

US EPA ARCHIVE DOCUMENT

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

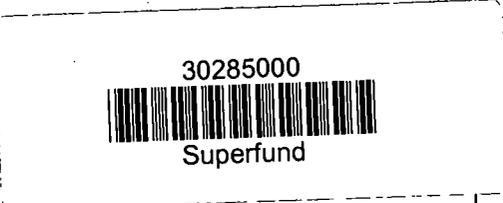
ORIGINAL

AUGUST 8, 2013

PUBLIC MEETING TO ANNOUNCE
PROPOSED PLAN AND PUBLIC COMMENT PERIOD
FOR INTERIM ACTION REMEDY
FOR THE GARVEY ELEVATOR SUPERFUND SITE
HASTINGS, ADAMS COUNTY, NEBRASKA

Hastings Public Library
517 W. 4th Street
Hastings, Nebraska 68901

Reporter:
Dana Burkdoll, CSR, RPR, CCR



1 (Commenced on the record.)

2

3 MR. BEN WASHBURN: We are going to
4 talk about the proposed plan, what some of the
5 alternatives were, give you some site updates,
6 and kind of what's going to happen in the
7 future here at the site.

8 We have a court reporter here
9 tonight who will be documenting everything that
10 is said for the record, for the public comment,
11 because we will take your comments and we will
12 consider those and provide responses to all
13 comments provided here tonight.

14 Brian Zurbuchen is the remedial
15 project manager for the site. He will be
16 giving the presentation, he is the man with all
17 of the knowledge. He's the one that can answer
18 all of your questions.

19 So really I would like to thank you
20 guys for coming tonight. Please ask questions,
21 make comments throughout the night. And at the
22 end of the presentation we will be available as
23 well if you prefer to speak to us privately and
24 not in front of the group.

25 If you would like to be on the

1 mailing list, we have some green cards there in
2 the back, which you can sign, put your address
3 and your name on. And if you're not on the
4 mailing list, we'll add you to the mailing
5 list.

6 So whenever we have site updates, we
7 send out a fact sheet, things like that, you'll
8 receive it in the mail.

9 So I would ask you guys to do that
10 if you so please.

11 And with at that, I'll turn it over
12 to Brian and let him discuss the site.

13 Brian.

14 SPEAKER, MR. BRIAN ZURBUCHEN: Good
15 evening, everybody. Again, thank you for
16 coming.

17 If you do have questions during the
18 presentation, feel free to ask them, just be
19 sure to speak clearly and state your name for
20 the court reporter before you ask your
21 question.

22 Let's get right down to it. I've
23 got quite a few slides here, so hopefully we'll
24 flip through them quickly. But you will be
25 able to absorb most of the information.

1 As Ben said, we're here to
2 facilitate public involvement in our remedy
3 selection process. We want to inform the
4 public about what we've been doing to clean up
5 the site thus far and how much progress we've
6 made about the current site conditions, where's
7 the contamination, and at what levels. And to
8 let you know what alternatives we looked at to
9 address that contamination.

10 How we're going to clean it up. Not
11 how we're going to clean it up, but the
12 different methods we looked at to clean it up.
13 And we're here most importantly to solicit your
14 public -- the public comments on what we
15 consider to be our EPA's preferred remedial
16 alternative.

17 This is just an outline of what I'll
18 talk about tonight. An introduction and a
19 little bit about the site history. It's got
20 quite a long history.

21 Garvey Elevators was constructed way
22 back in 1959 and it went on the State's
23 voluntary cleanup program, and went into that
24 program in 1995. So we've got a lot of history
25 there. I'll try to get us through it quickly.

1 I'll talk about the remedial
2 investigation. These are our activities to
3 determine where all the contaminants are at the
4 site and the soil and groundwater, where they
5 are and what type of contaminants we have
6 there.

7 And then we'll talk about the human
8 health risks from that contamination. Does it
9 potentially pose an excess risk to human
10 health?

11 Then we'll talk about all the
12 alternatives we looked at for soil and
13 groundwater, and which ones are the preferred
14 remedy.

15 I don't work alone on the site, of
16 course. Randy Schademann, he just stepped out,
17 he's our on-scene coordinator. He handles most
18 of the response -- early response actions of
19 the site, providing people with alternate
20 water, extending municipal water lines, running
21 the treatment system, these are all activities
22 that -- that on-scene coordinators typically
23 conduct early on in the process before they get
24 to a remedy.

25 Jennifer Trotter is our site

1 attorney.

2 Jennifer, do you want to stand up
3 there?

4 And Ben Washburn, our community
5 involvement coordinator, of course, is up here.

6 And then our state partner is Lloyd
7 Bruners, project manager for the Nebraska
8 Department of Environmental Quality.

9 And then Tom Buell his -- his title,
10 sorry, unit supervisor -- Superfund unit
11 supervisor. Correct?

12 MR. BUELL: Perfect.

13 SPEAKER, MR. BRIAN ZURBUCHEN: And
14 then, of course, part of the site team is
15 Hastings and the surrounding community.

16 Okay. Typically, the Superfund
17 remedial process, you know, how do we get to
18 this point where we select a remedy? How do we
19 get to the end where we cleaned it up?

20 It's a long process. It's not
21 simple. We're spending a lot of public dollars
22 to do these cleanups. We have to be certain
23 that we're selecting the right remedy. We have
24 to be certain that we know where all the
25 contaminants are before we go out and take an

1 action, because it's extremely expensive.

2 So, in the first phase is our
3 pre-remedial process, we're done with that.
4 Then the site becomes listed on the national
5 priorities list. It's on the national
6 priorities list. It was listed in 2005.

7 Then we begin what's called a
8 remedial investigation feasibility study.
9 That's where we look at where the contaminants
10 are, what types of contaminants we have. And
11 then we do a feasibility study to identify a
12 number of alternatives that might be used to
13 clean it up.

14 And then we issue our proposed plan
15 and take public comment on that.

16 We're in this stage right here.

17 When we issued a record of decision,
18 that documents the alternative we've selected.
19 So we're right here in the public comment
20 period.

21 After we select that remedy, we're
22 going to design a treatment system and then
23 implement it.

24 It's a little more complex at
25 Garvey. Life is never as simple as you hoped

1 it would be and that's especially true
2 sometimes for Superfund sites.

3 At this site, we had a lot of
4 historical information when we came onto the
5 site in 2005.

6 As you recall, I said back in 1995
7 it was in the State's voluntary cleanup
8 program. Garvey had done some work, they
9 installed a system at the site. And they had
10 done a little bit of site characterization on
11 their property.

12 So we had enough information to move
13 towards what's called an interim rod so we
14 could take early action. And this early
15 action, the purpose of that was to control that
16 source area and stop further releases from the
17 former Garvey facility itself to the
18 downgrading groundwater plume.

19 So right now we're right here. So
20 we're -- we're implementing that interim rod
21 that we selected back in 2010. Many of you
22 were here for that meeting. And we're here to
23 take public comment on this interim remedial
24 action as well, because there is still some
25 question of what is the best remedy for one

1 particular area, that's the groundwater at the
2 source area.

3 So we're containing the source area,
4 and right now we're proposing a remedy for the
5 -- for the source area soils and that big
6 plume, that large four-mile long plume that
7 comes from the site. Those are the two areas.

8 Many of you are familiar with Garvey
9 Elevators, that's why I just jumped to that.

10 Site history: Garvey former owner,
11 current owner is Ag Processing.

12 Garvey Elevators, back in 1959,
13 constructed the facility, installed a carbon
14 tetrachloride storage tank for the fumigation
15 of grain. There was a pipe that ran from that
16 tank to the above-ground storage tank that
17 stored 2,000 gallons. And so there was a pipe
18 that ran from that tank up the side of the
19 elevator into galleries, infiltration
20 galleries, along the top of the elevator there.

21 So at some point between 1959 when
22 that tank was installed and 1986 when it was we
23 removed, there were releases of carbon
24 tetrachloride from that tank. Or from the tank
25 and the -- and the buried line.

1 There were drips, the pipe may have
2 burst, the buried pipe may have burst or
3 leaked, or corroded and leaked, but there were
4 releases in that vicinity there.

5 So there are a number of bullet
6 items here that go through how the site was
7 discovered. And, um, the State's involvement
8 early on, '94, Garvey let us say, no, we have a
9 problem here, we have this tetrachloride in our
10 soil and groundwater.

11 In '97 they found in it one of the
12 municipal wells. That well was taken off line
13 and put on emergency use only.

14 In '99, Garvey installed their --
15 their system just on their property to handle
16 some of that soil and the groundwater there.

17 Between '99 and 2002 they operated
18 that system. They estimated they removed 2,100
19 pounds of carbon tetrachloride.

20 In 2002, they said they didn't want
21 to participate anymore with the State. And
22 then the State conducted what's called an
23 preliminary assessment site investigation.
24 That's the early phases of the Superfund
25 process.

1 This shows that treatment system
2 that was -- that is at the former Garvey
3 Elevator property.

4 Actually, this should be eight.
5 That is my mistake.

6 There are eight groundwater
7 extraction wells. Groundwater extraction wells
8 are denoted by the symbol here. General
9 groundwater flow direction is east, with a
10 slight southeast trend.

11 There are eight soil vapor
12 extraction wells to treat the soil.

13 So the goal of this system was to
14 prevent any contamination from flowing off
15 their site. And, um, the soil vapor extraction
16 wells, they extract soil vapors and then
17 emitted it into the atmosphere. But if the
18 concentrations are too high, then it is
19 destroyed in a catalytic oxidation oxidizer
20 system. It's on-site as well.

21 So, these extraction wells extracted
22 the water, it was treated in a treatment
23 building here, and then rejected into these two
24 injections. They installed that system back in
25 '99. They operated it for a few years. We

1 aren't certain how reliably they operated it.
2 But that's all -- that's all we know is what's
3 in the records there, because we hadn't taken
4 over at that point.

5 In 2005, we added it to the NPL.
6 That made it eligible to receive public funds
7 in the event that the former owner wasn't able
8 to pay for it or the operator or the
9 transporter.

10 There are a few categories there
11 that could be potentially liable.

12 In 2005, 2008, that time range, EPA
13 signed Garvey on to an administrative order of
14 dissent. That was an order that they
15 voluntarily signed and they agreed to do some
16 site characterization work. They agreed to
17 determine where all of the contamination is at
18 the source area and also downgrading it. And
19 they performed part of that work. But then in
20 2008 they declared bankruptcy, in March 2008.

21 So we took over at that point. And,
22 from 2008, to the present, these are some of
23 the removal actions that Randy and his group
24 has performed. They extended it, you know, 1.4
25 miles of water mains to get clean water to

1 residents whose private wells were impacted.
2 By our current count, I believe that's 19
3 residences.

4 And they -- they also upgraded that
5 system at that source area. The Garvey system,
6 that they installed, Randy's group, they
7 upgraded that system to better capture that
8 groundwater.

9 And then a few more dates here.
10 Move on.

11 Operable units. The site -- the
12 site is rather large. We have a plume that is
13 four miles long. The former property itself.
14 Soil contaminated. Groundwater contaminated.
15 We broke it into operable units to make it
16 easier for us to address. So some of it is
17 administrative.

18 OU 1, operable unit 1, is a
19 contaminated soils and groundwater at the
20 facility itself on that former Garvey property.

21 OU 2 is downgraded. Everything
22 downgrades, so that huge plume downgraded.
23 That is OU 2.

24 We've already talked about the
25 purpose of the RI. We characterized the soil

1 and geology and the nature and action of the
2 net contamination.

3 This is just a general profile of
4 the soil beneath the site. We have about 115
5 feet of unsaturated soils. And underlaying by,
6 saturated zone that is about 110 feet thick.
7 Sand and gravel aquifer, very conductive, as
8 you all probably know.

9 And, there are a couple of fairly
10 laterally extensive silty clay units. And
11 those are denoted here by these brown zones.

12 So we've got an upper, medial and
13 lower aquifer. But it's all the same. Like
14 the age of aquifer is 110 feet thick.

15 So what did we do to characterize
16 the site? We took a lot of samples. We took a
17 sample everywhere we thought contamination
18 might be. Because we're not only looking at
19 carbon tetrachloride, we need to see if there
20 is any other pesticides, perhaps, they used and
21 didn't apply properly. Maybe there are other
22 fumigants they used. Maybe there is PCBs from
23 the other transformer out there that leaked
24 into the ground. We have to go out and take a
25 look at all the different media.

1 Sediment. We looked where the --
2 where, you know, we expect the runoff to flow.
3 And we took sediment samples at eight
4 locations. We collected surface soil samples,
5 19 of those. Subsurface soil samples.

