**University of Michigan -Housing Facilities Department**

**Revised Aug 1, 2013**

**Liquid Ozone History and Implementation**

In October 2010 the South Quad Facilities team began testing a new and promising cleaning product, liquid ozone. This product is a powerful, chemical free cleaner which is also a certified sanitizer. Sally Gonzales the South Quad facilities manager reviewed the safety and appropriateness of this product for our cleaning purposes with Patrice Berlinski from the University OSEH office. After receiving favorable feedback from our OSEH representative Sally then proceeded to do a full blown test of the product with her custodial staff. The nature of this test involved using liquid ozone as her primary cleaning product throughout the facility for a six week period.

At the conclusion of the six week test the results were quite impressive. The appearance level of the facility actually improved during the testing period. Bathroom fixtures tended to dry with less streaking and glass, porcelain and stainless steel surfaces had a higher quality of shine. These observations can be attributed to the fact that no chemical residue is left behind when cleaning is done with liquid ozone. Because we clean not just for appearance but also for health and safety reasons, swab tests were completed with ATP meters. ATP meters are hygiene monitoring devices that measure the level of microbial contamination on surfaces. These swab tests indicated that the presence of microbial contaminants were well within industry standards. In several instances the swab test results indicated that these levels were actually lower than when tested after surfaces had been cleaned with a registered disinfectant. At the conclusion of the test period a very interesting dynamic had surfaced with the South Quad custodial staff. Staff who were initially resistant to the use of this new product became strong supporters and proponents of liquid ozone. After completing this test a decision was made to incorporate liquid ozone as our primary cleaning product at South Quad and Sally began the process of removing from her inventory most of the other products she had historically utilized.

Having experienced this very positive pilot test, a decision was made to see if similar results could be duplicated in a different facility. To facilitate this second test Karen Saltz the manger for Mosher Jordan was selected. Karen held informational meetings with Sally, the vendor and I to prepare for the test. The liquid ozone product was installed at Mosher Jordan in early January 2011 and the testing began immediately thereafter. After the initial six week testing period the feedback received from Karen was very similar to that received from Sally at South Quad. The results of the South Quad tests had in fact been duplicated and at this point we all became very excited about the possibility of incorporating this new innovative product throughout the department. Before making such a recommendation it was determined that we should do one more series of strategic swab tests with our ATP meters. A number of cleaning surfaces which normally indicated high levels of microbial contamination were tested using our traditional cleaning chemicals and then similar surfaces were tested using the liquid ozone product. The results of those tests are included below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | SQ pre chem clean | SQ post chem clean | MoJo pre chem clean | MoJo post chem clean | SQ pre ozone clean | SQ post ozone clean | MoJo pre ozone clean | MoJo post ozone clean |
| Push plate/handle bathroom entrance | 849 | 33 | 279 | 33 | 420 | 41 | 272 | 140 |
| Urinal handle | 334 | 10 | 22 | 8 | 70 | 7 | 206 | 74 |
| Bathroom partition door lock | 369 | 59 | 138 | 45 | 99 | 26 | 970 | 7 |
| Sink handles | 36 | 25 | 234 | 3 | 88 | 35 | 86 | 14 |
| Toilet seat surface | 954 | 38 | 1643 | 4 | 154 | 7 | 97 | 26 |
| Glass/mirror surface around soap dispenser | 9116 | 789 | 78 | 10 | 458 | 11 | 23 | 6 |
| Drinking fountain spigot | 149 | 36 | 813 | 31 | 492 | 37 | 35 | 16 |
| Shower handles | 273 | 14 | 171 | 71 | 51 | 14 | 156 | 17 |

After reviewing this data and in light of the very positive outcomes of the two pilot projects completed at South Quad and Mosher Jordan, a proposal was submitted to and approved by Housing Administration in April 2011 that would allow the department to incorporate liquid ozone as our primary cleaning product. The bulleted list below highlights the rationale for our recommendation:

* Liquid ozone is a revolutionary product that truly supports the university’s sustainability initiative, it’s environmental footprint is minimal as compared to products it will be replacing
* Potential for cost savings related to future cleaning chemical purchases is estimated at 50% or a minimum of $50,000 annually
* Exposure of staff, residents and environment to potentially harmful chemicals is dramatically reduced
* Greatly enhanced consistency, continuity and economy of scale are achieved through significant reduction in number of different products that have been historically purchased and used
* Floor buffing/burnishing pads are lasting longer as previous build up of chemical residue has been eliminated from floor surfaces
* Hard floor surfaces which are covered with a floor finish or sealer are “bouncing back” quicker when buffed or burnished because of the absence of chemical residue
* Grout cleaning has been greatly simplified because use of liquid ozone eliminates residual chemical left behind by other cleaning products and as a result re-soiling is much less of an issue
* Carpet cleaning has been greatly enhanced by using liquid ozone as no chemical residue is left behind to cause re-soiling. Also allows over time the removal of all previous build up of chemical residue

The following plan was used to assure proper implementation of the liquid ozone product and process throughout our inventory of residence halls:

* Form a transition team comprised of Karen, Sally and myself who will oversee the entire process
* Develop a building by building transition schedule and calendar which will guide the process
* Conduct informational meeting with BFM and facilities staff prior to implementation process
* Implementation process will start at each hall with a total building analysis which will focus on cleaning and organizing all custodial equipment and supply storage areas and will include a report with action items
* Standard list of approved cleaning products, equipment and supplies will be distributed, implemented and enforced
* As non standard items are identified they will be either cascaded out to other halls that have not yet been converted and/or otherwise properly disposed of
* Implementation plan will be supported by ongoing training
  + Vendor based
  + Custodial staff from converted hall will assist training in new hall
  + Peer coach support
  + Implementation team will also support training needs
* ATP testing will be conducted in order to document results
* Final building analysis will be completed prior to moving to next hall to assure program compliance and proper follow up for all identified action items

As a final note I would like to share the path liquid ozone has taken since initial testing began in October 2010. At the annual Big 10 conference for facilities professionals in fall 2010 news of our testing process was shared with our colleagues. Since that meeting we have entertained on-site visits from both Michigan State and Ohio State. In addition to these on-site visits we have also fielded multiple calls and emails from: the University of Alabama, Penn State University, Indiana University, University of Wisconsin, Gullford College, Harvard University, Kent County IDS, Fire Keepers Casino, Thompson Rivers University, City Veterinarian Clinics, Milan Federal Prison, Washtenaw Community College, University of Michigan Dearborn Campus, University of Central Florida, University of Michigan University Unions, Florida State University, Duke University, New York Chiropractic College, University of Arkansas, Los Angeles Unified School District, Hilton Carlsbad Oceanfront Resort & Spa, University of Michigan Athletics Department, Master Australia Pty. Ltd., Brigham Young University, The University of British Columbia, The Rio Grande Bible College, Washington State University Spokane Campus, Lee’s Summit School District (Summit, MO) and Honda Transmissions of America who were all interested in learning from our experience.

Respectfully Submitted,

Joe Kennedy