

**SECTION C. FINANCIAL RESPONSIBILITY DEMONSTRATION**  
**40 CFR 146.85**

**MONTEZUMA NORCAL CARBON SEQUESTRATION HUB**

## **Facility Information**

Facility name: Montezuma NorCal Carbon Sequestration Hub  
IW-A1

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Well location: Collinsville, Solano County, CA  
Lat: 38° 5' 7.334" N Long: -121° 51' 30.914" W NAVD 88  
Sec 28 T 3 N R 1 E

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## **List of Abbreviations and Acronyms**

AoR = area of review	PISC = Post-Injection Site Care
BBL = barrels	UIC = Underground Injection Control
CA = corrective action	USDW = Underground Source of Drinking
CO <sub>2</sub> = carbon dioxide	Water
cyds = cubic yards	US EPA = United States Environmental Protection
MC = Montezuma Carbon, LLC	Agency
P&A = plugging and abandonment	

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### **C.1. SUMMARY**

Montezuma Carbon, LLC, (MC) plans to provide financial responsibility pursuant to 40 CFR 146.82(a)(14) and 146.85 using a combination of an escrow/surety bond, trust fund, and commercial insurance to cover the estimated costs of corrective actions, well plugging and abandonment, post-injection site care (PISC) and site closure, and emergency and remedial response including endangerment to Underground Sources of Drinking Water (USDWs), respectively.

The estimated costs of each of these activities, as provided by MC and their team of consultants, are presented in Table C-1.

**TABLE C-1. SUMMARY OF COST ESTIMATES FOR ACTIVITIES TO BE COVERED BY FINANCIAL RESPONSIBILITY**

<b>Activity</b>	<b>Estimated Costs</b>	<b>Financial Instrument</b>		<b>See cited tables for additional detail</b>
		<b>Coverage<sup>Note 1</sup></b>	<b>Type</b>	
Corrective Action	\$5,502,000		Escrow/Surety Bond	Table C-2
Well Plugging and Abandonment (IW-A1 & IZMW-A1)	\$1,095,368		Escrow/Surety Bond	Table C-3
PISC (50 years) and Site Closure	\$8,005,517		Trust	Table C-4
Emergency and Remedial Response Plan	\$19,464,793		Insurance	Table C-5
Endangerment of USDWs	\$3,564,589		Insurance	Table C-6

Note 1: The amount of coverage column will be updated once the financial instruments are established

### **C.2. CORRECTIVE ACTION**

The Area of Review and Corrective Action Plan identifies all artificial penetrations located within the area of review (AoR) that penetrate the confining zone, evaluates the potential for each artificial penetration to serve as a conduit for fluid movement, and defines corrective actions (as needed) for each artificial penetration. MC anticipates using some manner of escrow/surety bond as the financial instrument for corrective action to satisfy the requirement of 40 CFR 146.85(a)(2)(i). From the research and review of the deep gas wells in the vicinity of the project site and within the preliminary, structurally bound AoR, there are 19 wells for consideration of potential corrective action. For cost estimating purposes, MC conducted an initial evaluation of these wells to assess whether they have been properly plugged and will not allow the potential carbon dioxide (CO<sub>2</sub>) release from the injection interval.

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The estimated costs for implementation of these potential corrective actions are presented in Table C-2 and Appendix C-1.

**TABLE C-2. COST ESTIMATES FOR POTENTIAL CORRECTIVE ACTIONS**

<b>Corrective Action on Wells in AoR</b>		
<b>Activity</b>		<b>Cost</b>
<b>Nine Wells Nearest Injection Well</b>	API	
GP1-7	409520436	\$ 803,000
Feykert 1	409520021	\$ 0
Roaring River 20-2	409521228	\$ 490,000
McDougal 2-8	409520724	\$ 0
Swepi-Hershey 1-8	409520674	\$ 0
Dozier-Pressley 1	409500426	\$ 500,000
Neil 1	409520450	\$ 500,000
Lower Sherman Island 1	406720166	\$ 0
Signal-R.I.L. 1	406700295	\$ 0
<b>Nine Wells Furthest from Injection Well</b>		
Well 1 needing corrective action		\$ 573,000
Well 2 needing corrective action		\$ 573,000
Well 3 needing corrective action		\$ 573,000
Well 4 needing corrective action		\$ 573,000
	Subtotal	\$4,585,000
	Contingency (20%)	\$ 917,000
		\$5,502,000

### C.3. WELL PLUGGING AND ABANDONMENT

The cost for plugging and abandonment of IW-A1 and IZMW-A1 are estimated by a third-party industry expert using the scope of work defined in the Injection Well Plugging Plan and Post-Injection Site Care and Site Closure Plan, combined with their knowledge of current costs for comparable goods and services, and guided by the methodology and checklist provided in Appendix C and Appendix D of the United States Environmental Protection Agency (US EPA) Underground Injection Control (UIC) Program Class VI Financial Responsibility Guidance document (US EPA 2011). The cost estimate basis is an independent third-party contracted to perform the work, where per 40 CFR 146.85(c)(1) the independent third-party is neither a parent nor a subsidiary of the owner or operator.

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MC will establish a surety bond and standby trust guaranteeing performance of well plugging and abandonment. Table C-1 summarizes the coverage for the instrument, which meets/exceeds the estimated cost for performing the work, thus satisfying the requirement of 40 CFR 146.85(a)(2)(ii).

Neither the surety bond nor the standby trust have been established as of the time of this writing. Discussion on conformance of the instrument to the required and recommended specifications will be provided in a future revision of the plan. At a minimum, MC will comply with the following required specifications given in Section 5. Conditions of Coverage and Specifications for Financial Responsibility Demonstrations C. Surety bond guaranteeing performance of injection well plugging and abandonment of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011):

1. Under 40 CFR 146.85(a)(6)(ii), MC will provide proof that the surety either:
  - a. Has passed financial strength requirements based on credit ratings, or
  - b. Has met a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.
2. Under 40 CFR 146.85(a)(6)(iii), MC will establish a standby trust to enable the US EPA to be party to the financial responsibility agreement without the US EPA being the beneficiary of any funds.
3. As specified at 40 CFR 146.85(a)(2), the penal sum of the bond will be in an amount at least equal to the current cost estimate, except as provided in Section H. "Use of multiple financial instruments" of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011).

An overview discussion on conformance of the instrument with the additional recommended specifications given in Section 5. Conditions of Coverage and Specifications for Financial Responsibility Demonstrations C. Surety bond guaranteeing performance of injection well plugging and abandonment of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011) will be provided in a future revision of the plan.

The estimated costs for plugging of injection well IW-A1 and injection zone monitoring well IZMW-A1 are presented in Table C-3 and Appendix C-2.

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**TABLE C-3. COST ESTIMATES FOR PLUGGING OF IW-A1 AND IZMW-A1**

<b>Plugging Injection Wells</b>			
<b>Activity</b>	<b>Unit Rates</b>	<b>Units</b>	<b>Cost</b>
Mobilization/Demob - Rig & Crew	2	15,000	\$ 30,000
Pre P&A work: Permitting, road and location prep/repair	1	100,000	\$ 100,000
Completion rig and rental cost	6	30,000	\$ 180,000
Mud: ~250 BBL at \$20/BBL	240	6	\$ 1,440
Logging Services (including segmented bond log and casing map)	1	55,000	\$ 55,000
Cement	1	120,000	\$ 120,000
Supervision	6	2,100	\$ 12,600
Contingencies (10% minus supervision)			\$ 48,644
<b>Subtotal</b>			<b>\$ 547,684</b>
<b>Total Cost - per well</b>			<b>\$ 547,684</b>

IW-A1	\$	547,684
IZMW- A1	\$	547,684
<b>Well Plugging Total Cost Estimate - IW A1 &amp; IZMW-A1 -</b>	<b>\$</b>	<b>1,095,368</b>

#### C.4. PISC AND SITE CLOSURE

The costs for PISC and Site Closure were estimated by third-party industry experts using the scope of work defined in the Post-Injection Site Care and Site Closure Plan, combined with their knowledge of current costs for comparable goods and services, and guided by the methodology provided in Appendix C of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011). The basis for the cost estimates is an independent third-party contracted to perform the work, whereas per 40 CFR 146.85(c)(1) the independent third party is neither a parent nor a subsidiary of the owner or operator.

MC will establish a trust fund guaranteeing performance of PISC and Site Closure. Table C-1 summarizes the coverage for the trust, which meets/exceeds the estimated costs thus satisfying the requirement of 40 CFR 146.85(a)(2)(iii).

The trust has not been established as of the time of this writing. Discussion for conformance of this instrument to the required and recommended specifications will be provided in a future revision of the plan. At a

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minimum, MC will comply with the following required specifications given in Section 5. Conditions of Coverage and Specifications for Financial Responsibility Demonstrations A. Trust fund of the USEPA UIC Program Class VI Financial Responsibility Guidance document (USEPA 2011):

1. Under 40 CFR 146.85(a)(6)(ii), MC will provide proof that the trustee either:
  - a. Has passed financial strength requirements based on credit ratings, or
  - b. Has met a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.
2. Under 40 CFR 146.85(f), the US EPA Program Director must approve the use and length of pay-in-periods for trust funds.

An overview discussion on conformance of this instrument with the additional recommended specifications given in Section 5. Conditions of Coverage and Specifications for Financial Responsibility Demonstrations A. Trust fund of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011) will be provided in a future revision of the plan.

The estimated costs for post injection site care and site closure are presented in Table C-4 and Appendix C-3.

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**TABLE C-4. COST ESTIMATES FOR PISC AND SITE CLOSURE**

<b>Post-Injection Site Care and Site Closure</b>					
<b>Activity</b>	<b>Unit Rates</b>	<b>Units</b>	<b>Years</b>	<b>Cost Breakdown</b>	
<b>Initial PISC (5 years)</b>			<b>per yr</b>		
PM / Data Management / Telemetry	\$ 16,000	1	5	\$ 80,000	
Atmosphere / Soil Gas Monitoring	\$ 2,854	14	5	\$ 199,752	
Groundwater Monitoring	\$ 3,995	15	5	\$ 299,628	
3D seismic surveys - years 40 and 45	\$ 420,000	1	2	\$ 840,000	
			<b>Subtotal</b>	\$ 1,419,380	
<b>Maintenance PISC (45 years)</b>					
PM / Data Management / Telemetry (continuous)	\$ 16,000	1	45	\$ 720,000	
Atmosphere / Soil Gas Monitoring (every 5 years)	\$ 2,854	14	45	\$ 359,554	
Groundwater Monitoring (every 5 years)	\$ 3,995	15	45	\$ 539,330	
3D seismic surveys (years 55, 65, 75, 90)	\$ 420,000	1	4	\$ 1,680,000	
			<b>Subtotal</b>	\$ 3,298,884	
<b>Site Closure (1 year)</b>					
PM/Reporting	\$ 165,000	1	1	\$ 165,000	
Field Oversight /Expenses	\$ 1,063,000	1	1	\$ 1,063,000	
Drilling Contractor	\$ 725,000	1	1	\$ 725,000	
			<b>Subtotal</b>	\$ 1,953,000	
			<b>Subtotal</b>	\$ 6,671,264	
		<b>Contingency</b>	20%		\$ 1,334,253
				<b>Total Cost</b>	\$ 8,005,517

### C.5. EMERGENCY AND REMEDIAL RESPONSE

The cost for emergency and remedial response (including endangerment to USDWs) was estimated by third-party environmental/engineering consultant using the scope of work defined in the Emergency and Remedial Response Plan, combined with their knowledge of current costs for comparable goods and services, and guided by the methodology provided in Appendix C of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011). The basis for the cost estimate is an independent third-party contracted to perform the work, where per 40 CFR 146.85(c)(1) the independent third-party is neither a parent nor a subsidiary of the owner or operator.

MC will establish an insurance policy with an independent third-party insurer to guarantee performance of emergency and remedial response (including endangerment to USDWs). Table C-1 summarizes coverage for the insurance, which meets/exceeds the estimated costs thus satisfying the requirements of 40 CFR 146.85(a)(2)(iv) and 40 CFR 146.85(a)(3).

