**Randall Morin:** Well, good morning. My name is Randall Morin. Uh, it’s October 10th, 2007, and we’re here in Nashville Tennessee at the 50th meeting of what has become the American Biological Safety Association. And with me this morning are four, uh, real pioneers in the field of biosafety that we brought together to, uh, discuss and reminisce over their, uh, their careers in biosafety and hopefully we’ll have a, a very good exchange of information this morning.

I’d like to start out by introducing, there’s Don Vesley, Diane Fleming, Byron Tepper and Jerry Schmidt. All long time members of ABSA and, uh, have all had long and distinguished careers in the field of, uh, biosafety. Uh, in particular, uh, Dr. Vesley and Dr. Tepper, uh, the majority of their careers was spent in the, uh, academic arena at, at the university level and, uh, Dr. Schmidt had a career that, uh, was focused primarily, uh, supporting, uh, the United States Air Force at their air, uh, School of Aerospace Medicine and Dr. Fleming’s career, uh, is very varied. She has worked, uh, in academia, uh, at biofarm companies, and most recently as a, uh, biosafety consultant.

So, I’d like to ask, uh, just to get started this morning, just a general question. As you reflect back on your careers in biosafety, are there events or, uh, watershed, uh, moments that you can recall as either shaping your careers or, uh, a particular, uh, uh, incidents that you were involved with that you feel, uh, were significant in, in your, in your career or in the field of biosafety, uh, in general?

**Don Vesley:** Yes. [Laughter] Um, who would like to start?

**Diane Fleming:** You can start.

**Byron Tepper:** You have the mic.

**Don Vesley:** Events that shaped the career or are you talking about highlights or are you talking about…?

**Randall Morin:** Either one.

**Don Vesley:** Well, there are a lot of both [laughs]. I think as most of us sort of got into biosafety indirectly because, uh, there really wasn’t such a field, I think, when most of us even graduated from college, there was really no such field as, other than the secret work which was being done at Camp Dietrich at that time, which, uh, those of us weren’t directly involved didn’t even know about. Uh, but in my own case, I think I got into biosafety, sort of, indirectly. Uh, I, uh, my undergraduate work was in food science at Cornell University and I worked originally as a sanitarian for the New York State Health Department. I had an opportunity to do graduate work in, uh, in public health at the University of Minnesota in 1957. Came back to Minnesota in 1960, uh, to work on a PhD and to work on a project which was, uh, actually a contamination control, uh, project in the nosocomial infection area. Uh, from there things really evolved rather quickly and, uh, we had, there were a couple of, uh, research projects which really led me into the biosafety area, uh, through my work in contamination control. Uh, one of them, uh, was with the National Cancer Institute. At the time, this was in the 1960’s, when, uh [clears throat], they were first, uh, beginning to use, uh, uh, chemotherapy to treat, uh, Leukemia and they were concerned that the chemotherapy was reducing the immune systems and leaving patients open to infection. And, uh, we worked on the concept of providing a, an ultra clean environment, the laminar airflow room, for, uh, cancer patients undergoing chemotherapy, and our job was to monitor this to, to find out whether we could do it, uh, in such a way as to prevent these contaminants from reaching the patient. Uh, ultimately this proved to be an impractical system, uh, because it was simply too difficult to protect human beings from, uh, environmental germs of, uh, uh, at that magnitude. Uh [clears throat], at any rate, uh, uh, simultaneously almost at the same time, we had a contract from the National Aeronautics and Space Administration, uh, which was also very much a contamination control, uh, project. They were, it was related to the Viking Program which was the first, uh, uh, spacecraft to seek out life on Mars. Uh, our work was in the 1960’s. Ultimately the Viking landed on Mars, was, was designed to land on the bicentennial date, July 4th ’76. They missed that by a little bit, but the problem, the contamination control problem, uh, was simply this: if they were going to look for life on Mars, uh, they didn’t want the life detected to be human skin organisms. And, uh, therefore, there were, they were international standards at the time, uh, to reduce contamination levels, uh, uh, so that, uh, the [clears throat] the system would both work and would not be contaminated with earthly organisms. Uh, they were dry, using dry heat to sterilize these and the problem, of course, in the earlier lunar programs was that the dry heat was rendering the electronics inoperable. And, uh, so they, our charge, basically was to produce, uh, uh, these the space hardware under ultra clean conditions, uh, so that, uh, the bioload would be low enough so that you wouldn’t have to heat it high enough to destroy the electronics. And, this was quite a challenge. Uh, the, the thing that, what has this got to do with biosafety? Well, this contamination control, but the interesting thing is I was working on my PhD at the university at that time and one of my fellow graduate students was Emmett Barkley, who was also working on his PhD on biosafety cabinets, and we shared an advisor, Dr. Richard Bond was, uh, an advisor. And Emmett and I and Lonnie and Catherine over here became friends. And, uh, Emmett, of course, was already working for NCI at that time and, um [clears throat] the uh, the thing that, re, resulted from this, all of our experience in contamination control, uh, Emmett felt was, had led us to the point where, and Emmett was a real thinker. He was the one who really pioneered, I think, to me a real pioneer, the real pioneer in this field. But, uh, at NCI at that time there was a lot of emphasis on viral oncology – the search for human cancer viruses. And, he felt that the researchers needed to be trained in safe technique. Uh, he did not want to see, uh, the first evidence of human cancer viruses to be in a lab technician who was culturing these viruses. So, uh, between us, uh, we put together a training course in biosafety. And, uh, this turned, uh, turned out to be, uh, I think, quite a successful venture. Uh, but it was, again, starting from scratch, and Emmett – I still give Emmett most of the credit for this because he was the one who had all of the ideas – but, uh, the course, you know, consisted of all the basic biosafety techniques; the primary barriers, secondary barriers, risk assessment, uh, working technique, uh, all of the, decontamination sterilization, all of these things that we now see as elements in the biosafety programs. And, we actually ended up, uh, putting on 35 of these courses, uh, all around the country. We put them on at cancer centers and coast to coast. Uh, but about the start of 19 - actually the first courses were given in 1972 – and in, uh, 1976, there was another major development. Uh, recombinant DNA became a huge national issue. And, uh, Emmett immediately asked us to modify our course, uh, so that we could also give it to the recombinant DNA community. And, uh, one of my challenges, well, I had finished my PhD at that time and was a young Assistant Professor, but we were told to go to Cold Spring Harbor and teach James Watson how to do research.

