Saunas and EMFs:
A Special Interview with Steve Benda

By Dr. Joseph Mercola

DM: Dr. Joseph Mercola

SB: Steve Benda

Introduction:

DM: Hello! This is Dr. Mercola. Today we're here to talk about a topic that many people in natural medicine are aware of and personally use, and that's saunas. Joining me here today to elaborate on this topic is Steve Benda, who has some training in power systems and nuclear engineering. So Steve, welcome to our studio and thank you for joining us.

SB: Thank you.

DM: I'm wondering if you can tell our viewers how you first became interested in this topic and how your journey led you to the position that you are in now.

SB: Well, sauna's in my heritage; I have a Finnish and German background. It seems like every Finnish home has a sauna in it in some degree.

DM: So just about everyone?

SB: Yeah, everyone.

DM: That's interesting.

SB: I think it's very interesting. The tradition is that the sauna gets built oftentimes before the home. In light of that, I have been raised with saunas since I was a small child.

DM: Were you born in Finland?

SB: No. I wasn't, but my mother was from a Finnish heritage. Her mom and dad were directly from Finland.

DM: Okay.

SB: The saunas were always in my family and they became part of our lives so that, I guess, I just found an early interest. Now with the advent of the newer technology, like the infrared saunas or the traditional type saunas where the electrical energy provides the heating mechanism, these become more and more available to the common user in their homes.

DM: Can you expand on the use of saunas historically? Obviously, you mentioned that it's common in Finland. In my experience, it's common in many eastern European countries and in many Asian countries. How far back does it go, and do you have any perspective on when it started and how it became widely adopted within a culture?

SB: I can't speak as an expert for one of these – of the early days. But some of the old Finnish saunas were building fires under piles of rocks inside a room that was very smoky. Then people would come in to those rooms and throw water on that pile of rocks, get the steam heat in the room and sweat.

Sweating is a mechanism that I would say is a very common attribute of saunas. It evolved into contained wood stoves, where the woodstove would heat the pile of rocks and more of a contained smoke being that they have chimneys. The same water on the rocks, you sitting in the room and experiencing a sweaty, very warm environment. That evolved into electrical saunas, which are more traditional now, where the electric heating elements will heat the rocks in a small stove. It's very typically found in basements or little rec centers in homes and in lots of clinics. Again the same things – heat – then throw water on the rocks. The bather will experience the warm heats of the steam and his body will sweat, as in profusely. But what a great experience.

That has led to more recent years. and probably 10 or 15 years ago. to the evolution of the infrared sauna, which is a different kind of heating mechanism that relies on the infrared portion of the electromagnetic spectrum to provide heat and radiation, radiant heat.

DM: So it's really an important innovation in the evolution of the technology. Certainly, the basic goal is to generate heat, and you can generate heat from burning wood. But the problem with burning wood in a confined space is, of course, there are toxic byproducts like carbon monoxide in smoke, which are not very good for your health. The sweating may be, but certainly the toxic byproducts are not. So it's nice to have an alternative strategy and certainly, using the rocks as a way to capture and store that energy, then transfer it is certainly useful.

Basically, we have evolved now to the point where we have two safe ways to heat the internal environment of the sauna, which would be the traditional. Is that classically called the Finnish sauna?

SB: I would call it Finnish sauna – traditional Finnish, which would be the electrical heating. Yes.

DM: Okay, so it's electrical heat. Then we have the newer, more 21st century versions, which would be the infrared saunas. I'm wondering if you can discuss the traditional saunas first – maybe the type of the heating elements that they're doing and then the difference between the wet and the dry – then we can go and discuss the infrared.

SB: Absolutely. The traditional, which is very typically found, it's not a very big stove but it has radiant heat elements which are resistive elements that will heat when current flows through. They'll heat up under the rocks. The rocks will become warm from that. The room will be regulated by thermostat. Then the bather would go in and initially the room will feel dry and warm, comfortably warm. You'll throw water on the rocks, which will then release an explosion. I call it a "fun explosion" of steam heat.

At that moment when it goes from dry to more of a humid environment, thousands of pores are popping at the same time on your body. It feels really, really nice as your sweat mechanisms turn on. That's a traditional sauna. We throw water on the rocks. We get the steam heat in the room and we experience a lot of sweating.

DM: That would be considered the wet sauna?

SB: That'd be considered the wet sauna. Yeah. What typically happens is you'll go in, take a few ladles of water on the rocks, and experience the steam blast and enjoy the warm, sweaty heat. Then maybe you'll go into a cool down mode after that in the changing room and then probably shower. I'll say it's the best recipe to get ready to go to bed. Now when you lay down to go to sleep at night, you're very, very relaxed and cleaned from the sauna.

