For my second co-op assignment, I took a position at a cogen plant in Stockton, CA. This cogen is a plant that produces both power and steam, feeding the Corn Products plant next door, and selling the rest of the power to PG&E. At the plant, I assumed many daily responsibilities along with doing specific projects. The largest ongoing issue which I had a hand in was tracking the pH of the ash which the plant produces. To facilitate this, the other coop at the plant and I were in charge of sampling, testing, and tracking pH results. To put this all together, I created a database to enter data and present it in an easily accessible form.

Aside from these daily matters, there were a few other projects that involved bringing up the safety of the aging plant. The first was to make the ash unloading building nitrogen-safe, to account for a nitrogen line that had been added and ran through the building. Second was an update to the plant’s basic safety introduction that is given to all people coming on the site. Finally, there was a plan to install wireless video cameras on the coal unloading building, which I have passed on to the new plant engineer who was hired during my term in Stockton.

Aside from these projects and chores, I was sometimes called upon as the site’s only chemical engineer. This was perhaps the most interesting part of my stay here, as I did not expect to be the expert in all the chemical matters on the plant. Though I was not doing these things every day, it was good to see that I was useful and my knowledge was applicable, even at a power plant.

Overall, these experiences were helpful to my learning about engineering and how a plant works in general. Between hearing and seeing the daily problems that were dealt with and doing my part to make the plant run more smoothly, I feel that I have a new perspective from which I can view my classroom learning. Hopefully I will be able to apply this knowledge and experience in my upcoming classes senior year, especially Unit Operations Lab and Senior Design.

Outside of work, I found myself in a unique situation. Since I live in San Jose, only an hour and half away, I would go back home for weekends, and usually go out with
other Cornell students working in the Bay Area. Commuting back and forth every week turned out to be fairly easy, and I recommend anyone coming to the Northern California area to stop by San Francisco and the rest of the Bay Area at least on occasion. For housing here in Stockton, I found myself in a one bedroom apartment fairly easily, and it was located relatively close to my work. The people here at the plant are very helpful in this area, as they have had many interns and coops come through.

All in all, this coop session was a positive experience for me. It helped greatly that it was close to home, but gave a unique experience being far enough away that I had to live alone. I would certainly suggest trying a similar situation to any new coops. My job in particular was fairly fulfilling as well. Since I came into the position from a office position in Air Products’ headquarters in Allentown, PA, it was a fresh look from the plant on what I had only seen on paper before. I think that seeing both ends of the production process is very important, both when learning the work in school, and actually doing the work on a job.
A. Co-op Work Assignment

During the summer of 2008, I worked in the Epoxy Marketing Group for Air Products and Chemicals, Inc. at their corporate headquarters in Trexlertown, PA. This group is involved in the commercial aspects of the epoxy business and interfaces with everyone from customers to the asset management engineers to the research and development team. Being in this group made for an assignment out of the ordinary for a chemical engineering co-op. Instead of being given projects with definitive results and deliverables, my projects had more ambiguous “problem statements.” This type of project allowed me to be responsible for formulating my own plan and even for determining what I would be delivering in the end.

During my assignment, I worked on three very different projects. My major project involved researching the value of the “green” movement in the epoxy marketplace with the goals of identifying potential for Air Products as well as determining Air Products’ positioning and message. My research included surveying customer websites, conducting phone interviews with customers, gathering information on different standards agencies and their standards, and interfacing with the Asian and European team to collect start-point data in their respective regions. My final “deliverable” ended up being an informative presentation which included my own conclusions and recommendations which the team can now use to develop any new programs or advertising.

In another project, I worked closely with the technology team in R&D to create a market study of structural adhesives in the automotive industry. I gathered information from various people, customer visit reports, and other documentation to come up with estimates for the overall size of this market. In the last week of my assignment, I presented this information to the global adhesive marketing team.

Finally, I also worked on a project to create a global intelligence database for epoxies. Using a database created by the European team, I made a template which could be used in all regions. I also created a draft of a work process which can be implemented to allow for the updating of this database.

B. Assessment of Learning and Development

As I said before, this assignment was unique for a chemical engineering co-op, but I actually pursued this opportunity. I wanted to broaden my view of the possibilities of a chemical engineering degree by exploring the commercial side of things. In the epoxy group, specifically, it seems to be important to at least have an ability to understand the technical aspects and/or chemistry of our products in order to fully understand their markets and their potential.

I definitely think that I enjoy this aspect of chemical engineering more than the purely technical positions. I could definitely see myself in a commercial role in the future. I enjoyed the fact that I had the responsibility to “design” my own approach to tackling my projects. During my first week, my boss literally told me what projects he
C. Life Out-side of Co-op

Since I was here in the fall, I had a familiarity with the area. Another Cornell co-op and I decided to search for and rent an apartment together rather than using the resources provided by Air Products. Last fall, I used the list provided by human resources and lived in a townhouse owned by an Air Products’ employee. Either way, housing was fairly easy to find, and if you have difficulty, I am sure the HR department would help in any way they could.

As for transportation, you definitely need a car. There is not really any public transportation in Allentown. There are some bus lines but I am not familiar with them. One weekend, I did take the bus to New York City which was very easy; I would highly recommend it.

Also, there are about 100 interns and co-ops during the summer at Air Products. This provides for ample social activities. We went to concerts, a Phillies game, a comedy show, various restaurants, bars, and clubs, as well as just hanging out at each other’s houses. Whenever anyone had an idea, they just sent an email out to the intern social distribution list and it ended up being that if you wanted, there was something to do every night. On top of that, Air Products also organized a picnic for the interns and a movie/games night. Many people also joined the different intramural sports teams here, such as volleyball and softball.

