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P.O. Box 873
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Gateway Neighborhood Association
724 Butte Ave.
Mt. Shasta, CA 97067

Subject: Crystal Geyser Draft Environmental Impact Report Comment

Ms. Ryan Sawyer
Analytical Environmental Services,
1801 7th Street Sacramento, CA 95811
crystalgeyser@analyticalcorp.com

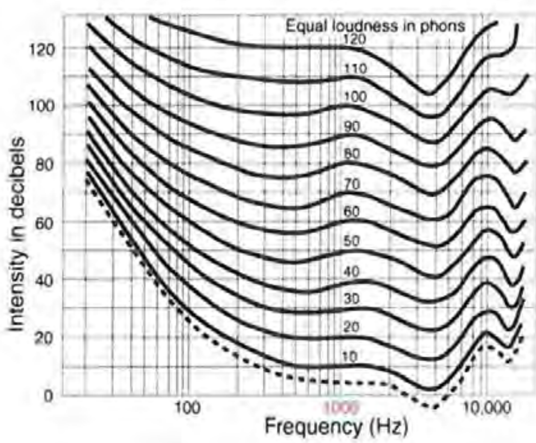
Dear Ms. Sawyer:

W.A.T.E.R. and the Gateway Neighborhood Association asked me to review the Crystal Geyser DEIR noise section and the noise technical report by Bollard Acoustical Consultants, Inc. (Bollard: report included in the DEIR as Appendix T) that supports the DEIR analysis and conclusions regarding project noise impacts and proposed mitigations. As a consultant in environmental air quality and acoustics, I have more than 20 years of experience in the preparation and review of environmental technical reports for a wide variety of commercial, transportation, and urban development projects in California. The following content of this letter is based on my review of Bollard's Environmental Noise Assessment. P77-1

The Bollard report begins by presenting (on page 2) supposed universally accepted research findings concerning "increases in A-weighted noise level:"

> *"With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 2013):*
>
> - *"Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dBA;*
> - *"Outside such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise;*
> - *"It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA;*
> - *"A change in level of 5 dBA is a readily perceptible increase in noise level; and*
> - *"A 10-dBA change is recognized as twice as loud as the original source."*

The findings presented by the 1st and 5th bullet points above on audibility and relative loudness hold only for pure (single frequency) tones generated in the laboratory at relatively low amplitudes (see graphic below), not for sound levels produced by multi-frequency real-world sources at real-world amplitudes in real-world background contexts. This is an important distinction because a noise from a real-world source (e.g., an air conditioner) has a frequency spectrum substantially different from the background levels (e.g., usually traffic-dominated in urban areas). Noise from such sources are often audible (and disturbing to a listener trying to sleep, say) because the human ear can distinguish the characteristic frequency components of the noise even when it's A-weighted average sound level is not much different from (or even less than) the local A-weighted background level. P77-1 (Cont.)



Also, the incremental acoustical energy content of a sound is not uniform across the decibel scale; it increases exponentially with decibel value. For example, a one decibel increase in sound level starting from 70 decibels has 1000 times the acoustical energy of an increase starting from 40 decibels. Thus, even for pure tones, the minimum perceptible sound level increase depends on the initial reference sound level. And for real-world sounds, it also depends on the frequency spectrum of the source in comparison with the frequency spectrum of the local background. At very high loudness levels the very idea that a further increase in sound intensity needs to be perceptible to be of concern is irrelevant. The USEPA finds that long-term exposure to sound levels exceeding 70 dBA could eventually cause hearing loss. Thus, cases where noise intensity is increasing from 70 dBA to any higher levels are all equally unacceptable regardless of the increment.

Because of the reasons just noted, in environmental analysis there can be no generally applicable standards for determining the minimal change perceptible by a "trained" ear or an "average healthy" ear or "any" ear, as claimed in the 2nd, 3rd and 4th bullet points above. A quantitative analysis of environmental noise impacts with significance determination, as called for by CEQA, can only be done by careful choice of the noise metrics most applicable to the disruptive effects of the noise sources under consideration and an evaluation of exposure severity in relation to accepted research findings from similar sources.

