A PHOTO ESSAY

On the construction of the **Ohio Valley Connector** Pipeline in Wetzel County, West Virginia

by

Bill Hughes

We bought our property in the center of Wetzel County in 1974 and moved here in 1977. This county, as many of you know, was the original target of the massive invasion by Chesapeake Energy over eight years ago. The Marcellus boom in West Virginia began here in Wetzel. So we have seen our share of everything related to the exploding Marcellus shale gas activity. Our home has been surrounded by Marcellus gas operations for that time. We live slightly less than a mile off the highway where our mailbox is located. In the field behind our mailbox (previously a hay field or pasture) is a large Southwestern Energy (previously Chesapeake, soon to be Antero) staging area and truck dispatch center. Thousands of trucks with drill rigs, sand, drill rods, well casing, frac pumps, etc. have been going past our mailbox on a daily basis for years now.

And now we have a new uninvited neighbor – a local, FERC-approved 30-inch pipeline very near our mailbox. FERC is the acronym for the **Federal Energy Regulatory Commission**. Applications for interstate, large-diameter, high-pressure, high-volume gas pipelines are proposed to **FERC**. FERC approves them. Being given FERC approval then gives the gas companies the legal power of eminent domain. That can create some problems.

We have had a variety of gas pipelines here for over 100 years. As Marcellus operations ramped up, we saw hundreds of miles of new gas pipelines added over the past few years. These recent unregulated pipelines have been mainly the smaller, intrastate gathering lines between well pads and compressor stations. They might have ranged from 8-20 inches in diameter. Now, as readers here are aware, there is a massive glut of extra natural shale gas that the gas companies want to sell elsewhere. Their suggested solutions are many, big, new, high-pressure, high-volume, interstate pipelines.

Before we get too far along here discussing this Ohio Valley Connector pipeline by my mailbox, let's look at some generic, everyday, smaller, Wetzel County pipelines. On the next slide are four typical completed pipelines in the area. Usually, there is no easy way to determine the diameter of the pipe, the pressure within, or even the contents.


10 18 2014 16:07

The previous slide showed the cleared areas for four existing pipelines which are relatively recent. In addition to them, we have hundreds of miles of much older pipelines. Some are abandoned, and contents and locations are not documented.

The next picture of pipes in four trenches shows typical examples of what might be below the surface in any of the existing, older pipelines here. None of these were FERC approved pipelines. These four show what might be buried in those four previous pictures of rights-of-way. Maybe natural gas, brine, condensate, or even water for gas well pad storage ponds and tanks.


04/27/2014 7:01 pm


07/22/2012 11:48 am


02/15/2012 4:26 pm

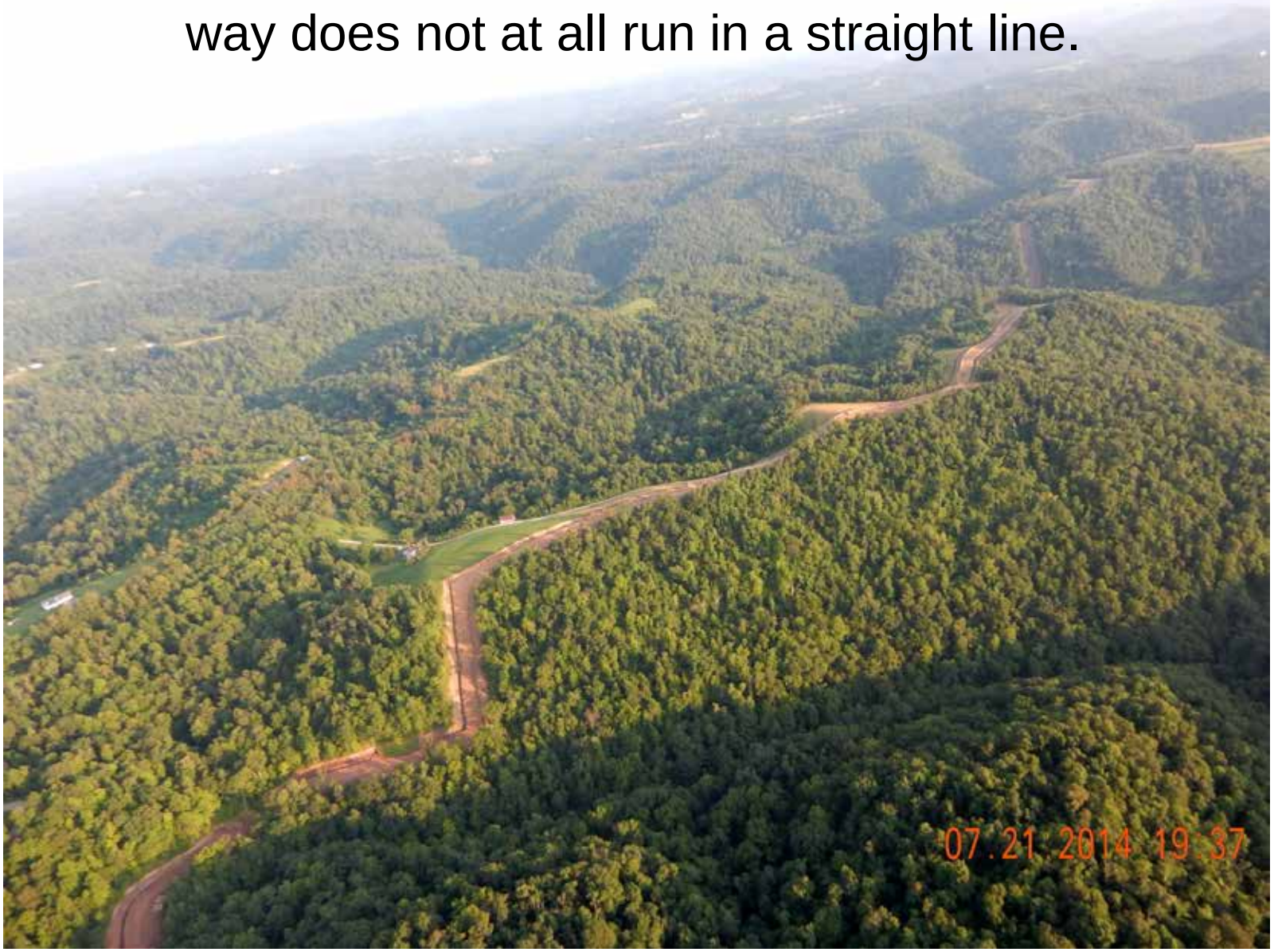
Natural gas companies and their political supporters all favor new pipelines. Pipelines are seen as the single, magical silver bullet to guarantee forever increasing profits. Time will tell.

However, shale gas opponents (anti-fracking) groups do not think we need even more infrastructure to support high-carbon-footprint energy sources.

No matter where one sits along this Pro/Con pipeline continuum, it is likely that many in both groups have not had the opportunity to walk a pipeline right-of-way or to watch in detail, up close, what both the process and the final product look like.

My goal here in this photo essay is to allow everyone to see up close what a **FERC-**approved pipeline construction looks like in various stages. This is not a proposed pipeline or on the drawing board. It is being constructed as I write this. This essay will not dwell on the impacts to the neighborhood. That perspective is yet to come in another presentation. For now, we will just show the details of construction.

This is what a typical pipeline Right-of-Way looks like from the air. Given the steep and hilly terrain here, the right-of-way does not at all run in a straight line.



This is a typical pipeline right-of-way, after the pipe has been strung out, but not yet welded together.

Some background information on this Photo Essay

1. With the exception of the previous pictures, all photos were taken between January and June of 2016
2. These photos represent what a typical pipeline construction operation will look like. What you see here is what you will get with a **FERC-**approved pipeline line.
3. I do not know if the process shown here would go as well with a much larger diameter line, like the much larger and longer 42-inch proposed Mountain Valley Pipeline.
4. Every aspect of this process occurred very near my mailbox, but many photos from nearby locations are also provided when they more clearly show better details.
5. All pictures were taken from an adjacent public road. Anyone could have taken these pictures. I do not know if the construction procedures were significantly better or worse or at all different far away from a public area out of the range of my lens. Good Question.

Federal Energy Regulatory Commission
Office of Energy Projects

October 2015

Equitrans, LP

Docket Nos. CP15-41-000
CP15-41-001

Ohio Valley Connector Project

Environmental Assessment

Washington, DC 20426

Cooperating Agency

US Army Corps of Engineers®

This is the cover to the Federal Energy Regulatory Commission document called the **Environmental Assessment** for this Ohio Valley Connector pipeline project.

All the metrics given on the next page on miles and acreage have been taken from this document. It is about 160 pages of text and at least another 100 pages of charts, tables, and appendices.

