2/14/72 Meeting

Jerry, what I'm doing here instead of taking a bunch of notes is playing this little tape recorder. Okay. In-house, so. What this stuff is we take it from our own methodology division,...it up, so it's under Methods W-1 which is our PCB and we go pretty close to this method. First of all, we take the actual milk sample and we weigh it into a beaker such as this, 50 grams. We transfer it from the beaker into a separatory funnel with the aid of water and whenever we run a sample we always run a blank next to it so we can determine our background to see if we have contamination ....no quantity, no it's just solvent blank, just the reagents. There would be no milk or anything, just water...in other words, the water used is to transfer the milk .... and then you treat that blank one just like it was a milk sample... pretend the milk is there essentially and uses the same reagents.... I understand. Okay. Then we add, then what we're going to do here is to extract the fat, the fatty portion from the milk because this is where the PCBs will accumulate. To do this we add 5 mils of...and then we use ethyl ether, 100 ml on top of.....and then we shake it for a few minutes, then we let it set and we add hexane to it which I have right over here...out of our measured 50 ml I think it calls for. Then again we shake this, and this we let it set for about 10 minutes and then the two layers will separate. The aqueous layer versus the organic layer... after it sits and separates you get a real distinct separation and with the milk it takes awhile because you sometimes get emulsion formed, it takes a long time to break up. You drain off the aqueous phase and then you just add your ether hexane mix left in your ... in other words, it's lighter than water so it floats on top and it has part of the fat in it and then transfers the milk water mixture to a lower separatory funnel. Then we repeat this, you go around ....let me show you, then we drain the aqueous layer back into here and we extract it again with ..... in the top layer you just have a hexane ether mix and in the bottom layer you'll just have your aqueous phase and hexane and then we reverse it again, and we'll extract the aqueous phase again with hexane and then up here you'll have all your first two extracts combined, then you combine all three extracts plus your aqueous phase.....in the bottom funnel

then again you let it separate out and then you now have all of your fat will be in your organic phase and then you can throw away the..... aqueous phase .....started out with....50 grams. That's a standard size it's pretty close to 50 grams...will give you just about the percent fat and milk.....we have to worry about how much fat we put on these as we get down the line...they eventually separate the fat from the PCBs. What we'll do now is.....we just have the organic layers with the fat dissolved and concentrate this down to a slow enough volume we want to go down to 5 ml or less, so that we can get a fat weight, a lipid weight how much fat was in the milk. You want to get rid of the bulk of solids...right. So you take this and we pour it or we drain it through the sodium sulfate layer which will take out any water which is left in here..into this and then we'll wash the sodium sulfate cake a few times with hexane and we'll throw this away and we'll place it ....a three row Snyder column that plugs in the top and three balls that are one way bells...and you stick the whole thing in a hot water bath and the hexane volatilizes and it goes up through these balls like this, so you always have a nice cool layer of hexane here, so that any vapors that go through have to go through that and it retains the PCBs in the flask and the fat too, for that matter, and you end up with the fat and the PCBs and everything concentrated, plus some solvent concentrated down into a volume of approximately 5 ml. Jerry, ... careful with this, it's hot.... We have a contamination problem because of the prior use of PCBs in these laboratories and that was really over there that we have that problem, as we move down to lower and lower levels in samples we thought we couldn't work there any more, so we moved over here which is more....it's freer ...it's an environment that is freer of PCBs, but whether you like it or not some of it ....not significant in terms of what you're looking for, so we store them in the oven at 150°C roughly 16 hours, in between usage, that way we don't have cross contamination. A lot of times we may run a sample at 2 or 3% PCBs in it and the next time you run a sample with two-tenths of a part per million in it and if any is retained on the glass .....you've just blown your thing, so we take the precaution of storing it .....and it

