Michigan Department of Environmental Quality (MDEQ) and

The Dow Chemical Company (DOW)

TRI-CITIES DIOXIN COMMUNITY MEETING

August 9, 2007

6:30 - 9:00 p.m.

Horizons Center, 6200 State Street, Saginaw

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CHUCK NELSON: My name is Chuck Nelson. I want to welcome you to the August 9th Tri-Cities Dioxin community meeting. We have a fairly full agenda tonight and I think more folks than usual from a little bit broader range of agencies, so it will take a little while to do introductions and things like that.

Prior to doing that, however, I would like to call your attention to the ground rules which are ~~in~~on the back of the agenda. We've been able to successfully follow these ground rules I believe at every meeting and I look forward to continuing to follow these rules so we can have good, useful, civil discourse. I would call your attention to number eleven at the bottom which says that questions and comments may be submitted anonymously if you so choose on an index card. If you would like to do that, Cheryl has the cards in the back, just please hand me the card before 8:00 and I will happily -- at 8:00, we will be able to be part of what happens, so I haven't highlighted that in the past as much but that opportunity is certainly there. The only filtering that will be done is, if I can't read your handwriting, I will say, what does this mean, but

other than that, I'm going to read them like I get them. So we'll do our best.

Tonight I want to remind all the folks from the different agencies and Dow and other companies that please when you speak come to a microphone. For the folks that are taping, this is very important for them to get good sound from everybody, and if you stand in your seat and give a response, it's often difficult for the folks in the back to hear. Natalie has a challenging time sometimes getting your words down. So if you can come to the mike and just do it, it makes it a little easier. I realize it's a brief delay but nothing serious.

So what I'd like to do now is have folks do introductions and I think that I will start with the DEQ folks and then we'll go to the EPA and other folks. We've got some other State of Michigan folks. We'll come over to you guys because you've got the first presentation with ATS. So Jim.

JIM SYGO: If I can have the DEQ folks stand up and we'll introduce you as you sit down then. At the front of the room, we have Steve Buda; George Bruchmann, who's the Division Chief for Waste and Hazardous Materials Division; Al Taylor, who's the geologist on this project; De~~an~~ M~~ac~~ontgomery, who's I

think Acting Section Chief right now on the project; Deborah MacKenzie-Taylor, who's our toxicologist; Art Ostaszewski, who works on a number of the aspects of our sampling program; and then we also have from our District Office Mark Reed, who's the Air Quality District Supervisor. In the back of the room, we have Terry Walkington, who's the Waste and Hazardous Material District Supervisor in our Saginaw/Bay Office; and Cheryl Howe, who's the Project Manager for the Dow site.

Now we also have some members of the Michigan Department of Community Health. We have ~~C~~Kory Groetsch, who's a toxicologist with MDCH; Brendan Boyle, also with MDCH; and Linda Dykema. Do you want me to introduce -- we also have EPA with us, if EPA would stand. From left to right, we have John Steketee, who's the Regional Counsel -- with the Regional Counsel Office for EPA. I'm going to have to have some help here.

KAREN THOMPSON: Karen Thompson, I am with the Office of Public Affairs EPA Region Five.

JIM SYGO: Karen Thompson with Region Five Public Affairs; and Greg Rudloff who deals with Project Management; Gerald Phillips, who's the Coordinator for Corrective Action for the Dow site;

Jason El-Zein, who's with the Gross Ile Office in the on-scene work that's usually done; and Jim Augustyn, who's the on-scene Coordinator for the work being done under the CERCLA orders that were recently issued; and Brian Schlieger. Anyone we missed? Okay. Thank you very much.

JOHN MUSSER: Could I have the Dow folks on the core team and presenters, please, stand and I'll do the same routine as Jim. Greg Cochran, the Dioxin ~~i~~Initiative leader; Tom Long, Sapphire Group, Toxicology Risk Assessment; Jim Collins, Dow Chemical Epidemiology; Victor Magar, with ENVIRON; Denise Kay with ENTRIX; Bob ~~Babinski~~Budinsky, Dow Chemical Toxicology; Mike Carson, our Medical Director for this region; Steve Lucas is our On-Site Remediation Leader; Todd Konechne is our Project Leader for one of the areas that we'll talk about tonight; David Gustafson, Regional Regulatory Affairs Leader; and Peter Simon with ATS.

If I could, I'd just like to make a brief comment about kind of what we're up to here tonight so ~~we've~~you've got some context. First of all, thank you all for coming. It's nice to see some new faces as well as the usual crowd. So thank you all for coming out this evening. ~~What we're planning on doing this evening,~~ I

just want to take you back a little bit and refresh your memory that we have been working the last year to characterize the nature and extent of contamination in the Upper Tittabawassee River. This is the first 6 miles of the river, and you'll hear some information related about additional sampling that was done in-channel that rounded out the sampling that was done in-channel to a lesser degree earlier on and also in the floodplain -- the riverbanks and floodplain areas in that first 6 miles.

In addition to that, you'll hear an update on the plans that have been reviewed and we're moving forward on those plans with DEQ approval on the Middle Tittabawassee River area. This is the next 11 miles of the river and we'll be using basically the same process. This is the GeoMorph process where we're looking at erosional and depositional areas, trying to analyze through samples of sediments and soil where the deposits are located, what is the nature and the extent of those deposits, and that will help us map any remedial activity that might need to be taken at a later date.

So you'll hear about some of those plans and then we're going to update you on the sediment trap studies that have been underway now for, I don't know, six or

eight months anyway. We've done some preliminary sampling. ~~We've done~~We have some preliminary results to relate to you and you'll hear about that.

Lastly, you're all aware I'm sure of the CERCLA orders, the EPA orders, that Dow and EPA negotiated. That work is well underway. You'll see quite a bit of evidence of that. Three areas in the river which were identified during the nature and extent characterization work that took place last year, those activities will be detailed for you, and hopefully, there will be a lot of questions surrounding that activity. I think you're all quite interested in that. So with that little bit of introduction, why don't I turn it over to Peter and he'll give you the update on the work with the GeoMorph process.

PETER SIMON: As John mentioned, good evening. My name is Peter Simon. I am the Project Manager for the GeoMorph investigation of the Tittabawassee River. I work for Ann Arbor Technical Services. We've been working on this project for just over a year. Tonight my goal is to provide you with an update and kind of a recap of what GeoMorph is all about, to summarize quickly the investigation activities from 2006 and how those 2006 activities have been expanded -- in the GeoMorph process

expanded, and now that we have approval to formally implement that in the Middle Tittabawassee River and ultimately the Lower Tittabawassee River, provide an overview of the 2007 sampling activities. John alluded to the fact that we're still doing some work in the upper and I'll explain that it relates to the preliminary in-channel characterization that we performed last year, and we ~~identified~~ determined that the in-channel setting is pretty complicated and it's going to need a more thorough or more detailed analysis of the erosion and deposition settings. In addition to that, I'll provide you with an overview of what this year's schedule is.

What is GeoMorph? It's kind of a funny word. A lot of you have probably heard it now. GeoMorph is a process. It's an information rich process that is used to identify sediment deposition and erosion areas based on river characteristics. What does that all mean? It's about understanding the river landscape. The natural river's tendency is to evolve in a certain process. Meandering bends will evolve and erosion typically will occur on outside meander bends and deposition occurs on inside meander bends, and left to its own vices, it will evolve under mother nature's natural tendency in a very predicted way. Man has a

tendency of messing that up by putting in bridges and other things that change the flow sequence of those river systems. Understanding the interrelationship of those things is kind of a foundational element to GeoMorph.

The goal is really to identify like deposition areas, identify where erosion areas are, and then focus the sampling to characterize these activities. In general, it's a real sampling intensive program but it's focused. It's focused based on knowledge of the river system, looking at fluvial or river tendencies, and it really comes down to trying to understand what the river landscape is trying to say to you.

Last year the project was broken up into three main study areas, and interestingly enough, as we've gotten more involved in the Middle and Lower Tittabawassee River, it worked out pretty well. We really have three general river setting changes. The upper portion or last year's work, the Upper Tittabawassee River, with the possible exception of maybe Reach N and Reach O, which some of you maybe are familiar with, is that it has its own similar set of characteristics. It's a transition area that goes into a natural river setting.

As you move into the Middle Tittabawassee River,

it changes. The characteristics of the middle part of the river are quite a bit different. The river has a lot more sinuosity or curvature. I know you probably have driven up and down the Tittabawassee and said, well, it's not that -- you know, it doesn't curve that much, but relatively speaking for this river system, there's more curvature or more degrees of meandering, and then the Lower Tittabawassee River, the floodplain really expands out quite a bit, probably two to three times what the width of the floodplain is in the upper portions.

So for study objective purposes, we have the upper 6 miles which is where we focused our work on last year. We'll be doing some in-channel work -- detailed in-channel work this year. The Middle Tittabawassee River is about 11 miles, takes us down to State Street, right out here, and then the Lower Tittabawassee River starts at State Street and runs through the confluence of the Shiawassee and Tittabawassee River and then also incorporates the upper 6 miles of the Saginaw.

Last year, just to kind of recap what last year's activities were all about, February 1st, we submitted a site characterization report. That was that characterization of 6 and a half or 6.4 river miles.

It included extensive sampling and analysis. More than 700 sampling locations were collected, both in-channel and over-bank, and more than 4,000 analyses for ~~D~~dioxins and ~~Furans~~ furans were performed. For those of you that ~~-~~are not familiar with the complexity of ~~Dioxin~~ dioxin and ~~Furan~~ furan analyses, that's a pretty monumental effort and unprecedented for these types of investigations. 4,000 ~~D~~dioxin and f~~F~~uran analyses is a major milestone.

In addition to that, 85 of the samples were analyzed for other chemicals. There's a broader range of chemicals that were looked at, initially Appendix Nine, which is a target list of chemicals. It's a specific target list based on U.S. EPA guidance, and then from that looking at more site specific compounds, and that was done on 85 very select samples that were selected ~~between~~ by DEQ and Dow to do further understanding of what these other constituents might be and how do they behave with respect to ~~Dioxins~~ ~~Furans~~furans dioxins and furans.

Out of that work last year, we also identified again -- and I mentioned this a couple of times -- that further in-channel work needs to be done. The river setting for the in-channel is pretty complicated and we need to bring some additional tools to help

map, like we've done in the over-bank, what the river bottom is all about. There are some tools and we'll show you a couple of samples today of what that was.

On May 3rd of this year, we received formal approval of the process to implement the GeoMorph process beyond the upper 6 and a half miles of the Tittabawassee River. So that program we wrapped up in May of this year to pull together a detailed sampling and analysis plan for the balance of the river, at least for this part, the Middle Tittabawassee River. Out of last year's work and the intensive sampling and analysis, there were three areas that further action or further work was deemed appropriate. I'm not going to talk a lot about those. You'll hear more about those that are affectionately referred to as Reach D, Reach J/K, and Reach O. The reach designations tie back to the GeoMorph investigation. We do our work based on reaches. Each reach is kind of a smaller sub-component of the river system. It acts in a certain way or it has certain river characteristics. In general, the goal of those actions this year is to have the work done here in 2007, and again, you'll hear more about those later tonight.

The 2007 sampling and analysis plan incorporates in-channel sampling of the upper 6 and a half miles of

the Tittabawassee River. We're working from Reach O upstream. Reach O is where they're going to be doing some corrective actions this year. We've done work in Reach N, M and L at this point and we're starting to go into Reach K. It's about 6 and a half miles, and ultimately, once we get up near the plant, the need for the additional characterization probably will be minimized and the number of samples we'll have to take up as we get towards the confluence will probably go down.

In addition to that, we'll be characterizing 3 miles of the Middle Tittabawassee River. You may say, well, come on, Peter, you said 11 miles in the Middle Tittabawassee. Well, there's a reason. We're using what we refer to as ~~d~~bathymet~~e~~ry, or detailed in-channel mapping. The Tittabawassee River has some pretty unique characteristics based on flow. During the spring, the water is very high, lots of water to work with, and under those conditions, it's not really safe to be on the river in boats. When it's rushing at 35,000 CFS or something like that, it presents some health and safety issues.

So in April of this year as soon as it was safe to go down the river, we initiated the ~~d~~bathymetry for the upper 6 miles, which was completed, and then

ultimately, we got 3 miles of the Middle Tittabawassee done before we ran out of water. The river right now is running about 300 CFS, so you can barely float a canoe in those areas, and the instrumentation just doesn't work under those settings.

