

2320, 38.015

# ROZAK ENGINEERING

Civil, Construction & Environmental Consulting

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RECEIVED

May 30, 2008

JUN 04 2008

Alaska Department of Environmental Conservation  
Spill Prevention and Response Program  
43335 Kalifornsky Beach Road, Suite 11  
Soldotna, Alaska 99669

ADEC  
Kenai Area Office

Attn: Don Seagren, Environmental Specialist

Re: Corrective Action Performed in 2007  
Former Doyle's Fuel Storage Facility, Spill #1998230128901  
SE ¼, BLM Lot 51, S34, T5S, R11W, City of Kenai

This is a report of activities performed at this facility in 2007 on behalf of Doyle's Fuel Service (Doyle), P.O. Box 582 Kenai, Alaska 99611. Previous reports submitted to the department have described the site characterization, installation of six groundwater monitoring wells and results of eight groundwater monitoring events. Analytical results of previous site investigations have shown petroleum hydrocarbon (PHC) contamination to be present in soil and groundwater on the property at concentrations that exceed regulatory cleanup standards. Contamination exceeding cleanup standards was also detected at MW-4, located 150 feet down-gradient (southwest) from the spill site. We estimated that contamination could have migrated 150 feet beyond MW-4.

Site characterization has shown that the PHC contaminants are primarily diesel range organics (DRO), however, the last four rounds of groundwater samples indicated that the site had been impacted by erratic spikes of gasoline range organics. We concluded that these spikes were a transient, confusing issue overlaid on a relatively well-defined and otherwise straightforward diesel fuel release, and recommended that the spikes be treated as background levels. ?

The 2007 activities were proposed in a work plan dated October 27, 2006, and approved by the department on November 2, 2006. The plan outlined an in-situ biological remediation system that would combine air-sparging, nutrient injection, and heating of the subsurface to reduce the concentrations of PHCs. The following tasks were performed in 2007. The remediation system had not been completed as of May 29, 2008.

1. Prepared the site and removed storage containers, stored materials and equipment
2. Begin installing equipment for injecting air and nutrients and heating water
3. Installed one air sparge test (AS) well, measured air flow, evaluated radius of influence
4. Installed five additional AS wells to provide air sparge coverage of the spill site
5. Installed one point-of-compliance (POC) groundwater monitoring well (GWMW)
6. Surveyed well locations and collected groundwater sample from new POC well
7. Evaluated data, summarized results, and recommended further action (herein)

### **Prepared Site**

After the work plan was approved, the Engineer met with the current property owner and operator of Redoubt Plumbing & Heating, Inc (Redoubt), and discussed the system design, layout, installation, operation, and schedule. Redoubt had installed an air sparge and soil vapor extraction system for Rozak Engineering (Rozak) at the Kenai Airport, and Doyle negotiated with Redoubt to install the similar system at the former Doyle site. In addition, Redoubt would assist with startup and testing, operate and monitor the remediation system, service and repair the equipment, and decommission the system after the remediation is approved by ADEC.

Site preparation included removing equipment, tools and a large quantity of plumbing materials that were stored in racks and vans at the proposed remediation site. Redoubt also assessed the adequacy of on-site electrical power and natural gas and evaluated how the installation and operation of remediation equipment would be integrated with Redoubt's plumbing operations.

### **Started Installing Equipment**

Redoubt moved a steel van close to the remediation site (north of Old Garage) and started installing pipe and control fittings for injection pumps and three hot water boilers. Some equipment was purchased, but the extent of equipment installed at this time is not known.

X Neither the infiltration gallery nor the distribution piping from the equipment to the gallery or AS wells were installed in 2007.

### **Installed One AS Test Well**

On June 15, 2007, Ron Rozak logged the drilling and installing, by Hughes Drilling Company, of one air sparge test well (AS1) near the middle of the former spill site. The well log is attached. The test well location was selected by David Thomas, P.E., environmental consulting engineer to Rozak Engineering. Following Mr. Thomas's recommendation, drilling continued to 17 feet below the observed water table, approximately 10 feet below ground surface (bgs) at time of drilling. Visual examination of soil brought to the surface by the augers indicated the soil was medium sand without any dense (low permeability) layers. Hughes constructed an air sparge well consisting of 2" inside diameter PVC, with 2 ft of 0.020 slotted screen placed at 25-27 ft, capped at bottom, and screwed to solid pipe rising to one ft above ground. Silica sand (#10 - #20) was placed around the screen and one foot above. Bentonite tablets, coated to facilitate placement, were placed for approximately 3 ft above the silica sand, then medium bentonite chips were placed above the tablets to 5 ft bgs. The annular space from 5 ft to the surface was filled with clean on-site soil.

