



EA Engineering, Science, and Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, NM 87102
Phone: 505-224-9013

September 1, 2022

Ms. Susan von Gonten
New Mexico Environment Department
Petroleum Storage Tank Bureau
2905 Rodeo Park Dr. East, Bldg. 1
Santa Fe, NM 87505

**Subject: Amendment Injection Letter report
Santa Fe County Judicial Complex State Lead Site
327 Sandoval Street, Santa Fe, New Mexico
Contract #19-667-3200-0007
Facility #: 53763 Release ID #: 4597 Deliverable ID #: 4260-2**

Dear Ms. von Gonten,

EA Engineering, Science, and Technology, Inc., PBC (EA) and Talon LPE (Talon) attempted to inject PetroFix[®] in the Santa Fe County Judicial Complex (SFCJC) plume (Figure 1) during two 10-day rotations between April 25 and May 11, 2022. A summary of those injection efforts is provided below.

Efforts to Inject PetroFix[®] in the SFCJC Plume

Preparatory Activities

Preparatory activities took place during the week of April 18th. Prior to field activities, well permits were obtained from the New Mexico Office of the State Engineer (OSE), a NM 811 utility request was placed, private utility locates were performed, temporary fencing was installed, proposed injection boring locations were marked, the courthouse As-Built drawings were reviewed to evaluate existing utilities outside the perimeter of the parking garage, and meetings with property owners were conducted to discuss schedule, activities to be performed, and address any concerns related to project activities.

Amendment Injection

Injection activities in the SFCJC plume took place starting the week of April 25th, with the first 10-day rotation ending on May 4th. The second 10-day rotation started on May 9th and ended shortly thereafter on May 11th. During this time, EA and Talon evaluated eight methods to inject PetroFix[®] into the subsurface at the site, as follows:

1. **Direct Push** – A single direct push borehole was advanced at injection boring location SF-15 (Figure 1) to 40 feet below the ground surface (bgs) to evaluate the efficacy of direct push for injection. Although the direct push was advanced to the target depth, Talon pushed the rig to the upper limits of performance and required shutting down to avoid damage to critical

systems of the Geoprobe. Drilling was also damaging to the threads between the rod sections. Due to the above issues, Talon ruled out this method as a sustainable approach. Fluids were not injected into this borehole.

2. **Open-Borehole Straddle-Packer Method** – This method was attempted at injection boring locations SF-15 and SF-18 (Figure 1) using 3.5-inch diameter solid-stem augers that were advanced to the total injection depth of 40 feet bgs. Upon removal of the augers, the soil within the saturated interval sloughed into the boreholes. Despite the sloughing, Talon was able to lower the straddle packer tool to the total borehole depth; however, the poly tubing connecting the packers was impacted by the uneven borehole sidewalls and would break or snap at the fittings resulting in loss of pressure in both the upper and lower packers. The packers were initially inflated to 80 – 150 pounds per square inch (psi), but would rapidly bleed off due to the broken fittings. Only 35 – 40 gallons of PetroFix® solution were injected into each borehole before surfacing occurred. The flowrate ranged between 1.2 and 2.3 gallons per minute (gpm) with a spike of 5 gpm in SF-15 at the start of the injection.
3. **Open-Borehole Single-Packer Method** – This method was attempted at injection boring locations SF-14 and SF-21 (Figure 1) as an alternative to the straddle-packer method. The bottom packer was removed, and injection was performed using only the top packer, which was inflated to 150 psi. Surfacing was observed after injecting 40-208 gallons of PetroFix® solution and reaching 100-120 psi of the applied pressure. The flowrate ranged between 1.5 and 2.3 gpm.
4. **Direct Push Injection Inside Pre-Drilled Boreholes using a 5-foot Injection Tool** – After the two packer methods described above did not succeed in injecting target volumes of PetroFix® solution at target injection rates, the pre-drilled boreholes were advanced to total depth with solid stem augers and then backfilled with hydrated bentonite. Thereafter, a direct push rig was used to advance a 5-foot tool and inject the PetroFix® solution into the target zone. This method was attempted at injection boring locations SF-14, SF-18, SF-21, CP-6, DC-12, and DV-9 within the SFCJC, West De Vargas, Capital 66, and Design Center plumes (Figures 1-4). Surfacing occurred in SF-14 and SF-21 after injecting 18 and 8 gallons, respectively. In the other boreholes, between 120 and 300 gallons were injected into each borehole. The breakthrough pressure ranged between 100 and 120 psi, the working pressure ranged between 10 and 200 psi, and the flowrate ranged between 1.5 and 3.5 gpm.
5. **Injection of Potable Water into MW-8** – NMED PTSB approved injection into existing monitoring well MW-8 (Figure 1). A total of 605 gallons of potable water was injected into the well at flowrates of up to 11 gpm at 2 psi.
6. **Injection of PetroFix® Solution into MW-8** – A total of 70 gallons of PetroFix® solution was injected into MW-8 at a flowrate of 5 gpm in the beginning and rapidly decreased to 1.5 gpm. Observed pressures ranged from 20 psi to 35 psi, greater than during the injection of potable water. Decreased flowrates and increased pressures indicated that the addition of PetroFix® had a major influence on the injection rates and pressures.

7. **Injection of PetroFix® Solution into MW-7** – A total of 514 gallons of PetroFix® solution was injected into MW-7 (Figure 1) at flowrates ranging between 1.5 and 6.0 gpm and pressures ranging between 0 and 30 psi.
8. **Direct Push Injection Inside Pre-Drilled Boreholes using a Drop-Tip** – Using this method, injection boring SF-12 (Figure 1) was pre-drilled and backfilled with hydrated bentonite. PetroFix® solution was then injected directly into the borehole through the end of the steel push rod starting at the bottom of the injection interval. Surfacing occurred in the bottom interval after injecting 26 gallons. A total of 300 gallons of PetroFix® solution was injected into the borehole, mostly in the upper interval at flow rates varying between 1.5 and 2.5 gpm.

A listing of the eight injection methods and injection data is presented in Table 1. Talon's injection field log is included in Attachment 1 and EA field notes are included in Attachment 2.

Summary:

1. The direct push method was not applicable for injection due to lithology. The rig was pushed to the limits and the rod threads began to sustain damage.
2. The solid-stem auger drilling method resulted in formation collapse within the saturated zone upon auger retrieval.
3. The straddle-packer method failed due to borehole collapse within the saturated zone. This method resulted in surfacing after injecting only 30-40 gallons of the PetroFix® solution into each borehole. Surfacing was likely caused by an uneven borehole wall and the presence of gravel that precluded a tight seal.
4. The single-packer method resulted in surfacing after injecting 40-208 gallons of the PetroFix® solution at flowrates ranging between 1.5 and 2.3 gpm.
5. The direct push injection inside the pre-drilled boreholes using a 5-foot injection tool and a drop-tip method had PetroFix® solution surface in three out of eight boreholes. The injected volumes were as high as 250-300 gallons per borehole and the injection flowrates ranged between 1.5 and 3.5 gpm at 10-200 psi.
6. Injection of potable water into MW-8 resulted in the highest flowrate of up to 11 gpm at the lowest pressure of 0-2 psi.
7. Injection of PetroFix® solution into MW-7 and MW-8 started at 5-6 gpm at the start and decreased to 1.5 gpm at the end of the injection. Pressures increased up to 30-35 psi.

Conclusions

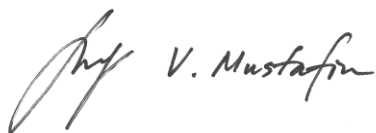
- Injection of the PetroFix® solution into the wells resulted in the highest injection rates up to 5-6 gpm and the lowest injection pressures of 0-2 psi at the beginning of the injection. However, the flowrates decreased to 1.5 gpm and the pressure increased to 30-35 psi at the end of the injection. Surfacing was not observed using this method; however, some surfacing could be expected depending on lithology. This method provides the best seal and the most consistent injection results.