Further misinformation on basic acoustical concepts is included (on page 6; underline added):

> *"These relationships occur in part because of the logarithmic nature of sound and the decibel system ... a doubling in traffic volume will increase ambient noise levels by 3 dBA. Similarly, a doubling in heavy equipment use, such as the use of two pieces of equipment where one formerly was used, would also increase ambient noise levels by 3 dBA. A 3 dBA increase is the smallest change in noise level detectable to the average person. A change in ambient sound of 5 dBA can begin to create concern. A change in sound of 7 to 10 dBA typically elicits extreme concern and/or anger."*

Sound does not have a "logarithmic nature." The human ear is sensitive to sounds over a very (very) wide intensity range (see table below) and logarithms were introduced to simplify the mathematics of dealing with the resultant complexity. If the temperatures we commonly experience were spread over a similar range, logarithms would be used in thermodynamics as well as acoustics. P77-1 (Cont.)

Threshold of Hearing	Threshold of Pain
I_0	$10^{13}I_0 = 10,000,000,000,000\ I_0$
0 decibels	**130 decibels**

A doubling of sound source strength will produce a 3 dBA increase in sound intensity at a receiver. But in a real-world situation, this is rarely "*the smallest change in noise level detectable to the average person.*" Consider this case of changing real-world noise levels: A man is relaxing in his garden after a hard day's work. After a while, the next-door neighbor comes out with a power mower and proceeds to mow his backyard lawn. The man is annoyed at this change of acoustic circumstances. Then, a few minutes later, the neighbor's son comes out with 2nd mower (same model - thus, mower noise $L_1 + L_2 = 2L_1 = L_1 + 3dBA$) to help his dad. Noise from this 2nd mower will be clearly noticeable by the man considering he's already disturbed by the first. And what if a short time later the neighbor's wife came out with a 3rd active mower (thus, $L_1 + L_2 + L_3 = L_1 + 5dBA$). Would it really take a 5 dBA increment (not 3 dBA) to "begin to create concern" in the man's mind? Would it take a lawn maintenance crew with even more mowers before the man would be driven to "extreme concern and/or anger?" What if, instead of a mower, the first acoustic change had been caused by the son using a leaf-blower (with a smaller engine – thus, delta L < 3 dBA)? Clearly the man would have noticed the leaf-blower over the noise of the first mower even though its increment is less than 3 dBA.

This misinformation sets a reader up to believe that science has proved that any changes in A-weighted sound levels in the low- to mid-single digit range are of no concern because either it cannot be heard or is "barely" perceptible. Or that A-weighted sound level must be at least in the mid- to high-single digit range before it can be "readily" perceived or elicit "extreme concern and/or anger."

Also, it draws attention away from other true statements about noise made in the report Setting that have important implications for the Crystal Geyser measurement data and analysis yet to be presented.

And none are more important than the following (also from Bollard page 6, underline added):

> *"A single event is an individual distinct loud activity, such as an aircraft overflight, a train or truck passage, or any other brief and discrete noise-generating activity. Because most noise policies applicable to transportation noise sources are typically specified in terms of 24-hour-averaged descriptors, such as Ldn or Community Noise Equivalent Level (CNEL), the potential for annoyance or sleep disturbance associated with individual loud events can be masked by representing the data as an average."*

P77-1 (Cont.)

Instead of serving as a motivation for considering both single-event and time-average aspects of Crystal Geyser noise impacts, just the opposite occurs. The report dismisses the possibility of meaningful single-event noise standards, adopts the County/City long-term time average noise impact standards as the only ones applicable, and then shows that long-term average noise levels from on- and off-site truck movements and from on-site HVAC and other equipment (with a few exceptions) meet the City/County noise standards at the local residential receptors.

It is interesting that the Bollard report then mentions the following court case (BKJOB) court case and its concern with single-event noise levels (page 6, underline added):

> *"The analysis of single event noise effects under CEQA can be traced to a 2001 court case (Berkeley Keep Jets Over the Bay Committee* [BKJOB] *v. Board of Port Commissioners of the City of Oakland (2001) 91 Cal.App.4th 1344), which concerned a challenge to the proposed expansion of the Oakland Airport because the project EIR noise analysis didn't include an evaluation of the effects of single-event noise on sleep disturbance. The court required, in that context (i.e. an airport expansion), that the EIR address single-event noise and sleep disturbance effects on existing residents in the City of Berkeley. However, the court did not recommend an appropriate single event noise level standard to be employed."*

The Crystal Geyser noise analysis suffers from the same deficiencies as the noise analysis originally done for the Oakland Airport Master Plan EIR. But the Port of Oakland complied with the court order, did a single event noise analysis and issued the findings in a Supplemental EIR. Bollard, in contrast, denies the usefulness of such an analysis (page 7, underline added)