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The insurance has not been established as of the time of this writing. Discussion for conformance of this instrument to the required and recommended specifications will be provided in a future revision of the plan. At a minimum, MC will comply with the following required specifications given in Section 5. Conditions of Coverage and Specifications for Financial Responsibility Demonstrations E. Insurance of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011):

1. Under 40 CFR 146.85(a)(6)(ii) MC will provide proof that the insurer either:
  - a. Has passed financial strength requirements based on credit ratings, or
  - b. Has met a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.
2. Under 40 CFR 146.85(a)(6)(vii) MC will demonstrate that the insurer issuing the policy is a third party.
3. As specified at 40 CFR 146.85(a)(2), the insurance policy must be issued for a face amount at least equal to the current estimate, except as provided in Section H. "Use of multiple financial instruments" of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011). The term "face amount" means the total amount the insurer is obligated to pay under the policy. Actual payments by the insurer will not change the face amount, although the insurer's future liability will be lowered by the amount of the payments.

An overview discussion on conformance of this instrument with the additional recommended specifications given in Section 5. Conditions of Coverage and Specifications for Financial Responsibility Demonstrations E. Insurance of the US EPA UIC Program Class VI Financial Responsibility Guidance document (US EPA 2011) will be provided in a future revision of the plan.

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The estimated costs for emergency remedial response actions are presented in Table C-5 and Appendix C-4.

**TABLE C-5. COST ESTIMATES FOR EMERGENCY AND REMEDIAL RESPONSE PLAN**

<b>Emergency Remedial Response</b>	
<b>Activity</b>	<b>Cost</b>
Project Management	\$ 19,070
Excavation oversight and backfill operations	\$ 903,215
Field Screening and Soil Sampling	\$ 31,775
Drill Relief Well	\$ 6,615,918
Well Control Team	\$ 103,000
New Injector Well - Replacement (mob, drill, and comp.)	\$ 8,000,000
Original Injector Well Abandonment; same cost as P&A estimate	\$ 547,684
	<b><i>Subtotal</i></b> \$ 16,220,661
Contingency 20%	\$ 3,244,132
	<b><i>Total Cost</i></b> \$ 19,464,793

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The estimated costs for investigation, remediation, and monitoring associated with potential endangerment of a USDW are presented in Table C-6 and Appendix C-5.

**TABLE C-6. COST ESTIMATES FOR ENDANGERMENT OF USDWS**

Endangerment of USDWs			
Description	Unit Rates	Units	Total Estimated Amount
<b>Subsurface Release to USDW</b>			
Shallow/Mid Depth Groundwater Monitoring Well Installation & Oversight	\$286,256	1	\$ 286,256
Groundwater Monitoring Well- Equipment Installation	\$81,116	1	\$ 81,116
Collection of Data from monitoring wells - Quarterly sampling and reporting for 10 years	\$986,859	1	\$ 986,859
Collection of Data from surrounding wells and possible replacement	\$1,385,359	1	\$ 1,385,359
Plugging of monitoring wells	\$230,900	1	\$ 230,900
	<b>Subtotal</b>		<b>\$ 2,970,491</b>
	Contingency	20%	\$ 594,098
			<b>Total Cost</b>
			<b>\$ 3,564,589</b>

**C.6. REFERENCES**

US EPA 2011, Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Financial Responsibility Guidance, Office of Water (4606M), EPA 816-R-11-005, July 2011. Available at: [https://www.epa.gov/system/files/documents/2022-11/uicfinancialresponsibilityguidancefinal072011v\\_0.pdf](https://www.epa.gov/system/files/documents/2022-11/uicfinancialresponsibilityguidancefinal072011v_0.pdf).

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**APPENDIX C-1**

**CORRECTIVE ACTION COST ESTIMATE**



Eric F. Hadsell  
President  
Cell: 707-249-4765

14 North Orange Avenue  
Lodi, California 95240  
efhadsell@comcast.net

August 28, 2023

Montezuma Carbon LLC  
2000 Powell Street, Suite 920  
Emeryville, CA 94608

Dear Mr. Levine-

I am pleased to be working with Montezuma Carbon in the development of the Montezuma CO<sub>2</sub> sequestration hub. This particular task, the estimate of the corrective action on relevant wells within the AoR, has been prepared based on the qualifications and methodology shown here.

### **Company Qualifications**

The cost estimate for the abandonment of a Montezuma Carbon LLC CO<sub>2</sub> injection well at the proposed Montezuma injection facility has been prepared by Eric Hadsell of P. O. E. Inc. P. O. E. is an Engineering consulting firm and a third party relative to Montezuma Carbon LLC and their CO<sub>2</sub> injection project. Mr. Hadsell has provided engineering services and directed drilling and completion operations, including abandonments, in Northern California for northern California gas producers for 25 years, both in house (Rosetta Resources, Calpine Natural Gas and others) and as a consultant.

### **Basis used to develop cost estimates**

Wells needing corrective action, by Montezuma Carbon criteria, are wells that do not have the BFW covered with cement either annular or within casing, have no cement over the Meganos, either open hole or cased, and have only one cement plug between the Meganos shale and the BFW. The nine wells nearest the injection well were reviewed in detail, as potentially in need of corrective action. Please see the attached well bore diagrams for reference on these wells. As a conservative approach, the nine wells nearest the injection well are considered as representative of the remaining wells further away but within the AoR. With this approach, an estimate for potential corrective action on all wells was developed.

### Review of Nine Nearest Wells

**GP 1-7: Likely to need corrective action.** This well was drilled and abandoned in 1980. Distance from the center of the SW corner Sec 22 T3N R 2E ~ 3.6 miles. The 1,450 BFW is in open hole between two cement plugs at 1,001' to 1,099; and 1,322' to 1,792'. Likely corrective action needed to minimize the risk of CO<sub>2</sub> escaping the storage interval and entering "fresh water" sands and to bring the well into CalGEM compliance:

1. Rebuild the drilling pad and access road.
2. Drill out the three cement plugs and clean out the open hole to nearly TD at 11,000'. Assume this can be done with a completion rig.



3. Set a cement plug over the potential sources of gas, roughly 11,000' to ~9,000'.
4. Displace the mud with CalGEM compliant abandonment mud.
5. Set a 2<sup>nd</sup> plug at ~5,500' to 5,300' or higher.
6. Set a third plug top cover the BFW and cover the surface casing shoe (1,050') at 1,550' to 950' or higher. This assumes the identified depth of the BFW has not changed since 1980.
7. Set a surface plug from 50' to GL.
8. Rehab the drilling pad and access road

Assuming there are no major deviations from the outlined plan, and the well can be cleaned out to 11,000' with a completion rig, the rough estimate cost will be **\$803,000**

**Feykert 1 Original Hole: Likely not to need corrective action.** The original hole was drilled as a straight hole to 11,040'. No production casing was run. Three cement plugs were set in the open hole, two are above the top of the Meganos.

**Feykert 1 Sidetrack: Likely not to need corrective action.** The sidetrack was drilled to 8,384', which is approximately 900' above the top of the Meganos. Also, the 4 1/2" casing, perforated from 7,641' to 7,732', was abandoned with a continuous cement plug from 7,616' to the surface. Distance from the center of the SW corner Sec 22 T3N R 2E ~ 1.6 miles.

**Roaring River 20-2: Likely to need corrective action.** Although the top of the Meganos has not been positively identified it may be below the 10,301' TD MD (8,606 TVD) in which case the well will not require corrective action. If the top of the Meganos is above 8,606' it will, by our standards (see above) require corrective action. This action will include drilling out five bridge plugs and cement retainers, displacing with CalGEM compatible mud, and setting four or five cement plugs. The well is 'Idle' and will eventually have to be brought into CalGEM compliance, most probably by being abandoned. Perhaps the operator, CRC can be persuaded to move this well up on its abandonment schedule. A rough estimate of the cost of bringing this well into EPA acceptance is about **\$490,000**.

**McDougal 2-8 (D&A): Likely to not need corrective action.** The well was drilled to ~12,066' TVD, below any plausible depth of the Meganos. It was plugged immediately after drilling with three cement plugs and ~564' of cement between the open hole and the base of fresh water (BFW) at ~1,250'. A base of fresh water plug was set from 1,301' to ~1,002'. McDougal 2-8 is approximately 2.7 miles from the proposed Strat Well location.

**Swepi-Hershey 1-8: Should not need corrective action.** The well was drilled directionally and abandoned immediately after drilling. The BFW is shown as "surface" on the abandonment NOI. All three casing strings are cemented to the surface and three cement plugs isolate the open hole from the cased hole. Three additional plugs are set at 2,059' to 1,938' (surface casing is set at 2,038'), 1,350' to 950' and 140' to GL.



**Dozier-Pressley 1: Will need corrective action.** The depth of the BFW will have to be identified more specifically than "behind surface pipe" before a specific corrective action can be designed. At a minimum, the surface plug and Plug 1 (1,070' to 875'±) will have to be removed. A deep plug will be set through and over the Meganos and a surface plug set between ~1,000' and the surface. This minimum work will move the well from "corrective action needed" to "corrective action *not* needed but will not make the well compliant with current CalGEM abandonment regulations. The bulk of the cost will be cleaning out the open hole below the 1,009' 9 5/8" shoe. If this can be done without making new hole, a rough guess of the corrective action work will be ~\$500,000. The Dossier-Pressley well is about 5.7 miles from the proposed Strat Well location.

**Neil 1: Will need corrective action.** This well is very similar to the Dozier-Pressley 1. It is approximately 4.5 miles from the proposed Strat Well location and will require approximately \$500,000 to minimize the chance of becoming a conduit of CO<sub>2</sub> into fresh water.

**Lower Sherman Island 1: Likely to *not* need corrective action.** Very similar to the previous two wells but with an additional cement plug over the BFW.

**Signal R.I.L. 1: Likely to *not* need corrective action.** The BFW is noted as "none". Otherwise this well is very similar to the previous three. This well is approximately 5.4 miles southeast of proposed Strat Well location.

#### Estimate for Nine Remaining Wells

While the remaining wells are distant from the injection well, they are within the AoR and at some point in the project life may warrant consideration for corrective action. For cost estimating purposes, the nine wells near the injection well are considered representative of conditions for these remaining wells. As described above, five of the wells are determined as likely not needing corrective action, while four wells are considered as likely requiring corrective action. For those four wells, the average estimated cost for corrective action is approximately \$573,000. Applying this to the remaining wells yields four wells needing corrective action, also at an average of approximately \$573,000.

Please contact me as the project progresses and additional evaluation is needed on these wells. At that time, a honed cost estimate can be developed based on new information obtained.

Sincerely,

Eric Hadsell  
P. O. E. Inc

Table 1 - Cost Estimate for Corrective Action on Existing Oil & Gas Wells  
Nearest Injection Well

GP1-7	409520436
Rebuild the necessary location and road including rehab	\$ 150,000
20 days of rig time and associated rentals	\$ 400,000
Cement and cement placement	\$ 50,000
Supervision	\$ 44,000
Abandonment quality mud	\$ 25,000
Miscellaneous and contingencies (20%)	\$ 133,800
Estimated total cost:	\$ 802,800

Roaring River 20-2	409521228
Assume the production pad is useable as is	\$ -
Rig up and rig down, 2 days at 12,000/day	\$ 24,000
Rig time 15 days at \$20,000 including most rentals	\$ 300,000
Cement at \$40/sx	\$ 8,000
Supervision, 17 days at \$2,000/day	\$ 34,000
Water, 8 loads at \$500/load	\$ 4,000
Mud at \$30/sx	\$ 6,000
Miscellaneous and Contingencies (30%)	\$ 112,800
Estimated total cost:	\$ 488,800

