

Presentation

At first blush your request for documentation as to the cost of not doing Preventive maintenance seems like an easy task. But separation between what would have broken down with time and what broke down because of a lack of maintenance isn't that black and white.

I looked over the past fiscal year and although there are miscellaneous items I might accredit to lack of P.M.s only one really stood out.

We have 14 chambers or tanks if you will at our main facility with miscellaneous mechanical apparatuses inside. It is our intentions to take each one of these off line each year, empty them, clean them, enter and inspect them and then perform the required maintenance in them so as to put them back on line. These tasks are performed in the warm weather due to freezing considerations.

Last year, although we were shorthanded because of our Superintendent being out for a hip replacement and our new hire being trained up, we were still able to perform this maintenance on 1 grit chamber, 2 primary clarifiers, 1 aeration tank, 2 secondary clarifiers, and one chlorine contact chamber. A quick math exercise and you can see we got 50%. Not bad considering our permit is our first priority. The problem is a break down in just one chamber can be costly.

When we do these inspections we look at, touch and physically shake each and every nut, bolt, washer, and mechanical piece of the structure to insure that everything will stay where it belongs. We also look for wear marks and try to determine if they are caused by lack of lubrication or need of adjustment. And then take subsequent repair action.

On January 22, 2018 not inspecting every tank came back to bite us.

An operator I, while doing the rounds noticed that the drive chain on grit chamber #1 was missing. The operator notified the Superintendent and the maintenance man. Maintenance and the operator started draining down tank to recover the chain. The crew found the chamber full of grit and specified the need to call in Professional Service help. (See note #1&2.)

Paul Pomerleau from the Ted Berry Company was called. They were available on 01/24/2018

January 24, 2018: Paul from Ted Berry arrives with his crew. Vacuumed out grit chamber. (See note #3). We inspected the Mechanism and found a broken wall bearing assembly, Broken Drive bearing assembly, and broken center hanger bearing assembly, broken and bent drive chain, damaged drive sprockets, broken chain lightener and miscellaneous bent and broken bolts. (See pictures 1-3 and note #4) Inspection revealed that a bolt had probably vibrated loose, (picture #4) dropped out of place and jamming the mechanism causing the screw to shatter the wall mounts and brackets. Once the mounts were gone and the screw was free floating. The screw, turning in the grit pulled away from the drive unit snapping the chain and destroying the drive sprockets and chain tensioner.

On January 25 two Operator I's and our Maintenance man disassembled the grit Screw and drive and comprised a required parts list for repair. (See notes #5&6).

January 26th through April 24th we commenced ordering and receiving new part. (Note # 7-10, 12-14, 16, 17, 20, 24-32)

On April 16 we started installing some of the new parts. (See note #18).

On April 17 we continued reassembling Grit Screw. (See note #19)

And Again on April 30 completing the assembly (see note #33&34)

We have a total of 50 man hours inside the tank, many more hours involved in searching out replacement parts and acquiring them. But more importantly, we have spent \$11,816.91 on parts and labor.

I wish I could say that this is the total expense for this break down but the month of April had an average influent daily flow of 3.36 MGD. This type of flow requires 2 grit chambers to remove all of the grit but we only had one. Whatever grit got by our one and only grit chamber on line was caught in the primary clarifier and pumped out by our primary pumps but little wear is expected in these pumps. The diaphragm pumps pump the grit laden sludge to the sludge holding tanks where our Dewatering pumps pump it to the screw press. These dewatering pumps are a progressive cavity pump that doesn't handle grit very well (See Picture #5&6). They are in the process of being rebuilt. To rebuild these pumps we will need to replace the stator at \$1,451.00 each and the rotor at \$3,297.00 each. We have three pumps that are showing the wear. $\$1,451.00 + \$3,297.00 = \$4,748.00$ per pump, X 3 pumps = \$14,244.00 for parts alone (see notes 36&37). It will take two men 8 hours each to disassemble, rebuild, and reinstall each pump for a total of \$1083.84 (see note 38)

These three Dewatering pumps pump the sludge to the FKC Dewatering Press. This press is not designed to press Grit laden sludge either. In time we will have to service this equipment for excessive wear also, but as of now we haven't been able to shut down and inspect this Piece yet.