For community service activities, each term, the Air Products interns and co-ops organize a “Day of Caring” where we go out and volunteer. Since I organized the fall “Day of Caring,” I took the lead on setting up this summer’s “Day of Caring” also. We decided to volunteer for Habitat for Humanity. With about 100 people, we had to split up and go multiple days, and during those days, we helped work towards the completion of four different houses.

D. Evaluation

The best features of this assignment were the freedom and responsibility given to me. I also enjoyed the people-interaction that I believe is more typical in a commercial versus very technical role. Outside of the job itself, spending a summer here was amazing solely for the amount of people you get to meet. Out of 100 co-ops and interns, you can definitely find people with similar interests and form great friendships.

It is really hard to think of the worst features of this assignment. I really enjoyed my job this summer. If I had to pick something, I would say that the worst part was that I found that a lot of the people I needed information from were much busier than I was. For example, when I would call customers to interview, more often than not, I would just get
their voicemails. This could be frustrating at times. But all in all, I had a great experience this summer.

E. Additional Info

During your summer assignment at Air Products (before your senior year), you have the option of interviewing for their career development program (a full-time job offer) when you graduate. It's an all-day process, and I would highly recommend it. From what I've heard, it is one of the most in-depth interview processes out of the stereotypical chemical engineering companies, and I feel that now I am ready for any interview I have this coming year.
For my second co-op assignment with Air Products, I worked in the Advanced Gas Separation and Technology group with the Ion Transport Membrane team toward the design of a syngas reactor. The group is research-focused, with particular emphasis on learning alongside results. The major project I worked on was to progress the reactor design forward. I helped implement a more accurate membrane model into the overall reactor design. I used ASPENPlus for most of my modeling work and analyzed the results in Excel. By the end of my assignment, an improved model and initial reactor simulation had been reached that future simulations and reactor designs will build on.

Training was mostly hands on. I was given a few ASPENPlus models to work with and some Excel spreadsheets showing how I could use the data from the simulations. I worked very closely with my supervisor throughout the course of my assignment to develop greater understanding and learn how to use various tools relevant to the reactor design.

This assignment tied in very nicely with my educational background. It allowed me to use several aspects of the chemical engineering fundamentals I have become familiar with to optimize the reactor and provide a deeper understanding of what was really going on. This assignment also helped me gain a better understanding of the career path I wish to follow. I enjoyed this assignment very much, but do not think R&D would suit me well for a long term position. My interests are more toward roles in process engineering, start-up engineering, or project engineering. Three months was perfect to get a "taste" for R&D and have the understanding I may need in the future to be able to incorporate new research into other tasks.

During the course of my assignment, I also learned about many different roles that engineers serve within Air Products. There are many different paths available to a B.S. ChemE, and after meeting with people who have experience in various jobs throughout the company, I have started to develop an idea of how I want to start my career if I end up at Air Products.

Overall, I had an excellent experience. If I were to repeat it, I wouldn’t change much. I would pursue informational interviews earlier in the assignment and I would try to incorporate a little more lab work into the assignment.

Short-term housing in the Allentown area is very limited. The apartment complex I was at (South Mountain Apartments) is the only place that I’ve heard of that offers short term leases, so a lot of other interns lived in the same area. The co-op coordinator can also provide names of some Air Products employees that offer housing for interns/co-ops. A car is essential in the Allentown area. Public transportation is very limited.
There is plenty of opportunity for social activities in the area, especially with the large number of interns present in the summer. Allentown is reasonably close to both New York City and Philadelphia making for easy weekend or even day trips to either. There are athletic fields and a fitness center on the Air Products campus that are available to all employees. Several interns arranged for weekly soccer and ultimate Frisbee games through the summer.

The best part of this job was the heavy emphasis on learning, both for me and the rest of the team. I liked that I was given a good amount of responsibility and trust to complete my work in a timely fashion. The opportunity to meet with people from all over the company was a great way to learn a lot more about the company and other positions I could pursue in the future, since my specific job did not expose me to much outside of R&D.

I would have liked the opportunity to work with a broader range of individuals. While the mutual learning was probably higher with just a few so we could maintain focus throughout my assignment, I feel that experiencing a little more diversity would have given me a better understanding of what I might encounter if I go to a different part of the company. While constantly running simulations did get repetitive at times, every run taught me something new about the reactor or about how the tools I was using worked, so it was overall a very valuable experience.

I would highly recommend this position to any undergraduates considering graduate school. I got a very good understanding for the kind of work that I would be doing were I to pursue a doctorate degree. Also, if planning to work for Air Products, I can't recommend highly enough that you remain in Allentown for your first assignment. In Allentown, you gain a much more complete understanding of the company as a whole and learn a lot of background info that will help you should you choose to do a field assignment at a later time.

Overall, I was very pleased with this assignment. It was a good balance of contributing and learning and offered me many opportunities to learn about the company and the various career paths available. The team I worked with is very encouraging and understands the importance of learning to the co-op program.
David Polley  
Chemical Engineering 2009  
Air Products and Chemicals Inc  
Fall 2007

For my first co-op term in Fall 2007, I worked for Air Products and Chemicals Inc in the Pasadena Plant Maintenance group. The first project I was assigned was to label different types of transmitters and switches throughout the plant. I used piping and instrumentation diagrams for each machine or area to figure out what would have to be labeled, to make the labels, and to find each piece of equipment in the field. This project lasted me almost my entire assignment.

Not long into my assignment, I received a second assignment. This one was to acquire quotes from various contractors to perform road repairs throughout the plant. To complete this, I had to meet with several of them and take them through the plant to show them what repairs would have to be done, and then maintain communication with them to refine the quotes to fit the exact scope of work that we wanted completed. This is still a work in progress, so the road repairs will not begin before my assignment ends.

