evans and Associates
2100 S.W. River Park Way
Portland, Oregon 97201

Re: Klondike 3 Project

Dear Mr. Dupey:

After meeting with Fred Reser, North Sherman County RFPD Fire Chief, we feel that the Klondike 3 Project will not have a significant impact on Sherman County Emergency Services. This includes Sherman County Ambulance Service and North Sherman County RFPD. If you have any questions, please feel free to contact me at the above listed number.

Sincerely,

Shawn Payne

Shawn Payne, Director
Sherman County Emergency Services

SHERMAN COUNTY
SHERIFF'S OFFICE
500 Court St. / PO Box 424
Moro, OR 97039
(541) 565-3622/Fx (541) 565-3312
Sheriff Brad Lohrey

August 2, 2005

Alex Dupey
David, Evans, & Associates
2100 SW River Parkway
Portland, OR 97201

Dear Alex Dupey,

I am writing this letter to advise you that at this point the Klondike windmill projects do not have an adverse effect on the Sherman County Sheriff's Office.

Sincerely,
Brad Lohrey
Sherman County Sheriff

EXHIBIT U

PUBLIC SERVICES / SOCIO-ECONOMIC IMPACTS
OAR 345-021-0010(1)(u)

TABLE OF CONTENTS

TABLES

U.1 INTRODUCTION

OAR 345-021-0010(1)(u) *Information about significant potential adverse impacts of construction and operation of the proposed facility on the ability of public and private providers in the analysis area to provide the services listed in OAR 345-022-0110, providing evidence to support a finding by the Council as required by OAR 345-022-0110. The applicant shall include:*

Response: Under OAR 345-022-0110(1), the Council must find that the construction and operation of the proposed facility, taking into account mitigation, are not likely to result in significant potential adverse impacts to the ability of the public and private providers in the analysis area described in the project order to provide: sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools.

U.2 IMPORTANT ASSUMPTIONS USED TO EVALUATE POTENTIAL IMPACTS

OAR 345-021-0010(1)(u)(A) *The important assumptions the applicant used to evaluate potential impacts*;

Response: In undertaking this analysis, Klondike Wind Power III LLC made the following estimates:

A. Facility construction is anticipated to take about nine months and employ an estimated 100 to 120 workers at peak construction periods. Construction workers will include locally hired workers for road and turbine pad construction as local expertise and availability permits; the remaining workers will be from outside the local area. When feasible, preference will be given to local workers. It is assumed that at least half of the construction workers will be come from outside of the area.

B. During the anticipated 20 to 30-year life of the proposed facility, operation and maintenance ("O&M") will employ 15 to 20 full-time and part-time employees.

C. The study area includes eight incorporated communities in Oregon and one incorporated community in Washington[1] with a combined 2003 population of 17,053, or about 41% of the combined population for Gilliam, Sherman, Morrow, and Klickitat counties. Unemployment rates in December 2004, as reported by the Oregon Employment Department, range from 5.9% in Gilliam County to 10.3% in Wasco County; Sherman County has an unemployment rate of 9.8%. The Washington State Employment Security Department reported an unemployment

[1] In its First Request for Additional Information, the Department of Energy took the position that the analysis area for impacts on the public services discussed in this Exhibit U includes the area within 30 miles from the site boundary, including communities that are in Washington, and further requested that this Exhibit U discuss whether the construction and operation of the facility would have any adverse impact on the provision of public services for communities in Washington that are within the analysis area. While the Applicant has provided the requested information in this revised Exhibit U, the Applicant hereby reserves and expressly does not waive the right to argue, if necessary, that the analysis area should not extend into Washington, that the applicable statutes and rules do not require an analysis of adverse impact on the provision of public services for communities in Washington, and that the Energy Facility Siting Commission's findings with respect to the requirements contained in OAR 345-022-0110 need not take into account such analysis.

rate of 9.4% during the same period for Klickitat County. Based on existing unemployment in the analysis area, it is assumed that approximately 40% of the full-time and part-time operational employees (8 employees) would be hired from within the analysis area, and 60% (12 employees) would be hired from outside the area (in-migrant).

D. Existing capacities of public services were used to estimate the current level of service for the communities within the analysis area.

E. Klondike Wind Power III LLC will lease land for the facility from local landowners. Land lease payments will be made annually.

U.3 PUBLIC AND PRIVATE PROVIDERS IN THE ANALYSIS AREA

OAR 345-021-0010(1)(u)(B) *Identification of the public and private providers in the analysis area that would likely be affected*;

Response: Responses are provided in sections U.3.1 and U.3.2, below.

U.3.1 Population Within Analysis Area

While the project itself is entirely within Sherman County, the analysis area includes portions of Gilliam, Sherman, Wasco, and Klickitat counties and incorporated communities with a 30-mile radius of the project site. There are nine incorporated communities within the 30-mile analysis area: Arlington, Condon, Dufur, Grass Valley, Moro, Rufus, The Dalles, and Wasco in Oregon, and Goldendale in Washington. The 2003 population for all of these communities is 17,053, which accounts for about 41% of the entire population for Gilliam, Sherman, Wasco, and Klickitat counties, as shown in Table U-1. By far the largest community in the project area is The Dalles, located on the far western side of the project area in Wasco County. The Dalles had a 2003 population of 12,350 people, accounting for about 72% of the analysis area's population in incorporated communities. The next largest community is Goldendale (Klickitat County) with 3,324 people.

Between 1990 and 2003, communities in the analysis area added population at varying rates, with the highest percent change occurring in Condon, which grew by nearly 18%, although a closer look at that community population growth actually shows a decline between 1990 and 2000 and then a sharp increase, over 40%, between 2000 and 2003. Other growing communities include Goldendale, Arlington, Moro, Dufur, and The Dalles, which grew from between approximately 9% and 25% between 1990 and 2003.

Growth has occurred throughout the analysis area, but appears to have occurred mainly in western portion of the analysis area in The Dalles, which added 1,721 people since 1990. Other communities have also added residents, as described above, but not to the degree experienced in The Dalles. Sherman County was the only county in the analysis area to lose population, unlike Wasco and Gilliam Counties, which have grown by approximately 7.9% and 9.6%, respectively. Klickitat County experienced the strongest growth of any county, increasing in population by 13.9% since 1990.

Table U- 1. Population of Incorporated Communities within the Analysis Area

	Population				
	1990	2000	2003	Percent Change 1990-2003	Percent Change 2000-2003
Gilliam County	1,717	1,915	1,900	9.6%	-0.8%
Arlington	*425*	*524*	*570*	*25.4%*	*8.1%*
Condon	*635*	*459*	*770*	*17.5%*	*40.4%*
Sherman County	1,918	1,934	1,900	-0.9%	-1.8%
Grass Valley	*160*	*171*	*170*	*5.9%*	*-0.6%*
Moro	*292*	*337*	*340*	*14.1%*	*0.9%*
Rufus	*295*	*268*	*270*	*-9.3%*	*0.7%*
Wasco	*374*	*381*	*380*	*1.6%*	*-0.3%*
Wasco County	21,683	23,791	23,550	7.9%	-1.0%
Dufur	*527*	*588*	*600*	*12.2%*	*2.0%*
The Dalles	*11,021*	*12,156*	*12,350*	*10.8%*	*1.6%*
Klickitat County (WA)	16,616	19,161	19,300	13.9%	0.7%
Goldendale	*3,324*	*3,324*	*3,650*	*8.9%*	*8.9%*
Combined population of cities within the analysis area	17,053	14,884	15,450		
Percentage of four county total population	41%	32%	33%		

Source: Center for Population Research and Census, 2005; State of Washington Office of Financial Management, 2005

It is likely that full-time, operational in-migrant employees would relocate to one of the above communities within the 30-mile radius of the proposed facility. In migrants could also potentially relocate to Washington because there is a bridge over the Columbia River near on US 97 that would provide a direct connection to the Oregon portion of the project area. There are also small unincorporated communities (where localized census data are not available) within the analysis area boundary. It is possible that workers moving to the area may choose to relocate to one of these communities or choose to live in a rural area outside of a town or city where the residences would likely have private wells and septic systems.

U.3.2 Public and Private Providers

Table U-2 identifies the public service and utility providers for the affected communities in the analysis area that provide the essential governmental services listed in OAR 345-022-0110(1). The following is a description of the current public service providers by community in the analysis area.

Table U- 2. Public Service Providers in the Analysis Area

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Sewers and Sewage Treatment	Condon: City of Condon. Lagoon treatment system with 0.13 mgd capacity. Treatment system built in 1997.	In the process of upgrading wastewater collection system. Have completed portions of the new system. Improvements are ongoing as funds are available.
	Arlington: City of Arlington. Lagoon treatment system with 0.13 mgd capacity. No other information available.	Unknown
	Goldendale (WA): City of Goldendale. Biolac Treatment System". Treats approximately 1.1 mgd. Plant was upgraded in 2000. Drains year-round in the Little Klickitat River.	Changes in Environmental Protection Agency policies required changing the previous treatment system of holding ponds to the new Biolac system, allowing for year around discharge into the Little Klickitat River.
	Grass Valley: City of Grass Valley. No other information available.	Unknown
	Moro: City of Moro. Lagoon treatment system with 0.05 mgd capacity. Stores effluent during winter months and then disperses on city owned land or evaporates in lagoons.	A fourth lagoon will be added to increase winter storage needs and comply with DEQ requirements. The entire wastewater collection system will be replaced as funds are available.
	Rufus: City of Rufus. Lagoon treatment system with 0.40 mgd capacity. Effluent drains into drainage ditches.	Treatment plant is at capacity. The City is in noncompliance with DEQ. Working with DEQ to develop new system. By 2007, the City will switch from using drainage ditches to sprinklers for effluent removal.
	Wasco: City of Wasco. Lagoon treatment capacity 0.035 mgd/average use 0.024 mgd. Stores effluent during winter months and then disperses on city owned land after frost.	The City is in the process of constructing a new storage pond. The City has been in noncompliance for storage for the last year. The new capacity will meet the city's needs and compliance issues with DEQ.
	Dufur: City of Dufur. Treatment capacity unknown. Releases effluent during winter and spring to 15-Mile Creek. Irrigates alfalfa during the summer on city owned land.	Recently installed a third lagoon for storage and built an irrigation system to disperse effluent to city owned land during the summer. No DEQ issues now that new system is online.
	The Dalles: City of The Dalles. Treatment capacity 4.14 mgd/average use: 2 to 2.5 mgd. Drains to Columbia River below boat basin. Serves entire city UGB.	Amending Master Plan. The City is in the process of a $7 million upgrade to the treatment facility. Phase One will be complete in 18 months.
Water	Condon: City of Condon. Wells within city limits, providing 0.50 mgd. Water stored in reserviors.	In the process of upgrading water lines. Have completed portions of the new system. Improvements are ongoing as funds are available.
	Arlington: City of Arlington. Wells within city limits providing 0.17 mgd. No other information available.	Unknown

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
	Goldendale (WA): City of Goldendale. Springwater source 13 miles from city. Three wells within city limits are also used. Water stored in two reservoirs with 2.6 million gallon capacity	None. City recently began operation of a third well. No issues identified
	Grass Valley: No information available.	Unknown
	Moro: City of Moro. Three wells provide 100% of the city's water. Capacity unknown.	None. Prior to drilling the third well, water rationing was required but with the addition of the third well drilled recently, the city has adequate capacity without rationing.
	Rufus: City of Rufus. Operates three wells within the city limits, providing 0.40 mgd. Stores water in one 300,000 gallon reservior.	None. The system was completely reconstructed recently.
	Wasco: City of Wasco. Two wells provide 100% of the city's water. Capacity is approximately 0.30 mgd. Well capacity unknown.	The City rebuilt its water system two years ago. No issues to date.
	Dufur: City of Dufur. Two wells provide 100% of the city's water. Capacity is approximately 0.30 mgd	None. Future plans are to build a line from the well directly to the reservoirs rather than the existing on-demand system.
	The Dalles: City of The Dalles. 23,000 acre surface water permit provides 80 to 85% of municipal water. Three city wells provide remaining needs during peak times.	Developing a new Water Master Plan to be completed in June 2005 that will include a 20 year capital improvement plan.
Storm Water	Condon: City of Condon. The City has a stormwater system.	None.
	Arlington. The City of Arlington. The City has storm drains. No other information available.	Unknown
	Golldendale (WA): Unknown	Unknown
	Grass Valley: Unknown	Unknown
	Moro: City of Moro. Conveyance only, no treatment. The City has storm drains that discharge directly into Dry Creek. Provides coverage for entire city.	None.
	Rufus: No system.	N/A
	Wasco: No system.	N/A
	Dufur: No system.	N/A
	The Dalles: City of The Dalles provides conveyance only. The City also operates 4 oil/water separators.	Considering developing a stormwater management plan, but no schedule for completion.
Solid Waste Management	Condon: Sunrise Disposal and Recycling	See below.

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
	Arlington: City of Arlington. The City provides collection service for the entire city.	None.
	Golldendale (WA): Tri-County Disposal.	The project is outside of the service area
	Grass Valley: Sunrise Disposal and Recycling	See below.
	Moro: Sunrise Disposal and Recycling	
	Rufus: Sunrise Disposal and Recycling	
	Wasco: Sunrise Disposal and Recycling	
	Dufur: Mel's Sanitary Service	The project is outside of the service area.
	The Dalles: The Dalles Disposal	The project is outside of the service area.
	Columbia Ridge Recycling and Landfill/ Chemical Waste Management of the Northwest	None. The landfill and recycling portion of the operation serves Oregon, Washington, Idaho, Alaska, Montana, and British Columbia and has approximately 56 years left with the current configuration. The hazardous waste facilties have the same service area, but also accept some materials from other sources nationwide.
	Sunrise Disposal and Recycling: Provides garbage and recycling services to all of Sherman County and portions of Gilliam County. Also operates a transfer facility that is open to the public twice a month. All refuse and recycling is sent to the Columbia Ridge facility.	No hazardous waste pickup is provided. Many residents bury paint and pesticides rather than disposing of them appropriately.
Police	Condon: Condon City Police Department. One full-time officer, three reserve staff.	None
	Arlington: Gilliam County Sheriff's Department	None: The Gilliam County Sheriff's Department patrols Gilliam County and provides police service to the City of Arlington. The Sheriff's Department has four full time officers and one office deputy. The station is located in the City of Condon. Staff is adequate to meet the county's needs.
	Golldendale (WA): Goldendale Police Department. Provides police service within Goldendale city limits.	Project site is outside of service area.
	Grass Valley: Sherman County Sheriff's Department	None. The Sherman County Sheriff's Department patrols Sherman County and provides police service for the cities of Grass Valley, Moro, Rufus, and Wasco. The Sheriff's Department has four full time officers, one part time officer, and one sheriff. The station is located in Moro. Staff is adequate to meet the county's needs.
	Moro: Sherman County Sheriff's Department	
	Rufus: Sherman County Sheriff's Department	
	Wasco: Sherman County Sheriff's Department	

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
	Dufur: Wasco County Sheriff's Department	None: The Wasco County Sheriff's Department patrols Wasco County and also provides police service to the City of Dufur. The Sheriff's Department has 17 full time officers, including the sheriff. The station is located in The Dalles. Staff is adequate to meet the county's needs.
	The Dalles: The Dalles Police Department. Provides police service within The Dalles city limits.	Project site is outside of service area.
Fire Protection and Emergency Response	Condon: City of Condon Fire Department. Serves the city of Condon and outlying areas. 20 volunteer staff. One station with two fire trucks plus rural fire equipment	None
	Arlington: Gilliam County Rural Fire Department	Unknown
	Goldendale (WA). City of Goldendale Fire Department.	Project site is outside of service area.
	Grass Valley: South Sherman Fire Department	Unknown
	Moro: City of Moro Rural Fire Protection District. The district serves Moro and outlying areas with fire and ambulance service. The district also provides ambulance service for the North Sherman Fire Protection District. Facilities include one fire station with 11 volunteers, one fire chief and one assistant fire chief.	None
	Rufus: City of Rufus. The City has a volunteer fire department with a single station and five volunteers that serves the city and nearby areas.	None
	Wasco: North Sherman Fire Protection District. Serves North Sherman County and the existing Klondike windfarm. 10 volunteers, one fire chief, one assistant fire chief, two lieutenants. One station in Wasco. Two engines, two tenders, one tanker truck, and one jeep. Staff trained in high angle rescue.	None
	Dufur: City of Dufur Fire and Ambulance. Serves the City and surrounding areas, as needed. 10 to 12 fire volunteers, 15 ambulance volunteers. One station, two fire trucks, one rescue rig.	None
	The Dalles: Mid Columbia Fire and Rescue. Serves The Dalles and northern Wasco County. One station in The Dalles. One fire chief, one assistant chief, one fire marshall, three captains, three lieutenants and 12 engineers. 36 volunteers. Provides fire and ambulance service.	Project site is outside of service area

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Health Care (Regional Facilities)	Mid-Columbia Medical Center: Regional Medical Center (The Dalles). Full service facility providing emergency and surgery services.	None. Mid-Columbia Medical Center is a regional full service facility. Emergency services would be able to accommodate emergency situations.
	Klickitat Valley Hospital (Goldendale, WA). 15-bed hospital and a 7-member clinic that serves all of Central and Eastern Klickitat County. Offers inpatient care and some minor surgical procedures.	This is a small facility. Patients would be directed to Mid Columbia Medical Center first.
Education	Condon: Condon School District #25. One K-8 and one high school.	Enrollment has declined consistently for the last 10 years. No facilities issues, but a loss of revenue from fewer students reduces overall revenue for the school district.
	Arlington: Arlington School District #13. One K-8 and one high school. Approximately 136 students.	Enrollment has declined recently from approximately 160 students to 136. Loss of students equates to a loss of revenue for the school district. There are no outstanding facility issues, other than reduced revenue for upkeep.
	Golldendale (WA): Goldendale School District 404	Serves the City of Goldendale and surrounding areas. The district has one high school serving approximately 415 students in grades 9 to 12, one middle school serving approximately 415 students in grades 5 to 8, and one primary school serving approximately 415 students in grades kindergarten to 6. All facilties are located in Goldendale.
	Grass Valley: Sherman County School District Moro: Sherman County School District Rufus: Sherman County School District Wasco: Sherman County School District	Sherman County School District serves the entire county. The district has one high school with grades 7 to 12 located in Moro. There are two elementary schools in the district providing kindergarten through 6th grade. The elementary schools are located in Wasco and Grass Valley. There are approximately 280 students although enrollment has decreased in the last several years. The district has adequate capacity and there are no facility needs.
	Dufur: Wasco School District #29: One K-12 school located in Dufur.	School enrollment has grown in the last five years to approximately 255 students. The district recently increased its classroom size and built a new gymnasium. There are no facility or capacity issues.

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
	The Dalles: The Dalles School District #12. One high school (two campuses), two middle schools, three elementary schools. Various sports facilities throughout district	Recently merged with Chenowith School District. Facilities generally adequate, although the high schools have parking and food service issues. No new facilities planned. Upgrades to track facilties are completed and are now completing deferred maintenance issues. Projecting 1 to 3% growth annually for the next ten years.

U.4 SERVICE PROVIDERS IN COMMUNITIES

OAR 345-021-0010(1)(u)(C) *A description of any likely adverse impact to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0110;*

Response: Responses are provided in sections U.4.1 through U.4.11, below.

U.4.1 Economic and Demographic Impacts

U.4.1.1 Population

Limited in-migration for construction-related employment as well as permanent O&M employment is expected to occur as a result of the proposed project, having a beneficial impact on businesses in the nearby communities from increased patronage of area motels, restaurants, and other supporting services. Temporary construction-related jobs filled from outside of the analysis area are anticipated to last no more than 9 months, but during that time workers will likely stay in one of the area motels, eat at local restaurants, and purchase other amenities such as gas and groceries, all having a beneficial impact on the local economy. To the extent practicable, residents from the local communities would fill the 15 to 20 permanent full-time and part-time O&M jobs. In-migrant operational staff and their families would not have a significant impact on local population, particularly in Sherman County which has lost population since 1990. Assuming 60% of permanent positions are filled from outside the analysis area, approximately 29 new residents would be added (12 new employees x 2.43 average persons per household) to Sherman County's population, assuming all relocated within the county and not in another county.

U.4.1.2 Economic Activity

An earlier and smaller wind power facility (Klondike I, 24 megawatts) was shown to not have any adverse impacts to public and private service providers in the area. In contrast, revenue generated for the local economy has been a boon for public services, including schools and others services Sherman County provides for its residents (Ourderkirk and Pedden, 2004). While Gilliam, Klickitat and Wasco County would not gain revenue from the site operation through tax payments, residents from communities within those counties may be employed during the construction or operation phases of the project. Income earned by those individuals as a result of the proposed facility would contribute

to the local economy indirectly through local purchases. In addition, the proposed facility itself would purchase goods and services from local and regional businesses, from facility maintenance services to office equipment to business services. Lease payments to local landowners will also benefit the local economy because it is likely that a portion of the lease payments will be spent in nearby communities. All of this would result in a net inflow of dollars into the local economy that would have a beneficial effect beyond that of the new employment.

U.4.1.3 Tax Revenues

As with other windpower facilities in Sherman County, the proposed energy facility would be a major new source of tax revenue to local government. This injection of additional tax revenues and/or in-lieu contributions would contribute to the provision of improved roads, quality education, police, fire, and other municipal needs that would benefit the entire community, particularly because the proposed project has shown to have no adverse impacts to existing public facilities, as described below.

Klondike I has contributed roughly $300,000 per year to the local tax authority. Klondike II is three times the size of Klondike I, and thus is estimated to provide roughly $900,000 to the local tax authority annually through the life of the project. Based on Klondike III's larger project size, it is estimated to provide roughly $2,000,000 to $3,000,000 to the local tax authority on an annual average basis throughout its project life.

U.4.2 Sewers and Sewage Treatment

The proposed project is not located within or near a municipal wastewater treatment system. The nearest system serves the City of Wasco, located approximately seven miles from the nearest turbine. The proposed project would not adversely affect sewer and sewage treatment service or providers within the analysis area because it would not be connected to any existing system identified in the analysis area.

All jurisdictions within the analysis area provide wastewater collection and treatment (within the city limits). All systems are lagoon facilities, with the exception of The Dalles, which operates an activated sludge plant that drains into the Columbia River and Goldendale, which operates a recently completed Biolac facility that drains into the Little Klickitat River. Several improvements to existing systems within these communities have recently occurred or are planned in the near future. The cities of Moro, Rufus, Wasco, and Dufur have added capacity or will add capacity to meet DEQ standards for wastewater. Noncompliance of these systems with DEQ standards has generally involved leaking lagoons or capacity issues that required the plants to prematurely discharge effluent into local waterways. Improvements to these systems have included constructing additional lagoons for storage and improving dispersion techniques. Most of the jurisdictions have, or will have enough storage for winter months and then will irrigate city-owned land with the gray water stored throughout the winter.

Residents living outside of incorporated communities use private subsurface sewage disposal systems. The O&M facility for the Klondike II wind generation facility now

under construction will have a subsurface system in place and the new operations and maintenance facility will include construction of another new subsurface system. Installation of the system will require compliance with any applicable Sherman County and DEQ requirements prior to and during construction, and during system operations.

U.4.3 Water

The proposed project is not located within or near a municipal water system. The nearest system serves the City of Wasco, located approximately four miles from the nearest turbine.

During construction, water will be trucked in from offsite for dust control, making concrete, etc. To serve the project during operations, a new well will be drilled near the O&M facility. The well will pump less than 5,000 gallons per day. Wells of this size are exempt from local and state permitting requirement because of their limited output (see Exhibit O).

All jurisdictions in the analysis area rely on wells for drinking water, except for The Dalles, which uses surface water resources to meet approximately 85% of its water need. Three wells meet the remaining water need, although those wells are generally only used during peak summer use periods. Goldendale uses a series of springs in addition to its three wells.

Existing facilities are generally adequate to meet municipal water needs. The City of Moro recently drilled a third well to meet demand. Prior to the addition of the third well, the City required water rationing during summer months, but with the addition of the well, rationing is no longer required. Other jurisdictions with proposed improvements include the City of Condon, which is in the process of upgrading its water lines (as funding allows) and the City of Dufur, which plans to build a water line from its wells directly to the reservoir. The cities of Rufus and Wasco have rebuilt their system recently and have no plans for any future improvements.

Residents living outside of incorporated communities use private wells. The operations and maintenance facility for the existing Klondike I wind generation facility has a well.

Because the proposed project will obtain water from its own well, and will not connect to any of the water systems described above, no adverse impacts to the local water supplies or systems are anticipated.

U.4.4 Storm Water

The proposed project is not within any jurisdiction's storm water system and would have no impact to existing storm water systems or providers. Exhibit V describes the proposed stormwater treatment and disposal for the proposed project.

Jurisdictions that provide storm water service generally provide conveyance only and do not offer treatment (except for The Dalles). Jurisdictions that provide conveyance include the cities of Condon, Arlington, Moro, and The Dalles. The Dalles provides some

treatment; the City operates four oil/water separators for industrial uses, but does not treat storm water for the entire city. The Dalles is also considering developing a storm water master plan, but no schedule has been set.

Construction-related storm water impacts could occur during the construction of the proposed project, likely from road, turbine foundation, and staging area construction. Erosion control measures would be developed to mitigate these potential impacts (see Appendix I-2).

U.4.5 Solid Waste Management

Sunrise Disposal and Recycling provides solid waste service for all of Sherman County, including the existing operations and maintenance facility for Klondike I, and portions of Gilliam County. Sunrise Disposal also operates a transfer station that is open to the public on the second and fourth Saturdays of each month. Twenty, 30, and 40-yard construction waste disposal boxes are also available. Following pickup, refuse and recycling is transported via truck to the Columbia Ridge Recycling and Landfill site located near Arlington. Columbia Ridge is a large regional facility that accepts refuse from the northwest and Canada. Sunrise does not provide hazardous waste pickup, although hazardous waste disposal is available at Chemical Waste Management of the Northwest, a facility located adjacent to the Columbia Ridge facility. Waste Management, Inc. operates both facilities.

Temporary and permanent population increases for construction and operation of the proposed project are minimal compared to the population of the affected communities. Sunrise Disposal and Recycling already provides services for all of Sherman County, including the existing O&M facility for Klondike I and has adequate capacity to accommodate construction-related debris and service to the proposed project facility. The proposed project would have no adverse impact on the ability of Sunrise Sanitation and Recycling to provide solid waste collection services.

Solid waste generated in the construction and operation of the proposed energy facility is described in Exhibit V. The proposed project will generate minimal construction waste and very little solid waste when the facility is operational that would require offsite disposal. The nearest landfill is the Columbia Ridge Recycling and Landfill Center located near Arlington. The landfill is not projected to reach capacity for at least 56 years and conversations with landfill operators did not specify any concerns regarding solid waste generation from construction or operation of the proposed project.

Other providers in the analysis area are The Dalles Disposal, which provides service for The Dalles, and the City of Arlington, which provides refuse and recycling services for the City of Arlington. Tri-County Disposal and Recycling provides refuse and recycling service for Goldendale. The proposed project will be located outside of these service areas and, therefore, will not affect these providers.

U.4.6 Housing

Housing availability and supply in the affected communities is described in Table U-3. According to the 2000 census, there are 8,527 housing units in the affected communities in the analysis area, totaling approximately 40% of all housing units within Gilliam, Sherman, Wasco, and Klickitat counties. Housing vacancy rates in the analysis area are relatively high, averaging approximately 13.5% for the nine communities in the analysis area. Grass Valley and Rufus have the highest vacancy rates and are both located in Sherman County.

Table U- 3. Housing Supply and Availability in Communities Within the Analysis Area

Jurisdiction	Total Housing Units			Vacancy Rate
	Occupied	Vacant	Total	
Gilliam County	819	224	1,043	21.5%
Arlington	*228*	*50*	*278*	*18.0%*
Condon	*357*	*65*	*422*	*15.4%*
Sherman County	797	138	935	14.8%
Grass Valley	*74*	*20*	*94*	*21.3%*
Moro	*132*	*12*	*144*	*8.3%*
Rufus	*128*	*34*	*162*	*21.0%*
Wasco	*171*	*28*	*199*	*14.1%*
Wasco County	9,401	1,250	10,651	11.7%
Dufur	*254*	*23*	*277*	*8.3%*
The Dalles	*4,928*	*318*	*5,246*	*6.1%*
Klickitat County	7,473	1,160	8,633	13.4%
Goldendale	*1,525*	*180*	*1,705*	*10.6%*

Source: U. S. Census Bureau, 2000 Summary File 3.

The demand for permanent housing in the analysis area is not anticipated to increase significantly because the proposed project would employ about 15 to 20 full-time and part-time employees. Only 12 new employees are assumed to move to the area with the remainder hired locally. Employees hired from the local community would not require new housing and, given the small number of in-migrant households and the housing vacancy rate in the affected communities, there would be no adverse impact in terms of finding permanent housing.

U.4.6.1 Temporary Housing

Approximately 100 to 120 temporary construction workers will be needed for the duration of construction. At least half of the construction workers will likely be hired from outside of the area, identifying a need for temporary housing. There are several

potential temporary housing options within the analysis area. During construction of Klondike I, construction workers were housed in motels in the communities of Moro and Biggs Junction, and in an RV park in Wasco. There are also several motels located in The Dalles. As a result, there would be no adverse impact to temporary housing and lodging in the analysis area.

U.4.7 Traffic Safety

Construction-related traffic as a result of the proposed project will use public roads to access the construction staging areas and construct the turbine strings that are located on private property.

The assumed route of construction-related traffic is to take I-84 to US 97 (at Biggs Junction) to the US 97/OR 206 intersection. Workers traveling from Washington would take US 97 south across the Columbia River bridge at Biggs Junction and continue south to OR 206. At that intersection, construction-related traffic will take OR 206 to Wasco. Construction traffic may also approach the site from the south on US 97. Both US 97 and OR 206 are two-lane paved highways with poor to fair pavement condition. From Wasco, construction-related traffic will use a series of local Sherman County roads to access private land where the construction staging areas and turbine strings will be located. Local roads are generally gravel rural roadways with little traffic other than local residential traffic. Local roads that will be used include: Wasco Lane, North Klondike Road, Emigrant Springs Road, Rayburn Road, Dehler Lane, Dormaier Road, McDonald Ferry Lane, Gosson Lane, Egypt Road, and Smith Road. An unnamed road connecting Gosson Lane and Dormaier Road will also be used.

Some of the local roadways will require improvements, generally a 6-inch gravel layer placed on top of the existing road, prior to project construction to accommodate the length and weight of vehicles that will deliver the turbine pieces and machinery necessary for construction. Large sections of local roads in poor condition will be completely reconstructed. Areas where substantial improvements (road reconstruction) will be made are shown in Appendix C-2. Reconstructed roadways will be improved to accommodate two eight-foot travel lanes and will be constructed with eight inches of crushed aggregate on top of a geotextile separation fabric. There is one bridge located near Webfoot, but this bridge is adequate to accommodate construction related traffic and will not require improvements. All improvements on local roads will be constructed within the public right-of-way.

Construction related traffic may cause short-term traffic delays when trucks deliver construction-related equipment and the turbines, but those delays will be temporary and are not anticipated to have an adverse impact on highways in the project area. Construction-related traffic delays on local roadways could occur but are anticipated to be limited due to very low use of these local roadways. Several local roadways will be improved or completely reconstructed to accommodate construction-related traffic. Many of the existing local roads are in poor condition; the proposed improvements will have a beneficial long-term impact by improving the quality of the road for all users.

Permanent staff for the proposed project, assumed to be between 15 and 20 employees, will use the improved local road system. Because the traffic generated from these employees is small and existing usage is low, no adverse impacts to the road system as a result of new permanent staff are anticipated.