After the first AS well was installed, David Thomas performed an air flow test using MW-2 (located 15 ft south of AS1) to evaluate the radius of influence for air sparge operations. He concluded that a total of 5 or 6 wells with 2 ft screened interval at 25 to 27 ft bgs would provide adequate overlap to cover the spill site.

### **Installed Five AS Coverage Wells**

On September 4, 2007, David Thomas and Ron Rozak laid out a pattern around AS-1 for five more AS wells to provide adequate overlapping coverage of the spill site. Ron Rozak logged the drilling and installing of air sparge wells AS2-AS6 by Hughes Drilling. Visual examination indicated the soil profile and water level were consistent with AS1, therefore, construction of these five wells was similar to AS1. Logs for all AS wells are attached.

### **Installed 1 POC Well (MW-7)**

On June 15, 2007, Hughes Drilling Company was unable to drive their truck-mounted drill rig to the proposed location for installing the POC well. Homer Electric had recently installed power poles and overhead electrical lines that restricted access for the truck rig. On October 12, 2007, when Hughes track-mounted drill rig was available, monitoring well MW-7 was installed at the proposed POC location as depicted in the approved work plan. The well is near edge of clearing on the north side of Aliak Street right-of-way (ROW). The location is approximately 30 ft north of the drainage ditch along north side of Aliak Street, approximately 300 ft south and 400 ft east of MW-4, and 400 ft west of the 42" diameter culvert for the stream crossing Aliak Street.

The boring was advanced to 17.5 feet. Beneath 1.5 ft of surface organics and silt, the soil was medium sand, without silt or appreciable gravel, to bottom of hole. Groundwater table was 9.5 ft bgs at time of drilling. Spit spoon samples were collected between 8 ft and 12 ft bgs. Soil samples were collected at 5, 9 and 12 feet bgs, placed in one-quart Ziploc bags, and headspaces were tested with a photoionization detector (PID) calibrated with 100 ppm isobutylene. PID readings of headspace vapor were less than 1 ppm and none of the samples had PHC odor.

Hughes Drilling constructed the well using 2" ID PVC, with 10 ft of 0.020 slotted screen set at 7 to 17 ft, capped on bottom, and screwed on top to 10 ft of solid pipe extending almost 3 ft aboveground. Silica sand (#10 - #20) was placed around the screen and one foot above. Bentonite chips were placed above the silica sand from 6 ft to 3 ft bgs. A steel security casing with cover was placed over the PVC riser and secured with padlock. The annular space around the steel casing was backfilled with clean on-site soil and tamped with hand tools. The attached log shows soil and well construction details. A wood post with visibility tape was installed between the well and an ATV trail running along the edge of ROW.

On October 13-14, 2007, Rozak developed the well using a one-liter stainless steel bailer. Water was bailed (45 gallons) until the color changed from brown-gray to cloudy white and less than one tablespoon of sand was produced per 5 gallons of water. PHC sheen and odor were not detected in water poured into 5-gallon buckets during the bailing activity.

### **Surveyed and Sampled MW-7**

On October 20, 2007, Rozak surveyed the tops of PVC monitoring well casings at MW-2 and MW-7, with a laser level and a direct-reading rod to accuracy of 0.01-ft. Measurements were referenced to elevation 98.09 ft previously established on top of the PVC casing at MW-2. Distances from top of PVC casings to surface of groundwater in the monitoring wells were

170  
bailings?

measured to accuracy of 0.01 ft using a tape attached to an electronic water interface probe. Static water level (SWL) elevations were 89.27 ft at MW-2 and 87.62 ft at MW-7. This drop of 1.65 ft elevation, in approximately 630 ft horizontally, equates to a gradient of 0.0026. This compares with gradients of 0.0033, or more, for previous surveys at MW-1 and MW-4.