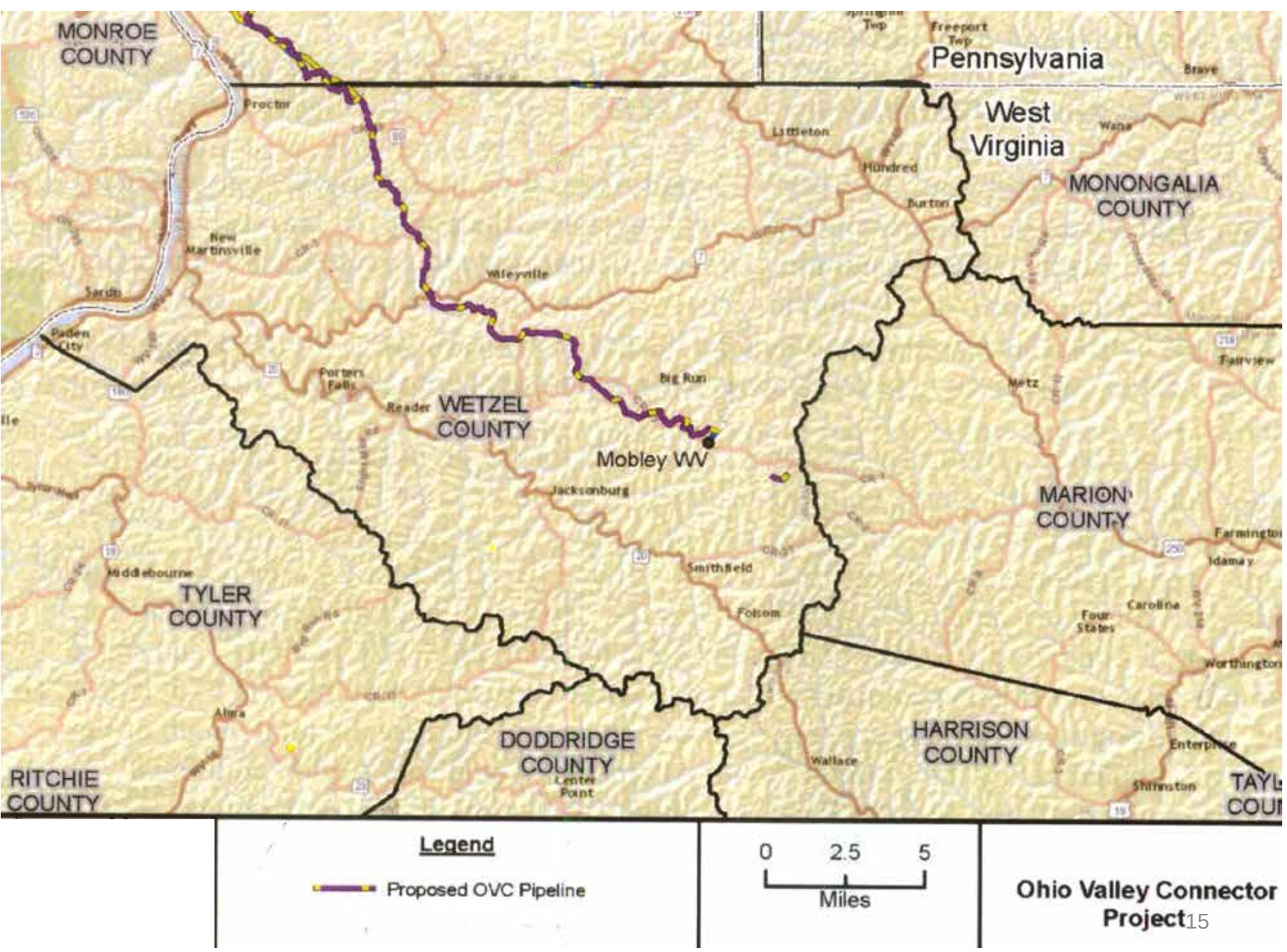
Data taken from the **Environmental Assessment** for the Ohio Valley Connector **H-310** pipeline

1. The **H-310** pipeline consists of 35 miles of 30 inch diameter steel pipeline to move natural gas from Wetzel County and through Marshall County in West Virginia into Ohio. It will have a maximum approved operating pressure (MAOP) of 1,480 pounds per square inch (PSI).
2. During construction, 838 acres will be disturbed and 298 acres permanently disturbed once in operation. (pg. 15)
3. There are two new compressor stations with this pipeline with a total of 36,000 horse power of engines. One is in Wetzel County and one in Monroe County, Ohio.
4. There will be 28 miles of access road needed for the construction of this pipeline, using 74 acres of land. See appendix E and pg.19 & 82.
5. The pipeline project will cross 138 streams; 103 minor ones and 34 intermediate ones which are over 10 feet wide. One of these intermediate stream crossings, *Little Fishing Creek*, is detailed in **Section Seven** below here. The pipeline will also go under the Ohio River between mile post 31 and Mile post 32 in Ohio. Page 62
6. During construction, 242 acres of land will be needed for contractor work space, lay-down yards and storage areas; pg. 82

A single sample of one section of 30-inch pipe. This might be the last daylight this tube ever sees before it is buried. The pipeline is visible on the far right side here.

The map shown on the next slide is taken from the Ohio Valley Connector Project Document, shown earlier, called the **Environmental Assessment** for the Ohio Valley Connector. The cover was shown earlier here.

The irregular purple line shown in the center of this map is the route of the **H-310** pipeline. It is the 30-inch diameter pipeline which will be discussed here. This pipeline begins at the Eastern side of Wetzel County, in the area known as Mobley, a village which is now owned completely by the natural gas producer, EQT. It then travels to the Northwest corner of Wetzel County where it passes into Marshall County, WV. It will then be put under the Ohio River into Monroe County Ohio, between Clarington and Powhatan Point, Ohio. I have been told that the section of pipe under the Ohio River has been completed.



Legend

Proposed OVC Pipeline

0 2.5 5

Miles

Ohio Valley Connector Project

One last note

Since many readers of these web sites probably follow shale gas related activities, they might have already formed an opinion **FOR** or **AGAINST** FERC pipelines. My intent here is to just show what the construction of a large-diameter, high-pressure pipeline looks like here at **My Mailbox**. A later story will clearly document some community and environmental impacts. But for now, this is the process of pipeline construction as seen from public areas near **MY MAILBOX**.

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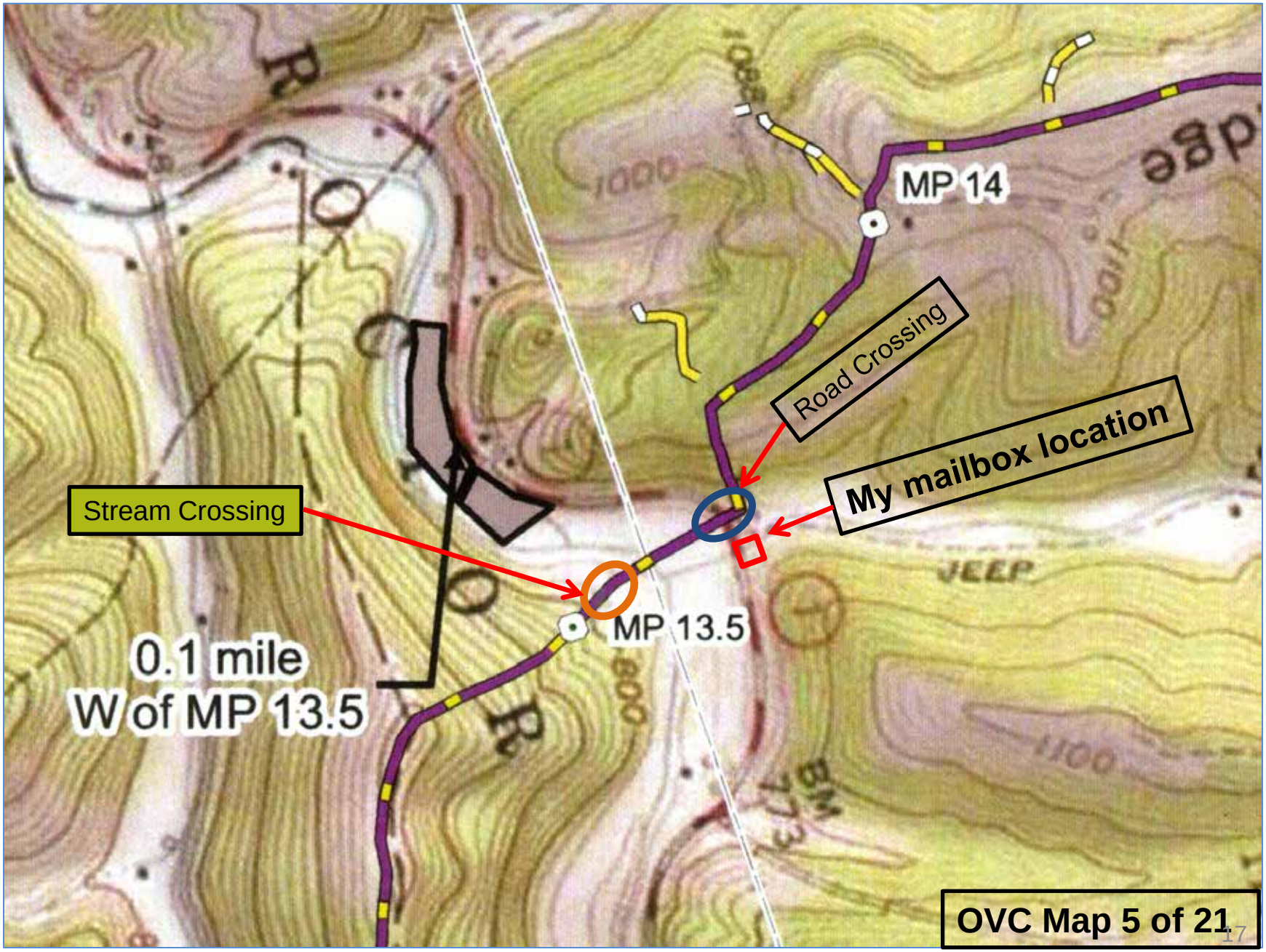
This next slide is an excerpt from the OVC document **Environmental Assessment.** It is an enlarged map taken out of the Ohio Valley Connector Project book. It is page 5 of 21 pages of maps showing details of the 35 miles of this pipeline. **MP** refers to the **Mile Post** as measured from the beginning of the pipeline in Mobley WV. So as can be seen on this map enlargement, this section of pipe adjacent to my mailbox is between Mile-post **13.5 and 13.7**.