The over-bank sampling is including 11 over-bank miles starting at Reach P and going all the way down to State Street ~~here.~~. The width of the floodplain will be characterized as part of the GeoMorph process, and in addition to that, there's been agreement between Dow and ATS to do some select areas in the Lower Tittabawassee River. There's a number of reaches down there that have some special interests and so we're going to be doing some select sampling down in those reaches as well.

In addition to that, there will be sampling of select eroding banks in the Upper and Middle Tittabawassee River. This is something that a lot of people have a lot of interest in, and based on the site characterization, it's going to provide us with insight as to where we may want to do further characterization of the eroding banks.

The Upper Tittabawassee River again starts at the confluence of the Chippewa and Tittabawassee River, runs about 6 and a half miles. For reference,

Gordonville Road Bridge is here and Smith's Crossing is here, or Bailey Bridge Road. This area, the bulk of the work that -- the work that we'll be focusing on this year is detailed in-channel characterization that has been developed based on the river bottom mapping, which I'm going to show you next.

The Middle Tittabawassee River is divided into 24 reaches. It really has no other real significant meaning. It's really a site characterization meaning for us. Each reach has some specific interests. There's a difference in the flow characteristics through that part of the river, a bridge maybe, maybe there's a tributary that changes the flow characteristics through that part of the river. So there's 24 reaches in the next 11 miles as opposed to 15 in the upper 6 and a half miles.

The MTR incorporates 3 miles. This is the first 3 miles up here of the Middle Tittabawassee River ~~that~~where we'll be conducting the detailed in-channel characterization based on the river bottom mapping that I mentioned. The 11 miles takes us down to State Street and we'll pass Tittabawassee River Road, so it's a long way~~s~~. For a lot of our crews mobilizing out of Midland, we're probably going to end up mobilizing out of the Freeland area or possibly

Saginaw. It's a 20-minute drive. It's a long ways. It's a lot of river to characterize this year.

In-channel investigation update, -- we initiated the dbathymetry or the river bottom mapping. This is one example of river bottom mapping. The significance is here. This is one reach. This is Gordonville Road Bridge on the left and Smith's Crossing down here on the right. The yellow or brighter colored areas are depositional areas. These are areas where the river has been accreting or building up sediment over a period of time. The blue areas are holes. In classic river systems, it's very common to have riffle pool run areas, even in sand bottom river systems. It's really common for those of you who are trout fisherman to see these riffle areas. That's where you like to cast your flys flies and so forth. Well, the Tittabawassee has those similar characteristics. It's different than a trout stream. It's a lot bigger than that but it still has these same river characteristics in terms of riffle pool run and glide areas.

The dbathymetry, or river bottom mapping, like the over-bank provides us with an understanding of where we want to focus our sampling activities. The higher velocity or pool areas typically have more water running through there at higher velocities, so the

tendency for sediments to settle out there is a lot lower than the accumulating or point bar areas or the yellow areas where sediments are building up. Typically, in the broader areas, sometimes there's rocks or something underneath that drop the velocity, and as a result, the sediments end up dropping out there.

In general, this provides us with an insight as to what mother nature has been doing in terms of erosion and deposition, and like the approach that we have for the over-bank, we want to focus those efforts. That isn't to say we don't look at any other places but we want to focus our efforts and use our time and resources in the most efficient way.

The 2007 in-channel sampling again is based on GeoMorphic characteristics of the river, looking at cross-sectional areas, looking at riffle pool run, looking at sediment deposition, looking at high resolution aerial photography, what does this part of the river look like for 5 years, 10 years, 50 years, 100 years, or as far back as you can go. We have some aerial photographs that go back to 1937. It's pretty remarkable, and when you look at what the river has done from then to now, it gives you some insight as to what the lineage or history might be based on the

sediments that we're seeing here in depositional areas. It really comes down to an analysis of these surfaces. We've talked about GeoMorph surfaces and the over-bank, the wetlands, high terraces, natural levies. In-channel systems have the same type of thing, same type of surfaces. They're called different things but they have -- it really comes down to erosion and deposition.

The initial sampling work in Reaches L, M, N, and O incorporated more than 140 sampling locations, so it's not a small effort. Again these little black triangles here, those are all proposed sampling locations that our initial observation is to characterize these deposits. Based on what we see in these deposits, we may have to do some additional sampling, but it's a fairly intensive sampling approach for this portion of the river, and that approach is going to be used to characterize those upstream reaches and also the 3 miles of the MTR, and again the reason why there's only 3 miles in the MTR -- in order to develop this high precision, it's called multibeam ~~d~~bathymetry, multibeam sonar, you have to have a certain amount of water, and when you've got a foot of water, you can barely float a boat in there, so we ran out of water towards the end of June. We

ran it as far and as long as we possibly could. We're going to restart our in-channel ~~dathymetry~~ bathymetry or river bottom mapping as soon as the water levels start to come back up in the fall, probably October, November, depending on where that breakeven line is in order for the instrumentation to work properly.

The over-bank sampling program, like the in-channel I've been talking about, and really no different than what we did last year, is about mapping these surfaces. You see a variety of colors here. Those colors are not just to paint a pretty picture. They mean things. They mean things based on the different erosion and depositional settings. These blue areas are what we'll refer to are GeoMorphic wetlands. They typically are low depressional areas and during flooding conditions are usually the last ones to dry up and they have certain depositional characteristics.

The little pink areas along the riverbank, those are either natural levies or historic natural levies, and if you go back to the site characterization report, there's a discussion in there as to why the Tittabawassee River has a dual levy system, and it relates to impacts from the logging era many, many years ago in the 1800's, started about 1855, and ended right around the onset of the industrialization and

urbanization of the Midland area in about 1890. So there's some really good indicators. The onset of the logging era infused a tremendous amount of sediment into these river systems that frankly the rivers, not just the Tittabawassee, but many rivers in Michigan and in the United States are still recovering from. So we've got a very good timeline chronology, and we help use that to understand where we're likely to see deposition and where we're likely to see erosion and as a result where the probability of finding contaminants are, and that's kind of the basis of where we begin selecting transects.

If you see, our classic approach for characterizing these surfaces is you typically have a transect, a beginning, middle, and end, of each one of these cross-sectional changes. What do you mean by cross-sectional changes? A lot of fancy words. Well, you can see in this area right here we have -- this is a high terrace, a wetland, and you've got a low terrace adjacent to the river and on the river, and a wetland and so forth, and so we map across the river. You have a sequence of surfaces, and typically, anytime you have a major change in that sequence or cross-sectional sequence, we'll put a transect in there to see what the relationship is at the upstream

side, the middle portion, and downstream side of those surfaces, so we can have a better understanding of how that surface is behaving with respect to its orientation along the river.

The in-channel or over-bank sampling program for the Middle Tittabawassee River incorporates more than 1,200 sampling locations. Those are the initial sampling locations. The GeoMorph process incorporates an iterative approach, which says, based on the results, when we get results back to the field in fairly short order based on the TRP methodology or the rapid turn ~~D~~dioxin methodology, allows us to iterate our way through to make sure that we've adequately characterized these surfaces based on what the concentrations look like. There will be more than 5,000 analyses we anticipate based on those 1,200 sampling locations. We have to provide some reserve capacity because that's not an absolute number, but there's a lot of planning and a lot of work. Our field crews are out in the field and have been since the 19th of July beginning this implementation of that work.

Of those 1,200 sampling locations, 963 of those locations fall on either a Priority ~~One~~ 1 or Priority ~~Two~~ 2 property. Those have some long -- some more

historical significances, Priority ~~One~~ 1 and Priority ~~Two~~ 2 properties, so that's a pretty good representation. The approach that we use in developing these sampling locations, we had no knowledge. Our field crews and our GeoMorphologists were blinded to where Priority ~~One~~ 1 and Priority ~~Two~~2 properties are. We needed to stick pure to the process, and as a result, we ended up still having sampling locations, 963 of them, on Priority ~~One~~ 1 and Priority ~~Two~~ 2 properties, and that gives us some insight as to where we're likely to see elevated concentrations or not. The GeoMorph process is all about erosion and deposition.

Just kind of a recap since the beginning of this year of the investigation activities documents that we've submitted to MDEQ. I'm not going to go through all of them. The site characterization report probably is the first and foremost one submitted on February 1st. From that, there's a series of other things that provided supplemental information about the site characterization up through and including the approval that we officially received on May 3rd of this year on the GeoMorph process. On July 12th of this year, we received formal approval of the MTR sampling and analysis plan or the 2007 sampling and

analysis plan. That was unprecedented turnaround.

We had submitted a first draft, working draft -- again, if you look at the dates, May 3rd is when we received the approval. We submitted our first draft of this year's sampling program on June 15th. It formally went in on July 2nd, and DEQ worked very hard to get that process and that sampling program approved so that we could be out in the field. We received formal approval on July 12th, and on July 19th, we collected the first samples from this year's program, seven days after the formal approval. So there's a lot of work and a lot of effort to be able to wrap up a sampling program of this magnitude and this effort in this time frame.

In general, our goal is to have all the sampling that I've talked about, the 2007 field sampling program, completed by November 15th, 2007. That includes the in-channel sampling of the areas in the UTR and the 3 miles of the MTR done this year, as well as the MTR and the select areas in the Lower Tittabawassee River. We'll be submitting the formal site characterization report of this year's activities on March 1st of 2008, and just as a reference, again assuming the water conditions provide, we'll be back on the river collecting the detailed river bottom

mapping so that we can continue next spring and next summer doing the detailed in-channel characterization of the Middle and Lower Tittabawassee Rivers.

That's all I have. Thank you. Any questions?

AUDIENCE MEMBER: Just two quick questions. One, for the forthcoming samples, how deep are you going to go? How deep are the samples going to be taken?

PETER SIMON: That's a great question.

AUDIENCE MEMBER: Would you repeat your question?

AUDIENCE MEMBER: For the forthcoming samples that are going to be taken on the upcoming reaches, how deep are the samples going to be taken?

PETER SIMON: I'm assuming you're talking about the over-bank?

AUDIENCE MEMBER: Yes.

PETER SIMON: We have target locations. Based on the work we did last year, we have an idea based on the surfaces, natural levies, wetlands, upper terraces and so forth, of where the vertical extent of contamination was, and so based on that, we have some ideas for this year to help optimize and streamline our program. In general, the depths go to clean materials. So in the upland high terrace areas,

typically, the elevated concentrations are within the top one foot. We typically will go below that by usually at least one or two intervals. We do layer based sampling, not interval based sampling, looking at what the soil or soil development process looks like.

For the natural levies, as an example, 1 foot isn't going to get you there. A lot of these natural levies are pretty deep. Last year's program took us, in some areas where the natural levies are pretty well developed, down to 20 feet or down to the clustering clay. So it's going to range, you know, from a few feet to many feet depending on what the surface is that we're trying to characterize.

AUDIENCE MEMBER: And just for clarification, I'm not aware of the terms you used, Priority ~~One~~ 1 and ~~Two~~ 2 properties. Could you define that?

PETER SIMON: I personally can't define what Priority ~~One~~ 1 and Priority ~~Two~~ 2 properties are. John? It has some history going back --

JOHN MUSSER: The Priority ~~One~~ 1 properties are properties that were most extensively flooded during the March 2004 flood, and then the Priority ~~Two~~2 properties are simply those properties that were

flooded but not as extensively, such that the flood waters hit the property but didn't get up around to the residential living quarters or structures.

AUDIENCE MEMBER: So Priority ~~One~~ 1 properties then are around residences and so forth?

JOHN MUSSER: It's where the flooding occurred ~~up near~~ within 20 feet of residential structures.

AUDIENCE MEMBER: Thank you.

CHUCK NELSON: Al, I know you had some things that -- some comments you wanted to make, too. Do you want to do that before we answer questions?

AL TAYLOR: I think this might help answer some questions.

CHUCK NELSON: Okay. If you got something that will help to clarify, we'll still get to you, but let him make his comments and then we'll do you.

AL TAYLOR: My name is Al Taylor. I'm one of the geologists working on the program. I want to thank Peter. That was a great presentation. I think it's really a very good overview of where ATS and Dow is this year. I would like to comment that this project has been moving very rapidly. They've accomplished a tremendous amount of work in a relatively short period of time, and in doing so, you

know, a lot of the project is starting to catch up with each other, and a couple of things I just wanted to go over real quickly, because of the pace at which this project is proceeding, there's certain things that as I said are beginning to catch up.