> *"SEL represents the entire sound energy of a given single-event normalized into a one-second period regardless of event duration ... There are currently on-going discussions regarding the appropriateness of using the SEL metric as a supplement or replacement for cumulative noise level metrics such as Ldn and CNEL, 24-hour noise descriptors"*

P77-2

The regulatory agency discussions are over. The Federal Aviation Administration (FAA) in their *Environmental Desk Reference for Airport Actions* (2007) recognizes the usefulness of a single-event analysis (underline below) and recommends the SEL metric in Table 17-1 of the *Desk Reference* (included below, highlight added):

> *"**Supplemental noise analysis**. FICON (1992) noted that supplemental metrics are useful in addressing various public concerns and to help the public better understand noise impacts. As a result, FAA sometimes uses supplemental noise information to describe aircraft noise impacts for specific noise-sensitive locations or situations."*

Suggested Metrics to Determine or Describe Noise Impacts				
Possible Human Response	***Corresponding Average, Cumulative Noise Metric***	***Corresponding Single Event Metric***	***Time Aircraft Heard Above a Particular Noise Level***	***Number of Events that Will Occur Above a Particular Noise Level***
Community annoyance *How people psychologically respond to a given noise.*	***DNL*** *Average Day-Night Sound Level.* ***L_{eq}*** *Equivalent Sound Level.*	***L_{max}*** *Maximum Sound Level.* ***SEL*** *Sound Exposure Level.*	***Time Above*** *Typically, 60 or 65 dB. Above these levels, noise would interfere with normal conversational levels.*	***N_x*** *Number of events specified at each sound level x.*
Sleep disturbance *Sound levels causing sleep arousal.*	***Nighttime L_{eq}*** *(10:00 p.m. - 7:00 a.m.= typical sleeping hours)*	***SEL*** *Federal Interagency Committee on Aviation Noise (FICAN) uses SEL to predict the percentage of people a given SEL would awaken.*		
Speech interference *Intruding noise levels that may mask normal conversational speech levels and reduce listener understanding.*	***Daytime L_{eq}*** *(7:00 a.m. to 10:00 p.m. = typical activity hours)*	***L_{max} or SEL***		
School Learning *Noise level that could adversely affect classroom activities.*	***School Hour Leq*** *(vary)* ***Interior Leq*** *45 dB interior sound level goal.*	***SEL*** *Used to determine the interior noise level reduction (NLR). The minimum standard is 5 dB SEL.*		
Source: Federal Aviation Administration, Environmental Desk Reference for Airport Actions (October 2007); Table 17-1.				

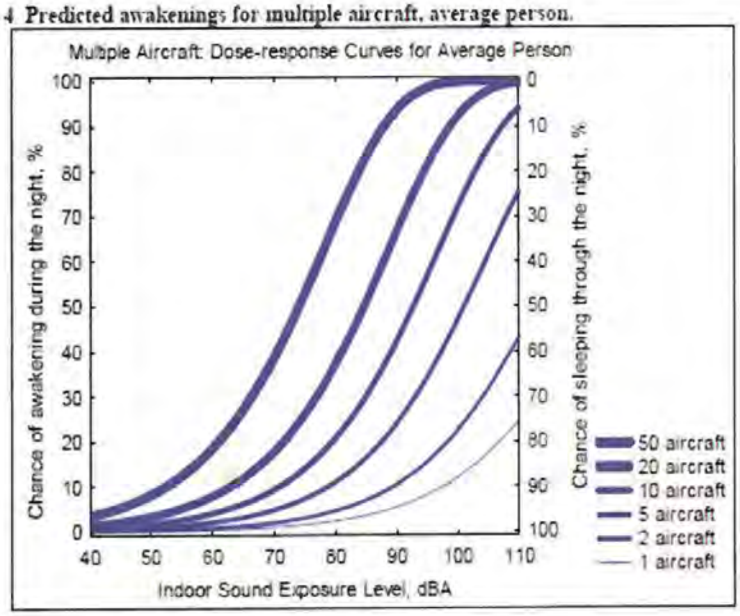
P77-2
(Cont.)

Bollard finds an additional problem with extending the known probability of a disturbance from a single noise event to determine the resultant probability from multiple events (page 7, underline added).