DM: And your skin is silky smooth.

SB: Oh. It is so wonderful, and that's such a nice way to close the day. My sauna at home is heated every night — my traditional (sauna) in the basement.

DM: Is it on a timer?

SB: It's on a timer. We'll set a timer. It might be a delayed timer. We'll come home after a hockey game. We'll come home after a day of skiing or just come home after a day of work. The sauna will be heated 8:00 or 9:00 PM, which is our time and we'll sauna, have a glass of orange juice, and we're ready for a great night of sleep. That's the traditional, and it's a great traditional kind of sauna. Now, the distinction between that and the infrared…

DM: Before we go to the infrared, let's stick on the traditional. It's still unclear. It's obvious with the technical differences – the wet and the dry. But I'm wondering what the benefits and disadvantages of each one are, why one might choose a wet versus a dry, the differences between the temperature and the length of time at this day and age.

SB: Okay. I understand. A traditional, you can set the room, which I find to be a comfortable room. I set my thermostat probably at 170 to190, and 190 would be Fahrenheit.

DM: This is dry enough?

SB: This is to be in a dry environment for a moment. I'll come in to put water on the rocks and I'll get a blast of steam that I love to be in that hot room for that experience. That's my personal preference.

DM: It's something you have worked out over the years. You have been doing it your whole life essentially.

SB: Yeah. Some might like it cooler; some might even go over 200°. For me, 190° is really a nice benchmark. I'll enjoy the room, the sauna, and the water on the rocks. I'm probably a 10 to 15 minute person that by the end of 15 minutes, I have had my experience.

DM: Yeah. How do you know that you have had enough?

SB: I probably feel like I'm done with the steam. I'm now fully wet from sweat and I'm ready to…

DM: Do you start to feel uncomfortable?

SB: I never feel uncomfortable in the room.

DM: So you could stay longer if you want?

SB: I could, absolutely. You bet. I feel that it's just kind of my time and I spend those 15 minutes of bathing. I'll typically do a cool down and then I'll come in. Shaving is the best because my skin is so soft. Then I'll take a shower and I'm ready to close the day down. So that's kind of the traditional type of sauna.

DM: Are there any cautions that you would mention to individuals who would first engage in this type of process? Are there any health conditions that may be exacerbated or worsened by using the sauna therapy?

SB: I guess that people who might have health risks in their heart or different things should always consult their family physician. But in terms of any that I have ever experienced, I don't find it to have any negative effects for me.

[----- 10:00 -----]

DM: Because I guess if you have a history of fainting, vertigo, dizziness, low blood pressure, or congestive heart failure. These are conditions where your body's ability to profuse your brain is somewhat challenged. When you're in a sauna, the body is going to want to cool down. The way it does that is to send blood to your peripheral extremities. You'll tend to be light-headed and relatively have low blood pressure on your brains. You don't want to pass out.

SB: Sure.

DM: My recommendation would be to exercise caution and go at really slow levels before you begin – if you have a complication and if, in fact, those are known conditions that you have.

SB: It's a really good advice from the medical community. You know, to start and experience with the traditional, or for that matter any sauna, is to start gradual and build up to where you find to be your comfortable benchmark. From there, you can use that as your target and enjoy a very wonderful experience from time to time.

DM: So then you mentioned that the next version – the newest 21st century version – is the infrared saunas. I believe I got one of the first ones, the first generation, once they came out. I think it came out '95, maybe even '94, so I guess you're right with the years that they came out. So why don't you discuss that technology and how it differs?

SB: Okay. The difference, first of all, is the heating mechanism. The traditional will rephrase that as it has a resistive tube system that when you pass electrical current through, it will heat and glow red. You can physically see that, and that would be in very high temperature but underneath the rocks, to heat the rocks. That also heats the room.

The infrared room has a lower temperature. It's a carbon fiber that is printed on high temperature resistive boards. It's a circuit that when you energize that circuit, current will flow through the circuit. When current flows through the resistive circuit, heat is given off. It'll be lower temperature heat, but it's temperature that will be in a broader range, more square inches of heated surface. Traditional is a very small tube, but very hot. Infrared is a very large surface, but cooler.

Wattage wise were comparable one to the next. But what will happen to the infrared is it will heat the carbon fiber circuits, and these are installed in the walls safely so that the wall will never overheat but will be a heat generator. So you, Doctor, sitting in there like leaning against the wall. The wall directly behind you will be an infrared panel bathing you in infrared heat energy.

DM: I have used an infrared for many years and for whatever reason, I find that I don't actually sit back on the panel. You're suggesting that it's actually safe to do that?

SB: Very safe. Some things we'll talk about in a few moments, but I find it very comfortable to sit back in the room, lean in the corner, foot up on the bench, whatever the case. However, I'm most comfortable and I'm at that point bathed in the infrared heat radiation.