Another small side project I was given was to arrange for electric water heaters to be put into the Air Products change room at the plant. They are currently using a heat exchanger, heating the water with steam lines from elsewhere in the plant, but have been having issues with not having enough water and not having hot enough water. To do this, I had to learn about the Air Products MOC system, or Management of Change. All significant changes at Air Products facilities start with an MOC that must be approved by people in various departments at the facility. The MOC must include all information about the change. In this case, that meant a description of what was currently there, what exactly was being removed, what the replacement was going to be, and how it was going to be installed. After extensive research to complete and submit the MOC, I had to wait several weeks for it to go through the approval process. It is still in the approval process and awaiting small modifications before it can be approved. Because of this change, this project will not be completed before the end of my assignment, but has the framework in place to be done without me.

I also became involved with the Machine Condition Monitoring team partway through my assignment. MCM’s focus is to monitor the state of the machines around the plant by keeping data on temperature, pressure, vibration readings, and performing visual inspections. Equipment throughout the plant was classified in one of 3 levels, L1, L2, or L3. L1 equipment is equipment that is vital to the operation of the plant; if an L1 shuts down, the rest of the plant goes with it. L2 equipment comprises mostly things that are very important to the operation of the plant and some things involved in complying with governmental regulations. L3 equipment is mostly redundant systems, things that might not even be noticed by anyone if they were to fail while the L1s and L2s continued to run. Obviously, MCM’s first priority is to make sure L1s are all working in top condition. As it is a new program, my first task for the MCM group was to get all of the machines at
the Pasadena plant into the database system that they were implementing. After that was complete, I helped them go through the data that had been collected and set alarm limits for all of the machines that had enough data that a reasonable value could be obtained.

While working with the MCM group, I got the opportunity to attend several seminars and a trade show where I learned how various types of machines worked and what different options there were for the condition monitoring community.

Overall, I do not feel that this position had much direct relationship to my educational background. While nothing was specifically chemical engineering, I do feel that I was exposed to certain things that I will find useful as I continue through my education and into a career. In particular, the experience I gained from working with the members of the MCM team, while quite a bit more mechanical in nature, really helped to give me an understanding of how different pieces of equipment work, methods of identifying and solving potential problems, and the impact one small problem can potentially have on the operation of the entire plant.

If I were to go through the same experience again, I would try to find a position with a stronger emphasis on engineering and applying what I have learned at Cornell. The purpose of co-op for me was to find out what kind of career I would be looking at after graduation if I decided to pursue an engineering career, and I don’t feel that this assignment exposed me to that. I believe this would have made a better second assignment, allowing me to delve into the finer details of production after becoming more familiar with the “big picture” that I would hopefully get from a position that was more specifically engineering.

Outside of work, I found Houston to be an enjoyable place to live. I had to find housing on my own which was a little frustrating, but I found a nice apartment about 25 minutes away from the plant, so it worked out pretty well. Aside from the horrendous traffic, it’s a pretty easy area to get around. There’s one circular highway that goes around the entire city which can be used to get just about anywhere. I definitely couldn’t imagine being here without a car. There doesn’t seem to be much in the way of public transportation, especially by the plant. I made friends with some of the younger employees at the plant, but I found options for solo activities in the area to be a bit lacking. There was definitely a lot more to do when there were a few people available.

The best part of this job was being able to experience the plant environment first hand. I had never been to a chemical plant before I started co-op. I learned a lot about the communication required to make things happen and what role each of the different departments serves. Since I was at one of Air Products’ older plants, there was a higher demand for manual labor than you might see at some newer plants where everything is automated. This helped me to see what actually had to be done in certain situations that would otherwise be completed with the push of a button at a newer facility.

The worst part of this job was the inability to apply my skills to much of the work I was doing. There were many times that I felt I was contributing near nothing, simply because the task I was doing was not complex or was something that may not be used
immediately and will not drastically affect the overall performance of the plant (e.g. labels). As I talked to more people, I became aware that while it may not be a huge contribution that makes the plant millions of extra dollars every year, it can contribute a lot to helping other people get their jobs done quicker, especially since the plant has several new operators that are unfamiliar with the plant and may need to locate something quickly to ensure continued safe operation of the plant. I would have liked to have been more involved in the actual day-to-day operations of the plant, but a lot of what I would have liked to have been a part of was not handled by my department, so I did not have much of an opportunity to be a part of it.

I believe that this position will help me figure out what I want to do for my next co-op assignment much more clearly. I feel that a lot of what I learned about communication and operations at the plant level will give me a better understanding of how whatever I do in my next assignment will affect the company as a whole. I think I will be able to contribute much more to Air Products during my next assignment, and will be able to learn a lot more, now that I have the basic understanding that I need to really be able to get involved.
Leah B. Wright  
Chemical Engineering ‘09  
Air Products and Chemicals Inc.  
Fall 2007

A. Co-Op Work Assignment

This fall I worked as a co-op in the Asset Management Engineering group for Performance Materials at the headquarters of Air Products and Chemicals Inc. in Allentown, PA. When I first started my assignment this fall, my group leader Keith Holtermann assigned me to work on a capacity model project which was supposed to be completed in two weeks. The goal of this model was to calculate the percent utilization of all of the reactors used in the Performance Materials businesses of Air Products. After that I was supposed to be doing work for my supervisor Jim Emerick. However, as I began working on the capacity model with a more experienced employee in the group, we realized that it was a much more detailed and complex model than originally predicted. It also became apparent that when finished, it was going to be able to be beneficial to a lot more people in the Performance Materials business. Therefore, I was directed to try to find as much excel training on the internet as I could so that I could hopefully tackle the complexity of it all. The capacity model project was also split into two phases and as time progressed, it became understood that I would only be able to finish Phase I in my assignment’s time. When there were lull times with this project, I also did work for Jim such as verification work on a new relief valve sizing tool as well as doing some basic relief valve sizing myself. As time progressed, however, the owners of the capacity model project decided to push ahead with Phase II of the model in the hopes of finishing it before I leave.

