Mike

FAX

To: Mike Miyasaka
Company: State of Hawaii DOH
Phone:

Date: 5/7/98
Fax : # 586-7537

From: Bruce Tsutsui
Location: Honolulu

Ext: (808) 523-8874 x266
Sending from Fax #: (808) 523-8950

Project #: 25260 Red Hill Phase II RI/FS
Subject: Abandonment of Red Hill Deep Monitoring Well RH-B07

Comments:

Hi Mike-

Attached please find information regarding the Red Hill Oily Waste Disposal Facility monitoring well RH-B07, proposed well abandonment procedures, and well construction and subsurface lithology for all three deep monitoring wells installed at the site.

If you do not receive ____12____ pages (including cover page)
please call us as soon as possible @ 808.523.8874

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To: Wes Ching, PACNAVFACENGCOM
From: John Fern, Bruce Tsutsui, Earth Tech
Project Name: Red Hill Oily Waste Disposal Facility (OWDF) Phase II RI
Project Number: CTO 0034
Date: May 6, 1998

Re: Abandonment and Replacement of Deep Monitoring Well RH-MW07

As you know, we finished installing the three deep monitoring wells (RH-MW06 through RH-MW08) into the basal Halawa-Moanalua aquifer beneath the Red Hill OWDF on Monday, May 4, 1998. Estimated elevations of water levels measured in two of the wells (RH-MW06 and RH-MW08, illustrated in Figure 1) were found to correspond to known groundwater level elevations for the basal aquifer, between 17 and 19 feet above mean sea level (msl)

Water levels measured in the third well (RH MW07); however, are significantly higher in elevation, approximately 85 feet above msl, corresponding to the perched groundwater levels measured in the existing shallow monitoring wells (Figure 1). These water levels indicate an apparent communication between the upper perched water-bearing zone and RH-MW07. This connection occurred in spite of our concerted efforts to isolate the perched aquifer from the basal aquifer using steel surface conductor casing grouted from the bottom of the perched zone to ground surface, and special precautions taken while installing the well.

Water samples were recently collected from three of the four existing shallow site monitoring wells penetrating the perched zone (MW02, MW03, and MW05) as part of the current RI effort. MW04 yielded insufficient water to collect a sample. Only a single polynuclear aromatic hydrocarbon compound, pyrene, was detected in the sample collected from MW03, at a concentration well below the tap water PRG, as listed in Table 1. In addition, no concentrations of volatile organic compounds (VOCs) or total petroleum hydrocarbons were detected above the laboratory method detection limits as illustrated in Tables 2 and 3.

Although results of the water sample analyses do not indicate that the overlying perched zone is contaminated, the water level data indicate the potential for cross-contamination with the basal aquifer exists. We recommend RH-MW07 be abandoned and replaced with a new monitoring well in a nearby location. Well abandonment should commence as soon as possible.

Because of the situation, we recommend the abandonment procedures include steps in addition to those usually recommended by the State of Hawaii Department of Land and Natural Resources (DLNR). A construction diagram of RH-MW07 is illustrated in Figure 2, along with recommended steps for well abandonment:

1) A cutting tool will be lowered into the well to perforate/cut open the stainless steel well screen.
2) After the well screen is opened, the sand filter pack will be removed from the annulus of the borehole by airlifting through the opened screen.

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3) After sand removal, the borehole will be sealed by pressure grouting through the perforated screen.
4) Volclay or a grout and 3-5% bentonite mixture will be continually pumped into the well casing to seal off the zone below the existing bentonite well seal. Grout will also be pumped into the casing up to a depth corresponding to the top of the bentonite seal. The consistency of the existing bentonite well seal prevents the driller from removing the seal. As a result, the portion of casing within the bentonite layer will be left in place and sealed from above and below using this method.
5) The well casing will be drilled out to a depth just above the bentonite seal. The resulting pilot hole will then be used to assist in drilling out the existing grout and reaming the surrounding subsurface.
6) The reamed borehole will be regrouted to ground surface using Volclay grout or equivalent. Reaming and regrouting the borehole will fill in voids potentially not completely filled during the original well construction.