Static water levels previously surveyed between monitoring wells MW-1 and MW-4 have consistently showed the direction of groundwater flow at the site to be toward the location of POC well MW-7. On October 20, 2007, the water surface at the inlet to the 42" culvert 400 ft east of MW-7 was surveyed. The elevation was 85.53 ft, with same reference datum as MW-2.

On October 21, 2007, Rozak collected the first groundwater sample at MW-7. Groundwater for sampling was collected with a new 1-liter pre-cleaned polyethylene bailer and transferred directly to three 40-mL vials and three 1-liter jars pre-preserved with HCL. Vials and jars were labeled and placed in a cooler with gel ice, temperature blank, and bubble wrap provided by SGS Environmental Services. The sample kit and samples were in custody of Ron Rozak from pickup at SGS on October 19, 2007 until delivery to SGS on October 24, 2007.

The sample was analyzed for volatile organic compounds (BTEX) by method SW8021B, for gas range organics (GRO) by method AK101, and diesel range organics (DRO) by method AK102. Analytical results, report attached, showed no detectable levels of BTEX, GRO or DRO compounds at the practical quantitation limit (PQL). The sample was maintained at proper temperature and analysis was performed within the required holding times.

### **Summary of Results and Recommended Actions**

All of the work planned for 2007 was not completed, in particular the installation of equipment and startup of the biological remediation system. To take advantage of the 2008 season, the entire remediation system should be installed and operating by July 4<sup>th</sup>. David Thomas will document the system startup, monitor the remediation progress, and recommend adjustments for efficient operation. Based on startup in early July 2008, nutrient, heat and air sparge components would operate through fall of 2009, and air sparging would continue through the fall of 2010, or until efficiency drops below acceptable levels.

Ron Rozak will collect groundwater samples and survey the static water levels at monitoring wells MW-2, MW-4 and MW-7 after the remediation system has operated for three months (fall 2008) and again after nine months (spring 2009). Water samples will be submitted to SGS for analytical testing for BTEX, GRO and DRO. Sampling events will include trip blanks and field duplicates. Analytical results will be evaluated after the second sampling event to determine if changes should be made to the remediation and/or sampling programs. There would be three or four sampling events.

A report documenting the system installation and startup, and the sampling event three months later, will be submitted to the department approximately one month after we receive the laboratory analytical results (winter 2008-2009).

Additional reports will be submitted at the end of each calendar year (2009, 2010, etc.) until site cleanup requirements are met. Reports will describe field activities performed during the period, adjustments to the remediation process, exceptions to the approved work plan, and include field data, original analytical reports, a summary of results, and appropriate recommendations.

Rozak Engineering prepared this report for use by Doyle's Fuel Service, parties approved by Jim Doyle, and the Alaska Department of Environmental Conservation. The report addresses specific environmental conditions associated with subject facility. No warranty or other conditions are intended. Within limitations of scope, budget and schedule, the services were performed in accordance with approved work plans and generally accepted environmental practices in this area when this work was done

Prepared by,



Ronald T. Rozak, P.E.  
Consulting Engineer

cc: Jim Doyle, Doyle's Fuel Service  
David Yragui, Redoubt Plumbing  
David Thomas, P.E.

Attachments:

Aerial Map (2003) of the Vicinity  
Site Plan for Remedial Action  
Logs for AS and POC Wells  
Site Photographs – AS and POC Well Installation  
SGS Level II Laboratory Report for MW-7

XAVIER

Kenai Spur Hwy

LINWOOD LN

SHELIKOFF ST

ALIAK DR

CANDLELIGHT DR

SITE

Stream

Muskeg

MM-2  
89.27

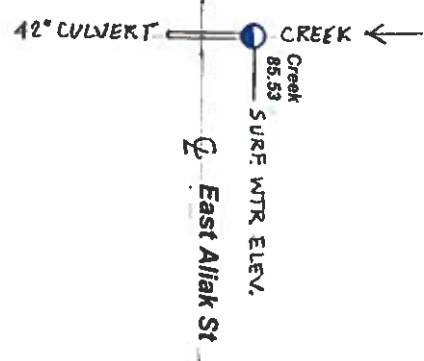
MM-7  
87.62

GROUNDWATER

**FORMER DOYLE'S FUEL STORAGE FACILITY**



SITE arrow shows location of former A/G fuel tanks and source of diesel release  
GROUNDWATER arrow indicates direction of contamination migration from release  
○ = approximate location of groundwater monitoring points for compliance monitoring  
Groundwater elevations surveyed 20 October 2007 by R. Rozak