I have added a red square to show where my mailbox is located on the roadway. An Orange oval marks where the pipeline was buried in the stream bed. And finally the blue oval is where a long bore-hole was put under the public road and the pipeline was inserted into it.

The purple line on this map is the Route of the Ohio Valley Connector Pipeline



When standing at my mailbox, this is the hill-side to the **SOUTH**. The Red circle at the top here is greatly enlarged and inserted at the top left of the picture to show the close-up of the pipe-laying equipment at the top of the hill. The Right-of-Way makes a few bends coming down the hillside to the stream.

This photograph on the left here shows the hill-side just to the west of my mailbox. This section of right-of-way was one of the earlier ones completed. The 30-inch pipe is already buried there. It also goes under the roadway at this point.

What we need to do now is go back five months to when this started.

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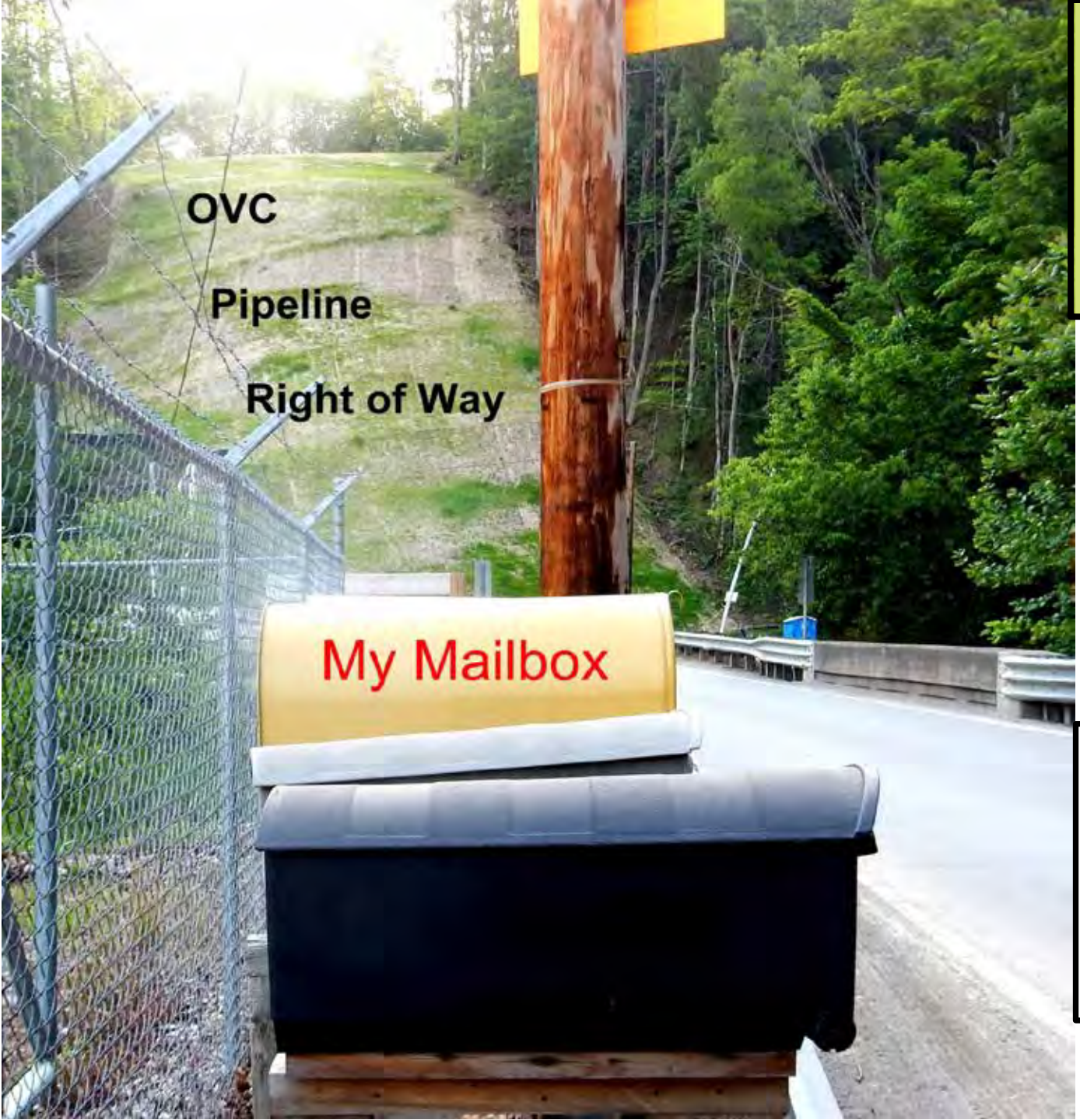
There will be 8 SECTIONS here.

1. Preparing work areas; pipe laydown yards
2. Clear cutting of all timber
3. Prepared surface for trench start
4. Assorted trench excavations
5. Pipe transport; stringing out pipe; welding
6. Pipe installed under roadways
7. Pipe installed in stream beds
8. Covered over and complete

Enough background information. We need to get started. I have a lot of photos to show you. Let us stroll down my lane to get my mail and see what has been going on there for the past 6 months. Always bring your camera. And extra batteries.



Pipeline at my Mailbox

Section ONE

Establishing Work areas and laydown yards

Before any trees are cut and dirt pushed, there is a transfer of a major industrial manufacturing plant. These pipes do not grow here. The pipeline will be manufactured and constructed here in our front yards and hayfields, forests and pastures. So we will look at the many work areas and fabricating locations. A successful pipeline construction project requires all the components of any manufacturing operation. Just no walls or roof. Work areas are built in strategically located pasture land and hayfields.

These work areas are needed to:

- Stockpile miles of the 30-inch pipe and pre-bent pipe sections;
- Store tools, part, supply trailers;
- Park hundreds of pipeline employees' trucks;
- Stage equipment; park water trucks and diesel fuel trucks;
- Repair equipment; assemble pipe sections;
- Bulk fuel storage tanks; office trailers
- Equipment parts and repairs
- Company truck fleet parking
- Store and distribute sand bags, silt fencing, and stakes.

The fields shown here are typical of the fields selected for the pipeline work areas. Usually the topsoil is pushed aside. Hopefully it will be later returned to some productive use. The next slide shows four examples of the topsoil removal.


01 21 2016 17:14


01 21 2016 13:27


01 28 2016

After the top soil is pushed aside, some plastic is put down, and then a few billion tons of gravel are dumped.

This photo shows the field directly across the stream from my mailbox. It soon became an important work area as the pipeline goes completely through it.

Around the bend from my mailbox (is) was a hayfield. It is shown on the left here as the transformation began from agricultural use to industrial use. The same field is also shown in both pictures below. It is now a work and storage area for the pipeline construction process.

You are looking at over a million dollars' worth of brand new earth-moving equipment waiting to be taken out to the pipeline right-of-way.

The next two slides show one use of the work areas that were established in many hayfields and pastures along the pipe route. The first one shows various segments of pre-bent 30-inch pipe elbows which will be assembled into pre-welded pipe sections to be taken out to the pipeline right-of-way.

The slide after that shows the actual fabrication process of welding; grinding welds; sand-blasting the welded area, and finally epoxy coating the pipe surface.

Welding sections

Grinding Welds

Sand blasting Welded sections

Epoxy Painting Welded sections

In some of the laydown yards and work areas, large wood timbers, called matting, were first put down over softer ground.