Dozier-Pressley 1	409500426
Based on above and text:	\$ 500,000

Neil 1	409520450
Based on above and text:	\$ 500,000

**GP 1-7 Abandoned****Harvest Petroleum Inc.**

API No. 0409520436

Eric Hadsell

27-Aug-23

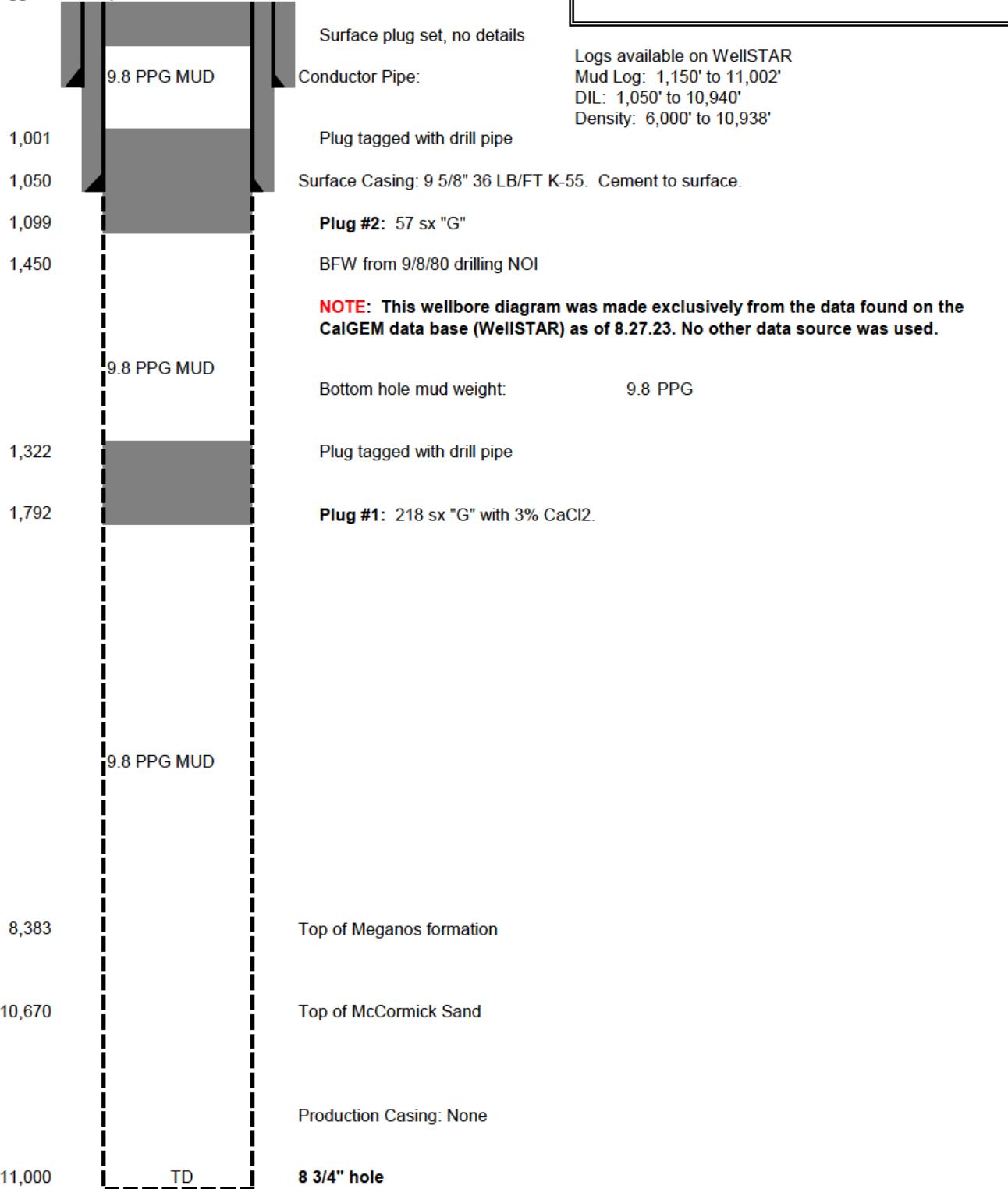
Distance from Center SW corner Sec 22 T3N R1E: ~3.6 Miles

Solano Co., California

Location 400' East 1,850' Nort Sec 7 T3N R2E MDB&amp;M

WI/NRI:  
Spud: 8-Aug-80  
Plugged: 08-Sep-80

KB:  
DF:  
GL:

**Directional Data: Straight hole**

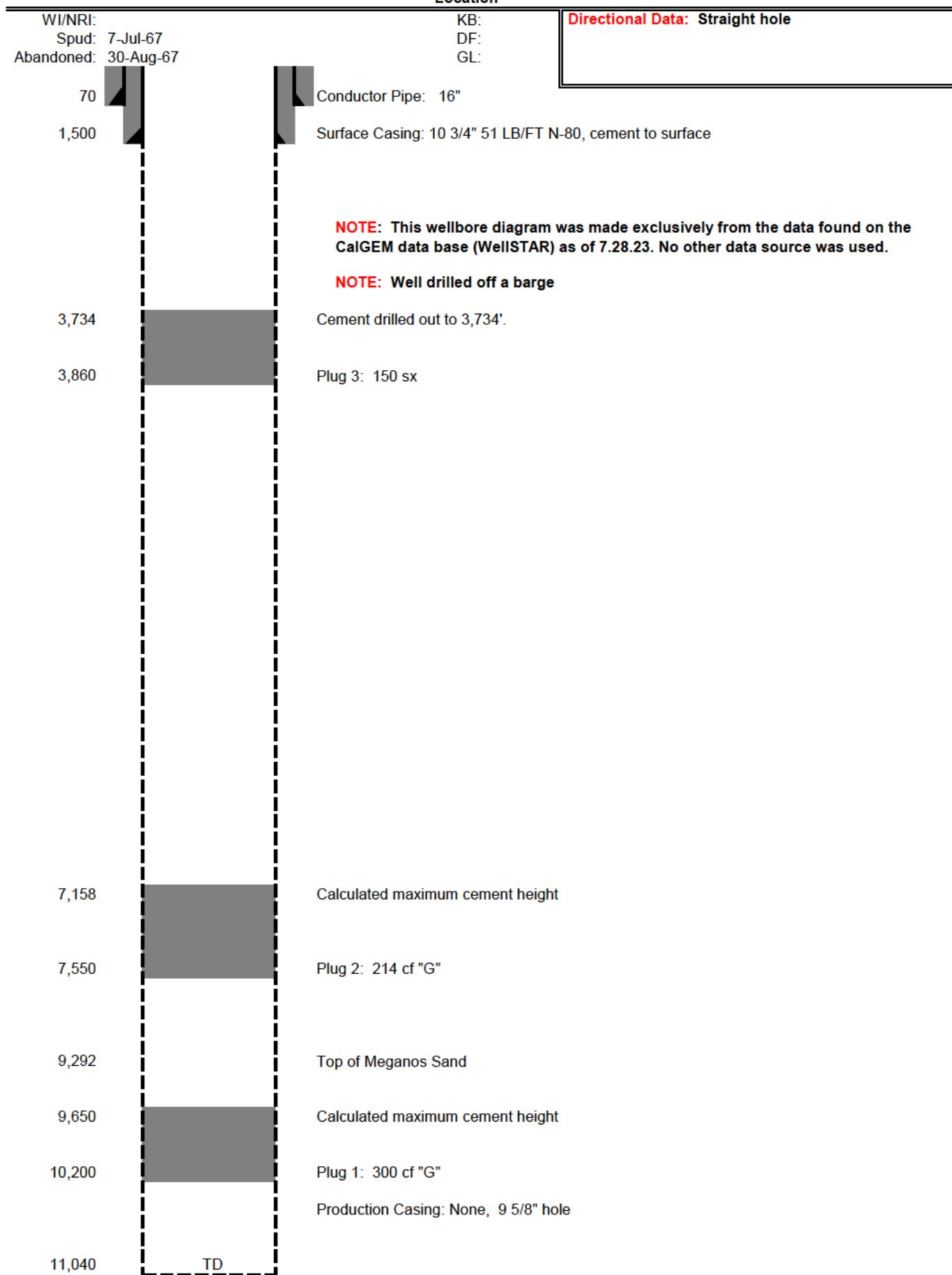
NOT  
TO  
SCALE

# Feykert 1 Original Hole

Eric Hadsell

27-Aug-23

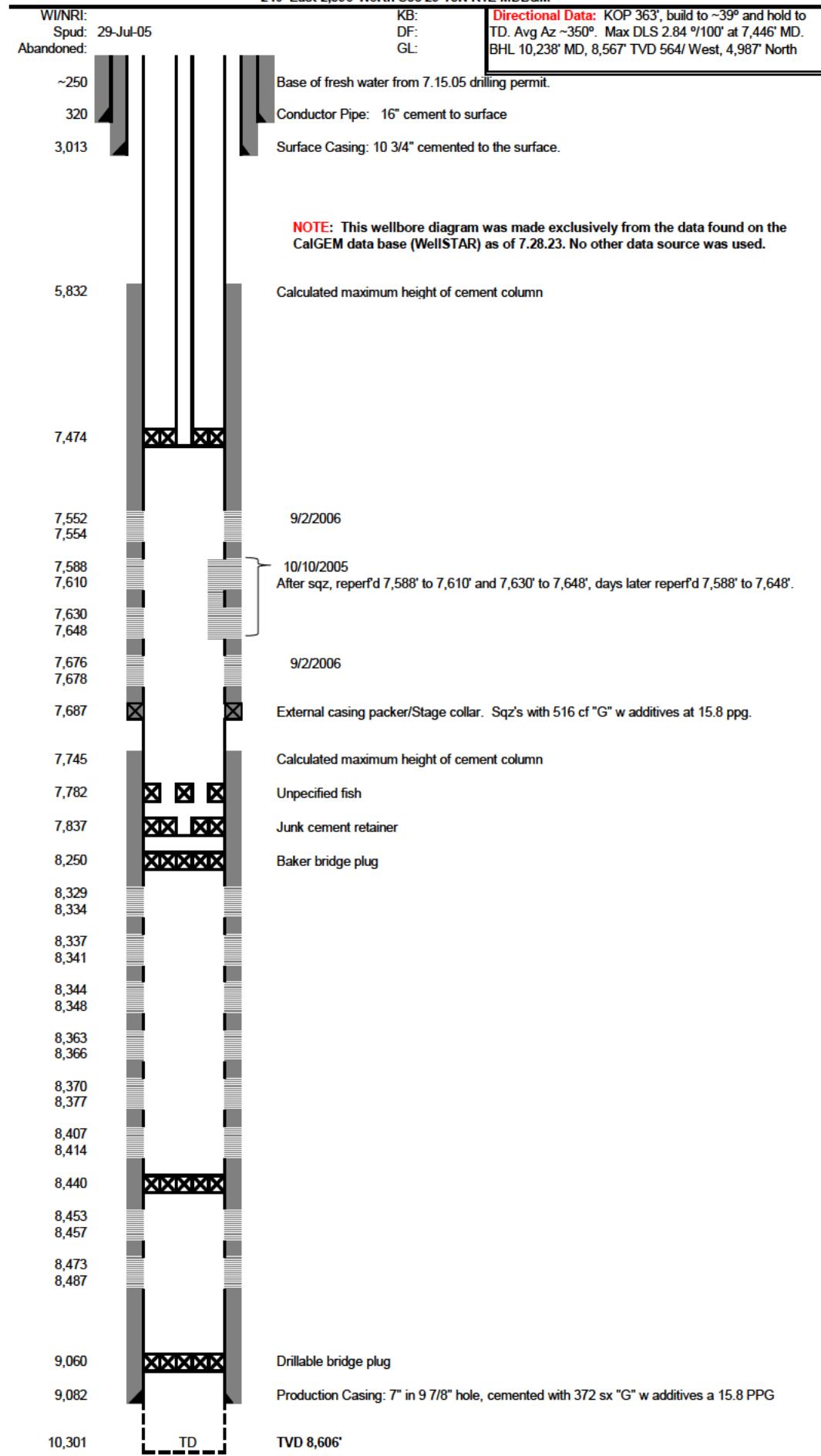
API No. 0409520021  
Van Sickle Island Gas Field  
Solano Co., California  
Location



