

Department of Environmental Quality
Air Quality Division
RE: Violation Notices N5391 & N 7933, Ingham County
Site Name: Orchid Orthopedic Solutions

DEQ-AQD LANSING D.O.

MAR 24 2017

On November 7, 2016 DEQ-AQD conducted an inspection of Orchid Orthopedic Solutions. The following violations were identified:

1. SRN N5391

- Rule Violated: Rule 290(d)
- Company was not keeping emission calculation records of controlled emissions for the most recent 2 year period.

2. SRN N7933

- Rule Violated: Rule 290(d)
- Company was not keeping emission calculation records of controlled emissions for the most recent 2 year period.

Written Response

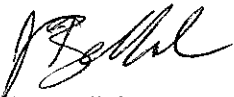
During our internal investigation we discovered the monthly emission calculations were being kept as required until August of 2009. We are unable to determine why the calculations suddenly stopped being recorded, although it is suspected that a change of personnel and lack of communication led to our inattention to Rule 290(d) and the recordkeeping requirement.

Following the DEQ inspection, Orchid once again began tracking the monthly emissions. Records are being kept, with sufficient detail, to demonstrate our emissions are within the limits outlined by Rule 290(d). Copies of those records are included for your review.

In addition, liquid-level checks are being performed on the wet dust collectors during each shift. The checks are documented and the records are maintained.

Please let me know if you have any questions, comments or feedback regarding any of the information listed above.

Best Regards,



James Belloli
EHS Specialist
Orchid Orthopedic Solutions
(517)449-8091



Controlled Scrubber Emissions Monitoring Tool Chem Mill Tank

The below system monitors Orchid Orthopedics Solutions utilization of hydroflouric acid.

Rule 290 states the following are necessary:

- Less than 1000 lbs of contaminants are produced monthly
 - Calculations are below
- A description of the emissions unit is maintained throughout the life of the unit
 - Acid scrubbers are maintained per Orchid's Maintenance System
- Records demonstrating that the unit meets Rule 290 are maintained in sufficient detail
 - Record are reflected per the calculation and utilization charts below

Calculation of emissions rate, per 1 sq ft of surface area:

$$W \text{ (lb/hr)} = \frac{M \text{ (lb/lb - mole)} \times A \text{ (sqft)} \times P \text{ (psia @ T1)} \times K \text{ (ft/sec)} \times 3600 \text{ (sec/hr)}}{R \text{ (psia cu-ft/R lb-mole)} \times T \text{ (deg R)}}$$

W = emission rate

M = molecular weight of compound

A = area of tank

P = vapor pressure of compound in solution (74mm HG)

K = gas-mass transfer coefficient = $0.011479 \times (U^{0.78} / M^{0.33})$

U = Wind speed in mph (assume 1 mile/hr)

R = gas constant = 10.73

T = temperature of solution (deg R = deg F + 460)

| Month | Evap Rate | BLDG A | BLDG A - Rinse | Max Rate Evaporation | Monthly Evaporation | Total Monthly Emissions |
|---------------|------------|-------------------|----------------|----------------------|---------------------|-------------------------|
| | .053807 | 15 lb/hr | 12.50 lb/hr | lb/hr | 730 hrs/mo | 100% A |
| | lb/hr/sqft | Tank surface area | | | | 90% scrubber |
| January '17 | .054 | .807 | .673 | 1.480 | 1080.169 | 63.828 |
| February '17 | .054 | .807 | .673 | 1.480 | 1080.169 | 63.828 |
| March '17 | .054 | .807 | .673 | 1.480 | 1080.169 | 63.828 |
| April '17 | | | | | | |
| May '17 | | | | | | |
| June '17 | | | | | | |
| July '17 | | | | | | |
| August '17 | | | | | | |
| September '17 | | | | | | |
| October '17 | | | | | | |
| November '17 | | | | | | |
| December '17 | | | | | | |



Controlled Scrubber Emissions Monitoring Tool EP Tank

The below system monitors Orchid Orthopedics Solutions utilization of orthophosphoric acid.

Rule 290 states the following are necessary:

- Less than 100 lbs of contaminants are produced monthly
 - Calculations are below
- A description of the emissions unit is maintained throughout the life of the unit
 - Acid scrubbers are maintained per Orchid's Maintenance System
- Records demonstrating that the unit meets Rule 290 are maintained in sufficient detail
 - Records are reflected per the calculation and utilization charts below

Calculation of emissions rate, per 1 sq ft of surface area:

$$W \text{ (lb/hr)} = \frac{M \text{ (lb/lb - mole)} \times A \text{ (sqft)} \times P \text{ (psia @ T1)} \times K \text{ (ft/sec)} \times 3600 \text{ (sec/hr)}}{R \text{ (psia cu-ft/R lb-mole)} \times T \text{ (deg R)}}$$

W = emission rate

M = molecular weight of compound

A = area of tank

P = vapor pressure of compound in solution (700mm)

K = gas-mass transfer coefficient = $0.011479 \times (U^{0.78} / M^{0.33})$

U = Wind speed in mph (assume 1 mile/hr)

R = gas constant = 10.73

T = temperature of solution (deg R = deg F + 460)

| Month | Evap Rate | BLDG A | Max Rate Evaporation | Monthly Evaporation | Monthly Emissions |
|---------------|------------|-------------------|----------------------|---------------------|-------------------|
| | .72368966 | 10 lb/hr | lb/hr | 730 hrs/mo | 5% HFL |
| | lb/hr/sqft | Tank surface area | | | 90% scrubber |
| January '17 | .72368 | 7.2368 | 7.2368 | 5282.9344 | 26.415 |
| February '17 | .72368 | 7.2368 | 7.2368 | 5282.9344 | 26.415 |
| March '17 | .72368 | 7.2368 | 7.2368 | 5282.9344 | 26.415 |
| April '17 | | | | | |
| May '17 | | | | | |
| June '17 | | | | | |
| July '17 | | | | | |
| August '17 | | | | | |
| September '17 | | | | | |
| October '17 | | | | | |
| November '17 | | | | | |
| December '17 | | | | | |