U.4.8 Police

Some local jurisdictions provide their own police service, while others rely on the county sheriff for police service. The cities of The Dalles, Goldendale, and Condon are the only jurisdictions within the analysis area that provide their own police service.

The Sherman County Sheriff's Department provides police service for all of Sherman County, including the proposed location of the Klondike III facility. Other sheriff's departments within the analysis area include the Gilliam County Sheriff's Department and the Wasco County Sheriff's Department. The Wasco County Sheriff's is the largest of the three Oregon departments, with 17 full-time officers, due to the much larger population it serves. Sherman and Gilliam Counties employ four to five full-time officers. All three departments have agreements to provide backup service for each other if needed. The Klickitat Sheriff's Department provides law enforcement for Klickitat County and employs 17 patrol and command staff in addition to jail and detective branches. The project area would be outside of the Klickitat Sheriff's Department service area.

According to the Sherman County Sheriff, no events have occurred at the existing Klondike I facility that would require police service. In the event response is required at the Klondike III facilities, sheriff services can be accommodated with existing sheriff's department resources. No adverse impacts to the sheriff's department are anticipated as a result of the proposed project.

U.4.9 Fire Protection and Emergency Response

The project site is located in the North Sherman Fire Protection District based in Wasco. The District provides fire protection and has trained EMT volunteers, although the District does not provide ambulance service. The District contracts with the Moro Rural Fire Protection District to provide ambulance service. The North Sherman Rural Fire Protection District has one volunteer trained in high angle rescue, specifically for potential accidents occurring on wind generation towers or aboveground collector line. No incidents at existing wind power facilities within the district have occurred that would require this service.

Aside from the North Sherman Fire Protection District, there are eight other fire departments or districts that provide, at minimum, fire protection. Those that provide only fire service contract with other districts that have ambulance service. Communities that provide their own fire service include the cities of Condon, Goldendale, Moro, Rufus, Dufur, and The Dalles. Rural fire districts serving other parts of the analysis area include the Gilliam County Rural Fire District, the South Sherman Rural Fire District, and Klickitat Rural Fire District #7, which provides service for portions of Klickitat

County. Gilliam and South Sherman Rural Fire districts provide fire and emergency response for Arlington and Grass Valley, respectively, as well as for rural county areas.

Local farmers also provide fire suppression and are often the first to respond because of the large service areas. Local service providers indicated that farmers often have their own fire equipment and also often respond to emergencies.

To minimize the potential of fires starting from construction-related activities, roads would be established prior to construction to minimize vehicle contact with dry grass; idling vehicles in grassy areas would be avoided; and open flames, such as cutting torches, would be kept away from grassy areas. Staging areas will be graveled to minimize fire potential.

Interviews with both the North Sherman County Rural Fire Protection District and the Moro Rural Fire Protection District indicated that the proposed project would not affect either department's ability to provide fire protection or ambulance service for their service areas. One fire district staff has been trained in high angle rescue specifically in the event an accident were to occur on wind generation towers or aboveground collector line. Future O&M staff will also be trained to respond in the event of an accident. In the event of a critical injury, helicopter service could also be dispatched to the project site. Accident victims would be transported to the Mid-Columbia Medical Center in The Dalles.

U.4.10 Health Care

The Mid-Columbia Medical Center, located in The Dalles, is the only full service medical facility located within the analysis area. The Center provides emergency services as well as surgery. If an accident were to occur at the site, ambulance service from the Moro Rural Fire Protection District would transport patients to the hospital. Evacuation via helicopter is also available, if needed.

Klickitat Valley Hospital in Goldendale serves all of Central and Eastern Klickitat County. The hospital offers inpatient care and some minor surgical procedures, but is a small facility and any accidents would likely be directed to Mid Columbia Medical Center first.

The proposed project would not adversely impact medical services in the analysis area. Mid-Columbia Valley Medical Center in The Dalles would be capable of providing services for construction and operational employees in case of an emergency.

U.4.11 Schools

The Sherman County School District serves all of Sherman County. The school district operates one high school (grades 7 to 12) in Moro and two elementary schools (kindergarten through 6th grade) in Grass Valley and Wasco. The district serves approximately 280 students, although enrollment has declined in recent years due to a lack of employment opportunities.

Other school districts in the analysis area include the Condon School District #25, Arlington School District #13, Wasco School District #29, The Dalles School District #12, and Goldendale School District #4. The Condon and Arlington school districts each operate one kindergarten through 8th grade facility and one 9th grade through 12th grade facility. The Wasco School District serving Dufur operates one kindergarten through 12th grade school. The Goldendale School District operates one kindergarten through 6th grade, one 7th through 8th grade middle school, and one 9th through 12th grade high school.

The Dalles and Dufur school districts are the only two districts within the analysis area that are experiencing growth in the student population. The Dalles School District expects student enrollment to increase approximately one to three percent annually. Facilities are generally adequate to accommodate the projected number of students, although the district recently merged with the Chenowith School District and is now in the process of completing deferred maintenance for former Chenowith district facilities. Dufur School District administrators also said their enrollment is growing, primarily because of the district's proximity to The Dalles because Dufur has become somewhat of a bedroom community to The Dalles. The Dufur School District recently expanded its classrooms and built a new gymnasium to accommodate existing and projected student growth. No additional facilities are planned.

No adverse impact to local schools is anticipated to occur as a result of the construction and operation of the proposed project. No demand on school facilities is expected from the construction of the proposed project because the portion of the construction work force that might temporarily live in the area is not expected to include any families. Therefore, temporary increases in the analysis area population caused by in-migration of construction workers would result in little to no increase in the student population.

The number of in-migrant operational staff is anticipated to be small, creating few new households with school-age children. Consequently, there would be no significant increase in the student population. Interviews with local school districts indicated that the small number of potential new students would not have a significant adverse impact on the school districts and all districts would be able to accommodate students with existing capacity. All school districts said that an increase in the number of students would have a beneficial impact on school districts because each additional student would increase revenue for the district without having to add new services or facilities.

U.5 ADVERSE IMPACT TO THE ABILITY OF PROVIDERS TO PROVIDE SERVICES

OAR 345-021-0010(1)(u)(D) *Evidence that adverse impacts described in (C) are not likely to be significant, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts; and*

Response: Responses are provided in sections U.5.1 through U.5.12, below.

U.5.1 Economic and Demographic Impacts

U.5.1.1 Population

Limited in-migration for construction-related employment as well as permanent O&M employment is expected to occur as a result of the proposed project and would have a beneficial impact on businesses in the nearby communities from increased patronage of area motels, restaurants, and other supporting services. No significant adverse impacts as a result of temporary construction activities are anticipated. In-migrant operational staff and their families would not have a significant impact on local population, particularly in Sherman County, which has lost population since 1990.

U.5.1.2 Economic Activity

The proposed project would not have significant adverse economic impacts to the analysis area. On the contrary, revenue generated for the local economy as a result of the project may improve Sherman County's ability to provide public services, including schools and others services Sherman County provides for its residents. Increased employment opportunities, both temporary and permanent, may increase the amount of money spent at local businesses. Landowners who receive payments for permitting the location of turbines on their property may also see an increase in income and as a result spend a portion of that at local businesses.

U.5.1.3 Tax Revenues

The proposed project would have no significant adverse tax revenue consequences within the analysis area. As with other windpower facilities in Sherman County, the proposed energy facility would be a major new source of tax revenue to local government. This injection of additional tax revenues and/or in-lieu contributions would contribute to the provision of improved roads, quality education, police, fire, and other municipal needs that would benefit the entire community.

U.5.2 Sewers and Sewage Treatment

The proposed project is not located within any waste water facility treatment area, therefore, the proposed project would have no impact to existing waste water treatment facilities or collection systems. During construction, a local provider will supply portable toilets to the site, which would be treated at a local treatment facility chosen by the toilet provider. No impacts from using the portable toilets are anticipated because the toilet provider will be required to dispose wastewater in an appropriate manner.

The proposed facility will not be connected to a local wastewater collection system because it will have its own septic system. Sherman County and/or DEQ review and approval will be required prior to installation of the septic system. No significant adverse impacts are anticipated as a result of the septic system installation.

It is assumed that temporary construction and permanent employees will use existing wastewater or private septic systems, and would have no additional impact on facilities in

the analysis area. Temporary employees from outside the area would likely stay in one of the area's motels or RV parks and use those facilities, which are adequately sized to provide wastewater service. Permanent employees moving to the area would likely reside in existing dwellings already connected to a public wastewater or private septic system and would not increase need for or have an adverse impact to wastewater collection or treatment systems in the analysis area.

U.5.3 Water

During construction, water will be trucked in from offsite, possibly from a local municipal water supplier, which will be paid for the water. The proposed project is not within the service area of any water system. The proposed O&M facility will have its own well for its water needs. The well will provide less than 5,000 gallons per day, and because of its limited output, is not required to obtain a state water withdrawal permit (see Exhibit O). No adverse impacts to the local water supply are anticipated.

U.5.4 Storm Water

No significant adverse impacts to existing storm water facilities are anticipated. Construction-related storm water drainage impacts could occur during the construction of the proposed project, likely from road, turbine foundation, and staging area construction. Erosion control measures would be implemented as needed to meet any applicable local regulations and reduce the potential for project related erosion (see Appendix I-2).

U.5.5 Solid Waste Management

Sunrise Disposal has adequate capacity to accommodate construction-related debris and service to the new facility. The proposed project would have no adverse impact on the ability of Sunrise Sanitation and Recycling to provide these services.

Solid waste generated in the construction and operation will require offsite disposal. The nearest landfill is the Columbia Ridge Recycling and Landfill, which is not projected to reach capacity for at least 56 years. Conversations with landfill operators did not specify any concerns regarding solid waste generation from construction or operation of the proposed project. While the proposed project will generate some solid waste, the amount would not have a significant adverse impact on landfill operations that provide solid waste management services in the area.

U.5.6 Housing

No adverse impacts to housing in the analysis area are anticipated as a result of the proposed project. Employees hired from the local community would not require new housing and, given the small number of in-migrant households and the housing vacancy rate in the affected communities, adequate housing is available.

Temporary employees hired from outside the area will likely stay in nearby motels. While the majority of those are concentrated in The Dalles, there are other accommodations (motels, RV parks) in Wasco and in other communities that will meet

temporary housing needs. Although not all of these would likely be available at one time, there are many temporary-housing possibilities within these communities compared to the relatively small number of in-migrant construction workers. There would be adequate motel and camping/trailer facilities to accommodate the short-term needs for in-migrant construction workers.

There would be no adverse impact to temporary or permanent housing in the analysis area. On the contrary, businesses would experience a beneficial impact from construction workers renting accommodations and permanent in-migrant workers purchasing homes.

U.5.7 Traffic Safety

Construction related traffic may cause short-term traffic delays when trucks deliver construction-related equipment and the turbines, but those delays will be temporary and are not anticipated to have an adverse impact on highways in the project area. Construction-related traffic delays on local roadways could occur but are anticipated to be limited due to very low use these local roadways currently have. Several local roadways will be improved or completely reconstructed to accommodate construction-related traffic. Many of the existing local roads are in poor condition; the proposed improvements will have a beneficial impact by improving the quality of the roads for all users.

Permanent staff for the proposed project, assumed to be between 15 and 20 employees, will use the improved local road system. Because the traffic generated from these employees is small and existing usage light, no adverse impacts to the road system as a result of new permanent staff are anticipated.

Improvements to the local roadway system will have a significant beneficial impact to Sherman County roads by improving deteriorated roadway sections with additional or new aggregate. Those improvements will remain when the project's construction is complete for local residents to use. While short-term construction-related impacts, primarily traffic delays, may occur, those impacts will be temporary and would not constitute a significant adverse impact.

U.5.8 Police

The small population increase attributed to the proposed facility would not have a significant adverse impact on local police services. Discussions with the Sherman County Sheriff's Department did not identify any concerns about the in-migrant construction workers or any need for increased patrols near the proposed project, either when it is under construction or when it is operational. Therefore, the proposed project would not have a significant adverse impact on police service.

U.5.9 Fire Protection and Emergency Response

No adverse impacts are anticipated to occur to fire protection and emergency services as a result of the proposed project. Existing facilities are adequate to provide fire and emergency response services.

U.5.10 Health Care

The proposed project would not adversely impact medical services in the analysis area. The Mid-Columbia Valley Medical Center in The Dalles would be capable of providing services for construction and operational employees in case of an emergency.

U.5.11 Schools

No significant adverse impact to local schools is anticipated to occur. No short-term demand on school facilities is expected from the construction of the proposed project because the portion of the construction work force that might temporarily live in the area is not expected to include any families. The number of in-migrant operational staff is anticipated to be small, creating few new households with school-age children. Consequently, there would be no significant increase in the student population. Interviews with local school districts indicated that any new students would not have a significant adverse impact on the school district. On the contrary, most school districts in the analysis area have lost students; an increase in the student population would have a beneficial impact on school districts because each additional student increases revenue for the district.

U.5.12 Mitigation Measures

The proposed facility would not result in any significant adverse impacts to the public service and utility providers within the analysis area. Therefore, no mitigation is required.

U.6 MONITORING PROGRAMS

OAR 345-021-0010(1)(u)(E) *The applicant's proposed monitoring program, if any, for impacts to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0010;*

Response: No adverse impacts to public facilities are anticipated, therefore, no monitoring program is required.

U.7 CONCLUSION

Based on the information presented in this Exhibit, no adverse impacts to any public services are expected. Based on the above information, the Applicant has satisfied OAR 345-021-0010(1)(u), and the Council may find the requirements contained in OAR 345-022-0110 are satisfied.

U.8 REFERENCES

U.8.1 Personal Contacts

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Chanliss, Dan, The Dalles School District, Business Manager. Telephone Conversation. February 7, 2005.

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September 29, 2005

PPM Energy
Jesse Gronner
1125 NW Couch
Suite 700
Portland, Ore. 97209

Mr. Gronner,

Regarding the FSEC questions pertaining to the Phase III energy development plan for Sherman County, I would like to provide some answers to some of the questions posed.

Although the contracts call for the sites to be restored upon possible decommissioning of the towers, the questions regarding farming over those sites should not be a problem. Typical tillage in this area is primarily in the 6 to 8 inch zone, occasionally as deep as 10 inches and rarely if ever, over 12.

When the original soil was removed, most of the topsoil was spread around the farm ground in the area of the tower site and it could be pushed back in to the holes upon decommissioning. Farmers in this area frequently scrape the topsoil to build sediment dams and terrace as conservation practices to control erosion and there are skilled contractors in the area very capable of pushing enough nearby topsoil into position without going so deep they expose non-producing bedrock or hard pans. If extra fill dirt is needed, there are a number of sites behind old sediment dams or fill that has been stored after removal for a sewage filtration pond that could be available for that purpose.

If you have any other questions, please do not hesitate to contact me.

Sincerely,

Sandy Macnab
Oregon State University Extension Service
Sherman County Crops Agent

Blattner

Project: Klondike III Decommissioning
Owner: PPM Energy LLC
Location: Sherman County, OR
Date: 10/06/05

Wind Tower Decommission and Site Restoration Estimate

All of the pricing is estimated based on 2005 pricing and does not include any time value of money.
The information below is for informational purposes only and does not represent a quotation to accomplish the work.
THE COSTS ARE BASED ON DISMANTLEMENT, DEMOLITION, AND LOADING ON TRUCKS

			Quantity		Unit Price	Extension
1a	**Remove turbines and towers, assume 165 ea GE 1.5 MW SLE's on 80 meter towers** Towers and turbines will be removed in such a manner as to allow for re-use & max. salvage Load on trucks		165	EA	22,500	3,712,500
1b	**Disconnect electrical within turbine and ready for disassembly**		165	EA	3,500	577,500
2a	**Excavate and demolish turbine foundations to 4' below grade, incl. tranformer pads** Sites will be graded to match existing contours andrestored to a condition that will support surrounding vegitation.		165	EA	7,850	1,295,250
2b	**Remove, load on trucks 1750 kVA transformers** Remove 600 volt cabling from transformer secondary to turbine controller Remove 35kV treminations from transformer primary and abandon 4' below grade		165	EA	1,000	165,000
3a	**Roadway obliteration, gravel removal and return roads to tillable conditions.**		20	MI	17,085	341,700
3b	**Revegitation**		38	ac	1,500	57,000
3c	**Remove 35kV junction boxes, 35 kV cabling, remove and abandon 4' below sub-grade**		20	ea	1,000	20,000
4a	**Remove three (3) 80 m met towers**		3	ea	5,000	15,000
4b	**Remove electrical and abandon at 4' below subgrade**		3	ea	500	1,500
5a	**Take down 3.5 miles of 230 kV t-line and coil conductors, load on trucks**		1	ea	685,000	685,000
6a	**Remove substation, load equipment, and restore land** Remove all fencing, foundations, equipment, load, and restore land	(Qty 2 ea ?)	2	ea	200,000	400,000
						7,270,450
7a	**Salvage Value of tower and turbine steel**		26400	Ton	-260	-6,864,000
	Project Cost					406,450

Data extracted on: August 11, 2005 (06:29 PM)

Producer Price Index-Commodities

Series Catalog:

Series ID : WPS1012

Seasonally Adjusted
Group : Metals and metal products
Item : Iron and steel scrap
Base Date : 8200

Data:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1973	64.6	68.0	65.4	65.2	71.2	76.9	76.1	78.5	81.7	91.8	116.2	120.6	
1974	111.8	132.7	149.4	172.5	131.3	149.6	167.6	165.6	170.7	169.7	167.0	134.7	
1975	120.0	119.6	112.6	109.1	110.9	102.1	83.6	96.0	112.2	102.1	97.5	99.6	
1976	106.4	105.5	109.6	115.4	112.4	117.5	121.6	118.9	111.3	105.0	102.9	108.3	
1977	106.5	104.7	104.0	102.4	102.1	98.9	94.8	98.5	100.3	93.7	86.6	96.3	
1978	101.8	100.5	102.3	105.1	108.1	112.3	118.3	118.6	117.9	121.7	127.9	133.6	
1979	134.3	140.7	158.1	143.5	138.6	163.5	151.8	145.8	141.8	144.0	148.5	149.7	
1980	144.7	146.1	145.4	140.6	128.8	118.9	119.6	132.2	144.4	152.6	154.8	160.1	
1981	146.7	136.9	142.5	146.0	150.4	147.6	144.7	147.5	142.0	135.0	125.6	119.7	
1982	122.7	116.6	110.9	106.3	103.0	98.1	96.2	93.8	91.2	89.3	85.8	82.3	
1983	87.1	91.3	101.4	101.3	103.2	109.1	111.5	111.5	114.5	114.8	119.5	125.3	
1984	125.6	128.8	127.4	124.5	131.5	129.6	122.1	115.0	117.9	121.1	121.1	117.8	
1985	115.7	114.1	117.8	116.8	112.9	108.2	110.7	112.7	113.5	111.4	108.3	107.4	
1986	108.8	108.3	106.7	108.0	109.8	108.5	111.6	109.9	110.6	109.5	111.9	112.2	
1987	111.0	110.9	109.9	109.4	113.2	118.8	123.8	122.7	136.7	158.8	167.4	160.6	
1988	153.8	170.4	176.4	175.9	173.2	170.9	190.3	187.0	181.9	181.4	182.2	182.8	
1989	185.9	189.8	187.6	184.5	185.8	179.6	173.9	164.3	162.4	159.2	155.7	155.3	
1990	No data available for this year.												
1991	No data available for this year.												
1992	No data available for this year.												
1993	No data available for this year.												
1994	No data available for this year.												
1995	No data available for this year.												
1996	No data available for this year.												
1997	180.2	187.2	185.3	181.2	182.5	182.7	188.5	188.5	189.3	196.7	204.6	202.6	
1998	195.4	191.0	185.7	184.3	180.9	178.8	173.1	159.3	145.0	132.1	125.5	123.2	
1999	122.2	131.7	124.8	125.2	131.5	135.5	135.0	140.8	141.3	149.1	164.7	173.5	
2000	167.9	158.3	158.2	155.5	143.9	138.0	133.6	131.9	135.6	131.7	125.1	124.2	
2001	126.3	115.4	118.1	117.8	117.7	118.5	122.4	122.3	123.8	122.3	118.3	118.3	
2002	115.2	117.4	122.6	131.6	144.7	150.9	151.7	151.3	152.7	156.4	154.5	151.9	
2003	154.1	160.1	169.8	168.9	165.9	165.0	167.9	178.9	192.1	202.6	224.5	251.7	
2004	268.4	301.5	324.5	291.8	251.0	253.0	333.8	359.7	336.5	384.2	413.2	380.1	
2005	334.8	294.2	281.9(P)	304.4(P)	267.0(P)	213.9(P)							

P : Preliminary. All indexes are subject to revision four months after original publication.

1985	117.0	119.2	122.9	120.5	112.0	105.4	106.7	112.2	112.6	111.0	105.9	105.9	112.6
1986	110.6	112.7	110.1	110.1	108.8	106.4	107.4	110.1	110.0	109.1	109.7	110.5	109.6
1987	112.8	114.7	111.9	109.1	112.6	116.7	120.0	124.3	137.4	159.3	164.4	157.7	128.4
1988	156.3	175.2	177.6	176.3	171.3	168.0	185.4	191.3	184.3	182.3	178.7	179.0	177.1
1989	188.1	194.2	189.5	185.4	185.4	177.8	170.1	168.2	164.2	158.9	151.7	151.1	173.7
1990	157.7	157.4	159.2	165.9	174.0	169.3	166.5	177.4	174.8	168.6	162.0	159.6	166.0
1991	161.2	157.6	153.0	152.5	148.8	137.8	139.8	146.5	148.0	146.4	141.6	138.3	147.6
1992	139.2	140.8	144.2	143.3	142.6	138.4	138.7	138.9	138.4	134.0	132.7	138.7	139.2
1993	151.9	160.8	159.9	157.4	160.2	170.1	176.4	172.9	174.5	189.4	196.0	200.8	172.5
1994	203.8	206.2	204.0	198.5	185.7	168.1	176.5	190.6	193.3	190.0	196.1	202.0	192.9
1995	210.6	208.1	201.3	202.9	202.8	200.7	201.0	210.2	206.3	201.4	193.1	193.7	202.7
1996	199.7	201.4	197.8	197.8	199.5	194.8	190.5	191.6	191.7	183.4	172.4	172.2	191.1
1997	182.2	191.1	186.0	181.6	185.4	185.1	189.4	191.7	189.7	191.2	196.0	197.1	188.9
1998	197.3	193.5	186.4	184.1	184.5	182.0	175.7	162.5	147.5	129.1	119.2	118.5	165.0
1999	124.4	132.7	125.4	126.2	134.4	138.2	137.3	143.4	143.0	145.0	154.7	165.9	139.2
2000	169.4	162.1	159.9	157.8	147.3	140.4	135.6	134.7	135.6	127.3	117.4	118.2	142.1
2001	127.2	119.0	120.3	120.5	120.2	119.4	123.5	125.0	124.3	118.5	110.6	111.6	120.0
2002	115.5	122.1	126.1	135.5	147.4	150.6	152.2	154.8	153.7	151.5	144.3	142.6	141.4
2003	153.9	167.9	176.1	174.8	168.7	163.7	167.9	183.2	193.4	196.1	209.9	235.1	182.6
2004	267.5	317.5	337.8	302.6	255.5	250.5	333.2	368.3	338.5	371.2	386.7	354.6	323.7
2005	333.8	309.8	293.5(P)	315.6(P)	271.8(P)	211.7(P)							

P : Preliminary. All indexes are subject to revision four months after original publication.

1/9/06 e-mail

John,

Below is a slightly revised Blattner cost estimate (taking into account more acreage for revegetation) and a revised scrap value amount. These amounts are in 2005 dollars. The net result for a proposed bond amount, rounded up is $1,550,000 in 2005 dollars. An inflation adjustor acceptable to the Council could be applied to this as a starting amount.

The scrap value amount is the result of a VERY conservative analysis performed by a metals industry consultant and uses Klondike III-specific amounts. A higher value would be attributed to the salvage (beyond just scrap) relative to removal cost if the same individuals doing the removal were realizing the salvage value, which is most likely to be the case. It is also very difficult to believe that a $250 million+ investment immediately drops in value to less than $10 million in year 1, but I understand there needs to be a compromise.

Please let me know any questions.

Thanks,

Jesse

	Quantity		Unit Price	Extension
Remove turbines and towers, assume 165 ea GE 1.5 MW SLE's on 80 meter towers Towers and turbines will be removed in such a manner as to allow for re-use & max. salvage Load on trucks	165	EA	22,500	3,712,500
Disconnect electrical within turbine and ready for disassembly	165	EA	3,500	577,500
Excavate and demolish turbine foundations to 4' below grade, incl. tranformer pads Sites will be graded to match existing contours andrestored to a condition that will support surrounding vegitation.	165	EA	7,850	1,295,250
Remove, load on trucks 1750 kVA transformers Remove 600 volt cabling from transformer secondary to turbine controller Remove 35kV treminations from transformer primary and abandon 4' below grade	165	EA	1,000	165,000
Roadway obliteration, gravel removal and return roads to tillable conditions.	20	MI	17,085	341,700
Revegitation	100	ac	1,500	150,000
Remove 35kV junction boxes, 35 kV cabling, remove and abandon 4' below sub-grade	20	ea	1,000	20,000

Remove three (3) 80 m met towers		**3**	**ea**	**5,000**	**15,000**
Remove electrical and abandon at 4' below subgrade		**3**	**ea**	**500**	**1,500**
Take down 3.5 miles of 230 kV t-line and coil conductors, load on trucks		**1**	**ea**	**685,000**	**685,000**
Remove substation, load equipment, and restore land	**(Qty 2 ea ?)**	**2**	**ea**	**200,000**	**400,000**
Remove all fencing, foundations, equipment, load, and restore land					
Gross Project Cost (per Blattner)					**7,363,450**
Salvage Value of tower and turbine steel (per independent consultant)					**-5,828,981**
Net Project Cost					**1,534,469**

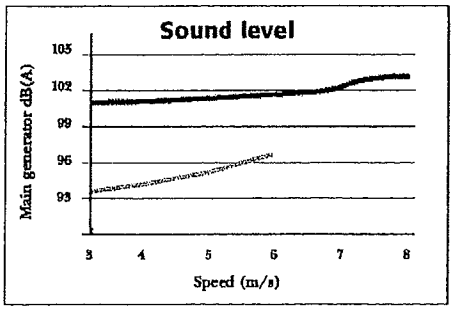
Response to Kerrie Standlee Comments on Exhibit X		
Comment No.		Comment and Response
1		It is stated on page X-5 of Exhibit X and again on page 8 of the TW Environmental, Inc. report in Appendix X-1 that a maximum sound power level of 106 dBA was used in predicting the noise that would radiate from the Klondike III project (104 ± 2 dBA). However, on those same pages, the maximum octave band sound power level data presented as representative of the data supplied by GE summed up to only 104 dBA. After running some preliminary calculations of my own, it appears to me that the 104 dBA octave band data may have been used in the calculations instead of 106 dBA octave band data. We need to know if octave band data summing up to 106 dBA was used in the analysis of if those octave band data shown in Exhibit X were used in the analysis. If octave band data summing up to 106 dBA was used in the analysis, we need to see that data. **TW Response**: The sound power data supplied by GE and used in the analysis sums to 104 dBA. The statement that 106 dBA was used in the calculations was in error. Use of the mean maximum level (104 dBA) is reasonable, given that multiple towers contribute to the sound levels at affected receivers.
2		In your "request for additional information" question X4, you requested documentation of the sound power level for the GE and Vestas turbines over the entire range of wind speeds from "cut-in" to the "wind speed corresponding to the maximum sound power." The response provided by the applicant stated that the sound power data fro the GE turbines ranges from less than 96 ±2 dBA at a wind speed of 3 m/s to less than or equal to 104 ± 2 dBA at a wind speed of 7 m/s (cut-out). The applicant stated that documentation for the GE turbines was not provided because the data explicitly states that it is confidential and can not be copied without written consent from GE Energy. Finally, the applicant stated that the Vestas data was available but it was not provided because the GE data was considered to be more conservative and was used in the analysis. The data you requested is needed for our review because it is needed to determine the wind speed at which the noise from the turbines would first begin to exceed the 36 dBA ambient degradation criteria at all residences in the area. The applicant has shown that, at cut-out wind speed, the GE turbines would generate noise levels that exceed the 36 dBA limit at four residences but they implied that such an event would rarely occur. The DEQ noise regulation for wind turbines states that the noise generated by a wind facility shall not cause an increase of more than 10 dBA in the ambient noise at any residence over the entire range of operating wind speeds. Based on what little information the applicant has provided, it appears that the GE turbines will generate noise levels that exceed the 36 dBA criteria at some of the residences at wind

		speeds close to the cut-in wind speed. We therefore request that either the applicant request written consent from GE Energy to supply the sound power data for the GE turbine or the applicant provide the wind speed at which the sound generated by the GE turbines will first exceed the 36 dBA criteria at the four residences identified in their report as experiencing noise levels above the criteria when the wind speed was at cut-out speed. Since it is possible that the applicant will be using the Vestas turbines instead of the GE turbines, and because we also need to determine the wind speed at which the Vestas turbines will initially begin to generate noise levels that exceed the 36 dBA level at residences around the area, the applicant should provide the sound power data for the Vestas turbines as you requested. **TW Response**: GE sound power data are shown in the attached table. Please note that this information is considered confidential business information and GE has authorized its release to permitting agencies only. (This data should be protected by the Oregon Department of Energy pursuant to ORS 192.501(2) and 192.502(4), as well as other applicable law.) Vestas sound power data are shown in the attached figure. Wind speed data at an 80-meter tower height are included in the attached table. It appears there was a misinterpretation of the GE data where the notation 9 – cut out was interpreted to mean that 9 m/s was the cut out speed. However, the correct interpretation appears to be from 9 m/s to the cut out speed of 20 m/s. Based on a GE calculation, 9 m/s at hub height correlates to 7 m/s at a 10 meter tower height (referenced in the TW Environmental, Inc. report) with certain assumptions. These assumptions are not needed as the attached wind speed data are for an 80 meter height. The highest sound level predicted at a receiver is 41 dBA at R6. To maintain sound levels below 36 dBA (a 10 dBA increase over 26 dBA), the contribution from the turbines at R6 cannot exceed approximately 35 dBA, or 6 dBA less than at maximum sound levels. The GE data indicate that this condition would be met at hub height wind speeds of between 6 and 7 m/s (13.4 to 15.6 miles per hour). These hub height wind speeds would be expected to correlate to surface wind speeds over 10 miles per hour. Ambient sound levels without the turbines are not likely to be as low as 26 dBA at surface wind speeds over 10 mph. The Vestas data are limited, but have a flatter sound power curve indicating that sound levels are not substantially reduced at lower wind speeds. If they are unable to obtain waivers from property owners, PPM would have several options for maintaining sound level increases lower than 10 dBA over the entire range of wind speeds of the finally selected turbine. They could collect surface noise level data at affected receivers and correlate the data to wind speeds at hub

		height. This would allow them to determine ambient levels at varying wind speeds, and to limit increases to 10 dBA over actual ambient levels instead of an assumed 26 dBA level. They could purchase turbines that allow for reduced noise operations above certain wind speeds for the towers expected to contribute to increases over 10 dBA at receivers. Or they could limit operations of selected towers.
3		Finally, in your "request for additional information" question X2, you asked the applicant to provide the specification data for the transformers. In the response to your request, the applicant stated that BPA was contacted and that BPA confirmed that the transformers generated 70 dBA at a location described as "at the transformer". The applicant stated that "a distance of 3 feet from the transformer was used to conservatively estimate the distance for the specification." While the applicant may in fact be correct as to the reference distance for the 70 dBA measurement described by BPA, we have on other occasions found sound pressure levels of 70 to 75 dBA at a distance of 25 feet from the transformers which would result in much higher noise levels at some of the residences than those predicted with a reference distance of 3 feet. We therefore request that the applicant provide a more accurate description of the distance related to the reported sound radiating from the transformers and that the applicant provide information on the size of the transformers (both dimensional and power). **TW Response**: The following transformers are included in the project: • K3 east project sub: Two 50/66.7/83.3 MVA 230-34.5 KV transformers • K3 west project sub: One 50/66.7/83.3 MVA 230-34.5 KV transformer We do not currently have dimensional data on the transformers. Sound pressure level data from the National Electrical Manufacturer's Association Publication NEMA TR 1 were used to verify the reasonableness of data provided by BPA. Table 0-2 of the NEMA TR 1 document shows audible sound levels for oil immersed power transformers. The reference distance for the data is between 0.3 meter and 2 meters depending on which transformer surface is the noise source. Fan cooled surfaces are measured at 2 meters. All other surfaces are measured at 0.3 meters. The average distance of the measurement would be approximately 0.75 meter. The most common Basic Impulse Level (BIL) associated with a 230 KV transformer is 900 KV. The average sound pressure levels for a 900 BIL, FOA, 83.3 MVA transformer is listed as 82 dBA at the reference distance of approximately 0.75 meter. For 2 co-located transformers, the distance to the 36 dBA noise contour (assuming no shielding or ground absorption) would be approximately 211 meters (690 feet). No receivers were identified within approximately a mile of this location. For the single

		transformer, the distance to the 36 dBA noise contour (assuming no shielding or ground absorption) would be 149 meters (490 feet). No receivers were identified within approximately one-half mile of this location. In summary, the 3 foot reference distance appears reasonable, but the BPA data may have underestimated source noise levels for the capacity of the proposed transformers. Given the distances between the substation locations and receivers, the transformers are not expected to contribute to overall sound levels at a sensitive receiver.

