Sloan Career Cornerstone Center

Profiles of Chemical Engineers

Franklyn Hall

Chemical Engineer
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Education:
B.S. - Chemical Engineering, Howard University

Job Description:
Chemical engineer, working in the Economics, Exposure and Technology Division

Advice to Students:
"Because there are so many different areas of engineering, search out the one that addresses your strengths and abilities the best and don't just fall into one of the big four: mechanical, civil, electrical, or chemical engineering."

Video Transcript 1:
"Two things that we mainly do. One is occupational exposure assessment. Primarily what that involves, I guess when a chemical comes into commerce in the United States, whenever it's going to be manufactured, processed or used in any quantity, or in certain quantities it has to go through an review process and the engineers in my branch review that chemical for any potential exposure to the workers or any people who may be using the chemical during their lifetime. The second part of what we primarily do is general technical support. We do a lot of data searching, technical review, summarizing and kind of submitting technical data that we get from industry."

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"I made a lot of contacts. I was able to use some of those contacts to maybe find out what the employment opportunities were at different companies and that's actually how I got the opportunity to be interviewed here, was through a contact I made at a career fair."

Interview:

Hall: My name's Franklyn Hall. I work for the U.S. Environmental Protection Agency at its headquarters in Washington, D.C. I'm a chemical engineer, working in the Economics, Exposure and Technology Division, Chemical Engineering Branch.

Q: What does that branch do?

Hall: Two things. One is occupational exposure assessment. When a chemical comes into commerce in the United States, whenever it's going to be manufactured, processed, or used in any quantity, it has to go through a review process. The engineers in my branch review that chemical for any potential exposure to the workers or any people who may be using that chemical during their lifetime. The second part of what we do is general technical support. We do a lot of data searching, technical review, summarizing, and submitting technical data that we get from industry.

Q: What's involved in reviewing these chemicals?

Hall: At the point we're at in the review process, most of the toxicological and ecological toxicity information has been gathered for this chemical, usually by the submitter or the company in industry that wants to manufacture this chemical. What we do is look at the number of workers involved at the different sites where this chemical will be used. We look at the different physical chemical properties-vapor pressure, viscosity, water solubility, those kinds of things-and use that information with models that have been developed over a number of years to come up with estimates, or assessments, of a quantitative analysis of the kind of exposure we would expect during certain scenarios of this chemical's lifetime when it's manufactured, processed, or used.

Q: How do you use the information that you compile?

Hall: The information, the occupational assessments that we do, gets taken into consideration with other assessments from other branches-branches that look at the fate of this chemical, in other words, where it's going to end up once it has been released into the environment and the populations that might be exposed to this release. All these things come into play with a multi-disciplinary group including toxicologists and biologists. They look at the submitted testing and laboratory data, along with our occupational exposure assessment and the fate information-the information that's going to tell us where this chemical's going to end up-and put that together and make a decision based on all those different factors. But ours is just one of many points of information that get taken into account.

Q: What is a typical day like for you?

Hall: Usually, it starts out with the pre-manufacturing notification. I will go ahead and pick up the submitted data from the manufacturer. I will review that data and then make the assessment of the different occupational exposures, as well as any environmental releases that we think could occur. We do a lot of support. One of the things that I work on is the Toxic Release Inventory. There are different work groups involved with chemicals in the environment that certain communities or state and local governments may want to put into what's called the Community Right to Know for Toxic Release Inventory. I review the releases, the different locations, the potential for this chemical to be used in other industries, and then this information, along with that of another multi-disciplinary group, is used to come to a conclusion as to whether or not this chemical should be put on the TRI-the Toxic Release Inventory-or if it should be de-listed from this Release Inventory. We look also at protective clothing that

workers may wear, whether it be gloves, full body suits, respirators, that kind of thing, and evaluate the technical information that we receive on that.

Q: How long would it take for you to review one chemical?

Hall: Generally, with the PMN chemicals-the Pre-manufacturing Notification chemicals-there is a 90-day review period. So from the day that the EPA receives the submitted information, we have to review it and come to a conclusion on whether or not we need to regulate it or whether or not we need more test data in those 90 days. So I have a relatively short period of time to get the information, review it, and get it back out so that these other disciplines can take a look at it and do their own assessments so that the group can come together and make a conclusion.

Q: Who do you interact with on a day-to-day basis?