PCB-ARCH-EXT0379842

volatilize it....method....go into a DMF hexane partition??? this step we skipped because we found it was unnecessary. Brings the sample up ...parts in the end....really designed to do and a lot of people have employed it, is designed to separate the bulk of the fat from the PCBs. I think it takes about 70% of the fat away and leaves your PCBs with about 30% of the fat. We found that we don't need to do that.....so we eliminate that now. There are instances that begin with a huge sample where you have a large amount of fat....partition step but we don't employ it any more. So skipping that step, going directly to our chemical treatment. Lithogate ????? first, yeah, transfer it quantitatively to one of those little beakers and vaporate all hexane with a dry stream of air and there is no danger of losing the PCBs because you have the fat there and it helps retain it. Then you'll lay that and give a lithogate and this is a hexane soluble lithogate is this is how you report the fat content of the milk. From there we transfer the lithogate lipid fat into a ...flask and we'll add 25 mils of 2½% alcoholic KOH and we'll reflux this for approximately 40 minutes.... under water condenser and this is just to get rid of the ...a lot of the matrix and it gets rid of a lot of the molecules that are not as stable as the PCBs. It's in alcoholic KOH in that flask...just heat it up, boil it like you would boil water....going back down into it. Cool it, wash it off with hexane...make sure ...glass column into a flask, transfer it again back here....all this time we're carrying a blank lung ?? with it, just to make sure we don't pick up any contamination... then we'll again go through the same type of extraction procedure except this time we'll only use 25 ml of hexane, and then we'll extract it three times going back and forth with the funnels...solvents versus the ...you transfer the alcoholic KOH and the alcohol ...water so you add water to the thing and the alcohol ...stays in the water and then you extract it with the hexane ....this pulls the PCBs from the alcohol water mixture into the hexane, because you eventually want to end up in hexane. Okay, after you've got your extraction completed you keep your, you throw away your alcohol phase and your water phase and you get rid of it....and then you extract the hexane which was your original

PCB-ARCH-EXT0379843

which was your original extraction solvent, ..concentrated sulfuric acid to pull off any further contaminants...organics that are going to be left behind. Then you throw away your sulfuric acid ....hexane with water and throw out any of the residual sulfuric that's left, then again after you've done that you go back again all the way down....then after you've got it all concentrated ...go to the ....column ...this will flow ... other organics that are left behind on all of the other methods ...a nice clean sample, this will allow all the PCBs to come through and take out any electron capture interferences...with the exception of DDT ..... reflux ...KOH..DDT goes to DDE .. and by this time you're .....absorbent ....just another way of clarifying it...cleaning up your sample, because the electronic capture systems are pretty damned sensitive to ..... materials you want to ....clean sample.....to do this you just take your concentrate you put it on the top of the column and let it flow into the column a few times then you pull your reservoir up, ...150 ml of .....hexane...just dilute your column.....and then you concentrate it again and you bring it back down to a 5 ml sample and this is the sample you take over to the electronic capture ....previously determined the conditions under which we would elude only the PCBs and the PCBs completely. How long does it take you to prepare the sample like this? About 3 hours. Roughly about 2 hours ....time break, if you do one sample alone it's 2 hours, one person can handle about 12 samples, so we save a little bit. Lapsed time...the way we charge and the way we figure on these samples... complex as this one....which is a complex type of a sample, it's roughly three hours total from start to finish. Even with 12 samples? It handles 12 at the same time but it still takes around 2-3 hours, it's not very easy. As far as an analytical operation is concerned it is a complex analytical ....they follow about the same general type of procedure.... ultimately show more or less PCBs, well it depends on the step .....most laboratories will check the method that they use, for example some people instead of using aluminum use phlorosil as their ....or something like that, it's just a preference of choice, we found that you can reproduce

this stuff real easily, not touchy, most labs would use the same general procedure...they left out the ....extraction is pretty straight forward ....a different solvent system than some people do ...might not get quantitative.....in other words we get 100% this way and any other way would either give you 100% or a lower number. Suppose you had motor oil rather than milk...fortunately when we designed this technique we designed it general enough that it handles just about ....no, motor oil you're a little different you're back to fat, motor oil is like fat and naturally as Jerry indicated there is about 2 to 5% fat in milk, so 2 to 5% of 50 would be roughly the sample weight of something like....paper, what's done with paper is we do a cold extraction with paper....take the paper and cut it up into little squares and throw it into one of these flasks, throw in some hexane and then throw in some sodium sulfate too and just grind it up ...with the hexame...tissue samples.....take a ...500 ml flask and weigh the tissue sample into it and add a standard amount of sodium sulfate.