Sound Power Levels for Vestas V82-1.65 MW Turbine



Upper Line: Data for the MW Generator
Lower Line: Data for the 900 kw Generator

TECHNICAL SPECIFICATION - Noise Emission Compliance

1. TESTING

(a) Having given Seller seven days notice, Buyer may proceed with Test.

(b) Buyer shall maintain complete documentation, and both Parties shall have complete access to all measured data and documentation at any time.

(c) The measurement, data processing and evaluation of the wind turbine's noise emission parameters are to be performed by a qualified and experienced measurement institute.

(d) The procedure ("Test Procedure") set forth in the publication IEC 61400-11, Second edition 2002-12, Wind Turbine Generator Systems - Part 11: Acoustic Noise Measurement Techniques shall govern the Tests, with the following deviations or additions:

   a. Section 7.3.1: Method 1 of wind speed measurement shall be used. Method 2 shall only be used when measuring background noise, and noise at and above rated power.

   b. Annex C: The turbulence measurement shall be mandatory.

(e) Buyer may choose to undertake Tests on any Turbine location that complies with the limits of the Test Procedure.

(f) The Parties recognize that conformance with the Test Procedure may require that some Turbines be turned off during certain Tests. Any hours during which Turbines are turned off for purposes of the Tests shall not be counted against Availability Guarantee.

2. WARRANTY EVALUATION

(a) The only warranty that Seller makes is for maximum Sound Power Level – $L_{WA,k}$. For the 1.5sle, this value is 106 dB(A). Other data in the Noise Emission Characteristics document is for information and planning purposes only. Definitions:

   a. $L_{WA,k}$ is defined in the Test Procedure, and "$_k$" is any integer wind speed from 6 to 10 m/s.

   b. Note: This value include a tolerance that is related to the "variable" confidence level defined as "K" in reference document IEC 61400-14 (CDV).

(b) If the above condition is met, the Seller satisfies the Sound Level Guarantee, and Purchaser shall issue to Seller a certificate to that effect. If the condition is not met, subsequent terms of the Contract shall be followed.

3. REPORTING

(a) In addition to the reporting requirements of the Test Procedure, Buyer shall report the following as a minimum:

   a. Section 9.4: All optional acoustic data.

   b. Section 9.5: All optional non-acoustic data.

5 May 2005
GE Wind Energy
Author: David A. Wahl
Revision 2

(b) Buyer shall issue to Seller a copy of the complete test report upon completion.

TW Environmental, Inc.

136 NE 28th Avenue, Portland, OR 97232-3146

503-235-9194 ▪ Fax: 503-239-7998

Date: August 8, 2005

To: Dana Siegfried
David Evans and Associates
2100 SW River Parkway
Portland, Oregon 97201

Contact: Francesca Sims FS

Subject: Klondike III Wind Project

Project #: 242

The following materials are enclosed. If you do not receive the materials listed below, please notify the listed contact person immediately.

Quantity	Description
1	Set of model output files to be included in Appendix B of TW report

COMMENTS:

Transmittal

Input Data Summary For:
E:\Projects\242\SPM 9613 Model Files\Klondike - Contour.prj

Project Description:
Contour Trial
User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 20 dB Cap, re Hard ground
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 15
Relative Humidity, in percent: 70

Source Files:

E:\Projects\242\SPM 9613 Model Files\C1.src // C1
E:\Projects\242\SPM 9613 Model Files\C2.src // C2
E:\Projects\242\SPM 9613 Model Files\C3.src // C3
E:\Projects\242\SPM 9613 Model Files\C4.src // C4
E:\Projects\242\SPM 9613 Model Files\C5.src // C5
E:\Projects\242\SPM 9613 Model Files\C6.src // C6
E:\Projects\242\SPM 9613 Model Files\C7.src // C7
E:\Projects\242\SPM 9613 Model Files\C8.src // C8
E:\Projects\242\SPM 9613 Model Files\C9.src // C9
E:\Projects\242\SPM 9613 Model Files\C10.src // C10
E:\Projects\242\SPM 9613 Model Files\C11.src // C11
E:\Projects\242\SPM 9613 Model Files\C12.src // C12
E:\Projects\242\SPM 9613 Model Files\C13.src // C13
E:\Projects\242\SPM 9613 Model Files\C14.src // C14
E:\Projects\242\SPM 9613 Model Files\C15.src // C15
E:\Projects\242\SPM 9613 Model Files\C16.src // C16
E:\Projects\242\SPM 9613 Model Files\C17.src // C17

Observer File:

E:\Projects\242\SPM 9613 Model Files\Contour Receiver.obs // Contour 1

Output Data Summary

x = 38.5 y = 1248 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	53.1	43.0	36.0	32.4	30.5	20.4	0.0	0.0	35.7	52.9
C9	0.0	0.0	41.5	31.7	24.8	21.3	19.6	10.1	0.0	0.0	24.6	41.4
C8	0.0	0.0	41.5	31.7	24.7	21.2	19.6	9.9	0.0	0.0	24.5	41.3
C10	0.0	0.0	41.5	31.7	24.7	21.2	19.6	9.9	0.0	0.0	24.5	41.3
C11	0.0	0.0	41.4	31.5	24.5	21.0	19.3	9.6	0.0	0.0	24.3	41.2
C7	0.0	0.0	41.4	31.5	24.5	21.0	19.3	9.6	0.0	0.0	24.3	41.2
C6	0.0	0.0	41.2	31.2	24.2	20.7	18.9	9.0	0.0	0.0	24.0	41.0
C12	0.0	0.0	41.2	31.2	24.2	20.7	18.9	9.0	0.0	0.0	24.0	41.0
C13	0.0	0.0	41.0	30.9	23.8	20.3	18.4	8.3	0.0	0.0	23.6	40.8
C5	0.0	0.0	41.0	30.9	23.8	20.3	18.4	8.3	0.0	0.0	23.6	40.8
C14	0.0	0.0	40.7	30.4	23.4	19.7	17.8	7.4	0.0	0.0	23.1	40.5
C4	0.0	0.0	40.7	30.4	23.4	19.7	17.8	7.4	0.0	0.0	23.1	40.5
C3	0.0	0.0	40.4	30.0	22.9	19.1	17.1	6.3	0.0	0.0	22.5	40.2
C15	0.0	0.0	40.4	30.0	22.9	19.1	17.1	6.3	0.0	0.0	22.5	40.2
C16	0.0	0.0	40.1	29.5	22.3	18.5	16.3	5.2	0.0	0.0	21.9	39.8
C2	0.0	0.0	40.1	29.5	22.3	18.5	16.3	5.2	0.0	0.0	21.9	39.8
C1	0.0	0.0	39.7	29.0	21.8	17.8	15.5	4.0	0.0	0.0	21.3	39.4
C17	0.0	0.0	39.7	29.0	21.8	17.8	15.5	4.0	0.0	0.0	21.3	39.4

Input Data Summary For:
E:\Projects\242\SPM 9613 Model Files\Klondike - R4 sans.prj

Project Description:
Klondike- R4
User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 15
Relative Humidity, in percent: 70

Source Files:

E:\Projects\242\SPM 9613 Model Files\R5_1.src // Wpt54
E:\Projects\242\SPM 9613 Model Files\R5_2.src // Wpt55
E:\Projects\242\SPM 9613 Model Files\R5_3.src // Wpt56
E:\Projects\242\SPM 9613 Model Files\R5_4.src // Wpt57
E:\Projects\242\SPM 9613 Model Files\R5_5.src // Wpt58
E:\Projects\242\SPM 9613 Model Files\R5_10.src // Wpt63
E:\Projects\242\SPM 9613 Model Files\R5_11.src // Wpt64

Observer File:

E:\Projects\242\SPM 9613 Model Files\Receiver 4.obs // R4

Output Data Summary

x = 1443 y = -310 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	51.2	41.7	34.7	31.3	30.1	21.8	0.0	0.0	34.8	51.2
Wpt58	0.0	0.0	45.4	36.5	29.1	26.1	25.2	17.6	0.0	0.0	29.6	45.4
Wpt63	0.0	0.0	44.8	35.6	28.4	25.4	24.4	16.5	0.0	0.0	28.9	44.7
Wpt64	0.0	0.0	43.7	34.3	27.2	24.1	22.9	14.6	0.0	0.0	27.5	43.6
Wpt56	0.0	0.0	40.6	30.3	23.7	19.5	17.5	7.0	0.0	0.0	22.9	40.4
Wpt57	0.0	0.0	40.6	30.2	23.6	19.5	17.5	7.0	0.0	0.0	22.9	40.4
Wpt55	0.0	0.0	40.5	30.2	23.6	19.4	17.4	6.9	0.0	0.0	22.8	40.3
Wpt54	0.0	0.0	40.4	30.0	23.4	19.2	17.1	6.4	0.0	0.0	22.6	40.2

Input Data Summary For:
E:\Projects\242\SPM 9613 Model Files\Klondike - R5 sans.prj

Project Description:
Klondike- R5
User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 15
Relative Humidity, in percent: 70

Source Files:

E:\Projects\242\SPM 9613 Model Files\R5_1.src // Wpt54
E:\Projects\242\SPM 9613 Model Files\R5_2.src // Wpt55
E:\Projects\242\SPM 9613 Model Files\R5_3.src // Wpt56
E:\Projects\242\SPM 9613 Model Files\R5_4.src // Wpt57
E:\Projects\242\SPM 9613 Model Files\R5_6.src // Wpt59
E:\Projects\242\SPM 9613 Model Files\R5_7.src // Wpt60
E:\Projects\242\SPM 9613 Model Files\R5_8.src // Wpt61
E:\Projects\242\SPM 9613 Model Files\R5_9.src // Wpt62
E:\Projects\242\SPM 9613 Model Files\R5_10.src // Wpt63
E:\Projects\242\SPM 9613 Model Files\R5_11.src // Wpt64

Observer File:

E:\Projects\242\SPM 9613 Model Files\Receiver 5.obs // Receiver 5

Output Data Summary

x = 1674.5 y = 432.8 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	52.0	42.4	35.4	31.9	30.5	22.1	0.1	0.0	35.4	51.9
Wpt59	0.0	0.0	45.8	37.0	29.5	26.6	25.8	18.4	0.0	0.0	30.2	45.8
Wpt60	0.0	0.0	44.4	35.2	28.1	25.0	23.9	16.0	0.0	0.0	28.5	44.4
Wpt61	0.0	0.0	43.2	33.7	26.7	23.5	22.2	13.6	0.0	0.0	26.8	43.1
Wpt62	0.0	0.0	42.0	32.3	25.4	22.0	20.4	11.2	0.0	0.0	25.3	41.9
Wpt63	0.0	0.0	41.1	31.1	24.3	20.5	18.7	8.8	0.0	0.0	23.9	41.0
Wpt64	0.0	0.0	40.4	30.0	23.4	19.1	17.1	6.3	0.0	0.0	22.6	40.2
Wpt54	0.0	0.0	39.4	28.6	22.2	17.3	14.8	3.0	0.0	0.0	20.9	39.2
Wpt55	0.0	0.0	39.2	28.3	22.0	17.0	14.4	2.4	0.0	0.0	20.6	39.0
Wpt56	0.0	0.0	39.0	28.1	21.7	16.6	13.9	1.7	0.0	0.0	20.3	38.8
Wpt57	0.0	0.0	38.8	27.7	21.4	16.1	13.3	0.7	0.0	0.0	19.8	38.5

Input Data Summary For:
E:\Projects\242\SPM 9613 Model Files\Klondike - R6 sans.prj

Project Description:
Klondike - R6

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 15
Relative Humidity, in percent: 70

Source Files:

E:\Projects\242\SPM 9613 Model Files\R8_1.src // Wpt126
E:\Projects\242\SPM 9613 Model Files\R8_2.src // Wpt127
E:\Projects\242\SPM 9613 Model Files\R8_3.src // Wpt128
E:\Projects\242\SPM 9613 Model Files\R8_4.src // Wpt129
E:\Projects\242\SPM 9613 Model Files\R8_5.src // Wpt130
E:\Projects\242\SPM 9613 Model Files\R8_6.src // Wpt131
E:\Projects\242\SPM 9613 Model Files\R8_7.src // Wpt132
E:\Projects\242\SPM 9613 Model Files\R8_8.src // Wpt136
E:\Projects\242\SPM 9613 Model Files\R8_9.src // Wpt137
E:\Projects\242\SPM 9613 Model Files\R8_10.src // Wpt138
E:\Projects\242\SPM 9613 Model Files\R8_11.src // Wpt139
E:\Projects\242\SPM 9613 Model Files\R8_12.src // Wpt140
E:\Projects\242\SPM 9613 Model Files\Wpt96.src // Wpt96
E:\Projects\242\SPM 9613 Model Files\Wpt95.src // Wpt95
E:\Projects\242\SPM 9613 Model Files\Wpt88.src // Wpt88
E:\Projects\242\SPM 9613 Model Files\Wpt87.src // Wpt87
E:\Projects\242\SPM 9613 Model Files\Wpt86.src // Wpt86
E:\Projects\242\SPM 9613 Model Files\Wpt85.src // Wpt85

Observer File:

E:\Projects\242\SPM 9613 Model Files\Receiver 6.obs // Receiver 6

Output Data Summary

x = 806 y = 78.5 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	53.4	43.2	36.5	32.6	30.8	20.8	0.0	0.0	36.0	53.2
Wpt126	0.0	0.0	42.3	32.6	25.7	22.4	20.9	11.8	0.0	0.0	25.7	42.2
Wpt127	0.0	0.0	41.9	32.2	25.3	21.9	20.3	11.0	0.0	0.0	25.2	41.8
Wpt88	0.0	0.0	41.8	32.0	25.1	21.7	20.1	10.7	0.0	0.0	25.0	41.7
Wpt136	0.0	0.0	41.6	31.8	24.8	21.4	19.7	10.2	0.0	0.0	24.7	41.4
Wpt96	0.0	0.0	41.4	31.6	24.7	21.2	19.5	9.8	0.0	0.0	24.5	41.3
Wpt128	0.0	0.0	41.4	31.6	24.7	21.2	19.5	9.8	0.0	0.0	24.5	41.3
Wpt87	0.0	0.0	41.1	31.0	24.2	20.4	18.6	8.6	0.0	0.0	23.8	40.9
Wpt129	0.0	0.0	41.0	31.0	24.2	20.4	18.6	8.5	0.0	0.0	23.7	40.9
Wpt137	0.0	0.0	40.9	30.7	24.0	20.0	18.1	7.9	0.0	0.0	23.4	40.7
Wpt95	0.0	0.0	40.8	30.6	23.9	20.0	18.0	7.8	0.0	0.0	23.3	40.6
Wpt86	0.0	0.0	40.5	30.1	23.5	19.3	17.2	6.6	0.0	0.0	22.7	40.2
Wpt130	0.0	0.0	40.3	29.9	23.3	19.1	17.0	6.2	0.0	0.0	22.5	40.1
Wpt138	0.0	0.0	40.2	29.7	23.2	18.8	16.7	5.8	0.0	0.0	22.3	40.0
Wpt131	0.0	0.0	39.9	29.2	22.7	18.1	15.8	4.5	0.0	0.0	21.7	39.6
Wpt85	0.0	0.0	39.8	29.1	22.7	18.0	15.7	4.3	0.0	0.0	21.5	39.5
Wpt139	0.0	0.0	39.6	28.8	22.4	17.7	15.3	3.7	0.0	0.0	21.2	39.4
Wpt132	0.0	0.0	39.4	28.6	22.2	17.3	14.9	3.1	0.0	0.0	20.9	39.2
Wpt140	0.0	0.0	39.1	28.1	21.8	16.7	14.0	1.8	0.0	0.0	20.3	38.8

Input Data Summary For:
E:\Projects\242\SPM 9613 Model Files\Klondike - R7 sans.prj

Project Description:
Klondike - R7

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 15
Relative Humidity, in percent: 70

Source Files:

e:\Projects\242\SPM 9613 Model Files\R7_1.src // Wpt94
e:\Projects\242\SPM 9613 Model Files\R7_2.src // Wpt93
E:\Projects\242\SPM 9613 Model Files\R7_3.src // Wpt92
E:\Projects\242\SPM 9613 Model Files\R7_4.src // Wpt91
E:\Projects\242\SPM 9613 Model Files\R7_5.src // Wpt90
E:\Projects\242\SPM 9613 Model Files\R7_7.src // Wpt101
E:\Projects\242\SPM 9613 Model Files\R7_8.src // Wpt100
E:\Projects\242\SPM 9613 Model Files\R8_1.src // Wpt126
E:\Projects\242\SPM 9613 Model Files\R8_11.src // Wpt139
E:\Projects\242\SPM 9613 Model Files\R8_12.src // Wpt140
E:\Projects\242\SPM 9613 Model Files\Wpt85.src // Wpt85
E:\Projects\242\SPM 9613 Model Files\Wpt86.src // Wpt86
E:\Projects\242\SPM 9613 Model Files\Wpt87.src // Wpt87
E:\Projects\242\SPM 9613 Model Files\Wpt88.src // Wpt88
E:\Projects\242\SPM 9613 Model Files\Wpt89.src // Wpt89
E:\Projects\242\SPM 9613 Model Files\Wpt95.src // Wpt95
E:\Projects\242\SPM 9613 Model Files\Wpt96.src // Wpt96
E:\Projects\242\SPM 9613 Model Files\Wpt97.src // Wpt97
E:\Projects\242\SPM 9613 Model Files\Wpt98.src // Wpt98
E:\Projects\242\SPM 9613 Model Files\Wpt99.src // Wpt99

Observer File:

E:\Projects\242\SPM 9613 Model Files\Receiver 7.obs // Receiver 7

Output Data Summary

x = 955 y = -690 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	53.3	43.1	36.4	32.3	30.4	20.5	0.0	0.0	35.7	53.1
Wpt126	0.0	0.0	42.5	32.9	25.9	22.6	21.2	12.2	0.0	0.0	26.0	42.4
Wpt101	0.0	0.0	42.4	32.7	25.7	22.4	21.0	11.9	0.0	0.0	25.7	42.3
Wpt139	0.0	0.0	42.3	32.6	25.6	22.3	20.8	11.7	0.0	0.0	25.6	42.2
Wpt94	0.0	0.0	41.8	32.0	25.1	21.7	20.1	10.7	0.0	0.0	25.0	41.7
Wpt140	0.0	0.0	41.5	31.7	24.8	21.3	19.6	10.1	0.0	0.0	24.6	41.4
Wpt100	0.0	0.0	41.2	31.2	24.4	20.7	19.0	9.1	0.0	0.0	24.1	41.1
Wpt93	0.0	0.0	41.2	31.2	24.4	20.7	18.9	9.0	0.0	0.0	24.0	41.0
Wpt92	0.0	0.0	40.6	30.3	23.7	19.6	17.6	7.2	0.0	0.0	23.0	40.4
Wpt99	0.0	0.0	40.6	30.2	23.6	19.5	17.4	6.9	0.0	0.0	22.9	40.3
Wpt91	0.0	0.0	40.1	29.6	23.1	18.7	16.5	5.5	0.0	0.0	22.1	39.9
Wpt98	0.0	0.0	39.9	29.2	22.8	18.2	15.9	4.6	0.0	0.0	21.7	39.6
Wpt90	0.0	0.0	39.6	28.9	22.5	17.7	15.3	3.8	0.0	0.0	21.3	39.4
Wpt97	0.0	0.0	39.2	28.3	22.0	17.0	14.4	2.4	0.0	0.0	20.6	39.0
Wpt89	0.0	0.0	39.2	28.3	21.9	16.9	14.3	2.3	0.0	0.0	20.6	38.9
Wpt96	0.0	0.0	38.7	27.6	21.3	15.9	13.1	0.4	0.0	0.0	19.7	38.4
Wpt88	0.0	0.0	38.6	27.5	21.2	15.8	13.0	0.2	0.0	0.0	19.6	38.3
Wpt95	0.0	0.0	38.2	26.8	20.6	14.9	11.8	0.0	0.0	0.0	18.8	37.8
Wpt87	0.0	0.0	38.1	26.8	20.5	14.8	11.7	0.0	0.0	0.0	18.7	37.8
Wpt86	0.0	0.0	37.6	26.1	19.9	13.9	10.5	0.0	0.0	0.0	18.0	37.3
Wpt85	0.0	0.0	37.1	25.4	19.2	12.8	9.2	0.0	0.0	0.0	17.1	36.7

From: "Gronner, Jesse" <Jesse.Gronner@PPMEnergy.com>
To: "John White" <John.White@state.or.us>
Date: Tue, Dec 13, 2005 4:48 PM
Subject: RE: response to your submittal

John,

Thank you for your email. It appears the primary remaining issue to be resolved for completeness purposes is the noise issue you've identified below. We appreciate your efforts to develop a workable approach.

We have considered your approach of having us identify "responsible turbines" and then attempting to establish a no-build zone around affected receptor locations if no waiver is obtained. We are concerned that this approach requires an excessive amount of up-front analysis as there are simply too many variables for multiple turbine locations within a 900-foot corridor. At the same time, we recognize your need for a "self-executing" condition. Thus, we propose the following modified approach:

Our consultant will complete the analysis of turbine construction at worst-case positions within the 900-foot proposed corridor this week. This will provide the worst-case scenario for affected landowners. If all affected landowners sign a waiver, then nothing further is required. If one or more affected landowners does not sign a waiver, then we would work to micro-site the responsible turbine or turbines (in the 900-foot corridor) so that the otherwise affected landowner is no longer affected (i.e., so that the project is in compliance with the ambient degradation standard at the identified receptor, such that no waiver is required). We would anticipate that the Council would approve the methodology for analyzing noise impacts in the site certificate, and thus, so long as we adhere to the methodology, we would not have to go back to the Council for further approval. ODOE would of course review the final turbine locations and compliance with noise standards. Finally, if an affected landowner did not sign a waiver, and we could not micro-site the responsible turbine or turbines in such a way so that the affected landowner is no longer affected, then that particular turbine or turbines would not be constructed.

In this way, we are not defining a zone within which no turbine would be located if the requisite waivers are not acquired. This is because the movement of one or more turbines (or the removal of one or more turbines) could very well change the shape of the zone. At the same time, this approach provides assurance that we will comply with the noise standard, without having to seek approval from the Council of the exact micro-siting location within the 900-foot corridor. Such an

approach complies with the OAR 345-021-0010(1)(x) requirement of "providing evidence to support a finding by the Council that the proposed facility complies with [DEQ's] noise control standards."

Please give me a call if you'd like to discuss this further.

Jesse

Also, by the way, here are responses to your non-completeness-related question #5 below:

a) What is the area "precluded" by the 3.5-mile aboveground 230 kV transmission line?

25 square feet around the 95 (approx) above-ground transmission poles would be the area precluded from farming, for a total area of 0.05 acres.

b) Is the aboveground footprint of 1,000 sq ft around turbines the extent of the graveled area that would surround each turbine? Or, is it larger, to account for the tight turning radius for farm equipment? (For the purpose of the restoration estimate, I will assume that the graveled area is 1,000 sq ft at each turbine, unless you tell me otherwise.)

1000 sq ft is the graveled area plus a small additional area (1-2 feet from edge of gravel) that would be precluded from farming.

c) The notes say that you considered only the area "currently being farmed." What areas did you exclude? Can you provide a table that shows the areas excluded and shows a total area that matches up with Table P-3?

If the above ground transmission poles are placed in CRP or a habitat category 2, 3, or 4, they would not preclude farming, because these areas are currently not farmed. Given the very small disturbance of these poles (4-9 square feet), we do not expect any change in the overall acreage of impact to these habitats.

-----Original Message-----
From: John White [mailto:John.White@state.or.us]
Sent: Thursday, December 08, 2005 12:22 PM
To: dns@deainc.com; Gronner, Jesse
Subject: response to your submittal

Here is my initial response to the materials that you sent yesterday:

1. The "critical path" issue for completeness is the information that is still needed regarding compliance with the noise regulations. The remaining issues are focused on two questions. First, to what extent does the noise from the "Webfoot" substation add to the overall facility noise experienced at R6 and R7? Second, what would the applicant do to demonstrate compliance with the "ambient degradation" standard at R4, R5, R6 and R7 if waivers are not obtained? With regard to R6 and R7, any significant transformer noise must be included in the analysis of compliance with the ambient degradation standard.

In the materials you sent yesterday, you describe that your consultant is undertaking an analysis of the resulting noise levels if turbines were constructed "at worst-case positions within the 900-foot proposed corridor." You say that "those turbines that result in exceedence of the noise standard would be removed as a part of the project" if waivers are not obtained. Nevertheless, you also propose that "the determination of whether the noise standard is met will be determined using the final location of turbines, with model results provided to the Department when final turbine locations are known." May I suggest a different approach?

Although it is highly likely that you will be able to obtain the necessary waivers from the affected landowners, the site certificate must include a condition that specifies what happens in the event that one or more of the affected landowners does not sign the waiver. The condition must be essentially "self-executing" in the sense that we do not want to leave a judgement call to be made after issuance of a site certificate. The present analysis, therefore, should begin with identification of those turbines that are primarily responsible for generating noise levels at R4, R5, R6 and R7 such that if they were eliminated or moved farther from the receptors, the facility would comply with the standard. With respect to R6 and R7, as stated above, the contribution of transformer noise from the substation must be included in the analysis. The "responsible turbines" may be identified by whatever method makes sense, whether you assume worst-case positions within the 900-foot corridor or whether you analyze them based on the positions originally identified in the site certificate application.

After the "responsible turbines" have been identified, can a zone be defined by a distance from the receptor location, within which no turbine would be located if a waiver from that landowner is not obtained? This may mean positioning one or more turbines farther from the receptor than would otherwise be "optimal for wind capture," but it might not require eliminating of these turbines from the project altogether. The site certificate condition would prohibit construction of turbines within the zone and would not require any further modeling or any post-issuance judgment call by the Department or the Siting Council.

2. The application supplement that you prepare to "complete" the application should include a map or set of maps to illustrate your proposal regarding turbine corridors. You have provided a spreadsheet (string_ends_110705.xls) to define the endpoints of turbine corridors. I could not figure out the logic that drove the order in which these points are listed on the spreadsheet, but I rearranged the list to pair the north and south endpoints of each string, based on the Turbine Location Map (Appendix C-3). I then assigned letters to each string, starting with the west side of the project (Wpt1) and working east. I have attached the resulting spreadsheet (JW_string_ends_110705.xls).

Do the points identified on the spreadsheet represent the turbine locations as originally shown on the maps in the site certificate application?

Can you produce a new set of maps, similar to the set in Appendix P-1 and P-2 and showing the original turbine "dots," but adding the following features:

- Identification of the strings by their assigned letter (based on my spreadsheet)

- Showing the endpoints of each string

- Showing the 300-foot corridor boundary

- Showing the 900-foot corridor boundary

- Showing all facility components (access roads, turbine locations, O&M building, substations, transmission lines, mitigation area)

- Showing active and inactive raptor nest sites within the lease boundary

- Showing the lease boundary

- Showing the noise receptor locations

- Showing habitat types and categories

3. Based on my telephone conversation with Jesse yesterday, it is understood that the site certificate would allow no more than 165 turbines to be built.

4. Based on the same telephone conversation, it is understood that the applicant will contact the U.S. Corps of Engineers to ascertain whether they have any concerns and whether they concur that no Section 404 permit is needed.

5. Regarding the table in the "Response to 11/22/05 email" memo that you sent yesterday, I have the following questions:

a) What is the area "precluded" by the 3.5-mile aboveground 230 kV transmission line?

b) Is the aboveground footprint of 1,000 sq ft around turbines the extent of the graveled area that would surround each turbine? Or, is it larger, to account for the tight turning radius for farm equipment? (For the purpose of the restoration estimate, I will assume that the graveled area is 1,000 sq ft at each turbine, unless you tell me otherwise.)

c) The notes say that you considered only the area "currently being farmed." What areas did you exclude? Can you provide a table that shows the areas excluded and shows a total area that matches up with Table P-3?

6. I need a corrected "Table P-3 (300)" as well as a copy of "Table P-3 (900)," which was not included with the materials sent yesterday.

Regards,

John

John G. White
Oregon Department of Energy
625 Marion St., NE
Salem, Oregon 97301-3742
john.white@state.or.us

CC: "Dana Siegfried" <Dns@deainc.com>

From: "Gronner, Jesse" <Jesse.Gronner@PPMEnergy.com>
To: "John White" <John.White@state.or.us>
Date: 1/10/2006 1:53:18 PM
Subject: Vestas noise info

John,

You had requested in your 12/27 email that we provide the Vestas V82 1.65 MW turbine sound power information. Please see attached. It is for the NM-82 (which was the predecessor to the V82 before NEG Micon and Vestas merged). I've verified with our Vestas rep that this information still holds true for the V82. As you'll see, this turbine is quieter than the GE.

As for the revised noise analysis, you should be receiving in hard copy by end of tomorrow. Let's please touch base before the end of the week after you've received the analysis to discuss completeness.

Regards,
Jesse

<<Noise_measurement_summary_NM82-1650_2004-01-19.pdf>>

CC: "Dana Siegfried" <Dns@deainc.com>

Noise measurement summary, NM82/1650

1. Identification of Measuring institute

Windtest Grevenbroich GmbH
Frimmersdorfer str. 73
D 41517 Grevenbroich, Germany

Windtest Grevenbroich is accredited by DAR (DPT-DL-3175.00) to perform noise measurements on wind turbines.