In ending I would like to state that I am positive if we were able to take this tank down and inspect it in a timely fashion we could have caught this problem when it existed as a loose bolt instead of a major rebuild project.

Note #	Date	Item	Men	Cost	Unit	Quantity	Total
1	1/22/2018	operator I	1	\$21.47	Hour	3	\$64.41
2	1/22/2018	Maintenance Man	1	\$22.58	Hour	3	\$67.74
3	1/24/2018	Ted Berry Vactor truck	6	\$2,425.00	each	1	\$2,425.00
4	1/24/2018	operator I	2	\$21.47	Hour	6	\$128.82
5	1/25/2018	operator I	2	\$21.47	Hour	6	\$128.82
6	1/25/2018	Maintenance Man	1	\$22.58	Hour	3	\$67.74
7	1/26/2018	Wall Bearing assembly non drive end		\$1,646.00	each	1	\$1,646.00
8	1/26/2018	Wall Bearing assembly drive end		\$1,698.00	each	1	\$1,698.00
9	1/26/2018	Hangerl Bearing assembly		\$628.00	each	1	\$628.00
10	1/26/2018	Thrust washers (bronze 3")		\$198.00	each	1	\$198.00
11	1/26/2018	operator I	1	\$21.47	Hour	2	\$42.94
12	2/2/2018	Chain Tightener- SNAPIDLE		\$725.00	each	1	\$725.00
13	2/8/2018	Fabrication from Cross machine(center hanger tapered spacers)		\$236.00	each	1	\$236.00
14	2/21/2018	Fabrication from Cross machine(center hanger shims)		\$121.37	each	1	\$121.37
15	3/21/2018	operator I	2	\$21.47	Hour	2	\$42.94
16	4/12/2018	Drive Sprocket Lower		\$300.85	each	1	\$300.85
17	4/12/2018	Drive Sprocket Upper		\$224.44	each	1	\$224.44
18	4/16/2018	operator I	1	\$21.47	Hour	4	\$85.88
19	4/17/2018	operator I	1	\$21.47	Hour	2	\$42.94
20	4/17/2018	Key way & set screw from Cross machine	1	\$9.10	each	1	\$9.10
21	4/18/2018	operator I	1	\$21.47	Hour	2	\$42.94
22	4/19/2018	operator I	1	\$21.47	Hour	3	\$64.41
23	4/19/2018	Maintenance Man	1	\$22.58	Hour	4	\$90.32
24	4/18/2018	Fabrication from Cross machine(trim stub shafts)		\$57.00	each	1	\$57.00
25	4/19/2018	PVC elbows (Flush water parts)		\$1.27	each	6	\$7.62
26	4/19/2018	PVC adapters (Flush water parts)		\$2.57	each	4	\$10.28
27	4/19/2018	48" SS Flex Hose (Flush water parts)		\$10.60	each	1	\$10.60
28	4/19/2018	60" SS Flex Hose (Flush water parts)		\$12.60	each	1	\$12.60

29	4/24/2018	Drive end Stub Shaft		\$451.00	each	1	\$451.00
30	4/24/2018	Tail end Stub Sheft		\$445.00	each	1	\$445.00
31	4/24/2018	Coupling shaft		\$310.00	each	1	\$310.00
		Drive chain From Spare					
32	11/29/2011	Parts Inventory, will have to restock at new price		\$1,220.00	each	1	\$1,220.00
33	4/30/2018	operator I	1	\$21.47	Hour	5	\$107.35
34	4/30/2018	Maintenance Man	1	\$22.58	Hour	5	\$112.90
35	5/1/2018	Grit chamber Back on line					

