TRANSCRIPT
MAY 27, 1980, ITEM #42
GTE APPEAL
DR. H. TAYLOR HOWARD'S TESTIMONY

Bill Holliman: Mr. Mayor and members of the Council I am Bill Holliman representing GTE Data Services. At the last hearing we indicated that we would attempt to answer any questions which you suggested that the appellant submit in writing and we received no questions. I want to be brief because I see no reason to go on. I want to make about 1 minute of comment and then indicate, indicate to you who is here and leave it to you to determine to what extent you want him to say anything.
The problem all along has been that we have talked about microwave radiation generally, without it having any relevance what's so ever to the type of radiation and power, density radiation associated with this project. So, we can go on forever talking about, there's all kinds of microwave radiation tremendously more intensity than this and of different nature, pulsating and all the rest. My point to you is that when you get around to making your decisions. It appears to me that you have to do it within the parameters of the defined nature and scope of the radiation associated with the project and all the rest is neither here nor there. Dr. Kaiser could not return (from the last hearing) but I talked with GTE and the staff about having somebody available to answer any questions which you may have or may have had in response to testimony which I could not anticipate and for that reason I have asked another person to be here, he is here and I think I should identify him for you at least. He is prepared to answer any questions and briefly respond and I don't think that it would take but a moment. To the specific issue that Mr. Monasky mentioned. He is professor H. Taylor Howard from Stanford University. You have a summary and bibliography and there is no point in my going through that long list. I would only highlight two things. He has had substantial experience and done substantial research in satellite communication. He is an active consultant to both the industry and NASA in that field and I think well qualified to address the issue. He has in fact been provided the technical data with respect to the GTE facility. He's examined it, reviewed it, reached his own conclusion and made his own calculations. He has also listened to the testimony tonight and I think would be prepared to address that. So, with your permission I would like him to take, whatever 5 or 10 minutes, to summarize it or be available for questions. I think it's important however, that we leave you with a satisfactory record of the nature of the project. I don't want this thing to go on forever. I dont't want to leave questions unanswered.

ISENBERG: Let's see if there are council questions.

CONNELLY: Well I would like, Yea, I think that we ought to hear the summary to the response. Mr. Jackson is shaking his head as a manner of law. I would just like to deliver--to hear it. Alright Mr. Howard 5 minutes or so.

HOWARD: Well, I'll be briefer than that. My name is Taylor Howard I am an adjunt professor at Stanford Univ. My work in the 30 years since I graduated from high school has been in high power radars for both in high frequencies and microwaves and some with lasar's with light frequencies. The questions that have been asked by the Friends of the Earth and by Mr. Monasky are been reasonable questions to ask and you as a public body are going to hear it a lot more of this in the future. There is a great concern for it in Federal Legislation and I don't think that the standards have been satisfactorily resolved. Like our volunteer gentlemen here-- I enjoyed his testimony too because I spent many years exceeding radiation dosage of self heating. I've been in the field for a long time. I have three children out of three tries and they are all fine. Uh. . .and I have had no problems either.

ISENBERG: I assume that is not the summary of your testimony.

HOWARD: Well, I was actually going to come here with thick glasses on tonight and say my cataracts are getting better. The fact is there that many of us here in the industry that have exceeded levels many, many times and we don't know if it's beneficial or not. But certainly the people that have worked for me have been my concern over the years and we just simply have not had problems. Now the beauty of the satellite thing is, it has changed what we had to do to communicate daily. Before, this gentlemen was talking about filter scanner systems. We ran large antennas, thousands and thousands of watts of power. With the satellite what you can do if you have a station in the sky you have a fairly large antenna because you have to collect a very weak signal from the satellite and you then can use a very low power transmitter which this is to communicate with the satellite. So you don't have to see large voltage of American transmitting station. You don't, have to see transmitting stations with dixon put out hundreds of thousands of watts. We are getting away from that now, technology is changing, we are going to see that part of the zapping of America come down. We're getting away from it almost entirely and relying on the satellite. Military communications are doing the same sort of thing. Now I've checked the GT&E calculations as far as calculations as theory and practice go in the antenna business this is well understood that there's a ray-optic problem. The antenna manufactures are required by the Federal Commission to measure the patterns of their antennas to meet certain specifications so that they don't