Let me back up on the word, "radiation" because radiation might have a negative connotation. It's a heat signature coming from the panel as heat waves. Sitting in those, I feel my body heating up and the room's set point now is maximum 150°F. Noting that to the traditional, which I said was 190. Okay, we're 40 degrees less now.

DM: It's a lot cooler.

SB: It's a lot cooler set point, but personally I feel like I sweat more in an infrared sauna than I do in the traditional.

DM: Okay. So perhaps we can discuss some of the reasons why you feel you're sweating more. There are distinct differences, and you have alluded to some of them. For most of our viewers, they really don't have any significant technical background, so I'm wondering if you can describe at a simple level what that difference might be.

SB: Okay. First, traditional goes from a dry room to a steam environment that the person is bathed in warm moist air. That warm moist air will turn on the sweat mechanisms and I start to sweat – my body sweats. I'd call it more of maybe a surface heating, where my body will turn on the sweat mechanism.

DM: The process is that you have these very hot coils that are heated usually through electricity, that heat a secondary element like rocks to retain the heat?

SB: Yes.

DM: Then the rocks radiate heat that transfers to you. Once the rocks are heated, does that heat generate infrared or that's from a different spectrum?

SB: Actually, it's the same spectrum. Remember this always: the infrared spectrum is everywhere in our lives. That if I took a camera, Doctor, and took a photo of you from an infrared camera, you would look like a heat source, a body that's hot.

DM: Unless it was a bigger heat source behind me.

SB: If it's big, yeah. If it was, then you'd look black…

DM: It's the same principle as thermography.

SB: Yeah, thermography. So in a traditional sauna, if you took a photo of the traditional stove, the elements would be very hot. The rocks are very hot. The stove a little cooler, around it would look kind of dark. That would be the heat signature. That's infrared heat. On the other side, the infrared heating element would be the same. You take the photo of the room; you'd see the warm panels showing up. You'd see a person sitting in there. He'll probably be a little darker in color because he's not quite as warm as those heating panels. But everything has an infrared heat signature.

DM: Well, that's good to know, but I still can't understand. Because these panels, I believe, can be constructed in different frequencies. That's what I'm trying to understand myself and hopefully in the process we'll educate our viewers. The rocks – let's just compare the rocks, because the rocks that emanate heat in the traditional sauna emanate infrared also. So how does that heat from the rock – infrared heat – differ from the carbon or ceramic panels in infrared saunas?

SB: The rock and the heating elements in the traditional sauna are really set up to give heat to heat the room. The room will go to 190° and that room is set. The water on the rocks will create steam, which is more of a conductive mechanism for our body. Now, over the infrared side is that it actually has in the wavelength, and inside the infrared spectrum are certain wavelengths that will penetrate our bodies. Our bodies will absorb the wavelengths in different ways.

I think a very distinct difference is in the infrared spectrum. My body actually absorbs that infrared heat signature probably better in different ways than the traditional because I'm bathed right in the heat wave or signature. So my body is absorbing the heat. Not only am I experiencing the heat of the room, which is only 150, I am also experiencing…

DM: Or lower.

SB: Or absolutely lower… But I'm also being affected by the absorption of the infrared signature, the wavelength.

DM: So is the difference then from the rocks… Because the rocks could be exposed into the air, in which case you get some direct. But is it just the difference between absorbing it directly versus indirectly from the panels, the surface area, and the volume?

SB: Yes.

DM: Or not the volume, but it would really be the surface area.

SB: If we talk about the volume for one moment is that the rooms, let's assume, is the same volume. The traditional will heat the room up to be the heat source and then the water on will be the conductive mechanism, whereas in the infrared room, the heating element is really the infrared heat signature that the body will feel directly. The traditional is probably an indirect. The IR room is a direct infrared signature. I truly believe our bodies absorb the infrared and heat deeper than the traditional.

DM: Are there any studies that show that? Because a claim that many infrared promoters suggest is that the infrared heat radiation is able to penetrate deeper into the tissues. So have you had any studies in that? And if you do, how deeply does it penetrate?

SB: Actually those are both good questions and I don't have answers for either, except I can give you a personal experience. The traditional sauna at 190°, I'll go in and take a very short experience. I'll sweat probably. Let me give it a unit of five, okay, and I'll sweat to five. In the infrared, I'll sweat 10 – twice as much at a lower temperature. My cool down rate in the infrared is about half of that of the traditional.

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Okay, a lot of data float in there, but traditional, If I take a good traditional sauna… Let's say, my cool down rate is 10 minutes. Then I take a similar sauna at 150° in the infrared and my cool down rate is five. Yet I sweat twice as much in the infrared room than I did in the traditional.