> *"The FICAN results focused on individual single-event sound levels but did not take into consideration how exposure to multiple single events affected sleep disturbance."*

But estimating resultant probabilities from multiple events requires application of a simple formula from probability theory, which was used to estimate the awakening probabilities from multiple aircraft operations in the Oakland Airport Master Plan SEIR. Here is a graph of it from a presentation given more than ten years ago by the acoustical consultants Harris, Miller, Miller & Hanson (*"Using Supplemental Metrics to Communicate Aircraft Noise Effects,"* November 2006):

FIGURE 4 Predicted awakenings for multiple aircraft, average person.



P77-3

And Bollard offers two more objections to single-event analysis (page 8, underline added)

> *"Although the FICAN and ANSI methodologies provide a means by which the potential for awakenings due to single events can be predicted, neither methodology provides a recommended target level for acceptable single-event noise or percentage of awakening. Further, there is no industry consensus establishing recommended target levels for acceptable single-event noise or percentage of awakening."*

Why does there need to be one recommended target level for single-event noise to justify an analysis using single-event metrics? The usual problem with single-event noise is that there are multiple noise events from a source (or one noise event from multiple sources) over a limited period of time. It is the resultant probability of disturbance over time that is the important issue, not the probability from a single occurrence (e.g., the probability of a sleeper being awakened at some point during the night by the passage of 20 trucks, not the probability of awakening at any one time from a single truck passage). If the individual probability of disturbance is known, it should be obvious at the end of the analysis incorporating specific project circumstances whether the total disturbance is problematic (e.g., a 20% nightly awakening probability may point to a substantial problem requiring mitigation, 5%? - probably not). As for the lack of "industry consensus" on single-event noise disturbance, the main reason should also be obvious: major corporate and public noise generators (i.e., airlines, trucking companies, heavy industry, public highway/transit agencies, etc.) oppose regulations setting additional noise standards. This is why the official standards for aircraft noise still only limit 24-hour average exposures and not the frequency of high-noise intrusions from many single-event operations (i.e., take-off/landing, low overpass, etc.). **If consideration of single-event sources seems to offer needed additional protection from noise impacts, it should be employed in CEQA analysis right now and not delayed until industry consensus is reached.** P77-3 (Cont.)

Bollard then moves on to consider and choose **significance criteria for the noise analysis** (pages 12-19). One complication for this project is that the closest noise-sensitive receptors (11 residential uses) lie in two jurisdictions, Siskiyou County and the City of Mount Shasta, each with somewhat different noise exposure standards. Both County and City standards only limit long-term average noise exposure for specified land uses (including residential): County standards apply to 24-hour average noise levels from all noise sources, while the City has separate standards for daytime- and nighttime-average noise levels, which are also dependent on whether the noise source is transportation-related or non-transportation. Bollard chooses to apply each set of standards separately to each residential receptor depending on whether it is in the County or City. The problem with this decision is that the residential receptors are so closely grouped around the Crystal Geyser plant, some in the County some in the City; Receptors #1 and #11 are next-door neighbors, yet the former is in the County and the latter in the City. The City standards are more protective (i.e., limiting average noise at night, restricting stationary noise sources more than transportation sources). **Applying them separately seems to benefit Crystal Geyser rather than offering equal protection to the residents around the plant. Applying the City standards to all would seem to be more in the spirit of what CEQA was designed to accomplish.** P77-4

Bollard then makes another questionable choice regarding City standards (page 15, underline added):

> *"The general footnote at the bottom of Table 4 states that the noise standards shall be increased in 5 dB increments to encompass the ambient in cases where existing ambient noise levels exceed the Table 4 standards. As noted in Table 1, measured average daytime noise levels ranged from 44 to 49 dB Leq, which are below the City of Mount*

Shasta 50 dB Leq daytime noise level standard. As a result, no adjustment to the daytime noise standard is warranted for this project.

The Table 1 data also indicate that measured nighttime ambient noise levels averaged 51 dB Leq at Sites 1 and 3, which represent sensitive receptors within the City of Mount Shasta. As a result, the nighttime noise level standard is adjusted upwards in 5 dB increments until the ambient is encompassed. The resulting nighttime noise level threshold is adjusted to 55 dB Leq at the sensitive receptors within the City of Mount Shasta."