The method used to install the replacement well will need to be carefully selected to avoid similar problems to those encountered with MW-07. Although there are a few possibilities, the preferred method would be to install permanent conductor casing from the ground surface to just above the top of the basal aquifer water table. Details regarding the proposed installation methods will be discussed and determined during the May 8, 1998 meeting.

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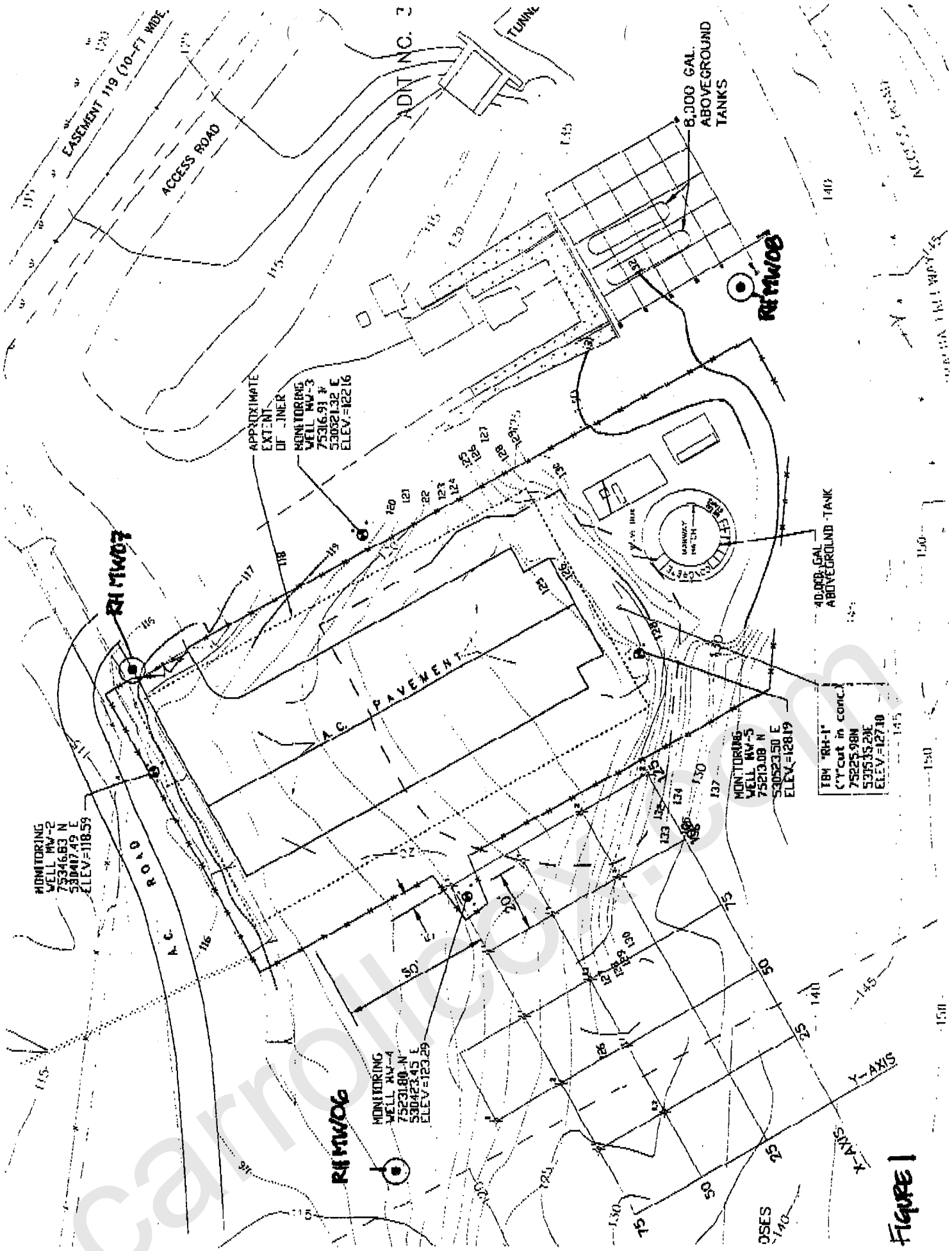
EASEMENT 119 (10-FT WIDE)
ACCESS ROAD
ADIT N.C.
TUNNEL
8,000 GAL. ABOVEGROUND TANKS
RH MW08
APPROXIMATE EXTENT OF LINER
MONITORING WELL MW-3
75316.91 N
530521.32 E
ELEV.=122.16
RH MW07
A.C. PAVEMENT
40,000 GAL. ABOVEGROUND TANK
MONITORING WELL MW-5
75213.08 N
530523.50 E
ELEV.=128.19
TBM "RH-1"
("Y"cut in conc.)
752598N
530535.20E
ELEV.=127.10
MONITORING WELL MW-2
75346.83 N
530407.49 E
ELEV.=118.59
A.C. ROAD
MONITORING WELL MW-4
75221.80 N
530423.45 E
ELEV.=123.29
RH MW06
Y-AXIS
X-AXIS
Figure 1