DM: Why do you think that is? Is it because the tissues are being heated more deeply?

SB: You know, I think so. I'm not a medical doctor, but I'll throw this out and see what your opinion is. If I get heated deeper, maybe my internal cooling mechanism is to send more blood to the surface to try to cool down my core. I'm not sure what the whole mechanism is, but that might be the reason why I sweat more at the external. The infrared is penetrating me deeper to heat my core deeper, whereas the traditional is heating more of just the surface (but it's a very warm surface). Again, those are more empirical points than they are statistical studies.

DM: Evans [21:31] suggests that the infrared saunas are able to transfer some of that energy directly to cells and perhaps enhance your cellular metabolism because of this sort of energy boost that they get through that feeding, so to speak.

SB: I have seen some studies or read some studies that have done blood work before and after. The blood work before will show units of 10, and the blood work after some heavy metal component would be eight, lower than going into the room. So the indicators there would be that something is happening within your body to expel some levels of toxins.

DM: And do those studies compare results between infrared and traditional?

SB: I can't recall that. I know this was the infrared piece that I was reading, and it's only just one study that I have read. So I can't say that there's a whole medical community standing behind it. But it gave some pretty good, compelling evidence on that.

DM: Now when you're in the infrared sauna, do you find that your time in the lower temperature infrared sauna is about the same? You know, maybe 10 to 15 minutes. Or is it longer or shorter periods that you're in there?

SB: I may actually be in the infrared much longer. Again, here's an interesting empirical piece – I mean actual evidence – from me. If I sit in the traditional sauna room at a 125°, I could probably sit there for several hours and not sweat. Whereas in the infrared, if I go in from the moment it's turned on and be it 70° and I enjoy the experience until it's all the way up to 150°, my body starts to sweat profusely.

DM: In what temperature?

SB: At about 120°. I'm starting to become extremely wet from sweat. Then I comfortably ride that all the way to 150°, and I may be in that room for 30 minutes.

DM: It's interesting because I have been using saunas also for years. Pretty much my primary experience is only occasionally using traditional when I go to a spa or something, which is not

that frequent. But when I'm in there, the sauna I used doesn't really go above 120°, for some reason it just doesn't go above 120°. What I know is that I start to sweat about 98° to 100°.

SB: Okay, and that's…

DM: And then by 105°, I'm profusely sweating, like dripping. At 100°, it actually starts to become uncomfortable.

SB: Oh, so you call that uncomfortable at some point?

DM: Well, it depends if I'm combining it with a strategy, like some physicians that I know of, experts in metabolic detoxification that combine exercise with sauna.

SB: Oh, okay. Okay.

DM: So you're going in there, aggressively exercising the person, stimulating the lymphatics (24:34) by the rebounder. Then sauna going into the sauna, and then doing some rebounding afterwards to help stimulate lymphatic excretion. But that's my experiment. I could tolerate much shorter periods – post-exercise, intense exercise – because you're already sweating and your heart rate is up. So you've sort of got to start on it, the process.

SB: Sure. I would say maybe I would feel the same if I went in with exercise and came out with exercise. Mine has always been I go in to relax, to sit, and enjoy the environment. I can ride up from 70 to 150° and feel very, very good about the whole experience and...

DM: Sure.

SB: And what's very interesting is to me is when I cool down. I cool down very, very rapidly, much different from that of the traditional.

DM: There's a good question about cool down. Many traditional saunas and many facilities that offer sauna therapy will typically have multiple types of sauna and a whole variety. But what seems to be a common denominator of many of them is they have what's called a "cold plunge." They have basically a small pool. There's very cold water, typically close to 40° or so, and I'm sure you know more about this. I'm wondering if you can comment on the temperature, that whole experience or any benefits – perceived benefits, purported benefits – of that experience.

SB: From my background, a very typical and exciting sauna for us would be a winter sauna where we'll experience the heat, we'll experience the steam, but then we'll run out into the snow bank. It becomes kind of a game to see who can stay out in the snow the longest, but then when you come back into the...

DM: Do you walk out without shoes?

SB: Or clothes or…

DM: Oh you're stark naked.

SB: Stark naked – of course, within the right environment.

DM: Sure. We don't want to violate any privacy issues or...

SB: You bet. So it's typically just a bunch of same-gender friends jumping in the snow banks and rolling around until they're kind of cold to that bitter point. Then you'll come back in and sit in the room and I guarantee…

DM: The room or the sauna?

SB: The sauna. You'll actually come in to the sauna room.

DM: So you're back to the sauna?