- The open borehole injection method was limited to a 1.5-3.5 gpm injection rate at pressures ranging between 10 and 200 psi. The expected average production using this method is approximately 2 gpm. Surfacing was observed in multiple boreholes indicating that the outcome of the injection is likely to vary between boreholes and plumes. This method produced varying outcomes and large variability in the application pressures.
- The direct push method is not feasible for injection of the PetroFix[®] solution at the site into the target interval due to subsurface lithology.
- The packer method was not a reliable or consistent method for the injection of the PetroFix[®] solution at the site into the target interval due to the uneven borehole walls and the design of the packer system.

EA plans to invoice \$189,622.71 (including NMGR of 7.75%) for Deliverable ID 4260-2 for the injection efforts performed at the site during the first two 10-day rotations between April 25 and May 11, 2022 as discussed above.

If you have any questions or need additional information, please feel free to contact me at (505) 296-1070 or Mike at (505) 235-9037.

Respectfully,

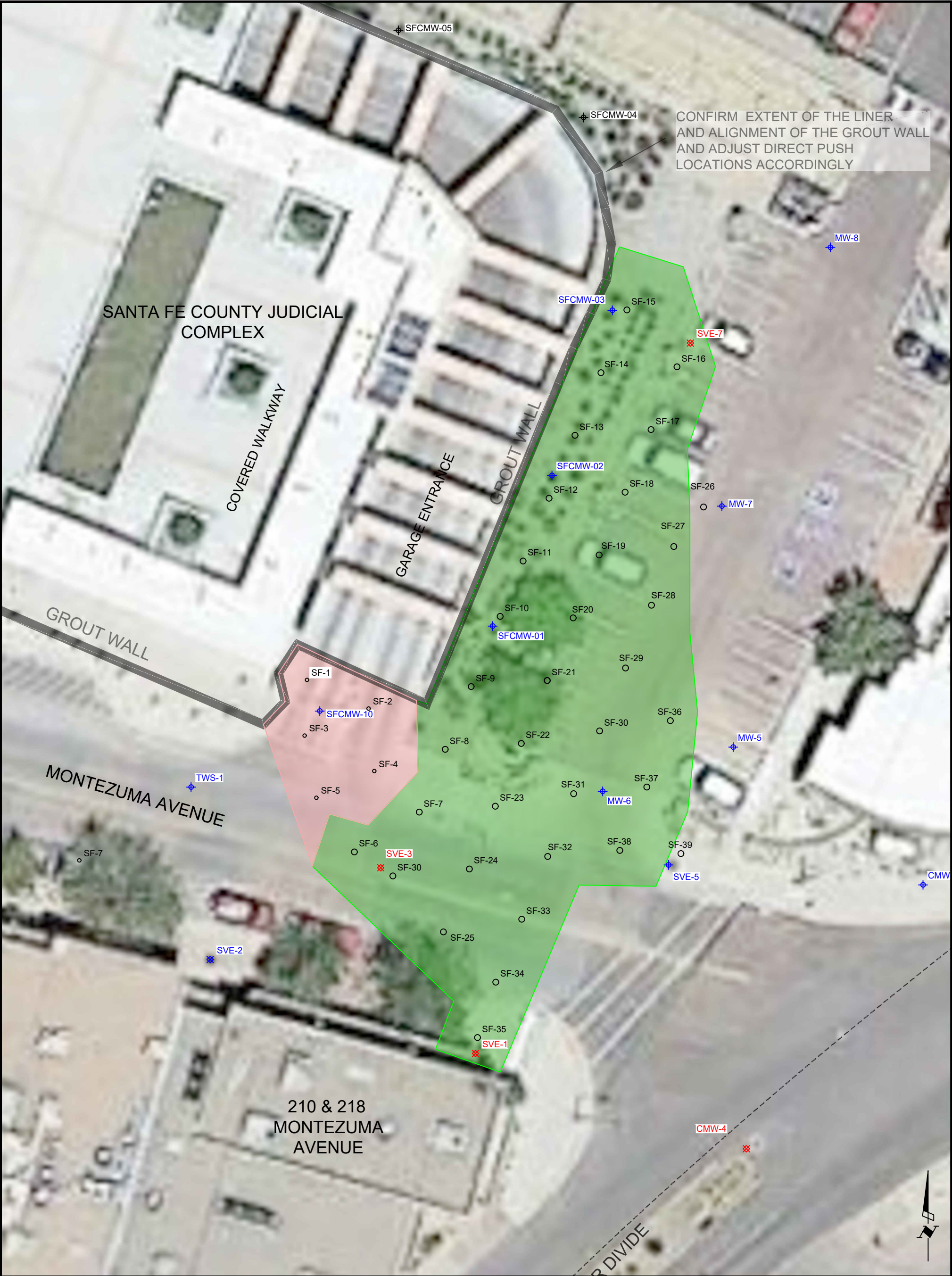


Vener Mustafin, P.E.
Senior Engineer



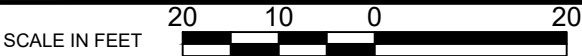
Michael D. McVey, P.G., C.P.G.
Project Manager/Senior Hydrogeologist

FIGURES



LEGEND:

- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- SF-1
- INJECTION POINTS
- HOT SPOT TARGET TREATMENT AREA
- PLUME TARGET TREATMENT AREA