# SITE PLAN FOR REMEDIAL ACTION

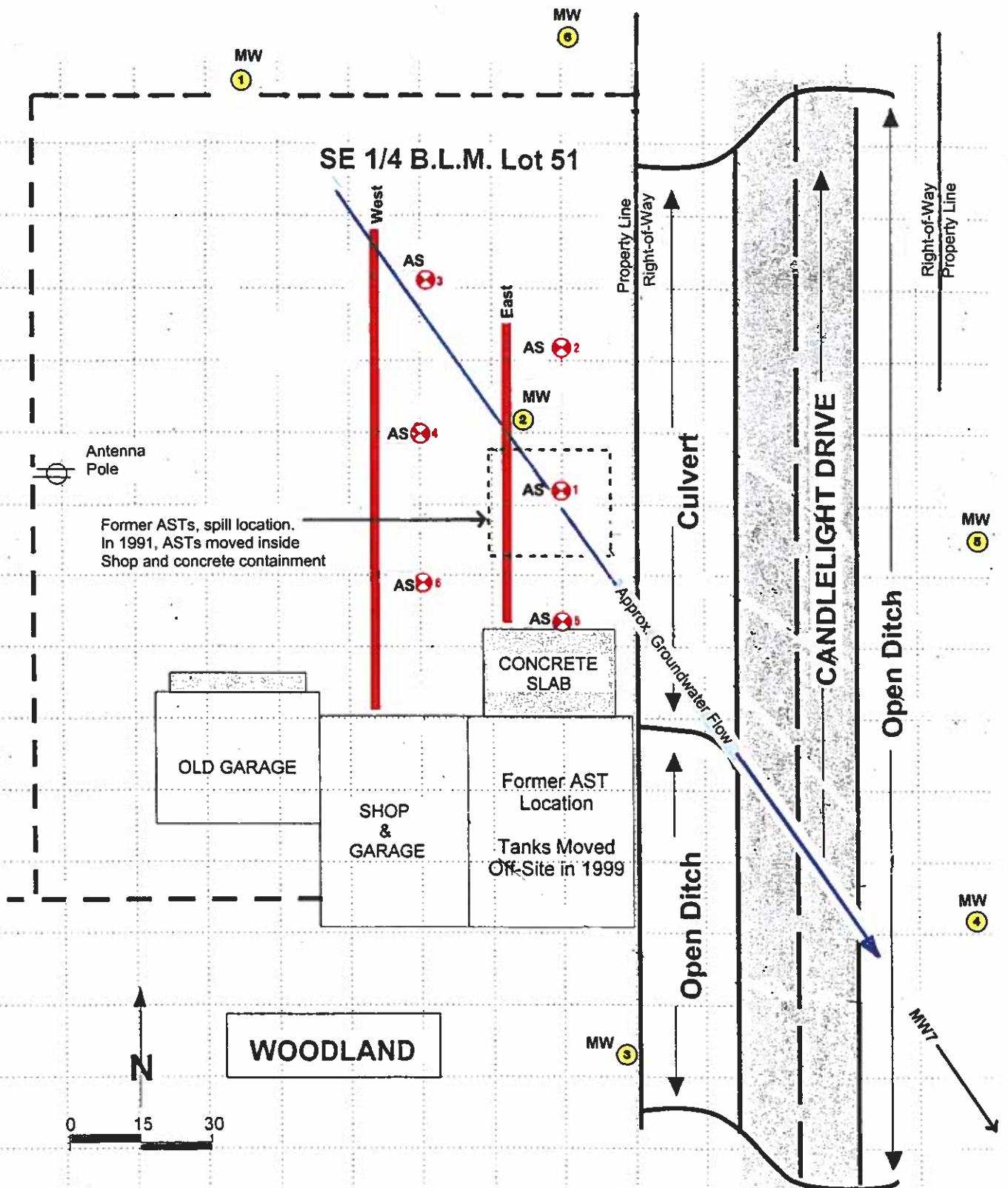
FORMER DOYLE'S FUEL STORAGE FACILITY  
ADEC SPILL NO. 1998230128901

Rozak Engineering PO Box 350 Kenai, Alaska

## LEGEND

MONITOR WELL  
AIR SPARGE WELL  
INFILTRATION GALLERY

May 2008



# MONITOR WELL

No.