HOWARD: slop over and eliminate the wrong satellite at the wrong time. So that the physical configuration of the antenna, the side load activity, the feed horn design is all very well understood. Once you eliminate the satellite you can tell from the satellite how much power your station is putting out. You get very percise measurements, you can look at the arrow rate on your data and tell exactly what's going on. You don't need to stand aside and measure. But, let me point out in this installation it's a very low power transmitter and if you get on the beam in the near field and to answer Mr. Monasky question, in the near field of this antenna goes up 4 kilometers, approximate about 1200 feet in altitude, but it doesn't mean anything. Because the fact is, if you are on the beam in the field just a little bit away you are below the suggested 10 milliwatt per square centimeter by a factor of 80 and that's on the main beam. The main beam is very small. As far as a bird flying through it's a facture of a second as far as an airplane going through at a 1200 feet at 600 miles per hour he's in it for a small facture of a second. So, there is no exposure to it either in time or in density at the edge of the dish where you are looking at the energy that's been eliminating the edge of the dish. You are down by a factor of 800 from the suggested Federal Standards and at the fence line you are down by a factor of more than 10,000, somewhere between 10 and 50,000 and it depends in details on how the feed horn elimation is done but it's very conservative, it's down by more than a factor of 10,000. So there is, perfectly measurable. But there is no way that a radiation level like this could bother anything, birds sitting on fences, or anything else. The uh...an airplane in the beam of 12,000 ft. is down by a factor of 2,000 from the standards and the point up, the airplane can't fly straight up, if it fly straight down they don't care about radiation. So the fact is that it's a time energy consideration and neither the time nor the energy are there. Now you can listen to a lot of this and you have and my...I will give a opinion if you like. I think the planning staff and original work did a very thorough job in a kind of black art area. It's something that they didn't know anything about. I talked to the gentlemen, I think he did a nice job. I agree with his conclusions, I think you can listen forever and ever that the Federal Government is going to do the radiation standards and hear no more that contributes to the knowledge. In other words if you go through an EIR on this subject I don't think you would learn any more. You're not going to contribute anything to human knowledge or human safety.

Now, in the future you're going to come up with projects where people have smaller dishes, higher power transmitters. I'm talking about 5,000 watt transmitters, 10 foot dishes and at those levels you want to begin thinking about high fences around them, some distance away, because there are radiations levels there that are of some concern. And I don't know anymore to say. It's a very low power installation and there's no possible way it's going to hurt anybody.

ISENBERG: Questions of Mr. Howard. Mr. Howard I just have one question. I want to make sure I understand your testimony. There has been a lot of comment about whether or not there are devices capable of making measurements and I want.....

HOWARD: Oh yes, there are....

ISENBERG: I want to make sure that the device in your opinion, that the present device are or are not capable of making the kind of refine measurements that are necessary in your opinion to evaluate the intensity of radiation.

HOWARD: Well, these devices are mainly drawn out of the proliferation of microwave ovens and the concern about their radiation and very simple inexpensive devices that measure in the 1 to 10 milliwatts per square centimeters range are available at...they cost of a few hundred dollars. We are talking about never getting to that level. We are 10 times below what a simple device can do so you have to get a field intensity meter, fairly complicated. I can do those measurements quite expensive to get done. To do this... uh..I, but I am pointing out that the radiation levels are so low that there are not a biological question in except a few people minds and that to make a measurement the thing you have to have to make the measurement is something that any person operating a station like this makes all the time... What is my transmitter power output and what will the satellite see from my signal and once you have those two numbers, you know where all the radiation went. It can't have gone any place but up in the sky through the satellite.

ISENBERG: Alright to satisfy the federal regulations on measuring the intensity of the microwave the ignitions and so on it's your testimony is that those kinds of measurements tools are in fact and will be in fact available through GTE facility.

HOWARD: Oh yes, in having a Federal Communication license to operate the transmitter they are required at certain intervals to measure the power. Now look it's a 25 watt transmitter. Where do we begin to get a radiation problem that might hurt somebody. It's at the 5,000 watt level, so 10,000 watt level. So a transmitter that is running 25,000 watts isn't suddenly going to lurch over and produce 5,000 watts. It just isn't physically possible.

ISENBERG: Thank you, very much. Mr. Connelly.

CONNELLY: You indicated the fence line with ratios like 10,000 to 1 are with federal standards which are a milliwatt level.

HOWARD: Yeah, the current federal guideline is 10 milliwatts per square centimeter.

CONNELLY: Could you translate the fence line to my _____ so I could understand it good.

HOWARD: It's on the order of a few hundred microwatts. Microwatts a 1,000 of a milliwatt is a microwatt. All show you, let me show you what I'm talking about. That flashlight is a different frequency. But that's 500 milliwatts. So we're talking about 10 milliwatts per square centimeter. I put that down on my hand, I put, get that down to square centimeter, I've got 500 milliwatts per square centimeter of energy on my hand. It's not microwaves, it's light, it's different, but it gives you a feeling for what the amount of energy is. There are two pen light cells. Now I don't know what I can do to anybody with these pen light cells, where I can put them inside to heat up something to do any damage. Because I can dissipate the amount of heat that these batteries can generate. And that's the argument over any of these things. Is how much heat can the organ dissipate? Now in the eyes, it's a different thing. You can cause permanent damage to eyes by cooking them. But it takes watts per square centimeter. The long terms effect of that are not understood yet, and hopefully, if you read the New Yorker article, which is very good. A series in the New Yorker on this. There are _____ because these are all high powered, very long term exposure situation. And it's apples and oranges. It has nothing to do with this situation.