**Diane Fleming:** Wow.

**Don Vesley:** And, this was a bit of a daunting experience. We also went to Stanford with Paul Berg and, uh, to Dietrich and, uh, many other places. We ended up giving 35 such courses, uh, by 1979, uh, at which time they ran out of money for that kind of thing and felt that the course should be self-sustaining. This is where Byron came into the picture. Uh, Byron put together a course which has continued to this day, uh, which is out, I don’t know if it’s an outgrowth of our course, it’s undoubtedly, but it’s followed our course, at any rate. And, uh, and Byron will be the one, obviously, to tell you a great deal about, about that.

Well, I don’t, I don’t want to talk this whole…

**Diane Fleming:** Because your course also developed into that audio-visual course. Wonderful.

**Don Vesley:** Oh, yes. That was another thing, and, oh. Additionally we also gave it as a pre-conference course for ASM. And, I think Diane that’s where…

**Diane Fleming:** [Talking over Don Vesley] I took it at ASM. That’s when I first started doing some of my biosafety training.

**Don Vesley:** [Talking over Diane Fleming] that’s where I first met Diane. That was the first time I met Diane. I don’t know what year that was.

**Diane Fleming:** It was in the ‘70’s [laughs]

**Don Vesley:** I think it was in Las Vegas, but I’m not sure.

**Diane Fleming:** It was. Yeah. Right.

**Randall Morin:** So, Diane, prior to, uh, was that your first, uh, experience in the biosafety, or you started out as, I guess, a microbiologist.

**Diane Fleming:**  I did. And, I was trained in microbiology immunology at Duke over a long period of time because I was married to an Air Force person. And, um, and then when I, when I finished there and we went to various places where I couldn’t do biosafety. One of the places that I was able to do a little bit was over in England where I was able to sit in on the pathology courses over at, uh, Cambridge University. When we came back to the States, we came back to Ohio and I started teaching medical microbiology immunology at Wright State Medical School. And, they were the ones that sent me to the ASM course and that was in, that was probably somewhere around ’76. It wasn’t until the ‘80’s when Wright State had a person who was going to come and do research, was actually going to do recombinant research, that they needed to have an IBC and they needed someone to do that kind of thing. I had been doing some lab safety for, um, for Wright State because they had histoplasmas and things like that in that area. But in the, uh, early ‘80’s, the first course that Byron offered in the, uh, uh, in this biosafety hazard field, I took. And that was, so I’ve been trained by two of the best. I’m probably the second generation [laughter] of; I probably shouldn’t even be here.

**Randall Morin:** So, you didn’t choose biosafety, you were forced into it [unintelligible – Diane Fleming speaks over him]

**Diane Fleming:** Well, I chose it in a way because my background in infectious diseases had always interested me. And, the first job I had in Ohio be, before I could get on the faculty at Wright State, was as a hospital epidemiologist at one of the local hospitals. So, I’ve always, sort of, tried to combine infection control and biosafety because they are, sort of, sisters or brothers and, it’s, uh, very closely related, so I’ve, I’ve stayed interested in both.

**Randall Morin:** Interestingly, the first interview this morning, Mary Ellen Kennedy mentioned that her, her first experience in biosafety grew out of, of her work in infection control in Canada. So, uh, that’s interesting.

**Diane Fleming:** And then Emmett was my mentor. I would get on the phone and call him and he would sort of hold my hand as I was trying to go through these recombinant guidelines and things, so I’ve had, uh, I’ve had really good mentors over the years.

**Byron Tepper:** And a few years later I hired her as a biosafety officer [laughter].

**Randall Morin:** Right. So what, uh, year, uh, uh, Byron, did you begin to offer your formal, what’s known as Biosafety 101?

