Ball-InCon
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PUGET SOUND AIR POLLUTION CONTROL AGENCY

Ball-InCon

February 4, 1991

Puget Sound Air Pollution Control Agency
200 West Mercer Street, Room 205
Seattle, Washington 98119

Attn: Fred L. Austin
Air Pollution Engineer

Dear Mr. Austin,

Enclosed are the results of stack emission tests conducted on the three fuel-fired glass melting furnaces at the Seattle facility of Ball-InCon Glass Packaging Corp. Results are summarized in the attached Table 2.1, taken from the report.

As we discussed on Friday, February 1, I have some comments on the results obtained. Emission rates for #3 and #5 furnaces showed a significant reduction in mass emissions from the December 1989 tests. Number 3 furnace particulate emission concentrations averaged 0.023 gr/dscf, well below the current 0.05 gr/dscf standard of Regulation I. Number 5 furnace, while showing a greater reduction in mass emission rate than #3, did not exhibit a corresponding decrease in grain loading as expected, with an average of 0.070 gr/dscf. Results for the #4 furnace were unusual in that there was no reduction in mass emission rate or particulate concentration from the December 1989 test. The processes and operation of all three furnaces are similar, including the electric boost improvements made in early 1990 to bring the grain loading within the 0.05 limit, and we are puzzled by results which show no apparent change in emissions.

We are obviously concerned about some of these results in light of the 0.05 grain loading standard of Regulation I. In our phone conversation, you indicated your willingness to meet and discuss these concerns with us. The earliest date I could confirm is Wednesday, February 13. Gordon Hughes, Director of Engineering, Ms. Karen Nardi, our attorney from McCutchen and I will be available to meet with you and other PSAPCA representatives, either at your offices or at our facility at 5801 East Marginal Way South in Seattle. I will call you later this week to confirm the time and location.

Please let me know if this is not convenient and we can reschedule for a later date. However, we would like to resolve this matter as soon as possible.

Sincerely,

MC Gridley

Marvin C. Gridley
Mgr., Environment and Glass Technology

Attachment

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PUGET SOUND AIR POLLUTION
CONTROL AGENCY

Table 2.1. Summary of particulate matter concentration results collected at Furnace's #3, #4 and #5 at Ball-InCon Glass in Seattle, Washington on December 18, 1990 and January 10-11, 1991.

| Run # | Front-Half Partic. Matter gr/dscf | Back-Half Partic. Matter gr/dscf | Total Partic. Matter gr/dscf | Dilution Corrected Partic. Matter gr/dscf | Mass Emission Rate lb/hr |
|---|---|---|---|---|---|
| FURNACE #3 | | | | | |
| RUN 1 | 0.011 | 0.005 | 0.016 | 0.028 | 3.70 |
| RUN 2 | 0.008 | 0.004 | 0.012 | 0.020 | 2.86 |
| RUN 3 | 0.007 | 0.005 | 0.012 | 0.020 | 2.91 |
| AVERAGE | 0.009 | 0.005 | 0.013 | 0.023 | 3.16 |
| FURNACE #4 | | | | | |
| RUN 1 | 0.029 | 0.012 | 0.041 | 0.064 | 7.72 |
| RUN 2 | 0.021 | 0.010 | 0.031 | 0.049 | 5.80 |
| RUN 3 | 0.026 | 0.011 | 0.037 | 0.058 | 6.97 |
| AVERAGE | 0.025 | 0.011 | 0.036 | 0.057 | 6.83 |
| FURNACE #5 | | | | | |
| RUN 1 | 0.016 | 0.004 | 0.021 | 0.075 | 2.20 |
| RUN 2 | 0.016 | 0.005 | 0.021 | 0.066 | 2.38 |
| RUN 3 | 0.014 | 0.006 | 0.020 | 0.069 | 2.25 |
| AVERAGE | 0.015 | 0.005 | 0.021 | 0.070 | 2.28 |

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Seattle Particulate Emission Test Results

