Ivan Hall
2575 Star Drive
Redding, CA 96001
(530) 247-1604
(530) 246-1060
info@ivanhall.com

RECEIVED
MAR 29 2006
Permits Office Air-3
U.S. EPA, Region 9

Shaheerah Kelly
Air Division (AIR-3)
EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear Ms. Kelly:

March 25, 2006

Thank you for the opportunity to comment on Knauf's revised PSD permit and Ambient Air Quality Impact Report.

A top down BACT analysis for NOx control equipment was a significant component missing from Knauf's very first PSD application. That is because, according to the EPA, Knauf initially underestimated their NOx emissions to a level below the PSD threshold of 40 tons per year. Now that Knauf has been operational for over four years and has been consistently emitting Nox well above the PSD threshold of 40 tons per year, EPA as part of a revised Knauf PSD permit has done a top down BACT analysis for NOx control equipment.

EPA region 9's Knauf NOx BACT top down analysis is critical in that it must be done "as if the construction of the source had not yet commenced", 40CFR52.21(r)(4). Additionally, EPA region 9 in its Feb. 3, 2006 Knauf Air Impact Report p. 9 of 37 states, " EPA considers Knauf a major source for NOx and will review the proposed NOx emissions limit in accordance with our PSD requirements as if the source had not yet been constructed."

Region 9's Feb. 3, 2006 Air Impact Report is particularly informative to the public in that it clearly states on p.4 of 37, "Most of the NOx emitted from the Main Stack is associated with the thermal decomposition of ammonia." Hitherto the public's attention had been focused on Knauf's NOx emissions as largely a by-product of natural gas combustion occurring in the curing ovens and the thermal oxidizers. I recall Knauf officials explaining their higher NOx emissions to the public as the result of an engineering error made by the manufacturer of the thermal oxidizers. Indeed, Knauf initially sought to minimize their NOx emissions by reducing the operating temperature of their thermal oxidizers, the consequence though was unacceptably higher PM-10 and VOC emissions.

Additionally Knauf's Revised Draft Environmental Impact Report p. 3-26 states, "The curing process would use low NOx burners to reduce NOx emissions from approximately 60 tons per year to approximately 13 tons per year." No mention of NOx emissions occurs, to my knowledge, in public documents as a result of the thermal breakdown ammonia until now.

Ammonia and urea are key ingredients in Knauf's process. Ammonia emissions are projected at 166 tons per year per Knauf's Environmental Impact Report(s).

In considering EPA region 9's top down BACT analysis for Knauf's NOx emissions it's important to point out that the analysis uses low NOx burners as a baseline in their Table 7: NOx BACT Control Hierarchy, Table 8: Economic Impact Analysis, and Table 9: Environmental and Energy Impacts.

Clearly the rationale for the basis of this type of analysis, whereby a pollution control technology (in this case low NOx burners) is not analyzed for Range of Control percentage, BACT Analysis Control Level percentage, Emissions Reductions (tpy), Total Capital Costs ($), Total Annualized Cost ($/yr), Average Cost Effectiveness ($/ton), and Energy Impacts is the fact that the facility is both operational and already using low NOx burners in the curing oven section. (pg. 22 of 37 EPA region 9 Knauf Air Quality Report states, "Since the curing oven already uses LNBs, the baseline NOx emissions from this operation will be based on the use of LNBs.)

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One cannot analyze pollution control technologies "as if the source had not yet been constructed", and also from a perspective of technology in use at a built and operational facility as being considered baseline.

Conclusion:

EPA region 9's NOx BACT top down analysis is inadequate.

NOx emission levels need to be established using standard burners. Then low NOx burners need to be evaluated just as the other pollution control technologies are, rather than as a baseline.

Page 23 of 37 Air Quality Report states, "Table 7 shows the emission levels that could be achieved using LNB (i.e., baseline) and SCR at the three points in the process listed above." In other words the analysis does not provide the information necessary to evaluate Selective Catalytic Reduction as a stand alone NOx pollution control device. SCRs potential effectiveness is compromised because it is only evaluated in tandem with LNBs.

Thank you for your consideration in this matter. I look forward to your response.

Sincerely,

Ivan A. Hall

cc dbenda r/searchlight

3.6.7.2 Molten Glass Transformation

The weighed and blended raw materials would be heated to a temperature of appro mately 2,500°F in the electric-fired melting furnace. Heating would transform the materials into molten glass. All glass melting would occur electrically without fuel combustion.

Trace amounts of PM_{10}would be emitted from the furnace. These emissions would be controlled by two dust collectors with greater than a 99 percent efficiency.

3.6.7.3 Fiber Formation and Binder Application

The molten glass from the furnace would be spun. Centrifugal force would cause the molten glass to flow through small holes in disks (spinners). The glass fibers that would result from this process would flow through a high velocity air stream, where binder would be applied to bond the fibers. The quantity of binder sprayed into the glass fibers depends on the type of product being manufactured. Typically, about 85 percent of the binder that is applied to the fiberglass would remain on the product, and the other 15 percent would remain on the conveyer or would be collected by the pollution control equipment. The binder typically consists of a solution of phenol-formaldehyde resin, water, urea, organo-silane, ammonium sulfate, and ammonia. The phenol-formaldehyde resin would be stored at a 50 to 55 percent solid concentration, and would be mixed with water and the other ingredients in vented mixing tanks, as needed.

The fiberglass would be pulled onto a perforated conveyer belt directly below the spinners by fans pulling air through the conveyor belt. Air temperature along the conveyor belt would be approximately 130°F. The fibers would be collected on the conveyer to form a fiberglass mat. Each spinner would contribute fiberglass to the mat, causing the mat to increase in thickness as it travels along the conveyor belt. The thickness of the mat would be controlled by the conveyer speed.

The forming and binder application process would emit reactive organic gases (ROG) and particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) through the stack, greater than 95 percent of which are organic solids and the balance of which are inorganic solids and minute amounts of entrained glass fibers.

3.6.7.4 Mat Curing

After the mat is formed, it would proceed on the conveyer belt to the curing oven. The purpose of the curing oven is to remove the moisture remaining in the fibers and thermally set the binder (known as curing). The oven temperature would range from 450°F to 550°F. Upper and lower conveyers in the oven would compress and cure the fiberglass to the desired final thickness. The space between the conveyers would be adjusted for different products.

The curing process would use low NO_x burners to reduce NO_x emissions from approximately 60 tons per year to approximately 13 tons per year. These emissions would be exhausted through the stack.

7

Knauf Revised Draft EIR

Ivan Hall
<info@ivanhall.com>
03/25/2006 12:59 PM

To KnaufPermit@EPA
cc dbenda@redding.com
bcc
Subject Knauf's Revised PSD Permit

Ivan Hall

2575 Star Drive

Redding, CA 96001;

(530) 247-1604

(530) 246-1060

info@ivanhall.com

Shaheerah Kelly

Air Division (AIR-3)

EPA, Region 9

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Ivan A. Hall

cc dbenda r/searchlight

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U.S. EPA, Region

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Sincerely,

Ivan A. Hall

cc dbenda r/searchlight

ivan a hall
<info@ivanhall.com>

02/01/2006 09:50 PM

To KnaufPermit@EPA

cc

bcc

Subject Proposed revised PSD

History: This message has been replied to.

To Whom it may Concern:

I read the public notice regarding Knauf's proposed revised PSD in the Redding Record Searchlight. The notice stated "these documents are also available" on line: The proposed revised PSD permit and Air Quality Impact Report. I wasn't able to locate them however. Can you provide the link or instructions please?

Likewise the public notice states, "The Administrative Record for the proposed permit, which consists of the proposed revised PSD permit, all data submitted by the applicant in support of the permit revision, and correspondence between EPA and the applicant is available for public inspection." Where is the information available at please?

The public notice also states: "All public documents that are available in electronic form may be requested via email." Please e-mail me all public documents available in electronic form.

Thank you.
Sincerely,
Ivan Hall

Next person is Ivan Hall.

MR. HALL: Good evening. My name is Ivan Hall. I live at 2575 Star Drive. Thanks for finally coming up here and squaring aware this NOx issue that's been going on for quite some time.

My comments concern the top down back analysis for the NOx emissions, now that NOx is under PSD control. What I noticed is that the low NOx burners, no cost analysis was given for the low NOx burners. Rather it was listed as baseline. And specifically in your document here you say that you're going to consider -- under the regulations you're going to consider the PSD requirements as if the construction of the source had not commenced. Clearly if we're using low NOx burners already in operation as baseline, that's not the case. Selective catalytic reduction, if I'm saying that right, just familiarizing myself with that terminology, you mention that's used in Quiet Flex operation of fiberglass facility in Texas. Yet when we look at the cost analysis given for Knauf using it, it's astronomical. So astronomical as to be ridiculous. Which makes me wonder why would anyone use it? So doesn't seem to be -- doesn't seem to jibe there.

One of the things I noted though is you're considering the SCR analysis in conjunction with the low NOx burners in operation. And I'm not sure that that's appropriate. Rather, should be looking at the selective catalytic reducers operating separately from the LNBs. And the low NOx burners, we should be getting emission reduction, a total capital cost, and total annualized cost to compare these things. We should be seeing what are the NOx emissions without pollution control devices and then each pollution control device matched against the pollution coming out to see which one is the most effective. Just in terms of reducing the pollution and then how much each one costs, and then we can see how much each ton is actually being reduced. I'm not sure this analysis is correct if we're calling low NOx burners a best available control technology, but we're only considering selected catalytic reduction after the low NOx burners have already been put into operation. So they're being unfairly evaluated in terms of their cost effectiveness in reducing pollution because they're having to reduce the pollution once it's already been considered to be a reduced by the low NOx burners.

It may be that the low NOx burners are ultimately the best available control technology. But I don't understand from this analysis that that's clear. And it seems to me that -- we've already given them four years, what's another six months. Whatever it takes to get this thing so it comes out straight here so that we understand.

If it comes down to, well, we don't want to make Knauf rip out their low NOx burners and put in selective catalytic reducers because it doesn't seem to make sense, at least let's get that in black and white. If it's because low NOx burners are the best available control technology and that's what they have on it, well great. Seems like they could have been forthcoming with their pollution emissions from the beginning and they would have had low NOx burners and everybody's time would not have been wasted up to this point.

So I'm a little skeptical of the whole process. Knauf has went to great lengths to try to do away with PSD permit to try to avoid some things. Fortunately, EPA Region 9 didn't allow them to do that. Now that we're here and we're considering a revised permit, I would ask that the Region 9 would consider my request and review the top down analysis for NOx facts and look at the technologies individually as if this factory truly had not been built yet, instead of looking at it, well, the factory has been built, it does have low NOx burners in place.

Thank you.

MS. DeLUCIA: Thank you. Next speaker is Colleen Leavitt.

MS. LEAVITT: Hi. We must kind of seem like a

Mary Scott
<caseynmary@hotmail.com>
03/02/2006 08:26 AM

To KnaufPermit@EPA
cc
bcc
Subject

I am requesting copies of the administrative records for the proposed revised PSD permit for KnaufInsulation GmbH.

Thank you,
Mary Scott
caseynmary@hotmail.com
(530) 275-3654

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-6

Mary Scott
<caseynmary@hotmail.com>
03/08/2006 09:08 PM

To Shaheerah Kelly/R9/USEPA/US@EPA
cc
bcc
Subject Knauf PSD Administrative Record

Dear Shaheerah,

Thanks again for coming up to Shasta Lake for the public hearing. I am again requesting access to the complete administrative record for the Knauf PSD permit, including all submissions by Knauf and all correspondence. I think the best thing would be to make copies of the documents available at the Shasta County Library in Redding. Please let me know when this can be done.

Thank you,

Mary Scott

(530) 275-3654

12982 Beltline Road

Redding, CA 96003

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-7

United States Environmental Protection Agency

RECEIVED

MAR 0 8 2006

Permits Office Air-3
U.S. EPA, Region 9

Public Comment Form

(Please Print)

Name Mary Scott

Address 12982 Beltline Rd.
Redding, CA 96003

Affiliation

Telephone (530) 275-3654

Email caseynmary@hotmail.com

Would you like to be added to our mailing list? ☒ Yes ☐ No

Comments: I am requesting that the public comment period be started over after new notification. The public notice was inadequate -

no address OR phone number given to view complete administrative record (applicant data, correspondence).

Additionally, I am requesting that this data be made available IN the local Redding/Shasta Lake area for public review.

Thank you

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-8

Mary Scott
<caseynmary@hotmail.com>
03/27/2006 04:59 PM

To KnaufPermit@EPA
cc
bcc
Subject Comments on Knauf Permit

Enclosed as an attachment is my comments on the Knauf proposed PSD permit.

Comments on the Proposed Prevention of Significant Deterioration Permit and Ambient Air Quality Impact Report for Knauf Insulation.doc

Comments on the Proposed Prevention of Significant Deterioration Permit and Ambient Air Quality Impact Report for Knauf Insulation

Proposed PSD Permit:

1. Annual Emissions Testing. Condition 29. This condition specifies that the annual emissions test shall be performed at minimum 95% of maximum operating capacity of 225 tons. Considering the different products produced, it would be easy for Knauf to perform the tests while manufacturing the least polluting product, thus giving a less than average reading of pollutants. Different products are made with different amounts of binder, varying from no binder for unbonded blowing wool insulation to 10% binder by weight for some products. This testing should be required to be performed at a minimum of 95% of the most polluting manufacturing process.

2. Annual Emissions Testing. Conditions 36, 58. These conditions allow Knauf to waive the annual test and/or allow for testing to be done at less than 95% of the maximum operating capacity. The permit should not allow Knauf to waive the test for any reason, as long as it is in operation and emitting pollutants.

3. Compliance and enforcement. The proposed permit does not have any conditions for enforcement and compliance. There are no consequences or penalties for Knauf not complying with the permit, other than reporting malfunctions and non-compliance. From the history of this plant, the only enforcement I see is an application for another permit modification when not in compliance with this one. There must be punative consequences for Knauf not complying with PSD limits. Knauf should be required to shut down when not in compliance.

Ambient Air Quality Impact Report

1. BACT determination. NOx limit. The Ambient Air Quality Impact Report states that it will review the proposed NOx emissions limit in accordance with the PSD requirement as if the sorce had not yet been constructed. Yet, there are several considerations made as add-on sources, rather than not yet built. First, electric furnaces for the manufacturing line have not even been considered. Electric furnaces would eliminate most, if not all NOx emissions, and were not even considered in BACT determination. Selective Non-Catalytic Reduction was only considered as an add-on control device, not a primary device.

In step 3:Rank existing control technologies, baseline NOx emissions were based on low NOx burners, because they are already in place. This does not comply with considering the source not yet constructed. The discussion of Table 6 only includes plants that have "similar operations." It does not consider the lowest NOx emitting plant, Certainteed Corporation of Kansas City, KS. The controls used by that plant must be considered in BACT.

Step 4:Evaluate the most effective controls consideres the costs of SCR as an add-on, not as if it were not yet built. The economic analysis is based on SCR as an add-on, not instead of LNBs. Would the total capital costs be the same as if the plant were not already built? Was it compared to the costs of LNBs?

Additionally, the environmental impact shown on Table 9 are only additional solid waste that must be disposed. This "additional solid waste" is what we are trying to keep out of the air. This should not be considered any more of an environmental impact when disposed in a landfill rather than emitted into the air.

The most blatant error in the document, though, is a factual error. In several places in the fact sheet, public notice, ambient air quality impact report, it states that increasing the production of fiberglass from 195 tons/day to 225 tons/day would not increase emissions. This is not true. The production increase is approximately 15 percent, and emissions would increase at about the same rate. The emission *limits* may not increase, but actual emissions WILL INCREASE. For this reason, an increase in production should not be allowed. NOx limits should be reduced to reflect current production. Once again, Knauf is trying to incrementally increase its production to minimize its responsibilities to keep the air clean.

Thank you for your consideration of my comments.

Mary C. Scott
12982 Beltline Road
Redding, CA 96003
(530) 275-3654
caseynmary@hotmail.com

voluntarily did this. Part of the citizens group, I remember they raised comment 295 tons, they voluntarily went to 195 so they can get below the 200-ton limit to have a different environmental process. They decided they would come down to a hundred and a half and they decided to come in at a hundred and a quarter. At one point they offered the citizens a thing, we're willing to square up with you guys and give you money for your lawyers and time for this, but when we come in, we're coming at 125. They actually said we'll give you the money. Some people said, "Well, I'll take the money." Some said, "No, we're into clean air, we're not into money, you don't understand."

So what caused some riff, the fact was Knauf then voluntarily reduced it to 125. It wasn't the citizens standing here before you that reduced that, it wasn't you, wasn't the EPA, wasn't our county officials, it was them. They lowered it. If they lowered that just to get in and now they're asking to increase it, that's not the way it's supposed to work. And I'd invite you to make sure that's not what's been happening and not going to happen in the future. Thank you.

MS. DeLUCIA: Thank you.

Next speaker is Mary Scott.

MS. SCOTT: I don't have a lot of detailed information and I need to get more information. The one comment -- a couple comments I would like to make though that I have made already to a few of you this evening is the inadequacy of the public notice. And I'm requesting that the -- I believe it's 45- or 60-day public comment period begin again because of the lack of address and phone numbers and information of the complete documents. The public notice that were available are not really available to us. I'm also requesting they be brought into Shasta County so we can actually see them without having to go down to San Francisco.

About compliance. This has happened from the original EIR to the revised EIR process and PSD process to the revision of the County process last year. All these limits keep getting set and broken. And even in this new PSD permit, it says you're set to these limits, and if you go over these limits, you need to notify us, you need to notify us. There's nothing in it for any compliance. Nowhere is there any explanation of what will happen once Knauf notifies the EPA. And I think that it needs to be written into the permit about what will happen. Will they be closed down? Will their production be limited or decreased? And I think this is one of the biggest problems the citizens of Shasta County have had is this over and over -- continuously for four years now, not one day in four years have they been in compliance. We were promised in the process that Knauf would be shut down within four hours of any violation of any air violation. And four years later it hasn't been shut down. And I really think this needs to be addressed.

Thank you.

MS. DeLUCIA: Thank you for comments.

Next speaker is Kathy Callan.

MS. CALLAN: As I begin, I'd like to thank Shaheerah and Gerardo for spending so much time on the phone with me last April answering my questions about the PSD permitting process. I really appreciate that.

I'm really concerned, though, about the allowances that are going to be given to Knauf. I know originally they had requested from you an increase -- I'm going to deal mostly with the nitrous oxide emissions and NOx emissions, because that's the largest increase they requested in the permit.

Originally they requested an increase in their NOx emissions from 24.9 tons per year to 99 tons per year. And I just want everybody here to realize that that's a four-fold increase. It kind of reminds you of the story of the Trojan horse kind of sneaking in and then the soldiers come out from within it. I think it's a violation of the public trust on Knauf's part.

Holly Harmon
<blkrose@sonic.net>
03/02/2006 01:18 PM

To KnaufPermit@EPA
cc
bcc
Subject Att: Ms. Kelly

Dear Ms Kelly:

I am writing to protest any increase in Knauf's air pollution limits. I purchased property on Newtown Rd. last July. It was only after the purchase was a made aware of the pollution caused by Knauf's fiberglass production. In particular, during the summer months, especially when there was little breeze, I would find glass particles, easily visible to the naked eye, on the roof and hood of my car as well as in any exposed empty containers. As indicated in your 'fact sheet', Knauf has already exceeded the permitted emissions. Word has it that they 'buy' pollution credits from other companies so that they can continue to exceed their allowable limits.

Many times, when Knauf is up and running, there is a definite heavy 'cloud' in the air. There is also a strong smell associated with it.

The general consensus is that Knauf can pretty much do whatever they please due to their size and political influence in Redding. People believe that they have little or no say in the matter. I have a problem with ANY increase in emissions, period. I don't want to 'breathe in' any of those fibers, which are so obvious to the naked eye.

During the past 30 days, I have noticed a sharp decline in Knauf's activity. I am assuming that due to this investigation that production at the Knauf facilities has been sharply curtailed.

Please DO NOT increase Knauf's pollution emissions. If anything they should be REDUCED.

In closing, I urge the EPA to conduct a continuous and vigilant monitoring of Knauf's emissions.

Thank you for your consideration,

Holly Nelson
12725 Newtown Rd.
Redding, CA 96003
530-276-9181

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MAR 0 8 2006

Permits Office Air-3
U.S. EPA, Region 9

EPA United States Environmental Protection Agency

Public Comment Form

(Please Print)

Name DOUGLAS BENNETT

Address 3370 OAKWOOD PL.

REDDING, CA 96001

Affiliation CITIZENS FOR RESPONSIBLE GOVERNMENT

Telephone 530-244-4010

Email dougbnt@snowcrest.net

Would you like to be added to our E-MAIL mailing list? ☑ Yes ☐ No

Comments: I'M CONCERNED THAT THE UPPER LIMIT OF TOTAL POLLUTANTS BE KEPT AS CLOSE TO ACTUAL LIMITS. THAT IS AT MAX. PERMITTED PRODUCTION RATES THE EMISSIONS SHOULD NOT BE ALLOWED TO EXCEED. CONTROL STANDARDS AND TOTAL ANNUAL PERMITTED EMISSIONS, THE OBVIOUS THING ONCE TIGHT GUIDE-LINES ARE IN PLACE IS TO HAVE A MONITORING AND REPORTING SYSTEM IN PLACE TO INSURE COMPLIANCE. ALL OF THIS SHOULD BE PUBLIC RECORD, AVAILABLE UPON REQUEST.

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-4

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MAR 0 1 2008

Permits Office Air-3
U.S. EPA, Region 9

Attn: Shaheerah Kelly (AIR-3)
EPA Region 9
75 Hawthorne St.
San Francisco, CA. 94105-3901

RE: Comments on Knauf Insulation Proposed Air Permit Revision

Since the EPA is bias in favor of the Knauf Corporation it would be useless to make any comments.

B Bowen

Sincerely, Bruce Bowen
16326 Acero Dr.
Anderson, CA 96007

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-5

March 28, 2006

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APR 0 5 2006

Permits Office Air-3
U.S. EPA, Region 9

Richard and Elaine Harrison
17918 Pine Cone Drive
Redding, CA 96003

Attn: Shaheerah Kelly
Air division (AIR-3) EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear EPA,

The Knauf plant has been down to rebuild its furnace since the holidays. In that time we have noticed some differences in and around our house. We have noticed that the grit that used to accumulate on the stove hood "exhaust fan" is not there? We clean it twice a week. We have realized that the persistent cough that I had is gone, and we have noticed that the grit that use to settle on our cars is not there? Also the noise from the plant is not heard. We live on a private road and the railroad uses it to repair Knauf access without repairing the road regularly.

I find it very disturbing that the EPA would even consider increasing anything that the Knauf plant emits; Knauf has not been within the limits of the original permit from the first day they started. The strange thing is that they have never paid the fines? If you get a ticket and don't pay the fine what happens? Why would you reward a business that routinely over pollutes when you could be rewarding companies that meet air quality permits.

Even the Record Searchlight dated March 23, 2006 has great concern about our air quality stating California has the second most polluted air in the U.S.

Please note there are many more concerns on this project such as the valley is like Southern California and there is nowhere for the bad air to go. As well as the particle matter will settle into the lakes that surround Redding that are all of California's drinking water and that we are breathing deadly carcinogenic material, cancer producing agents.

P.S. You should be sending this announcement to everyone in Shasta County not just the people who attend a meeting for public comment. Also it should have been put to a vote thru the state.

So is the no brainer easy fix solution just raise the permit levels to where Knauf is within limits and even a little for a buffer NO!

Please note we have real concerns about the KNAUF Plant. We live with in view of the facility. And in fact if you look out of our bedroom window you have a lovely view of a tower, see below. Also the noise is very much a problem to us. We had to replace our windows because of it and the extreme dust?.

CONCERNED CITIZENS,
Rick and Elaine Harrison

Elaine Harrison

March 28, 2006

Richard and Elaine Harrison
17918 Pine Cone Drive
Redding, CA 96003

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APR 0 5 2006

Permits Office Air-3
U.S. EPA, Region 9

Attn: Shaheerah Kelly
Air division (AIR-3) EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

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Sue Kowalewski
<sue_ed@juno.com>
03/14/2006 04:22 PM

To KnaufPermit@EPA
cc
bcc
Subject Knauf Fiberglass plant

Dear Mr Nastri:

Although we were unable to attend the information meeting at Shasta Lake on March 8, our concerns continue about Knauf wanting to increase their pollution limits for NOx and PM10 factory emissions. Fiberglass particles in the lung are a well known health hazard.

The 120 jobs that were created by Knauf do not begin to compensate for the possible increased health risks of cancer, asthma, especially to the elderly and children. We live two-and-a-half miles from the plant and feel we and our neighbors are daily at risk.

We hope you will not approve Knauf's request and fine the company any time they exceed the set limits.

Sincerely,

Edward & Suzanne Kowalewski
3731 Poinsettia Ave.
Redding, CA 96003

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-11

RAYMOND GALLANT
<shirray@mailstation.com>
03/09/2006 05:24 AM

To KnaufPermit@EPA
cc
bcc
Subject proposed epa air permit

PLEASE NOTE WE ARE OPPOSED TO ANY EPA AIR PERMIT FOR KNAUF FIBER GLASS CO. (AKA KNAUF INSULATION). THANK YOU SHIRLEY GALLANT, CITIZENS FOR CLEAN AIR REDDING

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-12

Chris Hunter

16265 Laurie Ann Lane
Redding, CA 96001

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APR 0 5 2006
Permits Office A
U.S. EPA, Regio..

February 13, 2006

Shaheerah Kelly
Air Division (AIR-3) EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear EPA:

I find it appalling that the EPA will vote to increase the PSD permit to pollute our environment for several reasons. The first reason is that the company (Knauf) has never paid the fines that they have accumulated from when they 1st started operating. The second reason is that Knauf goes over the allotted pollutants that their permit currently allows. So increasing the permit doesn't mean that you are increasing the pollutants by (x) you are actually increasing the pollutants by (x+1). What is going to stop Knauf from polluting more than they already do? Why would you reward a business that routine over pollutes when you could be rewarding companies that pollute within there permits?

P.S. You should be sending this announcement to everyone in Shasta County not just the people who attend a meeting for public comment.

Sincerely,

Chris Hunter
Concerned Citizen

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-13

Eric Cassano
<ecassano@shastalake.com
>

03/27/2006 12:38 PM

To KnaufPermit@EPA

cc

bcc

Subject Knauf Insulation PSD Air Quality Permit

[redacted]

Date: March 27, 2006

To: Shaheerah Kelly
Air Division (AIR-3)
U.S. EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

From: Eric A. Cassano
4512 Boca St.
Shasta Lake, CA 96019
(530) 275-1296
ecassano@shastalake.com

Subject: Comments on the proposal to revise the
Knauf Insulation PSD Air Quality Permit (5 pages)

Knauf has been in violation of their original PSD air permit since November 22, 2002. That's 1,221 days that Knauf has ignored their air permit and broke the federal pollution laws. It's been 3 years, 4 months and 5 days that the EPA has allowed this company to spew illegal pollution into our air. And now what does the EPA want to do? -- They want to give Knauf an even larger permit to pollute even more.

This insane plan makes a total mockery of the EPA's mission statement. I found a copy of the mission statement on the EPA website. The officials at EPA Region 9 should really take a moment to read it. After they read it, they may get inspired to actually fulfill it.

The mission of the Environmental Protection Agency is to protect human health and the environment. Since 1970, EPA has been working for a cleaner, healthier environment for the American people.

The EPA needs to spend less time writing new permits and more time enforcing the permits they've already issued. If the EPA won't enforce the pollution laws that Knauf is currently violating it has absolutely no business granting Knauf a new permit with even higher pollution limits.

The EPA needs to start protecting our environment instead of sheltering Knauf from the pollution laws. The EPA should be out at the industrial park right now shutting down this arrogant polluter and padlocking their doors instead of running a blatant pro-Knauf campaign for a new permit.

Despite numerous complaints from community members, the EPA has refused to protect our environment and enforce Knauf's original permit. The EPA should be ashamed and embarrassed to be involved in this fiasco. The EPA has been making all kinds of excuses on Knauf's behalf attempting

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-15

to explain why Knauf's actual NOx emissions ended up being 226% of what their original permit allowed. I suspect that Knauf knew all along that their NOx emissions would be well above their permit but submitted a lower figure so they could get a foot in the door.

On Sunday, February 2, 2003, Knauf ran a full page newspaper advertisement admitting to their NOx violation but attempted to cover up their particulate matter (PM10) violation with this incorrect statement: "With the exception of NOx, we have significantly beaten all permitted levels." This is simply not true. The test results plainly show that Knauf is violating their permit limit for particulate matter. Ironically, in the same full page advertisement, Knauf accused "some people" in the public of making "misleading claims about our performance." The advertisement goes on to say, "It seems that some people are willing to say just about anything to justify their actions, including stretching or even ignoring the truth." Here we have an illegal polluter attacking the public's credibility. Absolutely amazing.

I should mention that Knauf did receive a Notice of Violation from the EPA in October of 2004 but nothing has been done to make them comply with their permit. The Notice of Violation was signed by EPA Region 9 Air Director Deborah Jordan. Recently I've made several attempts to contact Deborah Jordan about the Notice of Violation but she refuses to talk to me. The EPA's public affairs department also refuses to return my phone calls.

The only person who's ever shown any interest in Knauf's ongoing violation was EPA Special Agent in Charge Scott West. He actually went out to the factory and took a look at it. I also gave Mr. West a large amount of information about the Knauf violations which included press clippings, test data and Knauf's full page newspaper advertisement which admitted that the NOx emissions at their Shasta Lake factory exceeded the permitted level.

At one point, while talking on his cell phone, Mr. West even described me as a possible witness in an air case. I recently called the EPA to check up on the case and learned that Mr. West had transferred out of EPA Region 9 to another region. None of the other investigators would give me any information on the status of the case. It was like the whole matter had completely disappeared.

After reading the proposed PSD permit I began to wonder if it had been written by Knauf's management or a paid consultant. I find it odd that Deborah Jordan's name is spelled wrong on the cover of the permit. You would think that the EPA person who drafted the permit would know how to spell the name of the Region 9 Air Director. Of course, if I were Deborah Jordan I wouldn't want my real name on this piece of rubbish either. I also noticed that Knauf's address is wrong on both the PSD permit and the Ambient Air Quality Impact Report. The jokers who wrote these documents don't even know where the factory is located let alone how Knauf's pollution will affect the surrounding area.

There are several problems with the permit and the air report. Here are two paragraphs that really caught my eye.

Performance tests shall be performed by an independent testing firm. Performance tests shall be at least performed at or greater than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. The Permittee shall furnish EPA with a written report of the results of such tests within thirty

(30) days after the performance tests are conducted.

Upon prior written request and adequate justification from the Permittee, EPA may waive the annual test and/or allow for testing to be done at less than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. EPA approval shall be in writing. Such request must be submitted to EPA no later than 60 days prior to the annual test date.

Who's idea was it to give Knauf the options of testing at less than maximum operating capacity or simply eliminate testing completely? Did the EPA think that nobody was going to read their proposed permit? Did Knauf's lawyers and consultants write this thing? The testing is intended to ensure that Knauf is complying with their permit. The inclusion of these ridiculous loopholes makes the permit useless as a way to regulate Knauf's pollution.

The EPA is using their "AMBIENT AIR QUALITY IMPACT REPORT" to justify giving Knauf a new permit. This report could have easily been written by Knauf's public relations department. Here's the way the report describes Knauf's violation of their original PSD permit.

Knauf's emissions tests demonstrated that the original permit limits for NOx were not appropriate. (From page 9 of the AMBIENT AIR QUALITY IMPACT REPORT)

Not appropriate? In my opinion, the report should actually read...

Knauf's emissions tests demonstrate that the company is in violation of their original permit limits for NOx and particulate matter but has been allowed to pollute illegally for over three years with no enforcement by the EPA.

How can the EPA simply ignore this company's violations of the law by saying the permit limits were "not appropriate?"

For several years EPA has been making excuses for Knauf's violations claiming that an "engineering error" led to a miscalculation of the NOx emissions. The identity of this numerically-challenged engineer has never been revealed despite numerous requests to EPA officials. Now the EPA has changed their defense of Knauf's lawbreaking by simply stating that the "limits for NOx were not appropriate."

I was told by an EPA technical expert that the ambient NOx levels used in the air report's computer modeling were measured in the town of Bella Vista, California back in the year 2000. How can this computer modeling possibly be accurate considering that the data was collected at least 5 years ago? The town of Bella Vista is close to 9 miles east of Knauf's factory and approximately 320 feet lower in elevation. An air analysis that uses data measured in Bella Vista can not possibly be accurate and should not be used by the EPA to support giving Knauf higher pollution limits. This kind of nonsense wouldn't even be acceptable in an 8th grade science class. The EPA needs to do a real air study with good local data instead of just plugging in some Knauf-friendly numbers. This is exactly what they mean by "garbage in, garbage out."

When Knauf's NOx violations were first announced by Shasta County officials the public was told that Knauf was causing $2000 a day of environmental impact. If this is true, how can the EPA justify raising Knauf's permit limits beyond a level that has already caused impact to the environment?

The EPA needs to take the public comment process seriously. At the end of the Ambient Air Quality Impact Report I found a paragraph suggesting that the permit would be issued despite any new information brought forth during the public comment period. I believe it was deliberately written this way to discourage public comment.

XIV. CONCLUSION & PROPOSED ACTION
Based on the information supplied by Knauf and the analyses conducted by EPA, it is the preliminary determination of EPA that the proposed modification will not interfere with the attainment or maintenance of any applicable PSD increment or NAAQS, and meets all of the requirements of 40 CFR ' 52.21. Therefore, EPA proposes to issue the PSD permit after soliciting public comment and conducting a public hearing. (From page 37 of the AMBIENT AIR QUALITY IMPACT REPORT)

The enforcement authorities at EPA Region 9 need to get in gear and start doing their jobs. Knauf needs to be held to their original permit limits and forced to comply with the law even if it means shutting the place down until they do. The EPA also needs to send Knauf another Notice of Violation for their particulate matter (PM10) violations occurring at their furnace stack. Now is the time to rein in this arrogant polluter before the EPA's credibility sinks any lower.

Knauf also needs to receive a fine from the EPA for the environmental impact they have caused to Shasta County. It was reported in the newspaper that the local air quality district had determined Knauf was causing $2000 a day in environmental impact. Since Knauf has been polluting illegally since November 22, 2002, the total fine on March 27, 2006 would be about $2,442,000.

A company that has polluted illegally for well over three years can not be allowed to avoid punishment for their actions and continue unchecked. Knauf must be forced to comply with their original permit and punished properly according to the law.

Knauf's request for a new permit must be denied.

Eric A. Cassano
4512 Boca St.
Shasta Lake, CA 96019
(530) 275-1296
ecassano@shastalake.com

Note: A copy of these comments has also been faxed to EPA Region 9 at (415) 947-3579

Date: March 27, 2006

RECEIVED
MAR 2 7 2006
Permits Office A.
U.S. EPA, Region ..

To: Shaheerah Kelly
Air Division (AIR-3)
U.S. EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

From: Eric A. Cassano
4512 Boca St.
Shasta Lake, CA 96019
(530) 275-1296
ecassano@shastalake.com

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The EPA needs to spend less time writing new permits and more time enforcing the permits they've already issued. If the EPA won't enforce the pollution laws that Knauf is currently violating it has absolutely no business granting Knauf a new permit with even higher pollution limits.

The EPA needs to start protecting our environment instead of sheltering Knauf from the pollution laws. The EPA should be out at the industrial park right now shutting down this arrogant polluter and padlocking their doors instead of running a blatant pro-Knauf campaign for a new permit.

Despite numerous complaints from community members, the EPA has refused to protect our environment and enforce Knauf's original permit. The EPA should be ashamed and embarrassed to be involved in this fiasco. The EPA has been making all kinds of excuses on Knauf's behalf attempting to explain why Knauf's actual NOx emissions ended up being 226% of what their original permit allowed. I suspect that Knauf knew all along that their NOx emissions would be well above their permit but submitted a lower figure so they could get a foot in the door.

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At one point, while talking on his cell phone, Mr. West even described me as a possible witness in an air case. I recently called the EPA to check up on the case and learned that Mr. West had transferred out of EPA Region 9 to another region.

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Knauf's request for a new permit must be denied.

Eric A. Cassano
4512 Boca St.
Shasta Lake, CA 96019
(530) 275-1296
ecassano@shastalake.com

Eric A. Cassano

restore trust in these companies that come into our community and please be there for us. And I think 72 tons per year is way too great an increase. Please make them abide by the original contract

MS. DeLUCIA: Thank y

Next speaker is Eric Cassano.

MR. CASSANO: Thank you for coming up here and holding this pro Knauf PR rally. I'd like to see you come up here sometime and maybe enforce the permits. That might be a good change of pace from the EPA since you do call yourselves the Environmental Protection Agency. Maybe protecting the environment could be something you could make time to do in the future.

I'm going to go ahead with my written comments here. Knauf has been in violation of the original PSD air permit since November 22, 2002. That's 1,202 days that Knauf has ignored their air permit and broke the Federal pollution laws. Been three years, three months, and 14 days that the EPA has allowed this company to spew illegal pollution into our air. Now that the EPA has finally come to town, what do they want to do? They want to give Knauf an even larger permit to pollute even more. The EPA needs to spend less time writing new permits and more time enforcing the permits they've already issued. If the EPA won't enforce the pollution laws Knauf is currently violating, it has absolutely no business granting Knauf a new permit with even higher pollution limits. Pretty fundamental stuff. Probably in your job descriptions, but God forbid you read them.

The EPA needs to start actually protecting our environment instead of sheltering Knauf from the pollution laws. The EPA should be out at the industrial park right now shutting down this arrogant polluter and padlocking their doors instead of holding this blatant pro Knauf campaign rally.

Despite numerous complaints from community members, the EPA has refused to protect our environment and enforce Knauf's original permit. The EPA should be ashamed and embarrassed to be involved in this fiasco. The EPA has been making all kind of excuses on Knauf's behalf attempting to explain why Knauf's actual NOx emissions ended up being 226 percent of what their original permit allowed. I suspect Knauf knew all along their NOx emission would be well above their permit but submitted a lower figure to get a foot in the door. Like they say, it's easier to ask forgiveness than permission. I should mention Knauf did receive a notice of violation, which I notice you conveniently left off your fact sheet in describing this particular matter. I think that's pertinent information when you're talking about granting a new permit to give people a history this company violated their original permit. Quit playing us like fools here. This is ridiculous.

Notice of violation -- they receive notice of violation from EPA in October of 2004. And I've got a copy if anyone is interested in looking. But nothing has been done to make them comply with the permit. The notice of violation was signed by the EPA Region 9 air district -- air director Deborah Jordan. Recently I've made several attempts to contact Deborah Jordan about this notice of violation, but she refuses to talk to me. EPA public affairs department also refuses to return my phone calls. The only person who has ever shown any true interest in this ongoing violation was EPA special investigator in charge by the name of Scott West. He actually went out to the factory and took a look at it.

I think it's rather interesting that when I called to check up on the case, I found out Mr. West had been transferred out of Region 9 by some mechanism, and none of the other investigators would give me any information on the status of the case. It was like it just disappeared.

Deborah Jordan's name is, by the way, spelled wrong on the permit. Kind of interesting that the air director's name wouldn't be caught as a typo on the front of your permit. You would think the person who drafted the permit would know how to spell the name of Region 9 air director. Of course, if I were Deborah Jordan, I wouldn't want my real name on this piece of rubbish either. And Knauf's address is wrong on both the PSD permit and ambient air quality impact report. So you have the address wrong of the facility you're talking about, and you claim to be experts. Be interesting to know how many of these people actually have been to the facility. Probably not very many.

I want to point out one thing that really caught my eye. There's a paragraph says, "Performance tests shall be performed by independent testing firm, performance test shall be at least performed at greater than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any 24-hour period. Committee shall furnish EPA with a written report of results of such tests within 30 days after the performance tests are conducted." Then a paragraph later says, "Upon written request and adequate justification from the committee, EPA may waive the annual test and/or allow for testing to be done at less than 95 percent the maximum operating capacity of 225 tons," et cetera. I won't go into all the detail, but you the get general idea. So I wonder which one of these options Knauf would choose.

My time is up. I'll submit the rest in written form. Pretty disheartened with your attempts at complying with the law. Please do your job. Thank you very much.

MS. DeLUCIA: Thank you.

Next speaker is Betty Doty.

MS. DOTY: Mine is short and probably off the target. I'll say it anyway.

Before Knauf was issued its first permit, Dr. Andrew Dever (phonetic), a Shasta County Health Officer, asked for basic health survey so we can have before and after figures about this obvious polluter. And I've heard all kinds of rumors that people that say they've had more health problems than before. I've heard that. But I know there's so many variables, it's not easy for us out here to know if something really serious is happening or not. I'm suggesting that part of the new permit, why isn't it possible you can put in a requirement they do a health survey now so a few years down the road we'll know something?

MS. DeLUCIA: Thank you for your comment.

Next speaker is Jeff Smith.

MR. SMITH: No comment at this time, thank you.

MS. DeLUCIA: Okay. Thank you.

In that case, next comment is Celeste Draisner.

MS. DRAISNER: I'll try to follow Betty Doty,

415-947-3579
FAX: Shaheerah Kelly
AIR DIVISION (AIR-3)
EPA Region 9
75 Hawthorne ST.
San Francisco, CA 94105-3901

United States Environmental Protection Agency

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MAR 30 2006

Permits Office Air-3
U.S. EPA, Region 9

Public Comment Form

(Please Print)

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-23

Name VIRGINIA MERRYMAN

Address 17516 Walker Mine Rd.
Redding, CA 96003-0148

Affiliation Retired Research Librarian

Telephone unlisted

Email None

Would you like to be added to our mailing list? ☒ Yes ☐ No

Comments: Being acquainted with EPA from their work in many projects, local and distant, from Iron Mtn Mine drainage, Hanford Cleanup, other processing plants to domestic and commercial Water systems, I am aware of many success stories. I am also very aware of many projects where EPA missed the mark completely.

I hope your concerns for local residences welfare will enable this Knauf project to be one of success for better health and Cleaner air.

Since reports show Knauf has not operated within the original licensed PSD rates, what will guarantee compliance to the new PSD permit rates?

The prevailing winds in this closed-end Valley allows heavier fall out over a smaller area than suitable for clean air. Knauf should never been sited here.

public comment on PSO rates for Knauf

Virginia Merryman
Redding, Ca

EPA should have independent (from Knauf) investigations of the actual fallout before increasing PSD limits. EPA should look into some, if not all, health, and other complaints of odor, noise, night time operations and dumping practices.

Our family has owned and resided here for over 38 years. We have witnessed the changes Knauf has caused.

Please do not increase our air Pollution!

Letter following.
Virginia

415-947-3579
Fax: Shaheerah Kelly
AIR DIVISION (AIR-3)
EPA Region 9
75 Hawthorne ST
San Francisco, CA 94105-3901

United States Environmental Protection Agency

Public Comment Form

(Please Print)

RECEIVED
MAR 27 2006
Permits Office Air-
U.S. EPA, Region

Name Virginia Merryman

Address 17516 Walker Mine Rd.
Redding, CA 96003-0148

Affiliation Retired Research Librarian

Telephone unlisted

Email None

Would you like to be added to our mailing list? ☒ Yes ☐ No

Comments: Being acquainted with EPA from their work in many projects, local and distant, from Iron Mtn. Mine drainage, Hanford Cleanup, other processing plants to domestic and commercial water systems, I am aware of many success stories. I am also very aware of many projects where EPA missed the mark completely.

I hope your concerns for local residences welfare will enable this Knauf project to be one of success for better health and cleaner air.

Since reports show Knauf has not operated within the original licensed PSO rates, what will guarantee compliance to the new PSO permit rates?

The prevailing winds in this closed-end valley allows heavier fallout over a smaller area than suitable for clean air. Knauf should never been sited here.

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-24

Public comment on PSD Rates for Knauf Page 2
Virginia Merryman
Redding, Ca

EPA should have independent (from Knauf) investigations of the actual fallout before increasing PSD limits. EPA should look into some, if not all, health, and other complaints of odor, noise, night time operations and dumping practices.

Our family has owned and resided here for over 35 years. We have witnessed the changes Knauf has caused.

Please do not increase our air Pollution!

Letter following.
Virginia

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MAR 3 0 2006

Permits Office Air-3
U.S. EPA, Region 9

March 26, 2006

To Members of the Environmental Protection Agency,

As one of the many private citizens that you serve, I demand you deny the current request of the Knauf corporation in Shasta Lake City, to increase its pollution limits.

The EPA states that the proposed increase of NOx emissions will not violate the National Ambient Air Quality Standards. This is meaningless and misleading since during his presidency George W. Bush has ceaselessly decimated air quality standards in favor of corporate pollution. The "standards" right now are very low, which is why Knauf is acting swiftly to take advantage.

Under the 14th Amendment, corporations in America have acquired the false status of personhood. Because of this fake claim, corporations have gained enormous power, privilege and advantage over ordinary citizens, who you as a "protection" agency must consider first.

I want it to go on record that the Knauf corporation is polluting the north state environment and damaging the health of local citizens, under this utterly false legal claim of "personhood". A corporation is a *group of people*; shareholders, removed from and protected by the corporate body they govern. This group of private citizens is not held legally or morally responsible to anything but the corporate inherent drive for profit.

A corporation cannot possibly serve the public interest, it can only legally serve its shareholders, most of whom are not required to suffer the pollution that they impose onto others. This is an anti-democratic, win-lose situation. Corporate shareholders win, private citizens lose. It is the duty of the each EPA member to recognize this, and act to protect the people and environment they are personally paid to protect.

Since Knauf has been producing fiberglass at it's facility in Shasta Lake City, I have developed sensitivities to my environment in the form of allergies that act like a head cold. A coworker of mine, Jackie Leos, who lives in Summit City near the Knauf facility has developed a chronic deep seated cough since Knauf has come around. My husband has been having newly acquired sinus difficulties, my grandson experiences fatigue not normal for a thirteen year old youth, all of this since Knauf has established itself in our area. These are only a few of the stories, and I hope victims of the Knauf corporation will come forward and speak out.

Who is monitoring the Knauf corporation? As a legal "person", Knauf has the 4th Amendment right to be protected from random inspection, (although private citizens in America today, no longer enjoy that freedom under the so-called Patriot Act).

Who is researching the local health of the citizens and environment for short and long term effects of the Knauf emissions? Knauf must be held monetarily responsible for every health claim against it, for the restoration of every bit of local environment damaged by its imposed pollution, since it has made the north state its home. Along with millions of others in America, I, nor any of my immediate family members have health insurance, and cannot afford to have toxic air forced on us for the profit of another greedy, inhumane corporation.

It is clear citizens need to unite and take action against toxic and abusive corporations like Knauf by demanding responsible government; government willing to revoke corporate charters and impose heavy fines. Citizens need the Environmental Protection Agency to do its job in protecting the health of the environment, which is the health of the people. Who is left to protect us, if we cannot even look to the agencies created to do that very job?

Sincerely,

Suzy Coffee

Suzy Coffee
P.O. Box 514
Manton, CA 96059

03/28/2006 16:52 FAX 530 223 5200 001/004

BERG AND ASSOCIATES

A LAW CORPORATION

DIRECT ALL CORRESPONDENCE TO:
5000 BECHELLI LANE SUITE 201
REDDING, CA 96002
530-223-5100
FAX-223-5200

CHICO OFFICE
1381 ESPLANADE
CHICO, CA 95926
530-896-0100
FAX-343-2269

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MAR 28 2006

Permits Office Air-3
U.S. EPA, Region 9

FAX TRANSMITTAL COVER SHEET

TO: Shaheerah Kelly

FAX NUMBER: 1-415-947-3579

FROM: Berg & Associates

DATE: March 28, 2006

OUR FAX: (530) 223-5200 NUMBER OF PAGES (Including cover sheet): 4

RE: ____

NOTE TO RECIPIENT: ____

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☺ By: Candace Whaler

ERIC ALAN BERG*
GARY ROBERTS
KATHERINE M. TANNENBAUM
MICHELLE MAHOOD, Legal Assistant
SONJA FACKRELL, Family Law Assistant
HEATHER COLLINS, Trial Assistant
JENNIFER DUVAL, Subpoena Clerk

* CERTIFIED SPECIALIST IN CRIMINAL LAW BY THE CALIFORNIA STATE BAR

E-mail: bergiaw@awwwsome.com
Website: http://www.bergslaw.com/

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-26

PSD issued to Knauf Fiberglass insulation (4)

7-12-06

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FEB 17 2006

Dear Ms Shaheerah Kelly

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FEB 17 2006

Permits Office Air-3
U.S. EPA, Region 9

The EPA + the purpose of the Clean Air Act is to continually clean + improve enviromental qualities of EARTH, AIR + WATER

How does adding more pollutants fit with of mission of continually cleaning the air? EPA has become an impotent agent to protect polluters — THE MISSION IS TO IMPROVE AIR QUALITY Increasing PM 10 Limits 6 TIMES is out of control. Knauf already couldn't meet NOx LIMITS Had their operating permit altered - Now THEY WANT TO INCREASE POLLUTION AND YOUR WORTHLESS AGENCY WILL APPROVE MORE POLLUTANTS AND MAKE IT "LEGAL"

The head of the Dept of Resource management for the County lied to a citizens board to get the operating permit issued We have documentation.

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-1

(2)

Quit going along with the program of selling the enviroment for money. THE ENVIROMENT IS ALREADY OVERLOADED SHOW SO-COURAGE — DENIAL OF INCREASED POLLUTANTS IN THE ENVIRONMENT

Thank You

Russ Meade
1991 Heller
Redding Ca 96001

530-244-5250

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-2

THE EPA

MARCH 8, 2006

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MAR 2 2 2006
Permits Office Air-3
U.S. EPA, Region 9

THE EPA, YOU MIGHT
AS WELL THROW THEM
AWAY
SHUFFLING PAPERS EVERY
DAY
PROTECTING POLLUTERS FROM
THE GIVE-A-HOOTERS
MORE POLLUTION IS THEIR
SOLUTION
THEY GO THRU THE MOTIONS
BUT DON'T REALLY CARE
JUST PROTECTING THEIR JOBS,
ITS REALLY UNFAIR
THE ONLY WAY TO REALLY
BARE FRUIT IS TOO
TAKE THEM TO COURT WITH
A LAWSUIT

SO FOLKES ITS THE END
OF THES RHYME
ABOUT THE EPA WHO
WASTES YOUR TIME

Rusy [illegible]
1991 Heller
Rdg C 96001
530 - 244 5250

BERG AND ASSOCIATES

A LAW CORPORATION

DIRECT ALL CORRESPONDENCE TO:
5000 BECHELLI LANE SUITE 201
REDDING, CA 96002
530-223-5100
FAX-223-5200

CHICO OFFICE
1361 ESPLANADE
CHICO, CA 95926
530-896-0100
FAX-343-2269

March 28, 2006

Shaheerah Kelly
Air Division (AIR-3)
U.S. EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105

Dear Ms. Shaheerah Kelly:

I INTRODUCTION

I, Eric Alan Berg, am writing on behalf of interested parties Colleen Leavitt, Celeste Draisner and Citizens For Clean Air, and in response to your agency's proposal to revise the Prevention of Significant Deterioration (PSD) air quality permit for Knauf Insulation GmbH.

Environmental Protection Agency Region 9 (EPA) is requesting public comment on this latest proposed PSD permit revision. The public comment period for submitting comments on EPA's proposal will end March 28, 2006.

Knauf Insulation is a fiberglass insulation facility located in Shasta Lake, California that has been operating in violation of its pollution limits since November 22, 2002. As of the drafting of this letter, it continues to violate local and federal regulations enacted for the benefit of the public good.

Citizens For Clean Air has reviewed the fact sheet, proposed permit and Ambient Air Quality Impact Report to gain a better understanding of the basis for EPA's proposal to issue a new permit. Through careful analysis, we have concluded that the Air Quality Impact Report is inadequate and must be redone. Additionally, we find EPA's complete lack of regard for the health and welfare of the citizenry surrounding the factory to be reprehensible in the extreme.

II ARGUMENT

In general, we urge you to investigate the totality of the process by which your agency originally permitted Knauf and how after Knauf was granted a PSD permit in 2000 they willfully disregarded their promises to your agency and the public.

ERIC ALAN BERG*
GARY ROBERTS
KATHERINE M. TANNENBAUM
TEAL M. DIXON
MICHELLE MAHOOD, Legal Assistant
HEATHER COLLINS, Trial Assistant
JENNIFER DUVAL, Subpoena Clerk

* CERTIFIED SPECIALIST IN CRIMINAL LAW BY THE CALIFORNIA STATE BAR

E-mail: berglaw@awwwsome.com
Website: http://www.bergslaw.com/

This means looking at the full authority given the EPA by the Clean Air Act as well as all other applicable federal laws including but not limited to the Resource Conservation and Recovery Act (RCRA) , the Clean Water Act, the Civil Rights Act and the Administrative Procedures Act.

The current situation is unusual for both the EPA and the permitee, Knauf. Because Knauf does not actually possess a current Title V Permit to Operate, the facility must now rely on EPA to approve their new PSD permit application in the hope of one day being given a federal operating permit. EPA admits they may take until this summer 2006 to make a decision.

Meanwhile Knauf continues to violate the conditions of their PSD permit and manufacture fiberglass illegally.

If your investigation is to be meaningful, you must address both the pattern and practice of behavior by Knauf and the EPA. Greater consideration must also be given to the many hazards posed to residents (who live within 200 feet) and the elementary schools a few miles away.

Equipment and operating modifications can go a long ways toward reducing PM10 and NOx emissions. Technologies such as low NOx burners, staged combustion, gas recirculation and low excess air firing can all assist with NOx removal. However, to meet upcoming EPA mandates, industry has been using more aggressive reduction techniques such as Selective Catalytic Reduction (SCR).

Why do Citizens For Clean Air consider NOx Bad?

- NOx contributes to acid rain
- NOx emissions reacts to form low level (bad) ozone and smog
- Nitric oxide (NO) is a greenhouse gas

Status of SCR Installations:

- SCR is the most widely used post-combustion technology for minimizing NOx emissions
- Over 110 Selective Catalytic Reduction units are to be installed in the Eastern US alone
- More than 60% of SCRs are on units of 500 MW or larger

This technology. among others, has not been given proper consideration in the environmental review documents prepared by EPA.

EPA has prepared a draft permit and an Ambient Air Quality Impact Report (AAQIR) that does not significantly address the issue of best available control technology (BACT). The draft permit contains conditions for controlling air pollution only in the abstract.

The AAQIR includes an air quality impact analysis with data that does not apply to what Knauf is actually doing at their facility. EPA includes no analysis for installation of the BACT; and it describes the derivation of the conditions in the draft permit and the reasons for them poorly and without sufficient evidence.

The process of preparing the draft permit may take from six months to a year from the time the application is deemed complete. Yet EPA continues to allow Knauf to violate the law, while assisting Knauf in obtaining even higher pollution limits.

III CONCLUSION

Surely the accumulation of these facts, in particular the location of the facility to residents and elementary schools, should invoke EPA's authority to prevent any further hazards. In fact the courts have found (Dague V. City of Burlington) that: "a finding that an activity may present an imminent and substantial endangerment does not require actual harm...Courts have consistently held that 'endangerment' means a threatened or potential harm and does not require proof of actual harm."

In this case the harm has already occurred. Knauf has not obeyed the law. The extent of harm is the only question remaining. Waiting for an answer could impose irrevocable harm on the community. EPA must work harder to protect the citizens who live near this poorly regulated industrial pollution source.

Please feel free to contact us if you have any questions regarding the above.

Sincerely,

ERIC ALAN BERG
Attorney, Citizens For Clean Air and Water Campaign

cc Ombudsman Via Fax: (202) 566-2848
U.S. Environmental Protection Agency
401 M Street, S.W. Room SE 301
Washington, D.C. 20460

Liz Ballou
<lizardgoddess62@yahoo.com>
03/28/2006 01:05 PM

To KnaufPermit@EPA
cc
bcc
Subject Knauf PSD Permit Revision

The initial air quality analysis for Knauf GmbH was grossly inadequate. For EPA to revise the PSD permit in the first place I find extremely ludicrous. Knauf is known as a gross polluter in Indiana and Alabama. Do we really need them to continue doing this in California too?

Knauf promised to come to our neighborhood as clean as possible and now they are requesting "carte blanche" from you to pollute more? What's wrong with this picture??
Why are you even considering approval of yet ANOTHER REVISION?

As an educator, I am appalled at the continuing saga of the Knauf pollution game. I hope you think strongly about all the little kindergarten lungs youare about to damage more by modifying Knaufs' PSD permit. I hope you can sleep at night!

Sincerely,

Elizabeth A. Ballou
P.O. Box 207
Shasta Lake, CA 96019

Liz Ballou
<lizardgoddess62@yahoo.co
m>
03/28/2006 01:06 PM

To KnaufPermit@EPA
cc
bcc
Subject Knauf PSD Permit Revision

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Sincerely,

Elizabeth A. Ballou
P.O. Box 207
Shasta Lake, CA 96019

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-28

Due by March 28th

United States Environmental Protection Agency

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-29

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MAR 28 2006

Permits Office Air-3
U.S. EPA, Region 9

RECEIVED

MAR 28 2006

Public Comment Form

(Please Print)

Name Susan Walden

Address 3320 Nicolet Ln.
Redding, CA 96001

Affiliation

Telephone 530 243-6504

Email rgwalden@earthlink.net

Would you like to be added to our mailing list? ☐ Yes ☑ No

Comments: The EPA failed to enforce the original permit levels. What is the purpose of issuing a new one? The permit is worthless.

Statistics on NOx levels can and have been manipulated to favor Knauf's output, for example testing site remote from the plant. A scientific background is not necessary to understand that tons of PM10 and Nox levels will be deleterious to local citizens. It's plain common sense!

The EPA needs to do its job by conducting its own scientifically valid study, not just accept previous numbers.

Read your own literature! At the meeting on Mar 8th in Shasta Lake pamphlets were

(over)

available from the EPA stressing the harmful effects of NOx and PM10. Then, ironically, the EPA has the unmitigated gall to substantially allow an increase in the pollution levels for Knauf.

Do not issue the revised permit. Insist on compliance with the original permit and enforce the consequences that your agency set up.

Ann Louise Zimmerman
<twozims@awwwsome.com>
03/26/2006 05:50 PM

To KnaufPermit@EPA
cc
bcc
Subject Reject Knauf's application

Air Division (Air-3)
U.S. EPA Region 9
75 Hawthorne Street
San Franciscio, CA 94105

Dear Air Division:

Regarding the application of Knauf to increase four fold their NO emissions.

We are adamently opposed to Knauf increasing any emissions. What they are emitting now is obscene. They never should have been permitted to come into this area in the first place.

The terrain here can be compared to a bowl, a large lower area surrounded on three sides by mountains. The area frequently has high pressure systems that place a lid on the entire area. Everything is trapped in this "bowl" and we breathe all the muck.

These are serious respiratory ailments caused by the Knauf emissions.

They did not live up to their projected and contracted emission level in the beginning. They should not be allowed to increase it now.

Thank you,

Mr. and Mrs. Albert J. Zimmerman
6394 Carmel Dr.
Redding, CA 96003

530 242-6897No virus found in this outgoing message.

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-30

Ann Louise Zimmerman <twozims@awwwsome.com>

03/28/2006 06:32 AM

To Ann Louise Zimmerman <twozims@awwwsome.com>

cc KnaufPermit@EPA

bcc

Subject Fw: Reject Knauf's application

Dear Shaheerah Kelly:

This was sent to you on Sunday, March 26, 2006. In time to meet the deadline. I am faxing it to you today as it was returned to me as "mail failure - undelieverable" via e-mail.

Thank you, Louise Zimmerman

----- Original Message -----
From: Ann Louise Zimmerman
To: knaufpermit@ep.gov
Sent: Sunday, March 26, 2006 5:52 PM
Subject: Fw: Reject Knauf's application

----- Original Message -----
From: Ann Louise Zimmerman
To: knaufpermit@epa.gov
Sent: Sunday, March 26, 2006 5:50 PM
Subject: Reject Knauf's application

Shaheerah Kelly
Air Division (Air-3)
U.S. EPA Region 9
75 Hawthorne Street
San Franciscio, CA 94105

Dear Air Division:

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They did not live up to their projected and contracted emission level in the beginning. They should not be allowed to increase it now.

Thank you,

Mr. and Mrs. Albert J. Zimmerman
6394 Carmel Dr.
Redding, CA 96003

530 242-6897No virus found in this outgoing message.
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Version: 7.1.385 / Virus Database: 268.3.2/294 - Release Date: 3/27/06

United States Environmental Protection Agency

RECEIVED
MAR 0 8 2006
Permits Office Air-3
U.S. EPA, Region 9

Public Comment Form

(Please Print)

Name: Joy Newcom R.N. F.N.P. - P.A.

Address: 3702 Fujiyama Way
Redding, CA 96001

Affiliation: 401(c)3 Health Improvement Partnership, Northstate Health Network

Telephone: 530-241-1007

Email: sgnewcom@snowcrest.net

Would you like to be added to our mailing list? ☒ Yes ☐ No

Comments: Please please please stop KNAUF (cough) Fiberglass from SUFFOCATING US!!! Our air inversion layers in the summertime are unbearable — We can't even see the mountains anymore — I-5 Deisel trucks are CONSTANT, woodstove smoke, dirt roads, Sierra Pacific, Calaveras Cement, ETC. and NO access to the ocean, surrounded by TALL mountain ranges — We're the LOW POINT — of the north valley. Our Shasta County Resource director, Russ Mull lies about Knauf air-test-results and we can't afford to hire our own independent tester.

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-32

3-8-06

Why is Knauf Fiberglass plant allowed to suffocate us?

CLEAN AIR IS MORE IMPORTANT THAN GERMAN MULTI-NATIONAL CORPORATE PROFITS !!!

ISN'T THERE EVEN ONE, SINGLE PERSON IN A POSITION-OF-POWER WHO WON'T SELL-OUT A CHILD'S RIGHT TO CLEAN AIR??? THERE ARE THOUSANDS OF BABIES, CHILDREN, AND YOUNG PEOPLE WHO DESERVE the PURE, UNADULTERATED HEALTH AND BEAUTY OF CLEAN AIR AND CLEAR VIEWS

FIBERGLASS IS HATED BY WORKERS-CONTACTED-BY-IT AND IS COMPLETELY UNNECESSARY — thanks to cellulose, strawbales, foam and COB —

HERE IS the very, worst, possible location for a plant: AIR-INVERSION LAYERS 1/2 the year, (when its hot), surrounding mountain ranges preventing ventillation, and being in the low point of the north valley —

Joy Louise Newcom R.N. F.N.P.-P.A.
530-241-1007

KNAUF

March 21, 2006

Cert. Mail #70010320000106104359

Shaheerah Kelly
Air Division (AIR-3)
EPA Region 9
75 Hawthorne Street
San Francisco, California 94105-3901

RECEIVED

MAR 27 2006

Permits Office Air-3
U.S. EPA, Region 9

Re: Comments on Proposed PSD Permit
for Knauf Insulation GmbH
Shasta Lake County
PSD Permit No. NSR 4-4-4, SAC 03-01

Dear Shaheerah:

Below sets out the comments by Knauf Insulation GmbH on the above-referenced proposed permit:

1. **Project Description**. In the third sentence of the second paragraph, the reference to 225 ton per day capacity for the electric glass melting furnace should be revised to indicate that this reference is descriptive only, and does not impose a capacity limitation on the furnace. A production limit is not required under PSD, and is not a best available control technology (BACT) limit. BACT focuses on *emissions rates*, not *production rates*. It is defined as an "*emission limitation* … based on the maximum degree of reduction…." *See* 40 C.F.R. 52.21(b)(12) (emphasis added). All ambient modeling calculations were performed based on the allowable emission rate, not based on a production rate. There is no basis for including an enforceable production limitation.

In the original PSD permit, a production capacity of 195 tons per day was referenced, but that was inserted for state-law purposes, not for federal PSD purposes, and that limitation should not be carried forward here. Condition No. 3 of that permit stated:

> Equipment is to be maintained so that it operates as it did when the permit was issued. Any anticipated production expansion beyond the 195 Tons/day limit found in Condition #35 of this permit is prohibited without separate application for a new Authority to Construct and Permit to Operate from the District. Any change in equipment, method of operation, fuel use, or process which may cause an emissions increase, shall be reported to the District at least 30 days prior to taking any action or seeking other permits regarding such change in order for the District to determine if an application for an Authority to Construct is necessary.

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-33

However, that permit was issued as a joint state-Authority-to-Construct ("ATC") and a federal PSD permit. The 195-ton-per-day condition was derived from the state CEQA process and therefore should be considered part of the state-ATC portion of the permit.

When Shasta County intended to include General Permit Conditions as part of both the state Authority to Construct portion and the federal PSD portion, it did so by using the phrase "Authority to Construct (PSD Permit)." *See* General Permit Conditions 1, 2, and 4. However, the General Permit Condition requiring an application if production was to be expanded beyond 195-tons/day, General Permit Condition 3, contains no such phrase. Instead, that condition merely requires the submission of an application for a "new Authority to Construct and Permit to Operate," *i.e.*, two local permits. Furthermore, the second half of General Permit Condition 3 that deals with changes that may cause an emissions increase allows the District to determine if "an Authority to Construct" permit is necessary. By using the phrase "Authority to Construct" in General Permit Condition 3 in place of "Authority to Construct (PSD Permit)" as found in General Permit Conditions 1, 2, and 4, the County expressed clear intent that the terms in General Permit Condition 3 are part of the state Authority to Construct portion of the permit, and not part of the federal PSD portion of the permit, and they impose state, not federal, permitting requirements.

In prior conversations, EPA has indicated that the federal Environmental Appeals Board ("EAB") determined that Condition No. 3 was a PSD condition and that EPA was bound by that "determination." *In re: Knauf Fiber Glass, GmbH*, PSD Appeal Nos. 98-3 through 98-20 (February 11, 1999). We have reviewed that decision, and believe the EPA conclusion may be in error. Therefore, we request reconsideration of the EPA position.

In *In re Knauf Fiber Glass GmbH*, the EAB stated:

> A number of petitioners assert that Knauf ultimately intends to build a much larger facility than the one described in the permit application. Petition Nos. 98-6, 98-16, 98-17. These petitioners are concerned that after Knauf builds the permitted facility, it will seek to increase production and add additional manufacturing lines. Petitioners believe that Knauf should be required to apply for a PSD permit for the full plant build-out at this time. Petition 98-16 at 3.
>
> In response to these concerns, AQMD modified a permit condition so as to explicitly prohibit expansion of production beyond 195 tons of fiberglass/day. Permit ¶ 3. This condition also states that a new PSD application will be required should Knauf seek to increase production. *Id.* In the response to comments, AQMD explained that a new PSD permit and CEQA review is required before any expansion will be permitted. RTC at 5, 13.
>
> The express prohibition in the permit is fully adequate to address petitioners' concerns. A permit will be required before construction can commence *on any major modification* to the plant. The purpose of a new PSD review process *for major modifications* of facilities like the proposed Knauf plant is to allow issues such as BACT and the air quality analysis to be revisited before any expansion

> takes place. The public participation requirements are also applicable to PSD modification applications.

Id. at 50-51 (emphasis added).

This EAB language does not imply that this condition is a federal "PSD" condition. It states that the condition was imposed by AQMD. Further, when it notes that the condition requires a "PSD" application to be submitted should Knauf seek to increase production, it is apparently contemplating a production increase *that results in a significant emissions increase.* At the time, the petitioners were referring to the construction of a much larger facility with more lines that they believed should have been permitted as one project. They were not referring to small, non-significant increases.

The meaning of EAB's statements becomes clear when it states that "a permit will be required before construction can commence on any *major modification* to the plant." *Id.* (emphasis added). It further states that "the *purpose* of a new PSD review process for *major modifications* ... is to allow issues such as BACT and the air quality analysis to be revisited..." *Id.* (emphasis added).

The term "major modification" is defined under PSD at 40 C.F.R. § 52.21(b)(2)(i). It is not equivalent to "any increase." Instead, before a modification is "major," it must result in "significant" emissions increases.

The focus of the EAB decision was that PSD review would be required prior to any "major modification," and therefore any challenges to significant future expansions (such as the addition of new lines, which was the subject of the petitioners) could be reviewed if a new PSD permit was needed. The fact that the Shasta County AQMD chose to include an additional state requirement which provided that the county would need to issue a county permit to allow production increases does not convert that restriction into a "PSD" permit term. The idea that any production increase, no matter how small, would trigger PSD review, even if the increase had *no* or minimal emission impacts, is contrary to the PSD program and it conflicts with the EAB decision.

GENERAL PERMIT CONDITIONS

2. **<u>Condition 1 — Permit Notification Requirements</u>.** This condition, which relates to notifying EPA of the initial performance test deadline, should be deleted because this condition has been satisfied and is no longer necessary or appropriate.

3. **<u>Condition 2 — Facility Operation</u>.** This condition, which imposes a requirement to maintain and operate the facility in a manner consistent with good air pollution control practice for minimizing emissions, should either be deleted or should be tied to specific emission units. The only requirement that establishes this standard is the New Source Performance Standard ("NSPS"), which applies on a unit-by-unit basis, not on a plant-wide basis.

4. **Condition 3 — Malfunction Reporting.** Subsection c., which states that "compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of the permit" is inconsistent with the malfunction exemption, which is available under the NSPS at 40 CFR 60.11, and other comparable exemptions.

5. **Condition 10 — Recordkeeping.** The first sentence of this condition, which states that "failure to monitor, record information, or maintain records" will be "considered a violation of the applicable emission standards," is not based on any law or regulation and should be deleted. A violation of an applicable emission standard is a violation of the standard. A violation of a monitoring or recordkeeping requirement is a violation of that requirement, not of the underlying standard.

MOLTEN GLASS PRODUCTION OPERATING CONDITIONS

6. **Condition 17.** The word "protable" in the last line should be changed to "portable."

7. **Condition 18.** As described under Comment No. 1, there should be no production limit of 225 tons per rolling 24-hour period. Accordingly, Condition 18 should be removed.

8. **Condition 22.** This condition, which establishes PM10 emission limitations for the furnace stack should be changed in the following three ways.

a. The limitation should be set at 1.0 lb/hr, not .67 lb/hr. EPA calculated an emission limit of .67 lb/hr on the following basis:

> Knauf estimates that 80 - 90% of the particulates exiting the furnace stack could be condensable particulate. Using the 85% figure for condensable in the original BACT limit of 0.1 lb/hr for filterable portion of the particulate matter emissions, we calculate a total PM10 limit of 0.67 lb/hr....

First, the fraction that should be used is 90%, not 85%, to ensure that the limit is achievable. Using the average condensable estimate, rather than the maximum condensable estimate, causes the emission limit to be violated about 50% of the time (whenever above average). If a figure of 90% is used, the base PM10 limit would be 0.72 lb/hr. In addition, some margin of safety should be applied to account for variability in emission rates, rather than relying on a small number of data points or estimates. A 33% safety margin would be reasonable, which would lead to a value of approximately .96 lb/hr, which when rounded up should be equal to approximately 1.0 lb/hr.

b. The emission limit should be expressed simply in terms of pound per hour, and not pound per ton of glass pulled, because the emission rate per production unit will vary based on the production level. Emissions associated with production from the Knauf facilities are not linear to the production rates. The control equipment used by Knauf generates a relatively consistent emission rate, regardless of the production rate. At lower production rates, the mass loading would presumably be equal to or somewhat less than the emission rates at higher production levels, but the emission rate per production unit would be higher because of the lower production rates and the relatively similar emission rates, therefore, making it unreasonable to establish a production rate limit based on a maximum production rate and imposing that limit at lower levels of production. In addition, it is important to note that the ambient modeling was performed at the maximum lb/hr allowable emission rate, making the lb/ton emission rates unnecessary for ambient protection.

c. **The annual limit should be deleted.** The annual emission limit is unnecessary because it is fulfilled by the hourly emission limit. Since the furnace runs continuously, any annual emission limit should simply be based on the hourly emission rate, multiplied by 8760 hours, making the annual limit redundant. Knauf notes that the 2.2 tons per year limit is less than the .67 lb/hr limit (if extrapolated), which should be changed if the annual limit is maintained. (Knauf also believes the limit should be 1.0 lb/hr, not .67 lb/hr, as discussed above.) The .67 lb/hr limit multiplying 8760 is equivalent to 2.93 tons per year, not 2.2 tons per year.

9. **Condition 23.** This condition imposes a requirement to record the hours of operation of the glass melting furnace on a daily basis and retain records of the hourly glass pull rate. The condition should not require recording the hours of operation of the glass melting furnace because the glass melting furnace runs 24 hours a day, and there is no benefit by tracking the number of hours it runs in any given day.