6 And then we also did a lot of
7 groundwater sampling, 146 samples from 40
8 locations. And then we installed several
9 monitoring wells that we continue to monitor.

10 I'm going to show you pictures of
11 these where we took these samples here to give
12 you some perspective.

13 So we sampled groundwater at the
14 property and then also on downgrading in that
15 plume. And we sampled multiple depths, not
16 just one depth.

17 For example, here -- here is where
18 we collected our sediment samples. These are
19 the drainage areas by these white dash lines
20 here. So each point represents a sediment
21 sample.

22 This red one here, this is an area
23 where we detected something. What we first do
24 is we sample. If it's above our screening
25 levels, then we have to look more closely at

1 it. We have only one location here of
2 sediments where it exceeded our screening
3 levels. So we keep that and retain that
4 because we want to take a closer look when we
5 do the remediation.

6 So at first we screen it.

7 Next, we -- are the surface soil
8 samples. Each point represents a surface soil
9 sampling location. We can see the elevator
10 here.

11 Here is the upright grain bins.

12 I didn't explain that. This is an
13 aerial photograph that we're looking at.

14 Here is the entry road to the grain
15 elevator.

16 Here's the tracks that run in the
17 northwest -- northeast/southwest direction.

18 Here's that flap storage at the
19 grain bin.

20 So this is the big tall elevator
21 that we see here.

22 Now, where did we see anything?

23 When we screened it, we had, one,
24 two, three, four, five locations where we had
25 contaminants above our screening levels and

1 these are those contaminants here.

2 Notice that none of the surface
3 soil samples had carbon tetrachloride, but they
4 did have this chloroform, which is a
5 degradation compound of carbon tetrachloride.

6 PCB's were found near the
7 transformer.

8 Now, that's just screen load.

9 We looked at 108 samples from 31
10 locations at multiple depths in the soil at all
11 of these locations here. And we found four
12 locations, only four locations where we found
13 contaminants above the screening levels.

14 We did find carbon depth in the
15 soil.

16 These points here are near that
17 former storage tank and we intentionally
18 focused our sampling, some of the sampling
19 right where that storage tank was.

20 We also collected indoor air and
21 sub-flat samples to assess whether there were
22 any vapors coming into the shop, the
23 maintenance stop there, or into the office.

24 Those are the locations for those. And we only
25 had a few that were above our screening levels.

1 Okay. Now, here's that huge plume.
2 This is the elevator right here that's covered
3 up by all of our sampling points. And this is
4 what the plume looks like. That's the total
5 lateral extent of the plume. The highest
6 levels are right here in the middle.

7 Now, this is, over here is -- I
8 think this is Technical Boulevard right here.
9 Baltimore Avenue is right here. Washington is
10 this street here.

11 THE AUDIENCE: Wabash.

12 SPEAKER, MR. BRIAN ZURBUCHEN: Thank
13 you. You know where we are.

14 Does anybody not? I think everybody
15 does.

16 So, what we did is we took a -- a,
17 what's called a direct push, technology probe,
18 and we pushed down into the aquifer and grabbed
19 samples from several different depths.

20 Okay. Each one of these yellow
21 dots.

22 And we also supplemented that with
23 some existing information from our other site.
24 Those are the green dots.

25 So before we did these samples, we

1 didn't know where the plume was. We had an
2 idea which direction it was flowing. I should
3 have showed you the sample we did first without
4 the plume, because we got the plume picture
5 after we did the sampling, of course.

6 Now, I'm going to show you a couple
7 of cross-sections. We're going to slice down
8 into the aquifer so you can see what the plume
9 looks like that is not spread throughout the
10 aquifer uniformly.

11 And these were the -- the samples --
12 okay, from monitoring wells. So to get this
13 picture, we also used monitoring well data from
14 a number of monitoring wells. Some associated
15 with Garvey that we installed. Some from the
16 Dana site.

17 And it looks like quite a few, but
18 actually that number of wells over that aerial
19 extent is not that many.

20 You have four miles long and you're
21 trying to track how it's moving. So it seems
22 like a lot of samples, but it's really not.

23 So, if we -- this cross-section
24 right here at Garvey, along the railroad there
25 if we slice down and look at that. Here's the

1 water table right here. Here's where we
2 sampled. Here's where the highest
3 concentrations are. And that gives you a
4 little bit of a mental image there.

5 The next cross-section shows a nice
6 egg-shaped plume there. It's how we would
7 expect transport and dispersion to occur in the
8 aquifer. As it flows with the groundwater, it
9 actually spreads out laterally as well. It
10 spreads with the direction of groundwater flow
11 and laterally.

12 So the next step we -- we assess
13 where -- what the contaminants were, where they
14 are, and now we need to quantify the risks.

15 There is four steps:

16 Characterize distribution.

17 Estimate exposures.

18 Assess the health dangers and dose
19 response.

20 And calculate the risks.

21 And I'll talk about what populations
22 we considered. There is different groups of
23 populations we have when we do a risk
24 assessment.

25 So we -- the different populations

1 we looked at were:

2 Outdoor industrial workers.

3 Indoor industrial works.

4 Off-property residents.

5 Trespassers.

6 Construction workers.

7 And future on-property residents,
8 because what if the elevator was dismantled and
9 it was developed for residents. So we assessed
10 that halfway as well.

11 Now, what's shown here are -- HI
12 stands for hazard index. If it's greater than
13 1, then that's bad. So, NV means no value, we
14 don't have the toxicity information to assess
15 that pathway. That is what NV means.

16 Over here, we have 24, which is many
17 times greater than 1 force. And, that is
18 definitely an issue.

19 And the CR is cancer risk. Excess
20 cancer risk above your normal risk of getting
21 cancer over your lifetime.

22 So that's 1.4 times to the minus 3.
23 So it's .000 -- no. Too many 0's. 001, 1 in
24 1,000, excess cancer risks above the normal
25 risk. That's to an off-property resident

1 drinking the most contaminated water in the
2 plume over a -- I believe it's a 30-year
3 period.

4 So the red areas are the ones that
5 we found pose an unacceptable risk and we need
6 to address those. So the future
7 on-property residents exposed to soils, and
8 then off-property residents exposed to
9 groundwater, future on-property residents
10 exposed to on-site groundwater.

11 Yes, Lori.

12 THE AUDIENCE: So these folks here
13 that live downgrade, it was current
14 off-property residents, right?

15 SPEAKER, MR. BRIAN ZURBUCHEN: These
16 folks would not, because they have been
17 connected to municipal water.

18 THE AUDIENCE: Okay.

19 SPEAKER, MR. BRIAN ZURBUCHEN: We're
20 looking at -- in the scenario, we're looking at
21 someone who installed a well that we don't know
22 about. Since we're on the site and we provide
23 alternate water, either connecting people to
24 the municipal main or supplying them with
25 bottled water.

1 But everybody, except for one
2 resident, is connected to the municipal main
3 and we sample periodically residents that are
4 near the plume. So the ones within are already
5 taken care of. The ones near it, we continue
6 to monitor on a frequency that we determine
7 based on -- on what -- what we suspect the
8 plume is doing or what we estimate it's doing.

9 THE AUDIENCE: So that risk now may
10 be removed for all of these folks that are on
11 City water now?

12 SPEAKER, MR. BRIAN ZURBUCHEN: Yes.

13 THE AUDIENCE: There is no risk
14 whatsoever, not even in the ground soil?

15 SPEAKER, MR. BRIAN ZURBUCHEN: No.
16 There is for future on-property residents.
17 Right here, there is an unacceptable excess
18 cancer risk to surface and subsurface soil.
19 This risk is not -- it doesn't disappear. We
20 take -- we assume that people are able to use
21 that groundwater and we want to clean it up and
22 restore it to its beneficial use. If you can't
23 address a site by simply supplying municipal
24 water to residents, that doesn't -- that
25 doesn't address contamination and that is not

1 what we're doing. We're here to clean up the
2 site.

3 THE AUDIENCE: My question is: What
4 about the soil?

5 SPEAKER, MR. BRIAN ZURBUCHEN: Oh,
6 the soil. To off-property residents, no, there
7 is no issue there because there were no
8 releases to the soil. It's in the groundwater,
9 it's not volatilizing, you know, into the soil
10 at a rate where it can cause soil contamination
11 throughout a 100 foot, going out to the surface
12 soil that you would be exposed to.

13 No, there is no risk from the
14 Garfield...

15 THE AUDIENCE: Except at the
16 elevator.

17 SPEAKER, MR. BRIAN ZURBUCHEN:
18 Except on the property. Right. She was taking
19 about the off-property resident. Right.

20 At the elevator, if someone, in an
21 exposure scenario like an on-property resident,
22 that -- that includes children. So, um, you
23 would be eating a certain fraction of the soil,
24 they assume that you eat so much a day, you
25 breath so much of the dust, there are a lot of

1 assumptions that to go into these risk
2 assessments.

3 So, say, again, sediment, it was
4 found to be within acceptable limits. Surface
5 and subsurface soil at the source area exceeds
6 acceptable limits for a future resident. And
7 then, groundwater exceeds acceptable limits for
8 a future resident.

9 Off-site, we have the same thing,
10 unacceptable.

11 The contaminants of concern. These are
12 the contaminants that pose that excess risk in
13 the soils, PCB and carbon tet. Groundwater,
14 carbon tet, chloroform, and trichloroethanol.

15 Downgrading in the plume, it's
16 carbon tet and chloroform. CCL4 and CHCL3.

17 What's our cleanup strategy? So,
18 early on I showed you that -- that bar or that
19 ribbon that described the remedial process.
20 And then I showed you there was a popup that
21 said -- showed the interim actions that were
22 taken. Those interim actions that we're
23 already taking are Phase 1.

24 Phase 2 is what we're in right now
25 and that's what we're here to take public

1 comment about, is what our preferred remedy
2 that we're presenting to you.

3 Phase 3, that will address the
4 source area groundwater that we're still
5 evacuating.

6 So this is just, again, that bar
7 that shows Phase 1, what's going on right now.
8 We're right here.

9 We're in this Phase 2.

10 And then, eventually, there will be
11 a Phase 3 to get to a final remedy for the
12 entire site.

13 So where are -- we have to identify what
14 our objectives are before we go out and just
15 start designing something. Short-term
16 and long-term objectives are shown here.

17 We want to prevent any further
18 migration from those contaminated soils
19 infiltrating to the groundwater. We want to
20 prevent that, we want to clean up that soil.
21 And we want to prevent that plume from
22 spreading further, that huge four-mile long
23 plume. We want to prevent any exposures to
24 that plume.

25 And long term, we want to restore

1 the aquifer, its beneficial use and reduce
2 contaminant concentrations to an acceptable
3 levels.

4 Now, we looked at four alternatives
5 for the soils at Garvey and four alternatives
6 for that plume. The no-action alternative
7 you'll see S1 and G1, that's an alternative we
8 have to look at, it's a baseline alternative.
9 We have to look at it, because there is some
10 cost associated with that. Even though we're
11 taking no remedial action, we still have to
12 monitor things at the site, so there is some
13 costs associated with it. So that is our
14 baseline.

15 OU 2, S2, this alternative we looked
16 at what if we took those soils, dug them up,
17 treated them, and then continued to operate
18 that soil vapor extraction system that is
19 currently there. We looked at that
20 alternative.

21 S3, what if we just expanded that
22 SVE system. What if we didn't dig up the soil.
23 What if we just expanded that SVE system.

24 And then alternative S4, what if we
25 dug up the soils, expand the SVE system and

1 continued to operate.

2 Now, groundwater. This is a lot of
3 information. I can barely remember the soils
4 right now. Probably your heads are swimming.

5 OU 2 groundwater. We'll go through
6 these and I can come back if we need to.

7 G2. What if we just pump and treat
8 at the leading edge of the plume, it's the
9 farthest edge of the plume, in the direction of
10 groundwater flow out at Texaco Boulevard, in
11 that area.

12 What did we do? Extracted the
13 groundwater there, treated and discharged it.
14 How much would that cost? How long would it
15 take? There's all sorts of criteria we'd have
16 to look at.

17 G3. What if we pumped and treated
18 at the leading edge, but we also in the middle
19 we pumped and treated. So we kind of cut the
20 plume off here, and at the leading edge. Would
21 that speed up things? Maybe.

22 And then alternative G4 is what if
23 we pumped and treated at the leading edge and
24 then in the most contaminated area we did some
25 chemical in situ treatment that breaks down the

1 carbon tetrachloride.

2 As I was saying before, the
3 no-action alternative, there is some cost
4 associated with that because we have to have
5 continued project management, which means work
6 plans. We have to do a statutory five-year
7 review on the site. We still have to conduct
8 monitoring. So all the cleanup alternatives
9 will include these components, of course.