Peter mentioned that 85 of the samples that were collected last year were run for extended analyses, and what that information is telling us is that we have -- we're starting to identify the other compounds of concern in the Tittabawassee River besides ~~Dioxins~~dioxins and ~~Furans~~furans, and those compounds are going to be looked at in the Middle Tittabawassee River and potentially some more analysis of Upper Tittabawassee River work. What's being found right now are some of the older pesticides and herbicides, like Endrin and Aldrin. We're seeing some methyl chloropurathons, a lot of tar compounds. Up in the Reach D area, which is right next to the plant site, we're seeing some fairly high levels of chlorobenzene and other compounds and some metals related to that. We're seeing hexachlorobenzene and hexachlorohexane and a number of other things, but it's important to understand that as we go through this process there's going to be some risk assessment and some risk management that's going to be conducted, not just on the ~~Dioxins~~ dioxins and ~~Furans~~furans

but also on these other compounds that we're beginning to understand the distribution of in the river.

So the other portion of that is Dow and ATS are doing a tremendous amount of work in trying to identify what we call TICs or tentatively identified compounds. Those are things that we really don't have a solid analysis or a solid identification on yet, but we know that there's something there at a concentration and they have identified TICs, which means that they're about 90 percent sure that it's this compound, or they have an unidentified TIC, which means, well, we know there's something there, we just don't know what it is yet. A lot of -- a tremendous amount of work is going into that by ATS and Dow and by MDEQ staff right now.

With respect to the interim -- or the corrective action plans, Reach D, Reach J/K and Reach O, those have been identified in the presentation as corrective action areas and I just wanted to caution that we agree that they are corrective action areas. We look at them as interim response activities right now and they're CERCLA removal actions, and what that means is that removal is going to go on now but there may be the need for additional work in the future. So I don't want the idea to be that we won't have to

revisit these spots. There is a possibility that we will have to go back and do additional work. Like, for example, in the case of Reach O, material is being -- is going to be removed this year. There are upstream deposits of contamination that may need to be removed, and by taking care of O now, which is a good thing, it's doing mass removal from the river, but there is the potential for recontamination as things move down the river from eroding banks and from other in-channel deposits that are going to be addressed through the corrective action program.

I think that was it, other than I just -- oh, there is one other issue. That I wanted to express the appreciation of MDEQ in particular for the great participation that is being afforded this program, because unlike last year's process, a lot of the property, not owned by Dow, is private property that Dow has had to gain access for in order to conduct these investigations and they've done very well at getting property access. There are some areas where we don't -- Dow does not have access yet to collect samples and that's something we're going to be working through with Dow and the property owners in the near future, but I just wanted to express the Department's appreciation for all those folks that are actively

participating in this process, and for those who are not, I'd like to encourage you to participate, because we're going to have to get that data eventually, and the faster we get -- are able to get the data, the faster that we'll be able to get to the conclusion of this process. That's it. Thank you very much.

CHUCK NELSON: Ma'am, go right ahead.

AUDIENCE MEMBER: Hi. It's pretty cool how the GeoMorph thing works and how you're measuring the lower and higher levels in the river and I think this was probably brought up once before. It's a concern that the characterizations you're making in the river now this summer, come next summer after we've had the spring floods, and some of them are pretty large, is that going to remain the same or is it just going to change and make everything completely different so all the data you've collected this year isn't the same as what's there next year?

PETER SIMON: Sure. That's a great question and that's a concern that we have as part of the investigation. One of the elements to help us gain an understanding of that -- we talked about erosion and deposition areas and looking at where sediment is building up and so forth. Gaining an understanding of the relative stability of those deposits is a key

component of that, and there's some tools talking about modeling and looking at sheer stresses and so forth. Looking at bed stability is a component of the investigation, because obviously, we need to have an understanding of its relative stability, and in many instances, if the deposits are there, they've been there for a while, and then it's just trying to come up with an understanding of how stable that deposit is in the long-term. So that's a component of the investigation.

AUDIENCE MEMBER: Okay. And you're cleaning up the real high numbers in the river right now, which is great, but like Al had just said, there probably could be recontamination in these areas, and it just seems it would save an awful lot of time and money if you could just go in and start where the pollution starts and clear it all out once, you know. Wouldn't that just save a lot of time and money in the long run?

PETER SIMON: In an ideal sense, you typically want to start upstream and move downstream. We don't have that opportunity. There's work that has been committed to in the Reach O, so that is one of those areas that we may have to come back to. Anytime you remove sediments from a river, it creates what

I'll call a hungry river, a hungry river in terms of sediments, and so we have to be aware of that. If you take out sediments in one spot, it's going to want to replace them from somewhere else, and so that's a factor, and typically, you like to start upstream and move downstream, absolutely.

AUDIENCE MEMBER: Thank you.

CHUCK NELSON: Any other questions? Sir, why don't you go to a mike.

AUDIENCE MEMBER: Yes. I'd like for someone to clarify, there seems to be some confusion between the EPA comments and the GeoMorph process that they made back in June and then the DEQ indicated that some of that information might have been incorrect or dated, but specifically, the question refers to an EPA statement that the GeoMorph process has not been fully proven on this site, and they went into some specifics as to what they saw as issues, but my question is, have those issues been resolved? Have you provided that information to the EPA, the data, and is that information available to the public?

JIM SYGO: Just very quickly, I think you're referring to a response document that the Department received from the EPA that was identifying concerns that they had with the RI -- the remedial

investigation workplan last December 1st of 2006 basically. Our response has been that at the time that EPA provided those comments we would agree there was not I believe a formal approval but we were in the process of approving that, and basically, those approvals crossed basically in my mind, and we did provide the approval of the GeoMorph process I believe it was on May 3rd. In the letter that EPA had sent us, they made no reference to that. From that perspective, I'd let EPA take it from there whether they believe that the GeoMorph process has been appropriately approved now or not, but I'll also let Al contribute to what he'd like to.

AL TAYLOR: I guess a couple of points that I'd like to make is, I think that many of the technical issues raised in EPA's letter were addressed by the May 3rd letter and by ongoing work that has been occurring. A good example of that is EPA brought, rightly so, to the forefront that there are other compounds of concern besides ~~Dioxins~~ dioxins and ~~Furans~~furans that need to be identified and evaluated. However, they were not aware at the time that they wrote the letter or the person that signed the letter wasn't aware that that work was actually actively occurring and the compounds that they cited of concern we

actually had data for and were in the process of evaluating that data when we got EPA's letter. So that's an example where we have that crossing going on.

One of the things that we agreed with the EPA on with respect to that is, because we've been working collaboratively in a collaborative manner on the RIWPs, we've been working through a series of working meetings to try to get to agreement rather than having letters flying back and forth and not really accomplishing anything in a real timely manner, because this -- the pace of this project is very fast. EPA commented that we had -- and you can, of course, speak for yourself, but we didn't have a -- to their mind what was an enforceable schedule. We didn't completely agree with that but we could see where there were some gaps in that schedule, and to that end, we have provided a partial approval of the RIWP with an enforceable schedule on I think July 24th or 25th of this year. That was their number one comment. That schedule we believe also addresses some of the substantial comments that EPA had with respect to the human health risk assessment, the ecological risk assessment process, and timeline. However, we're still probably in discussions with EPA on that issue.

GREG RUDLOFF: I'm Greg Rudloff with EPA. I think the comment that was being referenced that the Agency had made was with respect to the variability within a specific GeoMorphic unit whether you could sample just a few locations within what sometimes could be a relatively large GeoMorphic unit and have that be representative of the rest of the material within that unit. We were looking for some type of a statistical demonstration that those few samples within a GeoMorphic unit were indeed representative of that unit. We understand some of that information had been provided to DEQ and we did not have that at the time that that comment was made and I understand that we'll be discussing that further in another month or two.

AL TAYLOR: That's one of the things I meant to say before when I got up here and started blabbing. One of the things that we're doing as part of the GeoMorph process, and it's a very important part of the process, is that for the Priority ~~One~~ 1 and ~~Two~~ 2 areas, we have required as a part of our approval of the GeoMorph process that there be additional characterization on residential properties and some agricultural properties which is more statistically based. Dow is using the GeoMorph process because this

Priority

is an area of contamination that is 25 miles long and miles wide. It is not possible to sample it at the level of density that we would typically use for, say, a gas station site or something like that, that's like a quarter acre. This is a shift in scale, but with that said, we need to have a high level of certainty of the range of concentrations that people are being exposed to on these residential properties, and as part of this GeoMorph approval process, Dow will be proposing Priority ~~One~~ 1 properties and some Priority ~~Two~~ 2 properties, that is those properties that were flooded during the March 2004 flood, for additional statistically based characterization so that we get that level of comfort that the predictions that we're making using GeoMorph can be accurately ramped to these residential properties, because that's obviously the most important areas that we're concerned about is where people are living, and so we need to have that extra level of confidence.

GREG RUDLOFF: And that additional sampling we're expecting will much address the comment that we had made.

CHUCK NELSON: Any further questions?

AUDIENCE MEMBER: Is it possible to make a timeline for the contaminants by the type of

contaminants that are identified, a timeline as to when they were deposited?

PETER SIMON: That is part of the process is to try and develop that timeline. In the RIWP that was mentioned, there is a timeline. It's a very complicated timeline that looks at manufacturing process and chemicals that were in commerce or in manufacturing and so forth to develop when things could have been introduced into the environment. Looking at anthropogenic or man-made modifications, I talked about the logging era and there were two major forest fires that basically swept from the West Coast of Michigan to the East Coast of Michigan, and we have timelines associated with that, because each one of those introduced certain things into the river system.

So putting together an absolute timeline is very difficult to do, but when you look at these chronologic events, you can begin to understand in a sequence in a natural levy what the progression of time is when you begin to see the presence of certain contaminants. ~~Dioxins~~ dioxins and ~~Furans~~ furans didn't exist 1,000 years ago or 500 years ago. So in many of these natural levies, as an example, you have clean sand all the way down to the clustering clay and you have that present for a number of feet and then you have the

presence of a wood layer. That wood layer is uncontaminated and is very indicative or suggestive of the logging era because the Tittabawassee River was used as a major transport for logs for a long period of time, and then you can begin to build kind of this vertical timeline when you begin to see the presence of ~~Furans~~ furans and other compounds and then ultimately those go away.

So you can kind of develop a timeline so to speak. That's one of our goals to help us understand what the evolution of those deposits -- that depositional setting has been. I hope I answered your question. It's a complicated -- it's a simple question and a complicated answer.

AUDIENCE MEMBER: Well, it's an adequate answer, but I wanted to know, does that making a timeline influence how deep you go, 5 feet, 20 feet? You mentioned anywhere from 1 foot to 20 feet, and I wondered if that timeline facilitated you knowing how deep to go when you're sampling?

PETER SIMON: We use visual indicators wherever we can. As an example, we know in the natural levies when we get to certain visual indicators that the likelihood of contamination is very low. We'll still collect samples and we'll still

submit them for analysis to verify what our assumptions are about that timeline. So we use chemistry or the analyses to confirm what our beliefs are, develop empirical information, but we use kind of that visual timeline indicators to suggest where we should be out of the contamination as an example.

AUDIENCE MEMBER: Thank you.

JOHN MUSSER: Could I add something to that response just to fill out -- I think your initial question was, is there some way to determine the time that the deposits were made and that sort of thing? We have fingerprinted these ~~findings~~ samples in the river, and for the most part, we're able to attach the fingerprint to a process that was used up until just before World War I. This is a process that created waste materials that largely composed of ~~F~~furans and there are some ~~Dioxins~~ dioxins in there but it's largely a ~~Furan~~ furan composition. Now you've heard other comments here tonight to suggest that there are other contaminants in the river and we don't know precisely what the source of those are at this point. That will be determined at a later point, but as far as the ~~Dioxins~~ dioxins and ~~Furans~~ furans go, we've pretty well documented that the process that created those was discontinued before World War I.

AUDIENCE MEMBER: Thank you.

AL TAYLOR: We're not there yet, at least from the regulatory side, that that's when the ~~Dioxins~~dioxins and ~~Furans~~ furans were stopped being released to the river.

JOHN MUSSER: I didn't say that, Al, but go ahead.

AL TAYLOR: But prior to World War I. That is still something that we're looking at through the RIWP process and we'll probably get to resolution on it eventually, but just from a regulatory perspective, we don't know yet when the major ~~D~~dioxin -- forgive me, ~~Furan~~furan, in particular, producing processes ceased being released to the river, but that's something that we're going to be figuring out as part of this process. We're not together on that yet.

