

# BALANCE

NEWS FROM BALA CONSULTING ENGINEERS, INC.  
*Practicing the Art of Engineering*  
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## *Projects* OF SPECIAL NOTE



### 3-D PHARMACEUTICALS EXTON, PA

3-Dimensional Pharmaceuticals was started in 1993 to make the drug discovery process more efficient by combining drug discovery tools with advanced computer technology. They use combinatorial chemistry, structure based drug design and high throughput screening to discover new pharmaceutical possibilities.

Bala was hired in 1995 to design a 10,000 square foot headquarters at the Eagleview Corporate Campus to house analytical and wet chemistry laboratories, offices, and support spaces.

Bala was hired again in 1997 to develop additional laboratory space for this emerging company. The second expansion includes a new boiler room, additional laboratories-both wet chemistry and biology, and a chemical storage area.

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## MANUFACTURING ENVIRONMENTS PROCESS ENGINEERING DIVISION EXPANDS

Bala's mission of providing full service engineering services in the pharmaceutical, biotechnology and specialty/fine chemicals industries includes a ten-year track record of manufacturing facilities engineering. The steady growth in our process engineering capabilities has taken a more focused direction under the leadership of Marc J. Tellier, P.E.

"Small and medium size manufacturing projects, particularly those involving renovation and rededication aren't getting the attention pharmaceutical and biological corporate engineering clients demand," says Marc; "Our firm is perfectly matched for these types of projects." His strategy is to concentrate on manufacturing projects that require a midsize responsive approach. As Bala approaches a staff of 100, the Process Engineering Group has been a significant factor in its growth and a complement to Bala's existing R&D laboratory design group.

Current projects include a cGMP pilot plant renovation for SmithKline Beecham, a Solid Dosage Manufacturing Facility in Shanghai, China, a feasibility study for McNeil Consumer Products, and a small scale pilot facility for American Cyanamid Agricultural Products.

Other clients include DuPont Pharmaceuticals, Johnson & Johnson, Elf Atochem North America, Inc., Biomatrix, Therics, and ITT Avionics.



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## SURVIVING UNEXPECTED INTERRUPTIONS Multiple UPS Installations Can Increase Risks

*Below is an abridged version of Robert Craemer's article that appeared in the July 1998 issue of Buildings Magazine.*

The use of uninterruptible power supply (UPS) to protect a company's vital electronic equipment, such as local area networks, communications systems/computer workstations and/or mainframes, has expanded as recovery costs of system failure have increased. By providing continuous, conditioned power to all critical loads, UPS systems ensure that equipment will operate normally during power disturbances such as outages, brownouts, distribution faults, or surges.

### Key Factors

Typically, a UPS system is specified based on an assessment of risk. Key factors in selecting a UPS systems include: the type of equipment to be protected; UPS system kW rating ; degree of redundancy required; provisions for on-line maintenance; transfer speeds; and the mode of system operation. One critical consideration that is frequently overlooked is the method of distributing and grounding the UPS output power particularly in applications requiring multiple UPS systems.

### Multiple UPS Installations Can Cause Problems

Multiple UPS installations increase the risk of unexplained computer glitches. These problems may be the result of high momentary potential differences between interfacing components. Significant differences between the ground potential of separate UPS systems can cause circulating currents, surges, spikes, and transients in communication lines. These momentary differentials can reach levels high enough to cause component failure and/or data corruption, even though each system component is served by a UPS that is presumed to protect against such conditions.

To maintain reliable communications between separate electronic systems, the

instantaneous voltage differential between the components should be as close to zero as possible. Other wise, the resultant circulating currents can corrupt data, especially as data transmission rates and faster processing speeds (now approaching 1,000 MHz) have contributed to the sensitivity of DP equipment to power supply disturbances.

### Design Solutions

A single point-of-connection of all UPS neutrals to the building system can avoid many of these problems. The cost to link a company's UPS systems to a single point-of-connection to earth ground varies. Factors such as configuration of existing wiring, relative location of the UPS systems and data processing components, and the magnitude of loads impact the cost.

By performing a cost benefit analysis, an institution or corporation can determine the most appropriate plan of action. The costs to install UPS systems with a single common ground point in new facilities can be nominal, however, older facilities may require extensive, costly rewiring if the UPS ground cannot be easily segregated.