Floor model and bench model, ...and U-shaped columns in there that are packed with a solid phase and then on that solid phase is a liquid material that is liquid at the temperature that you operate here. You inject the sample in there and the PCB is partitioned in and out of this liquid phase...and it holds them back preferentially because it likes ....which is a simple description. It goes through the column ....for example..this would note that the sample had been injected ...various PCBs moving from the polymers ...Aroclor 1260 and this ...as each of the components move through the detector it gives the response ....is this characteristic of .....right....now we're running these at a little higher temperature it depends on what we're after, at these samples we know ...to cut down on the elapsed time .....you are dealing with, you want a little more resolution and more character and so you slow your temperature down so you separate things out .....this is the way you get to your quantitative .....mechanical integrator and each one of these lines corresponds to a certain amount of area and you just count your

lines ...in other words, this pen tracks that pen. For example, if you draw a line from down there to down there that would tell you how much area would be under that peak in counts. These counts would be related to square inches if you want, but there is really no sense to it. What we do we quantitate .....Bill does most of our tissue work around this is a big store, this is Dick Stohr, and they are involved with our ...Bill handles all the quantitative aspects of this and mostly the tissue work, at any rate, what's done ...I just have these laid out as a set of ....indicating a typical run and what's done we have a standard sample containing so many of the Aroclor in question per micro liter, in other words, so many grams of the material per volume that is injected....in the gas chromotograph which you basically have ....a gas moving through your columns at all times, and you take your sample, your hexane ....using this syringe...calibrated off in liters, and then you inject a known amount through..off the column is volatilized sweeps it through the column into the detector. This is ....so we know the original weight of the sample that we took, ground up, we know the liquid weight that we ended up with and we know the amount we inject into the instrument of the unknown material. We also know the amount of the standard that we inject in the instrument, for example, I think this ...1254 Bill, in this particular instance three micro liters of Aroclor 1254 were injected in the instrument ...and these are the PCB ....and three micro liters are equivalent to 1.5 times.....grams...absolute...put in that instrument so it is fairly sensitive...so we inject 3, 5, 7 micro liters of the standard in it and then from that we prepare a calibration curve...you block off your area and then count the number of strokes and this gives you an area versus the concentration, for example I know I put in 1½ ...and I get a certain area and I put in five times ....3...each time a get a nannogram?? in an area under the curve. Right. Then we go over here and this is ....each one of these represents ten counts or 100 counts, each stroke is 100 counts, then you plot that versus concentration...and these are the actual standards....now there are more standards obviously than I've shown you ...pretty typical????Yes.... no, that's a very small amount of variation, you get that always you very seldom ....I could draw you the

curve so they all look like they're falling all in there, but we expanded a little part, we like to know how precise we are in terms of our injection volume ....our response in the area...this type of variation is very typical.....trying to ratio it and these calibration curves...and it's very...Bill is very experienced in that. Just a second, Bill. At any rate, then for example in this case, this is a rat fat tissue extract and we know the sample size that we had originally and the volume we extracted it into and this type of thing and how much we inject it, to go through we get an area under this, and we go over here and it corresponded apparently to something between 1 and 1.5 x ..... third counts and you just take that response and go to here and down to here and this tells me that there was 1. something or other nannograms in the volume I injected in that instrument. Then you go back here and you know the nannograms that you've got from your calibration curve, you know the micro liters that you injected in the instrument and you multiply this by the conversion factors and based on the sample size you took and things of that sort, you end up with a concentration of parts per million, parts per billion of this sort, in this particular instance this sample on the lipid weight basis had 8.5 parts per million of Aroclor 1254 in it. That is very simply, not simply how it's done but .....that's the mechanical operations that we go through to ensure that we get as an accurate a number as possible. When you say lipid, I'm not sure I understand .... lipid is the hexane soluble fat, which is what we're after all the time, because that's where the PCBs are, in other words, if we can isolate the fat we've got the PCBs. When you say weight basis.....wet basis....okay, if I have a muscle, okay if I have a milk sample, for example we have the confusion on the milk sample where we've recorded on a lipid weight basis, right, there are two ways to report numbers, one is on a wet weight or a whole weight, that's the original sample as is and then you grind it up and extract the fat and determine the lipid weight. Then you can also report that amount on the basis of the lipid in that original sample which is the way I recorded it to you. Right. Lipid....also reported lipid content of the originals. You should, if you want to get back to the whole. Normally, the environmentalists that are interested in this