This decision also seems to penalize the City residents for their properties not being quiet enough and to benefit Crystal Geyser by giving them an addition 4 dBA for their noise emissions before they would be held accountable under City standards. **Increasing the City nighttime standard by only 1 dBA would give the residents the benefit of additional protection and seems to be more in the spirit of what CEQA was designed to accomplish.**

Bollard then moves on to consider incremental noise standards (Page 16, underline added)

"Neither Siskiyou County nor the City of Mount Shasta noise regulations contain standards for assessing the significance of project-related noise level increases. In such cases, noise evaluation criteria developed by the Federal Interagency Committee on Noise (FICON) provide guidance in the assessment of changes in ambient noise levels. The FICON recommendations, which are provided in Table 6, are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these criteria have been applied to other sources of noise similarly described in terms of cumulative noise exposure metrics such as the Ldn." P77-4 (Cont.)

Table 6
Significance of Changes in Cumulative Noise Exposure

Ambient Noise Level Without Project (Ldn)	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON)

" ... The rationale for the Table 6 criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance. Conversely, in lower ambient noise environments (i.e. below 60 dB Ldn), a greater increase in noise levels was found to be tolerated before persons became annoyed."

The fact that incremental noise standards need to become more stringent as existing ambient noise levels increase is an important point to make. But there is a better choice of incremental standards for the Crystal Geyser project than the FICON standards. The Federal Transit Administration (FTA) developed incremental noise standards are also based on survey data on community annoyance specifically to motor vehicle noise (*Transit Noise and Vibration Impact Assessment*, May 2006). As summarized in the table below, they are more stringent than the FICON standards, allowing only a 3 dBA increase if existing levels are less than 60 dBA, only 2 dBA for existing levels between 60-65 dBA, 1 dBA or less if existing levels exceed 65 dBA, and for existing noise levels above 75 dBA, no increase is allowed. These standards should have been used for the Crystal Geyser noise study.

Table 3-3. Noise Impact Criteria: Effect on Cumulative Noise Exposure			
L_{dn} or L_{eq} in dBA (rounded to nearest whole decibel)			
Existing Noise Exposure	**Allowable Project Noise Exposure**	**Allowable Combined Total Noise Exposure**	**Allowable Noise Exposure Increase**
45	51	52	7
50	53	55	5
55	55	58	3
60	57	62	2
65	60	66	1
70	64	71	1
75	65	75	0

P77-4 (Cont.)

Given the comments above on the adequacy of the significance criteria chosen for the Crystal Geyser noise study, the following changes should be made to the Bollard criteria (pages 18-19) and the analysis redone:

> ***"Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;***
>
> ~~*For residences located within Siskiyou County, exterior and interior noise level standards of 60 dB and 45 dB Ldn are applied for both transportation and nontransportation noise sources*~~
>
> *"For all residences ~~located within the City of Mount Shasta~~ affected by on-site operations (i.e. non-transportation noise sources), the noise level standards of Table 3 are applied after adjusting for ambient conditions. Specifically, the daytime and adjusted nighttime exterior noise level standards applicable to this project are 50 dB Leq and ~~55~~* ***51 dB Leq****, respectively, at outdoor areas. In addition, the interior noise level standard would be 40 and 45 dB Leq during daytime and nighttime hours, respectively, after adjusting for measured exterior ambient conditions and very conservatively assuming 10 dB of building façade noise reduction with windows in the open position. For transportation noise sources, the City's 60 dB Ldn exterior noise level standard is applied to sensitive uses, as shown in Table 4.*

"A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

*"As noted in Table 6, a substantial increase in noise levels is identified as being ~~5~~ **3 dBA** Ldn for residences located in Siskiyou County based on the measured ambient noise level of 55 dB Ldn at measurement Site 2. For residences within the City of Mount Shasta, a substantial increase in noise levels is identified as being ~~3~~ **2 dBA** Ldn based on the measured ambient noise levels of 60 - 61 dB Ldn at measurement Sites 1 and 3. This test of significance would apply to increases in non-transportation noise due to on-site project activity. Off-Site increases in traffic noise levels due to project traffic on the local roadway network would be subject to the ~~Table 6~~ **FTA** thresholds.*

"A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

*As noted in Table 6, a substantial increase in noise levels is identified as being ~~5~~ **3 dBA** Ldn for residences located in Siskiyou County based on the measured ambient noise level of 55 dB Ldn at measurement Site 2. For residences within the City of Mount Shasta, a substantial increase in noise levels is identified as being ~~3~~ **2 dBA** Ldn based on the measured ambient noise levels of 60 - 61 dB Ldn at measurement Sites 1 and 3. This test of significance would apply to increases in non-transportation noise due to on-site project activity. Off-Site increases in traffic noise levels due to project traffic on the local roadway network would be subject to the ~~Table 6~~ **FTA** thresholds."*

P77-4 (Cont.)