SANTA FE COUNTY JUDICIAL COMPLEX
SANTA FE, NEW MEXICO

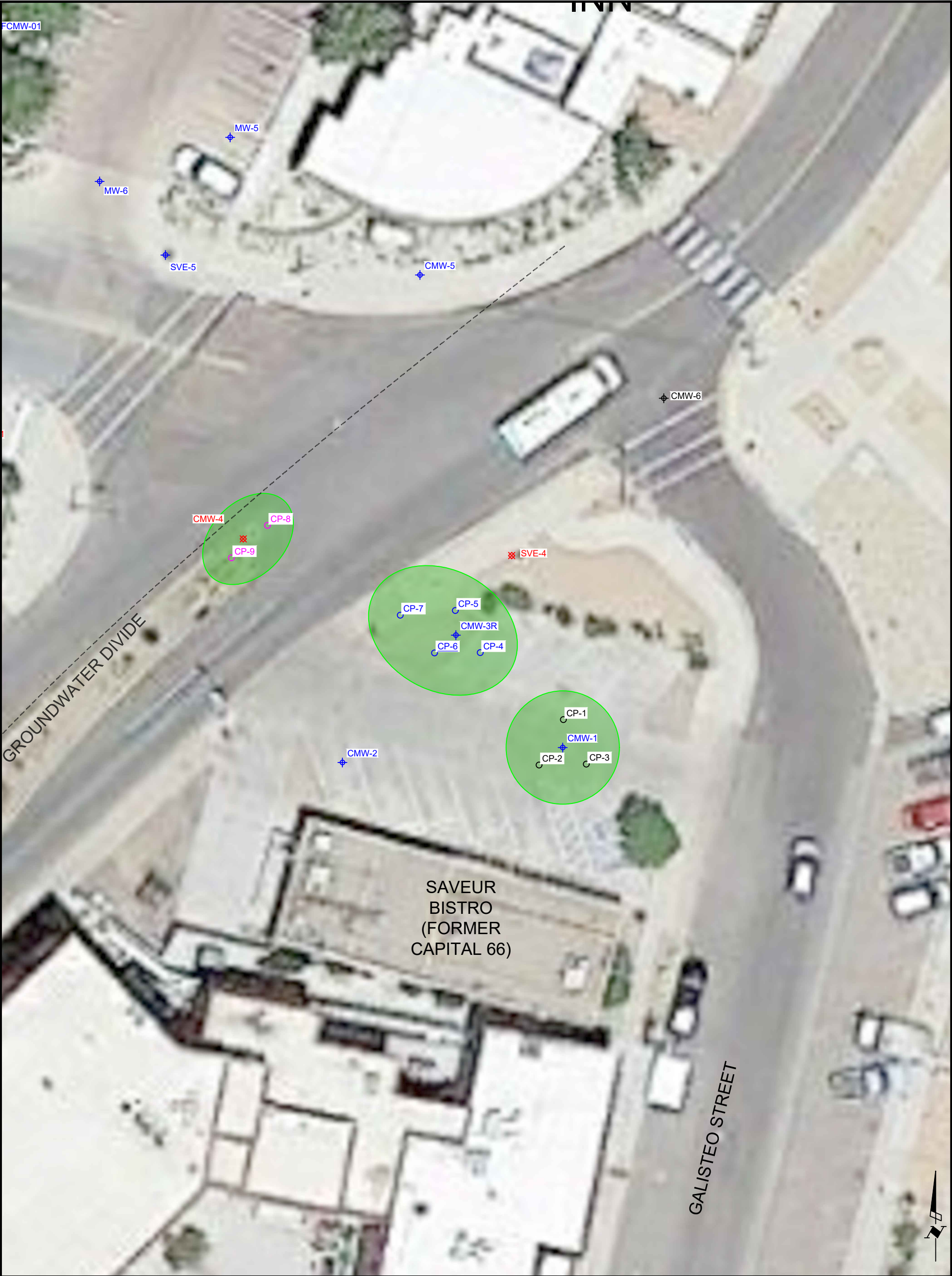
FIGURE 1. SANTA FE COUNTY JUDICIAL
COMPLEX PLUME AND INJECTION POINTS

PROJECT #:	6347001	PROJECT PHASE:	01	PROJECT MANAGER:	MM
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LEGEND:



MONITORING WELL



SOIL VAPOR EXTRACTION WELL



INJECTION POINT



TARGET TREATMENT AREA

SCALE IN FEET

20

10

0

20

SANTA FE COUNTY JUDICIAL COMPLEX

SANTA FE, NEW MEXICO

FIGURE 2. CAPITAL 66 PLUME

AND INJECTION POINTS

PROJECT #:


6347001

PROJECT PHASE:

01

PROJECT MANAGER:

MM



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LEGEND:

MONITORING WELL

SOIL VAPOR EXTRACTION WELL

DC-1
INJECTION POINT

TARGET TREATMENT AREA

SCALE IN FEET

20

10

0

20

SANTA FE COUNTY JUDICIAL COMPLEX

SANTA FE, NEW MEXICO

FIGURE 3. DESIGN CENTER PLUME AND

INJECTION POINTS

PROJECT #:

PROPOSAL

PROJECT PHASE:

PROJECT MANAGER:

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. PBC

320 Gold Avenue, SW Suite 1300

Albuquerque, NM 87102

Phone: (505) 224-9013



LEGEND:

MONITORING WELL

SOIL VAPOR EXTRACTION WELL


DV-1

INJECTION POINTS

TARGET TREATMENT AREA

2010020

SCALE IN FEET

SANTA FE COUNTY JUDICIAL COMPLEX			
SANTA FE, NEW MEXICO			
FIGURE 4. WEST DE VARGAS PLUME AND INJECTION POINTS			
PROJECT #:	6347001	PROJECT PHASE:	01
PROJECT MANAGER:		MM	
		320 Gold Avenue, SW Suite 1300 Albuquerque, NM 87102 Phone: (505) 224-9013	
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. PBC			

TABLE

TABLE 1. SUMMARY OF INJECTION METHODS AND DATA
SANTA FE COUNTY JUDICIAL COMPLEX, SANTA FE, NEW MEXICO

Point ID	Method	Date	Packer Pressure (psi)	Injection Interval (ft bgs)	Interval (ft)	Injeciton Pressure (psi)	Injection Flowrate (gpm)	Unit Flowrate (gal/ft)	Volume (gal)	Day Lighting Yes/No	Notes
Near SF-15	Direct Push	4/28/2022	NA	NA	40	NA	NA	NA	NA	NA	Exploratory boring. The rig was pushed to the limit and rod thread showed wear. Talon indicated that this is not a viable option and would result in rig damage is attempted in several locations.
SF-15	Straddle Packer	4/29/2022	80	40 - 34	6		1.2 - 5.0	6.7	40	Yes	Surfacing shortly after starting injection. Packer stuck in the borehole. Attempted to removed with Geoprobe - PVC pipe broke. Attempted to overdrill with 3.5"-diameter auger. Unable to retrieve pakers. Grouted in place.
SF-18	Straddle Packer	4/29/2022	150	40 - 34	6		1.2 - 2.3	5.8	35	Yes	Packer stuck in the borehole. Removed with Geoprobe
SF-21	Single Packer	4/30/2022	150	40 - 34	6	20 - 25	1.5 - 2.0	35	208	Yes	
SF-14	Single Packer	4/30/2022	150	40 - 34	6	75 - 80	1.5 - 2.3	7	40	Yes	
SF-14	Direct Push/Predrilled Borehole/Sand-Bentonite	5/2/2022	NA	40 - 35	5	65 - 80	1.8 - 1.8	3.6	18	Yes	Sand in the injection interval. Hydrated bentonite to the surface. Five-foot tool.
SF-18	Direct Push/Predrilled Borehole/Bentonite	5/2/2022	NA	40 - 35	5	40 - 55	1.7 - 1.8	56	282	No	Hydrated bentonite to the surface. Five-foot tool.
SF-21	Direct Push/Predrilled Borehole/Bentonite	5/2/2022	NA	40 - 35	5	55 - 200	0.0 - 1.3	1.6	8	Yes	Hydrated bentonite to the surface. Five-foot tool. Could not inject.
CP-6	Direct Push/Predrilled Borehole/Bentonite	5/3/2022	NA	32 - 0	32	45 - 110	1.5 - 3.0	6.3	200	No	Hydrant water
DC-12	Direct Push/Predrilled Borehole/Bentonite	5/3/2022	NA	62 - 37	25	35 - 115	1.5 - 3.5	9.2	229	No	Hydrant water
DV-9	Direct Push/Predrilled Borehole/Bentonite	5/3/2022	NA	40 - 30	10	10 - 20	2.0 - 3.0	12	120	No	Hydrant water
SF-12	Direct Push/Predrilled Borehole/Bentonite/Drop-Tip	5/11/2022	NA	40 - 34	6		1.5 - 2.5	50	300	Yes	Surfacing in the bottom interval after injecting 26 gallons.
MW-8	Well/Hydrant Water	5/3/2022	NA	40 - 25	15	0 - 2	0.5 - 11	40	605	No	Monitoring well. Hydrant water.
MW-8	Well/PetroFix	5/9/2022	NA	40 - 25	15	30 - 35	5.0 - 1.5	4.7	70	No	Monitoring well. PetroFix solution.
MW-7	Well/PetroFix	5/9/2022	NA	40 - 25	15	0 - 30	6.0 - 1.5	34	514	No	Monitoring well. PetroFix solution.

NOTES:
SF = SFCJC plume injection boring
CP = Capitol 66 plume injection boring
DC = Design Center plume injection boring
DV = DeVargas plume injection boring
psi = pounds per square inch
feet bgs = feet below ground surface
gpm = gallons per minute
gal/ft = gallons per foot
ft = feet

ATTACHMENT 1
TALON INJECTION FIELD LOG

INJECTION FIELD LOG

PROJECT NUMBER/NAME: EA Santa Fe Judicial Complex / 701043.002.01

LEAD OPERATOR: TJ Haley

SCOPE OF WORK: At 81 locations across four different areas, Talon will use 3.5" OD solid stem augers to create an open hole down to total depth. Once the termination depth has been reached, Talon will lower straddle packers down into the target zones for each area and inject the required amount of mix into each point.