10. **Condition 24.** This condition, which establishes a 5% opacity limit for any three minute average, should be changed to impose that limit on a six minute basis, since six minute averages are the federal standard, and three minute averages are not applicable to a federal PSD permit. Six minute opacity averages are the compliance method, per 40 C.F.R. 60.11 and 40 C.F.R. 60, Appendix A, Method 9.

11. **Condition 25.** The reference to requiring a summary report of three minute averages of opacity readings should be changed to six minute averages, since a six minute averaging period is the federal standard, not a three minute averaging period. *See* Comment No. 10.

12. **Condition 29.** This condition, which establishes the criteria for conducting performance tests, should be modified to allow the submission of written results within 60 days of the test date, rather than 30 days. The federal MACT rules allow 60 days for submission of test results and there are no regulations that require such test results to be submitted within 30 days, which is technically challenging in real-world testing.

13. **Condition 31.** This condition should be modified to remove references to a lb/ton of glass pulled because the limit should be expressed in terms of lb/hr, not lb/ton of production. *See* Comment No. 8.

14. **Condition 32.** This condition should be deleted because it provides no useful data. This condition requires the permittee to use an emission factor gained through the performance test to determine compliance on an hourly basis. The emission factor will be based on the same test data, and therefore if it is in compliance on any hour, it will be in compliance for all hours. Calculating and recording a number repeatedly over the course of the year that does not have any relevance to compliance is unduly burdensome.

15. **Condition 34.** This condition should be deleted because excess emissions cannot occur for Condition 22 if the performance test emission factor is in compliance with the underlying emission limitation. *See* Comment No. 14.

FIBERGLASS FORMING/CURING/COOLING OPERATING CONDITIONS

16. **Condition 38.** This condition, which establishes a molten glass feed rate limitation, should be deleted because there should be no production limitation of 225 tons in rolling 24-hour period. *See* Comment No. 1. In addition, if this condition is maintained, the last sentence of Condition 38 should be limited to "reasonable" times for which EPA can inspect the production log.

17. **Condition 40.** This condition, which imposes NOx and PM10 emission limitations on the main stack, should be modified to remove the references to a lb/ton emission limit based on reasoning set forth in Comment No. 8.

18. **Condition 41.** This condition, which imposes an opacity limitation on a three minute average, should be changed to establish that limitation on a six minute average since the six minute average is the federal standard. *See* Comment No. 10.

19. **Table 2.** This table, which imposes testing requirements, should be modified to remove the testing requirement for the "wet ESP inlet" because the inlet emissions are not emitted into the ambient air. There should be no requirement to test "inlet" loadings under this permit.

20. **Condition 51.** This condition, which establishes certain testing requirements, should be modified to allow 60 days to submit a written report to EPA of results of any such test, for the reasons set out in Comment No. 12.

21. **Conditions 53 and 55.** These conditions should be removed because the limitations should be based simply on a lb/hr basis, and, in any event, the calculated number would simply be based on the same compliance test in all instances and would always show either compliance, or noncompliance, based on whether the stack test showed compliance or noncompliance. *See* Comment No. 8.

22. **Condition 56.** This condition, which imposes certain requirements relating to failures of a leak bag detection system, should be removed because there are no baghouses or leak bag detection systems on these sections of the plant.

FIBERGLASS TRIMMING & PACKAGING OPERATING CONDITIONS

23. **Condition 60.** The second sentence of this condition, which requires the dust collectors to be equipped with differential pressure measuring devices for the daily monitoring and recording of pressure drop, should be removed because the pressure drop is a meaningless parameter. The operative parameter is the bag leak detector, which will identify when a bag is leaking, and the requirement for pressure drop monitoring is therefore unnecessary and unduly burdensome.

24. **Condition 61.** This condition, which requires certain corrective action to be imposed in the event of leaking or torn bags in this section, should be removed because the operations exhaust into the plant, not into the ambient atmosphere, and therefore any permit requirement to implement corrective action is not necessary to protect the ambient air, and is therefore unduly burdensome.

25. **Conditions 62 and 64.** These conditions should be removed from the permit since the bags exhaust inside the building and therefore any requirement for corrective action associated with a leaking bag should not be necessary under this permit since the air that escapes, if any, would not vent to the ambient air.

26. **Condition 63.** Subsection d. of this condition, which requires recordkeeping of pressure drop across the filter modules, should be removed because the bag leak detection system should satisfy any leak detection requirement.

* * *

Thank you for the opportunity to submit these comments. We have set out in *Attachment A* a redlined version of the proposed permit that reflects our comments. If you have any questions, please call.

Sincerely,

Stephen R. Aldridge
Manager EH&S

Attachment
Via Email and Regular Mail

PROPOSED

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT ISSUED PURSUANT TO THE REQUIREMENTS AT 40 CFR § 52.21

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IX

PSD PERMIT NUMBER: NSR 4-4-4, SAC 03-01

PERMITTEE: Knauf Insulation GmbH
240 Elizabeth Street
Shelbyville, Indiana 46176

FACILITY LOCATION: 3100 District Drive
Shasta Lake, California 96019

This revised Permit is issued pursuant to the Prevention of Significant Deterioration (PSD) requirements of the Clean Air Act, as amended, 42 U.S.C. § 7401 - 7671, et seq. Knauf Insulation GmbH (Knauf) is granted this revised PSD Permit as described herein, in accordance with the permit application (and plans submitted with the permit application), federal regulations governing the Prevention of Significant Deterioration of air quality (40 CFR § 52.21), and other terms and conditions set forth in this revised PSD Permit.

Failure to comply with any condition or term set forth in this revised PSD Permit is subject to enforcement action pursuant to Section 113 of the Clean Air Act.

This revised PSD Permit does not relieve the Permittee from the responsibility to comply with any other applicable provisions of the Clean Air Act and other federal or Shasta County Air Quality Management District requirements.

Date	Deborah Jordon Director, Air Division

ATTACHMENT A

PROPOSED

Abbreviations and Acronyms

Amps	Ampere
ACFM	Actual cubic feet per minute
BACT	Best Available Control Technology
CEM	Continuous Emission Monitoring
CFR	Code of Federal Regulations
CMS	Continuous Monitoring System
CO	Carbon monoxide
EPA	United States Environmental Protection Agency, Region IX
°F	degrees Fahrenheit
g	grams
gph	gallons per hour
GPM	gallons per minute
HAP	Hazardous Air Pollutant
in H 2O	inches of water
hr	hour
kg	kilogram
kV	kilovolt
kW	kilowatt
lb	pound
min	Minute
NOx	Nitrogen Oxides
NO2	Nitrogen Dioxide
NSPS	New Source Performance Standard
NSR	New Source Review
Permittee	Knauf Insulation, GmbH
PM	Particulate Matter
PM10	Particulate matter less than 10 microns in diameter
ppm	parts per million
PSD	Prevention of Significant Deterioration
psia	pounds per square inch absolute
SO 2	Sulfur Dioxide
tpd	tons of glass produced or pulled per operating day
TSP	Total suspended particulate
VOC	Volatile organic compounds

PROPOSED

PROJECT DESCRIPTION

This PSD permit is an amendment to the PSD permit issued on March 14, 2000, to the Knauf Insulation facility located in Shasta Lake, California. This permit applies Best Available Control Technology (BACT) emission standards for minimizing PM10 and NOx emissions during the fiberglass manufacturing operations at Knauf. The fiberglass operations consist of the following: (1) raw materials handling and mixing; (2) molten glass production; (3) glass fiber forming, curing, and cooling; and (4) fiberglass trimming and packaging.

The raw materials handling and mixing operations consist of storage bins and tanks that are used to store materials which are used to produce the fiberglass insulation. Emissions from this operation consist primarily of particulate matter, which are captured in dust collectors within the facility and are not vented to the outside air. Molten glass production is achieved using an electric glass melting furnace that has a **nominal** capacity ~~which is limited by this permit to~~ **of** 225 tons per day (tpd). **This capacity reference is descriptive only and does not establish an enforceable production limitation.** Emissions from the furnace are vented to the Furnace Stack. The forming, curing, and cooling operations make up the manufacturing line where emissions are vented to the Main Stack. Emissions from the fiberglass trimming and packaging operations are also captured in dust collectors which are vented within the facility and not to the outside air.

EQUIPMENT LIST

Raw Materials Handling and Mixing

One (1) Raw Material Unloading Dust Collector
One (1) Sand Bins Dust Collector
One (1) Consumer Cullet Bin Dust Collector
One (1) Dolomite Bin Dust Collector
One (1) Limestone Bin Dust Collector
One (1) (Spare) Bin Dust Collector
One (1) Borax Bin Dust Collector
One (1) Soda Ash Bin Dust Collector
One (1) Feldspar Bin Dust Collector
One (1) Knauf Cullet Dust Collector
One (1) Weigh Scales/Conveyor Dust Collector
One (1) Check Scale/Batch Mixer Dust Collector
One (1) Day Bin #1 Dust Collector
One (1) Day Bin #2 Dust Collector
One (1) Liquid Urea Tank
Two (2) Phenolic Resin Tanks
Two (2) Resin-Urea Premix Tanks
One (1) Outdoor Mineral Oil Tank
One (1) Outdoor Aqueous Ammonia Tank
Two (2) Ammonium Sulfate Mix Tanks
One (1) Organosilane Weigh Tank
One (1) Binder Mix Tank
Two (2) Binder Supply Hold Tanks

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Molten Glass Production
225 Tons/Day Molten Glass Production Electric Glass Melting Furnace
Two (2) ea. 7681 DSCFM, GMD Pulse Jet Dust Collectors(Mod.2-169-10-6RA)
Two (2) 15 MMBtu North American Burner Systems (Model 8520)
One Marley NC Series Cooling Tower, Serial No. 169921-001

Fiberglass Forming/Curing/Cooling
One (1) Natural Gas-Fired Forming Section
One (1) Natural Gas-Fired Curing Oven w/ low NOx Burners
One (1) Volatile Organic Compound Binder Application Process
Six (6) 10" P Venturi Scrubbers on Bonded Wool Forming Line
One (1) 10" P Venturi Scrubber on Blowing Wool Forming Line
One (1) 400,000 ACFM, 600 GPM Wet Electrostatic Precipitator
Two (2) 1400°F Thermal Oxidizers (with low NOx/CO Burners) on Curing Oven
One (1) Settling Chamber/Air Washer on Cooling Line

Fiberglass Trimming and Packaging
One (1) 9874 ACFM Trimming-Packaging Cyclone (1) & Dust Collector Assembly
One (1) 9874 ACFM Class B Blowing Wool Cyclones (2) & Dust Collector Assembly
One (1) 15,708 ACFM Class A Blowing Wool Cyclone (1) & Dust Collector Assembly
One (1) 15,708 ACFM Class A Blowing Wool Bagger Dust Collector Assembly Four (4) High Density Filter Modules

GENERAL PERMIT CONDITIONS

1. ~~Permit Notification Requirements:~~

   ~~The Permittee shall notify EPA in writing or by electronic mail of the date upon which initial performance tests will commence, in accordance with the provisions of this PSD Permit, postmarked not less than 30 days prior to such date. Notification may be provided with the submittal of the performance test protocol(s) required in this PSD permit.~~

2. Facility Operation:

   ~~a. At all times, including periods of startup, shutdown and malfunction, the Permittee shall, maintain and operate the facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on~~

PROPOSED

~~information available to the EPA which may include, but is not limited to, performance tests, monitoring results, review of operating maintenance procedures and inspection of the source.~~

b. The operating staff with management authority at this facility shall be advised of and be familiar with all the conditions of this PSD permit.

3. Malfunction Reporting:

a. The Permittee shall notify EPA by telephone, facsimile, or electronic mail at r9.aeo@epa.gov within two (2) working days following the discovery of any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner, which results in an increase in emissions above the allowable emission limits stated in Conditions 22 and 40 of this Permit.

b. In addition, the Permittee shall notify EPA in writing or electronic mail within fifteen (15) days of any such failure described under Condition 3.a. of this PSD Permit. The notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial malfunction, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of the emission limitations contained in this PSD permit, and the methods utilized to mitigate emissions and restore normal operations.

~~c. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or any law or regulation such malfunction may cause.~~

4. Right of Entry:

The EPA Regional Administrator, and/or an authorized representative, upon the presentation of credentials, shall be permitted:

a. To enter the premises where the source is located or where any records are required to be kept under the terms and conditions of this PSD Permit; and

b. At reasonable times to have access to and to copy any records required to be kept under the terms and conditions of this PSD Permit; and

c. To inspect any equipment, operation, or method subject to requirements in this

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PSD Permit; and

d. To sample emissions from any and all emission sources within the facility.

5. Transfer of Ownership:

In the event of any changes in control or ownership of the facilities to be constructed and operated, this PSD Permit shall be binding on all subsequent owners and operators. Within fifteen (15) days of the change in control or ownership, the Permittee shall notify the succeeding owner and operator of the existence of this PSD Permit and its conditions by letter, a copy of which shall be forwarded to EPA.

6. Severability:

The provisions of this PSD Permit are severable, and, if any provision of the PSD Permit is held invalid, the remainder of this PSD Permit shall not be affected.

7. New Source Performance Standards:

The Permittee is subject to the federal regulations entitled Standards of Performance for New Stationary Source (40 CFR Part 60). The owner or operator shall meet all applicable requirements of the General Provisions pursuant to 40 CFR Part 60, Subpart A, the Standard of Performance for Volatile Organic Liquid Storage Vessels pursuant to 40 CFR Part 60, Subpart Kb, and the Standard of Performance for Wool Fiberglass Insulation Manufacturing Plants pursuant to 40 CFR Part 60, Subpart PPP.

8. Other Applicable Regulations:

The Permittee shall construct and operate the stationary source in compliance with all other applicable provisions of 40 CFR Parts 52, 60, 61, and 63 and all other applicable federal, state and local air quality regulations.

9. Paperwork Reduction Act:

Any requirements established by this PSD Permit for the gathering and reporting of information are not subject to review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act because this permit is not an "information collection request" within the meaning of 44 U.S.C. §§ 3502(4), 3502 (11), 3507, 3512, and 3518. Furthermore, this PSD Permit and any information gathering and reporting requirements established by this permit are exempt from OMB review under the Paperwork Reduction

Act because it is directed to fewer than ten persons. 44 U.S.C. § 3502(4) and § 3502(11); 5 CFR § 1320.5(a).

10. Recordkeeping:

~~Failure to monitor, record information, and maintain records according to the following conditions will be considered a violation of the applicable emission standards.~~ All records and emission test results requested to be kept under the terms and conditions of this PSD Permit shall be retained for at least five years from the date the record was created and be made available to the EPA upon request.

11. Agency Notification:

a. Unless otherwise directed by the EPA or this permit, the owner or operator shall submit a copy of all test plans, reports, certifications, notifications, and other information pertaining to compliance with this permit to:

Director, Air Division (Attn: AIR-5)
U. S. Environmental Protection Agency Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

b. The owner or operator shall submit permit applications, permit amendments, and other applicable permit information, which includes but not limited to installation of control equipment, replacement of an emissions unit, and changes that contravene permit terms, to:

Director, Air Division (Attn: AIR-3)
U. S. Environmental Protection Agency Region IX
75 Hawthorne Street
San Francisco, CA 94105

c. Copies of all correspondence required by this PSD Permit shall be forwarded to:

Air Pollution Control Officer
Air Quality Management District
Shasta County Department of Resource Management
1855 Placer Street, Suite 200
Redding, CA 96001

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RAW MATERIAL HANDLING & MIXING OPERATING CONDITIONS

12. All of the material handling vents and tank vents that discharge into the interior of the batch plant building shall be controlled by twelve (12) baghouse dust collectors that shall prevent any and all particulate matter emissions from escaping the facility. The dust collectors shall be equipped with bag leak detectors which shall be maintained, continuously operated, and calibrated on a regular basis as recommended by the manufacturer to assure reliability. The bag leak detectors shall be equipped with an audible alarm which shall sound automatically in the control room to indicate a torn or leaking bag. Spare bags shall be kept on site for immediate replacement of leaking or torn bags. The Permittee must initiate corrective action within 1 hour of an alarm from the bag leak detection system and complete corrective actions immediately. The corrective action may include any one or combination of the following actions:

    a. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other conditions that may cause an increase in emissions;

    b. Sealing off defective bags or filter media;

    c. Replacing defective bags or filter media, or otherwise repairing the control device;

    d. Sealing off a defective baghouse compartment;

    e. Cleaning the bag leak detection system probe, or otherwise repairing the bag leak detection system; and

    f. Shutting down the process producing the particulate emissions;

13. The Permittee shall retain records of (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).

14. Day Bin #1 and #2 dust collector emissions in the furnace building shall be discharged through the forming section exhausts and be controlled by the forming line scrubbers and wet electrostatic precipitator. Emissions from these dust collectors shall be measured as emissions from the forming line.

PROPOSED

15. All railcar and bottom-dump hopper truck unloading of raw materials shall be done with a "dust boot" that seals the gap between the discharge of the hopper and the delivery system. The dust collectors on the material handling system shall be operational whenever materials are being delivered and shall prevent any and all particulate matter emissions from escaping the batch plant.

16. The Permittee shall submit a written report of the following actions on a semi-annual basis: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s). The report shall be submitted to EPA and is due on the 30th day following the end of each semi-annual period after the effective date of this permit.

MOLTEN GLASS PRODUCTION OPERATING CONDITIONS

17. The glass melting furnace shall be heated only by electricity. No other auxiliary fuels may be used except during cold startup of the melting furnace or during prolonged electrical outages beyond the control of the facility when portable natural gas burners may be used to bring the temperature of the refractory and raw materials up to operating temperature. The Permittee shall notify the EPA of the intended use of the portable burners at least 24 hours prior to use. The Permittee shall retain records of the periods when **portable** ~~protable~~ burners are used and the amount of fuel used.

~~18. Molten glass production from the glass melting furnace shall be limited to a total of 225 tons in any rolling 24-hour period. A permanent record of daily production shall be maintained and shall be available for inspection by the EPA.~~

19. The method of control of particulate matter from the glass melting furnace shall be the use of two baghouse dust collectors capable of meeting the emission standards specified in condition 22 of this permit. The dust collectors shall be equipped with bag leak detectors which shall be maintained, continuously operated, and calibrated on a regular basis as recommended by the manufacturer to assure reliability. The bag leak detectors shall be equipped with an audible alarm which shall sound automatically in the control room to indicate a torn or leaking bag. Spare bags shall be kept on site for immediate replacement of leaking or torn bags. The Permittee must initiate corrective action within 1 hour of an alarm from the bag leak detection system and complete corrective actions immediately. The corrective action may include any one or combination of the following actions:

   a. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any

PROPOSED

other conditions that may cause an increase in emissions;

b. Sealing off defective bags or filter media;

c. Replacing defective bags or filter media, or otherwise repairing the control device;

d. Sealing off a defective baghouse compartment;

e. Cleaning the bag leak detection system probe, or otherwise repairing the bag leak detection system; and

f. Shutting down the process producing the particulate emissions;

20. The Permittee shall retain records of (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).

21. The Permittee shall install, and thereafter continuously operate and maintain the following air pollution controls capable of meeting the emission standards in Condition 22 of this permit:

a. Use of two (2) baghouse dust collectors; and

b. Use of an all electric glass melting furnace.

22. PM10 emissions (filterable and condensable) from the Furnace Stack of the combined baghouse discharge exhausts from the glass melting furnace shall not exceed the following emission limitations:

a. **1.0 lb/hr** ~~0.67 lb/hr and 0.07 lb/ton of glass pulled, based on a 3-hour rolling average; and~~

~~b. 2.2 tons per year, based on a 12-month rolling sum~~.

23. The Permittee shall ~~record hours of operation of the glass melting furnace on a daily basis and shall~~ install, calibrate, and maintain the following continuous monitors. The Permittee shall retain records of the hourly glass pull rate.

a. A continuous glass pull (production) rate monitor that records glass pull (production) rate on an hourly basis; and

PROPOSED

b. A continuous dust collector bag leak detection system that records relative particulate matter emissions.

24. The opacity from the above stack shall not exceed 5 percent opacity for a period greater than **six (6)** ~~three (3)~~ minutes in any one (1) hour period. An audible alarm shall sound in the control room to indicate an opacity exceeding the above opacity limit.

25. The Permittee shall install, and continuously operate and maintain a stack gas opacity monitor on the stack combining the baghouse discharge exhausts from the glass melting furnace. The continuous opacity monitor shall meet all applicable design and quality assurance requirements specified in 40 CFR 60.13 and 40 CFR Part 60, Specification 1 of Appendix B. A computer data acquisition system which has the capability of interpreting the sampling data, providing a graphical trend analysis, and producing a summary report of all **six (6)** ~~three (3)~~ minute averages of opacity readings shall also be provided.

26. The Permittee shall conduct performance testing annually. Annual performance testing shall be performed within 30 days after the anniversary of the most recent performance test. The Permittee shall conduct performance tests (as described in 40 CFR 60.8) for PM10 (as TSP) on the stack receiving the combined dust collector exhausts from the glass melting furnace (Furnace Stack). The Permittee shall retain records of performance test measurements.

27. Performance tests shall be conducted in accordance with CARB Methods 1 through 5 (including filter and impinger catch) for PM10 (as TSP).

28. The Permittee shall submit a performance test protocol to EPA no later than 45 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The performance test protocol shall be amended if required by EPA. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA. In lieu of the above mentioned test methods, equivalent methods may be used with prior written approval from EPA.

29. Performance tests shall be performed by an independent testing firm. Performance tests shall be at least performed at or greater than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. The Permittee shall furnish EPA with a written report of the results of such tests within **sixty (60)** ~~thirty (30)~~ days after the performance tests are conducted.

30. For performance test purposes, the Permittee shall provide sampling ports, platforms and

access on the emission unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).

31. The annual performance test results shall include a calculation of the PM10 (as TSP) actual emission factor (in units of **lb/hr** ~~lb PM10/ton~~ glass pulled) for the glass melting furnace. ~~The Permittee shall use the hourly emission rate determined from the most recent annual performance test and the actual glass production rate in tons of glass pulled per hour (averaged over the performance test runs) to calculate a PM10 emission factor in units of lb PM10/ton glass pulled.~~ The Permittee shall use this calculated PM10 emission factor to determine compliance with the lb/ton BACT emission limit for the glass melting furnace (Furnace Stack) in Condition 22 of this permit. The Permittee shall retain records of all calculations and measurements.

~~32. The Permittee shall determine compliance with the lb/hr emission limit for PM10 (as TSP) in Condition 22 of this permit on an hourly basis. The lb/hr emissions shall be calculated on an hourly basis using the PM10 emission factor determined from the most recent performance test according to Condition 31 and the actual glass pull rate for each hour. The Permittee shall use the PM10 emission factor determined from the most recent performance test until a new emission factor is calculated based on the next performance test. The new emission factor shall be determined and used within 60 days after each performance test. The Permittee shall retain records of all calculations and measurements.~~

33. The Permittee shall submit a written report of all excess emissions and monitoring systems performance to EPA in accordance with 40 CFR 60.7 (c) and (d) on a semiannual basis. The report is due on the 30th day following the end of each semiannual period after the effective date of this permit. Excess emissions shall be defined as any opacity level exceeding the opacity limitation in Condition 24 of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.

~~34. The Permittee shall submit a written report of all excess emissions for Condition 22 of this permit in accordance with Conditions 31 and 32 of this permit for the Furnace Stack. Excess emissions shall be defined as any emissions exceeding the maximum emission limits set forth in Condition 22. The report shall be submitted to EPA semi-annually and is due on the 30th day following the end of each semi-annual period after the effective date of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.~~

35. The Permittee shall submit a written report of the following actions on a semi-annual

basis: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s). The report shall be submitted to EPA and is due on the 30th day following the end of each semi-annual period after the effective date of this permit.

36. Upon prior written request and adequate justification from the Permittee, EPA may waive the annual test and/or allow for testing to be done at less than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. EPA approval shall be in writing. Such request must be submitted to EPA no later than 60 days prior to the annual test date.

FIBERGLASS FORMING/CURING/COOLING OPERATING CONDITIONS

37. Natural gas shall constitute the only fuel allowed for use in the forming and curing operations.

~~38. Molten glass feed rate to the forming line shall be limited to a total of 225 tons in any rolling 24-hour period. The Permittee shall maintain a log indicating the throughput of molten glass material in tons/day. The log shall be available for inspection at any time by the EPA.~~

39. The Permittee shall install, and thereafter continuously operate whenever fiberglass is being produced, and maintain the following air pollution control technologies capable of meeting the emission limitations specified in Condition 40 of this permit:

   a. Forming Sections: Use of combustion controls which minimize peak flame temperatures in the fiber forming process for control of NOx. Use of six (6) venturi scrubbers on the bonded wool forming line and one (1) venturi scrubber on the unbonded wool forming line (each with a minimum of 10" wc pressure drop), followed by a wet electrostatic precipitator with continuous water spray wash system and four (4) electrical fields (minimum) for the control of particulate matter.

   b. Curing Section: Use of low NOx burners burning natural gas for the control of NOx. Use of two thermal oxidizers operating in parallel with a minimum temperature of 1400°F and a residence time of at least 0.5 second for the control of VOC and particulate matter. (A lower minimum operating temperature, not less then 1200°F, may be used for the thermal oxidizers if, through emission testing, it is demonstrated to the satisfaction of the EPA that the lower temperature offers an equivalent emission control of VOC and particulate matter as provided by the 1400°F minimum temperature.)

c. Cooling Section: Use of a water-washed settling chamber for the control of particulate matter and VOC with exhaust immediately combined with high-temperature exhaust of the thermal oxidizers.

40. Emissions from the Main Stack of the forming/curing/cooling (manufacturing line) operations shall not exceed the following emission limitations:

a. NOx - 16.5 lb/hr ~~and 1.76 lb/ton of glass pulled~~, based on a 3-hour rolling average.

b. PM10 - 28.4 lb/hr ~~and 3.03 lb/ton of glass pulled~~, based on a 3-hour rolling average.

41. The opacity of the Main Stack exhaust, excluding condensed water vapor, shall not exceed 20 percent for a period greater than <u>six (6)</u> ~~three (3)~~ minutes in any one (1) hour period. An audible alarm shall sound in the control room to indicate an opacity exceeding the above opacity limit.

42. The Permittee shall continuously operate and maintain the venturi scrubbers for the removal of suspended particulate matter and for the pretreatment of the gas upstream of the wet electrostatic precipitator. The scrubbers shall maintain a minimum gas pressure drop of 10 inches water across the venturi throat and a minimum water flow to each scrubber of 200 gal/min. The pressure drop and water flow parameters shall be measured and recorded continuously. The solids in the scrubber water shall be removed to the extent necessary and fresh make-up water added at all times of operation.

43. The Permittee shall continuously operate and maintain a wet electrostatic precipitator for the control of suspended particulate matter from the outlet of the forming zone venturi scrubbers. The wet electrostatic precipitator shall maintain a minimum water flow and a minimum total corona power as established during initial emission testing to determine compliance with 40 CFR 60, Subpart PPP.

44. The Permittee shall install, calibrate, maintain, and operate monitoring devices that measure the following parameters at the frequency and accuracy as noted in Table 1. All monitoring devices required for measuring the parameters in Table 1 are to be recalibrated quarterly in accordance with procedures under Section 60.13(b) of 40 CFR 60.

PROPOSED

Table 1

Parameters	Recording Frequency	Accuracy
Gas pressure drop across each scrubber (in.H2O)	Continuous	±1" WC
Inlet water flow rate to each scrubber (GPM)	Continuous	±5% over range
Wet Electrostatic Precipitator inlet water flowrate (GPM)	Every 15 minutes	±5% over range
Wet Electrostatic Precipitator: Secondary current (Amps.) Secondary voltage (kV) Spark rate Corona power/T-R set per field Inlet temp. (°F)	Every 15 minutes	±5% over range
Thermal Oxidizer: Exhaust temperature	Continuous	±5% over range
Settling Chamber water flow rate (gph)	Every 15 minutes	±5% over range

45. For performance test purposes, the Permittee shall provide sampling ports, platforms and access on the emission unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).

46. Four sampling ports must be provided on the Main Stack (located on the same horizontal plane, 90 degrees apart, and at least two (2) duct diameters downstream, and one-half (1/2) duct diameters upstream of any flow disturbance) and shall consist of 4-inch female NPT couplings welded to the stack. The couplings shall be supplied with 4-inch pipe plugs. A sampling platform shall also be installed on the Main Stack.

47. Sampling ports must be provided on the inlet and outlet of the wet electrostatic precipitator, and on the outlets of the thermal oxidizers for the purpose of determining emission control efficiency. A sampling platform or other means of providing safe access to the sampling ports shall be installed.

PROPOSED

Table 2

Test Location	PM10 (as TSP)	NOx (as NO2)
Main Stack	Yes	Yes
wet ESP exhaust	Yes	No
~~wet ESP inlet~~	~~Yes~~	~~No~~

48. The Permittee shall conduct performance testing annually. Annual performance testing shall be performed within 30 days after the anniversary of the most recent performance test. The Permittee shall conduct performance tests (as described in 40 CFR 60.8) for the NOx and PM10 emission limitations that apply to the Main Stack. The Permittee shall retain records of all performance tests measurements.

49. Performance tests shall be conducted in accordance with EPA Test Methods 1 through 4 and EPA Test Method 7E for NOx (as NO 2), and EPA Test Method 5E for PM10 (as TSP).

50. The Permittee shall submit a performance test protocol to EPA no later than 45 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The performance test protocol shall be amended if required by EPA. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA. In lieu of the above mentioned test methods, equivalent methods may be used with prior written approval from EPA.

51. Performance tests shall be performed by an independent testing firm. Performance tests shall be at least performed at or greater than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. The Permittee shall furnish EPA with a written report of the results of such tests within <u>**sixty (60)**</u> ~~thirty (30)~~ days after the performance tests are conducted.

52. The annual performance test results shall include a calculation of the actual emission factors for NOx and PM10 (as TSP) in units of <u>**lb/hr**</u> ~~lb NOx/ton~~ glass pulled ~~and lb PM10/ton glass pulled, respectively~~, for the forming/curing/cooling operation (Main Stack). ~~The Permittee shall use the hourly emission rates determined from the most recent annual performance tests and the actual glass production rate in tons of glass pulled per hour (averaged over the performance test runs) to calculate a NOx and PM10 emission factors in units of lb NOx/ton glass pulled and lb PM10/ton glass pulled, respectively~~. The Permittee shall use the calculated NOx and PM10 emission factors to determine compliance with the lb/ton BACT emission limits for the forming/curing/ cooling

operation (Main Stack) in Condition 40 of this permit. The Permittee shall retain records of all calculations and measurements.

~~53. The Permittee shall determine compliance with the lb/hr emission limits for NOx and PM10 (as TSP) in Condition 40 of this permit on an hourly basis. The lb/hr emissions shall be calculated on an hourly basis using the NOx and PM10 emission factors determined from the most recent performance test according to Condition 52 and the actual glass pull rate for each hour. The Permittee shall use the NOx and PM10 emission factors determined from the most recent performance test until a new emission factor is calculated based on the next performance test. The new emission factor shall be determined and used within 60 days after each performance test. The Permittee shall retain records of all calculations and measurements.~~

54. The Permittee shall submit a written report of all excess emissions and monitoring systems performance to EPA in accordance with 40 CFR 60.7 (c) and (d) on a semiannual basis. The report is due on the 30th day following the end of each semiannual period after the effective date of this permit. Excess emissions shall be defined as any opacity level exceeding the opacity limitation in Condition 41 of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.

~~55. The Permittee shall submit a written report of all excess emissions for Condition 40 of this permit in accordance with Conditions 52 and 53 of this permit for the forming/curing/cooling operation (Main Stack). Excess emissions shall be defined as any emissions exceeding the maximum emission limits set forth in Condition 20. The report shall be submitted to EPA semi-annually and is due on the 30th day following the end of each semi-annual period after the effective date of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.~~

~~56. The Permittee shall submit a written report of the following actions on a semiannual basis for the leak bag detection system: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).~~

57. The Permittee shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by 40 CFR Part 60 recorded in a permanent form suitable for inspection. The file shall be retained for at least five (5)

years following the date of such measurements, maintenance, reports and records.

58. Upon prior written request and adequate justification from the Permittee, EPA may waive the annual test and/or allow for testing to be done at less than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. EPA approval shall be in writing. Such request must be submitted to EPA no later than 60 days prior to the annual test date.

FIBERGLASS TRIMMING & PACKAGING OPERATING CONDITIONS

59. The method of control of particulate matter from the bonded wool forming line trimming and packaging areas, the Class A unbonded blowing wool processing area, and the Class B blowing wool processing area of the plant shall be the use of four (4) dust collector assemblies each followed by a high density filter module which shall exhaust inside the Scrap Building and have no outside vent.

60. The dust collectors shall be equipped with bag leak detectors which shall be maintained, continuously operated, and calibrated on a regular basis as recommended by the manufacturer to assure reliability. ~~The filter modules shall be equipped with differential pressure measuring devices for daily monitoring and recording of the pressure drop across each filter bank.~~

~~61. The bag leak detectors shall be equipped with an audible alarm which shall sound automatically in the control room to indicate a torn or leaking bag. Spare bags shall be kept on site for immediate replacement of leaking or torn bags. The Permittee must initiate corrective action within 1 hour of an alarm from the bag leak detection system and complete corrective actions immediately. The corrective action may include any one or combination of the following actions:~~

~~a. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other conditions that may cause an increase in emissions;~~

~~b. Sealing off defective bags or filter media;~~

~~c. Replacing defective bags or filter media, or otherwise repairing the control device;~~

~~d. Sealing off a defective baghouse compartment;~~

~~e. Cleaning the bag leak detection system probe, or otherwise repairing the bag leak~~

~~detection system; and~~

~~f. Shutting down the process producing the particulate emissions.~~

~~62. The Permittee shall retain records of (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).~~

63. The Permittee shall monitor and retain records of the following parameters on a daily basis:

a. Hours of operation

b. Production rates

c. Leaks from the dust collectors

~~d. Pressure drop across the filter modules~~

~~64. The Permittee shall submit a written report of the following actions on a semi-annual basis for the leak bag detection system: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s). The report shall be submitted to EPA and is due on the 30th day following the end of each semi-annual period after the effective date of this permit.~~

Steve Aldridge <steve.aldridge@knaufusa.com>
03/21/2006 01:41 PM

To Shaheerah Kelly/R9/USEPA/US@EPA
cc
bcc
Subject Knauf comments on draft PSD Permit revision

History: This message has been forwarded.

Shaheerah,

Attached are our comments on the draft PSD permit for our Shasta Lake, California facility. Also attached is a marked up version of the draft permit incorporating our comments. I will send them via US Mail tomorrow.

Please give me a call or email is you have any questions.

Stephen R. Aldridge

Stephen R. Aldridge
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Draft PSD Permit comments 3-21-06.DOC Draft PSD Permit comments - revised permit 3-21-06.DOC

March 21, 2006

Shaheerah Kelly
Air Division (AIR-3)
EPA Region 9
75 Hawthorne Street
San Francisco, California 94105-3901

Re: Comments on Proposed PSD Permit for Knauf Insulation GmbH Shasta Lake County PSD Permit No. NSR 4-4-4, SAC 03-01

Dear Shaheerah:

Below sets out the comments by Knauf Insulation GmbH on the above-referenced proposed permit:

1. **Project Description.** In the third sentence of the second paragraph, the reference to 225 ton per day capacity for the electric glass melting furnace should be revised to indicate that this reference is descriptive only, and does not impose a capacity limitation on the furnace. A production limit is not required under PSD, and is not a best available control technology (BACT) limit. BACT focuses on *emissions rates*, not *production rates*. It is defined as an "*emission limitation* ... based on the maximum degree of reduction...." *See* 40 C.F.R. 52.21(b)(12) (emphasis added). All ambient modeling calculations were performed based on the allowable emission rate, not based on a production rate. There is no basis for including an enforceable production limitation.

In the original PSD permit, a production capacity of 195 tons per day was referenced, but that was inserted for state-law purposes, not for federal PSD purposes, and that limitation should not be carried forward here. Condition No. 3 of that permit stated:

> Equipment is to be maintained so that it operates as it did when the permit was issued. Any anticipated production expansion beyond the 195 Tons/day limit found in Condition #35 of this permit is prohibited without separate application for a new Authority to Construct and Permit to Operate from the District. Any change in equipment, method of operation, fuel use, or process which may cause an emissions increase, shall be reported to the District at least 30 days prior to taking any action or seeking other permits regarding such change in order for the District to determine if an application for an Authority to Construct is necessary.

However, that permit was issued as a joint state-Authority-to-Construct ("ATC") and a federal PSD permit. The 195-ton-per-day condition was derived from the state CEQA process and therefore should be considered part of the state-ATC portion of the permit.

When Shasta County intended to include General Permit Conditions as part of both the state Authority to Construct portion and the federal PSD portion, it did so by using the phrase "Authority to Construct (PSD Permit)." *See* General Permit Conditions 1, 2, and 4. However, the General Permit Condition requiring an application if production was to be expanded beyond 195-tons/day, General Permit Condition 3, contains no such phrase. Instead, that condition merely requires the submission of an application for a "new Authority to Construct and Permit to Operate," *i.e.*, two local permits. Furthermore, the second half of General Permit Condition 3 that deals with changes that may cause an emissions increase allows the District to determine if "an Authority to Construct" permit is necessary. By using the phrase "Authority to Construct" in General Permit Condition 3 in place of "Authority to Construct (PSD Permit)" as found in General Permit Conditions 1, 2, and 4, the County expressed clear intent that the terms in General Permit Condition 3 are part of the state Authority to Construct portion of the permit, and not part of the federal PSD portion of the permit, and they impose state, not federal, permitting requirements.

In prior conversations, EPA has indicated that the federal Environmental Appeals Board ("EAB") determined that Condition No. 3 was a PSD condition and that EPA was bound by that "determination." *In re: Knauf Fiber Glass, GmbH*, PSD Appeal Nos. 98-3 through 98-20 (February 11, 1999). We have reviewed that decision, and believe the EPA conclusion may be in error. Therefore, we request reconsideration of the EPA position.

In *In re Knauf Fiber Glass GmbH*, the EAB stated:

> A number of petitioners assert that Knauf ultimately intends to build a much larger facility than the one described in the permit application. Petition Nos. 98-6, 98-16, 98-17. These petitioners are concerned that after Knauf builds the permitted facility, it will seek to increase production and add additional manufacturing lines. Petitioners believe that Knauf should be required to apply for a PSD permit for the full plant build-out at this time. Petition 98-16 at 3.
>
> In response to these concerns, AQMD modified a permit condition so as to explicitly prohibit expansion of production beyond 195 tons of fiberglass/day. Permit ¶ 3. This condition also states that a new PSD application will be required should Knauf seek to increase production. *Id.* In the response to comments, AQMD explained that a new PSD permit and CEQA review is required before any expansion will be permitted. RTC at 5, 13.
>
> The express prohibition in the permit is fully adequate to address petitioners' concerns. A permit will be required before construction can commence *on any major modification* to the plant. The purpose of a new PSD review process *for major modifications* of facilities like the proposed Knauf plant is to allow issues such as BACT and the air quality analysis to be revisited before any expansion

> takes place. The public participation requirements are also applicable to PSD modification applications.

Id. at 50-51 (emphasis added).

This EAB language does not imply that this condition is a federal "PSD" condition. It states that the condition was imposed by AQMD. Further, when it notes that the condition requires a "PSD" application to be submitted should Knauf seek to increase production, it is apparently contemplating a production increase *that results in a significant emissions increase.* At the time, the petitioners were referring to the construction of a much larger facility with more lines that they believed should have been permitted as one project. They were not referring to small, non-significant increases.

The meaning of EAB's statements becomes clear when it states that "a permit will be required before construction can commence on any *major modification* to the plant." *Id.* (emphasis added). It further states that "the *purpose* of a new PSD review process for *major modifications* ... is to allow issues such as BACT and the air quality analysis to be revisited..." *Id.* (emphasis added).

The term "major modification" is defined under PSD at 40 C.F.R. § 52.21(b)(2)(i). It is not equivalent to "any increase." Instead, before a modification is "major," it must result in "significant" emissions increases.

The focus of the EAB decision was that PSD review would be required prior to any "major modification," and therefore any challenges to significant future expansions (such as the addition of new lines, which was the subject of the petitioners) could be reviewed if a new PSD permit was needed. The fact that the Shasta County AQMD chose to include an additional state requirement which provided that the county would need to issue a county permit to allow production increases does not convert that restriction into a "PSD" permit term. The idea that any production increase, no matter how small, would trigger PSD review, even if the increase had *no* or minimal emission impacts, is contrary to the PSD program and it conflicts with the EAB decision.

GENERAL PERMIT CONDITIONS

2. **Condition 1 — Permit Notification Requirements**. This condition, which relates to notifying EPA of the initial performance test deadline, should be deleted because this condition has been satisfied and is no longer necessary or appropriate.

3. **Condition 2 — Facility Operation**. This condition, which imposes a requirement to maintain and operate the facility in a manner consistent with good air pollution control practice for minimizing emissions, should either be deleted or should be tied to specific emission units. The only requirement that establishes this standard is the New Source Performance Standard ("NSPS"), which applies on a unit-by-unit basis, not on a plant-wide basis.

4. **Condition 3 — Malfunction Reporting.** Subsection c., which states that "compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of the permit" is inconsistent with the malfunction exemption, which is available under the NSPS at 40 CFR 60.11, and other comparable exemptions.

5. **Condition 10 — Recordkeeping.** The first sentence of this condition, which states that "failure to monitor, record information, or maintain records" will be "considered a violation of the applicable emission standards," is not based on any law or regulation and should be deleted. A violation of an applicable emission standard is a violation of the standard. A violation of a monitoring or recordkeeping requirement is a violation of that requirement, not of the underlying standard.

MOLTEN GLASS PRODUCTION OPERATING CONDITIONS

6. **Condition 17.** The word "protable" in the last line should be changed to "portable."

7. **Condition 18.** As described under Comment No. 1, there should be no production limit of 225 tons per rolling 24-hour period. Accordingly, Condition 18 should be removed.

8. **Condition 22.** This condition, which establishes PM10 emission limitations for the furnace stack should be changed in the following three ways.

a. **The limitation should be set at 1.0 lb/hr, not .67 lb/hr. EPA calculated an emission limit of .67 lb/hr on the following basis:**

> Knauf estimates that 80 - 90% of the particulates exiting the furnace stack could be condensable particulate. Using the 85% figure for condensable in the original BACT limit of 0.1 lb/hr for filterable portion of the particulate matter emissions, we calculate a total PM10 limit of 0.67 lb/hr....

First, the fraction that should be used is 90%, not 85%, to ensure that the limit is achievable. Using the average condensable estimate, rather than the maximum condensable estimate, causes the emission limit to be violated about 50% of the time (whenever above average). If a figure of 90% is used, the base PM10 limit would be 0.72 lb/hr. In addition, some margin of safety should be applied to account for variability in emission rates, rather than relying on a small number of data points or estimates. A 33% safety margin would be reasonable, which would lead to a value of approximately .96 lb/hr, which when rounded up should be equal to approximately 1.0 lb/hr.

b. **The emission limit should be expressed simply in terms of pound per hour, and not pound per ton of glass pulled, because the emission rate per production unit will vary based on the production level.** Emissions associated with production from the Knauf facilities are not linear to the production rates. The control equipment used by Knauf generates a relatively consistent emission rate, regardless of the production rate. At lower production rates, the mass loading would presumably be equal to or somewhat less than the emission rates at higher production levels, but the emission rate per production unit would be higher because of the lower production rates and the relatively similar emission rates, therefore, making it unreasonable to establish a production rate limit based on a maximum production rate and imposing that limit at lower levels of production. In addition, it is important to note that the ambient modeling was performed at the maximum lb/hr allowable emission rate, making the lb/ton emission rates unnecessary for ambient protection.

c. **The annual limit should be deleted.** The annual emission limit is unnecessary because it is fulfilled by the hourly emission limit. Since the furnace runs continuously, any annual emission limit should simply be based on the hourly emission rate, multiplied by 8760 hours, making the annual limit redundant. Knauf notes that the 2.2 tons per year limit is less than the .67 lb/hr limit (if extrapolated), which should be changed if the annual limit is maintained. (Knauf also believes the limit should be 1.0 lb/hr, not .67 lb/hr, as discussed above.) The .67 lb/hr limit multiplying 8760 is equivalent to 2.93 tons per year, not 2.2 tons per year.

9. **<u>Condition 23</u>.** This condition imposes a requirement to record the hours of operation of the glass melting furnace on a daily basis and retain records of the hourly glass pull rate. The condition should not require recording the hours of operation of the glass melting furnace because the glass melting furnace runs 24 hours a day, and there is no benefit by tracking the number of hours it runs in any given day.

10. **<u>Condition 24</u>.** This condition, which establishes a 5% opacity limit for any three minute average, should be changed to impose that limit on a six minute basis, since six minute averages are the federal standard, and three minute averages are not applicable to a federal PSD permit. Six minute opacity averages are the compliance method, per 40 C.F.R. 60.11 and 40 C.F.R. 60, Appendix A, Method 9.

11. **<u>Condition 25</u>.** The reference to requiring a summary report of three minute averages of opacity readings should be changed to six minute averages, since a six minute averaging period is the federal standard, not a three minute averaging period. *See* Comment No. 10.

12. **<u>Condition 29</u>.** This condition, which establishes the criteria for conducting performance tests, should be modified to allow the submission of written results within 60 days of the test date, rather than 30 days. The federal MACT rules allow 60 days for submission of test results and there are no regulations that require such test results to be submitted within 30 days, which is technically challenging in real-world testing.

13. **<u>Condition 31</u>.** This condition should be modified to remove references to a lb/ton of glass pulled because the limit should be expressed in terms of lb/hr, not lb/ton of production. *See* Comment No. 8.

14. **Condition 32**. This condition should be deleted because it provides no useful data. This condition requires the permittee to use an emission factor gained through the performance test to determine compliance on an hourly basis. The emission factor will be based on the same test data, and therefore if it is in compliance on any hour, it will be in compliance for all hours. Calculating and recording a number repeatedly over the course of the year that does not have any relevance to compliance is unduly burdensome.

15. **Condition 34**. This condition should be deleted because excess emissions cannot occur for Condition 22 if the performance test emission factor is in compliance with the underlying emission limitation. *See* Comment No. 14.

FIBERGLASS FORMING/CURING/COOLING OPERATING CONDITIONS

16. **Condition 38**. This condition, which establishes a molten glass feed rate limitation, should be deleted because there should be no production limitation of 225 tons in rolling 24-hour period. *See* Comment No. 1. In addition, if this condition is maintained, the last sentence of Condition 38 should be limited to "reasonable" times for which EPA can inspect the production log.

17. **Condition 40**. This condition, which imposes NOx and PM10 emission limitations on the main stack, should be modified to remove the references to a lb/ton emission limit based on reasoning set forth in Comment No. 8.

18. **Condition 41**. This condition, which imposes an opacity limitation on a three minute average, should be changed to establish that limitation on a six minute average since the six minute average is the federal standard. *See* Comment No. 10.

19. **Table 2**. This table, which imposes testing requirements, should be modified to remove the testing requirement for the "wet ESP inlet" because the inlet emissions are not emitted into the ambient air. There should be no requirement to test "inlet" loadings under this permit.

20. **Condition 51**. This condition, which establishes certain testing requirements, should be modified to allow 60 days to submit a written report to EPA of results of any such test, for the reasons set out in Comment No. 12.

21. **Conditions 53 and 55**. These conditions should be removed because the limitations should be based simply on a lb/hr basis, and, in any event, the calculated number would simply be based on the same compliance test in all instances and would always show either compliance, or noncompliance, based on whether the stack test showed compliance or noncompliance. *See* Comment No. 8.

22. **Condition 56**. This condition, which imposes certain requirements relating to failures of a leak bag detection system, should be removed because there are no baghouses or leak bag detection systems on these sections of the plant.

FIBERGLASS TRIMMING & PACKAGING OPERATING CONDITIONS

23. **Condition 60.** The second sentence of this condition, which requires the dust collectors to be equipped with differential pressure measuring devices for the daily monitoring and recording of pressure drop, should be removed because the pressure drop is a meaningless parameter. The operative parameter is the bag leak detector, which will identify when a bag is leaking, and the requirement for pressure drop monitoring is therefore unnecessary and unduly burdensome.

24. **Condition 61.** This condition, which requires certain corrective action to be imposed in the event of leaking or torn bags in this section, should be removed because the operations exhaust into the plant, not into the ambient atmosphere, and therefore any permit requirement to implement corrective action is not necessary to protect the ambient air, and is therefore unduly burdensome.

25. **Conditions 62 and 64.** These conditions should be removed from the permit since the bags exhaust inside the building and therefore any requirement for corrective action associated with a leaking bag should not be necessary under this permit since the air that escapes, if any, would not vent to the ambient air.

26. **Condition 63.** Subsection d. of this condition, which requires recordkeeping of pressure drop across the filter modules, should be removed because the bag leak detection system should satisfy any leak detection requirement.

* * *

Thank you for the opportunity to submit these comments. We have set out in *Attachment A* a redlined version of the proposed permit that reflects our comments. If you have any questions, please call.

Sincerely,

Stephen R. Aldridge
Manager EH&S

Attachment
Via Email and Regular Mail

INDS01 ACS 829457v1

PROPOSED

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT ISSUED PURSUANT TO THE REQUIREMENTS AT 40 CFR § 52.21

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IX

PSD PERMIT NUMBER:	NSR 4-4-4, SAC 03-01
PERMITTEE:	Knauf Insulation GmbH 240 Elizabeth Street Shelbyville, Indiana 46176
FACILITY LOCATION:	3100 District Drive Shasta Lake, California 96019

This revised Permit is issued pursuant to the Prevention of Significant Deterioration (PSD) requirements of the Clean Air Act, as amended, 42 U.S.C. § 7401 - 7671, et seq. Knauf Insulation GmbH (Knauf) is granted this revised PSD Permit as described herein, in accordance with the permit application (and plans submitted with the permit application), federal regulations governing the Prevention of Significant Deterioration of air quality (40 CFR § 52.21), and other terms and conditions set forth in this revised PSD Permit.

Failure to comply with any condition or term set forth in this revised PSD Permit is subject to enforcement action pursuant to Section 113 of the Clean Air Act.

This revised PSD Permit does not relieve the Permittee from the responsibility to comply with any other applicable provisions of the Clean Air Act and other federal or Shasta County Air Quality Management District requirements.

Date

Deborah Jordon
Director, Air Division

ATTACHMENT A

PROPOSED

Abbreviations and Acronyms

Amps	Ampere
ACFM	Actual cubic feet per minute
BACT	Best Available Control Technology
CEM	Continuous Emission Monitoring
CFR	Code of Federal Regulations
CMS	Continuous Monitoring System
CO	Carbon monoxide
EPA	United States Environmental Protection Agency, Region IX
°F	degrees Fahrenheit
g	grams
gph	gallons per hour
GPM	gallons per minute
HAP	Hazardous Air Pollutant
in H 2O	inches of water
hr	hour
kg	kilogram
kV	kilovolt
kW	kilowatt
lb	pound
min	Minute
NOx	Nitrogen Oxides
NO2	Nitrogen Dioxide
NSPS	New Source Performance Standard
NSR	New Source Review
Permittee	Knauf Insulation, GmbH
PM	Particulate Matter
PM10	Particulate matter less than 10 microns in diameter
ppm	parts per million
PSD	Prevention of Significant Deterioration
psia	pounds per square inch absolute
SO 2	Sulfur Dioxide
tpd	tons of glass produced or pulled per operating day
TSP	Total suspended particulate
VOC	Volatile organic compounds

PROPOSED

PROJECT DESCRIPTION

This PSD permit is an amendment to the PSD permit issued on March 14, 2000, to the Knauf Insulation facility located in Shasta Lake, California. This permit applies Best Available Control Technology (BACT) emission standards for minimizing PM10 and NOx emissions during the fiberglass manufacturing operations at Knauf. The fiberglass operations consist of the following: (1) raw materials handling and mixing; (2) molten glass production; (3) glass fiber forming, curing, and cooling; and (4) fiberglass trimming and packaging.

The raw materials handling and mixing operations consist of storage bins and tanks that are used to store materials which are used to produce the fiberglass insulation. Emissions from this operation consist primarily of particulate matter, which are captured in dust collectors within the facility and are not vented to the outside air. Molten glass production is achieved using an electric glass melting furnace that has a **nominal** capacity ~~which is limited by this permit to~~ **of** 225 tons per day (tpd). **This capacity reference is descriptive only and does not establish an enforceable production limitation.** Emissions from the furnace are vented to the Furnace Stack. The forming, curing, and cooling operations make up the manufacturing line where emissions are vented to the Main Stack. Emissions from the fiberglass trimming and packaging operations are also captured in dust collectors which are vented within the facility and not to the outside air.

EQUIPMENT LIST

Raw Materials Handling and Mixing

One (1) Raw Material Unloading Dust Collector
One (1) Sand Bins Dust Collector
One (1) Consumer Cullet Bin Dust Collector
One (1) Dolomite Bin Dust Collector
One (1) Limestone Bin Dust Collector
One (1) (Spare) Bin Dust Collector
One (1) Borax Bin Dust Collector
One (1) Soda Ash Bin Dust Collector
One (1) Feldspar Bin Dust Collector
One (1) Knauf Cullet Dust Collector
One (1) Weigh Scales/Conveyor Dust Collector
One (1) Check Scale/Batch Mixer Dust Collector
One (1) Day Bin #1 Dust Collector
One (1) Day Bin #2 Dust Collector
One (1) Liquid Urea Tank
Two (2) Phenolic Resin Tanks
Two (2) Resin-Urea Premix Tanks
One (1) Outdoor Mineral Oil Tank
One (1) Outdoor Aqueous Ammonia Tank
Two (2) Ammonium Sulfate Mix Tanks
One (1) Organosilane Weigh Tank
One (1) Binder Mix Tank
Two (2) Binder Supply Hold Tanks

PROPOSED

Molten Glass Production
225 Tons/Day Molten Glass Production Electric Glass Melting Furnace
Two (2) ea. 7681 DSCFM, GMD Pulse Jet Dust Collectors(Mod.2-169-10-6RA)
Two (2) 15 MMBtu North American Burner Systems (Model 8520)
One Marley NC Series Cooling Tower, Serial No. 169921-001

Fiberglass Forming/Curing/Cooling
One (1) Natural Gas-Fired Forming Section
One (1) Natural Gas-Fired Curing Oven w/ low NOx Burners
One (1) Volatile Organic Compound Binder Application Process
Six (6) 10" P Venturi Scrubbers on Bonded Wool Forming Line
One (1) 10" P Venturi Scrubber on Blowing Wool Forming Line
One (1) 400,000 ACFM, 600 GPM Wet Electrostatic Precipitator
Two (2) 1400°F Thermal Oxidizers (with low NOx/CO Burners) on Curing Oven
One (1) Settling Chamber/Air Washer on Cooling Line

Fiberglass Trimming and Packaging
One (1) 9874 ACFM Trimming-Packaging Cyclone (1) & Dust Collector Assembly
One (1) 9874 ACFM Class B Blowing Wool Cyclones (2) & Dust Collector Assembly
One (1) 15,708 ACFM Class A Blowing Wool Cyclone (1) & Dust Collector Assembly
One (1) 15,708 ACFM Class A Blowing Wool Bagger Dust Collector Assembly Four (4) High Density Filter Modules

GENERAL PERMIT CONDITIONS

1. ~~Permit Notification Requirements:~~

~~The Permittee shall notify EPA in writing or by electronic mail of the date upon which initial performance tests will commence, in accordance with the provisions of this PSD Permit, postmarked not less than 30 days prior to such date. Notification may be provided with the submittal of the performance test protocol(s) required in this PSD permit.~~

2. Facility Operation:

~~a. At all times, including periods of startup, shutdown and malfunction, the Permittee shall, maintain and operate the facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on~~

~~information available to the EPA which may include, but is not limited to, performance tests, monitoring results, review of operating maintenance procedures and inspection of the source.~~

b. The operating staff with management authority at this facility shall be advised of and be familiar with all the conditions of this PSD permit.

3. Malfunction Reporting:

a. The Permittee shall notify EPA by telephone, facsimile, or electronic mail at r9.aeo@epa.gov within two (2) working days following the discovery of any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner, which results in an increase in emissions above the allowable emission limits stated in Conditions 22 and 40 of this Permit.

b. In addition, the Permittee shall notify EPA in writing or electronic mail within fifteen (15) days of any such failure described under Condition 3.a. of this PSD Permit. The notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial malfunction, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of the emission limitations contained in this PSD permit, and the methods utilized to mitigate emissions and restore normal operations.

~~c. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or any law or regulation such malfunction may cause.~~

4. Right of Entry:

The EPA Regional Administrator, and/or an authorized representative, upon the presentation of credentials, shall be permitted:

a. To enter the premises where the source is located or where any records are required to be kept under the terms and conditions of this PSD Permit; and

b. At reasonable times to have access to and to copy any records required to be kept under the terms and conditions of this PSD Permit; and

c. To inspect any equipment, operation, or method subject to requirements in this

PSD Permit; and

d. To sample emissions from any and all emission sources within the facility.

5. Transfer of Ownership:

In the event of any changes in control or ownership of the facilities to be constructed and operated, this PSD Permit shall be binding on all subsequent owners and operators. Within fifteen (15) days of the change in control or ownership, the Permittee shall notify the succeeding owner and operator of the existence of this PSD Permit and its conditions by letter, a copy of which shall be forwarded to EPA.

6. Severability:

The provisions of this PSD Permit are severable, and, if any provision of the PSD Permit is held invalid, the remainder of this PSD Permit shall not be affected.

7. New Source Performance Standards:

The Permittee is subject to the federal regulations entitled Standards of Performance for New Stationary Source (40 CFR Part 60). The owner or operator shall meet all applicable requirements of the General Provisions pursuant to 40 CFR Part 60, Subpart A, the Standard of Performance for Volatile Organic Liquid Storage Vessels pursuant to 40 CFR Part 60, Subpart Kb, and the Standard of Performance for Wool Fiberglass Insulation Manufacturing Plants pursuant to 40 CFR Part 60, Subpart PPP.

8. Other Applicable Regulations:

The Permittee shall construct and operate the stationary source in compliance with all other applicable provisions of 40 CFR Parts 52, 60, 61, and 63 and all other applicable federal, state and local air quality regulations.

9. Paperwork Reduction Act:

Any requirements established by this PSD Permit for the gathering and reporting of information are not subject to review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act because this permit is not an "information collection request" within the meaning of 44 U.S.C. §§ 3502(4), 3502 (11), 3507, 3512, and 3518. Furthermore, this PSD Permit and any information gathering and reporting requirements established by this permit are exempt from OMB review under the Paperwork Reduction

Act because it is directed to fewer than ten persons. 44 U.S.C. § 3502(4) and § 3502(11); 5 CFR § 1320.5(a).

10. Recordkeeping:

~~Failure to monitor, record information, and maintain records according to the following conditions will be considered a violation of the applicable emission standards.~~ All records and emission test results requested to be kept under the terms and conditions of this PSD Permit shall be retained for at least five years from the date the record was created and be made available to the EPA upon request.

11. Agency Notification:

a. Unless otherwise directed by the EPA or this permit, the owner or operator shall submit a copy of all test plans, reports, certifications, notifications, and other information pertaining to compliance with this permit to:

Director, Air Division (Attn: AIR-5)
U. S. Environmental Protection Agency Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

b. The owner or operator shall submit permit applications, permit amendments, and other applicable permit information, which includes but not limited to installation of control equipment, replacement of an emissions unit, and changes that contravene permit terms, to:

Director, Air Division (Attn: AIR-3)
U. S. Environmental Protection Agency Region IX
75 Hawthorne Street
San Francisco, CA 94105

c. Copies of all correspondence required by this PSD Permit shall be forwarded to:

Air Pollution Control Officer
Air Quality Management District
Shasta County Department of Resource Management
1855 Placer Street, Suite 200
Redding, CA 96001

PROPOSED

RAW MATERIAL HANDLING & MIXING OPERATING CONDITIONS

12. All of the material handling vents and tank vents that discharge into the interior of the batch plant building shall be controlled by twelve (12) baghouse dust collectors that shall prevent any and all particulate matter emissions from escaping the facility. The dust collectors shall be equipped with bag leak detectors which shall be maintained, continuously operated, and calibrated on a regular basis as recommended by the manufacturer to assure reliability. The bag leak detectors shall be equipped with an audible alarm which shall sound automatically in the control room to indicate a torn or leaking bag. Spare bags shall be kept on site for immediate replacement of leaking or torn bags. The Permittee must initiate corrective action within 1 hour of an alarm from the bag leak detection system and complete corrective actions immediately. The corrective action may include any one or combination of the following actions:

    a. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other conditions that may cause an increase in emissions;

    b. Sealing off defective bags or filter media;

    c. Replacing defective bags or filter media, or otherwise repairing the control device;

    d. Sealing off a defective baghouse compartment;

    e. Cleaning the bag leak detection system probe, or otherwise repairing the bag leak detection system; and

    f. Shutting down the process producing the particulate emissions;

13. The Permittee shall retain records of (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).

14. Day Bin #1 and #2 dust collector emissions in the furnace building shall be discharged through the forming section exhausts and be controlled by the forming line scrubbers and wet electrostatic precipitator. Emissions from these dust collectors shall be measured as emissions from the forming line.

15. All railcar and bottom-dump hopper truck unloading of raw materials shall be done with a "dust boot" that seals the gap between the discharge of the hopper and the delivery system. The dust collectors on the material handling system shall be operational whenever materials are being delivered and shall prevent any and all particulate matter emissions from escaping the batch plant.

16. The Permittee shall submit a written report of the following actions on a semi-annual basis: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s). The report shall be submitted to EPA and is due on the 30th day following the end of each semi-annual period after the effective date of this permit.

MOLTEN GLASS PRODUCTION OPERATING CONDITIONS

17. The glass melting furnace shall be heated only by electricity. No other auxiliary fuels may be used except during cold startup of the melting furnace or during prolonged electrical outages beyond the control of the facility when portable natural gas burners may be used to bring the temperature of the refractory and raw materials up to operating temperature. The Permittee shall notify the EPA of the intended use of the portable burners at least 24 hours prior to use. The Permittee shall retain records of the periods when **portable** ~~protable~~ burners are used and the amount of fuel used.

~~18. Molten glass production from the glass melting furnace shall be limited to a total of 225 tons in any rolling 24-hour period. A permanent record of daily production shall be maintained and shall be available for inspection by the EPA.~~

19. The method of control of particulate matter from the glass melting furnace shall be the use of two baghouse dust collectors capable of meeting the emission standards specified in condition 22 of this permit. The dust collectors shall be equipped with bag leak detectors which shall be maintained, continuously operated, and calibrated on a regular basis as recommended by the manufacturer to assure reliability. The bag leak detectors shall be equipped with an audible alarm which shall sound automatically in the control room to indicate a torn or leaking bag. Spare bags shall be kept on site for immediate replacement of leaking or torn bags. The Permittee must initiate corrective action within 1 hour of an alarm from the bag leak detection system and complete corrective actions immediately. The corrective action may include any one or combination of the following actions:

   a. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other conditions that may cause an increase in emissions;

b. Sealing off defective bags or filter media;

c. Replacing defective bags or filter media, or otherwise repairing the control device;

d. Sealing off a defective baghouse compartment;

e. Cleaning the bag leak detection system probe, or otherwise repairing the bag leak detection system; and

f. Shutting down the process producing the particulate emissions;

20. The Permittee shall retain records of (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).

21. The Permittee shall install, and thereafter continuously operate and maintain the following air pollution controls capable of meeting the emission standards in Condition 22 of this permit:

a. Use of two (2) baghouse dust collectors; and

b. Use of an all electric glass melting furnace.

22. PM10 emissions (filterable and condensable) from the Furnace Stack of the combined baghouse discharge exhausts from the glass melting furnace shall not exceed the following emission limitations:

a. **1.0 lb/hr** ~~0.67 lb/hr and 0.07 lb/ton of glass pulled, based on a 3-hour rolling average; and~~

~~b. 2.2 tons per year, based on a 12-month rolling sum.~~

23. The Permittee shall ~~record hours of operation of the glass melting furnace on a daily basis and shall~~ install, calibrate, and maintain the following continuous monitors. The Permittee shall retain records of the hourly glass pull rate.

a. A continuous glass pull (production) rate monitor that records glass pull (production) rate on an hourly basis; and

b. A continuous dust collector bag leak detection system that records relative particulate matter emissions.

24. The opacity from the above stack shall not exceed 5 percent opacity for a period greater than six (6) ~~three (3)~~ minutes in any one (1) hour period. An audible alarm shall sound in the control room to indicate an opacity exceeding the above opacity limit.

25. The Permittee shall install, and continuously operate and maintain a stack gas opacity monitor on the stack combining the baghouse discharge exhausts from the glass melting furnace. The continuous opacity monitor shall meet all applicable design and quality assurance requirements specified in 40 CFR 60.13 and 40 CFR Part 60, Specification 1 of Appendix B. A computer data acquisition system which has the capability of interpreting the sampling data, providing a graphical trend analysis, and producing a summary report of all six (6) ~~three (3)~~ minute averages of opacity readings shall also be provided.

26. The Permittee shall conduct performance testing annually. Annual performance testing shall be performed within 30 days after the anniversary of the most recent performance test. The Permittee shall conduct performance tests (as described in 40 CFR 60.8) for PM10 (as TSP) on the stack receiving the combined dust collector exhausts from the glass melting furnace (Furnace Stack). The Permittee shall retain records of performance test measurements.

27. Performance tests shall be conducted in accordance with CARB Methods 1 through 5 (including filter and impinger catch) for PM10 (as TSP).

28. The Permittee shall submit a performance test protocol to EPA no later than 45 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The performance test protocol shall be amended if required by EPA. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA. In lieu of the above mentioned test methods, equivalent methods may be used with prior written approval from EPA.

29. Performance tests shall be performed by an independent testing firm. Performance tests shall be at least performed at or greater than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. The Permittee shall furnish EPA with a written report of the results of such tests within sixty (60) ~~thirty (30)~~ days after the performance tests are conducted.

30. For performance test purposes, the Permittee shall provide sampling ports, platforms and

access on the emission unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).

31. The annual performance test results shall include a calculation of the PM10 (as TSP) actual emission factor (in units of **lb/hr** ~~lb PM10/ton~~ glass pulled) for the glass melting furnace. ~~The Permittee shall use the hourly emission rate determined from the most recent annual performance test and the actual glass production rate in tons of glass pulled per hour (averaged over the performance test runs) to calculate a PM10 emission factor in units of lb PM10/ton glass pulled.~~ The Permittee shall use this calculated PM10 emission factor to determine compliance with the lb/ton BACT emission limit for the glass melting furnace (Furnace Stack) in Condition 22 of this permit. The Permittee shall retain records of all calculations and measurements.

~~32. The Permittee shall determine compliance with the lb/hr emission limit for PM10 (as TSP) in Condition 22 of this permit on an hourly basis. The lb/hr emissions shall be calculated on an hourly basis using the PM10 emission factor determined from the most recent performance test according to Condition 31 and the actual glass pull rate for each hour. The Permittee shall use the PM10 emission factor determined from the most recent performance test until a new emission factor is calculated based on the next performance test. The new emission factor shall be determined and used within 60 days after each performance test. The Permittee shall retain records of all calculations and measurements.~~

33. The Permittee shall submit a written report of all excess emissions and monitoring systems performance to EPA in accordance with 40 CFR 60.7 (c) and (d) on a semiannual basis. The report is due on the 30th day following the end of each semiannual period after the effective date of this permit. Excess emissions shall be defined as any opacity level exceeding the opacity limitation in Condition 24 of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.

~~34. The Permittee shall submit a written report of all excess emissions for Condition 22 of this permit in accordance with Conditions 31 and 32 of this permit for the Furnace Stack. Excess emissions shall be defined as any emissions exceeding the maximum emission limits set forth in Condition 22. The report shall be submitted to EPA semi-annually and is due on the 30th day following the end of each semi-annual period after the effective date of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.~~

35. The Permittee shall submit a written report of the following actions on a semi-annual

basis: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s). The report shall be submitted to EPA and is due on the 30th day following the end of each semi-annual period after the effective date of this permit.

36. Upon prior written request and adequate justification from the Permittee, EPA may waive the annual test and/or allow for testing to be done at less than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. EPA approval shall be in writing. Such request must be submitted to EPA no later than 60 days prior to the annual test date.

FIBERGLASS FORMING/CURING/COOLING OPERATING CONDITIONS

37. Natural gas shall constitute the only fuel allowed for use in the forming and curing operations.

~~38. Molten glass feed rate to the forming line shall be limited to a total of 225 tons in any rolling 24-hour period. The Permittee shall maintain a log indicating the throughput of molten glass material in tons/day. The log shall be available for inspection at any time by the EPA.~~

39. The Permittee shall install, and thereafter continuously operate whenever fiberglass is being produced, and maintain the following air pollution control technologies capable of meeting the emission limitations specified in Condition 40 of this permit:

a. Forming Sections: Use of combustion controls which minimize peak flame temperatures in the fiber forming process for control of NOx. Use of six (6) venturi scrubbers on the bonded wool forming line and one (1) venturi scrubber on the unbonded wool forming line (each with a minimum of 10" wc pressure drop), followed by a wet electrostatic precipitator with continuous water spray wash system and four (4) electrical fields (minimum) for the control of particulate matter.

b. Curing Section: Use of low NOx burners burning natural gas for the control of NOx. Use of two thermal oxidizers operating in parallel with a minimum temperature of 1400°F and a residence time of at least 0.5 second for the control of VOC and particulate matter. (A lower minimum operating temperature, not less then 1200°F, may be used for the thermal oxidizers if, through emission testing, it is demonstrated to the satisfaction of the EPA that the lower temperature offers an equivalent emission control of VOC and particulate matter as provided by the 1400°F minimum temperature.)

c. Cooling Section: Use of a water-washed settling chamber for the control of particulate matter and VOC with exhaust immediately combined with high-temperature exhaust of the thermal oxidizers.

40. Emissions from the Main Stack of the forming/curing/cooling (manufacturing line) operations shall not exceed the following emission limitations:

a. NOx - 16.5 lb/hr ~~and 1.76 lb/ton of glass pulled~~, based on a 3-hour rolling average.

b. PM10 - 28.4 lb/hr ~~and 3.03 lb/ton of glass pulled~~, based on a 3-hour rolling average.

41. The opacity of the Main Stack exhaust, excluding condensed water vapor, shall not exceed 20 percent for a period greater than <u>six (6)</u> ~~three (3)~~ minutes in any one (1) hour period. An audible alarm shall sound in the control room to indicate an opacity exceeding the above opacity limit.

42. The Permittee shall continuously operate and maintain the venturi scrubbers for the removal of suspended particulate matter and for the pretreatment of the gas upstream of the wet electrostatic precipitator. The scrubbers shall maintain a minimum gas pressure drop of 10 inches water across the venturi throat and a minimum water flow to each scrubber of 200 gal/min. The pressure drop and water flow parameters shall be measured and recorded continuously. The solids in the scrubber water shall be removed to the extent necessary and fresh make-up water added at all times of operation.

43. The Permittee shall continuously operate and maintain a wet electrostatic precipitator for the control of suspended particulate matter from the outlet of the forming zone venturi scrubbers. The wet electrostatic precipitator shall maintain a minimum water flow and a minimum total corona power as established during initial emission testing to determine compliance with 40 CFR 60, Subpart PPP.

44. The Permittee shall install, calibrate, maintain, and operate monitoring devices that measure the following parameters at the frequency and accuracy as noted in Table 1. All monitoring devices required for measuring the parameters in Table 1 are to be recalibrated quarterly in accordance with procedures under Section 60.13(b) of 40 CFR 60.

PROPOSED

Table 1

Parameters	Recording Frequency	Accuracy
Gas pressure drop across each scrubber (in.H2O)	Continuous	±1" WC
Inlet water flow rate to each scrubber (GPM)	Continuous	±5% over range
Wet Electrostatic Precipitator inlet water flowrate (GPM)	Every 15 minutes	±5% over range
Wet Electrostatic Precipitator: Secondary current (Amps.) Secondary voltage (kV) Spark rate Corona power/T-R set per field Inlet temp. (°F)	Every 15 minutes	±5% over range
Thermal Oxidizer: Exhaust temperature	Continuous	±5% over range
Settling Chamber water flow rate (gph)	Every 15 minutes	±5% over range

45. For performance test purposes, the Permittee shall provide sampling ports, platforms and access on the emission unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).

46. Four sampling ports must be provided on the Main Stack (located on the same horizontal plane, 90 degrees apart, and at least two (2) duct diameters downstream, and one-half (1/2) duct diameters upstream of any flow disturbance) and shall consist of 4-inch female NPT couplings welded to the stack. The couplings shall be supplied with 4-inch pipe plugs. A sampling platform shall also be installed on the Main Stack.