This first section will finish up with samples of the work areas in use. The next **NINE** slides show a wide assortment of the types of supplies, tools, and equipment in the work areas. These include: tool storage; matting; office trailers; pipe bending equipment; truck parking; fuel storage tanks. And, of course, miles of pipe.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PORTA BULL
FUEL
KEEP MOVING


DARBY


ice


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02 28 2016 13:19


03 05 2016 16:44


03.23.2016 13:05


05.18.2016 16:16


05.19.2016 12:30


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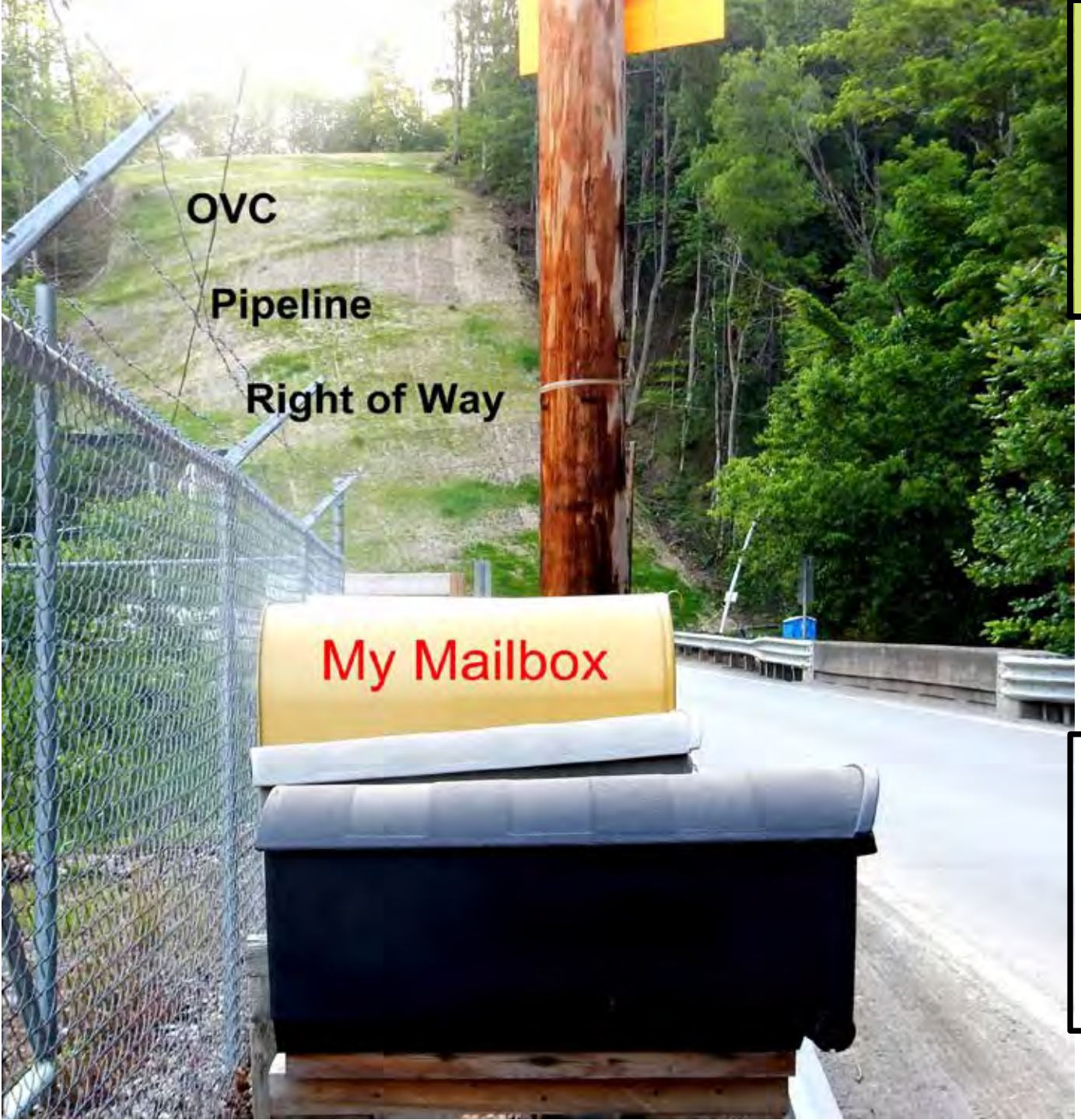
02.29.2016 10:18



Pipeline at my Mailbox

Section Two

Clear cut Timber on Right of Way

There have always been a lot of hardwood timber stands here in Wetzel County, West Virginia. We have a lot of forested land. But now there is less. Pipeline construction cannot be done here without the permanent removal of a lot of board feet of timber. Many trees had to go. As we will see here, hundreds of acres of trees were permanently removed for this pipeline.

There are two hillsides close to my mailbox, one to the west and one to the south. The pipeline uses both of them and the field between them.

This is the clear-cut hillside to the south of my mailbox.

This is the hillside to the west of my mailbox. They are finishing up the last of the tree removal after clear-cutting all the trees.


02 07 2016 14:17


03.05.2016 16:14

Some landowners demand that their timber be saved and stockpiled.

After all the trees are cut down and the biggest of the trees pushed aside, the smaller branches and tree tops are then piled up and burned. The next two pictures show two of the hundreds of tree-top burning piles ready to burn.

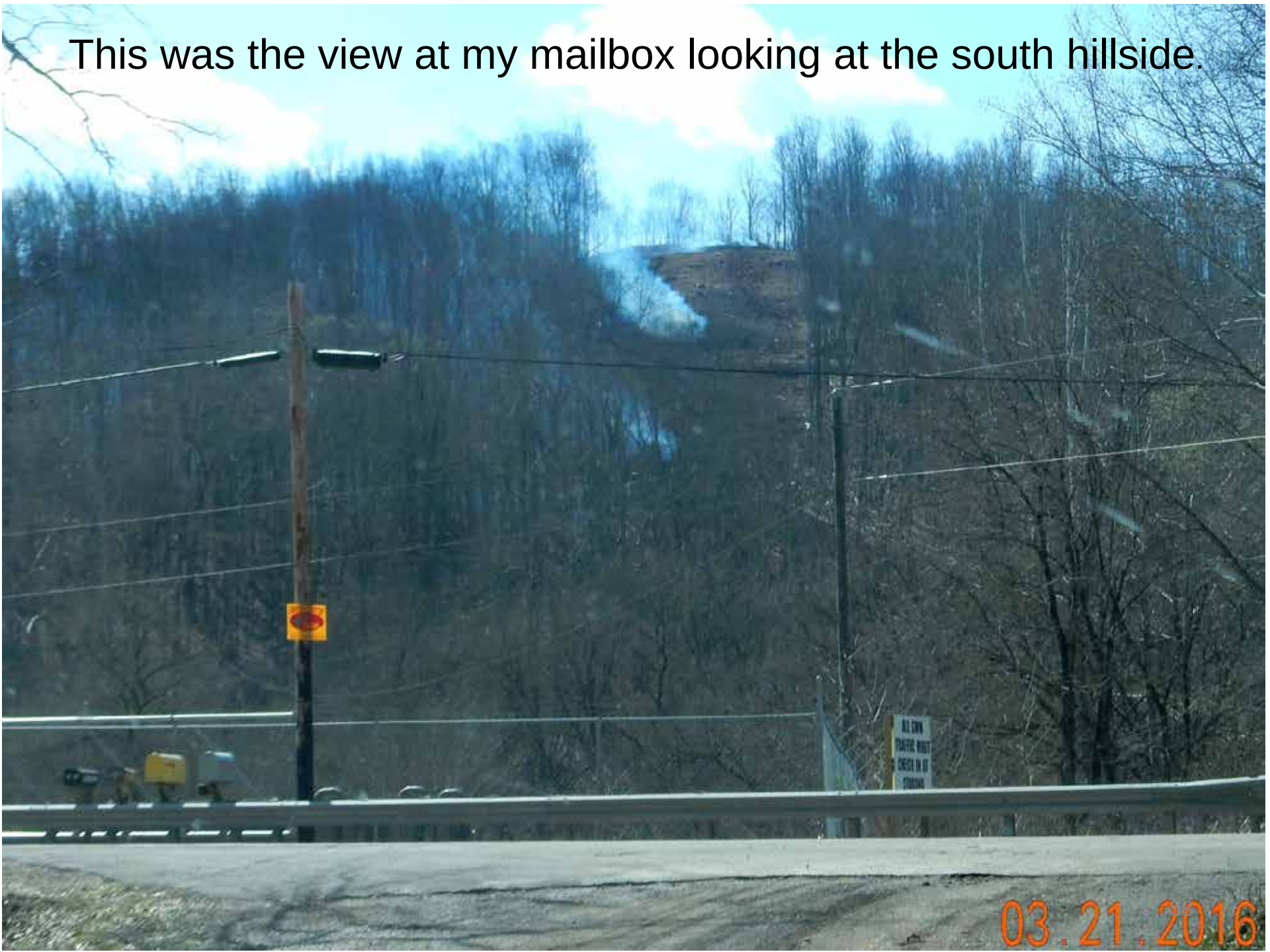

CAT

The next two slides show just one example of the burning of the tree tops and smaller branches. This occurred at many locations. These two photos were also taken while standing at my mailbox. I came back later that night to watch the big bonfire.