CHUCK NELSON: Any other questions? I have someone who has handed me one here and I'm going to do this one after I hear from you guys. So you go first.

AUDIENCE MEMBER: John, this question is for you. If those ~~Furans~~ furans are ~~Pre~~ pre-World War I, then I want a little explanation on natural attenuation. Doesn't that shoot your theory of natural attenuation out the window?

JOHN MUSSER: How's that? What's our theory of natural attenuation? Let's start there.

AUDIENCE MEMBER: I want to go back to comments that, who was it, Sue Carrington made and has been said by Dow in a number of public forums, that these compounds degrade over time, these ~~Furans~~furans, I'm saying that this is ~~Pre~~ pre-World War I. How long people have to wait for your natural attenuation?

JOHN MUSSER: The degradation occurs only in surface situations where there's sunlight. It doesn't occur at depth.

AUDIENCE MEMBER: So then if you wanted to cap a part of river or something and rely on natural attenuation, it wouldn't degrade because of the lack of sunlight?

JOHN MUSSER: You don't get degradation -- the capping approach to remediation is merely to prevent exposure.

AUDIENCE MEMBER: Okay. So the natural attenuation then you're saying only occurs in the presence of sunlight?

JOHN MUSSER: Well, natural attenuation as a remediation process -- and somebody who's more skilled than I am, but my simple lay understanding of it is that natural attenuation occurs when you're looking at an area that isn't populated with people, isn't -- there's not a lot of people traffic there, the

and

do

depositions of contamination are out of reach where you're not going to get exposure -- or not a potential for exposure. So you could consider just putting some controls in place like a fence or signage and then let the area return to its natural state or continue to be natural in its state, and that's natural attenuation, not that there's necessarily degradation. It's just a situation that might be a situation which you can monitor and not necessarily dig up and possibly create a bigger problem than what you have where it's at currently.

AUDIENCE MEMBER: Al, I would just like a little explanation from you, because we had a conversation about that one time and it was my understanding, and John, thanks for that clarification, but it's always been my understanding that as these chemicals sat that folks were under the impression that they attenuated, that they weakened, over time, and so maybe I do have it wrong, so Al, like I said, we had that conversation.

AL TAYLOR: I'll try to rephrase the question. As the ~~Dioxins~~ dioxins and ~~Furans~~ furans age, they become -- or they degrade?

AUDIENCE MEMBER: Right, or they're attenuated or weakened.

AL TAYLOR: I wouldn't say that particularly, just because, as John indicated, ~~Dioxins~~dioxins and ~~Furans~~ furans are very resist~~e~~ant to environmental degradation. They can be buried and covered by cleaner material and that could reduce the potential for exposure. That's problematic in a river system where the river is naturally moving from side to side because there's always the potential for re-exposure of those contaminants. One of the -- I think one of the issues you're talking about is ~~Dioxins~~ dioxins and ~~Furans~~ furans -- the more toxic of the ~~Dioxins~~ dioxins and ~~Furans~~furans tend to be the one with the four and five chlorines on them. There's an octachloro or eight chlorinated ~~Dioxins~~ dioxins and seven chlorinated ~~Dioxins~~dioxins, but you know, the octachloros and the heptachloros, that if they are partially dehalogenated or they knock off one or two chlorines, they become potentially more toxic I think is probably one of the discussions we were having. So it's kind of, if it becomes partially dehalogenated, there is the potential for increasing toxicity in some instances.

AUDIENCE MEMBER: Okay. Then what about their breakdown in sunlight?

AL TAYLOR: The only research that I've seen on that is -- I think it was done by the Air Force is

that like in the top third of a millimeter there is some breakdown of ~~Dioxins~~ dioxins and ~~Furans~~ furans when exposed to light. Obviously, that doesn't happen a whole lot. It certainly hasn't been effective on the Tittabawassee River. We can discuss, you know, whether it's ~~Pre~~ pre-World War II or it went up later in time, but there's a lot of ~~Furan~~ furan out there that's obviously still there.

AUDIENCE MEMBER: Okay. Thank you. Thank you, John.

VICTOR MAGAR: I just want to comment on the natural attenuation. Forgive me for the semantics, but for sediments, we often talk about natural recovery and it's a remedy that the EPA does recognize and the EPA recognizes in their guidance document for sediment remediation four processes that contribute to natural recovery. One is transformation and they don't all have to occur equally but they may occur in different -- to different degrees to be able to reduce risk. Transformation could behave, for some compounds like hydrocarbons, it might be much slower than the ~~Furans~~ furans and ~~Dioxins~~dioxins. There's also burial. Burial would reduce exposure at the sediment surface. There's also even dispersion and off-site transport but that creates some concern for downstream

receptors, so we have to recognize those. When we look at burial, there's also a lot of rigor to look at the stability of the sediments and to make sure that they will be able to remain in place long-term. So as a remedy though, EPA certainly recognizes natural recovery and the multiple processes that will contribute to that remedy.

CHUCK NELSON: The question that I have handed to me I think will play right into the EPA saying something brief in just a moment anyway, so Jim, this will probably be for you folks. The question reads, why did the EPA get involved? Why is it not just a State matter?

JIM AUGUSTYN: Is that a segueway for me to begin? Good evening. Again my name is Jim Augustyn. I'm a Federal On-Scene Coordinator with the U.S. EPA Superfund Division. I'm stationed out of Westlake, Ohio. I'd like to thank Michigan DEQ and Dow Chemical for inviting U.S. EPA to participate this evening. That was a very good question and I hope I can answer it. I do not have a formal presentation this evening. I'm just going to make a brief statement but I hope I can cover that answer with my statement. However, myself and Jason El-Zein will be available to ask follow up questions later this evening. Jason is my

boss so he gets the hard questions and I'll take the easy ones.

As many of you know, on June 27th, U.S. EPA issued three administrative orders to Dow Chemical to initiate and complete interim corrective actions on all three reaches this year. U.S. EPA and Dow negotiated those orders, and on July the 12th, the orders were signed and became effective. The reason U.S. EPA stepped in at this time and issued the three orders was simply to establish completion dates, deadlines, and ensure cleanup work began on all three reaches this year. As you will see later in follow up presentations this evening, Dow was prepared and has been planning to begin the work on Reach D under permits issued by Michigan DEQ and they have gone a long way to get that work started and up and running.

However, the proposed schedule that U.S. EPA saw had that Reach D work starting this year but was not going to be completed until next year and the same schedule also deferred any work on Reach O until next year in 2008. The U.S. EPA believed that these three cleanups needed to be expedited and moved forward as quickly as possible and completed as quickly as possible this year. So that is why those orders were issued and that is the only reason the orders were

issued was to expedite the cleanups and to work with Dow and the State to move these cleanups forward and hopefully get them done by I believe our goal is mid December of 2007. U.S. EPA will continue to provide oversight and work with Dow to make sure that happens, and Dow Chemical has committed to the U.S. EPA that they will make every effort to complete that work this calendar year.

CHUCK NELSON: Thank you, Jim. I did things a little out of turn because I wanted Jim to be able to respond to the question I was handed, but we still have the presentation on the Saginaw River Sediment Trap Studies, so Victor, I apologize for kind of stepping in front of you but I wanted to make sure I responded like I said I would.

VICTOR MAGAR: I'm Victor Magar. I work with Environment International Corporation and we're a consultant to Dow. I'm the Lead Engineer on this project looking at the long-term performance and feasibility of pilot scale -- a pilot scale field sediment trap in the Saginaw River and I'll talk to you about our current status and the progress we've been making in the last six or nine months on this project. I'll introduce the project scope and talk about the status of the studies. We have two studies

we're working on. I'll mention the preliminary results of study one, which is in the Ojibway Turning Basin, and study two, which is in the Sixth Street Turning Basin, both in the Saginaw River, and then talk about some of the ongoing work we're doing in the next steps and our proposed reporting schedule.

Our goal here is to look at how sediments might deposit in what we're calling a large scale sediment trap. In this case we're looking at turning basins that may serve as those sediment traps, and what we mean by a sediment trap is an area where as the velocity of the water slows down sufficiently sediments will begin to drop out of the water column and those fall into this what we think of then as a trap, and turning basin as you can see by -- we have two turning basins, the Sixth Street Turning Basin -- and this is really where the turning basin ends. You can see the bulge coming out of the river and then the Ojibway Turning Basin, another bulge here in the river.

The Ojibway Turning Basin by the way now has been abandoned and it has not been dredged for some time. The Sixth Street Turning Basic was just dredged last August to October or so, so it's provided us an opportunity to look at after dredging how as this area

of the river widens and the area gets larger the velocity of the water begins to slow down and then how those sediments might drop out in the turning basins themselves, and what's of interest to us then is how does this serve to help manage the sediments in the river, and the Corps of Engineers has even expressed also some interest in that, just from a gross management of sediments, turning basins themselves routinely need to be managed and dredged, but also as there are ~~Furans~~ furans and ~~Dioxins~~ dioxins associated with those, sediments, if those are dropping out in those turning basins, then what does that mean in terms of the reduced sediment load that might be moving downstream in the river.

So we did these two turning basin studies. The focus primarily was in this Sixth Street Turning Basin where we did what we call a mass balance study. We look at the mass of sediment moving into the turning basin. Mass is measured by the concentration of suspended solids and the concentration of ~~Furans~~ furans and ~~Dioxins~~ dioxins and the mass exiting the turning basin, and if more comes in than goes out, then we can say that a net -- there's been a net deposition in the turning basin. We also went to the Ojibway Turning Basin because that was of interest as an older turning

basin, could we look at that, sort of look at it in hindsight, and with one sampling effort, go the Ojibway Turning Basin and learn a little bit about what the depositional behavior is in a turning basin.

So those were the two studies that we had done, and the first one, the Ojibway Turning Basin study, was completed last fall, about last October or November of last year and that involved taking sediment cores. We took eight sediment cores within the turning basin to try and understand the distribution of ~~Furans~~ furans and ~~Dioxins~~ dioxins in those sediment cores and also to look at the turning basin and see in what manner has it filled in. We heard about the GeoMorphology. This is a particular morphology that was really formed through dredging and to create the turning basin but it also created a vacuum in which eventually sediments would fill back in, and one of the things that we did see is that those sediments really did fill in that turning basin portion, that the bulge, if you say, that we saw in the river was very much filled in.

In the second study, we had very focused events where we looked at dry weather events. Dry weather being a period of low rainfall and then wet weather events, prolonged periods of high rainfall, and that

tells -- that gives us measurements at low and high flow velocities, and the reason that becomes important is the higher the velocity the more sediment that would be moved downstream or that is carried in the water column. That velocity gives energy to the water to lift sediments and move them downstream. So we're interested in how these sediments are behaving under a variety of flow conditions that exist in the river, trying to capture even some of the highest flow conditions that we might see and some of the lowest conditions that we would see, and we have one more event that we're still planning and that's this final wet weather event. We're looking for another rainfall event, and it's been very dry, as you all know, so we've been waiting through the summer and we're hoping that in the fall we'll be able to conduct another event.

So some of our preliminary results in the Ojibway Turning Basin we did really see differences in the profile of contaminants through the sediment columns. We saw differences that might reflect differences -- somebody talked about a timeline of release that might have some -- give us some understanding of historic releases that are decades old versus recent releases that might be closer to the sediment surface, and that

would be -- the timeline would be the deeper you go into that sediment core the older you might -- you can infer that those sediments are, and we also saw as I mentioned before that the sediments do indeed fill the turning basin in, and that, of course, was not a surprise. That's something we see in turning basins all the time, and that is, of course, why they have to be routinely dredged.

In the Sixth Street Turning Basin, we had what we think were very successful results in starting to see how sediments are depositing in the turning basin. This is just a rather dramatic example. I mean, I've dramatized this by having a high concentration of sediments upstream, and you can imagine this being the turning basin which is dug -- is dredged both deeper and wider in the river to allow these ships to turn, and you can see here I depict a much lighter concentration of sediments showing how if sediments are dropped out that concentration will change, and that's really the mass balance approach I mentioned that we use. We looked at the mass coming in and the mass going out and we're starting to see that there really are differences.