10 Now, that alternative S2, where we
11 dig up the soils and treat them and put them
12 back. Well, actually, we don't put them
13 directly back. We dig them up, treat them over
14 in this area here, and then dispose of them
15 here, and borrow the soil from here and put it
16 back here.

17 Um, so our activation area, we would
18 have a 40-foot-by-10-foot area that is six foot
19 deep. That's what we estimate right now.
20 Later, when we get into design, we may do some
21 additional sampling to revise that area, but
22 that's our best guess right now what it would
23 take.

24 Alternative S3, expand that SVE
25 system. And by expanding it, there are eight

1 wells currently. We would install two
2 additional ones right in the place they -- it
3 would have been best to install them in the
4 first place, which is right at that tank and
5 right at that buried line. We would have
6 installed two wells right there where we know
7 the release is -- some releases occurred.

8 Alternative S4, we put those two
9 alternatives that we just talked about
10 together.

11 Okay. That -- that slide is
12 missing. And that's proposed extension of ICA.
13 Let me get to that. That's a component of the
14 three groundwater remedies for operable Unit 2.

15 For the large plume down gradient,
16 there's currently an institutional control area
17 for the City of Hastings. And it -- let's see,
18 that boundary coincides in some places with the
19 edge of the City's boundary.

20 So, what we are proposing to do is
21 to extend to -- have that ordinance be extended
22 down to prevent somebody from installing a -- a
23 private drinking water well in that area where
24 the plume is.

25 Now, we can't draw a line exactly

1 around the plume and say this is that
2 institutional control area where nobody should
3 put a well, a drinking water well in particular
4 is what I'm talking about, a domestic well.

5 So we have to go outside of that a
6 little bit to the north and south just a little
7 bit and then out in front of it.

8 Out in front of it is the NAD, that
9 there are not many residents out in that area.

10 Alternative G2 for the OU 2
11 groundwater. Pump and treat the leading edge.
12 We would install three wells at the leading
13 edge.

14 And it's called the leading edge
15 because some of the plume is still in the
16 medial aquifer at this point and then it slowly
17 migrates down into the lower aquifer. So it
18 moves not only horizontally, but it has a
19 vertical component as well.

20 So that's why there are two sets of
21 wells. We had a single treatment building
22 here. So six extraction wells, treatment
23 building and two injection -- or three
24 injection wells to reinject the clean and
25 treated water.

1 So we would have a piping run
2 along -- this road is --

3 THE AUDIENCE: Ottawa well.

4 SPEAKER, MR. BRIAN ZURBUCHEN:
5 Ottawa, yes, that is correct.

6 Alternative G3. Pump and treat at
7 the leading edge and mid-plume. So this is in
8 an effort to see what would happen if we would
9 pump in two additional areas to see if we could
10 speed that up. So we would have three wells
11 out at the leading edge and then an additional
12 six wells in the middle of the plume there.

13 The treatment building in this case
14 would have to be located or be best to be
15 located midway between those sets of wells.

16 And the green is the piping.

17 Now, alternative G4, which is
18 pumping at the leading edge. In addition to
19 that, it would be injections of -- of, a
20 chemical treatment to -- to address that
21 contamination.

22 That -- those injection wells, there
23 would be 39 of them on a 40-foot -- it had a
24 40-foot spacing.

25 Delivery is always a problem with

1 these injections because you have to get the
2 stuff to the contaminants.

3 So this plume has been spreading out
4 for 53 years. Um, so it's not going to -- you
5 know, it's -- it's spread out for four miles.
6 It's not contracting, it's spreading. So it's
7 very difficult to inject a treatment everywhere
8 the contaminated groundwater is. That's
9 unfeasible.

10 That is why the default alternative
11 a lot of times is pump and treat because there
12 aren't a lot of alternatives that are good.

13 Now, how did we evaluate the
14 alternatives? There are two threshold
15 criteria. If it doesn't meet -- if the
16 alternative doesn't meet these two criteria, we
17 don't consider it. Protection of human health
18 in the environment and compliance with ARARS.
19 That is -- here we go. Applicable or relevant
20 and appropriate requirements.

21 These might be State requirements,
22 or, other Federal requirements not under a set
23 of regulations that EPA oversees. Maybe --
24 maybe Fish and Wildlife statutes or something
25 that we have to meet. So those are other

1 requirements that we have to meet. If it
2 doesn't meet those, then we don't consider it.

3 And then modifying criteria in the
4 short term and long term how effective it is.
5 Does it reduce toxicity, mobility and volume of
6 the contaminants? Can we implement it? And
7 how much does it cost? Those are modifying
8 criteria that we're trying.

9 The balancing criteria are State and
10 community acceptance. So we'll look at each
11 one of these alternatives and look at our
12 evaluation of those alternatives.

13 So all the no-action alternatives
14 have some common elements. They're not
15 protective. We looked at a 30-year time frame
16 for each one of those. No-action alternatives.
17 And it would cost for those soils, no-action is
18 still going to cost about \$300,000.
19 Groundwater, about 850,000. That is our
20 estimate. That's to do project management, to
21 create work plans, to do groundwater
22 monitoring, and to do our five-year statutory
23 required reviews.

24 Now, this is -- it presents -- or
25 present an evaluation of all of the soil

1 alternatives here.

2 Protection of human health and
3 environment for the no-action alternative,
4 minus it doesn't meet that alternative -- or I
5 mean that criteria. It doesn't protect human
6 health and the environment. If we just leave
7 it there and do nothing, it doesn't protect it.
8 And it doesn't -- nor does it comply with our
9 ARARS. So we don't -- we don't look at the
10 rest of it.

11 Cost, as I said before, is almost
12 \$300,000.

13 S2. If we excavated the soil and
14 operated the SVE system, protection of human
15 health and the environment. It's protective
16 and complies with the ARARS. On a scale of 1
17 to 5, we rated it a 3 in terms of long-term
18 effectiveness. A 3 in terms of reducing
19 toxicity, mobility and volume through
20 treatment.

21 Is it effective in the short term?
22 Moderately effective, moderately implementable.

23 If we expanded the SVE system, if we
24 just expanded it, you can see, again, that S3
25 and S4 are both -- both meet the two threshold

1 criteria. But in the end, alternative S4 is
2 better in terms of long-term effectiveness and
3 the cost is less than the alternative S3. The
4 time frame for cleanup is also shorter.

5 And all of these things are
6 explained in more detail in that proposed plan
7 there and you can read it. So you can read
8 that later, if you would like.

9 But alternative S4 is the
10 alternative EPA has identified as its preferred
11 alternative. But we -- we have not decided.

12 The State is on board with our
13 identifying S4. They also believe that that is
14 the best alternative. But it's not a done
15 deal, we haven't taken public comments yet.

16 THE AUDIENCE: So S4 is just S2 and
17 S3 put together?

18 SPEAKER, MR. BRIAN ZURBUCHEN:
19 Correct.

20 THE AUDIENCE: Why is it cheaper
21 than just S3?

22 SPEAKER, MR. BRIAN ZURBUCHEN: It's
23 the time frame it's required to -- to -- for it
24 to operate. If you -- if you flip in there,
25 it's on page --

1 THE AUDIENCE: 16.

2 SPEAKER, MR. BRIAN ZURBUCHEN: I am
3 sorry?

4 THE AUDIENCE: Page 16.

5 SPEAKER, MR. BRIAN ZURBUCHEN: 16.

6 On page 16. Ten years it was
7 estimated to take S3, and five for S4.

8 Now, for OU 2 groundwater, this is
9 that large downgrading groundwater plume.
10 Again, we looked at the threshold criteria, did
11 no action, didn't meet it. The others met that
12 threshold criteria.

13 If you looked down at the -- our
14 evaluation on our scale from 1 to 5, with 5
15 being better, alternative G4 best meets our
16 criteria at a cost of 15.5 million
17 approximately.

18 Alternative G4, with the injections
19 and pump and treat, you notice it's much more
20 expensive. The injections are quite expensive
21 because it's 115, 110 feet to get to the water
22 table, and then it's 110 feet thick, that
23 aquifer is. So it's hard to deliver all of
24 those -- deliver the treatment chemicals
25 throughout the aquifer.

1 Um, and, EPA, both EPA and the State
2 agree that alternative G3 is the preferred
3 alternative.

4 And this just says, with regard to
5 satisfy threshold criteria and best satisfied
6 the balancing criteria.

7 This is an EPA fund lead site. Um,
8 EPA and the State will be paying for this
9 remedy.

10 Garvey, this site became eligible
11 for Federal funding when it was put on the
12 national priorities list and they declared
13 bankruptcy.

14 So, as I've said before, the public
15 comment period, we're in the middle of it. It
16 ends August 30th. So you have plenty of time
17 to take a closer look at the proposed plan and
18 send us your comments.

19 We'll issue -- after we receive
20 those comments and take them into
21 consideration, we'll issue what's called a
22 Record of Decision. That documents what our
23 remedial action is going to be for the site.
24 And it will include our response to the public
25 comments.

1 Later, we'll have a design meeting
2 at some point when we get into the design of
3 this system. And then later Phase 3 will have
4 a -- well, and then we'll implement the design
5 in the interim remedial action.

6 I think I've said most of this
7 already. Fax, e-mail or letter. If you have
8 verbal comments tonight, if we can't answer
9 them here, we'll get you a written answer. But
10 we'll take your comments tonight, if you'd
11 like.

12 So I think I'll leave that slide up
13 if you want to write it down. Actually, it's
14 in the facts sheet and in the proposed plan. I
15 think everybody has a copy.

16 So, I'll take questions, if you're still
17 awake.

18 THE AUDIENCE: How long before any
19 of this could possibly be implemented? I mean,
20 we had a meeting in 2010, we're back to 2013.
21 We're part of the way there.

22 SPEAKER, MR. BRIAN ZURBUCHEN:
23 Before -- so you're asking how long will it be
24 before we actually start constructing something
25 to address that OU 2 plume?

1 THE AUDIENCE: Yeah.

2 SPEAKER, MR. BRIAN ZURBUCHEN:

3 Currently, I think our on-site construction
4 activities are projected to begin I believe
5 it's 2015. In 2015. The -- the next phase
6 that we'll go through is we have -- we have --
7 we have to have a -- we have to hire a
8 contractor to design our system.

9 Let's say that these alternatives
10 are the ones that end up being selected after
11 reviewing public comments, then we have to have
12 our contractors complete a design. And then we
13 have to review that design and go back and
14 forth on -- on comments, all the while working
15 with the State and to iron out their comments
16 and their revisions.

17 Um, after that, then we will, you
18 know, hire a -- a construction contractor.
19 We -- it has to go through a public bidding
20 process. So that design has to be bid out.
21 And that's a process as well.

22 It doesn't happen overnight and like
23 I was saying before, it's a huge sum of money
24 that we're talking about to clean this site up.
25 It is very serious. We don't want to take any

1 missteps, so we step carefully.

2 THE AUDIENCE: How many years do you
3 have actual accurate information on your
4 testing?

5 SPEAKER, MR. BRIAN ZURBUCHEN: On
6 the samples that we've selected, we have, you
7 know, we have -- we go through a validation
8 process that we use to evaluate whether our
9 procedures in the field were correct, whether
10 the lab performed its job correctly. So any of
11 the samples that EPA collected we have --
12 they're all what we call validated data.

13 So we can -- we say we can base our
14 decisions on this data. And that data that was
15 collected previously by Garvey, we don't know.
16 We aren't relying on that data to make our
17 recommendation for a proposed plan tonight.
18 We're relying on our data that we collected.

19 THE AUDIENCE: You said that -- that
20 this is -- has been spreading for a lot of --

21 SPEAKER, MR. BRIAN ZURBUCHEN: It
22 could have been spreading for 53 years, ever
23 since they put in the tank. We don't know when
24 the release occurred.

25 THE AUDIENCE: So through periodic

1 testing, have you noticed that it's
2 spreading --

3 SPEAKER, MR. BRIAN ZURBUCHEN: Is it
4 continuing to spread?

5 THE AUDIENCE: Yes. How fast is it
6 spreading?

7 SPEAKER, MR. BRIAN ZURBUCHEN: A
8 foot or two a day. It continues to migrate
9 with the direction of groundwater flow.

10 THE AUDIENCE: So since it is
11 probably going to take at least five years
12 after 2015, that is 2020, how far west will be
13 the plume at that time?

14 SPEAKER, MR. BRIAN ZURBUCHEN: We're
15 -- we're going to continue to monitor it. I'm
16 not going to guess how far it will be. We'll
17 continue to monitor it.