B. Assessment of Learning and Development

The way the capacity model was first explained to me was that it is like a “global materials balance.” To some extent that is true and therefore, I definitely had to implement a portion of my educational background. I think that more-so, however, it taught me about the products we make and the details surrounding what steps go into delivering a finished product to a customer. The work that Jim had me do with relief valve sizing definitely implemented my education as you had to have a basic understanding of thermodynamics and fluids (though thankfully they have neat programs which do all of those calculations for you!). Jim also took me out to a plant and that was great as I got to actually see the real equipment which we talk about in school. During one plant visit, I also got to observe the first batch of a product which was moved into the plant.

In terms of professional and personal development, I learned about how important networking is. People love to talk about their careers and give advice and it is really beneficial to talk to people in areas where you may think about pursuing a career. For example, during one of my capacity model meetings, I met a Cornell Chemical Engineer alumnus who works in a commercial position. I set up an hour to talk to him about his career and to ask for advice because one of my interests is to pursue a more business-like assignment next summer. Our talk was very interesting and informative and I may be able to get my next assignment in his department.
Initiative is also greatly appreciated. When I first started working on the capacity model, the guy I was working with would give me a portion to work on and then I would report back. I remember specifically one time where I finished what he had given me and he was busy for the rest of the day so I just continued on my own with what I thought he would want me to do next. When I showed him what I had done the next day, there were some parts he wanted me to change, but mostly I had proven to him that I could take more responsibility. After that, he gave me a lot more freedom on working with the model and setting up meetings alone with people for help and advice.

C. Life Outside of Co-Op

Housing was quite easy to find in the Allentown area because the human resources department sends you a list of people who have rooms to rent. I rented a room in a townhouse owned by an Air Products employee. It was about 10 minutes from work and in a very nice neighborhood. As for transportation to work, I would definitely recommend you have a car. There may be carpooling opportunities depending on who you live with but there is no public transportation that I know of.

Socially, Air Products has an activities committee and you can get discounts through being an Air Products employee to places like movie theaters, Dorney Park, the Philadelphia Art Museum, etc. The fact that Philadelphia is close-by is a plus. I went into the city for a weekend and toured the historic district which was very fun and interesting. Also, at the Allentown headquarters, there are many other co-ops from other schools, so it was definitely nice to be able to have lunch everyday with people your own age. My biggest recommendation, however, is to find something to do after work which aligns with your hobbies and interests. If you like to work out, join the Air Products gym; if you like to ski, there are slopes near-by. Personally, I am a horseback rider so I found a barn in the area where I could go ride in the evenings.

Air Products also has many intramural athletic teams and opportunities for community service. They also suggest that the co-ops as a group organize a “Day of Caring” where we go out to help a non-profit organization for a day. This fall the co-ops went to a therapeutic horseback riding facility called Equi-librium, Inc. and helped them replace a fence line which had been damaged in a past flood. Equi-librium really appreciated all we did and we got numerous emails from their C.E.O. and directors thanking us and telling us what a great job we did.

D. Evaluation

The best features of the job were the fact that I had the responsibility and freedom to work on my project and present it at meetings. Also, everyone is very flexible and very willing to help you. Another great benefit is the fact that as a co-op, human resources sets up tons of tours and lunches so that you can learn about other departments and see what else Air Products is doing. I think the best aspect of all, however, is the fact that they encourage you to network and meet with other people in other departments. I am still not exactly sure what I want to do with my career, but I definitely have gotten a lot of good advice from a lot of very successful people.

Honestly, the very worst feature of the job was the fact that after the clocks fell back for daylight savings time, it was almost pitch dark every day leaving work. Thankfully, the barn where I rode had lights in their arena, but it was fairly disappointing
dealing with the fact that you have to be in work all day when it's nice and sunny outside and then when you’re out of work it is dark and cold. Work-wise, I would say the only complaint is that some tasks (especially in excel) can become monotonous, but it is work that has to get done so sometimes I would just have to stand up and stretch or take a walk to get a candy bar before heading back to my desk.

E. Additional Info

In conclusion, I would have to say that your assignment mostly is what you make of it. If you don’t go out and schedule meetings to talk to people, then you have to be content with just sitting behind your desk all day. I personally enjoy those networking meetings a lot and I think that they really helped my morale at times when things were slow. Also, a lot of the co-ops here also found it hard to find something to do after work. Again, if you think ahead and plan something fun or something useful to do with your time, I think you'll be much better off. All in all, I definitely think that this assignment was a great experience for me as it helped to shape my career ambitions and allowed me to receive a lot of great advice.
For my Fall Co-Op term, I worked at Air Products & Chemicals at their Allentown location. Here, I was a part of their Generated Gases division, working on large air separations units. Among the many divisions of Air Products, air separation is one of their main businesses, and has been for many years. Within the Large Air Separations Units department, I was working in process controls with my mentor. On my first day there, my supervisor (the group’s head) introduced me to my mentor, with whom I was working for the rest of the fall.

At the beginning of my work term, my mentor had me doing work for a few other people in the group, so I was able to meet new people and get a somewhat expanded base of knowledge about the group and the company. Some early projects I worked on included identifying safety loops on a air sep plant, testing a replacement program being implemented to size pressure safety valves, and help specify instrumentation and controls for a plant. Afterward, I worked more closely with my mentor, helping him on the projects with which he was involved. The majority of this work was specification of controls for air sep plants, with work on plants in Texas and South Korea. Toward the end of my work term, I helped with the company’s upgrade to a Profibus data transfer system for controls in their plants.