One of the other differences we saw is we see all this as suspended sediments but some of the heavier

suspended sediments tend to stay much lower to the river bottom versus the much lighter suspended sediments. The lighter suspended sediments would tend to be composed of silts and clays; whereas, the heavier material might be sands or material that's just harder to lift into the water column. The reason it starts to become important to us is that these heavier sediments had some of our highest concentrations. The lighter sediments were much lower. I mean, I think our concentrations generally were less than 20 parts per trillion in this lighter fraction. So if you can imagine that passing through the system, we're letting through concentrations that would be much lower. If we can design this that would capture these heavier sediments, this is a fraction that we call bedload because it stays so close to the bed, if we can design something to capture the bedload, we could be very effective in managing mass without trying to design it for the lighter fraction, which would require a much larger turning basin or a much larger sediment trap just to slow the water down enough to settle out clays, because clay material, as I'm sure you all know, just travels much faster and is harder to settle out than sand or porous material. So those were some of the findings that we think are very

promising.

We also looked at a variety of other chemicals and those results are truly just coming in right now. We looked at PCBs. We looked at polycyclics, hydrogenated carbons. We looked at metals and pesticides, and the interest of that was, if we are looking at this as a sediment trap, there's an interest in knowing the range of chemicals or contaminants that might be associated with those sediments, because if we're then managing the sediments in those sediment traps, we're going to have to manage not just ~~Furans~~ furans and ~~Dioxins~~ dioxins but that full range of chemicals.

We're doing sediment grain size analysis. Dow is leading this effort. This grain size analysis starts to mechanistically pull apart the sediments so we can separate the sand fraction, the silt fraction, and the clay fractions in the laboratory and then we measure the ~~Furans~~ furans and ~~Dioxins~~ dioxins on each of those fractions, and as we start to understand where the ~~Furans~~ furans and ~~Dioxins~~dioxins are most associated, we can better design this trap to be able to target those specific fractions because those fractions also move through the river differently as I've been saying. The clays move differently than the silts and those move differently

than the thin sands.

We're conducting a long-term surface water monitoring study. The studies I explained before, those dry weather and wet weather events, were very focused events that were conducted over about one- or two-week periods. This long-term event is to be able to monitor velocity and suspended solids upstream and downstream of the Sixth Street Turning Basin for three to six months so we get a much broader range of the kind of movement through the system and the suspended sediment load that is passing through the system and then we can start to piece all of that information together in a model to more suitably understand this behavior and even design a turning basin, and as I mentioned earlier, that we're planning a fall wet weather event. I hope that we get rain so we can do that.

So we're hoping to finish this work by November, weather pending. If we end up getting into the winter without the wet weather event, we may even extend it to spring, and we'll probably just discuss that with a number of our colleagues that we're working with that is on this list here to implement this study, but assuming that we get some rain by November, then we would be doing our reporting November through January.

In February, we'll review that report with MDEQ, EPA, Fish and Wildlife, ACE Saginaw, and the Saginaw Chippewa Tribe, Fisheries, and PSC who is helping us manage this project, and then we hope to finalize this report by March. That's it. I'll be happy to answer questions.

CHUCK NELSON: Al, Jim, do you guys have any comments you want to make on this before we go on? I just wanted to make sure.

ART OSTASZEWSKI: Art Ostaszewski with the Michigan Department of Environmental Quality and I sit on the team that Victor alluded to as far as the technical work group. I just wanted -- a couple of points that Victor made. As far as timing the potential releases in the core sediments of the Ojibway Island Turning Basin, I want the public to understand that that may not necessarily mean a release from the facility but it could be a release from an eroding bank that finally ends up in the Saginaw Turning Basin. So it's not like a one to one out of a pipe or off a -- blowing off a stack that comes down to the Saginaw Turning Basin right away. So I wanted you to be cognizant of that. Also a lot of this work was preempted by the Corps of Engineers' Study in 2000 that looked specifically at modeling

sediment traps or turning basins as sediment traps in the Saginaw, and we're providing very good information, like Victor mentioned, to the Army Corps of Engineers. There are three other turning basins in the Saginaw below Sixth Street currently right now and those are Carrollton, the Airport, also known as Skull Island and Essexville. So I just wanted to mention those.

CHUCK NELSON: We're going to finish up the presentations on the various reaches right now. Then we'll go to questions. You'll have a chance to ask Victor questions. I want to make sure we got an hour at the end, and I realize I changed a couple of things around to make sure we covered the question that related to you folks in the EPA. So come on up.

STEVE LUCAS: My name is Steve Lucas. I'm a Remediation Leader with Dow Chemical. In that capacity, I'm responsible for all the corrective action work we do at the Michigan plant site and immediately adjacent to it. So the Reach D project falls in my portfolio of activities. Peter did discuss last year's Upper Tittabawassee nature and extent study at length, so I'm not going to get into much detail in that, but as a reminder, there were a few areas within the first 6 and a half miles of the

river that were identified with uncharacteristically high chlorinated ~~Furans~~furans, Reach D being one of those and that's up next to the Dow site.

Let's take a little closer look at it. It's an area of the river bounded on both sides, east and west, by the Dow plant itself. In fact, in this photo, you can see two bridges we have that cross from the east to the west side of the plant. On the down river section, that is the Dow dam~~n~~. For those folks that are familiar, it's just above the Dow dam~~n~~. The area in this picture that's a green color is the area targeted for removal with this project. That's a stretch of about 1,200 foot of river length. At its maximum width, it's about 80 to 90 foot wide to give you an idea of size.

This is an area of the Dow site where there was a former waste water treatment -- or waste water outfall. Contaminants and the sediments in this area include the chlorinated ~~Furans~~furans. Also as Al mentioned earlier, there are considerable chlorinated benzenes and polynucleotide hydrocarbons and metals, so it's not just a ~~Furan~~ furan issue in this case. These contaminants are consistent with the chemicals and compounds we would find on the site prior to the 1971 closure of the water plant -- or the water outfall in

this location. In the area we're talking about, we're looking at removing 15,000 in-~~-~~place cubic yards of sediment, rocks and debris from the river.

How we're doing that? Well, first, we're installing a steel wall around the deposit to contain it in its location. We're then going to remove the deposit by hydraulic dredging. That's essentially pumping sediment and water together out of the contained area. At the conclusion of the dredging, we're going to conduct confirmation sampling to demonstrate we finished the project. The solids and water that's pumped out of the containment is going to be separated using Geotubes. They're essentially very large filter bags, large bags that allow the water to pass out and most of the sediment to stay inside. The water that comes out of the Geotubes, we treat it in our on-site waste water treatment plant prior to discharge, and the solids upon reaching adequate dry~~ingnn~~ess will be shipped to our -- for disposal at our Dow Salzburg landfill.

Schedules as follows. We started construction of the dewatering facility, the dredge line, in early May. You'll see some pictures in a minute. That construction is well underway. We expect to finish the dewatering facility, which is key to starting

dredging, about the end of this month. It will be operational. We're going to start hydraulic dredging immediately after its done, so we're targeting early September at this point. The containment wall -- steel containment wall started construction in July. We expect to have that done in October, and you might ask, well, Steve, how are you starting dredging and your wall isn't done? Well, it's 1,200 foot length area we are segmenting construction, so we're going to finish a section and be able to start dredging in the upper river reaches while we're still constructing the containment wall further down. That way do it parallel and have the project get completed.

As Jim mentioned, we hope to get this project done by December 15th. That's the target date or the requirement in the consent order. If hard winter and river flooding holds off, that's an achievable date for us but it's a tough date. We should finish confirmation sampling at that time, and then first quarter, second quarter of next year we'd anticipate that the sediments will be landfilled at Salzburg. ~~after dryingness.~~

Here's some pictures of current activity. This picture is right off the EPA's website of the project and it was taken last Friday. This is the containment

wall being installed in the upper portion of Reach D. Those sheets of steel that are out in the river about 30, 35 foot in length in this location and they're driven into the sediment so they're in there solid. They're not going to fail as we dig out the sediment, but the upper portion of the outside wall is substantially complete. We have a few weeks of work on installing an inner wall along the shore here before this can be dredged.

That's a picture of the dredge pipeline. From where Reach D physically is located, we are -- the containment facility is being built up adjacent to our water plant. It's about 9,000 foot away. So the dredge pipeline is 9,000 foot long. That's installed, pressure tested, and it's ready to go at this point when the other facilities come in place. That is in place.

That's a relatively recent picture of the dewatering facility that's under construction. This is just short of a 5-acre site. The background in this facility is where the Geotubes are going to lay and initially dewater, and then the basin in the foreground there, the water from the Geotubes will be collected, pumped into this basin. It allows for a little additional sediment settling, any that might

get out prior to discharge into our watering plant, so a relatively sizable structure underway, and as I said, a few more weeks of work. The GeoTubes as of today when I left work, seven or eight of the Geotubes were laid out and starting to get piped up, so these -- this site changes significantly everyday as we move along, and that's a quick summary of Reach D. So if there's any quick questions, I'd be glad to take them.

AUDIENCE MEMBER: I have a question for you.

CHUCK NELSON: I think we're going to try to march through these three segments and then do questions and you'll be first in line, okay.

AUDIENCE MEMBER: It was just a quick question that he could explain real quick.

CHUCK NELSON: Well, let's just march through and then we'll do it because you're first, okay.

TODD KONECHNE: Good evening. My name is Todd Konechne. I work for Dow Chemical. I'm the Project Coordinator for the Reach O and Reach J/K, so I'll be talking about both of those this evening. To cover the corrective interim activities that we're going to be doing in 2007, you just heard Steve talk about Reach D, which is up in this area along the Dow

on

~~Plant~~plant. Just to give you a little more perspective where these are located, Reach J/K is just upstream of the Caldwell Boat Launch. It's about 3 miles downstream from D. Reach O is then about another 3 miles downstream from Reach J/K.

Reach O, this is kind of a site plan what it's going to look like. At this area, the river is a significant distance away from the closest road, which is Saginaw Road up here. The plan of this site is to construct a temporary access road all the way down to an area where we will have sediment dewatering and sediment -- other activities, water management activities, taking place. From there, we will construct another temporary road into the river area through a small tree belt to address the areas where the removal will be taking place. We're trying to avoid as much as possible impacting the wetlands in this area, which is primarily the tree~~'~~d areas. The cleared areas here is an agricultural field today, which we can easily turn back into agricultural use when we're done with our restoration. The characterization work that has been conducted in this area has identified three areas within that reach where there will be sediment removal taking place and they are somewhat identified roughly by this photo by

the purple outlines.

Reach O is the most downstream section of the Upper Tittabawassee River study that was conducted in 2006 -- or initiated in 2006 and continuing on into 2007. The property that you just looked at where all that activity is taking place is -- happens to be Dow property. In 2006, a single data point of very high concentrations of ~~Furans~~ furans was found within that reach area. Additional characterization that was conducted in the spring of 2007 identified a layer within that sediment deposit that was impacted, and that's what triggered the further decisions to move forward on removal of that impacted sediment yet this year. The planned interim action is pretty simple. It's sediment removal. There's a lot of work and a lot of activity and a lot of planning that has to take place to make that happen and we are on a very fast track to try and get that completed this year.

Just a very simple schematic of what the deposition may look like. This cross section of the river you have your natural banks of the river. The water and the yellow area down here shows or represents what the sediment deposition area may look like. In our case, we have what we believe a thin layer of impacted contamination within that sediment

deposit.

The anticipated activities that we're going to be going through here in the near future. Site access preparation, we have constructing that road. That road is about 5,000 feet long. Our dewatering area which will be an area where we will be staging the sediment as we remove them for dewatering. The sediment excavation activities itself which will include construction of in-channel barriers most likely, or it will be as recent decisions, and we're making decisions everyday as we're moving forward on this that we will be using sheet pile or something very similar to the pictures you've seen from Steve Lucas. That sheet piling will aid in the dewatering and control of sediment movement during that excavation activity. We will actually dewater this area within the sheet pile barriers, and our plan is to excavate this material dry rather than a hydraulic removal, really based on the location and our ability to manage the amount of hydraulics that would be required from a hydraulic removal, and then the actual sediment excavation and removal and transport that to the dewatering stage or dewatering area.

From a transportation standpoint, we will -- after the material is dewatered, we're anticipating 24

to 48 hours of dewatering time. The sediment is a very course sand and gravel. We expect the dewatering of this through the bench studies we've done to be a very simple dewatering activity. It will be transported to the Dow Salzburg landfill as well crossing Saginaw Road and then Waldo Road. During the peak times, we anticipate 30 to 40 trucks per day of transportation of this material and we'll be using trucks that are equipped with tarps and sealed tailgates.