18 We have -- one of the things that
19 we've done is construct a groundwater flow and
20 transport model during -- during the -- let's
21 see. We have side-by-side, we have two thing
22 going on. So it's hard to keep things separate
23 sometimes.

24 But we have that interim action
25 going on right where we're actually in the

1 remedial action phase at the source area. And
2 we've got this phase going on.

3 But we've done a groundwater flow
4 and transport model and in general it's about a
5 foot or two per day that the groundwater --
6 that's the rate the groundwater moves at.

7 Now, that front edge is continuing
8 to smear and spread out, you know, to --

9 THE AUDIENCE: So it's moving north
10 and south also?

11 SPEAKER, MR. BRIAN ZURBUCHEN: No.
12 It's moving to the east -- almost directly
13 east. If you see the plume there on that map,
14 it's almost directly east. It's about 11
15 degrees south of east. That's the direction
16 the plume is moving from that elevator.

17 THE AUDIENCE: My kids go to school
18 less than a half a mile to the south edge of
19 that plume. So it's -- if it's not treated for
20 how many years, would they ever be affected by
21 it?

22 SPEAKER, MR. BRIAN ZURBUCHEN: Well,
23 there should be no concern, because there is no
24 exposure pathway complete.

25 They -- the school is on municipal

1 water. Am I correct? I believe it is. Randy
2 stepped out right -- no, there he is.

3 THE AUDIENCE: Because we've got
4 notes home from school suggesting that the kids
5 bring their own water because it's high in
6 nitrates.

7 SPEAKER, MR. BRIAN ZURBUCHEN: Oh,
8 because it's high in nitrates.

9 THE AUDIENCE: Yes, that's in the --

10 SPEAKER, MR. BRIAN ZURBUCHEN:
11 Right. Nitrates are not associated with the
12 Garvey Elevator site. Nitrates are a regional
13 problem in this area.

14 THE AUDIENCE: I was wondering if
15 there is a possibility that it is spreading in
16 one direction?

17 SPEAKER, MR. BRIAN ZURBUCHEN:
18 Remember, it's 110, 115 feet even to the water
19 table. And if there -- they're not on the
20 former property itself. So the soil is not
21 contaminated with contaminants from Garvey.
22 The groundwater may be, but -- but they're on
23 the surface. And if you're not drinking the
24 water, then there's no complete pathway.

25 THE AUDIENCE: -- right across the

1 road from Garvey.

2 THE AUDIENCE: They're not on the
3 city water, the school is on the private well.

4 SPEAKER, MR. BRIAN ZURBUCHEN: The
5 school is on a private well --

6 THE AUDIENCE: It's south of the
7 plume?

8 THE AUDIENCE: Wallace, Adam.

9 SPEAKER, MR. BRIAN ZURBUCHEN:
10 Different school. Okay. So you were thinking
11 of a different school?

12 THE AUDIENCE: Well, I was thinking
13 of different locations.

14 THE AUDIENCE: It's on Baltimore
15 about a half of a mile from the south edge of
16 that plume.

17 SPEAKER, MR. BRIAN ZURBUCHEN: Okay.
18 Well, the -- if we get too many people talking
19 at once, the court reporter wouldn't be able to
20 do her job.

21 You're a half mile -- we -- we are
22 confident in knowing where that plume is right
23 now. We have monitoring wells -- here, let me
24 flip back to a figure.

25 We have groundwater monitoring wells

1 on the perimeter of the plume, just outside of
2 the plume monitoring it to -- to determine --

3 THE AUDIENCE: How often?

4 SPEAKER, MR. BRIAN ZURBUCHEN: How
5 often do we sample those? The sampling
6 frequency is -- is changing. It changes
7 because early on we don't know as much. We
8 sample more frequently. But I believe we're
9 sampling those on a semiannual basis right now.

10 A half mile is a long way when we're
11 talking laterally from the plume. It's not in
12 the direction of the groundwater flow. So it's
13 off to the side. So the plume would have to
14 diffuse and disperse out that far, which it --
15 it -- it's not dispersing laterally at any
16 great rate, if any.

17 THE AUDIENCE: Where is Wabash
18 Avenue on your map?

19 SPEAKER, MR. BRIAN ZURBUCHEN:
20 Wabash is right there.

21 THE AUDIENCE: That is all between
22 highway --

23 SPEAKER, MR. BRIAN ZURBUCHEN: Did
24 -- can you see that cursor on the screen?

25 THE AUDIENCE: Yeah.

1 SPEAKER, MR. BRIAN ZURBUCHEN: That
2 is where Wabash is.

3 THE AUDIENCE: I thought there was a
4 test site right on the edge of that plume.
5 Idlewilde and Wabash.

6 SPEAKER, MR. BRIAN ZURBUCHEN:
7 Idlewilde and Wabash would be right here at the
8 intersection. So we have a monitoring well
9 just west of there.

10 Oh, you probably saw a transect.
11 Okay. I know which figure you're talking
12 about, we collected groundwater samples there.

13 So the school is on Wabash you said.

14 THE AUDIENCE: No. No.

15 THE AUDIENCE: It's on Baltimore.

16 THE AUDIENCE: Baltimore.

17 SPEAKER, MR. BRIAN ZURBUCHEN:
18 That's even closer to the source area.

19 THE AUDIENCE: It's closer to the
20 source area, but a little farther south.

21 THE AUDIENCE: Right.

22 THE AUDIENCE: Because I'm 100 yards
23 from Wabash and Idlewilde.

24 SPEAKER, MR. BRIAN ZURBUCHEN: 100
25 yards south of there?

1 THE AUDIENCE: Yeah.

2 SPEAKER, MR. BRIAN ZURBUCHEN: And
3 we sampled your well before, correct?

4 THE AUDIENCE: Well --

5 SPEAKER, MR. BRIAN ZURBUCHEN: We
6 have sampled it. I'm confident we have. I
7 think that I've spoken to you before. Your
8 last name is --

9 THE AUDIENCE: You mean private
10 well?

11 SPEAKER, MR. BRIAN ZURBUCHEN: I'm
12 sorry?

13 THE AUDIENCE: You mean, sampled our
14 private well?

15 SPEAKER, MR. BRIAN ZURBUCHEN: Yes.

16 THE AUDIENCE: Don't they test it
17 across Idlewilde?

18 SPEAKER, MR. BRIAN ZURBUCHEN:
19 Across Idlewilde, I believe the municipal main,
20 a removal extended to the municipal main all
21 the way down to Wabash.

22 THE AUDIENCE: Yeah, that is true.

23 SPEAKER, MR. BRIAN ZURBUCHEN: All
24 the way down Wabash. And you're just on the
25 other side of Idlewilde from Wabash.

1 THE AUDIENCE: Yeah.

2 SPEAKER, MR. BRIAN ZURBUCHEN: And
3 you're --

4 THE AUDIENCE: They go across the
5 road with their -- where all the orange pipes
6 are. That --

7 SPEAKER, MR. BRIAN ZURBUCHEN: Oh,
8 the City may be extending it further, is
9 that where they're working right now?

10 THE AUDIENCE: Well, a couple of
11 months ago, they did.

12 SPEAKER, MR. BRIAN ZURBUCHEN: Okay.
13 Well, we'll -- we'll talk with the City. But
14 it sounds like they may be extending their
15 mains further, perhaps.

16 THE AUDIENCE: No. No.

17 SPEAKER, MR. BRIAN ZURBUCHEN: No?

18 THE AUDIENCE: No.

19 SPEAKER, MR. BRIAN ZURBUCHEN: Okay.

20 THE AUDIENCE: It might be helpful
21 to understand that -- that that plume is a
22 straight line down. It's more of a -- a --

23 SPEAKER, MR. BRIAN ZURBUCHEN:
24 Right. Right.

25 THE AUDIENCE: At the center of that

1 plume there may be nothing in the first 100
2 feet. At 200 or 300 feet, it may be as wide as
3 that plume.

4 THE AUDIENCE: But it would still
5 affect the well.

6 SPEAKER, MR. BRIAN ZURBUCHEN: Yeah.
7 Yeah. So these are -- back to this -- back to
8 this figure here, our Geo-Globe locations where
9 we did extensive sampling here. Um, and that's
10 a cross-section through there.

11 So you're saying -- you're right,
12 it's not -- the concentration is not uniform
13 with depth.

14 THE AUDIENCE: No. At one mile at
15 the edge of that plume, it's not a straight up
16 and down. That -- that plume may be 200 feet
17 down, and at 100 feet it may be clean.

18 SPEAKER, MR. BRIAN ZURBUCHEN:
19 Right. Right. It could be.

20 THE AUDIENCE: That's what I'm
21 getting at, that it slopes this way.

22 SPEAKER, MR. BRIAN ZURBUCHEN: That
23 is right.

24 So out here we had a well that is
25 shallow. The water from it might not be

1 contaminated. Right there -- where did it go?
2 Where the cursor is right there.

3 THE AUDIENCE: Yeah.

4 SPEAKER, MR. BRIAN ZURBUCHEN: Yeah.
5 It's not -- the concentration is not the same
6 everywhere with depth. Yeah.

7 THE AUDIENCE: So the part of the
8 plume why is it at the elevator now that is --
9 it hasn't been leaking for years. Why wouldn't
10 the largest concentration -- why wouldn't --

11 SPEAKER, MR. BRIAN ZURBUCHEN: Well,
12 some of the highest concentrations were at the
13 elevator. We've seen concentrations drop by
14 two orders of magnitude and some of our
15 monitoring wells at the site.

16 In our extraction wells, I was just
17 taking a look back at the data from some of our
18 extraction wells that we monitor very
19 frequently. Like we were monitoring them, oh,
20 quarterly, I believe.

21 The concentrations have dropped
22 from, you know, a few hundred, to half or a
23 quarter as much as they were. So the
24 concentrations are dropping at the source area
25 due to possibly source depletion, yes. And it

1 could be less contributions from the soil.
2 Because, remember, there is that soil vapor
3 extraction system that Garvey installed and
4 operated for a while. And then they went
5 bankrupt -- well, and we're not confident that
6 the operation was consistent. They went
7 bankrupt, we started operating it. We've been
8 extracting contaminants.

9 And, in fact, there have been --
10 since 2008, we've removed 200 -- more than 260
11 pounds from the soil and from the groundwater
12 at the source area through those systems.

13 THE AUDIENCE: What's the water test
14 at the site now?

15 SPEAKER, MR. BRIAN ZURBUCHEN: Um,
16 well, in our extraction wells, the majority of
17 them are below, I believe, 100 micrograms per
18 liter.

19 The monitoring wells, boy, I've got the
20 data and I can show you the data and show you
21 some trends, but I don't have the slide to
22 illustrate it for you right now. But, if
23 you're going to stick around, I can show you on
24 that. Pull up something on the laptop.

25 And all of this information is -- is

1 provided to the public. It's in this library,
2 there's a repository here in this library.
3 It's in our administrative records. So all the
4 documents that we're basing this on are in the
5 library here for you to review. And all
6 that -- that data is there.

7 Yes, sir.

8 THE AUDIENCE: If you pump water up
9 and treat it, you can pump it right back down
10 to the aquifer; is that correct?

11 SPEAKER, MR. BRIAN ZURBUCHEN: And
12 your name was -- I didn't get your name.

13 THE AUDIENCE: Dennis Carlson.

14 SPEAKER, MR. BRIAN ZURBUCHEN: Oh,
15 Dennis Carlson. Okay.

16 We're going to extract it, treat it,
17 and reinjection is one of the options.

18 THE AUDIENCE: Because east of town
19 on the NAD, they're pumping it down the creek.

20 SPEAKER, MR. BRIAN ZURBUCHEN: They
21 are?

22 THE AUDIENCE: Yes, but they're not
23 planning on doing that here, are they?

24 SPEAKER, MR. BRIAN ZURBUCHEN: We'll
25 probably reinject it. That's what's -- that

1 what's currently -- that's what we're doing at
2 the source area currently.

3 THE WITNESS: Because they're
4 putting in center field wells and there is a
5 huge reservoir at the research center to get
6 into.

7 SPEAKER, MR. BRIAN ZURBUCHEN: I
8 think it's a manmade reservoir, isn't it?

9 THE AUDIENCE: That's expensive.

10 THE AUDIENCE: They spent 25 million
11 on that project last year.

12 THE AUDIENCE: That's Federal money?

13 SPEAKER, MR. BRIAN ZURBUCHEN:
14 That's a different -- a different source than
15 our -- than ours. Yeah. A different pot.

16 And we're not even -- let's say we
17 do select this remedy, it has to be funded in
18 order for us to actually construct it and to
19 move forward.