01.29.2016 17:44

The next **FIVE** photos show the ongoing burning along the pipeline route in various locations. Also seen are the piles of ashes or embers the following days.


CAT
CAT


This was the view at my mailbox looking at the south hillside.
03.21.2016


03 04 2016 17:14


03.08.2016 13:57

This is the hillside to the West of my mailbox. All the trees have been removed but the stumps not yet ground up.

Here a stump grinder is being lowered down the hillside by a much larger bulldozer.

Shown here is a stump grinder

Pipeline at my Mailbox

Section Three

Examples of clear cut RoW; ready for trench excavating

All trees on the right-of-way are now cut and removed. Tree stumps and large rocks are gone. Land surface cleared and smoothed out some. Some piles of ashes remain from the tree burn. Surveyors now re-mark the center line of the pipeline. The surface of the right-of-way is ready for the pipe-trench crew to start.

This is the south hillside near my mailbox. The ash piles from the tree burning can still be seen here.

This is also the south hillside near my mailbox after more landscaping. All the extra dirt and rock have been pushed to the opposite side of where the pipe trench will be.

The west hillside as seen from my mailbox is being smoothed out.

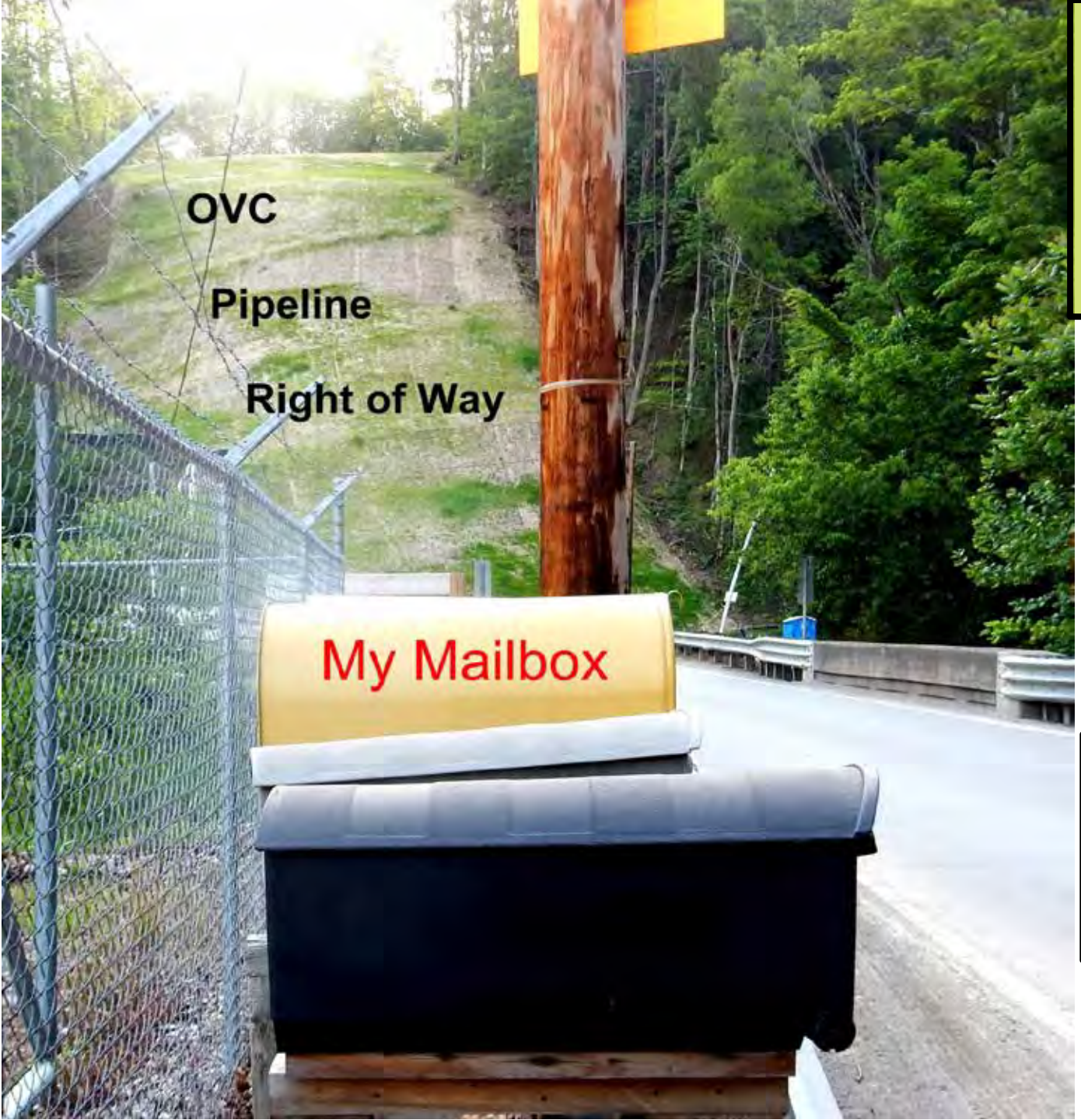
This is the west hillside. All prepared and ready for the trench to be dug.

This particular right-of-way is at Mile Post ZERO. This is where the Ohio Valley Connector pipeline begins near what remains of Mobley, WV, in Wetzel County

This photo and the next two are just cleared right-of-ways, waiting for the trench


03 14 2016 14 34


03/20/2016 14:41



Pipeline at my Mailbox

Section Four

Examples of pipe trench excavations

The pictures in this section will show an assortment of trenches being dug. It is common on the steep hillsides here to have the track excavator tethered to a very large bulldozer further up the hill. A cable is used to lower the excavator down the hill and hold it while it works and pull it back up. Frequently, rock ledges are encountered and another track hoe will be brought in with a jack hammer. The white bags in the trench are filled with sand. They provide both a dam to restrict water flow in the trench and to provide protected support for the pipe to rest on.

Cameras and photographs do not seem to accurately show the steepness of some of our hills herereflect what we see a

Cameras and photographs do not seem to accurately reflect the steepness of our hills here no matter how I try to show them. This photo might give others some idea of it. This is the bottom of the pipelineRoW on this hill.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03.08.2016 13:29


03.08.2016 13:48


03.11.2016 09:43


03.09.2016 12:36


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03.14.2016 08:45


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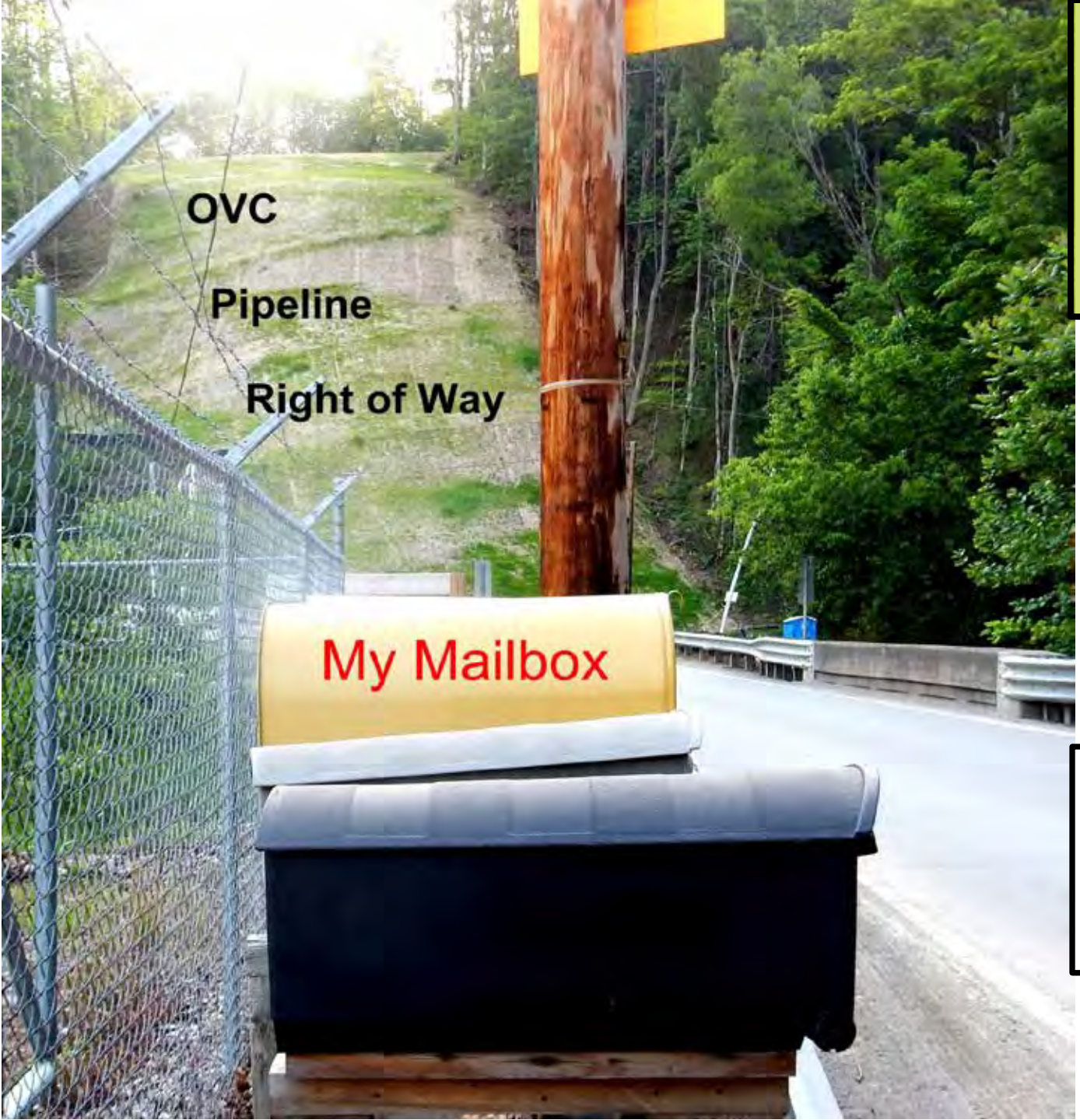

