

3M Transcript for the following interview: Ep 51 Debbie Dietrich, Exposure

Monitoring Mark Reggers (R) Debbie Dietrich (D)

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Welcome to the 3M Science of Safety podcast presented by 3M Australia and New Zealand Personal Safety Division. This is a podcast that is curious about the signs and systems of all things work, health and safety, that keep workers safe and protect their health. I am Mark Reggers, an occupational hygienist, who likes to ask the questions Why, How, and Please Explain. Whether you are a safety professional, occupational hygienist, or someone with any level of WHS responsibility in the workplace, maybe you are a user of safety products or maybe you are a bit of a safety nerd who finds this stuff really interesting, then this is a podcast for you.

Welcome to the 3M Science of Safety podcast everyone. I am Mark Reggers, an occupational hygienist, who likes to ask the questions Why, How, and Please Explain.

(R) Today we are talking with Debbie Dietrich. Welcome, Debbie.

(D) Thank you very much. I'm very happy to be involved with this event.

(R) Whereabouts are you based because we are Skyping you from somewhere in the world?

(D) All the way from Houston, Texas. Yee-haw.

(R) You sound like a very proud Texan there. Excellent. Now, we are talking about exposure monitoring today and we're going to do two parts with you, but can you please introduce yourself, who are you and where are you from and a little bit of your background if that's okay?

(D) Okay. Well, I was born and raised in Pittsburgh, Pennsylvania but I moved to the warm sunny south at the tender age of 21 to begin my Master's Degree in Industrial Hygiene. After graduating, I decided to stay in the great state of Texas and I found my way to SKC in 1984 and I have been with SKC ever since, travelling the world, talking about air sampling.

(R) So, you are the right person to speak to about exposure monitoring. So, let's start with the basics. What is exposure monitoring for someone who may not have heard what that is before?

(D) This is a great first question and I've given it a lot of thought so I can have a great answer. Exposure monitoring is a quantitative measurement of environmental hazards to which workers may be exposed. And it is a very critical step in the prevention of worker illness and the preservation of health. Now, today I'm here to speak about exposure monitoring for hazardous chemicals but exposure monitoring is also done for other workplace hazards; things like noise, radiation, or heat stress.

(R) So, Debbie, when you say quantifying the hazard, so, a workplace would know that maybe an area is really dusty or they're working with chemicals but it's putting that number to it. Is that what you mean by quantifying?

(D) Definitely. You just want to know how much of the chemical the worker is actually breathing during the day. As I always say, we need chemicals in modern

day life. They fuel our cars, clean our clothes, fertilise our crops and for women, hey, it colours our hair. We need chemicals but we just have to be sure that the exposures that we get are at safe levels.

(R) So, a workplace gets this number. What do they do with that number then? It's one thing to go, "It's X level," or, "That level." How do they use that?

(D) Well, of course one sample is never enough. Once they get a number, then they go and gather more numbers. You have to generate enough data to be sure that you can draw the correct conclusion. And there is a whole science called Exposure Assessment Strategies when we look at where to collect the samples, who do we sample and most importantly, how many samples that we take. And then, once we as trained professionals feel that we have collected enough samples, we interpret the data. And that's based on our university degrees, our professional training, our professional experience. We exercise sound professional judgement after we look at all of the data we've collected, not just one or two air samples.

(R) Debbie, there's hundreds of thousands of different chemicals in the workplace. Can exposure monitoring be done for every single chemical that may be found in the workplace?

(D) Well, there are established scientific methods on how to do exposure monitoring for most hazardous chemicals found in the workplace, particularly the high-profile chemicals like carcinogens that are highly toxic. I want to take this moment to describe methods. This tends to be confusing to people new to air sampling. I always equate methods to a recipe. Like a recipe, methods list all the equipment that you need to collect the sample. Then, they tell you how to do it. They specify the critical sampling details like the flow rate of a pump or the minimum and maximum air volume which equates to the sample time. And finally, the methods tell chemist how to do the laboratory analysis. So, everything you

need from soup to nuts is included in the methods. Now, in your country, Standards Australia has published sampling methods for compounds such as respirable dust or inhalable dust. And you may be surprised to learn that exposure monitoring in Australia is also done following methods published by US governmental agencies like NIOSH or the UK Health and Safety Executive. These method manuals are available online and throughout the world we all use these resources. It's very, very expensive to develop and validate methods so each country doesn't validate their own methods for every single thing. We share our resources.