20 THE AUDIENCE: When this -- you took
21 over, I know one of our neighborhoods, said
22 that their well was tested out at 900 parts per
23 million. Is that possible? At that time on
24 South Wabash?

25 SPEAKER, MR. BRIAN ZURBUCHEN: Oh,

1 on South Wabash? There could be -- yes. In
2 several 100s, yes.

3 THE AUDIENCE: But now we're at 100
4 or less? Or 100 or more?

5 SPEAKER, MR. BRIAN ZURBUCHEN: Well,
6 it's greater than 100.

7 THE AUDIENCE: Greater than 100.

8 SPEAKER, MR. BRIAN ZURBUCHEN: My
9 figures here, We just had two contours. One
10 contour was the five micrograms per liter
11 contour. The five micrograms per liter, the
12 Federal MCL for municipal drinking water
13 systems. That's the standard that they have to
14 meet. And that's the standard, that is one of
15 our ARARS.

16 So, it was contoured at 5 and then
17 100. So the area was greater than 100, that
18 dark red area was greater than 100. Right
19 there. And this is based on more recent data.
20 In the past, the levels were higher, yes.

21 Well, if there's -- if there are no
22 more questions, I think that we'll wrap it up.
23 You're welcome to stick around and I'll answer
24 questions one-on-one, if you like.

25 I appreciate you taking the time to

1 come out and listen to, um -- listen to us.

2 MR. WASHBURN: I would just add one
3 thing. We have copies of the proposed plan
4 here, it's a very technical, detailed document.
5 I'd be happy to e-mail this presentation to
6 anyone else that would like information that is
7 a little bit less technical, something for you
8 to reference.

9 My contact information is available
10 in the proposed plan and also on the fact
11 sheet. So if you would like an e-mail copy of
12 this presentation, please send me an e-mail and
13 I'll be happy to send it out to you.

14 THE AUDIENCE: Thank you.

15 (The public hearing went off the
16 record.)

17

18

19

20

21

22

23

24

25

C E R T I F I C A T E

I, DANA L. BURKDOLL, a Certified Court Reporter, Registered Professional Reporter and Certified Shorthand Reporter, do hereby certify that the within-named witness was by me first duly sworn to testify the truth, that the testimony given in response

To the questions propounded, as herein set forth, was first taken in machine shorthand and reduced to writing with computer-aided transcription, and is a true and correct record of the testimony given by the witness.

I certify that review of the testimony was requested by the witness or the parties. If any changes are made by the deponent during the time period allowed, they will be appended to the transcript.

I further certify that I am not a relative or employee or attorney or counsel of any of the parties, or a relative or employee of such attorney or counsel, or financially interested in the action.

WITNESS my hand and official seal at on this 8th day of August, 2013.



DANA L. BURKDOLL, CSR, RPR, CCR
Certified Court Reporter #1364
MIDWEST REPORTERS, INC.
800-528-3194

WORD INDEX

< \$ >

\$300,000 34:18
35:12

< 0 >

000 21:23
001 21:23
0's 21:23
0U 13:21 28:5

< 1 >

1 13:18, 18 21:13,
17, 23 25:23 26:7
35:16 37:14
1,000 21:24
1.4 12:24 21:22
100 24:11 47:22,
24 50:1, 17 52:17
55:3, 4, 6, 7, 17, 17,
18
100s 55:2
108 17:9
11 43:14
110 14:6, 14
37:21, 22 44:18
115 14:4 37:21
44:18
1364 57:22
146 15:7
15.5 37:16
16 37:1, 4, 5, 6
19 13:2 15:5
1959 4:22 9:12,
21
1986 9:22
1995 4:24 8:6

< 2 >

2 13:21, 23 25:24
26:9 27:15 28:5
30:14 31:10 37:8
39:25
2,000 9:17
2,100 10:18
200 50:2, 16
52:10
2002 10:17, 20**2005** 7:6 8:512:5, 12
2008 12:12, 20, 20,
22 52:10
2010 8:21 39:20
2013 1:4 39:20
57:18
2015 40:5, 5
42:12
2020 42:12
24 21:16
25 54:10
260 52:10

< 3 >

3 21:22 26:3, 11
35:17, 18 39:3
300 50:2
30th 38:16
30-year 22:2
34:15
31 17:9
39 32:23

< 4 >

40 15:7
40-foot 32:23, 24
40-foot-by-10-foot
29:18
4th 1:21

< 5 >

5 35:17 37:14, 14
55:16
517 1:21
53 33:4 41:22

< 6 >

68901 1:22

< 8 >

8 1:4
800-528-3194
57:23
850,000 34:19
8tht 57:18

< 9 >

900 54:22**94** 10:8**97** 10:11
99 10:14, 17
11:25

< A >

able 3:25 12:7
23:20 45:19
above-ground
9:16
absorb 3:25
acceptable 25:4,
6, 7 27:2
acceptance 34:10
accurate 41:3
ACTION 1:8 7:1
8:14, 15, 24 14:1
27:11 37:11
38:23 39:5 42:24
43:1 57:16
actions 5:18
12:23 25:21, 22
activation 29:17
activities 5:2, 21
40:4
actual 41:3
Adam 45:8
ADAMS 1:10
add 3:4 56:2
added 12:5
addition 32:18
additional 29:21
30:2 32:9, 11
address 3:2 4:9
13:16 22:6 23:23,
25 26:3 32:20
39:25
administrative
12:13 13:17 53:3
aerial 16:13 19:18
affect 50:5
Ag 9:11
age 14:14
ago 49:11
agree 38:2
agreed 12:15, 16
air 17:20
allowed 57:12
alternate 5:19
22:23**alternative** 4:16
7:18 27:6, 7, 8, 15,
20, 24 28:22 29:3,
10, 24 30:8 31:10
32:6, 17 33:10, 16
35:3, 4 36:1, 3, 9,
10, 11, 14 37:15,
18 38:2, 3
alternatives 2:5
4:8 5:12 7:12
27:4, 5 29:8 30:9
33:12, 14 34:11,
12, 13, 16 35:1
40:9
ANNOUNCE 1:6
answer 2:17 39:8,
9 55:23
anybody 18:14
anymore 10:21
appended 57:13
Applicable 33:19
apply 14:21
appreciate 55:25
appropriate 33:20
approximately
37:17
aquifer 14:7, 13,
14 18:18 19:8, 10
20:8 27:1 31:16,
17 37:23, 25
53:10
ARARS 33:18
35:9, 16 55:15
area 8:16 9:1, 2,
3, 5 12:18 13:5
15:22 25:5 26:4
28:11, 24 29:14,
17, 18, 21 30:16,
23 31:2, 9 43:1
44:13 47:18, 20
51:24 52:12 54:2
55:17, 18
areas 9:7 15:19
22:4 32:9
asking 39:23
assess 17:21
20:12, 18 21:14
assessed 21:9
assessment

10:23 20:24	bankruptcy 12:20	11, 15, 18, 23 49:2,	changes 46:6
assessments 25:2	38:13	7, 12, 17, 19, 23	57:12
associated 19:14	bar 25:18 26:6	50:6, 18, 22 51:4,	changing 46:6
27:10, 13 29:4	barely 28:3	11 52:15 53:11,	characterization
44:11	base 41:13	14, 20, 24 54:7, 13,	8:10 12:16
assume 23:20	based 23:7 55:19	25 55:5, 8	characterize
24:24	baseline 27:8, 14	bring 44:5	14:15 20:16
assumptions 25:1	basing 53:4	broke 13:15	characterized
atmosphere 11:17	basis 46:9	brown 14:11	13:25
attorney 6:1	believe 13:2 22:2	Bruners 6:7	CHCL3 25:16
57:15, 16	36:13 40:4 44:1	Buell 6:9, 12	cheaper 36:20
AUDIENCE 18:11	46:8 48:19 51:20	building 11:23	chemical 28:25
22:12, 18 23:9, 13	52:17	31:21, 23 32:13	32:20
24:3, 15 32:3	BEN 2:3 4:1 6:4	bullet 10:5	chemicals 37:24
36:16, 20 37:1, 4	beneath 14:4	buried 9:25 10:2	children 24:22
39:18 40:1 41:2,	beneficial 23:22	30:5	chloroform 17:4
19, 25 42:5, 10	27:1	Burkdoll 1:25	25:14, 16
43:9, 17 44:3, 9,	best 8:25 29:22	57:3, 21	City 23:11 30:17
14, 25 45:2, 6, 8,	30:3 32:14 36:14	burst 10:2, 2	45:3 49:8, 13
12, 14 46:3, 17, 21,	37:15 38:5		City's 30:19
25 47:3, 14, 15, 16,	better 13:7 36:2		clay 14:10
19, 21, 22 48:1, 4,	37:15	< C >	clean 4:4, 10, 11,
9, 13, 16, 22 49:1,	bid 40:20	calculate 20:20	12 7:13 12:25
4, 10, 16, 18, 20, 25	bidding 40:19	call 41:12	23:21 24:1 26:20
50:4, 14, 20 51:3,	big 9:5 16:20	called 7:7 8:13	31:24 40:24
7 52:13 53:8, 13,	bin 16:19	10:22 18:17	50:17
18, 22 54:9, 10, 12,	bins 16:11	31:14 38:21	cleaned 6:19
20 55:3, 7 56:14	bit 4:19 8:10	cancer 21:19, 20,	cleanup 4:23 8:7
AUGUST 1:4	20:4 31:6, 7 56:7	21, 24 23:18	25:17 29:8 36:4
38:16 57:18	board 36:12	capture 13:7	cleanups 6:22
available 2:22	borrow 29:15	carbon 9:13, 23	clearly 3:19
56:9	bottled 22:25	10:19 14:19 17:3,	closely 15:25
Avenue 18:9	Boulevard 18:8	5, 14 25:13, 14, 16	closer 16:4
46:18	28:10	29:1	38:17 47:18, 19
awake 39:17	boundary 30:18,	cards 3:1	coincides 30:18
	19	care 23:5	collected 15:4, 18
< B >	boy 52:19	carefully 41:1	17:20 41:11, 15,
back 3:2 4:22	breaks 28:25	Carlson 53:13, 15	18 47:12
8:6, 21 9:12	breath 24:25	case 32:13	come 28:6 56:1
11:24 28:6 29:12,	Brian 2:14 3:12,	catalytic 11:19	comes 9:7
13, 16 39:20	13, 14 6:13 18:12	categories 12:10	coming 2:20
40:13 45:24 50:7,	22:15, 19 23:12,	cause 24:10	3:16 17:22
7 51:17 53:9	15 24:5, 17 32:4	CCL4 25:16	Commenced 2:1
bad 21:13	36:18, 22 37:2, 5	CCR 1:25 57:21	COMMENT 1:7
balancing 34:9	39:22 40:2 41:5,	center 49:25	2:10 7:15, 19
38:6	21 42:3, 7, 14	54:4, 5	8:23 26:1 38:15
Baltimore 18:9	43:11, 22 44:7, 10,	certain 6:22, 24	comments 2:11,
45:14 47:15, 16	17 45:4, 9, 17	12:1 24:23	13, 21 4:14 36:15
bankrupt 52:5, 7	46:4, 19, 23 47:1,	Certified 57:3, 4,	38:18, 20, 25 39:8,
	6, 17, 24 48:2, 5,	22	
		certify 57:4, 11, 13	