**AS-1**

Depth	Legend	Description	USCS	Groundwater	PID, ppm	Dexsil, ppm	HC Odor
1105		Gravel, brn dry sand, olive, med			C: W 129		yes
1110	5	sand, gray w/white spts, med			130		Y
1120	10	3/5 PURE GOLD med Bentonite chips 5/5 SWL @ MW-2 = 9.5' BGS @ 1100 * 2" PVC SOLID TUBER +1' → -25' SCH. 40		ATD	180		Y
1130	15						Y
1140	25	T. catco 1/4" coated Bentonite Tablets, 50# pair #10-20 silica sand 24' → BOT 2' x 2' 0.020' screen cap w ss screws			95		Y
	24				0		2
	27				0		
	30						

Project: REMEDIAL ACTION AS TEST WELL Location: 13' SOUTH, 6' EAST OF MW-2  
 Former: DOYLE'S FUEL STORAGE SITE Driller: HUGHES DRILLING CO. (PAT SMITH)  
 Date MW Installed: 6/5/07 Start: 1100 AM Inspector: RON ROZAK



# MONITOR WELL

No.

AS-3

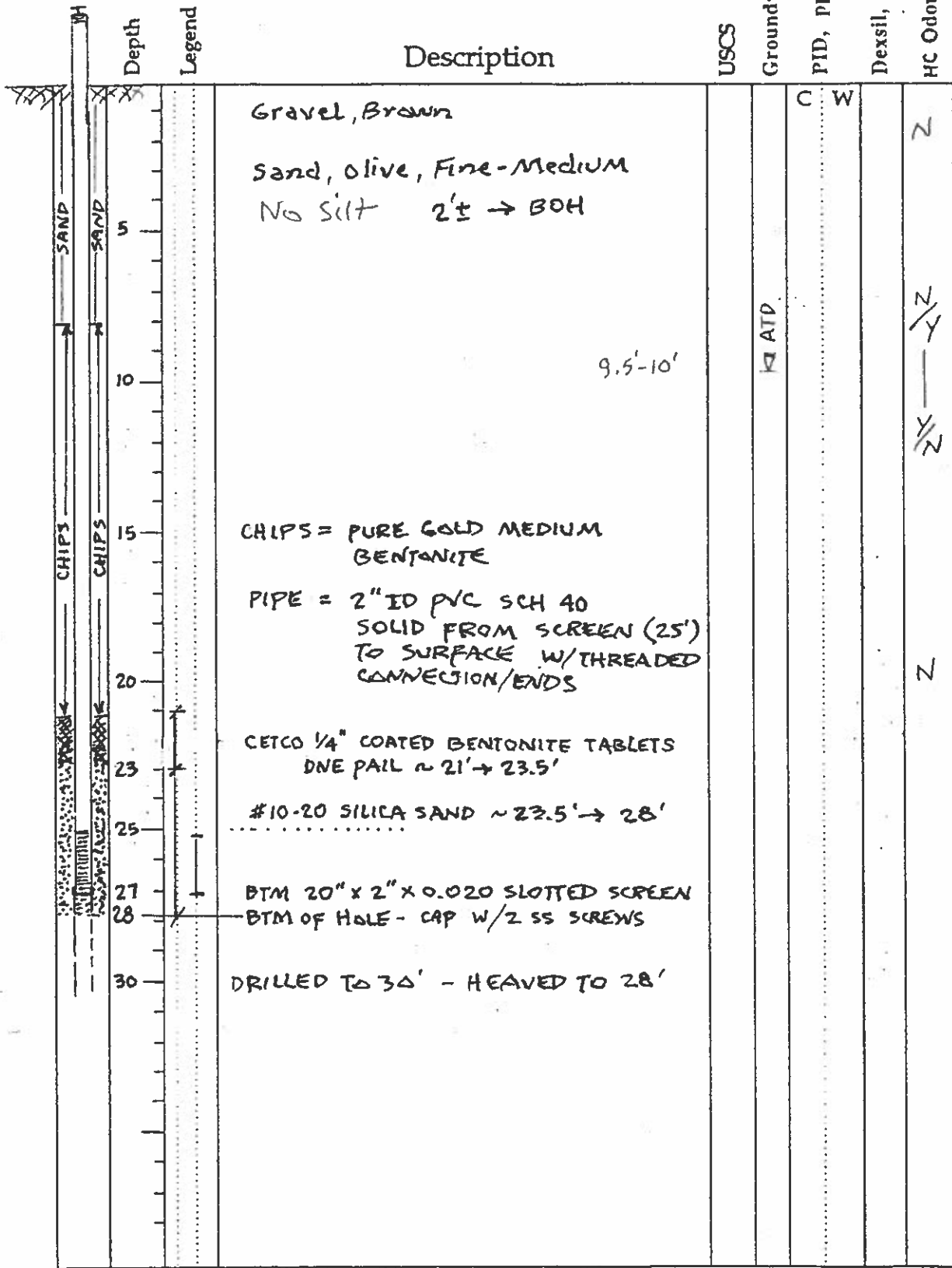
Depth	Legend	Description	USCS	Groundwater	PID, ppm	Dexsil, ppm	HC Odor
0		Gravel, Brown			C		2
5		Sand, olive, Fine-Medium No SILT 2'± → BOH			W		
9.5-10'				ATP			2
15		CHIPS = PURE GOLD MEDIUM BENTONITE					
20		PIPE = 2" ID PVC SCH 40 SOLID FROM SCREEN (25') TO SURFACE W/ THREADED CONNECTION/ENDS					2
23		CETCO 1/4" COATED BENTONITE TABLETS ONE PAIL ~ 21' → 23.5'					
25		#10-20 SILICA SAND ~ 23.5' → 28'					
27		BTM 20" x 2" x 0.020 SLOTTED SCREEN					
28		BTM OF HOLE - CAP W/ 2 SS SCREWS					
30							