INJECTION APPROACH: Open Hole/ Straddle Packers

Well ID	Start Date	Start Time	End Date	End Time	Injection Interval			Initial Pressure (PSI)	Sustained Pressure (PSI)	Well Head Pressure (PSI)	Average Flow Rate (GPM)	% Solution				% Solution Injected (Gallons)	Total Injected (Gal)	Day Lighting	Field Notes
												PetroFix (lbs)	Water (gallons)	Electron Acceptor (lbs)	Chase Water (gallons)				
SF - 15	4/29/22	2:10 PM		2:16 PM	40.0	to	34.0	0	0	0	5.0	0.7	29.3	0.3		30.0	30.0	X	Straddle Packers Method. Surfacing up borehole
		3:00 PM	4/29/22	3:06 PM	40.0	to	34.0	0	0	0	1.2	0.2	9.8	0.1		10.0	10.0	X	Inflated packers to 80 PSI, Surfacing up Borehole, Packers Stuck in hole. Attempted to remove with Geoprobe, PVC Pipe broke. Attempted to over drill location with 3.5" hollow stem augers. Unable to retrieve Packers, grout in place
TOTALS												0.9	39.1	0.4	0.0	40.0	40		
SF - 18	4/29/22	2:50 PM		3:10 PM	40.0	to	34.0	0	0	0	1.2	0.5	23.5	0.3		24.0	24.0	X	Straddle Packers Method. Packer PSI at 150
		3:10 PM	4/29/22	3:15 PM	40.0	to	34.0	0	0	0	2.3	0.2	11.3	0.1		11.5	11.5	X	Surfacing up Borehole, Packers Stuck in hole. Removed with Geoprobe
TOTALS												0.8	34.7	0.4	0.0	35.5	35.5		
PAGE TOTALS												1.6	73.9	0.8	0.0	75.5	75.5		

INJECTION FIELD LOG

PROJECT NUMBER/NAME: EA Santa Fe Judicial Complex / 701043.002.01

LEAD OPERATOR: TJ Haley

SCOPE OF WORK: At 81 locations across four different areas, Talon will use 3.5" OD solid stem augers to create an open hole down to total depth. Once the termination depth has been reached, Talon will lower straddle packers down into the target zones for each area and inject the required amount of mix into each point.

INJECTION APPROACH: Open Hole/ Straddle Packers

Well ID	Start Date	Start Time	End Date	End Time	Injection Interval			Initial Pressure (PSI)	Sustained Pressure (PSI)	Well Head Pressure (PSI)	Average Flow Rate (GPM)	% Solution				% Solution Injected (Gallons)	Total Injected (Gal)	Day Lighting	Field Notes
												PetroFix (lbs)	Water (gallons)	Electron Acceptor (lbs)	Chase Water (gallons)				
SF - 21	4/30/22	12:18 PM		12:30 PM	40.0	to	34.0	0	0	0	1.5	0.4	17.6	0.2		18.0	18.0		Single Packer Method. Inflated to 150 PSI
		12:30 PM		1:00 PM	40.0	to	34.0		0	0	1.5	1.0	44.0	0.5		45.0	45.0		
		1:00 PM		1:30 PM	40.0	to	34.0		20	25	1.5	1.0	44.0	0.5		45.0	45.0		
		1:30 PM		2:00 PM	40.0	to	34.0		25	30	2.0	1.3	58.7	0.6		60.0	60.0		
		2:00 PM	4/30/22	2:20 PM	40.0	to	34.0		25	30	2.0	0.9	39.1	0.4		40.0	40.0	X	Surfacing up borehole
TOTALS												4.5	203.5	2.2	0.0	208.0	208		
SF - 14	4/30/22	2:50 PM		2:55 PM	40.0	to	34.0	0	85	95	1.5	0.2	7.3	0.1		7.5	7.5		Single Packer Method. Inflated to 150 PSI
		2:55 PM		3:00 PM	40.0	to	34.0	0	80	85	2.0	0.2	9.8	0.1		10.0	10.0		
		3:00 PM	4/30/22	3:09 PM	40.0	to	34.0		75	80	2.3	0.5	22.0	0.2		22.5	22.5	X	Surfacing up borehole
TOTALS												0.9	39.1	0.4	0.0	40.0	40.0		
PAGE TOTALS												5.4	242.6	2.7	0.0	248.0	248.0		

INJECTION FIELD LOG

PROJECT NUMBER/NAME: EA Santa Fe Judicial Complex / 701043.002.01

LEAD OPERATOR: TJ Haley

SCOPE OF WORK: At 81 locations across four different areas, Talon will use 3.5" OD solid stem augers to create an open hole down to total depth. Once the termination depth has been reached, Talon will lower straddle packers down into the target zones for each area and inject the required amount of mix into each point.

INJECTION APPROACH: Open Hole/ Straddle Packers

Well ID	Start Date	Start Time	End Date	End Time	Injection Interval			Initial Pressure (PSI)	Sustained Pressure (PSI)	Well Head Pressure (PSI)	Average Flow Rate (GPM)	% Solution				% Solution Injected (Gallons)	Total Injected (Gal)	Day Lighting	Field Notes	
												PetroFix (lbs)	Water (gallons)	Electron Acceptor (lbs)	Chase Water (gallons)					
SF - 14	5/2/22	10:00 AM		10:10 AM	40.0	to	35.0	80	65	70	1.8	0.4	17.6	0.2		18.0	18.0		Placed sand in the injection interval and hydrated bentonite in the rest of the bore hole on 5/1/22. Used Direct Push method with five foot bottom up injection tool. Surfacing up the borehole.	
TOTALS												0.4	17.6	0.2	0.0	18.0	18			

SF - 18	5/2/22	10:40 AM		11:00 AM	40.0	to	35.0	120	55	55	1.5	0.7	29.3	0.3		30.0	30.0		Placed hydrated bentonite to surface on 5/1/22. Used Direct Push method with five foot bottom up injection tool.	
		11:00 AM		11:30 AM	40.0	to	35.0		50	50	1.5	1.0	44.0	0.5		45.0	45.0			
		11:30 AM		12:00 PM	40.0	to	35.0		45	45	1.7	1.1	49.9	0.5		51.0	51.0			
		12:00 PM		12:30 PM	40.0	to	35.0		45	45	1.7	1.1	49.9	0.5		51.0	51.0			
		12:30 PM		1:00 PM	40.0	to	35.0		40	40	1.9	1.2	55.8	0.6		57.0	57.0			
		1:00 PM		1:30 PM	40.0	to	35.0		40	40	2.0	1.0	47.0	0.5		48.0	48.0		Completed Injection of Mixed chemical from on board tanks	
		1:30 PM		3:00 PM	40.0	to	35.0		40	40	2.0	0.0	0.0	0.0	168.0		168.0			
TOTALS												6.1	275.9	3.0	168.0	282.0	450.0			

SF - 21	5/2/22	11:10 AM		11:15 AM	40.0	to	35.0	120	200	200	0.0	0.0	0.0	0.0			0.0		Placed sand in the injection interval and hydrated bentonite in the rest of the bore hole on 5/1/22. Used Direct Push method with five foot bottom up injection tool.	
		11:15 AM		11:17 AM	39.0	to	34.0		200	200	0.0	0.0	0.0	0.0			0.0		Tooling clogged, pull rods, clean out. Backfill hole with hydrated bentonite	
		12:30 PM	5/2/22	12:37 PM	40.0	to	35.0	120	55	55	1.3	0.2	7.8	0.1		8.0	8.0		Surfacing up borehole.	
TOTALS												0.2	7.8	0.1	0.0	8.0	8.0			
PAGE TOTALS												6.7	301.3	3.3	168.0	308.0	476.0			

INJECTION FIELD LOG

PROJECT NUMBER/NAME: EA Santa Fe Judicial Complex / 701043.002.01

LEAD OPERATOR: TJ Haley

SCOPE OF WORK: At 81 locations across four different areas, Talon will use 3.5" OD solid stem augers to create an open hole down to total depth. Once the termination depth has been reached, Talon will lower straddle packers down into the target zones for each area and inject the required amount of mix into each point.