2. Report identification

Acoustic report for a wind energy converter type
NEG Micon NM 82/1650, hub height 93,6m
Report SE03007B1

Authorised signatory: Dr. Markus Koschinsky

3. Measurement date:

May 12. 2003, Grevenbroich test site

4. Description of wind turbine and surroundings

Wind turbine: NM82/1650
Rotor blades: AL 40
Main Gear: Flender PEAS 4390
Generator: ELIN MCS556M31Z7B
Terrain: Flat
Surface: Grass, low vegetation, a few tree lines
Measurement conditions: Optimal

5. Standard of measurement

IEC 61400-11: 1998 " Wind turbine generator systems – Part 11: Acoustic noise measurement techniques"

	Name:	Date:	Signature:
Written by:	ESL	19-01-2004	
Approved by:			
Filename:	Noise measurement summary NM82-1650.doc rev 1		
NEG MICON			

6. Measurement results

6.1 Apparent sound power level and uncertainty:

	6 m/s	7 m/s	8 m/s	95% RP (8,6 m/s)
L_{wA} [dB re 1 pW]	100,3	100,7	101,7	101,8
uncertainty	0,9	0,9	>0,9	>0,9

6.2 Frequency analysis at 8 m/s

A-weighted 1/1 octave analysis of the sound power level at 8 m/s

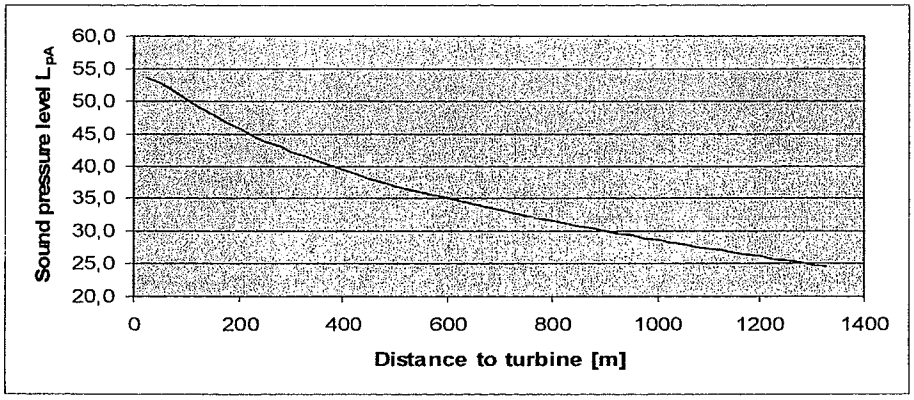
Octave band	63 Hz	125 Hz	250 Hz	500 z	1 kHz	2 kHz	4 kHz	8 kHz
L_{wA} [dB]	83,3	90,3	94,9	95,0	95,9	92,9	91	81,5

6.3 Tonality

The noise from the turbine did not contain any tonal peaks with a calculated ΔL_{tn} above the IEC 61400-11:1998 expression (9). According to IEC 61400-11:1998 no audible tones is present in the noise.

7 Sound pressure level at distances from turbine

The graph below shows the sound pressure level L_{pA} 1.5 m above the ground at a wind speed 10 m above ground of 8 m/s as function of the distance from the turbine. It is calculated for 78 m hub height, and includes air absorption (0.005 dB(m)). At 218 meters distance from the turbine the sound pressure level is 45 dB(A), and at 376 meters distance form the turbine, the sound pressure level is 40 dB(A).



	Name:	Date:	Signature:
Written by:	ESL	19-01-2004	
Approved by:			
Filename:	Noise measurement summary NM82-1650.doc rev 1		
NEG MICON	Property of NEG Micon A/S. This document must not be passed on to any person, nor be copied or made use of without approval from NEG Micon A/S.		

Klondike III Wind Project

Noise Buffer and Receptor Locations

Legend

Turbines:
- Proposed Klondike III
- Klondike II
- Klondike I
- Proposed Met Tower

Collector Systems:
- Proposed Overhead T-line
- Proposed Overhead T-line and Power Supply
- Proposed Underground Collector within Road Prism
- Proposed Underground Collector not in Road Prism

- Already Permitted Road
- Proposed New Road
- Existing Road
- Existing Road Requiring Widening Upgrade
- Railroad
- Proposed Habitat Mitigation Area
- Proposed Laydown Area
- Proposed Substation and O&M Building
- Proposed Substation
- Proposed Substation (BPA)
- Existing Substation
- Existing O&M Building
- Lease Boundary
- 0.8 Mile Buffer of Lease Boundary
- Receptors

R5
Emigrant Springs Rd
R4
Medler Ln
N Klondike Rd
Not Leased
Dehler Rd
Beacon Rd
R6
R7
McDonald Ferry Ln
Klondike Ln
Sandon Rd
Not Leased
Gosson Ln
Hwy 206
Smith Ln
R2
R3
R1

0 0.5 1 2
Miles

p:/ppme00000001/0600info/gs/arcmap/figures/fig_x1_noise_buffer.mxd August 8, 2005

PPM Energy
A ScottishPower Company

Transmittal

Date: January 11, 2006

To: John White
Oregon Department of Energy
625 Marion St. NE
Salem, OR 97301
VIA FEDEX

From: Jesse Gronner

Copy: n/a

Subject: Klondike III Wind Project

This package includes:

Revised noise analysis performed by TWE Environmental per your 12/27/05 email

TW Environmental, Inc.
136 NE 28th Avenue, Portland, OR 97232-3146
503-235-9194 ■ Fax: 503-239-7998

To: Dana Siegfried
David Evans and Associates, Inc.

From: Martha Moore, P.E.

Subject: Klondike III Noise Analysis – Modifications as Requested by EFSC Staff and Tabulation of Assumptions

Project #: 242

Date: January 10, 2006

Background

A reanalysis of noise levels for the Klondike III Wind Power Project has been completed to address specific concerns raised by EFSC staff. EFSC concerns were the sound power level used for the turbines and the contribution of noise from the east substation at Receiver 7 (R7). The analysis follows methods and guidance in International Standards Organization (ISO) 9613 Part 1 and Part 2. The Sound Propagation Model for Outdoor Noise Sources (SPM 9613, Version 2) was used to complete the analysis. Key assumptions used in the analysis are shown in Table 1, with references.

Table 1
Key Assumptions used in the Klondike Noise Analysis

Parameter	Value	Reference
Temperature, Humidity	11 C, 60 % RH – normal temperature and relative humidity from 30+ year period of record, Pendleton Climate Data, National Climatic Data Center – this is the nearest station with relative humidity data	ISO 9613-2, Section 7.2 Atmospheric absorption, Note 9 – "For calculation of environmental noise levels, the atmospheric attenuation coefficient should be based on average values determined by the range of ambient weather which is relevant to the locality."
Ground Absorption Coefficient	G=1 for porous ground. Ground effects included for transformers and R7. See Attachment 1 for topographic data from Oregon Terrain Navigator model showing the profile. Within a distance of 30 times the receiver or source height, the model assumption of linear ground elevation between the 2 ground points at the receiver and source is conservative. The model assumption is valid for soft ground. Aerial	ISO 9613-2, Section 7.3 Ground effects – "Porous ground, which includes ground covered by grass, trees, or other vegetation, and all other ground surfaces suitable for the growth of vegetation, such as farming land."

	photo showing all land between transformers and R7 is farm land or vegetated (Attachment 2). Mid-ground attenuation was not included.	
Topographic barriers	A barrier following the ground elevation for the topographical ridge near R7 was included in the analysis.	
Tower locations	At nearest point to receivers within potential 900-foot corridor.	
Wind turbine sound power levels	As shown in Table 2 – maximum sound power levels plus reported deviation at all turbines simultaneously	See Note.
Transformer sound power levels	As shown in Table 3 – sound power levels were calculated in accordance with BBN Report 3305. Octave band data were based on measurements made by TW Environmental at BPA's Ross Complex in Vancouver, WA. A transformer height of 15 feet was used.	Bolt, Beranek, and Newman Report 3305, *Characterization of Transformer Noise* (April 1977).
Note: OAR 340-035-0035(1)(B)(iii)(VI) requires the use of the turbine's maximum sound power level following procedures established by IEC 61400-11 (version 2002-12) and assumes that all of the proposed wind facility's turbines are operating at the maximum sound power level. Maximum sound power levels measured in accordance with IEC 61400 would result in a mean maximum sound power level for a batch of turbines. All turbine sound power levels were input to the model at the mean maximum sound power level reported by the manufacturer according to IEC 61400 plus the reported deviation. Mean maximum sound power levels reported by the turbine manufacturer in accordance with IEC 61400 were not used, and the resulting noise levels reported at each receiver are likely to be overstated as a result.		

Table 2
Turbine Sound Power Levels Used in Model Input (dBA)

Frequency	Manufacturer's Data	Model Input
63	85.1	87.1
125	94.0	96.0
250	97.2	99.2
500	98.6	100.6
1000	97.9	99.9
2000	94.5	96.5
4000	87.3	89.3
8000	78.1	80.1
Overall dBA	104	106

Table 3
Transformer Sound Power Levels Used in Model Input (dB)

Frequency	Model Input
63	73.3
125	96.2
250	96.6
500	101.4
1000	90.7
2000	82.9
4000	77.9
8000	75.8
Overall dB	103.8

Note: Sound power levels are for two transformers.

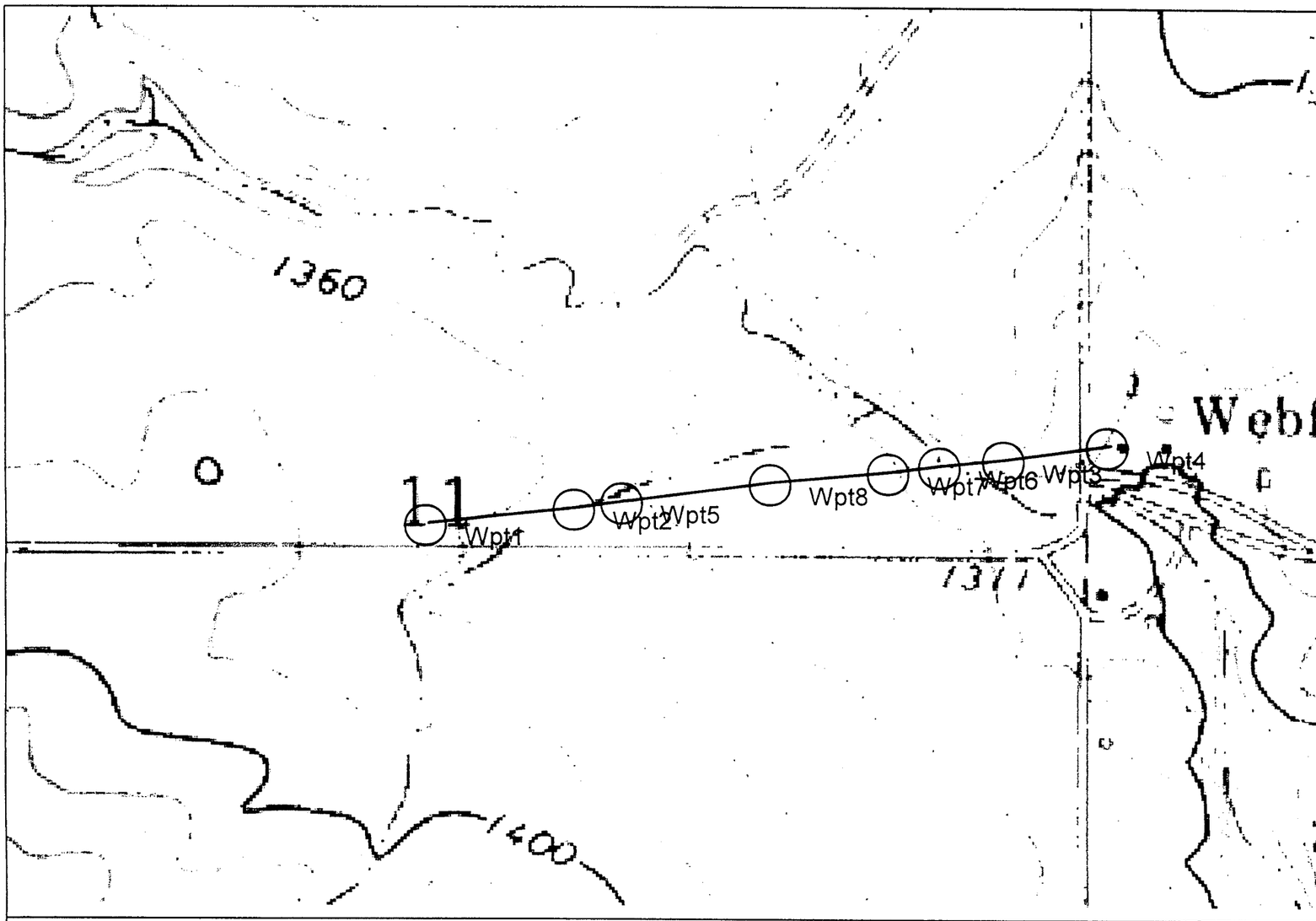
Results

Output files from the SPM9613 Model are included in Attachment 3. Receivers R3, R4, R5, R6, and R7 have predicted noise levels above 36 dBA when all towers are included. Table 3 summarizes the towers contributing to sound levels in excess of 36 dBA. The transformers at the east substation are predicted to contribute a sound level of 24.1 dBA at R7.

Table 4
Affected Receivers and Towers

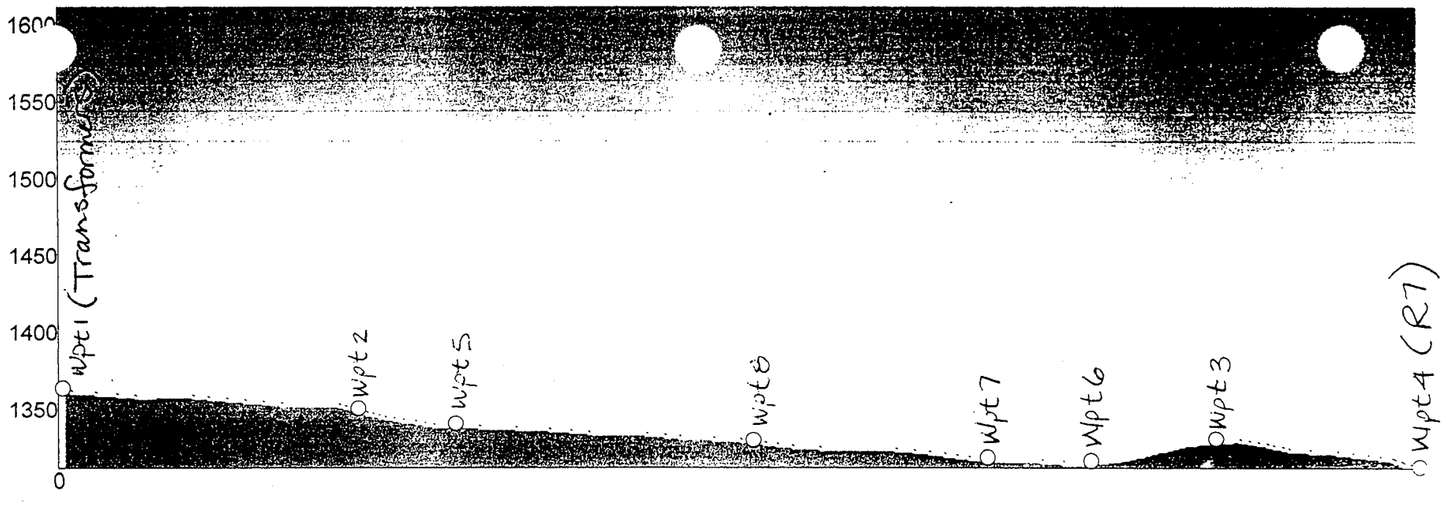
Receivers	Contributing Towers (Wpt)
R3	48, 49
R4	58, 59, 60, 61, 62, 63 and 64
R5	58, 59, 60
R6	89, 90, 91, 92, 93, 94, 97, 98, 99, 100, 101, 102, 126, 127, 128, and 136
R7	93, 94, 101, 102, 126, 127, 128, 129, 130, 131, 132, 136, 137, 138 and 139

Attachment 1
Topographic Data for East Transformers and R7



Name: KLONDIKE
Date: 12/28/2005
Scale: 1 inch equals 500 feet

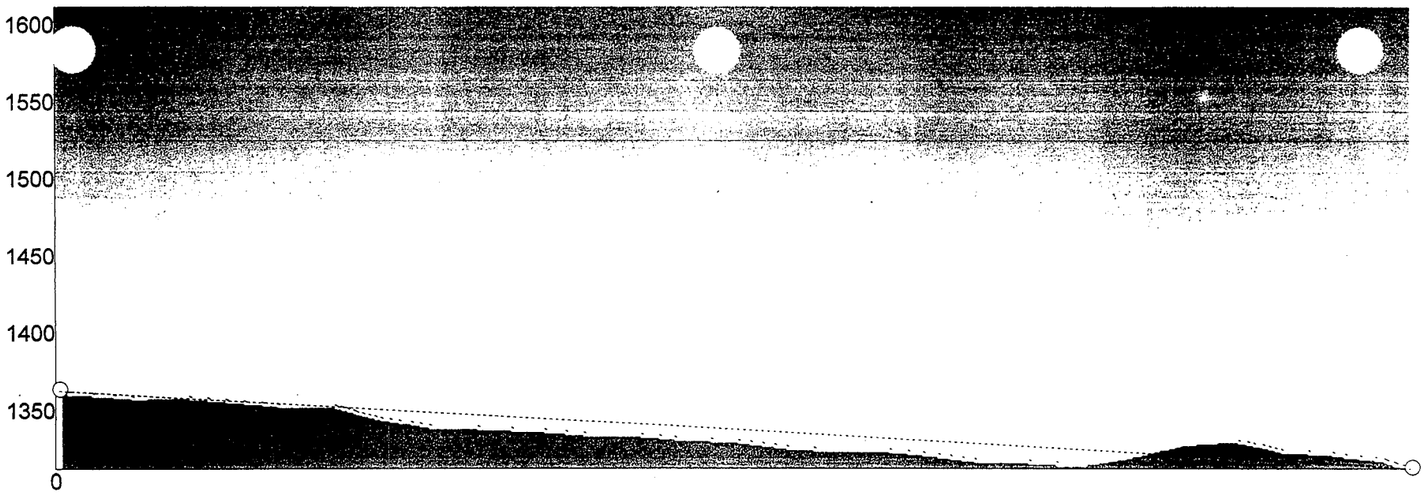
Location: 045° 35' 5.34" N 120° 31' 31.38" W



Total distance:	2692 feet	Climbing:	15 feet	Latitude:	045° 35' 3.70" N
		Descending:	-65 feet	Longitude:	120° 31' 34.42" W
Ground distance:	2694 feet	Elevation change:	-50 feet	Elevation:	1335 feet
		Min/Max:	1312/1363	Grade:	0%

POINT	RECEPTOR/SOURCE HEIGHT	GRD ELEV	DISTANCE
Wpt1	1378	1363	
2		1350	584
5		1340	777
8		1329	1368
7		1318	1832
6		1316	2033
3		1330	2284
4	1317	1312	2692

Δ = 61' OVER 2692'



Total distance:	2691 feet	Climbing:	15 feet	Latitude:	045° 35' 2.40" N
		Descending:	-66 feet	Longitude:	120° 31' 49.63" W
Ground distance:	2694 feet	Elevation change:	-50 feet	Elevation:	1363 feet
		Min/Max:	1312/1363	Grade:	2%

Routes

Name: Rte10

Short Name: Rte10

Distance: 2692 feet

Number of Waypoint: 8

Name: Wpt1

Short Name: RteW01

Coordinates: 045° 35' 2.94" N, 120° 31' 45.44" W

Distance to next Waypoint: 584 feet

Bearing to next Waypoint: 83 degrees (true)

Name: Wpt2

Short Name: RteW02

Coordinates: 045° 35' 3.56" N, 120° 31' 37.25" W

Distance to next Waypoint: 193 feet

Bearing to next Waypoint: 81 degrees (true)

Name: Wpt5

Short Name: RteW05

Coordinates: 045° 35' 3.85" N, 120° 31' 34.55" W

Distance to next Waypoint: 591 feet

Bearing to next Waypoint: 82 degrees (true)

Name: Wpt8

Short Name: RteW08

Coordinates: 045° 35' 4.60" N, 120° 31' 26.28" W

Distance to next Waypoint: 464 feet

Bearing to next Waypoint: 84 degrees (true)

Name: Wpt7

Short Name: RteW07

Coordinates: 045° 35' 5.03" N, 120° 31' 19.76" W

Distance to next Waypoint: 201 feet

Bearing to next Waypoint: 82 degrees (true)

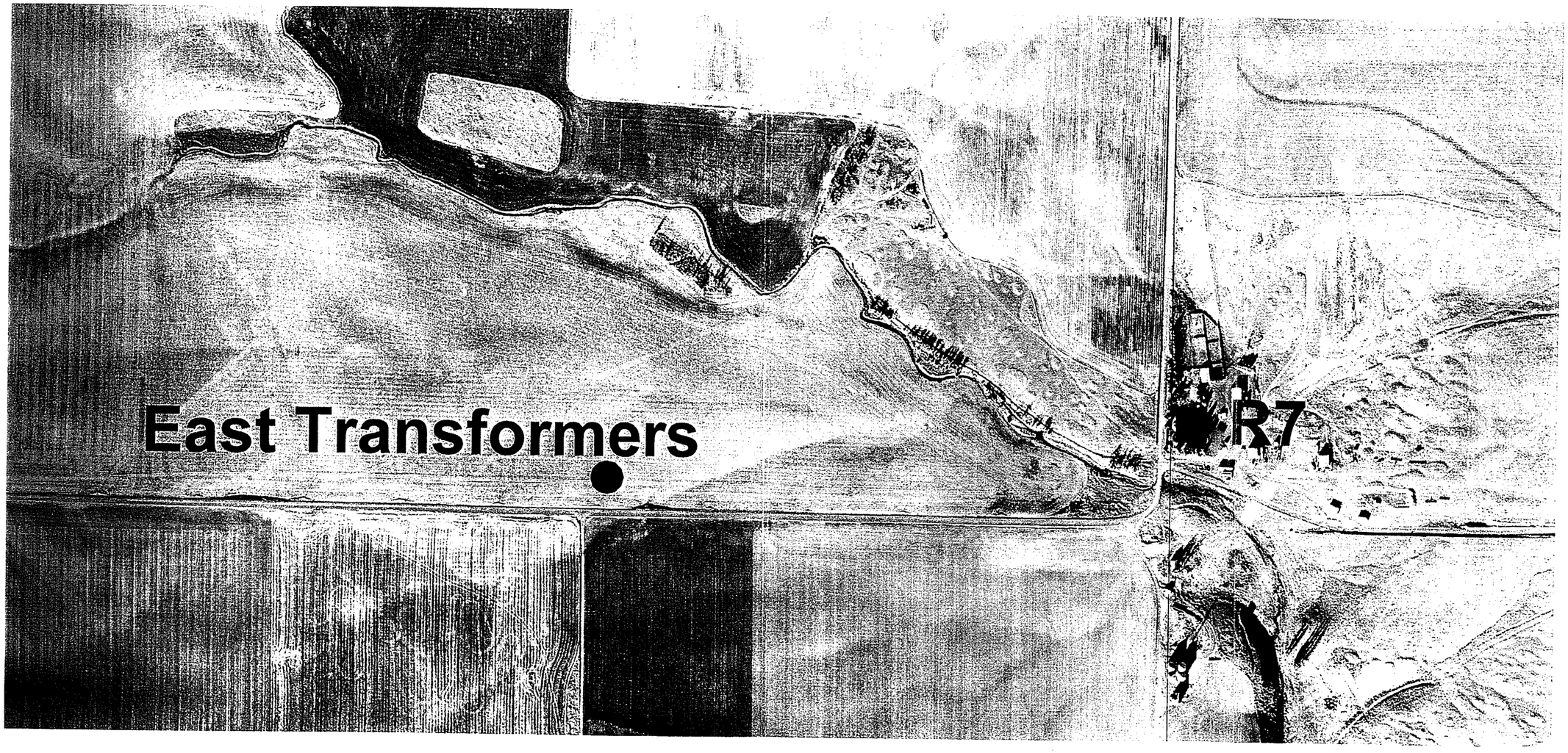
Name: Wpt6

Sho me: RteW06
Coordinates: 045° 35' 5.28" N, 120° 31' 16.94" W
Distance to next Waypoint: 251 feet
Bearing to next Waypoint: 82 degrees (true)

Name: Wpt3
Short Name: RteW03
Coordinates: 045° 35' 5.59" N, 120° 31' 13.42" W
Distance to next Waypoint: 405 feet
Bearing to next Waypoint: 82 degrees (true)

Name: Wpt4
Short Name: RteW04
Coordinates: 045° 35' 6.10" N, 120° 31' 7.75" W

Attachment 2
Aerial Photo of East Transformers and R7



Attachment 2
Aerial Photo of East Transformers and R7

TW Environmental, Inc.

Attachment 3
SPM9613 Output for Model Runs

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R1ContResults.prj

Project Description:
Receiver 1 - All towers 106 dBA

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt31.src // Wpt31
C:\Martha\Temp Projects\106 dB reanalysis\wpt32.src // Wpt32
C:\Martha\Temp Projects\106 dB reanalysis\wpt33.src // Wpt33
C:\Martha\Temp Projects\106 dB reanalysis\wpt34.src // Wpt34
C:\Martha\Temp Projects\106 dB reanalysis\wpt35.src // Wpt35
C:\Martha\Temp Projects\106 dB reanalysis\wpt36.src // Wpt36
C:\Martha\Temp Projects\106 dB reanalysis\wpt37.src // Wpt37
C:\Martha\Temp Projects\106 dB reanalysis\wpt38.src // Wpt38
C:\Martha\Temp Projects\106 dB reanalysis\wpt39.src // Wpt39
C:\Martha\Temp Projects\106 dB reanalysis\wpt40.src // Wpt40
C:\Martha\Temp Projects\106 dB reanalysis\wpt49.src // Wpt49

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R1.obs // R1

Output Data Summary

x = 2090.8 y = 7155.3 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz 16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	51.8	42.0	35.0	31.8	29.9	18.4	0.0	0.0	34.8	51.7
Wpt40	0.0	0.0	46.2	36.8	29.8	27.0	25.8	15.8	0.0	0.0	30.1	46.1
Wpt39	0.0	0.0	44.6	34.9	28.1	25.2	23.6	12.5	0.0	0.0	28.2	44.5
Wpt38	0.0	0.0	43.4	33.5	26.7	23.6	21.7	9.5	0.0	0.0	26.6	43.2
Wpt37	0.0	0.0	40.9	30.9	23.9	20.5	17.9	3.0	0.0	0.0	23.4	40.8
Wpt36	0.0	0.0	40.1	30.0	23.0	19.4	16.5	0.6	0.0	0.0	22.3	39.9
Wpt35	0.0	0.0	39.4	29.3	22.1	18.4	15.2	0.0	0.0	0.0	21.3	39.2
Wpt34	0.0	0.0	38.8	28.6	21.3	17.5	14.1	0.0	0.0	0.0	20.5	38.6
Wpt33	0.0	0.0	38.0	27.8	20.4	16.4	12.6	0.0	0.0	0.0	19.4	37.8
Wpt32	0.0	0.0	37.4	27.1	19.7	15.6	11.5	0.0	0.0	0.0	18.6	37.2
Wpt31	0.0	0.0	37.0	26.6	19.0	14.8	10.4	0.0	0.0	0.0	17.9	36.7
Wpt49	0.0	0.0	36.1	25.7	17.9	13.4	8.3	0.0	0.0	0.0	16.6	35.9

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R2ContResults.prj

Project Description:
Receiver 2 - All towers 106 dBA

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt31.src // Wpt31
C:\Martha\Temp Projects\106 dB reanalysis\wpt32.src // Wpt32
C:\Martha\Temp Projects\106 dB reanalysis\wpt33.src // Wpt33
C:\Martha\Temp Projects\106 dB reanalysis\wpt34.src // Wpt34
C:\Martha\Temp Projects\106 dB reanalysis\wpt35.src // Wpt35
C:\Martha\Temp Projects\106 dB reanalysis\wpt36.src // Wpt36
C:\Martha\Temp Projects\106 dB reanalysis\wpt37.src // Wpt37
C:\Martha\Temp Projects\106 dB reanalysis\wpt38.src // Wpt38
C:\Martha\Temp Projects\106 dB reanalysis\wpt39.src // Wpt39
C:\Martha\Temp Projects\106 dB reanalysis\wpt40.src // Wpt40
C:\Martha\Temp Projects\106 dB reanalysis\wpt41.src // Wpt41
C:\Martha\Temp Projects\106 dB reanalysis\wpt42.src // Wpt42
C:\Martha\Temp Projects\106 dB reanalysis\wpt43.src // Wpt43

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R2.obs // R2

Output Data Summary

x = 2754.9 y = 9239.3 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz											
	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	52.8	42.8	35.9	32.7	30.3	16.6	0.0	0.0	35.5	52.7
Wpt38	0.0	0.0	43.6	33.8	27.0	24.0	22.1	10.1	0.0	0.0	26.9	43.5
Wpt39	0.0	0.0	42.7	32.8	26.0	22.8	20.8	7.9	0.0	0.0	25.7	42.6
Wpt40	0.0	0.0	41.8	31.9	25.0	21.7	19.4	5.6	0.0	0.0	24.6	41.7
Wpt33	0.0	0.0	41.7	31.7	24.8	21.5	19.2	5.3	0.0	0.0	24.4	41.6
Wpt34	0.0	0.0	41.7	31.7	24.7	21.5	19.1	5.1	0.0	0.0	24.3	41.5
Wpt32	0.0	0.0	41.6	31.6	24.7	21.4	19.0	5.0	0.0	0.0	24.3	41.5
Wpt35	0.0	0.0	41.5	31.5	24.6	21.3	18.9	4.8	0.0	0.0	24.2	41.4
Wpt31	0.0	0.0	41.5	31.4	24.5	21.2	18.7	4.5	0.0	0.0	24.1	41.3
Wpt36	0.0	0.0	41.3	31.2	24.3	20.9	18.4	4.0	0.0	0.0	23.8	41.1
Wpt43	0.0	0.0	41.0	31.0	24.0	20.7	18.1	3.4	0.0	0.0	23.5	40.9
Wpt37	0.0	0.0	41.0	30.9	24.0	20.6	18.0	3.2	0.0	0.0	23.4	40.8
Wpt42	0.0	0.0	40.9	30.8	23.8	20.4	17.8	2.8	0.0	0.0	23.3	40.7
Wpt41	0.0	0.0	40.6	30.6	23.5	20.1	17.3	2.1	0.0	0.0	22.9	40.4

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R3ElimResults.prj

Project Description:
Receiver 3 - All towers 106 dBA, high towers eliminated

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt40.src // Wpt40
C:\Martha\Temp Projects\106 dB reanalysis\wpt41.src // Wpt41
C:\Martha\Temp Projects\106 dB reanalysis\wpt42.src // Wpt42
C:\Martha\Temp Projects\106 dB reanalysis\wpt43.src // Wpt43
C:\Martha\Temp Projects\106 dB reanalysis\wpt44.src // Wpt44
C:\Martha\Temp Projects\106 dB reanalysis\wpt45.src // Wpt45
C:\Martha\Temp Projects\106 dB reanalysis\wpt46.src // Wpt46
C:\Martha\Temp Projects\106 dB reanalysis\wpt47.src // Wpt47