Total Expence

\$11,826.01

Additional cost

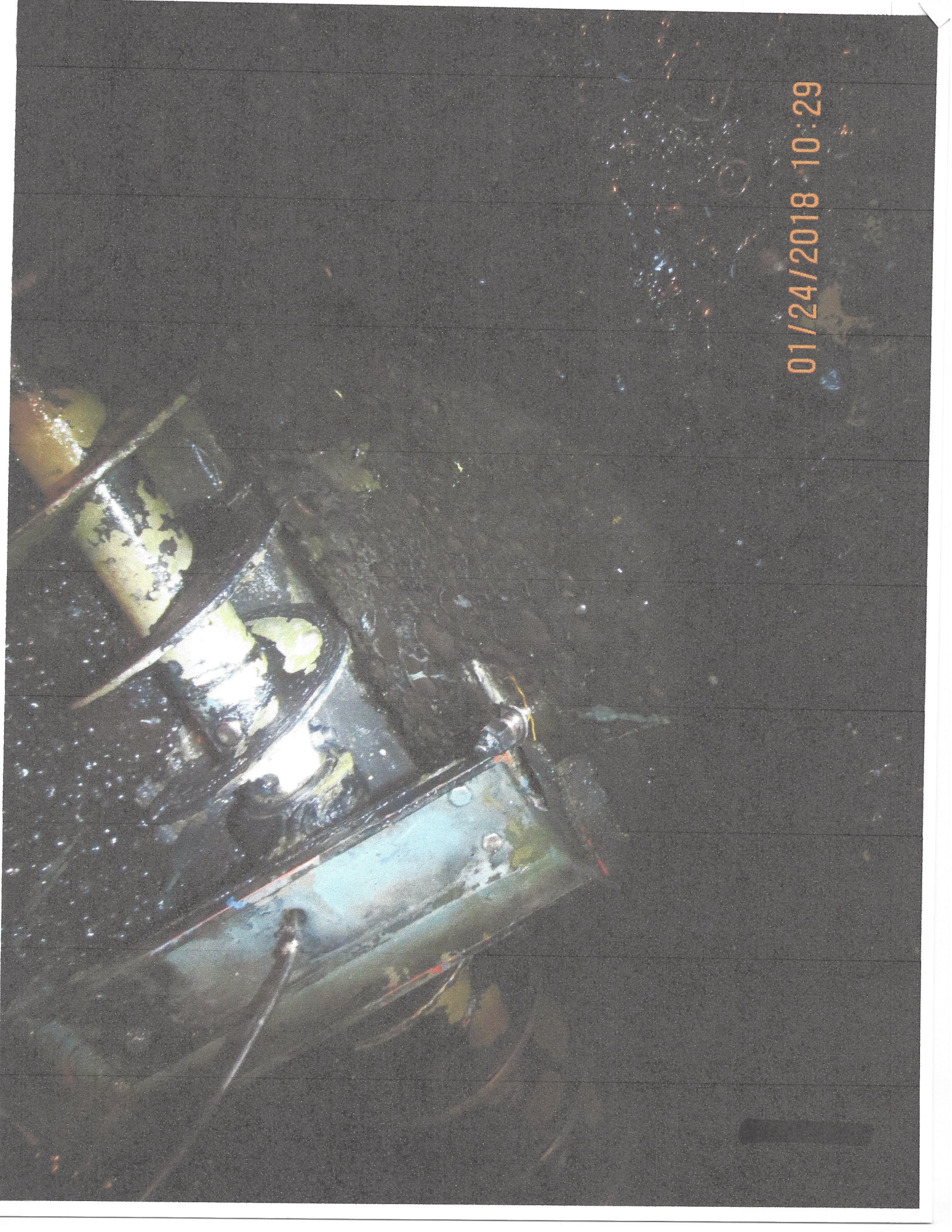
36		Netch Rotor		\$3,297.00		3	\$9,891.00
37		Netch Stator		\$1,451.00		3	\$4,353.00
38		maintenance men	2	\$22.58	Hour	24	\$1,083.84
		Replacement chain back into spair parts					\$3,629.29