47. Sampling ports must be provided on the inlet and outlet of the wet electrostatic precipitator, and on the outlets of the thermal oxidizers for the purpose of determining emission control efficiency. A sampling platform or other means of providing safe access to the sampling ports shall be installed.

PROPOSED

Table 2

[illegible]	PM10 (as TSP)	NOx (as NO2)
Main Stack	Yes	Yes
wet ESP exhaust	Yes	No
~~wet ESP inlet~~	~~Yes~~	~~No~~

48. The Permittee shall conduct performance testing annually. Annual performance testing shall be performed within 30 days after the anniversary of the most recent performance test. The Permittee shall conduct performance tests (as described in 40 CFR 60.8) for the NOx and PM10 emission limitations that apply to the Main Stack. The Permittee shall retain records of all performance tests measurements.

49. Performance tests shall be conducted in accordance with EPA Test Methods 1 through 4 and EPA Test Method 7E for NOx (as NO 2), and EPA Test Method 5E for PM10 (as TSP).

50. The Permittee shall submit a performance test protocol to EPA no later than 45 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The performance test protocol shall be amended if required by EPA. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA. In lieu of the above mentioned test methods, equivalent methods may be used with prior written approval from EPA.

51. Performance tests shall be performed by an independent testing firm. Performance tests shall be at least performed at or greater than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. The Permittee shall furnish EPA with a written report of the results of such tests within **sixty (60)** ~~thirty (30)~~ days after the performance tests are conducted.

52. The annual performance test results shall include a calculation of the actual emission factors for NOx and PM10 (as TSP) in units of **lb/hr** ~~lb NOx/ton~~ glass pulled ~~and lb PM10/ton glass pulled, respectively~~, for the forming/curing/cooling operation (Main Stack). ~~The Permittee shall use the hourly emission rates determined from the most recent annual performance tests and the actual glass production rate in tons of glass pulled per hour (averaged over the performance test runs) to calculate a NOx and PM10 emission factors in units of lb NOx/ton glass pulled and lb PM10/ton glass pulled, respectively~~. The Permittee shall use the calculated NOx and PM10 emission factors to determine compliance with the lb/ton BACT emission limits for the forming/curing/ cooling

operation (Main Stack) in Condition 40 of this permit. The Permittee shall retain records of all calculations and measurements.

~~53. The Permittee shall determine compliance with the lb/hr emission limits for NOx and PM10 (as TSP) in Condition 40 of this permit on an hourly basis. The lb/hr emissions shall be calculated on an hourly basis using the NOx and PM10 emission factors determined from the most recent performance test according to Condition 52 and the actual glass pull rate for each hour. The Permittee shall use the NOx and PM10 emission factors determined from the most recent performance test until a new emission factor is calculated based on the next performance test. The new emission factor shall be determined and used within 60 days after each performance test. The Permittee shall retain records of all calculations and measurements.~~

54. The Permittee shall submit a written report of all excess emissions and monitoring systems performance to EPA in accordance with 40 CFR 60.7 (c) and (d) on a semiannual basis. The report is due on the 30^{th} day following the end of each semiannual period after the effective date of this permit. Excess emissions shall be defined as any opacity level exceeding the opacity limitation in Condition 41 of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.

~~55. The Permittee shall submit a written report of all excess emissions for Condition 40 of this permit in accordance with Conditions 52 and 53 of this permit for the forming/curing/cooling operation (Main Stack). Excess emissions shall be defined as any emissions exceeding the maximum emission limits set forth in Condition 20. The report shall be submitted to EPA semi-annually and is due on the 30th day following the end of each semi-annual period after the effective date of this permit. Excess emissions shall be considered violations of the applicable emission limits for the purposes of this permit.~~

~~56. The Permittee shall submit a written report of the following actions on a semiannual basis for the leak bag detection system: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).~~

57. The Permittee shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by 40 CFR Part 60 recorded in a permanent form suitable for inspection. The file shall be retained for at least five (5)

years following the date of such measurements, maintenance, reports and records.

58. Upon prior written request and adequate justification from the Permittee, EPA may waive the annual test and/or allow for testing to be done at less than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any rolling 24-hour period. EPA approval shall be in writing. Such request must be submitted to EPA no later than 60 days prior to the annual test date.

FIBERGLASS TRIMMING & PACKAGING OPERATING CONDITIONS

59. The method of control of particulate matter from the bonded wool forming line trimming and packaging areas, the Class A unbonded blowing wool processing area, and the Class B blowing wool processing area of the plant shall be the use of four (4) dust collector assemblies each followed by a high density filter module which shall exhaust inside the Scrap Building and have no outside vent.

60. The dust collectors shall be equipped with bag leak detectors which shall be maintained, continuously operated, and calibrated on a regular basis as recommended by the manufacturer to assure reliability. ~~The filter modules shall be equipped with differential pressure measuring devices for daily monitoring and recording of the pressure drop across each filter bank.~~

~~61. The bag leak detectors shall be equipped with an audible alarm which shall sound automatically in the control room to indicate a torn or leaking bag. Spare bags shall be kept on-site for immediate replacement of leaking or torn bags. The Permittee must initiate corrective action within 1 hour of an alarm from the bag leak detection system and complete corrective actions immediately. The corrective action may include any one or combination of the following actions:~~

~~a. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other conditions that may cause an increase in emissions;~~

~~b. Sealing off defective bags or filter media;~~

~~c. Replacing defective bags or filter media, or otherwise repairing the control device;~~

~~d. Sealing off a defective baghouse compartment;~~

~~e. Cleaning the bag leak detection system probe, or otherwise repairing the bag leak~~

~~detection system; and~~

~~f. Shutting down the process producing the particulate emissions.~~

~~62. The Permittee shall retain records of (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s).~~

63. The Permittee shall monitor and retain records of the following parameters on a daily basis:

a. Hours of operation

b. Production rates

c. Leaks from the dust collectors

~~d. Pressure drop across the filter modules~~

~~64. The Permittee shall submit a written report of the following actions on a semi-annual basis for the leak bag detection system: (a) each occurrence of the alarm for the bag leak detection system, (b) the corrective action(s) taken for each occurrence of the alarm, and (c) the duration for completing each corrective action(s). The report shall be submitted to EPA and is due on the 30th day following the end of each semi-annual period after the effective date of this permit.~~

Luise L
<shannonluise@charter.net>
03/10/2006 01:53 PM

To KnaufPermit@EPA
cc
bcc
Subject Permit to increase Knauf emissions

Knauf has been in violation of its pollution limits for over four years.

This manufacturer should be required to settle all past fines and requirements before being allowed to increase its capacity.

Citizens rely on EPA to enforce compliance of polluters.

Luise Landers
3953 Golf Drive, Redding CA 96002
shannonluise@charter.net

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-36

MAR 1 4 2006

DATE			
ACTION (✓)		COPIED (✓)	
	RA		RA
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	OSPEI		OSPEI
	PMD		PMD
	# FUND		# FUND
	WASTE		WASTE
	WATER		WATER
	X-MEDIA		X-MEDIA

Patricia Jiminez
Attorney at Law
13613 Jaybird Way
Redding, CA 96003
530.275.6201
Fax same

March 9, 2006

Wayne Nastri
EPA REGION 9 Director
Air Division (AIR -3)
75 Hawthorne Street
San Francisco, CA 94105

Dear Mr. Nastri:

Knauf Fiberglass is living up to its reputation. It is continuing the corporate track record of historically exceeding gross toxic air pollution than air permits allow. A hearing was just held in Shasta Lake about the possibility of increasing the current permit allowances for Knauf. The report in the local newspaper, quoting the EPA officer chairing the event, pretty much said that there was already a conclusion that these increases would be allowed. If there has been a decision made, why hold a hearing? Just window dressing?

Some of us fought very hard to keep Knauf out of Shasta Lake and Shasta County. We did our research, and what we found was disturbing:

- NOx fumes would be trapped in our natural basin and be problematic to citizens with lung problems;
- Fiberglass shards in the emissions would waft as far away as 3o miles, settle in school yards, on playground equipment, in yards and gardens, etc.;
- The fiberglass shards breathed into the lungs never are absorbed by the body. They remain a dangerous carcinogen.

We sent representatives to Alabama to check on that facility and talk to the locals; what they discovered was scary, and so was the aftermath:

- The plant in Alabama grossly exceeded emissions allowed;
- Fiberglass was thick on lawns and gardens, like frost;
- The plant smokestack belched out a big, black plume at night instead in the daytime.

When our representatives brought back a film to show us, they were threatened with a suit by Knauf. As they could not economically afford this, the matter was dropped.

The local EPA Officer, at that time, was an employee of Shasta County. His boss, the County Board of Supervisors, wanted Knauf, so the EPA man did nothing. Despite a flawed and misrepresentative EIR (Environmental Impact Report), Knauf was allowed to build in Shasta County.

Now, it seems like "deja vue all over again." The plant has exceeded production emissions and was fined by the EPA. The fines were then greatly reduced and allowed 14 years to be paid. 14 years? Really!

Why has the EPA allowed this dirty plant to continue without a final permit to operate? If Knauf does not abide by the limits already set, will it abide by new ones? They have repeatedly asked for more emission allowances in the few years of operation. The plant operates unlawfully and wants to do more!

I am adamantly opposed to granting any kind of a greater allowance to Knauf for production or emissions. This has been their ploy all along! EPA…DO YOUR JOB!

Yours truly,

Patricia Jiminez

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-37

Serafin Jiminez
13613 Jaybird Way
Redding, CA 96003

March 9, 2006

RECEIVED

MAR 17 2006

Permits Office Air-3
U.S. EPA, Region 9

Wayne Nastri
EPA REGION 9 Director
75 Hawthorne Street
San Francisco. CA 94105

Re: Knauf Fiberglass

Dear Sir:

I retired and moved to Shasta County in 1981. Prior to the opening of Knauf Fiberglass in Shasta Lake, I had never in my life had any respiratory problems, but now I suffer from asthma that gets increasingly worse. I am dependent on medical inhalers twice a day to help me breathe.

Unfortunately, I live only about five air miles from the Knauf plant, and with prevailing westerly breezes, my asthma condition is really exacerbated.

It is ironic that I lived and worked all of my life in metropolitan areas and retired to this place that used to have air so clean, and a sky so blue that it hurt the eyes. I am basically an outdoor person, always out doing one job or another. Now, it is not always possible.

Knauf should not be allowed to operate in a wonderful place like this, where they pollute the air, the water and the land. The plant should be closed down permanently, but the EPA does not even do that temporarily as required, when there is an excessive air pollution emission. Knauf should NOT be granted greater Nox and PMI allowances, as the plant would just commit more damage than it is doing already.

I always thought the EPA was supposed to protect the people from harm, but in this case they have not done so. Is this just another case of whatever big business wants, big business gets? Why doesn't the EPA live up to what EPA stands for?

Thank you.

Serafin Jiminez

Gean Vonk
<gvred43@jett.net>

03/29/2006 08:57 AM

Please respond to gvred43@jett.net

To KnaufPermit@EPA

cc

bcc

Subject Knauf permit increase

Many of us effected with asthma and lung conditions, along with our Doctors are against the increase in release of emissions and production of Knauf.

1.Greatly increase of asthma and lung problems in overall area since increased operations. Especially with north wind bringing pollution down into our area and in the summer when everything is trapped in our air basin. I must wear a special mask if I go outside.

2.Overall decline in air quality in our basin from all sources, re: recent U.S. report

It has taken me three days to try and find where to send this. Tried both in Sacramento and Shasta Co. No one knew how to contact your office.

Should be looking at newer applications for Knauf to decrease ommissions which they have done in other areas and countries.

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-39

3-10-06

DATE MAR 14 2006											
ACTION (✓)	RA	DRA	AIR	OCGR	ORC	OSPEI	PMD	#FUND	WASTE	WATER	X-MEDIA
COPIED (✓)	RA	DRA	AIR	OCGR	ORC	OSPEI	PMD	#FUND	WASTE	WATER	X-MEDIA

Dear Sir,

I am seventy-five years old and have lived here all my life. I am writing to you because I am appalled at the change for the worse in the air quality - especially in the last few years. You are called the "Environmental Protection Agency", are you not? then why are you not protecting us? You have allowed Knauf Fiber Glass to violate their PSD/ATC pollution limits for over four years. You have allowed them to manufacture fiberglass, a known carcinogen, without a federal permit to operate for <u>over</u> four years. You are <u>now</u> about to O.K. their plans to <u>increase</u> their pollution even more!? Why does your office sound more like a "Corporation Protection Agency" to me? <u>Where</u> is the EPA of <u>old</u> that <u>used</u> to protect the citizens via the Clean Air Act?

Sincerely yours,

Georgia Cook

Georgia Cook

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: VII-A-35

CRAIG WOOD REPORTING
P.O. Box 493577 • Redding, CA 96049-3577 • (530) 244-0789 • Fax: (530) 244-0787 • www.craigwoodreporting.com

ENVIRONMENTAL PROTECTION AGENCY

PUBLIC HEARING

SHASTA LAKE CITY, CALIFORNIA

ORIGINAL

Re: KNAUF INSULATION PROPOSED AIR PERMIT REVISION.

RECEIVED
MAR 29 2006
Permits Office Air-3
U.S. EPA, Region 9

TRANSCRIPT OF PROCEEDINGS

Wednesday, March 8, 2006

John Beaudet Senior Community Center

Shasta Lake City, CA

7:00 p.m.

Reported By: CRAIG W. WOOD, RPR, CSR No. 9789

APPEARANCES

FOR THE ENVIRONMENTAL PROTECTION AGENCY:

JOANNA DeLUCIA -- Hearing Officer

SHAHEERAH KELLY

GERARDO RIOS

Also Present:

Representatives from EPA

---oOo---

INDEX

---oOo---

PROCEEDINGS

MS. DeLUCIA: Good evening. It's approximately 7:05 p.m. on March 8, 2006, and this public hearing is now in session.

My name is Joanna DeLucia, and I'm from the U.S. Environmental Protection Agency in San Francisco, Region 9, and I'll be serving as tonight's hearing officer for this public hearing.

The purpose of tonight's hearing is to accept public comment on the EPA's proposal to make revisions to Knauf Insulation Prevention of Significant Deterioration, or PSD, permit. With me are staff members from EPA San Francisco regional office, here to assist with the public hearing. Shaheerah Kelly, Gerardo Rios, Joe Lafca (phonetic), Karen Bohenkamp, and (inaudible) are here from the Region 9 air program. Alan Vable is here from the EPA Regional Council's Office. And Laurie Lewis and Leo Kay (phonetic) are here from the Region 9 Office of Public Affairs.

Before we start to take your comments tonight, Shaheerah Kelly of the Air Permits Office is going to make a short presentation regarding the proposed actions. Then I'll be explaining the ground rules for making sure everybody that wishes to comment tonight will have an opportunity to do so.

If you'd like some background information about the air permit, please help yourself to one of the blue fact sheets on the sign-in table when you came in.

Now I'm going to turn it over to Shaheerah so she can provide you with some information about the proposed permit revision. I have to ask you to please refrain from interrupting or asking questions during the presentation since you'll have the opportunity to make comments shortly once we begin the public comment portion.

We do realize this is a complex issue. So if you have technical or clarifying questions during the presentation, please see one of the EPA staff circulating around the room or raise your hand and an EPA staff member will come over and assist you quietly.

PRESENTATION BY MS. KELLY

MS. KELLY: Good evening everyone. As Joanna said, my name is Shaheerah Kelly and I am the technical contact for the Knauf Insulation air permit revision.

I'd like to give you an overview of what I'm going to talk about. First I'll give you some background on the facility, I'm going to describe the operations at the facility, describe the Prevention of Significant

Deterioration program, and the Federal permit process, describe the air quality analysis conducted for Knauf, and finally I'll talk about the proposed changes to the permit.

Many of you probably are already aware of this. Knauf Fiberglass is a fiberglass insulation facility. They produce wool fiberglass products like residential insulation. The facility is located in Shasta Lake, California, right here. The Shasta County Air Quality Management District issued a combined Federal and local pre-construction permit to the facility in 2000. The Federal portion was for particulate matter less than 10 microns, or PM10, and the local portion of that permit was for nitrogen oxide, or NOx, and all the other pollutants that were addressed in that permit. And the facility began operation in 2002.

To give you a description of the facility, the operations at the facility, there's the raw materials handling process in which raw materials are delivered and processed and prepared for later use. There's the glass melting furnace in which the raw materials are converted to molten glass, and the pollution from the glass melting furnace is emitted through the furnace stack.

There's a manufacturing line which the molten glass is converted to fiberglass particles or --

converted to fiberglass, or glass fibers, and converted into a mat, and eventually converted to a final product. There's also trimming and packaging in which the final product is packaged, or prepared for packaging. And the pollution control equipment that's used for these processes include dust collectors, vac houses, wet scrubbers, and wet electrostatic precipitator, which is used to reduce particulate matter. Knauf uses a thermal oxidizer to destroy (inaudible) compounds, and a low nitrogen oxide burner -- nitrogen oxide burners to reduce NOx emissions.

So what is prevention of significant deterioration? It's a Clean Air Act federal permitting program, and it applies to areas that are attaining the ambient air quality standards set by the U.S. Government. It applies to new and modified major sources and applies to criteria pollutants like nitrogen oxides and particulate matter. And regulations are at 40 CFR 52.21, located in the Federal regulations.

The Federal permit requirements include requiring the source to obtain a permit prior to construction or modification or a changing of PSD permit. It requires source to install the best available control technology and perform air quality analysis. That air quality analysis has to show that the change in pollution won't cause or contribute to a violation of any ambient air quality standards or significantly deteriorate air quality. It also has to show that the change in the pollution won't adversely impact any national parks or wilderness areas designated as Class 1 areas. And for this project that we are working on that we're proposing today, it applies to PM10 and NOx. And the air quality analysis is conducted for NO2 for Knauf.

So what are the proposed changes in the permit? For Knauf, we're establishing Federal permit requirements. We're actually bringing it into the PSD process. Whereas before, the facility had a local limit for NOx and it was not subject to the PSD process. So the new PSD level will be at 72.3 tons per year. For PM10, we're changing the limit at the furnace. We're changing the limit to include condensable particulate matter. The new limit will be only two percent of the entire particulate matter emissions at the facility.

The increase for the particulate matter at the facility will increase from 124.4 tons per year to 126.9 tons per year. We're also changing the glass production limit. Knauf requested increase from 195 to 225 tons per year, 225 tons of glass produced per day. We don't expect any additional pollutant increases because the facility's actual emissions are much less than its potential emissions. Basically maximum emissions. And the increase in glass production was factored into the emission limits for PM10 and for NOx.

UNIDENTIFIED SPEAKER: Could you go back on that slide? You said under PM10 the furnace, the third statement there, you said it was increase from --

MS. DeLUCIA: I'm sorry, I'll have to cut you off. If you have specific questions, if you could ask one of the EPA staff in the back of the room.

UNIDENTIFIED SPEAKER: She read it wrong. Could you read it again?

MS. DeLUCIA: Go ahead and read it.

MS. KELLY: For NOx, we are establishing Federal PSD requirements and the new PSD emission level will be set at 72.3 tons per year. For PM10, we're changing the limit at the furnace only, and we're changing that limit to include condensable particulate matter. The new limit will only be two percent of the overall PM10 emissions at the facility, and the increase at the -- the increase in particulate matter emissions for the entire facility will go from 124.4 --

UNIDENTIFIED SPEAKER: From 124?

MS. KELLY: 124.4 tons per year to 126.9 tons per year.

UNIDENTIFIED SPEAKER: Not "of." You said --

says "increase of 124 tons."

MS. KELLY: Okay. That is a correction. It should be increase of 124 -- increased from 124.4 tons per year to 126.9 tons per year.

UNIDENTIFIED SPEAKER: Thank you.

MS. KELLY: So why is EPA issuing this permit? The last permit was issued by the District Office, the Shasta County Air Quality Management District. EPA is currently the PSD permitting authority. We have the PSD delegation. The county had the PSD delegation previously, and right now EPA is the permitting authority because that authority was withdrawn because of new regulations that were promulgated back in 2003. So for this permitting action, Shasta County rules don't apply to this permitting action.

For the air quality impact analysis, for NOx, NOx is modeled at 99 tons per year. Based on that modeling, it showed that it will not cause or contribute to a violation of the NO2 standard or significantly deteriorate air quality. And the overall permit level will be at 72.3 tons per year. So the impact we expect from the permit action we're proposing should be less than what it was modeled at.

For PM10, the previous analysis was modeled at 191.8 tons per year. And that also showed that the impact will not cause or contribute to a violation of the standard or significantly deteriorate air quality. And since the overall permit level, the new level proposed in our permit, will be at 126.9 tons per year, a new analysis won't be required because the new level is below the model level.

For Class 1, we looked at NO2, PM10, visibility degradation, and nitrogen deposition. Nine Class 1 areas were reviewed and five were within 100 kilometers. And the proposed emission levels for PM10 and NOx would not -- do not result in a significant impact in any Class 1 areas.

The changes -- the specific changes in the permit, to compare the current permit to -- to compare the current permit to the permit that we're proposing, for the furnace stack we're changing the PM10 limit from 0.1 pounds per hour to 0.67 pounds per hour. And also applying another limit 0.07 pounds per ton for glass pulled. Which is a pollution-based limit based on the glass production, also. The amount of pollution produced per amount of glass produced. And that requires Knauf to operate more efficiently so that their pollution is reduced per the amount of glass that is produced.

For the main stack, we're changing that limit also because we're factoring in the increase in the glass production. So that limit will -- the pound per ton limit for the main stack will decrease from 3.5 pounds per ton of glass pulled to 3.03 pounds per ton of glass pulled, because we're factoring in the increase in the glass production. So it requires them to operate more efficiently to produce less pollution per ton of glass that's produced.

For NOx, the current permit did not contain any PSD requirements. We're pulling that into the Federal program. For the furnace stack, there are no numerical limits because they're -- Knauf is using an electric furnace. And the furnace, it's not combusting any fossil fuel such as natural gas. We don't expect any combustion products such as NOx. So no NOx limit is applied there.

For the main stack, the limit -- limits are 16.5 pounds per hour and 1.76 pounds per ton of glass pulled. Knauf is required to use low nitrogen oxide burners.

For the glass production requirements, the limit in the current permit is 195 tons per day. And the limit will go to 225 tons per day. But that limit is factored in to the pound per ton limit for each of the pollutants, including PM10 and NOx.

So the proposed permit that we are -- that we put out for public comment includes emission limits, control technology limits, and limits to protect air quality that were included in air quality analysis to show that it will not significantly deteriorate air quality or significantly impact the air. Also includes controls that are required to be operated continuously, it requires testing and monitoring and record keeping and reporting so that we can be sure that the limits are being met on a continuous basis -- on an ongoing basis.

And for more information, we have a web page on our Region 9 EPA web site, and that information is included in the fact sheets that are at the back of the room.

Joanna?

MS. DeLUCIA: Thank you, Shaheerah.

Now before taking your testimony, I want to just go over the ground rules of the hearing tonight.

This hearing is a legal proceeding being held pursuant to part 124 of Title 40 of the Code of Civil Regulations. Public notice of this hearing was given January 31, 2006, by publication in the Redding Record Searchlight. And it was also made available on EPA's web site.

As you came into the hearing room, we asked you to sign in on the sign-in sheet. This assists us in the completion of our work if we know how many people attended and who they represented. It also helps in the preparation of the transcript of the hearing.

And in addition, it you don't plan on submitting oral comments tonight or written comments, signing in ensures you'll be an EPA's mailing list to receive a copy of the final permit decision, if you wish to receive that.

If you would like to make comments at tonight's hearing, you should fill out one of the green speaker request forms that you saw on that sign-in table there and hand it to one of the EPA staff, who can be identified by the name tags. If you don't wish to speak tonight, you can also submit written comments for the official record. Both written comments and oral comments will receive equal consideration by the EPA in making a permit decision.

Written comments must be received by the EPA regional office by the time the public comment period closes on March 28th, 2006. You'll find the procedure for submitting written comments on the yellow handout on the sign-in table that's called Public Participation Guidelines.

Now, it's important for you to know we're here to take comments only on the draft permit revision. So only comments specific to the permit will be accepted into the record. But if you do have general questions or concerns, please see one of the EPA staff members who can let you know how best to address the concerns or where to direct the concerns.

Now, you can also make oral comments on the record in the form of questions as long as they're specific to the permit. You do need to know that EPA won't be providing responses to your questions and comments during this hearing since the purpose of this proceeding is only to accept comments.

After the hearing, EPA will carefully consider all of the comments received, both oral and written, in making its final permit decision and it will prepare a written response to your comments and questions. These responses will be included in the official permit record.

Once EPA reaches a determination on the revised permit, notice of final decision, as well as the written response to comments document I just mentioned, will be sent to each person who has submitted written comments or oral comments or signed up to receive notice on the sign-in sheet of the permit decision. This information is also going to be available on EPA's web site.

Now, after the final decision is made, within 30 days of the date of that decision, interested persons who disagree with the decision can file an appeal. And you'll find the specific procedures for filing an appeal in the yellow handout that's titled Public Participation Guidelines.

Now, we'll be taking your testimony in the approximate order which you turned in your speaker cards. Given I only have about a dozen cards here on the desk, I can safely say everyone will have an opportunity to speak tonight. So when your name is called, please come up to the microphone, state your name, and if you're appearing on behalf of someone else or on behalf of an organization, please tell us who you're representing. Please speak clearly into the microphone so the court reporter can accurately record your testimony. And for that reason, I'd also ask while a person is testifying, not to speak when you're in the audience.

Now we want to ensure everybody has an opportunity to speak tonight. So to make sure, we're asking that you try to limit your comments to no more than five minutes if possible. And if you do take up to five minutes, we have someone in the back here who will be holding up a sign that says "one minute left" just to keep us on track here. Then you'll be notified when your time is up.

If you do have extensive comments, you can provide them in writing either tonight or up through the end of the comment period which is March 28th. And then one other thing I wanted to say about written comments, if you brought a written copy of your comments tonight, please give it to one of the EPA staff so we can incorporate it into the official record. There's no need to actually read your written comments into the record since, as I've explained, both written and oral comments will receive equal consideration.

PUBLIC COMMENT SECTION

MS. DeLUCIA: So at this point I'm going to go ahead and turn to the public comment portion of tonight. First, though, I'd like to ask whether there are any public officials in the room who would like to make comments on the record?

Okay. I guess not. In that case, then the first speaker is Henry Francis.

MR. FRANCIS: My comment is going to be very short. My name is Henry Francis. I live out east of Knauf, and I suffer from chronic bronchitis, and have for several years. But it's gotten worse since the plant has been in operation when the wind blows in our direction. And the increase in emissions will probably make my problem even worse.

I'm a -- I've had five major surgeries that have been -- have also caused my bronchitis to be worse. And I don't think that those of us with respiratory problems would be benefited by this increase in emissions.

Thank you.

MS. DeLUCIA: Thank you for coming.

The next individual is Dwight Bailey.

MR. BAILEY: You know, it's kind of hard for the layman to really understand about the increase and the decrease and the permitting process. I think probably the biggest thing that comes to mind is about a year ago, year and a half ago, when we had -- I guess 2003, during a public hearing comment there, one of the best enlightening things I heard was from an electrician actually working for Knauf Fiberglass at the time. At the time they were trying to explain how they were going to increase the NOx and decrease a little bit of the PM10.

Basically this electrician raised -- his comments are on file and you can hear what he actually said to verify this. What he pretty much said was he said already there's a lot of fiberglass particles left over which they have to take to the landfill. This has been a problem, we suggest best available technology to actually filter it through the ground, that way there would be nothing getting in the air. That would create more product to take to the landfill. They didn't think that was the best available technology. They prefer to put it up the main stack, let the scrubbers -- knock it out, all the loose stuff back down, gathering that back up, taking what is left over to the landfill.

This electrician in his comment, he said basically what they figured out was that they take that material -- think it might be labeled bag house material -- and they actually put that back in the melting furnace. It does two things. It's combustible material, creates heat, molten glass in it, also eliminates problem of pollution. Of course part of his thing was, it's getting far too costly for them to move this from one part of the facility to the other, physically doing this. He was trying to explain to us how they were trying, but they just couldn't do that.

So apparently what I learned from that was this is kind of a bait and switch thing when they're going to actually do this and this is where they're going to increase and decrease and come up with these better limits.

The fact is, this is not how it was designed, it's not how it was supposed to be. The fact was, if you go back on record, and I ask you to do that and get the electricians that actually worked at the plant and have inside knowledge, actually listen to what he said year and a half, two years ago, when he said that, and you say they've already been doing that. He's saying it's costing too much money to do that. Of course now if they can get the permission and do it or put the dump back in wherever they want to, then they can save a lot of money and do that. The fact is, when this is burned -- reburned, this material, the material is supposed to be taken to the landfill. That creates stuff that was not best available technology. Just moving things from one side of the plant to the other in my opinion is not best available technology.

So I'd advise you to look at that, figure out if that's actually the physical thing that's going on, and whether it has been going on. According to this gentleman's testimony two years ago, it was going on then. I have to assume it's still going on and I have to say that's what they're actually applying to do. I don't want that to happen. I don't think you want that to happen. Look at the numbers what I'm saying, if it is true, check into it. If it is, stop it. That's not what it's supposed to do. Not what the original plan was.

I have to also say these limits Knauf came in here with, these are limits set by Knauf. They voluntarily did this. Part of the citizens group, I remember they raised comment 295 tons, they voluntarily went to 195 so they can get below the 200-ton limit to have a different environmental process. They decided they would come down to a hundred and a half and they decided to come in at a hundred and a quarter. At one point they offered the citizens a thing, we're willing to square up with you guys and give you money for your lawyers and time for this, but when we come in, we're coming at 125. They actually said we'll give you the money. Some people said, "Well, I'll take the money." Some said, "No, we're into clean air, we're not into money, you don't understand."

So what caused some riff, the fact was Knauf then voluntarily reduced it to 125. It wasn't the citizens standing here before you that reduced that, it wasn't you, wasn't the EPA, wasn't our county officials, it was them. They lowered it. If they lowered that just to get in and now they're asking to increase it, that's not the way it's supposed to work. And I'd invite you to make sure that's not what's been happening and not going to happen in the future. Thank you.

MS. DeLUCIA: Thank you.

Next speaker is Mary Scott.

MS. SCOTT: I don't have a lot of detailed information and I need to get more information. The one

comment -- a couple comments I would like to make though that I have made already to a few of you this evening is the inadequacy of the public notice. And I'm requesting that the -- I believe it's 45- or 60-day public comment period begin again because of the lack of address and phone numbers and information of the complete documents. The public notice that were available are not really available to us. I'm also requesting they be brought into Shasta County so we can actually see them without having to go down to San Francisco.

About compliance. This has happened from the original EIR to the revised EIR process and PSD process to the revision of the County process last year. All these limits keep getting set and broken. And even in this new PSD permit, it says you're set to these limits, and if you go over these limits, you need to notify us, you need to notify us. There's nothing in it for any compliance. Nowhere is there any explanation of what will happen once Knauf notifies the EPA. And I think that it needs to be written into the permit about what will happen. Will they be closed down? Will their production be limited or decreased? And I think this is one of the biggest problems the citizens of Shasta County have had is this over and over -- continuously for four years now, not one day in four years have they been in compliance. We were promised in the process that Knauf would be shut down within four hours of any violation of any air violation. And four years later it hasn't been shut down. And I really think this needs to be addressed.

Thank you.

MS. DeLUCIA: Thank you for comments.

Next speaker is Kathy Callan.

MS. CALLAN: As I begin, I'd like to thank Shaheerah and Gerardo for spending so much time on the phone with me last April answering my questions about the PSD permitting process. I really appreciate that.

I'm really concerned, though, about the allowances that are going to be given to Knauf. I know originally they had requested from you an increase -- I'm going to deal mostly with the nitrous oxide emissions and NOx emissions, because that's the largest increase they requested in the permit.

Originally they requested an increase in their NOx emissions from 24.9 tons per year to 99 tons per year. And I just want everybody here to realize that that's a four-fold increase. It kind of reminds you of the story of the Trojan horse kind of sneaking in and then the soldiers come out from within it. I think it's a violation of the public trust on Knauf's part.

I also, being a former science teacher, looked very meticulously at the supplemental EIR that was available online through the County last spring and I found it seriously flawed. There were a lot of air monitoring assessments that were done in Chico. Well, we don't live in Chico. The air quality here is what needs to be assessed. I know some of the stations were located in Chico. I don't find that very accurate at all. And I found several flaws in the EIR that I submitted, so you have them on record.

I also find it very hard to believe that an increase -- a three-fold increase, which is what you're proposing allowing Knauf, from 24.9 tons per year to 72 tons per year, that's basically a three-fold increase in allowable emissions of NOx, nitrogen oxides. I find it hard to believe that's not going to have a significant affect on air quality. I think what basically the EPA is saying is because of these air credits that they bought from companies that didn't pollute as much as they were allowed to, on paper it will show that Knauf is not increasing air pollution. But I would ask everybody here to consider that our lungs don't recognize what's on paper. As the gentleman who had the chronic bronchitis said, we're going to be breathing the actual pollutants that -- that is going to be a three-fold increase. And that really concerns me. Again, the consultants that did the EIR for Knauf did a poor job.

I really feel the original permit was a contract with the community. I think you've heard that from several of the people that spoke in here this evening. If a company comes in and says, gee, we promise to keep our emissions at this level, we really have to take them at their word. And then to ask for four-fold increase and be granted a three-fold increase, whom can we trust anymore? It's really an issue of trust, I think.

The last question I would ask is really I guess a rhetorical question, but I would like an answer to. If it's so easy for a company to change their permit, what incentive do they have to abide by the original permit? All of us in this room have to abide by certain laws and certain limits. And the incentive is there's a consequence if we don't. I don't see a consequence here for Knauf. So if it is the law that you have to grant them this increase, I think the law is seriously flawed and we need to work on that.

I think they lowballed their estimates -- this is my opinion -- so they could get the permit and get into the community, and now it's, "Oops, we're not able to keep our emissions at this level." So I would ask you to please be the guardians of our health and help us to restore trust in these companies that come into our community and please be there for us. And I think 72 tons per year is way too great an increase. Please make them abide by the original contract. Thank you very much.

MS. DeLUCIA: Thank you for your comments.

Next speaker is Eric Cassano.

MR. CASSANO: Thank you for coming up here and holding this pro Knauf PR rally. I'd like to see you come up here sometime and maybe enforce the permits. That might be a good change of pace from the EPA since you do call yourselves the Environmental Protection Agency. Maybe protecting the environment could be something you could make time to do in the future.

I'm going to go ahead with my written comments here. Knauf has been in violation of the original PSD air permit since November 22, 2002. That's 1,202 days that Knauf has ignored their air permit and broke the Federal pollution laws. Been three years, three months, and 14 days that the EPA has allowed this company to spew illegal pollution into our air. Now that the EPA has finally come to town, what do they want to do? They want to give Knauf an even larger permit to pollute even more. The EPA needs to spend less time writing new permits and more time enforcing the permits they've already issued. If the EPA won't enforce the pollution laws Knauf is currently violating, it has absolutely no business granting Knauf a new permit with even higher pollution limits. Pretty fundamental stuff. Probably in your job descriptions, but God forbid you read them.

The EPA needs to start actually protecting our environment instead of sheltering Knauf from the pollution laws. The EPA should be out at the industrial park right now shutting down this arrogant polluter and padlocking their doors instead of holding this blatant pro Knauf campaign rally.

Despite numerous complaints from community members, the EPA has refused to protect our environment and enforce Knauf's original permit. The EPA should be ashamed and embarrassed to be involved in this fiasco. The EPA has been making all kind of excuses on Knauf's behalf attempting to explain why Knauf's actual NOx emissions ended up being 226 percent of what their original permit allowed. I suspect Knauf knew all along their NOx emission would be well above their permit but submitted a lower figure to get a foot in the door. Like they say, it's easier to ask forgiveness than permission. I should mention Knauf did receive a notice of violation, which I notice you conveniently left off your fact sheet in describing this particular matter. I think that's pertinent information when you're talking about granting a new permit to give people a history this company violated their original permit. Quit playing us like fools here. This is ridiculous.

Notice of violation -- they receive notice of violation from EPA in October of 2004. And I've got a copy if anyone is interested in looking. But nothing has been done to make them comply with the permit. The notice of violation was signed by the EPA Region 9 air district -- air director Deborah Jordan. Recently I've made several attempts to contact Deborah Jordan about this notice of violation, but she refuses to talk to me. EPA public affairs department also refuses to return my phone calls. The only person who has ever shown any true interest in this ongoing violation was EPA special investigator in charge by the name of Scott West. He actually went out to the factory and took a look at it.

I think it's rather interesting that when I called to check up on the case, I found out Mr. West had been transferred out of Region 9 by some mechanism, and none of the other investigators would give me any information on the status of the case. It was like it just disappeared.

Deborah Jordan's name is, by the way, spelled wrong on the permit. Kind of interesting that the air director's name wouldn't be caught as a typo on the front of your permit. You would think the person who drafted the permit would know how to spell the name of Region 9 air director. Of course, if I were Deborah Jordan, I wouldn't want my real name on this piece of rubbish either. And Knauf's address is wrong on both the PSD permit and ambient air quality impact report. So you have the address wrong of the facility you're talking about, and you claim to be experts. Be interesting to know how many of these people actually have been to the facility. Probably not very many.

I want to point out one thing that really caught my eye. There's a paragraph says, "Performance tests shall be performed by independent testing firm, performance test shall be at least performed at greater than 95 percent of the maximum operating capacity of 225 tons of molten glass produced in any 24-hour period. Committee shall furnish EPA with a written report of results of such tests within 30 days after the performance tests are conducted." Then a paragraph later says, "Upon written request and adequate justification from the committee, EPA may waive the annual test and/or allow for testing to be done at less than 95 percent the maximum operating capacity of 225 tons," et cetera. I won't go into all the detail, but you the get general idea. So I wonder which one of these options Knauf would choose.

My time is up. I'll submit the rest in written form. Pretty disheartened with your attempts at complying with the law. Please do your job. Thank you very much.

MS. DeLUCIA: Thank you.

Next speaker is Betty Doty.

MS. DOTY: Mine is short and probably off the target. I'll say it anyway.

Before Knauf was issued its first permit, Dr. Andrew Dever (phonetic), a Shasta County Health Officer, asked for basic health survey so we can have before and after figures about this obvious polluter. And I've heard all kinds of rumors that people that say they've had more health problems than before. I've heard that. But I know there's so many variables, it's not easy for us out here to know if something really serious is happening or not. I'm suggesting that part of the new permit, why isn't it possible you can put in a requirement they do a health survey now so a few years down the road we'll know something?

MS. DeLUCIA: Thank you for your comment.

Next speaker is Jeff Smith.

MR. SMITH: No comment at this time, thank you.

MS. DeLUCIA: Okay. Thank you.

In that case, next comment is Celeste Draisner.

MS. DRAISNER: I'll try to follow Betty Doty, be brief.

I consider myself many different things. Most of all I consider myself an American, someone who loves this country and appreciates the diverse tapestry that binds us all together. And I know the EPA people that came here, they have a job to do and they specifically are not the ones making the decisions regarding this. So it's hard to be angry at you for what you're doing when you're not really making the decisions. I hope the people here understand that, that the decisions go much higher. And that if there's anyone who is making the decisions, it's probably Knauf Fiberglass. They're just writing the permit (inaudible) and paying out the money to the correct locations, which will remain nameless. But I think we all know where they are. That's where it comes from.

And so I would offer this. Just this one statement. And that is that I appreciate all the people that came out here in the rain, came out here in the cold, came out here even though they didn't have any hope that their voice would be heard or listened to or even considered.

I'd also urge Knauf Fiberglass to do a better job, to operate cleaner. The best engineers in the world are in Germany. And Knauf, if they were to operate clean, if they were to operate in a way that was much more helpful and beneficial to this county, they can succeed. And there's a certain price that they have paid in negative publicity. There's a lot of media coverage generated -- some by me and some by others -- which have really blown the lid off what they're doing.

I would give an example to Knauf, and that would be Enron. Enron thought they had it all worked out. They were the master's of (inaudible). Enron part of the same clubs as Knauf Fiberglass and other prominent corporations. In the end, Enron cheated and defrauded people, and there were elderly people that were cold and couldn't pay their electric bills because of Enron's methods that simply profiteering on human misery is not the way to have a sustainable company or corporation. And I know Knauf Fiberglass is not technically a corporation, but they are in many ways a corporation and in a way we see corporations in this country. And in the world.

So they have a responsibility that goes beyond profit making aspect that goes to the long-term profit making aspect, and that has to do with humanity and caring about other people and understanding that everyone has children and grandchildren or friends and family and they want to take care of those people.

One of the best speakers we had was a man named

John Rascal (phonetic), and he can't come here anymore because -- he can't. But my friend Colleen is going to read some of his previous comments. He would usually bring an oxygen tank up at the podium, and he said he never had to be on oxygen, he was never sick until the factory came online. All you have to do is look at our valley and how it's shaped and realize this valley is not a good place to put heavy industry.

So I would urge Knauf Fiberglass, the true puppetmasters, if you will, of this meeting, I would urge them to do a better job. It's not the -- the problem is not me, the problem is not the citizens that have come here. The problem is what they're doing, that they keep doing it here. Not just here, but other places in the world. They're going to suffer financially just as Enron suffered.

And so once again, I want to say thank you to everyone here that came and thank you to the people at EPA who have tried the very best to do a difficult job. We're just asking for whatever help we can get from you, whatever small thing you can do. If there's something you can do to help us, please, please help us. We really need it. There are people that are honestly in need of help. Thank you to everyone here.

MS. DeLUCIA: Thank you for your comments.

Next person is Ivan Hall.

MR. HALL: Good evening. My name is Ivan Hall. I live at 2575 Star Drive. Thanks for finally coming up here and squaring aware this NOx issue that's been going on for quite some time.

My comments concern the top down back analysis for the NOx emissions, now that NOx is under PSD control. What I noticed is that the low NOx burners, no cost analysis was given for the low NOx burners. Rather it was listed as baseline. And specifically in your document here you say that you're going to consider -- under the regulations you're going to consider the PSD requirements as if the construction of the source had not commenced. Clearly if we're using low NOx burners already in operation as baseline, that's not the case. Selective catalytic reduction, if I'm saying that right, just familiarizing myself with that terminology, you mention that's used in Quiet Flex operation of fiberglass facility in Texas. Yet when we look at the cost analysis given for Knauf using it, it's astronomical. So astronomical as to be ridiculous. Which makes me wonder why would anyone use it? So doesn't seem to be -- doesn't seem to jibe there.

One of the things I noted though is you're considering the SCR analysis in conjunction with the low NOx burners in operation. And I'm not sure that that's appropriate. Rather, should be looking at the selective catalytic reducers operating separately from the LNBs. And the low NOx burners, we should be getting emission reduction, a total capital cost, and total annualized cost to compare these things. We should be seeing what are the NOx emissions without pollution control devices and then each pollution control device matched against the pollution coming out to see which one is the most effective. Just in terms of reducing the pollution and then how much each one costs, and then we can see how much each ton is actually being reduced. I'm not sure this analysis is correct if we're calling low NOx burners a best available control technology, but we're only considering selected catalytic reduction after the low NOx burners have already been put into operation. So they're being unfairly evaluated in terms of their cost effectiveness in reducing pollution because they're having to reduce the pollution once it's already been considered to be a reduced by the low NOx burners.

It may be that the low NOx burners are ultimately the best available control technology. But I don't understand from this analysis that that's clear. And it seems to me that -- we've already given them four years, what's another six months. Whatever it takes to get this thing so it comes out straight here so that we understand.

If it comes down to, well, we don't want to make Knauf rip out their low NOx burners and put in selective catalytic reducers because it doesn't seem to make sense, at least let's get that in black and white. If it's because low NOx burners are the best available control technology and that's what they have on it, well great. Seems like they could have been forthcoming with their pollution emissions from the beginning and they would have had low NOx burners and everybody's time would not have been wasted up to this point.

So I'm a little skeptical of the whole process. Knauf has went to great lengths to try to do away with PSD permit to try to avoid some things. Fortunately, EPA Region 9 didn't allow them to do that. Now that we're here and we're considering a revised permit, I would ask that the Region 9 would consider my request and review the top down analysis for NOx facts and look at the technologies individually as if this factory truly had not been built yet, instead of looking at it, well, the factory has been built, it does have low NOx burners in place.

Thank you.

MS. DeLUCIA: Thank you. Next speaker is Colleen Leavitt.

MS. LEAVITT: Hi. We must kind of seem like a cynical bunch, but I think a lot of us have been going to these hearings that always seem like a sham probably longer than some of you have worked for EPA. You'll have to forgive us if we're a little bit hostile.

I have actually two points. One as I discussed with -- has checkered shirt on, the guy that was supposed to be enforcement guy, why he -- why the condition in their PSD permit that was issued by Shasta County was not enforced. That it said that they would be shut down in four hours if they weren't in compliance. And he said he wasn't familiar with that.

So I went and got -- this is the Knauf Fiberglass PSD authority to construct and -- you made a couple comments in your speech and then also in the permit that it wasn't subject to Federal rules because the Federal government had delegated authority to the County and now they've taken it back. So it's not directly -- was not -- original permit was not directly issued by the Federal government, but it was absolutely subject to all Federal requirements. The actual legal language is that AQMB is allowed to stand in the shoes of EPA in issuing the permit and that the permit remains a Federal permit and EPA does not -- is not excused from their oversights. So it was a Federal permit and it still is a Federal permit.

Anyway, there's condition 57 in the original

permit, "Under no circumstances shall the owner/operator be allowed to operate the system with operational parameters beyond the limit specified in conditions 45, 47, and 48. The owner/operator shall take immediate action to bring the operational parameters to within the specified limits. The immediate action for the purpose of this condition shall be defined as within four hours of the discovery of the excedence." Remember, it says "under no circumstances" will they be allowed to.

So then you have to go to condition 42. But you finally end up at the chart that has the NOx limits in it. And I'm surprised that nobody at the EPA seemed to know about this. I think you people probably changed hands there. I sent all of this information and several requests, I think probably three times, several times, even to EPA people in Washington when I was ignored by the Region 9. Why isn't this being enforced? I never got any answer, either through the mail or over the telephone. No one ever acknowledged that I had even sent this information and this request.

Then I notice in your permit, which is still a Federal permit, you've kind of done away with that problem, because although you have an entire section -- you have an entire section that talks about -- says compliance and reporting. And -- I can't find it. It has all kinds of things about reporting and the report within the certain amount of time that they're out of excedence and they'll report this and they'll report that. But conveniently there's absolutely no -- it doesn't say what's going to happen if they're out of compliance. It's like they can be out of compliance as long as they report it. I think there should be some language in here that says if you're out of compliance, we'll do this, or that will happen to you, or something. Although, from past experience, we might not really expect it to -- anything to really happen.

I have a lot of other things that I can submit. I'd like permission just to run a little over to read something from the transcript of the hearing from the -- before the Board of Supervisors. I'll send that entire transcript. So many people talk about the health impacts and I talked to some of you before that -- and Betty Doty talked about the baseline.

This was a man, John Rascal. "I am probably the closest neighbor to the plant. We live within 200 feet of the plant and we bought our place back in 1979. We moved up from Los Angeles where the smog was killing us to a nice clean place. Now we're back where we started from. To start off with, I'm 72 years old and I've never spent a day in the hospital in my life until a year and a half ago, and it was with my lungs. My doctor said, 'Are you still living near Knauf?' I said, 'Yeah.' He said, 'Maybe you should think about moving.' 'We'd like to move, but we don't have the money to move. Now I'm tethered to this thing.' Although it doesn't reflect it, he's talking about his oxygen tank. 'Now I'm tethered to this thing here. I can't even brush my teeth without this hose in my nose.' So due to Knauf, up until then, I was probably about 50 percent offered no oxygen, didn't need no oxygen. Now I have to have a gardener, painter, plumber. I can't do anything. That's all I have to say, and I just hope you don't give them any more room to pollute the country anymore. Thank you."

He's since died. And people talk about being the guardians of our health. I think that's how we see the EPA, and I hope that's how you see yourselves, also. Thank you.

MS. DeLUCIA: Thank you.

Next speaker is Curtis Brown.

Mr. Brown, I don't have a city and state and Zip code on your form. If you want to receive a copy of the permit, just make sure --

MR. BROWN: Redding, California.

I read this article that the Record Searchlight put out today about Knauf seeks new air permit. It sounded like to me by this couple paragraphs here, says, "Modification would increase the Ashby Road glass production capacity of 195 tons per day to 225, a change that one EPA environmental engineer said would trigger a fairly minor increase in emissions from the plant's 199-foot main stack." What's that tell you? That tells you you people have already made up your mind, doesn't it?

You know, Eric had it right. You people are not doing your job. The first time that it ever rang a bell in my head about the Environmental Protection Agency -- because I always thought you guys did your job and did it right. But I took a trip back to Lanett, Alabama, to one of their plants, and interviewed the same people that the Record Searchlight interviewed back there. And I got almost exactly the same response from those people that the Record Searchlight did. So the Record Searchlight did their job. And here I am talking to one guy that's got a swimming pool back there. And Knauf, every so often they have to burn their stack out to get all the stuff out of it that accumulates. A lot of this, the wind had to be blowing towards his place that day, and it blew over on him and other neighbors. He collected a jar of it. And he sent it to the Environmental Protection Agency of Alabama. And I asked him, I said, "What did they say?" He said, "I haven't heard back from them." I said, "How long has it been?" He said, "Two years." So he didn't get an answer back.

So I thought, well, this is Alabama, you know, the deep south, they walk on people down here, they don't care about people, they don't have to respond to them. But we in this state right here lead the entire nation when it comes to common sense on air pollution and keeping things under control. Just common sense is all we're asking for. And it sounds to me like you guys have already made your minds up. I hope you haven't. Because this plant, this company, is extremely intelligent people. They're smarter than hell. They have started off from the ground zero -- this is not a four-year thing we're talking about here. This started in 1996, about ten years ago if I remember correctly, and they have misled the people in this county, the County officials, the State officials, the environmental officials, from day one. And it continues right up until now. It just keeps continuing.

They told us when we come in here, "We can run this plant over here on all this sewage water here going into the treatment pond." As soon as they started up, "Hey, we can't do that, we have to have your drinking water." Now they're using all our good drinking water. Guess what, our water price has gone up. Same with the electric. They put in two different plants out here, power -- not generation, but control plant where they can supply that plant, two of them. One is right there on the corner of Beltline Road and Oasis, and another one back out here (indicating). Not supposed to affect our electric. Guess what? Everybody's electric rates goes up.

We've been shafted ever since. They're smart. And they're making you people look like either butt suckers or yes-men. They've snowed you all the way through. You have to stop and look this thing over. These people that stood up here and talked to you with facts here in front of them, they're telling you exactly the truth. If they didn't, they'd get their ass sued off. That company has threatened me before and it threatened the guy that spoke up here before. They're smart, and they're snowing you. You have to take these people's word. What they're telling you is the truth. Otherwise, we'd be up a shaft creek, boy.

MS. DeLUCIA: Thank you for your comments.

Are there any other speaker cards?

UNIDENTIFIED SPEAKER: Would anybody else like a speaker card at this time?

MS. DeLUCIA: Anyone else who didn't have a chance to speak and would like to do so now?

Okay, anyone who did speak and wants to expand upon their comments? We have some time here.

Yes, sir.

MR. SCHALESKY: I'd like to make a comment.

MS. DeLUCIA: Could you step to the microphone and also tell us your name.

MR. SCHALESKY: I will. My name is kind of long, I'll give you a brief. It's -- F. Ted Schalesky. The reason why I'm here is because 15 years ago my parents moved from the Bay Area, very much like some of these people have, to come here to have the ability of breathing fresh air and a good environment. Since Knauf has been operating, which is about three years -- my parents' home is down Oasis Road east of Interstate 5 about five miles, and every night we get gassed by the fumes that come from Knauf. I have checked it myself. I wish I had a couple sniffers to check the oxygen and also the emissions that come out of the plant. The gas is so bad that it burns your eyes at night. It burns their nose when you breathe, inside membranes, just burning on fire. Same thing with our lungs. Only happens at nighttime. And it did not happen when they were remodeling their plant here this last month or so. But it's really causing some serious problems. And it's bad enough that -- I'm an investor -- that when my mom passes away -- because I'm here to take care of her until she passes away -- I will not spend a dime in this community. Not because of the people, not because of where it's at, but because of what Knauf has. We have several million dollars worth of property in the area. If they continue doing what they're doing, the community will not have access to that money. Because I will move.

Anyway, it's very bad. We've lost birds out of our bird aviary. Nights it's been really very bad. Currently I'm working with a firm out of Texas that's building an air purifier we can put in the cold air returns to reduce particles and fumes from the air that we breathe in our house. And it's terrible. I wish one of you guys would come and live with us for a month and see what you think of it. It's bad. It's worse than sticking your nose up a tailpipe of a car.

I hope, like a few people before us said, please do your job. We had a nice environment and good place to be, good place to live, good place for people to come and retire. Right at the moment, it stinks, literally.

MS. DeLUCIA: Thank you. Could you sign the sign-in sheet, I want to make sure we have the right spelling of your name for the transcript.

MR. SCHALESKY: Yes. No problem.

MS. DeLUCIA: Anyone else want to make a comment?

Ms. Leavitt?

MS. LEAVITT: I didn't get to read both comments. I read what John Rascal said. I wanted to read also what Claire Rascal said.

"I'm Claire Rascal. I happen to be his wife, and I'm in pretty good condition myself, but I have been getting a lot of allergies." Which is actually a common complaint of the people that live around the plant. "But I've been getting a lot of allergies. I'm telling you at times there are terrible smells. Heavy chlorine and sometimes, believe it or not, like rotten eggs. We live on the west side. Like he says, we're right near there, and it stinks mostly at night. Believe me, maybe they're doing it secretly to do it at night. I don't know. But it would be nice if one of you would come and spend the night with us," obscured by applause from the audience, "just to find out yourself. You know you're living somewhere far away from them and you don't smell it. But I would love to have you come and stay with us."

She was speaking to the Board of Supervisors, and none of them did go and spend a night with her. But passes away -- because I'm here to take care of her until she passes away -- I will not spend a dime in this community. Not because of the people, not because of where it's at, but because of what Knauf has. We have several million dollars worth of property in the area. If they continue doing what they're doing, the community will not have access to that money. Because I will move.

Anyway, it's very bad. We've lost birds out of our bird aviary. Nights it's been really very bad. Currently I'm working with a firm out of Texas that's building an air purifier we can put in the cold air returns to reduce particles and fumes from the air that we breathe in our house. And it's terrible. I wish one of you guys would come and live with us for a month and see what you think of it. It's bad. It's worse than sticking your nose up a tailpipe of a car.

I hope, like a few people before us said, please do your job. We had a nice environment and good place to be, good place to live, good place for people to come and retire. Right at the moment, it stinks, literally.

MS. DeLUCIA: Thank you. Could you sign the sign-in sheet, I want to make sure we have the right spelling of your name for the transcript.

MR. SCHALESKY: Yes. No problem.

MS. DeLUCIA: Anyone else want to make a comment?

Ms. Leavitt?

MS. LEAVITT: I didn't get to read both comments. I read what John Rascal said. I wanted to read also what Claire Rascal said.

"I'm Claire Rascal. I happen to be his wife, and I'm in pretty good condition myself, but I have been getting a lot of allergies." Which is actually a common complaint of the people that live around the plant. "But I've been getting a lot of allergies. I'm telling you at times there are terrible smells. Heavy chlorine and sometimes, believe it or not, like rotten eggs. We live on the west side. Like he says, we're right near there, and it stinks mostly at night. Believe me, maybe they're doing it secretly to do it at night. I don't know. But it would be nice if one of you would come and spend the night with us," obscured by applause from the audience, "just to find out yourself. You know you're living somewhere far away from them and you don't smell it. But I would love to have you come and stay with us."

She was speaking to the Board of Supervisors, and none of them did go and spend a night with her. But that -- when that gentleman was talking and he wished that you would come and -- and I've heard a lot of people comment that it's worse at night, also.

So that's all I wanted to add. Thank you.

MS. DeLUCIA: Thank you.

Are there any further comments?

Well, if there aren't any further comments for the record, I'm going to go ahead and conclude this public hearing. But as a reminder, the public comment period remains open until March 28th. If you wish to make further written comments about the proposed permit revision, don't forget to take a yellow handout in the back. That will explain how to make those comments.

It's now 8:09 p.m. and this public hearing is hereby closed. Thank you all for coming out tonight in the rain and have a good night.

(Public hearing concluded at 8:09 p.m.)

---oOo---

CERTIFICATE OF REPORTER

I, CRAIG W. WOOD, a Certified Shorthand Reporter, licensed by the State of California, License No. 9789, being empowered to administer oaths and affirmations pursuant to Section 2093(b) of the Code of Civil Procedure, do hereby certify:

That the foregoing proceedings were taken in stenographic shorthand before me at the time and place herein stated, that said proceedings were taken before me in shorthand writing, and were thereafter transcribed under my direction by computer-aided transcription;

That the foregoing transcript constitutes a full, true, and accurate record of the proceedings which took place;

That I am not of counsel or attorney for any of the parties hereto, or in any way interested in the event of this cause, and that I am not related to any of the parties hereto.

IN WITNESS WHEREOF, I have hereunto subscribed my signature.

DATED: March 24, 2006

Craig W. Wood

CRAIG W. WOOD, RPR, CSR 9789

CLASS I AREA IMPACT AND VISIBILITY ASSESSMENT REPORT
(SUPPLEMENT TO PSD AIR PERMIT MODIFICATION)

Prepared For
KNAUF FIBER GLASS
Shasta Lake, California

June 27, 2003

Mostardi Platt

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: V-G

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MPE PROJECT M030601

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CLASS I AREA IMPACT AND VISIBILITY ASSESSMENT REPORT
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Shasta Lake, California
June 27, 2003

1.0 INTRODUCTION

Knauf Fiber Glass GmbH (Knauf) operates a 195-ton per day fiberglass manufacturing facility (Facility) in Shasta County, California. On May 21, 2003, Knauf submitted an Air Permit Modification to the U. S. Environmental Protection Agency (EPA or Agency), Region IX, to modify the Prevention of Significant Deterioration (PSD) permit for the Facility to allow a significant increase in nitrogen oxides (NO_x) emissions. The Facility is currently permitted for 124.4 tons per year (TPY) of PM-10 (particulate) emissions, and 24.8 TPY for NO_x. The modification for the permit is for a NO_x increase to 99 TPY, while total PM-10 emissions remain the same.

The application for the PSD air permit modification included an air quality impact analysis to demonstrate compliance with PSD thresholds. As discussed in the application, Knauf has prepared this Class I Impact and Visibility Assessment Report to demonstrate that the proposed NO_x emissions increase will not adversely affect the nine (9) Class I Areas located within 200 km of the Facility.[5]

The nine Class I areas are: (1) Thousand Lakes Wilderness – 63 km, (2) Yolla Bolly Middle Eel National Wildernes – 69 km, (3) Lassen Volcanic National Park – 70 km, (4) Caribou Wilderness – 95 km, (5) Marble Mountain Wilderness – 101 km, (6) Lava Beds National Monument – 132 km, (7) Redwood National Park – 138 km, (8) Mountain Lakes Wilderness – 179 km, and (9) South Warner Wilderness – 190 km.

[5] The U. S. Department of Agriculture, Forest Service, General Technical Report PSW-GTR-136, entitled "Guidelines for Evaluating Air Pollution Impacts on Class I Wilderness Areas in California," states that a permit applicant [for a major air emissions source] is required to demonstrate that the proposed facility will not violate national or state air quality standards, use the best available control technology to limit emissions, not violate either Class I or Class II PSD increments for sulfur dioxide, nitrogen dioxide, and particulates, and not cause or contribute to adverse impacts to air quality related values (AQRV) in any Class I area. Coordination between the Forest Service and the air regulatory agency (EPA Region IX for this project) is required in decisions on PSD permits, and permit modifications.

CLASS I AREA IMPACT AND VISIBILITY ASSESSMENT REPORT
(SUPPLEMENT TO PSD AIR PERMIT MODIFICATION)

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1.0 INTRODUCTION

Knauf Fiber Glass GmbH (Knauf) operates a 195-ton per day fiberglass manufacturing facility (Facility) in Shasta County, California. On May 21, 2003, Knauf submitted an Air Permit Modification to the U. S. Environmental Protection Agency (EPA or Agency), Region IX, to modify the Prevention of Significant Deterioration (PSD) permit for the Facility to allow a significant increase in nitrogen oxides (NO_x) emissions. The Facility is currently permitted for 124.4 tons per year (TPY) of PM-10 (particulate) emissions, and 24.8 TPY for NO_x. The modification for the permit is for a NO_x increase to 99 TPY, while total PM-10 emissions remain the same.

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2.0 BACKGROUND INFORMATION

To assist with the review of this document, portions of the air permit modification application text are reprinted in this section and include:

- Facility Location
- Site Map
- Project Contact
- Consultant Contact
- Permit History
- Process Description
- Facility Operating Schedule
- Plant Emissions

Knauf incorporates by reference the following sections of the *Air Permit Modification, May 21, 2003*:

- The air quality impact analysis relative to both National Ambient Air Quality Standards (NAAQS) and the California Air Resources Board Air Quality Standards (CARBAQS)

- The Air Quality Impact Assessments (AQIAs) using EPA approved dispersion modeling techniques

- The federal Best Available Control Technology (BACT) and Shasta County Air Quality Management District Rules and Regulations, Section 205 BACT analyses

- The Hazardous Air Pollutants (HAPs) Hazard Risk Analysis

2.1 Facility Location

A site location map can be found in Figure 2.1-1. Shasta County is located at the northern end of the Sacramento Valley Air Basin. The location of the nine Class I areas within 200 km of the Knauf Shasta site can be found in Figure 2.1-2.

The plant site is a 92-acre parcel in Shasta Lake. The facility address is:

Knauf Fiber Glass
3100 District Drive
Shasta Lake, California 96019

The UTM coordinates (NAD 27, Zone 10) at the center of the facility are:

Northing	4,500,750	meters
Easting	551,620	meters

The Latitude and Longitude at the center of the facility are:

Latitude	40°	39'	30"
Longitude	122°	23'	23"

2.2 Project Contact

Mr. Stephen R. Aldridge
Manager, Environmental Health and Safety
Knauf Fiber Glass
240 Elizabeth Street
Shelbyville, Indiana 46176
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2.3 Consultant Contact

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Oak Brook, Illinois 60523
Phone: (630) 993-2127
FAX: (630) 993-9017
EMAIL: jmacak@mostardiplattenv.com

Figure 2.1-1. Site Location Map

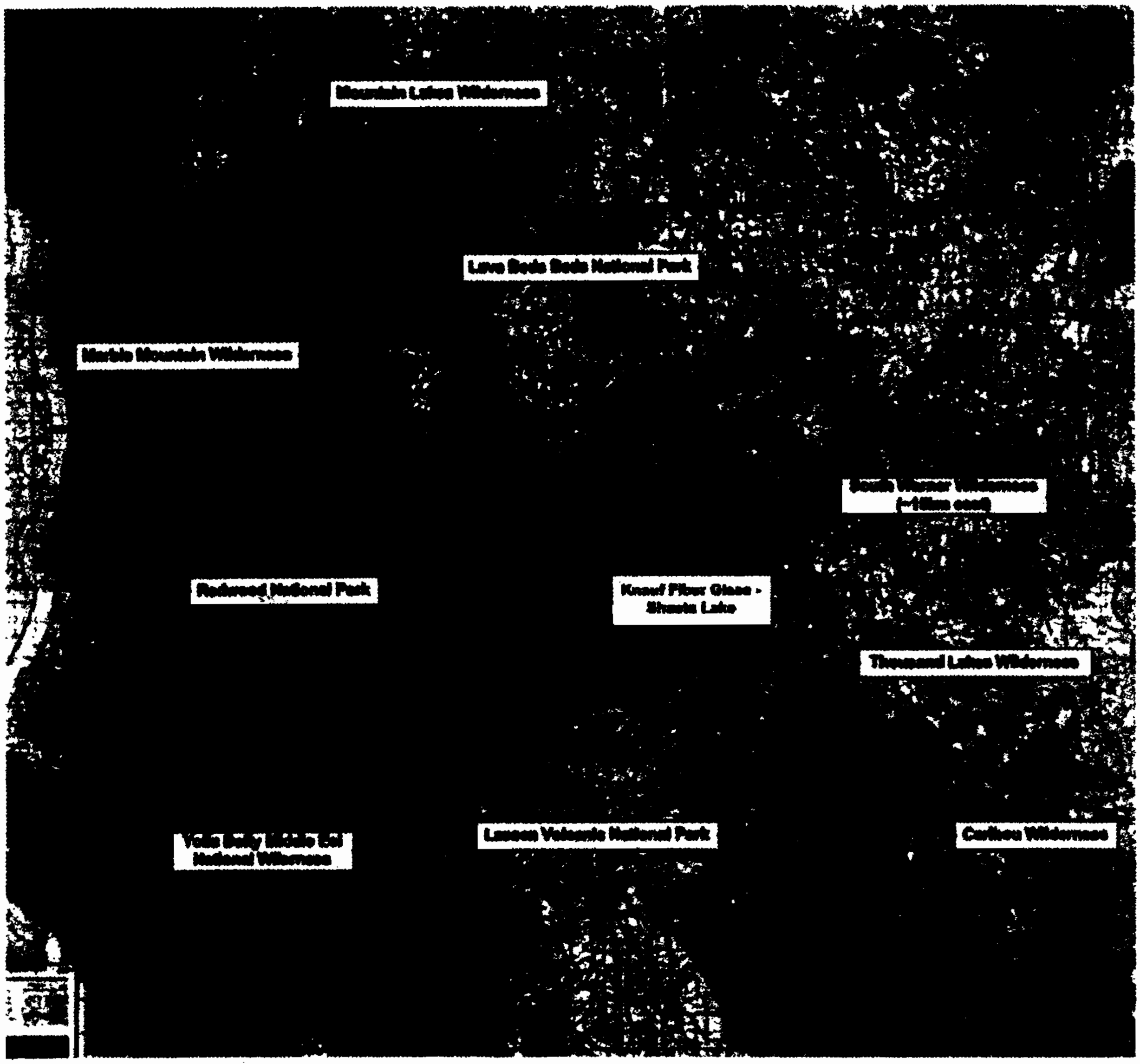

Figure 2.1-2. Location of Nine Class I Areas within 200 km of Knauf Shasta Facility.

2.4 Permit History

Knauf submitted the original air quality permit application under the federal (PSD) requirements on July 17, 1997. A PSD permit application was completed for PM_{10} because there was the potential for particulate emission rates to exceed 100 tons per year (TPY) and thus trigger PSD review for PM_{10}. Using the conservative estimates, PM_{10} emissions were estimated at 191.8 TPY (43.6 lb/hr), and the PSD threshold is 100 TPY. All other air pollutant emissions were considered minor in comparison to the PSD thresholds as shown in Table 2.4-1. All analyses for PM_{10} for the original PSD application were based on 191.8 TPY.

Table 2.4-1. Knauf Shasta Facility Emissions from Original PSD Application.

Pollutant	Knauf Plant, TPY	PSD Review Required?
PM_{10}	191.8 (124.4)[a]	Yes
NO_x	24.8	No
SO_2	4.4	No
CO	97.7	No
ROG (includes Formaldehyde and Phenol)	39.4	No
Formaldehyde	8.76	No
Phenol	26.28	No
Ammonia	166.4	No

Note: Knauf Fiber Glass considers all particulate matter as PM_{10}. Since PM_{10} emissions have more stringent limitations, all discussions in this permit application utilize PM_{10} rather than PM.
[a] PSD permit issued had a reduced PM_{10} limit.

After an extensive period of appeals, the PSD permit was issued three years later on March 22, 2000 with a reduced PM_{10} emission limit of 124.4 TPY (28.4 lb/hr). Construction of the facility commenced immediately and the plant began operation on February 4, 2002. Air emissions testing was completed in April and December 2002.

Based on oven exhaust gas and thermal oxidizer burner manufacturer's emission estimates, NO_x emissions from the facility were expected to be minor due to the use of low NO_x burners in the fiberglass curing oven and thermal oxidizers. As a result, NO_x was not formally evaluated under PSD in the original PSD permit application, but was evaluated in the California Environmental Quality Act (CEQA) Environmental Impact Report (EIR) and the required California BACT analysis.

NO_x emissions test results demonstrated that the actual emissions resulted in a level that exceeded 40 TPY, but were less than 100 TPY. Therefore, to be conservative in this PSD air permit modification, NO_x was increased to 99 TPY.

2.5 Process Description

The Knauf Shasta facility consists of one fiber glass insulation production line rated at 195 tons of molten glass per 24-hour production day. A process flow diagram is included as Figure 2.5-1, and the typical material handling flow diagram is included as Figure 2.5-2. Fiber glass manufacturing consists of the following processes:

1. Raw materials handling
2. Molten glass preparation
3. Fiber forming and binder application
4. Curing the binder-coated fiber glass mat
5. Cooling the mat
6. Facing
7. Cutting and packaging

2.5.1 Raw Materials Handling

The primary component of fiberized glass is silica sand, but it also includes granular quantities of soda ash, limestone, borax, dolomite, feldspar and other minor ingredients. The raw materials are received in bulk by rail car and truck. The bulk raw materials are unloaded from the trucks and rail cars by a mechanical conveying system to storage silos. All conveying and storage areas are enclosed.

From the storage areas, the materials are measured by weight according to the desired product recipe and blended prior to their introduction into the electrical glass melting furnace. The weighing, mixing and charging operations are conducted in batch mode.

Particulate matter (PM) is the only regulated pollutant which is generated by the raw materials handling operation. Emissions from the indoor dust collectors are insignificant and vent indoors. There is no ultimate vent point that leads to the atmosphere outside the building. Air is exhausted from these dust collectors only when batch raw materials or mixed batch is transported through the system. Proposed methods for controlling particulate matter from conveying and storage operations include enclosures and fabric filter dust collectors. All captured particulates are recycled back to the system.

The furnace batch day bins, containing mixed batch ready to be put into the furnace, are located next to the furnace and exhaust into the furnace/forming building. Negative pressure inside of this building prevents any emissions from these devices from exiting the building. Due to the extremely large volume of air exhausted through the forming section, a negative pressure is generated throughout the entire building. All fugitive emissions from the inside-vented dust collectors, raw material storage tanks, washwater storage, etc. pass through the forming section control devices prior to being discharged through the main stack. Any emissions from these sources are measured during emission tests on the main sack. To control fugitive emissions, all emissions from the mixing process and indoor venting are routed through the forming operation (via induced draft) and are included in the overall emission rates for the process.

2.5.2 Molten Glass Production

After introduction into the electric glass melting furnace, the raw materials are heated to a temperature of approximately 2,500 °F and transformed through a sequence of chemical reactions to molten glass. The proportions of the glass ingredients remain the same for the various products manufactured on the line. The raw materials are introduced continuously at the rear of the furnace where they are slowly mixed and dissolved.

Since all glass melting is done electrically (no fuel combustion), the only pollutant emitted by the glass melting furnace is PM in trace amounts from the batch feeding process. The particulate emissions are controlled by two fabric filter baghouse dust collectors with 99+% removal efficiency.

2.5.3 Glass Fiber Forming and Binder Application

The rotary spin process is used in the Knauf facility production line to form glass fibers. In the rotary spin process, molten glass from the furnace is continuously poured into a rotating cylinder or spinner. Centrifugal force causes the molten glass to flow through small holes in the wall of the spinner. The emerging fibers are entrained in a high velocity air stream, and binder is applied to bond the fibers. Typically, the binder consists of a solution of phenol-formaldehyde resin, water, urea, organo silane, ammonium sulfate, and ammonia.

The liquid phenol-formaldehyde resin is purchased and stored as a 50-55% solid concentration (45-50% water) and mixed with the other ingredients as needed. The resin dilution operation is a batch process. In the batch process the resin is diluted with water and other ingredients in vented mixing tanks and then stored for use. All emissions from the mixing and indoor venting are routed through the forming operation (via induced draft) and included in the overall emission rates for the forming operation.

The glass fibers are pulled onto a perforated flyte conveyer belt directly below the spinners by suction air from fans pulling air through the perforated conveyer belt. The fibers are collected on the conveyer to form a fiberglass mat. Each spinner contributes fiberized glass to the mat causing the mat to increase in thickness as it travels through the forming section. The thickness of the uncured fiber glass mat is controlled by the conveyer speed.

The quantity of binder solids sprayed onto the glass fibers is governed by the type of product being manufactured. Residential insulation is approximately 4% binder by weight, whereas metal building, duct wrap and flexible duct material are up to 10% binder by weight. Typically, about 85% of the binder applied to the fiber glass remains on the product (referred to as binder application efficiency); the remainder is exhausted with the forming or curing oven air to an air pollution control device, or remains on the conveyer.

Quality control checks will be routinely performed by plant personnel to determine the loss on ignition (LOI) of the product. The LOI check insures that the correct weight percent of binder is present in the product. To determine the LOI, a sample of the product is weighed, ignited to remove the binder and reweighed.