INJECTION APPROACH: Injection Wells

Well ID	Start Date		Start Time		End Date		End Time		Injection Interval			Initial Pressure (PSI)	Sustained Pressure (PSI)	Well Head Pressure (PSI)	Average Flow Rate (GPM)	% Solution				% Solution Injected (Gallons)	Total Injected (Gal)	Day Lighting	Field Notes
																PetroFix (lbs)	Water (gallons)	Electron Acceptor (lbs)	Chase Water (gallons)				
MW-8	5/3/22		10:06 AM				10:16 AM		25.0	to	40.0	0	0	0	0.5	0.0	0.0	0.0	5.0	0.0	5.0		Water Test on 2-inch Sch 40 Monitoring Well
			10:16 AM				10:26 AM		25.0	to	40.0		0	0	0.5	0.0	0.0	0.0	5.0	0.0	5.0		
			10:26 AM				10:36 AM		25.0	to	40.0		0	0	0.5	0.0	0.0	0.0	5.0	0.0	5.0		
			10:36 AM				10:46 AM		25.0	to	40.0		0	0	0.5	0.0	0.0	0.0	5.0	0.0	5.0		
			10:46 AM				10:56 AM		25.0	to	40.0		0	0	1.0	0.0	0.0	0.0	10.0	0.0	10.0		
			10:56 AM				11:06 AM		25.0	to	40.0		0	0	1.0	0.0	0.0	0.0	10.0	0.0	10.0		
			11:06 AM				11:16 AM		25.0	to	40.0		0	0	1.0	0.0	0.0	0.0	10.0	0.0	10.0		
			11:16 AM				11:26 AM		25.0	to	40.0		0	0	1.5	0.0	0.0	0.0	15.0	0.0	15.0		
			11:26 AM				11:36 AM		25.0	to	40.0		0	0	1.5	0.0	0.0	0.0	15.0	0.0	15.0		
			11:36 AM				11:46 AM		25.0	to	40.0		0	0	1.5	0.0	0.0	0.0	15.0	0.0	15.0		
			11:46 AM				11:56 AM		25.0	to	40.0		0	0	2.0	0.0	0.0	0.0	20.0	0.0	20.0		
			11:56 AM				12:06 PM		25.0	to	40.0		0	0	2.0	0.0	0.0	0.0	20.0	0.0	20.0		
			12:06 PM				12:16 PM		25.0	to	40.0		0	0	2.0	0.0	0.0	0.0	20.0	0.0	20.0		
			12:16 PM				12:26 PM		25.0	to	40.0		0	0	2.5	0.0	0.0	0.0	25.0	0.0	25.0		
			12:26 PM				12:36 PM		25.0	to	40.0		0	0	2.5	0.0	0.0	0.0	25.0	0.0	25.0		
			12:36 PM				12:46 PM		25.0	to	40.0		0	0	2.5	0.0	0.0	0.0	25.0	0.0	25.0		
			12:46 PM				12:56 PM		25.0	to	40.0		0	0	3.0	0.0	0.0	0.0	30.0	0.0	30.0		
			12:56 PM				1:06 PM		25.0	to	40.0		0	0	3.5	0.0	0.0	0.0	35.0	0.0	35.0		
			1:06 PM				1:16 PM		25.0	to	40.0		0	0	4.0	0.0	0.0	0.0	40.0	0.0	40.0		
			1:16 PM				1:26 PM		25.0	to	40.0		0	0	4.5	0.0	0.0	0.0	45.0	0.0	45.0		
			1:26 PM				1:31 PM		25.0	to	40.0		0	0	5.0	0.0	0.0	0.0	25.0	0.0	25.0		
			1:31 PM				1:36 PM		25.0	to	40.0		0	0	5.5	0.0	0.0	0.0	27.5	0.0	27.5		
			1:46 PM				1:51 PM		25.0	to	40.0		0	0	6.0	0.0	0.0	0.0	30.0	0.0	30.0		
			1:56 PM				2:01 PM		25.0	to	40.0		0	0	7.0	0.0	0.0	0.0	35.0	0.0	35.0		
			2:01 PM				2:06 PM		25.0	to	40.0		0	0	8.0	0.0	0.0	0.0	40.0	0.0	40.0		
			2:06 PM				2:11 PM		25.0	to	40.0		0	0	9.0	0.0	0.0	0.0	45.0	0.0	45.0		
			2:11 PM				2:13 PM		25.0	to	40.0		0	0	11.0	0.0	0.0	0.0	22.0	0.0	22.0		
TOTALS																0.0	0.0	0.0	604.5	0.0	605		
PAGE TOTALS																0.0	0.0	0.0	604.5	0.0	604.5		

INJECTION FIELD LOG

PROJECT NUMBER/NAME: EA Santa Fe Judicial Complex / 701043.002.01

LEAD OPERATOR: TJ Haley

SCOPE OF WORK: At 81 locations across four different areas, Talon will use 3.5" OD solid stem augers to create an open hole down to total depth. Once the termination depth has been reached, Talon will lower straddle packers down into the target zones for each area and inject the required amount of mix into each point.

INJECTION APPROACH: Open Hole/ Straddle Packers

Well ID	Start Date		Start Time		End Date		End Time		Injection Interval			Initial Pressure (PSI)	Sustained Pressure (PSI)	Well Head Pressure (PSI)	Average Flow Rate (GPM)	% Solution				% Solution Injected (Gallons)	Total Injected (Gal)	Day Lighting	Field Notes
																PetroFix (lbs)	Water (gallons)	Electron Acceptor (lbs)	Chase Water (gallons)				
DC - 12	5/3/22		4:00 PM				4:10 PM		62.0	to	57.0	120	35	35	1.5	0.0	0.0	0.0	15.0	0.0	15.0		Placed hydrated bentonite to surface on 5/2/22. Used Direct Push method with five foot bottom up injection tool.
			4:10 PM				4:20 PM		62.0	to	57.0		55	55	1.6	0.0	0.0	0.0	16.0	0.0	16.0		
			4:20 PM				4:30 PM		62.0	to	57.0		55	55	1.6	0.0	0.0	0.0	16.0	0.0	16.0		
			4:30 PM				4:40 PM		62.0	to	57.0		70	70	2.0	0.0	0.0	0.0	20.0	0.0	20.0		
			4:40 PM				4:50 PM		62.0	to	57.0		105	105	2.1	0.0	0.0	0.0	21.0	0.0	21.0		
			4:50 PM				5:00 PM		62.0	to	57.0		110	110	2.0	0.0	0.0	0.0	20.0	0.0	20.0		
			5:00 PM	5/3/22			5:10 PM		62.0	to	57.0	120	115	115	1.9	0.0	0.0	0.0	19.0	0.0	19.0		
			5:15 PM				5:20 PM		57.0	to	52.0		75	75	2.0	0.0	0.0	0.0	10.0	0.0	10.0		
			5:20 PM				5:30 PM		57.0	to	52.0		80	80	2.0	0.0	0.0	0.0	20.0	0.0	20.0		
			5:30 PM				5:40 PM		57.0	to	52.0		80	80	2.9	0.0	0.0	0.0	29.0	0.0	29.0		
			5:40 PM	5/3/22			5:48 PM		57.0	to	52.0		85	85	3.5	0.0	0.0	0.0	35.0	0.0	35.0		
			5:54 PM	5/3/22			5:58 PM		52.0	to	47.0		60	60	2.0	0.0	0.0	0.0	8.0	0.0	8.0		Surfacing up borehole
									47.0	to	42.0					0.0	0.0	0.0	0.0	0.0	0.0		Skip Interval
			6:05 PM	5/3/22			6:05 PM		42.0	to	37.0		0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		Surfacing Immediately
	TOTALS															0.0	0.0	0.0	229.0	0.0	229		
CP - 6	5/3/22		6:50 PM				6:52 PM		32.0	to	27.0	120	100	100	1.5	0.0	0.0	0.0	3.0	0.0	3.0		Placed hydrated bentonite to surface on 5/2/22. Used Direct Push method with five foot bottom up injection tool.
			6:52 PM				6:56 PM		32.0	to	27.0		55	55	2.5	0.0	0.0	0.0	10.0	0.0	10.0		
			6:56 PM				7:06 PM		32.0	to	27.0		50	50	3.0	0.0	0.0	0.0	30.0	0.0	30.0		
			7:06 PM				7:16 PM		32.0	to	27.0		45	45	3.1	0.0	0.0	0.0	31.0	0.0	31.0		
			7:16 PM	5/3/22			7:24 PM		32.0	to	27.0		45	45	3.2	0.0	0.0	0.0	26.0	0.0	26.0		
			7:28 PM				7:38 PM		27.0	to	22.0		80	80	1.5	0.0	0.0	0.0	15.0	0.0	15.0		
			7:38 PM				7:48 PM		27.0	to	22.0		85	85	2.0	0.0	0.0	0.0	20.0	0.0	20.0		
			7:48 PM				7:58 PM		27.0	to	22.0		110	110	2.5	0.0	0.0	0.0	25.0	0.0	25.0		
			7:58 PM				8:08 PM		27.0	to	22.0		110	110	2.3	0.0	0.0	0.0	23.0	0.0	23.0		
			8:08 PM	5/3/22			8:14 PM		27.0	to	22.0		100	100	2.6	0.0	0.0	0.0	17.0	0.0	17.0		Water Test Complete
	TOTALS															0.0	0.0	0.0	200.0	0.0	200.0		
PAGE TOTALS																0.0	0.0	0.0	429.0	0.0	429.0		

