BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

IN RE APPLICATION NO. 2002-01 BP WEST COAST PRODUCTS, LLC. BP CHERRY POINT COGENERATION PROJECT	**EXHIBIT 22R.0** (BRP-RT)

APPLICANT'S PREFILED REBUTTAL TESTIMONY

BRIAN R. PHILLIPS

Q. Please re-introduce yourself to the Council.

A. My name is Brian Phillips. I am an air permitting consultant and am the lead on the air quality modeling for the Cogeneration Project.

Q. What testimony will you be addressing?

A. I will be responding to portions of Dr. Jane Koenig's testimony, which was filed on behalf of Whatcom County.

Perkins Coie LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
Phone: (206) 359-8000
Fax: (206) 359-9000

Q. Can you summarize your understanding of Dr. Koenig's testimony?

A. Dr. Koenig's testimony is relatively brief, although there are several papers attached to it. Her testimony addresses ultra fine particulate matter, also known as $PM_{2.5}$. Dr. Koenig makes essentially two claims in her testimony: First, she contends that a guideline of 25 $\mu g/m^3$ for 24-hour $PM_{2.5}$ concentrations should be used to protect public health. Second, she contends that the Cogeneration Project has "the potential to adversely affect public health" because when she combines the maximum background $PM_{2.5}$ concentrations measured at the Vancouver airport during 1999 through 2001 and the maximum modeled $PM_{2.5}$ concentration from the Cogeneration Project she gets a value higher than her suggested 25 $\mu g/m^3$ guideline.

Q. How do you respond to the first of these claims – that a 25 $\mu g/m^3$ guideline should be used?

A. I am an air quality permitting consultant, not a health expert, so the only way I can respond is to say that her suggested 25 $\mu g/m^3$ 24-hour average guideline is significantly more stringent than the established regulatory standards in effect in the United States and Canada. In the United States, EPA has established National Ambient Air Quality Standards (NAAQS) at levels designed to protect public health. The proposed 24-hour NAAQS for $PM_{2.5}$ is 65 $\mu g/m^3$. In Canada, the Canadian Council of Ministers of the Environment have developed a Canada-wide Standard for $PM_{2.5}$ that establishes 30 $\mu g/m^3$ as a 24-hour average, calculated based on the 98th percentile concentration over a 3-year period, as a goal to be met by 2010. As documented in the Application and explained in my prefiled Direct Testimony, the Cogeneration Project will not result in either the United States or Canadian standards

Perkins Coie LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
Phone: (206) 359-8000
Fax: (206) 359-9000

being exceeded. Dr. Donald Davies, who is a health expert, will be addressing the health aspects of Dr. Koenig's testimony in more detail.

Q. How do you respond to Dr. Koenig's second contention -- that the Cogeneration Project has "the potential to adversely affect public health" because the combination of the maximum existing background $PM_{2.5}$ concentrations and the maximum modeled $PM_{2.5}$ concentrations from the Cogeneration Project would exceed her suggested 25 $\mu g/m^3$ guideline?

A. First of all, Dr. Koenig's testimony falsely implies that, if there is a potential health hazard, it will be due to the Cherry Point Cogeneration Project. The health risk she seems to be concerned about is associated with the existing background concentrations of $PM_{2.5}$, which are much higher than any expected contribution from this Project. In fact, the Cogeneration Project is expected to reduce the overall amount of PM in the airshed.

Even so, Dr. Koenig appears to dramatically overstate the potential risk associated with the cumulative effect of the Cogeneration Project emissions and existing $PM_{2.5}$ concentrations. She does so with "worst case scenario" reasoning that fails to adequately consider many aspects of the existing ambient concentrations of $PM_{2.5}$ and the Cogeneration Project. In particular:

- She fails to adequately consider the full range of existing ambient concentrations of $PM_{2.5}$.
- She fails to adequately consider the full range of modeled impacts from the Cogeneration Project.

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- She fails to adequately take into account the fact that the actual emission levels from the Cogeneration Project are expected to be considerably lower than the maximum permitted emissions.
- She fails to adequately take into account the emission reductions from secondary particulates that will occur at the Refinery as a result of the Cogeneration Project, and the effect of those reductions on ambient $PM_{2.5}$ concentrations.