The fiber glass from several of the rotary spinners is diverted without binder application to a processing area to be packaged as unbonded blowing wool insulation.

The regulated pollutants which are emitted from the forming and binder application section are reactive organic gases (ROGs)/volatile organic compounds (VOCs) and PM, 90 to 95% of which are organic solids and the balance of which are inorganic solids and minute amounts of entrained glass fibers. Carbon monoxide (CO), NO_x, and trace amounts of sulfur dioxide (SO_2) are also emitted from the combustion of natural gas. The exhaust stream from the forming sections is sent through wet venturi scrubbers and a wet electrostatic precipitator prior to entering the stack.

2.5.4 Curing the Binder-Coated Fiber Glass Mat

After the mat is formed, it continues on the conveyer to the curing oven. Upper and lower perforated flytes in the oven compress and cure the fiber glass mat to the desired final thickness. The clearance between the flytes may be adjusted for different products.

The purpose of the curing oven is to drive off the moisture remaining on the fibers and cure the binder. The oven has six (6) zones, plus two (2) vestibule burners to maintain temperature. Each zone has its own low NO_x burner and blower to recirculate the hot air through the mat. An illustration of the curing oven is shown in Figure 2.5-3. The oven burners are Maxon Model 3.7M low NO_x burners. Each of the eight (8) oven burners is rated at 3.7 million Btu per hr (MMBtu/hr; High Heating Value basis), with a NO_x emission rate of 0.034 lb/MMBtu. The normal operating rate per burner is 40% of capacity, or 1.5 MMBtu/hr. The oven temperature ranges from 450 °F to 500 °F. Hoods are at the entry and exit of the oven to capture the exhaust from the oven.

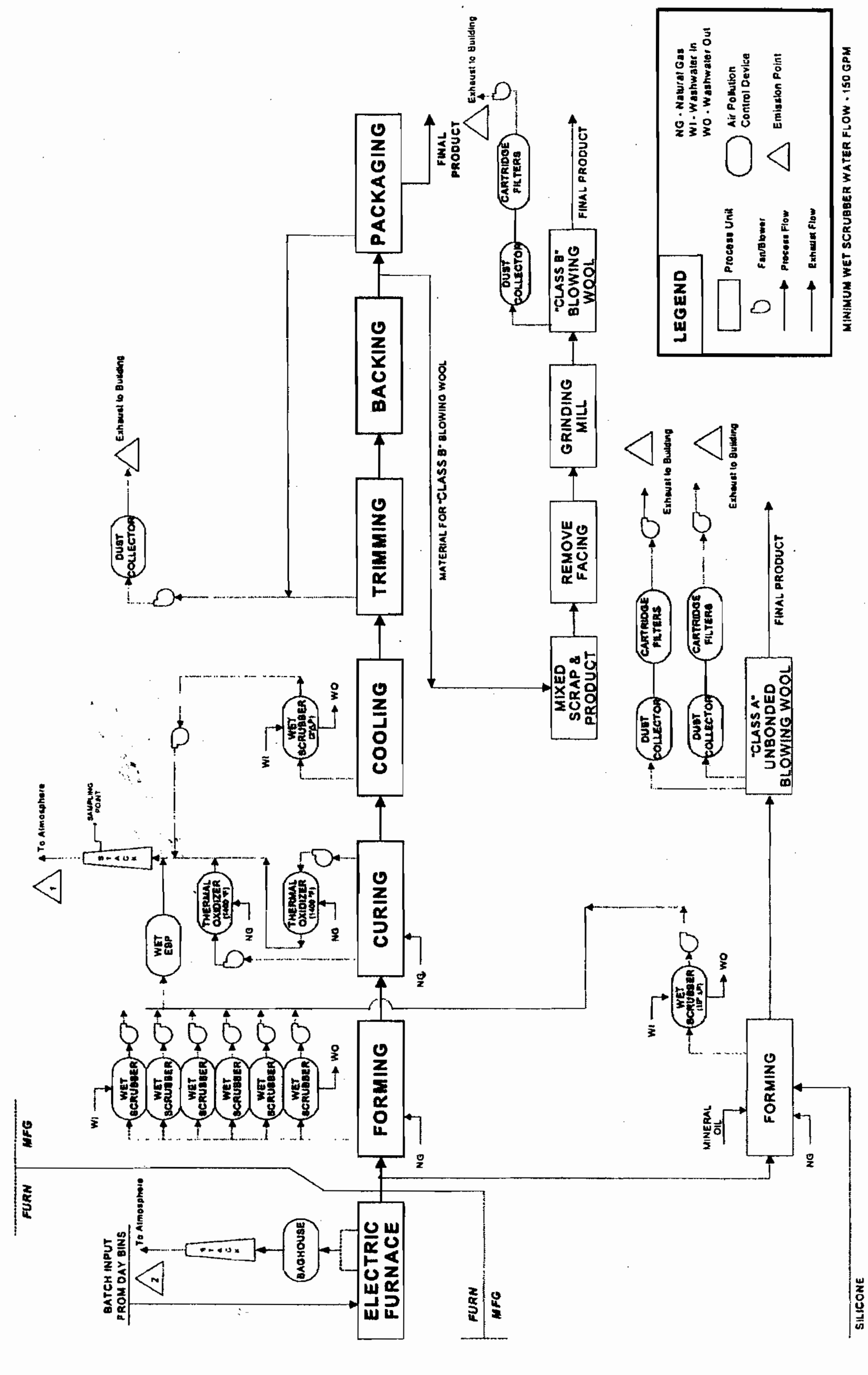

Figure 2.5-1. Process Flow Diagram for Knauf Fiber Glass.

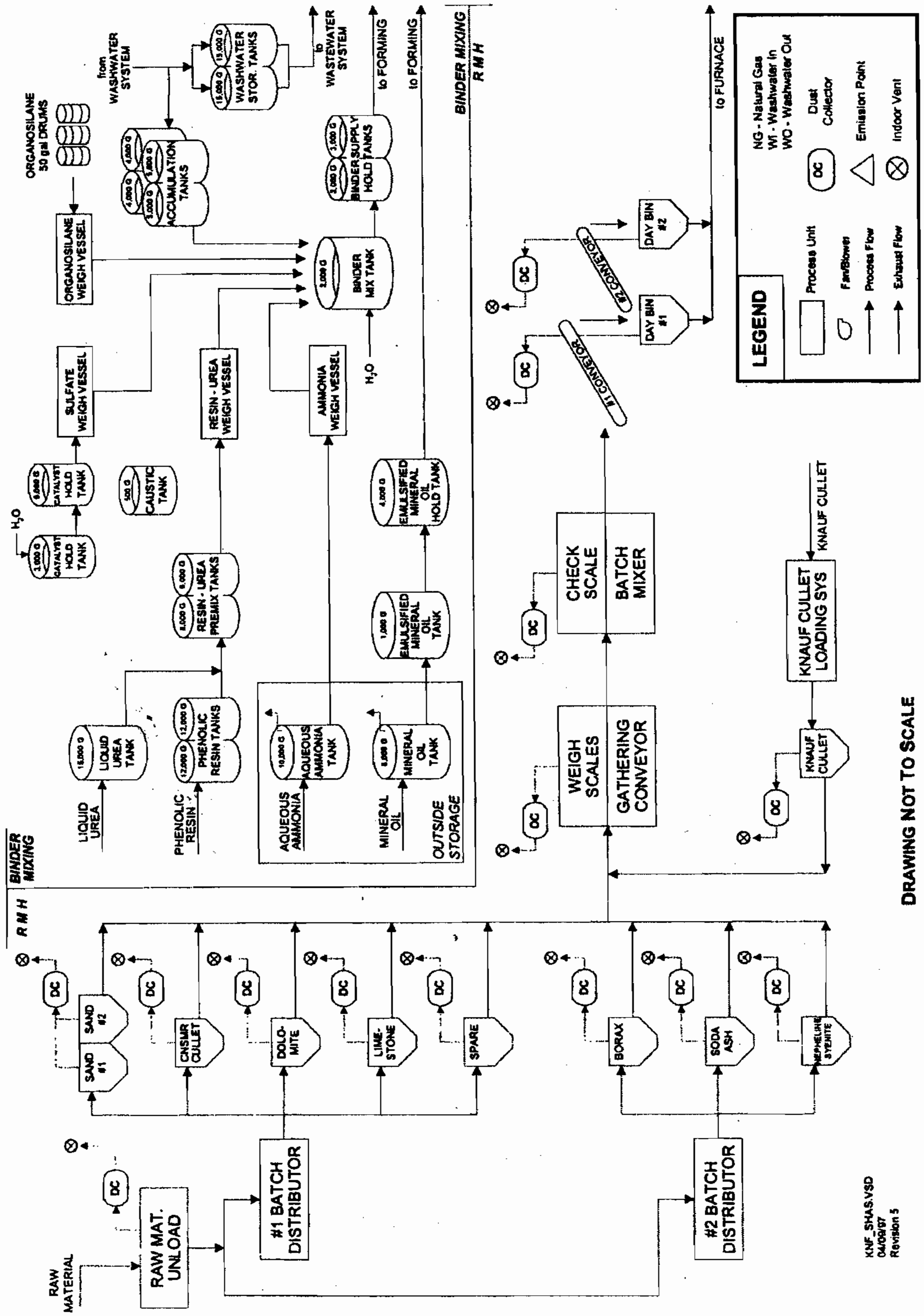

Figure 2.5-2. Typical Material Handling Flow Diagram.

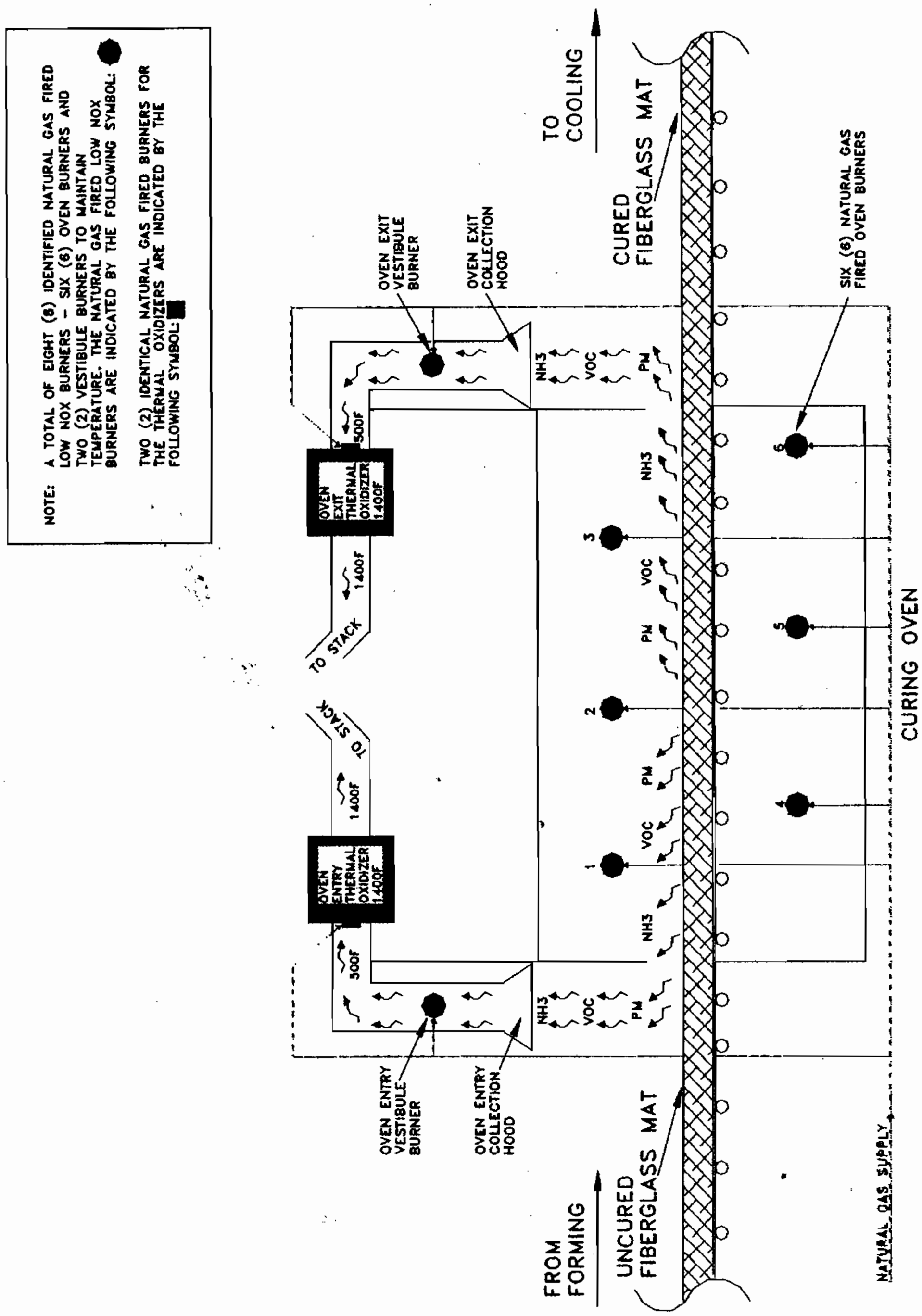

Figure 2.5-3. Curing Oven with Thermal Oxidizers.

The regulated pollutants emitted from the curing oven are PM and ROG/VOCs from heating the binder, and NO_x, SO_2, and CO from the natural gas combustion burners. These pollutants are sent through two (2) thermal oxidizers prior to entering the main stack as shown in Figure 2.5-3. A thermal oxidizer is the best available control device for the destruction of VOCs contained in the binder. The thermal oxidizers are Maxon Kinedizer Model 18M rated at 18 MMBtu/hr. The normal operating level is between 60 and 70%, or 10.8 to 12.6 MMBtu/hr. Typical destruction efficiencies exceed 90% at a thermal oxidizer outlet temperature of 1400 °F.

As stated in Section 2.5.3, the binder contains ammonia and urea. Some free ammonia is present and enters the curing oven. In addition, during the curing process, ammonia is one of the byproducts that are driven off during the thermal decomposition of urea. As this ammonia passes through the thermal oxidizers operating with a minimum outlet temperature of approximately 1400 °F, some of the free ammonia is converted to additional NO_x as follows:

$$4NH_3 + 7O_2 \rightarrow 4NO_2 + 6H_2O$$

$$4NH_3 + 4O_2 \rightarrow 2N_2O + 6H_2O$$

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$

The magnitude of the NO_x created by the ammonia oxidation was not known at the time the original PSD permit application was filed for this facility.

2.5.5 Cooling the Mat

After the mat has been cured, it passes over a cooling section where ambient room air is induced through the mat. The regulated pollutants emitted from the cooling section are minor amounts of PM and ROG. The exhaust from the cooling section exits through the common stack.

2.5.6 Facing

An asphalt adhesive precoated paper facing is heated and pressed against the cooled mat for some of the insulation products. A water-based adhesive is also used to glue facings to some products.

2.5.7 Cutting and Packaging

Just prior to the facing section of the line, the mat edges are trimmed and cut. The trimmed edge waste is recycled using an air conveyer system back to the forming section to be included with the mat being formed. The dust that develops during the cutting and packaging operations is collected with an air evacuation system and filtered with a fabric filter dust collector system.
Blowing wool is sent through a separation system that removes the wool from the blown air stream and packages it.

2.6 Operating Schedule

This permit application is for continuous operation of the Knauf Shasta facility (8,760 hours/year).

2.7 Plant Emissions

Authority to Construct and New Source Review (NSR) regulations require a determination of the source's potential to emit (PTE), which is the maximum capacity of a stationary source to emit air pollutants under its physical limitations and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, provided the limitation is enforceable, is to be treated as part of its design. The emission rates presented in this section are based on maximum plant operations.

The following PTE emission rates are based on 195 tons of molten glass being produced per day (8.13 tons/hr). The major source of air pollutants at the facility comes from the combined stack for the forming, oven, and cooling operations. The PTE emission rates for all pollutants from the combined forming, oven, and cooling are listed in Table 2.7-1.

The basis for the PTE rates are the currently permitted limits at 8,760 hours of operation, with the exception of PM_{10} and NO_x, which are the values listed in this application. Emission calculations can be found in Appendix A for PM_{10} and NO_x.

Table 2.7-1. Manufacturing Line (Forming, Oven and Cooling) Stack PTE Emissions.

Pollutant	lb/hr	tons/yr (TPY)
PM_{10} (particulate matter less than 10 microns in size)	28.4	124.4
NO_x	22.6*	99.0
SO_2	1.0	4.4
CO	22.3	97.7
ROG (includes Formaldehyde and Phenol)	9.0	39.4
Formaldehyde	2.0	8.8
Phenol	6.0	26.3
Ammonia	38.0	166.4

* Change from original PSD application (5.66 lb/hr).

PM_{10} emissions also exhaust from a dust collector associated with the electric glass melting furnace. The total plant PTE PM-10 emission rates are given in Table 2.7-2. A more detailed emission summary is contained in Appendix A.

Table 2.7-2. Total Plant PM10 Emissions.

Emission Source	lb/hr	TPY
Combined Forming/Oven/ Cooling Stack	27.4	120.0
Electric Glass Melting Furnace Dust Collector	1.0	4.4
Total PM_{10} Emissions	**28.4**	**124.4**

3.0 CLASS I AREA IMPACT AND VISIBILITY ASSESSMENT

PSD regulations require estimation of the impact of criteria pollutants and visibility impairment on any Class I area within 200 kilometers (124 miles) of a major source. Pollutant concentrations, deposition levels, and visibility impairment at Class I areas are compared to EPA standards and Federal Land Manager accepted guidelines.

A Level II Visibility Impairment study was performed using the EPA VISCREEN Model for the original PSD permit application in 1997. New EPA guidelines require the use of EPA's CALPUFF model evaluation of concentration, deposition, and visibility for cases with long range transport (> 50 km) of air emissions.

3.1 Guidance Documents

Several references were consulted while performing this Class I Area Impact and Visibility Assessment which include:

- Guidelines for Evaluating Air Pollution Impact on Class I wilderness Areas in California[6]
- Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report[7]
- Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts[8]
- 40 CFR 51, Revision of the Guideline on Air Quality Models: Adoption of a Preferred Long Range Transport Model and Other Revisions[9]

These guidance documents and their relevance are discussed below, and procedures and criteria established in these documents were used for the AQRV analysis for the NO_x increase at the Knauf Facility in Shasta Lake, California.

It is important to note that this study conservatively includes an analysis of the PM-10 levels contained in the current PSD permit, with a slight adjustment in stack emission rates to reflect the fact that there is a 0.9 lb/hr increase in the PM-10 emissions from the furnace stack, and a 0.9

[6] United States Department of Agriculture, Forest Service, Pacific Southwest Research Station, General Technical Report PSW-GTR-136, November, 1992

[7] Department of the Interior, National Park Service, Interior; U.S. Forest Service – Air Quality Program, National Park Service – Air Resources Division, U.S. Fish and wildlife Service – Air Quality Branch, December 2000

[8] EPA-454/R-98-019, December 1998

[9] 40 CFR Part 51, Final Rule, Revision to the Guideline on Air Quality Models, published April 15, 2003

lb/hr decrease in PM-10 emissions from the forming stack. Furthermore, this study includes an analysis of the total NO_x emissions from the Facility (99 TPY), although the PSD modification is for an increase of 74.2 TPY.

3.1.1 Guidelines for Evaluating Air Pollution Impact on Class I Wilderness Areas in California

This report, published in 1992, is a high level discussion on the development of guidelines to evaluate the effects of air emissions on wilderness resources. It looks at the assessment of a wide range of physical, chemical, and biological data as they relate to various wilderness areas in California. The report summarizes the results of an interagency workshop to review and discuss AQRVs, sensitive receptors, pollutant loadings, and resource impacts.

3.1.2 Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report

The FLAG Phase I Report issued in 2000 presents the results of The Federal Land Managers' Air Quality Related Values Work Group (FLAG) in order to have a more consistent approach for Federal Land Managers (FLM) to evaluate air pollution effects on their resources.

3.1.3 Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts

The IWAQM Phase 2 report reflects the results of a Interagency workgroup study that recommends the use of the CALPUFF model for the evaluation of long range transport of air emissions.

3.1.4 40 CFR 51, Revision of the Guideline on Air Quality Models: Adoption of a Preferred Long Range Transport Model and Other Revisions

The EPA published new Air Quality Modeling guidelines on April 15, 2003, that officially adopts the use of CALPUFF for assessing long range transport of pollutants and their impacts on Federal Class I areas.

3.2 Class I Area PSD Increments

PSD increments have also been established for air quality in federal Class I areas. For PM_{10}, the Class I increment is 4 $\mu g/m^3$ for annual averages, and 8 $\mu g/m^3$ for 24-hour averages. For NO_x, the Class I increment is 2.5 $\mu g/m^3$ for an annual average, never to be exceeded.

4.0 CALPUFF MODELING ANALYSIS

Air dispersion modeling has been performed using the latest version of CALPUFF released on May 6, 2003. The CALPUFF Modeling System includes three main components: CALMET, CALPUFF, and CALPOST plus a large set of preprocessing programs designed to interface the model to standard, routinely-available meteorological and geophysical datasets.

CALMET is a meteorological model that develops hourly wind and temperature fields on a three-dimensional gridded modeling domain. Associated two-dimensional fields such as mixing height, surface characteristics, and dispersion properties are also included in the file produced by CALMET. CALMET's diagnostic wind field generator is an objective, parameterized treatment of slope flows, terrain effects, terrain blocking, and micrometeorological model for overland and overwater boundary layers.

CALPUFF is a transport and dispersion model that advects "puffs" of material emitted from modeled sources, simulating dispersion and transformation processes along the way. In doing so it typically uses the fields generated by CALMET, or as an option, it may use simpler non-gridded meteorological data much like the ISCST3 steady-state gaussian plume model. Temporal and spatial variations in the meteorological fields selected are explicitly incorporated in the resulting distribution of puffs throughout a simulation period. The primary output files from CALPUFF contain either hourly concentrations or hourly deposition fluxes evaluated at selected receptor locations.

CALPOST is used to process these files, producing tabulations that summarize the results of the simulation. When performing visibility-related modeling, CALPOST uses concentrations from CALPUFF to compute extinction coefficients and related measures of visibility, reporting these for selected averaging times and locations. In addition to calculating the visibility impacts, CALPOST also computes concentration and deposition impacts at user specified receptor locations.

4.1 CALPUFF Screening Model

An alternative screening procedure has been applied to this analysis, thus providing a conservative estimate of AQRV impacts from Knauf on each Class I area. The screening methodology used in this analysis is as follows:

1) Generate and model five years of ISCST3 meteorological data for each Class I area (see section 4.1.1)

2) Create a ring of receptors spaced every two degrees, with the radius being equal to the distance from Knauf to each respective Class I area. Receptor elevations are representative of elevation at Class I area (see Section 4.1.2)

3) Appropriate CALPUFF input parameters are set to reflect standard ISC defaults

4) MESOPUFF II chemistry option selected

5) Ozone and ammonia background concentrations conservatively set to 80 ppb and 10 ppb, respectively

6) Background concentrations reflect natural conditions of each Class I area (see Appendix 2.B, FLAG Phase I report, December 2000)

7) Monthly relative humidity (RH) values set to equal maximum seasonal value specified for each Class I area (see Appendix 2.B, FLAG Phase I report, December 2000)

4.1.1 Meteorology

Meteorological data for modeling was based on five years of hourly surface data from the Redding Municipal Airport (1987-1991). Concurrent upper air mixing height data was obtained from the nearest available source in Medford, Oregon. Data from Redding and Medford were used in this analysis because, when compared with other meteorological stations providing data in compatible formats, they provide the most representative meteorological data for the Knauf facility location. The data was pre-processed for the CALPUFF dispersion model, and was used for computing visibility, concentration, and dry deposition impacts.

Precipitation data was not available from the Redding surface station in an acceptable format for the modeled years, therefore wet deposition impacts could not be computed using Redding data. To account for wet deposition impacts, a second set of meteorological data was modeled using surface data from the Medford, Oregon location. Surface data meteorological station information can be found in Table 4.1.1-1.

Table 4.1.1-1. Surface Data Meteorological Station Information

Station	Latitude	Longitude	Base Elevation (m)	Anemometer Height (m)
Redding Municipal Airport	40.515	122.297	156.4	10
Medford Municipal Airport	42.389	122.871	396.2	6.1

4.1.2 Receptor Placement

A polar receptor ring was created for each Class I area with receptors positioned every two degrees (180 receptors total). The distance from the source to the receptor ring is equal to the distance to each respective Class I area. The elevation of each receptor is set to be an elevation representative of each respective Class I area. Receptor ring distances and elevations are provided in Table 4.1.2-1.

Table 4.1.2-1. Receptor Ring Placement for each Class I Area

Class I Area	Receptor Ring Distance from Knauf (km)	Receptor Elevation (m)
Thousand Lakes Wilderness	62.8	1615
Yolla Bolly Middle Eel National Wilderness	69.2	549
Lassen Volcanic National Park	69.9	1768
Caribou Wilderness	95.1	2073
Marble Mountain Wilderness	100.8	1707
Lava Beds National Monument	132.4	1722
Redwood National Park	138.1	366
Mountain Lakes Wilderness	179.3	2134
South Warner Wilderness	189.6	1890

4.1.3 Emissions and Stack Parameters

The modeled exit parameters and emission rates are presented in Tables 4.1.3-1 and 4.1.3-2.

Table 4.1.3-1. Exit Parameters

Source	UTM [km]	UTM [km]	Base Elevation [m]	Stack Height [m]	Exit Temp. [K]	Exit Vel. [m/s]	Stack Diameter [m]
Forming Stack	551.570	4500.724	225	60.7	331.9	9.04	5.18
Electric Furnace Dust Collector	551.581	4500.633	224	25.9	319.4	16.7	0.94

Table 4.1.3-2. Emission Rates

Source	PM_{10} Emission Rate [lb/hr]	NO_x Emission Rate [lb/hr]
Forming Stack	27.4	22.6
Electric Furnace Dust Collector	1.0	---

4.2 CALPUFF Modeling Analysis

A modeling analysis was performed using five years of meteorological data (see Section 4.1.1 for description of meteorological data) to determine the impacts at each Class I area. Visibility, concentration, and deposition impacts were analyzed and compared with recommended threshold values (see Tables 4.2-1 through 4.2-3). The recommended thresholds determine whether additional analyses are necessary to assess a facility's impact on a Class I area.

Table 4.2-1. Visibility Analysis Significance Levels

Visibility Parameter	Averaging Period	Significance Level
Extinction Change	24-Hour	5
	Annual	1
Delta Deciview	24-Hour	1
	Annual	0.1

Table 4.2-2. Class I Area Increment and Modeling Significance Levels

Pollutant	Averaging Period	Class I Increment ($\mu g/m^3$)	Modeling Significance Level[1] ($\mu g/m^3$)
PM_{10}	24-Hour	8	0.32
	Annual	4	0.16
NO_x	Annual	2.5	0.10

(1) Commonly accepted Class I area modeling significance threshold equal to 4% of increment.

Table 4.2-3. Nitrogen Deposition Analysis Threshold Value

Natural Background Deposition Value[(1)] (kgN/ha-yr)	Variability Factor	Cumulative Factor	Threshold Value (kg/ha-yr)
0.25	0.5	0.04	0.005

(1) General background deposition value for Western U.S. Class I areas.

The CALPUFF screening results are compared with the above threshold values in sections 4.2.1 through 4.2.3. In addition to the result summaries shown below, detailed summaries can be found in Appendix B. All modeling input and output files are included on the DVD found in Appendix D.

4.2.1 Visibility Analysis

CALPUFF screening summaries of visibility impacts are shown in Tables 4.2.1-1 and 4.2.1-2. The results indicate that, when compared with the threshold values, visibility will not be significantly impaired at any of the listed Class I areas.

Table 4.2.1-1. CALPUFF Screening - Visibility Impact Summary
(Using Medford Surface Data: 1987-1991)

Class I Area	Maximum 24 Hour Extinction Change (%)	Maximum Annual Extinction Change (%)	Maximum 24 Hour Delta Deciview	Maximum Annual Delta Deciview
Thousand Lakes Wilderness	4.04	0.39	0.396	0.039
Yolla Bolly Middle Eel National Wilderness	3.95	0.33	0.387	0.033
Lassen Volcanic National Park	3.78	0.33	0.371	0.033
Caribou Wilderness	2.45	0.21	0.242	0.020
Marble Mountain Wilderness	2.76	0.20	0.272	0.020
Lava Beds National Monument	2.12	0.11	0.210	0.011
Redwood National Park	2.36	0.12	0.233	0.012
Mountain Lakes Wilderness	2.18	0.07	0.216	0.007
South Warner Wilderness	1.64	0.07	0.163	0.007
Threshold Value (Table 4.2-1)	5	1	1	0.1

Table 4.2.1-2. CALPUFF Screening -Visibility Impact Summary
(Using Redding Surface Data: 1987-1991)

Class I Area	Maximum 24 Hour Extinction Change (%)	Maximum Annual Extinction Change (%))	Maximum 24 Hour Delta Deciview	Maximum Annual Delta Deciview
Thousand Lakes Wilderness	4.60	0.67	0.450	0.067
Yolla Bolly Middle Eel National Wilderness	4.34	0.61	0.425	0.061
Lassen Volcanic National Park	4.15	0.60	0.407	0.060
Caribou Wilderness	3.41	0.43	0.336	0.043
Marble Mountain Wilderness	3.73	0.43	0.366	0.043
Lava Beds National Monument	3.26	0.26	0.321	0.026
Redwood National Park	3.48	0.27	0.342	0.027
Mountain Lakes Wilderness	2.03	0.16	0.201	0.016
South Warner Wilderness	1.53	0.13	0.152	0.013
Threshold Value (Table 4.2-1)	5	1	1	0.1

4.2.2 NO_x and PM_{10} Concentration Analysis

CALPUFF screening results for concentration impacts at the Class I areas are shown in Tables 4.2.2-1 and 4.2.2-2. Based on the modeling results, the PSD Class I increment significance thresholds for NO_x and PM_{10} will not be exceeded.

Table 4.2.2-1. CALPUFF Screening -Concentration Impact Summary
(Using Medford Surface Data: 1987-1991)

Class I Area	Maximum 24 Hour PM Concentration [$\mu g/m^3$]	Maximum Annual PM Concentration [$\mu g/m^3$]	Maximum Annual NO_x Concentration [$\mu g/m^3$]
Thousand Lakes Wilderness	0.16	0.0187	0.00623
Yolla Bolly Middle Eel National Wilderness	0.148	0.0155	0.00479
Lassen Volcanic National Park	0.146	0.0152	0.00467
Caribou Wilderness	0.090	0.0085	0.00200
Marble Mountain Wilderness	0.084	0.0074	0.00158
Lava Beds National Monument	0.068	0.0046	0.00049
Redwood National Park	0.067	0.0043	0.00040
Mountain Lakes Wilderness	0.060	0.0028	0.00013
South Warner Wilderness	0.051	0.0026	0.00010
Threshold Value (Table 4.2-2)	0.32	0.16	0.10

Table 4.2.2-2. CALPUFF Screening -Concentration Impact Summary
(Using Redding Surface Data: 1987-1991)

Class I Area	Maximum 24 Hour PM Concentration [μg/m^3]	Maximum Annual PM Concentration [μg/m^3]	Maximum Annual NO_x Concentration [μg/m^3]
Thousand Lakes Wilderness	0.192	0.0405	0.0178
Yolla Bolly Middle Eel National Wilderness	0.159	0.0354	0.0149
Lassen Volcanic National Park	0.158	0.0349	0.0147
Caribou Wilderness	0.110	0.0223	0.00788
Marble Mountain Wilderness	0.108	0.0204	0.00693
Lava Beds National Monument	0.092	0.0120	0.00314
Redwood National Park	0.086	0.0111	0.00278
Mountain Lakes Wilderness	0.050	0.0065	0.00115
South Warner Wilderness	0.048	0.0057	0.00090
Threshold Value (Table 4.2-2)	0.32	0.16	0.10

4.2.3 Deposition Analysis

CALPUFF screening summaries of nitrogen deposition impacts are shown in Tables 4.2.3-1 and 4.2.3-2. The results indicate that nitrogen deposition impacts associated with the NO_x emissions increase will not exceed the significance threshold listed in Table 4.2-3.

Table 4.2.3-1. CALPUFF Screening – Nitrogen Deposition Impact Summary
(Using Medford Surface Data: 1987-1991)

Class I Area	Maximum Deposition of Nitrogen Compounds [kgN/ha-yr]
Thousand Lakes Wilderness	0.00187
Yolla Bolly Middle Eel National Wilderness	0.00155
Lassen Volcanic National Park	0.00152
Caribou Wilderness	0.00092
Marble Mountain Wilderness	0.00084
Lava Beds National Monument	0.00049
Redwood National Park	0.00045
Mountain Lakes Wilderness	0.00029
South Warner Wilderness	0.00027
Threshold Value (Table 4.2-3)	0.005

Table 4.2.3-2. CALPUFF Screening – Nitrogen Deposition Impact Summary
(Using Redding Surface Data: 1987-1991)

Class I Area	Maximum Deposition of Nitrogen Compounds [kgN/ha-yr]
Thousand Lakes Wilderness	0.00559 (0.00419)*
Yolla Bolly Middle Eel National Wilderness	0.00470 (0.00352)*
Lassen Volcanic National Park	0.00463 (0.00347)*
Caribou Wilderness	0.00281
Marble Mountain Wilderness	0.00255
Lava Beds National Monument	0.00147
Redwood National Park	0.00134
Mountain Lakes Wilderness	0.00069
South Warner Wilderness	0.00056
Threshold Value (Table 4.2-3)	0.005

* Value in ( ) represents the contribution for the NO_x increase of 74.2 tons per year associated with this PSD air permit modification.

5.0 ANALYSIS OF CALPUFF SCREEN CONSERVATISM

As discussed in Section 4, the evaluation of concentration, deposition, and visibility impacts was performed with the conservative "screening" mode of CALPUFF. In order to demonstrate that the CALPUFF screen modeling methodology is truly conservative in the northern California terrain, an analysis of the nine Class I areas was conducted using the EPA's ISC PRIME (Industrial Source Complex Plume RIse Model Enhancements) air quality dispersion model as used in the Knauf Air Permit Modification. This model includes COMPLEX I modeling capability for complex terrain and the PRIME algorithm for aerodynamic downwash determination.

The purpose of the ISC PRIME study was to demonstrate that (1) NO_x concentrations decrease with distance from the Knauf Facility, and (2) at a 49 km distance in the direction of each Class I area, the NO_x concentrations were significantly less than those calculated with CALPUFF screen at further distances. PM-10 emissions were also evaluated for informational purposes. The ISC PRIME runs were conducted with the same stack exit parameters and emission levels as used in CALPUFF screen.

5.1 Meteorology and Terrain Data

5.1.1 Meteorological Data

Meteorological data for the modeling was based on five (5) years of hourly surface data from the Redding airport, from 1987-1991. Concurrent upper air mixing height data was obtained from the nearest available source in Medford, Oregon. Data from Redding and Medford were used in this analysis because, when compared with other meteorological stations providing data in compatible formats, they provide the most representative meteorological data for the Knauf facility location. The data was pre-processed for input into the ISC PRIME dispersion model.

5.1.2 Terrain

The terrain surrounding the Knauf Shasta site is considered complex, which is characterized by terrain features above the effective stack height of the forming stack. Since complex terrain modeling was required, digitized terrain in 30-meter increments out to 50 kilometers in each direction from the plant was obtained from the United States Geological Survey.

5.2 Receptor Grids

The Knauf facility was modeled with discrete polar coordinate receptors out 49 kilometers in the direction of each of the nine Class I areas as shown in Figure 5.2-1. Receptor distances were 20 km, 30 km, 40 km, and 49 km on each radial. No modeling was conducted beyond 49 km due to the 50 km limitation of ISC PRIME.

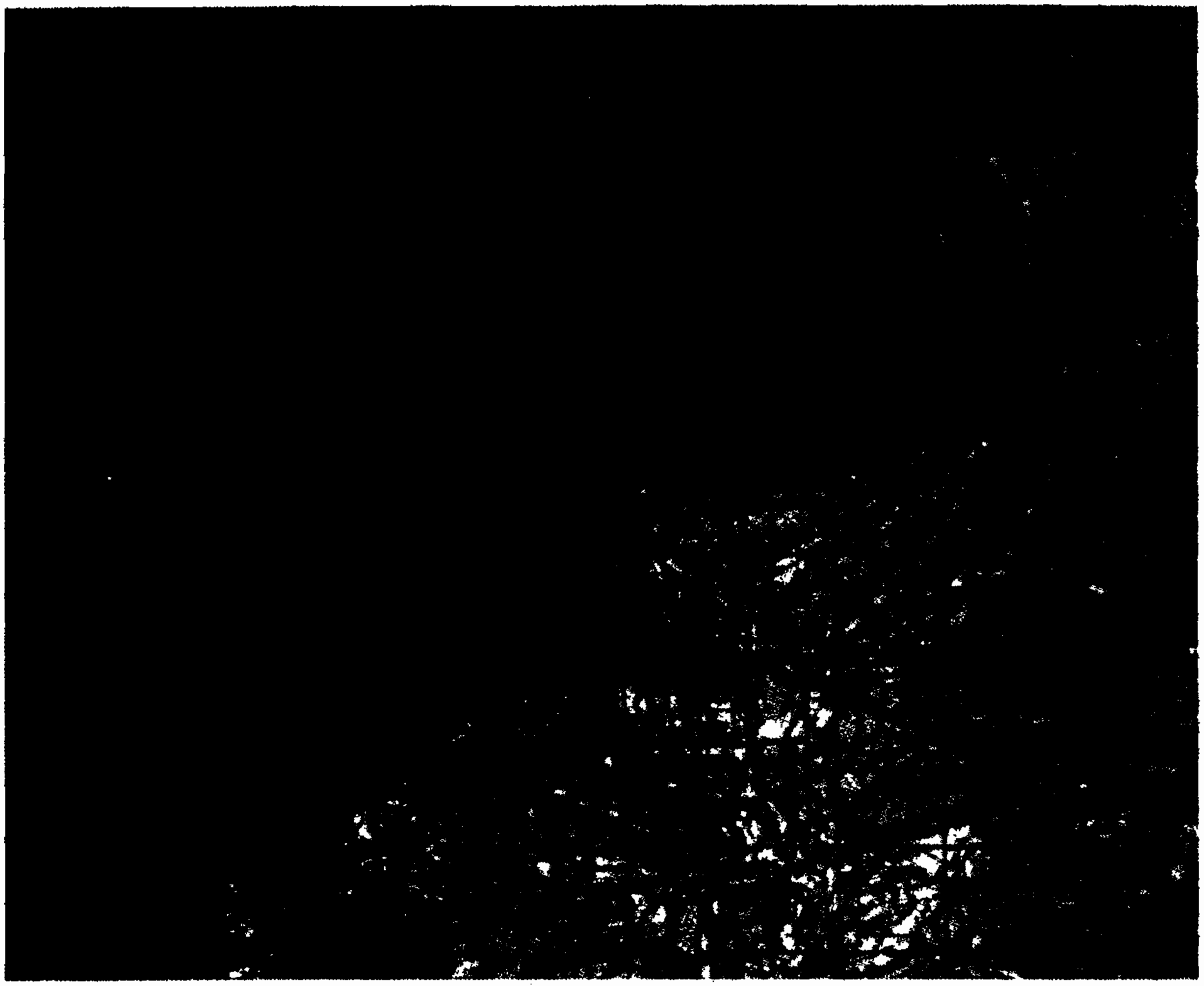

Figure 5.2-1. Modeled Receptor Grid Near Knauf Fiber Glass in Shasta Lake.

5.3 Rural/Urban Determination

Modeling was conducted with rural dispersion coefficients as determined in the Knauf PSD air permit modification dated May 21, 2003. The meteorological land use typing scheme established by Auer (1978) was used to demonstrate that rural land use types comprise greater than 70% of the total area in the vicinity of the Knauf facility. Figure 5.3-1 illustrates the area surrounding the Knauf facility.

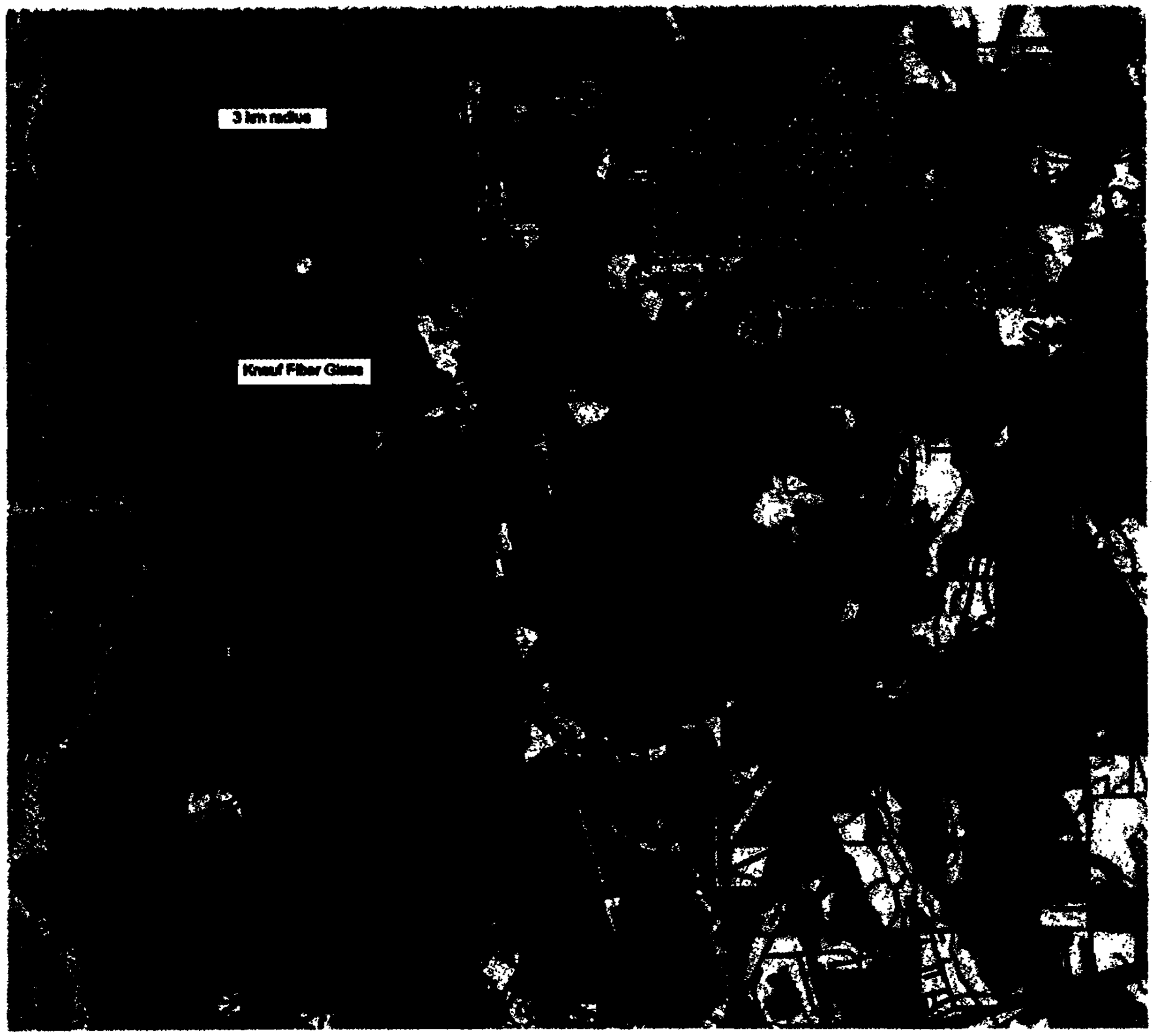

Figure 5.3-1. Topographical Map of Area Near the Knauf Fiber Glass Site.

5.4 Modeling Analysis

A modeling analysis was performed for NO_x (annual averages), PM_{10} (annual averages), and PM-10 (24-hour average) for the five-year period. Appendix C summarizes the modeling results and demonstrates that beyond 30 km, concentrations of NO_x and PM-10 will decrease as a function of distance. The results further demonstrate that at 49 km, the modeled impacts using ISC PRIME with terrain features are significantly lower than virtually all of the CALPUFF screen modeling results, with the exception of Mountain Lakes and South Warner Wilderness Areas for NO_x, where the CALPUFF screen values were 25 and 73% of the ISC PRIME values.

For these two instances, the differences were directly attributed to the fact that the two Class I areas were 179 and 190 km away from the Knauf Shasta Facility, as compared to results from ISC PRIME at a distance of only 49 km. A sample of the modeling output for the worst case NOx year, 1987, can be found in Figure 5.4-1. The direct comparison between the ISC Prime Results and the CALPUFF screen results can be found in Table 5.4-1.

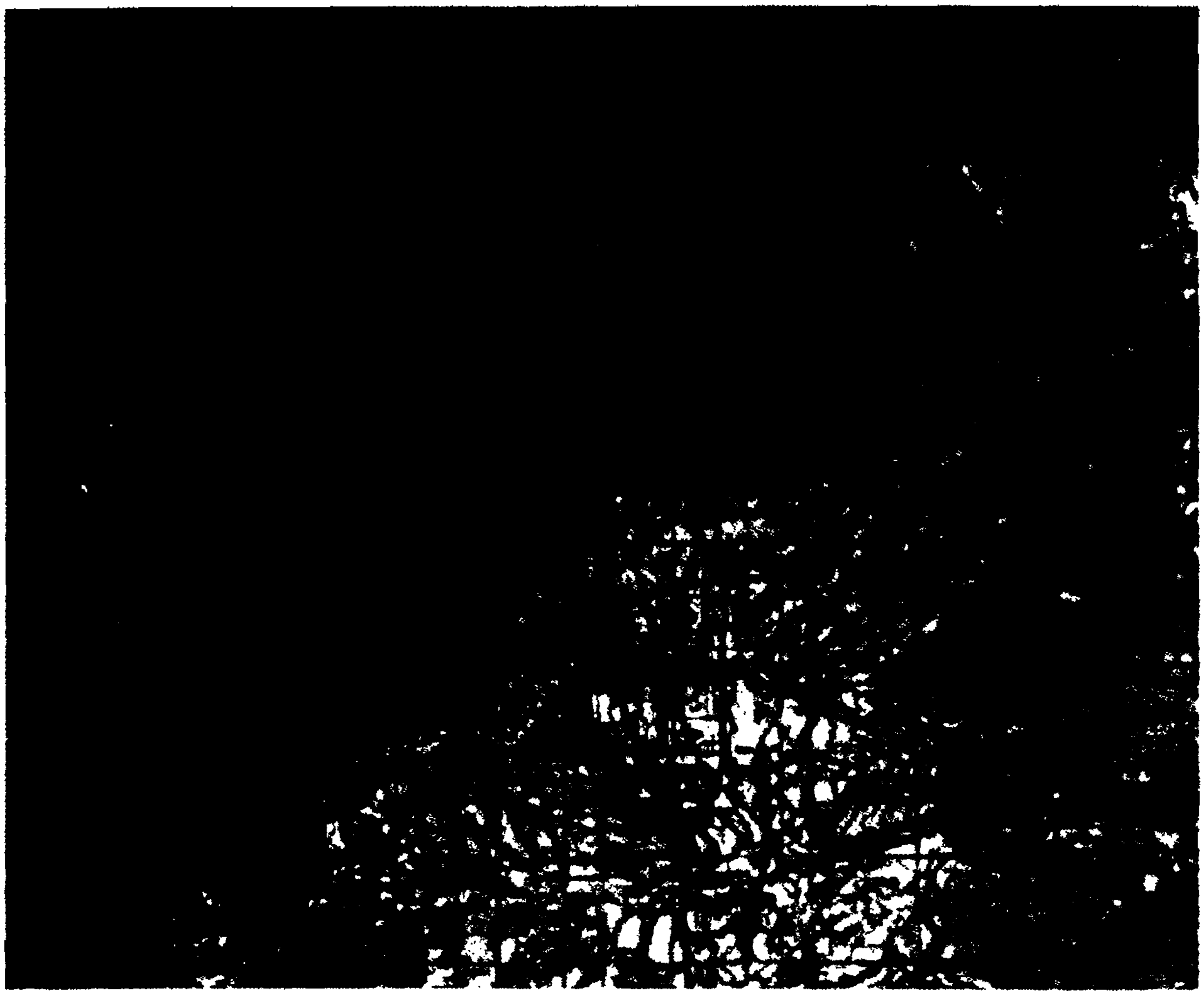

Figure 5.4-1. Annual NOx Modeling Results (ug/m^3) for Worst Case Year, 1987.

Table 5.4-1. ISC PRIME Modeling Results Comparison with CALPUFF SCREEN Concentrations.

Pollutant: NOx
Averaging Period: Annual

Location	Distance from Knauf (km)	Direction From Knauf (Degrees)	ISC PRIME 30 km	ISC PRIME 40 km	ISC PRIME 49 km	CALPUFF Results ug/m^3
Knauf - Shasta Lake	----					
Thousand Lakes Wilderness	62.8	84	0.00560	0.00155	0.00120	0.01780
Yolla Bolly Middle Eel National Wilderness	69.2	223	0.01281	0.00458	0.00378	0.01490
Lassen Volcanic National Park	69.9	99	0.00958	0.00274	0.00115	0.01470
Caribou Wilderness	95.1	96	0.00462	0.00202	0.00120	0.00788
Marble Mountain Wilderness	100.8	323	0.00393	0.00272	0.00210	0.00693
Lava Beds National Monument	132.4	29	0.00456	0.00322	0.00187	0.00314
Redwood National Park	138.1	292	0.00183	0.00128	0.00100	0.00278
Mountain Lakes Wilderness	179.3	8	0.01061	0.00629	0.00464	0.00115
South Warner Wilderness	189.6	70	0.00635	0.00172	0.00124	0.00090

Pollutant: PM-10
Averaging Period: Annual

Location	Distance from Knauf (km)	Direction From Knauf (Degrees)	ISC PRIME 30 km	ISC PRIME 40 km	ISC PRIME 49 km	CALPUFF Results ug/m^3
Knauf - Shasta Lake	----					
Thousand Lakes Wilderness	62.8	84	0.00712	0.00200	0.00154	0.0405
Yolla Bolly Middle Eel National Wilderness	69.2	223	0.01609	0.00581	0.00480	0.0354
Lassen Volcanic National Park	69.9	99	0.01208	0.00347	0.00149	0.0349
Caribou Wilderness	95.1	96	0.00614	0.00257	0.00154	0.0223
Marble Mountain Wilderness	100.8	323	0.00504	0.00348	0.00269	0.0204
Lava Beds National Monument	132.4	29	0.00579	0.00408	0.00238	0.0120
Redwood National Park	138.1	292	0.00234	0.00164	0.00128	0.0111
Mountain Lakes Wilderness	179.3	8	0.01343	0.00797	0.00589	0.0065
South Warner Wilderness	189.6	70	0.00804	0.00218	0.00158	0.0057

Pollutant: PM-10
Averaging Period: 24-Hour Average

Location	Distance from Knauf (km)	Direction From Knauf (Degrees)	ISC PRIME 30 km	ISC PRIME 40 km	ISC PRIME 49 km	CALPUFF Results ug/m^3
Knauf - Shasta Lake	----					
Thousand Lakes Wilderness	62.8	84	0.10588	0.04364	0.03274	0.1920
Yolla Bolly Middle Eel National Wilderness	69.2	223	0.28991	0.07005	0.05793	0.1590
Lassen Volcanic National Park	69.9	99	0.24034	0.05157	0.03625	0.1580
Caribou Wilderness	95.1	96	0.13169	0.04455	0.03625	0.1100
Marble Mountain Wilderness	100.8	323	0.08729	0.05794	0.04324	0.1080
Lava Beds National Monument	132.4	29	0.06270	0.04270	0.03046	0.0920
Redwood National Park	138.1	292	0.09756	0.06700	0.05101	0.0860
Mountain Lakes Wilderness	179.3	8	0.09058	0.06395	0.05060	0.0500
South Warner Wilderness	189.6	70	0.16881	0.03713	0.02803	0.0480

The modeling run files and output files can be found on the modeling DVD in Appendix D.

6.0 CONCLUSION

The results of this analysis demonstrate that the CALPUFF screen modeling in Section 4 is very conservative, and that the Knauf Shasta Facility air permit modification will have insignificant impacts on the AQRV for the nine Class I areas. The use of both CALPUFF and ISC PRIME dispersion models demonstrate that AQRV impacts are below the FLM thresholds established to protect these Class I areas.

Appendix A

Emission Summary

Electric Furnace Baghouse Emissions

	Electric Furnace Baghouse Stack
Exhaust Flow (lbs/hour):	98,825
Glass Pull Rate (tons/day)	195
Inlet Particulate Loading (lb/hr)	250.0
Removal Efficiency (%)	99.8
Unmargined Outlet Particulate Loading (lb/hr)	0.5
Exhaust Moisture (%)	3.1
Exhaust Molecular Wt.	28.9
Exhaust Temperature (F)	115.3
Bar. Pressure (PSIA)	14.390
ACFM	24,426
DSCFM (60 F; 14.696 PSIA; 0% H2O)	20,948
SCFM	21,618
Stack Exit Diameter (ft)	1.74
Stack Exit Velocity (ft/min)	10,286
Stack Exit Velocity (ft/sec)	171.4
Particulates (lb/hr), with margin	**1.0**
Particulates (lb/ton of glass pulled), with margin	0.12
MACT Standard (lb/ton)	0.50

Manufacturing Line Forming/Oven/Cooling Stack Emissions

	Individual Sources			
	Forming	Oven/Cooling	Oxidizer	Combined Stack
Exhaust Flow (lbs/hour)	1,427,677	144,619		1,572,296
Glass Pull Rate (tons/day)		195		195
Total Heat Input (million Btu/hr)	55	29.6	36	120.6
NOx emission rate (lb/million Btu)	0.0525	0.034	0.08	0.056
Natural Gas (10^6 scf)	0.053	0.029	0.035	
Particulates after ESP(lb/hr), Method 5E				**27.4**
NOx from combustion (lb/hr)	2.888	1.01	2.88	6.77
NOx from NH3 to NOx Conversion (lb/hr)		1.58	14.24	15.83
Total NOx (lb/hr)				**22.6**
Exhaust Moisture (%)	6	6	[redacted]	6.0
Exhaust Molecular Wt.	28.9	28.9	[redacted]	28.9
Exhaust Temperature (F)	101	500	[redacted]	137.7
Bar. Pressure (PSIA)	14.39	14.39	[redacted]	14.390
ACFM	344,373	59,697	[redacted]	404,070
DSCFM (60 F; 14.696 PSIA; 0% H2O)	293,818	29,763	[redacted]	323,581
SCFM	312,573	31,663	[redacted]	344,235
Stack Exit Diameter (ft)	[redacted]	[redacted]	[redacted]	17
Stack Exit Velocity (ft/min)	[redacted]	[redacted]	[redacted]	1780.2
Stack Exit Velocity (ft/sec)	[redacted]	[redacted]	[redacted]	29.67

Appendix B

CALPUFF Modeling Summaries

CALPUFF Screening Result Summaries

Knauf Fiber Glass - Shasta Lake
CALPUFF Screen Results Summary for Class I Areas within 200kn

Parameter	Significanc Threshold	National Park IW, 366m elev) Maximum - Redding '87-'91(2,3)	Mountain Lakes Wilderness (179km N, 2134m elev) Maximum - Medford '87-'91(1,3)	Mountain Lakes Wilderness (179km N, 2134m elev) Maximum - Redding '87-'91(2,3)	South Warner Wilderness (190km ENE, 1890m elev) Maximum - Medford '87-'91(1,3)	South Warner Wilderness (190km ENE, 1890m elev) Maximum - Redding '87-'91(2,3)
24 Hour Extinction Change: # of days >= 5%	0	0	0	0	0	0
24 Hour Extinction Change: # of days >= 10%	0	0	0	0	0	0
24 Hour Extinction Change: largest ext. change (%)	5	3.48	2.18	2.03	1.64	1.53
Annual Extinction Change: # of days >= 1%	0	0	0	0	0	0
Annual Extinction Change: largest ext. change (%)	1	0.27	0.07	0.16	0.07	0.13
24 Hour Delta Deciview: # of days >= 0.5	0	0	0	0	0	0
24 Hour Delta Deciview: # of days >= 1.0	0	0	0	0	0	0
24 Hour Delta Deciview: largest delta deciview	0.5	0.342	0.216	0.201	0.163	0.152
Annual Delta Deciview: # of days >= 0.1	0	0	0	0	0	0
Annual Delta Deciview: largest delta deciview	0.1	0.027	0.007	0.016	0.007	0.013
Concentration: 24 Hour PM_{10} (ug/m^3)	0.32	0.086	0.060	0.050	0.051	0.048
Concentration: Annual PM_{10} (ug/m^3)	0.16	0.0111	0.0028	0.0065	0.0026	0.0057
Concentration: Annual NOx (ug/m^3)	0.1	0.00278	0.00013	0.00115	0.00010	0.00090
Dry Deposition: NOx (kgN/ha-yr)	---	7.35E-04	3.23E-05	3.03E-04	2.58E-05	2.40E-04
Dry Deposition: HNO_3 (kgN/ha-yr)	---	5.70E-04	1.18E-04	3.61E-04	1.10E-04	2.96E-04
Dry Deposition: NO_3 (kgN/ha-yr)	---	5.04E-05	1.68E-05	4.48E-05	1.56E-05	4.41E-05
Wet Deposition: HNO_3 (kgN/ha-yr)	---	---	7.50E-06	---	6.68E-06	---
Wet Deposition: NO_3 (kgN/ha-yr)	---	---	1.42E-04	---	1.32E-04	---
Total Deposition: N-Compounds (kgN/ha-yr)	0.005	0.00134	0.00029	0.00069	0.00027	0.00056

(1) Maximum impact for all modeled years using Medford Municipal Airp
(2) Maximum impact for all modeled years using Redding Municipal Airp
(3) For complete result summaries see pages 2 through 19

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Thousand Lakes Wilderness

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 62.8 km
Direction From Knauf = E (84°)
Elevation = 1615 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	3.04	4.04	3.53	3.83	3.91
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.38	0.36	0.36	0.39	0.36
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.3	0.396	0.347	0.376	0.384
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.038	0.036	0.036	0.039	0.036

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.139	0.160	0.148	0.145	0.148
	Annual	1st	0.16	0.019	0.017	0.016	0.016	0.016
NOx	*Annual*	1st	0.1	0.006	0.005	0.005	0.004	0.005

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		9.90E-04	7.39E-04	6.44E-04	6.52E-04	7.46E-04
HNO_3	*Annual - Dry*	1st		5.13E-04	5.10E-04	5.23E-04	5.89E-04	4.67E-04
NO_3	*Annual - Dry*	1st		5.20E-05	3.40E-05	3.03E-05	4.11E-05	3.65E-05
HNO_3	*Annual - Wet*	1st		6.06E-06	1.15E-05	1.74E-05	1.46E-05	2.42E-05
NO_3	*Annual - Wet*	1st		3.06E-04	4.01E-04	4.50E-04	5.66E-04	5.34E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0019	0.0017	0.0017	0.0019	0.0018

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Thousand Lakes Wilderness

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 62.8 km
Direction From Knauf = E (84°)
Elevation = 1615 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	3.67	4.6	3.86	4.06	4.1
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.57	0.61	0.64	0.67	0.66
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.361	0.45	0.378	0.398	0.402
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.057	0.0061	0.064	0.067	0.066

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.164	0.192	0.159	0.179	0.192
	Annual	1st	0.16	0.034	0.0363	0.0371	0.0405	0.0379
NOx	*Annual*	1st	0.1	0.0146	0.0151	0.0161	0.0178	0.0153

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		3.51E-03	3.69E-03	3.90E-03	4.28E-03	3.66E-03
HNO_3	*Annual - Dry*	1st		1.12E-03	1.25E-03	1.07E-03	1.23E-03	1.25E-03
NO_3	*Annual - Dry*	1st		9.76E-05	9.07E-05	8.69E-05	7.76E-05	8.55E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0047	0.00503	0.0051	0.0056	0.00499

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Yolla Bolly Middle Eel National Wilderness

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 69.2 km
Direction From Knauf = SW (223°)
Elevation = 549 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	2.77	3.95	3.67	3.4	3.45
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.33	0.31	0.31	0.33	0.3

Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.273	0.387	0.361	0.334	0.339
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.033	0.031	0.031	0.033	0.03

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.126	0.135	0.148	0.125	0.123
	Annual	1st	0.16	0.0155	0.0139	0.0128	0.0138	0.0132
NOx	*Annual*	1st	0.1	0.00479	0.00392	0.00339	0.00285	0.00359

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		7.78E-04	5.81E-04	4.66E-04	4.64E-04	5.50E-04
HNO_3	*Annual - Dry*	1st		2.98E-04	4.31E-04	4.49E-04	5.10E-04	3.94E-04
NO_3	*Annual - Dry*	1st		4.74E-05	2.95E-05	2.61E-05	3.62E-05	3.20E-05
HNO_3	*Annual - Wet*	1st		5.58E-06	1.15E-05	1.59E-05	1.30E-05	2.15E-05
NO_3	*Annual - Wet*	1st		2.67E-04	3.96E-04	4.04E-04	5.23E-04	4.56E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0014	0.0015	0.0014	0.0015	0.0015

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Yolla Bolly Middle Eel National Wilderness

Meteorological Stations: **Surface - Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 69.2 km
Direction From Knauf = SW (223°)
Elevation = 549 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	3.45	4.34	3.76	4.03	3.75
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.51	0.56	0.58	0.61	0.61
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.339	0.425	0.37	0.395	0.368
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.051	0.056	0.058	0.061	0.06

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m³)	1987 (ug/m³)	1988 (ug/m³)	1989 (ug/m³)	1990 (ug/m³)	1991 (ug/m³)
PM_{10}	*24hr*	1st	0.32	0.148	0.159	0.159	0.152	0.143
	Annual	1st	0.16	0.0295	0.0318	0.0324	0.0354	0.0335
NOx	*Annual*	1st	0.1	0.0120	0.0126	0.0135	0.0149	0.013

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		2.94E-03	3.10E-03	3.24E-03	3.53E-03	3.02E-03
HNO_3	*Annual - Dry*	1st		1.03E-03	1.16E-03	9.81E-04	1.10E-03	1.14E-03
NO_3	*Annual - Dry*	1st		8.97E-05	8.43E-05	7.90E-05	7.08E-05	8.05E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0041	0.0043	0.0043	0.0047	0.0042

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Lassen Volcanic National Park

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 69.9 km
Direction From Knauf = ESE (99°)
Elevation = 1768 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	2.65	3.78	3.54	3.23	3.27
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.32	0.31	0.31	0.33	0.3
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.261	0.371	0.348	0.318	0.322
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.032	0.031	0.031	0.033	0.03

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.127	0.135	0.148	0.123	0.12
	Annual	1st	0.16	0.0152	0.0137	0.0126	0.0136	0.0129
NOx	*Annual*	1st	0.1	0.00467	0.00382	0.00329	0.00275	0.00349

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		7.60E-04	5.67E-04	4.52E-04	4.52E-04	5.34E-04
HNO_3	*Annual - Dry*	1st		4.31E-04	4.25E-04	4.43E-04	5.02E-04	3.88E-04
NO_3	*Annual - Dry*	1st		4.69E-05	2.91E-05	2.57E-05	3.58E-05	3.19E-05
HNO_3	*Annual - Wet*	1st		5.51E-08	1.14E-05	1.57E-05	1.28E-05	2.12E-05
NO_3	*Annual - Wet*	1st		2.64E-04	3.90E-04	3.99E-04	5.19E-04	4.49E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0015	0.0014	0.0013	0.0015	0.0014

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Lassen Volcanic National Park

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 69.9 km
Direction From Knauf = ESE (99°)
Elevation = 1768 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	3.28	4.15	3.6	3.89	3.57
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.51	0.55	0.57	0.6	0.6
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.323	0.407	0.353	0.382	0.351
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.051	0.055	0.057	0.06	0.06

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.146	0.158	0.156	0.149	0.144
	Annual	1st	0.16	0.0291	0.0314	0.0320	0.0349	0.0331
NOx	*Annual*	1st	0.1	0.0118	0.0124	0.0132	0.0147	0.0127

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		2.89E-03	3.05E-03	3.19E-03	3.48E-03	2.98E-03
HNO_3	*Annual - Dry*	1st		1.02E-03	1.15E-03	9.74E-04	1.09E-03	1.13E-03
NO_3	*Annual - Dry*	1st		8.90E-05	8.35E-05	7.83E-05	7.02E-05	7.98E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0040	0.0043	0.0042	0.0046	0.0042

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Caribou Wilderness

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 95.1 km
Direction From Knauf = ESE (96°)
Elevation = 2073 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	2.3	2.42	2.42	1.95	2.45
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.2	0.19	0.19	0.21	0.19
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.228	0.24	0.239	0.194	0.242
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.02	0.019	0.019	0.02	0.019

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.0893	0.0896	0.0836	0.0847	0.0819
	Annual	1st	0.16	0.00853	0.00774	0.00752	0.00813	0.00736
NOx	*Annual*	1st	0.1	0.002	0.00161	0.00135	0.000978	0.00135

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		3.03E-04	2.43E-04	1.86E-04	1.98E-04	2.09E-04
HNO_3	*Annual - Dry*	1st		2.73E-04	2.71E-04	2.79E-04	3.21E-04	2.40E-04
NO_3	*Annual - Dry*	1st		3.44E-05	1.84E-05	1.72E-05	2.39E-05	2.33E-05
HNO_3	*Annual - Wet*	1st		6.78E-06	9.91E-06	9.74E-06	8.90E-06	1.49E-05
NO_3	*Annual - Wet*	1st		1.83E-04	2.53E-04	2.80E-04	3.73E-04	3.20E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0008	0.0008	0.0008	0.0009	0.0008

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Caribou Wilderness

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 95.1 km
Direction From Knauf = ESE (96°)
Elevation = 2073 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	2.59	2.74	2.79	3.41	3.2
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.37	0.4	0.41	0.43	0.43
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.255	0.27	0.275	0.338	0.315
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.037	0.04	0.041	0.043	0.043

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.110	0.110	0.108	0.102	0.108
	Annual	1st	0.16	0.0188	0.0205	0.0211	0.0223	0.0212
NOx	*Annual*	1st	0.1	0.0063	0.00665	0.00745	0.007880	0.00682

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		1.57E-03	1.64E-03	1.81E-03	1.89E-03	1.58E-03
HNO_3	*Annual - Dry*	1st		7.57E-04	8.85E-04	7.85E-04	8.69E-04	8.27E-04
NO_3	*Annual - Dry*	1st		7.02E-05	6.26E-05	1.42E-05	5.34E-05	8.32E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0024	0.0026	0.0026	0.0028	0.0025

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Marble Mountain Wilderness

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 100.8 km
Direction From Knauf = NW (323°)
Elevation = 1707 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	2.54	2.63	2.56	2.1	2.76
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.2	0.19	0.18	0.2	0.19
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.251	0.259	0.253	0.208	0.272
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.02	0.019	0.018	0.02	0.019

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m³)	1987 (ug/m³)	1988 (ug/m³)	1989 (ug/m³)	1990 (ug/m³)	1991 (ug/m³)
PM_{10}	*24hr*	1st	0.32	0.083	0.0842	0.0794	0.0862	0.0752
	Annual	1st	0.16	0.007	0.00684	0.00676	0.00743	0.00667
NOx	*Annual*	1st	0.1	0.002	0.00133	0.00109	0.000792	0.00111

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		2.45E-04	1.98E-04	1.57E-04	1.71E-04	1.77E-04
HNO_3	*Annual - Dry*	1st		2.51E-04	2.52E-04	2.54E-04	2.94E-04	2.19E-04
NO_3	*Annual - Dry*	1st		3.21E-05	1.69E-05	1.57E-05	2.21E-05	2.12E-05
HNO_3	*Annual - Wet*	1st		5.95E-06	9.14E-06	8.83E-06	8.41E-06	1.48E-05
NO_3	*Annual - Wet*	1st		1.63E-04	2.28E-04	2.61E-04	3.42E-04	3.03E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0007	0.0007	0.0007	0.0008	0.0007

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Marble Mountain Wilderness

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 100.8 km
Direction From Knauf = NW (323°)
Elevation = 1707 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	2.8	3.09	3.05	3.69	3.73
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.37	0.4	0.42	0.43	0.43
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.276	0.304	0.3	0.363	0.366
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.037	0.04	0.042	0.043	0.043

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m³)	1987 (ug/m³)	1988 (ug/m³)	1989 (ug/m³)	1990 (ug/m³)	1991 (ug/m³)
PM_{10}	*24hr*	1st	0.32	0.107	0.0975	0.0991	0.0939	0.108
	Annual	1st	0.16	0.017	0.0189	0.0194	0.0204	0.0193
NOx	*Annual*	1st	0.1	0.006	0.00578	0.00659	0.00693	0.00598

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		1.38E-03	1.41E-03	1.60E-03	1.67E-03	1.38E-03
HNO_3	*Annual - Dry*	1st		7.08E-04	8.22E-04	7.50E-04	8.27E-04	7.78E-04
NO_3	*Annual - Dry*	1st		6.66E-05	5.88E-05	5.38E-05	5.05E-05	5.97E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0022	0.0023	0.0024	0.0025	0.0022

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Lava Beds National Monument

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 132.4 km
Direction From Knauf = NE (29°)
Elevation = 1722 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	1.99	1.67	2.03	1.49	2.12
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.1	0.1	0.1	0.11	0.11
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.197	0.166	0.201	0.148	0.21
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.01	0.01	0.01	0.011	0.011

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.067	0.0522	0.0652	0.068	0.0613
	Annual	1st	0.16	0.004	0.00397	0.00432	0.00462	0.00441
NOx	*Annual*	1st	0.1	0.000	0.000437	0.000293	0.000301	0.000385

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		7.86E-05	6.18E-05	6.18E-05	7.04E-05	9.06E-05
HNO_3	*Annual - Dry*	1st		1.65E-04	1.70E-04	1.67E-04	1.86E-04	1.49E-04
NO_3	*Annual - Dry*	1st		2.33E-05	1.09E-05	1.07E-05	1.48E-05	1.37E-05
HNO_3	*Annual - Wet*	1st		7.06E-06	5.52E-06	7.29E-06	5.98E-06	1.43E-05
NO_3	*Annual - Wet*	1st		1.39E-04	1.43E-04	1.97E-04	2.09E-04	2.10E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0004	0.0004	0.0004	0.0005	0.0005

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Lava Beds National Monument

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 132.4 km
Direction From Knauf = NE (29°)
Elevation = 1722 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	1.69	2.22	2.35	2.17	3.26
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.23	0.24	0.25	0.25	0.26
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.167	0.22	0.233	0.215	0.321
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.022	0.024	0.025	0.025	0.026

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.067	0.0703	0.0704	0.0663	0.0918
	Annual	1st	0.16	0.011	0.0115	0.0119	0.012	0.0117
NOx	*Annual*	1st	0.1	0.003	0.00277	0.00307	0.00314	0.00275

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		6.84E-04	6.98E-04	7.84E-04	8.28E-04	6.90E-04
HNO_3	*Annual - Dry*	1st		5.24E-04	5.76E-04	5.68E-04	6.07E-04	5.61E-04
NO_3	*Annual - Dry*	1st		5.23E-05	4.96E-05	3.99E-05	3.87E-05	4.71E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0013	0.0013	0.0014	0.0015	0.0013

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Redwood National Park

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 138.1 km
Direction From Knauf = WNW (292°)
Elevation = 366 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	2.16	1.79	2.36	1.43	2.28
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.11	0.11	0.11	0.12	0.11
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.214	0.178	0.233	0.142	0.226
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.011	0.011	0.011	0.012	0.011

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.0656	0.0492	0.0668	0.0573	0.0593
	Annual	1st	0.16	0.00355	0.00367	0.00402	0.00432	0.00417
NOx	*Annual*	1st	0.1	0.000397	0.000349	0.000246	0.000268	0.000343

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		6.57E-05	5.03E-05	5.21E-05	6.25E-05	7.97E-05
HNO_3	*Annual - Dry*	1st		1.54E-04	1.59E-04	1.56E-04	1.75E-05	1.42E-04
NO_3	*Annual - Dry*	1st		2.25E-05	1.02E-05	1.00E-05	1.39E-05	1.28E-05
HNO_3	*Annual - Wet*	1st		6.08E-06	5.15E-06	7.08E-06	5.61E-06	1.39E-05
NO_3	*Annual - Wet*	1st		1.29E-04	1.34E-04	1.88E-04	1.92E-04	1.99E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0004	0.0004	0.0004	0.0003	0.0004