Table 1. Preliminary Laboratory Analytical Results for Polynuclear Aromatic Hydrocarbons (PNA), MW02, MW03, MW05
Red Hill Oily Waste Disposal Facility
Fleet and Industrial Supply Center, Pearl Harbor, Hawaii

Compounds	PRGs Tap Water (ug/l)	AB501 MW02 Sampled 3/25/98 (ug/l)	AB502 MW02D Sampled 3/25/98 (ug/l)	AB503 MW03 Sampled 3/25/98 (ug/l)	AB507 MW05 Sampled 4/8/98 (ug/l)	Lab MDL(8310) (ug/l)
Naphthalene	240	<0.48U	<0.48U	<0.48U	<0.48U	0.13
Acenaphthylene	NA	<0.96U	<0.96U	<0.96U	<0.95U	0.97
Acenaphthene	370	<0.48U	<0.48U	<0.48U	<0.48U	0.14
Fluorene	240	<0.096U	<0.096U	<0.096U	<0.095U	0.025
Phenanthrene	NA	<0.048U	<0.048U	<0.048U	<0.048U	0.048
Anthracene	1800	<0.48U	<0.48U	<0.48U	<0.48U	0.015
Fluoranthene	1500	<0.096U	<0.096U	<0.096U	<0.095U	0.014
Pyrene	180	<0.048U	<0.048U	0.082	<0.048U	0.019
Benzo(a)anthracene	0.092	<0.048U	<0.048U	<0.048U	<0.048U	0.015
Chrysene	9.2	<0.048U	<0.048U	<0.048U	<0.048U	0.037
Benzo(b)fluoranthene	0.092	<0.096U	<0.096U	<0.096U	<0.095U	0.037
Benzo(k)fluoranthene	0.92	<0.048U	<0.048U	<0.048U	<0.048U	0.014
Benzo(a)pyrene*	0.0092	<0.048U	<0.048U	<0.048U	<0.048U	0.015
Dibenzo(a,h)anthracene*	0.0092	<0.096U	<0.096U	<0.096U	<0.095U	0.026
Benzo(g,h, I)perylene	NA	<0.096U	<0.096U	<0.096U	<0.095U	0.095
Indeno(1,2,3-cd)pyrene	0.092	<0.048U	<0.048U	<0.048U	<0.048U	0.011
1-Methylnaphthalene	NA	<0.048U	<0.048U	<0.048U	<0.048U	0.048
2-Methylnaphthalene	NA	<0.048U	<0.048U	<0.048U	<0.048U	0.048

* Lab detection limits are above Preliminary Remedial Goals (PRGs).
<xxxU: Compound not detected above indicated Lab reporting Limit.
ug/l: Microgram per liter (10^{-6})

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Table 2. Preliminary Laboratory Analytical Results for TPH-Gas and TPH-Diesel, MW02, MW03, MW05
Red Hill Waste Disposal Facility
Fleet and Industrial Supply Center, Pearl Harbor, Hawaii