**Byron Tepper:** [Randall Morin speaks over him] 1980. 1980.

**Randall Morin:** So, that course has been going every year since 1980.

**Byron Tepper:** At least annually. We’re doing somewhere in the order of 30 times that I’ve given it.

**Randall Morin:** Right.

**Byron Tepper:** Uh, but that’s a, a branch, essentially I attended Don’s course and a lot of the material was swiped and that, but, uh, the first course was for seven days, was tuition free, the people just had to pay for their room and board. And, uh, they essentially took over a motel [laughs].

**Diane Fleming:** Well, it was, it was a two week course. He doesn’t re, he’s trying to block out the second week [laughs].

**Byron Tepper:** Oh, what did I say? Oh, I said, yeah it was two weeks. I’m sorry. That’s, uh…

**Randall Morin:** So, the instructors gave of their time, basically, to teach the course?

**Byron Tepper:** Well, many of them just flew in, gave their lectures and we had discussion periods, and then left. Now, interesting enough, I was also a, a bench scientist. A leprosy researcher, infectious agents – the least infectious of all the infectious agents [laughs]. But, the connection between us is, is really funny because I was Chairman of, what I considered, the first academic IBC. It was called the Joint
Committee on the Use of Infectious Agents at Johns Hopkins. It was established for all the wrong reasons. It was established to prove that a technician working in a cancer research lab did not – and who died – did not have the disease that she, it was not a laboratory acquired infection. I don’t know how that was resolved. But at the same, as I was Chair of that committee, I had a grant in that was not funded for the leprosy research. Uh, and here’s the connection to the Mars project, because the grant that wasn’t funded had a system in it to measure the metabolism of leprosy basilea that I had to isolate from tissue. I had to clean them up so that the bacteria were the things that were, uh, reactive. And, I used the system that detected radioactive carbon-dioxide from various metabolites. That was not funded. But, that was a system that was used on that flight to Mars…

**Don Vesley:** The Viking Program.

**Byron Tepper:** On the Viking Program to prove that there was life on Mars. Here, I had living organisms. But, as Chairman of that committee, uh, in the early, in the late ‘60’s, we decided we needed a biosafety officer for Johns Hopkins because there were a lot of infectious agents being worked on. Uh, there was essentially no one available. And, those of us, those of you that worked for, uh, Ft. Dietrich or the other agent, government agencies, they interviewed several people and they all came out of the Ft. Dietrich background, which, uh, when you’re dealing with the highly infectious agents, and possibly lethal agents, in that environment, you needed a rather authoritative, uh, safety officers. Uh, the, the interviews went on and, and they, uh, found shortly that that type of person could not succeed in an academic environment, and they asked me to take the job. Well, I lost the grant. Most opportune beginning, and then shortly after that I was introduced to this RFP for, uh, teaching this, uh, biosafety – the Control of Biohazards in the Research Laboratory, it was called at that time. And, uh, it was an RFP that was put out and, uh, we won the grant. And, I’ve been running it, uh, it was only for seven, the grant was only for seven courses, but I’ve continued that at least annually at Hopkins, uh, since that time. And, uh, I’ve just completed a list of a number of people who have gone through that course and its 1,402 people that have taken, uh, that course in all the years that, uh, we presented it.

**Randall Morin:** So, did, Jerry, how did you get into the field of biosafety?

**Jerry Schmidt:** Well, I got in in, uh, 1964. Uh, the Air Force had just hired me the previous year to, uh, be head, to head up a laboratory. They were just completing the building. It was to be a containment laboratory. And, uh, I had no idea of, uh, biosafety. I was trained as a medical microbiologist and worked with infectious agents all along and, so I was aware of the threats, but there was a, as to any science dealing with, uh, biological safety, I had no thought of it. Well, Dr. Wedum, um, was, and others from Dietrich, were involved in the planning and, um, outlining of the building and the facilities that were in the, for containment, and so on. It had a negative air pressure and, uh, the, the exhaust air was filtered through HEPA filters and containment for liquid affluence with, to be sterilized before they were released and so on. But, Dr. Wedum, when the building was finished in 1964, early 1964, came down to San Antonio, uh, where this was located, and, uh, to inspect it and to make sure everything was according to what it should be. And, uh, as he, one afternoon, uh, he got me aside and said, “Jerry, do you, have you ever heard of the biological safety meetings, conferences that we have?” And I said no I, I hadn’t. He said, “Well, the next one is in Ames, Iowa this fall, and I think, maybe, you ought to go to that.” And, so, I did and that was my introduction then to the science, if you will, of biological safety. And, uh, I was the, and, and so I met Dr. Wedum, had met Dr. Wedum and he was there and Joe Songer and, uh, Jim Sullivan and the people, there were [laughs]….the, it was held at the, uh, Natal National Animal Disease Laboratory in Ames, Iowa and, uh, that was the first time that, that the safety conferences were held anywhere other than Ft. Dietrich or Pine Bluff, Arkansas or Dugway, Utah. Ames, Iowa was the first to break that spell. And, uh, the first meetings were in 1955, so this was the, the, well, ninth meeting; I guess it was, in 1964.