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Redwood National Park

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 138.1 km
Direction From Knauf = WNW (292°)
Elevation = 366 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	1.89	2.26	2.5	2.22	3.48
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.24	0.25	0.27	0.26	0.27
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.187	0.224	0.247	0.22	0.342
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.024	0.025	0.027	0.026	0.027

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.061	0.0666	0.0655	0.0637	0.0864
	Annual	1st	0.16	0.010	0.0106	0.0109	0.0111	0.0108
NOx	*Annual*	1st	0.1	0.002	0.00239	0.00267	0.00278	0.00242

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		6.04E-04	6.11E-04	6.85E-04	7.35E-04	6.09E-04
HNO_3	*Annual - Dry*	1st		4.98E-04	5.45E-04	5.33E-04	5.70E-04	5.25E-04
NO_3	*Annual - Dry*	1st		5.04E-05	4.91E-05	3.78E-05	3.75E-05	4.50E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0012	0.0012	0.0013	0.0013	0.0012

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Mountain Lakes Wilderness

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 179.3 km
Direction From Knauf = N (8°)
Elevation = 2134 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	1.27	1.29	2.18	0.96	1.65
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.05	0.06	0.07	0.07	0.07
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.127	0.128	0.216	0.095	0.163
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.005	0.006	0.007	0.007	0.007

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.0339	0.0420	0.0598	0.0316	0.0416
	Annual	1st	0.16	0.00215	0.00235	0.00254	0.00278	0.00274
NOx	*Annual*	1st	0.1	0.0000981	0.0000670	0.0000793	0.0001020	0.0001300

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		2.46E-05	1.44E-05	1.78E-05	2.48E-05	3.23E-05
HNO_3	*Annual - Dry*	1st		1.02E-04	1.08E-04	1.06E-04	1.18E-04	1.04E-04
NO_3	*Annual - Dry*	1st		1.68E-05	6.50E-06	6.63E-06	8.97E-06	8.40E-07
HNO_3	*Annual - Wet*	1st		2.22E-06	5.68E-06	3.71E-06	4.46E-06	7.50E-06
NO_3	*Annual - Wet*	1st		7.46E-05	1.16E-04	1.29E-04	1.32E-04	1.42E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0002	0.0003	0.0003	0.0003	0.0003

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for Mountain Lakes Wilderness

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 179.3 km
Direction From Knauf = N (8°)
Elevation = 2134 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	1.29	1.58	1.7	1.5	2.03
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.14	0.14	0.15	0.16	0.15
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.128	0.157	0.169	0.148	0.201
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.014	0.014	0.015	0.016	0.015

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.0367	0.0458	0.0453	0.0496	0.0503
	Annual	1st	0.16	0.00581	0.00592	0.00603	0.00652	0.00601
NOx	*Annual*	1st	0.1	0.000914	0.000870	0.000948	0.001150	0.000899

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		2.53E-04	2.43E-04	2.57E-04	3.03E-04	2.45E-04
HNO_3	*Annual - Dry*	1st		3.24E-04	3.25E-04	3.32E-04	3.61E-04	3.20E-04
NO_3	*Annual - Dry*	1st		3.82E-05	4.48E-05	2.80E-05	2.95E-05	3.41E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0006	0.0006	0.0006	0.0007	0.0006

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for South Warner Wilderness

Meteorological Stations: Surface - **Medford Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 189.6 km
Direction From Knauf = ENE (70°)
Elevation = 1890 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	1.11	1.14	1.64	0.79	1.35
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.05	0.06	0.07	0.07	0.07
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.109	0.114	0.163	0.078	0.134
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.005	0.006	0.007	0.007	0.007

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.0330	0.0418	0.0507	0.0311	0.0389
	Annual	1st	0.16	0.00196	0.00211	0.00229	0.00255	0.00247
NOx	*Annual*	1st	0.1	0.0000800	0.0000561	0.0000608	0.0000820	0.0001000

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		2.04E-05	1.15E-05	1.41E-05	1.98E-05	2.58E-05
HNO_3	*Annual - Dry*	1st		9.36E-05	9.98E-05	9.74E-05	1.10E-04	9.81E-05
NO_3	*Annual - Dry*	1st		1.56E-05	5.89E-06	6.10E-06	8.19E-06	7.69E-06
HNO_3	*Annual - Wet*	1st		2.15E-06	5.21E-06	3.45E-06	4.20E-06	6.68E-06
NO_3	*Annual - Wet*	1st		6.90E-05	1.07E-04	1.15E-04	1.25E-04	1.32E-04
N-Compounds	*Annual - Total*	1st	0.005	0.0002	0.0002	0.0002	0.0003	0.0003

Knauf Fiberglass - Shasta Lake
CALPUFF Screen Results for South Warner Wilderness

Meteorological Stations: Surface - **Redding Municipal Airport**
Upper Air - Medford Municipal Airport

Distance From Knauf = 189.6 km
Direction From Knauf = ENE (70°)
Elevation = 1890 m

VISIBILITY

Visibility Parameter	Averaging Period		Criteria	1987	1988	1989	1990	1991
Extinction Change	*24hr*	# of days => 5%	Quantify	0	0	0	0	0
		# of days => 10%	0	0	0	0	0	0
		largest ext. change (%)	10	1.1	1.26	1.43	1.32	1.53
	Annual	# of receptors > 1%	0	0	0	0	0	0
		largest ext. change (%)	1	0.12	0.13	0.13	0.13	0.13
Delta Deciview	*24hr*	# of days => 0.5	Quantify	0	0	0	0	0
		# of days => 1.0	0	0	0	0	0	0
		largest delta deciview	1	0.109	0.125	0.142	0.131	0.152
	Annual	# of receptors > 0.1	Quantify	0	0	0	0	0
		largest delta deciview	Quantify	0.012	0.013	0.013	0.013	0.013

CONCENTRATION

Pollutant	Averaging Period	Rank	PSD Increment Significance Threshold (ug/m^3)	1987 (ug/m^3)	1988 (ug/m^3)	1989 (ug/m^3)	1990 (ug/m^3)	1991 (ug/m^3)
PM_{10}	*24hr*	1st	0.32	0.0349	0.0392	0.0431	0.0476	0.0444
	Annual	1st	0.16	0.00519	0.00528	0.00522	0.00574	0.00526
NOx	*Annual*	1st	0.1	0.000731	0.000696	0.000725	0.000898	0.000715

DEPOSITION

Pollutant	Averaging Period	Rank	Significance Threshold (kgN/ha-yr)	1987 (kgN/ha-yr)	1988 (kgN/ha-yr)	1989 (kgN/ha-yr)	1990 (kgN/ha-yr)	1991 (kgN/ha-yr)
NOx	*Annual - Dry*	1st		2.04E-04	1.96E-04	2.02E-04	2.40E-04	2.01E-04
HNO_3	*Annual - Dry*	1st		2.94E-04	2.90E-04	2.92E-04	2.96E-04	2.85E-04
NO_3	*Annual - Dry*	1st		3.62E-05	4.41E-05	2.60E-05	2.78E-05	3.16E-05
HNO_3	*Annual - Wet*	1st		—	—	—	—	—
NO_3	*Annual - Wet*	1st		—	—	—	—	—
N-Compounds	*Annual - Total*	1st	0.005	0.0005	0.0005	0.0005	0.0006	0.0005

CALPUFF Input File and CALPOST Input/Output Files for:

Thousand Lakes Wilderness using 1987 meteorological data
(surface data: Medford, upper air: Medford)*

* See Appendix D for DVD containing all CALPUFF/CALPOST input and output files

CALPUFF Input File

```
Thousand Lakes Wilderness - Screen
Surface Data - Medford, OR

---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =              *
    or
ISCMET.DAT    input    ! ISCDAT =G:\CALPUFF1\KMAUF\MED87.ASC    !
    or
PLMMET.DAT    input    * PLMDAT =              *
    or
PROFILE.DAT   input    * PRFDAT =              *
SURFACE.DAT   input    * SFCDAT =              *
RESTARTB.DAT  input    * RSTARTB=              *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =G:\CALPUFF1\KMAUF\1_TLW\M_1987\1_CP_87M.LST  !
CONC.DAT      output   ! CONDAT =G:\CALPUFF1\KMAUF\1_TLW\M_1987\CONC_87M.DAT     !
DFLX.DAT      output   ! DFDAT  =G:\CALPUFF1\KMAUF\1_TLW\M_1987\DFLX_87M.DAT     !
WFLX.DAT      output   ! WFDAT  =G:\CALPUFF1\KMAUF\1_TLW\M_1987\WFLX_87M.DAT     !

VISB.DAT      output   ! VISDAT =G:\CALPUFF1\KMAUF\1_TLW\M_1987\VISB_87M.DAT     !
RESTARTE.DAT  output   * RSTARTE=              *
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =              *
VOLEMARB.DAT  input    * VOLDAT =              *
BAEMARB.DAT   input    * ARDAT  =              *
LNEMARB.DAT   input    * LNDAT  =              *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =              *
VD.DAT        input    * VDDAT  =              *
CHEM.DAT      input    * CHEMDAT=              *
H2O2.DAT      input    * H2O2DAT=              *
HILL.DAT      input    * HILDAT=              *
HILLRCT.DAT   input    * RCTDAT=              *
COASTLN.DAT   input    * CSTDAT=              *
FLUXBDY.DAT   input    * BDYDAT=              *
BCON.DAT      input    * BCNDAT=              *
DEBUG.DAT     output   * DEBUG =              *
MASSFLX.DAT   output   * FLXDAT=              *
MASSBAL.DAT   output   * BALDAT=              *
FOG.DAT       output   * FOGDAT=              *
--------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case       ! LCFILES = F !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                        Default: 1       ! NMETDAT =   0   !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                        Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                        Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                        Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
 none         input    * METDAT=      *    *END*

--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file      (METRUN)   Default: 0       ! METRUN =   1  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  1987  !
     (used only if   Month (IBMO) -- No default       ! IBMO =  0  !
```

```
 METRUN = 0)        Day (IBDY) -- No default       ! IBDY =  0  !
                   Hour (IBHR) -- No default       ! IBHR =  0  !

Base time zone          (XBTZ) -- No default       ! XBTZ = 8.0  !
   PST = 8., MST = 7.
   CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default         ! IRLG =  0  !

Number of chemical species (NSPEC)
                                  Default: 5       ! NSPEC =  6   !

Number of chemical species
to be emitted  (NSE)              Default: 3       ! NSE =  2   !

Flag to stop run after
SETUP phase (ITEST)               Default: 2       ! ITEST =  2   !
(Used to allow checking
of the model inputs, files, etc.)
      ITEST = 1 - STOPS program after SETUP phase
      ITEST = 2 - Continues with execution of program
                  after SETUP

Restart Configuration:

   Control flag (MRESTART)        Default: 0       ! MRESTART =  0   !

      0 = Do not read or write a restart file
      1 = Read a restart file at the beginning of
          the run
      2 = Write a restart file during run
      3 = Read a restart file at beginning of run
          and write a restart file during run

   Number of periods in Restart
   output cycle (NRESPD)          Default: 0       ! NRESPD =  0   !

      0 = File written only at last period
     >0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
                                  Default: 1       ! METFM =  2   !

      METFM = 1 - CALMET binary file (CALMET.MET)
      METFM = 2 - ISC ASCII file (ISCMET.MET)
      METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
      METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                  surface parameters file (SURFACE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
                                  Default: 60.0    ! AVET = 60. !
PG Averaging Time (minutes) (PGTIME)
                                  Default: 60.0    ! PGTIME = 60. !


!END!

--------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


    Vertical distribution used in the
    near field (MGAUSS)                   Default: 1      ! MGAUSS =  1   !
       0 = uniform
       1 = Gaussian

    Terrain adjustment method
    (MCTADJ)                              Default: 3      ! MCTADJ =  1   !
       0 = no adjustment
       1 = ISC-type of terrain adjustment
       2 = simple, CALPUFF-type of terrain
           adjustment
       3 = partial plume path adjustment

    Subgrid-scale complex terrain
    flag (MCTSG)                          Default: 0      ! MCTSG =  0   !
       0 = not modeled
       1 = modeled

    Near-field puffs modeled as
    elongated 0 (MSLUG)                   Default: 0      ! MSLUG =  0   !
       0 = no
       1 = yes (slug model used)

    Transitional plume rise modeled ?
    (MTRANS)                              Default: 1      ! MTRANS =  0   !
       0 = no  (i.e., final rise only)
       1 = yes (i.e., transitional rise computed)

    Stack tip downwash? (MTIP)            Default: 1      ! MTIP =  1  !
       0 = no  (i.e., no stack tip downwash)
       1 = yes (i.e., use stack tip downwash)

    Vertical wind shear modeled above
    stack top? (MSHEAR)                   Default: 0      ! MSHEAR =  1  !
       0 = no  (i.e., vertical wind shear not modeled)
       1 = yes (i.e., vertical wind shear modeled)

    Puff splitting allowed? (MSPLIT)      Default: 0      ! MSPLIT =  0  !
       0 = no (i.e., puffs not split)
```

```
   1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1   !
   0 = chemical transformation not
       modeled
   1 = transformation rates computed
       internally (MESOPUFF II scheme)
   2 = user-specified transformation
       rates used
   3 = transformation rates computed
       internally (RIVAD/ARM3 scheme)
   4 = secondary organic aerosol formation
       computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0   !
   0 = aqueous phase transformation
       not modeled
   1 = transformation rates adjusted
       for aqueous phase reactions

Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1   !
   0 = no
   1 = yes

Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1   !
   0 = no
   1 = yes
   (dry deposition method specified
    for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)                  Default: 3     ! MDISP =  3   !

   1 = dispersion coefficients computed from measured values
       of turbulence, sigma v, sigma w
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.
   5 = CTDM sigmas used for stable and neutral conditions.
       For unstable conditions, sigmas are computed as in
       MDISP = 3, described above.  MDISP = 5 assumes that
       measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3  !
   1 = use sigma-v or sigma-theta measurements
       from PROFILE.DAT to compute sigma-y
       (valid for METFM = 1, 2, 3, 4)
   2 = use sigma-w measurements
       from PROFILE.DAT to compute sigma-z
       (valid for METFM = 1, 2, 3, 4)
   3 = use both sigma-(v/theta) and sigma-w
       from PROFILE.DAT to compute sigma-y and sigma-z
       (valid for METFM = 1, 2, 3, 4)
   4 = use sigma-theta measurements
       from PLMMET.DAT to compute sigma-y
       (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)                      Default: 3     ! MDISP2 =  3  !
(used only if MDISP = 1 or 5)
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0  !
(MROUGH)
   0 = no
   1 = yes

Partial plume penetration of          Default: 1     ! MPARTL =  0  !
elevated inversion?
(MPARTL)
   0 = no
   1 = yes

Strength of temperature inversion     Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                      Default: 0     ! MPDF =  0  !
(MPDF)
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                      Default: 0     ! MSGTIBL = 0  !
(MSGTIBL)
   0 = no
```

```
   1 = yes

 Boundary conditions (concentration) modeled?
                                      Default: 0      ! MBCON = 0  !

 (MBCON)
    0 = no
    1 = yes


 Analyses of fogging and icing impacts due to emissions from
 arrays of mechanically-forced cooling towers can be performed
 using CALPUFF in conjunction with a cooling tower emissions
 processor (CTEMISS) and its associated postprocessors.  Hourly
 emissions of water vapor and temperature from each cooling tower
 cell are computed for the current cell configuration and ambient
 conditions by CTEMISS. CALPUFF models the dispersion of these
 emissions and provides cloud information in a specialized format
 for further analysis. Output to FOG.DAT is provided in either
 'plume mode' or 'receptor mode' format.

 Configure for FOG Model output?
                                      Default: 0      ! MFOG =  0   !
 (MFOG)
    0 = no
    1 = yes  - report results in PLUME Mode format
    2 = yes  - report results in RECEPTOR Mode format


 Test options specified to see if
 they conform to regulatory
 values? (MREG)                       Default: 1      ! MREG =  0   !

    0 = NO checks are made
    1 = Technical options must conform to USEPA
        Long Range Transport (LRT) guidance
                     METFM    1 or 2
                     AVET     60. (min)
                     PGTIME   60. (min)
                     MGAUSS   1
                     MCTADJ   3
                     MTRANS   1
                     MTIP     1
                     MCHEM    1 or 3 (if modeling SOx, NOx)
                     MWET     1
                     MDRY     1
                     MDISP    2 or 3
                     MPDF     0 if MDISP=3
                              1 if MDISP=2
                     MROUGH   0
                     MPARTL   1
                     SYTDEP   550. (m)
                     MHFTSZ   0

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                     Dry                 OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED               NUMBER
     NAME          (0=NO, 1=YES)    (0=NO, 1=YES)   (0=NO,                (0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS       1=1st CGRUP,
   Characters                                        2=COMPUTED-PARTICLE  2=2nd CGRUP,
   in length)                                        3=USER-SPECIFIED)    3= etc.)

!          SO2  =        1,               0,           1,                  0   !
!          SO4  =        1,               0,           2,                  0   !
!          NOX  =        1,               1,           1,                  0   !
!         HNO3  =        1,               0,           1,                  0   !
!          NO3  =        1,               0,           2,                  0   !
!         PM10  =        1,               1,           2,                  0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.

-------------------------------------------------------------------------------
```

```
INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                      Default: UTM     ! PMAP = UTM  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                     Default=0.0      ! FEAST  = 0.000  !
     (FNORTH)                    Default=0.0      ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                    No Default       ! IUTMZN =  10   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                    Default: N       ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                     No Default       ! RLAT0 = 0N  !
     (RLON0)                     No Default       ! RLON0 = 0E  !

         TTM :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
                RLAT0 identifies latitude of tangent-point of mapping plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                     No Default       ! XLAT1 = 0N  !
     (XLAT2)                     No Default       ! XLAT2 = 0N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other local
     models may be in use, and their selection in CALMET will make its output
     consistent with local mapping products.  The list of Datum-Regions with
     official transformation parameters provided by the National Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)
     ------------------------------------------------------------------------------
     WGS-G     WGS-84 GRS 80, Global coverage
     NAS-C     NORTH AMERICAN 1927 Clarke 1866, MEAN FOR (CONUS)
     NWS-27    NWS 6370KM Radius, Global Sphere (NAD27)
     NWS-84    NWS 6370KM Radius, Global Sphere (WGS84)
     ESR-S     ESRI REFERENCE Normal Sphere (6371KM Radius), Global Reference Sphere

     Datum-region for output coordinates
     (DATUM)                      Default: WGS-G     ! DATUM = NWS 27  !

METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default      ! NX =  4    !
            No. Y grid cells (NY)      No default      ! NY =  4    !
         No. vertical layers (NZ)      No default      ! NZ =  9    !

           Grid spacing (DGRIDKM)      No default      ! DGRIDKM = 150.  !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
```

```
! ZFACE = 0., 20., 40., 80., 160., 320., 1000., 1600., 2200., 3000. !

         Reference Coordinates
        of SOUTHWEST corner of
             grid cell(1, 1):

         X coordinate (XORIGKM)      No default      ! XORIGKM = 351.57 !
         Y coordinate (YORIGKM)      No default      ! YORIGKM = 4200.723 !
                                    Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET. grid.
     The lower left (LL) corner of the computational grid is at grid point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
     computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
     The grid spacing of the computational grid is the same as the MET. grid.

        X index of LL corner (IBCOMP)       No default     ! IBCOMP =  1    !
                 (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)       No default     ! JBCOMP =  1    !
                 (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)       No default     ! IECOMP =  4    !
                 (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)       No default     ! JECOMP =  4    !
                 (1 <= JECOMP <= NY)


SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)          Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)       No default     ! IBSAMP =  0    !
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)       No default     ! JBSAMP =  0    !
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)       No default     ! IESAMP =  0    !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)       No default     ! JESAMP =  0    !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                       Default: 1     ! MESHDN =  1  !
        (MESHDN is an integer >= 1)

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------

      FILE                         DEFAULT VALUE            VALUE THIS RUN
      ----                         -------------            --------------

   Concentrations (ICON)                1                   !  ICON =  1    !
   Dry Fluxes (IDRY)                    1                   !  IDRY =  1    !
   Wet Fluxes (IWET)                    1                   !  IWET =  1    !
   Relative Humidity (IVIS)             1                   !  IVIS =  1    !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                             Default: T         ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                           Default: 0         ! IMFLX =  0  !
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                           Default: 0         ! IMBAL =  0  !
         0 = no
```

```
        1 = yes (MASSBAL.DAT filename is
             specified in Input Group 0)


     LINE PRINTER OUTPUT OPTIONS:

        Print concentrations (ICPRT)     Default: 0         ! ICPRT =  1   !
        Print dry fluxes (IDPRT)         Default: 0         ! IDPRT =  1   !
        Print wet fluxes (IWPRT)         Default: 0         ! IWPRT =  1   !
        (0 = Do not print, 1 = Print)

        Concentration print interval
        (ICFRQ) in hours                 Default: 1         ! ICFRQ =  1   !
        Dry flux print interval
        (IDFRQ) in hours                 Default: 1         ! IDFRQ =  1   !
        Wet flux print interval
        (IWFRQ) in hours                 Default: 1         ! IWFRQ =  1   !

        Units for Line Printer Output
        (IPRTU)                          Default: 1         ! IPRTU =  3   !
                        for              for
                   Concentration     Deposition
            1 =       g/m**3          g/m**2/s
            2 =      mg/m**3         mg/m**2/s
            3 =      ug/m**3         ug/m**2/s
            4 =      ng/m**3         ng/m**2/s
            5 =     Odour Units

        Messages tracking progress of run
        written to the screen ?
        (IMESG)                          Default: 2         ! IMESG =  2   !
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


      SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                     ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS FLUX --
     SPECIES
     /GROUP          PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   SAVED ON DISK?
     -------         ------------------------   ------------------------   ------------------------   ---------------
 !         SO2 =       1,           1,            1,           1,            1,           1,            0   !
 !         SO4 =       1,           1,            1,           1,            1,           1,            0   !
 !         NOX =       1,           1,            1,           1,            1,           1,            0   !
 !        HNO3 =       1,           1,            1,           1,            1,           1,            0   !
 !         NO3 =       1,           1,            1,           1,            1,           1,            0   !
 !        PM10 =       1,           1,            1,           1,            1,           1,            0   !

      OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

        Logical for debug output
        (LDEBUG)                              Default: F      ! LDEBUG = F !

        First puff to track
        (IPFDEB)                              Default: 1      ! IPFDEB =  1  !

        Number of puffs to track
        (NPFDEB)                              Default: 1      ! NPFDEB =  1  !

        Met. period to start output
        (NN1)                                 Default: 1      ! NN1 =  1   !

        Met. period to end output
        (NN2)                                 Default: 10     ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
        Number of terrain features (NHILL)       Default: 0      ! NHILL =  0   !

        Number of special complex terrain
        receptors  (NCTREC)                      Default: 0      ! NCTREC =  0   !

        Terrain and CTSG Receptor data for
        CTSG hills input in CTDM format ?
        (MHILL)                                  No Default      ! MHILL =  2   !
        1 = Hill and Receptor data created
            by CTDM processors & read from
            HILL.DAT and HILLRCT.DAT files
        2 = Hill data created by OPTHILL &
            input below in Subgroup (6b);
            Receptor data in Subgroup (6c)

        Factor to convert horizontal dimensions  Default: 1.0    ! XHILL2M = 1. !
        to meters (MHILL=1)

        Factor to convert vertical dimensions    Default: 1.0    ! ZHILL2M = 1. !
        to meters (MHILL=1)

        X-origin of CTDM system relative to      No Default      ! XCTDMKM = 0.0E00 !
        CALPUFF coordinate system, in Kilometers (MHILL=1)

        Y-origin of CTDM system relative to      No Default      ! YCTDMKM = 0.0E00 !
        CALPUFF coordinate system, in Kilometers (MHILL=1)
```

```
! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL         XC       YC      THETAH  ZGRID  RELIEF    EXPO 1   EXPO 2   SCALE 1   SCALE 2   AMAX1   AMAX2
NO.         (km)     (km)     (deg.)   (m)     (m)      (m)      (m)      (m)       (m)      (m)     (m)
----        ----     ----     ------  -----  ------    ------   ------   -------   -------   -----   -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                     XRCT         YRCT        ZRCT          XHH
                     (km)         (km)         (m)
                    ------        -----       ------        ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a separate
           input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES    DIFFUSIVITY     ALPHA STAR     REACTIVITY    MESOPHYLL RESISTANCE    HENRY'S LAW COEFFICIENT
       NAME       (cm**2/s)                                          (s/cm)                (dimensionless)
      -------    -----------     ----------     ----------    --------------------    -----------------------

!        SO2 =      0.1509,         1000.,          8.,                0.,                    0.04 !
!        NOX =      0.1656,            1.,          8.,                5.,                     3.5 !
!       HNO3 =      0.1628,            1.,         18.,                0.,              0.00000008 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES    GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME           DIAMETER                   DEVIATION
                      (microns)                  (microns)
      -------    -------------------        ------------------
!        SO4 =          0.48,                       2.   !
!        NO3 =          0.48,                       2.   !
!       PM10 =          0.48,                       2.   !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------


     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30      !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
```

```
      (RGR)                                 Default: 10      !    RGR = 10.0 !
      Reference pollutant reactivity
      (REACTR)                              Default: 8       ! REACTR = 8.0 !

      Number of particle-size intervals used to
      evaluate effective particle deposition velocity
      (NINT)                                Default: 9       !    NINT =  9   !

      Vegetation state in unirrigated areas
      (IVEG)                                Default: 1       !    IVEG =  1    !
         IVEG=1 for active and unstressed vegetation
         IVEG=2 for active and stressed vegetation
         IVEG=3 for inactive vegetation

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 10 -- Wet Deposition Parameters
---------------

                      Scavenging Coefficient -- Units: (sec)**(-1)

         Pollutant         Liquid Precip.        Frozen Precip.
         ---------         --------------        --------------
!           SO2 =            3.0E-05,               0.0E00 !
!           SO4 =            1.0E-04,              3.0E-05 !
!          HNO3 =            6.0E-05,               0.0E00 !
!           NO3 =            1.0E-04,              3.0E-05 !
!          PM10 =            1.0E-04,              3.0E-05 !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 11 -- Chemistry Parameters
---------------

      Ozone data input option (MOZ)     Default: 1              ! MOZ =  0   !
      (Used only if MCHEM = 1, 3, or 4)
         0 = use a monthly background ozone value
         1 = read hourly ozone concentrations from
             the OZONE.DAT data file

      Monthly ozone concentrations
      (Used only if MCHEM = 1, 3, or 4 and
       MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
      (BCKO3) in ppb                    Default: 12*80.
      !  BCKO3 = 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00 !

      Monthly ammonia concentrations
      (Used only if MCHEM = 1, or 3)
      (BCKNH3) in ppb                   Default: 12*10.
      !  BCKNH3 = 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00 !

      Nighttime SO2 loss rate (RNITE1)
      in percent/hour                   Default: 0.2            ! RNITE1 = .2 !

      Nighttime NOx loss rate (RNITE2)
      in percent/hour                   Default: 2.0            ! RNITE2 = 2.0 !

      Nighttime HNO3 formation rate (RNITE3)
      in percent/hour                   Default: 2.0            ! RNITE3 = 2.0 !

      H2O2 data input option (MH2O2)    Default: 1              ! MH2O2 =  1   !
      (Used only if MAQCHEM = 1)
         0 = use a monthly background H2O2 value
         1 = read hourly H2O2 concentrations from
             the H2O2.DAT data file

      Monthly H2O2 concentrations
      (Used only if MQACHEM = 1 and
       MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
      (BCKH2O2) in ppb                  Default: 12*1.
      !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !

 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
      (used only if MCHEM = 4)

      The SOA module uses monthly values of:
           Fine particulate concentration in ug/m^3 (BCKPMF)
           Organic fraction of fine particulate      (OFRAC)
           VOC / NOX ratio (after reaction)          (VCNX)
      to characterize the air mass when computing
      the formation of SOA from VOC emissions.
      Typical values for several distinct air mass types are:

         Month    1    2    3    4    5    6    7    8    9   10   11   12
                 Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

      Clean Continental
         BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
         OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
         VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

      Clean Marine (surface)
         BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
         OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
```

```
       VCNX     50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Urban - low biogenic (controls present)
       BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
       OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
       VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

    Urban - high biogenic (controls present)
       BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
       OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
       VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Regional Plume
       BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
       OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
       VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Urban - no controls present
       BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
       OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
       VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

    Default: Clean Continental
    !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
    !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
    are used to determine sigma-y and
    sigma-z (SYTDEP)                            Default: 550.    ! SYTDEP = 5.5E02 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
    (MHFTSZ)                                    Default: 0       ! MHFTSZ =  0   !

    Stability class used to determine plume
    growth rates for puffs above the boundary
    layer (JSUP)                                Default: 5       ! JSUP =  5   !

    Vertical dispersion constant for stable
    conditions (k1 in Eqn. 2.7-3)  (CONK1)      Default: 0.01    ! CONK1 = .01 !

    Vertical dispersion constant for neutral/
    unstable conditions (k2 in Eqn. 2.7-4)
    (CONK2)                                     Default: 0.1     ! CONK2 = .1 !

    Factor for determining Transition-point from
    Schulman-Scire to Huber-Snyder Building Downwash
    scheme (SS used for Hs < Hb + TBD * HL)
    (TBD)                                       Default: 0.5     ! TBD = .5 !
       TBD < 0    ==> always use Huber-Snyder
       TBD = 1.5  ==> always use Schulman-Scire
       TBD = 0.5  ==> ISC Transition-point

    Range of land use categories for which
    urban dispersion is assumed
    (IURB1, IURB2)                              Default: 10      ! IURB1 =  10  !
                                                         19      ! IURB2 =  19  !

    Site characterization parameters for single-point Met data files ---------
    (needed for METFM = 2,3,4)

       Land use category for modeling domain
       (ILANDUIN)                               Default: 20      ! ILANDUIN =  40  !

       Roughness length (m) for modeling domain
       (Z0IN)                                   Default: 0.25    ! Z0IN = 1.0 !

       Leaf area index for modeling domain
       (XLAIIN)                                 Default: 3.0     ! XLAIIN = 7.0 !

       Elevation above sea level (m)
       (ELEVIN)                                 Default: 0.0     ! ELEVIN = 396.0 !

       Latitude (degrees) for met location
       (XLATIN)                                 Default: -999.   ! XLATIN = 42.389 !

       Longitude (degrees) for met location
       (XLONIN)                                 Default: -999.   ! XLONIN = 122.871 !

    Specialized information for interpreting single-point Met data files -----

       Anemometer height (m) (Used only if METFM = 2,3)
       (ANEMHT)                                 Default: 10.     ! ANEMHT = 6.1 !

       Form of lateral turbulance data in PROFILE.DAT file
       (Used only if METFM = 4 or MTURBVW = 1 or 3)
       (ISIGMAV)                                Default: 1       ! ISIGMAV =  1  !
          0 = read sigma-theta
          1 = read sigma-v

       Choice of mixing heights (Used only if METFM = 4)
       (IMIXCTDM)                               Default: 0       ! IMIXCTDM =  0  !
```

```
        0 = read PREDICTED mixing heights
        1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                                     Default: 1.0     ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                                    Default: 1.0     ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                                      Default: 99      ! MXNEW =  99   !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                      Default: 99      ! MXSAM =  99   !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                                     Default: 2       ! NCOUNT =  2   !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                      Default: 1.0     ! SYMIN = 1.0  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                      Default: 1.0     ! SZMIN = 1.0  !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))       Default SVMIN : .50,   .50,   .50,   .50,   .50,   .50
                              Default SWMIN : .20,   .12,   .08,   .06,   .03,   .016

                           Stability Class :  A      B      C      D      E      F
                                             ---    ---    ---    ---    ---    ---
                                  ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
                                  ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                                    Default: 0.0,0.0  ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                                     Default: 0.5     ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                                     Default: 3000.  ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)                                     Default: 50.     ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                      Default    :
                                ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                          Wind Speed Class :  1     2     3     4     5
                                             ---   ---   ---   ---   ---
                                  ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                       Default    : ISC RURAL values
                                ISC RURAL : .07, .07, .10, .15, .35, .55
                                ISC URBAN : .15, .15, .20, .25, .30, .30

                           Stability Class :  A     B     C     D     E     F
                                             ---   ---   ---   ---   ---   ---
                                   ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                       Default: 0.020, 0.035
                                   ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))                   Stability Class :  A     B     C     D     E     F
                                Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                             ---   ---   ---   ---   ---   ---
                                   !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                             Default: 10.        ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

  VERTICAL SPLIT
  --------------

  Number of puffs that result every time a puff
```

```
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                          Default:   3        ! NSPLIT =  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                    Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                         Default: 100.       ! ZISPLIT = 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until e nocturnal layer develops) .
       (ROLDMAX)                         Default: 0.25       ! ROLDMAX = 0.25 !


       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                         Default:   5        ! NSPLITH =  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                        Default:  1.0       ! SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                        Default:  2.        ! SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                        Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                         Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                         Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                          Default:   1.0      ! DSRISE = 1.0 !

!END!


-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =  2  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   3  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
```

```
        POINT SOURCE: CONSTANT DATA
        ---------------------------
                                                                              b          c
 Source     X UTM      Y UTM      Stack   Base      Stack    Exit  Exit     Bldg.  Emission
  No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.    Dwash   Rates
            (km)       (km)       (m)      (m)        (m)   (m/s) (deg. K)
 ------  ---------- ---------- ------  ------    -------- ----- -------- ----- --------
   1 ! SRCNAM = P1 !
   1 ! X =   551.57, 4500.724,    60.7, 225.0,      5.18,  9.04,  331.9,    .0, 0.0E00,  0.0E00, 2.2619E01,
       0.0E00,  0.0E00, 2.74E01 !
   1 ! FMFAC  =       1.0 !   !END!
   2 ! SRCNAM = P2 !
   2 ! X =  551.581, 4500.633,    25.9, 224.0,       .94,  16.7,  319.4,    .0, 0.0E00,  0.0E00,  0.0E00,
       0.0E00,  0.0E00,  1.0E00 !
   2 ! FMFAC  =       1.0 !   !END!

--------

  a
   Data for each source are treated as a separate input subgroup
   and therefore must end with an input group terminator.

   SRCNAM  is a 12-character name for a source
           (No default)
   X       is an array holding the source data listed by the column headings
           (No default)
   SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
           (Default: 0.,0.)
   FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
           the effect of rain-caps or other physical configurations that
           reduce momentum rise associated with the actual exit velocity.
           (Default: 1.0  -- full momentum used)

  b
   0. = No building downwash modeled, 1. = downwash modeled
   NOTE: must be entered as a REAL number (i.e., with decimal point)

  c
   An emission rate must be entered for every pollutant modeled.
   Enter emission rate of zero for secondary pollutants that are
   modeled, but not emitted.  Units are specified by IPTU
   (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

         BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
         -------------------------------------------------------
Source                                                                a
 No.       Effective building width and height (in meters) every 10 degrees
------     ----------------------------------------------------------------


--------

  a
   Each pair of width and height values is treated as a separate input
   subgroup and therefore must end with an input group terminator.

---------------
Subgroup (13d)
---------------
                                                  a
        POINT SOURCE: VARIABLE EMISSIONS DATA
        -------------------------------------

   Use this subgroup to describe temporal variations in the emission
   rates given in 13b.  Factors entered multiply the rates in 13b.
   Skip sources here that have constant emissions.  For more elaborate
   variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

   IVARY determines the type of variation, and is source-specific:
   (IVARY)                             Default: 0
         0 =       Constant
         1 =       Diurnal cycle (24 scaling factors: hours 1-24)
         2 =       Monthly cycle (12 scaling factors: months 1-12)
         3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                  where first group is DEC-JAN-FEB)
         4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                  first group is Stability Class A,
                                  and the speed classes have upper
                                  bounds (m/s) defined in Group 12
         5 =       Temperature   (12 scaling factors, where temperature
                                  classes have upper bounds (C) of:
                                  0, 5, 10, 15, 20, 25, 30, 35, 40,
                                  45, 50, 50+)


--------
  a
   Data for each species are treated as a separate input subgroup
   and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
------------------------------

---------------
Subgroup (14a)
```

```
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0   !

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1  !
            1 =        g/m**2/s
            2 =      kg/m**2/hr
            3 =      lb/m**2/hr
            4 =    tons/m**2/yr
            5 =    Odour Unit * m/s  (vol. flux/m**2 of odour compound)
            6 =    Odour Unit * m/min
            7 =    metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                            a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                                 b
Source           Effect.    Base       Initial    Emission
 No.             Height   Elevation    Sigma z     Rates
                   (m)       (m)         (m)
-------          ------    ------     --------    ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                               a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                                     a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                              Default: 0
            0 =      Constant
            1 =      Diurnal cycle (24 scaling factors: hours 1-24)
            2 =      Monthly cycle (12 scaling factors: months 1-12)
            3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
            4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
            5 =      Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.
```

```
---------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   ! NLINES =  0  !

     Units used for line source
     emissions below                 (ILNU)         Default: 1   !  ILNU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0   !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7    ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6    ! NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default    ! XL = .0 !
                                                    (in meters)

        Average building height (HBL)               No default    ! HBL = .0 !
                                                    (in meters)

        Average building width (WBL)                No default    ! WBL = .0 !
                                                    (in meters)

        Average line source width (WML)             No default    ! WML = .0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default    ! DXL = .0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default    ! FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

           BUOYANT LINE SOURCE: CONSTANT DATA
           ----------------------------------
                                                                                     a
Source     Beg. X      Beg. Y      End. X     End. Y     Release     Base         Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate   Height    Elevation       Rates
            (km)        (km)        (km)       (km)        (m)        (m)
------   ----------  ----------  ---------- ----------   -------   ---------     ---------

--------

     a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                              a
           BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
           -------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
```

```
         4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                                first group is Stability Class A,
                                and the speed classes have upper
                                bounds (m/s) defined in Group 12
         5 =      Temperature   (12 scaling factors, where temperature
                                classes have upper bounds (C) of:
                                0, 5, 10, 15, 20, 25, 30, 35, 40,
                                45, 50, 50+)


--------
    a
    Data for each species are treated as a separate input subgroup
    and therefore must end with an input group terminator.

--------------------------------------------------------------------------------

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

--------------
Subgroup (16a)
--------------

    Number of volume sources with
    parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

    Units used for volume source
    emissions below in 16b        (IVLU)     Default: 1  !  IVLU =   1  !
         1 =       g/s
         2 =      kg/hr
         3 =      lb/hr
         4 =    tons/yr
         5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =    Odour Unit * m**3/min
         7 =    metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (16c)       (NSVL1)    Default: 0  !  NSVL1 =  0  !

    Number of volume sources with
    variable location and emission
    parameters                    (NVL2)     No default  !  NVL2 =   0   !

    (If NVL2 > 0, ALL parameter data for
     these sources are read from the VOLEMARB.DAT file(s) )

!END!

--------------
Subgroup (16b)
--------------
                                     a
          VOLUME SOURCE: CONSTANT DATA
          ----------------------------
                                                                          b
      X UTM      Y UTM     Effect.    Base     Initial    Initial   Emission
    Coordinate Coordinate  Height   Elevation  Sigma y    Sigma z     Rates
       (km)       (km)       (m)       (m)       (m)        (m)
    ---------- ----------  ------    ------   --------   --------   --------


--------
    a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

    b
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by IVLU
    (e.g. 1 for g/s).

--------------
Subgroup (16c)
--------------
                                                 a
         VOLUME SOURCE: VARIABLE EMISSIONS DATA
         ---------------------------------------

    Use this subgroup to describe temporal variations in the emission
    rates given in 16b.  Factors entered multiply the rates in 16b.
    Skip sources here that have constant emissions.  For more elaborate
    variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

    IVARY determines the type of variation, and is source-specific:
    (IVARY)                              Default: 0
         0 =       Constant
         1 =       Diurnal cycle (24 scaling factors: hours 1-24)
         2 =       Monthly cycle (12 scaling factors: months 1-12)
         3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                where first group is DEC-JAN-FEB)
         4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                first group is Stability Class A,
                                and the speed classes have upper
                                bounds (m/s) defined in Group 12
         5 =       Temperature  (12 scaling factors, where temperature
                                classes have upper bounds (C) of:
                                0, 5, 10, 15, 20, 25, 30, 35, 40,
```

```
                                45, 50, 50+)

--------
  a
   Data for each species are treated as a separate input subgroup
   and therefore must end with an input group terminator.

-------------------------------------------------------------------------------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
---------------------

---------------
Subgroup (17a)
---------------

   Number of non-gridded receptors (NREC)  No default  !  NREC =  180   !

!END!

---------------
Subgroup (17b)
---------------
                                                      a
             NON-GRIDDED (DISCRETE) RECEPTOR DATA
             ------------------------------------

                     X UTM        Y UTM         Ground       Height   b
Receptor          Coordinate   Coordinate     Elevation   Above Ground
  No.                (km)         (km)           (m)           (m)
--------          ----------   ----------     ---------   ------------
      1 ! X = 553.7337689,4562.6852313,    1615.000,        0.000!   !END!
      2 ! X = 555.8949015,4562.5719711,    1615.000,        0.000!   !END!
      3 ! X = 558.0507649,4562.3833575,    1615.000,        0.000!   !END!
      4 ! X = 560.1987325,4562.1196202,    1615.000,        0.000!   !END!
      5 ! X = 562.3361873,4561.7810806,    1615.000,        0.000!   !END!
      6 ! X = 564.4605252,4561.3681512,    1615.000,        0.000!   !END!
      7 ! X = 566.5691579,4560.8813349,    1615.000,        0.000!   !END!
      8 ! X = 568.6595165,4560.321225,    1615.000,        0.000!   !END!
      9 ! X = 570.7280542,4559.6885038,    1615.000,        0.000!   !END!
     10 ! X = 572.7752495,4558.9839423,    1615.000,        0.000!   !END!
     11 ! X = 574.7956094,4558.2083987,    1615.000,        0.000!   !END!
     12 ! X = 576.7876725,4557.3628181,    1615.000,        0.000!   !END!
     13 ! X = 578.7490118,4556.4482305,    1615.000,        0.000!   !END!
     14 ! X = 580.6772376,4555.4657504,    1615.000,        0.000!   !END!
     15 ! X = 582.5700008,4554.4165746,    1615.000,        0.000!   !END!
     16 ! X = 584.4249952,4553.3019815,    1615.000,        0.000!   !END!
     17 ! X = 586.2399609,4552.1233289,    1615.000,        0.000!   !END!
     18 ! X = 588.0126865,4550.882053,    1615.000,        0.000!   !END!
     19 ! X = 589.7410124,4549.579666,    1615.000,        0.000!   !END!
     20 ! X = 591.4228327,4548.2177547,    1615.000,        0.000!   !END!
     21 ! X = 593.0560985,4546.7979783,    1615.000,        0.000!   !END!
     22 ! X = 594.6388199,4545.3220667,    1615.000,        0.000!   !END!
     23 ! X = 596.1690686,4543.791818,    1615.000,        0.000!   !END!
     24 ! X = 597.6449801,4542.2090965,    1615.000,        0.000!   !END!
     25 ! X = 599.0647564,4540.5758306,    1615.000,        0.000!   !END!
     26 ! X = 600.4266677,4538.8940102,    1615.000,        0.000!   !END!
     27 ! X = 601.7290546,4537.1656843,    1615.000,        0.000!   !END!
     28 ! X = 602.9703304,4535.3929586,    1615.000,        0.000!   !END!
     29 ! X = 604.1489829,4533.5779929,    1615.000,        0.000!   !END!
     30 ! X = 605.2635759,4531.7229984,    1615.000,        0.000!   !END!
     31 ! X = 606.3127516,4529.8302352,    1615.000,        0.000!   !END!
     32 ! X = 607.2952317,4527.9020094,    1615.000,        0.000!   !END!
     33 ! X = 608.2098192,4525.9406701,    1615.000,        0.000!   !END!
     34 ! X = 609.0553998,4523.9486069,    1615.000,        0.000!   !END!
     35 ! X = 609.8309432,4521.9282469,    1615.000,        0.000!   !END!
     36 ! X = 610.5355047,4519.8820516,    1615.000,        0.000!   !END!
     37 ! X = 611.1682258,4517.8125139,    1615.000,        0.000!   !END!
     38 ! X = 611.7283356,4515.7221553,    1615.000,        0.000!   !END!
     39 ! X = 612.2151517,4513.6135225,    1615.000,        0.000!   !END!
     40 ! X = 612.6280811,4511.4891846,    1615.000,        0.000!   !END!
     41 ! X = 612.9666206,4509.3517298,    1615.000,        0.000!   !END!
     42 ! X = 613.2303578,4507.2037622,    1615.000,        0.000!   !END!
     43 ! X = 613.4189713,4505.0478988,    1615.000,        0.000!   !END!
     44 ! X = 613.5322314,4502.8867661,    1615.000,        0.000!   !END!
     45 ! X =       613.57,4500.7229973,    1615.000,        0.000!   !END!
     46 ! X = 613.5322312,4498.5592284,    1615.000,        0.000!   !END!
     47 ! X = 613.4189709,4496.3980958,    1615.000,        0.000!   !END!
     48 ! X = 613.2303572,4494.2422324,    1615.000,        0.000!   !END!
     49 ! X = 612.9666199,4492.0942648,    1615.000,        0.000!   !END!
     50 ! X = 612.6280802, 4489.95681,    1615.000,        0.000!   !END!
     51 ! X = 612.2151506,4487.8324722,    1615.000,        0.000!   !END!
     52 ! X = 611.7283343,4485.7238394,    1615.000,        0.000!   !END!
     53 ! X = 611.1682243,4483.6334809,    1615.000,        0.000!   !END!
     54 ! X =  610.535503,4481.5639433,    1615.000,        0.000!   !END!
     55 ! X = 609.8309414,4479.517748,    1615.000,        0.000!   !END!
     56 ! X = 609.0553977,4477.4973881,    1615.000,        0.000!   !END!
     57 ! X =  608.209817,4475.505325,    1615.000,        0.000!   !END!
     58 ! X = 607.2952293,4473.5439858,    1615.000,        0.000!   !END!
     59 ! X = 606.3127491, 4471.61576,    1615.000,        0.000!   !END!
     60 ! X = 605.2635732,4469.7229969,    1615.000,        0.000!   !END!
     61 ! X =   604.14898,4467.8680025,    1615.000,        0.000!   !END!
     62 ! X = 602.9703274,4466.0530369,    1615.000,        0.000!   !END!
     63 ! X = 601.7290514,4464.2803113,    1615.000,        0.000!   !END!
     64 ! X = 600.4266644,4462.5519855,    1615.000,        0.000!   !END!
     65 ! X =  599.064753,4460.8701652,    1615.000,        0.000!   !END!
     66 ! X = 597.6449765,4459.2368995,    1615.000,        0.000!   !END!
     67 ! X = 596.1690648,4457.6541781,    1615.000,        0.000!   !END!
     68 ! X =  594.638816,4456.1239295,    1615.000,        0.000!   !END!
     69 ! X = 593.0560945,4454.648018,    1615.000,        0.000!   !END!
     70 ! X = 591.4228286,4453.2282418,    1615.000,        0.000!   !END!
```

```
 71 ! X = 589.7410081,4451.8663306,   1615.000,     0.000!  !END!
 72 ! X = 588.0126821,4450.5639438,   1615.000,     0.000!  !END!
 73 ! X = 586.2399564,4449.322668,    1615.000,     0.000!  !END!
 74 ! X = 584.4249906,4448.1440157,   1615.000,     0.000!  !END!
 75 ! X = 582.5699961,4447.0294227,   1615.000,     0.000!  !END!
 76 ! X = 580.6772329,4445.9802471,   1616.000,     0.000!  !END!
 77 ! X = 578.7490069,4444.9977671,   1615.000,     0.000!  !END!
 78 ! X = 576.7876676,4444.0831797,   1615.000,     0.000!  !END!
 79 ! X = 574.7956044,4443.2375992,   1615.000,     0.000!  !END!
 80 ! X = 572.7752444,4442.4620559,   1615.000,     0.000!  !END!
 81 ! X =  570.729049,4441.7574945,   1615.000,     0.000!  !END!
 82 ! X = 568.6595113,4441.1247735,   1615.000,     0.000!  !END!
 83 ! X = 566.5691527,4440.5646638,   1615.000,     0.000!  !END!
 84 ! X = 564.4605199,4440.0778477,   1615.000,     0.000!  !END!
 85 ! X =  562.336182,4439.6649184,   1615.000,     0.000!  !END!
 86 ! X = 560.1987271,4439.326379,    1615.000,     0.000!  !END!
 87 ! X = 558.0507595,4439.0626419,   1615.000,     0.000!  !END!
 88 ! X = 555.8948961,4438.8740285,   1615.000,     0.080!  !END!
 89 ! X = 553.7337634,4438.7607685,   1615.000,     0.000!  !END!
 90 ! X = 551.5699946,   4438.723,    1615.000,     0.000!  !END!
 91 ! X = 549.4062257,4438.7607689,   1615.000,     0.000!  !END!
 92 ! X = 547.2450931,4438.8740293,   1615.000,     0.000!  !END!
 93 ! X = 545.0892297,4439.0626431,   1615.000,     0.000!  !END!
 94 ! X = 542.9412621,4439.3263805,   1615.000,     0.000!  !END!
 95 ! X = 548.8038074,4439.6649203,   1615.000,     0.000!  !END!
 96 ! X = 538.6794695, 4440.07785,    1615.000,     0.000!  !END!
 97 ! X = 536.5708368,4440.5646664,   1615.000,     0.000!  !END!
 98 ! X = 534.4804783,4441.1247765,   1615.000,     0.000!  !END!
 99 ! X = 532.4109407,4441.7574978,   1615.000,     0.000!  !END!
100 ! X = 530.3647455,4442.4620596,   1615.000,     0.000!  !END!
101 ! X = 528.3443856,4443.2376033,   1615.000,     0.000!  !END!
102 ! X = 526.3523225,4444.0831841,   1615.000,     0.000!  !END!
103 ! X = 524.3909833,4444.9977718,   1615.000,     0.000!  !END!
104 ! X = 522.4627576,4445.9802522,   1615.000,     0.000!  !END!
105 ! X = 520.5699945,4447.0294281,   1615.000,     0.000!  !END!
106 ! X = 518.7150002,4448.1440214,   1615.000,     0.000!  !END!
107 ! X = 516.9000346,4449.3226741,   1615.000,     0.000!  !END!
108 ! X = 515.1273091,4450.5639502,   1615.000,     0.000!  !END!
109 ! X = 513.3989834,4451.8663373,   1615.000,     0.000!  !END!
110 ! X = 511.7171631,4453.2282488,   1615.000,     0.000!  !END!
111 ! X = 510.0838974,4454.6480253,   1615.000,     0.000!  !END!
112 ! X = 508.5011762,4456.1239371,   1615.000,     0.000!  !END!
113 ! X = 506.9709277,4457.6541859,   1615.000,     0.000!  !END!
114 ! X = 505.4950162,4459.2369075,   1615.000,     0.000!  !END!
115 ! X = 504.0752401,4460.8701735,   1615.000,     0.000!  !END!
116 ! X =  502.713329,4462.551994,    1615.000,     0.000!  !END!
117 ! X = 501.4109422,4464.2803201,   1615.000,     0.000!  !END!
118 ! X = 500.1696665,4466.0530459,   1615.000,     0.000!  !END!
119 ! X = 498.9910142,4467.8680117,   1615.000,     0.000!  !END!
120 ! X = 497.8764214,4469.7230063,   1615.000,     0.000!  !END!
121 ! X = 496.8272458,4471.6157695,   1615.000,     0.000!  !END!
122 ! X = 495.8447659,4473.5439955,   1615.000,     0.000!  !END!
123 ! X = 494.9301786,4475.5053349,   1615.000,     0.000!  !END!
124 ! X = 494.0845982,4477.4973981,   1615.000,     0.000!  !END!
125 ! X = 493.3090549,4479.5177582,   1615.000,     0.000!  !END!
126 ! X = 492.6044936,4481.5639536,   1615.000,     0.000!  !END!
127 ! X = 491.9717727,4483.6334913,   1615.000,     0.000!  !END!
128 ! X = 491.4116631, 4485.72385,    1615.000,     0.000!  !END!
129 ! X = 490.9248471,4487.8324828,   1615.000,     0.000!  !END!
130 ! X =  490.511918,4489.9568207,   1615.000,     0.000!  !END!
131 ! X = 490.1733786,4492.0942756,   1615.000,     0.000!  !END!
132 ! X = 489.9096417,4494.2422432,   1615.000,     0.000!  !END!
133 ! X = 489.7210283,4496.3981066,   1615.000,     0.000!  !END!
134 ! X = 489.6077684,4498.5592393,   1615.000,     0.000!  !END!
135 ! X =      489.57,4500.7230081,   1615.000,     0.000!  !END!
136 ! X =  489.607769,4502.886777,    1615.000,     0.000!  !END!
137 ! X = 489.7210295,4505.0479096,   1615.000,     0.000!  !END!
138 ! X = 489.9096434,4507.203773,    1615.000,     0.000!  !END!
139 ! X = 490.1733809,4509.3517405,   1615.000,     0.000!  !END!
140 ! X = 490.5119208,4511.4891953,   1615.000,     0.000!  !END!
141 ! X = 490.9248505,4513.6135331,   1615.000,     0.000!  !END!
142 ! X =  491.411667,4515.7221658,   1615.000,     0.000!  !END!
143 ! X = 491.9717772,4517.8125243,   1615.000,     0.000!  !END!
144 ! X = 492.6044987,4519.8820619,   1615.000,     0.000!  !END!
145 ! X = 493.3090605,4521.9282571,   1615.000,     0.000!  !END!
146 ! X = 494.0846043,4523.9486169,   1615.000,     0.000!  !END!
147 ! X = 494.9301852, 4525.94068,    1615.000,     0.000!  !END!
148 ! X =  495.844773,4527.9020191,   1615.000,     0.000!  !END!
149 ! X = 496.8272535,4529.8302448,   1615.000,     0.000!  !END!
150 ! X = 497.8764295,4531.7230078,   1615.000,     0.000!  !END!
151 ! X = 498.9910229,4533.5780021,   1615.000,     0.000!  !END!
152 ! X = 500.1696756,4535.3929676,   1615.000,     0.000!  !END!
153 ! X = 501.4109518,4537.1656931,   1615.000,     0.000!  !END!
154 ! X =  502.713339,4538.8940188,   1615.000,     0.000!  !END!
155 ! X = 504.0752505,4540.575839,    1615.000,     0.000!  !END!
156 ! X = 505.4950271,4542.2091046,   1615.000,     0.000!  !END!
157 ! X = 506.9709389,4543.7918258,   1615.000,     0.000!  !END!
158 ! X = 508.5011879,4545.3220742,   1615.000,     0.000!  !END!
159 ! X = 510.0839095,4546.7979856,   1615.000,     0.000!  !END!
160 ! X = 511.7171756,4548.2177617,   1615.000,     0.000!  !END!
161 ! X = 513.3989962,4549.5796727,   1615.000,     0.000!  !END!
162 ! X = 515.1273223,4550.8820594,   1615.000,     0.000!  !END!
163 ! X = 516.9000481,4552.123335,    1615.000,     0.000!  !END!
164 ! X =  518.715014,4553.3019872,   1615.000,     0.000!  !END!
165 ! X = 520.5700086, 4554.41658,    1615.000,     0.000!  !END!
166 ! X = 522.4627719,4555.4657555,   1615.000,     0.000!  !END!
167 ! X = 524.3909979,4556.4482353,   1615.000,     0.000!  !END!
168 ! X = 526.3523374,4557.3628225,   1615.000,     0.000!  !END!
169 ! X = 528.3444006,4558.2084028,   1615.000,     0.000!  !END!
170 ! X = 530.3647607,4558.983946,    1615.000,     0.000!  !END!
171 ! X = 532.4109561,4559.6885072,   1615.000,     0.000!  !END!
172 ! X = 534.4804939,4560.321228,    1615.000,     0.000!  !END!
173 ! X = 536.5708526,4560.8813375,   1615.000,     0.000!  !END!
174 ! X = 538.6794854,4561.3681534,   1615.000,     0.000!  !END!
```

```
175 ! X = 540.8038234,4561.7810825,    1615.000,       0.000!   !END!
176 ! X = 542.9412782,4562.1196217,    1615.000,       0.000!   !END!
177 ! X = 545.0892459,4562.3833586,    1615.000,       0.000!   !END!
178 ! X = 547.2451093,4562.5719719,    1615.000,       0.000!   !END!
179 ! X =  549.406242,4562.6852317,    1615.000,       0.000!   !END!
180 ! X = 551.5700108,    4562.723,    1615.000,       0.000!   !END!
```

----

a

Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b

Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

CALPOST Input File - Visibility

```
Thousand Lakes Wilderness - Screen
Visibility
Surface Data - Medford, OR
---------------- Run title (3 lines) ------------------------------------------

                    CALPOST MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names
--------------

Input Files
-----------

File                      Default File Name
----                      -----------------
Conc/Dep Flux File        MODEL.DAT          ! MODDAT =G:\CALPUFF1\KMAUF\1_TLW\M_1987\CONC_87M.DAT   !
Relative Humidity File    VISB.DAT           * VISDAT =   *
Background Data File      BACK.DAT           *BACKDAT =   *
Transmissometer/          VSRN.DAT           *VSRDAT =   *
Nephelometer Data File

Output Files
------------

File                      Default File Name
----                      -----------------
List File                 CALPOST.LST        ! PSTLST =G:\CALPUFF1\KMAUF\1_TLW\M_1987\1VIS87M.LST   !

Pathname for Timeseries Files   (blank)      * TSPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files   (blank)            * PLPATH =   *
(activate with exclamation points only if
 providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
 providing NON-BLANK character string)

Timeseries                TStUUUU.DAT        * TSUNAM =   *

Top Nth Rank Plot         RttUUUUU.DAT
                     or   RttiiUUU.GRD       * TUNAM =   *

Exceedance Plot           XttUUUUU.DAT
                     or   XttUUUUU.GRD       * XUNAM =   *

Echo Plot                 jjjtthhU.DAT
(Specific Days)      or   jjjtthhU.GRD       * EUNAM =   *

Visibility Plot           V24UUUUU.DAT       * VUNAM =   *
(Daily Peak Summary)

--------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = F !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
          using a template that includes a pathname, user-supplied
          character(s), and fixed strings (tt,ii,jjj, and hh), where
                tt = Averaging Period (e.g. 03)
                ii = Rank (e.g. 02)
                jjj= Julian Day
                hh = Hour(ending)
          are determined internally based on selections made below.
          If a path or user-supplied character(s) are supplied, each
          must contain at least 1 non-blank character.

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

     Option to run all periods found
     in the met. file(s)  (METRUN)         Default: 0    ! METRUN =   1  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR)  --    No default    ! ISYR  =  1987   !
     (used only if     Month (ISMO)  --    No default    ! ISMO  =  0   !
      METRUN = 0)      Day   (ISDY)  --    No default    ! ISDY  =  0   !
                       Hour  (ISHR)  --    No default    ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default     ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1     ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

      Species to process (ASPEC)        -- No default    ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)
```

```
      Layer/deposition code (ILAYER)    -- Default: 1    ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:       -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0     ! B =  0.0    !
        (NOT applied if A = B = 0.0)         B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                                (LBACK)  -- Default: F   ! LBACK =  F !

Receptor information
--------------------

  Gridded receptors processed?     (LG) -- Default: F    ! LG  = F  !
  Discrete receptors processed?    (LD) -- Default: F    ! LD  = T  !
  CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F    ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)      (LDRING) -- Default: F    ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):

  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                  OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
                                              ! NDRECP =  -1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                           (NGONOFF) -- Default: 0      ! NGONOFF =  0  !

!END!


--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98    ! RHMAX = 98.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?           (LVSO4) -- Default: T    ! LVSO4  = T  !
```

```
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE     (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE       (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
               PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
               PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
               PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
              AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
              AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
              ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
              SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
              ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                               (MVISBK) -- Default: 2   ! MVISBK =  6  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - Hourly RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - Hourly RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - Hourly RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
             - Hourly RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        6 =  Compute extinction from speciated PM measurements
             - FLAG RH adjustment factor applied to observed and
               modeled sulfate and nitrate

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                               (BEXTBK) -- No default    ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                               (RHFRAC) -- No default    ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 6:
    --------------------------------------
     Extinction coefficients for hygroscopic species (modeled and
     background) are computed using a monthly RH adjustment factor
     in place of an hourly RH factor (VISB.DAT file is NOT needed).
     Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

     (RHFAC)  -- No default      ! RHFAC = 3.7, 3.7, 3.7, 3.7,
                                           3.7, 3.7, 3.7, 3.7,
                                           3.7, 3.7, 3.7, 3.7 !

    Additional inputs used for MVISBK = 2,3,6:
    ------------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)   -- No default      ! BKSO4 = 0.2, 0.2, 0.2, 0.2,
                                            0.2, 0.2, 0.2, 0.2,
                                            0.2, 0.2, 0.2, 0.2 !
     (BKNO3)   -- No default      ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                            0.0, 0.0, 0.0, 0.0,
                                            0.0, 0.0, 0.0, 0.0 !
     (BKPMC)   -- No default      ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                            0.0, 0.0, 0.0, 0.0,
                                            0.0, 0.0, 0.0, 0.0 !
     (BKOC)    -- No default      ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                            0.0, 0.0, 0.0, 0.0,
                                            0.0, 0.0, 0.0, 0.0 !
     (BKSOIL)  -- No default      ! BKSOIL= 4.5, 4.5, 4.5, 4.5,
                                            4.5, 4.5, 4.5, 4.5,
                                            4.5, 4.5, 4.5, 4.5 !
     (BKEC)    -- No default      ! BKEC  = 0.0, 0.0, 0.0, 0.0,
```

```
                                        0.0, 0.0, 0.0, 0.0,
                                        0.0, 0.0, 0.0, 0.0 !

   Additional inputs used for MVISBK = 2,3,5,6:
   ----------------------------------------
    Extinction due to Rayleigh scattering is added (1/Mm)
                              (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

    Documentation records contained in the header of the
    CALPUFF output file may be written to the list file.
    Print documentation image?
                              (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1    ! IPRTU =  1   !
                     for              for
                Concentration     Deposition
        1 =         g/m**3         g/m**2/s
        2 =        mg/m**3        mg/m**2/s
        3 =        ug/m**3        ug/m**2/s
        4 =        ng/m**3        ng/m**2/s
        5 =     Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

    1-hr averages            (L1HR) -- Default: T    !    L1HR = F  !

    3-hr averages            (L3HR) -- Default: T    !    L3HR = F  !

    24-hr averages          (L24HR) -- Default: T    !   L24HR = T  !

    Run-length averages     (LRUNL) -- Default: T    !   LRUNL = T  !

    User-specified averaging time in hours - results for
    an averaging time of NAVG hours are reported for
    NAVG greater than 0:
                             (NAVG) -- Default: 0    !    NAVG =  0  !


Types of tabulations reported
------------------------------

   1) Visibility: daily visibility tabulations are always reported
                  for the selected receptors when ASPEC = VISIB.
                  In addition, any of the other tabulations listed
                  below may be chosen to characterize the light
                  extinction coefficients.
                  [List file or Plot/Analysis File]


   2) Top 50 table for each averaging time selected
      [List file only]
                             (LT50) -- Default: T    !    LT50 = F  !

   3) Top 'N' table for each averaging time selected
      [List file or Plot file]
                            (LTOPN) -- Default: F    !   LTOPN = T  !

        -- Number of 'Top-N' values at each receptor
           selected (NTOP must be <= 4)
                             (NTOP) -- Default: 4    ! NTOP =  2   !

        -- Specific ranks of 'Top-N' values reported
           (NTOP values must be entered)
                   (ITOP(4) array) -- Default:       ! ITOP =  1 , 2   !
                                      1,2,3,4


   4) Threshold exceedance counts for each receptor and each averaging
      time selected
      [List file or Plot file]
                            (LEXCD) -- Default: F    !   LEXCD = F  !

        -- Identify the threshold for each averaging time by assigning a
           non-negative value (output units).

                                      -- Default: -1.0
           Threshold for  1-hr averages    (THRESH1) !   THRESH1 = -1.0  !
           Threshold for  3-hr averages    (THRESH3) !   THRESH3 = -1.0  !
           Threshold for 24-hr averages   (THRESH24) !  THRESH24 = -1.0  !
           Threshold for NAVG-hr averages (THRESHN)  !   THRESHN = -1.0  !


        -- Counts for the shortest averaging period selected can be
           tallied daily, and receptors that experience more than NCOUNT
           counts over any NDAY period will be reported.  This type of
           exceedance violation output is triggered only if NDAY > 0.

           Accumulation period(Days)
                             (NDAY) -- Default: 0    !    NDAY =  0  !
```

```
        Number of exceedances allowed
                        (NCOUNT) -- Default: 1   ! NCOUNT =  1  !

  5) Selected day table(s)

     Echo Option -- Many records are written each averaging period
     selected and output is grouped by day
     [List file or Plot file]
                         (LECHO) -- Default: F   ! LECHO = F  !

     Timeseries Option -- Averages at all selected receptors for
     each selected averaging period are written to timeseries files.
     Each file contains one averaging period, and all receptors are
     written to a single record each averaging time.
     [TSttUUUU.DAT files]
                         (LTIME) -- Default: F   ! LTIME = F  !

       -- Days selected for output
                      (IECHO(366)) -- Default: 366*0
          ! IECHO  = 366*0  !
          (366 values must be entered)

Plot output options
-------------------

     Plot files can be created for the Top-N, Exceedance, and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file can also be created for the daily
     peak visibility summary output, in DATA format only.

     Generate Plot file output in addition to writing tables
     to List file?
                            (LPLT) -- Default: F   ! LPLT  = F !

     Use GRID format rather than DATA format,
     when available?
                            (LGRD) -- Default: F   ! LGRD  = F !


Additional Debug Output
-----------------------

   Output selected information to List file
    for debugging?
                            (LDEBUG) -- Default: F  ! LDEBUG  = F !

!END!
```

CALPOST Output File – Visibility

```
*****************************************************************************************************************
                                           CALPOST  Version 5.4          Level 030402
*****************************************************************************************************************


 Run Title:
    Thousand Lakes Wilderness - Screen
    Visibility
    Surface Data - Medford, OR

-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

     Option to run all periods found
     in the met. file(s)  (METRUN)        Default: 0    ! METRUM =    1  !

         METRUM = 0 - Run period explicitly defined below
         METRUM = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default    ! ISYR  =  1987   !
     (used only if     Month (ISMO) --    No default    ! ISMO  =  0   !
      METRUM = 0)      Day   (ISDY) --    No default    ! ISDY  =  0   !
                       Hour  (ISHR) --    No default    ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default    ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1    ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

      Species to process (ASPEC)       -- No default    ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)   -- Default: 1    ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:     -- Defaults:     ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
        (NOT applied if A = B = 0.0)         B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                               (LBACK)  -- Default: F   ! LBACK =  F !

Receptor information
--------------------

  Gridded receptors processed?     (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?    (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)      (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):

  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                 OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
                                            ! NDRECP =  -1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).
```

```
 Number of gridded receptor rows provided in Subgroup (1a) to
 identify specific gridded receptors to process
                              (NGONOFF) -- Default: 0      ! NGONOFF =  0  !

!END!


--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1

-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                              (RHMAX) -- Default: 98    ! RHMAX  = 98.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?            (LVSO4) -- Default: T    ! LVSO4  = T  !
     Include NITRATE?            (LVNO3) -- Default: T    ! LVNO3  = T  !
     Include ORGANIC CARBON?     (LVOC)  -- Default: T    ! LVOC   = F  !
     Include COARSE PARTICLES?   (LVPMC) -- Default: T    ! LVPMC  = F  !
     Include FINE PARTICLES?     (LVPMF) -- Default: T    ! LVPMF  = T  !
     Include ELEMENTAL CARBON?   (LVEC)  -- Default: T    ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?         (LVBK)  -- Default: T    ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                 COARSE      (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                 FINE        (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
                PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
                PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
                PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                              (MVISBK) -- Default: 2    ! MVISBK =  6  !

         1 =  Supply single light extinction and hygroscopic fraction
              - IWAQM (1993) RH adjustment applied to hygroscopic background
                and modeled sulfate and nitrate
         2 =  Compute extinction from speciated PM measurements (A)
              - Hourly RH adjustment applied to observed and modeled sulfate
                and nitrate
              - RH factor is capped at RHMAX
         3 =  Compute extinction from speciated PM measurements (B)
              - Hourly RH adjustment applied to observed and modeled sulfate
                and nitrate
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         4 =  Read hourly transmissometer background extinction measurements
              - Hourly RH adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         5 =  Read hourly nephelometer background extinction measurements
              - Rayleigh extinction value (BEXTRAY) added to measurement
              - Hourly RH adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         6 =  Compute extinction from speciated PM measurements
              - FLAG RH adjustment factor applied to observed and
                modeled sulfate and nitrate
```

```
    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                               (BEXTBK) -- No default    ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                               (RHFRAC) -- No default    ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 6:
    --------------------------------------
     Extinction coefficients for hygroscopic species (modeled and
     background) are computed using a monthly RH adjustment factor
     in place of an hourly RH factor (VISB.DAT file is NOT needed).
     Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

     (RHFAC)  -- No default     ! RHFAC = 3.7, 3.7, 3.7, 3.7,
                                          3.7, 3.7, 3.7, 3.7,
                                          3.7, 3.7, 3.7, 3.7 !

    Additional inputs used for MVISBK = 2,3,6:
    ------------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default     ! BKSO4 = 0.2, 0.2, 0.2, 0.2,
                                          0.2, 0.2, 0.2, 0.2,
                                          0.2, 0.2, 0.2, 0.2 !
     (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKSOIL) -- No default     ! BKSOIL= 4.5, 4.5, 4.5, 4.5,
                                          4.5, 4.5, 4.5, 4.5,
                                          4.5, 4.5, 4.5, 4.5 !
     (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !

    Additional inputs used for MVISBK = 2,3,5,6:
    --------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                              (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

    Documentation records contained in the header of the
    CALPUFF output file may be written to the list file.
    Print documentation image?
                                 (LDOC) -- Default: F    !  LDOC = F !

Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1    ! IPRTU =  1   !
                          for             for
                     Concentration     Deposition
        1 =              g/m**3          g/m**2/s
        2 =             mg/m**3         mg/m**2/s
        3 =             ug/m**3         ug/m**2/s
        4 =             ng/m**3         ng/m**2/s
        5 =          Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

    1-hr averages            (L1HR) -- Default: T   !   L1HR = F  !

    3-hr averages            (L3HR) -- Default: T   !   L3HR = F  !

    24-hr averages          (L24HR) -- Default: T   !  L24HR = T  !

    Run-length averages     (LRUNL) -- Default: T   !  LRUNL = T  !

    User-specified averaging time in hours - results for
    an averaging time of NAVG hours are reported for
    NAVG greater than 0:
                             (NAVG) -- Default: 0   !   NAVG =  0  !


Types of tabulations reported
------------------------------

   1) Visibility: daily visibility tabulations are always reported
                  for the selected receptors when ASPEC = VISIB.
                  In addition, any of the other tabulations listed
                  below may be chosen to characterize the light
                  extinction coefficients.
```

```
                    [List file or Plot/Analysis File]

   2) Top 50 table for each averaging time selected
      [List file only]
                              (LT50) -- Default: T   !   LT50 = F  !

   3) Top 'N' table for each averaging time selected
      [List file or Plot file]
                             (LTOPN) -- Default: F   !  LTOPN = T  !

        -- Number of 'Top-N' values at each receptor
           selected (NTOP must be <= 4)
                              (NTOP) -- Default: 4   ! NTOP =  2   !

        -- Specific ranks of 'Top-N' values reported
           (NTOP values must be entered)
                      (ITOP(4) array) -- Default:      ! ITOP =  1 , 2   !
                                         1,2,3,4

   4) Threshold exceedance counts for each receptor and each averaging
      time selected
      [List file or Plot file]
                             (LEXCD) -- Default: F   !  LEXCD = F  !

        -- Identify the threshold for each averaging time by assigning a
           non-negative value (output units).

                                       -- Default: -1.0
           Threshold for  1-hr averages    (THRESH1) !  THRESH1 = -1.0  !
           Threshold for  3-hr averages    (THRESH3) !  THRESH3 = -1.0  !
           Threshold for 24-hr averages   (THRESH24) ! THRESH24 = -1.0  !
           Threshold for NAVG-hr averages (THRESHN)  !  THRESHN = -1.0  !


        -- Counts for the shortest averaging period selected can be
           tallied daily, and receptors that experience more than NCOUNT
           counts over any NDAY period will be reported.  This type of
           exceedance violation output is triggered only if NDAY > 0.

           Accumulation period(Days)
                              (NDAY) -- Default: 0   !    NDAY =  0  !
           Number of exceedances allowed
                            (NCOUNT) -- Default: 1   !  NCOUNT =  1  !


   5) Selected day table(s)

      Echo Option -- Many records are written each averaging period
      selected and output is grouped by day
      [List file or Plot file]
                             (LECHO) -- Default: F   !  LECHO = F  !

      Timeseries Option -- Averages at all selected receptors for
      each selected averaging period are written to timeseries files.
      Each file contains one averaging period, and all receptors are
      written to a single record each averaging time.
      [TSttUUUU.DAT files]
                             (LTIME) -- Default: F   !  LTIME = F  !

        -- Days selected for output
                         (IECHO(366)) -- Default: 366*0
           ! IECHO  = 366*0  !
           (366 values must be entered)

Plot output options
-------------------

     Plot files can be created for the Top-N, Exceedance, and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file can also be created for the daily
     peak visibility summary output, in DATA format only.

     Generate Plot file output in addition to writing tables
     to List file?
                                    (LPLT) -- Default: F   ! LPLT  = F !

     Use GRID format rather than DATA format,
     when available?
                                    (LGRD) -- Default: F   ! LGRD  = F !


Additional Debug Output
-----------------------

   Output selected information to List file
    for debugging?
                                  (LDEBUG) -- Default: F  ! LDEBUG  = F !

!END!

-----------------------------------------------------
NOTICE: Starting year in control file sets the
        expected century for the simulation.  All
        YY years are converted to YYYY years in
```

```
        the range:  1937 2036
 ----------------------------------------------------


*****************************************************************************************************************
                                                     CALPOST  Version 5.4          Level 030402
*****************************************************************************************************************



 CALPOST Control File Input Summary ------------------------

    Replace run data with data in Puff file 1=Y:      1
                        Run starting date -- year: 1987
                                            month:    0
                                              day:    0
                                       Julian day:    0
        Time at beginning of run  -   hour(0-23):    0
                                  -       second:    0
                               Run length (hours):    0


Every hour of data processed -- NREP = 1


 Species & Concentration/Deposition Information
                                          Species: VISIB
                         Layer of processed data:     1
    (>0=conc, -1=dry flux, -2=wet flux, -3=wet & dry flux)
                  Multiplicative scaling factor: 0.0000E+00
                        Additive scaling factor: 0.0000E+00
                 Hourly background values used?: F


 Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F

 Discrete Receptors Processed

  (All Discrete Receptors are Used)


 Visibility Processing Selected

 Extinction Computation includes:
                                  SULFATES
                                  NITRATES
                                  FINE PARTICLES
                                  BACKGROUND
              Max. RH % for particle growth (%):   98.000

 Species name for modeled particulates
                                          fine: PM10

 Extinction Efficiency (1/Mm per µg/m**3)
                              ammonium sulfate:    3.00
                              ammonium nitrate:    3.00
                                organic carbon:    4.00
                                          soil:    1.00
                              elemental carbon:   10.00
                             MODELED coarse PM:    0.60
                             MODELED   fine PM:    1.00
                             BACKGRND coarse PM:   0.60

 Background Extinction Calculation Method 6
         Rayleigh scattering extinction (1/Mm):    10.00
            Monthly background conc. (ug/m**3):
```