COMPOUNDS	AB501 MW02 Sampled 3/25/98 (mg/l)	AB502 MW02D Sampled 3/25/98 (mg/l)	AB503 MW03 Sampled 3/25/98 (mg/l)	AB507 MW05 Sampled 4/8/98 (mg/l)
TPH-Gas	<100 U	<100 U	<100 U	<100 U
TPH-diesel	<0.24 U	<0.24 U	<0.59 U	<0.24 U

<xxxU: Compound not detected above indicated Lab reporting Limit
mg/l: Milligram per liter (10^)
TPH soil action levels from DOH:

TPH-gasoline	2,000mg/kg
TPH-middle distillates	5,000mg.kg
TPH-residual fuels	5,000mg/kg

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Table 3. Preliminary Laboratory Analytical Results for Volatile Organic Compounds (VOCs), MW02, MW03, MW05
Red Hill Oily Waste Disposal Facility
Fleet and Industrial Supply Center, Pearl Harbor, Hawaii

Compounds	PRGs Tap Water (ug/l)	AB501 MW02 Sampled 3/25/98 (ug/l)	AB502 MW02D Sampled 3/25/98 (ug/l)	AB503 MW03 Sampled 3/25/98 (ug/l)	AB507 MW05 Sampled 4/8/98 (ug/l)	Lab MDL (8260) (ug/l)
Methylene Chloride	4.3	<5.0 U	<5.0 U	<5.0 U	<5.0 U	0.26
Chloroform	0.16	<0.16 U	<0.16 U	<0.16 U	<0.16 U	0.087
1,1,1-Trichloroethane	200	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.11
1,2-Dichloroethane	55	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.19
Carbon Tetrachloride	0.17	<0.17 U	<0.17 U	<0.17 U	<0.17 U	0.17
Benzene	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.047
Trichloroethene	1.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.17
Bromodichloromethane	0.18	<0.18 U	<0.18 U	<0.18 U	<0.18 U	0.15
4-Methyl-2-pentanone	NA	<10 U	<10 U	<10 U	<10 U	0.23
1,1,2-Trichloroethane	3	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.15
Toluene	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.07
Tetrachloroethene	1.1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.13
Chlorobenzene	100	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.081
Ethylbenzene	700	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.046
Bromoform	8.5	<3.0 U	<3.0 U	<3.0 U	<3.0 U	0.084
Total xylenes	1400	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.21
1,1,2,2-tetrachloroethane*	0.055	<0.15 U	<0.15 U	<0.15 U	<0.15 U	0.15
Chlorodibromomethane	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1
Chloromethane	1.5	<1.5 U	<1.5 U	<1.5 U	<1.5 U	0.32
Vinyl Chloride	2	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.13
Bromomethane	8.7	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.21
Chloroethane	710	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.47
Acetone	610	<10 U	<10 U	<10 U	<10 U	2.9
1,1-Dichloroethene*	0.046	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.20
Carbon Disulfide	21	<5.0 U	<5.0 U	<5.0 U	<5.0 U	0.17
Trans-1,2-Dichloroethane	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.0
1,1-Dichloroethane	810	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.11
2-Butanone	1900	<10 U	<10 U	<10 U	<10 U	0.88
Cis-1,2-Dichloroethene	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.0
1,2-Dichloropropane	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.15
Cis-1,3-Dichloropropene*	0.081	<0.14 U	<0.14 U	<0.14 U	<0.14 U	0.14
Trans-1, 3-Dichloropropene*	0.081	<0.10 U	<0.10 U	<0.10 U	<0.10 U	0.1
2-Hexanone	NA	<10 U	<10 U	<10 U	<10 U	0.50
Styrene	100	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.10

*Lab detection limits are above Preliminary Remedial Goals (PRGs).
<xxx U: Compound not detected above Lab reporting limit.
ug/l: microgram per liter (10^{-9})

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Calculation Sheet

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Checked by _____ Client _____ Job No. _____ Date _____