**Randall Morin:** Right.

**Jerry Schmidt:** So, I attended that and I was very, very impressed and so, basically, I have been attending these conferences and trying to educate myself in, um, biological safety since 1964. And, uh, earlier the conferences were, at that time even, uh, and for several years later, they were held at the facilities, the company or the, like Ft. Dietrich or Ames, Iowa in the disease laboratory there, because they were such a small group. We just met right in the facilities, the conference rooms or so on, of the, uh, organizations which the, I, in my case, worked for. So, first meeting that I had was in, uh, 1967 – I hosted that, I should say – and it was at Brooks Air Force Base at the School of Aerospace Medicine in San Antonio. And, uh, there were, I’m just guessing, well, at the one in Ames, Iowa there were twenty people or so, you know, like we could all get around a table, basically. And, uh, there were maybe thirty, four years later in San Antonio. And then later, uh, in 1977, uh, I had another conference, hosted another conference in San Antonio, and that was the first conference at which there were more than 100 attendees. Uh and of course it…. [Byron Tepper talks over him]

**Byron Tepper:** It was the first conference that I attended.

**Jerry Schmidt:** It was. Ok. Well I, as I said, I started, uh, with the organization in, uh, or with the group, with the conferences in 1964. And, basically have stayed with it.

**Randall Morin:** Now, you were also involved, uh, with a NASA project as well, but it was a, it was a different project, uh, than the one that Dr. Vesley mentioned?

**Jerry Schmidt:** Well, I was involved, uh, in it, with a, um. Recently, I was involved with the lunar program to a degree as well. But, uh, NASA, uh, project for Mars, they had planned, uh, and intended to carry out two missions to Mars. Um, the first one was to be in a 2002 launch and then the other one in 2005.

**Don Vesley:** These are the return missions you’re talking about.

**Jerry Schmidt:**  They were sample return missions.

**Don Vesley:** Right. I was a consultant on that [talks over Jerry Schmidt]

**Jerry Schmidt:** [Talks over Don Vesley] were you? We were not at the same meetings. I, I was on a five member board, or something. I was the one for biological safety. I was the one who was to look at the plans for decontamination and safety and to affirm that they would, uh, achieve not contaminating Mars with earthen materials. When we sent missions to the moon, uh, the, the requirement was that there be no living organisms or cells on that arrived at the moon. For this could not, it was further down, that there could not be any organic molecules. So, it was, and I was to see that it appeared that the procedures that were going to be employed were sufficient to accomplish that; secondly that there would be no contaminating of the Mars, they were going to bring back each, each mission would bring back fifty individual samples and, uh, that they would not be contaminated with earthen materials and that, maybe most important, that we would not [clears throat] contaminate the earth biosphere with materials brought back from Mars.

**Don Vesley:** [Talks over Jerry Schmidt] they were running low on money at that time and, you know, they, their plan was to crash land those things into the Utah desert because they couldn’t afford the parachutes.

**Jerry Schmidt:** [Talks over Don Vesley] Oh yeah. Absolutely, and that was tested and these were, the sample return vehicle, or container was about the size of a soccer ball and it was encased in, uh, if you could think of foam or something like that, but a material that would cushion it. It didn’t, had no retro rockets, no parachutes, it just blap. And, it was tested many times from an altitude, dropped from an altitude of 70-80,000 feet, on rock, and it never ever, uh, ruptured or that sort of thing. But, yes, I was involved with that.

**Randall Morin:** So, what was the outcome of that project?

**Jerry Schmidt:** [clears throat] Well, the outcome was two previous projects failed for very stupid reasons; one was that they did not convert from metric to the English system, for parts of it and it, it went on by; and another one, there was, uh, an oversight in it and it crashed.

**Randall Morin:** So, uh, is there a project now currently going on to…? [Jerry Schmidt starts to talk over him]

**Jerry Schmidt:** So, NASA then…. [Clears throat] I, I have not heard anything about that.

**Don Vesley:** It was on indefinite hold at that time and that was the last I heard of it.

**Jerry Schmidt:** [Talks over Don Vesley] Yeah. It was the, the sample return lander and so on were fine, but it was the, um, transport rockets and so on that were the delay cause.

**Randall Morin:** Well, shifting gears, one of the things that came up, uh, during the earlier, uh, interview was, um, related to the proliferation of high containment laboratories in the Country in terms of the future of biosafety and what some of the, well, I think, all of the, all of them agreed that there, there is likely to be a shortage of not only scientists that are trained to work at these containment levels, but biosafety and other safety personnel to assist these scientists in workling, working safely. The, there appears to be no formal training program in biohazard science as there was at one time at North Carolina or Duke.

**Jerry Schmidt:** [starts talking over Randall Morin] There’s getting to be some courses, of course, and, indeed, there is a degree now, as I understand it, and I’m not sure where, what university grants it, but in biological safety or that related science.