The restoration activities here will be turning the areas that we have to take down the vegetation, trees, we will be using native species, revegetate that so that it will eventually grow back into a similar type of environment that it is today, and then the roads, the dewatering area, all of that will be removed from the agricultural field and that turned back to agricultural use.

From a work schedule standpoint, we have recently let a contract for doing all of what we call the civil work, which will be site access preparations, constructing the road and the dewatering area, and that's scheduled to start on Monday. The removal work will begin with the installation of the sheet piling and the in-channel barrier controls, and then the

excavation of the deposit, the dewatering, and transport will follow shortly after. We hope to have the sheet piling on-site and have that contractor mobilized on-site so we can begin at least getting our access down into the river and getting prepared to start putting in sheet piling by August 20th, and then the site restoration will obviously take place once the project is completed and we're ready to back out of there basically, and our goal is to have that all completed by the December 15th time frame.

Now for J/K, same slide, here's J/K as compared to O, and I also want to point out where Salzburg landfill is. It's located right here. So relative to J/K, it's a very short distance. Relative to Reach O, it's also a relatively short distance of travel. For the J/K site, there's really two areas of primary concern in this area, the riverbank -- and ~~just~~ none of the J/K areas is in the river itself. This is all dry. This is up on the riverbank which is identified by the red here, and then an upper terrace area which comprises ~~of~~ both a meadow type area and a wooded wetland area down in here.

Reach J/K was also a part of the Upper Tittabawassee River study. That is also on the Dow property which helps us facilitate moving this forward

quite quickly. As a result of that study, there was approximately 1,700 feet of the riverbank and then the upper terrace area as I just pointed out that had that elevated levels of ~~Furans~~ furans and ~~Dioxins~~dioxins. The planned interim corrective action for this area, we have a couple of different approaches that we're taking on this. For the contaminated riverbank area, we're looking at removing those soils and actually doing a large excavation to get down to and beyond the contaminated area, and this is really driven by the potential for erosion and the concern that that contamination could be spread further through the erosion process. For the other areas, the upper terrace area, we're looking at exposure pathway institutional controls to ensure that the potential for that pathway is basically blocked off or eliminated and we're looking at a barrier cap type arrangement and fencing.

Another quick look at the map here. Again the red area, that's the area where the excavation will be taking place where we will be removing the contaminated impacted soils, as well as additional soils, to reshape that riverbank and eliminate the erosional area by reshaping and cutting that riverbank, and we're actually doing some widening

above the bank area, the normal river level area. The upper terrace area, which is depicted by the yellow and the white, the yellow area is the meadow area. That's where we will be placing 2 feet of material to cap that area off and then revegetating it. In this area depicted by the white line is the wooded wetland area to try and minimize the impact on the wetland area. At this time our interim corrective action is going to be an 8-foot chain link fence to secure that area and to mitigate any potential exposure in that area.

Planned activities, there's a significant number of trees along the riverbank that need to be cleared. Unfortunately, to do this type of work, to do the excavation activity, that's the first thing that we're going to be out there doing. The soil excavation in the riverbank will be taking place shortly after that, along with and parallel to the exposure controls being installed, the fencing around the wetland area and the capping of the meadow area, and then transportation like the other two projects. The contaminated soils that we excavate will be transported to the Dow Salzburg landfill, and this operation, because it's a dry activity, we anticipate to transfer 50 to 60 truckloads per day, and again these will be tarped and

equipped with sealed tailgates.

And then restoration in this area, this is really a significant part of this project. Every area that, you know, the soil is impacted, all of the excavation area and the capped area and anyplace where we have really a footprint down there, it will be revegetated using native plants and trees. We've conducted surveys of what the existing undergrowth is, what the ground cover is, what the trees are in that area, and we will be revegetating it back to its natural type of condition.

For our work schedule, the site preparations, the clearing and the access of the road construction, actually started this Monday, and there already is a significant amount of clearing and trees down. I'll have a few pictures to show you, but it's changing the landscape. It's changing significantly everyday. So they're a day old. They don't look like what it looks like today. The removal work, the excavation of the impacted soil and the transport to Salzburg landfill, we're hoping to begin next week as long as we get through all of our appropriate workplan approvals. The exposure control activities, putting the fence around the wetland area as well as the soil capping, will also begin next week, and we'll operate in

parallel to the excavation activities, and then the site restoration, as soon as we, you know, get done with our excavation and capping activity, we'll be bringing in clean top soil, placing a layer of clean top soil over everything as well, and then doing our vegetation, and our goal is to be completed with that by ~~mid~~ mid-October.

Just to give a few pictures of the area. It is a fairly densely wooded area at least right along the river on the riverbank, and then this is kind of backing off into some of the meadow area where it's partially wooded, and another picture of the meadow area that has the impacted soils, and then this was day one or two after the initiation of the clearing, so it's moving quickly. That's it.

CHUCK NELSON: Folks from DEQ, do you have any comments about this before we start questions? Do you folks have any comments? Sir, you were first about Reach D.

AUDIENCE MEMBER: What's the consistency of the material you're going to dewater? Are you going to take it down to toothpaste type material? At what extent are you going to quit dewatering?

STEVE LUCAS: Well, the requirement to put it in the landfill is to pass a test called a paint

filter test which basically shows there isn't floatable water. I expect that the stuff will actually be more like a top -- look like a top soil would, kind of moist, not necessarily toothpaste consistency; although, in one section, there is a fair amount of silts and clays that are a finer particle in it. It could be somewhat more of that consistency.

AUDIENCE MEMBER: Okay. When you transport this to the landfill, are you going to put it -- they have fiber bags that we use on the farms, or even at Dow, we put Dd~~d~~ry ~~t~~Tech stuff in fiber bags. Are you going to put this stuff in fiber bags so that it can being transported in the truck or are you just going to put it in as a loose sand type material in the truck to be transported?

STEVE LUCAS: The details of the transportation haven't been fully worked out. I'll assure you we're not going to have water or dribbling out the back of the trucks.

AUDIENCE MEMBER: Water isn't what I was thinking about. It was the dust, what blows out of that truck as we transport it.

STEVE LUCAS: The trucks will be well sealed. We have done a number of large dig and haul projects on the site and have pretty good capability

to move truckloads without releasing solids or dusts on the roads.

AUDIENCE MEMBER: Well, I'd like to have you --

STEVE LUCAS: So a combination of tarps and monitoring and other things that will assure that --

AUDIENCE MEMBER: I drove truck at Dow so I drove the trucks that have the sealed tailgates. I'd like to have you think about putting this material in sealed bags. Thank you.

CHUCK NELSON: Other questions? We're at that portion of the evening where everything is on the table. So Terry.

AUDIENCE MEMBER: Okay. Hopefully, I'll have an opportunity to come up again, but needless to say, we absolutely applaud DEQ's effort on this and we were ecstatic when EPA stepped in and required that these removals be expedited, and of course, Dow's commitment to remove these materials. It sounds like an extremely elaborate process and we've been hoping for these removals for the length of the time that we became aware that they were in the river.

But the question I have actually goes to Peter. The GeoMorph process, which has been a part from the very beginning, when we initially were introduced to

it, I think it was very clear -- you made it very clear that all sorts of changes could occur to a river system, and as I recall, Peter saying that a bridge built downstream could impact a bridge -- or the deposition upstream. That man-made activities create a dynamic within a river, and we're looking at three projects that are going to step into that river and are going to damn off a portion of the river and in one case actually change the river shoreline considerably.

Now the question is, what does that do to all the work? And it sort of goes back to the question that was asked at the beginning in terms of fall rains or spring rains and flooding. What is this -- what kind of dynamic is going to occur with all this human interaction, and are there ways, perhaps sediment traps, to address some of the perhaps problematic associated with these changes?

PETER SIMON: Anytime you do mass removal in a river system, it has effects. It changes the river landscape and there are trade-offs. You have to balance those trade-offs. In terms of sediment traps and so forth, the J/K example right now, once that's done, it isn't affecting the in-channel portion of it. It's actually going to be a beneficial removal in that

area. It's going to relieve the stresses along that portion of the river. There's a tremendous amount of water, under flood conditions, that really run into that J/K. It's a first major inside meander bend and so this is going to help relieve the stresses through that part of the river, and it isn't going to affect it under low flow conditions, but under high flow conditions, that's where the benefit will be experienced.

Reach O is a different example. You know, each one of these is a little bit different. So there are absolutely consequences for doing any type of removal and that's why you can't jump into them too quickly. You have to understand them and there has to be balances and trade-offs. What is it going to do in terms of the investigation, our work, not much in these areas. We're going to be continuing to do the in-channel~~ling~~ investigation in the UTR, which is where all of these areas are, so I think from that perspective we're going to be fine.

AL TAYLOR: One of the things that the MDEQ is very interested in, I think we presented this at previous public meetings, is we want to do some monitoring, and we will be working with EPA to get this done, but we think it's very important to use

these IRA PCAP ~~cap~~ opportunities to figure out what works, what doesn't work, what we have to monitor for, what's being released during the remediation, and that's one of the things we need to be very careful of that we don't lose as part of the circle process, but I think we can work together and make sure that that kind of monitoring occurs, because that was definitely one of the major components of the original interim response activities.

CHUCK NELSON: Other questions? Please go to the mike.

AUDIENCE MEMBER: Just to follow up on a trucking question, if they do assure a way that the soil is -- the sediments aren't going to blow out of the back of the truck as they're going down the road, what other options have you come up with for cleaning the trucks as they leave the hot area? Those trucks will be picking up dirt and contaminated soil on their tires and stuff. Have they come up with a way to address that? And then once the sediment is dumped out of the back of the truck into the landfill, is it going to be cleaned there so that that sediment is not washed out of the back of that truck at some other site of the trucking company or whatever?

STEVE LUCAS: Let me speak for Reach D and

then the details will probably be similar but may out of necessity be slightly different for J/K and O. The trucks that are at Reach D that come up off the riverbank, before they even drive through the plant site -- and all the trucking goes through the plant site most of the way to the landfill. There's a little bit of public road. We have decontamination stations at the fence line where each and every truck is physically decon~~-~~taminated and inspected before it's driven through the plant. In addition to that, we have significant street sweeping and water flashing going on within the plant site to keep dust down. The trucks go to the landfill. They're put into the landfill. We have particulate monitoring going on at the landfill. The trucks are -- each and every truck that goes out into the landfill and in the active cell area is washed in a wash station we have at the landfill prior to leaving to come back to the site.

So a truck -- Todd was showing you numbers of 30 or 40 or 50 truckloads a day. That's not going to be 30 trucks. It will be a number going in a series. A truck will be washed many times a day on the outside and the undercarriage, make sure there isn't track out back and forth as you go. The trucks we'll have dedicated to this hauling service until they're done

and then they'd be appropriately cleaned on-site before they would be released back out to do other work. So that's ~~kind of~~ the gist of our truck management at Reach D.

TODD KONECHNE: The concept really isn't any different for J/K and O as well. There will be decontamination activities for every truck after it's loaded. It will be inspected before it leaves the site. They will be tarped. After they dump in the landfill, Steve mentioned, they have to go through a truck wash system. Before a truck -- and this truck will be, you know, going back to get another load, and before that truck is released from that job, it will go through a thorough decontamination inside as well as the outside, so it is a very thorough process. We literally have thousands and thousands of, you know, truck loads that we bring through this type of process and very successfully and we're going to stick with that same program.

CHUCK NELSON: I have a question that was turned in from a person. It says, what kind of monitoring is being performed during the removal areas, particularly Reach O?

TODD KONECHNE: Primarily at Reach O, you know, the monitoring that will be taking place -- I

assume you're talking about in the river. There will be turbidity monitoring done upstream of the removal areas as well as downstream of the removal areas so we can compare, just, you know, to ensure that we're not having any releases into that water column or into the river. A very significant thing, if you're taking the material out in a dewatered format, your hydraulic flow is all into your containment. It's almost impossible for it to release outward because we're going to be dewatering that down several feet below the water that's in the river itself, and any leakage through the sheet piling will only be internal into the area that we're excavating, and we'll have a continuing watering operation going on to manage that and manage that water. So it will be turbidity ~~de~~monitoring looking for any potential turbidity impact in the river.

CHUCK NELSON: Other questions? Michelle.

AUDIENCE MEMBER: I have some questions about the turning basin. Victor, I'm sorry, I didn't know who you were with, I apologize.