	(NH4)2SO4	(NH4)NO3	PM-C	OC	SOIL	EC
1	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
2	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
3	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
4	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
5	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
6	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
7	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
8	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
9	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
10	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
11	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00
12	.2000E+00	.0000E+00	.0000E+00	.0000E+00	.4500E+01	.0000E+00

Monthly RH factor for hygroscopic species:

1	.3700E+01
2	.3700E+01
3	.3700E+01
4	.3700E+01
5	.3700E+01
6	.3700E+01
7	.3700E+01
8	.3700E+01
9	.3700E+01
10	.3700E+01
11	.3700E+01
12	.3700E+01

```
 Output options
                     Units requested for output:   (1/Mega-m)
```

```
Averaging time(s) selected
    User-specified averaging time (NAVG hours):      0
                             1-hr averages:          F
                             3-hr averages:          F
                            24-hr averages:          T
                          NAVG-hr averages:          F
                      Length of run averages:        T

Output components selected
                                    Top-50:          F
              Top-N values at each receptor:         T
           Exceedance counts at each receptor:       F
     Output selected information for debugging:      F
              Echo tables for selected days:         F
              Time-series for selected days:         F

Top "n" table control
       Number of "top" values at each receptor:      2
       Specific ranks of "top" values reported:    1   2


Plot file option
                          Plot files created:        F


IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF     5.7         030402

Thousand Lakes Wilderness - Screen


Averaging time for values reported from model:
     1     HOUR

Number of averaging periods in file from model:
     999999

Chemical species names for each layer in model:
SO2           1
SO4           1
NOX           1
HNO3          1
NO3           1
PM10          1


**************      NOTICE      **************
NDRECP array reset to full range: all 1s

------------------------------------------------------------------------------------------------------------
         INPUT FILES

Default Name      Unit No.      File Name and Path
------------      --------      ------------------
 CALPOST.INP         5          G:\CALPUFF1\KNAUF\1_TLW\M_1987\1VIS87M.INP
   MODEL.DAT         4          G:\CALPUFF1\KNAUF\1_TLW\M_1987\CONC_87M.DAT

------------------------------------------------------------------------------------------------------------
         OUTPUT FILES

Default Name      Unit No.      File Name and Path
------------      --------      ------------------
 CALPOST.LST         8          G:\CALPUFF1\KNAUF\1_TLW\M_1987\1VIS87M.LST

**************************************************************************************************************
                                           CALPOST  Version 5.4          Level 030402
**************************************************************************************************************


                                                   VISIB   B _SN_F

2 RANKED     24    HOUR AVERAGE    EXTINCTION    VALUES AT EACH DISCRETE RECEPTOR   (YEAR,DAY,ENDING TIME)   (1/Mega-m)
```

RECEPTOR	COORDINATES (km)		1 RANK		2 RANK	
1	553.734	4562.685	1.7104E+01	(1987,041,0000)	1.7088E+01	(1987,040,0000)
2	555.895	4562.572	1.7087E+01	(1987,041,0000)	1.7082E+01	(1987,040,0000)
3	558.051	4562.383	1.7073E+01	(1987,040,0000)	1.7067E+01	(1987,041,0000)
4	560.199	4562.120	1.7061E+01	(1987,040,0000)	1.7043E+01	(1987,041,0000)
5	562.336	4561.781	1.7060E+01	(1987,327,0000)	1.7045E+01	(1987,040,0000)
6	564.461	4561.368	1.7079E+01	(1987,327,0000)	1.7027E+01	(1987,040,0000)
7	566.569	4560.881	1.7089E+01	(1987,327,0000)	1.7007E+01	(1987,040,0000)
8	568.660	4560.321	1.7088E+01	(1987,327,0000)	1.7019E+01	(1987,018,0000)
9	570.729	4559.688	1.7076E+01	(1987,327,0000)	1.7033E+01	(1987,018,0000)
10	572.775	4558.984	1.7054E+01	(1987,327,0000)	1.7046E+01	(1987,018,0000)
11	574.796	4558.208	1.7058E+01	(1987,018,0000)	1.7042E+01	(1987,349,0000)
12	576.788	4557.363	1.7069E+01	(1987,018,0000)	1.7052E+01	(1987,349,0000)
13	578.749	4556.448	1.7077E+01	(1987,018,0000)	1.7059E+01	(1987,349,0000)
14	580.677	4555.466	1.7086E+01	(1987,018,0000)	1.7063E+01	(1987,349,0000)
15	582.570	4554.417	1.7097E+01	(1987,018,0000)	1.7066E+01	(1987,349,0000)
16	584.425	4553.302	1.7111E+01	(1987,018,0000)	1.7066E+01	(1987,349,0000)
17	586.240	4552.124	1.7123E+01	(1987,018,0000)	1.7064E+01	(1987,349,0000)
18	588.013	4550.882	1.7126E+01	(1987,018,0000)	1.7059E+01	(1987,349,0000)
19	589.741	4549.580	1.7118E+01	(1987,018,0000)	1.7052E+01	(1987,349,0000)
20	591.423	4548.218	1.7099E+01	(1987,018,0000)	1.7[illegible]4E+01	(1987,349,0000)
21	593.056	4546.798	1.7079E+01	(1987,018,0000)	1.7035E+01	(1987,349,0000)
22	594.639	4545.322	1.7059E+01	(1987,018,0000)	1.7029E+01	(1987,009,0000)
23	596.169	4543.792	1.7041E+01	(1987,018,0000)	1.7037E+01	(1987,009,0000)

24	597.645	4542.209	1.7042E+01	(1987,009,0000)	1.7024E+01	(1987,018,0000)
25	599.065	4540.576	1.7041E+01	(1987,009,0000)	1.7007E+01	(1987,018,0000)
26	600.427	4538.894	1.7033E+01	(1987,009,0000)	1.6991E+01	(1987,330,0000)
27	601.729	4537.166	1.7020E+01	(1987,009,0000)	1.6982E+01	(1987,330,0000)
28	602.970	4535.393	1.7001E+01	(1987,009,0000)	1.6973E+01	(1987,330,0000)
29	604.149	4533.578	1.6980E+01	(1987,009,0000)	1.6967E+01	(1987,330,0000)
30	605.264	4531.723	1.6962E+01	(1987,330,0000)	1.6959E+01	(1987,009,0000)
31	606.313	4529.830	1.6956E+01	(1987,330,0000)	1.6938E+01	(1987,009,0000)
32	607.295	4527.902	1.6951E+01	(1987,330,0000)	1.6919E+01	(1987,009,0000)
33	608.210	4525.940	1.6945E+01	(1987,330,0000)	1.6920E+01	(1987,346,0000)
34	609.055	4523.949	1.6940E+01	(1987,330,0000)	1.6927E+01	(1987,346,0000)
35	609.831	4521.928	1.6935E+01	(1987,330,0000)	1.6934E+01	(1987,346,0000)
36	610.536	4519.882	1.6941E+01	(1987,346,0000)	1.6930E+01	(1987,330,0000)
37	611.168	4517.813	1.6949E+01	(1987,346,0000)	1.6926E+01	(1987,330,0000)
38	611.728	4515.722	1.6957E+01	(1987,346,0000)	1.6923E+01	(1987,330,0000)
39	612.215	4513.613	1.6965E+01	(1987,346,0000)	1.6922E+01	(1987,330,0000)
40	612.628	4511.489	1.6973E+01	(1987,346,0000)	1.6921E+01	(1987,330,0000)
41	612.967	4509.352	1.6981E+01	(1987,346,0000)	1.6921E+01	(1987,330,0000)
42	613.230	4507.204	1.6989E+01	(1987,346,0000)	1.6921E+01	(1987,330,0000)
43	613.419	4505.048	1.6996E+01	(1987,346,0000)	1.6922E+01	(1987,330,0000)
44	613.532	4502.887	1.7003E+01	(1987,346,0000)	1.6923E+01	(1987,330,0000)
45	613.570	4500.723	1.7009E+01	(1987,346,0000)	1.6923E+01	(1987,330,0000)
46	613.532	4498.559	1.7015E+01	(1987,346,0000)	1.6923E+01	(1987,330,0000)
47	613.419	4496.398	1.7020E+01	(1987,346,0000)	1.6923E+01	(1987,330,0000)
48	613.230	4494.242	1.7024E+01	(1987,346,0000)	1.6923E+01	(1987,330,0000)
49	612.967	4492.094	1.7028E+01	(1987,346,0000)	1.6922E+01	(1987,330,0000)
50	612.628	4489.957	1.7031E+01	(1987,346,0000)	1.6930E+01	(1987,324,0000)
51	612.215	4487.833	1.7034E+01	(1987,346,0000)	1.6942E+01	(1987,324,0000)
52	611.728	4485.724	1.7035E+01	(1987,346,0000)	1.6955E+01	(1987,324,0000)
53	611.168	4483.633	1.7036E+01	(1987,346,0000)	1.6967E+01	(1987,324,0000)
54	610.536	4481.564	1.7036E+01	(1987,346,0000)	1.6979E+01	(1987,324,0000)
55	609.831	4479.518	1.7035E+01	(1987,346,0000)	1.6988E+01	(1987,324,0000)
56	609.055	4477.498	1.7034E+01	(1987,346,0000)	1.6992E+01	(1987,324,0000)
57	608.210	4475.505	1.7032E+01	(1987,346,0000)	1.6992E+01	(1987,324,0000)
58	607.295	4473.544	1.7030E+01	(1987,346,0000)	1.6990E+01	(1987,324,0000)
59	606.313	4471.616	1.7028E+01	(1987,346,0000)	1.7004E+01	(1987,347,0000)
60	605.264	4469.723	1.7030E+01	(1987,347,0000)	1.7025E+01	(1987,346,0000)
61	604.149	4467.868	1.7058E+01	(1987,347,0000)	1.7021E+01	(1987,346,0000)
62	602.970	4466.053	1.7089E+01	(1987,347,0000)	1.7016E+01	(1987,346,0000)
63	601.729	4464.280	1.7121E+01	(1987,347,0000)	1.7012E+01	(1987,346,0000)
64	600.427	4462.552	1.7150E+01	(1987,347,0000)	1.7016E+01	(1987,352,0000)
65	599.065	4460.870	1.7172E+01	(1987,347,0000)	1.7036E+01	(1987,352,0000)
66	597.645	4459.237	1.7183E+01	(1987,347,0000)	1.7055E+01	(1987,352,0000)
67	596.169	4457.654	1.7183E+01	(1987,347,0000)	1.7072E+01	(1987,352,0000)
68	594.639	4456.124	1.7169E+01	(1987,347,0000)	1.7087E+01	(1987,352,0000)
69	593.056	4454.648	1.7146E+01	(1987,347,0000)	1.7101E+01	(1987,352,0000)
70	591.423	4453.228	1.7113E+01	(1987,347,0000)	1.7112E+01	(1987,352,0000)
71	589.741	4451.866	1.7122E+01	(1987,352,0000)	1.7075E+01	(1987,347,0000)
72	588.013	4450.564	1.7129E+01	(1987,352,0000)	1.7035E+01	(1987,347,0000)
73	586.240	4449.323	1.7135E+01	(1987,352,0000)	1.6996E+01	(1987,347,0000)
74	584.425	4448.144	1.7140E+01	(1987,352,0000)	1.6998E+01	(1987,006,0000)
75	582.570	4447.029	1.7142E+01	(1987,352,0000)	1.7000E+01	(1987,006,0000)
76	580.677	4445.980	1.7143E+01	(1987,352,0000)	1.7001E+01	(1987,006,0000)
77	578.749	4444.998	1.7142E+01	(1987,352,0000)	1.7001E+01	(1987,006,0000)
78	576.788	4444.083	1.7140E+01	(1987,352,0000)	1.6998E+01	(1987,006,0000)
79	574.796	4443.238	1.7136E+01	(1987,352,0000)	1.6993E+01	(1987,006,0000)
80	572.775	4442.462	1.7130E+01	(1987,352,0000)	1.6987E+01	(1987,006,0000)
81	570.729	4441.757	1.7124E+01	(1987,352,0000)	1.6979E+01	(1987,006,0000)
82	568.659	4441.125	1.7116E+01	(1987,352,0000)	1.6977E+01	(1987,044,0000)
83	566.569	4440.564	1.7308E+01	(1987,352,0000)	1.6987E+01	(1987,044,0000)
84	564.461	4440.078	1.7100E+01	(1987,352,0000)	1.6999E+01	(1987,044,0000)
85	562.336	4439.665	1.7091E+01	(1987,352,0000)	1.7009E+01	(1987,044,0000)
86	560.199	4439.326	1.7081E+01	(1987,352,0000)	1.7015E+01	(1987,044,0000)
87	558.051	4439.063	1.7070E+01	(1987,352,0000)	1.7018E+01	(1987,044,0000)
88	555.895	4438.874	1.7058E+01	(1987,352,0000)	1.7016E+01	(1987,044,0000)
89	553.734	4438.761	1.7045E+01	(1987,352,0000)	1.7014E+01	(1987,044,0000)
90	551.570	4438.723	1.7031E+01	(1987,352,0000)	1.7027E+01	(1987,362,0000)
91	549.406	4438.761	1.7043E+01	(1987,362,0000)	1.7022E+01	(1987,032,0000)
92	547.245	4438.874	1.7059E+01	(1987,362,0000)	1.7028E+01	(1987,032,0000)
93	545.089	4439.063	1.7075E+01	(1987,362,0000)	1.7030E+01	(1987,032,0000)
94	542.941	4439.326	1.7090E+01	(1987,362,0000)	1.7028E+01	(1987,032,0000)
95	540.804	4439.665	1.7103E+01	(1987,362,0000)	1.7021E+01	(1987,032,0000)
96	538.679	4440.078	1.7113E+01	(1987,362,0000)	1.7009E+01	(1987,032,0000)
97	536.571	4440.564	1.7119E+01	(1987,362,0000)	1.6993E+01	(1987,032,0000)
98	534.480	4441.125	1.7123E+01	(1987,362,0000)	1.6979E+01	(1987,044,0000)
99	532.411	4441.757	1.7123E+01	(1987,362,0000)	1.6967E+01	(1987,044,0000)
100	530.365	4442.462	1.7120E+01	(1987,362,0000)	1.8955E+01	(1987,044,0000)
101	528.344	4443.238	1.7113E+01	(1987,362,0000)	1.6942E+01	(1987,044,0000)
102	526.352	4444.083	1.7103E+01	(1987,362,0000)	1.6940E+01	(1987,359,0000)
103	524.391	4444.998	1.7090E+01	(1987,362,0000)	1.6935E+01	(1987,359,0000)
104	522.463	4445.980	1.7076E+01	(1987,362,0000)	1.6933E+01	(1987,357,0000)
105	520.570	4447.029	1.7059E+01	(1987,362,0000)	1.6932E+01	(1987,357,0000)
106	518.715	4448.144	1.7043E+01	(1987,362,0000)	1.6931E+01	(1987,357,0000)
107	516.900	4449.323	1.7028E+01	(1987,362,0000)	1.6929E+01	(1987,357,0000)
108	515.127	4450.564	1.7012E+01	(1987,362,0000)	1.6926E+01	(1987,357,0000)
109	513.399	4451.866	1.6996E+01	(1987,362,0000)	1.6924E+01	(1987,003,0000)
110	511.717	4453.228	1.6982E+01	(1987,362,0000)	1.6923E+01	(1987,003,0000)
111	510.084	4454.648	1.6968E+01	(1987,362,0000)	1.6919E+01	(1987,003,0000)
112	508.501	4456.124	1.6955E+01	(1987,362,0000)	1.6912E+01	(1987,003,0000)
113	506.971	4457.654	1.6943E+01	(1987,362,0000)	1.6905E+01	(1987,357,0000)
114	505.495	4459.237	1.6931E+01	(1987,362,0000)	1.6900E+01	(1987,357,0000)
115	504.075	4460.870	1.6921E+01	(1987,362,0000)	1.6894E+01	(1987,357,0000)
116	502.713	4462.552	1.6911E+01	(1987,362,0000)	1.6887E+01	(1987,357,0000)
117	501.411	4464.280	1.6902E+01	(1987,362,0000)	1.6882E+01	(1987,027,0000)
118	500.170	4466.053	1.6894E+01	(1987,362,0000)	1.6879E+01	(1987,027,0000)
119	498.991	4467.868	1.6886E+01	(1987,362,0000)	1.6876E+01	(1987,027,0000)
120	497.876	4469.723	1.6879E+01	(1987,362,0000)	1.6873E+01	(1987,027,0000)
121	496.827	4471.616	1.6891E+01	(1987,011,0000)	1.6872E+01	(1987,362,0000)
122	495.845	4473.544	1.6913E+01	(1987,011,0000)	1.6867E+01	(1987,362,0000)
123	494.930	4475.505	1.6936E+01	(1987,011,0000)	1.6867E+01	(1987,334,0000)
124	494.085	4477.498	1.6958E+01	(1987,011,0000)	1.68[illegible]E+01	(1987,364,0000)
125	493.309	4479.518	1.6980E+01	(1987,011,0000)	1.6906E+01	(1987,364,0000)
126	492.604	4481.564	1.7000E+01	(1987,011,0000)	1.6915E+01	(1987,364,0000)
127	491.972	4483.633	1.7015E+01	(1987,011,0000)	1.6905E+01	(1987,364,0000)

128	491.412	4485.724	1.7026E+01	(1987,011,0000)	1.6897E+01	(1987,302,0000)
129	490.925	4487.833	1.7034E+01	(1987,011,0000)	1.6915E+01	(1987,302,0000)
130	490.512	4489.957	1.7041E+01	(1987,011,0000)	1.6931E+01	(1987,302,0000)
131	490.173	4492.094	1.7046E+01	(1987,011,0000)	1.6947E+01	(1987,302,0000)
132	489.910	4494.242	1.7048E+01	(1987,011,0000)	1.6960E+01	(1987,302,0000)
133	489.721	4496.398	1.7049E+01	(1987,011,0000)	1.6968E+01	(1987,302,0000)
134	489.608	4498.559	1.7052E+01	(1987,011,0000)	1.6971E+01	(1987,302,0000)
135	489.570	4500.723	1.7056E+01	(1987,011,0000)	1.6974E+01	(1987,023,0000)
136	489.608	4502.887	1.7058E+01	(1987,011,0000)	1.6992E+01	(1987,023,0000)
137	489.721	4505.048	1.7057E+01	(1987,011,0000)	1.7011E+01	(1987,023,0000)
138	489.910	4507.204	1.7056E+01	(1987,011,0000)	1.7030E+01	(1987,023,0000)
139	490.173	4509.352	1.7054E+01	(1987,011,0000)	1.7050E+01	(1987,023,0000)
140	490.512	4511.489	1.7071E+01	(1987,023,0000)	1.7049E+01	(1987,011,0000)
141	490.925	4513.614	1.7091E+01	(1987,023,0000)	1.7041E+01	(1987,011,0000)
142	491.412	4515.722	1.7110E+01	(1987,023,0000)	1.7029E+01	(1987,011,0000)
143	491.972	4517.813	1.7129E+01	(1987,023,0000)	1.7020E+01	(1987,003,0000)
144	492.604	4519.882	1.7148E+01	(1987,023,0000)	1.7033E+01	(1987,003,0000)
145	493.309	4521.928	1.7165E+01	(1987,023,0000)	1.7045E+01	(1987,003,0000)
146	494.085	4523.949	1.7180E+01	(1987,023,0000)	1.7054E+01	(1987,003,0000)
147	494.930	4525.941	1.7194E+01	(1987,023,0000)	1.7061E+01	(1987,003,0000)
148	495.845	4527.902	1.7206E+01	(1987,023,0000)	1.7065E+01	(1987,003,0000)
149	496.827	4529.830	1.7215E+01	(1987,023,0000)	1.7067E+01	(1987,003,0000)
150	497.876	4531.723	1.7222E+01	(1987,023,0000)	1.7068E+01	(1987,003,0000)
151	498.991	4533.578	1.7227E+01	(1987,023,0000)	1.7068E+01	(1987,003,0000)
152	500.170	4535.393	1.7229E+01	(1987,023,0000)	1.7068E+01	(1987,003,0000)
153	501.411	4537.166	1.7229E+01	(1987,023,0000)	1.7066E+01	(1987,003,0000)
154	502.713	4538.894	1.7227E+01	(1987,023,0000)	1.7079E+01	(1987,287,0000)
155	504.075	4540.576	1.7223E+01	(1987,023,0000)	1.7087E+01	(1987,287,0000)
156	505.495	4542.209	1.7216E+01	(1987,023,0000)	1.7085E+01	(1987,020,0000)
157	506.971	4543.792	1.7205E+01	(1987,023,0000)	1.7098E+01	(1987,007,0000)
158	508.501	4545.322	1.7189E+01	(1987,023,0000)	1.7112E+01	(1987,007,0000)
159	510.084	4546.798	1.7166E+01	(1987,023,0000)	1.7120E+01	(1987,007,0000)
160	511.717	4548.218	1.7138E+01	(1987,023,0000)	1.7129E+01	(1987,332,0000)
161	513.399	4549.580	1.7136E+01	(1987,332,0000)	1.7113E+01	(1987,007,0000)
162	515.127	4550.882	1.7139E+01	(1987,332,0000)	1.7111E+01	(1987,037,0000)
163	516.900	4552.124	1.7139E+01	(1987,332,0000)	1.7113E+01	(1987,037,0000)
164	518.715	4553.302	1.7132E+01	(1987,332,0000)	1.7112E+01	(1987,037,0000)
165	520.570	4554.417	1.7117E+01	(1987,332,0000)	1.7110E+01	(1987,037,0000)
166	522.463	4555.466	1.7106E+01	(1987,037,0000)	1.7094E+01	(1987,332,0000)
167	524.391	4556.448	1.7110E+01	(1987,315,0000)	1.7101E+01	(1987,037,0000)
168	526.352	4557.363	1.7129E+01	(1987,315,0000)	1.7123E+01	(1987,022,0000)
169	528.344	4558.208	1.7145E+01	(1987,022,0000)	1.7140E+01	(1987,315,0000)
170	530.365	4558.984	1.7160E+01	(1987,022,0000)	1.7145E+01	(1987,315,0000)
171	532.411	4559.688	1.7168E+01	(1987,022,0000)	1.7146E+01	(1987,315,0000)
172	534.480	4560.321	1.7159E+01	(1987,022,0000)	1.7144E+01	(1987,315,0000)
173	536.571	4560.881	1.7143E+01	(1987,022,0000)	1.7139E+01	(1987,315,0000)
174	538.680	4561.368	1.7127E+01	(1987,315,0000)	1.7121E+01	(1987,022,0000)
175	540.804	4561.781	1.7111E+01	(1987,315,0000)	1.7096E+01	(1987,022,0000)
176	542.941	4562.120	1.7102E+01	(1987,041,0000)	1.7091E+01	(1987,315,0000)
177	545.089	4562.383	1.7115E+01	(1987,041,0000)	1.7085E+01	(1987,040,0000)
178	547.245	4562.572	1.7121E+01	(1987,041,0000)	1.7089E+01	(1987,040,0000)
179	549.406	4562.685	1.7121E+01	(1987,041,0000)	1.7091E+01	(1987,040,0000)
180	551.570	4562.723	1.7115E+01	(1987,041,0000)	1.7091E+01	(1987,040,0000)

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CALPOST Version 5.4 Level 030402

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8735 HOUR AVERAGE EXTINCTION AT EACH RECEPTOR FOR THE PERIOD ENDING YEAR: 1987 DAY: 364 HOUR(0-23): 23 SEC: 0

DISCRETE RECEPTORS: VISIB B _SN_F

RECEPTOR	COORDINATES (km)		EXTINCTION	RECEPTOR	COORDINATES (km)		EXTINCTION
1	553.734	4562.685	1.6767E+01	91	549.406	4438.761	1.6757E+01
2	555.895	4562.572	1.6766E+01	92	547.245	4438.874	1.6757E+01
3	558.051	4562.383	1.6764E+01	93	545.089	4439.063	1.6756E+01
4	560.199	4562.120	1.6762E+01	94	542.941	4439.326	1.6755E+01
5	562.336	4561.781	1.6761E+01	95	540.804	4439.665	1.6754E+01
6	564.461	4561.368	1.6759E+01	96	538.679	4440.078	1.6753E+01
7	566.569	4560.881	1.6758E+01	97	536.571	4440.564	1.6752E+01
8	568.660	4560.321	1.6757E+01	98	534.480	4441.125	1.6751E+01
9	570.729	4559.688	1.6756E+01	99	532.411	4441.757	1.6750E+01
10	572.775	4558.984	1.6755E+01	100	530.365	4442.462	1.6749E+01
11	574.796	4558.208	1.6754E+01	101	528.344	4443.238	1.6748E+01
12	576.788	4557.363	1.6754E+01	102	526.352	4444.083	1.6747E+01
13	578.749	4556.448	1.6753E+01	103	524.391	4444.998	1.6746E+01
14	580.677	4555.466	1.6752E+01	104	522.463	4445.980	1.6745E+01
15	582.570	4554.417	1.6751E+01	105	520.570	4447.029	1.6743E+01
16	584.425	4553.302	1.6751E+01	106	518.715	4448.144	1.6742E+01
17	586.240	4552.124	1.6750E+01	107	516.900	4449.323	1.6741E+01
18	588.013	4550.882	1.6749E+01	108	515.127	4450.564	1.6740E+01
19	589.741	4549.580	1.6749E+01	109	513.399	4451.866	1.6740E+01
20	591.423	4548.218	1.6748E+01	110	511.717	4453.228	1.6739E+01
21	593.056	4546.798	1.6747E+01	111	510.084	4454.648	1.6738E+01
22	594.639	4545.322	1.6747E+01	112	508.501	4456.124	1.6738E+01
23	596.169	4543.792	1.6746E+01	113	506.971	4457.654	1.6737E+01
24	597.645	4542.209	1.6745E+01	114	505.495	4459.237	1.6737E+01
25	599.065	4540.576	1.6745E+01	115	504.075	4460.870	1.6736E+01
26	600.427	4538.894	1.6744E+01	116	502.713	4462.552	1.6736E+01
27	601.729	4537.166	1.6744E+01	117	501.411	4464.280	1.6736E+01
28	602.970	4535.393	1.6743E+01	118	500.170	4466.053	1.6736E+01
29	604.149	4533.578	1.6743E+01	119	498.991	4467.868	1.6736E+01
30	605.264	4531.723	1.6742E+01	120	497.876	4469.723	1.6736E+01
31	606.313	4529.830	1.6742E+01	121	496.827	4471.616	1.6736E+01
32	607.295	4527.902	1.6742E+01	122	495.845	4473.544	1.6736E+01
33	608.210	4525.940	1.6742E+01	123	494.930	4475.505	1.6736E+01
34	609.055	4523.949	1.6741E+01	124	494.085	4477.498	1.6736E+01
35	609.831	4521.928	1.6741E+01	125	493.309	4479.518	1.6736E+01

36	610.536	4519.882	1.6741E+01	126	492.604	4481.564	1.6736E+01
37	611.168	4517.813	1.6741E+01	127	491.972	4483.633	1.6737E+01
38	611.728	4515.722	1.6741E+01	128	491.412	4485.724	1.6737E+01
39	612.215	4513.613	1.6741E+01	129	490.925	4487.833	1.6737E+01
40	612.628	4511.489	1.6741E+01	130	490.512	4489.957	1.6737E+01
41	612.967	4509.352	1.6742E+01	131	490.173	4492.094	1.6738E+01
42	613.230	4507.204	1.6742E+01	132	489.910	4494.242	1.6738E+01
43	613.419	4505.048	1.6742E+01	133	489.721	4496.398	1.6739E+01
44	613.532	4502.887	1.6742E+01	134	489.608	4498.559	1.6740E+01
45	613.570	4500.723	1.6743E+01	135	489.570	4500.723	1.6740E+01
46	613.532	4498.559	1.6743E+01	136	489.608	4502.887	1.6741E+01
47	613.419	4496.398	1.6744E+01	137	489.721	4505.048	1.6742E+01
48	613.230	4494.242	1.6744E+01	138	489.910	4507.204	1.6743E+01
49	612.967	4492.094	1.6745E+01	139	490.173	4509.352	1.6743E+01
50	612.628	4489.957	1.6745E+01	140	490.512	4511.489	1.6744E+01
51	612.215	4487.833	1.6746E+01	141	490.925	4513.614	1.6745E+01
52	611.728	4485.724	1.6747E+01	142	491.412	4515.722	1.6747E+01
53	611.168	4483.633	1.6748E+01	143	491.972	4517.813	1.6748E+01
54	610.536	4481.564	1.6749E+01	144	492.604	4519.882	1.6749E+01
55	609.831	4479.518	1.6750E+01	145	493.309	4521.928	1.6751E+01
56	609.055	4477.498	1.6751E+01	146	494.085	4523.949	1.6752E+01
57	608.210	4475.505	1.6752E+01	147	494.930	4525.941	1.6754E+01
58	607.295	4473.544	1.6753E+01	148	495.845	4527.902	1.6755E+01
59	606.313	4471.616	1.6754E+01	149	496.827	4529.830	1.6757E+01
60	605.264	4469.723	1.6756E+01	150	497.876	4531.723	1.6759E+01
61	604.149	4467.868	1.6757E+01	151	498.991	4533.578	1.6761E+01
62	602.970	4466.053	1.6758E+01	152	500.170	4535.393	1.6764E+01
63	601.729	4464.280	1.6758E+01	153	501.411	4537.166	1.6766E+01
64	600.427	4462.552	1.6759E+01	154	502.713	4538.894	1.6769E+01
65	599.065	4460.870	1.6759E+01	155	504.075	4540.576	1.6771E+01
66	597.645	4459.237	1.6760E+01	156	505.495	4542.209	1.6773E+01
67	596.169	4457.654	1.6760E+01	157	506.971	4543.792	1.6775E+01
68	594.639	4456.124	1.6760E+01	158	508.501	4545.322	1.6776E+01
69	593.056	4454.648	1.6760E+01	159	510.084	4546.798	1.6777E+01
70	591.423	4453.228	1.6760E+01	160	511.717	4548.218	1.6778E+01
71	589.741	4451.866	1.6760E+01	161	513.399	4549.580	1.6779E+01
72	588.013	4450.564	1.6759E+01	162	515.127	4550.882	1.6780E+01
73	586.240	4449.323	1.6759E+01	163	516.900	4552.124	1.6781E+01
74	584.425	4448.144	1.6759E+01	164	518.715	4553.302	1.6782E+01
75	582.570	4447.029	1.6759E+01	165	520.570	4554.417	1.6782E+01
76	580.677	4445.980	1.6758E+01	166	522.463	4555.466	1.6783E+03
77	578.749	4444.998	1.6758E+01	167	524.391	4556.448	1.6783E+01
78	576.788	4444.083	1.6758E+01	168	526.352	4557.363	1.6782E+01
79	574.796	4443.238	1.6758E+01	169	528.344	4558.208	1.6782E+01
80	572.775	4442.462	1.6758E+01	170	530.365	4558.984	1.6781E+01
81	570.729	4441.757	1.6758E+01	171	532.411	4559.688	1.6780E+01
82	568.659	4441.125	1.6758E+01	172	534.480	4560.321	1.6778E+01
83	566.569	4440.564	1.6758E+01	173	536.571	4560.881	1.6777E+01
84	564.461	4440.078	1.6758E+01	174	538.680	4561.368	1.6776E+01
85	562.336	4439.665	1.6758E+01	175	540.804	4561.781	1.6775E+01
86	560.199	4439.326	1.6758E+01	176	542.941	4562.120	1.6773E+01
87	558.051	4439.063	1.6758E+01	177	545.089	4562.383	1.6772E+01
88	555.895	4438.874	1.6758E+01	178	547.245	4562.572	1.6771E+01
89	553.734	4438.761	1.6758E+01	179	549.406	4562.685	1.6770E+01
90	551.570	4438.723	1.6757E+01	180	551.570	4562.723	1.6769E+01

CALPOST Version 5.4 Level 030402

24HR VISIBILITY

VISIB B _SN_F

(1/Mega-m)

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	BEXT(Model)	BEXT(BKG)	BEXT(Total)	%CHANGE	F(RH)	Modeled Extinction by Species bxSO4	bxNO3	bxOC	bxEC	bxPMC	bxPMF
1987	2	0	38	611.728	4515.722	D	0.104	16.720	16.824	0.62	3.700	0.000	0.083	0.000	0.000	0.000	0.021
1987	3	0	151	498.991	4533.578	D	0.348	16.720	17.068	2.08	3.700	0.000	0.263	0.000	0.000	0.000	0.085
1987	4	0	1	553.734	4562.685	D	0.123	16.720	16.843	0.73	3.700	0.000	0.059	0.000	0.000	0.000	0.064
1987	5	0	76	580.677	4445.980	D	0.119	16.720	16.839	0.71	3.700	0.000	0.096	0.000	0.000	0.000	0.023
1987	6	0	76	580.677	4445.980	D	0.281	16.720	17.001	1.68	3.700	0.000	0.225	0.000	0.000	0.000	0.057
1987	7	0	160	511.717	4548.218	D	0.401	16.720	17.121	2.40	3.700	0.000	0.298	0.000	0.000	0.000	0.103
1987	8	0	164	518.715	4553.302	D	0.318	16.720	17.038	1.90	3.700	0.000	0.239	0.000	0.000	0.000	0.079
1987	9	0	24	597.645	4542.209	D	0.322	16.720	17.042	1.92	3.700	0.000	0.237	0.000	0.000	0.000	0.085
1987	10	0	174	538.680	4561.368	D	0.221	16.720	16.941	1.32	3.700	0.000	0.176	0.000	0.000	0.000	0.046
1987	11	0	136	489.608	4502.887	D	0.338	16.720	17.058	2.02	3.700	0.000	0.259	0.000	0.000	0.000	0.079
1987	12	0	161	513.399	4549.580	D	0.315	16.720	17.035	1.89	3.700	0.000	0.223	0.000	0.000	0.000	0.093
1987	13	0	155	504.075	4540.576	D	0.310	16.720	17.030	1.85	3.700	0.000	0.246	0.000	0.000	0.000	0.064
1987	14	0	3	558.051	4562.383	D	0.231	16.720	16.951	1.38	3.700	0.000	0.178	0.000	0.000	0.000	0.053
1987	15	0	14	580.677	4555.466	D	0.137	16.720	16.857	0.82	3.700	0.000	0.107	0.000	0.000	0.000	0.030
1987	16	0	164	518.715	4553.302	D	0.188	16.720	16.908	1.12	3.700	0.000	0.132	0.000	0.000	0.000	0.055
1987	17	0	162	515.127	4550.882	D	0.315	16.720	17.035	1.88	3.700	0.000	0.234	0.000	0.000	0.000	0.082
1987	18	0	18	588.013	4550.882	D	0.406	16.720	17.126	2.43	3.700	0.000	0.301	0.000	0.000	0.000	0.105
1987	19	0	168	526.352	4557.363	D	0.383	16.720	17.103	2.29	3.700	0.000	0.266	0.000	0.000	0.000	0.116
1987	20	0	159	510.084	4546.798	D	0.385	16.720	17.105	2.30	3.700	0.000	0.304	0.000	0.000	0.000	0.082
1987	21	0	168	526.352	4557.363	D	0.379	16.720	17.099	2.27	3.700	0.000	0.295	0.000	0.000	0.000	0.083
1987	22	0	171	532.411	4559.688	D	0.446	16.720	17.166	2.67	3.700	0.000	0.332	0.000	0.000	0.000	0.114
1987	23	0	153	501.411	4537.166	D	0.509	16.720	17.229	3.04	3.700	0.000	0.393	0.000	0.000	0.000	0.116
1997	24	0	162	515.127	4550.882	D	0.125	16.720	16.845	0.75	3.700	0.000	0.101	0.000	0.000	0.000	0.024
1987	25	0	90	551.570	4438.723	D	0.175	16.720	16.895	1.05	3.700	0.000	0.143	0.000	0.000	0.000	0.032
1987	26	0	80	572.775	4442.462	D	0.086	16.720	16.806	0.51	3.700	0.000	0.073	0.000	0.000	0.000	0.013
1987	27	0	108	515.127	4450.564	D	0.176	16.720	16.896	1.05	3.700	0.000	0.144	0.000	0.000	0.000	0.032
1987	28	0	157	506.971	4543.792	D	0.094	16.720	16.814	0.56	3.700	0.000	0.064	0.000	0.000	0.000	0.030
1987	29	0	3	558.051	4562.383	D	0.151	16.720	16.871	0.90	3.700	0.000	0.116	0.000	0.000	0.000	0.035
1987	30	0	102	526.352	4444.083	D	0.077	16.720	16.797	0.46	3.700	0.000	0.057	0.000	0.000	0.000	0.020
1987	31	0	167	524.391	4556.448	D	0.109	16.720	16.829	0.65	3.700	0.000	0.084	0.000	0.000	0.000	0.025
1987	32	0	93	545.089	4439.063	D	0.310	16.720	17.030	1.85	3.700	0.000	0.224	0.000	0.000	0.000	0.085
1987	33	0	165	520.570	4554.417	D	0.063	16.720	16.783	0.37	3.700	0.000	0.039	0.000	0.000	0.000	0.023

1987	34	0	172	534.480	4560.321	D	0.144	16.720	16.864	0.86	3.700	0.000	0.109	0.000	0.000	0.000	0.035
1987	35	0	163	516.900	4552.124	D	0.289	16.720	17.009	1.73	3.700	0.000	0.211	0.000	0.000	0.000	0.078
1987	36	0	165	520.570	4554.417	D	0.258	16.720	16.978	1.54	3.700	0.000	0.189	0.000	0.000	0.000	0.069
1987	37	0	163	516.900	4552.124	D	0.393	16.720	17.113	2.35	3.700	0.000	0.301	0.000	0.000	0.000	0.092
1987	38	0	168	526.352	4557.363	D	0.371	16.720	17.091	2.22	3.700	0.000	0.251	0.000	0.000	0.000	0.120
1987	39	0	172	534.480	4560.321	D	0.262	16.720	16.982	1.56	3.700	0.000	0.196	0.000	0.000	0.000	0.066
1987	40	0	180	551.570	4562.723	D	0.371	16.720	17.091	2.22	3.700	0.000	0.290	0.000	0.000	0.000	0.081
1987	41	0	178	547.245	4562.572	D	0.401	16.720	17.121	2.40	3.700	0.000	0.282	0.000	0.000	0.000	0.119
1987	42	0	171	532.411	4559.688	D	0.228	16.720	16.948	1.37	3.700	0.000	0.153	0.000	0.000	0.000	0.075
1987	43	0	93	545.089	4439.063	D	0.133	16.720	16.853	0.80	3.700	0.000	0.060	0.000	0.000	0.000	0.073
1987	44	0	87	558.051	4439.063	D	0.298	16.720	17.018	1.78	3.700	0.000	0.230	0.000	0.000	0.000	0.068
1987	45	0	162	515.127	4550.882	D	0.075	16.720	16.795	0.45	3.700	0.000	0.066	0.000	0.000	0.000	0.009
1987	46	0	180	551.570	4562.723	D	0.171	16.720	16.891	1.03	3.700	0.000	0.112	0.000	0.000	0.000	0.060
1987	47	0	23	596.169	4543.792	D	0.085	16.720	16.805	0.51	3.700	0.000	0.056	0.000	0.000	0.000	0.029
1987	48	0	87	558.051	4439.063	D	0.220	16.720	16.940	1.32	3.700	0.000	0.180	0.000	0.000	0.000	0.041
1987	49	0	87	558.051	4439.063	D	0.253	16.720	16.973	1.52	3.700	0.000	0.203	0.000	0.000	0.000	0.050
1987	50	0	90	551.570	4438.723	D	0.211	16.720	16.931	1.26	3.700	0.000	0.151	0.000	0.000	0.000	0.060
1987	51	0	152	500.170	4535.393	D	0.258	16.720	16.978	1.54	3.700	0.000	0.197	0.000	0.000	0.000	0.061
1987	52	0	164	518.715	4553.302	D	0.201	16.720	16.921	1.20	3.700	0.000	0.143	0.000	0.000	0.000	0.058
1987	53	0	51	612.215	4487.833	D	0.101	16.720	16.821	0.60	3.700	0.000	0.076	0.000	0.000	0.000	0.025
1987	54	0	158	508.501	4545.322	D	0.201	16.720	16.921	1.20	3.700	0.000	0.135	0.000	0.000	0.000	0.066
1987	55	0	79	574.796	4443.238	D	0.137	16.720	16.857	0.82	3.700	0.000	0.099	0.000	0.000	0.000	0.038
1987	56	0	160	511.717	4548.218	D	0.221	16.720	16.941	1.32	3.700	0.000	0.155	0.000	0.000	0.000	0.066
1987	57	0	118	500.170	4466.053	D	0.105	16.720	16.825	0.63	3.700	0.000	0.067	0.000	0.000	0.000	0.038
1987	58	0	145	493.309	4521.928	D	0.202	16.720	16.922	1.21	3.700	0.000	0.162	0.000	0.000	0.000	0.049
1987	59	0	162	515.127	4550.882	D	0.250	16.720	16.970	1.49	3.700	0.000	0.186	0.000	0.000	0.000	0.064
1987	60	0	173	536.571	4560.881	D	0.153	16.720	16.873	0.92	3.700	0.000	0.114	0.000	0.000	0.000	0.039
1987	61	0	167	524.391	4556.448	D	0.364	16.720	17.084	2.18	3.700	0.000	0.285	0.000	0.000	0.000	0.080
1987	62	0	85	562.336	4439.665	D	0.158	16.720	16.878	0.94	3.700	0.000	0.122	0.000	0.000	0.000	0.036
1987	63	0	162	515.127	4550.882	D	0.064	16.720	16.784	0.38	3.700	0.000	0.032	0.000	0.000	0.000	0.031
1987	64	0	159	510.084	4546.798	D	0.031	16.720	16.751	0.18	3.700	0.000	0.011	0.000	0.000	0.000	0.020
1987	65	0	77	578.749	4444.998	D	0.065	16.720	16.785	0.39	3.700	0.000	0.039	0.000	0.000	0.000	0.026
1987	66	0	25	599.065	4540.576	D	0.183	16.720	16.903	1.09	3.700	0.000	0.123	0.000	0.000	0.000	0.059
1987	67	0	168	526.352	4557.363	D	0.297	16.720	17.017	1.78	3.700	0.000	0.210	0.000	0.000	0.000	0.087
1987	68	0	3	558.051	4562.383	D	0.139	16.720	16.859	0.83	3.700	0.000	0.108	0.000	0.000	0.000	0.031
1987	69	0	66	597.645	4459.237	D	0.176	16.720	16.896	1.05	3.700	0.000	0.135	0.000	0.000	0.000	0.041
1987	70	0	34	609.055	4523.949	D	0.084	16.720	16.804	0.50	3.700	0.000	0.056	0.000	0.000	0.000	0.029
1987	71	0	99	532.411	4441.757	D	0.196	16.720	16.916	1.17	3.700	0.000	0.153	0.000	0.000	0.000	0.044
1987	72	0	97	536.571	4440.564	D	0.154	16.720	16.874	0.92	3.700	0.000	0.114	0.000	0.000	0.000	0.040
1987	73	0	73	586.240	4449.323	D	0.104	16.720	16.824	0.62	3.700	0.000	0.075	0.000	0.000	0.000	0.029
1987	74	0	69	593.056	4454.648	D	0.194	16.720	16.914	1.16	3.700	0.000	0.160	0.000	0.000	0.000	0.034
1987	75	0	63	601.729	4464.280	D	0.097	16.720	16.817	0.58	3.700	0.000	0.080	0.000	0.000	0.000	0.017
1987	76	0	65	599.065	4460.870	D	0.090	16.720	16.810	0.54	3.700	0.000	0.074	0.000	0.000	0.000	0.017
1987	77	0	33	608.210	4525.940	D	0.136	16.720	16.856	0.81	3.700	0.000	0.099	0.000	0.000	0.000	0.037
1987	78	0	3	558.051	4562.383	D	0.139	16.720	16.859	0.83	3.700	0.000	0.111	0.000	0.000	0.000	0.028
1987	79	0	93	545.089	4439.063	D	0.138	36.720	16.858	0.82	3.700	0.000	0.116	0.000	0.000	0.000	0.022
1987	80	0	60	605.264	4469.723	D	0.111	16.720	16.831	0.66	3.700	0.000	0.089	0.000	0.000	0.000	0.022
1987	81	0	157	506.971	4543.792	D	0.104	16.720	16.824	0.62	3.700	0.000	0.068	0.000	0.000	0.000	0.036
1987	82	0	18	588.013	4550.882	D	0.084	16.720	16.804	0.50	3.700	0.000	0.068	0.000	0.000	0.000	0.017
1987	83	0	63	601.729	4464.280	D	0.165	16.720	16.885	0.98	3.700	0.000	0.133	0.000	0.000	0.000	0.032
1987	84	0	171	532.411	4559.688	D	0.086	16.720	16.806	0.51	3.700	0.000	0.037	0.000	0.000	0.000	0.049
1987	85	0	172	534.480	4560.321	D	0.221	16.720	16.941	1.32	3.700	0.000	0.149	0.000	0.000	0.000	0.072
1987	86	0	95	540.804	4439.665	D	0.090	16.720	16.810	0.54	3.700	0.000	0.057	0.000	0.000	0.000	0.032
1987	87	0	101	528.344	4443.238	D	0.100	16.720	16.820	0.60	3.700	0.000	0.056	0.000	0.000	0.000	0.044
1987	88	0	86	560.199	4439.326	D	0.129	16.720	16.849	0.77	3.700	0.000	0.076	0.000	0.000	0.000	0.053
1987	89	0	97	536.571	4440.564	D	0.144	16.720	16.864	0.86	3.700	0.000	0.101	0.000	0.000	0.000	0.042
1987	90	0	169	528.344	4558.208	D	0.163	16.720	16.883	0.98	3.700	0.000	0.116	0.000	0.000	0.000	0.047
1987	91	0	154	502.713	4538.894	D	0.213	16.720	16.933	1.28	3.700	0.000	0.148	0.000	0.000	0.000	0.065
1987	92	0	169	528.344	4558.208	D	0.159	16.720	16.879	0.95	3.700	0.000	0.102	0.000	0.000	0.000	0.057
1987	93	0	178	547.245	4562.572	D	0.132	16.720	16.852	0.79	3.700	0.000	0.079	0.000	0.000	0.000	0.054
1987	94	0	78	576.788	4444.083	D	0.070	16.720	16.790	0.42	3.700	0.000	0.053	0.000	0.000	0.000	0.017
1987	95	0	16	584.425	4553.302	D	0.092	16.720	16.812	0.55	3.700	0.000	0.050	0.000	0.000	0.000	0.042
1987	96	0	18	588.013	4550.882	D	0.104	16.720	16.824	0.62	3.700	0.000	0.072	0.000	0.000	0.000	0.033
1987	97	0	74	584.425	4448.144	D	0.127	16.720	16.847	0.76	3.700	0.000	0.097	0.000	0.000	0.000	0.030
1987	98	0	35	609.831	4521.928	D	0.137	16.720	16.857	0.82	3.700	0.000	0.102	0.000	0.000	0.000	0.035
1987	99	0	69	593.056	4454.648	D	0.075	16.720	16.795	0.45	3.700	0.000	0.049	0.000	0.000	0.000	0.026
1987	100	0	157	506.971	4543.792	D	0.223	16.720	16.943	1.34	3.700	0.000	0.155	0.000	0.000	0.000	0.068
1987	101	0	85	562.336	4439.665	D	0.153	16.720	16.873	0.92	3.700	0.000	0.114	0.000	0.000	0.000	0.040
3987	102	0	99	532.411	4441.757	D	0.152	16.720	16.872	0.91	3.700	0.000	0.101	0.000	0.000	0.000	0.050
1987	103	0	93	545.089	4439.063	D	0.151	16.720	16.871	0.90	3.700	0.000	0.105	0.000	0.000	0.000	0.046
1987	104	0	1	553.734	4562.685	D	0.167	16.720	16.887	1.00	3.700	0.000	0.093	0.000	0.000	0.000	0.075
1987	105	0	1	553.734	4562.685	D	0.123	16.720	16.843	0.74	3.700	0.000	0.062	0.000	0.000	0.000	0.062
1987	106	0	6	564.461	4561.368	D	0.123	16.720	16.843	0.74	3.700	0.000	0.082	0.000	0.000	0.000	0.041
1987	107	0	148	495.845	4527.902	D	0.105	16.720	16.825	0.63	3.700	0.000	0.078	0.000	0.000	0.000	0.027
1987	108	0	105	520.570	4447.029	D	0.093	16.720	16.811	0.54	3.700	0.000	0.050	0.000	0.000	0.000	0.041
1987	109	0	61	604.149	4467.868	D	0.104	16.720	16.824	0.62	3.700	0.000	0.067	0.000	0.000	0.000	0.037
1987	110	0	97	536.571	4440.564	D	0.084	16.720	16.804	0.50	3.700	0.000	0.065	0.000	0.000	0.000	0.018
1987	111	0	32	607.295	4527.902	D	0.161	16.720	16.881	0.96	3.700	0.000	0.113	0.000	0.000	0.000	0.048
1987	112	0	160	511.717	4548.218	D	0.285	16.720	17.005	1.71	3.700	0.000	0.177	0.000	0.000	0.000	0.108
1987	113	0	81	570.729	4441.757	D	0.061	16.720	16.781	0.36	3.700	0.000	0.037	0.000	0.000	0.000	0.024
1987	114	0	65	599.065	4460.870	D	0.070	16.720	16.790	0.42	3.700	0.000	0.041	0.000	0.000	0.000	0.030
1987	115	0	71	589.741	4451.866	D	0.171	16.720	16.891	1.03	3.700	0.000	0.111	0.000	0.000	0.000	0.060
1987	116	0	178	547.245	4562.572	D	0.137	16.720	16.857	0.82	3.700	0.000	0.102	0.000	0.000	0.000	0.034
1987	117	0	155	504.075	4540.576	D	0.209	16.720	16.929	1.25	3.700	0.000	0.122	0.000	0.000	0.000	0.088
1987	118	0	143	491.972	4517.813	D	0.097	16.720	16.817	0.58	3.700	0.000	0.049	0.000	0.000	0.000	0.048
1987	119	0	57	608.210	4475.505	D	0.062	16.720	16.782	0.37	3.700	0.000	0.034	0.000	0.000	0.000	0.028
1987	120	0	176	542.941	4562.120	D	0.095	16.720	16.815	0.57	3.700	0.000	0.067	0.000	0.000	0.000	0.028
1987	121	0	45	613.570	4500.723	D	0.101	16.720	16.821	0.60	3.700	0.000	0.062	0.000	0.000	0.000	0.039
1987	122	0	80	572.775	4442.462	D	0.121	16.720	16.841	0.72	3.700	0.000	0.089	0.000	0.000	0.000	0.032
1987	123	0	96	538.679	4440.078	D	0.192	16.720	16.912	1.15	3.700	0.000	0.145	0.000	0.000	0.000	0.047
1987	124	0	93	545.089	4439.063	D	0.106	16.720	16.826	0.63	3.700	0.000	0.076	0.000	0.000	0.000	0.029
1987	125	0	162	515.127	4550.882	D	0.155	16.720	16.875	0.93	3.700	0.000	0.101	0.000	0.000	0.000	0.054
1987	126	0	47	613.419	4496.398	D	0.108	16.720	16.828	0.64	3.700	0.000	0.067	0.000	0.000	0.000	0.040
1987	127	0	16	584.425	4553.302	D	0.117	16.720	16.837	0.70	3.700	0.000	0.071	0.000	0.000	0.000	0.046
1987	128	0	106	518.715	4448.144	D	0.073	16.720	16.793	0.44	3.700	0.000	0.036	0.000	0.000	0.000	0.037
1987	129	0	161	513.399	4549.580	D	0.100	16.720	16.820	0.60	3.700	0.000	0.060	0.000	0.000	0.000	0.041
1987	130	0	162	515.127	4550.882	D	0.212	16.720	16.932	1.27	3.700	0.000	0.127	0.000	0.000	0.000	0.085
1987	131	0	178	547.245	4562.572	D	0.076	16.720	16.796	0.45	3.700	0.000	0.052	0.000	0.000	0.000	0.023
1987	132	0	1	553.734	4562.685	D	0.155	16.720	16.875	0.93	3.700	0.000	0.089	0.000	0.000	0.000	0.066
1987	133	0	162	515.127	4550.882	D	0.109	16.720	16.829	0.65	3.700	0.000	0.070	0.000	0.000	0.000	0.039
1987	134	0	84	564.461	4440.078	D	0.190	16.720	16.910	1.13	3.700	0.000	0.110	0.000	0.000	0.000	0.079
1987	135	0	97	536.571	4440.564	D	0.088	16.720	16.808	0.53	3.700	0.000	0.045	0.000	0.000	0.000	0.044
1987	136	0	102	526.352	4444.083	D	0.160	16.720	16.880	0.96	3.700	0.000	0.087	0.000	0.000	0.000	0.074
1987	137	0	70	591.423	4453.228	D	0.094	16.720	16.814	0.56	3.700	0.000	0.057	0.000	0.000	0.000	0.037

1987	138	0	72	588.013	4450.564	D	0.115	16.720	16.835	0.69	3.700	0.000	0.072	0.000	0.000	0.000	0.043
1987	139	0	72	588.013	4450.564	D	0.135	16.720	16.855	0.81	3.700	0.000	0.072	0.000	0.000	0.000	0.063
1987	140	0	165	520.570	4554.417	D	0.119	16.720	16.839	0.71	3.700	0.000	0.062	0.000	0.000	0.000	0.057
1987	141	0	161	513.399	4549.580	D	0.081	16.720	16.801	0.48	3.700	0.000	0.050	0.000	0.000	0.000	0.031
1987	142	0	148	495.845	4527.902	D	0.095	16.720	16.815	0.57	3.700	0.000	0.069	0.000	0.000	0.000	0.026
1987	143	0	132	489.910	4494.242	D	0.088	16.720	16.808	0.53	3.700	0.000	0.067	0.000	0.000	0.000	0.021
1987	144	0	75	582.570	4447.029	D	0.071	16.720	16.791	0.42	3.700	0.000	0.029	0.000	0.000	0.000	0.042
1987	145	0	75	582.570	4447.029	D	0.059	16.720	16.779	0.35	3.700	0.000	0.042	0.000	0.000	0.000	0.016
1987	146	0	64	600.427	4462.552	D	0.189	16.720	16.909	1.13	3.700	0.000	0.146	0.000	0.000	0.000	0.043
1987	147	0	61	604.149	4467.868	D	0.126	16.720	16.846	0.75	3.700	0.000	0.094	0.000	0.000	0.000	0.032
1987	148	0	85	562.336	4439.665	D	0.070	16.720	16.790	0.42	3.700	0.000	0.044	0.000	0.000	0.000	0.026
1987	149	0	87	558.051	4439.063	D	0.175	16.720	16.895	1.05	3.700	0.000	0.122	0.000	0.000	0.000	0.054
1987	150	0	94	542.941	4439.326	D	0.098	16.720	16.818	0.59	3.700	0.000	8.053	0.000	0.000	0.000	0.045
1987	151	0	80	572.775	4442.462	D	0.109	16.720	16.829	0.65	3.700	0.000	0.075	0.000	0.000	0.000	0.033
1987	152	0	79	574.796	4443.238	D	0.079	16.720	16.799	0.47	3.700	0.000	0.048	0.000	0.000	0.000	0.031
1987	153	0	85	562.336	4439.665	D	0.078	16.720	16.798	0.47	3.700	0.000	0.044	0.000	0.000	0.000	0.034
1987	154	0	66	597.645	4459.237	D	0.065	16.720	16.785	0.39	3.700	0.000	0.043	0.000	0.000	0.000	0.023
1987	155	0	152	500.170	4535.393	D	0.243	16.720	16.963	1.45	3.700	0.000	0.154	0.000	0.000	0.000	0.088
1987	156	0	161	513.399	4549.580	D	0.055	16.720	16.775	0.33	3.700	0.000	0.028	0.000	0.000	0.000	0.027
1987	157	0	65	599.065	4460.870	D	0.069	16.720	16.789	0.41	3.700	0.000	0.029	0.000	0.000	0.000	0.040
1987	158	0	62	602.970	4466.053	D	0.109	16.720	16.829	0.65	3.700	0.000	0.064	0.000	0.000	0.000	0.045
1987	159	0	114	505.495	4459.237	D	0.059	16.720	16.779	0.35	3.700	0.000	0.035	0.000	0.000	0.000	0.023
1987	160	0	177	545.089	4562.383	D	0.071	16.720	16.791	0.43	3.700	0.000	0.054	0.000	0.000	0.000	0.017
1987	161	0	77	578.749	4444.998	D	0.133	16.720	16.853	0.80	3.700	0.000	0.059	0.000	0.000	0.000	0.074
1987	162	0	164	518.715	4553.302	D	0.103	16.720	16.823	0.62	3.700	0.000	0.062	0.000	0.000	0.000	0.041
1987	163	0	97	536.571	4440.564	D	0.069	16.720	16.789	0.41	3.700	0.000	0.034	0.000	0.000	0.000	0.035
1987	164	0	95	540.804	4439.665	D	0.078	16.720	16.798	0.47	3.700	0.000	0.041	0.000	0.000	0.000	0.037
1987	165	0	158	508.501	4545.322	D	0.119	16.720	16.839	0.71	3.700	0.000	0.080	0.000	0.000	0.000	0.039
1987	166	0	136	489.608	4502.887	D	0.042	16.720	16.762	0.25	3.700	0.000	0.020	0.000	0.000	0.000	0.022
1987	167	0	69	593.056	4454.648	D	0.117	16.720	16.837	0.70	3.700	0.000	0.077	0.000	0.000	0.000	0.040
1987	168	0	78	576.788	4444.083	D	0.083	16.720	16.803	0.50	3.700	0.000	0.062	0.000	0.000	0.000	0.021
1987	169	0	65	599.065	4460.870	D	0.111	16.720	16.831	0.66	3.700	0.000	0.074	0.000	0.000	0.000	0.036
1987	170	0	142	491.412	4515.722	D	0.116	16.720	16.836	0.69	3.700	0.000	0.084	0.000	0.000	0.000	0.032
1987	171	0	154	502.713	4538.894	D	0.105	16.720	16.825	0.63	3.700	0.000	0.069	0.000	0.000	0.000	0.036
1987	172	0	67	596.169	4457.654	D	0.095	16.720	16.815	0.57	3.700	0.000	0.048	0.000	0.000	0.000	0.048
1987	173	0	69	593.056	4454.648	D	0.103	16.720	16.823	0.62	3.700	0.000	0.065	0.000	0.000	0.000	0.038
1987	174	0	120	497.876	4469.723	D	0.069	16.720	16.789	0.41	3.700	0.000	0.051	0.000	0.000	0.000	0.018
1987	175	0	57	608.210	4475.505	D	0.058	16.720	16.778	0.35	3.700	0.000	0.041	0.000	0.000	0.000	0.017
1987	176	0	159	510.084	4546.798	D	0.061	16.720	16.781	0.37	3.700	0.000	0.039	0.000	0.000	0.000	0.022
1987	177	0	43	613.419	4505.048	D	0.097	16.720	16.817	0.58	3.700	0.000	0.047	0.000	0.000	0.000	0.050
1987	178	0	172	534.480	4560.321	D	0.104	16.720	16.824	0.62	3.700	0.000	0.050	0.000	0.000	0.000	0.054
1987	179	0	85	562.336	4439.665	D	0.037	16.720	16.757	0.22	3.700	0.000	0.010	0.000	0.000	0.000	0.027
1987	180	0	84	564.461	4440.078	D	0.047	16.720	16.767	0.28	3.700	0.000	0.021	0.000	0.000	0.000	0.026
1987	181	0	81	570.729	4441.757	D	0.026	16.720	16.746	0.16	3.700	0.000	0.014	0.000	0.000	0.000	0.012
1987	182	0	15	582.570	4554.417	D	0.162	16.720	16.882	0.97	3.700	0.000	0.061	0.000	0.000	0.000	0.101
1987	183	0	33	608.210	4525.940	D	0.048	16.720	16.768	0.29	3.700	0.000	0.021	0.000	0.000	0.000	0.027
1987	184	0	44	613.532	4502.887	D	0.051	16.720	16.771	0.31	3.700	0.000	0.023	0.000	0.000	0.000	0.028
1987	185	0	91	549.406	4438.761	D	0.149	16.720	16.869	0.89	3.700	0.000	0.072	0.000	0.000	0.000	0.077
1987	186	0	65	599.065	4460.870	D	0.081	16.720	16.801	0.48	3.700	0.000	0.029	0.000	0.000	0.000	0.051
1987	187	0	18	588.013	4550.882	D	0.063	16.720	16.783	0.38	3.700	0.000	0.041	0.000	0.000	0.000	0.022
1987	188	0	95	540.804	4439.665	D	0.052	16.720	16.772	0.31	3.700	0.000	0.026	0.000	0.000	0.000	0.025
1987	189	0	94	542.941	4439.326	D	0.048	16.720	16.768	0.29	3.700	0.000	0.029	0.000	0.000	0.000	0.020
1987	190	0	73	586.240	4449.323	D	0.072	16.720	16.792	0.43	3.700	0.000	0.039	0.000	0.000	0.000	0.033
1987	191	0	70	591.423	4453.228	D	0.057	16.720	16.777	0.34	3.700	0.000	0.030	0.000	0.000	0.000	0.027
1987	192	0	91	549.406	4438.761	D	0.042	16.720	16.762	0.25	3.700	0.000	0.017	0.000	0.000	0.000	0.025
1987	193	0	9	570.729	4559.688	D	0.150	16.720	16.870	0.90	3.700	0.000	0.090	0.000	0.000	0.000	0.061
1987	194	0	154	502.713	4538.894	D	0.057	16.720	16.777	0.34	3.700	0.000	0.035	0.000	0.000	0.000	0.022
1987	195	0	71	589.741	4451.866	D	0.036	16.720	16.756	0.21	3.700	0.000	0.019	0.000	0.000	0.000	0.017
1987	196	0	153	501.411	4537.166	D	0.067	16.720	16.787	0.40	3.700	0.000	0.038	0.000	0.000	0.000	0.029
1987	197	0	65	599.065	4460.870	D	0.047	16.720	16.767	0.28	3.700	0.000	0.018	0.000	0.000	0.000	0.029
1987	198	0	72	588.013	4450.564	D	0.073	16.720	16.793	0.44	3.700	0.000	0.049	0.000	0.000	0.000	0.024
1987	199	0	58	607.295	4473.544	D	0.127	16.720	16.847	0.76	3.700	0.000	0.089	0.000	0.000	0.000	0.038
1987	200	0	102	526.352	4444.083	D	0.084	16.720	16.804	0.50	3.700	0.000	0.066	0.000	0.000	0.000	0.018
1987	201	0	95	540.804	4439.665	D	0.101	16.720	16.821	0.60	3.700	0.000	0.077	0.000	0.000	0.000	0.024
1987	202	0	39	612.215	4513.613	D	0.067	16.720	16.787	0.40	3.700	0.000	0.043	0.000	0.000	0.000	0.024
1987	203	0	21	593.056	4546.798	D	0.072	16.720	16.792	0.43	3.700	0.000	0.046	0.000	0.000	0.000	0.026
1987	204	0	89	553.734	4438.761	D	0.073	16.720	16.793	0.44	3.700	0.000	0.024	0.000	0.000	0.000	0.049
1987	205	0	95	540.804	4439.665	D	0.075	16.720	16.795	0.45	3.700	0.000	0.050	0.000	0.000	0.000	0.025
1987	206	0	167	524.391	4556.448	D	0.102	16.720	16.822	0.61	3.700	0.000	0.069	0.000	0.000	0.000	0.033
1987	207	0	92	547.245	4438.874	D	0.073	16.720	16.793	0.44	3.700	0.000	0.042	0.000	0.000	0.000	0.031
1987	208	0	50	612.628	4489.957	D	0.078	16.720	16.798	0.46	3.700	0.000	0.042	0.000	0.000	0.000	0.035
1987	209	0	42	613.230	4507.204	D	0.086	16.720	16.806	0.52	3.700	0.000	0.060	0.000	0.000	0.000	0.027
1987	210	0	49	612.967	4492.094	D	0.076	16.720	16.796	0.45	3.700	0.000	0.039	0.000	0.000	0.000	0.037
1987	211	0	56	609.055	4477.498	D	0.077	16.720	16.797	0.46	3.700	0.000	0.044	0.000	0.000	0.000	0.033
1987	212	0	72	588.013	4450.564	D	0.103	16.720	16.823	0.62	3.700	0.000	0.058	0.000	0.000	0.000	0.045
1987	213	0	91	549.406	4438.761	D	0.059	16.720	16.779	0.35	3.700	0.000	0.028	0.000	0.000	0.000	0.031
1987	214	0	80	572.775	4442.462	D	0.148	16.720	16.868	0.89	3.700	0.000	0.088	0.000	0.000	0.000	0.060
1987	215	0	47	613.419	4496.398	D	0.129	16.720	16.849	0.77	3.700	0.000	0.067	0.000	0.000	0.000	0.062
1987	216	0	100	530.365	4442.462	D	0.095	16.720	16.815	0.57	3.700	0.000	0.058	0.000	0.000	0.000	0.037
1987	217	0	157	506.971	4543.792	D	0.063	16.720	16.783	0.38	3.700	0.000	0.032	0.000	0.000	0.000	0.031
1987	218	0	98	534.480	4441.125	D	0.054	16.720	16.774	0.32	3.700	0.000	0.032	0.000	0.000	0.000	0.022
1987	219	0	112	508.501	4456.124	D	0.060	16.720	16.780	0.36	3.700	0.000	0.042	0.000	0.000	0.000	0.018
1987	220	0	70	591.423	4453.228	D	0.043	16.720	16.763	0.26	3.700	0.000	0.027	0.000	0.000	0.000	0.016
1987	221	0	136	489.608	4502.887	D	0.101	16.720	16.821	0.60	3.700	0.000	0.050	0.000	0.000	0.000	0.051
1987	222	0	85	562.336	4439.665	D	0.046	16.720	16.766	0.28	3.700	0.000	0.015	0.000	0.000	0.000	0.031
1987	223	0	82	568.659	4441.125	D	0.090	16.720	16.810	0.54	3.700	0.000	0.048	0.000	0.000	0.000	0.042
1987	224	0	99	532.411	4441.757	D	0.124	16.720	16.844	0.74	3.700	0.000	0.076	0.000	0.000	0.000	0.048
1987	225	0	168	526.352	4557.363	D	0.078	16.720	16.798	0.47	3.700	0.000	0.049	0.000	0.000	0.000	0.029
1987	226	0	19	589.741	4549.580	D	0.102	16.720	16.822	0.61	3.700	0.000	0.049	0.000	0.000	0.000	0.053
1987	227	0	76	580.677	4445.980	D	0.070	16.720	16.790	0.42	3.700	0.000	0.045	0.000	0.000	0.000	0.025
1987	228	0	11	574.796	4558.208	D	0.189	16.720	16.909	1.13	3.700	0.000	0.111	0.000	0.000	0.000	0.078
1987	229	0	101	528.344	4443.238	D	0.090	16.720	16.810	0.54	3.700	0.000	0.054	0.000	0.000	0.000	0.036
1987	230	0	17	586.240	4552.124	D	0.129	16.720	16.849	0.77	3.700	0.000	0.081	0.000	0.000	0.000	0.048
1987	231	0	61	604.149	4467.868	D	0.157	16.720	16.877	0.94	3.700	0.000	0.082	0.000	0.000	0.000	0.075
1987	232	0	103	524.391	4444.998	D	0.067	16.720	16.787	0.40	3.700	0.000	0.042	0.000	0.000	0.000	0.026
1987	233	0	65	599.065	4460.870	D	0.107	16.720	16.827	0.64	3.700	0.000	0.042	0.000	0.000	0.000	0.065
1987	234	0	109	513.399	4451.866	D	0.115	16.720	16.835	0.69	3.700	0.000	0.065	0.000	0.000	0.000	0.050
1987	235	0	89	553.734	4438.761	D	0.082	16.720	16.802	0.49	3.700	0.000	0.047	0.000	0.000	0.000	0.035
1987	236	0	176	542.941	4562.120	D	0.187	16.720	16.907	1.12	3.700	0.000	0.106	0.000	0.000	0.000	0.082
1987	237	0	75	582.570	4447.029	D	0.091	16.720	16.811	0.55	3.700	0.000	0.036	0.000	0.000	0.000	0.056
1987	238	0	165	520.570	4554.417	D	0.136	16.720	16.856	0.81	3.700	0.000	0.072	0.000	0.000	0.000	0.064
1987	239	0	169	528.344	4558.208	D	0.102	16.720	16.822	0.61	3.700	0.000	0.058	0.000	0.000	0.000	0.044
1987	240	0	158	508.501	4545.322	D	0.062	16.720	16.782	0.37	3.700	0.000	0.036	0.000	0.000	0.000	0.026
1987	241	0	73	586.240	4449.323	D	0.037	16.720	16.757	0.22	3.700	0.000	0.021	0.000	0.000	0.000	0.016

REQUEST FOR A PSD PERMIT MODIFICATION

Prepared For
KNAUF FIBER GLASS
Shasta Lake, California

August 8, 2003

Mostardi Platt

U. S. EPA Region 9
Knauf Insulation
NSR 4-4-4, SAC 03-01
Docket Index #: V-D

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REQUEST FOR A PSD PERMIT MODIFICATION

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August 8, 2003

MPE PROJECT M030601

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Shasta Lake, California
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1.0 INTRODUCTION

Knauf Fiber Glass GmbH (Knauf) operates a 195-ton per day fiberglass manufacturing facility in Shasta County, California. A site location map can be found in Figure 1.0-1. Shasta County is located at the northern end of the Sacramento Valley Air Basin.