\$18,957.13

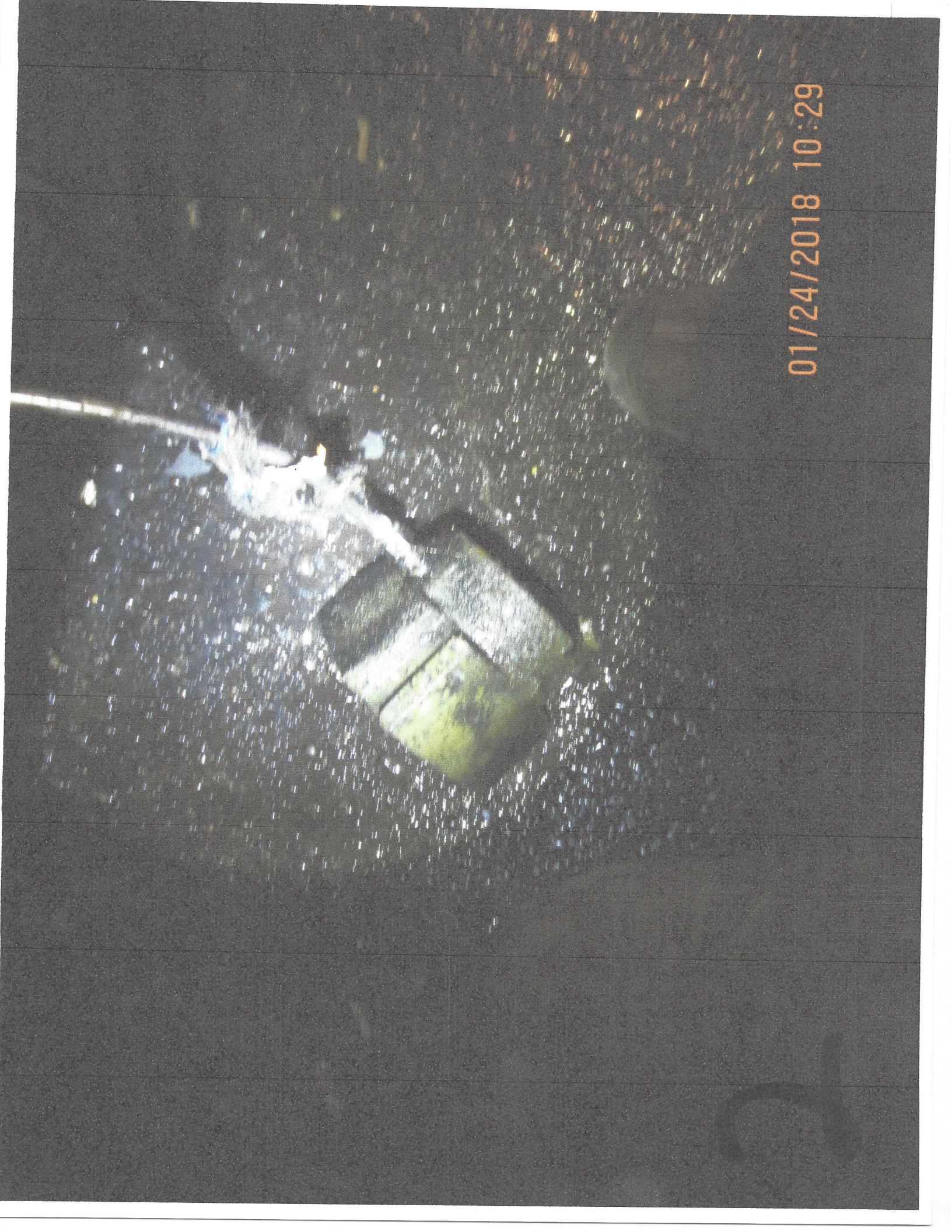
Extended cost

\$30,783.14