VICTOR MAGAR: With ENVIRON.

AUDIENCE MEMBER: Okay. Thanks. What I wanted to know is what the concentrations of ~~Dioxins~~dioxins and ~~Furans~~ furans are in those turning basins in the Saginaw

River? You said there were findings of like 20 parts per million, but I'd like to know what that expanse is?

VICTOR MAGAR: We had quite a range of concentration. At the sediment bed, we had ranges that were well under 500 or even in the 10s to much higher concentrations around 10,000. In one hit, that was about 30,000 parts per trillion. In the suspended load, the concentrations, that's where they were much lower, around 20 to -- during low weather 20 or less, and 50 or less during the wet weather events.

AUDIENCE MEMBER: Was it 30,000 parts per trillion? And I'm glad to hear that there was only one spike. Was that 30,000 in that bedload that's moving around?

VICTOR MAGAR: That was the bedload sample.

AUDIENCE MEMBER: It was. Another question is, how long does it take for those turning basins to fill up?

VICTOR MAGAR: I don't know. I mean, we could eventually figure that out or estimate, but I mean, it's a process of decades. The Ojibway Turning Basin which is almost full has not been dredged for several decades, so I don't have a good estimate. It really just depends on the sedimentation rate, the

size of the turning basin, the depth at which they were dredged. There's a lot of factors that go into that.

AUDIENCE MEMBER: Is there any interference with those freighters going into those turning basins and stirring that stuff up and resuspending it?

VICTOR MAGAR: There could be. I think that we would factor that in. They could keep some of that afloat and so that might affect how deeply we dredge the turning basin to affect this change or how we design this sediment trap.

AUDIENCE MEMBER: Okay. And I bring this up only because I think everyone is extremely anxious. We've had 30 years of Lake Huron accepting these contaminated sediments from the Saginaw River, regardless of what their source is, and you know, I think we need to start addressing the integrity of the Saginaw Bay and Lake Huron, and two really quick questions, Chuck, if I can for EPA? These questions are for EPA. What I wanted to know --

CHUCK NELSON: Can you let Art -- he had a comment. I want to let him answer.

ART OSTASZEWSKI: I want to kind of frame the response to the levels. The 32,000 that Victor mentioned was collected on November 21st. The range

for samples that were collected on that day ranged from 70 parts per trillion up to 32,000, so there's -- for everyday that we have results that come back, there's a large range. So it's not indicative of -- 32,000 is not the average or it's not even close to being -- that's the maximum, but the ranges vary from virtually nondetect up to that.

As far as settling times, one of the -- or how long the sediment traps fill in or some of these turning basins had filled in, that's one of the questions that we'll answer from the studies. These studies are ongoing. We had a technical work group made up of representatives of EPA -- you saw the list. There's a lot of agency people and Dow consultants, so that would be one of the -- we have some preliminary results based on -- but we haven't gone through the reporting process yet and I don't want to make any interpretations, so I'll give you some back of the envelope calculations but I'm not going to go on record.

AUDIENCE MEMBER: Thank you. Just two real quick questions for EPA, whoever wants to field these. I wanted to know if EPA has or is using or has the same cleanup standards as DEQ does? And my second question is, will there be any CERCLA orders in the

City of Midland?

JASON EL-ZEIN: Let me answer the second question because I think that's easier. You said are there going to be any orders in the Midland area. Right now, we're only concentrating on the three orders that we have now, and as you know, they are sampling -- we'll be evaluating the sampling and go from there, and are we using the same level of cleanup? Do you want to take a stab at that?

JIM AUGUSTYN: On three of these reaches, since they are interim corrective actions, they're not a final remedy, we negotiated with Dow that these were going to be performance based cleanup, so there is no number associated with how clean is clean. What do we mean by performance based, for instance, in Reach D, the performance base is remove all the sediments from within that containment area. So once that is done, Dow has reached their commitment under that CERCLA removal action, and the majority or all of these reaches the cleanup criteria is based on mass removal of the contamination and not specifically driven by a number.

AUDIENCE MEMBER: Okay. What would be your threshold? I mean, if you found 50,000, would you require removal of 40,000, 30,000? How far down do we

go?

JIM AUGUSTYN: Well, the number that was agreed to that Dow would put the corral around would be 1,000 parts per million. Anything that exceeded -- 1,000 parts per trillion, sorry. U.S. EPA deals with PPMs. So CERCLA, the number is one part per billion which equates to 1,000 parts per trillion. So that was the agreed to number. That Dow would clean up everything in the designated area that exceeded that number but they did not have a number that they had to reach when they cleaned down to.

JASON EL-ZEIN: Keep in mind that this is an interim measure. This is not a final cleanup. So the level might -- obviously will not be -- might be much lower later on.

AUDIENCE MEMBER: Thank you very much.

AUDIENCE MEMBER: Chuck, John Witzke from MUCC. Getting back to the sand trap theory and turning basins and so on, it showed a high concentration, of course, in the lower extremities of the turning basin and whatever it was and so on, but it never was brought up about the flow of the river on the effect of those turning basins in the springtime during the flooding when those turning basins would flush out or anything on that order. The DNR uses

these sand traps forever in the trout streams throughout the country and I've never gotten a real clear answer on that. Evidently, they work fine or trout reproduction -- but I'd like to get an answer on that turning basin issue.

VICTOR MAGAR: I do think, as Art said, that really is what we're studying. We're trying to look at what the range of velocities are in the river and the sediment deposition processes during that range of velocities. That's why we're going to these very high wet weather events and also looking at low weather events. So you're absolutely right, there's a big range of velocity that's associated with those, the wet weather events and dry weather events, and that range will influence the solids transport and deposition in traps, but eventually, this would go to a design of a sediment trap that would be adjusted to be able to accommodate that range of velocities, so that, in fact, indeed we would be maintaining that deposition even during the high wet weather events. That would be the goal.

ART OSTASZEWSKI: The studies are looking at clay, silt particles, fine sand, medium sand, and the difference between upstream versus downstream of the turning basins. One of the reasons that the reporting

is -- we're waiting for a second wet weather event. So we thought that was important enough to -- we're going to get a draft report in November from ENVIRON, but we will still need to incorporate a second wet weather event. We didn't want to base our conclusions just on one wet weather event.

AUDIENCE MEMBER: Thank you. Chuck, is this the time for questions off the agenda or is that coming later?

CHUCK NELSON: You're at the time for questions, John, so fire away.

AUDIENCE MEMBER: Thank you. This is for the EPA folks. Thanks for coming. It's nice to see you. Thanks for spurring this project on. My question to you is, do you have the oversight to approve or disapprove of any agreement between the DEQ and Dow Chemical Company, any signed agreement?

JASON EL-ZEIN: Again we issued what we call a Superfund Order, and for that portion of the work, actually, that's an agreement between U.S. EPA and Dow, and that agreement was signed between both of us, and under that order and agreement, we do have the authority to review and actually amend the workplan or change it if we want to, and that's based on the people in the field. If they see something that they

don't agree with, they have the authority actually to order Dow to change it.

AUDIENCE MEMBER: Thank you for that part of the answer, but how about the compensation and remedial action that the State evidently has agreed to in a signed statement agreeing with Dow on compensation and how that will be rendered?

JASON EL-ZEIN: I'm really not familiar with those. Our position would be that would be between the State and Dow. We will, if the State asks us to, to provide support and oversight, but I'm really not familiar with those, but that's between the DEQ and Dow.

AUDIENCE MEMBER: In other words, we'll need legal representation on issues like that?

JASON EL-ZEIN: However, again, I will mention again, that if the State asks us to support, obviously, we'll look at that and we'll look at that favorably.

AUDIENCE MEMBER: Thank you.

CHUCK NELSON: Let me just do one, a question was handed in to me, and then I'll do this and then you're next. The question says -- it's a little hard to read but I'll do my best -- for 20 or 30 parts per billion, what is the precision of this

testing and what is the recovery of the analytical -- what is the recovery, question, question, of the analytical methods? So I'm not sure I understand fully what was written there, but the precision of the testing when you're measuring things of 20 to 30 parts per billion, anybody want to cover that?

JOHN MUSSER: There's a ~~competence~~ confidence level presumably on the analytical testing.

AL TAYLOR: I think what your question is, is what's the precision of the test of the ~~Dioxin~~ dioxin and ~~Furan~~ furan testing, and I'm not an analytical chemist, but I know that as part of the protocol that the samples are run by there are specific windows that the recovery has to be within for ~~Dioxins~~ dioxins and ~~Furans~~ furans and any other compounds that you're looking at. I don't know what those are. There's a silo of chemists over here from Dow that probably will be able to answer that question.

CHUCK NELSON: Al says we would like to sit down with whoever asks this, please, come chat with these folks at 9:00.

AL TAYLOR: One other follow up to that is, because of the nature of this contamination because it seems to be associated with particulates that have some very high concentrations of a matrix of material

that has fairly low concentrations, you may get -- if you took repeated samples out of the same jar, you get quite a range of concentrations out of that same jar, because you can get a nugget of really hot stuff and they actually call it the nugget effect, and you could have some very clean stuff in there. The problem is there's a lot of these nuggets in there, so there's kind of the accuracy and precision issues, so the repeatability can be kind of difficult.

AUDIENCE MEMBER: On a totally unrelated subject here, I have the June 7 EPA thing that was issued, and on page 41, it goes on to describe that nowhere in Dow's license have they -- are they allowed to selectively or partially report data to MDEQ about the City of Midland and they recommend that Dow submit all of the information they have gathered in the City of Midland, and I would just like to know when Dow plans to turn over that information to DEQ?

JOHN MUSSER: As you may recall, the agreement with the City -- between the City and DEQ, if I recall it correctly, was that the sampling results would be blinded so that the anonymity of the people who had their property sampled would be respected.

AUDIENCE MEMBER: Right. But EPA says you

can't do that. That's a matter of public information and it's nowhere in your license -- operating license saying that you are -- anyone can allow you to do that.

JOHN MUSSER: I'll just add one thing and then I'm going to turn it over to Jim or MDEQ. We don't have that data. That data is the property of a third party which is representing the City, and the DEQ and Dow does not have the data, so we can't provide it in any event.

JIM SYGO: John, I don't think that's right. We do have the data but we don't have the data specific to parcels of property. The data that's available is data -- and at the meetings that we've had here, you actually saw the concentric circles and the spokes that came out, if you recall seeing that diagram. I think it was probably in our meeting last year, and along those diagonals through the City of Midland, those were the areas where samples were being collected, and within any polygon on that diagonal, there might have been up to eight different properties identified. As part of those properties, we would sample -- or we had sampled only one of the -- we sampled all the parcels but only one of the parcels was actually where the analytical work was actually

conducted on the parcel. That information is available. So spatially, we have that information. What has not been released is the specific parcel of the property itself and the associated level of contamination on that parcel of property.

So in order to move ahead, if you recall a year and a half ago or so, there were substantial controversies, and there was actually a bill that was being proposed regarding the concern of a facility under Part 201. In order to get around that process, we agreed to blind that information until such time as a site specific number was developed and agreed to by Dow and the Department for the cleanup of the City of Midland. Once that number is available, the specific information on the parcel of property will also be provided. Now any resident who's interested in that information from a spa~~c~~tial perspective can request that information through the City of Midland with their attorneys basically. Miller Canfield is the keeper of that information, but that information is available to people. It's just not available for the specific parcel of property.

AUDIENCE MEMBER: Okay. I lost my train of thought. Okay. Thank you.

CHUCK NELSON: Another question or comment?

JIM SYGO: Let me mention one other thing. The other thing I want to mention, even though EPA did place that in the document, EPA was aware that we were approaching this process in this way so that we could move the sampling process ahead within the City of Midland. I think they recognize some of the concerns that Michigan had with the City of Midland and the controversy we were getting into relative to this issue of the facility. I'm not going to say they agreed with it, but on the other hand, at the time we were doing it, we didn't get any -- any comment at that point that we shouldn't do it, and if EPA has a comment to that, they're welcome to comment.

CHUCK NELSON: You folks have a comment you'd like to make?

AUDIENCE MEMBER: Shouldn't that be a matter of record for any individual wanting to come in and purchase one of those properties?