INJECTION FIELD LOG

PROJECT NUMBER/NAME: EA Santa Fe Judicial Complex / 701043.002.01

LEAD OPERATOR: TJ Haley

SCOPE OF WORK: At 81 locations across four different areas, Talon will use 3.5" OD solid stem augers to create an open hole down to total depth. Once the termination depth has been reached, Talon will lower straddle packers down into the target zones for each area and inject the required amount of mix into each point.

INJECTION APPROACH: Open Hole/ Straddle Packers

Well ID	Start		Start Time	End Date	End Time	Injection Interval			Initial Pressure (PSI)	Sustained Pressure (PSI)	Well Head Pressure (PSI)	Average Flow Rate (GPM)	% Solution				% Solution Injected (Gallons)	Total Injected (Gal)	Day Lighting	Field Notes	
	Date											PetroFix (lbs)	Water (gallons)	Electron Acceptor (lbs)	Chase Water (gallons)						
DV - 9	5/3/22		8:47 PM		8:57 PM	40.0	to	35.0	120	20	15	2.0	0.0	0.0	0.0	20.0		20.0		Placed hydrated bentonite to surface on 5/2/22. Used Direct Push method with five foot bottom up injection tool.	
			8:57 PM		9:07 PM	40.0	to	35.0		19	15	2.3	0.0	0.0	0.0	23.0		23.0			
			9:07 PM		9:17 PM	40.0	to	35.0		20	20	2.7	0.0	0.0	0.0	27.0		27.0			
			9:17 PM	5/3/22	9:27 PM	40.0	to	35.0		20	20	3.0	0.0	0.0	0.0	30.0		30.0			
			9:31 PM		9:42 PM	35.0	to	30.0		10	10	2.2	0.0	0.0	0.0	20.0		20.0	X	Surfacing up borehole	
TOTALS												0.0	0.0	0.0	120.0	0.0	120				

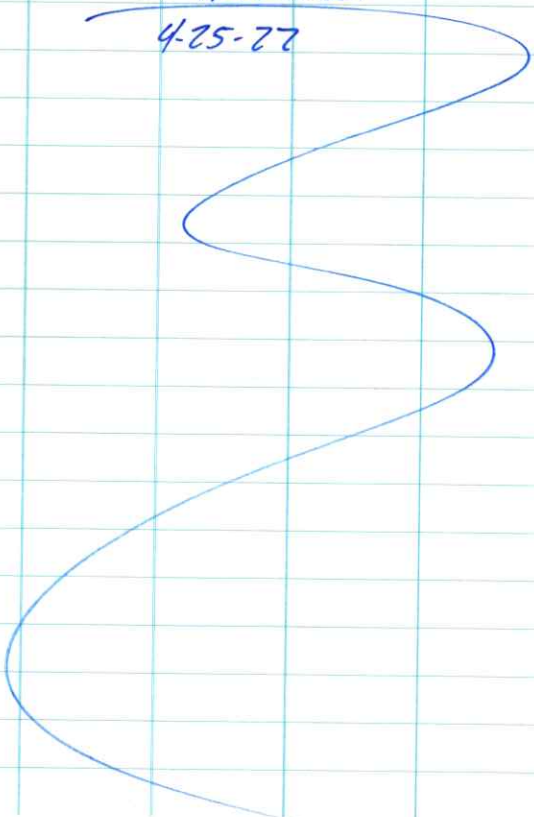
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ATTACHMENT 2
FIELD NOTES

Location SFCJTCDate 4-25-22Project / Client INJECTION

- 0745- E. ANDELMAN ON SITE @ STAGING AREA, HASP.
- 0800- TALON ON SITE @ STAGING AREA.
- 1730- OFF SITE. MOSTLY EQUIPMENT COLLECTION AND ORGANIZATION TODAY. SITE WALK WITH TJ TO LOOK AT INJECTION POINTS

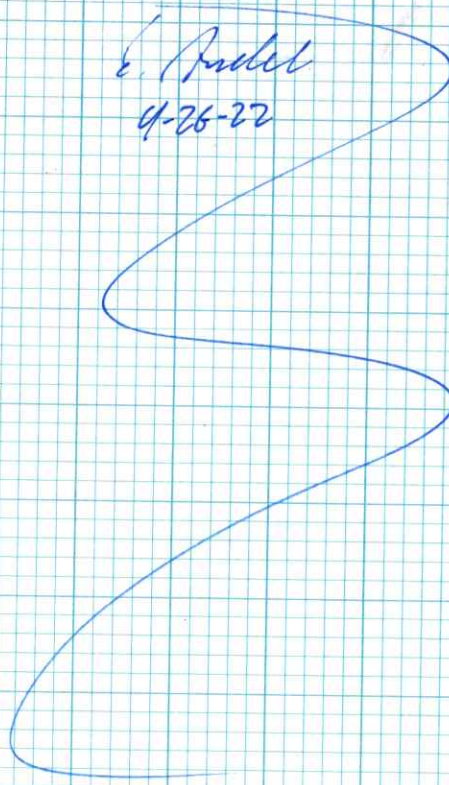
E. Andelman
4-25-22


Location SFCJTCDate 4-26-22Project / Client INJECTION

Scale

- 0800- ON SITE. HASP.
- 1130- OFF SITE. UNABLE TO ACQUIRE WATER METER

E. Andelman
4-26-22

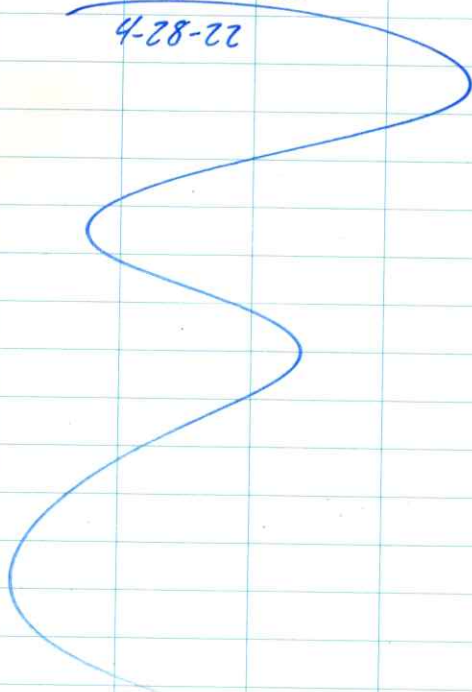


Location SFCJCDate 4-28-22Project / Client INJECTION

- 0745- ON SITE. HASP.
 1030- STATE EMPLOYEES ON SITE. HASP.
 1100- BEGIN DRILLING SF-15 AND SF-18.
 1530- COMPLETE DRILLING SF-15 & SF-18 TO
 42'-43' (FOR ROOM FOR 3' PACKER AT
 BOTTOM. WATER IS READY. PREPARED TO
 INJECT TOMORROW.
 1600- OFF SITE