<p>10 40:11, 14, 15 common 34:14 community 6:4, 15 34:10 complete 40:12 43:24 44:24 complex 7:24 compliance 33:18 complies 35:16 comply 35:8 component 30:13 31:19 components 29:9 compound 17:5 computer-aided 57:8 concentration 50:12 51:5, 10 concentrations 11:18 20:3 27:2 51:12, 13, 21, 24 concern 25:11 43:23 conditions 4:6 conduct 5:23 29:7 conducted 10:22 conductive 14:7 confident 45:22 48:6 52:5 connected 22:17 23:2 connecting 22:23 consider 2:12 4:15 33:17 34:2 consideration 38:21 considered 20:22 consistent 52:6 construct 42:19 54:18 constructed 4:21 9:13 constructing 39:24 Construction 21:6 40:3, 18 contact 56:9 containing 9:3 contaminant 27:2</p>	<p>contaminants 5:3, 5 6:25 7:9, 10 16:25 17:1, 13 20:13 25:11, 12 33:2 34:6 44:21 52:8 contaminated 13:14, 14, 19 22:1 26:18 28:24 33:8 44:21 51:1 contamination 4:7, 9 5:8 11:14 12:17 14:2, 17 23:25 24:10 32:21 continue 15:9 23:5 42:15, 17 continued 27:17 28:1 29:5 continues 42:8 continuing 42:4 43:7 contour 55:10, 11 contoured 55:16 contours 55:9 contracting 33:6 contractor 40:8, 18 contractors 40:12 contributions 52:1 control 8:15 30:16 31:2 coordinator 5:17 6:5 coordinators 5:22 copies 56:3 copy 39:15 56:11 Correct 6:11 32:5 36:19 41:9 44:1 48:3 53:10 57:9 correctly 41:10 corroded 10:3 cost 27:10 28:14 29:3 34:7, 17, 18 35:11 36:3 37:16 costs 27:13 counsel 57:15, 16 count 13:2 COUNTY 1:10</p>	<p>couple 14:9 19:6 49:10 course 5:16 6:5, 14 19:5 29:9 court 2:8 3:20 45:19 57:3, 22 covered 18:2 CR 21:19 create 34:21 creek 53:19 criteria 28:15 33:15, 16 34:3, 8, 9 35:5 36:1 37:10, 12, 16 38:5, 6 cross-section 19:23 20:5 50:10 cross-sections 19:7 CSR 1:25 57:21 current 4:6 9:11 13:2 22:13 currently 27:19 30:1, 16 40:3 54:1, 2 cursor 46:24 51:2 cut 28:19</p> <p>< D > Dana 1:25 19:16 57:3, 21 dangers 20:18 dark 55:18 dash 15:19 data 19:13 41:12, 14, 14, 16, 18 51:17 52:20, 20 53:6 55:19 dates 13:9 day 24:24 42:8 43:5 57:18 deal 36:15 decided 36:11 decision 7:17 38:22 decisions 41:14 declared 12:20 38:12 deep 29:19</p>	<p>default 33:10 definitely 21:18 degradation 17:5 degrees 43:15 deliver 37:23, 24 Delivery 32:25 Dennis 53:13, 15 denoted 11:8 14:11 Department 6:8 depletion 51:25 deponent 57:12 depth 15:16 17:14 50:13 51:6 depths 15:15 17:10 18:19 described 25:19 design 7:22 29:20 39:1, 2, 4 40:8, 12, 13, 20 designing 26:15 destroyed 11:19 detail 36:6 detailed 56:4 detected 15:23 determine 5:3 12:17 23:6 46:2 developed 21:9 different 4:12 14:25 18:19 20:22, 25 45:10, 11, 13 54:14, 14, 15 difficult 33:7 diffuse 46:14 dig 27:22 29:11, 13 direct 18:17 direction 11:9 16:17 19:2 20:10 28:9 42:9 43:15 44:16 46:12 directly 29:13 43:12, 14 disappear 23:19 discharged 28:13 discovered 10:7 discuss 3:12 dismantled 21:8</p>
---	--	---	--

<p> disperse 46:14 dispersing 46:15 dispersion 20:7 dispose 29:14 dissent 12:14 distribution 20:16 document 56:4 documenting 2:9 documents 7:18 38:22 53:4 doing 4:4 23:8, 8 24:1 53:23 54:1 dollars 6:21 domestic 31:4 dose 20:18 dots 18:21, 24 downgrade 22:13 downgraded 13:21, 22 downgrades 13:22 downgrading 8:18 12:18 15:14 25:15 37:9 drainage 15:19 draw 30:25 drinking 22:1 30:23 31:3 44:23 55:12 drips 10:1 drop 51:13 dropped 51:21 dropping 51:24 due 51:25 dug 27:16, 25 duly 57:5 dust 24:25 < E > early 5:18, 23 8:14, 14 10:8, 24 25:18 46:7 easier 13:16 east 11:9 43:12, 13, 14, 15 53:18 eat 24:24 eating 24:23 edge 28:8, 9, 18, 20, 23 30:19 31:11, 13, 14 32:7, </p>	<p> 11, 18 43:7, 18 45:15 47:4 50:15 effective 34:4 35:21, 22 effectiveness 35:18 36:2 effort 32:8 egg-shaped 20:6 eight 11:4, 6, 11 15:3 29:25 either 22:23 elements 34:14 ELEVATOR 1:9 9:19, 20 11:3 16:9, 15, 20 18:2 21:8 24:16, 20 43:16 44:12 51:8, 13 Elevators 4:21 9:9, 12 eligible 12:6 38:10 e-mail 39:7 56:5, 11, 12 emergency 10:13 emitted 11:17 employee 57:15, 15 ends 38:16 entire 26:12 entry 16:14 environment 33:18 35:3, 6, 15 Environmental 6:8 EPA 12:12 33:23 36:10 38:1, 1, 7, 8 41:11 EPA's 4:15 especially 8:1 Estimate 20:17 23:8 29:19 34:20 estimated 10:18 37:7 evacuating 26:5 evaluate 33:13 41:8 evaluation 34:12, 25 37:14 evening 3:15 </p>	<p> event 12:7 eventually 26:10 everybody 3:15 18:14 23:1 39:15 exactly 30:25 example 15:17 excavated 35:13 exceeded 16:2 exceeds 25:5, 7 excess 5:9 21:19, 24 23:17 25:12 existing 18:23 expand 27:25 29:24 expanded 27:21, 23 35:23, 24 expanding 29:25 expect 15:2 20:7 expensive 7:1 37:20, 20 54:9 explain 16:12 explained 36:6 exposed 22:7, 8, 10 24:12 exposure 24:21 43:24 exposures 20:17 26:23 extend 30:21 extended 12:24 30:21 48:20 extending 5:20 49:8, 14 extension 30:12 extensive 14:10 50:9 extent 18:5 19:19 extract 11:16 53:16 extracted 11:21 28:12 extracting 52:8 extraction 11:7, 7, 12, 15, 21 27:18 31:22 51:16, 18 52:3, 16 extremely 7:1 < F > facilitate 4:2 </p>	<p> facility 8:17 9:13 13:20 fact 3:7 52:9 56:10 facts 39:14 fairly 14:9 familiar 9:8 far 4:5 42:12, 16 46:14 farther 47:20 farthest 28:9 fast 42:5 Fax 39:7 feasibility 7:8, 11 Federal 33:22 38:11 54:12 55:12 feel 3:18 feet 14:5, 6, 14 37:21, 22 44:18 50:2, 2, 16, 17 field 41:9 54:4 figure 45:24 47:11 50:8 figures 55:9 final 26:11 financially 57:16 find 17:14 first 7:2 15:23 16:6 19:3 30:4 50:1 57:4, 7 Fish 33:24 five 16:24 37:7 42:11 55:10, 11 five-year 29:6 34:22 flap 16:18 flip 3:24 36:24 45:24 flow 11:9 15:2 20:10 28:10 42:9, 19 43:3 46:12 flowing 11:14 19:2 flows 20:8 focused 17:18 folks 22:12, 16 23:10 foot 24:11 29:18 </p>
---	---	---	---

42:8 43:5
force 21:17
former 8:17 9:10
 11:2 12:7 13:13,
 20 17:17 44:20
forth 40:14 57:7
forward 54:19
found 10:11 17:6,
 11, 12 22:5 25:4
four 13:13 16:24
 17:11, 12 19:20
 20:15 27:4, 5
 33:5
four-mile 9:6
 26:22
fraction 24:23
frame 34:15 36:4,
 23
free 3:18
frequency 23:6
 46:6
frequently 46:8
 51:19
front 2:24 31:7, 8
 43:7
fumigants 14:22
fumigation 9:14
fund 38:7
funded 54:17
funding 38:11
funds 12:6
further 8:16
 26:17, 22 49:8, 15
 57:13
future 2:7 21:7
 22:6, 9 23:16
 25:6, 8

< G >
G1 27:7
G2 28:7 31:10
G3 28:17 32:6
 38:2
G4 28:22 32:17
 37:15, 18
galleries 9:19, 20
gallons 9:17
Garfield 24:14
GARVEY 1:9
 4:21 7:25 8:8, 17

9:8, 10, 12 10:8,
 14 11:2 12:13
 13:5, 20 19:15, 24
 27:5 38:10 41:15
 44:12, 21 45:1
 52:3
General 11:8
 14:3 43:4
Geo-Globe 50:8
geology 14:1
getting 21:20
 50:21
give 2:5 15:11
given 57:5, 9
gives 20:3
giving 2:16
go 6:25 10:6
 14:24 25:1 26:14
 28:5 31:5 33:19
 40:6, 13, 19 41:7
 43:17 49:4 51:1
goal 11:13
going 2:3, 6 4:10,
 11 7:22 15:10
 19:6, 7 24:11
 26:7 33:4 34:18
 38:23 42:11, 15,
 16, 22, 25 43:2
 52:23 53:16
Good 3:14 33:12
grabbed 18:18
gradient 30:15
grain 9:15 16:11,
 14, 19
gravel 14:7
great 46:16
greater 21:12, 17
 55:6, 7, 17, 18
green 3:1 18:24
 32:16
ground 14:24
 23:14
groundwater 5:4,
 13 8:18 9:1
 10:10, 16 11:6, 7,
 9 13:8, 14, 19
 15:7, 13 20:8, 10
 22:9, 10 23:21
 24:8 25:7, 13
 26:4, 19 28:2, 5,

10, 13 30:14
 31:11 33:8 34:19,
 21 37:8, 9 42:9,
 19 43:3, 5, 6
 44:22 45:25
 46:12 47:12
 52:11
group 2:24 12:23
 13:6
groups 20:22
guess 29:22
 42:16
guys 2:20 3:9

< H >
half 43:18 45:15,
 21 46:10 51:22
halfway 21:10
hand 57:18
handle 10:15
handles 5:17
happen 2:6 32:8
 40:22
happy 56:5, 13
hard 37:23 42:22
HASTINGS 1:10,
 20, 22 6:15 30:17
hazard 21:12
heads 28:4
health 5:8, 10
 20:18 33:17 35:2,
 6, 15
hearing 56:15
helpful 49:20
HI 21:11
high 11:18 44:5,
 8
higher 55:20
highest 18:5
 20:2 51:12
highway 46:22
hire 40:7, 18
historical 8:4
history 4:19, 20,
 24 9:10
home 44:4
hoped 7:25
hopefully 3:23
horizontally 31:18

huge 13:22 18:1
 26:22 40:23 54:5
human 5:7, 9
 33:17 35:2, 5, 14
hundred 51:22

< I >
ICA 30:12
idea 19:2
identified 36:10
identify 7:11
 26:13
identifying 36:13
Idlewild 47:5, 7,
 23 48:17, 19, 25
illustrate 52:22
image 20:4
impacted 13:1
implement 7:23
 34:6 39:4
implementable
 35:22
implemented
 39:19
implementing 8:20
importantly 4:13
include 29:9
 38:24
includes 24:22
index 21:12
indoor 17:20 21:3
industrial 21:2, 3
infiltrating 26:19
infiltration 9:19
inform 4:3
information 3:25
 8:4, 12 18:23
 21:14 28:3 41:3
 52:25 56:6, 9
inject 33:7
injection 31:23,
 24 32:22
injections 11:24
 32:19 33:1 37:18,
 20
install 30:1, 3
 31:12
installed 8:9
 9:13, 22 10:14
 11:24 13:6 15:8

19:15 22:21 30:6
52:3
installing 30:22
institutional 30:16
31:2
intentionally 17:17
interested 57:16
INTERIM 1:8
8:13, 20, 23 25:21,
22 39:5 42:24
intersection 47:8
introduction 4:18
investigation 5:2
7:8 10:23
involvement 4:2
6:5 10:7
iron 40:15
issue 7:14 21:18
24:7 38:19, 21
issued 7:17
items 10:6
its 23:22 27:1
36:10 41:10

< J >

Jennifer 5:25 6:2
job 41:10 45:20
jumped 9:9

< K >

keep 16:3 42:22
kids 43:17 44:4
kind 2:6 28:19
know 4:8 6:17,
24 12:2, 24 14:8
15:2 18:13 19:1
22:21 24:9 30:6
33:5 40:18 41:7,
15, 23 43:8 46:7
47:11 51:22
54:21
knowing 45:22
knowledge 2:17