Throughout my term at Air Products, my mentor was my main contact and source of information. Though I did not have any formal training, talking to my mentor ensured that I was never lost on my projects. Along with him, I regularly talked to the other people I worked with – someone was always available to answer any question I had. I felt that this method of learning was very helpful, as it let me develop a network of coworkers and learn to communicate effectively in a workplace over the phone, by email, by instant message, and in person.

In my position in Generated Gases and process control, I was doing work that is not specifically ChemE, but my mentor always tried to give me work that was as closely related to my major and curriculum as possible. During my work, I learned a good deal about professional engineering and how much company culture plays into daily life at work. I found that Air Products values its people very highly, and puts an emphasis on their employees being helpful and courteous first and foremost. Before coming to work here, I did not think that a certain culture could show through in a company’s employees as much as it did. Since I know this now, I will be sure to take company culture into consideration very closely when looking for a position in the future.
Outside of Co-Op, I found life to be relatively easy and enjoyable. I personally found housing with an Air Products employee, which I found from a list Air Products provided in July. I would highly recommend this approach to housing, as it was easy to rent a room from him at a reasonable rate, and at a very good location close to work. Also, most of the people on the list are newer hires at Air Products, so they are not in a very different age group. This, along with other Co-Ops from Cornell and elsewhere (mainly Lehigh University) provides a range of people with whom I could socialize on a daily basis, from lunches to dinners and movies.

Outside of Allentown, I also had opportunities to meet up with friends from Cornell. Many Co-Ops will be taking jobs in Pennsylvania and New Jersey, and at one point we were able to attend a concert in Scranton. The proximity of other Co-Ops and of the Cornell campus makes it very easy to keep in touch with friends from school, even while seemingly being far away from everyone else.

Overall, I found my experience at Air Products to be interesting and very helpful. I know that the things that I have learned in this term will apply both to school and any other positions that I take later on, whether or not they are in the same industry. The fact that I was assigned to work closely with a mentor made my job very educational and rewarding. This aspect of my position, along with my chance to work on multiple projects made this Co-Op term very rewarding, and I would recommend the company and location to anyone else pursuing a Co-Op position.
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Overall, I found my experience at Air Products to be interesting and very helpful. I know that the things that I have learned in this term will apply both to school and any other positions that I take later on, whether or not they are in the same industry. The fact that I was assigned to work closely with a mentor made my job very educational and rewarding. This aspect of my position, along with my chance to work on multiple projects made this Co-Op term very rewarding, and I would recommend the company and location to anyone else pursuing a Co-Op position.
A. Co-op Work Assignment

For the first term of my co-op I worked at Stockton CoGen Company, a coal/biomass-fired power plant owned by Air Products & Chemicals in Stockton, CA. Air Products is an international company which specializes in the mass production and distribution of atmospheric gases, process and specialty gases, performance materials, and equipment and services.

During my co-op I had several daily responsibilities, as well as a number of larger projects which I completed. At Stockton CoGen, the plant was required to document all ash and water testing in order to pass state regulations each year. As a result, my daily tasks included ash collection/bottling/archiving, ash pH testing, ash heavy metal testing, fuel sampling and heavy metal testing, and logging of plant energy outputs (paperwork). In addition, I also had various jobs assigned to me throughout the week, such as collection and delivery of tools to mechanics, errands within the city of Stockton for the plant, and helping operators and mechanics with their labor duties.

Apart from these daily jobs, I also had several larger projects assigned to me by the plant engineer and management team. My first project was to analyze the efficiency of five superheaters in the plant’s piping system, write a report on this evaluation, and make suggestions as to how they could be improved. This job was not only somewhat fun, but also very educational since it showed me the mechanical design of these finer components of the plant, as well as the proper temperature testing of the superheaters via convection heat gun.

A second project on which I worked was the development of a Macros computer program to keep track of the age, use, and time-dependent replacement of the ash-collection bags at the exit of the combustion chamber. This “Baghouse” program was used by the maintenance crew to keep the plant running at maximum efficiency, so that the chance of a plant outage due to unplanned bag damage would be minimized. Although I have used Microsoft Excel spreadsheets an innumerable amount of times during my years at Cornell, I got to learn Macros coding while working on this project.

Another one of the larger projects which I completed was the design of a moveable coal-dust receptacle to fit under a coal conveyor belt which fed the combustion chamber. It was necessary for this coal dust to be filtered off the belt so that it could not spontaneously combust from a belt spark and damage the conveyor. This task took me a great amount of time, since I
needed to survey a number of the workers who would be using the receptacle on their specific recommendations for the cart. Subsequently, I drew up several potential designs and got the workers to all agree on one, all the while considering material and production costs.

Orientation for my position was mostly provided by required plant-worker films and online PowerPoint presentations which included quizzes. Since the plant had a number of hazardous areas and conditions, I had to become certified in numerous fields (ie. proper gas mask usage, confined space training) for safety reasons before I was allowed into the plant. Apart from these certifications, most of my educational learning was done through power plant textbooks and discussions with plant members. The plant workers each had a great deal of knowledge about the specific areas of the plant on which they worked, so I spent time with all of the different crews (maintenance, mechanics, HDP, operators) in order to get a well rounded understanding of the plant.

B. Assessment of Learning and Development

Working at Stockton CoGen Co. allowed me to see the application of several mechanical engineering principles in action. From thermodynamics to mechanical design, several of concepts which I learned in my Cornell Engineering classes were directly tied into the plant's design. As for future career interests, the reason I took a co-op was to explore one of the many fields within mechanical engineering, plant work, as a potential career. Although I learned a great deal about plants and had an enjoyable time working at Stockton CoGen, my experience has made me realize that I want to check out other fields within mechanical engineering for future jobs, such as design, since they may be a better fit for me. In addition, co-op made me realize that professional specialization within a field, such as a Masters degree in automotive or aerospace engineering, is highly desirable since it gives an engineer a specific body of knowledge (a "niche") which will be valuable to their company.