G. Andeleu

4-28-22

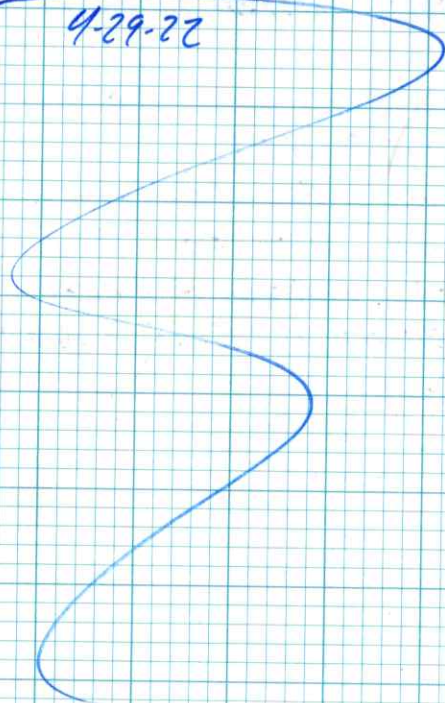
Location SFCJCDate 4-29-22Project / Client INJECTION

Scale _____

- 0800- ON SITE. HASP.
 0935- BEGIN DRILLING SF-14 BOREHOLE.
 0950- BEGIN DRILLING SF-21 BOREHOLE
 1130- COMPLETE DRILLING SF-21 BOREHOLE
 1200- COMPLETE DRILLING SF-14 BOREHOLE.
 1830- ATTEMPTED INJECTION. POSSIBLE DEFECTIVE
 PACKERS. NO REAL SUCCESS.
 1845- OFF SITE

G. Andeleu

4-29-22



Location SFCJCDate 4-30-77Project / Client INJECTION

0800- ON SITE. HASP.

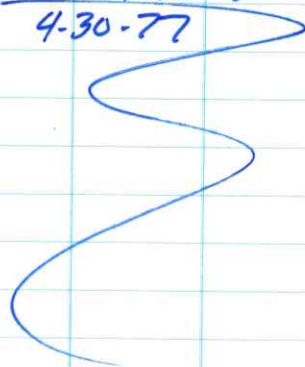
1230- PACKERS CONTINUE TO FAIL. ATTEMPTING TO REMOVE BOTTOM PACKER IN SF-21 BOREHOLE AND INJECT INTO BOTTOM INTERVAL 34'-40'.

1430- PACKER HELD CONSTANT PRESSURE, BUT WAS BREACHED AFTER ~200 gal. SOLUTION INJECTED. STOPPED INJECTION INTO SF-21

1445- ATTEMPTING SAME METHOD ON SF-14 BOREHOLE.

1530- SOLUTION BREACHED PACKER @ 41 gal. PACKER DROPPED FROM 150 psi TO 120 @ BREACH. PRESSURE @ TRAILER ~85 psi @ BREACH, ~2.5 gpm @ BREACH.

1630- OFF SITE

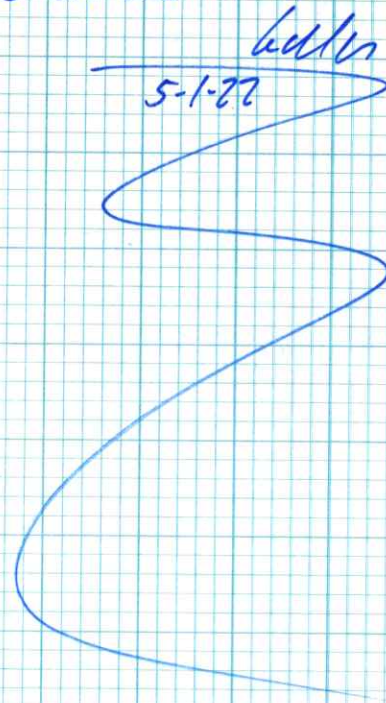
G. M. M.4-30-77Location SFCJCDate 5-1-77Project / Client INJECTION

Scale

0845- ON SITE. HASP.

1045. REMOVED INJECTION TOOLS FROM SF-14 & SF-21. CLEANUP SITE. TAYLOR WILL RETURN TONIGHT WITH BENTONITE TO FILL BOREHOLES AND ATTEMPT DP TOMORROW.

1130- OFF SITE



Location SFCJCDate 5-2-22Project / Client INJECTION

- 0800- ON SITE. HASP.
- 1000- INJECTED INTO SF-14 (SAND & BENT)
35'-40'. REACHED 80 psi, 1.8 gpm, 8 gal.
INJECTED BEFORE SOLUTION SURFACED IN
THE BOREHOLE. ATTEMPTING SF-18 (BENT.)
- 1110- SF-18 (ALL BENTONITE). CLIMBED PSI TO
120 TO PUSH OUT BENTONITE IN TARGET
INTERVAL. REDUCED TO STEADY 50 psi,
~1.7 gpm.
- 1130- ATTEMPTED TO INJECT INTO SF-21 (BENT.)
BUT FORMATION IS TOO TIGHT OR INS. TOOL
DID NOT OPEN. TRIPPED OUT.
- 1530- BEGIN DRILLING ^{CP-6} ~~SF-6~~ & ^{DC-12} ~~SF-12~~; DC-12
MOVED 2' SOUTH OF MARK DUE TO
FIBER OPTIC CABLES.
- 1800- COMPLETE CP-6 DRILLING TO 32', SLOUGH
TO 26'. FILLED W/ HYDRATED BENT TO SURFACE
(2x BAGS BENT.).
- 1800- COMPLETE DC-12 DRILLING TO 62'. SLOUGH
TO 40'. FILLED W/ HYDRATED BENT TO SURFACE
- 1830- BEGIN DRILLING DV-9 BOREHOLE.
- 1930- COMPLETE DRILLING DV-9 TO 40'. SLOUGH TO
30'. FILLED W/ BENT TO SURFACE.
- 2000- OFF SITE


5-2-22
Location SFCJCDate 5-3-22Project / Client INJECTION

Scale

- 0800- ON SITE. HASP.
- 0910- HOOKING UP TO INJECT WATER INTO MW-8
1010 TO TEST HOW FORMATION ACCEPTS INJ.
~~1000~~ BEGIN INJECTING INTO MW-8
- 1040- FIRST 30 MIN 0.5 gpm, 0 psi
- 1230- SUSAN VON GONTEN ON SITE.
- 1430- COMPLETE INJECTING WATER INTO MW-8.
GOT UP TO 11 gpm, 600 gal, 0 psi.
- 1530- SET UP TO INJECT WATER INTO DC-12.
- 1700- AT 55-60' INTERVAL INJECTED ~100 gal.
PSI REACHED 120 @ 2 gpm.
- 1710- RAISED INJECTION TOOL TO 50-55' INTERVAL
- 1750- 50'-55' INTERVAL REACHED 110 psi, 3.7 gpm,
PUMPED ~100 gal. RAISING TO 45'-50'.
- 1805- 45'-50' SURFACED AFTER ~5 gal. PRESSURE
WAS SLIGHTLY LOWER THAN PREVIOUS INTERVALS.
SKIPPING NEXT INTERVAL AND MOVING TO
35'-40' TO TEST.
- 1810- 35'-40' BREACHED IMMEDIATELY. TRIPPING
OUT INJECTION TOOL & GROUTING. MOVING
INJECTION EQUIPMENT TO CP-6.
- 1830- BEGIN INJECTING CP-6 @ BOTTOM INTERVAL
25'-30'. 27'-32'.
- 1930- 27'-32'. 45 psi, 3.2 gpm, 100 gal. MOVING
TO NEXT INTERVAL 22'-27'.
- 2015- COMPLETE 22'-27'. NO BREACH. 100 gal
INJECTED. 90 psi, 2.7 gpm.
- 2030- MOVED TO DV-9 TO INJECT WATER. BEGAN
AT 35'-40'
- 2130- COMPLETE INJECTION IN 35'-40'
100 gal, 20 psi, 30 gpm.