SB: Back to the sauna, and it is the best experience. It's kind of like your whole body starts tingling all over again from the experience. You'll go through a kind of this bitter cold to this slow nice warm environment. You'll learn (if you ever try doing that) that it becomes part of the staple. It's a must.

DM: Yeah. The reason why I asked is I saw some research that's really quite intriguing. It showed that this contrast of going from the warmth to the cold or relatively extreme cold can actually have some significant therapeutic benefits. One thing that they have looked at is the conversion of white fat to brown fat. White fat is the storage fat that really causes much of our health complications, whereas brown fat is actually highly metabolically active and is seen in healthier people. So it actually promotes the conversion of white to brown fat. Have you seen any studies on that?

SB: I have not. Mine is just how wonderful it feels.

DM: Yours is mostly anecdotal.

SB: Yes.

DM: So any recommendations about the cold plunge, the temperature, the length of time, and how long can you tolerate it. Most of us doesn't necessarily have the access to experience what you described, primarily because it's not legal to go outside naked.

SB: Sure.

DM: I mean you could do it, but you might get arrested. And obviously you don't want to offend anyone with your actions. The experience of the cold plunge is a lot easier to create in your own bath tub just with cold water.

SB: Yeah.

DM: But it seems to be common in many spas.

SB: Well, again, the bathing suit will certainly provide the protective covering.

Probably the greatest social event in the Finnish community is to invite families over to take sauna. They'll come in, sauna, and have coffee or some beverage after the sauna. Great visit time. It's a great time to visit in the sauna. It promotes great conversations. We use that as a mechanism to invite our friends over to take sauna and enjoy some evening visiting.

DM: Terrific. That's excellent. So have you looked at any of the research from the medical side of saunas? Because many people use them to facilitate and aid detoxification, especially from heavy metals and solvents people are exposed to like petrochemicals, DDTs, PCBs, and things like that.

SB: Again, I have seen just the writings on that. Without plunging deeply into study, to really look at the scientific evidence, I would say I don't have that in my mind.

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But I can say that if the sweating mechanism is a way to expel some of the toxins and heavy metals in our body, I'm absolutely going to guarantee that it's happening. Both traditional and IR will give you a great sweating experience.

DM: Okay, terrific. So I'm wondering if you can describe your transition into your current position, which is with a company that, as I understand, is the largest producers of saunas in the world.

SB: Yes, my background in nuclear power deals with radiation, power systems, and the control of certain electrical properties. The gentleman asked me to be involved with some development and, in doing so, applied some of those theories and processes to the infrared sauna rooms. Right now, we have effectively built some of the first low electromagnetic radiation rooms, as well as the first low electrical field rooms. I'll speak to that a little bit.

Electromagnetic fields, which are all about electrical energy, I call it the force components that come off of electrical energy. The force equations are set up where electrical fields are everywhere around us. If there are energized wires, electrical fields are around us and…

DM: Well potentially, because the electrical fields can be really easily mitigated.

SB: They can be— absolutely.

DM: That certainly is a potential, and for most of us, we are exposed to that.

SB: We are, and being that they can be mitigated through shielding. The electrical fields are probably one of the areas that we can easily contain. But the other component that's in the electrical field is the electromagnetic radiation (EMF).

DM: The M for EMF is magnetic, which is the bugger. That's the tough one.

SB: Yeah, but actually when you think about it, both are very bad actors, I would say, because they act on our bodies. Our bodies are filled with charged particles. We're made up of charged particles. Electrical field will act out with a force on those charged particles depending on its magnitude and over time may alter the way that our bodies behave cellularly.

DM: Well, because many people don't realize that we are fundamentally electrical beings.

SB: We are.

DM: That's the way our cells communicate. They communicate electrically. And if we're exposed to some external fields, that could interfere with their communication and wreak havoc on our system.

SB: It sure can, and you're probably closer to those physical effects than I am. But from the electrical side, I know that if I have an energized source, which is an EMF, an electromotive force – volt. We all know volts that are generating or emitting electric field. We measure that by volts per distance, and that's what our meter will tell us.

The other part of that force equation would be the electromagnetic part, which is when a charged particle moves in the wire, meaning now current (so volts and current). It'll generate a magnetic field around the wire, and that magnetic field will also impart a force on those same charged particles in our body.

So when there's an electromagnetic field present, then possibly an electromagnetic field will be present if there's a current flow. In both cases, we have developed some technology that we can effectively mitigate or eliminate the electric field piece. We have technology that will mitigate or minimize below acceptable standards of the electromagnetic piece.

DM: Well, thank you for setting that frame in that perspective because it is an issue. As I mentioned, when I first started doing saunas, it was about 15 years ago with the first generation saunas. And I believe now these panels that are being used to generate that infrared heat initially were carbon – or I think ceramic – and then the progressive carbon. Or is it the converse?