Roaring River 20-2  
VanSickle Island Gas Field  
API No. 0409521228

Eric Hadsell  
27-Aug-23

Solano Co., California  
240' East 2,396' North Sec 29 T3N R1E MDB&M



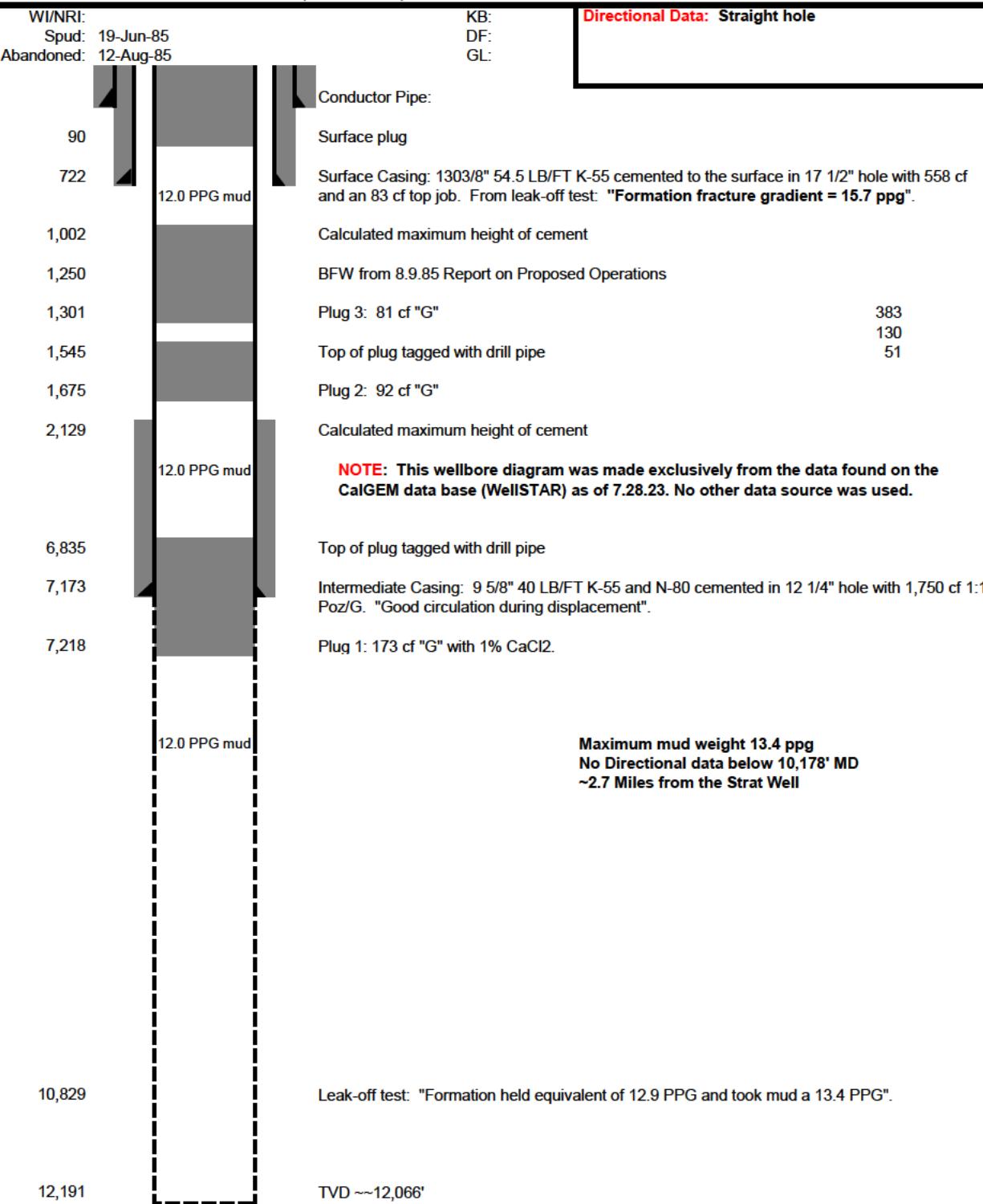
# McDougal 2-8 Abandoned

Eric Hadsell

28-Aug-23

API No. 0409520724

Solano Co., California  
4,000' South 2,390' West Sec 8 T3N R1E MDB&M



# Swepi-Hershey 1-8 (fka McDougal 1-8) **Abandoned**

Eric Hadsell

28-Aug-23

API No. 0409520674

Solano Co., California

2,400' West 4,000' South Sec 8 T3N R1E MDB&M

WI/NRI:

Spud: 17-Jun-84

Abandoned: 26-Jul-84

KB:

DF:

GL:

**Directional Data:** KOP 2,047', build to 24° at 3087', hold to 3,972'. drop to 17° to 12° to 7,087', build to 33° at 9,259'. Final survey. BHL at final survey: 695' North & 2,522' West, 8,736' TVD Average Az 288°.

80

30"

140

Plug 6: 50 sx

518

Conductor Pipe: 20" 94LB/FT "Good cement Returns".

950

Plug 5: 159 sx

1,350

Plug 4: 35 sx

1,938

Surface Casing: 13 38" 68 LB/FT K-55 cemented with 35 sx in XX" hole with 1,498 cf, 14.2 PPG lead and 785 cf 15.5 PPG tail

2,038

2,059

2,070

Leak-off test: 10.6 PPG equivalent

**NOTE:** Base of Fresh water shown as "surface" on 8.15.94 abandonment NOI.

**NOTE:** Swepi-Hershey 1-8 is approximately 2.7 miles north west of the Strat Well location.

**NOTE:** This wellbore diagram was made exclusively from the data found on the CalGEM data base (WellSTAR) as of 7.28.23. No other data source was used.

Cement Top

Marker Horizons (Shell)	Depth
Nortonville	5,920
Domengine	6,440
Capay	6,770
Wagonet	8,415
Fault & T/Cretaceous	8,530

N  
O  
T  
E  
T  
O  
S  
C  
A  
L  
E

6,718

Plug tagged with drill pipe

6,977

9 5/8" 43.5 LB/FT

# Dozier-Pressley 1 Abandoned

Eric Hadsell

27-Aug-23

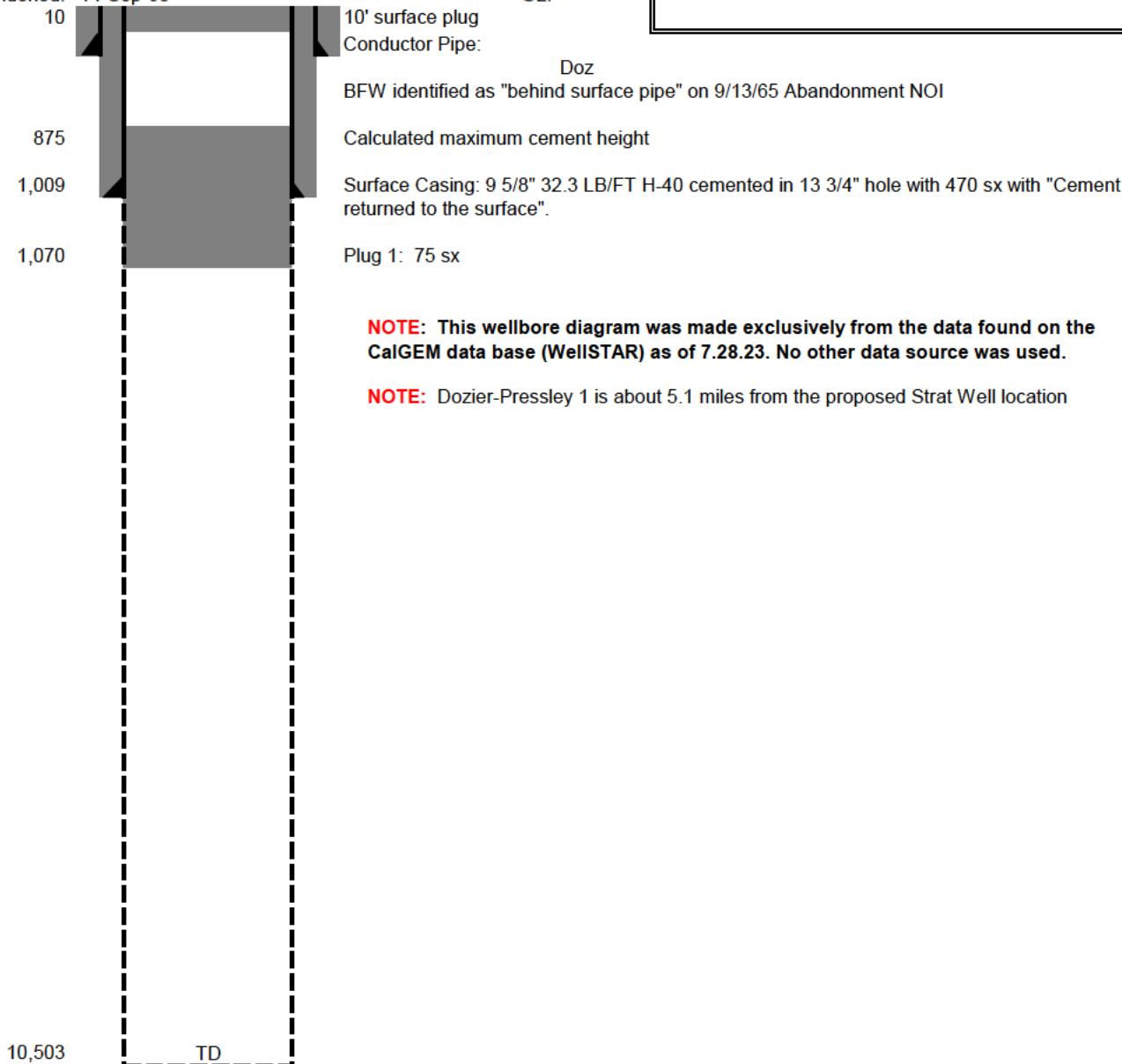
API No. 0409500426

Solano Co., California  
1,980' South and 1,320' West Sec 8 T3N R2E MDB&M

WI/NRI:  
Spud: 19-Aug-65  
Abandoned: 14-Sep-65

KB:  
DF:  
GL:

Directional Data: Straight hole



# Neil 1 Abandoned

Eric Hadsell

2-Aug-23

API No. 0409520450

Solano Co., California  
1,085' South 245' East Sec 8 T3N R2E MDB&M

WI/NRI:  
Spud: 22-Feb-81

Abandoned:

KB:  
DF:  
GL:

Directional Data: Straight hole

60	Surface plug: 50 sxc
??	Conductor Pipe:
718	Tagged with drill pipw.
1,022	Surface Casing: 9 5/8" 36 LB/FT J-55 cemented in 16" hole with 487 sx. "cement to surface".
1,088	Plug 1: 200 sx "G,

**NOTE:** This wellbore diagram was made exclusively from the data found on the CalGEM data base (WellSTAR) as of 7.28.23. No other data source was used.

**NOTE:** Maximum mud weight 11.4 PPG

**NOTE:** The base of the depth of fresh water is not included in the CalGEM records.

Formation	From Quintana	Top
Markley		3,300
Nortonville		5,460
Domengine		5,740
Capay		6,100
Hamilton		7,500
Meganos	7,500	(sic)
Anderson		8,035
Martinez		8,550
McCormick		9,055
First Massive		9,350

N  
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9,600 8 3/4" hole

# Lower Sherman Island 1

Eric Hadsell

28-Aug-23

API No. 0406720166

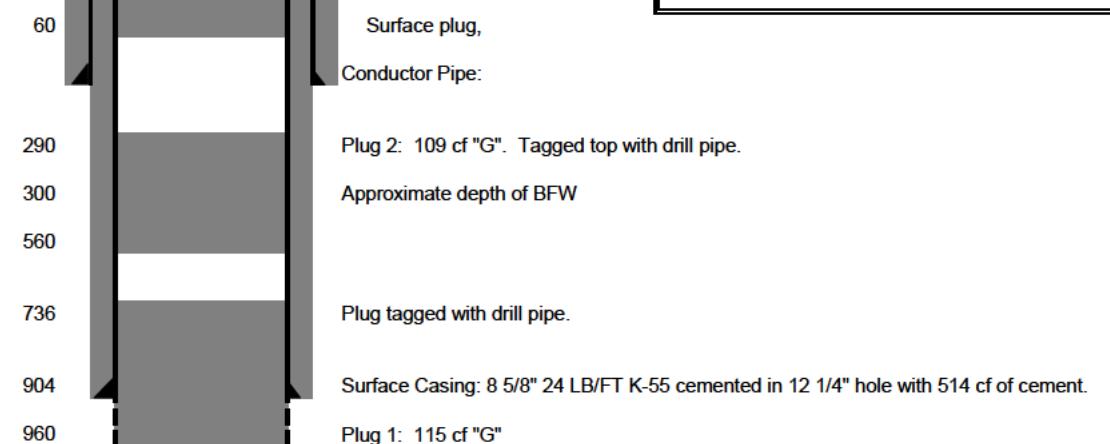
Solano Co., California

1,000' South 700' East Sec 5 T2N R2E MDB&M

WI/NRI:  
Spud: 8-Nov-80  
Abandoned: 01-Dec-80

KB:  
DF:  
GL:

Directional Data: Straight hole



**NOTE:** This wellbore diagram was made exclusively from the data found on the CalGEM data base (WellSTAR) as of 7.28.23. No other data source was used.