Moving on to **Impact 1: Off Site Traffic Noise Impacts.** Despite all said against it in the Setting, Bollard attempts a single-event analysis for off-site nighttime truck passbys (pages 23-25, underline added):

"The proposed project is reported to generate 100 daily heavy truck trips. While the majority of these truck trips would reportedly occur during daytime hours, because the project would include the potential for some nighttime truck operations, this analysis of potential noise impacts related to sleep disturbance is provided ...

"Because heavy trucks currently utilize Mount Shasta Boulevard during nighttime hours, it is reasonable to conclude that persons living in close proximity to that roadway would sleep with windows closed if they currently experience sleep disturbance issues with windows open. Even with a worst-case estimate of building façade noise exposure of 20 dB with windows closed, the resulting worst-case interior noise level in the nearest residence to Mount Shasta Boulevard would be 59 dB SEL during passages of project heavy trucks.

P77-5

As discussed earlier, incidents of sleep disturbance are predicted to be relatively low at interior SEL values of less than 65 dB ... Those results indicate that the % awakened ranged from 0 to 1.5 in cases where interior noise levels registered 59 dB SEL +/- 2 dB. In light of the low number of nighttime heavy truck passbys and the low percentage of awakening during such passbys, ***this impact is considered less than significant.***

Bollard makes two points here. Taking the second (i.e., low number of passbys/low awakenings) first, the project will generate 100 truck trips per day and a few pages later in the report it is mentioned that 20 will be a night. Applying the formula for estimating the probability of being awakened at least once per night from 20 truck passbys. **A one-in-four chance of awakening per resident exposed to passbys doesn't seem all that small and merits consideration of mitigations (e. g., limiting business hours to 7am – 7pm) to bring it down.**

Pawake, multiple =	**1 - (1 - Pawake, single) ^ (# of Events)**	
# of Events	Pawake, single	Pawake, multiple
1	1.5%	1.5%
2	1.5%	3.0%
3	1.5%	4.4%
4	1.5%	5.9%
5	1.5%	7.3%
10	1.5%	14.0%
20	1.5%	26.1%

P77-5 (Cont.)

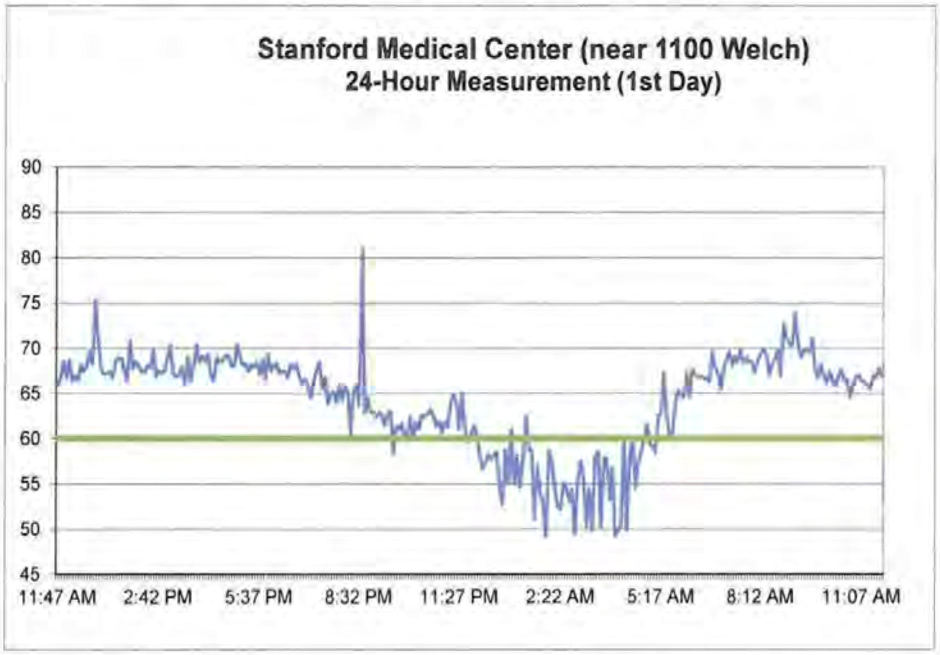
Now the first point (i.e., assuming windows closed) - windows closed may be a reasonable assumption in the winter, but in the summer and early fall, when it is hot, some residents without air conditioning may not have that option. The nightly cumulative awakening probability for these residents would be substantially higher than shown above in the table, making mitigation of project truck passby noise even more important.