SB: I think you're right. It started ceramic, which is much hotter.

DM: Yeah, the first ones are the ceramics. The newest ones, of course, are the carbons. But the ceramic are relatively safe as they progressed to the carbons. My understanding is that the initial technology – the second, third, or fourth generation – are actually very high in EMFs. So

essentially, almost any sauna that was made in the late 90s to just recently is likely infrared sauna and is going to be high in EMFs.

There's a very simple way to test for this. This is not something that you have to call and call many factories. You can just have an EMF meter. You can get an electrical meter for 10 dollars, or more sophisticated EMF meter for maybe 100 to 150 dollars like a Trifield. You can actually measure it yourself. You don't need somebody to tell you because you know exactly where it's coming from, where it's hot. One of the ones I recently looked at just within the last few weeks, it was off the chart, even outside the sauna 120.

SB: Yeah.

DM: I mean normally it'd be below 3, I think it's microgauss?

SB: Milligauss.

DM: Milligauss. Yes, I'm sorry, milligauss. So, three milligauss, and this was 120. These fields weren't mitigated because of the way that they were constructed. But I'm wondering if you can comment on what I just said, and what changes you made in your newest technologies of infrared saunas.

SB: If I walk around the room in here with a milligauss meter, I could go to cords, electrical cords, and lamps, whatever the case may be, and I could find hot spots. Hot spots would be ranges of 100, 200, 300 milligauss. I'd call those hot. However, the interesting thing on that radiation piece is that as you move away from the source, the measured field drops off by one over the distance squared. So it drops off relatively quickly.

DM: Very, very high.

SB: However, we don't have the luxury when we're sitting in one of these rooms to position ourselves just right, to be just far enough away. We go in a…

DM: It's virtually impossible to be less than a foot or two away from the source.

SB: Yeah. You'll go in and most likely I'll be leaning against the source (my body). You're a little bit further away, so if I metered where you sit, it would be less than mine but…

DM: Not much.

SB: Not that much. But nonetheless, when there is an electric field and there's an electric current flow, we will be generating electromagnetic radiation (EMR). Being that, electric fields and electromagnetic radiation fields are vectors, meaning they have a direction and a magnitude. Any combination of an electric field, plus an electric field, plus other components that add up will end up to be the result of the many, not just one.

What happen is if we don't effectively control all the sources of the electric field or all the sources of electromagnetic radiation, we aren't really taking care of the problem. So the technologies we have developed can effectively eliminate all the induced electric fields in the room so that they entire environment is below our acceptable standards. We have also upgraded the technologies to mitigate through some of the configurations we have used on the magnetic portion.

DM: Can you just touch on how you have mitigated against the electrical fields and adapt the technology within your saunas to essentially eliminate the electric fields?

SB: The electric fields are more — we can shield those.

DM: And how do you shield?

SB: We have effective materials for shielding and we have taken great care…

DM: With everything like a conduit or?

SB: Actually we have gone to some patent technology that we have developed on ways to shield our power sources. Through probably years' worth of work and testing, we have taken care of what we think all the different areas in the room that will have electrical sourcing.

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DM: Okay. So essentially it's some type of shielding?

SB: It's some type of shield, yeah. Electric fields are effectively reduced by shielding. Magnetic fields…

DM: But they can counter each other out, too, can't they?

SB: The answer would be yes, if you could layer them and line them up properly because they are vector, meaning they are directional. However, when you're running power wires through different areas in the room, to do that would be probably impossible.

DM: Oh, okay.

SB: I just say it would be impossible based on power feed being too wired. On the other hand, the magnetic fields are induced by current flow in that same conductor, and we have ways that can cancel the magnetic fields. Again, being that they're vector, which means length and direction, we have effectively placed our power conduiting systems in a way that will provide a vector cancellation.

DM: Okay. This takes some extra time, effort, energy, and resources to construct the sauna this way, right?

SB: Actually not to construct it, but we took all those energies, time, and resources just to develop it.

DM: Okay. So putting it together…

SB: Putting it together is the same as the other…

DM: There's no special changes to the wiring, the shielding or…

SB: No.

DM: Same as usual.

SB: Actually some of our goals here were to make the installation easier, and we have accomplished that as well.

DM: Okay, great. There's a number of sauna companies out there. Maybe you can relate to compare the company that you're working for with the other sauna companies. Have you seen any other companies that have even thought to address this issue?

SB: There are some out there that are addressing this issue. Being that I'm very electrically oriented, to hear their presentations about chemical processes and the things that they're using to minimize the electromagnetic radiation is either way beyond me or it's just not true. I happen to believe that it's just not true because of my experience with the electrical fields.