**NOTE:** Maximum mud weight 101.2PPG

NOT  
TO  
SCALE

Float Collar

Production Casing:

8,595

TD

7 7/8" hole

# Signal-R.I.L. 1 Abandoned

Eric Hadsell

28-Aug-23

API No. 0406700295

Sacramento Co., California  
1,400' North 1,600' East Sec 5 T2N R2E MDB&M

WI/NRI:  
Spud: 22-Apr-65  
Abandoned: 11-May-65

KB:  
DF:  
GL: -10'

Directional Data: Straight hole

10 Surface plug  
40 Conductor Pipe: 16"

756 Plug 1: Cemented with 55 sx "G", tagged to with drill pipe.  
800 Surface Casing: 9 5/8" 32 LB/FT H-40 cemented in 13 3/4" with 385 cf of cement. "Good returns to surface".  
850

**NOTE:** This wellbore diagram was made exclusively from the data found on the CalGEM data base (WellSTAR) as of 7.28.23. No other data source was used.

**NOTE:** Maximum mud weight 11.1 ppg.

**NOTE:** The BFW is noted on the abandonment NOI as "none".

NOT  
TO  
SCALE

8,835 8 3/4" hole

Float Collar

Production Casing:

8,595 TD 7 7/8" hole

**SECTION C. FINANCIAL RESPONSIBILITY DEMONSTRATION**  
**40 CFR 146.85**

**APPENDIX C-2**

**INJECTION WELL PLUGGING AND ABANDONMENT COST ESTIMATE**



Eric F. Hadsell  
President  
Cell: 707-249-4765

14 North Orange Avenue  
Lodi, California 95240  
efhadsell@comcast.net

Mr. Jim Levine, Managing Partner  
Montezuma Carbon LLC  
2000 Powell Street, Suite 920  
Emeryville, CA 94608

August 26, 2023

Dear Mr. Levine-

I am pleased to be working with Montezuma Carbon in the development of the Montezuma CO<sub>2</sub> sequestration hub. This particular task, the estimate of the abandonment cost of one of the proposed CO<sub>2</sub> injection wells, has been prepared based on the qualifications and methodology shown here.

#### Company Qualifications

The cost estimate for the abandonment of a Montezuma Carbon LLC CO<sub>2</sub> injection well at the proposed Montezuma injection facility has been prepared by Eric Hadsell of P. O. E. Inc. P. O. E. is an Engineering consulting firm and a third party relative to Montezuma Carbon LLC and their CO<sub>2</sub> injection project. Mr. Hadsell has provided engineering services and directed drilling and completion operations, including abandonments, in Northern California for northern California gas producers for 25 years, both in house (Rosetta Resources, Calpine Natural Gas and others) and as a consultant.

#### Basis used to develop cost estimates

Montezuma Carbon contracted P. O. E. Inc. to prepare a cost estimate for the abandonment of one of their CO<sub>2</sub> injection wells, prepare well designs and drilling programs for the injection wells, and provide engineering assistance in other aspects of their project. In developing the cost estimate P. O. E. has used cost estimates from various service companies, recent personal experience, and historical price and time records. The assumptions used in developing the abandonment cost estimate are included below.

#### Assumptions:

1. The well is idle well with a retrievable packer (see attached figure).
2. The perforations are open below a packer (see attached figure).
3. The 2 7/8" x 5 1/2" annulus is filled with water with additives; O<sub>2</sub> scavenger, biocide, and CO<sub>2</sub> scavenger.
4. A final segmented bond log, casing map, and pressure test will be required by regulation. These reveal no cause for remedial casing or cement work prior to permanent abandonment.
5. The 5 1/2" casing is to be cemented with CO<sub>2</sub> compatible cement from the existing cement top at 9,000' to the surface with CO<sub>2</sub> compatible cement, 70% class "G", 30% pozzolan plus additives.
6. After the cement is set all casing strings will be cut off 3 to 5 feet below the surface and covered with a steel plate marked with the last four digits of the API number.
7. The well pad and access road will be returned to pre-drilling conditions.
8. Remaining mud and completion fluids will be disposed of in a manner acceptable to regulators.
9. The Salvage value of the tree and tubing will be zero.

#### Abandonment Procedure:

1. Move in and rig up a completion rig, mud tanks, pump and BOP.
2. Displace any remaining CO2 in the tubing into the injection zone with a mud sufficient to overbalance the reservoir pressure. Assume 12.0 PPG.
3. Confirm the well is dead, no surface pressure and no flow.
4. Replace the tree with a 5,000 PSI BOP. Test the BOP to API/regulatory standards.
5. Set a tubing plug in the seat nipple at the base of the packer.
6. Pull the seal assembly from the PBR. Continuously monitor the well for flow
7. Circulate out the packer fluid and circulate in with 12.0 PPG mud completely filling the 5 1/2" casing.
8. Pressure test the casing by applying 2,000 PSI (or whatever satisfies regulatory requirements) at the surface.
9. Sting back into the packer and release the retrievable packer
10. Pull and stand back the 2 7/8" tubing, lay down the packer and seal assembly. Fill the casing to the surface with 12.0 PPG mud every ten stands while pulling out.
11. Run the required logs, segmented bond log and casing map.
12. Trip in with open ended tubing to the top of the cement.
13. Mix and circulate the abandonment cement: 70/30 poz with additives as required (~14.5 PPG, ~1.30 FT3/sx). Casing volume ~1,200 FT3, ~900 sx with 10% excess.
14. Pull and lay down the 2 7/8" tubing.
15. Remove the BOP
16. Confirm the cement is static at the surface. Run a "top job" if needed.
17. Cut off all casing strings 3 to 5 feet below ground level.
18. Weld a steel plate to the 5 1/2" casing identified with the last four digits of the API number
19. Release the rig and all rental equipment.
20. Restore the pad and access road to pre-drilling conditions.

Please see the attached estimate and before/after diagram figures for additional information.

Sincerely,

Eric Hadsell  
P. O. E. Inc



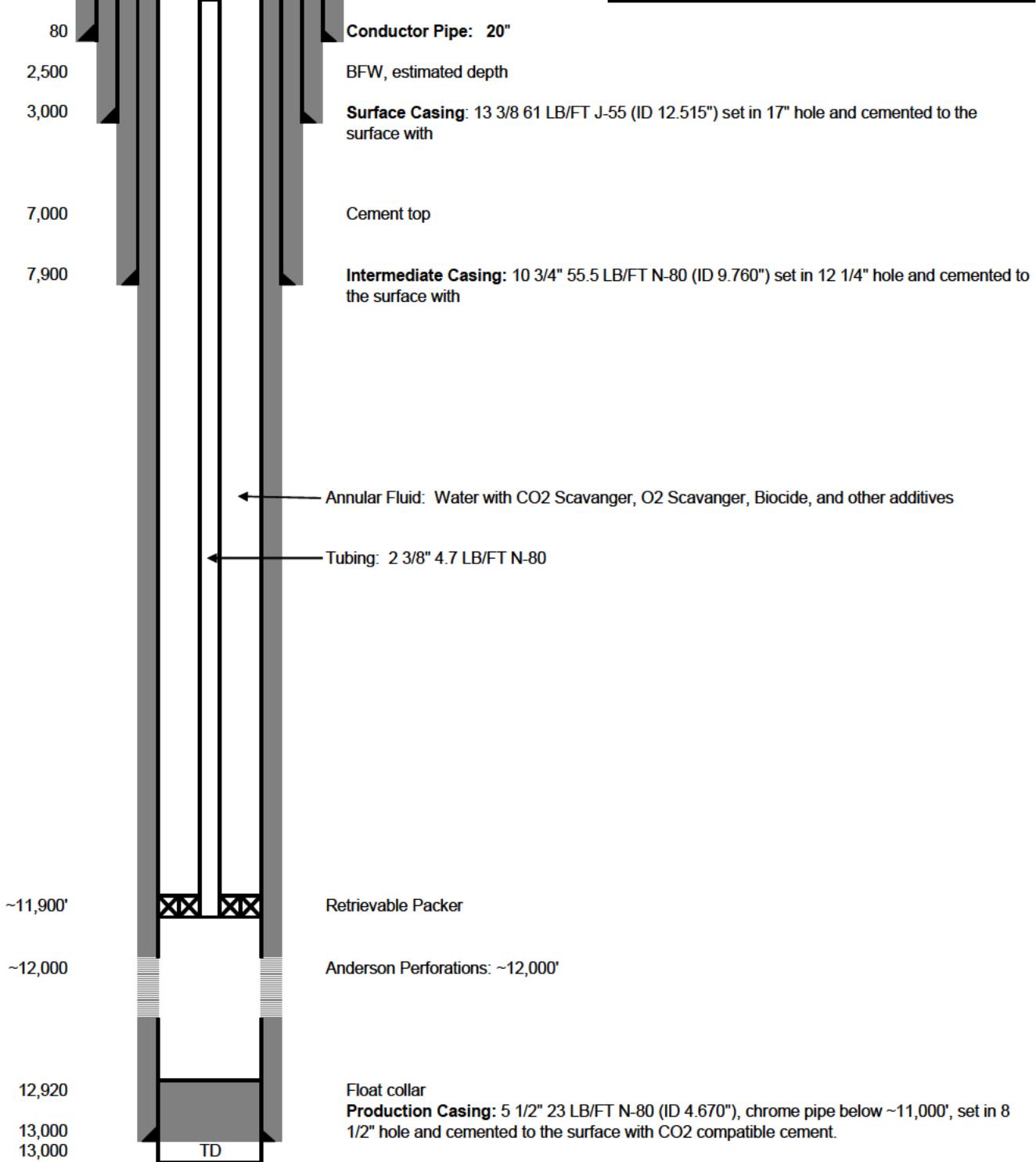
Montezuma Carbon LLC  
Montezuma Carbon LLC Injection Well **Prior to Abandonment**  
API No.: TBD  
Solano Co. California

Eric Hadsell  
25-Aug-23

WI/NRI:  
Spud:  
Comp:

KB: 20'  
DF:  
GL: 10'

Directional Data: **STRAIGHT HOLE**





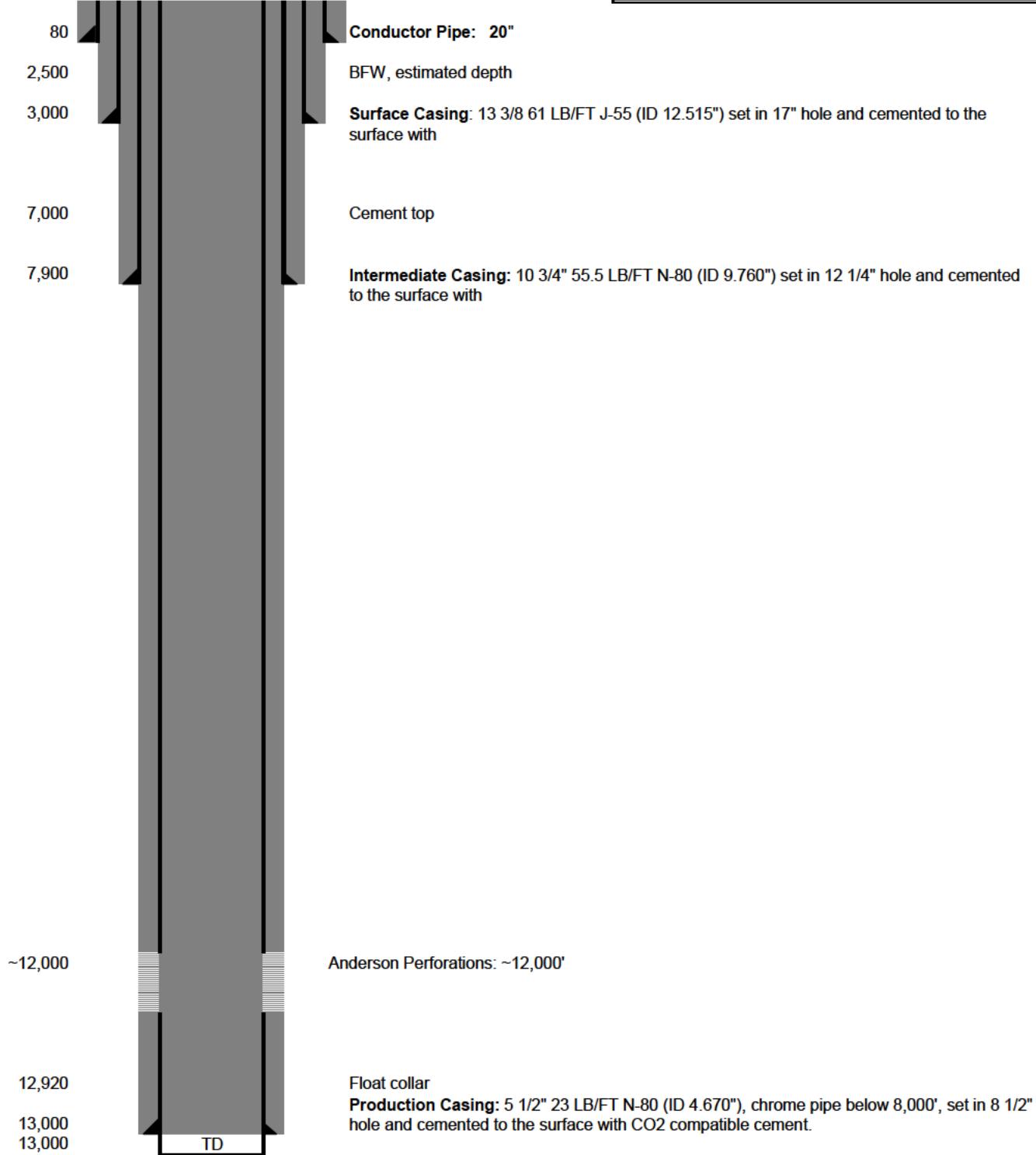
Montezuma Carbon LLC  
Montezuma Carbon LLC Injection Well **Prior to Abandonment**  
API No.: TBD  
Solano Co. California