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R3.obs // R3

Output Data Summary

x = 3928 y = 8146.1 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz											
	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	52.1	42.3	35.4	32.3	30.5	18.9	0.0	0.0	35.3	51.9
Wpt47	0.0	0.0	45.6	36.1	29.2	26.4	25.0	14.6	0.0	0.0	29.5	45.5
Wpt46	0.0	0.0	44.7	35.1	28.3	25.3	23.8	12.8	0.0	0.0	28.4	44.6
Wpt45	0.0	0.0	43.8	34.0	27.2	24.2	22.4	10.6	0.0	0.0	27.1	43.7
Wpt44	0.0	0.0	42.9	33.0	26.2	23.1	21.1	8.5	0.0	0.0	26.0	42.8
Wpt43	0.0	0.0	42.5	32.6	25.7	22.6	20.5	7.4	0.0	0.0	25.5	42.4
Wpt42	0.0	0.0	41.4	31.4	24.5	21.2	18.7	4.5	0.0	0.0	24.0	41.3
Wpt41	0.0	0.0	40.5	30.5	23.4	20.0	17.2	1.9	0.0	0.0	22.8	40.4
Wpt40	0.0	0.0	39.1	28.9	21.7	18.0	14.7	0.0	0.0	0.0	20.9	38.9

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R4ElimResults.prj

Project Description:
R4 - All towers at 106 dBA, high towers eliminated

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt54.src // Wpt54
C:\Martha\Temp Projects\106 dB reanalysis\wpt55.src // Wpt55
C:\Martha\Temp Projects\106 dB reanalysis\wpt56.src // Wpt56
C:\Martha\Temp Projects\106 dB reanalysis\wpt57.src // Wpt57
C:\Martha\Temp Projects\106 dB reanalysis\wpt65.src // Wpt65
C:\Martha\Temp Projects\106 dB reanalysis\wpt66.src // Wpt66
C:\Martha\Temp Projects\106 dB reanalysis\wpt67.src // Wpt67
C:\Martha\Temp Projects\106 dB reanalysis\wpt68.src // Wpt68

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R4.obs // R4

Output Data Summary

x = 5150.6 y = 7378.8 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	52.5	42.7	35.8	32.8	31.0	19.1	0.0	0.0	35.8	52.4
Wpt65	0.0	0.0	45.5	36.0	29.1	26.3	24.9	14.5	0.0	0.0	29.4	45.4
Wpt66	0.0	0.0	44.2	34.5	27.7	24.7	23.0	11.6	0.0	0.0	27.7	44.1
Wpt56	0.0	0.0	43.1	33.2	26.4	23.3	21.3	8.8	0.0	0.0	26.2	42.9
Wpt57	0.0	0.0	43.0	33.1	26.3	23.2	21.2	8.7	0.0	0.0	26.1	42.9
Wpt67	0.0	0.0	43.0	33.1	26.3	23.2	21.2	8.6	0.0	0.0	26.1	42.8
Wpt55	0.0	0.0	43.0	33.1	26.2	23.1	21.1	8.5	0.0	0.0	26.0	42.8
Wpt54	0.0	0.0	42.7	32.8	26.0	22.8	20.8	7.9	0.0	0.0	25.7	42.6
Wpt68	0.0	0.0	42.1	32.2	25.3	22.1	19.8	6.3	0.0	0.0	24.9	42.0

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R5ElimResults.prj

Project Description:
R5 - All towers at 106 dBA, high towers eliminated

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt54.src // Wpt54
C:\Martha\Temp Projects\106 dB reanalysis\wpt55.src // Wpt55
C:\Martha\Temp Projects\106 dB reanalysis\wpt56.src // Wpt56
C:\Martha\Temp Projects\106 dB reanalysis\wpt57.src // Wpt57
C:\Martha\Temp Projects\106 dB reanalysis\wpt61.src // Wpt61
C:\Martha\Temp Projects\106 dB reanalysis\wpt62.src // Wpt62
C:\Martha\Temp Projects\106 dB reanalysis\wpt63.src // Wpt63
C:\Martha\Temp Projects\106 dB reanalysis\wpt64.src // Wpt64
C:\Martha\Temp Projects\106 dB reanalysis\wpt65.src // Wpt65

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R5.obs // R5

Output Data Summary

x = 5376 y = 8111.4 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz											
	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	52.2	42.4	35.4	32.3	30.4	18.5	0.0	0.0	35.3	52.0
Wpt61	0.0	0.0	45.7	36.3	29.4	26.5	25.2	14.9	0.0	0.0	29.6	45.7
Wpt62	0.0	0.0	44.4	34.7	27.9	25.0	23.3	12.1	0.0	0.0	28.0	44.3
Wpt63	0.0	0.0	43.2	33.4	26.6	23.5	21.6	9.2	0.0	0.0	26.4	43.1
Wpt64	0.0	0.0	42.1	32.2	25.3	22.1	19.8	6.4	0.0	0.0	25.0	42.0
Wpt65	0.0	0.0	41.3	31.3	24.3	21.0	18.5	4.0	0.0	0.0	23.8	41.1
Wpt54	0.0	0.0	41.3	31.3	24.3	21.0	18.4	4.0	0.0	0.0	23.8	41.1
Wpt55	0.0	0.0	41.0	31.0	24.0	20.6	18.0	3.2	0.0	0.0	23.4	40.8
Wpt56	0.0	0.0	40.7	30.7	23.6	20.2	17.5	2.4	0.0	0.0	23.1	40.5
Wpt57	0.0	0.0	40.3	30.2	23.2	19.7	16.8	1.2	0.0	0.0	22.5	40.1

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R6ElimResults.prj

Project Description:
R6 - All towers at 106 dBA, high towers eliminated

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt129.src // Wpt129
C:\Martha\Temp Projects\106 dB reanalysis\wpt130.src // Wpt130
C:\Martha\Temp Projects\106 dB reanalysis\wpt137.src // Wpt137
C:\Martha\Temp Projects\106 dB reanalysis\wpt138.src // Wpt138
C:\Martha\Temp Projects\106 dB reanalysis\wpt87.src // Wpt87
C:\Martha\Temp Projects\106 dB reanalysis\wpt88.src // Wpt88
C:\Martha\Temp Projects\106 dB reanalysis\wpt95.src // Wpt95
C:\Martha\Temp Projects\106 dB reanalysis\wpt96.src // Wpt96
C:\Martha\Temp Projects\106 dB reanalysis\wpt86.src // Wpt86

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R6.obs // R6

Output Data Summary

x = 8383.6 y = 3843.4 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz											
	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	52.6	42.7	35.9	32.8	30.9	18.5	0.0	0.0	35.7	52.5
Wpt88	0.0	0.0	44.0	34.3	27.5	24.5	22.8	11.1	0.0	0.0	27.4	43.9
Wpt129	0.0	0.0	43.8	34.0	27.2	24.2	22.4	10.6	0.0	0.0	27.1	43.7
Wpt96	0.0	0.0	43.6	33.7	26.9	23.9	22.1	10.0	0.0	0.0	26.8	43.5
Wpt137	0.0	0.0	43.2	33.3	26.5	23.4	21.5	9.1	0.0	0.0	26.4	43.1
Wpt87	0.0	0.0	43.0	33.1	26.3	23.2	21.2	8.6	0.0	0.0	26.1	42.9
Wpt130	0.0	0.0	42.6	32.7	25.9	22.7	20.6	7.7	0.0	0.0	25.6	42.5
Wpt95	0.0	0.0	42.6	32.7	25.8	22.7	20.6	7.6	0.0	0.0	25.6	42.4
Wpt138	0.0	0.0	42.2	32.3	25.4	22.2	20.0	6.6	0.0	0.0	25.1	42.1
Wpt86	0.0	0.0	42.1	32.1	25.2	22.0	19.8	6.3	0.0	0.0	24.9	41.9

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R7ElimResultsbar.prj

Project Description:
R7 - All towers at 106 dBA, high towers eliminated, transformers included

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt100.src // Wpt100
C:\Martha\Temp Projects\106 dB reanalysis\wpt133.src // Wpt133
C:\Martha\Temp Projects\106 dB reanalysis\wpt134.src // Wpt134
C:\Martha\Temp Projects\106 dB reanalysis\wpt135.src // Wpt135
C:\Martha\Temp Projects\106 dB reanalysis\wpt140.src // Wpt140
C:\Martha\Temp Projects\106 dB reanalysis\wpt141.src // Wpt141
C:\Martha\Temp Projects\106 dB reanalysis\wpt91.src // Wpt91
C:\Martha\Temp Projects\106 dB reanalysis\wpt92.src // Wpt92
C:\Martha\Temp Projects\106 dB reanalysis\wpt99.src // Wpt99
C:\Martha\Temp Projects\106 dB reanalysis\Transformers.src // Transformers

Barrier Files:

C:\Martha\Temp Projects\106 dB reanalysis\bar1.bar // Barrier 1
C:\Martha\Temp Projects\106 dB reanalysis\bar2.bar // Barrier 2
C:\Martha\Temp Projects\106 dB reanalysis\bar3.bar // Barrier 3
C:\Martha\Temp Projects\106 dB reanalysis\bar4.bar // Barrier 4
C:\Martha\Temp Projects\106 dB reanalysis\bar5.bar // Barrier 5
C:\Martha\Temp Projects\106 dB reanalysis\bar6.bar // Barrier 6
C:\Martha\Temp Projects\106 dB reanalysis\bar7.bar // Barrier 7

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R7.obs // R7

Output Data Summary

x = 8441 y = 3161 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	52.8	42.9	36.2	33.8	31.2	18.9	0.0	0.0	36.2	52.6
Wpt140	0.0	0.0	44.3	34.6	27.8	24.8	23.2	11.8	0.0	0.0	27.8	44.2
Wpt133	0.0	0.0	43.9	34.1	27.3	24.3	22.6	10.8	0.0	0.0	27.3	43.8
Wpt100	0.0	0.0	43.4	33.6	26.8	23.7	21.9	9.7	0.0	0.0	26.7	43.3
Wpt92	0.0	0.0	43.3	33.5	26.6	23.6	21.7	9.4	0.0	0.0	26.5	43.2
Wpt141	0.0	0.0	43.2	33.4	26.6	23.5	21.6	9.2	0.0	0.0	26.4	43.1
Wpt134	0.0	0.0	43.1	33.2	26.4	23.3	21.3	8.9	0.0	0.0	26.2	43.0
Wpt91	0.0	0.0	42.5	32.5	25.7	22.5	20.3	7.2	0.0	0.0	25.4	42.3
Wpt99	0.0	0.0	42.4	32.5	25.6	22.5	20.3	7.2	0.0	0.0	25.3	42.3
Wpt135	0.0	0.0	42.2	32.2	25.4	22.2	19.9	6.6	0.0	0.0	25.0	42.1
Transformers	0.0	0.0	0.0	22.1	22.0	26.1	14.0	0.8	0.0	0.0	24.1	28.8

From: "Martha" <martha@tw-enviro.com>
To: <Jesse.Gronner@PPMEnergy.com>, "John White" <John.White@state.or.us>, "Dana Siegfried" <dns@deainc.com>
Date: 1/18/2006 4:43:33 PM
Subject: Klondike III - Requested Noise Files

The attachment contains the files requested showing eliminated towers at R3, R4, R5, R6, and R7.

Martha Moore, P.E.
TW Environmental, Inc.
136 NE 28th Avenue
Portland, OR 97232
503-235-9194
email: martha@tw-enviro.com

TW Environmental, Inc.

136 NE 28th Avenue, Portland, OR 97232-3146

503-235-9194 ■ Fax: 503-239-7998

To: Dana Siegfried
David Evans and Associates, Inc.

From: Martha Moore, P.E.

Subject: Klondike III Noise Analysis – Additional Analysis for Towers within the 900 Foot Corridor and EFSC Requested Modification to Transformer Noise Calculations

Project #: 242

Date: December 15, 2005

We have completed an analysis of moving all towers 450 feet closer to potentially affected noise receivers. The purpose of the analysis was to identify, on a worst case basis, all towers that contribute to noise levels in excess of 36 dBA at any residence. Please refer to the figures in the *Noise Analysis Report for the Klondike III Wind Project* dated March 2005 for the locations of substations and noise receivers. One additional tower, Wpt – 126, would be affected by moving towers closer to receivers within the 900-foot corridor. No new noise receivers would be affected.

The towers that would contribute to noise levels in excess of 36 dBA at the four affected receivers, with an assumed 104-dBA max sound power level for all towers simultaneously, are listed in Table 1. Table 1 includes data from our previous analysis submitted in response to RAI 1 from EFSC.

Table 1
Affected Receivers and Towers

Receivers	Contributing Towers (Wpt)
R4	59, 60, 61, and 62
R5	58
R6	89, 90, 91, 92, 93, 94, 97, 98, 99, 100, 101,102, and 126
R7	102, 126, 127, 128, 129, 130, 131, 132, 136, 137, and 138

In addition to the 900 foot corridor analysis completed, Kerrie Standlee (EFSC's reviewing engineer) requested a specific calculation method for transformer noise. He was particularly concerned about the contributions of the transformers to noise levels at the residences identified as R6 and R7. A summary of the results and assumptions for the calculations requested are presented below.

The distance from K3 east substation to R6 is 3,500 feet. The distance from K3 east substation to R7 is 3,300 feet. The ground between the substation and both receivers is dry wheat farm land. The K3 east substation will have two transformers at 230 kV and 83.3 MVA with auxiliary cooling. From the NEMA Table 0-2 (*NEMA TR 1, Transformers, Regulators, and Reactors*), the average sound level for a 900-BIL transformer (the most common BIL for a 230 kV) is 82 dBA.

For two transformers, the source level would be 85 dBA. The distance adjustments to R6 and R7 respectively, assuming the source measurements are at 2 meters, are -54.5 and -54.0. From *Noise and Vibration Control* (Beranek), attenuation over bare rough ground and thick grass can range between 3 dB per 100 meters and 23 dB per 100 meters. The additional ground attenuation for R6 and R7 will be (conservatively) in the range of -30 dBA. In addition, both R6 and R7 have topographic shielding of a minimum of 10 to 15 feet. Thus, the calculations support the previous conclusion that the substation will not contribute to sound levels at R6 and R7.

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R3ContResults.prj

Project Description:
Receiver 3 - All towers 106 dBA

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt40.src // Wpt40
C:\Martha\Temp Projects\106 dB reanalysis\wpt41.src // Wpt41
C:\Martha\Temp Projects\106 dB reanalysis\wpt42.src // Wpt42
C:\Martha\Temp Projects\106 dB reanalysis\wpt43.src // Wpt43
C:\Martha\Temp Projects\106 dB reanalysis\wpt44.src // Wpt44
C:\Martha\Temp Projects\106 dB reanalysis\wpt45.src // Wpt45
C:\Martha\Temp Projects\106 dB reanalysis\wpt46.src // Wpt46
C:\Martha\Temp Projects\106 dB reanalysis\wpt47.src // Wpt47
C:\Martha\Temp Projects\106 dB reanalysis\wpt48.src // Wpt48
C:\Martha\Temp Projects\106 dB reanalysis\wpt49.src // Wpt49

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R3.obs // R3

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R3.obs // R3

Output Data Summary

x = 3928 y = 8146.1 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	54.0	44.5	37.5	34.6	33.0	22.3	0.0	0.0	37.6	53.9
Wpt49	0.0	0.0	46.9	37.8	30.6	27.9	26.7	17.2	0.0	0.0	31.1	46.8
Wpt48	0.0	0.0	46.3	37.0	30.0	27.2	26.0	16.1	0.0	0.0	30.4	46.3
Wpt47	0.0	0.0	45.6	36.1	29.2	26.4	25.0	14.6	0.0	0.0	29.5	45.5
Wpt46	0.0	0.0	44.7	35.1	28.3	25.3	23.8	12.8	0.0	0.0	28.4	44.6
Wpt45	0.0	0.0	43.8	34.0	27.2	24.2	22.4	10.6	0.0	0.0	27.1	43.7
Wpt44	0.0	0.0	42.9	33.0	26.2	23.1	21.1	8.5	0.0	0.0	26.0	42.8
Wpt43	0.0	0.0	42.5	32.6	25.7	22.6	20.5	7.4	0.0	0.0	25.5	42.4
Wpt42	0.0	0.0	41.4	31.4	24.5	21.2	18.7	4.5	0.0	0.0	24.0	41.3
Wpt41	0.0	0.0	40.5	30.5	23.4	20.0	17.2	1.9	0.0	0.0	22.8	40.4
Wpt40	0.0	0.0	39.1	28.9	21.7	18.0	14.7	0.0	0.0	0.0	20.9	38.9

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R4ContResults.prj

Project Description:
R4 - All towers at 106 dBA

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt54.src // Wpt54
C:\Martha\Temp Projects\106 dB reanalysis\wpt55.src // Wpt55
C:\Martha\Temp Projects\106 dB reanalysis\wpt56.src // Wpt56
C:\Martha\Temp Projects\106 dB reanalysis\wpt57.src // Wpt57
C:\Martha\Temp Projects\106 dB reanalysis\wpt58.src // Wpt58
C:\Martha\Temp Projects\106 dB reanalysis\wpt59.src // Wpt59
C:\Martha\Temp Projects\106 dB reanalysis\wpt60.src // Wpt60
C:\Martha\Temp Projects\106 dB reanalysis\wpt61.src // Wpt61
C:\Martha\Temp Projects\106 dB reanalysis\wpt62.src // Wpt62
C:\Martha\Temp Projects\106 dB reanalysis\wpt63.src // Wpt63
C:\Martha\Temp Projects\106 dB reanalysis\wpt64.src // Wpt64
C:\Martha\Temp Projects\106 dB reanalysis\wpt65.src // Wpt65
C:\Martha\Temp Projects\106 dB reanalysis\wpt66.src // Wpt66
C:\Martha\Temp Projects\106 dB reanalysis\wpt67.src // Wpt67
C:\Martha\Temp Projects\106 dB reanalysis\wpt68.src // Wpt68

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R4.obs // R4

Output Data Summary

x = 5150.6 y = 7378.8 z = 1.5 (in meters)

	Octave Band Center Frequency, Hz											
Source Component	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	58.7	50.2	42.5	39.9	38.9	30.3	7.2	0.0	43.2	58.8
Wpt60	0.0	0.0	50.2	42.5	34.2	31.7	31.1	23.3	1.7	0.0	35.3	50.4
Wpt61	0.0	0.0	50.0	42.2	34.0	31.5	30.8	23.0	1.1	0.0	35.0	50.2
Wpt59	0.0	0.0	49.8	41.9	33.8	31.3	30.6	22.7	0.5	0.0	34.8	50.0
Wpt62	0.0	0.0	49.1	40.9	33.0	30.5	29.7	21.5	0.0	0.0	33.9	49.3
Wpt58	0.0	0.0	48.8	40.4	32.6	30.1	29.2	20.8	0.0	0.0	33.5	48.8
Wpt63	0.0	0.0	48.0	39.3	31.8	29.2	28.2	19.4	0.0	0.0	32.5	48.0
Wpt64	0.0	0.0	46.6	37.5	30.3	27.6	26.4	16.8	0.0	0.0	30.8	46.6
Wpt65	0.0	0.0	45.5	36.0	29.1	26.3	24.9	14.5	0.0	0.0	29.4	45.4
Wpt66	0.0	0.0	44.2	34.5	27.7	24.7	23.0	11.6	0.0	0.0	27.7	44.1
Wpt56	0.0	0.0	43.1	33.2	26.4	23.3	21.3	8.8	0.0	0.0	26.2	42.9
Wpt57	0.0	0.0	43.0	33.1	26.3	23.2	21.2	8.7	0.0	0.0	26.1	42.9
Wpt67	0.0	0.0	43.0	33.1	26.3	23.2	21.2	8.6	0.0	0.0	26.1	42.8
Wpt55	0.0	0.0	43.0	33.1	26.2	23.1	21.1	8.5	0.0	0.0	26.0	42.8
Wpt54	0.0	0.0	42.7	32.8	26.0	22.8	20.8	7.9	0.0	0.0	25.7	42.6
Wpt68	0.0	0.0	42.1	32.2	25.3	22.1	19.8	6.3	0.0	0.0	24.9	42.0

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R5ContResults.prj

Project Description:
R5 - All towers at 106 dBA

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt54.src // Wpt54
C:\Martha\Temp Projects\106 dB reanalysis\wpt55.src // Wpt55
C:\Martha\Temp Projects\106 dB reanalysis\wpt56.src // Wpt56
C:\Martha\Temp Projects\106 dB reanalysis\wpt57.src // Wpt57
C:\Martha\Temp Projects\106 dB reanalysis\wpt58.src // Wpt58
C:\Martha\Temp Projects\106 dB reanalysis\wpt59.src // Wpt59
C:\Martha\Temp Projects\106 dB reanalysis\wpt60.src // Wpt60
C:\Martha\Temp Projects\106 dB reanalysis\wpt61.src // Wpt61
C:\Martha\Temp Projects\106 dB reanalysis\wpt62.src // Wpt62
C:\Martha\Temp Projects\106 dB reanalysis\wpt63.src // Wpt63
C:\Martha\Temp Projects\106 dB reanalysis\wpt64.src // Wpt64
C:\Martha\Temp Projects\106 dB reanalysis\wpt65.src // Wpt65

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R5.obs // R5

Output Data Summary

x = 5376 y = 8111.4 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz											
	16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	56.2	47.5	39.9	37.1	36.0	27.3	4.9	0.0	40.5	56.2
Wpt58	0.0	0.0	50.9	43.4	34.9	32.5	31.9	24.5	4.0	0.0	36.1	51.1
Wpt59	0.0	0.0	48.8	40.4	32.7	30.1	29.3	20.9	0.0	0.0	33.5	48.9
Wpt60	0.0	0.0	47.2	38.2	30.9	28.2	27.1	17.8	0.0	0.0	31.4	47.2
Wpt61	0.0	0.0	45.7	36.3	29.4	26.5	25.2	14.9	0.0	0.0	29.6	45.7
Wpt62	0.0	0.0	44.4	34.7	27.9	25.0	23.3	12.1	0.0	0.0	28.0	44.3
Wpt63	0.0	0.0	43.2	33.4	26.6	23.5	21.6	9.2	0.0	0.0	26.4	43.1
Wpt64	0.0	0.0	42.1	32.2	25.3	22.1	19.8	6.4	0.0	0.0	25.0	42.0
Wpt65	0.0	0.0	41.3	31.3	24.3	21.0	18.5	4.0	0.0	0.0	23.8	41.1
Wpt54	0.0	0.0	41.3	31.3	24.3	21.0	18.4	4.0	0.0	0.0	23.8	41.1
Wpt55	0.0	0.0	41.0	31.0	24.0	20.6	18.0	3.2	0.0	0.0	23.4	40.8
Wpt56	0.0	0.0	40.7	30.7	23.6	20.2	17.5	2.4	0.0	0.0	23.1	40.5
Wpt57	0.0	0.0	40.3	30.2	23.2	19.7	16.8	1.2	0.0	0.0	22.5	40.1

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R6ContResults.prj

Project Description:
R6 - All towers at 106 dBA

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are NOT included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt100.src // Wpt100
C:\Martha\Temp Projects\106 dB reanalysis\wpt101.src // Wpt101
C:\Martha\Temp Projects\106 dB reanalysis\wpt102.src // Wpt102
C:\Martha\Temp Projects\106 dB reanalysis\wpt126.src // Wpt126
C:\Martha\Temp Projects\106 dB reanalysis\wpt127.src // Wpt127
C:\Martha\Temp Projects\106 dB reanalysis\wpt128.src // Wpt128
C:\Martha\Temp Projects\106 dB reanalysis\wpt129.src // Wpt129
C:\Martha\Temp Projects\106 dB reanalysis\wpt130.src // Wpt130
C:\Martha\Temp Projects\106 dB reanalysis\wpt136.src // Wpt136
C:\Martha\Temp Projects\106 dB reanalysis\wpt137.src // Wpt137
C:\Martha\Temp Projects\106 dB reanalysis\wpt138.src // Wpt138
C:\Martha\Temp Projects\106 dB reanalysis\wpt86.src // Wpt86
C:\Martha\Temp Projects\106 dB reanalysis\wpt87.src // Wpt87
C:\Martha\Temp Projects\106 dB reanalysis\wpt88.src // Wpt88
C:\Martha\Temp Projects\106 dB reanalysis\wpt89.src // Wpt89
C:\Martha\Temp Projects\106 dB reanalysis\wpt90.src // Wpt90
C:\Martha\Temp Projects\106 dB reanalysis\wpt91.src // Wpt91
C:\Martha\Temp Projects\106 dB reanalysis\wpt92.src // Wpt92
C:\Martha\Temp Projects\106 dB reanalysis\wpt93.src // Wpt93
C:\Martha\Temp Projects\106 dB reanalysis\wpt94.src // Wpt94
C:\Martha\Temp Projects\106 dB reanalysis\wpt95.src // Wpt95
C:\Martha\Temp Projects\106 dB reanalysis\wpt96.src // Wpt96
C:\Martha\Temp Projects\106 dB reanalysis\wpt97.src // Wpt97
C:\Martha\Temp Projects\106 dB reanalysis\wpt98.src // Wpt98
C:\Martha\Temp Projects\106 dB reanalysis\wpt99.src // Wpt99

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R6.obs // R6

Output Data Summary

x = 8383.6 y = 3843.4 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz 16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	60.3	51.6	44.0	41.4	40.3	31.3	8.1	0.0	44.6	60.4
Wpt102	0.0	0.0	51.1	43.7	35.1	32.7	32.2	24.8	4.6	0.0	36.4	51.4
Wpt101	0.0	0.0	50.2	42.4	34.2	31.7	31.0	23.3	1.7	0.0	35.3	50.4
Wpt94	0.0	0.0	49.0	40.8	32.9	30.4	29.6	21.3	0.0	0.0	33.8	49.1
Wpt93	0.0	0.0	48.8	40.4	32.6	30.1	29.2	20.8	0.0	0.0	33.5	48.8
Wpt100	0.0	0.0	48.7	40.2	32.5	30.0	29.1	20.6	0.0	0.0	33.3	48.7
Wpt92	0.0	0.0	48.0	39.3	31.8	29.2	28.3	19.4	0.0	0.0	32.5	48.1
Wpt99	0.0	0.0	47.3	38.4	31.1	28.4	27.3	18.1	0.0	0.0	31.6	47.3
Wpt91	0.0	0.0	47.1	38.0	30.8	28.1	27.0	17.6	0.0	0.0	31.3	47.0
Wpt90	0.0	0.0	46.1	36.7	29.7	26.9	25.7	15.6	0.0	0.0	30.1	46.0
Wpt98	0.0	0.0	45.9	36.5	29.6	26.8	25.4	15.3	0.0	0.0	29.9	45.9
Wpt126	0.0	0.0	45.6	36.1	29.2	26.4	25.0	14.6	0.0	0.0	29.4	45.5
Wpt89	0.0	0.0	45.2	35.7	28.8	25.9	24.5	13.8	0.0	0.0	29.0	45.1
Wpt127	0.0	0.0	45.1	35.5	28.7	25.8	24.3	13.6	0.0	0.0	28.8	45.0
Wpt97	0.0	0.0	44.6	35.0	28.1	25.2	23.6	12.5	0.0	0.0	28.2	44.5
Wpt128	0.0	0.0	44.5	34.8	28.0	25.0	23.4	12.2	0.0	0.0	28.0	44.4
Wpt136	0.0	0.0	44.3	34.6	27.8	24.9	23.2	11.8	0.0	0.0	27.8	44.2
Wpt88	0.0	0.0	44.0	34.3	27.5	24.5	22.8	11.1	0.0	0.0	27.4	43.9
Wpt129	0.0	0.0	43.8	34.0	27.2	24.2	22.4	10.6	0.0	0.0	27.1	43.7
Wpt96	0.0	0.0	43.6	33.7	26.9	23.9	22.1	10.0	0.0	0.0	26.8	43.5
Wpt137	0.0	0.0	43.2	33.3	26.5	23.4	21.5	9.1	0.0	0.0	26.4	43.1
Wpt87	0.0	0.0	43.0	33.1	26.3	23.2	21.2	8.6	0.0	0.0	26.1	42.9
Wpt130	0.0	0.0	42.6	32.7	25.9	22.7	20.6	7.7	0.0	0.0	25.6	42.5
Wpt95	0.0	0.0	42.6	32.7	25.8	22.7	20.6	7.6	0.0	0.0	25.6	42.4
Wpt138	0.0	0.0	42.2	32.3	25.4	22.2	20.0	6.6	0.0	0.0	25.1	42.1
Wpt86	0.0	0.0	42.1	32.1	25.2	22.0	19.8	6.3	0.0	0.0	24.9	41.9

Input Data Summary For:
C:\Martha\Temp Projects\106 dB reanalysis\R7ContResultsbar.prj

Project Description:
R7 - All towers at 106 dBA, transformers

User Defined Observer Positions will be calculated with the following options:

Line and 3-D sources will have 6 points per source
Sort on A-weighted sound levels (maximum to minimum)
Include ISO 9613 Ground Effects with a 10 dB Cap, re Hard groung
Barriers are included in the calculation
Reflectors are NOT included in the calculation
Industrial Sites and Foliage are NOT included in the calculation

Temperature, in degrees C: 11
Relative Humidity, in percent: 60

Source Files:

C:\Martha\Temp Projects\106 dB reanalysis\wpt100.src // Wpt100
C:\Martha\Temp Projects\106 dB reanalysis\wpt101.src // Wpt101
C:\Martha\Temp Projects\106 dB reanalysis\wpt102.src // Wpt102
C:\Martha\Temp Projects\106 dB reanalysis\wpt126.src // Wpt126
C:\Martha\Temp Projects\106 dB reanalysis\wpt127.src // Wpt127
C:\Martha\Temp Projects\106 dB reanalysis\wpt128.src // Wpt128
C:\Martha\Temp Projects\106 dB reanalysis\wpt129.src // Wpt129
C:\Martha\Temp Projects\106 dB reanalysis\wpt130.src // Wpt130
C:\Martha\Temp Projects\106 dB reanalysis\wpt131.src // Wpt131
C:\Martha\Temp Projects\106 dB reanalysis\wpt132.src // Wpt132
C:\Martha\Temp Projects\106 dB reanalysis\wpt133.src // Wpt133
C:\Martha\Temp Projects\106 dB reanalysis\wpt134.src // Wpt134
C:\Martha\Temp Projects\106 dB reanalysis\wpt135.src // Wpt135
C:\Martha\Temp Projects\106 dB reanalysis\wpt136.src // Wpt136
C:\Martha\Temp Projects\106 dB reanalysis\wpt137.src // Wpt137
C:\Martha\Temp Projects\106 dB reanalysis\wpt138.src // Wpt138
C:\Martha\Temp Projects\106 dB reanalysis\wpt139.src // Wpt139
C:\Martha\Temp Projects\106 dB reanalysis\wpt140.src // Wpt140
C:\Martha\Temp Projects\106 dB reanalysis\wpt141.src // Wpt141
C:\Martha\Temp Projects\106 dB reanalysis\wpt91.src // Wpt91
C:\Martha\Temp Projects\106 dB reanalysis\wpt92.src // Wpt92
C:\Martha\Temp Projects\106 dB reanalysis\wpt93.src // Wpt93
C:\Martha\Temp Projects\106 dB reanalysis\wpt94.src // Wpt94
C:\Martha\Temp Projects\106 dB reanalysis\wpt99.src // Wpt99
C:\Martha\Temp Projects\106 dB reanalysis\Transformers.src // Transformers

Barrier Files:

C:\Martha\Temp Projects\106 dB reanalysis\bar1.bar // Barrier 1
C:\Martha\Temp Projects\106 dB reanalysis\bar2.bar // Barrier 2
C:\Martha\Temp Projects\106 dB reanalysis\bar3.bar // Barrier 3
C:\Martha\Temp Projects\106 dB reanalysis\bar4.bar // Barrier 4
C:\Martha\Temp Projects\106 dB reanalysis\bar5.bar // Barrier 5
C:\Martha\Temp Projects\106 dB reanalysis\bar6.bar // Barrier 6
C:\Martha\Temp Projects\106 dB reanalysis\bar7.bar // Barrier 7

Observer File:

C:\Martha\Temp Projects\106 dB reanalysis\R7.obs // R7

Output Data Summary

x = 8441 y = 3161 z = 1.5 (in meters)

Source Component	Octave Band Center Frequency, Hz 16	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(C)
Total of Sources	0.0	0.0	58.9	49.5	42.5	39.8	38.3	28.0	0.0	0.0	42.8	58.9
Wpt136	0.0	0.0	48.5	40.0	32.4	29.8	28.9	20.4	0.0	0.0	33.2	48.6
Wpt137	0.0	0.0	47.5	38.7	31.3	28.6	27.6	18.5	0.0	0.0	31.9	47.5
Wpt138	0.0	0.0	46.4	37.2	30.1	27.4	26.2	16.4	0.0	0.0	30.5	46.4
Wpt129	0.0	0.0	46.3	37.0	29.9	27.2	25.9	16.0	0.0	0.0	30.3	46.2
Wpt128	0.0	0.0	46.1	36.8	29.8	27.0	25.8	15.8	0.0	0.0	30.2	46.1
Wpt102	0.0	0.0	46.1	36.8	29.8	27.0	25.7	15.7	0.0	0.0	30.1	46.1
Wpt130	0.0	0.0	45.9	36.5	29.5	26.7	25.4	15.2	0.0	0.0	29.8	45.8
Wpt127	0.0	0.0	45.7	36.2	29.3	26.5	25.1	14.8	0.0	0.0	29.6	45.6
Wpt139	0.0	0.0	45.3	35.8	28.9	26.0	24.6	14.0	0.0	0.0	29.1	45.2
Wpt94	0.0	0.0	45.3	35.8	28.9	26.0	24.6	14.0	0.0	0.0	29.1	45.2
Wpt131	0.0	0.0	45.3	35.8	28.9	26.0	24.6	14.0	0.0	0.0	29.1	45.2
Wpt126	0.0	0.0	45.1	35.5	28.6	25.7	24.2	13.5	0.0	0.0	28.8	45.0
Wpt101	0.0	0.0	44.8	35.2	28.3	25.4	23.9	12.9	0.0	0.0	28.4	44.7
Wpt132	0.0	0.0	44.7	35.0	28.2	25.3	23.7	12.7	0.0	0.0	28.3	44.6
Wpt93	0.0	0.0	44.3	34.6	27.8	24.8	23.2	11.8	0.0	0.0	27.8	44.2
Wpt140	0.0	0.0	44.3	34.6	27.8	24.8	23.2	11.8	0.0	0.0	27.8	44.2
Wpt133	0.0	0.0	43.9	34.1	27.3	24.3	22.6	10.8	0.0	0.0	27.3	43.8
Wpt100	0.0	0.0	43.4	33.6	26.8	23.7	21.9	9.7	0.0	0.0	26.7	43.3
Wpt92	0.0	0.0	43.3	33.5	26.6	23.6	21.7	9.4	0.0	0.0	26.5	43.2
Wpt141	0.0	0.0	43.2	33.4	26.6	23.5	21.6	9.2	0.0	0.0	26.4	43.1
Wpt134	0.0	0.0	43.1	33.2	26.4	23.3	21.3	8.9	0.0	0.0	26.2	43.0
Wpt91	0.0	0.0	42.5	32.5	25.7	22.5	20.3	7.2	0.0	0.0	25.4	42.3
Wpt99	0.0	0.0	42.4	32.5	25.6	22.5	20.3	7.2	0.0	0.0	25.3	42.3
Wpt135	0.0	0.0	42.2	32.2	25.4	22.2	19.9	6.6	0.0	0.0	25.0	42.1
Transformers	0.0	0.0	0.0	22.1	22.0	26.1	14.0	0.8	0.0	0.0	24.1	28.8

RESPONSE AA1

EMF CALCULATIONS FOR 34.5-KV UG COLLECTION SYSTEM

Generation of Electric and Magnetic Fields (EMF)

All electric utility wires and devices generate alternating electric and magnetic fields (EMF). The Earth itself generates steady-state magnetic and electric fields. The EMF produced by the AC electrical power system in the United States has a frequency of 60 Hz, meaning that the fields change from positive to negative and back to positive, 60 times per second. This section addresses the estimates of the maximum possible 60-Hz AC electric and magnetic field strengths that will be produced by the proposed 230-kV, and 34.5-kV facilities. These estimates are computed for a height of 1 meter above the ground on the proposed line routes.