DM: And this is relatively easy to measure. It's not like rocket science. You can take almost any grade school child – give him a meter, he can check and see if the fields are there or not.

SB: Yes, he can.

DM: I mean developing and designing systems to mitigate against that is certainly a challenge and requires professional expertise like yours. But to actually measure that is a pretty simple process.

SB: Yes. It is very simple. You could give the child the meter and tell them to interrogate the room.

DM: Right.

SB: Put the meter on the wall, flow the wall, and see what they come back with.

DM: I'd like to help people understand as a result of this interview that there is indeed a sort of public health warning. People do use saunas for relaxation as you have mentioned, but many people (in my experience) use it even more for health benefits like detoxification and things like that. So if they're doing that, it would seem counterproductive to employ a device that is actually aiding one aspect of their health but hurting them in another.

SB: I would agree.

DM: It's kind of like driving out on the road with your foot in the gas and the brake at the same time. It's not an efficient way to do it.

SB: Yeah.

DM: It's hard to say. You might get benefits, and it may actually make you worse depending on your specific individuality.

SB: We know that. Again, I look at this force equation which is the total net force. Of course, in our cellular body, the net force is an electric field force. The static, that's the volts part. Plus the magnetic part, which is the two very distinct components in that equation. To address only one of them and to assume that only one of them exists such as the magnetic part… The magnetic part can never exist without the electric field part.

The electric field, I use it like a water analogy where you have a garden hose and a water source, and then you saw a pressure gauge. In the pressure gauge, the pressure is volts in the electric analogy. When you turn it on, the flow of the water is the current in the electric analogy. You can't have current flowing without volts in the electric portion. To address only one and to assume only one exists is missing half of the equation. If we're truly addressing all aspects of the electromagnetic field, we need to effectively address both.

What's interesting, Doctor, is that the standard that we use as our target is one that has developed in Sweden. It has effectively been called the Swedish standard, the electromagnetic Swedish standard, where you can visualize how it was born and that a computer monitor would be in front of a person. That computer monitor would be at a certain distance realistically from that person. They have developed a standard where at 30 or 50 centimeters from that screen, there would be a certain amount of milligauss reading or maximum electric field.

What we have done based on that study and the credibility of that study is we have said, "Okay, let's take that same benchmark, that same standard and apply that to our saunas." Here's what we have to make the assumption.

We don't care really what distance it is that they're measuring. We care about what the milligauss reading is that they set as their maximum benchmark. What we have done is we said, "Okay, let's take that Swedish standard and apply that to everywhere in the room that a part of the human body could realistically exist – your back, foot, legs, and wherever that may be." We have taken that standard to be our maximum acceptance.

DM: And what was the standard again?

SB: Currently, our standard is 2.0 milligauss at 30 centimeters. But again, I don't' care about the distance. I care about the number.

DM: Yeah. Where your body is?

SB: Exactly.

DM: Exposure. That's going to be there. Your hand, your foot…

SB: Absolutely. I have also taken the Swedish number of 10 volts per meter as the electric field piece. So wherever you interrogate that room, those are the numbers we have used as acceptable.

The interesting part about the Swedish standard is that 2.0 milligauss is the number that would be added, milligauss reading to that background. So if I took my meter, I have to take this assumption that the meter is going to automatically have background, which, in my experience, is 0.4 to 0.6 in an area that is generally...

DM: Well if can interject, that's a pretty clean area.

SB: That is clean.

DM: More than likely, I would guess that the vast majority of people watching this live in environments that are beyond that, two or three, though under three they're doing pretty good.

SB: You bet.

DM: But your point is that you have to add the background reading on top of this. So before you measure whatever it is, you have to make sure it's off. Then measure all around it, so you now understand the background, and then turn it on. The difference is what the actual amount is coming on about.

SB: That's right and…

DM: But it's sort of a mood issue because it's a fine point. The bottomline is you still want it down to below 2.5 no matter what's contributing to it.

SB: That's true, right.

DM: Background or a new addition.

SB: Based on the science that went in with the Swedish standard – and we do use that as our benchmark…

Here's an interesting event that I see in our testing. When we test someone will say, "Oh, I got high readings!" The first thing that I'll do is take my meter. I'll walk around the external environment and see what the ambient is. Oftentimes, what happens is that somebody has laid a power cord near the test room, or something changed in the environment to make a high environmental EMF. You eliminate those external sources and isolate just the room. That's what we're really looking at – the isolated room.

The sciences that we have added to the room and the design attributes have really brought all aspects of that room under good control.

DM: I'm glad that you have because it really is an important detail. There are many details in many areas of life and certainly here. What I would encourage our viewers to do is actually to get an EMF meter. I have one personally. I have a Trifield. I have used it for 15 years or so. There are others. There are certainly less expensive ones and more expensive ones. Get one that works, that you can trust, and measure with it regularly.