RH-MW07

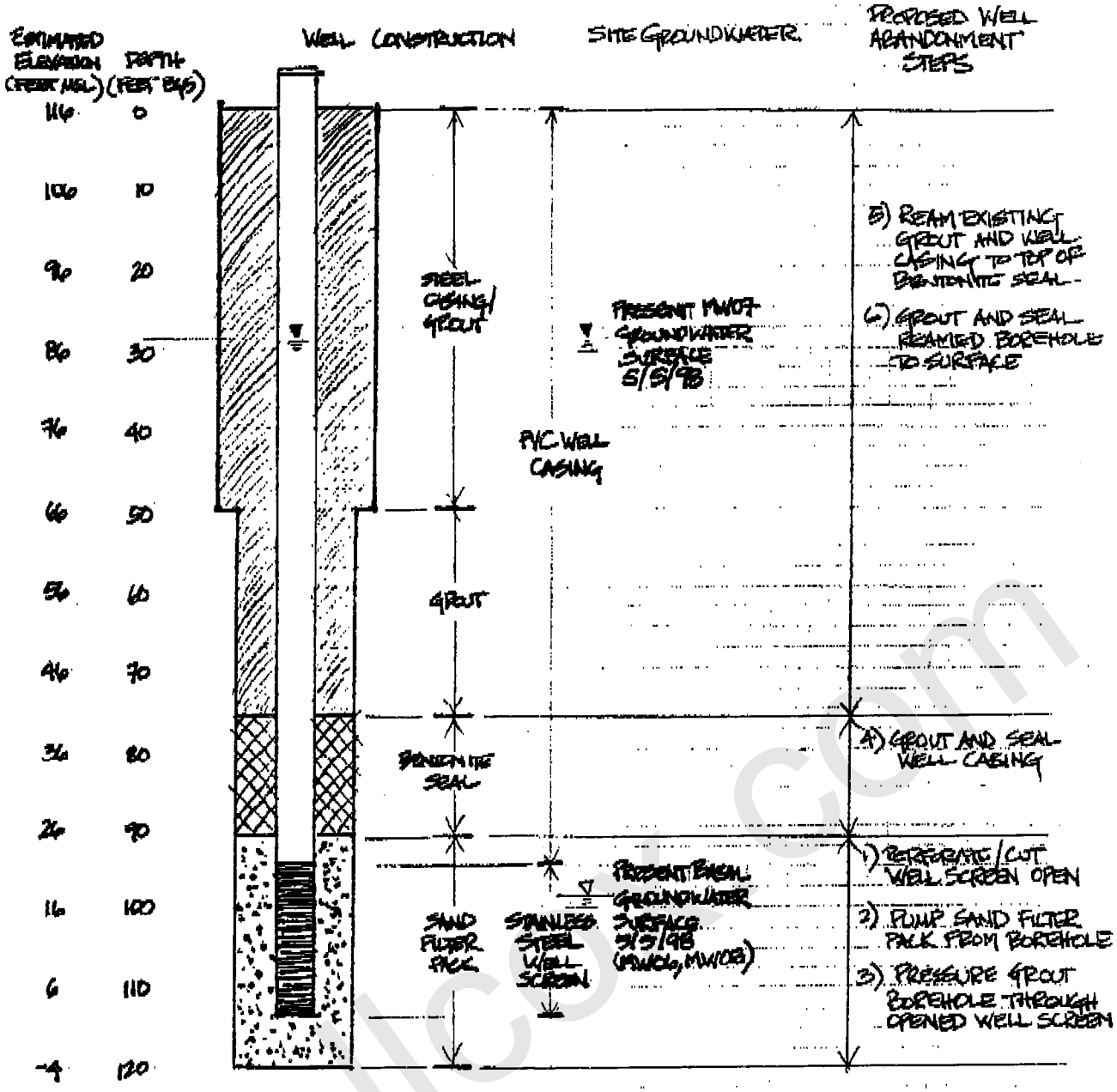

FIGURE 2.