Eric Hadsell  
25-Aug-23

WI/NRI:  
Spud:  
Comp:

KB: 20'  
DF:  
GL: 10'

Directional Data: **STRAIGHT HOLE**



**Montezuma Carbon LLC**  
**ABANDONMENT: CO2 Injection Well**  
**Authorization For Expenditure**

**Well Name:** CO2 Injection Well

**Location:**

**Field:**

**County:**

Solano

**State:**

California

Abandon the injection well according to EPA and DOGGR regulations. After forty or fifty years of injection assume the surface equipment, wellhead, tubing and packer have no value.

**Working Interest %:**

**Revenue Interest %:**

Account Code	Description	Nature of Expenditures	Service Company	Total Amount
500.881.42	INSURANCE			
500.881.51	LOCATION & ROAD	Restore production pad and road	Gomes	\$100,000
500.881.52	TRANSPORTATION & HAULING	Move in and Move out completion rig, 2 days	PGD	\$30,000
500.881.53	DAYWORK			
500.881.54	SERVICE RIG	6 days at \$30,000/day	PGD	\$180,000
500.881.55	CEMENTING SERVICES & SUPPLIES	Plug 9,000' - surface w CO2 compatible cement	Halliburton	\$120,000
500.881.56	FUEL & WATER	Included in day rate		
500.881.57	RENTALS	Included in day rate		
500.881.58	MUD & CHEMICALS	~240 BBL Mud & annular water disposal @ \$6/BBL	Gomes	\$1,440
500.881.59	LOGGING & PERFORATING	Cegmented bond log and casing map	SLB	\$55,000
500.881.60	TESTING	Casing pressure test included in day rate		
500.881.61	BITS & SUPPLIES			
500.881.62	STIMULATION			
500.881.63	CONTRACT SERVICES			
500.881.64	SUPERVISION	6 days at \$2,100/day	Irani	\$12,600
500.881.65	MISC. WORKOVER (RWO)			
500.881.66	OVERHEAD			
500.881.67	CONTINGENCIES	10%		\$48,644
500.881.88	NON-OPERATED INTANGIBLES			
<b>Gross Intangible Cost</b>				<b>\$0</b>
				<b>\$547,684</b>

500.881.10	TANKS			
500.881.20	PRODUCTION EQUIPMENT			
500.881.26	CASING & LINER			
500.881.30	PUMPING UNIT & ENGINE			
500.881.32	TUBING			
500.881.33	SUBSURFACE			
500.881.34	RODS & PUMP			
500.881.35	FLOW LINE & FITTINGS			
500.881.36	INSTALLATION			
500.881.37	MISCELLANEOUS			
500.881.38	CONTINGENCIES			
500.881.39	WELLHEAD			
500.881.89	NON-OPERATED TANGIBLES			
500.881.40	ENVIRONMENTAL REME CLEAN-UP			
<b>Gross Tangible Cost</b>				<b>\$0</b>
				<b>\$0</b>
				<b>\$547,684</b>
				<b>\$0</b>

Approvals:

Title:

Date

Montezuma Carbon, LLC

**SECTION C. FINANCIAL RESPONSIBILITY DEMONSTRATION**  
**40 CFR 146.85**

**APPENDIX C-3**

**PISC COST ESTIMATE**



August 22, 2023

*Sent via email to: [jim.levine@upstream.us.com](mailto:jim.levine@upstream.us.com)*

Mr. Jim Levine, Managing Partner  
Montezuma Carbon  
2000 Powell Street, Suite 920  
Emeryville, CA 94608

RE: Shallow and Near Surface Baseline Environmental Monitoring during the Post-Injection Site Care (PISC) period and Site Closure activities at the Montezuma Carbon Class VI UIC Project Site, Solano County, California

Dear Mr. Levine:

Trihydro has developed the enclosed cost estimate in support of PISC and Site Closure at the subject site. Multiple program components are included, based on similar monitoring that is planned by Trihydro for the injection period. Groundwater and soil gas/vapor samples will be collected annually during the initial PISC period for the 5 years following injection. During the 45-year maintenance PISC period, following the initial PISC, groundwater and soil gas/vapor samples will be collected once every 5 years.

Additionally, CO<sub>2</sub> flux measurements will be collected with a dynamic closed chamber during the initial PISC and maintenance PISC sampling events. During the entire 50-year PISC period, real-time, continual soil gas, groundwater, and CO<sub>2</sub> sensor data will be collected via telemetry systems set up at each monitoring station. These tasks include data management and validation; QAQC processes which are required by the USEPA Class VI well regulations.

Site closure activities will include abandoning 11 shallow, 8 intermediate, 7 deep, and 1 in the lower most USDW monitoring wells. Additionally, roads and any site buildings will be removed and habitat restored.

Montezuma contracted with Trihydro to provide a third-party cost estimate to meet the required financial responsibility activities. Trihydro used the EPA's UIC Program Class VI Financial Responsibility Guidance as the basis for the activities included in this cost estimate. The costs of the required activities were then estimated from 1) historic price data from other projects Trihydro has managed, 2) cost quotes from 3<sup>rd</sup> party companies, 3) EPA's Geologic CO<sub>2</sub> Sequestration Technology and Cost Analysis document, and 4) professional judgement on the level of effort required to complete an activity.

Trihydro is a well-established, national engineering and environmental consulting firm that has been in the business of providing engineering, surveying, and environmental consulting services since 1984. With over 525 employees, Trihydro was ranked No. 118 on the 2022 Top 200 Environmental Firms List by Engineering News-Record. We have 22 branch offices, as well as 7 field offices across the country. The combination of our values and regional bench strength provides a unique blend of responsive, customer-driven service along with nationally recognized technical horsepower in the engineering and environmental remediation industry.



Mr. Jim Levine

August 22, 2023

Page 2

At the time that PISC begins, Trihydro welcomes the opportunity to revisit this cost estimate and hone it based on knowledge gained during the injection period.

Sincerely,  
Trihydro Corporation

Bradley S. Pekas, P.E./P.G.  
Senior Engineer/Geologist

MONTZ-023-0001

**TABLE**

**TABLE 1. POST-INJECTION SITE CARE AND SITE CLOSURE COST ESTIMATE**  
**MONTEZUMA CARBON**  
**SOLANO COUNTY, CA**

Post-Injection Site Care and Site Closure				
Activity	Unit Rates	Units	Years	Cost Breakdown
<b>Initial PISC (5 years)</b>		per yr		
PM / Data Management / Telemetry	\$ 16,000	1	5	\$ 80,000
Atmosphere / Soil Gas Monitoring	\$ 2,854	14	5	\$ 199,752
Groundwater Monitoring	\$ 3,995	15	5	\$ 299,628
		Subtotal -		\$ 579,380
<b>Maintenance PISC (45 years)</b>			(Every 5 years)	
PM / Data Management / Telemetry	\$ 16,000	1	45	\$ 720,000
Atmosphere / Soil Gas Monitoring	\$ 2,854	14	45	\$ 359,554
Groundwater Monitoring	\$ 3,995	15	45	\$ 539,330
		Subtotal -		\$ 1,618,884
<b>Site Closure (1 year)</b>				
PM/Reporting	\$ 165,000.00	1	1	\$ 165,000
Field Oversight /Expenses	\$ 1,063,000.00	1	1	\$ 1,063,000
Drilling Contractor	\$ 725,000.00	1	1	\$ 725,000
		Subtotal -		\$ 1,953,000
		Subtotal		\$ 4,151,264
Contingency	20%			\$ 830,253
		<b>Total Cost</b>		<b>\$ 4,981,517</b>

August 22<sup>nd</sup>, 2023

Mr. Brad Pekas – Trihydro Corporation  
 Mr. Ben McAlexander – Trihydro Corporation  
 Dr. James W. Rector – UC Berkely

Re: Post-Injection CO<sub>2</sub> Plume Monitoring Surveys – Montezuma CCS Site

Gentlemen,

Please see below prices for monitor 3D surveys, at year 40, 45, 55, 65, 75, and 90. The prices quoted would be for 3D surveys with full-fold coverage of 10 sq mi, in order to provide an optimal image of the CO<sub>2</sub> plume.

The prices quoted are in 2023 dollars, consequently it will be necessary to re-quote these services to account for inflation and changes in acquisition and imaging technologies that will be available in 2065.

	Description	Charge
Year 40		
Mob/Demob		\$20,000
Data Acquisition (10 sq mi @ \$35,000)		\$350,000
Processing (10 sq mi @ \$5,000)		\$50,000
	Total:	\$420,000
Year 45		
Mob/Demob		\$20,000
Data Acquisition (10 sq mi @ \$35,000)		\$350,000
Processing (10 sq mi @ \$5,000)		\$50,000
	Total:	\$420,000
Year 55		
Mob/Demob		\$20,000
Data Acquisition (10 sq mi @ \$35,000)		\$350,000
Processing (10 sq mi @ \$5,000)		\$50,000
	Total:	\$420,000
Year 65		
Mob/Demob		\$20,000
Data Acquisition (10 sq mi @ \$35,000)		\$350,000
Processing (10 sq mi @ \$5,000)		\$50,000
	Total:	\$420,000



Description	Charge
<b>Year 75</b>	
Mob/Demob	\$20,000
Data Acquisition (10 sq mi @ \$35,000)	\$350,000
Processing (10 sq mi @ \$5,000)	\$50,000
	<b>Total:</b>
	<b>\$420,000</b>
<b>Year 90</b>	
Mob/Demob	\$20,000
Data Acquisition (10 sq mi @ \$35,000)	\$350,000
Processing (10 sq mi @ \$5,000)	\$50,000
	<b>Total:</b>
	<b>\$420,000</b>

Should you have any questions, please don't hesitate to call.

With best regards,

*MA Saunders*

Mike Saunders  
Operations Manager



10777 Westheimer, Ste. 250  
Houston, TX 77042  
713-742-3067



**SECTION C. FINANCIAL RESPONSIBILITY DEMONSTRATION**  
**40 CFR 146.85**

**APPENDIX C-4**

**ERR COST ESTIMATE**



Eric F. Hadsell  
President  
Cell: 707-249-4765

14 North Orange Avenue  
Lodi, California 95240  
efhadsell@comcast.net

Mr. Jim Levine, Managing Partner  
Montezuma Carbon LLC  
2000 Powell Street, Suite 920  
Emeryville, CA 94608

August 28, 2023

Dear Mr. Levine-

I am pleased to be working with Montezuma Carbon in the development of the Montezuma CO<sub>2</sub> sequestration hub. This particular task, the estimate of well control team and relief well to address a hypothetical release of CO<sub>2</sub> and brine from the injection well, has been prepared based on the qualifications and methodology shown here.