< L >

lab 41:10
laptop 52:24
large 9:6 13:12
30:15 37:9

largest 51:10
lateral 18:5
laterally 14:10
20:9, 11 46:11, 15
lead 38:7
leading 28:8, 18,
20, 23 31:11, 12,
14 32:7, 11, 18
leaked 10:3, 3
14:23
leaking 51:9
leave 35:6 39:12
letter 39:7
levels 4:7 15:25
16:3, 25 17:13, 25
18:6 27:3 55:20
liable 12:11
Library 1:20 53:1,
2, 5
Life 7:25
lifetime 21:21
limits 25:4, 6, 7
line 9:25 10:12
30:5, 25 49:22
lines 5:20 15:19
list 3:1, 4, 5 7:5,
6 38:12
listed 7:4, 6
listen 56:1, 1
liter 52:18 55:10,
11
little 4:19 7:24
8:10 20:4 31:6, 6
47:20 56:7
live 22:13
Lloyd 6:6
load 17:8
located 32:14, 15
location 16:1, 9
locations 15:4, 8
16:24 17:10, 11,
12, 12, 24 45:13
50:8
long 4:20 6:20
9:6 13:13 19:20
26:22, 25 28:14
34:4 39:18, 23
46:10
long-term 26:16
35:17 36:2

look 7:9 14:25
15:25 16:4 19:25
27:8, 9 28:16
34:10, 11 35:9
38:17 51:17
looked 4:8, 12
5:12 15:1 17:9
21:1 27:4, 15, 19
34:15 37:10, 13
looking 14:18
16:13 22:20, 20
looks 18:4 19:9,
17
Lori 22:11
lot 4:24 6:21 8:3
14:16 15:6 19:22
24:25 28:2 33:11,
12 41:20
lower 14:13 31:17

< M >

machine 57:7
magnitude 51:14
mail 3:8
mailing 3:1, 4, 4
main 22:24 23:2
48:19, 20
mains 12:25
49:15
maintenance
17:23
majority 52:16
man 2:16
management 29:5
34:20
manager 2:15 6:7
manmade 54:8
map 43:13 46:18
March 12:20
MCL 55:12
mean 35:5 39:19
48:9, 13
means 21:13, 15
29:5
media 14:25
medial 14:12
31:16
meet 33:15, 16, 25
34:1, 2 35:4, 25
37:11 55:14

MEETING 1:6
8:22 39:1, 20
meets 37:15
mental 20:4
met 37:11
methods 4:12
micrograms
52:17 55:10, 11
middle 18:6
28:18 32:12
38:15
mid-plume 32:7
midway 32:15
MIDWEST 57:22
migrate 42:8
migrates 31:17
migration 26:18
mile 43:18 45:15,
21 46:10 50:14
miles 12:25
13:13 19:20 33:5
million 37:16
54:10, 23
minus 21:22 35:4
missing 30:12
missteps 41:1
mistake 11:5
mobility 34:5
35:19
model 42:20 43:4
moderately 35:22,
22
modifying 34:3, 7
money 40:23
54:12
monitor 15:9
23:6 27:12 42:15,
17 51:18
monitoring 15:9
19:12, 13, 14 29:8
34:22 45:23, 25
46:2 47:8 51:15,
19 52:19
months 49:11
move 8:12 13:10
54:19
moves 31:18 43:6
moving 19:21
43:9, 12, 16

<p>multiple 15:15 17:10</p> <p>municipal 5:20 10:12 22:17, 24 23:2, 23 43:25 48:19, 20 55:12</p> <p>< N ></p> <p>NAD 31:8 53:19</p> <p>name 3:3, 19 48:8 53:12, 12</p> <p>national 7:4, 5 38:12</p> <p>nature 14:1</p> <p>near 17:6, 16 23:4, 5</p> <p>NEBRASKA 1:10, 22 6:7</p> <p>need 14:19 20:14 22:5 28:6</p> <p>neighborhoods 54:21</p> <p>net 14:2</p> <p>never 7:25</p> <p>nice 20:5</p> <p>night 2:21</p> <p>nitrates 44:6, 8, 11, 12</p> <p>no-action 27:6 29:3 34:13, 16, 17 35:3</p> <p>normal 21:20, 24</p> <p>north 31:6 43:9</p> <p>northeast 16:17</p> <p>northwest 16:17</p> <p>notes 44:4</p> <p>Notice 17:2 37:19</p> <p>noticed 42:1</p> <p>NPL 12:5</p> <p>number 7:12 10:5 19:14, 18</p> <p>NV 21:13, 15</p> <p>< O ></p> <p>objectives 26:14, 16</p> <p>occur 20:7</p> <p>occurred 30:7 41:24</p>	<p>office 17:23</p> <p>official 57:18</p> <p>Off-property 21:4, 25 22:8, 14 24:6, 19</p> <p>Off-site 25:9</p> <p>Oh 24:5 44:7 47:10 49:7 51:19 53:14 54:25</p> <p>Okay 6:16 18:1, 20 19:12 22:18 30:11 45:10, 17 47:11 49:12, 19 53:15</p> <p>once 45:19</p> <p>one-on-one 55:24</p> <p>ones 5:13 22:4 23:4, 5 30:2 40:10</p> <p>on-property 21:7 22:7, 9 23:16 24:21</p> <p>on-scene 5:17, 22</p> <p>on-site 11:20 22:10 40:3</p> <p>Operable 13:11, 15, 18 30:14</p> <p>operate 27:17 28:1 36:24</p> <p>operated 10:17 11:25 12:1 35:14 52:4</p> <p>operating 52:7</p> <p>operation 52:6</p> <p>operator 12:8</p> <p>options 53:17</p> <p>orange 49:5</p> <p>order 12:13, 14 54:18</p> <p>orders 51:14</p> <p>ordinance 30:21</p> <p>Ottawa 32:3, 5</p> <p>OU 13:18, 23 27:15 31:10 37:8 39:25</p> <p>Outdoor 21:2</p> <p>outline 4:17</p> <p>outside 31:5 46:1</p> <p>overnight 40:22</p> <p>oversees 33:23</p>	<p>owner 9:10, 11 12:7</p> <p>oxidation 11:19</p> <p>oxidizer 11:19</p> <p>< P ></p> <p>page 36:25 37:4, 6</p> <p>part 6:14 12:19 39:21 51:7</p> <p>participate 10:21</p> <p>particular 9:1 31:3</p> <p>parties 57:12, 15</p> <p>partner 6:6</p> <p>parts 54:22</p> <p>pathway 21:15 43:24 44:24</p> <p>pay 12:8</p> <p>paying 38:8</p> <p>PCB 25:13</p> <p>PCBs 14:22</p> <p>PCB's 17:6</p> <p>people 5:19 22:23 23:20 45:18</p> <p>Perfect 6:12</p> <p>performed 12:19, 24 41:10</p> <p>perimeter 46:1</p> <p>PERIOD 1:7 7:20 22:3 38:15 57:12</p> <p>periodic 41:25</p> <p>periodically 23:3</p> <p>perspective 15:12</p> <p>pesticides 14:20</p> <p>phase 7:2 25:23, 24 26:3, 7, 9, 11 39:3 40:5 43:1, 2</p> <p>phases 10:24</p> <p>photograph 16:13</p> <p>picture 19:4, 13</p> <p>pictures 15:10</p> <p>pipe 9:15, 17 10:1, 2</p> <p>pipes 49:5</p> <p>pipng 32:1, 16</p> <p>place 30:2, 4</p> <p>places 30:18</p>	<p>PLAN 1:7 2:4 7:14 36:6 38:17 39:14 41:17 56:3, 10</p> <p>planning 53:23</p> <p>plans 29:6 34:21</p> <p>Please 2:20 3:10 56:12</p> <p>plenty 38:16</p> <p>plume 8:18 9:6, 6 13:12, 22 15:15 18:1, 4, 5 19:1, 4, 4, 8 20:6 22:2 23:4, 8 25:15 26:21, 23, 24 27:6 28:8, 9, 20 30:15, 24 31:1, 15 32:12 33:3 37:9 39:25 42:13 43:13, 16, 19 45:7, 16, 22 46:1, 2, 11, 13 47:4 49:21 50:1, 3, 15, 16 51:8</p> <p>point 6:18 9:21 12:4, 21 15:20 16:8 31:16 39:2</p> <p>points 17:16 18:3</p> <p>populations 20:21, 23, 25</p> <p>popup 25:20</p> <p>pose 5:9 22:5 25:12</p> <p>possibility 44:15</p> <p>possible 54:23</p> <p>possibly 39:19 51:25</p> <p>pot 54:15</p> <p>potentially 5:9 12:11</p> <p>pounds 10:19 52:11</p> <p>prefer 2:23</p> <p>preferred 4:15 5:13 26:1 36:10 38:2</p> <p>preliminary 10:23</p> <p>pre-remedial 7:3</p> <p>present 12:22 34:25</p>
---	--	---	--

<p> presentation 2:16, 22 3:18 56:5, 12 presenting 26:2 presents 34:24 prevent 11:14 26:17, 20, 21, 23 30:22 previously 41:15 priorities 7:5, 6 38:12 private 13:1 30:23 45:3, 5 48:9, 14 privately 2:23 probably 14:8 28:4 42:11 47:10 53:25 probe 18:17 problem 10:9 32:25 44:13 procedures 41:9 process 4:3 5:23 6:17, 20 7:3 10:25 25:19 40:20, 21 41:8 Processing 9:11 Professional 57:3 profile 14:3 program 4:23, 24 8:8 progress 4:5 project 2:15 6:7 29:5 34:20 54:11 projected 40:4 properly 14:21 property 8:11 10:15 11:3 13:13, 20 15:14 24:18 44:20 PROPOSED 1:7 2:4 7:14 30:12 36:6 38:17 39:14 41:17 56:3, 10 proposing 9:4 30:20 propounded 57:7 protect 35:5, 7 Protection 33:17 35:2, 14 </p>	<p> protective 34:15 35:15 provide 2:12 22:22 provided 2:13 53:1 providing 5:19 PUBLIC 1:6, 7, 20 2:10 4:2, 4, 14, 14 6:21 7:15, 19 8:23 12:6 25:25 36:15 38:14, 24 40:11, 19 53:1 56:15 Pull 52:24 pump 28:7 31:11 32:6, 9 33:11 37:19 53:8, 9 pumped 28:17, 19, 23 pumping 32:18 53:19 purpose 8:15 13:25 push 18:17 pushed 18:18 put 3:2 10:13 29:11, 12, 15 30:8 31:3 36:17 38:11 41:23 putting 54:4 < Q > Quality 6:8 quantify 20:14 quarter 51:23 quarterly 51:20 question 3:21 8:25 24:3 questions 2:18, 20 3:17 39:16 55:22, 24 57:7 quickly 3:24 4:25 quite 3:23 4:20 19:17 37:20 < R > railroad 19:24 ran 9:15, 18 </p>	<p> Randy 5:16 12:23 44:1 Randy's 13:6 range 12:12 rate 24:10 43:6 46:16 rated 35:17 read 36:7, 7 really 2:19 19:22 recall 8:6 receive 3:8 12:6 38:19 recommendation 41:17 record 2:1, 10 7:17 38:22 56:16 57:9 records 12:3 53:3 red 15:22 22:4 55:18 reduce 27:1 34:5 reduced 57:8 reducing 35:18 reference 56:8 regard 38:4 regional 44:12 Registered 57:3 regulations 33:23 reinject 31:24 53:25 reinjection 53:17 rejected 11:23 relative 57:15, 15 release 30:7 41:24 releases 8:16 9:23 10:4 24:8 30:7 relevant 33:19 reliably 12:1 relying 41:16, 18 remedial 2:14 4:15 5:1 6:17 7:8 8:23 25:19 27:11 38:23 39:5 43:1 remediation 16:5 remedies 30:14 REMEDY 1:8 4:2 5:14, 24 6:18, 23 </p>	<p> 7:21 8:25 9:4 26:1, 11 38:9 54:17 remember 28:3 44:18 52:2 removal 12:23 48:20 removed 9:23 10:18 23:10 52:10 Reporter 1:24 2:8 3:20 45:19 57:3, 3, 4, 22 REPORTERS 57:22 repository 53:2 represents 15:20 16:8 requested 57:11 required 34:23 36:23 requirements 33:20, 21, 22 34:1 research 54:5 reservoir 54:5, 8 residences 13:3 resident 21:25 23:2 24:19, 21 25:6, 8 residents 13:1 21:4, 7, 9 22:7, 8, 9, 14 23:3, 16, 24 24:6 31:9 response 5:18, 18 20:19 38:24 57:5 responses 2:12 rest 35:10 restore 23:22 26:25 retain 16:3 review 29:7 40:13 53:5 57:11 reviewing 40:11 reviews 34:23 revise 29:21 revisions 40:16 RI 13:25 ribbon 25:19 right 3:22 6:23 7:16, 19 8:19, 19 </p>
---	--	--	--

9:4 17:19 18:2, 6,
8, 9 19:24 20:1
22:14 23:17
24:18, 19 25:24
26:7, 8 28:4
29:19, 22 30:2, 4,
5, 6 42:25 44:2,
11, 25 45:22 46:9,
20 47:4, 7, 21
49:9, 24, 24 50:11,
19, 19, 23 51:1, 2
52:22 53:9 55:18
risk 5:9 20:23
21:19, 20, 20, 25
22:5 23:9, 13, 18,
19 24:13 25:1, 12
risks 5:8 20:14,
20 21:24
road 16:14 32:2
45:1 49:5
rod 8:13, 20
RPR 1:25 57:21
run 16:16 32:1
running 5:20
runoff 15:2