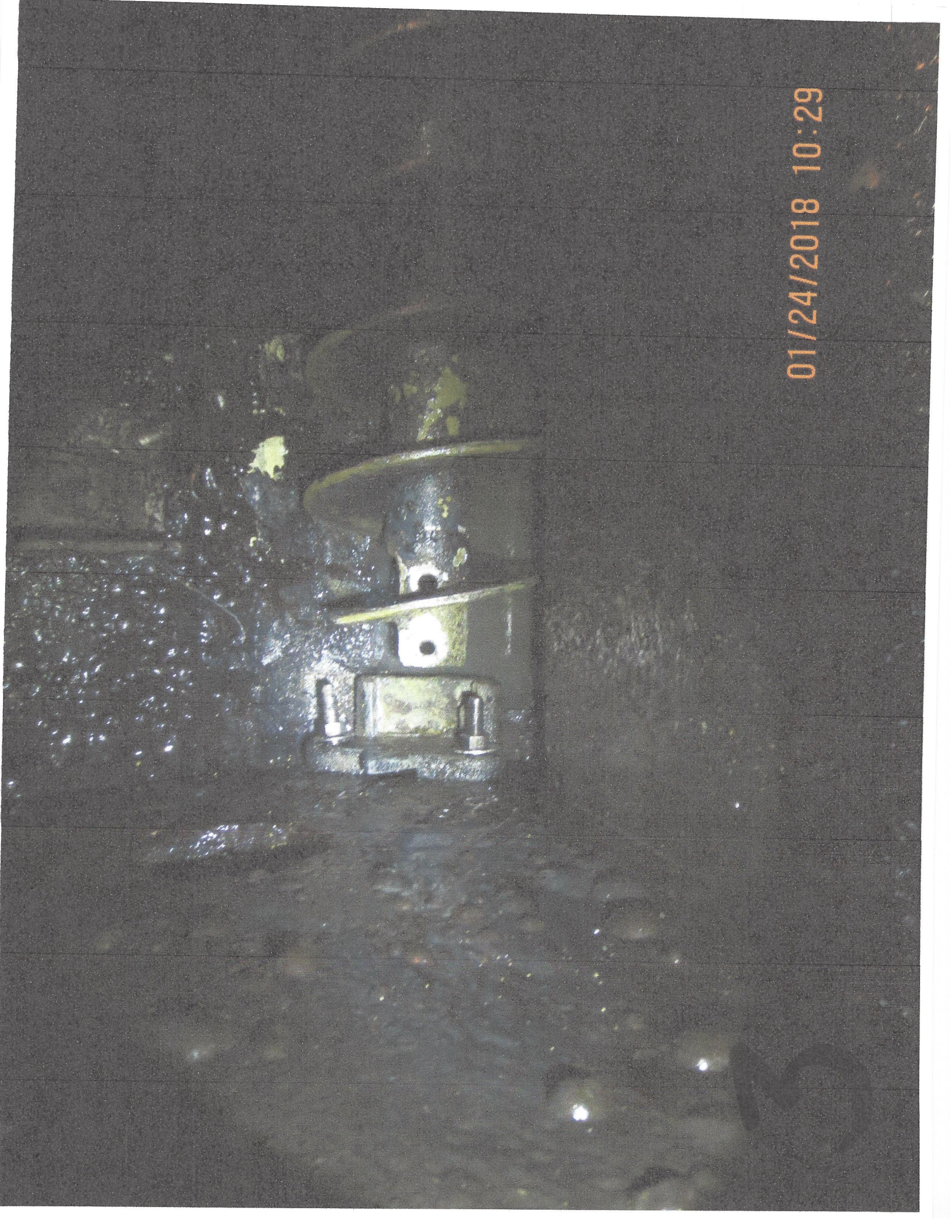
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