**Don Vesley:** Yeah. Jerry Tullis’ program was really the only full academic program in biosafety. I had tried to start one in Minnesota. It was rather interesting, after we had finished these, uh, short courses, uh, uh, Minnesota had one, one of these, uh, Noche Educational Resource Center, uh, grants – which is ongoing to this day. And, I had put in to, to have a biosafety program as part of that and it wasn’t included, so I developed a two-credit biosafety graduate course, uh, you know, out of our NCI courses and continued to teach that as a two-credit course until the time I retired four years ago. Uh, but, uh, that was as far as it went.

**Randall Morin:** And, it’s amazing to me, we have over 400 laboratories at, at Ft. Dietrich now and countless scientists come and go, and, it is actually unusual to find a PhD level scientist who really understands how a biological safety cabinet works. They just take it for granted that they work, but they don’t understand what you should and should not do working in a cabinet. It, it’s rather incredible to think that you’re training doctoral level virologists and microbiologists and they don’t understand the basics of containment.

**Diane Fleming:** Well, the don’t get the hands-on micro anymore either. They’re just shown plates.

**Randall Morin:** There is a lack of formal training in the university settings, or at least a, a very shortage. It seems like ABSA, or some other organization is going to have to step up and help to keep pace with the, uh, proliferation of, uh, of these institutions and, and personnel that will, that will be working with these potentially, uh hazardous materials.

**Diane Fleming:** Well, the educational, uh, component of ABSA has done a great job with that with the pre-conference courses. They’re getting more diverse and larger every year and we’re seeing so many students come. And I know in my own case, having had a background in medical microbiology and [someone in the room coughs] immunology, um, I was in a wonderful situation, I mean, we did have hands-on. Actually, Grace Blank and William and Mary gave a micro course when I was an undergraduate where you had to go out and collect environmental samples and then justify what media you used and it was a wonderful way to learn. It was frustrating, but it was a wonderful way to learn, and that’s why I wanted to go into micro. But, I have found that, um, a lot of the students that come along now don’t have that hands-on training. Where are they going to get it? We saw some virtual reality training that Stefan Wagner has put together, and it’s wonderful, but it’s, he knows it’s only the beginning. It doesn’t replace the hands-on.

**Randall Morin:** Sure.

**Diane Fleming:** Uh, I think the courses like Byron’s course, which when it, and when it was a two week course, was very, very intensive. And, having had the other background, you bring that in, you learn some biosafety, and then you have to go out and experience bio-safety. And that’s where I think I’ve had such a, you know, such a wonderful background, to have been able to come in late in, late in life, I mean, I think I was almost in my 40’s before I actually came in to biosafety, but I had had the background, the training, and that’s not what we’re seeing now. I mentored a woman at Wright State who has the virology degree and called and asked about biosafety and I said, “Oh, you’re a wonderful person to come in because you’ve already had this background, especially in virology.” And, she is now a CBSP. But, she can’t afford to be a biosafety officer because, there’s the other problem, is that they’re not paid the compensation that radiation safety specialist are paid. It’s not given that special recognition, even though we now have certification, and a lot of the, um, a lot of people who write a job description now are saying, you need to be RBP, which is registered, or you need to be CBSP, which is certified. At least that gives them some idea of what your training is. But, we need more of them. We need, we need to bring more people that are already trained and hands-on.

**Randall Morin:** In terms of this need to keep pace with the requirement for trained biosafety professionals, um, do you feel that ABSA should, perhaps, consider trying to either encourage or even sponsor a formalized training of some; uh, one of you mentioned a university that might actually be giving an undergraduate degree in, uh, biological safety. I, I wasn’t personally aware of that, but training people who already have, say, a degree in micro or a degree in virology, to become a biosafety officer, do you think that’s the sort of thing that can be done in a week? Or, do you think it’s the sort of thing that evolves over time being mentored by another seasoned professional?

**Byron Tepper:** The two year, uh, fellowship program at the NIH, uh, is probably the most active thing that’s, that’s going on right now because those students have taken, have shown a desire to get into the field, they get the fellowship, they get some training, and then they get some hands-on training at the NIH, and they come out fully proficient to be biosafety officers. In fact, unfortunately, the NIH keeps most of them [laughs].

**Randall Morin:** Yeah, and that’s one of my concerns. I think there are fifteen or so regional and national biocontainment laboratories in progress. Uh, some of them will be opening relatively soon. Uh, Diane mentioned the recruitment sometimes will contain requirements to be registered or certified. It will be interesting to see whether these laboratories actually are able to recruit people who can step right in and function as a biosafety officer or is it going to be another on-the-job training, like you perhaps went through at Wright State or you went through at Johns Hopkins. I’m not sure that would be the right approach for a laboratory that is going to be focused on handling some very, uh, hazardous, uh, materials.