In AC power systems, voltage swings positive to negative and back to positive, a 360-degrees cycle, 60 times every second. Current follows the voltage, flowing forward, reversing direction, and returning to the forward direction, again a 360-degrees cycle, 60 times every second. Each AC three-phase circuit carries power over three conductors. One phase of the circuit is carried by each of the three conductors. The AC voltage and current in each phase conductor is out of sync with the other two phases by 120 degrees, or one-third of the 360-degrees cycle. The fields from these conductors tend to cancel out because of the phase difference. However, when a person stands under a transmission line, or over a buried circuit of underground cables, one conductor is always significantly closer and will contribute a net uncanceled field at the person's location.

Electric fields around conductors are produced by electrical charges, measured as voltage, on the energized conductor. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. The electric field is inversely proportional to the distance a sensor is from the conductors, so that the electric field strength declines as the distance from the conductor increases. The strength of the field at any location depends on the voltage of the conductor, the geometry of the construction, the degree of cancellation from other conductors, and the distance from the conductors.

For any circuit, the voltage and electric field alternate at a frequency of 60 Hz. The strength of the electric field is measured in units of kilovolts per meter (kV/m). The voltage, and therefore the electric field, around a conductor remains practically steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

For an underground 34.5-kV circuit, the electric field is totally contained within the insulation of the cable. Each cable has a semi-conducting insulation shield, and a grounded concentric neutral made up of multiple strands of copper wire that encircle the cable just under the outer jacket. This means that the cable jacket has no measurable voltage to ground, or between other cable jackets, and that the cables can be safely touched, although it is not recommended. Because the electric field is contained within the buried cables, no electric field is measurable at the surface of the ground.

For an overhead transmission line, the conductors are isolated above the ground and insulated by air. Therefore the electric field is not contained, and a net field strength is measurable on the ground.

Magnetic fields around transmission lines are produced by the electrical load or the amount of current flow, measured in terms of amperage, through the conductors. Like the electric field, the magnetic field alternates at a frequency of 60 Hz. The magnetic field strength is directly proportional to the amperage; that is, increased amperage produces a stronger magnetic field. The magnetic field is inversely proportional to the sensor's distance from the conductors. Also, like the electric field, the magnetic field strength declines as the distance from the conductor increases. Magnetic fields are expressed in units of milligauss (mG). However, unlike voltage, the amperage and therefore the magnetic field around a transmission line, fluctuate hourly and daily as the amount of current flow varies. The strength of the magnetic field depends on the current in the conductor, the geometry of the construction, the degree of cancellation from other conductors, and the distance from the conductors or cables.

Underground cables do not contain the magnetic field. Therefore, the net magnetic field of buried cables is be measurable on the surface of the ground above the cables.

Calculation Method

The calculation methods used for the analysis that follows are provided in Chapter 8 of the "Transmission Line Reference Book, 345-kV and above / Second Edition." Published by the Electric Power Research Institute, 1982. The software tool program used for these analyses is based on the methods and equations of the referenced text, and is called the "Corona and Field Effect Program (Version 3)", and was developed by the Bonneville Power Administration. This program, and others like it, has been used to predict electric and magnetic field levels for many years. The predicted values of field strength from these programs have been consistently confirmed by field measurements.
To estimate the maximum fields, calculations are performed for a height of 1 meter above the ground, and at mid-span where the conductor is positioned at its lowest point between structures (the estimated maximum sag point).

34.5-kV Configuration and Line Loading

Maximum magnetic fields are produced at the maximum conductor currents. The project's largest cables carry the maximum currents. For the purpose of this EMF analyses, the maximum line loading is assumed to be 513 amperes per phase, and cable is assumed to be 1000 kcmil Aluminum, with 345 mils of XLPE-TR insulation. The underground trench is assumed to be 48" deep and all cables are assumed to be direct buried in a trefoil arrangement.

Calculation Results

Electric Fields: The underground cable construction contains the electric field within the cable insulation so that no electric field is present external to the cables.

Magnetic Fields: Maximum magnetic fields are computed at 1 meter above ground using a program called "Corona and Field Effect Program (Version 3)" developed by the Bonneville Power Administration.

To estimate maximum fields that might occur, one needs to consider locations where 1) a circuit is remote from other circuits, and 2) where a circuit parallels other circuits.

Case 1- 34.5-kV Underground Cable Remote from Other Circuits
For this case, the distance between the centerline of 34.5-kV circuits and the edge of the right-of-way is undefined because the entire wind farm is considered right-of-way. Figure 1 illustrates the profile of the resulting magnetic field strength perpendicular to the underground circuit.

Case 2- 34.5-kV Underground Circuit Parallel to Other Circuits
For this case, three parallel 34.5-kV circuits are considered. The distance between the centerline of 34.5-kV circuit is assumed to be 10 feet to achieve thermal isolation.

Figure 2 illustrates the profile of magnetic fields resulting from this construction.

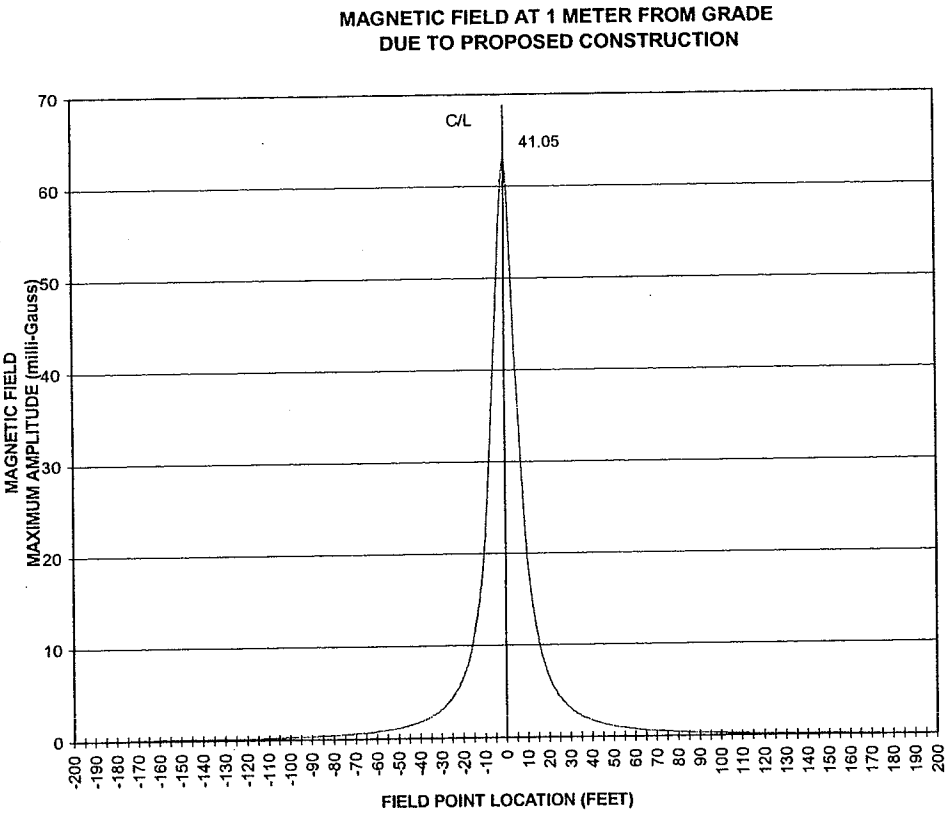


Figure 1 Magnetic Field Profile for One Circuit

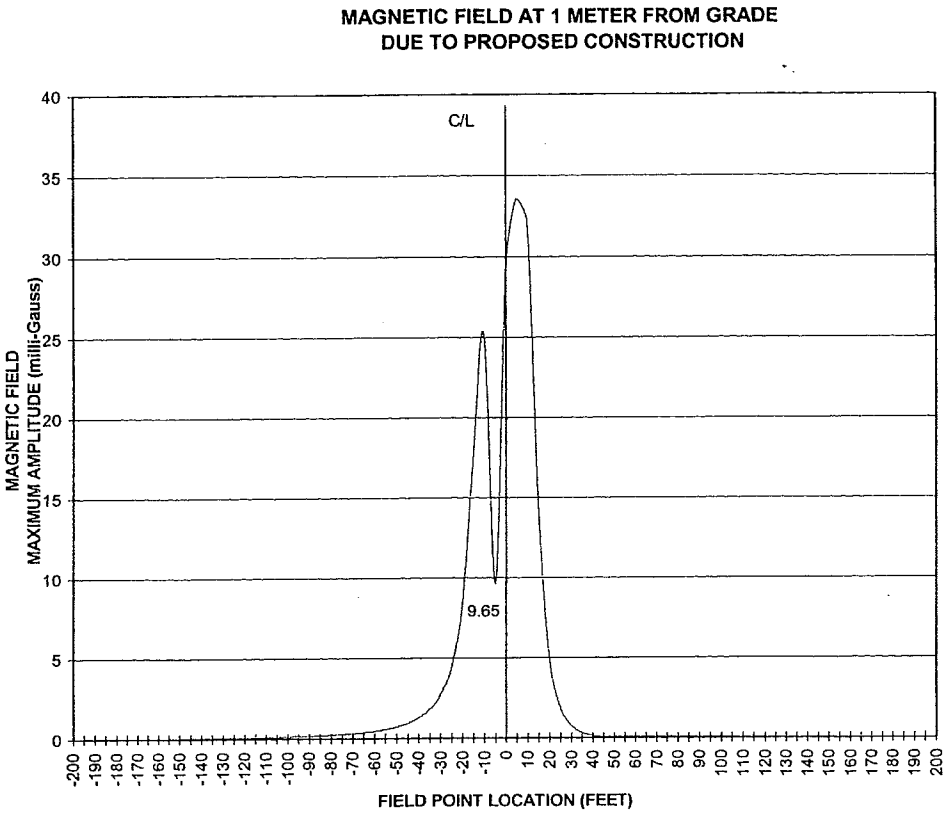


Figure 2 Magnetic Field Profile for Three Parallel Circuits

Conclusion

The maximum magnetic field values for the underground 34.5-kV collection system occur for the main feeder circuits (1000 kcmil cables) that are isolated from other circuits. This is because some cancellation of fields occur when several circuits are in proximity.

The maximum magnetic field value for the underground circuits occurs directly over the buried cable of an isolated circuit, and will be 41.05 milligauss.

No electric field is present external to the cable.

RESPONSE AA2

Induced Voltage and Current

Induced Voltage: Voltage is the electrical pressure that pushes current through a conducting wire or object. An object, such as a bird, person, vehicle, or barbed-wire fence that is insulated from ground, and in an electric field will possess an induced voltage. A bird flying through the field is safe because the induced voltage cannot make current flow through the bird, unless there is a conducting path for the current. Induced voltages can only be a hazard when the object is shorted to ground, allowing a path for current to flow. The conductivity of the air around the overhead conductor will determine the upper limit of the current that can flow when the object is shorted to ground.

A common induced voltage hazard occurs on fences that parallel overhead transmission lines. If the fence is ungrounded, it possesses the voltage of the net electric field of the overhead conductors. A person touching such a fence becomes a conducting path for the current and will feel a momentary shock. The AC static voltage on the fence bleeds off quickly but can be annoying or hazardous. This hazard is easily removed by periodically bonding the fence wires to grounding rods that are driven into the soil.

Induced Current: A current carrying conductor will induce a current to flow in another conductor that is parallel to it. Induced currents are due to the net AC magnetic field. In the common case cited above, grounded fences create electrical loops in which induced currents can flow. The value of the induced current will depend upon the magnetic field strength, the size, and shape of the conducting object, and the object-to-ground resistance.

Induced currents are not a hazard to people because almost no voltage is involved. However, induced currents are a concern for railroad communications, and pipeline cathodic protection systems that parallel transmission lines. Several mitigation techniques are available to solve these problems.

Induced Voltages due to the 230-kV Overhead Transmission Line

Appendix AA-1 shows the electric and magnetic field values computed at right angles to the proposed centerline. The Table titled "Electric Field Calculations" indicates that the average electric field is at its maximum of 1.468 kV/meter at a location approximately 20 feet to the right of centerline.

Separate calculations by TriAxis Engineeing, Inc., (8/11/05) confirms these values as reasonably accurate and provides the following statement:

The proposed configuration of the 230-kV overhead transmission line uses a single-shaft, tubular steel pole with conductors in a sufficiently compact triangular arrangement that is practical and economical to construct. This conductor arrangement provides good cancellation of both electric and magnetic fields. Average ground clearance will be approximately 40 feet from the ground and this height produces an electric field strength of approximately 1.55 kV/meter In addition the electric fields will not exceed 2.6 kV/meter, even when conductors at mid-span are at the design minimum clearance of 30

feet from the ground. These values are significantly under the recommended maximum value of 9 kV/meter.

The applicant intends to provide appropriate grounding of fences that are parallel to the transmission line, and any metal-roofed buildings in proximity to the line. This grounding practice is commonly done for transmission lines and will mitigate the shock hazard associated with the induced voltage.

Induced Current due to 34.5-kV Underground Line

As stated earlier in this response, the underground 34.5-kV cables do not generate electric fields and will not cause a voltage to appear on fences that parallel the underground circuits. Therefore, the grounding of fences in proximity to the underground lines is unnecessary.

As also stated above, underground circuits generate only magnetic fields, and these fields pose no shock hazard to people. Mitigation of magnetic fields may only be required for paralleling pipelines or other such facilities.

RESPONSE AA3

Radio and TV Interference Generation

Electric transmission lines are designed to be efficient by economically minimizing both resistive-related, and corona-related losses. Resistive losses occur in the aluminum the conductor (wire) and result in heating losses that are carried away by the air in convective cooling. The resistive losses also radiate away in the infrared electromagnetic frequency spectrum, and therefore, resistive losses do not contribute in any way to radio and television reception interference. Radio Interference (RI) and Television Interference (TVI) are caused by transmission line corona.

Corona on a transmission line is the physical phenomena of air ionization at the surface of the conductor. When corona is produced, it is heard as snaps, crackles, and pops. When one walks under the line on a dark night, it may be noticed as a glow around the conductor. Corona losses are principally a function of the conductor diameter and the voltage of the transmission line. Transmission line designers have two options to reduce the surface voltage gradient at the conductor surface and thus minimize corona losses: 1) increase the diameter of the conductor, or 2) increase the effective diameter by using multiple conductors held apart by spacers.

Because designers take special steps to control corona losses, corona effects and corona losses are primarily a foul weather phenomenon. The small diameters of rain droplets increase voltage gradients and lead to ionization of air in the vicinity of the conductors. Corona causes audible noise, and corona also generates electromagnetic noise throughout the electromagnetic spectrum. Fortunately, electromagnetic corona noise amplitude and power is inversely proportionate to frequency, and is also inversely proportionate to the square of distance from the source. This being the case, RI and TVI is confined to the area within a few hundred feet of a high-voltage transmission lines. RI is more likely to be a problem because the power in corona-caused electromagnetic radiation at radio frequencies (0.535-1.605 MHz) is much greater than at TV and FM radio frequencies (54-108 MHz). RI or TVI corona noise of all frequencies attenuates with the square of the distance from the conductor, therefore, corona noise dims quickly to insignificance as you leave the centerline of the facility.

RI and TVI Calculations

The electric utility industry has developed methods to calculate the RI and TVI performance of transmission lines. The most recent, and most comprehensive, summary of corona phenomena, and corona-caused electromagnetic noise analysis methods, are presented in the Electric Power Research Institute "Transmission Line Reference Book, 345-kV and Above", Second Edition, 1982. The analysis that follows for the proposed 230-kV overhead transmission facilities for the Klondike III Project uses the Bonneville Power Administration "Corona and Field Effects Program", which is based on the calculation methods set forth in Chapters 4 and 5 of the above EPRI reference.

This analysis produces values of RI and TVI that are measured in decibel microvolts/meter. These units are designed to be used in signal-to-noise calculations

because RI and TVI is only a problem when its strength is significant when compared to the signal trying to be received.

Analysis

For the purpose of this Radio and TV interference analyses, the nominal line voltage is assumed to be 230 kV.

The conductor is assumed to be a single conductor per phase of 1590 kcmil ACSR Falcon.

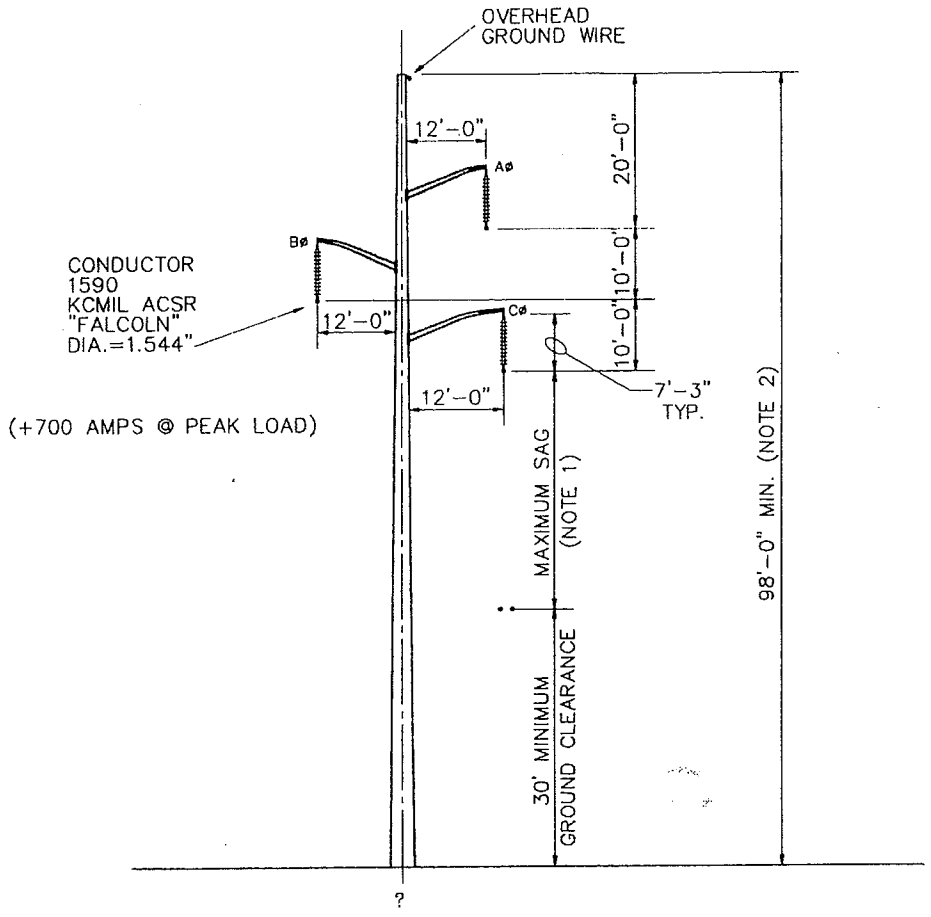
Figure 1 illustrates the configuration of the proposed 230-kV transmission line.

Graph 1A (in db microvolts/meter) presents the RI (Radio Interference) levels to a distance of 200 feet on either side of the centerline.

Graph 1B (in db microvolts/meter) presents the Television Interference levels to a distance of 200 feet on either side of the centerline.

FIGURE 1
TYPICAL TRANSMISSION POLE CONFIGURATION

7-25-05 PPM\KLONDIKE III\FIGURE AA3.DWG



NOTES:

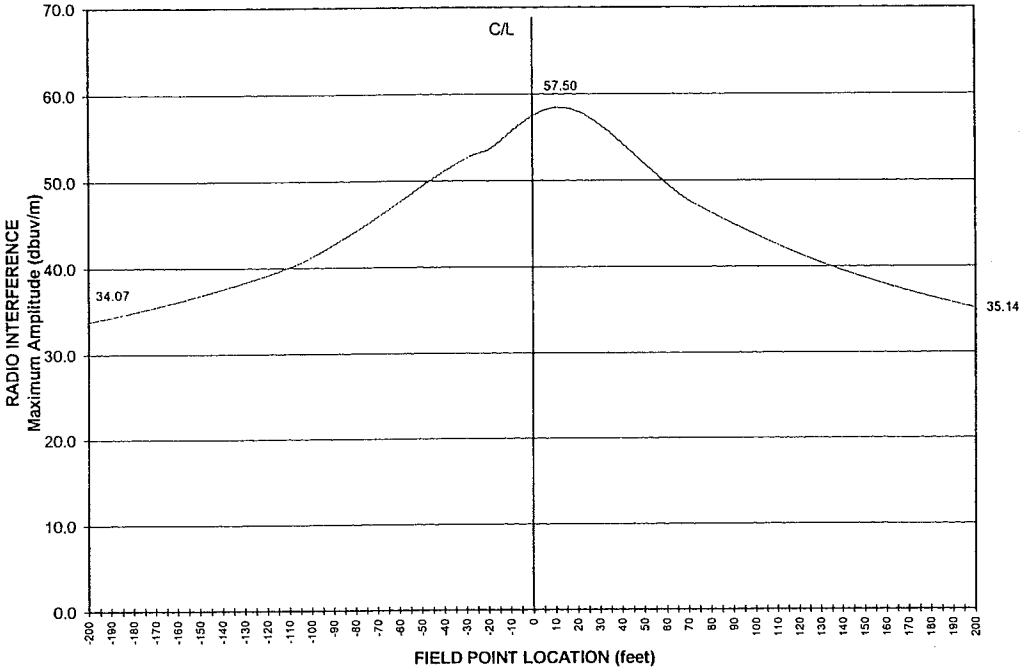
1. 1000'–1500' SPAN LENGTHS.
2. POLE WILL BE TALLER AND CROSSARMS LONGER FOR LONGER SPAN LENGTHS. OPTIMUM POLE DIMENSIONS WILL BE DETERMINED BY THE TERRAIN PROFILE.
3. FOR EMF CALCULATIONS, POLE DIA. AT CONDUCTORS ASSUMED TO BE 2'–0".

TYPICAL 230–KV SINGLE–CIRCUIT TUBULAR STEEL POLE

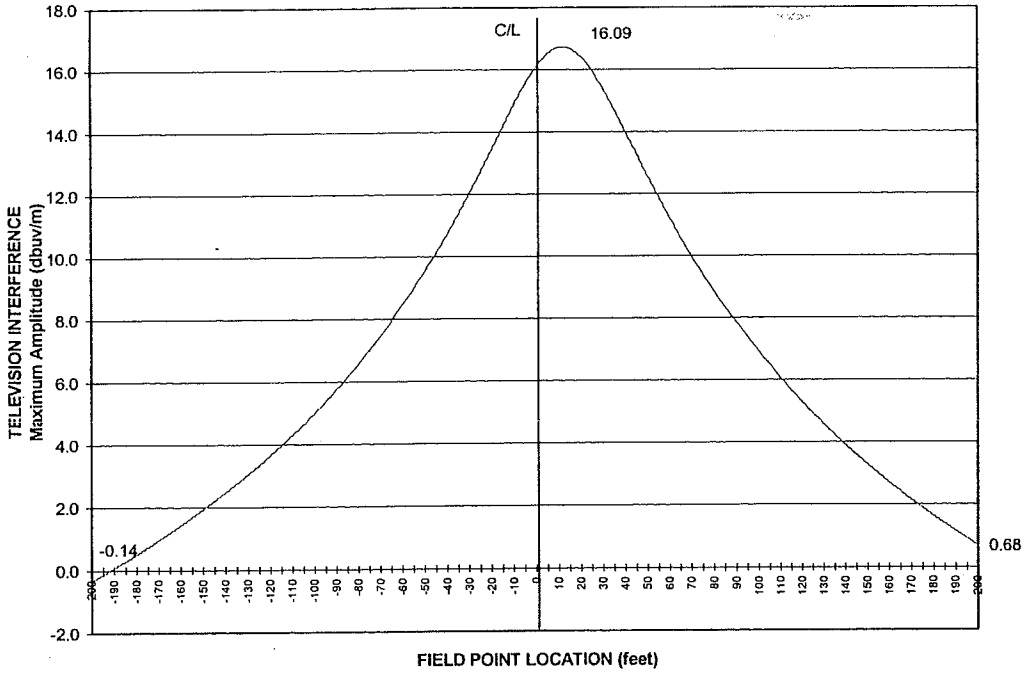
PROPOSED TRANSMISSION LINE STRUCTURE CONCEPT

(NOT TO SCALE)

RADIO INTERFERENCE AT 1 MHz
(in db microvolts/meter)
Graph 1A



TELEVISION INTERFERENCE AT 75 MHz
(in db microvolts/meter)
Graph 1B



Conclusions

The proposed power line will generate random corona radiation incidentally, during wet weather, due to raindrops on the wire. The power levels, thus generated, are so low as to be difficult to detect, even with amplified receivers, at any significant distance from the power line.

The 230-kV transmission line proposed for this project is of conventional design and will have RI and TVI performance that is typical for the industry. As such, RI and TVI produced by the line will not be any more of a problem or nuisance than the typical line. For example, southbound travelers on Oregon's Interstate 5 are within 100-200 feet of a BPA 230-kV line for much of the distance between Wilsonville and Salem. This BPA line has the same voltage, a similar conductor, and apparently has acceptable RI performance. Cars traveling near or under the line in foul weather may be expected to experience some RI when tuning weak stations. Residential AM radio receivers within 300 feet of the centerline also may detect RI when tuning weak and distant stations especially in bad weather. However for this project, there are no residents even this close to the line.

This project will be designed and constructed with conventional transmission line methods, configurations, and materials. These types of 230-kV facilities have traditionally performed well in fair weather, and without unacceptable electromagnetic corona noise generation, even in foul weather. The levels of Radio and TV noise calculated here indicate typical values. Therefore, corona is not expected to cause any interference, except in wet weather, and then, only for receiver equipment located within a few hundred feet of the centerline a signal-to-noise ratio may be smaller.