(R) So, Debbie, for those type of chemicals where there isn't a recipe as you say ... I like that analogy; I haven't heard that one before ... how do workplaces assess workers' exposure or health risk if there isn't a recipe as you say to get that number?

(D) Well, if there are no published methods from government agencies or scientific bodies, oftentimes the corporations that actually make the chemicals will have their own sampling methods that they develop within their company. Think of a pharmaceutical company. They have very unique or proprietary compounds. They may be the only one in the world that makes that. So, sometimes the manufacturer of the chemical will have their own methods that they will share with you. So, I always say, "Try and find the method through the method manuals that I just discussed," or, "Go to your lab." The lab is a great resource to provide you help on the choice of a method, finding a method. If you can't find anything anywhere, go to the SDS for the chemical and call the supplier that sold your company the chemical and ask them if they have any advice for exposure monitoring. Now, if you go through all of that and you still can't find any way to do exposure monitoring, you've just reached a total dead end, occupational hygienists will sometimes be forced to skip exposure monitoring and jump immediately to controlling the hazard. Now, again, within the field of occupational hygiene, there

is an entire science devoted to this approach of jumping directly to a control and it's called control banding. And this is a very scientific area where they use a control measure such as local exhaust ventilation based on the type or band of hazard. If it's eye, nose or throat irritation, they may say, "In that case we use local exhaust ventilation." Now, a lot of people who again are new to this would say, "Great. I don't have to do exposure monitoring. I'll just jump right in and control the hazard." Well, keep in mind controls are expensive. Your plant manager may not be happy to spend big bucks on a control with no data to justify the expense. So, whenever possible, exposure monitoring is a very good first step in assessing risk. Now, it can be done along with other good established health and safety practices like substitution of another chemical that may be less hazardous for which there is a method. So, there's a lot of options when you need to assess the risk.

(R) So, one thing that is great to reinforce, just because there isn't a number that we can compare it to, there are things that workplaces can do because at the end of the day it does come down to controlling the hazard which is for the workers' benefit, so, important stuff. Now, you mentioned this recipe before. You make it sound pretty easy. Who can undertake exposure monitoring? Is it only occupational hygienists? Can you do a training course? Who can do it or who should do it, I should say?

(D) Exposure monitoring in short should be done by someone who is fully trained. Typically, we think of occupational hygienists as the ones doing the exposure monitoring because they have university degrees and they have field experience in exposure monitoring. They understand not only how to pull air through a tube or pull air through a filter, but they understand who to sample, what chemicals to sample, how many samples to collect which is a very hard question. How many samples do you need to have enough data? And then most importantly, how they interpret the results. Now, for sure, other individuals who attend training courses

on exposure monitoring have the skills necessary to collect an air sample. They know how to attach a filter to a pump, calibrate that pump, put the pump on the worker, collect the sample throughout the day and get it sent to the laboratory. Absolutely, trained individuals can do that even if they don't have a university degree in occupational hygiene, but there's a lot more to it than just collecting the sample and shipping it off to the lab. The occupational hygienist has the additional expertise to properly assess and manage the risk and interpret those results and determine the steps ahead. So, my recommendation is if you don't have a full-time hygienist on staff to go to a consultant. There are many qualified consultants available in Australia at least to help you get started and get your program in place.

(R) So, something I have heard in my travels being a hygienist, but workplaces may have heard this term; similar exposure group or SEG for short. Can you explain what a SEG is very broadly to help understand where this fits in to this exposure monitoring, we're talking about?

(D) Okay. Now, let's all realise that there is no way you can do exposure monitoring of every single worker for every single chemical in your facility. The cost and time involved is overwhelming. So, what occupational hygienists do is define the similar exposure group, S-E-G, SEG, and this is a group of workers exposed to similar chemical agents. That's why they're called a similar exposure group. Now, the advantage of a SEG is that this grouping allows you to sample a few people to characterise the exposure profile of the entire group. So, you may have a similar exposure group based on a specific job. Maybe you're sampling all welders, or you may have a specific task of the type of material being welded. You're only sampling welders who are welding on stainless steel or it may be the specific location of the welders or the specific work area. It's just a grouping of folks with a similar chemical agent.