As for my personal development, engineering co-op was an invaluable experience for me. This was the first time that I was completely financially independent of my parents, and it taught me important budgeting and bargain hunting skills since I was on a co-op salary. In addition, it really gave me a true appreciation for those less financially and educationally fortunate who struggle to keep themselves and their families fed and under a roof, since this was a very common situation within the city of Stockton.

My co-op also provided me with a stronger set of social skills than I had when I started work. Since I decided to co-op in California, I was far away from my friends and family on the East Coast; I didn't know anyone in Stockton when I first started work in January 2009, and I knew little about getting around in Northern California in general. At first, meeting new friends was a bit of a challenge since everyone working at the plant was 40's+. Once I started hanging
out at the local college, University of the Pacific, I quickly found a fun social group to party with on weekends and play sports with when I was out of work.

Overall, it was a very positive experience in many respects, and I learned much about corporate engineering, workplace culture, social dynamics, and meeting new people. Looking back on it, I can't say that I would do anything differently during my stay in Stockton.

C. Life Outside of Co-op
Concerning housing, Air Products and Chemicals made sure that I had housing in California before I arrived; I was contacted by the previous co-op at Stockton Cogen, Julio, who made several recommendations for temporary housing around the city.

As for transportation, a vehicle is pretty necessary while living in Northern California. There is a city bus system within Stockton, but it is very slow; for example, to get from the power plant to my apartment 7 miles north took about two hours by city bus.

Concerning social activities outside of work, the city of Stockton has their own NHL hockey team, the Stockton Thunder, which is always fun to see. In addition, Northern California has many great places to visit all within a few hours drive: San Francisco, the beaches of Santa Cruz, the forests of Humboldt County, Yosemite National Park, concerts in Sacramento, and so on. The number of fun activities to enjoy in Northern California is innumerable, not to mention the weather is almost always sunny and warm.

D. Evaluation
As I've stated before, co-oping with Air Products and Chemicals in Stockton is a great experience overall, which I recommend. One of the best features of the job is that one will get to see several core mechanical engineering principles first-hand at the plant. Also, many of the workers at the plant have a positive, laid back attitude and a great sense of humor, which makes them very enjoyable to work with and be around. Lastly, the weather in Northern California is fantastic, if one likes warm, sunny weather.

There weren't many negative features to this job. However, one of the things which was difficult to get used to was the work schedule: 7AM – 3:30PM. Waking up at 6AM everyday can sometimes prove to be difficult. In addition, to those not inclined towards physical labor jobs, this position may not be ideal. Required job apparel are steel toe boots, hard hat, safety glasses, work gloves, and ear plugs. Getting your hands and clothes dirty with machine grease and ash is part of every day's work. However, if you do enjoy using your hands and physical work, then this job is for you.
First of all, Air Products campus at Trexlertown, PA is located directly off of a true boulevard lined with beautiful sycamores. I note this with particular enthusiasm because I lived in a house I shared with three co-ops from Purdue, which was a insignificant quarter mile from the front door of Air Products and a pleasant level walk, which never brought Libe Slope to mind.

Air Products told me I would be working in Trexlertown about a month before my start date and I scrambled to find plane tickets and housing on the website they suggested (internhousing.com). Surprisingly, the whole process went very smoothly, and I enjoyed my time in Allentown very much. My housemates were on their fourth of five assignments with Air Products and they knew a lot about the area and the company and helped me settle in. They have also become my best friends for the semester, and I have done almost everything with them, and often with a large group of other co-ops we have become friends with. We’ve gone skiing, hiking, to Philadelphia, to concerts and out to eat many times. I’ve also been reading profusely, riding my bike, jumping on a trampoline I bought, cooking and baking and all the other things I only now have time to do. I had a car, but rarely drove. From where I lived, I could have easily gone entirely without.

I worked in HyCo (Hydrogen) Process Controls. Having not yet taken a Process Controls class at Cornell, I read from textbooks and talked to coworkers on the subject and learned a lot just from observing on my own. My main job throughout the assignment was to work on a simulation called the Virtual Hydrogen Plant, which functions as a training tool to start up and operate plants for real HyCo plant operators. Because HyCo Plants stay in operation for years sometimes without shutting down, having operators trained to do a plant start-up can become a big problem. Using the VHP, a plant operator can dial into our computers from anywhere in the world and get experience in plant start up without compromising time and money on the real plant.

I spent the first week or so learning about parts and processes of a hydrogen plant, the simulation and the programming language Siemens PCS7. I didn’t have much training, but it really wasn’t necessary. If I needed any clarification on what I was reading or looking at on the screen, I simply needed to ask. PCS7 is a language based on interconnecting blocks, which do individual functions (from addition and subtraction to complex control schemes). I didn’t have that much programming experience, but I have always liked programming, and I found this language to be very intuitive.

Next I learned to do what the operators do: start up the plant. This task is not to be underestimated; after all, there is a reason the simulation exists. It took me four days to learn to do the whole simulation in two hours.

After this, I began to look at the problems it was my job to fix. Since the program itself started as an amalgamation of many smaller simulations, some parts of the program were quick fixes to make the more used parts of the simulation function reasonably. The last intern had the job of fixing simulation on the feed compressors. My first job was to make corrections on these feed compressors and make sure they were still functioning properly. This was a great task to help me get familiar with the programming language and the things that were possible in it.

After that I used my knowledge of my predecessor’s code to work on my own projects. First, I worked on the product compressors, which are similar to the feed compressors but with some important additional complexities.
Then I took a break from coding to learn about the theory behind process controls and lent my help to another member of HyCO process controls by working on editing Engineering Standard and PID Control Loop documents. This project helped me significantly, because my later projects required a deeper understanding of Process Controls and editing these documents gave me a much more direct way of learning about these subjects.