### **Company Qualifications**

The cost estimate for the abandonment of a Montezuma Carbon LLC CO<sub>2</sub> injection well at the proposed Montezuma injection facility has been prepared by Eric Hadsell of P. O. E. Inc. P. O. E. is an Engineering consulting firm and a third party relative to Montezuma Carbon LLC and their CO<sub>2</sub> injection project. Mr. Hadsell has provided engineering services and directed drilling and completion operations, including abandonments, in Northern California for northern California gas producers for 25 years, both in house (Rosetta Resources, Calpine Natural Gas and others) and as a consultant.

### **Basis used to develop cost estimates**

SLB's definition of a blowout is "an uncontrolled flow of reservoir fluids into the wellbore, and sometimes catastrophically to the surface". In developing the cost of a relief well I am assuming the source of the blowout is high pressure CO<sub>2</sub> escaping from the Anderson injection intervals, traveling up the tubing and escaping to the atmosphere through failed surface control equipment. There are many other scenarios where control of the CO<sub>2</sub> could be lost and a relief well might be required. The need for a relief well to control a CO<sub>2</sub> injection well that has suffered a blowout and is releasing a large volume of CO<sub>2</sub> to the atmosphere has an *extremely* low chance of actually occurring. For a blowout to occur the following events must occur:

1. The SSSV (SubSurface Safety Valve) must fail and the hydraulic line holding the valve open must fail. If the pressure in the hydraulic line falls below a predesignated pressure a spring within the SSSV will automatically force the SSSV to close.
2. Four valves on the tree (two master valves and two wing valves) must fail. These valves will have a rated working pressure of 5,000, possibly 10,000 PSIG.
3. The ESD (Emergency Shut Down) must fail. The ESD is a spring loaded valve held open with hydraulic pressure, very much like the SSSV. It will be located immediately downstream of the outer wing valve.



4. Other methods to control the blowout must fail. These include bull heading control fluid down the tubing or lubricating in a kill line, most likely coiled tubing, into the tubing.

Alternative 1: The packer or tubing fail releasing pressure from the tubing into the annulus. EPA regulations require the surface pressure on the annulus to be at least 100 PSIG greater than the surface pressure on the tubing. The fluid in the tubing/casing annulus (water with additives) will be denser than the CO<sub>2</sub> in the tubing. If the tubing fails the annular fluid will invade the tubing, not the other way around.

Alternative 2: The 5 1/2" casing fails allowing the formation fluid from the depth of the casing failure to enter the tubing/casing annulus. Combined with the surface control failures mentioned above, a casing failure could conceivably result in high pressure gas in the tubing/casing annulus at the surface. This scenario is also highly unlikely. Montezuma has located its sequestration hub in an area that has been geologically determined to have the minimum chance of having intervals of natural gas.

A plausible but highly unlikely initiation of the blow out which might require a relief well could be:

1. The injection well has been receiving super critical CO<sub>2</sub> for an extended period of time and has increased the reservoir pressure to the maximum allowable.
2. A heavy equipment operator runs his bulldozer through the protecting fence (and K rail barriers?) and knocks over the tree severing the tubing immediately below the tubing hanger and master valves. Severing the tree above the lower master valve would likely only require a safety technician using SCBA (Self Contained Breathing Apparatus) to walk up to the tree and close the remaining master valve.
3. Tension in the tubing (the setting weight) is released dropping the top of the severed tubing string several feet down into the 5 1/2" casing.
4. Despite cutting the hydraulic control line, the SSSV, located roughly sixty feet below the surface, fails to close.

The assumptions used in estimating the cost of the relief well include:

1. The relief well will be spotted approximately 1,000' upwind of the blow out.
2. The relief well will require its own drilling pad and access road.
3. The tubulars will likely be as follows:
  - a. 13 3/8" surface casing set at ~3,000' and cemented to the surface.
  - b. 10 3/4" intermediate casing set at ~7,900' and cemented to approximately 5,000'. At this point we will know the formation pressure in the various formations, intermediate casing may not be necessary.
  - c. 5 1/2" casing will be run to total depth, ~14,000' and cemented to ~10,000'.
4. A straight hole will be drilled to a few tens of feet below the intermediate casing where directional drilling will begin.



5. The 5 1/2" shoe will be drilled out and three days will be required to magnetically locate the injection well casing below the injection perforations.
6. A ~14 PPG kill fluid will be pumped down the relief well and into the injection well. When the kill fluid circulates to the top of the injection well its hydrostatic pressure will be enough to end the CO<sub>2</sub> inflow and kill the well.
7. After the injection well is repaired and is again operational the relief well will be abandoned.

Costs related to the restoration of the injection well are not included in this estimate.

Please see the details of the cost of the relief well in the attached AFE.

Please see the attached estimate for additional information.

Sincerely,

Eric Hadsell  
P. O. E. Inc



**Montezuma Carbon LLC**  
**Drilling and Completion Authorization for Expenditure**  
August 26, 2023

Well Name:	Relief Well	AFE Number:	_____	W.I.	_____
Operator:	Montezuma Carbon	Approval Due Date:	_____	N.R.I.	_____
Lease Name:	_____	Start Date:	_____	Proposed TD:	14,000'
County/Parish:	Solano	Supplemental Date:	_____	Proposed PBDT:	14,000'
State:	California	Location:	_____		

**Description:** Drill a relief well made necessary by the blow out of a CO2 injection well presuming the blow out occurred after the injection well was completed and was operating as a steady state injection well.

Description	Nature of Intangible Expenditures	Cost
Pre Drilling/Completion Cost	Finalized well design and drilling plan with blow out and relief well specialists	\$20,000
Legal & Title	This is an estimate of the cost of the relief well and does not include subsequent legal expenses	
Access Fee & Surface Damage	Surface access is controlled by Montezuma Carbon	
Permitting	A permitting specialist will likely be required. 10 days at \$2,500/day	\$25,000
Location & Roadway Exp.	Temporary drilling pad and access road	\$120,000
Stimulation		
Location & Roadway Restor.	Restoration immediately following well abandonment	\$100,000
Contract Footage & Turnkey		
Completion Rig	7 days at \$20,000/day to run tubing for kill fluid injection	\$140,000
Day work	Drilling rig, 40 total drilling days at \$35,000/day including most rentals	\$1,400,000
Turnkey Completion		
Fuel & Power	Included in rig cost	
Move in, Rig up, Rig down	6 days at \$30,000/day	\$180,000
Equipment Rental	Specific to relief well	\$50,000
Drill Bits, Reamers, Stabilizers	6 bits	\$180,000
Fishing - Tools & Service		
Whipstock and Sidelock equip	Whipstock	\$150,000
Pipe Inspection & Coating	Drill pipe inspection after rigging down, \$10/ft	\$140,000
Mud & Chemicals	1,000 BBL at \$50/BBL	\$50,000
Water	4 loads prior to spudding, one load per day after. \$600/load	\$44,400
Directional Drilling Services	\$15,000/day inclusive, 10 total days	\$150,000
Logging Open Hole/ Wire line		
Perforating-Cased Hole Logging		
Logging - LWD	Orientation and magnetic	\$100,000
Drill Stem Tests		
Core Analysis & Tools		
Mud Logging	\$4,000/day for 35 days	\$140,000
Cement & Service	13 3/8", 10 3/4" and 5 1/2"	\$220,000
Casing Crew and PU/LD machine	13 3/8", 10 3/4" and 5 1/2"	\$120,000
Trucking & Hauling	Miscellaneous, one load per day	\$35,000
Company Supervision & Labor	Wellsite Supervisor at \$3,000/day, 45 days	\$135,000
Contract Supervision	Restoration immediately following well abandonment	\$135,000
Drilling OH /Completion OH	Relief Well Specialist, 20 days at \$4,000/day plus travel	\$83,000
Contract Geologist		
Contract Labor		
Contract Labor-Well Testing		
Insurance		
Miscellaneous (Contingency)	35%	\$1,301,090
Non-Op Intangible Drilling		
Non-Op Intangible Completion		
<b>GROSS INTANGIBLE COST</b>		<b>\$5,018,490</b>

Description	Nature of Tangible Expenditures	Cost
Surface Casing	13 3/8" 54.5 LB/FT J-55, 3,000' at \$62.56/ft + trucking	\$191,680
Intermediate Casing	10 3/4" 55.5LB/FT N-80, 7,900' at \$97/FT + trucking	\$772,300
Production Casing & Liner	5 1/2" 23 LB/FT N-80, 14,000' at \$40.25/FT + trucking	\$568,500
Tubing	2 3/8" 4.7 LB/ft N-80, 14,000' at \$9/FT + trucking	\$127,000
Down hole Packers & Equip		
Wellhead		
Gas Lift		
Production Unit		
Pump Base & Tie Downs		
Engine Housing, Panel, Fittings		
Sucker Rods-Polish Rods		
Misc Fittings & Supplies		
Subsurface Pump/Accessories		
Telemetry		
Installation & Labor		
Tanks		
Separator & Heater Treater		
Compressor & Dehydrator		
Metering Equip & Lact Unit		
Site Preparation		
Professional Services		
Fabrication		
Utility Equipment		
Inspection		
Flow lines		
Company Supervision		
Miscellaneous (Contingency)	10%	\$165,948
Non-Op Tangible Drilling		
Non-Op Tangible Completion		
Non-Op Production Facilities		
<b>GROSS TANGIBLE COST</b>		<b>\$1,825,428</b>

<b>TOTAL P &amp; A COSTS</b>	\$150,000
<b>TOTAL GROSS COST</b>	<u>\$6,993,918</u>
<b>TOTAL NET COST</b>	<u>\$0</u>



Eric F. Hadsell  
President  
Cell: 707-249-4765

14 North Orange Avenue  
Lodi, California 95240  
efhadsell@comcast.net

Mr. Jim Levine, Managing Partner  
Montezuma Carbon LLC  
2000 Powell Street, Suite 920  
Emeryville, CA 94608

August 26, 2023

Dear Mr. Levine-

I am pleased to be working with Montezuma Carbon in the development of the Montezuma CO<sub>2</sub> sequestration hub. This particular task, the estimate of the cost of replacing an existing CO<sub>2</sub> injection well has been prepared based on the qualifications and methodology shown here.

#### Company Qualifications

The cost estimate for the replacement of a Montezuma Carbon LLC CO<sub>2</sub> injection well at the proposed Montezuma injection facility has been prepared by Eric Hadsell of P. O. E. Inc. P. O. E. is an Engineering consulting firm and a third party relative to Montezuma Carbon LLC and their CO<sub>2</sub> injection project. Mr. Hadsell has provided engineering services and directed drilling and completion operations in Northern California for northern California gas producers for 25 years, both in house (Rosetta Resources, Calpine Natural Gas and others) and as a consultant.

#### Basis used to develop cost estimates

Montezuma Carbon contracted P. O. E. Inc. to prepare a cost estimate for the replacement of one of their CO<sub>2</sub> injection wells, and provide engineering assistance in other aspects of their project. In developing the cost estimate P. O. E. has used cost estimates from various service companies, recent personal experience, and historical price and time records.

We are currently finalizing our design for our CO<sub>2</sub> injection well. Our estimate for drilling and completing a single well is about \$9,000,000 and I don't expect that number to change significantly. Consequently, the cost of a replacement CO<sub>2</sub> injection well will be about the same, perhaps a little less assuming the original well's location will be used and recoverable material from the original well will be used in the replacement well. The recoverable material will likely include the 13Cr tubing, the tree, surface monitoring and recording equipment, alarms, and possibly other materials. If this list of materials proves to be reusable, which will depend a great deal on time in use, a replacement well will cost about \$8,000,000 in 2023 dollars.

Sincerely,

Eric Hadsell  
P. O. E. Inc

## DRAFT Montezuma Carbon LLC DRAFT

### Drilling and Completion Authorization for Expenditure Version 2: June 21, 2023

Well Name: <u>Montezuma Strat 1</u>	AFE Number: _____
Operator: <u>Montezuma Carbon</u>	Approval Due Date: _____
Lease Name: _____	Start Date: _____
County/Parish: <u>Solano</u>	Supplemental Date: _____
State: <u>California</u>	Location: _____

**Description:** Cost Estimate: 13,000' straight hole, 5 1/2" casing to be set at 13,000', 9 5/8" at 7,900', 13 3/8" at 3,500'. AFE covers costs from pad construction through, drilling, setting the long string, perforating, formation fluid sampling and fall off tests. AFE does not include Pre drilling costs: permitting, legal, title, G&G, engineering, etc. Assume a maximum mud weight of 11.0 ppg and maximum formation pressure of ~7,100 PSIG. Assume 60 days with drilling rig and 20 days with completion rig.