Hall: I do a lot of work with a large number of different disciplines. We work with lawyers, biologists, statisticians, toxicologists-all these people bring their own expertise. Together, we look at, not just at the chemical make-up, or the physical properties of a chemical, but also at how prevalent this chemical is in commerce. What potential is there for this chemical's production volume to be increased, and that's where an economist may come in. Then we also look at what is called the risk, the probability that this chemical could be exposed to certain populations. We also look at how much of this chemical it would take before you would start to see some kind of observed effect, whether it be an ecological effect or a human toxicity effect. That's where toxicologists naturally come in.

Q: Do you have to have some understanding of the work that these other professionals do?

Hall: Absolutely, yes. The information that we pass on is used to make larger decisions, so we need to have some understanding as to what these other disciplines are going to do with the information we pass on. Just by the interaction with these other people we gain a little bit of knowledge into what they do in toxicology and economics. Sometimes we're relied on to incorporate some of this information that they come up with into our own reports, so naturally we have to have an understanding of what they do.

Q: What is it like to work for the government?

Hall: I compare it to experiences I've had in industry. You do more review and more research than you probably would in industry, so, from that standpoint, I think you get an opportunity to learn some different things. You write a lot of reports, and do a lot of summaries, so you naturally have to understand the material that you're reviewing. But you have to write in a form that someone who's maybe non-technical can read. We decipher a lot of technical information that we receive, so there has to be some understanding of who your audience is going to be.

Q: What do you like about being in the government sector, and what are some of the things that aren't as attractive to you?

Hall: The biggest thing that I like about being in the government sector, particularly in the EPA, is that I'm given the opportunity to work on a lot of different projects. Environmental issues come up all the time. There are always developments in different areas and policy. So, I get a chance to do things in what are called `new chemicals,' or chemicals that have yet to be manufactured, as well as working on existing chemicals-chemicals that have been in commerce for a significant period of time. I really enjoy that. I enjoy the research end because I get a chance to learn other things that I might not be exposed to if I didn't have to go and find more information on projects that I'm working on. I wish that I were able to do more hands-on chemical engineering work. We don't really do a lot of site visits and that kind of thing. We really review a lot of information and are relied upon heavily to review and understand the information that we get, whether or not we have expertise. The chemical industry is all over the place. We have to gain experience in a lot of different areas where maybe, if we had an opportunity to get out and see these things actually in action, we'd have even a greater understanding of what we're dealing with.

Q: So you don't work in a lab then?

Hall: No. We do have research and development laboratories, of course, and we have chemical engineers who do that kind of work. We have chemical engineers, I'm sure, who work at the state level and lower levels of government, who get out there in the field and do that kind of work, environmental engineering, environmental science kind of work. We more or less do a lot of data review and reporting.

Q: Do you have to deal with a lot of bureaucracy, red tape, or concerns about job security because of budget problems with the government?

Hall: No, actually when I started with the government, it was right before the budget crisis of 1995. At that time, I probably would have given a different answer, but now I think there's pretty good job security in the government, not just in the EPA, but across the board. I think that as far as bureaucracy is concerned, there is a certain level of what's called peer review, internal review, that you have to go through, but I think that it's good for things to be circulated internally before they're put out in public. I think that's just part of quality organization.

Q: What courses and experiences from college did you find most helpful?

Hall: I guess some of the courses that I found very helpful were Unit Operations-that probably was my favorite course-and Fluid Mechanics, Heat Transfer, and Management. Actually, a lot of the modeling and things that we do for the Occupational Exposure uses a lot of mass transfer principles. I think also that some of the liberal arts classes helped out a great deal as far as writing reports and communication in general. Technical writing helped out a lot-we have to take technical information and then either explain it or summarize it in a non-technical way, so that helps out a great deal. Although we may be able to write very good reports, the engineers sometimes need a little bit more work in being able to communicate that information to other people who may not be trained in the same areas that we are.

Q: Were you involved in any extracurricular activities?

Hall: Yes, I was involved in the marching band my freshman year. I was also involved in AIChE, and with the Big Brothers/Big Sisters of America.

Q: What skills did you pick up in those groups that transfer to your work now?

Hall: More than anything, the interpersonal skills and interaction with different people helped out a great deal. It probably was very important not to just associate with people at my school-technical people-because that's not who you're going to deal with in the real world. So I think it's advantageous to be able to have friends and associates in other areas. It gives you a different perspective on things and widens your views a little.

Q: How important are the chemical engineering classes that you take during your first couple years of school?