Next I worked on fixing a bunch of related problems with the stream drum simulation, which made the whole water system unstable and would often crash the VHP back down to the beginning. The testing for this project required going through the whole simulation to see if any parts of the process made this code unstable. During this time, I started the plant over and over, and learned to cut down my time from two hours to about five minutes.

Around this time, the assignment was starting to draw to a close and I ended up doing a few smaller jobs. I made sure that all possibly important variables were available at any time for tracking. And I also worked on Test Cases, where the failures of certain valves are simulated, so that the operator can practice determining the cause of the symptoms and the correct course of action in that case.

I worked mostly alone and my assignments were of a degree up to me. I chose the more programming oriented ones because I enjoy programming more than things like graphics and engineering documents, which seem to use fewer engineering skills. Not to say I didn’t switch between all of these for some variety.

I always had work to do, but felt less of a deadline than others. Instead I felt the direct impact of my work: either the code works or it doesn’t. Near the end of the job, a few newly hired Systems Engineers came in to try out the virtual plant, and I was satisfied to see how much more (like me) they understood by doing the simulation. A factory is composed of many interconnecting parts, but despite how much you read about or see each part and learn about how it works, its impossible to understand the great complexity of control systems and each part’s effects on all the others without experiencing a good simulation or being in a real plant. I enjoyed the large scope of my job. I loved that for the time I worked in Process Controls, I felt I owned the Virtual Hydrogen Plant simulation. I knew all that I could about it and often felt like an expert.

The only think I ever felt dissatisfied with in my job was that I was somewhat isolated from others, even in my immediate group. Since my work consisted of independent pieces that were entirely my responsibility (also a good thing), I did little collaboration with others.

Air Products gave me many opportunities to learn about the company as well as the job descriptions of just about every kind of job an engineer can do (which I have been struggling for years to totally distinguish). I went to “Brown Bag Lunches” almost every week: lunches for co-ops and new hires that give you a great representation of how those random jobs fit together into a coherent business. Air Products seems to be great at giving you what you want: variety, important work, and community. The company has a comfortable almost college-like hold on their “campus” at Trexlertown. There are two convenient cafeterias, community service events, a gym (which is very cheap), a health center, team sports, an ergonomic hotline, credit union and many other luxuries.
Joshua Mabry  
Chemical Engineering  
Air Products, Fall 2008

A. Co-Op Work Assignment
I worked at the Allentown headquarters of Air Products in the Global Operations Plant Process Engineering group, which is headed by Keith Holtermann. My mentor, i.e. direct day-to-day supervisor, was Jim Emerick, a process engineer who has worked at Air Products for over twenty years. The group's main role is to supply engineering support to some of the company's chemical plants. The engineers in the group pursue a whole range of projects from designing new plants to cutting operating costs, and most are assigned to support one specific plant. My supervisor, Jim, is tasked with supporting products that are manufactured by outside “toller” manufacturers and also is the group's pressure relief device guru, since he has done many of these calculations and helped develop some of the tools used for these calculations. He also provides engineering support to miscellaneous projects, like reducing wastewater at the Paulsboro pre-polymer and blends plant.

I describe Jim's role in detail because I worked very closely with Jim throughout my assignment, turning to him when I had questions or needed more work. Since he does many of the pressure-relief calculations, I also did many of these calculations. This work is highly-automated, with different programs capable of modeling different scenarios. However, the programs must be properly initialized to reflect the physical situation, and results carefully checked to make sure they seem realistic. Knowledge of thermodynamics and fluid mechanics is necessary to do this. A great deal of patience is also needed, as the programs often crash.

One consequence of doing so many calculations on the computer was that I suffered chronic wrist pain after five to six weeks on the job. The pain got bad enough that I could hardly stand to use a mouse or even drive my car. At this point, I realized I needed to seriously change my work habits and get some medical attention. Luckily, Air Products has a doctor on-site who gave me some advice, as well as a team of physical therapists. After a few weeks, the pain was under control, thanks in part to getting a new mouse, which my boss readily agreed to pay for. I was glad that the company took my injury seriously, and I was able to continue working without constant pain.

Luckily, I was not always in my cubicle doing calculations. I also got to visit several plants. Twice, I was sent to the recently-acquired Milton, WI plant to help correct drawings and to roughly estimate cooling water usage of equipment. This was a good experience, and I enjoyed the perks of business travel, including spending a weekend in Chicago. Jim and I also visited the Paulsboro plant many times, first to work on estimating the cost of a new process there and later to work on waste-water reduction. The estimating process lasted several weeks and I sat in on many meetings that gave me insight into how the process works.

The rest of my time during the assignment was spent on small, unrelated assignments. I helped revise documentation needed to move an existing product from a “toller” to another plant. I also spent several weeks developing macros in Excel for Keith that produced graphs and reports from a productivity-tracking database. My limited amount of programming experience helped me to learn VBA and to develop the macros. Finally, I did some administrative things to help Jim.
B. Assessment of Learning and Development

This assignment gave me a good overview of the types of activities a Process Engineer engages in to support a chemical plant. In visiting Milton, I also got to see the types of activities Production Engineers and Plant Managers engage in. Through informational lunches organized by HR, I also got to hear from many people throughout the company about their careers. Another highlight of my assignment was touring many of the labs at Air Products during a special event for that purpose and thereby learning about a two-day process scale-up course, which I was able to sign up for and enjoyed very much. Although I was not involved in process scale-up this assignment, it showed me how that is approached and should be useful knowledge in the future. Towards the end of my assignment, I decided that I would like to work in R&D in the future and was successful in setting up short informational interviews with several R&D managers in the company.