type of thing report on a lipid weight basis simply because lipid is where the material is stored, lipid is the stuff that's transferred from one ...level to the other and lipid is the where the energy for the animal is stored. So they're interested on what's in the lipid, now in this particular instance they reported on a whole milk basis... guideline, etc. Now we backed up and as you know, the numbers were alarming ....we ran that sample in duplicate to make sure we were okay. In fact, I think we came out of the .2 or .4 ...right you came out .225 and .226. Unfortunately.....this feature is not typical of every.... no, this device may or may not be available to all laboratories, right.. this is the measuring device....there are several ways to do this..... a lot of laboratories don't have mechanical integrators on their .... and they may use or they may use a .....just a little device you set down here and do manually.....cross sections of the highway department with that. That's another way. So you may not see this, and this is just a nicer way of doing it and a more accurate way. Over there, the thing...automatically eliminates this and it prints out an actual number in terms of counts, it prints it out just like you would on a typed thing...and it eliminates having to...these strokes, so there are all sorts of ways to do these types of things. That's just a way of conserving ...getting back the original sample, in other words, you know how many nannograms of material you have per micro liter that you injected ..you know there are ten to the third micro liters per mil and you know that micro gram there are ten to the third milligrams and you know that, how many milliliters you've got....and then this is a ....factor if you happen to have one in there, which ...chances are... and if you do a unit analysis which is what this really is it shows you all the units crossed out.....it comes out in milligrams or ....per liter which is parts per million. Milligrams per liter is parts per million? Yes, and micrograms per gram is parts per million? Yes. Right. One is wet and one is dry. Well, the assumption is that the specific gravity

PCB-ARCH-EXT0379848

of the liquid you're dealing with is one. So a kilogram of liquid equals a kilogram of the solid. If you're dealing with a liquid that has a different specific gravity of course, then you have to make that adjustment or you have to tell the people that you reported on a weight volume basis, rather than a weight weight basis. The continual use of an instrument like this, 24 hours a day, 7 days a week....day in, day out, it's not practical. What happens to that instrument? It depends, if your samples are clean enough and if you take pains and cautions that we do, then you probably might be able to get away with .....what happens a lot of the time is that your samples are simply not clean enough. There are other high molecular weight constituents...high boiling things that eventually build up on your column .....baseline drip ....roughly twelve hours a day which gives it a 12 hour.....we hope all the crap eludes out.... yes, always up.....so it cleans itself out....column...this goes into a injected....higher temperature .....which is also.....this happens to be a six foot, can you clean these. What are they packed with.....let's see, Chromform W is what they call it. It's a diatomaceous earth and on that diatomaceous earth we put a liquid phase, what we call a liquid phase. This is just an organic material.....evenly coats all the particles...and at the temperature in your chromotograph is a liquid, that's why it's called gas liquid chromotography. You convert your sample to a gas and it partitions in and out of this liquid phase and due to the characteristics of the liquid phase and the characteristics of the .... that you're running through there it ...holds it up, different ones up.... depending upon how polar and non polar they are....slows it down ..... basically....now do you ....after it goes through the electron .... okay.....first off, there is a mismatch in the two types of techniques in terms of sensitivity...we deal in a range of .....they need micro grams. So in other words, they need ten to the third times more sample than we do to make an identification, but their identification is absolute and ours is .....especially under certain circumstances. ...isolate enough PCB to get an absolute identification and we either get more sample or we are just out of luck.