Rite in the Rain

Location SFCJCDate 5-3-22Project / Client INJECTION

- 2135- MOVED TO 30'-35' INTERVAL. BEGAN INJECTION AT 10 psi AND 2.2 gpm.
 2150- 30'-35' INTERVAL SURFACED AFTER 20 gal. INJECTED. REMOVE INJECTION EQUIPMENT FROM DV-9 BOREHOLE.
 2230- SITE SECURE. OFF SITE

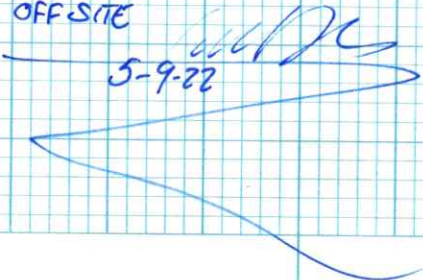
T. Pull
 5-3-22


Location SFCJCDate 5-9-22Project / Client INJECTION

Scale

- 0900- ON SITE. HIASP. GAS LEAK NEAR GARAGE. UNABLE TO WORK UNTIL SFFD SAYS IT IS OK.
 1115- SET UP TO INJECT SOLUTION INTO MW-8.
 1135- BEGIN INJECTING SOLUTION INTO MW-8
 1300- COMPLETE INJECTING INTO MW-8. ~70 gal. SOLUTION INJECTED. STARTED AT 5 gpm, WHICH REDUCED TO 1.5-2 gpm OVER TIME. PRESSOR WAS IMMEDIATELY AT 10-15 psi, SLOWLY INCREASING TO 20-25 BEFORE SHUTTING DOWN. FLUSHED WITH CLEAN WATER.
 1415- HOOKING UP TO INJECT SOLUTION INTO MW-7.
 1435- MW-7 1.8 GPM, 0 psi
 1443- MW-7 2.5 GPM, 0 psi
 1455- MW-7 3.5 gpm, 0 psi
 1503- MW-7 4.5 gpm, 0 psi, 80 gal. INJECTED
 1515- MW-7 5.5 gpm, 1 psi
 1524- MW-7 6.0 gpm, 10 psi, 183 gal. INJECTED.
 1532- MW-7 psi INCREASING AND FLOWRATE DROPPING. 228 gal. DELIVERED.
 1545- INJECTED ~75 gal. WATER INTO MW-7. gpm ~5.5-6, ~25 psi.
 1630- OFF SITE

T. Pull
 5-9-22



Location SFCJCDate 5-10-22Project / Client /INJECTION

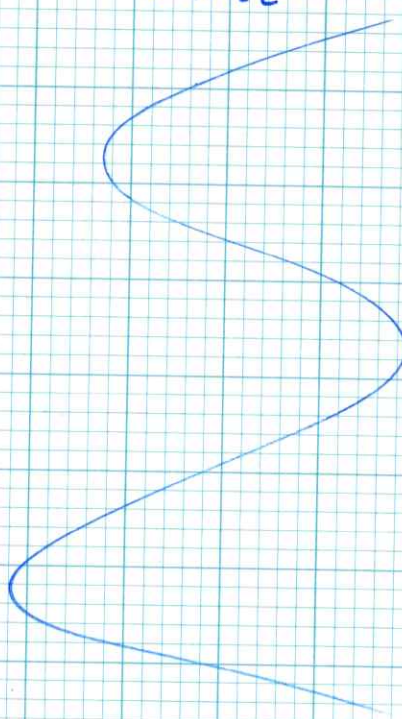
- 0830- ON SITE. HASP. COVERED PRODUCT WITH TARPS. ADDITIONAL EQUIPMENT DELIVERED AND OFF-LOADER.
- 1030- CONTINUE INJECTING INTO MW-7, 1.5 gpm, 0 psi
- 1043- MW-7 1.7 gpm, 20 psi, 25 gal. INJECTED
- 1103- MW-7 1.1 gpm, 25 psi, 49 gal. INJECTED
- 1140- MW-7 1.0 gpm, 30 psi, 83 gal. INJECTED
- 1202- MW-7 STOPPED INJECTING AT 105 gal. HOLDING PRESSURE.
- 1238- RESTART INJECTION INTO MW-7. 1 gpm AT 25 psi.
- 1545- INJECTED 291 gal. INTO MW-7, ~1 gpm ~25 psi. 519 gal. SOLUTION INJECTED TOTAL.
- 1615- BEGIN DRILLING SF-11 IN PREPARATION FOR INJECTION TOMORROW.
- 1643- HIT REFUSAL WITH THE GEOPROBE TWICE AT SF-11. MOVING TO DRILL SF-12.
- 1800- GEOPROBE BLEW SEAL @ 35'. HAD TO CUT SIGN TO BACK TRUCK MOUNTED HSA INTO SF-12 SPOT.
- 1830- COMPLETED SF-12 TO 43' BBS. FILLED W/ HYDRATED BENTONITE @ READY FOR INJECTION TOMORROW.
- 1855- OFF SITE *CAVITY*
5-10-22

Location SFCJCDate 5-11-22Project / Client /INJECTION

Scale

- 0800- ON SITE. HASP. PREPPING TO INJECT INTO SF-12.
- 1140- GEOPROBE RIG FIXED. BEGIN DP TO 40' IN SF-12.
- 1600- COMPLETE INJECTION INTO SF-12 FOR THE DAY ~300 gal. (1 BATCH INJECTED).
- 1700- OFF SITE.

C. Andelin
5-11-22

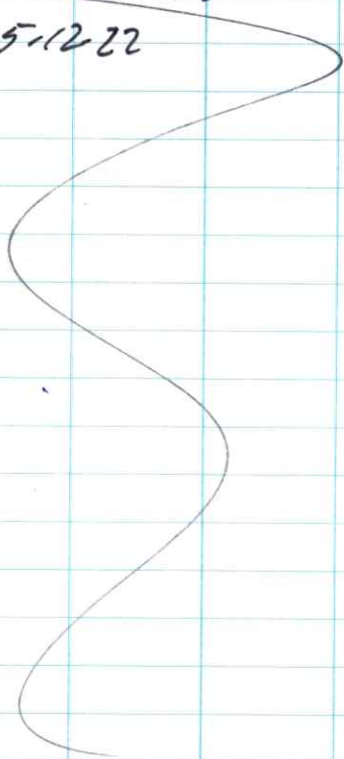


Location SFCJCDate 5-12-22Project / Client INJECTION0800- ON SITE. HASP. STORING EQUIPMENT IN
CAY DOWN YARD.1115- SITE WALK WITH AMY (OLD SF INN MANAGER)
TO APPROVE CLEAN-UP.

1300- OFF SITE

G. Pugh

5-12-22

Location SFCJCDate 5-15-22Project / Client SAMPLING WELLS

Scale

0830- ON SITE. HASP.

0845- BEGIN SAMPLING SFCMW-01 FOR
CATION/ANION BALANCE.

DTW: 31.1'

TD: 39'

PURGED 5 gal. PER VENER'S INSTRUCTIONS
PRIOR TO SAMPLING. NO PARAMETERS TAKEN.

0930- SAMPLED SFCMW-01.

0940- BEGIN SAMPLING MW-11 IN THE WEST
DEVARGAS PLUME AREA. FOR ANIONS/
CATIONS. NO PARAMETERS TAKEN. PURGED

DTW: 29.02'

TD: 34.1'

PURGED 4 gal. PRIOR TO SAMPLING.

1030- SAMPLED MW-11

1040- OFF SITE

G. Pugh

5-15-22