An alternative that many companies implement to maintain reliable data transmission is fiber-optic communication lines. By replacing copper wiring with fiber optics, the communication systems essentially become immune to disturbances in the power source.

The investment to properly ground all UPS systems is as important as procurement of the right equipment. The proper system solution is usually unique to each company's needs, and rests with the user's risk assessment to provide an appropriate level and quality of reliable conditioned power.

*For more information contact Robert Craemer at [rhc@bala.com](mailto:rhc@bala.com)*

### Manufacturing Environments continued from page one

#### Manufacturing Engineering Capabilities

The Process Engineering Group's core competencies include Process & Process Mechanical Engineering, Instrumentation & Automation Engineering, Process Piping Design and Equipment Arrangement Development. The services they provide to pharmaceutical, biological and fine/ specialty chemicals manufacturing clients include:

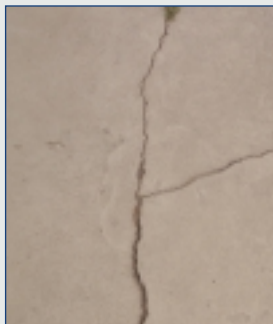
- **Feasibility & Conceptual Design Studies-** Establishment of manufacturing capacities and overall facility scale and support requirements, development of personnel/ product/ material flow, process engineering, equipment selection and arrangement, development of plant and critical utility schemes.
- **Preliminary Engineering & Detailed Design-** P&ID development, detailed piping and instrumentation design, automation engineering, building mechanical engineering, process, facility and utility equipment specification and procurement.
- **Estimating & Cost Control-** Project budgeting from conceptual design through preliminary engineering and detailed design.
- **Procurement-** Inquiry preparation, bidding & awarding, commercial and technical bid analysis, purchase order/contract negotiation and administration, expediting and source inspection, equipment and material.
- **Validation-** Development and execution of IQ/OQ/PQ protocols and SOP's, start-up and FDA validation.
- **HAZOP/Safety Analysis-** Development of safety audits and "what if" documentation.

*For more information contact Marc Tellier at [mjt@bala.com](mailto:mjt@bala.com).*

## CONCRETE ADVICE REVISITED

Thank you for the overwhelming response to our previous article about structural concrete requirements. Some verification with BOCA was done to get an official word and the original statement, "all concrete exposed to freezing and thawing in a moist condition shall have a maximum water-content ratio of 0.45 and a minimum compressive strength of 4,500 psi, except for buildings in Use Groups R-2 and R-3 (less than four stories), was confirmed.

Please note, projects not designed to the new standards could face delays and increased costs. Many trade contractors are not aware of these new standards.



## SPECIAL INSPECTIONS

Owners and CMs should beware that building permits and certificates of occupancy can be delayed unless they comply with the Special Inspections, Section 1705, of the BOCA Code. Although there are exceptions and work of a minor nature may not require it, we have found that some municipalities have begun to enforce this section. The section of the code covers the usual structural elements (soils, steel, and concrete), but it also includes: precast concrete, masonry, spray fireproofing, soils, EIFS, and sometimes even wood construction.

For more information about BOCA Codes, contact Mike Hayko at [msh@bala.com](mailto:msh@bala.com).

## THE TRUTH ABOUT LOWER GPF

Most new toilets are designed to conserve water. The old 3.2+ gallons per flush (GPF) toilets have been replaced with 1.6 GPF models. These specifications pertain to both tank type and flush valve operated toilets.

Nationally, there is an ongoing controversy on the effectiveness of the new lower flushing capacity toilets. We all recognize that water conservation is desirable. With many parts of the US and the world in severe water shortages, the 1.6 GPF are designed play a role in conservation by reducing the consumption of water.

However, there is a concern about the potential secondary result of the lower volume of waste water; specifically clogged sanitary lines. Having to rectify an underground line restriction can easily nullify any expected cost or energy savings. The debate is compounded by the fact that the individuals who benefit from installing the new model toilets (i.e. lower water bills), may not incur the costs of removing the obstruction since it occurs downstream.

Building owners, facility managers and directors of plant operations are in the unique position of seeing both the problems and the benefits (i.e. lower utility costs verse more frequent clogs). The new ANSI standard is the 1.6 GPF toilets, however, the testing of this standard still continues. Now, we must be sure the benefits are carried downstream. As engineers, Bala would like to hear your experiences and financial results. We would like to know if the new lower flush toilets have lowered your water bills and/or if your sanitary line maintenance costs have been affected.