APPENDIX SECTION AA3

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****************** KLONDIKE III *************
FIGURE AA3 TYPICAL 230-KV SINGLE CIR SINGLE SHAFT TUBULAR STEEL POLE
1,0, 3, 4,0.0,   2.00,   1.00,     .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  4 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,    .000,  1.000, 75.000,   3.280,  2.000,   3.280
'CIR1-A  ','A',   12.00,   60.00, 1,   1.545,     .000, 140.000,     .000,     .700,     .000
'CIR1-B  ','A',  -12.00,   50.00, 1,   1.545,     .000, 140.000,-120.000,     .700,     .000
'CIR1-C  ','A',   12.00,   40.00, 1,   1.545,     .000, 140.000, 120.000,     .700,     .000
'CIR1-SH ','A',    1.00,   80.00, 1,    .385,     .000,     .000,     .000,     .000,     .000
 41 -200.0    5.0
 40    5.0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
****************** KLONDIKE III *************
FIGURE AA3 TYPICAL 230-KV SINGLE CIR SINGLE SHAFT TUBULAR STEEL POLE
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
CIR1-A	12.00	60.00	12.24	1.55	1	.00	140.00	.00	.70	2.835
CIR1-B	-12.00	50.00	11.87	1.55	1	.00	140.00	-120.00	.70	2.332
CIR1-C	12.00	40.00	12.42	1.55	1	.00	140.00	120.00	.70	3.115
CIR1-SH	1.00	80.00	3.38	.38	1	.00	.00	.00	.00	.000

AN MICROPHONE HT.= 5.0 FT, RI ANT. HT.= 5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=   .0 FT
RI FREQ= 1.000 MHZ, TV FREQ= 75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.= 3.3FT, B-FIELD TRANSDUCER HT.= 3.3FT

LATERAL DIST FROM MAGNETIC REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	FIELD GAUSS
-200.0	31.8	6.8	33.8	16.8	-.3	.000000	.055	.00267
-195.0	31.9	6.9	34.1	17.1	-.1	.000000	.058	.00280
-190.0	32.0	7.0	34.3	17.3	.1	.000000	.062	.00294
-185.0	32.1	7.1	34.6	17.6	.3	.000000	.066	.00309
-180.0	32.3	7.3	34.9	17.9	.5	.000000	.070	.00326
-175.0	32.4	7.4	35.2	18.2	.7	.000000	.075	.00344
-170.0	32.5	7.5	35.5	18.5	1.0	.000000	.080	.00363
-165.0	32.7	7.7	35.8	18.8	1.2	.000000	.086	.00384
-160.0	32.8	7.8	36.1	19.1	1.4	.000000	.092	.00407
-155.0	32.9	7.9	36.5	19.5	1.7	.000000	.099	.00431
-150.0	33.1	8.1	36.8	19.8	1.9	.000000	.107	.00458
-145.0	33.2	8.2	37.2	20.2	2.2	.000000	.116	.00488
-140.0	33.4	8.4	37.5	20.5	2.5	.000000	.126	.00520
-135.0	33.5	8.5	37.9	20.9	2.8	.000000	.137	.00556
-130.0	33.7	8.7	38.3	21.3	3.0	.000000	.149	.00595
-125.0	33.9	8.9	38.7	21.7	3.3	.000000	.163	.00638
-120.0	34.0	9.0	39.2	22.2	3.6	.000000	.178	.00686
-115.0	34.2	9.2	39.6	22.6	4.0	.000000	.196	.00739
-110.0	34.4	9.4	40.1	23.1	4.3	.000000	.216	.00799
-105.0	34.6	9.6	40.6	23.6	4.6	.000000	.239	.00865
-100.0	34.8	9.8	41.3	24.3	5.0	.000000	.265	.00939
-95.0	35.0	10.0	42.0	25.0	5.4	.000000	.294	.01022
-90.0	35.2	10.2	42.7	25.7	5.7	.000000	.327	.01116
-85.0	35.4	10.4	43.4	26.4	6.1	.000000	.366	.01221
-80.0	35.7	10.7	44.2	27.2	6.6	.000000	.409	.01341
-75.0	35.9	10.9	45.0	28.0	7.0	.000000	.458	.01477
-70.0	36.1	11.1	45.8	28.8	7.5	.000000	.513	.01631
-65.0	36.4	11.4	46.7	29.7	7.9	.000000	.575	.01806
-60.0	36.6	11.6	47.6	30.6	8.4	.000000	.642	.02004
-55.0	36.9	11.9	48.5	31.5	9.0	.000000	.715	.02229
-50.0	37.2	12.2	49.4	32.4	9.5	.000000	.790	.02483
-45.0	37.4	12.4	50.3	33.3	10.1	.000000	.865	.02767
-40.0	37.7	12.7	51.1	34.1	10.7	.000000	.934	.03081
-35.0	38.0	13.0	51.9	34.9	11.3	.000000	.991	.03424
-30.0	38.2	13.2	52.6	35.6	12.0	.000000	1.026	.03788
-25.0	38.5	13.5	53.2	36.2	12.7	.000000	1.034	.04164
-20.0	38.8	13.8	53.6	36.6	13.4	.000000	1.015	.04537
-15.0	39.0	14.0	54.5	37.5	14.2	.000000	.986	.04887
-10.0	39.2	14.2	55.6	38.6	14.9	.000000	.982	.05190
-5.0	39.4	14.4	56.7	39.7	15.5	.000000	1.046	.05420
.0	39.5	14.5	57.5	40.5	16.1	.000002	1.185	.05552
5.0	39.6	14.6	58.1	41.1	16.5	.000252	1.353	.05565

10.0	39.6	14.6	58.4	41.4	16.7	.001872	1.493	.05452
15.0	39.5	14.5	58.4	41.4	16.7	.005137	1.562	.05218
20.0	39.4	14.4	58.0	41.0	16.4	.009041	1.547	.04886
25.0	39.2	14.2	57.4	40.4	16.0	.013170	1.458	.04490
30.0	39.0	14.0	56.5	39.5	15.4	.020863	1.321	.04065
35.0	38.7	13.7	55.4	38.4	14.7	.032487	1.163	.03641
40.0	38.5	13.5	54.3	37.3	14.0	.044701	1.006	.03241
45.0	38.2	13.2	53.1	36.1	13.3	.055502	.862	.02874
50.0	37.9	12.9	51.9	34.9	12.6	.064197	.738	.02547
55.0	37.6	12.6	50.8	33.8	11.9	.070745	.633	.02259
60.0	37.3	12.3	49.6	32.6	11.2	.075392	.547	.02008
65.0	37.0	12.0	48.5	31.5	10.6	.078478	.476	.01790
70.0	36.8	11.8	47.7	30.7	10.0	.080334	.418	.01602
75.0	36.5	11.5	47.0	30.0	9.4	.081251	.370	.01439
80.0	36.2	11.2	46.3	29.3	8.9	.081461	.329	.01298
85.0	36.0	11.0	45.6	28.6	8.3	.081150	.295	.01176
90.0	35.8	10.8	44.9	27.9	7.8	.080459	.266	.01069
95.0	35.5	10.5	44.3	27.3	7.4	.079496	.241	.00976
100.0	35.3	10.3	43.7	26.7	6.9	.078342	.219	.00894
105.0	35.1	10.1	43.1	26.1	6.5	.077057	.199	.00822
110.0	34.9	9.9	42.5	25.5	6.1	.075689	.182	.00759
115.0	34.7	9.7	42.0	25.0	5.7	.074271	.167	.00702
120.0	34.5	9.5	41.4	24.4	5.3	.072829	.154	.00651
125.0	34.3	9.3	40.9	23.9	4.9	.071380	.142	.00606
130.0	34.1	9.1	40.4	23.4	4.6	.069940	.131	.00565
135.0	34.0	9.0	40.0	23.0	4.2	.068518	.122	.00528
140.0	33.8	8.8	39.5	22.5	3.9	.067122	.113	.00495
145.0	33.6	8.6	39.1	22.1	3.6	.065756	.105	.00465
150.0	33.5	8.5	38.7	21.7	3.3	.064424	.098	.00437
155.0	33.3	8.3	38.2	21.2	3.0	.063128	.092	.00411
160.0	33.1	8.1	37.9	20.9	2.7	.061869	.086	.00388
165.0	33.0	8.0	37.5	20.5	2.4	.060648	.080	.00367
170.0	32.9	7.9	37.1	20.1	2.1	.059465	.076	.00347
175.0	32.7	7.7	36.7	19.7	1.9	.058320	.071	.00329
180.0	32.6	7.6	36.4	19.4	1.6	.057211	.067	.00312
185.0	32.4	7.4	36.1	19.1	1.4	.056139	.063	.00297
190.0	32.3	7.3	35.8	18.8	1.1	.055102	.060	.00282
195.0	32.2	7.2	35.4	18.4	.9	.054099	.056	.00269
200.0	32.1	7.1	35.1	18.1	.7	.053129	.053	.00256

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FIGURE AA3 TYPICAL 230-KV SINGLE CIR SINGLE SHAFT TUBULAR STEEL POLE, LOWEST COND. 30FT FROM GROUND
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(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF 4 CONDUCTORS, OF WHICH 3 ARE ENERGIZED PHASES

```
OPTIONS: 'COMB'
  5.000,  5.000, 10.000,    .000,  1.000, 75.000,  3.280,  2.000,  3.280
'CIR1-A  ','A',    12.00,    50.00, 1,    1.545,     .000, 140.000,     .000,      .700,     .000
'CIR1-B  ','A',   -12.00,    40.00, 1,    1.545,     .000, 140.000,-120.000,      .700,     .000
'CIR1-C  ','A',    12.00,    30.00, 1,    1.545,     .000, 140.000, 120.000,      .700,     .000
'CIR1-SH ','A',     1.00,    70.00, 1,     .385,     .000,     .000,     .000,      .000,     .000
 41 -200.0     5.0
 40    5.0     5.0
  0     .0      .0
```

1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
****************** KLONDIKE III *************
FIGURE AA3 TYPICAL 230-KV SINGLE CIR SINGLE SHAFT TUBULAR STEEL POLE

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
CIR1-A	12.00	50.00	12.20	1.55	1	.00	140.00	.00	.70	2.781
CIR1-B	-12.00	40.00	11.91	1.55	1	.00	140.00	-120.00	.70	2.381
CIR1-C	12.00	30.00	12.53	1.55	1	.00	140.00	120.00	.70	3.312
CIR1-SH	1.00	70.00	3.47	.38	1	.00	.00	.00	.00	.000

AN MICROPHONE HT.= 5.0 FT, RI ANT. HT.= 5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE= .0 FT
RI FREQ= 1.000 MHZ, TV FREQ= 75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY = 2.0 MMHOS/M
E-FIELD TRANSDUCER HT.= 3.3FT, B-FIELD TRANSDUCER HT.= 3.3FT

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	32.0	7.0	32.2	15.2	.2	.000000	.051	.00272
-195.0	32.1	7.1	32.5	15.5	.4	.000000	.054	.00286
-190.0	32.3	7.3	32.7	15.7	.6	.000000	.057	.00301
-185.0	32.4	7.4	33.0	16.0	.8	.000000	.060	.00317
-180.0	32.5	7.5	33.3	16.3	1.1	.000000	.064	.00334
-175.0	32.6	7.6	33.6	16.6	1.3	.000000	.069	.00353
-170.0	32.8	7.8	33.9	16.9	1.5	.000000	.073	.00373
-165.0	32.9	7.9	34.3	17.3	1.8	.000000	.079	.00395
-160.0	33.1	8.1	34.6	17.6	2.0	.000000	.085	.00420
-155.0	33.2	8.2	34.9	17.9	2.2	.000000	.091	.00446
-150.0	33.4	8.4	35.3	18.3	2.5	.000000	.098	.00475
-145.0	33.5	8.5	35.7	18.7	2.8	.000000	.107	.00507
-140.0	33.7	8.7	36.1	19.1	3.1	.000000	.116	.00542
-135.0	33.8	8.8	36.5	19.5	3.3	.000000	.126	.00580
-130.0	34.0	9.0	36.9	19.9	3.6	.000000	.138	.00623
-125.0	34.2	9.2	37.3	20.3	3.9	.000000	.151	.00670
-120.0	34.4	9.4	37.8	20.8	4.3	.000000	.167	.00723
-115.0	34.5	9.5	38.2	21.2	4.6	.000000	.184	.00783
-110.0	34.7	9.7	38.7	21.7	4.9	.000000	.204	.00850
-105.0	34.9	9.9	39.4	22.4	5.3	.000000	.227	.00925
-100.0	35.2	10.2	40.1	23.1	5.6	.000000	.254	.01010
-95.0	35.4	10.4	40.9	23.9	6.0	.000000	.285	.01107
-90.0	35.6	10.6	41.7	24.7	6.4	.000000	.322	.01217
-85.0	35.8	10.8	42.5	25.5	6.8	.000000	.365	.01344
-80.0	36.1	11.1	43.4	26.4	7.3	.000000	.415	.01491
-75.0	36.3	11.3	44.4	27.4	7.8	.000000	.474	.01660
-70.0	36.6	11.6	45.3	28.3	8.2	.000000	.543	.01857
-65.0	36.9	11.9	46.4	29.4	8.8	.000000	.625	.02087
-60.0	37.2	12.2	47.5	30.5	9.3	.000000	.720	.02357
-55.0	37.5	12.5	48.6	31.6	9.9	.000000	.830	.02673
-50.0	37.8	12.8	49.8	32.8	10.5	.000000	.954	.03045
-45.0	38.1	13.1	50.9	33.9	11.1	.000000	1.091	.03481
-40.0	38.5	13.5	52.1	35.1	11.9	.000000	1.235	.03987
-35.0	38.8	13.8	53.3	36.3	12.6	.000000	1.372	.04570
-30.0	39.2	14.2	54.3	37.3	13.4	.000000	1.486	.05228
-25.0	39.5	14.5	55.2	38.2	14.3	.000000	1.552	.05948
-20.0	39.9	14.9	55.9	38.9	15.2	.000000	1.545	.06705
-15.0	40.2	15.2	56.2	39.2	16.2	.000000	1.465	.07461
-10.0	40.5	15.5	57.3	40.3	17.3	.000000	1.369	.08161
-5.0	40.8	15.8	58.9	41.9	18.4	.000000	1.417	.08745
.0	41.0	16.0	60.4	43.4	19.4	.000149	1.721	.09140
5.0	41.1	16.1	61.5	44.5	20.2	.002655	2.140	.09269

10.0	41.2	16.2	62.1	45.1	20.7	.008536	2.471	.09070
15.0	41.1	16.1	62.1	45.1	20.6	.014990	2.585	.08537
20.0	40.9	15.9	61.3	44.3	20.1	.020352	2.463	.07748
25.0	40.6	15.6	60.1	43.1	19.2	.032450	2.176	.06832
30.0	40.3	15.3	58.6	41.6	18.2	.053989	1.827	.05910
35.0	39.9	14.9	56.9	39.9	17.1	.073166	1.491	.05062
40.0	39.5	14.5	55.3	38.3	16.0	.087108	1.207	.04320
45.0	39.1	14.1	53.6	36.6	15.0	.096369	.982	.03692
50.0	38.7	13.7	52.0	35.0	14.1	.101954	.810	.03166
55.0	38.3	13.3	50.5	33.5	13.2	.104825	.679	.02730
60.0	38.0	13.0	49.1	32.1	12.4	.105777	.579	.02369
65.0	37.7	12.7	48.1	31.1	11.7	.105412	.501	.02069
70.0	37.3	12.3	47.3	30.3	11.0	.104171	.438	.01819
75.0	37.0	12.0	46.4	29.4	10.4	.102363	.387	.01610
80.0	36.7	11.7	45.6	28.6	9.8	.100204	.344	.01434
85.0	36.5	11.5	44.8	27.8	9.2	.097843	.308	.01284
90.0	36.2	11.2	44.1	27.1	8.6	.095381	.277	.01157
95.0	36.0	11.0	43.4	26.4	8.1	.092887	.250	.01049
100.0	35.7	10.7	42.7	25.7	7.7	.090407	.227	.00955
105.0	35.5	10.5	42.0	25.0	7.2	.087971	.206	.00873
110.0	35.3	10.3	41.4	24.4	6.8	.085600	.188	.00801
115.0	35.0	10.0	40.8	23.8	6.3	.083305	.172	.00739
120.0	34.8	9.8	40.2	23.2	5.9	.081093	.158	.00683
125.0	34.6	9.6	39.7	22.7	5.6	.078967	.145	.00633
130.0	34.4	9.4	39.1	22.1	5.2	.076928	.134	.00589
135.0	34.3	9.3	38.6	21.6	4.9	.074974	.124	.00549
140.0	34.1	9.1	38.1	21.1	4.5	.073104	.115	.00513
145.0	33.9	8.9	37.7	20.7	4.2	.071315	.107	.00481
150.0	33.7	8.7	37.2	20.2	3.9	.069604	.099	.00451
155.0	33.6	8.6	36.8	19.8	3.6	.067967	.093	.00424
160.0	33.4	8.4	36.4	19.4	3.3	.066400	.087	.00399
165.0	33.3	8.3	36.0	19.0	3.0	.064901	.081	.00377
170.0	33.1	8.1	35.6	18.6	2.7	.063466	.076	.00356
175.0	33.0	8.0	35.2	18.2	2.5	.062091	.072	.00337
180.0	32.8	7.8	34.9	17.9	2.2	.060773	.067	.00320
185.0	32.7	7.7	34.5	17.5	1.9	.059509	.064	.00303
190.0	32.6	7.6	34.2	17.2	1.7	.058297	.060	.00288
195.0	32.4	7.4	33.9	16.9	1.5	.057132	.057	.00274
200.0	32.3	7.3	33.6	16.6	1.2	.056014	.054	.00261

From: "Gronner, Jesse" <Jesse.Gronner@PPMEnergy.com>
To: "John White" <John.White@state.or.us>
Date: 1/18/2006 10:05:26 AM
Subject: RE: Noise data

John,

I thought I had sent the 34.5 Kv analysis awhile ago, sorry about that. Please see attached, which includes description of structures as well as EMF analysis.
Please use 5.5 miles as the upper limit for 34.5 kV overhead (which is roughly 15% of total).
I do not believe this will change the retirement cost estimate in a significant way, there is already much contingency built into the cost estimate, and this could easily be covered in addition to the amount associated with the overhead 230 kV line.

I just spoke with the sanitarian at Wasco-Sherman Public Health Dept. He has completed the test pit evaluation and is just waiting for our check (which is in process) to send on the evaluation. I have attached a copy of our application. I ask that this please not hold up our completeness, it is done just waiting for payment to be processed.

After today, I will be unavailable through next week. If questions are in need of answering after today please work with Dana, and if someone at PPM is needed to answer anything, please get in touch with Ty Daul. I'll be back in the office on 1/30.

Thanks,
Jesse

-----Original Message-----
From: John White [mailto:John.White@state.or.us]
Sent: Wednesday, January 18, 2006 9:21 AM
To: Gronner, Jesse
Cc: dns@deainc.com
Subject: RE: Noise data

Thanks. I will be unavailable tomorrow after 10:00 and all day Friday due to a Council meeting in Pendleton.

We will have a number of unresolved issues to discuss after the finding of completeness. I am taking a gamble that we will be able to settle these within 30 days or so after completeness.

Aside from the noise information, my notes show the following items remain as part of completeness:

Test pit evaluation and application for county septic permit.

Description of aboveground 34.5 kV transmission line. Confirmation of maximum length permitted (is it 4.5 miles or is it 15% of 38 miles?). Description of aboveground support structures. EMF analysis. Retirement cost estimate. Dana's memo of December 6 said that Triaxis was working on this and that the information would be available "by 12/16/05."

-John

John G. White
Oregon Department of Energy
625 Marion St., NE
Salem, Oregon 97301-3742
john.white@state.or.us

>>> "Gronner, Jesse" <Jesse.Gronner@PPMEnergy.com> 01/18/06 08:59AM
>>>
John,

Dana and Martha spoke and I'm told you will be receiving what you asked
for below in the next day or so.

Dana - if possible, please have sent electronically so that John can quickly/easily forward on to Kerrie.

Regards,
Jesse

-----Original Message-----
From: John White [mailto:John.White@state.or.us]
Sent: Tuesday, January 17, 2006 11:57 AM
To: Gronner, Jesse
Cc: dns@deainc.com
Subject: Noise data

Jesse,
Thank you for sending the electronic file of Martha Moore's memo of January 10. I have forwarded this information to Kerrie Standlee.

The data printouts in Attachment 3 to the memo show data for R3, R4, R5, R6 and R7 with "high towers eliminated." We need to see the data for
these receivers with all towers included (as you have done for R1 and R2). Please provide this in PDF format.

Once this information has been provided, I believe that we will have a complete Exhibit X.

-John

John G. White
Oregon Department of Energy
625 Marion St., NE
Salem, Oregon 97301-3742
john.white@state.or.us

CC: <dns@deainc.com>, "Daul, Ty" <Ty.Daul@PPMEnergy.com>

EMF Calculations for the 35-KV Overhead Transmission Line

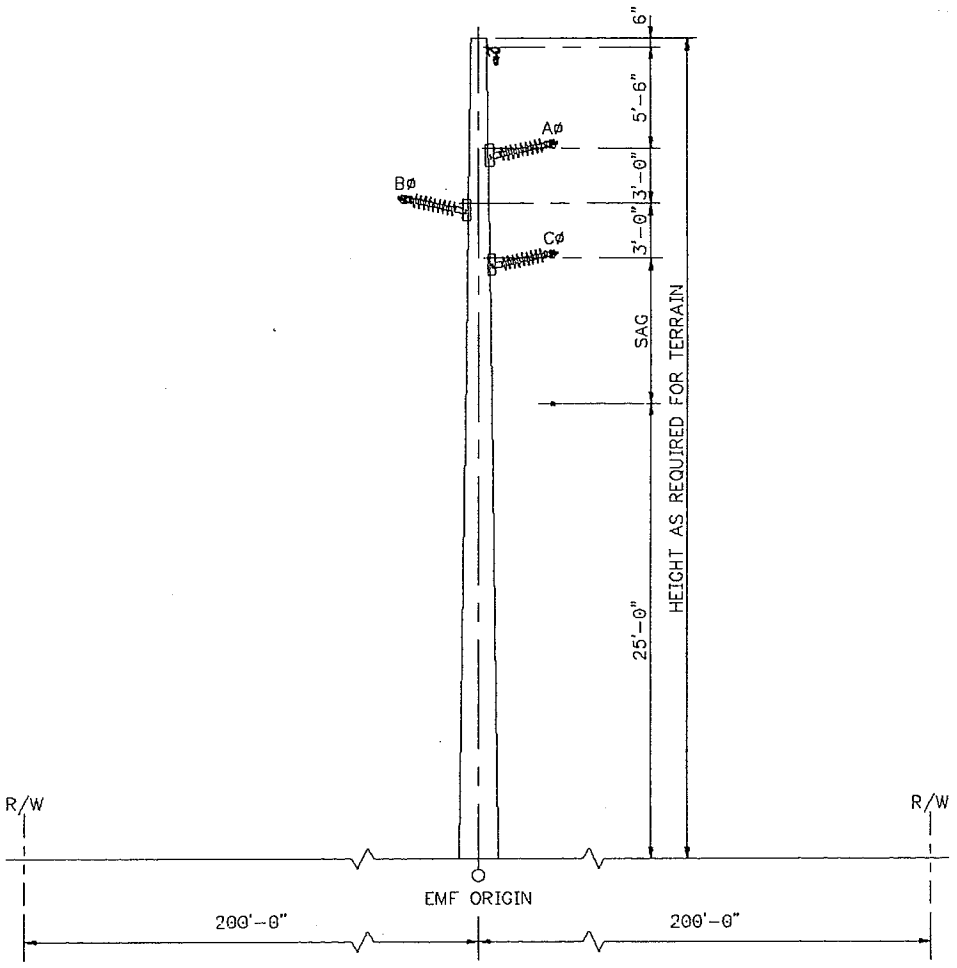
Figure 1 illustrates the typical proposed structural configuration of the 34.5-kV distribution collection line with a shield wire. The ground-level magnetic field intensity across the corridor is determined by the currents and geometry of these typical facilities.

Figure 2 illustrates the typical proposed structural configuration of the 34.5-kV Double-Circuit distribution line with a shield wire.

Line Loads for EMF Calculation.

It is important that any discussion of EMF include the assumptions used to calculate these fields. It is also important to remember that EMF in the vicinity of the power lines varies with regard to line design, line loading, distance from the line, and other factors. The electric field depends upon line voltage, which remains nearly constant for a transmission line in normal operation. The magnetic field is proportional to line loading (amperage), which varies as power plant generation is changed by the wind. Maximum magnetic fields are produced at the maximum (peak) conductor currents.

The entire overhead line in this study is rated for a nominal voltage of 34.5-kV. Line loading value assumed for the line is 30 MVA, or 502 amperes per phase at peak system load. This value is used in the EMF study. The conductor is assumed to be a single conductor per phase of 954 kcmil ACSR "Rail"; Diameter: 1.196 inches.



250' RULING SPAN, 300' MAX. SPAN

FIGURE 1 – TYPICAL 34.5-KV SINGLE-CIRCUIT CONFIGURATION

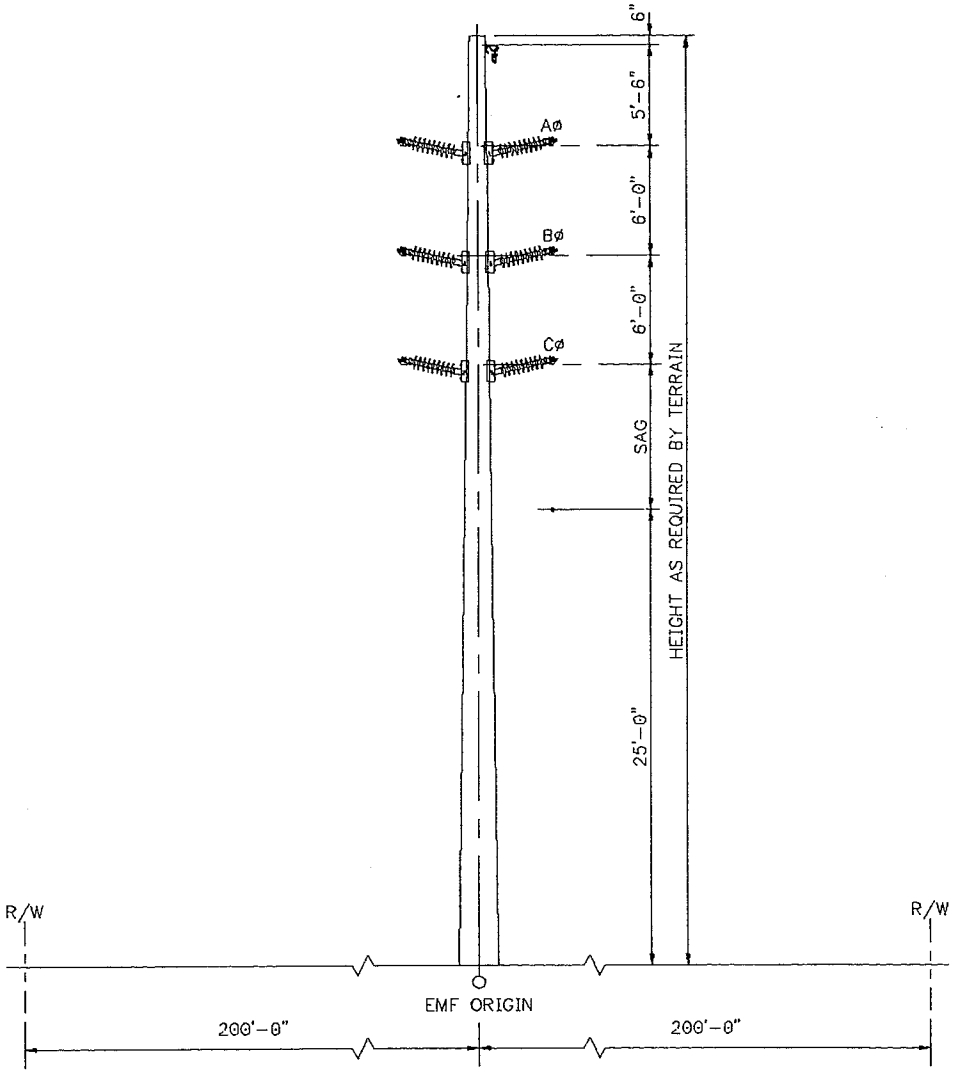


FIGURE 2 – TYPICAL 34.5-KV DOUBLE-CIRCUIT CONFIGURATION

Calculation Methods

To estimate the maximum fields, calculations are performed at mid-span where the conductor is positioned at its lowest point between structures (the estimated maximum sag point). The magnetic fields are computed at 1 meter above ground using a program called "Corona and Field Effect Program (Version 3)" developed by the Bonneville Power Administration. This program, and others like it, have been used to predict electric and magnetic field levels for many years, and have been confirmed by field measurements by numerous utilities.

The presumed distance between the centerline of 34.5-kV circuit and the edge of the "right-of-way" for this study is assumed to be 200 feet. However, in this project, there is no right-of-way limit because the entire wind farm constitutes the 34.5-kV right-of-way.

Results of EMF Calculations

Table 1 gives the calculated values of the magnetic and the electric field values at left and right edges of the right-of-way, and at the centerline, for the projected maximum currents during peak load, for minimum conductor ground clearances. The actual magnetic field values vary, as load varies daily, seasonally, and as conductor sag changes with ambient temperature. The levels shown represent the highest magnetic fields expected for the proposed project. Average fields along the ground between poles, and over a year's time would be considerably less than the peak values shown.

Table 1 Calculated Maximum Magnetic and Electric Field Values

Case Figure	Voltage	Magnetic Field (mGauss)			Electric Field (KV/M)		
		Left R/W (200')	Max. on R/W	Right R/W (200')	Left R/W (200')	Max. on R/W	Right R/W (200')
1	34.5-kV Single Circuit	0.7	49.6	0.7	0.003	0.26	0.003
2	34.5-kV Double-Circuit	1.7	86.2	1.7	0.007	0.705	0.007

As shown in Table 1, magnetic field and electric field values are higher on the right-of-way than at the edges of the right-of-way.

These results are plotted on graphs and included here.
For Case Figure 1, see Figure 1M for the magnetic field profile, and Figure 1E for the electric field graph.

For Case Figure 2, see Figure 2M for the magnetic field profile, and Figure 2E for the electric field graph.