The other thing is.....this is by sample not by parts per million ... by the size of the sample....on an absolute basis...the amount of the material that has to be delivered to the instrument to be detected... the other problem with the mass...is that it is not as selective....as the electronic capture detection system and it sees everything. So when a sample looks quite clean to me, I take it over to them and they say.....Phil, I'd like to see....versus the calibration system is not good. For people using one point and then.....are you in the right group...I think I understand the basis .....I would like him to..... thank you. Four detectors.....is another type of PCB detector..... it's the same type of.....is a little bigger and more expensive..... .....what is normally done with a PCB sample is it is simply injected into the instrument....and since they are not here I guess I can say it, in this particular instrument is another type of .....this is the same type of gas .....that is hooked .....in my laboratory except that the detection system is a little bigger and a little bit more expensive.... what is normally done with the PCB sample is that it's simply injected into the instrument, runs into a ...similar type column that we have over there and then it goes through an interface system which is here. Now the reason you have to have the interface is that this operates at about 30 lbs. .....operates in a vacuum so it goes through a ....which pumps away the helium and concentrates your PCBs and then lets them through a molecular hole or whatever.....so that you don't overload your instrument with helium and blow it because it is under vacuum, so you have to get rid of the helium and then it goes into the instrument itself. Now, that's the mechanical part of the instrument, and these are just associated electronics ....this is one type of read out, this is another type of read out..... and this is a ...computer.....this is also...status report of outputting the data and I'll explain what happens. We would run a sample through there and we'd get any number of peaks, well then these peaks go into the mass spectrometer and in there they are bombarded with electrons ..... and these are selected ...on the basis of ....after you run this through then you recall your spectra through your computer ....printout over here

normalizing correcting for.....just all sorts of neat things, which is why you need a computer. Then it comes out of printout over here, and all it tells you ....mass numbers in that peak which tell you molecular weight ...and then you have a .....isotropic abundance or ratio, there are several different in terms of weight and they have a natural distribution in the environment so you get a certain type of molecular weight distribution for a PCB and this is the way.....that's basically it. The reason this type of thing is not available .....how long have you had this.....we've had it, probably ...normally they do, but we've done so many PCBs that.....in other words the molecular weight of biphenyls is 154, you add chlorine you take...you have 189 and if you had a.....or you would have a peak at 189 and then chlorine has 35, 36 and 37 molecular weight and according to their abundance in the environment so you would actually see three peaks, 189, 190 and 191 and they would have a certain ratio to each other. This would tell you immediately .....it is absolute. Tell them why it's absolute for PCBs.....who determined the table in the first place. This table? Jake Hess....Bill Papageorge meet.....probably 100 different laboratories ...are they accurate, how do they determine that. How do you account the molecular weight the first time? You just take the particular compound that you are dealing with and run it through and measure it and weigh it. That's one way we also have.....If you sit down and go through the mathematics..... by knowing the electric field and the magnetic field you can calculate the ....plus this is the lifesaver, this is the computer which does a completely automatically for us, tells us everything .....is this how you identify type or does it also identify the cost? We primarily use it just to identify....it can be used for quantities and we normally get a rough estimate of the quantities if we are dealing with PCBs.... Right now we do get some ....because ....down here limited.....because we can see it.....what the level is, we've got a little better idea, a sample....easy to see or difficult to see....just from that.....