Moving on to **Impact 2: Noise Impacts from On-Site Operations.** Bollard deals with noise from **on-site stationary equipment** first (page 25-26, underline added):

> *"Noise-generating on-site operations will include <u>roof-top heating, ventilating and air-conditioning (HVAC) equipment</u>, ground-mounted cooling towers and chiller equipment, the proposed wastewater treatment equipment, propane power generators, and <u>on-site truck circulation</u> ...*
>
> *"Because the on-site mechanical equipment generates steady-state noise levels, noise impacts associated with this equipment are <u>evaluated relative to day/night average (Ldn) criteria for receptors located in Siskiyou County, and relative to hourly average noise level (Leq) criteria for receptors located in the City of Mount Shasta.</u> To compute Ldn values, it was conservatively assumed that all on-site mechanical equipment would be in operation for the entire 24-hour period of a day."*

P77-6

For the Crystal Geyser on-site stationary noise-generating equipment, compliance with the County/City limits on daytime- and nighttime-average may not be good enough to avoid significant nighttime impacts to the nearby residents if all on-site mechanical equipment would be in operation 24 hours a day at a relatively constant level. Any project equipment operating at night must be inaudible to the nearby residents at all times to avoid sleep disturbance. The situation to be avoided is illustrated in the graphic below - project equipment noise (i.e., the green horizontal line) must never rise above background even when nighttime background levels are at their lowest (usually in the early morning hours). To accomplish this, it will be necessary for it to be below the quietest nighttime hourly average background level (i.e., the L90s shown in the last columns of Appendix B-1 through B-30). The Bollard equipment noise analysis must be redone with these target levels as the goal for noise reduction. This may require quieter equipment and/or additional noise barriers not specified in the present report. P77-6 (Cont.)



Bollard then deals with noise from **on-site heavy truck circulation** (page 26-27, underline added):

> *"As a means of quantifying noise exposure associated with on-site heavy truck circulation, noise level data collected for previous trucking facility noise studies were utilized. From that data, it was determined that the sound exposure level (SEL) due to a heavy semi-trailer truck operation similar to what will occur at the project site, (including arriving, backing into loading docks, backup beepers, etc.) is approximately 83 dB at a distance of 50 feet ...* P77-7
>
> *"Based on the project traffic study, the project is predicted to generate 50 heavy truck loads per day (100 trips). ... For this analysis, it was assumed that 80 of the 100 daily truck operations would occur during daytime hours, with 20 occurring during nighttime periods. For calculation of hourly average noise levels, it was conservatively assumed that busy operations could consist of up to 10 trucks in an hour during daytime periods*

and 4 trucks per any given nighttime hour. On-site heavy truck noise exposure was determined using the following equation.

*"Hourly Leq = 83+10*log (N) – 35.6*

"Where 83 is the SEL for a heavy truck operation, N is the number of operations during the hour, and 35.6 is 10 times the logarithm of the number of seconds in an hour."

Thus, Bollard estimates the hourly average impact of nighttime truck movements, **but not the SEL impacts.** The hourly truck impacts are found less than significant (see text below from page 29, underline added)

*"The noise impacts identified at Receptors 4, 5 and 6 are identified as being due to the operation of the three (3) proposed propane generators to be located on the south side of the building at the position indicated on Figure 2. <u>No noise impacts were identified due to operation of rooftop mechanical equipment, ground level HVAC equipment, on-site truck circulation, or wastewater treatment plant equipment.</u> Nonetheless, because combined noise levels from on-site sources would exceed the project standards of significance at three nearby sensitive receptors, **this impact is considered significant**."* P77-7 (Cont.)

But if the interior SEL at interior residential receptors from on-site truck movements is the same (or close to) that estimated for off-site truck movements, the resultant nightly sleep disturbance e probability could exceed 25% (as estimated above for off-site truck movements) and motivate an analysis of mitigations from this on-site activity (e.g., noise walls along the western and southern site boundary, change in on-site truck routes or entry/exit points, limiting truck movements to daytime hours, etc.).

And that is all I have to say at this time.

Sincerely,

Geoffrey H. Hornek