**Diane Fleming:** I think they have to go into those running. They have to be prepared before they go into those. When we went into ours, we didn’t all have so many high-risk agents. We could learn at Level 2 and learn what Level 2 was, and you could train people to do that. So, I, I think it’s going to be very challenging to try to support those NIAID laboratories with…

**Jerry Schmidt:** [starts to talk over Diane Fleming] I see a lot of encouragement, though, in, uh, the, the growth of ABSA. Uh, the number of attendees, for instance this year is 750 people. Uh, the success and, and, uh, the relatively increasing numbers attending these, conf, these pre-conference courses, which are very intense – they’re good. And then, this certification program, which involves a written examination, a very tough examination for certification, and there are preparatory courses for that. But, of course, there’s the need for requirement for experience and for academic, uh, degrees. Uh, but, uh, those people who pass that test and become certified are very competent people. They have answered a lot of significant questions relating to biological safety and this international growth, this is going to spur, this is going to drag out of the society these people who will go into training and universities will be offering courses and degrees. My judgment is, uh, very quickly because where there’s a need, there will be universities that step up to meet that need.

**Diane Fleming:** Well, I think Bob Ellis is, is, he actually does some courses; I think he’s at Colorado and he does courses.

**Jerry Schmidt:** [talks over Diane Fleming] Yes. And, it’s going to be a degree program.

**Diane Fleming:** Mmm hmm. That’s what he’s working on. But the RBP - the, the registered biosafety professional – they’re the, that have the experience. They may not have the academic credentials, but, if you want an experienced person, that’s where you go.

**Randall Morin:** So, um, are there other challenges or, um, obstacles out there that you, you see that the biosafety profession needs to be thinking about, uh, coming up with solutions to or, or, uh, be ready to, uh, deal with those in the, uh, future?

**Jerry Schmidt:** My, my inner feeling is I am so excited, so enthusiastic about this international spread and acceptance. You know, we’re not taking it over there and say you need this - they’re wanting it, they’re inviting us, they’re practising it, if you will. They’re in the beginning stages, but to me it’s so encouraging to see the enthusiasm of these people. There’s, I don’t know how many, 194 attendees at this conference from foreign countries – 32 different countries represented. And, that was unheard of just shortly ago.

**Don Vesley:** [talks over Jerry Schmidt] five years ago.

**Diane Fleming:** And, and a lot of this is State Department funded, bringing them in and helping them to get their training and providing the translators and translating the manuals and, we had 96 students in a class for which we normally have 36 this year, and over half of them were, were foreign nationals. So, it makes for a different kind of training.

**Randall Morin:** So, do you think the trend will be away from individual, uh, national standards and more to an international standard like the WHO biosafety guidelines? Do you think that’s a practical way to try to deal with the issues?

**Byron Tepper [?]:** I think so.

**Diane Fleming:** It has to be. It’s international [unintelligible].

**Jerry Schmidt:** [talks over Diane Fleming] I think it’s got to be.

**Don Vesley:** Yeah. And, what’s driving us, one, one of the greatest challenges currently is that, that’s come up is this one of, uh, bioterrorism and biosecurity, which is an international issue and which presents tremendous challenges, uh, for the future because the, you know, the number of possible scenarios is almost infinite and, uh, and the methods of protecting large populations from deliberate bioterrorism is a, is a daunting challenge and biosafety people should be at the forefront of this.

[Everyone agrees]

**Randall Morin:** I agree, but, but I also have, uh, been, uh, in meetings where many of the scientists are starting to – I, I don’t know if the proper word is resent – but the, the stringent biosecurity, and security in general, guidelines are, are now impacting the science and, and, and some of the scientists are a little bit frustrated at what they have to now go through in order to do some of the work that they used to be able to do. That, that’s another challenge for us to try to deal with that,

**Don Vesley:** Yes…

**Diane Fleming:** [talks over Don Vesley and Randall Morin] Yes, but you try to keep them science based.

**Byron Tepper:** [talks over Diane Fleming] we had the same thing with the recombinant DNA.

**Diane Fleming:** And we continue to have it, and we’re having it with the CDC guidelines. Biohazard 1 now has to have a sign on the door. I thought this was for healthy human adults. And, you know, it’s, it’s not science based. And, you have to keep watching those guidelines. And, when you, when you have found that an individual can actually have input into them, because I used to go to the recombinant guidelines, and when I first started working in the pharmaceutical field, I found that they were using biosafety Level 2 for all work with this large group of actinomyosis [unsure of word] – even though none of them were pathogenic. The, the, uh, old classification of eologic agents on the basis of hazard had this little thing that said all actinomyosis were Level 2. Well they, what they meant was actinomyosis species that are pathogenic are Level 2. I couldn’t convince the pharma, pharmaceutical industry I worked for. So, I took it through a local ABSA group, MABSA. I petitioned the rack to look at that and change and only list the pathogenic organisms. It saved industry millions of dollars, millions of dollars. Because, they listed nine organisms out of thousands. You know, so you can make an impact if you have the background and you know how to do it and that’s what we need to train our people to do is keep an eye on it. The technical re, review committee, the technical resources committee of ABSA try to keep up with what’s coming out and have people comment on it and send an official ABSA to say what we feel about it, whether we think it should be or shouldn’t be. It may not make a difference in some cases, but in other cases it does and it’s very important.