we report that from the PLC, right, the quanitation is ....in most all instances and usually they can guess pretty close to what we've got... although I think the best way to do quantitations....they differ in their identification of the materials .....well we never really differ, usually we have enough sample or we don't. If we see it and we think it's PCB and it's altered and we're not too sure, we have enough experience now, enough backlog to look in the environmental type samples that I can say, I'm not sure....the only time we call them anymore is where we're dealing with something that's very critical and a critical decision has to be made on it, we have to absolutely know.....we need to absolutely identify ...for example, quite easily as I indicated earlier ...I think in every case it should come to us and ....pretty sure but we're not completely sure would you verify.....did you .....I recall PCBs in there and they were the type....well, what we see by the .... separation by the gas chromograph ....each individual PCB mixture..... overall.....we can't see, but we can see a lot of them, sometimes we get normally we use.....in terms of the PCBs you see what we see. The other thing is, I didn't explain that there are two types of detection systems here, actually there is a portion of the sample goes to a .....detector which is nothing more than a plane and the molecules pass through it and produce an electric current, but that type of detection system is very general and not ....and unless we have a pretty damn clean sample it doesn't really, they don't know if they have a PCB or not. In instances where they get a huge bunch ...what's done is that a mass..... continuously scans over the mass range that we are interested in once every three seconds....and then over the whole entire we don't even have to know where the PCB peaks are for that matter. Then we go back and choose peaks or choose mass spectra from areas that correspond closely to where PCBs normally elude and look at them on here so see if we have... distribution and pattern, does the mass spectrometer detect elements or compounds, or both? Well, it detects anything which is in the mass spectrometer which is volatile and which can be iodized. .....
.....

You see the same thing we see. The other thing is that I didn't explain there are two types of detection systems here, actually there is a portion of the sample goes to what they call a claim ionization detector which is nothing more than a plane and then the molecules pass through it... they are ionized to produce an electric current. But that type of detection system is very general and not as specific as an electron capture...and unless we have a pretty damn clean sample it doesn't really... they don't know if they have a PCB or not. In instances where they get a huge amount of peaks that we don't see, what's done is the mass ...continually scans over the mass range we are interested in once every three seconds and then over the whole entire ....we don't even have to know where the PCB peaks are for that matter, just the whole entire.... then we go back and choose peaks or chose mass spectra from areas that correspond closely to the and look on here to see ....pattern, does the mass spectrometer detect elements or compounds, or both. Both. It detects anything which is in the mass spectrometer which is volatile and which can be ionized. For example, when we say the fixed gas is in the air we...oxygen....is picking up elements we see.....oh yes, but that's background and that's normally there,.....with this type of a system there is a way to store the background in the computer room and subtract it out from the spectra that you look at, and most of these things aren't in the molecular weight range that we are interested in. Where you have the big problem is that the column....impregnate the diatomaceous earth with it....that can give you problems, but what they do is they can go through a run and record the mass spectram over the entire range that would bleed from the column, store it in the computer and then when they go to the actual going through they can take that mass spectram from the background and electronically subtract it from that and .....that is one of the other features that is very nice about the computer system. What is the main purpose of the ?? Application, ...we don't...like I say, first of all our samples are fairly selective and ....probably get the sample to begin with. Suppose I gave you a sample of milk and said, "Jim, what's in it?" I'd say lots of things, 95% water, 2½%.....give me a couple of weeks.....

I wouldn't use this....PCBs are one of the ...if you had to choose an ideal compound .....there could be a multitude of things in there, other than.....this type of thing, you've got milk contaminated with PCBs and they apparently have got that under the law, virtually with anything....anything added to milk....classified as milk.....right, question, right, everybody concentrates on PCBs.....okay.....what else... it finally dawns on me....find out what other, what else is in that pink (paint)??? formulation.....that we could find find in the milk that could, something else in the milk, then the milk could have been condemned just as easily because of component in that paint formulation....anything else that might appear. Carbon, anything from the field,....how much work is it to take a quart of milk....hell of a lot of work....wouldn't know if it was natural or otherwise.....how much mercury....how much arsenic... how much iron....well, I wouldn't look for those things because they're not normally there and they probably wouldn't be there at significant levels. What I would look for if you really want to say, let's quit using PCBs as a whipping board, I would say, let's look at the formulation of the paint, because you know they injested that and see if there is anything else in there that might have go into the milk. Then you have to say is it bad to be in milk that level, same source, not Monsanto..... that's a pretty .....high enough weight, just like eating cellulose.... what's the significance of the higher molecular weight.....well, the molecule is so huge that it can't pass through the gut....and possibly get to the milk.....when would this machine have the capability of identifying PCBs? When in time, when was this installed and ready to go? The scientific community....., mass chromotography determine the PCBs? Here, what's the ...by the time it was hooked up with .....by the time these were hooked by the GC and ....1960 but they didn't become very common at all until about '66 or '68. The types of mass mass ...that they were having were so easily contaminated .....madder than hell about it. LKB came out.....this is a very forward....no, hell no, the average ....what could you have ....that says okay here is the milk .....I want to know ....what point in time could scientific communities...