Q. Let's discuss each of these in turn. First, you said that Dr. Koenig has failed to adequately consider the full range of existing ambient concentrations of $PM_{2.5}$. Can you explain that point?

A. Yes. Dr. Koenig appears to focus on the single maximum 24-hour average for $PM_{2.5}$ among all of the data collected at three monitoring stations (Bellingham, Pitt Meadows and Vancouver Airport) during the 1999 through 2001 period, which was 29 $\mu g/m^3$. Because the background concentration she focuses on already exceeds her proposed 25 $\mu g/m^3$ guideline, she concludes that there is a potential health risk.

The first thing I need to do is point out a correction that has been made to the 29 $\mu g/m^3$ value. This value came from monitoring data provided by the Greater Vancouver Regional District (GVRD) and was reported in the Application for Site Certification, in section 3.2, Table 3.2-9. However, I have recently learned that the GVRD has corrected its $PM_{2.5}$ monitoring data for those years in a way that lowers the maximum 24-hour value at the Vancouver Airport from 29 to 25 $\mu g/m^3$. The

Perkins Coie LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
Phone: (206) 359-8000
Fax: (206) 359-9000

maximum 24-hour value for all three stations is now the 26 µg/m^3 measured at Bellingham in 2000.

This maximum value still exceeds Dr. Koenig's suggested 25 µg/m^3 guideline, but I think it is mistake to focus only on the maximum level monitored at one monitoring station during the three year period. It is helpful to put the 26 µg/m^3 concentration into perspective by taking a closer look at the three years of background data from 1999 through 2001.

Data from two different ambient monitoring stations in Canada and one in the United States were included in the EFSEC application. The following table is updated to reflect the GVRD's change in the Canadian data, and also shows 99th, 98th, 95th and 50th percentile values in addition to the absolute maximums.

	Pitt Meadows			Vancouver Airport			Bellingham		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
Maximum	19	17	18	19	25	18	25	26	24
99th	15	16	16	18	18	16	25	24	20
98th	14	15	15	14	17	15	21	21	17
95th	13	14	12	12	14	11	18	20	15
50th	4	5	5	5	5	5	7	7	6

At the ambient monitoring site with the highest concentration, now the Bellingham site, the background concentration was measured as greater than 25 µg/m^3 only twice in the three-year period 1999 through 2001. Background concentrations greater than

Perkins Coie LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
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Fax: (206) 359-9000

21 μg/m^3 were only measured 7 times in that three-year period.[1] In looking at this Bellingham data, I also think it is important to keep in mind that this monitoring station is located in a much more urban area than the Cogeneration Project site. As explained in the application, we believe the two Canadian monitoring stations are probably more reflective of the conditions near the Cogeneration Project. The concentrations measured at Pitt Meadows never exceeded 19 μg/m^3 and the concentrations measured at the Vancouver Airport only exceeded 21 μg/m^3 3 times in that three-year period.

Even if you conservatively assumed the maximum modeled $PM_{2.5}$ concentrations from the Cogeneration Project (4.3 μg/m^3) occurred every day (which they will not), the total PM2.5 concentrations would be well below Dr. Koenig's suggested 25 μg/m^3 guideline the vast majority of the time. And remember, the combined levels would be less than a third of the applicable National Ambient Air Quality Standard, and well below the Canadian standard applicable in British Columbia.

[1] $PM_{2.5}$ in Bellingham is measured every 3 days on the normal EPA schedule.

Perkins Coie LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
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Fax: (206) 359-9000

Q. The second point you mentioned was that Dr. Koenig failed to adequately consider the range of modeled impacts of the Cogeneration Project. Can you explain that point?

A. Yes. Even if we (unrealistically) assume that the Cogeneration Project will always emit $PM_{2.5}$ at the maximum potential level, the air quality modeling results provide a range of potential ambient impacts, which vary depending upon the day and the location. However, Dr. Koenig focuses on the maximum-modeled level (4.3 $\mu g/m^3$), which was modeled to occur on only one day at one location. It's important to consider the range of predicted impacts both over the course of the 5 years we modeled and at the various locations modeled.

The 4.3 $\mu g/m^3$ value represents the worst day at the worst location. Even at the worst location, the modeled results for other days are much lower. For example, the 99th and 98th percentile values at the worst location were only 2.7 $\mu g/m^3$and 1.9 $\mu g/m^3$, respectively. Even then, it is unlikely that these levels will occur at the same time and place as the maximum background concentration.