Project: Remedial Action AS Wells  
 Location: 43' W OF EAST SHOP WALL  
 92' N OF SHOP, 40' W OF FENCE  
 (former) Doyle's Fuel Storage Site, Kenai Driller Hughes Drilling Co. (Pat Smith)  
 Date MW Installed: 9-4-07 Start: 1000  
 Inspector: Ron Rozak

# MONITOR WELL

No.

AS-4



Project: Remedial Action AS Wells  
 Location: 43' W OF EAST SHOP WALL  
 60' N OF SHOP, 40' W OF CLFENCE  
 (former) Doyle's Fuel Storage Site, Kenai Driller Hughes Drilling Co. (Pat Smith)  
 Date MW Installed: 9-4-07 Start: 1110  
 Inspector: Ron Rozak

# MONITOR WELL

No.  
**AS-6**

Depth	Description	USCS	Groundwater	PID, ppm	Dexsil, ppm	HC Odor
0	Gravel, Brown			C	W	Z
5	Sand, olive, Fine-Medium No SILT 2'± → BOH					
9.5 - 10'			KAATD			
15	CHIPS = PURE GOLD MEDIUM BENTONITE					
20	PIPE = 2" ID PVC SCH 40 SOLID FROM SCREEN (25') TO SURFACE W/ THREADED CONNECTION/ENDS					
23	CETCO 1/4" COATED BENTONITE TABLETS ONE PAIL ~ 21' → 23.5'					
25	#10-20 SILICA SAND ~ 23.5' → 28'					
27	BTM 20" x 2" x 0.020 SLOTTED SCREEN					
28	BTM OF HOLE - CAP W/ 2 SS SCREWS					
30						

Project: Remedial Action AS Wells      Location: 43' WEST OF EAST SHOP WALL  
(former) Doyle's Fuel Storage Site, Kenai      Driller Hughes Drilling Co. (Pet Smith)  
 Date MW Installed: 9-4-07      Start: 1345      Inspector: Ron Rozak

# MONITOR WELL

No.