.....presence of PCBs. I would say about '66 and some of these were government labs....so ...I'd say about '68 or '69, let's try that one step further, when might industry ...the type of which Monsanto is a member....be expected to set this type of equipment up. 1967 or '68... in this laboratory here and in our central research laboratory one of the objectives of the analytical function ....is to keep abreast of all new techniques and as soon as they are good and solid, we want...that keeps us ahead of everybody else...so ..we were probably in the game as early as anybody. One further question, you're on the stand..... if that's your intention, in fact, has Monsanto carried that intention out? Your knowledge...would you rephrase the question. Your statement was to keep abreast of scientific developments...definitely....we are the fourth largest chemical company in the United States.....yes, that's the idea. Now what's this thing? Index of mass spectral data...right. that a compilation of records...where does PCB....in here, what's the number. Well, since there are many ....PCBs...let's look up, well I can't look up, 1254 as such ....but I can look up one of the components.... tetrachorobiphenyl...I doubt that's in there...I think .....so I'll just turn right to it.....but what you would get would be an unknown ...which would have a ....molecular weight ion....of mass 222 ??? So I would come in here and low and behold....and then I would look at these....this corresponds to ...this is the ....222....intensity of 65...this is the biphenyl itself which has an intensity of 40....what this does is break the molecule apart. Who publishes this book? When was the first time that that particular compound appeared in this publication? I don't really know. Is that a valid question? I don't know. It really isn't applicable...because a lot of them....pure compounds at much higher levels....much higher concentration levels..... PCBs...we are not at that concentration level ....fortunately. Most of these were done with....probably....GC inlets. This sytem has many different ways of inletting the compound....solids probe and take the

solid material and heat it up, volatilize it, run it through the electron gun which produces your fragments....the GC system which puts it in..we have ...gases which allows you to leak ....so most of the huge amounts ...we are dealing with ....environmental inlet system with ....which we acquire....these are the peaks in the order of appearing... yes, we skip some.....that's because I put a threshold in there so.... I can..peaks at a certain height....threshold anywhere he wants, so he ....this mass that you are talking about ....we get progressively larger....it looks as we go through, right.....is that a total mass or this is a mass of peaks. It separates, let's say you put a sample in there, now this sample is iodized and at the same time, it is partly decomposed. So you have ions not only with the molecular weight but you also have ions .....when you fragment....you also get some biphenylized, you also get some benzene ions ....you break up the benzene....so the whole thing is very characteristic...the only thing comes from a sample which happened to be in there when I was running this and has a molecular weight of 250, now I know you can't tell this ....may be 306....fragments and this column is the intensity and some of them are much more intense.. at 57 which corresponds to a ...most of that is decomposed, very little remains at the molecular weight...just the opposite.....most of that remains....it's also stable.....oh you mean putting out.....this is a reconstructed ....as the computer sees it.....PCB then for this. The computer printout of it, okay this looks interesting....1,050 so I can call for spectrum 1,050 and meet what it is and then I can jump over here and read this, and so on.....I'm impressed, ...I am too. Unfortunately, it does a damn good job on PCBs.....(laughter)....Anything else, ...thank you very much. It was very nice of you. Hope you can get us out of trouble. My job,.....no you wouldn't want it....I'm looking for a swap... I think so. Oh, twenty minutes to 6 or 5.....

END OF TAPE

PCB-ARCH-EXT0379856