**Randall Morin:** One of the issues that came out during one of the discussions, I think, from the floor was the, the concern, um, that for those countries that have money, you know, they can build these containment laboratories to the highest level of containment that’s technologically feasible. But, what about the other countries that, that are dealing with similar issues but do not have the money or the expertise? How do we, somehow, work with them to allow them to do the work that needs to be done safely without spending millions and millions of dollars that it takes to construct and operate one of these high containment labs?

**Byron Tepper:** Well, the facilities don’t protect anybody.

**Randall Morin:** Exactly.

**Byron Tepper:** That message is not getting through that it’s the practices. You can do the same thing in, in less of expensive facilities. Uh, but, I think they, we’re in an era right now where people are trying to build all of these facilities, the fancy facilities, and are neglecting the people that, as you said, the people that are working in them.

**Randall Morin:** Right. Yeah. Yeah, technology and money cannot solve all of the problems. Emmett brought up, in the earlier interview that one of the, the most heated debates at Alsilomar was over mouth pipetting - not the HVAC system or any technological issue, but it was over the issue of mouth pipetting.

**Byron Tepper:** It was in that recombinant DNA era when people kept saying, “Build me a, a P2 or a P3 lab saying that that was going to offer them the protection. Uh, it’s amazing.

**Randall Morin:** Yeah.

**Byron Tepper:** And, what I’m seeing nowadays, and I’m listening to these people, these papers, these people are reinventing the wheel. The wheel is getting a little bit bigger, but they keep reinventing it. People came to the exhibit that we have, the historical exhibit and, and looked at some of the papers that we had out there and said, “Oh my God, it’s out there, it’s been done!” We’re in the, the era of building facilities right now. That’s, that’s monopolizing biosafety.

**Randall Morin:** Right. Uh, one of the individuals in the last, uh, interview also brought up the, uh, the reconstitution of the 1918 flue virus. Uh, how do you feel about the, uh, our ability now to, uh, essentially almost create [Byron Tepper coughs] life, uh, and resurrect organisms like that, flu virus, uh, how, how do you have any feelings about that and how that might impact the field?

**Byron Tepper:** It’s going to be done in a laboratory and we’re not going to know about it. That’s the problem.

**Diane Fleming:** But, that that we do know about, we’re learning from and I think it’s a wonderful thing that we can do it, if we can do it correctly.

**Randall Morin:** Right.

**Diane Fleming:** Because there were a lot of things wrong with the 1918 flu and it didn’t all have to do with the influenza virus. It had to do with the way the diseased people were handled and allowed to travel everywhere.

**Randall Morin:** Living conditions…

**Diane Fleming:** Living conditions and put the military on a train and pass them all around the United States – how better could you transmit the disease?

**Randall Morin:** Right. Have any of you been involved in any of the, um, avian flu pandemic preparedness, uh, issues that, either in your local level or, or at your, uh, where you used to work?

**Diane Fleming:** I think the local level mostly [laughter]. My neighbors knock on the door, “What do we do? What do we do?” I say, “Shelter and place.”

**Randall Morin:** Yeah.

**Jerry Schmidt: I** got a flu shot before I came because I figured I was going to be exposed to [unintelligible] [laughter].

**Diane Fleming:** Awww.

**Jerry Schmidt:** And, and after this I’m going to New York City in the subway and the coughing people and the hands going down the rails in the subway.

**Don Vesley:** I was a little bit indirectly involved, uh, I was on the hospital infections committee in the university hospital for many years and, about the time I retired, there was a big move to get the hospitals together to do this emergency planning, uh, if there is an outbreak, and some of the things we find are really frightening. All the, the number of respirators available and things of that nature. If there was an overwhelming outbreak, there’d be chaos.

**Diane Fleming:** Mmm hmm.. mostly from fear.

**Don Vesley:** There are, there are people working on it. I think it was a good time to retire.

[laughter]

**Diane Fleming:** But, there’s a lot of information out there if you can just overcome the fear and give them the true information about how to protect themselves.

**Randall Morin:** Right. You mentioned the subways. Um, do you feel that, uh, the average, um, medical micra, microbiologist working in community hospital in, uh, you know, Iowa, they get a patient in the hospital they suspect might have, uh, drug resistant TB, uh, either XDR or a less, uh, serious, under what conditions, uh, do hospitals like that, are they allowed to work with, with that organism and try to culture it right there in the hospital or is this controlled at the State level so that there’s some oversight…

**Diane Fleming:** The public health labs control it. There’s a group of ABCDE labs, uh, those that are at the top are allowed to do everything; those at the bottom merely send samples back home, back to the CDC or wherever they’re supposed to go – sometimes through the State level to the CDC.

**Jerry Schmidt:** But, they would isolate the organism, culture and isolate the organism…

**Diane Fleming:** [talks over Jerry Schmidt] They would culture and probably do a stain because you can do that under Level 2 with, uh… But, they wouldn’t be culturing it if they hadn’t cultured it routinely because the public health labs now do have, uh, Level 3 facilities in, in the past.

**Randall Morin:** Are you aware of an States that have any active biosafety, uh, training programs that are actually funded by the States?