< S >

S1 27:7
S2 27:15 29:10
35:13 36:16
S3 27:21 29:24
35:24 36:3, 17, 21
37:7
S4 27:24 30:8
35:25 36:1, 9, 13,
16 37:7
sample 14:17
15:21, 24 19:3
23:3 46:5, 8
sampled 15:13,
15 20:2 48:3, 6,
13
samples 14:16
15:3, 4, 5, 7, 11, 18
16:8 17:3, 9, 21
18:19, 25 19:11,
22 41:6, 11 47:12
sampling 15:7
16:9 17:18, 18

18:3 19:5 29:21
46:5, 9 50:9
Sand 14:7
satisfied 38:5
satisfy 38:5
saturated 14:6
saw 47:10
saying 29:2
40:23 50:11
says 38:4
scale 35:16 37:14
scenario 22:20
24:21
Schademann 5:16
school 43:17, 25
44:4 45:3, 5, 10,
11 47:13
screen 16:6 17:8
46:24
screened 16:23
screening 15:24
16:2, 25 17:13, 25
seal 57:18
Sediment 15:1, 3,
18, 20 25:3
sediments 16:2
see 14:19 16:9,
21, 22 19:8 27:7
30:17 32:8, 9
35:24 42:21
43:13 46:24
seen 51:13
select 6:18 7:21
54:17
selected 7:18
8:21 40:10 41:6
selecting 6:23
selection 4:3
semiannual 46:9
send 3:7 38:18
56:12, 13
separate 42:22
serious 40:25
set 33:22 57:7
sets 31:20 32:15
shallow 50:25
sheet 3:7 39:14
56:11
shop 17:22

short 34:4 35:21
shorter 36:4
Shorthand 57:4, 8
Short-term 26:15
show 15:10 19:6
52:20, 20, 23
showed 19:3
25:18, 20, 21
shown 21:11
26:16
shows 11:1 20:5
26:7
side 9:18 46:13
48:25
side-by-side 42:21
sign 3:2
signed 12:13, 15
silty 14:10
simple 6:21 7:25
simply 23:23
single 31:21
sir 53:7
SITE 1:9 2:5, 7,
15 3:6, 12 4:5, 6,
19 5:4, 15, 19, 25
6:14 7:4 8:3, 5, 9,
10 9:7, 10 10:6,
23 11:15 12:16
13:11, 12 14:4, 16
18:23 19:16
22:22 23:23 24:2
26:12 27:12 29:7
38:7, 10, 23 40:24
44:12 47:4 51:15
52:14
sites 8:2
situ 28:25
six 29:18 31:22
32:12
slice 19:7, 25
slide 30:11 39:12
52:21
slides 3:23
slight 11:10
slopes 50:21
slowly 31:16
smear 43:8
soil 5:4, 12 10:10,
16 11:11, 12, 15,
16 13:14, 25 14:4

15:4, 5 16:7, 8
17:3, 10, 15 23:14,
18 24:4, 6, 8, 9, 10,
12, 23 25:5 26:20
27:18, 22 29:15
34:25 35:13
44:20 52:1, 2, 11
soils 9:5 13:19
14:5 22:7 25:13
26:18 27:5, 16, 25
28:3 29:11 34:17
solicit 4:13
somebody 30:22
sorry 6:10 37:3
48:12
sorts 28:15
sounds 49:14
source 8:16 9:2,
3, 5 12:18 13:5
25:5 26:4 43:1
47:18, 20 51:24,
25 52:12 54:2, 14
south 31:6 43:10,
15, 18 45:6, 15
47:20, 25 54:24
55:1
southeast 11:10
southwest 16:17
spacing 32:24
speak 2:23 3:19
SPEAKER 3:14
6:13 18:12 22:15,
19 23:12, 15 24:5,
17 32:4 36:18, 22
37:2, 5 39:22
40:2 41:5, 21
42:3, 7, 14 43:11,
22 44:7, 10, 17
45:4, 9, 17 46:4,
19, 23 47:1, 6, 17,
24 48:2, 5, 11, 15,
18, 23 49:2, 7, 12,
17, 19, 23 50:6, 18,
22 51:4, 11 52:15
53:11, 14, 20, 24
54:7, 13, 25 55:5,
8
speed 28:21
32:10

<p> spending 6:21 spent 54:10 spoken 48:7 spread 19:9 33:5 42:4 43:8 spreading 26:22 33:3, 6 41:20, 22 42:2, 6 44:15 spreads 20:9, 10 stage 7:16 stand 6:2 standard 55:13, 14 stands 21:12 start 26:15 39:24 started 52:7 state 3:19 6:6 10:21, 22 33:21 34:9 36:12 38:1, 8 40:15 State's 4:22 8:7 10:7 statutes 33:24 statutory 29:6 34:22 step 20:12 41:1 stepped 5:16 44:2 steps 20:15 stick 52:23 55:23 stop 8:16 17:23 storage 9:14, 16 16:18 17:17, 19 stored 9:17 straight 49:22 50:15 strategy 25:17 Street 1:21 18:10 study 7:8, 11 stuff 33:2 sub-flat 17:21 Subsurface 15:5 23:18 25:5 suggesting 44:4 sum 40:23 SUPERFUND 1:9 6:10, 16 8:2 10:24 supervisor 6:10, 11 </p>	<p> supplemented 18:22 supplying 22:24 23:23 sure 3:19 surface 15:4 16:7, 8 17:2 23:18 24:11 25:4 44:23 surrounding 6:15 suspect 23:7 SVE 27:22, 23, 25 29:24 35:14, 23 swimming 28:4 sworn 57:5 symbol 11:8 system 5:21 7:22 8:9 10:15, 18 11:1, 13, 20, 24 13:5, 5, 7 27:18, 22, 23, 25 29:25 35:14, 23 39:3 40:8 52:3 systems 52:12 55:13 < T > table 20:1 37:22 44:19 take 2:11 6:25 7:15 8:14, 23 14:24 16:4 23:20 25:25 28:15 29:23 37:7 38:17, 20 39:10, 16 40:25 42:11 taken 10:12 12:3 23:5 25:22 36:15 57:7 talk 2:4 4:18 5:1, 7, 11 20:21 49:13 talked 13:24 30:9 talking 31:4 40:24 45:18 46:11 47:11 tall 16:20 tank 9:14, 16, 16, 18, 22, 24, 24 17:17, 19 30:4 </p>	<p> 41:23 team 6:14 Technical 18:8 56:4, 7 technology 18:17 Ten 37:6 term 26:25 34:4, 4 35:21 terms 35:17, 18 36:2 test 47:4 48:16 52:13 tested 54:22 testify 57:5 testimony 57:5, 9, 11 testing 41:4 42:1 tet 25:13, 14, 16 tetrachloride 9:14, 24 10:9, 19 14:19 17:3, 5 29:1 Texaco 28:10 thank 2:19 3:15 18:12 56:14 thick 14:6, 14 37:22 thing 25:9 42:21 56:3 things 3:7 27:12 28:21 36:5 42:18, 22 think 18:8, 14 39:6, 12, 15 40:3 48:7 54:8 55:22 thinking 45:10, 12 thought 14:17 47:3 three 16:24 30:14 31:12, 23 32:10 threshold 33:14 35:25 37:10, 12 38:5 time 12:12 34:15 36:4, 23 38:16 42:13 54:23 55:25 57:12 times 21:17, 22 33:11 </p>	<p> title 6:9 Tom 6:9 tonight 2:9, 13, 20 4:18 39:8, 10 41:17 top 9:20 total 18:4 town 53:18 toxicity 21:14 34:5 35:19 track 19:21 tracks 16:16 transcript 57:13 transcription 57:8 transect 47:10 transformer 14:23 17:7 transport 20:7 42:20 43:4 transporter 12:9 treat 11:12 28:7 29:11, 13 31:11 32:6 33:11 37:19 53:9, 16 treated 11:22 27:17 28:13, 17, 19, 23 31:25 43:19 treatment 5:21 7:22 11:1, 22 28:25 31:21, 22 32:13, 20 33:7 35:20 37:24 trend 11:10 trends 52:21 Trespassers 21:5 trichloroethanol 25:14 Trotter 5:25 true 8:1 48:22 57:8 truth 57:5 try 4:25 trying 19:21 34:8 turn 3:11 two 9:7 11:23 16:24 30:1, 6, 8 31:20, 23 32:9 33:14, 16 35:25 </p>
---	--	---	---

42:8, 21 43:5
51:14 55:9
type 5:5
types 7:10
typically 5:22
6:16

< U >

um 10:7 11:15
24:22 29:17 33:4
38:1, 7 40:17
50:9 52:15 56:1
unacceptable
22:5 23:17 25:10
underlying 14:5
understand 49:21
unfeasible 33:9
uniform 50:12
uniformly 19:10
unit 6:10, 10
13:18 30:14
units 13:11, 15
14:10
unsaturated 14:5
updates 2:5 3:6
upgraded 13:4, 7
upper 14:12
upright 16:11
use 10:13 23:20,
22 27:1 41:8

< V >

validated 41:12
validation 41:7
value 21:13
vapor 11:11, 15
27:18 52:2
vapors 11:16
17:22
verbal 39:8
vertical 31:19
vicinity 10:4
volatilizing 24:9
volume 34:5
35:19
voluntarily 12:15
voluntary 4:23
8:7

< W >

Wabash 18:11
46:17, 20 47:2, 5,
7, 13, 23 48:21, 24,
25 54:24 55:1
Wallace 45:8
want 4:3 6:2
10:20 16:4 23:21
26:17, 19, 20, 21,
23, 25 39:13
40:25
WASHBURN 2:3
6:4 56:2
Washington 18:9
water 5:20, 20
11:22 12:25, 25
20:1 22:1, 17, 23,
25 23:11, 24
30:23 31:3, 25
37:21 44:1, 5, 18,
24 45:3 50:25
52:13 53:8 55:12
way 4:21 39:21
46:10 48:21, 24
50:21
welcome 55:23
well 2:23 8:24
10:12 11:20
19:13 20:9 21:10
22:21 29:12
30:23 31:3, 3, 4,
19 32:3 39:4
40:21 43:22 45:3,
5, 12, 18 47:8
48:3, 4, 10, 14
49:10, 13 50:5, 24
51:11 52:5, 16
54:22 55:5, 21
wells 10:12 11:7,
7, 12, 16, 21 13:1
15:9 19:12, 14, 18
30:1, 6 31:12, 21,
22, 24 32:10, 12,
15, 22 45:23, 25
51:15, 16, 18
52:16, 19 54:4
went 4:22, 23
52:4, 6 56:15
we're 4:1, 10, 11,
13 6:21, 23 7:3,
16, 19, 21 8:19, 20,

20, 22 9:3, 4
14:18 16:13 19:7
22:19, 20, 22 24:1,
1 25:22, 24, 25
26:2, 4, 8, 9 27:10
34:8 38:15 39:20,
21 40:24 41:18
42:14, 15, 25 46:8,
10 52:5 53:4, 16
54:1, 16 55:3
west 42:12 47:9
we've 4:4, 5, 24
7:18 13:24 14:12
41:6 42:19 43:2,
3 44:3 51:13
52:7, 10
whatsoever 23:14
white 15:19
wide 50:2
Wildlife 33:24
within-named 57:4
WITNESS 54:3
57:4, 9, 11, 18
wondering 44:14
work 5:15 8:8
12:16, 19 29:5
34:21
workers 21:2, 6
working 40:14
49:9
works 21:3
wrap 55:22
write 39:13
writing 57:8
written 39:9

< Y >

yards 47:22, 25
Yeah 40:1 46:25
48:1, 22 49:1
50:6, 7 51:3, 4, 6
54:15
year 54:11
years 11:25 33:4
37:6 41:2, 22
42:11 43:20 51:9
yellow 18:20

< Z >

zone 14:6
zones 14:11
Zurbuchen 2:14
3:14 6:13 18:12
22:15, 19 23:12,
15 24:5, 17 32:4
36:18, 22 37:2, 5
39:22 40:2 41:5,
21 42:3, 7, 14
43:11, 22 44:7, 10,
17 45:4, 9, 17
46:4, 19, 23 47:1,
6, 17, 24 48:2, 5,
11, 15, 18, 23 49:2,
7, 12, 17, 19, 23
50:6, 18, 22 51:4,
11 52:15 53:11,
14, 20, 24 54:7, 13,
25 55:5, 8