Please e-mail David Holst at [dnh@bala.com](mailto:dnh@bala.com)

## VALIDATION

### FDA Pilot Program saves inspection time

The FDA Office of Compliance is currently looking for companies with strong compliance records to take part in a new pilot program called "The Hazard Analysis of Critical Control Points" (HACCP). The program allows drug and medical service manufacturers with good compliance records to streamline GMP inspections. Normal inspections last for several weeks, but these HACCP inspections, which focus on critical points, only take 2-3 days.

Bala's Validation Department has performed numerous Hazard Operability Analysis (HAZOP) studies similar to the new FDA program. On a recent project for Hoechst Celanese, Bala analyzed reactor systems in the manufacturing plant to determine potential danger areas. Hoechst Celanese's commitment to safety combined with Bala's independent technical review resulted in a HAZOP study identifying possible modifications to the equipment and procedures to decrease the likelihood of accidents. The FDA understands the importance of Hazard Analysis programs and is now ready to reward firms with the best practices.



To see if your Company qualifies for HACCP, contact the FDA Information Center at (302) 827-4570.

For more information contact Dan Tisak at [djt@bala.com](mailto:djt@bala.com)



## Projects OF SPECIAL NOTE

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### **GEON Company**

Process, automation, instrumentation and equipment arrangement for a process waste neutralization system.

### **Renaissance Corporate Center**

Structural design for 5 new buildings.

### **Cigna**

Multiple Ventilation System Upgrades.

### **Coelacanth, Inc.**

Renovation of 20,000 square feet for new laboratories, clean rooms and offices.

### **SmithKline Beecham**

Renovation and process equipment arrangement services for cGMP solid dosage pilot facility.

### **Merck & Company**

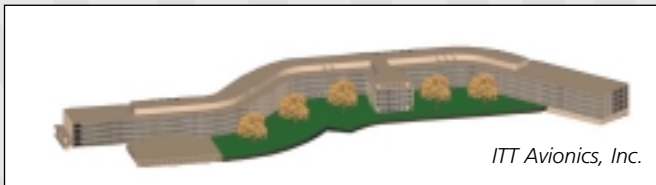
Feasibility/Basis of Design report for a new office building.

### **College of New Jersey**

Revisions to campus store.

### **ITT Avionics, Inc.**

Full service engineering for the gut and renovation of a 400,000 square foot facility to house laboratories and head quarter offices.



ITT Avionics, Inc.

### **GMAC Mortgage**

Engineering design for a new 100,000 square foot office building for corporate expansion.

### **Lafayette College**

Peer Review and Commissioning of Hugel-Olin Hall, the College's new Science Complex for the chemistry, physics and math departments.

### **Buchanan Ingersoll**

Law office expansion, with an IDF room and interconnecting stair.

### **De La Rue Card Systems**

Design of clean rooms and research & development labs for the manufacturing of Smart Cards. Smart Cards have built-in computer chips rather than magnetic strips.

### **BioMatrix, Inc.**

Finishing construction of a new Primate Vivarium for this growing company.

### **Automotive Rentals, Inc. (ARI)**

3 story 175,000 square foot Corporate Headquarters and Call Center for fleet car leasing.

*Although our name might not always be penned/recognized in the paper, our clients, projects, and people have made an impact locally and nationally.*

- ▶ Congratulations Dan Tisak! Dan was a speaker at this year's ISPE DVC education program entitled "GMP Pharmaceutical Production Facilities: Engineering, Compliance, Operation." The program was a huge success with over 100 attendees. The next stop on his ISPE tour was the National Convention in Orlando where he spoke on designing cGMP pharmaceutical facilities in China.
- ▶ Bala Consulting Engineers was recognized in the July Edition of Consulting Specifying Engineer as one of the countries M/E Engineering GIANTS, ranking at number 74
- ▶ Bala was recognized by the Society for Marketing Professional Services (SMPS) for our NEW LOOK. Our new logo and brochure took 3rd place nationally out of more than 200 entries in the Company Identity Category.

## BALA IS NOW ON THE WEB!

Go to <http://www.bala.com>  
and check out all of our services on line.