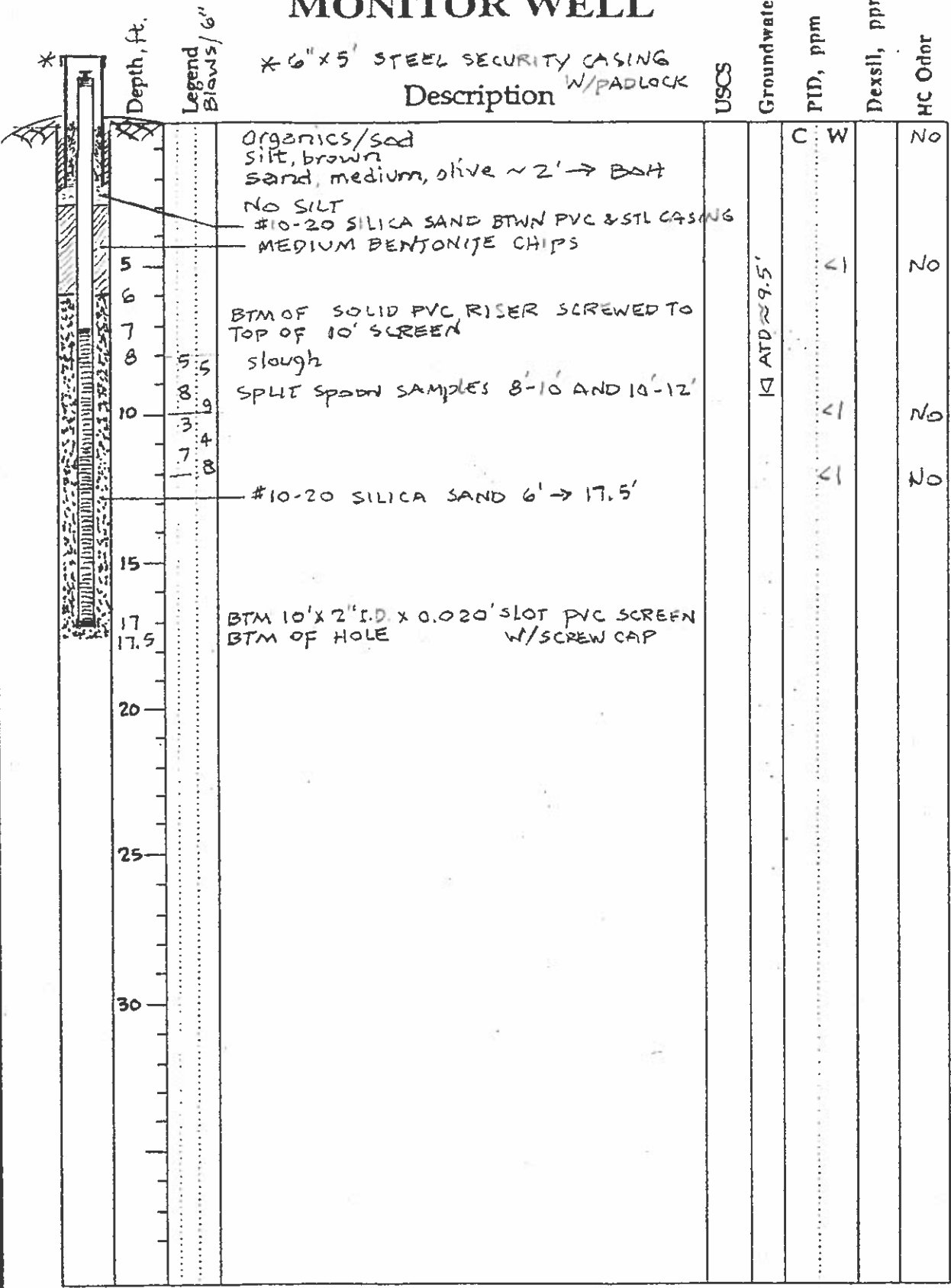
AS-5

Depth	Legend	Description	USCS	Groundwater	PID, ppm	Dexsil, ppm	HC Odor
0		Gravel, Brown			C		Y
0 - 5		Sand, Olive, Fine-Medium No silt 2' ± → BOH			W		
5 - 9.5				KATD			
9.5 - 10							
10 - 15							
15 - 21	CHIPS	CHIPS = PURE GOLD MEDIUM BENTONITE					
21 - 23.5		PIPE = 2" ID PVC SCH 40 SOLID FROM SCREEN (25') TO SURFACE W/ THREADED CONNECTION/ENDS					
23.5 - 28		CETCO 1/4" COATED BENTONITE TABLETS ONE PAIL ~ 21' → 23.5'  #10-20 SILICA SAND ~ 23.5' → 28'					
28 - 30		BTM 20" x 2" x 0.020 SLOTTED SCREEN BTM OF HOLE - CAP W/ 2 SS SCREWS					