Description	Nature of Expenditures	Drilling Amount
Pre Drilling/Completion Cost		
Legal & Title		
Access Fee & Surface Damage		
Permitting		
Location & Roadway Exp.	PGD Rig 9: 300' x 135' pad, rat hole & mouse hole	\$110,000
Stimulation	1 to 3 possible acid treatments	
Location & Roadway Restor.	After completion phase	
Contract Footage & Turnkey		
Completion Rig	\$20,000/day x 20 days	
Day work	PGD Rig 9: \$30,000/day x 60 days	\$2,100,000
Turnkey Completion		
Fuel & Power	1,350 gal/day, 5\$/gal, 60 days	\$405,000
Move in, Rig up, Rig down	\$30,000/day x 10 days	\$300,000
Equipment Rental	BOP, mud cleaner, centrifuge, jars +++ \$4,000 day	\$240,000
Drill Bits, Reamers, Stabilizers	10 bits, \$20,000/bit	\$200,000
Fishing - Tools & Service		
Pipe Inspection & Coating		
Mud & Chemicals	-1,800 BBL 11.0 ppg at TD	\$300,000
Water	One 120 BBL load per day	\$30,000
Directional Drilling Services		
Logging: Behind surface casing	Triple Combo + Compressional Sonic	\$50,000
Logging: Behind Intermediate csg	Triple Combo + Compressional Sonic	\$70,000
Logging: Behind Long String	See SLB logging recommendation	\$900,000
Cased Hole Logging: Surface pipe	Segmented CBL, GR, Sonic, VDL	\$20,000
Cased Hole Logging: Intermediate	Segmented CBL, GR, Sonic, VDL, corrosion, interp.	\$48,000
Cased Hole Logging: Long String	Segmented CBL, GR, Sonic, VDL, corrosion, interp.	\$63,000
Perforating	Eight x 20' intervals, 4 SPF, deep penetrating charges	\$240,000
Bridge plugs and cement retainers	Six cement retainers or bridge plugs	\$90,000
Logging - LWD		
Drill Stem Tests		
Coring Bits and Tools	4 bits x \$30,000/bit + core bbls etc	\$170,000
Core Analysis & Tools	~570' of core, TBD	\$40,000
Mud Logging	\$6,000/day for 50 days	\$300,000
Cement & Service		\$700,000
Casing Crew and PU/LD machine	Three Strings, four days	\$120,000
Trucking & Hauling	Misc trucking	\$12,000
Company Supervision & Labor		
Contract Supervision	\$2,200/day, 65 days plus travel	\$145,000
Drilling OH /Completion OH	(Overhead)	
Contract Geologist		
Contract Labor	Misc labor	\$7,000
Pason	Real time distribution of rig and drilling data, guess	\$44,000
Insurance		
Miscellaneous (Contingency)	10%	\$50,000
Non-Op Intangible Drilling		
Non-Op Intangible Completion		
<b>GROSS INTANGIBLE COST</b>		<b>\$6,754,000</b>

Surface Casing	3,500' 13 3/8" 62.56 LB/FT N-80, \$62.56/FT + trucking	\$226,000
Intermediate Casing	7,900' 9 5/8" 43.5 LB/FT N-80, \$76.12/FT + trucking	\$616,000
Long String Casing (Top)	7,850' 5 1/2" 23 LB/FT N-80, \$40.25/FT + trucking	\$321,000
Long String Casing (Bottom)	5,150' 5 1/2" 23 LB/FT, 13Cr80, \$74.95/FT + trucking	\$391,000
Tubing	12,900 2 7/8" 6.3 LB/FT 13Cr80, \$22.75/FT	\$292,000
Down hole Packers & Equip	5 1/2" x 2 7/8" 13Cr seal bore packer, 13Cr & SSSV	\$170,000
Wellhead	13Cr, 10,000 PSI, Wild Guess Only	\$400,000
DAS and DTS	Wild Guess Only	\$200,000
Site Preparation		
Professional Services		
Fabrication		
Inspection		
Company Supervision		
Miscellaneous (Contingency)		

**GROSS TANGIBLE COST** \$2,616,000

**TOTAL GROSS COST** \$9,370,000



August 24, 2023

*Sent via email to: [jim.levine@upstream.us.com](mailto:jim.levine@upstream.us.com)*

Mr. Jim Levine, Managing Partner  
Montezuma Carbon  
2000 Powell Street, Suite 920  
Emeryville, CA 94608

RE: Soil excavation and confirmation sampling activities at the Montezuma Carbon Class VI UIC Project Site, Solano County, California

Dear Mr. Levine:

Trihydro Corporation (Trihydro) has developed the enclosed cost estimate in support of the potential Emergency Response activities associated with the Class VI UIC project site. Our proposed scope of work is discussed below and includes project management, excavation oversight, confirmation soil sampling, and regulatory filings, if necessary. Costs associated with this scope are detailed in Table 1.

Trihydro will coordinate and plan the field work with Montezuma Carbon (Montezuma). Trihydro incorporated the excavation contractor cost, assuming that Montezuma will contract directly with the excavation contractor. Montezuma will also coordinate with the excavation contractor on proper onsite distribution of brine affected soil within the designated Montezuma wetland reclamation project area. Trihydro will provide project management, regulatory oversight, and will perform the confirmation soil sampling at an estimated 30 locations. The Project Manager will coordinate with the laboratory to provide applicable soil sampling and shipping materials.

Montezuma contracted with Trihydro to provide a third-party cost estimate to meet the required financial responsibility activities: corrective action on wells in the AoR, injection well plugging, post-injection site care and site closure, and emergency and remedial response. Trihydro used the EPA's UIC Program Class VI Financial Responsibility Guidance as the basis for the activities included in this cost estimate. The costs of the required activities were then estimated from 1) historic price data from other projects Trihydro has managed, 2) cost quotes from 3<sup>rd</sup> party companies, 3) EPA's Geologic CO<sub>2</sub> Sequestration Technology and Cost Analysis document, and 4) professional judgement on the level of effort required to complete an activity.

Trihydro is a well-established, national engineering and environmental consulting firm that has been in the business of providing engineering, surveying, and environmental consulting services since 1984. With over 525 employees, Trihydro was ranked No. 118 on the 2022 Top 200 Environmental Firms List by Engineering News-Record. We have 22 branch offices, as well as 7 field offices across the country. The combination of our values and regional bench strength provides a unique blend of responsive, customer-driven service along with nationally recognized technical horsepower in the engineering and environmental remediation industry.

If a brine release occurs, Trihydro will revisit this cost estimate and hone it based on actual impacts.



Mr. Jim Levine  
Montezuma Carbon  
Page 2

We appreciate this opportunity to support the project. If you have any questions or comments, please do not hesitate to contact me at (307) 745-7474, bpekas@trihydro.com

Sincerely,  
Trihydro Corporation



Brad Pekas, P.G., P.E.  
Senior Engineer/Geologist

MONTZ-023-0001

Attachment

**TABLE**  
**COST ESTIMATE**

TABLE 1. BRINE RELEASE SOIL EXCAVATION AND CONFIRMATION SAMPLING COST ESTIMATE  
 MONTEZUMA CARBON  
 SOLANO COUNTY, CALIFORNIA

	Trihydro Total	Subcontractors	TOTAL
Task 1 Project Management	\$19,070	\$0	\$19,070
Task 2 Excavation oversight and backfill operations	\$25,415	\$877,800	\$903,215
Task 3 Field Screening and Soil Sampling	\$25,175	\$6,600	\$31,775
<b>Total</b>	<b>\$69,659</b>	<b>\$884,400</b>	<b>\$954,059</b>

**SECTION C. FINANCIAL RESPONSIBILITY DEMONSTRATION**  
**40 CFR 146.85**

**APPENDIX C-5**

**USDW ENDANGERMENT COST ESTIMATE**



August 23, 2023

*Sent via email to: jim.levine@upstream.us.com*

Mr. Jim Levine, Managing Partner  
2000 Powell Street, Suite 920  
Emeryville, CA 94608

RE: USDW endangerment resulting from an acute event: investigation, monitoring, and reporting at the Montezuma Carbon Class VI UIC Project Site, Solano County, California

Dear Mr. Levine:

Trihydro has developed the enclosed cost estimate in support of a potential emergency response event related to the endangerment of an underground source of drinking water (USDW). Multiple program components are included, based on the events that may occur due to a subsurface release. The following tasks and costs are outlined here and in Table 1.

- Task 1: Initial response to subsurface release includes coordinating with regulatory agencies and Montezuma Carbon (MC)
- Task 2: Installation of groundwater monitoring wells and equipment installation to delineate and define the subsurface release area and impacts. This includes contracting a drilling firm to drill and install the wells, labor for oversight, and data interpretation and reporting of the findings to guide the duration of the 10-year monitoring effort, described in Task 3.
- Task 3: Collection of data from monitoring wells, on a quarterly basis for a 10-year duration. This includes labor, equipment, and laboratory costs associated with the effort.
- Task 4: Sampling and data collection from surrounding domestic wells. If wells are impacted, costs have been estimated to replace the wells. Costs are also included for quarterly sampling and laboratory costs over a 10-year period.
- Task 5: Abandonment and plugging of the monitoring wells. Costs include disposal and contracting a drilling contractor to perform the work.

Montezuma contracted with Trihydro to provide a third-party cost estimate to meet the required financial responsibility activities: corrective action on wells in the AoR, injection well plugging, post-injection site care and site closure, and emergency and remedial response. Trihydro used the EPA's UIC Program Class VI Financial Responsibility Guidance as the basis for the activities included in this cost estimate. The costs of the required activities were then estimated from 1) historic price data from other projects Trihydro has managed, 2) cost quotes from 3<sup>rd</sup> party companies, 3) EPA's Geologic CO<sub>2</sub> Sequestration Technology and Cost Analysis document, and 4) professional judgement on the level of effort required to complete an activity.

Trihydro is a well-established, national engineering and environmental consulting firm that has been in the business of providing engineering, surveying, and environmental consulting services since 1984. With over 525 employees, Trihydro was ranked No. 118 on the 2022 Top 200 Environmental Firms List by Engineering News-Record. We have 22 branch offices, as well as 7 field offices across the country. The combination of our values and regional bench strength provides a unique blend of



Mr. Jim Levine

August 23, 2023

Page 2

responsive, customer-driven service along with nationally recognized technical horsepower in the engineering and environmental remediation industry.

If a subsurface release(s) should occur, Trihydro will revisit this cost estimate and hone it based on specific site conditions.

Sincerely,  
Trihydro Corporation

Bradley S. Pekas, P.E./P.G.  
Senior Engineer/Geologist

MONTZ-023-0001

Attachment

**TABLE**

TABLE 1. USDW REMEDIATION COST ESTIMATE  
MONTEZUMA CARBON  
SOLANO COUNTY, CALIFORNIA

Tasks	Trihydro Labor Subtotal	Trihydro ODC/Expense Subtotal	Trihydro Subtotal	Subcontractor Subtotal	TOTAL
1 Shallow/Mid Depth Groundwater Monitoring Well Installation & Oversight	\$72,480	\$4,226	\$76,706	\$209,550	\$286,256
2 Groundwater Monitoring Well- Equipment Installation	\$56,466	\$2,650	\$59,116	\$22,000	\$81,116
3 Collection of Data from monitoring wells - Quarterly sampling and reporting for 10 years	\$963,800	\$9,900	\$973,700	\$13,159	\$986,859
4 Collection of Data from surrounding wells and possible replacement	\$966,300	\$9,900	\$976,200	\$409,159	\$1,385,359
5 Plugging of monitoring wells	\$59,400	\$6,500	\$65,900	\$165,000	\$230,900
	<b>\$2,118,446</b>	<b>\$33,176</b>	<b>\$2,151,622</b>	<b>\$818,869</b>	<b>\$2,970,491</b>
<b>TOTAL</b>					<b>\$2,970,491</b>