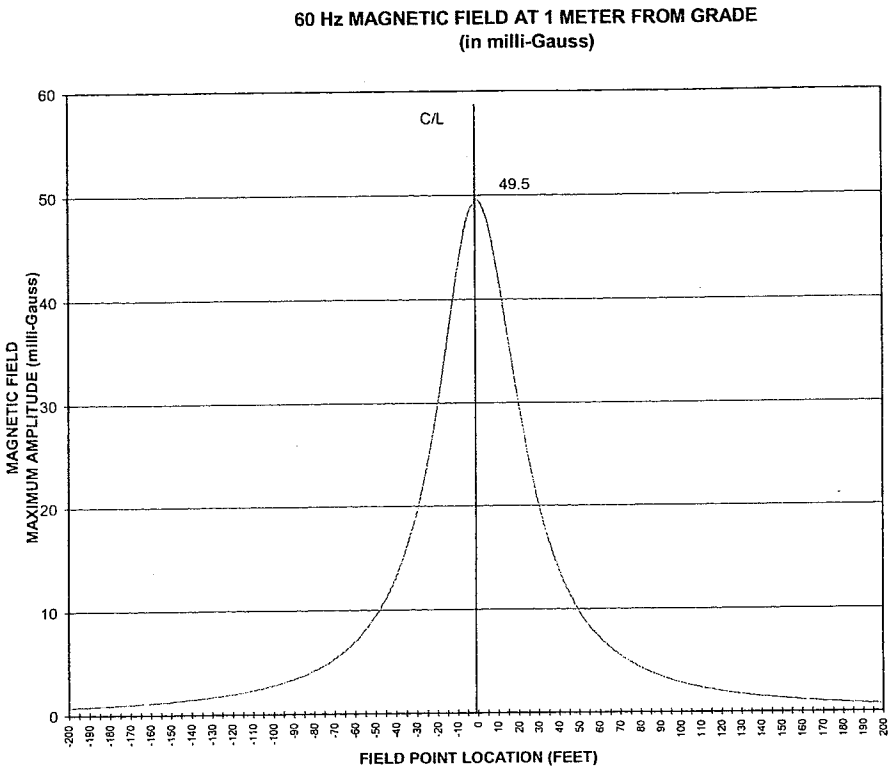


Figure 1M Magnetic Field Profile

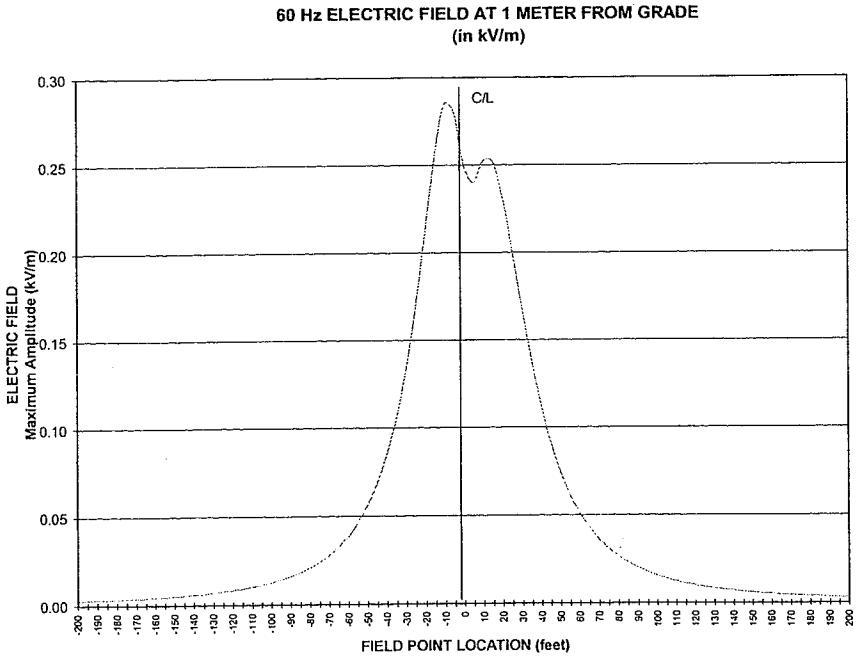


Figure 1E Electric Field Profile

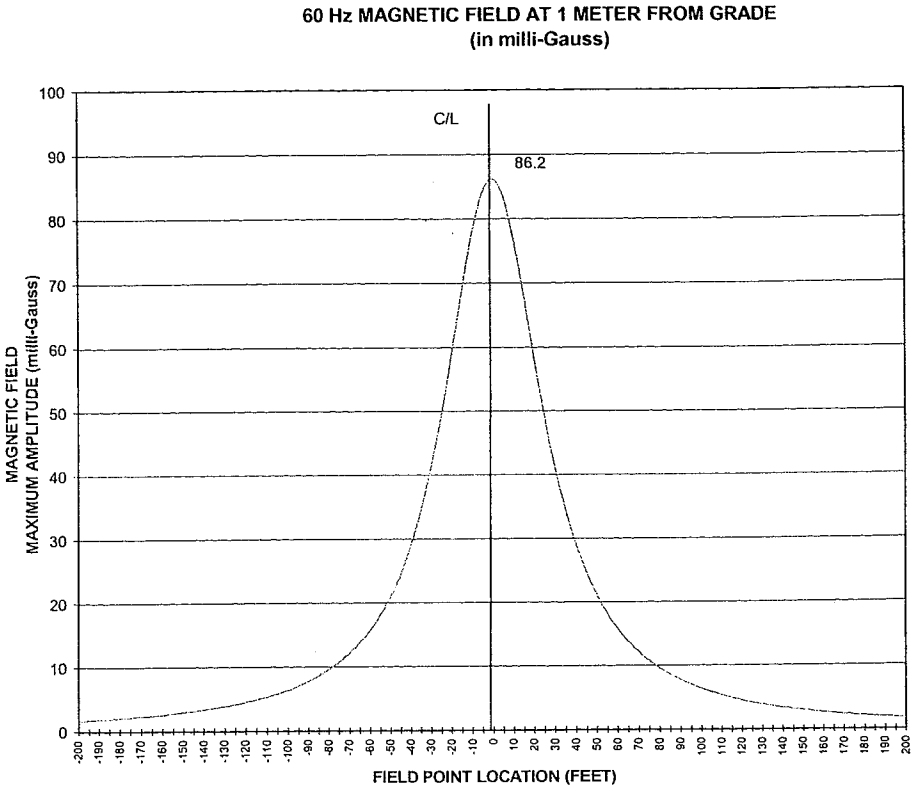


Figure 2M Magnetic Field Profile

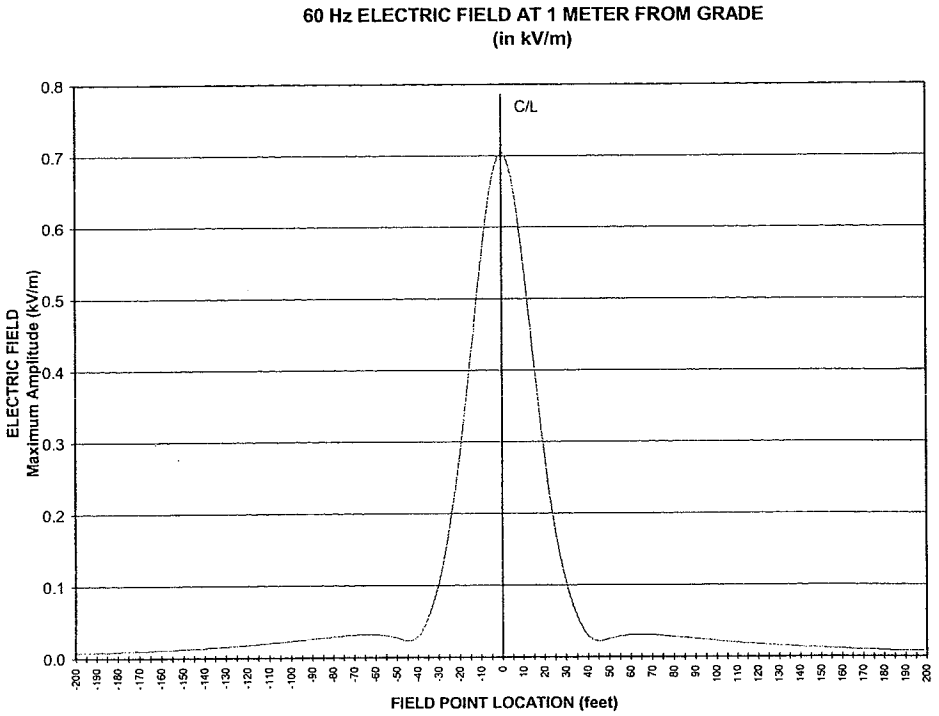


Figure 2E Electric Field Profile

AC Electric and Magnetic Field Analysis

APPENDIX EXHIBIT 34.5-kV OVERHEAD EMF DATA

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ÛßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßÛ
Û      C O R O N A    A N D    F I E L D      Û
Û E F F E C T S    P R O G R A M    V E R .  3  Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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INPUT DATA LIST

```
                12/20/2005            15:02:38
****************** KLONDIKE III*************
FIGURE 1 35-KV SINGLE CIRCUIT SHIELDED 954 ACSR RAIL 30MW-502A PER PHASE
1,0, 3, 4,0.0,   2.00,   1.00,    .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  4 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,    .000,  1.000, 75.000,  3.280,  2.000,  3.280
'CIR1-A  ','A',    -4.50,   31.00, 1,   1.165,    .000,  23.000,     .000,    .502,    .000
'CIR1-B  ','A',     4.50,   28.00, 1,   1.165,    .000,  23.000,-120.000,    .502,    .000
'CIR1-C  ','A',    -4.50,   25.00, 1,   1.165,    .000,  23.000, 120.000,    .502,    .000
'SH-1    ','A',      .75,   37.00, 1,    .385,    .000,    .000,     .000,    .000,    .000
 41 -200.0    5.0
 40    5.0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
****************** KLONDIKE III*************
FIGURE 1 35-KV SINGLE CIRCUIT SHIELDED 954 ACSR RAIL 30MW-502A PER PHASE
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
CIR1-A	-4.50	31.00	3.14	1.16	1	.00	23.00	.00	.50	.000
CIR1-B	4.50	28.00	2.92	1.16	1	.00	23.00	-120.00	.50	.000
CIR1-C	-4.50	25.00	3.13	1.16	1	.00	23.00	120.00	.50	.000
SH-1	.75	37.00	.62	.38	1	.00	.00	.00	.00	.000

```
AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=       .0 FT
RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT
```

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	-46.4	-71.4	-46.5	-63.5	-76.2	.000000	.003	.00073
-195.0	-46.3	-71.3	-46.2	-63.2	-75.9	.000000	.003	.00076
-190.0	-46.1	-71.1	-45.8	-62.8	-75.7	.000000	.003	.00080
-185.0	-46.0	-71.0	-45.5	-62.5	-75.5	.000000	.003	.00085
-180.0	-45.9	-70.9	-45.2	-62.2	-75.2	.000000	.003	.00089
-175.0	-45.7	-70.7	-44.8	-61.8	-75.0	.000000	.004	.00094
-170.0	-45.6	-70.6	-44.4	-61.4	-74.7	.000000	.004	.00100
-165.0	-45.4	-70.4	-44.1	-61.1	-74.5	.000000	.004	.00106
-160.0	-45.3	-70.3	-43.7	-60.7	-74.2	.000000	.004	.00112
-155.0	-45.1	-70.1	-43.2	-60.2	-73.9	.000000	.005	.00120
-150.0	-45.0	-70.0	-42.8	-59.8	-73.6	.000000	.005	.00127
-145.0	-44.8	-69.8	-42.4	-59.4	-73.3	.000000	.005	.00136
-140.0	-44.6	-69.6	-41.9	-58.9	-73.0	.000000	.006	.00146
-135.0	-44.4	-69.4	-41.4	-58.4	-72.7	.000000	.006	.00156
-130.0	-44.3	-69.3	-40.9	-57.9	-72.4	.000000	.007	.00168
-125.0	-44.1	-69.1	-40.3	-57.3	-72.0	.000000	.008	.00181
-120.0	-43.9	-68.9	-39.8	-56.8	-71.7	.000000	.008	.00196
-115.0	-43.7	-68.7	-39.2	-56.2	-71.3	.000000	.009	.00213
-110.0	-43.4	-68.4	-38.5	-55.5	-70.9	.000000	.010	.00231
-105.0	-43.2	-68.2	-37.8	-54.8	-70.5	.000000	.011	.00253
-100.0	-43.0	-68.0	-37.1	-54.1	-70.1	.000000	.013	.00277
-95.0	-42.7	-67.7	-36.4	-53.4	-69.6	.000000	.014	.00305
-90.0	-42.5	-67.5	-35.6	-52.6	-69.2	.000000	.016	.00337
-85.0	-42.2	-67.2	-34.8	-51.8	-68.7	.000000	.018	.00375
-80.0	-41.9	-66.9	-33.9	-50.9	-68.1	.000000	.021	.00418
-75.0	-41.6	-66.6	-32.9	-49.9	-67.6	.000000	.024	.00470
-70.0	-41.3	-66.3	-31.9	-48.9	-67.0	.000000	.028	.00532
-65.0	-40.9	-65.9	-30.8	-47.8	-66.3	.000000	.033	.00606
-60.0	-40.6	-65.6	-29.6	-46.6	-65.6	.000000	.039	.00696
-55.0	-40.2	-65.2	-28.4	-45.4	-64.8	.000000	.047	.00805
-50.0	-39.8	-64.8	-27.1	-44.1	-64.0	.000000	.057	.00941
-45.0	-39.3	-64.3	-25.7	-42.7	-63.1	.000000	.069	.01111
-40.0	-38.9	-63.9	-24.2	-41.2	-62.1	.000000	.086	.01326
-35.0	-38.4	-63.4	-22.6	-39.6	-61.0	.000000	.107	.01601
-30.0	-37.8	-62.8	-21.0	-38.0	-59.8	.000000	.135	.01952
-25.0	-37.3	-62.3	-18.9	-35.9	-58.5	.000000	.171	.02400
-20.0	-36.8	-61.8	-16.8	-33.8	-57.1	.000000	.215	.02957
-15.0	-36.3	-61.3	-14.8	-31.8	-55.7	.000000	.258	.03606
-10.0	-35.9	-60.9	-13.4	-30.4	-54.5	.000000	.285	.04264
-5.0	-35.7	-60.7	-12.8	-29.8	-53.9	.000000	.279	.04772
.0	-35.7	-60.7	-13.2	-30.2	-54.3	.000000	.250	.04955
5.0	-36.0	-61.0	-14.5	-31.5	-55.4	.000001	.240	.04752

10.0	-36.4	-61.4	-16.4	-33.4	-56.8	.000004	.252	.04255
15.0	-36.9	-61.9	-18.5	-35.5	-58.2	.000008	.252	.03626
20.0	-37.4	-62.4	-20.6	-37.6	-59.6	.000011	.232	.03003
25.0	-37.9	-62.9	-22.3	-39.3	-60.8	.000013	.200	.02457
30.0	-38.5	-63.5	-23.9	-40.9	-61.9	.000014	.167	.02009
35.0	-38.9	-63.9	-25.4	-42.4	-62.9	.000014	.137	.01651
40.0	-39.4	-64.4	-26.8	-43.8	-63.8	.000014	.111	.01369
45.0	-39.8	-64.8	-28.2	-45.2	-64.7	.000014	.090	.01147
50.0	-40.3	-65.3	-29.4	-46.4	-65.5	.000013	.074	.00971
55.0	-40.6	-65.6	-30.6	-47.6	-66.2	.000013	.061	.00829
60.0	-41.0	-66.0	-31.7	-48.7	-66.8	.000012	.051	.00715
65.0	-41.3	-66.3	-32.7	-49.7	-67.5	.000012	.042	.00622
70.0	-41.7	-66.7	-33.7	-50.7	-68.0	.000011	.036	.00546
75.0	-42.0	-67.0	-34.6	-51.6	-68.6	.000011	.031	.00482
80.0	-42.2	-67.2	-35.4	-52.4	-69.1	.000010	.026	.00428
85.0	-42.5	-67.5	-36.2	-53.2	-69.5	.000010	.023	.00383
90.0	-42.8	-67.8	-37.0	-54.0	-70.0	.000010	.020	.00344
95.0	-43.0	-68.0	-37.7	-54.7	-70.4	.000009	.018	.00311
100.0	-43.2	-68.2	-38.4	-55.4	-70.8	.000009	.016	.00282
105.0	-43.5	-68.5	-39.0	-56.0	-71.2	.000009	.014	.00257
110.0	-43.7	-68.7	-39.6	-56.6	-71.6	.000008	.012	.00235
115.0	-43.9	-68.9	-40.2	-57.2	-72.0	.000008	.011	.00216
120.0	-44.1	-69.1	-40.8	-57.8	-72.3	.000008	.010	.00199
125.0	-44.3	-69.3	-41.3	-58.3	-72.6	.000008	.009	.00184
130.0	-44.5	-69.5	-41.8	-58.8	-73.0	.000007	.008	.00171
135.0	-44.6	-69.6	-42.3	-59.3	-73.3	.000007	.008	.00159
140.0	-44.8	-69.8	-42.7	-59.7	-73.6	.000007	.007	.00148
145.0	-45.0	-70.0	-43.2	-60.2	-73.9	.000007	.006	.00138
150.0	-45.1	-70.1	-43.6	-60.6	-74.1	.000007	.006	.00129
155.0	-45.3	-70.3	-44.0	-61.0	-74.4	.000006	.005	.00121
160.0	-45.5	-70.5	-44.4	-61.4	-74.7	.000006	.005	.00114
165.0	-45.6	-70.6	-44.7	-61.7	-74.9	.000006	.005	.00107
170.0	-45.7	-70.7	-45.1	-62.1	-75.2	.000006	.004	.00101
175.0	-45.9	-70.9	-45.4	-62.4	-75.4	.000006	.004	.00095
180.0	-46.0	-71.0	-45.8	-62.8	-75.7	.000006	.004	.00090
185.0	-46.1	-71.1	-46.1	-63.1	-75.9	.000006	.004	.00086
190.0	-46.3	-71.3	-46.4	-63.4	-76.1	.000005	.003	.00081
195.0	-46.4	-71.4	-46.7	-63.7	-76.3	.000005	.003	.00077
200.0	-46.5	-71.5	-47.0	-64.0	-76.5	.000005	.003	.00073

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ÛßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßÛ
Û     C O R O N A   A N D   F I E L D            Û
Û E F F E C T S   P R O G R A M   V E R.  3      Û
Û   Source: Bonneville Power Administration      Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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INPUT DATA LIST

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                  12/20/2005          15:10:43
****************** KLONDIKE III *************
FIGURE 2 35-KV DOUBLE-CIRCUIT SHIELDED 954 ACSR RAIL 30MW-502A PER PHASE
1,0, 6, 7,0.0,    2.00,    1.00,     .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  7 CONDUCTORS, OF WHICH  6 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,    .000,  1.000, 75.000,  3.280,  2.000,  3.280
'CIR1-A  ','A',   -4.50,  37.00, 1,   1.196,    .000,  23.000,     .000,    .502,    .000
'CIR1-B  ','A',   -4.50,  31.00, 1,   1.196,    .000,  23.000,-120.000,    .502,    .000
'CIR1-C  ','A',   -4.50,  25.00, 1,   1.196,    .000,  23.000, 120.000,    .502,    .000
'CIR2-A  ','A',    4.50,  37.00, 1,   1.196,    .000,  23.000,     .000,    .502,    .000
'CIR2-B  ','A',    4.50,  31.00, 1,   1.196,    .000,  23.000,-120.000,    .502,    .000
'CIR2-C  ','A',    4.50,  25.00, 1,   1.196,    .000,  23.000, 120.000,    .502,    .000
'SH-1    ','A',     .75,  43.00, 1,    .385,    .000,     .000,    .000,    .000,    .000
 41 -200.0    5.0
 40    5.0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
****************** KLONDIKE III *************
FIGURE 2 35-KV DOUBLE-CIRCUIT SHIELDED 954 ACSR RAIL 30MW-502A PER PHASE
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
CIR1-A	-4.50	37.00	2.85	1.20	1	.00	23.00	.00	.50	.000
CIR1-B	-4.50	31.00	3.19	1.20	1	.00	23.00	-120.00	.50	.000
CIR1-C	-4.50	25.00	2.82	1.20	1	.00	23.00	120.00	.50	.000
CIR2-A	4.50	37.00	2.86	1.20	1	.00	23.00	.00	.50	.000
CIR2-B	4.50	31.00	3.19	1.20	1	.00	23.00	-120.00	.50	.000
CIR2-C	4.50	25.00	2.82	1.20	1	.00	23.00	120.00	.50	.000
SH-1	.75	43.00	1.86	.38	1	.00	.00	.00	.00	.000

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AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=      .0 FT
RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT
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LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	-44.0	-69.0	-45.1	-62.1	-74.8	.000000	.007	.00168
-195.0	-43.9	-68.9	-44.8	-61.8	-74.6	.000000	.008	.00177
-190.0	-43.7	-68.7	-44.5	-61.5	-74.3	.000000	.008	.00186
-185.0	-43.6	-68.6	-44.2	-61.2	-74.1	.000000	.009	.00196
-180.0	-43.5	-68.5	-43.8	-60.8	-73.9	.000000	.009	.00207
-175.0	-43.3	-68.3	-43.5	-60.5	-73.6	.000000	.010	.00218
-170.0	-43.2	-68.2	-43.1	-60.1	-73.4	.000000	.010	.00231
-165.0	-43.1	-68.1	-42.7	-59.7	-73.1	.000000	.011	.00245
-160.0	-42.9	-67.9	-42.3	-59.3	-72.8	.000000	.011	.00260
-155.0	-42.8	-67.8	-41.9	-58.9	-72.5	.000000	.012	.00276
-150.0	-42.6	-67.6	-41.4	-58.4	-72.3	.000000	.012	.00295
-145.0	-42.4	-67.4	-41.0	-58.0	-72.0	.000000	.013	.00314
-140.0	-42.3	-67.3	-40.5	-57.5	-71.7	.000000	.014	.00337
-135.0	-42.1	-67.1	-40.0	-57.0	-71.3	.000000	.015	.00361
-130.0	-41.9	-66.9	-39.5	-56.5	-71.0	.000000	.016	.00388
-125.0	-41.7	-66.7	-39.0	-56.0	-70.7	.000000	.017	.00418
-120.0	-41.5	-66.5	-38.4	-55.4	-70.3	.000000	.018	.00452
-115.0	-41.3	-66.3	-37.8	-54.8	-69.9	.000000	.019	.00490
-110.0	-41.1	-66.1	-37.2	-54.2	-69.5	.000000	.020	.00533
-105.0	-40.9	-65.9	-36.5	-53.5	-69.1	.000000	.022	.00582
-100.0	-40.7	-65.7	-35.8	-52.8	-68.7	.000000	.023	.00637
-95.0	-40.4	-65.4	-35.0	-52.0	-68.3	.000000	.024	.00701
-90.0	-40.2	-65.2	-34.2	-51.2	-67.8	.000000	.026	.00774
-85.0	-39.9	-64.9	-33.4	-50.4	-67.3	.000000	.028	.00859
-80.0	-39.7	-64.7	-32.5	-49.5	-66.8	.000000	.029	.00958
-75.0	-39.4	-64.4	-31.5	-48.5	-66.2	.000000	.030	.01074
-70.0	-39.1	-64.1	-30.5	-47.5	-65.7	.000000	.032	.01212
-65.0	-38.7	-63.7	-29.4	-46.4	-65.0	.000000	.032	.01376
-60.0	-38.4	-63.4	-28.3	-45.3	-64.4	.000000	.032	.01573
-55.0	-38.0	-63.0	-27.0	-44.0	-63.7	.000000	.030	.01813
-50.0	-37.7	-62.7	-25.7	-42.7	-62.9	.000000	.027	.02104
-45.0	-37.3	-62.3	-24.3	-41.3	-62.1	.000000	.023	.02463
-40.0	-36.8	-61.8	-22.8	-39.8	-61.2	.000000	.029	.02906
-35.0	-36.4	-61.4	-21.2	-38.2	-60.3	.000000	.056	.03452
-30.0	-35.9	-60.9	-19.6	-36.6	-59.3	.000000	.103	.04122
-25.0	-35.4	-60.4	-18.0	-35.0	-58.3	.000000	.177	.04928
-20.0	-35.0	-60.0	-16.5	-33.5	-57.2	.000000	.281	.05856

-15.0	-34.5	-59.5	-15.2	-32.2	-56.3	.000000	.412	.06843
-10.0	-34.2	-59.2	-14.3	-31.3	-55.6	.000000	.552	.07749
-5.0	-33.9	-58.9	-13.9	-30.9	-55.4	.000000	.662	.08390
.0	-33.9	-58.9	-14.1	-31.1	-55.6	.000000	.705	.08619
5.0	-33.9	-58.9	-13.9	-30.9	-55.4	.000000	.663	.08390
10.0	-34.2	-59.2	-14.3	-31.3	-55.7	.000003	.553	.07749
15.0	-34.5	-59.5	-15.2	-32.2	-56.3	.000007	.414	.06843
20.0	-35.0	-60.0	-16.5	-33.5	-57.3	.000013	.282	.05856
25.0	-35.4	-60.4	-18.0	-35.0	-58.3	.000018	.178	.04928
30.0	-35.9	-60.9	-19.6	-36.6	-59.3	.000021	.105	.04122
35.0	-36.4	-61.4	-21.3	-38.3	-60.3	.000022	.057	.03452
40.0	-36.8	-61.8	-22.8	-39.8	-61.2	.000023	.029	.02906
45.0	-37.3	-62.3	-24.3	-41.3	-62.1	.000023	.022	.02463
50.0	-37.7	-62.7	-25.7	-42.7	-62.9	.000022	.026	.02104
55.0	-38.0	-63.0	-27.1	-44.1	-63.7	.000022	.029	.01813
60.0	-38.4	-63.4	-28.3	-45.3	-64.4	.000021	.031	.01573
65.0	-38.7	-63.7	-29.5	-46.5	-65.1	.000020	.031	.01376
70.0	-39.1	-64.1	-30.5	-47.5	-65.7	.000020	.031	.01212
75.0	-39.4	-64.4	-31.6	-48.6	-66.3	.000019	.030	.01074
80.0	-39.7	-64.7	-32.5	-49.5	-66.8	.000018	.028	.00958
85.0	-39.9	-64.9	-33.4	-50.4	-67.3	.000018	.027	.00859
90.0	-40.2	-65.2	-34.3	-51.3	-67.8	.000017	.025	.00774
95.0	-40.4	-65.4	-35.0	-52.0	-68.3	.000016	.024	.00701
100.0	-40.7	-65.7	-35.8	-52.8	-68.7	.000016	.022	.00637
105.0	-40.9	-65.9	-36.5	-53.5	-69.2	.000015	.021	.00582
110.0	-41.1	-66.1	-37.2	-54.2	-69.6	.000015	.020	.00533
115.0	-41.3	-66.3	-37.8	-54.8	-70.0	.000014	.019	.00490
120.0	-41.5	-66.5	-38.4	-55.4	-70.3	.000014	.017	.00452
125.0	-41.7	-66.7	-39.0	-56.0	-70.7	.000013	.016	.00418
130.0	-41.9	-66.9	-39.5	-56.5	-71.0	.000013	.015	.00388
135.0	-42.1	-67.1	-40.0	-57.0	-71.4	.000013	.015	.00361
140.0	-42.3	-67.3	-40.5	-57.5	-71.7	.000012	.014	.00337
145.0	-42.4	-67.4	-41.0	-58.0	-72.0	.000012	.013	.00314
150.0	-42.6	-67.6	-41.5	-58.5	-72.3	.000012	.012	.00295
155.0	-42.8	-67.8	-41.9	-58.9	-72.6	.000011	.012	.00276
160.0	-42.9	-67.9	-42.3	-59.3	-72.8	.000011	.011	.00260
165.0	-43.1	-68.1	-42.7	-59.7	-73.1	.000011	.010	.00245
170.0	-43.2	-68.2	-43.1	-60.1	-73.4	.000011	.010	.00231
175.0	-43.3	-68.3	-43.5	-60.5	-73.6	.000010	.009	.00218
180.0	-43.5	-68.5	-43.8	-60.8	-73.9	.000010	.009	.00207
185.0	-43.6	-68.6	-44.2	-61.2	-74.1	.000010	.009	.00196
190.0	-43.7	-68.7	-44.5	-61.5	-74.4	.000010	.008	.00186
195.0	-43.9	-68.9	-44.8	-61.8	-74.6	.000010	.008	.00177
200.0	-44.0	-69.0	-45.1	-62.1	-74.8	.000009	.007	.00168

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From: "Gronner, Jesse" <Jesse.Gronner@PPMEnergy.com>
To: "John White" <John.White@state.or.us>
Date: 1/18/2006 11:44:04 AM
Subject: RE: Noise data

John,

The 34.5 kV line could either be single or double circuit, we provided data for both, but feel free to assume double circuit for your review to keep with "worst-case" theme. We would either use wood or steel, not ready to commit to one or the other at this time. If steel, the salvage value would negate removal cost, if wood then the cost would be minimal.

The county application I just sent covers both test pit evaluation as well as for the actual permit. I only checked the "Evaluation" box and not the "New Installation" box because the permit would be obtained much closer to construction. There is not a separate permit application. This should not be a siting issue for the Council to be concerned with, it is a construction-related building permit. The test pit evaluation will be sent as soon as I receive it, the check to the County is in the mail.

Thanks,
Jesse

-----Original Message-----
From: John White [mailto:John.White@state.or.us]
Sent: Wednesday, January 18, 2006 10:53 AM
To: Gronner, Jesse
Cc: dns@deainc.com; Daul, Ty
Subject: RE: Noise data

Jesse,
Thanks for the EMF analysis. It shows both single and double circuit configurations. Does that mean that you anticipate that there could be both types in the actual construction? The description does not specify whether these would be wood poles (versus concrete or steel). Would you be able to commit to using wood? I agree that the retirement cost would not be a major change to the overall total, but I want to give you an opportunity to include that in your cost estimate.

I am still working on our independent retirement cost estimate. I need information from Dana on acreages to complete the estimate (I have left several messages for her about this). When our estimate is done, I will send it to you and give you the opportunity to comment. This is one of the major post-completeness issues that we will need to deal with.

On the county septic analysis, what you sent appears to be a request for an evaluation. I assume this is the "test pit evaluation" we have discussed. I gather that you requested the evaluation, but did not pay for it?

Is there a separate permit application? If so, I would like to see a "draft" permit application. You should not actually submit the application to the county until we determine whether the permit is a siting issue. If it is, then the Council would make the decision on

whether the permit should be issued (you would then submit the application to the county and the county would be bound by the Council's decision to issue the permit). On the other hand, if we determine that this permit is not a siting issue but is instead a construction-related permit (similar to a building permit), then the Council would not be involved in the decision to issue the permit (although the site certificate would require that you obtain all necessary permits). I thought that seeing the permit application would help us decide how to treat this (whether it is a siting decision or not).

Can you clarify whether there is a separate permit application, and if so, send us a draft? If it is a siting decision, then we will need to see the test pit results.

-John

>>> "Gronner, Jesse" <Jesse.Gronner@PPMEnergy.com> 01/18/06 10:04AM >>>
John,

I thought I had sent the 34.5 Kv analysis awhile ago, sorry about that.
Please see attached, which includes description of structures as well as
EMF analysis.
Please use 5.5 miles as the upper limit for 34.5 kV overhead (which is roughly 15% of total).
I do not believe this will change the retirement cost estimate in a significant way, there is already much contingency built into the cost estimate, and this could easily be covered in addition to the amount associated with the overhead 230 kV line.

I just spoke with the sanitarian at Wasco-Sherman Public Health Dept. He has completed the test pit evaluation and is just waiting for our check (which is in process) to send on the evaluation. I have attached
a copy of our application. I ask that this please not hold up our completeness, it is done just waiting for payment to be processed.

After today, I will be unavailable through next week. If questions are
in need of answering after today please work with Dana, and if someone at PPM is needed to answer anything, please get in touch with Ty Daul. I'll be back in the office on 1/30.

Thanks,
Jesse

-----Original Message-----
From: John White [mailto:John.White@state.or.us]
Sent: Wednesday, January 18, 2006 9:21 AM
To: Gronner, Jesse
Cc: dns@deainc.com
Subject: RE: Noise data

Thanks. I will be unavailable tomorrow after 10:00 and all day Friday due to a Council meeting in Pendleton.

We will have a number of unresolved issues to discuss after the finding
of completeness. I am taking a gamble that we will be able to settle these within 30 days or so after completeness.

Aside from the noise information, my notes show the following items remain as part of completeness:

Test pit evaluation and application for county septic permit.

Description of aboveground 34.5 kV transmission line. Confirmation of maximum length permitted (is it 4.5 miles or is it 15% of 38 miles?). Description of aboveground support structures. EMF analysis. Retirement
cost estimate. Dana's memo of December 6 said that Triaxis was working on this and that the information would be available "by 12/16/05."

-John

John G. White
Oregon Department of Energy
625 Marion St., NE
Salem, Oregon 97301-3742
john.white@state.or.us

>>> "Gronner, Jesse" <Jesse.Gronner@PPMEnergy.com> 01/18/06 08:59AM >>>
John,

Dana and Martha spoke and I'm told you will be receiving what you asked
for below in the next day or so.

Dana - if possible, please have sent electronically so that John can quickly/easily forward on to Kerrie.

Regards,
Jesse

-----Original Message-----
From: John White [mailto:John.White@state.or.us]
Sent: Tuesday, January 17, 2006 11:57 AM
To: Gronner, Jesse
Cc: dns@deainc.com
Subject: Noise data

Jesse,
Thank you for sending the electronic file of Martha Moore's memo of January 10. I have forwarded this information to Kerrie Standlee.

The data printouts in Attachment 3 to the memo show data for R3, R4, R5, R6 and R7 with "high towers eliminated." We need to see the data for

these receivers with all towers included (as you have done for R1 and R2). Please provide this in PDF format.

Once this information has been provided, I believe that we will have a complete Exhibit X.

-John

John G. White
Oregon Department of Energy
625 Marion St., NE
Salem, Oregon 97301-3742
john.white@state.or.us

CC: <dns@deainc.com>, "Daul, Ty" <Ty.Daul@PPMEnergy.com>