ISENBERG: Alright any further questions? Mrs. Rudin.

RUDIN: Would it be practical then getting back to the question the Mayor asked about testing devices. Would it be practical if we wanted to do so, put a condition that testing be done on a regular basis and results reported to the City Council or is there any, is there an objective way that that could be done or would it be feasible?

HOWARD: I think that the only sensible thing there is what the Federal Communication System requires in terms of measuring transmitter power and the link analysis they do every time they talk to the satellite. I mean if the energy is missing from the satellite they're in trouble. They're not going to be on the air. They're going to find out where the energy is. But I think the point is, even if you took all the energy in the system, the 25 watts, and put the antenna and pointed it at the Mayor you're still 80 times below the federal standards. I mean there's no problem in that area at all.

ISENBERG: My vote no on the project should not subject me to that.

RUDIN: Dr. Howard what you say makes so much sense and I think I understand it. But I always have a fear that there's really not--everything that can be done about these things may not still be known despite the vast amount of knowledge you have. I'm really impressed with

RUDIN: your resume here. And that we may someday learn something that could tell us that we made a mistake. On things like this that are so abstract and so difficult for many of us to grasp. We've got to _____ that may be, it's worth doing the EIR. Simply to be sure that we haven't left any stones unturned. Yet, we've heard expert testimony. I'm not sure _____, as you say, there might not be anything left to gain from an EIR. But is there, there's always the possibility that we may not know everything at this time.

HOWARD: Well, I think that's right. I think that any reasonable person that's concerned about these things all the time. I know coming up here, the drive up here to me, absolutely terrifying. It's much more dangerous than standing in front of this antenna, for the rest of my natural life. But we're not going to understand these things and we simply have to live in the face of them. We now understand that the sunlight falling on the earth causes skin cancer. We didn't understand that before and in spite of people understanding that, they still get beautiful sun tans. We just don't know about a lot of things and you have to draw the line somewhere or it clears that line. Well, there's a federal line at 10 milliwatts per square centimeter. The Russians have drawn a federal line that's a lower level. All these radiation levels are below even the most conservative estimates. And maybe we'll discover something. But microwaves have been around for 75 years. And it's not new. We've been dealing with these much longer than we have other types of radiation and the effects of them are much better known. We use them medically in diathremia. Microwaves are now being used in cancer treatment. We know a lot about these waves and their effect on tissue. At this level I admit we don't know much because of the level of solo. They just can't do anything to you.

ISENBERG: Alright. Further questions Mr. Jackson.

JACKSON: I'd like to ask one question about the effect on the airplanes. There isn't any--the report covers that and we're talking about an airport that's located fairly close by, and we're talking about airplanes that maybe less than 1,000 ft., say 800 feet, _____, what would the effect be on those airplanes?

HOWARD: The radiation levels there are several, factors, several hundred below the federal standard, and the fact is, the beam is quite narrow at those lower elevations. It's only on the order of 12 meters across. An airplane 100 miles an hour is going on the order of about 100 feet per second, 60 miles an hour is 80 feet per second. So, the total exposure to the beam of being, say 30 feet wide, is a small fraction of a second again. I've flown through. I fly very nearly everyday in a light plane and I've flown through some of the most high powered radar beams

HOWARD: in the world, measuring antenna patterns and I can safely say that you don't hear it in the avionics. You don't, you sometimes hear it in the, you'll hear the pluses from the very high powered radar in the audio system. But you don't feel anything from it, the airplane goes through it so quickly there's no problem with the navigational instruments in the aircraft and there's certainly no problem any of the exposure guidelines because you go through it so quickly.

HOEBER: What does it do to your pacemaker?

HOWARD: Ah, now that's a good question. This have been addressed in a number of areas. Primarily in the amateur radio community because there's a number of retired people with pacemakers who've been long time hams. I've been a ham for 30 years and helped a guy who was, I guess he's on his 3rd pacemaker now, and he's a real aficionado and he runs at least a 1,000 watt in his station and when you touch things on it, he's not very good technically. You touch things and they're hot and you get little burns. The first time we fired up his transmitters it was to see, you know, we had the doctor was there Norm Shumway of Stanford and some of the rest of us who technically who knew how to turn on to see what it would do to his pacemaker. He also had a hearing aid. And there's no effect on the, all of these. The pacemaker's are quite tolerant of very radiation. I don't... I'd want to be inside a microwave oven with one.

ISENBERG: Alright. Further questions? Thank you very much.

END OF HOWARD'S TESTIMONY