C. Life Outside of Work

I found housing using InternHousing.com, which was set-up by HR. I rented a furnished room in a condo of a young Air Products employee, as did a co-op from another school. This was not the cheapest possible arrangement, but it was fairly comfortable and close to work. I brought my car, which is a must for the Allentown area, unless you live right next to the Air Products campus and have friends with cars who can take you places on the weekends. For social activities, the other co-ops at Air Products were pretty proactive at scheduling group activities, like soccer and bowling. Unfortunately, I was pretty busy taking a biology class at night and did not really participate in those activities. The upside of taking Microbiology at Lehigh Carbon Community College is that I have knocked out the ChemE biology elective.

D. Evaluation

Overall, this assignment gave me a lot of exposure to the engineering side of Air Products chemicals business. I was able to work on a wide range of tasks and got to see how the corporate office and some of the plants are run. I would recommend a similar assignment to any ChemEs considering working in the chemicals business.
Danielle Brody
dlb333
Chemical Engineering
Air Products
Fall 2009

Fall 2009 Job Summary

A. Co-op Work Assignment

I worked as a Plant Process Engineer for was the Polyurethane Intermediate (PUI) and HyCO group. More specifically, I supported the PUI plant in Pasadena, TX. However, I worked from Trexlertown, PA so this gave me the opportunity to travel several times to the plant in Texas.

The projects that I completed to support the plant were either projects that could help the plant run more efficiently, or projects that could help employees at the plant manage documentation better. Since I worked a seventeen-week co-op term, I feel that I was able to take on several different projects and see them to the finish line.

Orientation was a very brief session the morning of the first day, but it was definitely helpful for meeting some other co-op students. Besides the orientation, there were several online tutorials and training sessions that I completed throughout the term. Additionally, my supervisor always welcomed questions about my projects, or anything else. The people I sat with in my office were also very helpful since they were young employees who remembered being new.

B. Assessment of Learning and Development

I was definitely able to use some of my Chemical Engineering knowledge, and my assignment made me excited to take on my spring semester courses. I would love to see how they can help me next summer when I come back. I wish I had known a little more about Excel and VBA, but I was able to learn what I needed without too much trouble.

As for the professional culture, it seems that people at Air Products are very willing to help each other and no one ever treated me like I was an inexperienced intern. Another thing I noticed about Air Products is that they really promote seeing different aspects of the company. In fact, as a newly hired employee after graduation, you enter a "Career Development Program" where you rotate to three different positions. This type of experience is stressed on the intern level as well, which is why I will work in a different area next summer, possibly in research.

The co-op experience really pushes professional development. I now feel much more comfortable calling and e-mailing people to discuss my projects, and even scheduling
meetings with people. Also, I am considering graduate school and I was able to see what different degrees could do for my career in the future. This is something I still haven’t figured out, but it was very beneficial for me to meet people with graduate degrees and hear how that might have made an impact for them.

C. Life Outside of Co-op

The best part about life outside of co-op is that you have no prelims to study for, problem sets to work on, or office hours to attend. There were only about 8 other co-ops during the fall (I’ve heard there are usually about 100 in the summer), but this allowed the 8 of us to become very close. We occasionally went out for dinner or did some activity on the weekend.

As for living situations around Trexlertown, I used “internhousing.com,” a website that Air Products uses for interns to find temporary housing. HR gave me a password and I ended up finding the perfect apartment that was less than a mile away, came furnished, and included utilities. I lived with a young female employee at Air Products who had a spare bedroom and bathroom. I really enjoyed using the internhousing.com website and couldn’t be happier with my living situation. One thing I should mention is that there isn’t public transportation and you should either bring a car to Trexlertown or live with other interns and carpool.

Another thing I enjoyed about the company is that I sensed a focus on community service outreach. All of the interns participated in a “Day of Caring” at a local Elementary School. I also received many e-mails about other opportunities to volunteer, some of which I was able to sign up for.

D. Evaluation

One of the best features of the job was that I was able to meet so many people at the company and get to know their roles. During my trips to Texas I was often introduced to the other people coming to visit the plant and I would usually even go out for dinner with them. Talking to senior people at the company is helpful in getting to know how the company has evolved and what may be to come in the future. I also met people in the company through “Brown Bag lunches,” which were informal lunches with someone at the company. They would discuss their own career and how they got to position they currently had. They would also give advice and offer a chance to ask questions. Since there were so few co-ops, these sessions were intimate and I got a lot out of them.

Another good feature of this job was that I was able to work on and see so many different things. I worked for just over four months, with four trips to Texas, and almost every time I went to the plant there was some event going on that I sat in on and learned about. I can definitely say that I know a lot about the plant and what is going on with it.
Another thing I liked about the job was that I still felt connected to Cornell throughout the experience. Although I was the only co-op from Cornell, there were a few new employees from Cornell, my "buddy" graduated from Cornell, and my recruiter is a Cornillian and he stayed in touch with me during my work term. We even had lunch with the recent Cornellians one day. Also, Cornell is only a 3 hour drive from TREXLETTOWN so I was able to drive there a few times throughout the semester and catch up with friends.

As for bad features of the job, all I can really think of is that things would sometimes take longer to get done because people wouldn't get back to me when I e-mailed them. This problem was somewhat rectified by my trips to Texas, since I could just talk to people in person. I guess another issue was that I needed to receive Aspen training, only one training course was offered and I wasn't able to attend because of poor timing.

E. Additional Information

I really think that an Air Products co-op assignment teaches you a lot and gives you a better understanding of what you might want to make out of your career. You get to see the range of options from business to research to design, etc. I feel that I was exposed to so much in just four months, and I'll be coming back next summer to learn even more.

As for co-op in general, at Cornell you don't have to make up for any "lost time," like you do at some schools when you do co-op. This is something to take advantage of; the summer classes might be rigorous but it's an opportunity worth taking. If you do summer classes the right way, you can even come out ahead of people who don't do co-op, and you'll have invaluable work experience.

If you have any questions I could help you with, my net id is dlb333.