**Jerry Schmidt:** I don’t know. I couldn’t say there aren’t any, but I don’t know of any.

**Don Vesley:** I don’t know of any.

**Diane Fleming:** But, there is a system of training. I, I can’t remember what it’s called, the national labs, or something like that - that I know Karen Byers knows all about it because she teaches with them – and they go around and teach a variety of hands-on courses including safe practices.

**Randall Morin:** Right.

**Diane Fleming:**  So, it’s the laboratory network, national laboratory network?

**Randall Morin:** That’s right. Ok, well, uh, in, in conclusion are, are there any thoughts that come to mind that you’d like to, uh, to throw out before we, uh, conclude the discussion today in terms of either challenges for the future or, or recollections that you think we might want to recall so that we don’t; in fact, we mentioned reinventing the wheel. I think a lot of that does go on, unfortunately, and, and re-debating the same issue over and over again, uh, because, you know, when you really look at the history of biosafety, while the technology has increased over the years, the basic tenants of biosafety really haven’t changed all that much since the days of Ft. Dietrich. It’s the application of those practices and procedures that seems to be debated over and over again.

**Byron Tepper:** And there’s very few basic research projects on biosafety. I know Don, uh, did some. But, I can’t think of other institutions where, where…

**Don Vesley:** Very little.

**Byron Tepper:** ….very little type of work.

**Diane Fleming:** The ID50’s, um, and the industrial hygienists would love to know what the infectious dose is so they could put it in their little book. We don’t know that.

[group agrees]

**Jerry Schmidt:** I see a lot of encouragement to me. Starting out with, in our in the first, uh, biological safety conference, there were fourteen attendees. And, now we’ve got 750; we’ve got, uh 1,600 members or something like that. It’s growing and it’s about to explode, I think. With all of these international needs and so on, I just feel so encouraged by what is transpiring, and this, the pro, certification programs and the training courses and, yes there will be degrees, uh, but, I’m, I’m not at all apprehensive about, “Oh my gosh, what are we going to do in ten years because these people will be all dead, or something like that?” No. They’re coming up…

**Diane Fleming:** [starts talking over Jerry Schmidt] They’re coming along. They, they’re not recognized yet, but the Luanne Burnett’s and the people who do fantastic things in this organization.

**Don Vesley:** There’s tremendous people in ABSA. Really, the membership is, is just wonderful.

**Randall Morin:** Yeah. I think the future of biosafety looks, um, as rosy as it ever has in terms of opportunities and challenges. But, you know, along with challenges come opportunities.

**Jerry Schmidt:** Yeah. You got good people and they will meet those challenges.

**Randall Morin:** Right.

**Diane Fleming:**  I think we also have to learn to address current issues, and we’re not necessarily addressing the hot topics - the thing with Texas A&M that occurred recently. I don’t hear, hear any of that. It’s as if it’s underground. We have hearings in DC and they weren’t brought up here. We need to address them.

**Randall Morin:** [starts talking over Diane Fleming] Well, that’s one of the things I think could come out of the Roundtable this afternoon. Um, while I’m the moderator, um, we, you know, I’m not going to be controlling the questions and, while the focus of this year’s meeting was, you know, “ABSA Past, Present and Future,” I also think we, we ought to allow the open discussion of topics like you just mentioned. I mean, uh…

**Jerry Schmidt:** Certainly.

**Randall Morin:** Other, otherwise, we’ll never get to the bottom of things and there won’t be a, a good opening and exchange of information. So, we’ll wait and see how it goes this afternoon.

**Don Vesley:** You’re probably familiar with the article in the New York Times last Friday, making the point that there’s insufficient federal oversight of containment laboratories. Have any of you seen that?

**Diane Fleming:** Yeah. I saw it.

**Don Vesley:** That’s kind of, that’s the kind of challenge that…

**Diane Fleming:**  Yeah.

**Randall Morin:** Well, clearly we have a lot of federal participants at the conference, so we’ll see if they [laughter] if they are willing to react to the question if it does come up.

**Jerry Schmidt:** We started as federals essentially. The founders were, and the first attendees were federal people because they were doing the work that needed it. And now, again, it’s branched out to all sorts of different…

**Randall Morin:** Right.

**Diane Fleming:** But, you were able to share, right? You were able to share your information because you were federal. There was nothing under you at the table?

**Jerry Schmidt:** Well, there was, uh, some of the first get-togethers, I guess, uh, were classified. Uh, I had a, uh, classification for that sort of thing too. But, none of the biological safety conferences were restricted in any sense. Anybody could have come. There were no confidential, there was no confidential information. Everything was open and people were delighted to share their experience with this procedure or that procedure or this piece of equipment.

**Diane Fleming:** Or, that accident.

**Jerry Schmidt:** Yes.

**Diane Fleming:** That’s the thing that we’re missing.

**Jerry Schmidt:** Laminar Flow Cabinets weren’t in existence there, but there were cabinets. There was containment, and things have grown very well.

**Randall Morin:** Right. Well, thank you very much for your time and I look forward to, uh, continuing the conversation with all of the participants this afternoon at the roundtable.