Pipeline at my Mailbox

Section Five

Pipe transport; String out pipe; weld and X-ray

This is a large section with 24 slides. It will cover:

- Trucking the pipe sections from the work areas and laydown yards to the right-of-way,
- Laying pipe in the prepared trench. Some of the pipe sections will be pre-bent and some straight.
- Pipe will be laid on sand bags.
- Welding of the pipe sections; sand blasting of welds, and then epoxy coating the welds.
- Finally, the inspection team will X-ray the welds.


03.05.2016 16:44


05 06 2016 16:20

This slide and the next three will show the progress of the pipeline on the hillside west of my mailbox.


03.20.2016 12:54


03.21.2016 11:00

This is starting the pipe laying on the south hillside.


South hillside
06.12.2016 11:42


South hillside done
06 21 2016 16:43

Welding up pipe sections

Sand blasting welds

Workers are applying an epoxy coating to the recently welder pipe sections

This truck is the X-ray technician service truck. The warning cone to the left is put at the perimeter of the testing area. The yellow cone shown above is put right on the pipe being tested.

X-Ray preparation of 30-inch Pipe section at Mile Post **ZERO**

The next **EIGHT** slides are an assortment of stringing out pipe and pipe being laid into the previously dug trench. Some are a long distance away and others show close-up what the pipe in the trench looks like. A few pictures show how steep these hills are.


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06.06.2016 12:21


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INSPECTOR
04.25.2016 14:38


06.03.2016 12:22


05.28.2016 14:19


05 28 2016 13 27

This photo and the next two show the same location, progressively zoomed in.


04/13/2016 15:56


EERE
04.13.2016 15:56

Pipeline at my Mailbox

Section Six

Special Location: Installing pipe under roadways

Installation of gas pipe under public roadway

Most of the Ohio Valley Connector pipeline goes up or down hills with some in-between segments going along the ridge tops. However, there are a few special construction methods needed to cross under public roadways and under streams or water bodies. The pipeline near my mailbox did both.

This **Section Six** will show the special effort needed to bore under roads. **Section Seven** will cover under streams.

<u>There are few common aspects to all under-road work:</u>

- A drilling pit is dug off to one side of the road where the auger or drilling machine will be lowered.
- Then a second receiving pit is dug where the pipe will come through the bored hole under the roadway. The pipe need not run parallel to the road surface.

This is the pit for the boring machine to go under the road. It is common for pits like this which are near streams to fill up with water. The hoses are from small sump pumps in the bore pit to drain the water.

This boring machine was lowered into the dug pit to drill under the highway.

Example of a receiving pit filled up with water


Operating the boring machine
05.10.2016 12:30

Receiving pipe pit before and after the pipe was bored under the roadway

Starting to bore under the roadway. The augers to the left were used. This photo and the next two picture show active boring under roadway.

Exit end of the pipe after going under the road

Another example of the exit end of the pipe after going under the road

After the under-the-road pipe was done, it was time to start the run up the hill. This elbow was the beginning of that continuation.

Pipeline at my Mailbox

Section Seven

Special Location:
Install pipe under Stream Bed

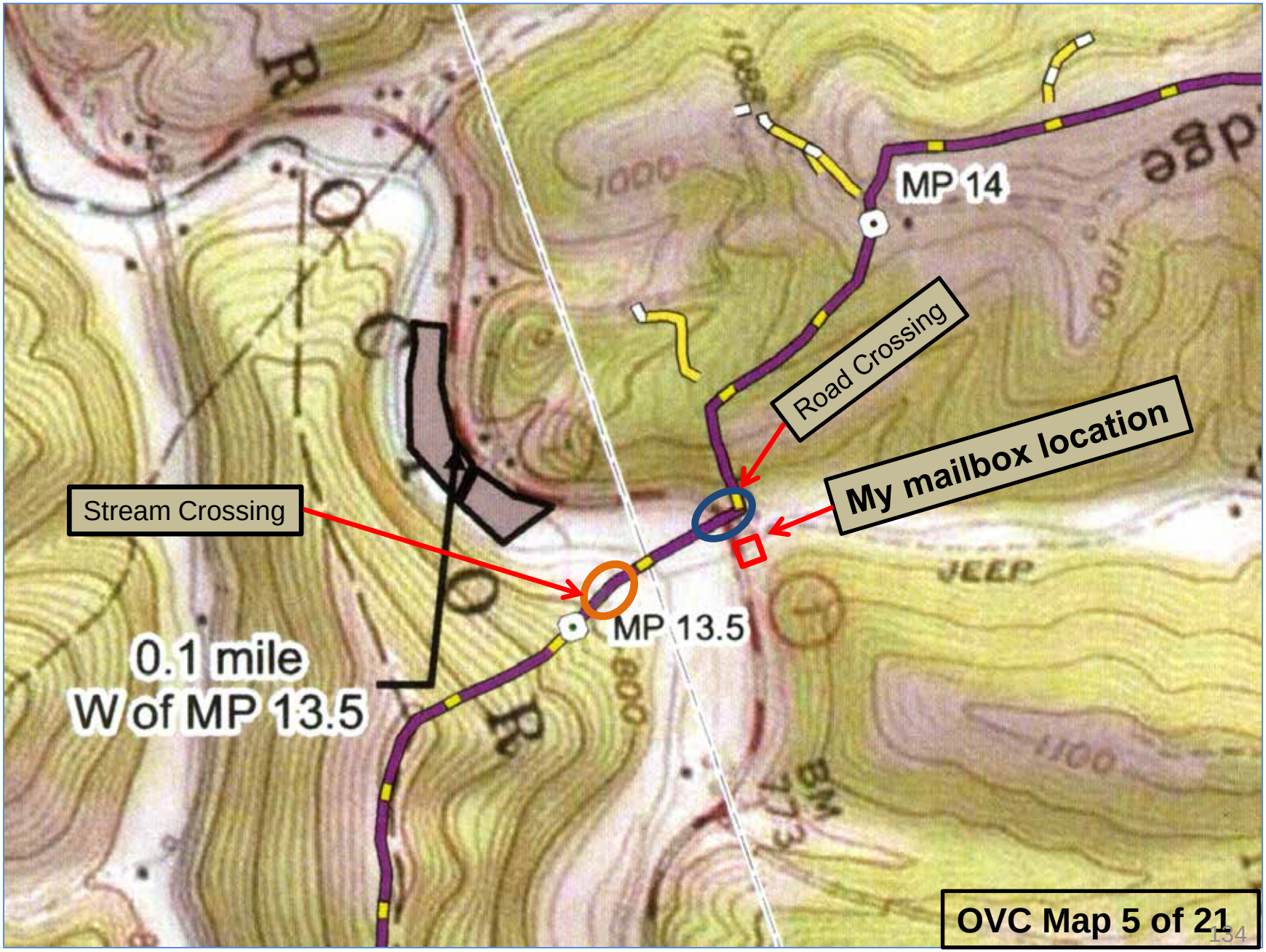
Stream Crossing Pump Around

The location at my mailbox is the **13.7** mile post on the Ohio Valley Connector. The next slide again shows the map. The pipeline had to both go under the highway here and under Little Fishing Creek. The pump around method was used. The stream here is a bit larger with higher water volume than other water bodies crossed. All these pump around photos are right here at mile post **13.7.** This can be seen on the map in the next slide.

Preparations for the pump around were started about May 8, 2016. Then continued through May 12. It mostly went as planned. Some glitches occurred.

A review of the map on the next slide might help identify the location.