The plant site is a 92-acre parcel in Shasta Lake. The facility address is:

Knauf Fiber Glass
3100 District Drive
Shasta Lake, California 96019

The UTM coordinates (NAD 27, Zone 10) at the center of the facility are:

Northing	4,500,750	meters
Easting	551,620	meters

The Latitude and Longitude at the center of the facility are:

Latitude	40°	39’	30”
Longitude	122°	23’	23”

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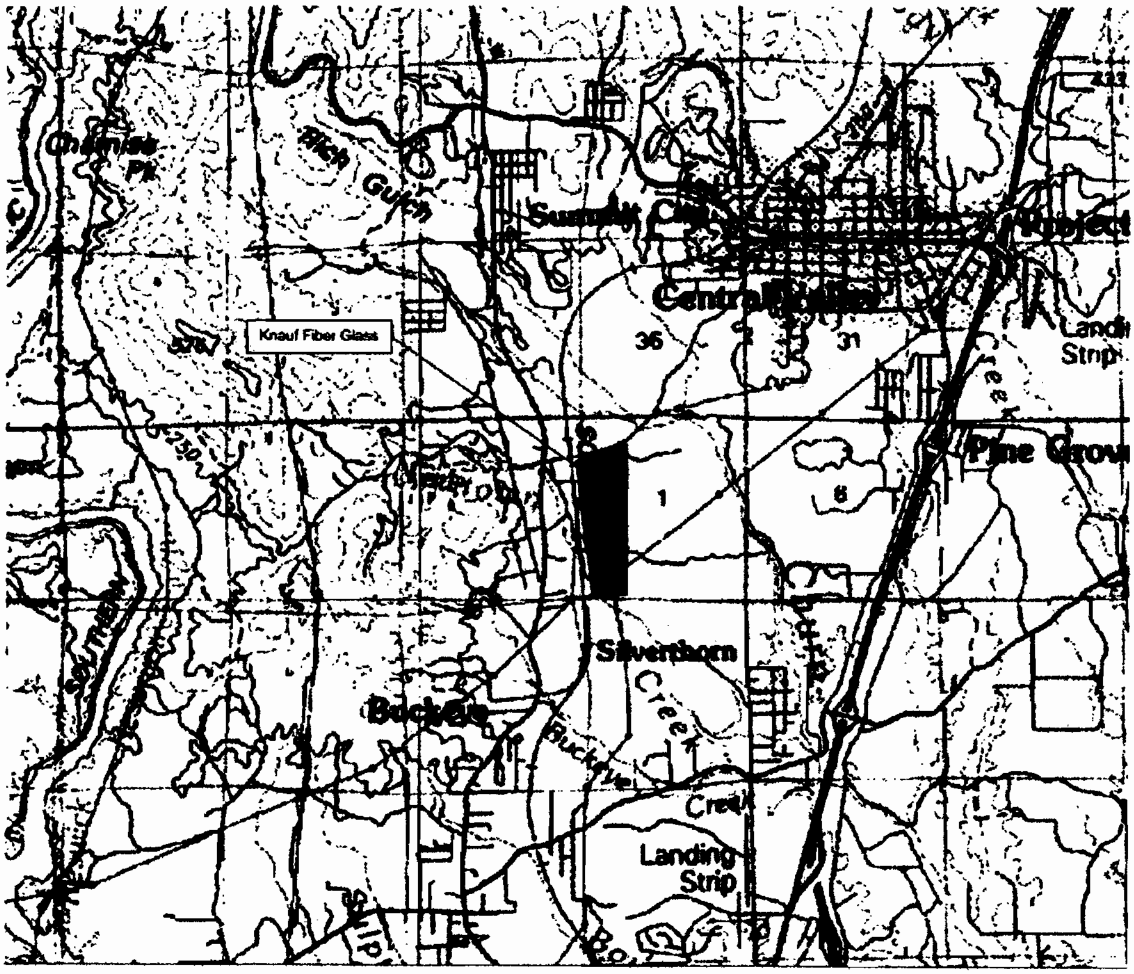

Figure 1.0-1. Site Location Map

1.3 Permit History

Knauf submitted an air quality permit application under the federal Prevention of Significant Deterioration (PSD) requirements on July 17, 1997. A PSD permit application was completed for PM_{10} because there was potential for the particulate emission rates to exceed 100 tons per year (TPY) and thus trigger PSD review for PM_{10}. Using the conservative estimates, PM_{10} emissions were estimated at 191.8 TPY (43.6 lb/hr), and the PSD threshold is 100 TPY. All other air pollutant emissions were considered minor in comparison to the PSD thresholds as shown in Table 1.3-1. All analyses for PM_{10} for the original PSD application were based on 191.8 TPY.

Table 1.3-1. Knauf Shasta Facility Emissions from Original PSD Application.

Pollutant	Knauf Plant, TPY	PSD Review Required?
PM_{10}	191.8 (124.4)[a]	**Yes**
NO_x	24.8	No
SO_2	4.4	No
CO	97.7	No
ROG (includes Formaldehyde and Phenol)	39.4	No
Formaldehyde	8.76	No
Phenol	26.28	No
Ammonia	166.4	No

Note: Knauf Fiber Glass considers all particulate matter as PM_{10}. Since PM_{10} emissions have more stringent limitations, all discussions in this permit application utilize PM_{10} rather than PM.

[a] PSD permit issued had a reduced PM_{10} limit.

After an extensive period of appeals, the PSD permit was issued three years later on March 22, 2000 with a reduced PM_{10} emission limit of 124.4 TPY (28.4 lb/hr). Construction of the facility commenced immediately and the plant began operation on February 4, 2002. Air emissions testing was completed in April and December 2002.

Based on oven exhaust gas and thermal oxidizer burner manufacturer's emission estimates, nitrogen oxides (NO_x) emissions from the facility were expected to be minor due to the use of low NO_x burners in the fiberglass curing oven and thermal oxidizers. As a result, NO_x was not formally evaluated under PSD in the original PSD permit application, but was evaluated in the California Environmental Quality Act (CEQA) Environmental Impact Report (EIR) and the required California Best Available Control Technology (BACT) analysis.

The results of the air emissions testing program demonstrated that the PM_{10} emission rate was equivalent to a level below 100 TPY. NO_x emissions test results demonstrated that the actual emissions resulted in a level that exceeded 40 TPY, but were less than 100 TPY.

1.4 Application for a Permit Modification

This permit application contains the necessary information for the U.S. Environmental Protection Agency (EPA or Agency), Region IX, to review the proposed permit modifications and perform the following actions:

1. Authorize a decrease in total plant PM_{10} emissions from 124.4 TPY to 100 TPY.

2. Authorize an increase in facility NO_x emissions from 24.8 TPY to 99 TPY.

3. Authorize an increase in PM_{10} emissions from the electric glass melting furnace to 1.0 pound per hour (increased from 0.1 to 1.0 lb/hr) which has been offset by lowering the manufacturing line PM_{10} emission rate.

2.0 PROJECT DESIGN

2.1 Process Description

The Knauf Shasta facility consists of one fiber glass insulation production line rated at 195 tons of molten glass per 24-hour production day. A process flow diagram is included as Figure 2.1-1, and the typical material handling flow diagram is included as Figure 2.1-2. Fiber glass manufacturing consists of the following processes:

1. Raw materials handling
2. Molten glass preparation
3. Fiber forming and binder application
4. Curing the binder-coated fiber glass mat
5. Cooling the mat
6. Facing
7. Cutting and packaging

2.1.1 Raw Materials Handling

The primary component of fiberized glass is silica sand, but it also includes granular quantities of soda ash, limestone, borax, dolomite, feldspar and other minor ingredients. The raw materials are received in bulk by rail car and truck. The bulk raw materials are unloaded from the trucks and rail cars by a mechanical conveying system to storage silos. All conveying and storage areas are enclosed.

From the storage areas, the materials are measured by weight according to the desired product recipe and blended prior to their introduction into the electrical glass melting furnace. The weighing, mixing and charging operations are conducted in batch mode.

Particulate matter (PM) is the only regulated pollutant that is generated by the raw materials handling operation. Emissions from the indoor dust collectors are insignificant and vent indoors. There is no ultimate vent point that leads to the atmosphere outside the building. Air is exhausted from these dust collectors only when batch raw materials or mixed batch is transported through the system. Proposed methods for controlling particulate matter from conveying and storage operations include enclosures and fabric filter dust collectors. All captured particulates are recycled back to the system.

The furnace batch day bins, containing mixed batch ready to be put into the furnace, are located next to the furnace and exhaust into the furnace/forming building. Negative pressure inside of this building prevents any emissions from these devices from exiting the building. Due to the extremely large volume of air exhausted through the forming section, a negative pressure is generated throughout the entire building. All fugitive emissions from the inside-vented dust collectors, raw material storage tanks, washwater storage, etc. pass through the forming section control devices prior to being discharged through the main stack. Any emissions from these sources are measured during emission tests on the main sack. To control fugitive emissions, all emissions from the mixing process and indoor venting are routed through the forming operation (via induced draft) and are included in the overall emission rates for the process.

2.1.2 Molten Glass Production

After introduction into the electric glass melting furnace, the raw materials are heated to a temperature of approximately 2,500 °F and transformed through a sequence of chemical reactions to molten glass. The proportions of the glass ingredients remain the same for the various products manufactured on the line. The raw materials are introduced continuously at the rear of the furnace where they are slowly mixed and dissolved.

Since all glass melting is done electrically (no fuel combustion), the only pollutant emitted by the glass melting furnace is particulate matter in trace amounts from the batch feeding process. The particulate emissions are controlled by two fabric filter baghouse dust collectors with 99+% removal efficiency.

2.1.3 Glass Fiber Forming and Binder Application

The rotary spin process is used in the Knauf facility production line to form glass fibers. In the rotary spin process, molten glass from the furnace is continuously poured into a rotating cylinder or spinner. Centrifugal force causes the molten glass to flow through small holes in the wall of the spinner. The emerging fibers are entrained in a high velocity air stream, and binder is applied to bond the fibers. Typically, the binder consists of a solution of phenol-formaldehyde resin, water, urea, organo silane, ammonium sulfate and ammonia.

The liquid phenol-formaldehyde resin is purchased and stored as a 50-55% solid concentration (45-50% water) and mixed with the other ingredients as needed. The resin dilution operation is a batch process. In the batch process the resin is diluted with water and other ingredients in vented mixing tanks and then stored for use. All emissions from the mixing and indoor venting are routed through the forming operation (via induced draft) and included in the overall emission rates for the forming operation.

The glass fibers are pulled onto a perforated flyte conveyer belt directly below the spinners by suction air from fans pulling air through the perforated conveyer belt. The fibers are collected on the conveyer to form a fiberglass mat. Each spinner contributes fiberized glass to the mat causing the mat to increase in thickness as it travels through the forming section. The thickness of the uncured fiber glass mat is controlled by the conveyer speed.

The quantity of binder solids sprayed onto the glass fibers is governed by the type of product being manufactured. Residential insulation is approximately 4% binder by weight, whereas metal building, duct wrap and flexible duct material are up to 10% binder by weight. Typically, about 85% of the binder applied to the fiber glass remains on the product (referred to as binder application efficiency); the remainder is exhausted with the forming or curing oven air to an air pollution control device, or remains on the conveyer.

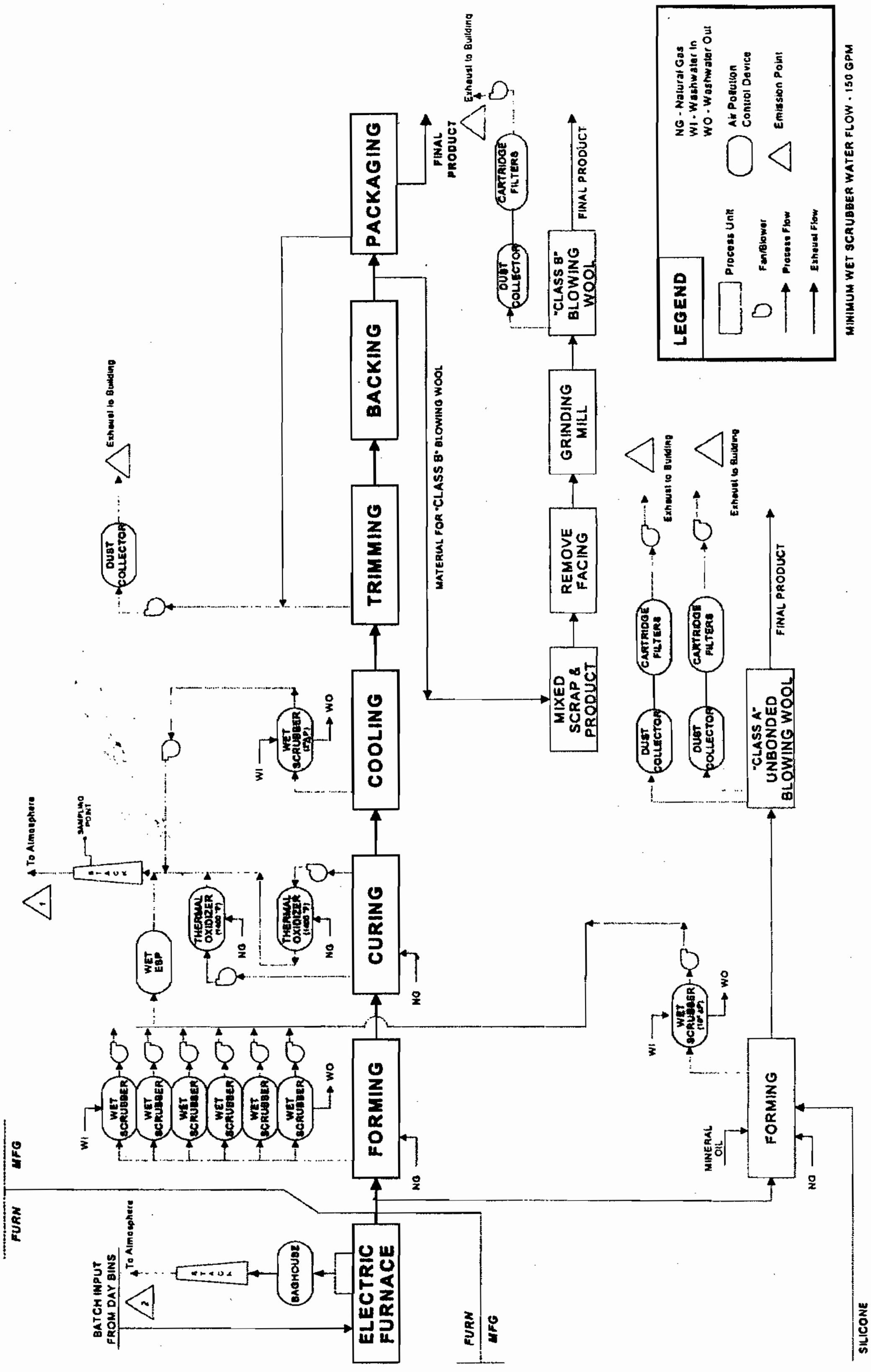

Figure 2.1-1. Process Flow Diagram for Knauf Fiber Glass.

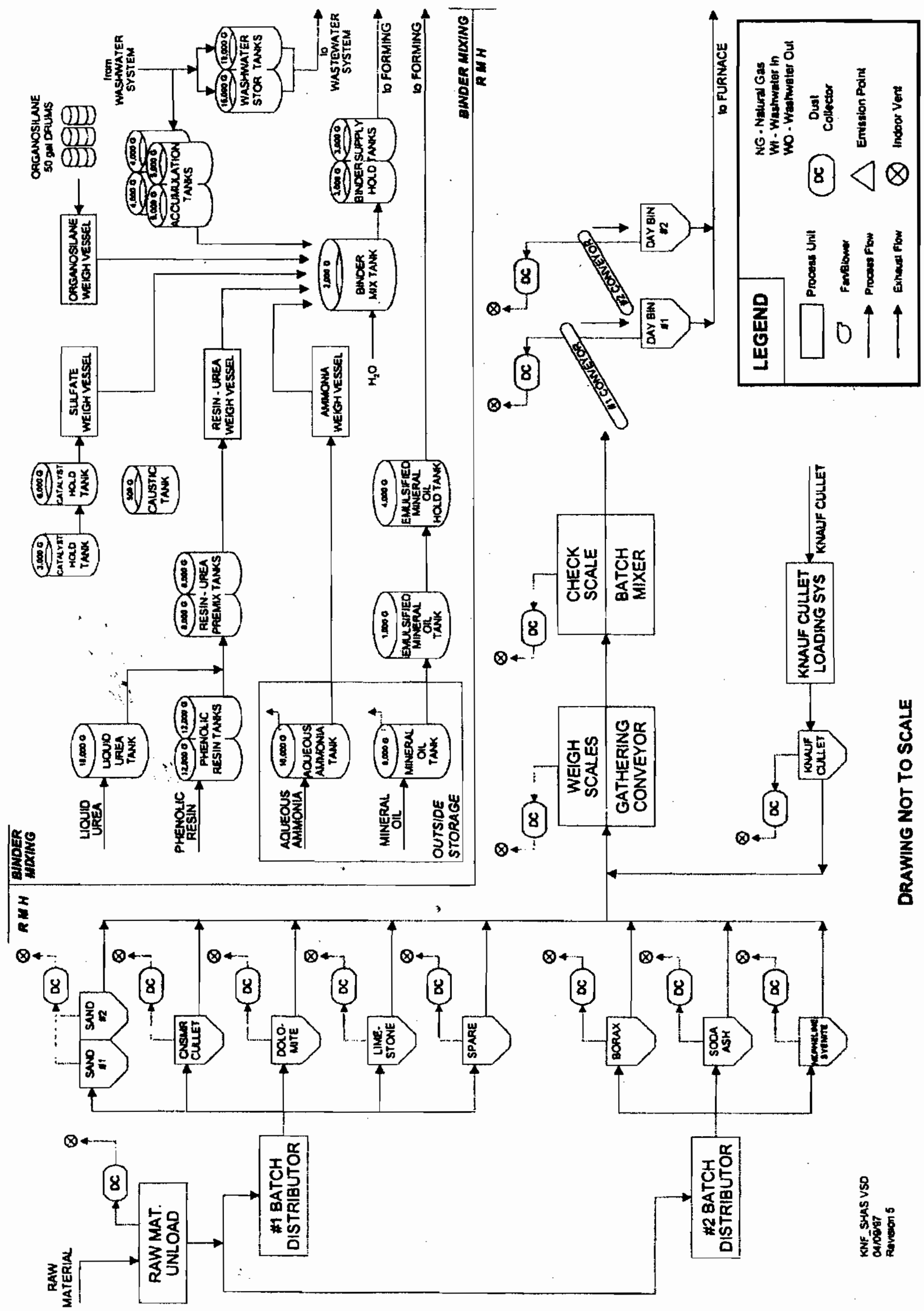

Figure 2.1-2. Typical Material Handling Flow Diagram.

Quality control checks will be routinely performed by plant personnel to determine the loss on ignition (LOI) of the product. The LOI check insures that the correct weight percent of binder is present in the product. To determine the LOI, a sample of the product is weighed, ignited to remove the binder and reweighed.

The fiber glass from several of the rotary spinners is diverted without binder application to a processing area to be packaged as unbonded blowing wool insulation.

The regulated pollutants which are emitted from the forming and binder application section are reactive organic gases (ROGs)/volatile organic compounds (VOCs) and PM, 90% to 95% of which are organic solids and the balance of which are inorganic solids and minute amounts of entrained glass fibers. Carbon monoxide (CO), NO_x, and trace amounts of sulfur dioxide (SO_2) are also emitted from the combustion of natural gas. The exhaust stream from the forming sections is sent through wet venturi scrubbers and a wet electrostatic precipitator prior to entering the stack.

2.1.4 Curing the Binder-Coated Fiber Glass Mat

After the mat is formed, it continues on the conveyer to the curing oven. Upper and lower perforated flytes in the oven compress and cure the fiber glass mat to the desired final thickness. The clearance between the flytes may be adjusted for different products.

The purpose of the curing oven is to drive off the moisture remaining on the fibers and cure the binder. The oven has six (6) zones, plus two (2) vestibule burners to maintain temperature. Each zone has its own low NO_x burner and blower to recirculate the hot air through the mat. An illustration of the curing oven is shown in Figure 2.1-3. The oven burners are Maxon Model 3.7M low NO_x burners. Each of the eight oven burners is rated at 3.7 million Btu per hr (MMBtu/hr; High Heating Value basis), with a NO_x emission rate of 0.034 lb/MMBtu. The normal operating rate per burner is 40% of capacity, or 1.5 MMBtu/hr.

The oven temperature ranges from 450 °F to 500 °F. Hoods are at the entry and exit of the oven to capture the exhaust from the oven.

The regulated pollutants emitted from the curing oven are particulate matter and reactive organic gasses from heating the binder, and NO_x, SO_2, and CO from the natural gas combustion burners. These pollutants are sent through two (2) thermal oxidizers prior to entering the main stack as shown in Figure 2.1-3. A thermal oxidizer is the best available control device for the destruction of VOCs contained in the binder. The thermal oxidizers are Maxon Kinedizer Model 18M rated at 18 million Btu/hr. The normal operating level is between 60 and 70%, or 10.8 to 12.6 million Btu/hr. Typical destruction efficiencies exceed 90% at a thermal oxidizer outlet temperature of 1400 °F.

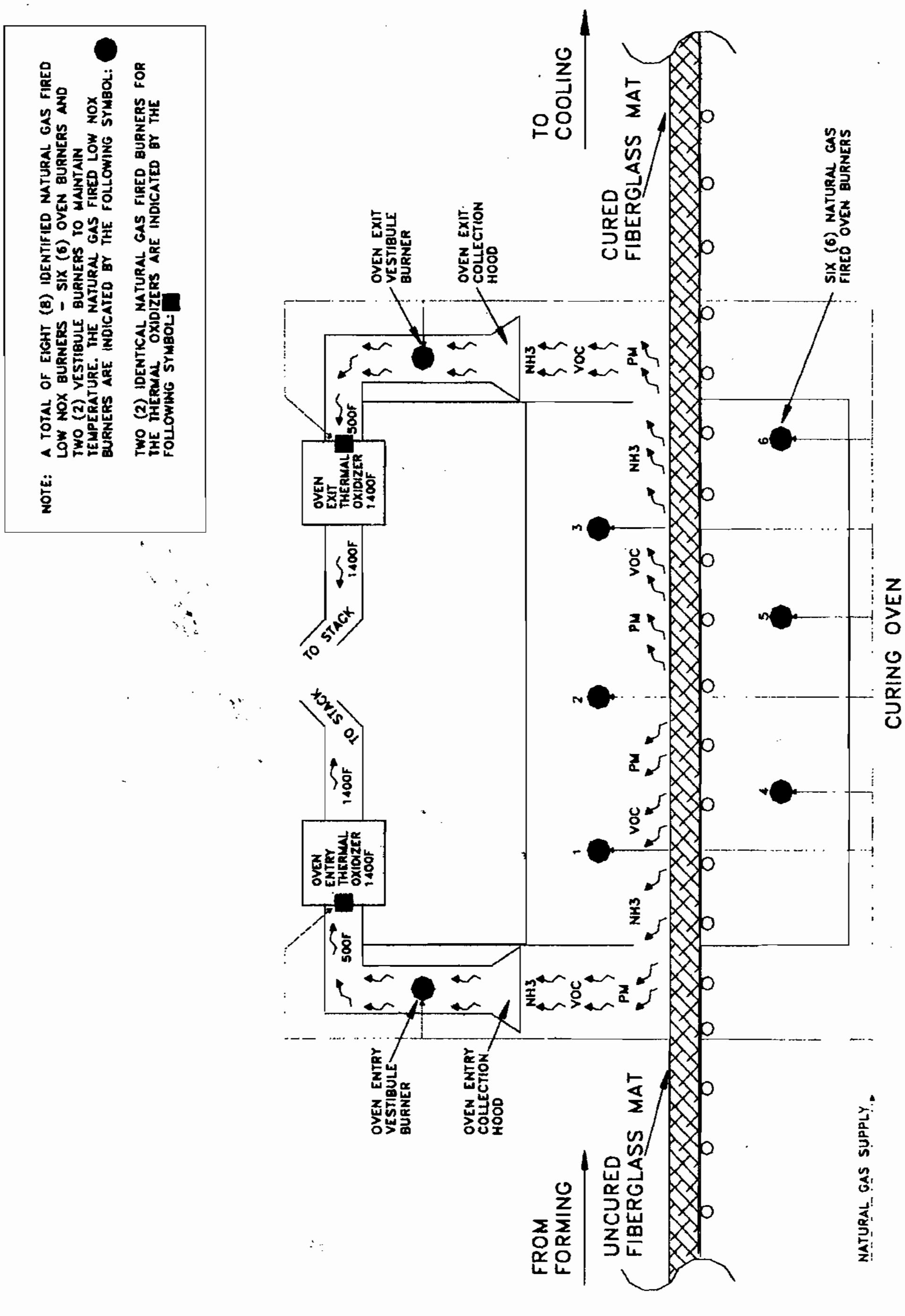

Figure 2.1-3. Curing Oven with Thermal Oxidizers.

As stated in Section 2.1-3, the binder contains ammonia and urea. Some free ammonia is present and enters the curing oven. In addition, during the curing process, ammonia is one of the byproducts that are driven off during the thermal decomposition of urea. As this ammonia passes through the thermal oxidizers operating with a minimum outlet temperature of approximately 1400 °F, some of the free ammonia is converted to additional NO_x as follows:

$$4NH_3 + 7O_2 \rightarrow 4NO_2 + 6H_2O$$

$$4NH_3 + 4O_2 \rightarrow 2N_2O + 6H_2O$$

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$

The magnitude of the NO_x created by the ammonia oxidation was not known at the time the original PSD permit application was filed for this facility.

2.1.5 Cooling the Mat

After the mat has been cured, it passes over a cooling section where ambient room air is induced through the mat. The regulated pollutants emitted from the cooling section are minor amounts of PM and ROG. The exhaust from the cooling section exits through the common stack.

2.1.6 Facing

An asphalt adhesive precoated paper facing is heated and pressed against the cooled mat for some of the insulation products. A water-based adhesive is also used to glue facings to some products.

2.1.7 Cutting and Packaging

Just prior to the facing section of the line, the mat edges are trimmed and cut. The trimmed edge waste is recycled using an air conveyer system back to the forming section to be included with the mat being formed.

The dust that develops during the cutting and packaging operations is collected with an air evacuation system and filtered with a fabric filter dust collector system.

Blowing wool is sent through a separation system that removes the wool from the blown air stream and packages it.

2.2 Operating Schedule

This permit application is for continuous operation of the Knauf Shasta facility (8760 hours/year).

2.3 Plant Emissions

Authority to Construct and New Source Review (NSR) regulations require a determination of the source's potential to emit (PTE), which is the maximum capacity of a stationary source to emit air pollutants under its physical limitations and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, provided the limitation is enforceable, is to be treated as part of its design. The emission rates presented in this section are based on maximum plant operations.

2.3.1 Air Pollutants

The following PTE emission rates are based on 195 tons of molten glass being produced per day (8.13 tons/hr). The major source of air pollutants at the facility comes from the combined stack for the forming, oven, and cooling operations. The PTE emission rates for all pollutants from the combined forming, oven, and cooling are listed in Table 2.3-1.

The basis for the PTE rates are the currently permitted limits at 8,760 hours of operation, with the exception of PM_{10} and NO_x, which are the values listed in this application. Emission calculations can be found in Appendix A for PM_{10} and NO_x.

Table 2.3-1. Manufacturing Line (Forming, Oven and Cooling) Stack PTE Emissions.

Pollutant	lb/hr	tons/yr (TPY)
PM_{10} (particulate matter less than 10 microns in size)	21.9*	95.6
NO_x	22.6*	99.0
SO_2	1.0	4.4
CO	22.3	97.7
ROG (includes Formaldehyde and Phenol)	9.0	39.4
Formaldehyde	2.0	8.8
Phenol	6.0	26.3
Ammonia	38.0	166.4

* Change from original PSD application.

PM_{10} emissions also exhaust from a dust collector associated with the electric glass melting furnace. The total plant PTE emission rates are given in Table 2.3-2.

Table 2.3-2. Total Plant PM_{10} Emissions.

Emission Source	lb/hr	TPY
Combined Forming/Oven/ Cooling Stack	21.9	95.6
Electric Glass Melting Furnace Dust Collector	1.0	4.38
Total PM_{10} Emissions	**22.9**	**100.0**

3.0 APPLICABLE REGULATORY REQUIREMENTS

This section discusses the applicable regulatory requirements for submitting a PSD Permit Modification for the Knauf facility in Shasta Lake, California.

3.1 New Source Review (NSR)

The Clean Air Act (Act) requires that new major stationary sources of air pollution, or major modifications of existing sources, obtain air pollution permits and/or approvals prior to commencing construction. Sources located in attainment areas (areas where all National Ambient Air Quality Standards (NAAQS) have been met) are required to perform NSR for compliance with NAAQS and PSD requirements. These preconstruction review programs for the Knauf Shasta facility were originally processed by the Shasta County Air Quality Management District. On March 3, 2003, this delegation was removed and the issuance of PSD permits for Shasta County is now performed by EPA Region IX.

PSD regulations are promulgated in federal regulations under Title 40, *Code of Federal Regulations*, Part 52.21 (40 CFR 52.21). The PSD program is designed to ensure that air quality will not significantly deteriorate in areas where the NAAQS are being met. The PSD regulations specify that any major new stationary source or major modification to an existing major source within a NAAQS attainment area must undergo a PSD review and obtain all applicable federal and state preconstruction permits prior to commencement of construction.

3.1.1 PSD Applicability

A stationary source, whether a proposed new source or an existing source, is considered major if it is:

- One of the 28 named source categories listed in Section 169 of the Act and emits, or has a PTE of 100 TPY or more of any air pollutant regulated by the Act or,

- Is an unlisted stationary source that emits or has the PTE of 250 TPY or more of any air pollutant regulated by the Act.

Glass fiber processing plants are one of the 28-named PSD source categories. The Knauf Shasta facility is subject to the 100 TPY PSD threshold. Once the PSD applicability threshold is exceeded for any pollutant, the regulated individual air pollutant emissions are compared to the significant emission levels listed in Table 3.1-1. If the air pollutant exceeds the significant emission level, then a PSD review applies to that pollutant.

Table 3.1-1. Significant Pollutant Emission Rates Once PSD Has Been Triggered.

Pollutant	Emission Rate (TPY)
Carbon monoxide	100.0
Nitrogen oxides	40.0
PM (total suspended particulates)	25.0
PM_{10}	15.0
Sulfur dioxide	40.0
Ozone, as Volatile Organic Compounds (VOC), also Reactive Organic Gases (ROG) in Shasta County	40.0
Lead	0.6
Mercury	0.1
Beryllium	0.0004
Asbestos	0.007
Fluorides	3.0
Sulfuric acid mist	7.0
Vinyl chloride	1.0
Hydrogen sulfide	10.0
Total reduced sulfur (including H_2S)	10.0
Reduced sulfur compounds (including H_2S)	10.0
Benzene	0
Inorganic arsenic	0
Radionuclides	0

Note: All PM is considered to be PM_{10}.

A comparison of the PTE emission rates for the Knauf facility, in contrast to the PSD significant emission thresholds, is given in Table 3.1-2.

Table 3.1-2. Knauf Shasta Facility Annual Emissions.

Pollutant	Knauf Plant, TPY	PSD Threshold If Any One Criteria Air Pollutant Equals or Exceeds 100 TPY	PSD Applicability for This Permit Modification
PM_{10}	100.0	15.0	No
NO_x	99.0	40.0	Yes
SO_2	4.4	40.0	No
CO	97.7	100.0	No
ROG (includes Formaldehyde and Phenol)	39.4	40.0	No
Formaldehyde	2.0	N/A	No
Phenol	6.0	N/A	No
Ammonia	38.0	N/A	No

Note: All PM is considered to be PM_{10}.

3.1.2 PSD Requirements

If a PSD review is triggered, the PSD regulations require the following analyses to be performed for the facility for each pollutant that exceeds the significant emission rates:

1. A BACT analysis to determine which control strategy and equipment is most appropriate for the plant being constructed.

2. An air quality impacts analysis to demonstrate that each significant emission increase resulting from the proposed emissions will not cause or contribute to a violation of any allowable increment or NAAQS.

3. An additional impacts analysis to determine the effects of the emission increase on soils, vegetation, visibility, and each potentially affected Class I area and the surrounding areas as a result of induced growth.

3.1.3 Air Quality Standards

For areas that are in attainment with the NAAQS, maximum allowable increases or "increments" in ambient pollution concentrations have been established for PM_{10}, NO_x, and SO_2. These PSD increments are presented in Table 3.1-3, along with the CARBAQS, Significant Impact Levels (for modeling purposes), and 8-hour Personal Exposure Limits (PEL). The PSD increments are an absolute ceiling, stated as the maximum allowable increases in concentration of the pollutant over a baseline concentration. In effect, the PSD increments, when added to baseline concentrations represent new ambient air quality levels for PSD areas.

Table 3.1-3. Air Quality Standards.

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	CARBAQS ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)	Significant Impact Levels ($\mu g/m^3$)	PEL ($\mu g/m^3$)
Ozone	1-Hour	235	175	-	-	-
PM_{10}	Annual	50	30	17	1	-
	24-Hour	150	50	30	5	-
NO_x	Annual	100	-	25	1	-
	1-Hour	-	500	-	-	-
SO_2	Annual	80	-	20	1	-
	24-Hour	365	105	91	5	-
	3-Hour	1,300	-	512	25	-
	1-Hour	-	655	-	-	-
CO	8-Hour	10,000	10,000	-	500	-
	1-Hour	40,000	23,000	-	2000	-
Formaldehyde	8-Hour	-	-	-	-	2,000
Phenol	8-Hour	-	-	-	-	19,000
Ammonia	8-Hour	-	-	-	-	18,000

3.2 New Source Performance Standards

New Source Performance Standards (NSPS) are nationally uniform emission standards established by the EPA and set forth in 40 CFR 60. NSPS apply to every qualifying new source and are based on pollution control technology available to the category of source. Federal NSPS provide a starting point to evaluate required controls; however, the BACT analysis specifies the type of control technology required.

The Knauf facility is required to comply with the NSPS for glass fiber manufacturing. Since the electric glass melting furnace is exempt from the NSPS in 40 CFR 60, Subpart CC (no fuel combustion), only 40 CFR 60, Subpart PPP is applicable.

40 CFR 60, Subpart PPP sets an emission limit on rotary spin wool fiber glass insulation manufacturing lines of 5.5 kg per Mg of glass pulled (11 lb/ton). The term "manufacturing line" is defined by Subpart PPP to include the forming, curing, and cooling sections of the process.

3.3 Best Available Control Technology (BACT)

The PSD process requires an evaluation of emission control devices and techniques demonstrating that BACT will be applied to the source. The BACT evaluation ensures that technically feasible control technologies are evaluated and that air pollutant emissions are mitigated while limiting the impacts on available energy, the economy, and the environment within an affected area. This analysis ultimately determines the allowable emissions from a source and is the basis for demonstrating emission rates, ambient air impacts, and compliance with applicable regulations. The application of BACT must result in emissions which comply with the federal, state and local ambient impact standards. BACT is defined in 40 CFR 52.21 as:

> "...an emissions limitation based on the maximum degree of reduction, which the Agency, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source through application of production process and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each pollutant."

A full BACT analysis ranks all feasible and available control technologies in descending order of control effectiveness. The most stringent or "top" alternative for comparable facilities is examined first. This alternative is established as BACT unless the applicant demonstrates that due to other considerations such as technical, energy, environmental, or economic reasons, it can be justified that a less stringent control technology is appropriate. If the most stringent technology is eliminated, then the process is repeated for the next most stringent alternative and so on.

To comply with the PSD requirements for BACT, the Knauf facility demonstrated BACT for PM_{10} emissions in the original application in 1997. This permit modification evaluates BACT for NO_x due to the increase from 24.8 to 99 TPY.

In addition to satisfying BACT in the PSD requirements, the Knauf facility must also satisfy BACT as defined in Section 205 of Shasta County Air Quality Management District Rules and Regulations. In Section 205, BACT is defined as the most stringent of one of the following:

- The most effective emission control device, emission limit, or technique that has been required or used for the type of equipment comprising such emission unit unless the applicant demonstrates to the satisfaction of the Air Pollution Control Officer (APCO) that such limitations are not achievable.

- Any other emission control device or technique, alternative basic equipment, different fuel or process, determined to be technologically feasible and cost-

effective by the APCO. The cost effective analysis shall be performed in accordance with the methodology specified by the APCO.

- Under no circumstances shall BACT be determined to be less stringent than the emission control required by any applicable provision of District, State, of federal laws or regulations, unless the applicant demonstrates to the satisfaction of the APCO that such limits are not achievable.

3.4 Air Quality Impact Analysis

The Knauf Shasta project must demonstrate the air quality impact of the project with both NAAQS and the CARBAQS. Air Quality Impact Assessments (AQIA) are performed using dispersion modeling techniques in accordance with the EPA's "Guidelines on Air Quality Models."

As part of the AQIA, a determination is made as to whether or not the impacts from the facility emissions are high enough to trigger a requirement for ambient air quality monitoring. The *de minimis* impact level for particulates, over a 24-hour averaging period, is 10 micrograms per cubic meter ($\mu g/m^3$). If the air quality impact exceeds this value, ambient air quality monitoring would be required to establish baseline air quality data. However, a source may qualify for a waiver from the ambient air quality monitoring requirements if existing monitoring data, representative of the area, is readily available. Ambient air quality monitoring data for particulates, as well as other pollutants, from the Redding, California monitoring station is considered representative for the City of Shasta Lake (Michael Kussow, 1996).

3.4.1 Federal Ambient Air Quality Standards

The National Ambient Air Quality Standards (NAAQS) were established by the United States Environmental Protection Agency to protect public health and welfare. Federal air quality standards have been set for ozone, CO, nitrogen dioxide (NO_x), SO_2, lead (Pb), and particulates (PM_{10}). The federal Clean Air Act provides that NAAQS can be exceeded no more than once each year. Areas that exceed the standard four times in three years or more can be considered "nonattainment areas" subject to more stringent planning and pollution control requirements. The NAAQS values are presented in Table 3.1-3.

3.4.2 State Ambient Air Quality Standards

The State of California has established its own ambient air quality standards, to protect public health and welfare and to prevent the significant deterioration of air quality. They are administered by the California Air Resources Board (CARB). The state has set its own standards for all NAAQS standards, as well as for hydrogen sulfide and vinyl chloride. The CARBAQS that have been established are more restrictive than the accompanying federal standards. The CARBAQS values are also presented in Table 3.1-3.

Both state and federal air quality standards consist of two parts: an allowable concentration of a pollutant and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of research studies of how pollutants affect human health, crops, and vegetation; potential damage to paint and other materials is also considered. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short period of time (e.g. one hour), or to a relatively lower average concentration over a much longer period (e.g. one year). For certain pollutants, there may be several air quality standards reflecting both short- and long-term effects.

3.4.3 Shasta County Standards

Shasta County currently meets all of the NAAQS federal standards. However, the County is non-attainment for the state standards for PM_{10} and ozone, meaning that there has been at least one violation of the state standard for these pollutants in Shasta County.

In addition to the Shasta County monitoring stations located in Redding and Anderson, a special purpose PM_{10} ambient air quality monitoring station has been operating near the Knauf facility since January 2001. According to data collected at this site, the state standard has been violated once over the two-year monitoring period. This violation can be attributed to forest fires in Northern California and Oregon during the summer of 2002. With the exception of the one violation, monitored PM_{10} levels have remained below the state standard.

During the summer of 2000, the District participated in a statewide ozone study, which included the monitoring of oxides of nitrogen (NO_x) concentration in Shasta County. The monitoring station was located less than ten miles from the Knauf facility in the town of Bella Vista. Data from this study indicates that state and federal NO_x standards are not being violated.

A summary of the Shasta County ambient pollutant concentrations (background levels) compared to their CARBAQS values is shown in Table 3.4-1.

Table 3.4-1. Shasta County Local Ambient Air Quality Levels.

Pollutant	Averaging Period	CARB Ambient Air Quality Standards ($\mu g/m^3$)	Shasta County Background Levels ($\mu g/m^3$)[3,5,6,7,8]
PM_{10}	Annual	20	13.7
	24-Hour	50	37.4
NO_x	Annual		1.5
	1-Hour	470	92.0

The Part 300 requirements of the Air Quality Management District, Rules and Regulations, requires the use of BACT for any new emission unit for any pollutant that exceeds the values in Table 3.4-2.

Table 3.4-2. Part 300 BACT Thresholds.

Pollutant	lb/day	TPY
Reactive organic gases	25.0	4.56
Nitrogen oxides	25.0	4.56
Sulfur oxides	80.0	14.6
PM_{10}	80.0	14.6
Carbon monoxide	500.0	91.25

3.5 Good Engineering Practice Stack Height

The EPA has established a Good Engineering Practice (GEP) stack height policy that limits the use of dispersion enhancement due to extremely tall stacks. The regulation does not limit the physical stack height, but rather limits the height of a stack that can be used in the dispersion modeling study. GEP stack height is defined as 65 meters (213 feet), or (H+ 1.5L), where H is building height and L is the lesser dimension of the height or projected width of the building.

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[5] PM_{10} ambient air quality data from City of Shasta Lake Animal Shelter monitoring station, data taken from 1/1/2001 to 2/14/2003

[6] 24 hour PM_{10} background concentration listed is second high over monitoring period due to maximum being caused by forest fires in California and Oregon during the summer of 2002 (56.3 ug/m^3)

[7] NOx ambient air quality data from Bella Vista, CA Ozone Study performed by CARB in 2000

[8] Value provided for annual NOx background concentration is average value from 45 day sampling period

For example, if the building height (H) is 50 feet, and the projected width is 200 feet, then L is 50 feet and the GEP height is (50 + 1.5*50), or 125 feet. Therefore, the GEP height is calculated to be 125 feet, but a stack height up to 213 feet (65 meters) can be built and the entire height will be allowed for modeling purposes.

Another example for a GEP height above 213 feet is as follows. If the GEP stack height is determined to be 220 feet, one can still build a stack that is 300 feet tall but the mathematical modeling of the plant can only take credit for a physical stack height of 220 feet.

A stack height shorter than GEP is allowable by the regulations, but the AQIA modeling study must consider the aerodynamic downwash effects of structures on the dispersion of air pollutants (discussed later).

3.6 Hazardous Air Pollutants

A major emission source for hazardous air pollutants (HAP) is defined as a source that emits more than 10 TPY of any one of the listed HAPs, or an aggregate to HAPs that exceeds 25 TPY. The Knauf Fiber Glass facility is a major HAP emission source and is subject to the applicable Maximum Achievable Control Technology (MACT) standards. The National Emission Standard for Hazardous Air Pollutants (NESHAP) for Wool Fiberglass Manufacturing was promulgated on June 14, 1999. This rule established a PM limit (a surrogate for arsenic, chromium, and lead) of 0.5 lb/ton of glass pulled from the glass furnace. The NESHAP also established a formaldehyde emission limit (a surrogate for phenol and methanol) of 0.8 lb/ton of glass pulled for new rotary spin manufacturing lines.

Sources of hazardous air pollutants are also evaluated at the state level. The State of California has set 8-hour permissible exposure levels (PEL) for a number of hazardous air pollutants. The PEL values for formaldehyde, phenol, and ammonia are given in Table 3.1-3.

In addition to the comparison to PEL values, CARB developed regulations for Assembly Bill (AB) 2588, the Air Toxics Hot Spots Information and Assessment Act of 1987. Facilities that exceed certain thresholds for hazardous air pollutant emissions are subject to AB 2588 requirements. AB 2588 requires facilities to report their emissions of toxic air contaminants. Facilities are subsequently prioritized by their emissions, and "high priority" facilities are required to conduct a health risk assessment.

The Knauf facility emits phenol, formaldehyde, and ammonia at levels which require evaluation under AB 2588. An evaluation of the air toxics emission rates will be completed in August, 2003. This study will evaluate human health risks calculated with health risk factors provided by the California Air Pollution Control Officers Association (CAPCOA, 1993). The risk factors were developed based on available data on human and animal exposure. Safety factors have been incorporated into the risk factors to protect human health.

Incremental cancer risk represents a person's increased chance of contracting cancer after living at the point of maximum concentration continuously for 70 years. The incremental cancer risk level considered to be significant by Shasta County is 1 x 10^{-5}, or 1 in 100,000.

A chronic hazard index is a ratio of the toxic air contaminant's concentration at the level at which noncarcinogenic health effects may occur after long-term exposure. A hazard index greater than 1.0 indicates that adverse health effects could occur. The evaluation is performed using the maximum five-year average pollutant concentrations predicted by dispersion modeling.

An acute hazard index is a ratio of a toxic air contaminant's concentration to the level at which noncarcinogenic health effects may occur after short-term exposure. Once again, a hazard index greater than 1.0 indicates that adverse health effects could occur. The evaluation is performed using the maximum one-hour average pollutant concentrations predicted by dispersion modeling.

3.7 Soils and Vegetation

The PSD program requires an evaluation of the project's air pollution impacts on soil and vegetation. After the completion of air quality modeling, an assessment of the impacts of pollution in the project area can be performed by correlating the modeling results with established "harmful effects" levels. For most types of soils and vegetation, air quality impacts below the NAAQS will not result in harmful effects. A soil and vegetation analysis is presented in Section 9.

3.8 Class I Area Impact Analysis

PSD increments have also been established for air quality in federal Class I areas. These levels are more stringent than the normal NAAQS presented in Table 3.2-1. For PM_{10}, the Class I increment is 4 μg/m^3 for annual averages, and 8 μg/m^3 for 24-hour averages. For NO_x, the Class I increment is 2.5 μg/m^3 for an annual average, never to be exceeded. A Class I area impact analysis is addressed in Section 10.

For PSD sources, an applicant is also required to demonstrate that the emissions from the source(s) will not cause or contribute to adverse impacts to Air Quality Related Values (AQRV) in any Class I area. The study evaluates the potential for impacts on sensitive receptors in the Class I areas, and needs to demonstrate that the acceptable limits of air pollution-caused changes (LAC) are not exceeded. The guidelines that are followed for Class I impact studies include the Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I report from December, 2000, the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase II Summary Report and Recommendations for Modeling Long Range Transport Impacts, issued in December, 1998, and 40 CFR 51, Revision of the Guideline on Air Quality Models: Adoption of a Preferred Long Range Transport Model and Other Revisions; Final Rule, published April 15, 2003.

3.9 Visibility

An analysis of visibility impairment is required at Class I land use areas as part of the PSD permitting process. Class I areas are national park and wilderness areas with more stringent air quality standards. EPA regulations define visibility impairment as any humanly perceptible change in visibility (visual range, contrast, or coloration) from natural conditions. To determine if a source will impair visibility at a federal Class I area, the EPA and Federal Land Managers require the use of the EPA's CALPUFF model to demonstrate that its emissions will not impair visibility inside any Class I area. A visibility analysis for the Knauf Shasta facility is addressed in Section 10.

3.10 Direct Growth Analysis

The PSD program requires an analysis of the anticipated growth in an area and subsequent air quality impacts associated with growth as a direct result of the project. Since this evaluation was covered in detail in the Environmental Impact Report for the Knauf Fiber Glass plant as part of the CEQA process, Knauf hereby incorporates the EIR growth analysis by reference.

3.11 Endangered Species Evaluation

Under Section 7 of the Endangered Species Act, impacts of a PSD project on endangered and threatened species and their habitats must be adequately assessed. Since this evaluation was covered in detail in the Environmental Impact Report for the Knauf Fiber Glass plant as part of the CEQA process, Knauf hereby incorporates the EIR endangered species analysis by reference.

4.0 EMISSION STANDARDS

The Knauf facility must demonstrate compliance with the applicable NSPS Subpart PPP for fiber glass manufacturing. The controlled particulate emissions from the rotary spin wool fiber glass operation, including the condensable organics, will be 21.6 lb/hr for a production rate of 195 ton/day. This equates to 2.7 lb/ton for manufacturing and easily complies with the 11 lb/ton NSPS limit. Since the electric glass melting furnace is exempt from the NSPS in 40 CFR 60, Subpart CC (no fuel combustion), only 40 CFR 60, Subpart PPP is applicable.

The MACT standard for glass melting (see Section 3.6) is 0.5 lb PM per ton of glass pulled. Although the MACT standard allows 4.1 lb/hr, the Knauf PSD/ATC permit limit will be 1.0 lb/hr at 195 tons of glass pulled per day, which equates to 0.123 lb/ton of glass pulled.

The MACT standard for new rotary spin fiberglass manufacturing lines is 0.8 lb of formaldehyde per ton of glass pulled. Although the MACT standard allows 6.5 lb/hr, the Knauf PSD ATC permit limit is 2.0 lb/hr at 195 tons per day, which equates to 0.25 lb/ton of glass pulled.

5.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

Based on the potential to emit emission rates for the Knauf facility shown in Table 3.1-2, and the Part 300 BACT thresholds of Table 3.5-1, the following pollutants would require a BACT analysis:

- PM_{10}
- Nitrogen oxides
- Carbon monoxide
- Reactive organic gases

No further evaluation has been prepared for PM_{10} since the emission rates for PM_{10} have decreased from the original PSD permit approval. Likewise, no further BACT analysis has been prepared for carbon monoxide and reactive organic gases because emission limits have not changed.

The only air pollutant to increase is NO_x from the manufacturing line, and therefore, this BACT analysis covers an update for NO_x emissions from the manufacturing line.

5.1 BACT Analysis – Manufacturing Line NO_X

Emissions from the manufacturing line at the Knauf Shasta facility consist of condensed and uncondensed PM_{10}, as well as reactive organic gases (ROG) from the binder. The combustion of natural gas in the forming fiberizers and the low NO_x oven burners results in emissions of NO_x, SO_2, CO, ROG, and trace amounts of PM_{10}.

The facility has been constructed with thermal oxidizers to control emissions of ROG and condensable particulates from the curing oven. Thermal oxidizers are very effective at the reduction of ROGs. However, as discussed in Section 2.1.4, the combustion of natural gas in the eight (8) oven burners and two (2) thermal oxidizer burners results in NO_x emissions. These emissions are minimized through the use of low NO_x burners. Unfortunately, the thermal curing of binder results in a release of ammonia (see Figure 2.1-3). A portion of this ammonia is converted to NO_x as it passes through the thermal oxidizers and greater than 50% of the NO_x emitted is associated with this process.

Virtually all NO_x emissions produced by natural gas combustion originates as NO. This NO is further oxidized in the exhaust system or later in the atmosphere to form the more stable NO_2 molecule. There are two mechanisms by which NO_x can be formed in the high temperature region (>2,500 °F) in and around the burner flame: 1) the oxidation of atmospheric nitrogen found in the combustion air (thermal NO_x and prompt NO_x), and 2) the conversion of nitrogen chemically bound in the fuel (fuel NO_x). These mechanisms are discussed in the following paragraphs.

Thermal NO_x is formed by a series of chemical reactions in which oxygen and nitrogen present in the combustion air dissociate and subsequently react to form oxides of nitrogen. The major contributing chemical reactions are known as the Zeldovich mechanism. Simply stated, the Zeldovich mechanism postulates that thermal NO_x formation increases exponentially with increases in temperature and linearly with increases in residence time. Flame temperature is dependent on the air/fuel ratio. A stoichiometric ratio is the point at which a flame burns at its highest theoretical temperature.

Prompt NO_x, a form of thermal NO_x, is formed in the proximity of the flame front as intermediate combustion products, such as HCN, N, and NH, are oxidized to form NO_x. Prompt NO_x is formed in both fuel rich flame zones and in fuel-lean combustion zones typical of some low-NO_x burner designs. The contribution of prompt NO_x to overall NO_x emissions is relatively small in conventional burners. This contribution is an increasingly significant percentage of overall thermal NO_x emissions in low-NO_x burners.

Fuel NO_x is formed when fuels containing nitrogen are burned. Molecular nitrogen, present as N_2 in some natural gas and propane, does not contribute significantly to fuel NO_x formation. The nitrogen content of liquid and solid hydrocarbon fuels, such as diesel oil and coal, can range from 0.1 to 2.0 percent by weight. When these fuels are burned, the nitrogen bonds break and some of the resulting free nitrogen oxidizes to form NO_x. With excess air, the degree of fuel NO_x formation is primarily a function of the nitrogen content in the fuel. The fraction of fuel-bound nitrogen (FBN) converted to fuel NO_x decreases with increasing nitrogen content, although the absolute magnitude of fuel NO_x increases. For example, a fuel with 0.01 percent nitrogen may have 100 percent of its FBN converted to fuel NO_x, whereas a fuel with a 1.0 percent FBN may have only 40 percent conversion rate. Natural gas contains essentially no FBN. As a result, when compared to thermal NO_x, fuel NO_x is not a significant contributor to overall NO_x emissions from curing oven burners.

Two potential post combustion NO_x control technologies include Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR).

SCR involves the injection of ammonia into an exhaust gas stream at a temperature range of 600 to 900 °F that then passes through a precious metal or zeolite catalyst bed. The two primary NO_x reduction reactions, in the presence of a catalyst, are:

$$4NH_3 + 4NO + O_2 \rightarrow 4N_2 + 6H_2O$$

$$4NH_3 + 2\,NO_2 + 2NO \rightarrow 4N_2 + 6\,H_2O$$

The fact that the thermal oxidizer generates most of the NO_x, plus the fact that the temperature exiting the thermal oxidizer is 1400 °F, makes an SCR a technically infeasible option for control.

SNCR involves the injection of ammonia or urea into an exhaust gas stream of approximately 1600 °F to 2000 °F temperature range. SNCR works most efficiently with elevated NO_x levels and a relatively long residence time of 1 to 2 seconds. Ammonia usage is greater than with SCR-based systems to achieve similar reductions. The low NO_x levels plus the 500 °F gas stream temperature upstream of the thermal oxidizers, and 1400 °F temperature leaving the thermal oxidizers, makes SNCR technically infeasible for the Knauf curing oven/thermal oxidizer exhaust.

Table 5.1-1 lists manufacturing line NO_x emission rates from other comparable new wool fiberglass manufacturing facilities in the United States. The Knauf Shasta NO_x level is the lowest comparable emission rate (lb/ton) of any wool fiberglass manufacturing plant equipped with thermal oxidizers, and is roughly one-third the level of the most recent PSD Permit level issued to the Johns-Mansville Plant in Winder, Georgia (1999). It should be noted that SCR and/or SNCR systems have never been utilized at any wool fiberglass manufacturing facility. The use of thermal oxidizers at the Knauf Shasta facility has the additional benefit of being extremely efficient at controlling condensable particulate matter and reactive organic gases.

Table 5.1-1 NO_x Control Technology for Wool Fiberglass Manufacturing Line.

Company/Location	Manufacturing Line NO_x Control Technology	NO_x Emission Limit	Comments
Knauf, Shasta Lake, CA	Low NO_x Burners (on oven & thermal oxidizers)	2.79 lb/ton of glass pulled (22.6 lb/hr, 99 tons/year)	Application for Air Permit Modification
Johns-Mansville, Winder, GA	Good combustion control	6.05 lb/ton of glass pulled	PSD Application and Title V Permit
Certainteed, Kansas City, KS[1]	Good combustion control (no thermal oxidizer on oven exhaust)	1 lb/ton of glass pulled	No RTO, higher VOC limits

The Knauf Shasta facility concludes that the only feasible NO_x control option for the manufacturing line is the use of low NO_x burners to minimize the formation of NO_x during the combustion stage. BACT is considered to be the use of low NO_x burners. The benefits of the use of thermal oxidizers for control of organic emissions and condensable particulates outweigh the increased NO_x emissions resulting from the conversion of ammonia to NO_x as it passes through the thermal oxidizers.

6.0 AIR QUALITY IMPACT ANALYSIS

An AQIA was performed to verify compliance with air quality standards. The primary objective of this analysis was to determine the worst-case ground-level impacts for comparison with the established air quality standards and other regulatory thresholds. If standards and thresholds are not exceeded under these worst-case conditions, then no exceedances are expected under any conditions.

6.1 Modeling Methodology

Impacts on ambient air quality from the Knauf facility were assessed using the ISC PRIME (Industrial Source Complex Plume RIse Model Enhancements) air quality dispersion model. This model includes COMPLEX I modeling capability for complex terrain and the PRIME algorithm for aerodynamic downwash determination. The ISC PRIME model is a versatile Gaussian dispersion model developed by EPA that is capable of assessing impacts from a variety of separate sources in regions of simple or complex terrain. The model is designed to evaluate a wide variety of sources within an industrial source complex. The ISC PRIME model can account for settling and dry deposition of particulates; area, line, and volume sources; plume rise as a function of downward distance; separation of point sources; and elevated receptors. The model is capable of estimating concentrations for a wide range of averaging times from one hour to one year. The ISC PRIME model also evaluates the impacts of multiple sources and sources over distances up to 31.25 miles (50 kilometers).

6.2 Emissions and Stack Parameters

The stack dimensions and exit parameters presented in Table 6.2-1 compare the originally submitted PSD model input parameters with revised input parameters.

Table 6.2-1 Stack Exit Parameters.

	Original PSD Modeling		Revised Modeling[1]	
Parameter	Forming Stack	Electric Furnace Dust Collector	Forming Stack	Electric Furnace Dust Collector
Stack Height, ft	200	85	199	85
Exit Temperature, deg F	190	175	137.7	115.3
Exit Diameter, ft	17	1.74	17	3.08
Flow Rate, ACFM	447,531	9,885	403,828	24,447
Exit Velocity, fps	32.9	69.29	29.7	54.7

1. Revised exit parameters based on worst case emission test data

A comparison of originally proposed PSD emission limits and revised emission limits proposed with this submittal are given in Table 6.2-2.

Table 6.2-2 Emission Rates for ISC PRIME Modeling.

	Originally Proposed PSD Limits		Revised Emission Limits	
Pollutant	**Forming Stack**	**Electric Furnace Dust Collectors**	**Forming Stack**	**Electric Furnace Dust Collectors**
PM_{10} (lb/hr)	43.6	0.1	21.9	1.0
PM_{10} (ton/yr)	191.0	0.4	95.6	4.4
NO_x (lb/hr)	5.7		22.6	
NO_x (ton/yr)	24.8		99	

6.3 Meteorology and Terrain Data

6.3.1 Meteorological Data

Meteorological data for the modeling was based on five (5) years of hourly surface data from the Redding airport, from 1987-1991. Concurrent upper air mixing height data was obtained from the nearest available source in Medford, Oregon. Data from Redding and Medford were used in this analysis because, when compared with other meteorological stations providing data in compatible formats, they provide the most representative meteorological data for the Knauf facility location. The data was pre-processed for input into the ISC PRIME dispersion model. A summary of the meteorological data for the five years can be found in Appendix B.

6.3.2 Terrain

The terrain surrounding the Knauf Shasta site is considered complex, which is characterized by terrain features above the effective stack height of the forming stack. Since complex terrain modeling was required, digitized terrain in 30-meter increments out to 48 kilometers in each direction from the plant was obtained from the United States Geological Survey.

6.4 Receptor Grids

The Knauf facility was modeled out to 2.6 kilometers in each direction with a 100-meter rectangular grid, to 5 kilometers in each direction with a 200-meter grid, to 10 kilometers in each direction with a 500-meter grid, and 45 kilometers in each direction with a 5000-meter grid. A diagram of the receptor grid near Knauf can be found in Figure 6.4-1.

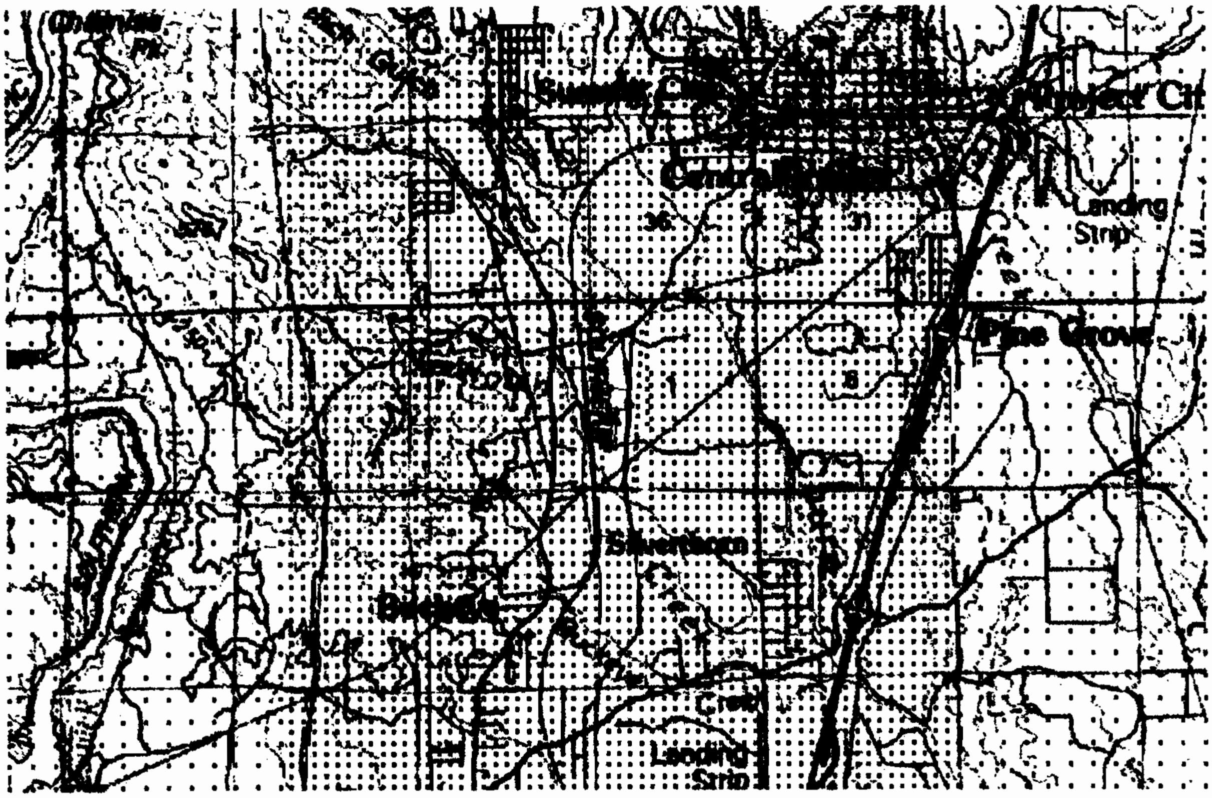

Figure 6.4-1. Modeled Receptor Grid Near Knauf Fiber Glass.

6.5 Rural/Urban Determination

A technique was developed by Irwin (1979) to classify a site area as either rural or urban for purposes of using rural or urban dispersion coefficients. The classification can be based on either land use or population density within 3 kilometers of an emission source. Of these, the USEPA has specified that land use is the most definitive criterion (USEPA, 1993b).

Using the meteorological land use typing scheme established by Auer (1978) for an area within a 3 kilometer radius from a site, an urban classification of the site area requires more than 50 percent of the following land use types: heavy industrial, light-moderate industrial, commercial, single family compact residential, and multi-family compact residential. Since rural land use types comprise greater than 70% of the total area in the vicinity of the Knauf facility, rural dispersion coefficients were employed in the model to calculate plume dispersion (see Figure 6.5-1).

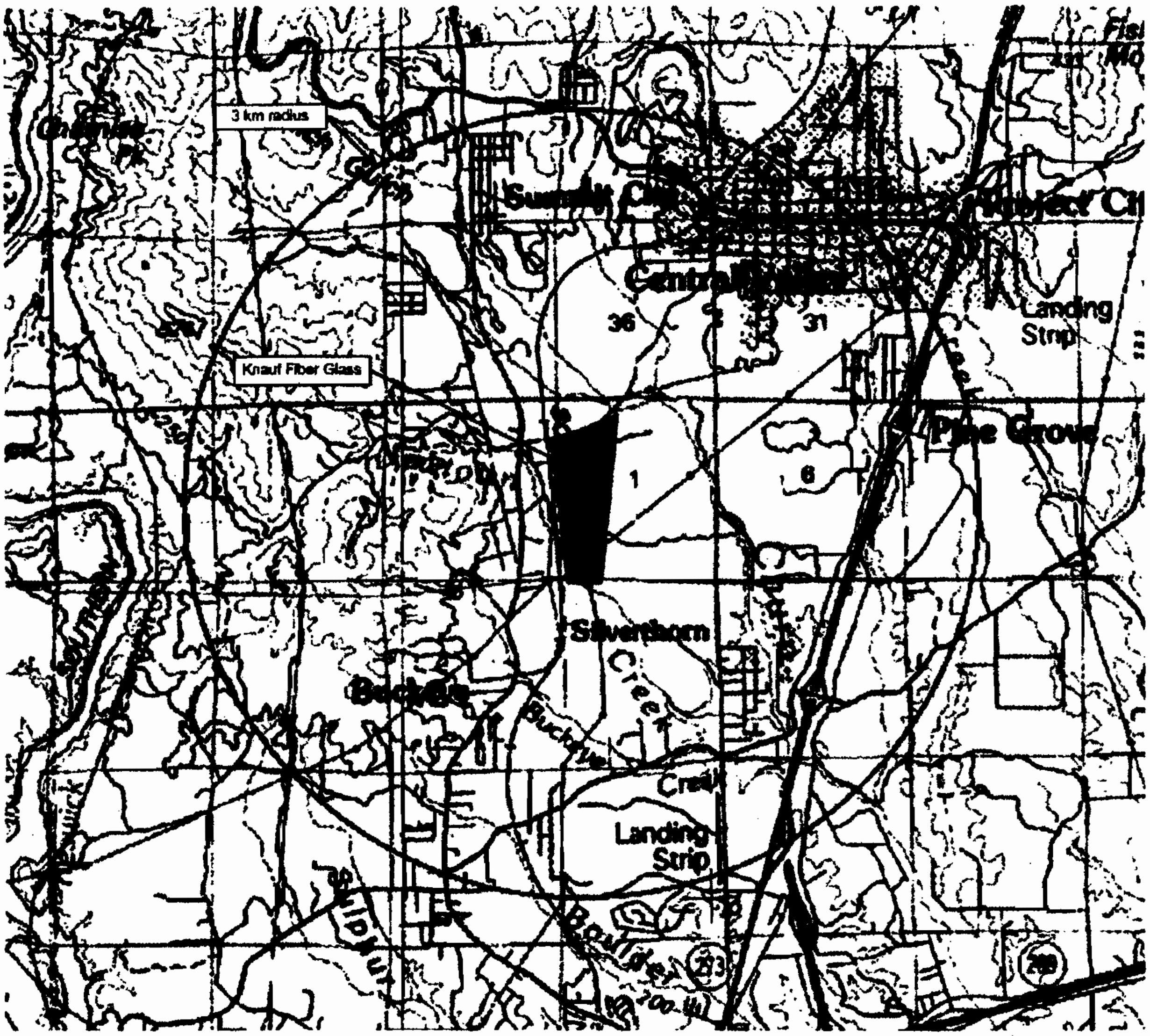

Figure 6.5-1. Topographical Map of Area Near the Knauf Fiber Glass Site.

6.6 Modeling Analysis

A modeling analysis was performed at 1 hour and annual intervals for NO_x. An analysis for PM_{10}, SO_2, CO, Phenol, Formaldehyde, ROG and Ammonia was performed for the original PSD permit application submittal and will not be repeated here since the emissions of these pollutants remain unchanged, or are reduced. Table 6.6-1 presents a summary of the modeling results, with a complete listing in Appendix C. Also included in Appendix C is a CD-ROM containing all modeling input and output files. Concentration distribution isopleths for NO_x can be found in Appendix D.

Table 6.6-1. Air Quality Modeling Results.

Pollutant	Averaging Period	Maximum Concentration – Original PSD Proposed Limits (µg/m³)	Maximum Concentration - Revised Limits (µg/m³)	PSD Increment (µg/m³)	Significant Impact Levels (µg/m³)
PM_{10}	24-Hour	11.3	**NA**	30	5
	Annual	0.62	**NA**	17	1
NO_x	1-Hour	14.3	**71.6**	NA	NA
	Annual	0.08	**0.45**	25	1

6.6.1 Ambient Air Quality Analysis

NO_x emission impacts are compared with National and CARB Ambient Air Quality Standards even though impacts were below the PSD significance level of 1 µg/m³.

Table 6.6-2 summarizes the results of the analysis. The results indicate that the maximum NO_x impacts from Knauf, when combined with the background ambient air quality, will comply with the National and CARB Ambient Air Quality Standards. In addition, this analysis does not take into account offsets obtained by Knauf for the existing permitted NO_x emission limit, and does not take into account offsets that will be obtained for the increase in NO_x requested in this permit application.

Table 6.6-2. Ambient Air Quality Impacts from Knauf.

Pollutant	Averaging Period	Modeled Maximum for Knauf (µg/m³)	Maximum Background Ambient Air Quality[1,2] (µg/m³)	Combined Total Impact (µg/m³)	NAAQS (µg/m³)	CARBAQS (µg/m³)
NO_x	1-Hour	71.6	92.0	163.6	NA	500
	Annual	0.45	1.5	2.0	100	NA

1. NO_x ambient air quality data from Bella Vista, CA Ozone Study performed by CARB in 2000
2. Value provided for annual NO_x background concentration is average value from 45 day sampling period

6.6.2 Increment Analysis

The PSD regulations establish the term "increment" which is the maximum allowable increase in concentration that is allowed to occur for a pollutant. The "baseline" concentration is defined for each pollutant and averaging time as the ambient concentration existing at the time that the first

PSD permit application affecting the area is submitted. Significant deterioration is said to occur when the amount of new pollution would exceed the applicable PSD increment.

Several dates are important. The "major source baseline date" is the date after which actual emissions associated with the construction at the source affect the available PSD increment. Other changes in actual emissions occurring at any source after the major source baseline date do not affect the increment, but instead (until the minor source baseline date is established) contribute to the baseline concentration.

The "trigger date" is the date after which the minor source baseline date may be established. The "minor source baseline date" is the earliest date after the trigger date on which a complete PSD application is received and accepted by the permit-reviewing agency. This date marks the point in time after which all sources affect the available increment. The area in which the minor source baseline date is established the permit application is known as the "baseline area," which includes all portions of the attainment (or unclassifiable area) in which the PSD applicant proposes to locate and any attainment (or unclassifiable area) in which the proposed emissions would have a significant ambient impact (defined at > 1 $\mu g/m^3$ for an annual average).

On December 19, 1996, Knauf representatives met with Messrs. Michael Kussow and Ken Berryman of the Shasta County Air Pollution Control District to discuss the Air Permit Application. At the meeting, it was learned that (1) no other PSD project has located in the Shasta Lake "baseline area" for the Knauf site, (2) the only significant emission source near the Knauf facility was the Sierra Pacific mill, and (3) the full PSD increment was still available for the Knauf project. Therefore, the minor source baseline date was established on the date that the Knauf permit application was deemed complete by Shasta County.

For NO_x emissions, the PSD increment is 25 $\mu g/m^3$ with a 1-$\mu g/m^3$ significant impact level. Since the maximum annual NO_x impact was only 0.45 $\mu g/m^3$, no increment analysis is required.

6.7 Emissions Offsets

6.7.1 Particulates

The Knauf facility has obtained PM_{10} emission offsets at a ratio of 1.2 to 1 for emissions above 25 TPY. This equates to 1.2*(124.4 - 25), or 119.3 TPY. The offsets are from road paving and purchasing of existing emission credits.

6.7.2. NO_x

The Knauf facility has obtained NO_x emission offsets at a ratio of 1.0 to 1 for NO_x emissions over 4.6 TPY, up to the proposed permit limit of 99 TPY. All such offset credits were certified through the Shasta County Air Quality Management District.

7.0 GOOD ENGINEERING PRACTICE STACK HEIGHT

A Good Engineering Practice (GEP) stack height determination was made for the proposed furnace/forming exhaust stack. GEP stacks reduce the effects of building downwash, a condition which can lead to increased air pollution concentrations at ground level. GEP stack heights are also used by EPA as an "upper limit" stack height for the purposes of modeling ground level pollutant concentrations from proposed sources.

Given the dimensions of the Knauf Shasta buildings, with a maximum building height of 78 feet, plus a batch house height of 125 feet, the GEP stack height to avoid downwash effects in all directions is 310.2 feet. The stack height of 199 feet has been kept lower than the GEP height to minimize the visual impact of the facility. By staying below 200 feet, no stack lighting was needed in accordance with Federal Aviation Administration (FAA) requirements.

Since non-GEP stack heights were evaluated, the ISCST3 model was run with the option to evaluate the effects of aerodynamic downwash. The direction specific downwash option of the model was used for the modeling studies.

8.0 HAZARDOUS AIR POLLUTANTS

8.1 Permissible Exposure Limits

The State of California has set 8-hour permissible exposure limits (PELs) for a number of Hazardous Air Pollutants (HAPs), including Ammonia, Formaldehyde and Phenol. The results of this evaluation from the original PSD application are repeated here for information only.

Ammonia emissions from the Knauf facility are a maximum of 38 lbs/hr. At this emission rate, the maximum-modeled ammonia concentration was 34.55 $\mu g/m^3$. Since the calculated ammonia concentration is significantly less than the 8-Hour PEL of 18,000 $\mu g/m^3$, no further modeling was required.