GERALD PHILLIPS: Gerald Phillips, U.S. EPA. I'm trying to be as diplomatic about this as I can be. We have expressed concerns about blinding the sampling data in the City of Midland and we are concerned about the location information and the concentration information where that's placed in the City and we are concerned about additional sampling protocols being

done, additional characterization being done in the City of Midland to fully characterize what we would think would be an environmental concern and then come up with a remediation plan to address it. So while we understand why the State of Michigan did what they did to blind the information and we understand that that was done to expedite getting people in the fields so at least some characterization could be done, we are still concerned about the data, the placement of the data, and the relevance in relationship to various properties and the risks associated with that information. So we are still concerned, as you seem to be, about making that data as available as possible to the public. So did that address your question?

AUDIENCE MEMBER: Well, sure, because there's just been a couple of articles in the Midland Newspaper recently of some secret investor coming in and buying out a lot of the properties right in one of the test areas and there's a lot of secrecy surrounding that and it just seems very bizarre.

GERALD PHILLIPS: That's news to me. Our concern is more about the availability of the data. Corrective action is an open process. It's basically a public information process. Once the data has been collected, evaluated, validated so that we're sure

that the information that we've got is correct, then that information is available to the public, and if you FOIA for it, requested it, we would provide it, and I'm sure the State would do the same thing under those circumstances. So our goal is to have the characterization done in a way that makes that information publicly available. Okay.

AUDIENCE MEMBER: Thank you.

GERALD PHILLIPS: You're welcome.

CHUCK NELSON: Other questions, comments? John.

AUDIENCE MEMBER: I may be getting the cart in front of the horse, but there's been a lot of comments in the media, especially the Saginaw News and so on, about the possibility of a trust fund compensation package that Dow will eventually end up having to work out. Some of these comments seem awful localized, especially the July 25th in the Saginaw News mentioned Saginaw Community Foundation being the overseer of a trust fund, nowhere does it mention anybody in Midland or Bay Counties. My belief is that every Township should be represented on a council or a commission. Am I out of line, Chuck?

CHUCK NELSON: I will look to folks. Do you have any comments here? I don't have the answer for

you.

AUDIENCE MEMBER: No. Let me continue, Jim, please.

JIM SYGO: Go ahead.

AUDIENCE MEMBER: What MUCC has looked at is each Township elect an official representative to a committee or a commission and have an independent DEQ or the DNR or the Governor, somebody, appoint an overseer for this commission for the use of those funds. The one thing we are definitely against is not letting it get in the hands of local governments, counties boards, and so on. I just wanted this group to be aware of what they're facing. Thank you.

JIM SYGO: Can I have a show of hands before I answer this question of how many Township Supervisors or Board Members are here? Anybody want to admit they're a member somewhere? I'm sure there's some of you out there. Anyway, we've been following the stories as well and we've actually had a letter from Mrs. Horn from the Chamber -- the Saginaw Chamber of Commerce indicating something very similar to what you're saying where that the Townships ought to be ready to go with any type of ~~rainfall~~ windfall from a trust fund that's being developed by Dow for restoration processes with this issue, and I wanted to make a

couple of things clear.

First of all, I know there was a meeting, I want to say, it was like June 7th or so that Tim Braun from Saginaw Township had called a number of Township Supervisors together, invited Dow over, didn't bother to invite DEQ, but I think they invited Dow, maybe somebody else, Greg, I'm not sure, but the discussion around that was associated with, from our understanding, that there's going to be some type of trust fund that the communities ought to be able to tap into for what I would call community improvements I guess.

And the big question mark in this is, what community improvements are. The concept of this trust fund is really associated with the natural resource damages and the Trustees. Those -- that authority is placed within the Trustees not only through the Constitution but also through the Federal Government through the CERCLA, I believe if I'm not mistaken. So the Trustees that are appointed for evaluating the types of environmental damages that may have been caused by this and the types of damages that will continue to be sustained, which will be dependent on the type of remediation that Dow conducts in this, will determine what the level of those damages are,

and those are generally determined by the Trustees and then negotiated with Dow Chemical along with the Trustees. That money, while the Trustees can take into consideration projects that are identified by communities that would be beneficial, must be used to benefit the watershed and the habitat and provide restorative features for, in this particular case, it would be the Tittabawassee River, the Saginaw River and Saginaw Bay, and to that end, the Trustees have said that they do have an interest in getting public input into this process.

And the statement that I have on behalf of the Trustees for today's meeting is that they hope to be at the November meeting, and what they say is that the restoration work group would like me to mention at this meeting Thursday that the Trustees will make a presentation at the November quarterly meeting regarding where we are, and I'm referring to the Trustees, in the natural resource damages assessment process and that the Trustees anticipate subsequent follow up meetings after the November meeting to engage local stakeholders in the conversation regarding the NRDA process.

The one thing that I can say is that at this point in time we haven't discussed anything about

compensation or any type of damage costs with Dow, and the primary reason for that is the assessment hasn't even been completed yet and they are just now identifying what needs to be done for that assessment so that the data can be gathered. So once we have that -- you know, again one thing that I think that the Trustees would say if they were all here today is they will coordinate and they will come to the communities to get information. It may be a meeting of this nature. They may have separate meetings with various communities along the river as well. I can't project that because I'm not one of the Trustees.

But the members of the Trustees from the State would be a member of the Attorney General's Office, a member from the DNR Office, and a member from the DEQ office. The Trustee for DEQ is Judy Gapp and Judy has been at several of our meetings historically, but we also have Fish and Wildlife serve as a member as part of the Department of Interior and that person has typically been Lisa Williams. We have the Indian Tribe is a member of the Trustees and that has been Sally ~~Niven~~Kniffen I think is her name, and then the Department of Justice is also represented. EPA attends on behalf of the Indian Tribe I believe it is and I guess they also assist the Department of Justice

if they have questions. NOAAH was at least considered as a Trustee but they've declined to participate is what my understanding is, and so this process has been going on now for about a year and a half maybe and then we periodically had meetings with -- the Trustees basically to have these discussions. They've just recently gotten their assessment groups underway, and as they said, they'll be here November to make a presentation on that. So I hope that helps out.

I know we just recently, I think it was just yesterday, sent a letter out to Mrs. Horn regarding a letter that she had sent on behalf of the Saginaw Chamber -- the Chamber of Commerce for Saginaw County, and we're certainly available for further discussion on it, but the DEQ in and of itself does not have any authority over how that fund will be managed. That will be a discussion amongst the Trustees.

AUDIENCE MEMBER: Thank you, Jim. Referring to how many Township officials were here, drop a dime, and within 20 minutes, you'll get them here. You'll have them, Jim.

CHUCK NELSON: John, we got one person behind you, so I want to make sure we finish on time. Terry, go ahead.

AUDIENCE MEMBER: A couple of questions.

The first one is probably answered very quickly but let me go through both of them first. A couple of parking lot questions from past meetings. Dr. Garabrandt's analyses, his data, have they been supplied to the State for review? That's one question.

The second question, at the last meeting, John Musser and I had quite an emotional exchange around the cleanup levels, around this thousand parts per trillion. We asked for clarification from the EPA in terms of their position on this. We've got some information back that, and I quote, U.S. EPA will generally use the authorized State's cleanup standards for projects within that State. In addition, U.S. EPA believes that MDEQ's default Dioxin cleanup criteria of 90 parts per trillion is entirely consistent with U.S. EPA's residential cleanup levels when both levels are normalized with the same target risk goal. Therefore, MDEQ's derivation of 90 parts per trillion cleanup criteria is consistent with the way that the U.S. EPA derives cleanup criteria when values are normalized at the same target risk.

The question there is, has this risk number, which I know has been contentious between Dow and the State, been resolved, and if it has not been resolved,

will EPA step in and support the State?

CHUCK NELSON: Do you want the short one or the long one?

AUDIENCE MEMBER: I'll take the Garabrandt question first or response.

JIM SYGO: Relative to the Garabrandt information, I know somebody is here from U of M. My understanding is we have not yet received that yet. Are you aware of anything different?

AL FRANZBLAU: I'm Al Franzblau. I'm one of the investigators on the Michigan Dioxin study. Dr. Garabrandt isn't here tonight. When you say the data, are you referring to our participation in the HHRA process? I don't know what you're referring to.

JIM SYGO: It was that along with -- I recall that we had a meeting down at the University at one point in time when the crew was going to take a look at some different analysis of the data for us, and I don't know whether or not we've ever received that yet or not.

AL FRANZBLAU: And I know that many things have been sent over and I don't know off the top of my head what was on that list and what has been sent, whether it's everything or partial or not. As I think you're aware, there were some considerable delays

because we had to do some major reanalyses and cleaning of our data last fall and over the winter which delayed our ability to process some of the data, but we've gotten that out of the way and we're moving ahead, and I know there's been some recently supplied materials to the HHRA process, and I don't know what else --

JIM SYGO: Deb, are you aware one way or another? They probably go to you if anybody.

DEB MACKENZIE-TAYLOR: We've gotten something through the HHRA meeting process where we've gotten some information. I know there was some information, I don't think it was exactly what we asked for, that was presented at their meeting in June. They had a public meeting in June. They presented some new information there, but I mean, the thing that we really want is a scientific document that describes what they did and how they did it, and I don't know when that is coming.

JIM SYGO: Terry, needless to say, I think we might have received some of the data but not all of the data that we believe we need yet or an explanation of it yet and that's something we'll clearly continue to work on.

DEB MACKENZIE-TAYLOR: And my understanding

is they are still working on the high-end exposure groups, which is what we're most interested, because we need to protect the majority of the population, not just the average, which most of data that has been presented to date is an average. So we're much more interested in those high-end exposures and they don't have that completed to date.

AL FRANZBLAU: Well, that I can comment on directly because I'm directly involved with that. In fact, Beth and I were the ones who were actually collecting this data, and we are not yet completed with that data collection. We're very near completing it, and then it will have to be cleaned and analyzed. So we're hoping to have that available in the next few months, but that data collection is a follow up data collection. It was not data that was collected as part of the original study, so that's an ongoing process right now. In fact, we just interviewed another person on the way up here, so it's ongoing.

JIM SYGO: Okay. Thanks, Al.

AUDIENCE MEMBER: Jim, I think this is a very important issue, because Dow continues to use this study as though it was a completed study and clearly it's an in-progress, and the State has not had a chance to review all your analyses.

JIM SYGO: Well, and you're right, there's a lot of information that was involved as part of the initial release of the information, but with the survey and everything else that was included as part of the study, there was other information that could be derived from it but it wasn't -- it wasn't presented in a manner where we could readily interpret it. So Brendan.

BRENDAN BOYLE: I just want to follow up on Deb's question. Can you tell us when a final technical report will be issued from your study?

AL FRANZBLAU: Not right offhand, no.

BRENDAN BOYLE: Will you be able to tell us at some time in the future?

AL FRANZBLAU: At some point, we can, but not right now.

CHUCK NELSON: We are at 9:00.

JIM SYGO: I owe one answer to Terry on schedule and numbers. In terms of a number, Terry, we have not yet come up with a number. We would agree 90 is fine, but under Part 201, Part 201 allows Dow to evaluate and develop a site specific risk assessment, as you know, and as part of that, Dow is working with the Department to identify what that would be, and we recently presented a schedule for that, which, let's

see, it calls for the sampling of the various pathways in 2007. In March of '08, they're supposed to have a screening level risk assessment for the Upper Tittabawassee River. In August of '08, they're to have a screening level risk assessment for the Middle Tittabawassee River. In March of '09, they're to have a screening level risk for the Lower Tittabawassee River. The probabilistic risk assessment for the Tittabawassee River, unless an alternate methodology and/or timeline are defined by -- necessary by DEQ, are to be completed by 8/1/09. So what we've tried to do is lay out a schedule for completing that work, but as of yet, we do not have a specific number for what we believe would be the site specific risk assessment for residential areas.

CHUCK NELSON: It's 9:00. I want to thank you all for coming. Our next meeting is November the 28th. As you heard, we will have a presentation about the natural resource damage assessment. I would also remind you that the folks from Michigan State University are here with their various wildlife studies. The posters are on the east wall. So feel free to talk to those folks. They'll also be around, as will all the folks from the different agencies and companies until 9:30. Thank you.

STATE OF MICHIGAN)
)
COUNTY OF SAGINAW)

I certify that this transcript, consisting of 106 pages, is a complete, true, and correct transcript of the proceedings and testimony taken in this case on August 9th, 2007.

I also certify that I am not a relative or employee of or an attorney for a party; or a relative or employee of an attorney for a party; or financially interested in the action.

August 20, 2007

Notary Public, Saginaw County, MI

My Commission Expires: 8-10-2013