The purple line on this map is the Route of the Ohio Valley Connector Pipeline



This description below is taken directly from the EQT Environmental Assessment document. It gives the essentials of what I call a Pump Around

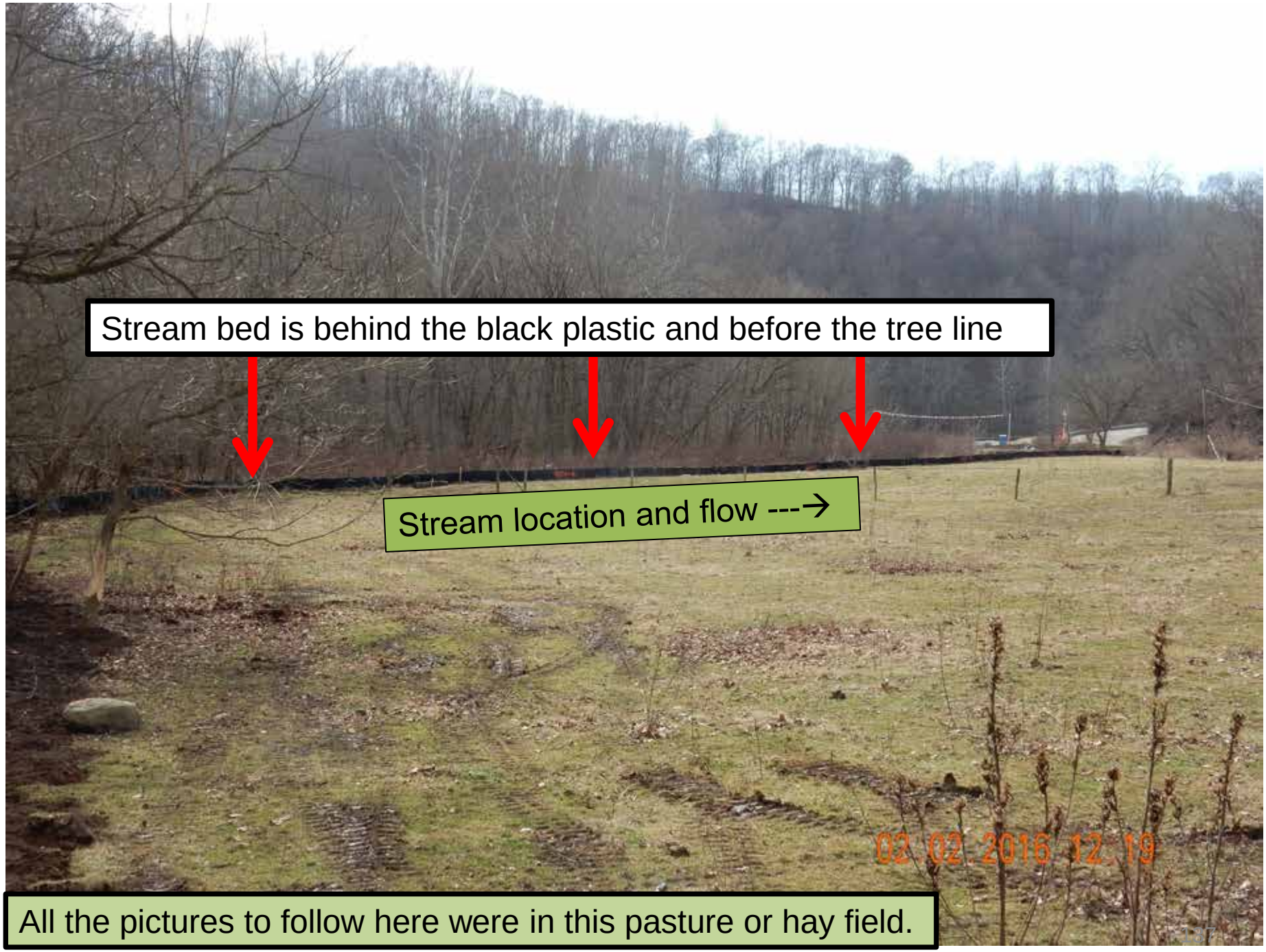
Dam-and-Pump Crossing Method

A dam-and-pump crossing diverts or isolates flow during pipe installation. The dam-and-pump method involves installing temporary dams upstream and downstream of the proposed waterbody crossing, typically using sandbags. Following dam installation, pumps with hoses would be used to transport the streamflow around the construction work area and trench. Additional pumps would be used to dewater the area between the dams. Intake screens would be installed at the pump inlets to prevent or limit entrainment of aquatic life, and energy-dissipating devices would be installed at the pump discharge point to minimize erosion and streambed scour. Trench excavation and pipe installation would then commence through the dewatered and relatively dry portion of the waterbody channel. After pipe installation, backfilling of the trench, and restoration of the stream banks, the temporary dams would be removed and flow-through the construction work area would be restored.

On the next page I break down what this all means and list the preparations and materials needed and how it is done. The many photos which follow will show what it actually looked like in real time here at my mailbox.

Stream Crossing Pump Around

Materials and Preparations needed	Sequence of Operations
1. Pre-cut, bent, welded and covered complete pipe segment for stream bed	1. If at all possible wait for a dry season and low water flow conditions.
2. Temporary bridge material; steel and heavy wooden matting	2. Obtain accurate estimate of expected stream water flow volume and potential rain fall and adjust operations accordingly
3. Excavation equipment as needed	3. Have engineered and fabricated pipe segment completed and on hand
4. Pumps and flexible, temporary piping sections for stream water	4. Build bridge for heavy equipment next to proposed trench
5. Hundreds of sandbags to dam up the stream bed and hold water back	5. Set all pumps in place on secondary containment; have spare pumps ready.
6. Refueling trucks for pumps	6. Hook up all intake pipes upstream and discharge pipe sections to downstream location
7. Spare pumps and pipes and parts	7. Dam up stream flow; begin pump around
8. Bag filter and impoundment for managing very muddy pit water	8. Excavate trench many feet below stream bed and keep trench as dry as possible
	9. Lower prepared gas pipe into place; sandbag it on both ends and on top to hold it down;
	10. Remove upstream dams and restore normal stream flow



All the pictures to follow here were in this pasture or hay field.

This is just another view of the same pasture where the pump around activities occurred.

The pipeline section to be buried under the stream bed is being fabricated here.

The pictures here are both of the same pipe section which was lowered into the trench dug in the stream bed. The overall length was about 100 feet long. This precisely designed and fabricated segment was made just for this stream crossing. The yellow covering wrapped over the pipe is a rock guard called Tuff-N-Nuff.

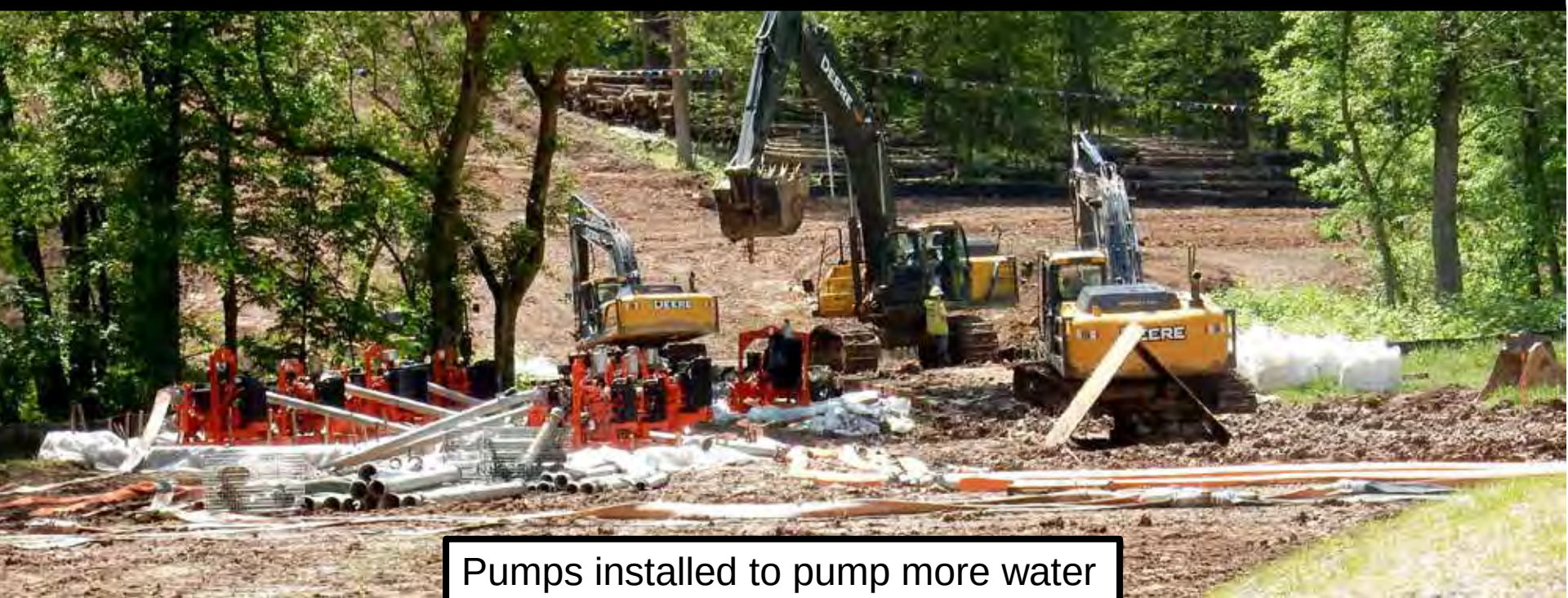
A temporary but substantial bridge was built across the stream

At first only six pumps, as shown here, were used to handle the total flow volume.