Formaldehyde emissions from the Knauf facility are a maximum of 2 lbs/hr. At this emission rate, the maximum-modeled formaldehyde concentration was 1.82 $\mu g/m^3$. Since the calculated concentration is significantly less than the 8-Hour PEL of 2,000 $\mu g/m^3$, no further modeling was required.

Phenol emissions from the Knauf facility are a maximum of 6 lbs/hr. At this emission rate, the maximum-modeled phenol concentration was 5.46 $\mu g/m^3$. Since the calculated concentration is significantly less than the 8-Hour PEL of 19,000 $\mu g/m^3$, no further modeling was required.

The modeling results for the Hazardous Air Pollutants emitted from the Knauf facility along with their 8-hour PEL limits are presented in Table 8.1-1.

Table 8.1-1. Hazardous Air Pollutant Concentrations 200' Stack.

Pollutant	Concentration ($\mu g/m^3$)	8-Hour PEL ($\mu g/m^3$)
Ammonia	34.55	18,000
Formaldehyde	1.82	2,000
Phenol	5.46	19,000

8.2 Hazard Risk Analysis

To assess the significance of the project's hazardous air pollutant emissions, dispersion modeling was conducted to predict the maximum 1-hour and 5-year average concentrations in the project vicinity. Incremental human health risks were calculated using health risk factors provided by the California Air Pollution Control Officers Association (CAPCOA), as discussed in Section 3.7.

A summary of the maximum predicted HAP concentrations from the original PSD permit is presented here for information only. This summary reflects levels that may occur during plant operation is given in Table 8.2-1. The results demonstrate that, in accordance with the CAPCOA health risk factors and assessment procedures, the Knauf Shasta HAP emissions are insignificant, and do not result in any adverse health effects.

8.2.1 Phenol
Based on the Air Toxics "Hot Spots" Program Risk Assessment Guidelines, there is no Unit Risk Factor for phenol. The chronic noncancer Reference Exposure Level (REL) is 45.0 $\mu g/m^3$, and there is no acute noncancer REL.

A hazard index greater than 1.0 indicates a potential for adverse health effects. The chronic hazard index for phenol is calculated by dividing the chemical's 5-year average concentration by the REL.

200' Stack

Phenol Chronic Hazard Index = 0.07 $\mu g/m^3$ / 45.0 $\mu g/m^3$ = **0.00156**

8.2.2 Formaldehyde
The cancer unit risk factor for formaldehyde is 6.0E-6 $(\mu g/m^3)^{-1}$. (Risks associated with different chemicals are additive.) To calculate the cancer risk, the 5-year average concentration predicted by modeling is multiplied by the unit risk factor.

200' Stack

Formaldehyde Risk Factor = 0.02 $\mu g/m^3$ * 6.0E-6 $(\mu g/m^3)^{-1}$ = **0.00000012**

The chronic noncancer REL is 3.6 $\mu g/m^3$, and the acute noncancer REL is 370 $\mu g/m^3$. The chronic hazard index for formaldehyde is calculated by dividing the chemical's 5-year average concentration by the REL. The acute hazard index for formaldehyde is calculated by dividing the chemical's maximum 1-hour average concentration by the REL.

200' Stack

Formaldehyde Chronic Hazard Index = 0.02 $\mu g/m^3$ / 3.6 $\mu g/m^3$ = **0.00556**

Formaldehyde Acute Hazard Index = 5.05 $\mu g/m^3$ / 370.0 $\mu g/m^3$ = **0.01365**

8.2.3 Ammonia
There is no cancer unit risk factor for ammonia. The chronic noncancer (REL) is 100.0 $\mu g/m^3$, and the acute noncancer REL is 2,100 $\mu g/m^3$. The chronic hazard index for ammonia is calculated by dividing the chemical's 5-year average concentration by the REL. The acute hazard index for ammonia is calculated by dividing the chemical's maximum 1-hour average concentration by the REL.

200' Stack

Ammonia Chronic Hazard Index = 0.44 $\mu g/m^3$ / 100.0 $\mu g/m^3$ = **0.0044**

Ammonia Acute Hazard Index = 96.00 $\mu g/m^3$ / 2,100.0 $\mu g/m^3$ = **0.04571**

Table 8.2-1. Summary of Hazardous Air Pollutant Impacts 200' Stack

Pollutant	5-Year Average (μg/m³)	Maximum 1-Hour (μg/m³)	Incremental Lifetime Cancer Risk	Chronic Hazard Index	Acute Hazard Index
Phenol	0.07	15.16	-	0.00156	-
Formaldehyde	0.02	5.05	0.00000012	0.00556	0.01365
Ammonia	0.44	96.00	-	0.0044	0.04571
Total			0.00000012		
Significance Criteria			0.00001	> 1.0	> 1.0

9.0 SOILS AND VEGETATION

With the plant in operation, air emissions from the facility will have no impact on soils and vegetation in the area. The Knauf facility combusts only natural gas which is extremely low in sulfur. Therefore, there are insignificant amounts of "acid rain" precursors commonly found in plumes from oil- and coal-fired emission sources.

The stack emissions from the facility will have no impact on soils and vegetation in the region. As demonstrated by the modeling study, the air quality impacts demonstrate full compliance with the NAAQS levels for all pollutants. The NAAQS levels were established to protect human health and public welfare (including soils and vegetation). By demonstrating that the Knauf facility will not cause violations of the NAAQS, one may conclude that there will be no impact on soils and vegetation.

10.0 CLASS I AREA IMPACT ANALYSIS AND VISIBILITY

PSD regulations require estimation of the impact of criteria pollutants and visibility impairment on any Class I area within 200 kilometers (100 miles) of a major source. A Level II Visibility Impairment study was performed using the EPA VISCREEN Model for the original PSD permit application. The new guidelines require the use of EPA's CALPUFF model for visibility, as well. Long range modeling has been completed using the CALPUFF model. A Class I Area Impact and Visibility Assessment Report was submitted on June 30, 2003.

11.0 REFERENCES

1. Air & Waste Management Association, *New Source Review: Prevention of Significant Deterioration and Nonattainment Area Guidance Notebook*, Pittsburgh, 1996.

2. Auer, A. H., "Correlation of Land Use and Cover with Meteorological Anomalies," *Journal of Applied Meteorology,* 17:636-643, 1978.

3. Kussow, R. M., Personal communication with Shasta County, Department of Resource Management, Air Quality Management District, Air Pollution Control Officer, December, 1996.

4. Shasta County, Department of Resource Management, Air Quality Management District, *Air Quality Management District, Rules and Regulations*, Redding, California.

5. Trinity Consultants, *Practical Guide to Dispersion Modeling*, Dallas, 1992.

6. U.S. Environmental Protection Agency, *Guideline for Determination of Good Engineering Practice Stack Height (Technical support Document for the Stack Height Regulations*), Research Triangle Park, North Carolina, July, 1981, EPA-450/4-80-023.

7. U.S. Environmental Protection Agency, *New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting*, Research Triangle Park, North Carolina, 1990.

Appendix A

Emission Summary

Electric Furnace Baghouse Emissions

	Electric Furnace Baghouse Stack
Exhaust Flow (lbs/hour):	98,825
Glass Pull Rate (tons/day)	195
Inlet Particulate Loading (lb/hr)	250.0
Removal Efficiency (%)	99.8
Unmargined Outlet Particulate Loading (lb/hr)	0.5
Exhaust Moisture (%)	3.1
Exhaust Molecular Wt.	28.9
Exhaust Temperature (F)	115.3
Bar. Pressure (PSIA)	14.390
ACFM	24,426
DSCFM (60 F; 14.696 PSIA; 0% H2O)	20,948
SCFM	21,618
Stack Exit Diameter (ft)	1.74
Stack Exit Velocity (ft/min)	10,286
Stack Exit Velocity (ft/sec)	171.4
Particulates (lb/hr), with margin	1.0
Particulates (lb/ton of glass pulled), with margin	0.12
MACT Standard (lb/ton)	0.50

Manufacturing Line Forming/Oven/Cooling Stack Emissions

	Individual Sources			
	Forming	**Oven/Cooling**	**Oxidizer**	**Combined Stack**
Exhaust Flow (lbs/hour)	1,427,677	144,619		1,572,296
Glass Pull Rate (tons/day)		195		195
Total Heat Input (million Btu/hr)	55	29.6	36	120.6
NOx emission rate (lb/million Btu)	0.0525	0.034	0.08	0.056
Natural Gas (10^6 scf)	0.053	0.029	0.035	
Particulates after ESP(lb/hr), Method 5E				**21.9**
NOx from combustion (lb/hr)	2.888	1.01	2.88	6.77
NOx from NH3 to NOx Conversion (lb/hr)		1.58	14.24	15.83
Total NOx (lb/hr)				**22.6**
Exhaust Moisture (%)	6	6		6.0
Exhaust Molecular Wt.	28.9	28.9		28.9
Exhaust Temperature (F)	101	500		137.7
Bar. Pressure (PSIA)	14.39	14.39		14.390
ACFM	344,373	59,697		404,070
DSCFM (60 F; 14.696 PSIA; 0% H2O)	293,818	29,763		323,581
SCFM	312,573	31,663		344,235
Stack Exit Diameter (ft)				17
Stack Exit Velocity (ft/min)				1780.2
Stack Exit Velocity (ft/sec)				29.67

Appendix B

Meteorological Data Summary

Summary of Meteorological Data
For Year 1987

Percentage Occurrence of Stability Classes

A	B	C	D	E	F
1.1	9.2	12.9	36.2	12.7	27.9

Distribution of Wind Direction vs. Stability (Hours)

	Stability Class						
Dir	A	B	C	D	E	F	Totals
N	2.	76.	143.	521.	185.	492.	1419.
NNE	2.	19.	33.	108.	20.	110.	292.
NE	2.	14.	18.	47.	19.	77.	177.
ENE	3.	23.	27.	41.	17.	55.	166.
E	6.	29.	29.	61.	15.	50.	190.
ESE	4.	24.	24.	50.	12.	32.	146.
SE	6.	54.	52.	84.	44.	53.	293.
SSE	3.	70.	122.	224.	66.	53.	538.
S	16.	156.	236.	738.	109.	64.	1319.
SSW	13.	68.	59.	149.	26.	21.	336.
SW	10.	48.	47.	76.	26.	22.	229.
WSW	3.	42.	26.	65.	26.	42.	204.
W	4.	36.	36.	103.	46.	54.	279.
WNW	7.	26.	28.	107.	88.	90.	346.
NW	7.	45.	64.	172.	163.	253.	704.
NNW	1.	58.	136.	468.	252.	393.	1308.
Calm	11.	18.	50.	153.	0.	582.	814.
Totals	100.	806.	1130.	3167.	1114.	2443.	8760.

Summary of Meteorological Data
For Year 1988

Percentage Occurrence of Stability Classes

A	B	C	D	E	F
1.6	8.7	12.8	36.8	12.2	28.0

Distribution of Wind Direction vs. Stability (Hours)

	Stability Class						
Dir	A	B	C	D	E	F	Totals
N	8.	74.	157.	609.	129.	455.	1432.
NNE	3.	17.	14.	94.	19.	91.	238.
NE	5.	20.	18.	44.	16.	62.	165.
ENE	1.	16.	15.	53.	17.	48.	150.
E	8.	37.	24.	62.	17.	44.	192.
ESE	6.	30.	30.	39.	18.	24.	147.
SE	6.	46.	73.	70.	42.	33.	270.
SSE	3.	60.	96.	203.	64.	40.	466.
S	23.	136.	206.	619.	85.	55.	1124.
SSW	13.	51.	50.	144.	27.	32.	317.
SW	10.	48.	28.	85.	25.	24.	220.
WSW	5.	33.	22.	67.	17.	31.	175.
W	7.	42.	34.	101.	50.	51.	285.
WNW	5.	36.	32.	136.	88.	97.	394.
NW	9.	41.	72.	181.	193.	243.	739.
NNW	6.	47.	170.	565.	263.	399.	1450.
Calm	19.	33.	80.	160.	0.	728.	1020.
Totals	137.	767.	1121.	3232.	1070.	2457.	8784.

Summary of Meteorological Data
For Year 1989

Percentage Occurrence of Stability Classes

A	B	C	D	E	F
1.2	9.4	13.0	34.2	12.3	29.9

Distribution of Wind Direction vs. Stability (Hours)

	Stability Class						
Dir	A	B	C	D	E	F	Totals
N	6.	68.	166.	690.	203.	526.	1659.
NNE	1.	25.	36.	77.	31.	135.	305.
NE	2.	17.	27.	36.	22.	85.	189.
ENE	2.	16.	17.	50.	7.	43.	135.
E	8.	27.	26.	44.	17.	36.	158.
ESE	4.	23.	27.	57.	16.	40.	167.
SE	5.	67.	72.	81.	38.	46.	309.
SSE	5.	54.	91.	183.	47.	46.	426.
S	8.	138.	202.	580.	88.	45.	1061.
SSW	2.	52.	61.	137.	38.	13.	303.
SW	7.	47.	41.	96.	17.	24.	232.
WSW	4.	35.	28.	66.	21.	21.	175.
W	11.	37.	37.	84.	32.	56.	257.
WNW	6.	31.	31.	83.	49.	61.	261.
NW	8.	55.	61.	146.	161.	181.	612.
NNW	8.	49.	124.	370.	287.	416.	1254.
Calm	20.	85.	92.	213.	0.	847.	1257.
Totals	107.	826.	1139.	2993.	1074.	2621.	8760.

Summary of Meteorological Data
For Year 1990

Percentage Occurrence of Stability Classes

A	B	C	D	E	F
1.9	8.9	13.6	31.2	12.9	31.5

Distribution of Wind Direction vs. Stability (Hours)

Dir	Stability Class A	B	C	D	E	F	Totals
N	8.	49.	178.	544.	247.	470.	1496.
NNE	2.	28.	36.	82.	23.	127.	298.
NE	2.	22.	32.	44.	14.	72.	186.
ENE	8.	31.	24.	39.	14.	48.	164.
E	4.	31.	27.	32.	12.	45.	151.
ESE	5.	27.	25.	38.	18.	18.	131.
SE	5.	36.	47.	71.	17.	27.	203.
SSE	7.	33.	110.	161.	48.	29.	388.
S	15.	119.	210.	558.	95.	35.	1032.
SSW	4.	61.	65.	143.	26.	15.	314.
SW	5.	53.	39.	86.	24.	19.	226.
WSW	7.	41.	26.	53.	23.	24.	174.
W	6.	31.	27.	73.	33.	47.	217.
WNW	6.	33.	29.	67.	68.	64.	267.
NW	7.	48.	52.	132.	152.	231.	622.
NNW	8.	44.	129.	370.	316.	408.	1275.
Calm	64.	91.	136.	242.	0.	1083.	1616.
Totals	163.	778.	1192.	2735.	1130.	2762.	8760.

Summary of Meteorological Data
For Year 1991

Percentage Occurrence of Stability Classes

A	B	C	D	E	F
1.1	9.4	13.7	32.9	11.9	31.1

Distribution of Wind Direction vs. Stability (Hours)

	Stability Class						
Dir	A	B	C	D	E	F	Totals
N	4.	75.	174.	631.	224.	466.	1574.
NNE	1.	28.	32.	80.	27.	129.	297.
NE	2.	16.	27.	59.	22.	82.	208.
ENE	1.	19.	17.	32.	20.	57.	146.
E	4.	42.	35.	65.	13.	50.	209.
ESE	3.	29.	31.	45.	17.	29.	154.
SE	4.	38.	53.	79.	32.	31.	237.
SSE	3.	54.	100.	197.	68.	47.	469.
S	15.	150.	217.	564.	98.	50.	1094.
SSW	6.	55.	73.	131.	32.	26.	323.
SW	4.	50.	46.	74.	24.	24.	222.
WSW	5.	35.	29.	62.	17.	23.	171.
W	4.	30.	40.	90.	40.	56.	260.
WNW	2.	26.	28.	90.	53.	80.	279.
NW	6.	39.	61.	124.	130.	210.	570.
NNW	5.	36.	102.	261.	227.	354.	985.
Calm	28.	103.	131.	294.	0.	1006.	1562.
Totals	97.	825.	1196.	2878.	1044.	2720.	8760.

```
*** ISC3P - VERSION 01228 ***
*** Knauf Shasta Lake                                                       ***
*** Model Executed on 05/19/03 at 18:18:36 ***
 Input File - d:\modeling\Knauf - Shasta Lake\Modeling\1hr NOx 87-91.DTA

Output File - d:\modeling\Knauf - Shasta Lake\Modeling\1hr NOx 87-91.LST

   Met File - D:\modeling\Knauf - Shasta Lake\Modeling\Met Data\red87_91.asc

      Number of sources -         2
Number of source groups -         4
    Number of receptors -      8103
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
FORM_1	0	0.71316E+00	551570.2	4500723.5	225.0	60.66	360.93	10.03	5.18	YES	
FORM_2	0	0.28476E+01	551570.2	4500723.5	225.0	60.66	331.87	9.04	5.18	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
KF_ORIG	FORM_1 ,
KF_REV	FORM_2 ,
ALL_ORIG	FORM_1 ,
ALL_REV	FORM_2 ,

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
KF_ORIG	HIGH 1ST HIGH VALUE IS	14.25712	ON 87092420: AT (	550400.00,	4500700.00,	376.10,	0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	13.99927	ON 88030302: AT (	550400.00,	4500700.00,	376.10,	0.00)	DC	NA
KF_REV	HIGH 1ST HIGH VALUE IS	71.59155	ON 87092420: AT (	550500.00,	4500700.00,	355.40,	0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	68.52325	ON 88030302: AT (	550500.00,	4500700.00,	355.40,	0.00)	DC	NA
ALL_ORIG	HIGH 1ST HIGH VALUE IS	14.25712	ON 87092420: AT (	550400.00,	4500700.00,	376.10,	0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	13.99927	ON 88030302: AT (	550400.00,	4500700.00,	376.10,	0.00)	DC	NA
ALL_REV	HIGH 1ST HIGH VALUE IS	71.59155	ON 87092420: AT (	550500.00,	4500700.00,	355.40,	0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	68.52325	ON 88030302: AT (	550500.00,	4500700.00,	355.40,	0.00)	DC	NA

*** ISC3P - VERSION 01228 ***
*** Knauf Shasta Lake ***
*** Model Executed on 05/19/03 at 18:26:15 ***
Input File d:\modeling\Knauf Shasta Lake\Modeling\Annual NOx 87.DTA

Output File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 87.LST

Met File - D:\modeling\Knauf - Shasta Lake\Modeling\Met Data\redc87.asc

Number of sources - 2
Number of source groups - 4
Number of receptors - 8103

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
FORM_1	0	0.71316E+00	551570.2	4500723.5	225.0	60.66	360.93	10.03	5.18	YES	
FORM_2	0	0.28476E+01	551570.2	4500723.5	225.0	60.66	331.87	9.04	5.18	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
KF_ORIG	FORM_1 ,
KF_REV	FORM_2 ,
ALL_ORIG	FORM_1 ,
ALL_REV	FORM_2 ,

*** THE SUMMARY OF MAXIMUM ANNUAL (8760 HRS) RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
KF_ORIG	1ST HIGHEST VALUE IS	0.08074 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.08000 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.07844 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.07641 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.07633 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.07578 AT (	551300.00,	4504000.00,	314.60,	0.00)	DC	NA
KF_REV	1ST HIGHEST VALUE IS	0.45047 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.44966 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.44569 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.44258 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.42998 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.42285 AT (	551300.00,	4503700.00,	291.70,	0.00)	DC	NA
ALL_ORIG	1ST HIGHEST VALUE IS	0.08074 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.08000 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.07844 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.07641 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.07633 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.07578 AT (	551300.00,	4504000.00,	314.60,	0.00)	DC	NA
ALL_REV	1ST HIGHEST VALUE IS	0.45047 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.44966 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.44569 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.44258 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.42998 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.42285 AT (	551300.00,	4503700.00,	291.70,	0.00)	DC	NA

```
*** ISC3P - VERSION 01228 ***
*** Knauf Shasta Lake                                                          ***
*** Model Executed on 05/19/03 at 18:27:46 ***
 Input File - d:\modeling\Knauf   Shasta Lake\Modeling\Annual NOx 88.DTA

Output File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 88.LST

   Met File - D:\modeling\Knauf - Shasta Lake\Modeling\Met Data\redc88.asc

     Number of sources -          2
Number of source groups -         4
   Number of receptors -       8103
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
FORM_1	0	0.71316E+00	551570.2	4500723.5	225.0	60.66	360.93	10.03	5.18	YES	
FORM_2	0	0.28476E+01	551570.2	4500723.5	225.0	60.66	331.87	9.04	5.18	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
KF_ORIG	FORM_1 ,
KF_REV	FORM_2 ,
ALL_ORIG	FORM_1 ,
ALL_REV	FORM_2 ,

*** THE SUMMARY OF MAXIMUM ANNUAL (8784 HRS) RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
KF_ORIG	1ST HIGHEST VALUE IS	0.06613 AT (	550400.00,	4500600.00,	361.00,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.06471 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06388 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06355 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06221 AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06219 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
KF_REV	1ST HIGHEST VALUE IS	0.37098 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.36470 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.36366 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.35994 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.35561 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.34986 AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA
ALL_ORIG	1ST HIGHEST VALUE IS	0.06613 AT (	550400.00,	4500600.00,	361.00,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.06471 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06388 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06355 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06221 AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06219 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
ALL_REV	1ST HIGHEST VALUE IS	0.37098 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.36470 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.36366 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.35994 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.35561 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.34986 AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA

*** ISC3P - VERSION 01228 ***
*** Knauf Shasta Lake ***
*** Model Executed on 05/19/03 at 18:29:12 ***
Input File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 89.DTA

Output File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 89.LST

Met File - D:\modeling\Knauf - Shasta Lake\Modeling\Met Data\redc89.asc

Number of sources - 2
Number of source groups - 4
Number of receptors - 8103

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
FORM_1	0	0.71316E+00	551570.2	4500723.5	225.0	60.66	360.93	10.03	5.18	YES	
FORM_2	0	0.28476E+01	551570.2	4500723.5	225.0	60.66	331.87	9.04	5.18	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
KF_ORIG	FORM_1 ,
KF_REV	FORM_2 ,
ALL_ORIG	FORM_1 ,
ALL_REV	FORM_2 ,

*** THE SUMMARY OF MAXIMUM ANNUAL (8760 HRS) RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
KF_ORIG	1ST HIGHEST VALUE IS	0.06518 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.06467 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06448 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06296 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06279 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06259 AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA
KF_REV	1ST HIGHEST VALUE IS	0.36823 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.36210 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.36180 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.35684 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.35171 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.34784 AT (	551500.00,	4504000.00,	300.70,	0.00)	DC	NA
ALL_ORIG	1ST HIGHEST VALUE IS	0.06518 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.06467 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06448 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06296 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06279 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06259 AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA
ALL_REV	1ST HIGHEST VALUE IS	0.36823 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.36210 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.36180 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.35684 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.35171 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.34784 AT (	551500.00,	4504000.00,	300.70,	0.00)	DC	NA

```
*** ISC3P - VERSION 01228 ***
*** Knauf Shasta Lake                                                    ***
*** Model Executed on 05/19/03 at 18:30:36 ***
 Input File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 90.DTA

Output File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 90.LST

   Met File - D:\modeling\Knauf - Shasta Lake\Modeling\Met Data\redc90.asc

     Number of sources -          2
Number of source groups -         4
   Number of receptors -       8103
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
FORM_1	0	0.71316E+00	551570.2	4500723.5	225.0	60.66	360.93	10.03	5.18	YES	
FORM_2	0	0.28476E+01	551570.2	4500723.5	225.0	60.66	331.87	9.04	5.18	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
KF_ORIG	FORM_1 ,
KF_REV	FORM_2 ,
ALL_ORIG	FORM_1 ,
ALL_REV	FORM_2 ,

*** THE SUMMARY OF MAXIMUM ANNUAL (8760 HRS) RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
KF_ORIG	1ST HIGHEST VALUE IS	0.06316	AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.06277	AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06258	AT (	550500.00,	4500700.00,	355.40,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06225	AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06179	AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06153	AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
KF_REV	1ST HIGHEST VALUE IS	0.37157	AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.36374	AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.36109	AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.36010	AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.35616	AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.35104	AT (	551500.00,	4504000.00,	300.70,	0.00)	DC	NA
ALL_ORIG	1ST HIGHEST VALUE IS	0.06316	AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.06277	AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06258	AT (	550500.00,	4500700.00,	355.40,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06225	AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06179	AT (	551500.00,	4504100.00,	309.70,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06153	AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
ALL_REV	1ST HIGHEST VALUE IS	0.37157	AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.36374	AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.36109	AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.36010	AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.35616	AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.35104	AT (	551500.00,	4504000.00,	300.70,	0.00)	DC	NA

```
*** ISC3P - VERSION 01228 ***
*** Knauf Shasta Lake                                                       ***
*** Model Executed on 05/19/03 at 18:31:55 ***
 Input File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 91.DTA

Output File - d:\modeling\Knauf - Shasta Lake\Modeling\Annual NOx 91.LST

   Met File - D:\modeling\Knauf - Shasta Lake\Modeling\Met Data\redc91.asc

      Number of sources -          2
Number of source groups -          4
    Number of receptors -       8103
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
FORM_1	0	0.71316E+00	551570.2	4500723.5	225.0	60.66	360.93	10.03	5.18	YES	
FORM_2	0	0.28476E+01	551570.2	4500723.5	225.0	60.66	331.87	9.04	5.18	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
KF_ORIG	FORM_1 ,
KF_REV	FORM_2 ,
ALL_ORIG	FORM_1 ,
ALL_REV	FORM_2 ,

*** THE SUMMARY OF MAXIMUM ANNUAL (8760 HRS) RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
KF_ORIG	1ST HIGHEST VALUE IS	0.07124 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.07063 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06785 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06631 AT (	551300.00,	4504000.00,	314.60,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06582 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06550 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
KF_REV	1ST HIGHEST VALUE IS	0.39882 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.39147 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.38729 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.38016 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.37513 AT (	551300.00,	4503700.00,	291.70,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.36896 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
ALL_ORIG	1ST HIGHEST VALUE IS	0.07124 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.07063 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.06785 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.06631 AT (	551300.00,	4504000.00,	314.60,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.06582 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.06550 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
ALL_REV	1ST HIGHEST VALUE IS	0.39882 AT (	551300.00,	4503800.00,	311.70,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.39147 AT (	551300.00,	4503900.00,	317.30,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.38729 AT (	551400.00,	4503800.00,	302.70,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.38016 AT (	551400.00,	4503700.00,	293.00,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.37513 AT (	551300.00,	4503700.00,	291.70,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.36896 AT (	551400.00,	4504000.00,	307.00,	0.00)	DC	NA

Appendix D

Modeling Isopleths

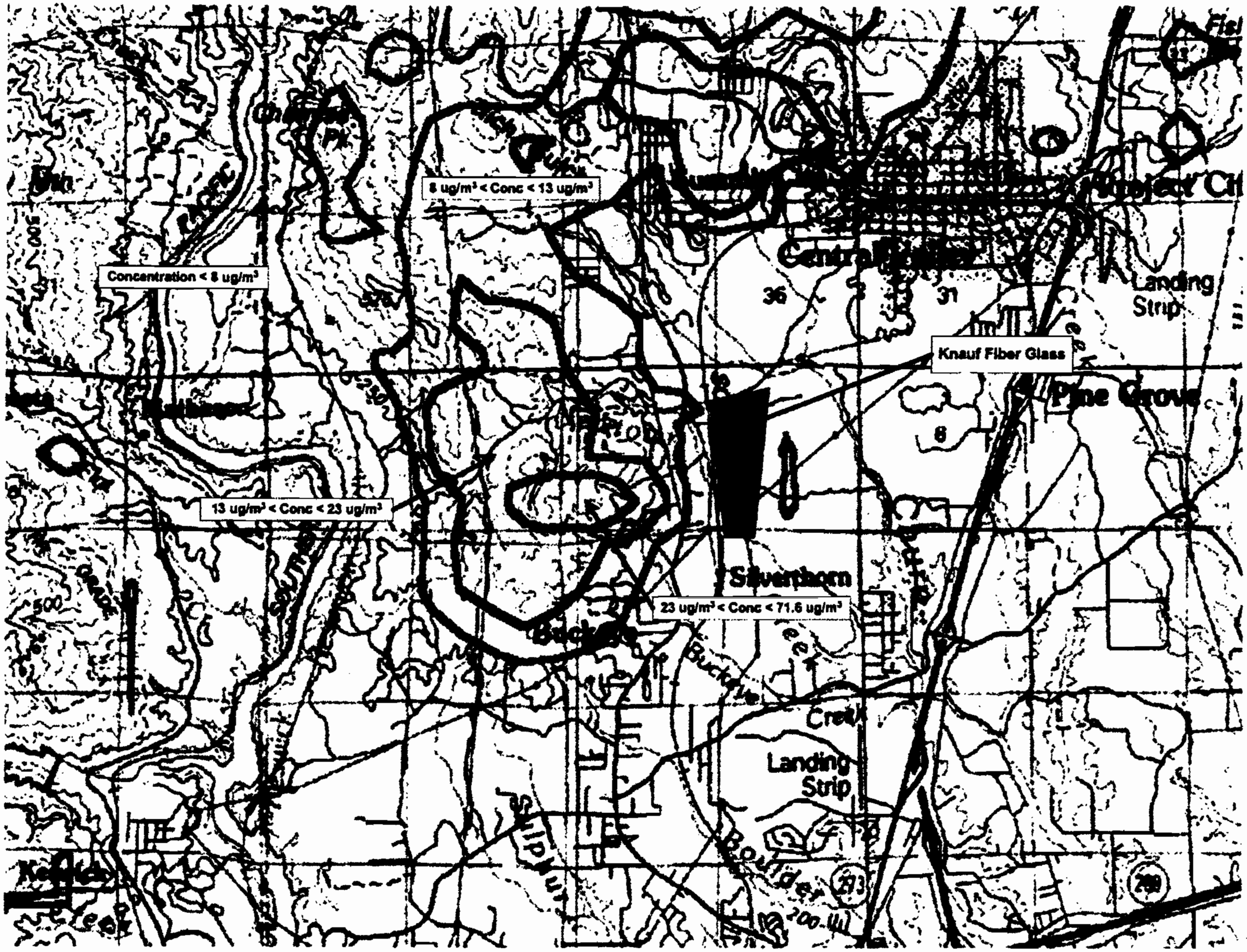

Figure D.1. Maximum 1-Hour NO_x Impacts From Knauf (1987-1991 Meteorological Data)

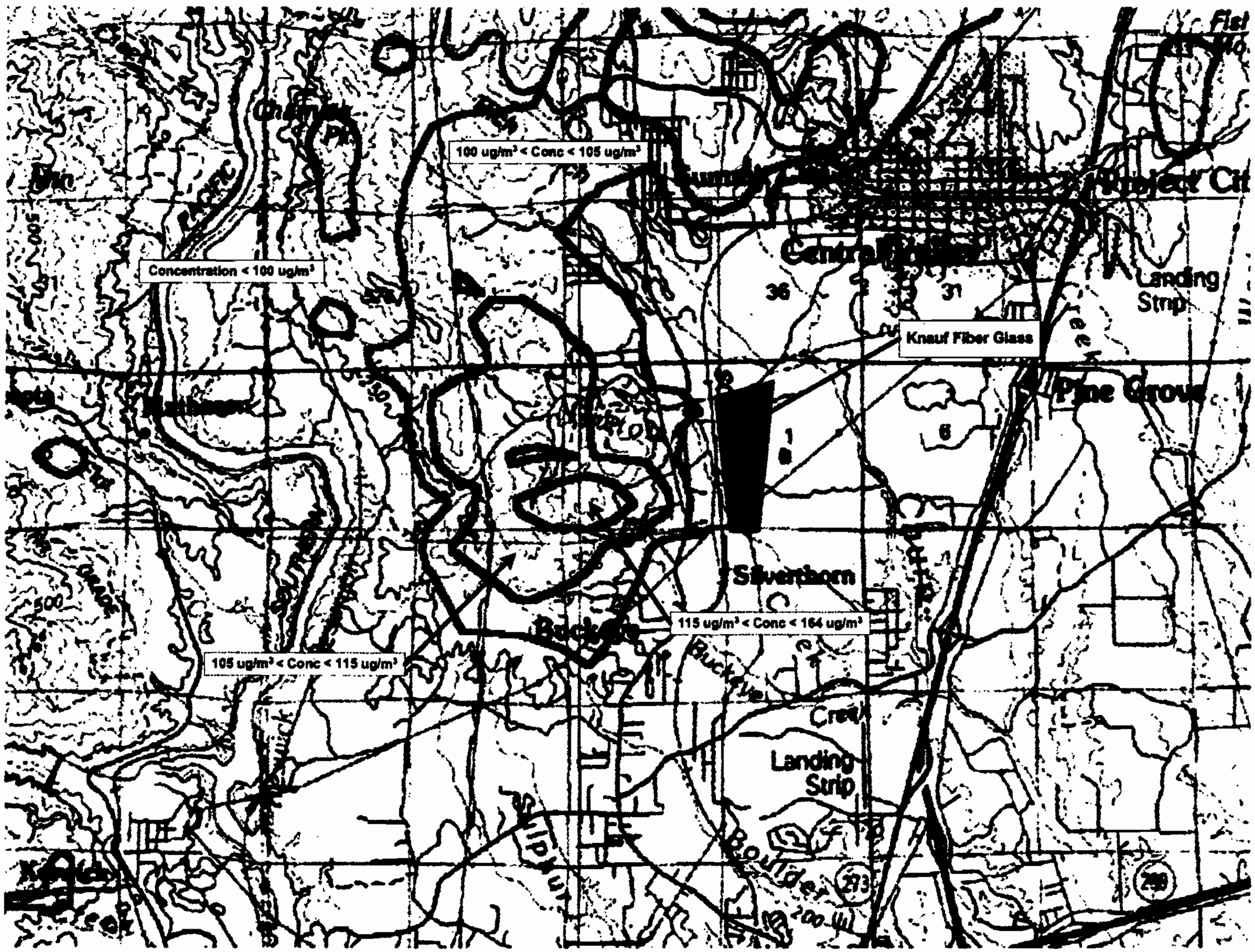

Figure D.2. Maximum 1-Hour NO_x Impacts From Knauf - Includes Background Concentration (1987-1991 Met. Data)

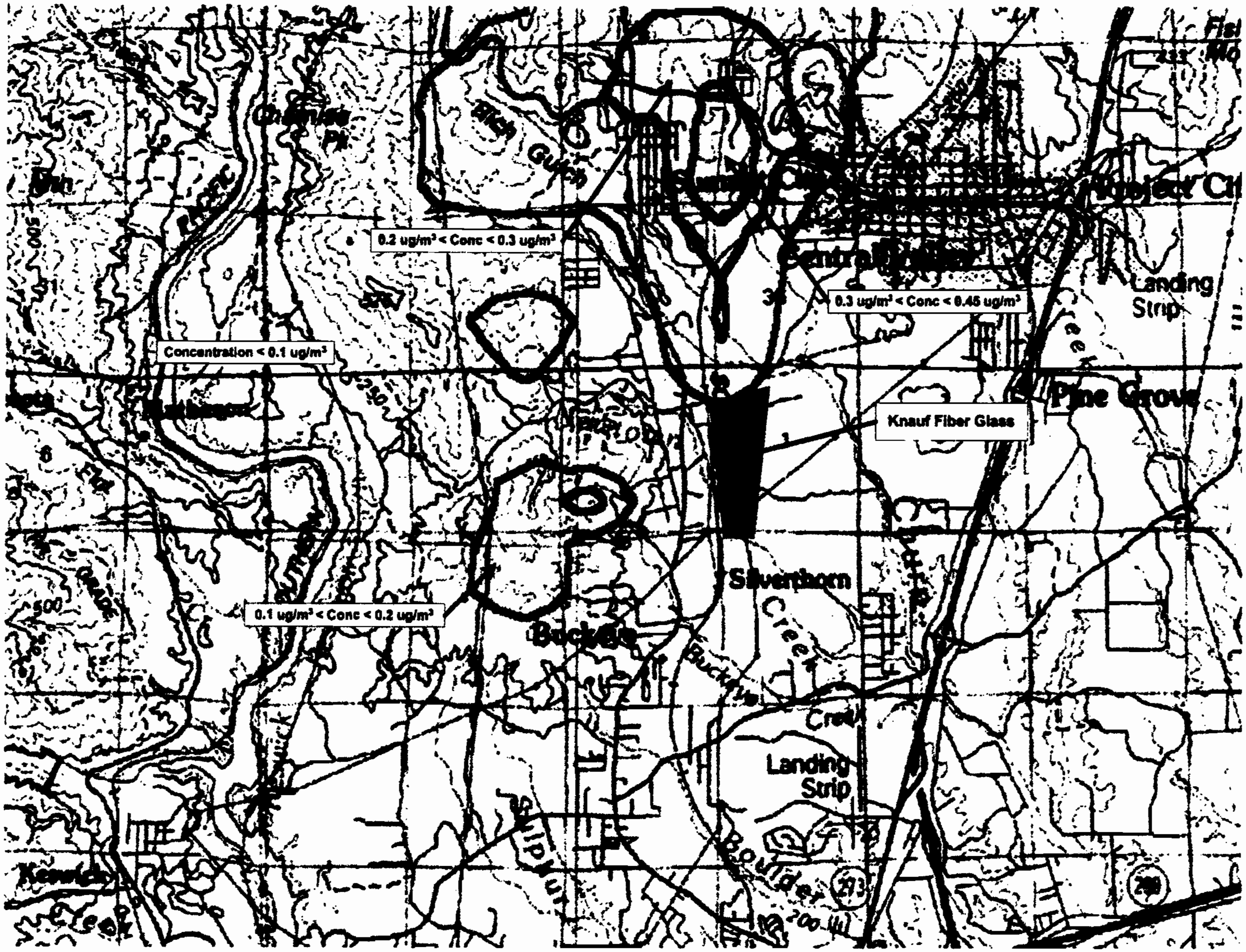

Figure D.3. Maximum Annual NO_x Impacts From Knauf (1987 Meteorological Data)

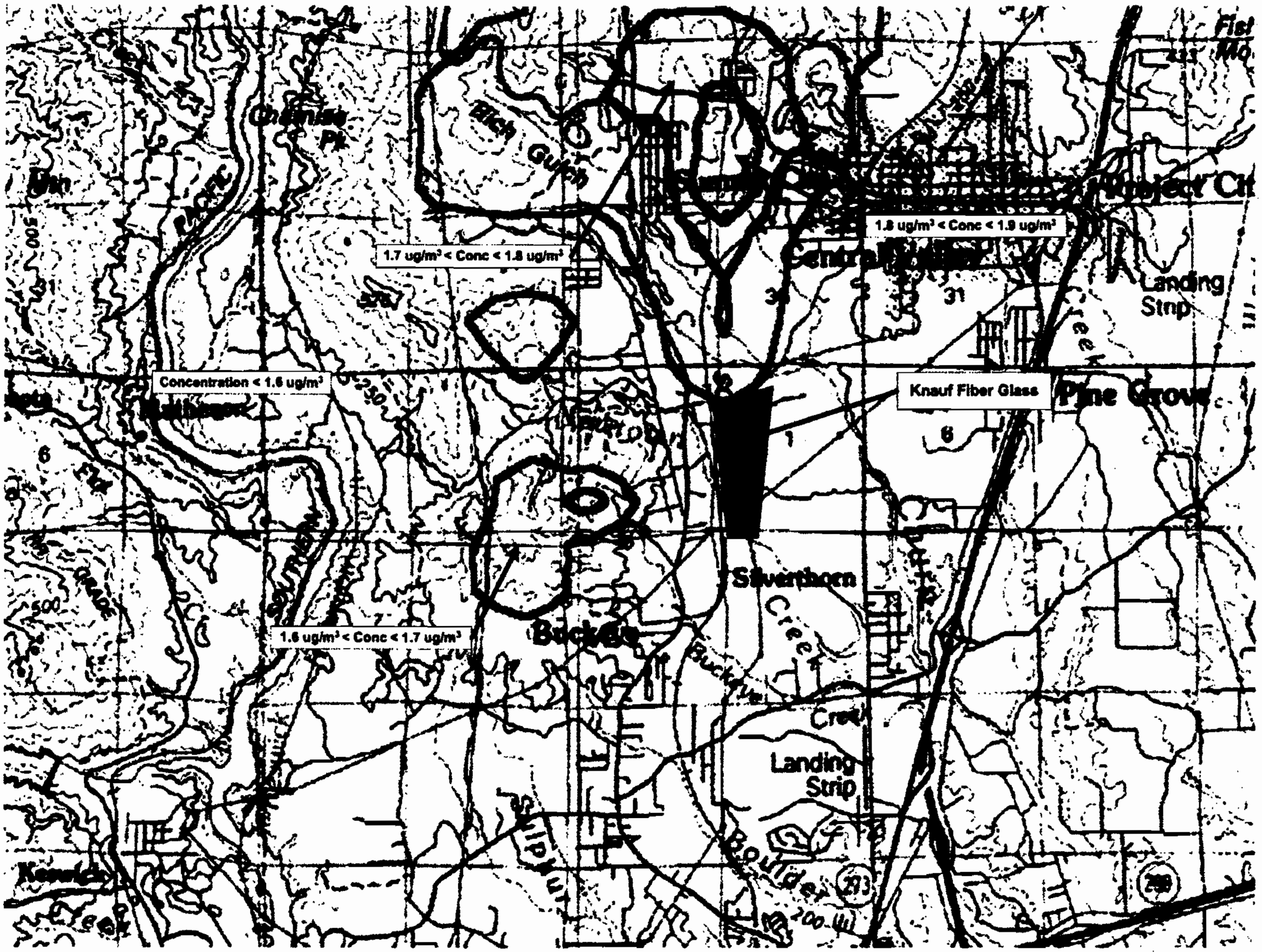

Figure D.4. Maximum Annual NO_x Impacts From Knauf - Includes Background Concentration (1987 Meteorological Data)

Appendix E

Original PSD Permit

EXPIRATION DATE:
March 14, 2002

PERMIT NO:
97-PO-06

SHASTA COUNTY
DEPARTMENT OF RESOURCE MANAGEMENT
AIR QUALITY MANAGEMENT DISTRICT

KNAUF FIBER GLASS GmbH
(Applicant)

IS HEREBY GRANTED A

FEDERAL PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

AUTHORITY TO CONSTRUCT

SUBJECT TO CONDITIONS NOTED

A FIBERGLASS MANUFACTURING FACILITY
Consisting of the following emission units:

RAW MATERIALS HANDLING AND MIXING	(#97-PO-26)
GLASS MELTING	(#97-PO-27)
FIBERGLASS FORMING/CURING/COOLING	(#97-PO-28)
FIBERGLASS TRIMMING AND PACKAGING	(#97-PO-29)

AT **3100 DISTRICT DRIVE, SHASTA LAKE, CALIFORNIA 96019**

DATE ISSUED: March 14, 2000

APPROVED: ______________________
Air Pollution Control Officer

SEE CONDITIONS ON ATTACHMENTS

11757

KNAUF FIBER GLASS
PSD AUTHORITY TO CONSTRUCT

EQUIPMENT UNDER PERMIT

RAW MATERIALS HANDLING AND MIXING (#97-PO-26)

1 ea. Raw Material Unloading Dust Collector
1 ea. Sand Bins Dust Collector
1 ea. Consumer Cullet Bin Dust Collector
1 ea. Dolomite Bin Dust Collector
1 ea. Limestone Bin Dust Collector
1 ea. (Spare) Bin Dust Collector
1 ea. Borax Bin Dust Collector
1 ea. Soda Ash Bin Dust Collector
1 ea. Feldspar Bin Dust Collector
1 ea. Knauf Cullet Dust Collector
1 ea. Weigh Scales/Conveyor Dust Collector
1 ea. Check Scale/Batch Mixer Dust Collector
1 ea. Day Bin #1 Dust Collector
1 ea. Day Bin #2 Dust Collector
1 ea. Liquid Urea Tank
2 ea. Phenolic Resin Tanks
2 ea. Resin-Urea Premix Tanks
1 ea. Outdoor Mineral Oil Tank
1 ea. Outdoor Aqueous Ammonia Tank
2 ea. Ammonium Sulfate Mix Tanks
1 ea. Organosilane Weigh Tank
1 ea. Binder Mix Tank
2 ea. Binder Supply Hold Tanks

GLASS MELTING (#97-PO-27)

195 Tons/Day Molten Glass Production Electric Glass Melting Furnace
Two (2)ea. 7681 DSCFM, GMD Pulse Jet Dust Collectors(Mod.2-169-10-6RA)

FIBERGLASS FORMING/CURING/COOLING (#97-PO-28)

1 ea. Natural Gas-Fired Forming Section
1 ea. Natural Gas-Fired Curing Oven (low NOx/CO Burners)
1 ea. Volatile Organic Compound Binder Application Process
6 ea. 10"_P Venturi Scrubbers on Bonded Wool Forming Line
1 ea. 10"_P Venturi Scrubber on Blowing Wool Forming Line
1 ea. 400,000 ACFM, 600 GPM Wet Electrostatic Precipitator
2 ea. 1400° Thermal Oxidizers (low NOx/CO Burners) on Curing Oven
1 ea. Settling Chamber/Air Washer on Cooling Line

FIBERGLASS TRIMMING AND PACKAGING (#97-PO-29)

1 ea 9874 ACFM Trimming-Packaging Cyclone (1) & Dust Collector Assembly
1 ea 9874 ACFM Class B Blowing Wool Cyclones (2) & Dust Collector Assembly
1 ea 15,708 ACFM Class A Blowing Wool Cyclone (1) & Dust Collector Assembly
1 ea 15,708 ACFM Class A Blowing Wool Bagger Dust Collector Assembly
4 ea High Density Filter Modules

SEE CONDITIONS ON ATTACHMENTS

KNAUF FIBER GLASS

PSD AUTHORITY TO CONSTRUCT

GENERAL PERMIT CONDITIONS
(Applies to all emission units under this permit.)

1. This Authority to Construct (PSD Permit) is issued in accordance with the rules and regulations of the District and pursuant to the delegation of PSD authority by the Environmental Protection Agency (EPA), Region 9, on July 8, 1985. If any provision of this permit is found invalid, such finding shall not affect the remaining provisions.

2. In the event of any changes in control or ownership of facilities to be constructed or modified, this Authority to Construct (PSD Permit) shall be binding on all subsequent owners and operators. The applicant shall notify the succeeding owner and operator of the existence of this Authority to Construct (PSD Permit) and its conditions by letter, a copy of which shall be forwarded to the Air Pollution Control Officer (APCO) of the Shasta County Air Quality Management District (District), the California Air Resources Board (CARB), and the EPA.

3. Equipment is to be maintained so that it operates as it did when the permit was issued. Any anticipated production expansion beyond the 195 Tons/day limit found in Condition #35 of this permit is prohibited without separate application for a new Authority to Construct and Permit to Operate from the District. Any change in equipment, method of operation, fuel use, or process which may cause an emission increase, shall be reported to the District at least 30 days prior to taking any action or seeking other permits regarding such change in order for the District to determine if an application for an Authority to Construct is necessary.

4. This Authority to Construct (PSD Permit) shall be valid for a period of two (2) years from the issuance date in accordance with District Rule 2:12.

5. Acceptance of this permit is deemed acceptance of all conditions as specified. All equipment, facilities, and systems shall be designed and operated in a manner that maintains compliance with the conditions of this permit, applicable provisions of 40 CFR Parts 52, 60, 61, 63 and any other applicable local, State, or Federal regulations. Failure to comply with any condition of this permit or the Rules and Regulations of the District shall be grounds for revocation, either by the APCO or the District Hearing Board.

6. The District reserves the right to amend this permit, if the need arises, in order to insure compliance of this facility with applicable local, State, or Federal regulations, or to abate any public nuisance.

7. Periods of excess emissions, upsets, breakdowns, or malfunctions shall be reported to the District, in accordance with District Rule 3:10, within four hours of occurrence. In no event shall the equipment be operated with the emission control equipment in a malfunctioning condition beyond the end of the work shift or 24 hours, whichever occurs first. If any emission control equipment or technology becomes inoperative or substantially impaired for any reason, including maintenance, to the degree of causing a violation of emission limitations, the owner/operator shall (1) immediately (within 15 minutes) cease all operations connected with that emission control equipment and (2) repair the equipment or technology to its prior efficiency before restarting operations.

8. This facility is subject to all applicable requirements of the Air Toxics "Hot Spots" Information and Assessment Act of 1987, as cited in *California Health and Safety Code* Sections 44300 *et seq.*

9. This facility is subject to the applicable provisions of Title V of the Federal Clean Air Act of 1990.

10. This facility is subject to the applicable provisions of the National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing (40 CFR Part 63, Subpart NNN). Emission limits stated in the above provisions, however, do not supersede more stringent limits found in other conditions of this permit.

11. The right of entry described in *California Health and Safety Code* Section 41510, Division 26, shall apply at all times. The Regional Administrator of the EPA, the Executive Officer of the California Air Resources Board, the APCO, and/or their authorized representatives, upon the presentation of credentials shall be permitted:

    a. to enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this Authority to Construct; and

    b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this Authority to Construct; and

    c. to inspect any equipment, operation, or method required in this Authority to Construct; and

    d. to sample emissions from any and all emission sources within the facility.

12. All records and emission test results requested to be kept under the terms and conditions of this Authority to Construct shall be retained for at least five years from the date of entry and be made available to the District staff upon request.

13. The operating staff with management authority at this facility shall be advised of and be familiar with all the conditions of this permit.

14. The owner/operator shall continuously employ at the facility site at least one staff person who maintains certification by the California Air Resources Board as a Visible Emission Evaluator capable of accurately discerning stack opacity.

15. During construction of this facility, the following fugitive emission control measures shall be implemented at the plant site:

    a. Suspend all grading operations when winds (including instantaneous gusts) exceed 20 miles per hour.

    b. Water active construction sites at least twice daily or as needed to control fugitive dust.
    c. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.

    d. Sweep streets with a water sweeper at the end of each day if visible soil materials are carried onto adjacent public paved roads.

e. All trucks hauling dirt, sand, soil, or other loose materials should be covered or should maintain at least two (2) feet of freeboard (minimum vertical distance between the top of the load and the top of the trailer), in accordance with the requirements of California Vehicle Code Section 23114.

f. Re-establish ground cover on the construction site through seeding and watering as soon as possible, but no later than final occupancy.

16. Monthly emission reports shall be required to be submitted by the 15th of the month following data recording and shall include:

a. notification of all periods 3 minutes and longer in duration when opacity from stack #1, the combined exhaust stack for the glass melting furnace dust collectors, any baghouse, or any dust collector exceeds the specified limit and the reason for the excursion;

b. notification of all periods the opacity monitor on stack #1 or the opacity monitor on the combined exhaust stack for the glass melting furnace dust collectors was not functioning and the reasons for the same;

c. notification of all dates and times when process exhausts are vented without the use of the required control equipment and the reason for each instance.

d. notification of all dates and times of failure to achieve minimum control device operating parameters required by Conditions #46, #47, and #48.

e. written documentation of the quarterly calibrations of the monitoring devices required in Condition #50 and a report of corrective maintenance required as a result of the calibrations.

f. written documentation of monthly natural gas fuel consumption for the fiberizing/forming section and the oven/incineration section of the facility on a separate basis.

g. written documentation of the date and times when the firebox temperature in the thermal oxidizer required in Condition #47b is less than 1400°F.

h. written documentation of quantity of glass pulled to fiber on a daily basis and total for the month.

i. written documentation of corrective action taken to correct each event of malfunctioning operating or control equipment or any condition causing excessive emissions.

j. if no permit limitations were exceeded, the report must so state.

17. Periodic emission testing shall be required pursuant to District Rule 2:11.a.3.(f). Results of all emission testing shall be forwarded to the District for compliance verification. An emission testing protocol detailing

the methods of sampling and analysis shall be submitted to the District for approval 60 days prior to the initial testing and any subsequent test required under the above rule.

18. Newly graded areas where active construction ceases for more than ten (10) days shall be treated with a non-toxic dust suppressant compound and be left undisturbed.

19. References to rules, regulations, etc., within this permit shall be interpreted as referring to such rules and regulations in their present configuration and language as of the date of issuance of this permit.

20. The owner/operator shall provide all necessary emission offset requirements for ROG, NOx, and PM10 as specified by City of Shasta Lake Conditional Use Permit No. 96-07 prior to issuance of a District Permit to Operate for the facility. All emission offsets shall be approved by the District and be quantifiable, enforceable, and permanent. Any combination of the following shall be acceptable for use as emission offsets:

    a. Best Available Mitigation Measures (BAMMs) as listed in the Air Quality Element of the City's General Plan,

    b. Banked emission reduction credits as allowed by District Rule 2:2,

    c. District-approved measures such as, but not limited to, paving roads within approximately 2 miles of the project site which are not associated with the project. If paving roads is selected for use as a measure for providing emission offsets, the following minimum analyses shall be accomplished on each candidate road segment to the satisfaction of the District prior to finalizing the specific roads to be paved:

        1) Silt content of each road surface material
        2) Traffic study to determine mean vehicle speed, trip lengths, number of trips, vehicle types, etc.
        3) Precipitation data for calculating emissions shall be obtained from the Shasta Lake Fire Station

21. Fugitive and direct emissions, during facility operation including, but not limited to, any of the following, shall be controlled at all times the permitted emissions units are operating such that a public nuisance is not created beyond the plant property boundaries:

    a. dust from paved or unpaved roads or any non-vegetation-covered area;

    b. dust from materials-handling devices and/or storage areas;

    c. accumulation of dust on outside surfaces including, but not limited to, the buildings, outdoor equipment, support pads, road areas. Surfaces shall be cleaned on a regular basis as needed to prevent buildup and/or fugitive dust;

d. dust from waste handling including waste from the water filtration system, wet electrostatic precipitator, dust collectors and waste containing unusable fiberglass. Waste shall be stored and transported in closed containers and handled at all times in a manner that prevents dust from becoming a public nuisance or a health hazard. It shall be the responsibility of the facility owner/operator to insure that any and all contract or company carriers adhere to this condition;

e. odorous chemical releases.

22. Agency Notifications: Correspondence shall be forwarded to each of the following agencies as required by the specific Authority to Construct conditions:

1. Air Pollution Control Officer
Shasta County Air Quality Management District
1855 Placer Street, Suite 101
Redding, CA 96001

2. Chief, Enforcement Office (Attn: Air-5)
U.S.Environmental Protection Agency Region 9
75 Hawthorne Street
San Francisco, CA 94105

3. Chief, Stationary Source Control Division
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95814

23. The owner/operator shall finance the purchase and installation of two (2) EPA-approved PM10 monitors and two (2) Federal Reference Method (FRM) PM2.5 monitors, related supplies, and calibration equipment. The monitors will be used as special purpose ambient air monitors by the District for measuring PM10 and PM2.5 concentration levels at locations chosen by the District to provide necessary monitor security and representative sampling of ambient emission impacts from construction and operation of the proposed facility. In choosing the location of the monitors, the District will give special consideration to any sensitive receptors surrounding the proposed facility and locate at least one (1) collocated monitoring site at a school near to the facility. The monitors will sample on the same schedule and use the identical procedures as the other District-owned PM10 ambient monitors. In addition, the owner/operator shall finance the District operation and maintenance of the special purpose monitors for up to one (1) year prior to, and for a minimum period of two (2) years after, the commencement of operation of the facility by reimbursing the District for all staff time, materials, mileage, etc. associated with such activity in accordance with District Rule 2:11a.3.(e). The special purpose monitoring program shall be reconsidered upon annual permit renewal thereafter.

24. The owner/operator shall install and maintain an on-site meteorological station at the subject facility. The station shall include the capability to measure temperature and wind pattern data (direction and velocity) and record the results on continuous chart paper or retain the data on a data acquisition system.

25. The owner/operator shall finance an ambient monitoring program conducted by District staff for fugitive respirable fiberglass particle impact levels at specific receptor locations chosen by District staff within

proximity of the facility. At least one (1) monitoring site shall be chosen at a school near to the facility. The monitoring will be conducted using a medium volume ambient air sampler equivalent to Hi-Q Model MRV-0523c and NIOSH Method 7400 analysis in accordance with a monitoring plan submitted by the owner/operator and approved by the District. The plan will be submitted to the District no later than 60 days prior to startup. The monitoring program shall continue for a minimum period of one (1) year following startup of the facility and be reconsidered upon annual permit renewal thereafter. The results of this monitoring program must demonstrate that the fiber concentrations in the ambient air must be below a level of significant health impact as defined by the State Office of Environmental Health Hazard Assessment.

26. The owner/operator shall notify the District within four (4) hours of receiving any odor-related or fugitive emission-related complaint and shall provide the following information to the District:

    a. date and time of contact

    b. complainant's name, location, and description of complaint

    c. status of plant operations during time of complaint

    d. investigation results and any action taken to remedy problem

A log of all complaints received will be maintained by the owner/operator for a minimum of five (5) years from date of entry and will be made available to the District upon request.

27. The owner/operator shall submit equipment drawings and design details of all baghouses, wet scrubbers, wet electrostatic precipitators, thermal oxidizers, settling chambers, dust collectors, and filtration modules to the District for approval prior to purchasing such equipment.

28. The owner/operator shall have an independent testing laboratory analyze particulate matter obtained from the emission tests required by Condition #55 for content of glass fiber in accordance with NIOSH Method 7400, and the results of the quantification shall be submitted as part of the emission test report.

29. All on-site roads and all off-site direct access roads to the facility shall be paved prior to commencing operational startup.

KNAUF FIBER GLASS
PSD AUTHORITY TO CONSTRUCT

RAW MATERIALS HANDLING AND MIXING (#97-PO-26)

OPERATING CONDITIONS

30. The 12,000 gallon phenolic resin tanks, the 15,000 gallon washwater liquid tanks, and the 15,000 gallon liquid urea tanks (all venting indoors) shall comply with all portions of the Federal New Source Performance Standards (40 CFR 60, Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels). Notification with respect to commencement of construction (30 day notice), anticipated date of startup (30 day notice), actual date of startup (within 15 days), and modifications which could increase emission rates (60 days or as soon as practicable) shall be provided to the EPA Administrator noted in Condition #22 in accordance with 40 CFR 60.7.

31. All of the material handling vents and tank vents that discharge into the interior of the batch plant building shall be controlled by twelve (12) baghouse dust collectors that shall not allow any fugitive dust emissions from the building. The dust collectors shall be equipped with bag leak detectors which shall be calibrated on a regular basis to assure reliability. An audible alarm shall sound in the control room to indicate a torn or leaking bag. Spare bags shall be kept on site for immediate replacement of leaking or torn bags. Day Bin #1 and #2 dust collector emissions in the furnace building shall ultimately be discharged through the forming section exhausts and be controlled by the forming line scrubbers and wet electrostatic precipitator. Emissions from these dust collectors will, therefore, be measured as emissions from the forming line main stack #1.

32. The mineral oil tank shall store only distillates having a Reid vapor pressure less than four (4) pounds.

33. All railcar and bottom-dump hopper truck unloading of raw materials shall be done with a "dust boot" that seals the gap between the discharge of the hopper and the delivery system. The dust collectors on the material handling system shall be operational whenever materials are being delivered.

KNAUF FIBER GLASS
PSD AUTHORITY TO CONSTRUCT

GLASS MELTING (#97-PO-27)

OPERATING CONDITIONS

34. The glass melting furnace shall be heated only by electricity. No other auxiliary fuels may be used except during cold startup of the melting furnace or during prolonged electrical outages beyond the control of the facility when portable natural gas burners may be used to bring the temperature of the refractory and raw materials up to operating temperature. The APCO shall be advised of the intended use of the portable burners at least 24 hours prior to startup.

35. Molten glass production from the glass melting furnace shall be limited to a total of 195 tons in any 24 hour period. A permanent record of daily production shall be maintained and shall be available for inspection by the District, EPA, or CARB.

36. The method of control of suspended particulate matter from the glass melting furnace shall be the use of two baghouse dust collectors capable of meeting the emission standards specified in this permit. The dust collectors shall be equipped with bag leak detectors which shall be calibrated on a regular basis as recommended by the manufacturer to assure reliability. An audible alarm shall sound in the control room to indicate a torn or leaking bag. The owner/operator must initiate corrective action within 1 hour of an alarm from the bag leak detection system and complete corrective actions in a timely manner according to the procedures developed in accordance with the requirements of Condition #10 of this permit. Spare bags shall be kept on site for immediate replacement of leaking or torn bags.

37. Best available control technology (BACT) for this emissions unit shall be defined as the following emission control technologies capable of meeting the emission standards specified in Condition #41 of this permit:

    a. Use of two baghouse dust collectors for the control of particulate matter on the glass melting furnace.

    b. Use of an all electric glass melting furnace for the control of NOx, CO, SOx, and ROG.

38. The owner/operator shall record hours of operation of the glass melting furnace on a daily basis and shall install, calibrate, and maintain the following continuous monitors:

    a. Continuous glass pull rate monitor that records glass pull rate on an hourly basis

    b. Continuous dust collector bag leak detection system that records relative particulate matter emissions.

    The above records shall be maintained by the owner/operator for a minimum of five (5) years from date of entry and will be made available for District, EPA, or CARB inspection upon request.

39. The owner/operator shall maintain and operate a stack gas opacity monitor on the stack combining the baghouse discharge exhausts (#3a and #3b) from the glass melting furnace at a location approved by the District. The continuous opacity monitor shall meet all applicable design and quality assurance requirements specified in the Federal Register Parts 40 CFR 60.13 and 40 CFR 60, Specification 1 of Appendix B. The opacity monitor shall be installed and operational prior to conducting performance testing required in Condition #41 of this permit. A computer data acquisition system which has the capability of interpreting the sampling data, providing a graphical trend analysis, and producing a summary report of all three (3) minute averages of opacity readings shall also be provided. (40 CFR 60.13(h).)

40. The opacity from the above stack shall not exceed 5 percent opacity for a period greater than three (3) minutes in any one (1) hour period. An audible alarm shall sound in the control room to indicate an opacity exceeding the above opacity limit.

41. Within 60 days of startup of the facility, an emission test for particulate matter and gaseous fluoride and performance testing of the continuous opacity monitoring system (COMS) shall be conducted on the stack receiving the combined dust collector exhausts from the glass melting furnace. CARB Methods 1-5 including filter and impinger catch shall be used for particulate matter testing and EPA Method 13B shall be used for gaseous fluoride testing. Performance testing of the COMS shall be in accordance with 40 CFR 60.8 and 40 CFR 60.13. These tests shall be performed by an independent testing firm while operating at design capacity. The District shall be notified at least thirty (30) days in advance of such test to allow a District staff member to be present to verify compliance. In lieu of the above mentioned test methods, equivalent methods may be used if approved by the APCO. Results of all stack tests shall be forwarded to the District for compliance verification.

Total particulate matter emissions from the stack of the combined baghouse discharge exhausts (#3a and #3b) from the glass melting furnace shall not exceed any of the following emission limitations:

0.10 pounds per hour

0.44 tons per year

The sum total emissions of fluoride from the glass melting furnace baghouse exhausts (#3a and #3b) shall not exceed 15 lbs/day (.625 lbs/hr) per District Rule 2:1. Part 301.

42. Sampling ports shall be provided on the stack receiving the combined dust collector exhausts from the glass melting furnace. A sampling platform shall be installed by the owner/operator or safe access shall be provided during emission testing. The location of the sampling ports, platform, and/or arrangement for access must be approved by the District prior to installation of the stack.

KNAUF FIBER GLASS
PSD AUTHORITY TO CONSTRUCT

FIBERGLASS FORMING/CURING/COOLING LINES (#97-PO-28)

OPERATING CONDITIONS

43. The glass forming lines shall comply with all portions of the Federal New Source Performance Standards (40 CFR 60, Subpart PPP, Standards of Performance for Glass Fiber Manufacturing). Notification with respect to commencement of construction (30 day notice), anticipated date of startup (30 day notice), actual date of startup (within 15 days), and modifications which could increase emission rates (60 days or as soon as practicable) shall be provided to the EPA Administrator noted in Condition #22 in accordance with 40 CFR 60.7.

44. Natural gas shall constitute the only fuel allowed for use in the forming and curing sections.

45. Molten glass feed rate to the forming line shall be limited to a total of 195 tons in any 24 hour period. The owner/operator shall maintain a District-approved log indicating the throughput of molten glass material in tons/day. The log shall be available for inspection by either the District, EPA, or CARB.

46. The opacity of the main stack exhaust #1, excluding condensed water vapor, shall not exceed 20 percent for a period greater than three (3) minutes in any one (1) hour period. An audible alarm shall sound in the control room to indicate an opacity exceeding the above opacity limit.

47. Best available control technology (BACT) for the emission units under this permit shall be defined as the following emission control technologies capable of meeting the emission standards specified in Condition #52 of this permit, which shall be required to be operating whenever fiberglass is being produced:

    a. Forming Sections: Use of combustion controls which minimize peak flame temperatures in the fiber forming process for control of NOx, CO, and SOx. Use of Knauf process technology, six (6) venturi scrubbers on the bonded wool forming line and one (1) venturi scrubber on the unbonded wool forming line (each with a minimum of 10"wc pressure drop), followed by a wet electrostatic precipitator with continuous water spray wash system and four (4) electrical fields (minimum) for the control of particulate matter and reactive organic gases (ROG).

    b. Curing Section: Use of low NOx/CO burners burning natural gas for the control of NOx, CO, and SOx. Use of two thermal oxidizers operating in parallel with a minimum temperature of 1400°F and a residence time of at least 0.5 second for the control of ROG and particulate matter. (A lower minimum operating temperature, not less then 1200°F, may be used for the thermal oxidizers if, through emission testing, it is demonstrated to the satisfaction of the APCO that the lower temperature offers an equivalent emission control of ROG and particulate matter as provided by the 1400 F minimum temperature.)

    c. Cooling Section: Use of a water-washed settling chamber for the control of particulate matter and ROG with exhaust immediately combined with high-temperature exhaust of the thermal oxidizers.

48. The owner/operator shall continuously operate and maintain the venturi scrubbers for the removal of suspended particulate matter and for the pretreatment of the gas upstream of the wet electrostatic precipitator. The scrubbers shall maintain a minimum gas pressure drop of 10 inches water across the venturi throat and a minimum water flow to each scrubber of 200 gal./min. The pressure drop and water flow parameters shall be measured and recorded continuously. The solids in the scrubber water shall be removed to the extent necessary and fresh make-up water added as required in order for the wet electrostatic precipitator exhaust to meet the emission limits in Condition #52 at all times of operation.

49. The owner/operator shall continuously operate and maintain a wet electrostatic precipitator for the control of suspended particulate matter from the outlet of the forming zone venturi scrubbers. The wet electrostatic precipitator shall maintain a minimum water flow and a minimum total corona power as established during initial emission testing to determine compliance with 40 CFR 60, Subpart PPP.

50. The owner/operator shall install, calibrate, maintain, and operate monitoring devices that measure the following parameters at the frequency and accuracy as noted in Table 1:

Table 1

Parameters	Recording Frequency	Accuracy
Gas pressure drop across each scrubber (in.H_20)	Continuous	±1" WC
Inlet water flow rate to each scrubber (GPM)	Continuous	±5% over range
Wet Electrostatic Precipitator inlet water flowrate (GPM)	Every 15 minutes	±5% over range
Wet Electrostatic Precipitator: Secondary current (Amps.) Secondary voltage (kV) Spark rate Corona power/T-R set per field Inlet temp. (^oF)	Every 15 minutes	±5% over range
Thermal Oxidizer: Exhaust temperature	Continuous	±5% over range

Settling Chamber water flow rate (gph)	Every 15 minutes	±5% over range

All monitoring devices required for the above parameters are to be recalibrated quarterly in accordance with procedures under Section 60.13(b) of 40 CFR 60.

51. The wet electrostatic precipitator inlet water total solids shall be determined daily using reference Method 209A, "Total Residue Dried at 103-105 °C," in *Standard Methods for the Examination of Water and Wastewater*, 15th Edition, 1980.

52. Total emissions from the main stack #1 shall not exceed the values shown in Table 2:

Table 2

EMISSION LIMITS:	POUNDS/HOUR (3 HR. AVG.)	LBS/TON OF GLASS PULLED (3 HR. AVG.)	TEST METHODS
PM10(as TSP)	28.4	3.50	EPA 5E
NOX(as NO_2)	5.66	.70	EPA 7E
CO	22.3	2.74	EPA 10
SO2	1.0	.12	EPA 6C
Non-Methane Hydrocarbon (as CH_4)	9.0	1.1	CARB 100 EPA 18
Ammonia	38.0	4.7	Bay Area AQMD ST-1B
Formaldehyde	2.0	.25	EPA 316
Phenol	6.0	.74	Bay Area AQMD ST-16
Gaseous Fluoride	.625	.077	EPA 13B

53. Four sampling ports must be provided on the main stack (located on the same horizontal plane, 90 degrees apart, and at least two [2] duct diameters downstream, and one-half [1/2] duct diameters upstream of any flow disturbance) and shall consist of 4-inch female NPT couplings welded to the stack. The couplings shall be supplied with 4-inch pipe plugs. A sampling platform shall be installed on the main stack. The location of the sampling ports and design of the platform must be approved by the District prior to installation.

54. Sampling ports must be provided on the inlet and outlet of the wet electrostatic precipitator, and on the outlets of the thermal oxidizers for the purpose of determining emission control efficiency. A sampling platform or other means of providing safe access to the sampling ports shall be installed. The location of the sampling ports and platforms must be approved by the District prior to installation.

55. Within 60 days of startup of the facility, performance testing of the continuous opacity monitoring system (COMS) and emission tests for the pollutants listed in Table 2, using the specified methods (or alternative testing methods approved by the APCO), shall be conducted by an independent testing firm at each of the following locations as indicated in Table 3 (see Condition #28 for additional testing requirements):

Table 3

EMISSIONS TESTS (X): TEST LOCATION:	PM10 as TSP	NOX as NO_2	CO	SO2	NMHC as CH_4	NH_3	CH_2O	C_6H_6O	Fl_2
main stack #1	x	x	x	x	x	x	x	x	x
wet ESP exhaust	x	x	x		x				
wet ESP inlet	x				x				

NH_3 = Ammonia, CH_2O = Formaldehyde, C_6H_5OH = Phenol, Fl_2 = Gaseous Fluoride

Performance testing of the COMS shall be in accordance with 40 CFR 60.8 and 40 CFR 60.13.

These tests are for both compliance and control efficiency determinations and shall be performed while operating at design capacity producing the fiberglass product with the highest loss on ignition (LOI) expected to be produced. The District shall be notified at least thirty (30) days in advance of such test to allow a District staff member to be present for compliance verification. Results of all stack tests shall be forwarded to the District within 30 days of the test for compliance verification.

56. The owner/operator shall maintain and operate a stack gas opacity monitor at a location on the main stack (#1) approved by the District. The continuous opacity monitor shall meet all applicable design and quality assurance requirements specified in the Federal Register Parts 40 CFR 60.13 and 40 CFR 60, Specification 1 of Appendix B. A computer data acquisition system which has the capability of interpreting the sampling data, providing a graphical trend analysis, and producing a summary report of all three (3) minute averages of opacity readings shall also be provided. (40 CFR 60.13(h)).

57. Under no circumstances shall the owner/operator be allowed to operate the system with operational parameters beyond the limits specified in Conditions #45, #47, and # 48. The owner/operator shall take immediate action to bring the operational parameters to within the specified limits. Immediate action for the purpose of this condition shall be defined as within four (4) hours of the discovery of the exceedance.

KNAUF FIBER GLASS
PSD AUTHORITY TO CONSTRUCT

FIBERGLASS TRIMMING AND PACKAGING (#97-PO-29)

OPERATING CONDITIONS

58. The method of control of suspended particulate matter from the bonded wool forming line trimming and packaging areas, the Class A unbonded blowing wool processing area, and the Class B blowing wool processing area of the plant shall be the use of four (4) dust collector assemblies each followed by a high density filter module which shall exhaust inside the Scrap Building and have no outside vent. The performance of the above systems shall be capable of meeting the emission standards specified by California OSHA for air quality inside the Scrap Building. The dust collectors shall be equipped with leak detectors which shall be calibrated on a regular basis as recommended by the manufacturer to assure reliability. An audible alarm shall sound in the control room to indicate a leak in the dust collector. Spare cartridges and bags shall be kept on site for immediate replacement of leaking dust collector components. The filter modules shall be equipped with differential pressure measuring devices for daily monitoring and recording of the pressure drop across each filter bank.

59. The owner/operator shall monitor and have records available for inspection by the District, EPA, or CARB for the following parameters on a daily basis:

    a. Hours of operation

    b. Production rates

    c. Leaks from the dust collectors

    d. Pressure drop across the filter modules

    The above records shall be maintained by the owner/operator for a minimum of five (5) years from date of entry and will be made available to the above-mentioned agencies upon request.