(R) So, undertaking this exposure monitoring for those different SEGs, this is probably the part you're probably most excited about, the equipment that is actually used. So, if I'm a worker and I'm being told I'm going to be getting some exposure monitoring done for the task that I'm doing that day, what type of equipment would be getting put on that worker and what are some other types of equipment that are in some of those recipes that you mentioned before?

(D) Okay. I just want to say that, again, in my 35 years of working with SKC, I've done endless training. Whenever I've trained safety professionals, they have honestly been overwhelmed when they look at all the different samplers that they may have to use for exposure monitoring. Safety professionals are used to using a gas detector, having a bottle of calibration gas, and a regulator. When they look at all the samplers for exposure monitoring, the normal response is like, "What are all these things and how will I ever know what to use?" Well, I always tell them, "Relax. Exposure monitoring is as easy as one, two, three." That's because there's three key things that you will use when you do monitoring of any chemical out there. One is a pump. A pump simply pulls air. That's it. Then you'll have sample collection media to pull the air through to collect the contaminant of interest. If it's a dust, it will be a filter. If it's a gas and vapour, the sample collect media will be a tube filled with absorbent material. And the third thing you have to have is a flow metre, also known as a calibrator. You have to have this because you have to know how much air you pulled through the collection media. Flow metres do exactly what their name sounds like; they metre the airflow of the pump. You have to know the total volume of air that was pulled through that filter or pulled through that tube. Now, the lab will analyse the filter or the tube and say, "Well, I found so many micrograms of contaminant," but they have to know how much air. Whether it was cubic metres or litres of air, that will enable them to report the results as either parts per million or milligrams per cubic metre or micrograms per cubic metre.

(R) When it comes to workers, we're always concerned how heavy equipment may be. How big and or heavy are some of these pumps and sampling heads that you've just mentioned that workers will have to wear during this exposure monitoring?

(D) Pumps are small enough to be clipped to the worker's belt, but they have the battery capacity to last the entire shift. They are very lightweight. They of course weigh more than a current cell phone, but they are definitely something that can be worn very comfortably on the belt.

(R) We've covered a fair bit today and I know there's a lot more I do want to ask you. So, we may finish it up there today and we'll ask a few more questions for our next part. But for those workers and workplaces that do want to have a little bit more reading and information about exposure monitoring, where would be a good starting spot you could direct them to?

(D) Well, of course you can always visit the SKC website. It is at S as in Sam, K-C-I-N-C.com. You can click on the big training button and as a first step you can watch the free one-hour webinar on active sampling. This is the very first webinar that I suggest to anyone that's new. It is a comprehensive review of active sampling with sorbent tubes, with filters and with other devices that may be used in occupational hygiene sampling. Of course, you can do an internet search using the words, the words are, "NIOSH," and that's all caps. N-I-O-S-H, which stands for National Institute of Occupational Safety and Health and they have a manual of analytical methods. By pulling up this method manual, you could search by the chemicals that are of interest to you and you can look at the methods, the recipes if you will, of how to do exposure monitoring for any chemical that you're interested in. Of course, you can contact the Australian Institute of Occupational Hygienists and see the training courses available from them, and that is A-I-O-H.org.au.

(R) And I know Safe Work Australia also has information about exposure monitoring from a higher level and responsibilities in the workplace. So, there are plenty of resources out there and I do recommend that you go and look some of those up. I know I've used the SKC website many a time in my past. There's a lot of good resources there. So, a really good starting point. Thank you so much for coming on today, Debbie. I look forward to our next chat.

(D) Thank you very much.

(R) Well, thanks for listening everyone. You can get in contact with the show by sending an email to scienceofsafetyanz@mmm.com. If you have any questions, topic suggestions or you'd like any assistance around anything in the workplace when it comes to PPE, 3M are certainly here to help. You can also visit our website, 3m.com.au/sospodcast for further resources on exposure monitoring that we've just spoken about with Debbie, plus there's information on all the previous episodes we have recorded as well. Be sure to subscribe and share through Apple Podcasts, Spotify, Google Podcasts, wherever you get this podcast from and as Jean Sibelius says, "Pay no attention to what critics say. No statue has ever been erected to a critic." Thanks for listening and have a safe day.