Hall: I think a lot of the early basic chemical engineering process classes helped out a lot. You probably use those as much, if not more, than some of the later classes that teach you how to design distillation towers. I think a lot of the mass balance and heat balance things that you may learn in the first year or two of chemical engineering help out. You probably use those more on a day-to-day basis than anything else so they're very, very important. They really are the basis of everything else you will probably do. I found those probably as helpful, if not the most helpful, of anything.

Q: How important were your internship or co-op experiences in getting you where you are today?

Hall: Well, from several perspectives, I guess it was very important. In a classroom setting you can see diagrams and balances, but until you really get into a plant, you don't see realistically that everything doesn't look exactly like a schematic diagram. You really get to understand the ins and outs of the everyday workings of a chemical plant and how things really operate. I also had some experience, from the business side of it, when I worked at a contract manufacturing group. That helped me see that chemical engineers do not always have to work in chemical plants. There are other places they can work, as far as in business development groups, for industry. In general, because I had the opportunity to work in three different industries, chemical processing industries, I gained an advantage in getting this job because of the different industries that we deal with and because of the different processes that we see. Having some real-life experience helps me when I get a chemical in to review that I've had experience with, or a process that I've had experience with. Even remote experience helps me to understand a little better and get a picture of what's going on, as opposed to someone who had never seen this ever before in action.

Q: Is it difficult to find a job in the government sector?

Hall: I think that really depends from agency to agency, or department to department. Howard University had a career fair, actually it had two each year. One was more geared towards engineering, and the other was a general career fair. I took advantage of those. That's how I got my internships and made a lot of contacts, even people that I knew that I never had contact with. I was able to use some of those contacts to find out what the employment opportunities were at different companies, and that's actually how I got the opportunity to be interviewed here, through calling someone up who I hadn't even spoken with in probably about two years who I met at a career fair. I came in for an interview, and was hired a few months later.

Q: Why did EPA hire you?

Hall: Because of the large number of petroleum chemicals that we deal with, my experience with the oil and gasoline additive industry helped out a great deal. This is my first post-graduate work experience, so to come out with that kind of experience-from undergraduate-helped out a lot. Dealing with the ejection molding and ceramic engineering in my past internship experiences probably gave me an advantage.

Q: If you could go back to your first year in college, what would you do differently, or the same, to get to where you are today?

Hall: The thing that I would do the same is take advantage of the internships. I wouldn't change that for anything. I think that has helped out a great deal. What I might do differently is take advantage of other engineering courses or other courses outside of chemical engineering, maybe in business, communications, computer science, or natural sciences. I think that if you have experience or training in areas outside of chemical engineering, you get an opportunity to see other areas of chemical engineering besides process engineering or plant work. I think there are a lot of areas, like biomedical, that you make yourself available for if you get these kinds of things under your belt as an undergraduate.

Q: What advice would you offer to someone who is interested in chemical engineering?

Hall: Because there are so many different areas of engineering, search out the one that addresses your strengths and abilities the best and don't just fall into one of the big four: mechanical, civil, electrical, or chemical engineering. I was a physics major before I transferred into chemical engineering in my sophomore year, so I got somewhat of a late start. Just make sure that you end up in the place that you want to be, and that it's a major that you feel comfortable with. Develop a circle of students that you can work with because it's accomplishable in terms of a degree in chemical engineering. You can accomplish it by yourself, but also I think it's very helpful to have a group of people with whom you can associate. If you have problems, they may be able to explain it to you in a way that a professor can't or may explain it in a different way that you can understand because they're at the same place in the learning curve as you are.

Q: What organizations or resources did you use in college that helped you prepare for your career in chemical engineering?

Hall: In general, I think it was when I had the opportunity to explore resources outside the university, whether it was going to one of the other area universities, whether it's George Washington or American University, or even looking at magazines like Chemical Engineering. Things like that helped me see more than what's in a textbook as far as chemical engineering is concerned, particularly as an undergraduate where you don't really have a lot of real-life experience. It gives you an opportunity to see what engineers are doing out there and gives you a realistic view of what may be expected of you once you get into the workforce.

Q: Do you think that chemical engineers in other sectors of the government are experiencing some of the same things that you are?

Hall: I think that probably there's an equal mix of those who are experiencing the same type of things that I encountered, as well as different. If you look at maybe the Department of Energy, they're probably doing very similar things, but if you were to go to the Office of Research and Development, in Research Triangle Park, there I think you would see a lot more hands-on. Then there are areas of EPA where you have chemical engineers who are inspectors involved in emergency response. They actually go out when there are spills or explosions or leaks. They're out there in the real world, so to speak, seeing these things happen. So it's somewhat different for them, but I think there's probably a place for everybody depending on what you want to do.