| | #3 12-11-89 | #3 1-10-91 | #4 12-13-89 | #4 1-11-91 | #5 12-12-89 | #5 12-18-90 |
|---|---|---|---|---|---|---|
| Pull (T/D) | 115.2 | 106.7 | 129.6 | 120.4 | 127.4 | 123.4 |
| Color | CH | F | F | CH | A | A |
| Gas (CFH) | 18750 | 15000 | 27000 | 17500 | 30000 | 17000 |
| Boost (KW) | 1067 | 2000 | 1097 | 2000 | 1104 | 2070 |
| % Cullet | 23 | 30 | 20 | ** 45 | 45 | 50-60 |
| Bridgewall (deg. F) | 2826 | 2580 | 2780 | 2580 | 2790 | 2585 |
| Combustion Air (CFH) | | | | | | |
| Air:Gas ratio | | | | | | |
| % O2 | | | | | | |
| East | 7.0 | 7.0 | 7.8 | 10.0 | 6.8 | 6.5 |
| West | 7.0 | 7.0 | 7.8 | 10.0 | 6.8 | 6.5 |
| Stack Gas | | | | | | |
| CO2 (%) | 2.4 | 1.5 | 3.9 | 2.8 | 3.9 | 2.2 |
| O2 (%) | 17.2 | 18.6 | 15.5 | 17.0 | 15.3 | 17.6 |
| H2O (%) | 4.3 | 3.7 | 5.5 | 5.9 | 6.5 | 4.7 |
| Stack Flow (DSCFM) | 20189 | 27177 | 24506 | 21842 | 14757 | 12873 |
| Stack Temp. (deg. F) | 334 | 214 | 576 | 506 | 661 | 407 |
| Dilution Air (DSCFM) (ejector air) | 11500 | 10525 | 11497 | 7880 | 9153 | 9048 |
| Furnace Exhaust Gas (Stack - Dilution) | 8689 | 16652 | 13009 | 13962 | 5604 | 3825 |
| Ejector air as % of stack flow | 57.0 | 38.7 | 46.9 | 36.1 | 62.0 | 70.3 |
| Dilution ratio factor (stack/furnace gas) | 2.324 | 1.632 | 1.884 | 1.564 | 2.633 | 3.365 |
| Opacity (%) | - | - | - | - | - | - |
| **Particulate Emissions** | | | | | | |
| gr/dscf (stack) | 0.030 | 0.013 | 0.031 | 0.036 | 0.042 | 0.021 |
| corrected gr/dscf | 0.069 | 0.023 | 0.059 | 0.057 | 0.111 | 0.070 |
| lb./hr. | 5.17 | 3.16 | 6.62 | 6.83 | 5.30 | 2.28 |
| % change in lb./hr. | --- | -38.9 | --- | 3.2 | --- | -57.0 |
| Emissions (Tons/yr) | 21.7 | 13.3 | 27.8 | 28.7 | 22.3 | 9.6 |
| Change (Tons/yr) | | -8.4 | | 0.9 | | -12.7 |
| New Jersey - lb/hr * | 7.68 | 8.45 | 8.01 | 9.74 | 9.89 | 9.77 |
| SCAQMD - lb/hr * | 9.00 | 8.62 | 9.53 | 9.09 | 9.34 | 9.15 |
| - gr/dscf | 0.061 | 0.054 | 0.057 | 0.059 | 0.067 | 0.072 |

* mass emission allowable calculated based on process wt. rate (lb. batch fed/hr for furnace tonnage listed.

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Seattle #5 Particulate Emission Test Results

| | PSAPCA 10-7-86 | AMTEST 12-12-89 | AMTEST 5-1-90 | AMTEST 5-24-90 | AMTEST 10-9-90 | AMTEST 12-18-90 |
|---|---|---|---|---|---|---|
| Pull (T/D) | 107.9 | 127.4 | 121.7 | 122.0 | 132.0 | 123.4 |
| Color | Amber | Amber | Amber | Emerald | Amber | Amber |
| Gas (CFH) | 27000 | 30000 | 23000 | 18000 | 18000 | 17000 |
| Boost (KW) | 1035 | 1104 | 1575 | 1909 | 2200 | 2070 |
| % Cullet | 35 | 45 | 45 | 45 | 60 | 50-60 |
| Bridgewall (deg. F) | - | 2790 | 2620 | 2580 | | 2585 |
| Combustion Air (CFH) | - | 375000 | 270000 | 247500 | 240000 | |
| Air:Gas ratio | | 12.50 | 11.74 | 13.75 | 13.33 | |
| % O2 | | | | | | |
| East | 5.7 | 7.0 | 6.0 | 4.2 | | |
| West | 5.7 | 6.5 | 7.5 | 5.0 | | |
| Stack Gas | | | | | | |
| CO2 (%) | 4.5 | 3.9 | 3.2 | 3.6 | 2.9 | 2.2 |
| O2 (%) | 13.5 | 15.3 | 16.1 | 15.8 | 16.8 | 17.6 |
| H2O (%) | 5.7 | 6.5 | 5.7 | 6.0 | 5.6 | 4.7 |
| Stack Flow (DSCFM) | 18800 | 14757 | 14697 | 11093 | 11918 | 12873 |
| Stack Temp. (deg. F) | 624 | 661 | 603 | 444 | 437 | 407 |
| Dilution Air (DSCFM) (ejector air) | 3952 | 9153 | 8939 | 7946 | 6658 | 9026 |
| Furnace Exhaust Gas (Stack - Dilution) | 14848 | 5604 | 5758 | 3147 | 5260 | 3847 |
| Ejector air as % of stack flow | 21.0 | 62.0 | 60.8 | 71.6 | 55.9 | 70.1 |
| Dilution ratio factor (stack/furnace gas) | 1.266 | 2.633 | 2.552 | 3.525 | 2.266 | 3.346 |
| Opacity (%) | 1.0-3.2 | 0-0.4 | 0.8-1.0 | ( 0 ) | | |
| **Particulate Emissions** | | | | | | |
| gr/dscf (stack) | 0.035 | 0.042 | 0.036 | 0.032 | 0.024 | 0.021 |
| corrected gr/dscf | 0.044 | 0.111 | 0.092 | 0.113 | 0.054 | 0.069 |
| lb./hr. | 5.79 | 5.30 | 4.45 | 3.05 | 2.48 | 2.28 |
| % change in lb./hr. | --- | -8.5 | -23.1 | -47.3 | -57.2 | -60.6 |

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