Likewise, the 4.3 $\mu g/m^3$ value was modeled at one location, approximately 100 meters north of the project boundary on fenced BP property. The predicted impacts decrease as the distance from the Cogeneration Facility increases. For example, the maximum-modeled 24-hour value at Birch Bay was only 1.7 $\mu g/m^3$. The maximum-modeled value at Lynden was only 0.35 $\mu g/m^3$. No values over 3.0 $\mu g/m^3$ exist at distances over 350 meters from the project fence line. The

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Seattle, Washington 98101-3099
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isopleths submitted with my Direct Testimony show the modeled concentrations at other locations.

Q. The third point you mentioned was that Dr. Koenig failed to adequately consider the fact that the Cogeneration Project's $PM_{2.5}$ emissions are likely to be lower than the maximum potential emissions levels. Can you explain this point.

A. Yes. The 4.3 $\mu g/m^3$ impact is from a maximum-modeled scenario that was used to show that the facility's impacts were below the significant impact levels. We often use unrealistic modeling scenarios in order to be overly conservative in calculating the potential maximum concentrations. In this case, the maximum scenario has all three turbines running at 50% load for 24 hours. This is very unlikely as one or more turbines would most likely be shut down in this case. It is unlikely for even one turbine to run for 24 hours at 50% load. The maximum-modeled impact if all three turbines are running at 75% load is 2.9 $\mu g/m^3$ and at full load is 2.2 $\mu g/m^3$. At times, all three turbines may not be in operation, resulting in even lower impacts. As Dr. Koenig stated, we expect the $PM_{2.5}$ emissions to be approximately 60% less than those projected under the standard EPA test. She has calculated a maximum $PM_{2.5}$ impact of 1.72 $\mu g/m^3$ for 50% load. For 75% load, this value is 1.2 $\mu g/m^3$and for full load it is 0.9 $\mu g/m^3$. So, if we take into account the expected emissions, it is even less likely that Dr. Koenig's suggested 25 $\mu g/m^3$ would be exceeded.

Q. The last point you mentioned was that Dr. Koenig failed to adequately consider the emission reductions from secondary particulates that will occur at the

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Seattle, Washington 98101-3099
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Refinery and the implications for particulate matter levels in the airshed. Can you explain?

A. Yes. The Cogeneration Project will provide steam to the refinery, which means that the refinery will not need to generate that steam with its boilers. Providing steam will avoid both the direct emission of primary particulate and the secondary formation of particulate in the airshed.

Providing steam will directly avoid 10 tons of $PM_{2.5}$ emissions. It will also avoid 499 tons of NO_X emissions. Because some of the NO_X forms $PM_{2.5}$ in the airshed, the reduction in NO_X will also reduce $PM_{2.5}$ in the airshed. The overall particulate matter balance is as follows:

Expected Emissions	93.8 tons
Refinery Emission Reductions	-10 tons
Secondary PM from NO_X	-182 tons
Secondary PM from SO_2	17.6 tons
Total Adjusted Expected Emissions Change	-81 tons

This means that the overall affect of the Cogeneration Project will be to decrease – not increase – $PM_{2.5}$ levels in the airshed. This is reflected for the annual average in Exhibit 22.3, the isopleths submitted with my Direct Testimony. The 24-hour average with emissions reductions from secondary particulate is difficult to model and has not been included, however, I expect it would show similar results. Therefore, for those concerned about ambient $PM_{2.5}$ in the airshed, the Cogeneration Project represents an improvement in the situation.

Perkins Coie LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
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Fax: (206) 359-9000

Q. In conclusion, do you believe the $PM_{2.5}$ emissions from the Cogeneration Project present a reason for concern?

A. No. I believe it is likely that the overall affect of the Cogeneration Project will be a net reduction in particulate matter in the airshed. Moreover, even without considering the emission reductions at the refinery, the Cogeneration Project emissions will have a negligible impact on $PM_{2.5}$ concentrations close to the Refinery and even less impact in airsheds further downwind. The modeled impacts are below the established SILs and will not cause any exceedence of applicable ambient air quality standards.

END OF TESTIMONY

Perkins Coie LLP
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