These Six pumps were unable to handle the total flow volume.

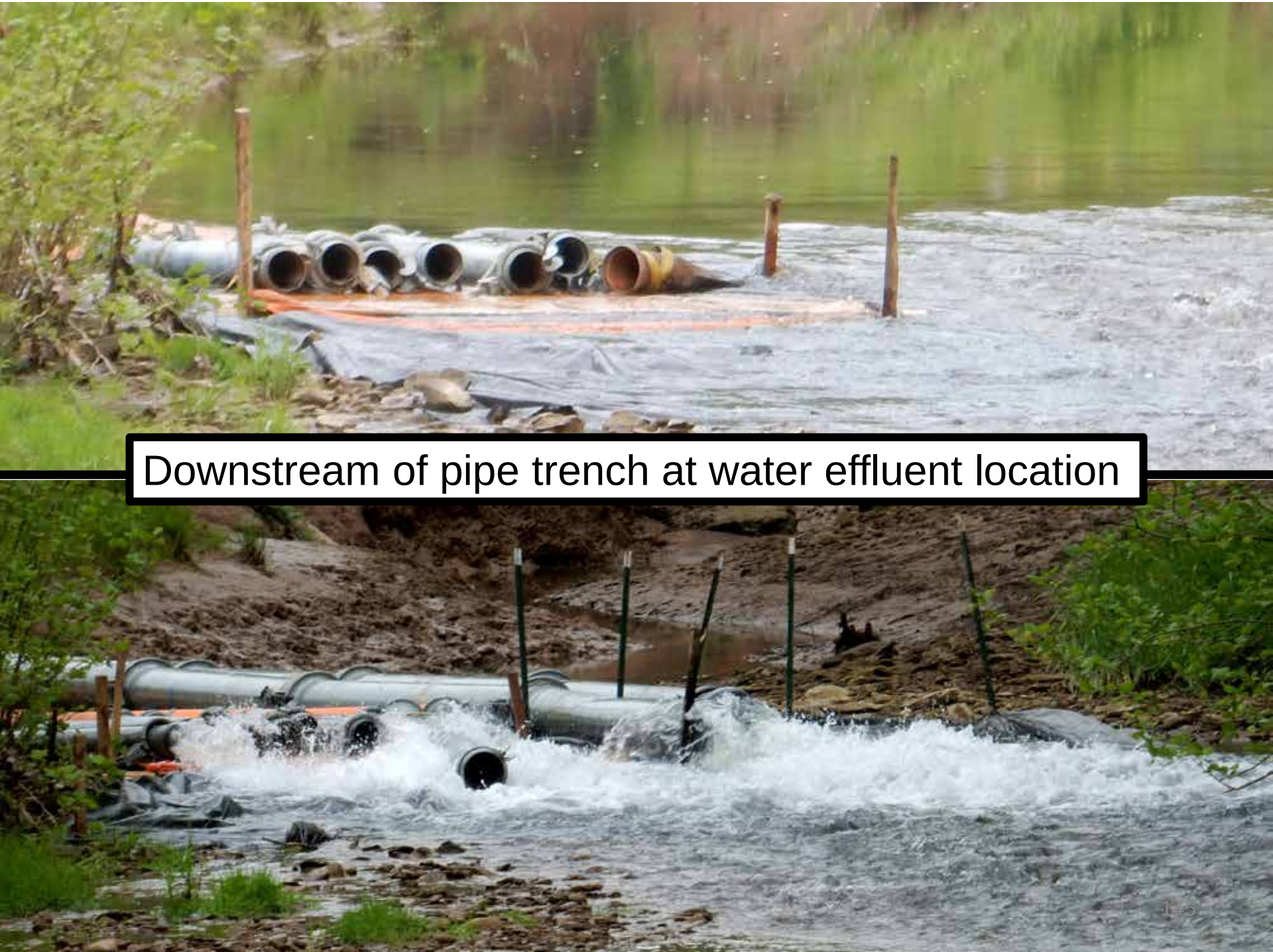
Four more pumps delivered

Pumps unloaded



Pumps installed to pump more water

This is the assortment of temporary piping used during the pump around.



Downstream of pipe trench at water effluent location

Muddy water from pipe trench pit would be pumped into this filter bag and hay bale set-up.

The high volume of extremely muddy water seemed to overwhelm the hay bale set-up

Normal flow of Little Fishing Creek at this location. Reasonably clear before the pump around began.

Little Fishing Creek at this location during the pump around. Not as clear.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350G
05.12.2016 16:17


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250G
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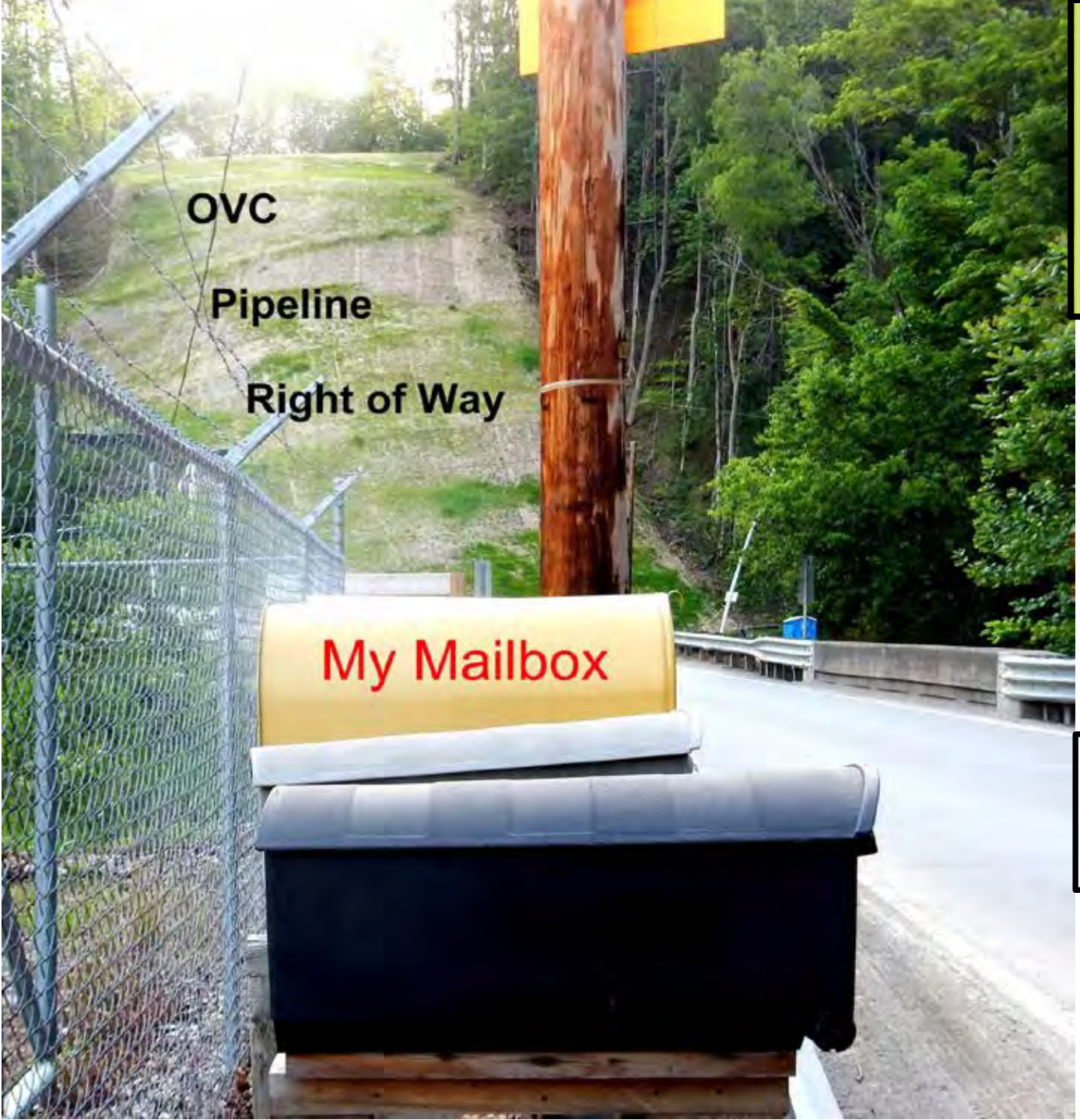
Use this at end



Pipeline at my Mailbox

Section Eight

Finished Right of Way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06.09.2016 13:03


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06.14.2016 13:17


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04.10.2016 14:54


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SPARE SLIDES AFTER HERE


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