Interestingly, just last night I was using a device that I was concerned had some EMFs. So I grabbed my meter and measured it. It was actually okay, but what kind of shocked me is that my ambient radiation in my bedroom had gone up.

[----- 50:00 -----]

I measured it when I first moved in several years ago and it was really low. In fact, I had one of the presidents of (50:07) biology in North America to come up and measure it. It passed with flying colors, but now there was like five or six milligauss not too far from where I was sleeping, which shocked me. But on the other side of the bed it was low. I still have to figure out what that is.

The reason I'm mentioning that is that my new strategy now is I always travel with my EMF meter. Because when you're travel and stay in a hotel or something, a lot of times all you have to do is move. Sometimes you won't be able to do anything but move the headboard off, sleep on the other side of the bed, or even change rooms because you'll never know what's going on. The only way to know is to measure it. Fortunately, these things are very simple. They typically require a nine-volt battery that lasts for years, as long as you turn it off. It's easy to measure it. As I have said, a grade school child can do it.

You really want to minimize your exposure because these exposures are not going to hurt you in a short-term, which is no question. It's kind of like smoking. You smoke a pack of cigarettes, you are not going to die. But it's what you do in the long-term. These exposures, these chronic exposures, and these fields can have really very significant adverse consequences on your biology.

SB: In my nuclear background, we deal with three aspects, and I have added the fourth. We deal with time, distance, and shielding. Applying those same things to our infrared room — Say, time, we can't really fuss with that too much because users are going to use it for as long as they feel. But the distance piece, yes you can. We try to find ways to maximize our distance. I remember it drops off to $1/dr^2$, so distance is most definitely in our favor. The shielding piece, of course — we can shield where we can or we can mitigate by cancellation and other techniques.

The other is my mitigation, where I look at ways in combination of different things I can take to minimize the fields. Because again, I think of all these little EMFs and EF generators as all these are little magnitude and directional additives. Every piece is adding to some meter reading somewhere. If I can configure and lay out the room properly, I can deal with reducing the pieces and, in essence, minimizing the net effect.

DM: Thank you for describing the details of the EMF process and how you reduce it in the saunas. I'm wondering if you could address some of the other areas of building the sauna, because obviously the power supply is only one. And how your company might differ from the other companies, as the largest and one of the oldest, I would imagine.

SB: They're a very seasoned company and they....

DM: What factors make it different or distinguish it from other companies? Maybe you can even comment on the types of materials that you use.

SB: The company in itself is very well-heeled in regards to the culture and the technologies that exist in the different sauna type rooms. I'd call them a leader in innovation. We have not only gone and solved these many little problems, but we're also building a good intellectual basis. We're moving forward at that. Some of the discoveries are…

Again, we're not generating the new wheel, but we're generating some techniques of existing pieces and bringing those together to effectively achieve the results that we want. So we're very innovative. We protect by patents and we are looking past this generation to our next version of this, that we'll have more whistles, more buzzes, more sizzle to it in terms of its technology.

We're also the first to truly, effectively deal with redefining the infrared on signature that we have turned from the typical 50 percent on infrared signature to one that's about 96 percent on.

DM: Can you elaborate more on that?

SB: When an infrared room nears the set point – the thermostat at 150°F setting, let's say – it begins to cycle on and off based on the controls and the set points. We have done some very interesting high-performance aspects that will more effectively keep the infrared signal on 96 percent of the time versus only 50 percent.

To the bather that means a lot because he'll feel warm and he'll feel like he's in an experience when the infrared is on. Again, the heat signature is coming from the electrical energization, whereas if the room is turned off their bodies will start to feel cold, cooler almost, instantaneously.

DM: Well if the temperature is still 120 or 150, it can't be that quickly?

SB: It will be very quickly. Very interesting. What happens is that as soon as the infrared turns off, their bodies start to cool down based on not getting that heat signature from the infrared ray.

I have seen some companies and some people to keep the infrared signal on, they'll open the door. So the thermostat is seating there thinking, "I got to be turned on, so I'm going to stay on." And yet the room is cooling down. To the bather, he'll feel like he's exposed in the nice and warm radiant heat.

DM: Are there any other aspects you want to comment on?

SB: I guess those are really some big items in terms of our IR engine. What's nice about it is we truly believe that we're the first in some of the intricate details on making these pieces come together, the IP associated with it.

DM: Perfect. Thank you for joining us today.

SB: I appreciate that.

DM: I appreciate all your time, effort, and energy to help reduce (the harmful effects), and for a useful device to help us reach our goals and take control of our health.

SB: Excellent. Thank you, Doctor. I appreciate it.