Project: Remedial Action AS Wells  
 Location: 15.5' W OF EAST SHOP WALL  
 19.5' N OF SHOP; 12.5' W OF CL FENCE  
 (former) Doyle's Fuel Storage Site, Kenai Driller Hughes Drilling Co. (Pat Smith)  
 Date MW Installed: 9-4-07 Start: 1245  
 Inspector: Ron Rozak

**ROZAK ENGINEERING**  
 P.O. BOX 350, Kenai, Alaska 99611

# MONITOR WELL



No.  
**MW-7**

Project: Remedial Action AS Wells      Location: 55' N of Aliak (North of ATV trail) East of Candlelight  
 (former) Doyle's Fuel Storage Site, Kenai Miller Hughes Drilling Co. (Pat Smith)

Date MW Installed: 10.12.07 Start: 09/5      Inspector: Ron Rozak



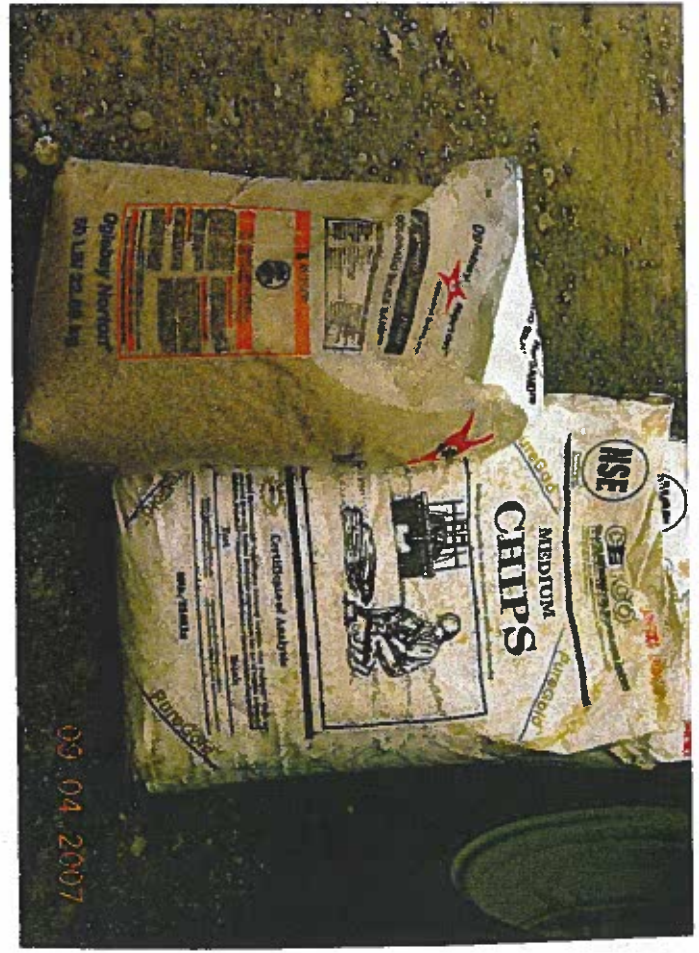
**Drilling hole for air sparge well**



**Constructing air sparge well**



**2 ft long x 2 in ID slotted PVC screen**



**Silica sand and bentonite chips**



NEW POWER POLE

TRAIL

10.12.2007

DRILLING MW-7 NORTH SIDE ATV & SNOWMACHINE TRAIL - ALIAK AT RIGHT →



CITY LIFT STATION

ALIAK

10.12.2007

VIEW NORTH-INSTALLING MW-7 POC. FOR DOYLE'S FUEL SERVICE