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Calculation Sheet

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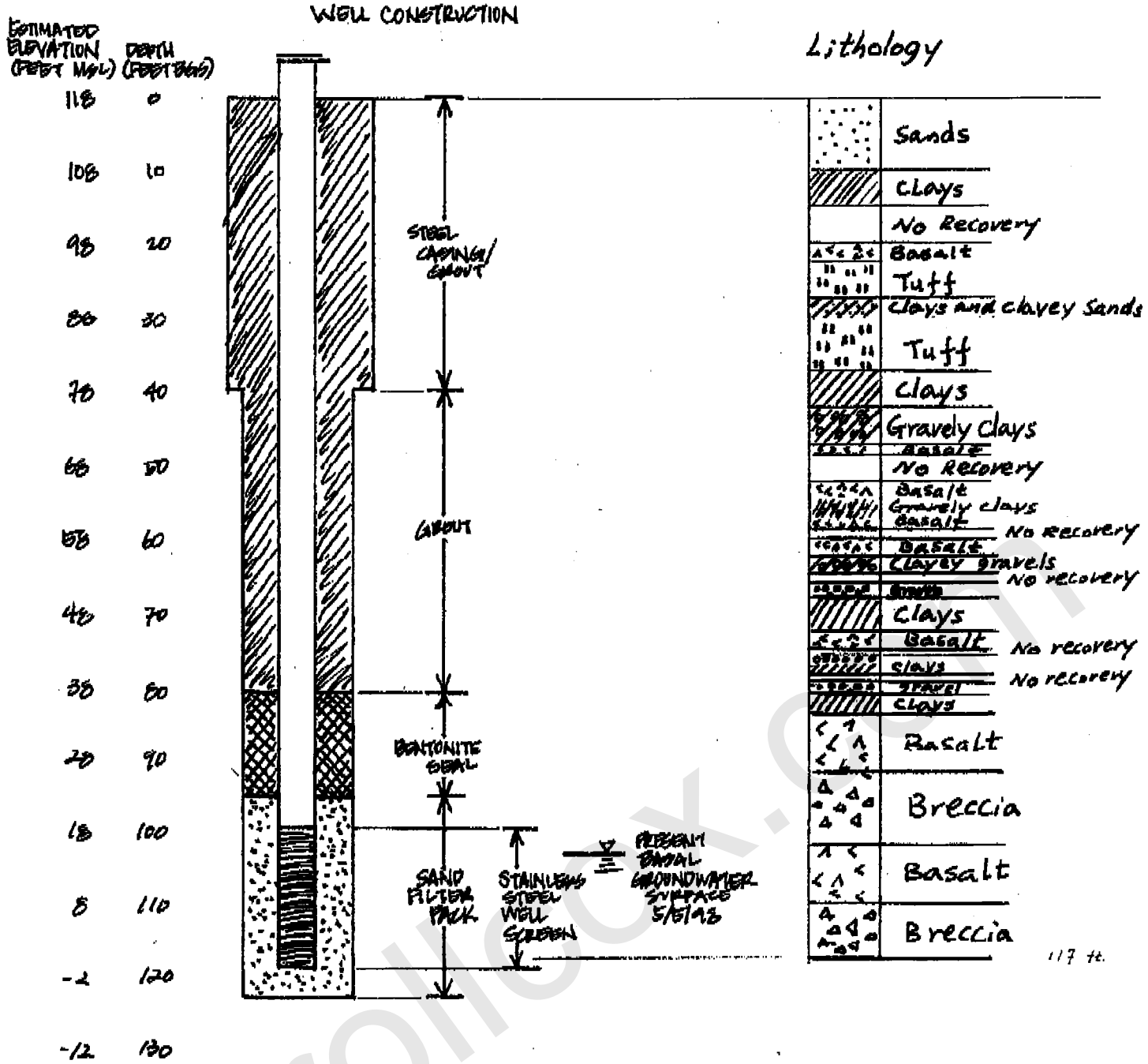
RH-MW06

WELL CONSTRUCTION



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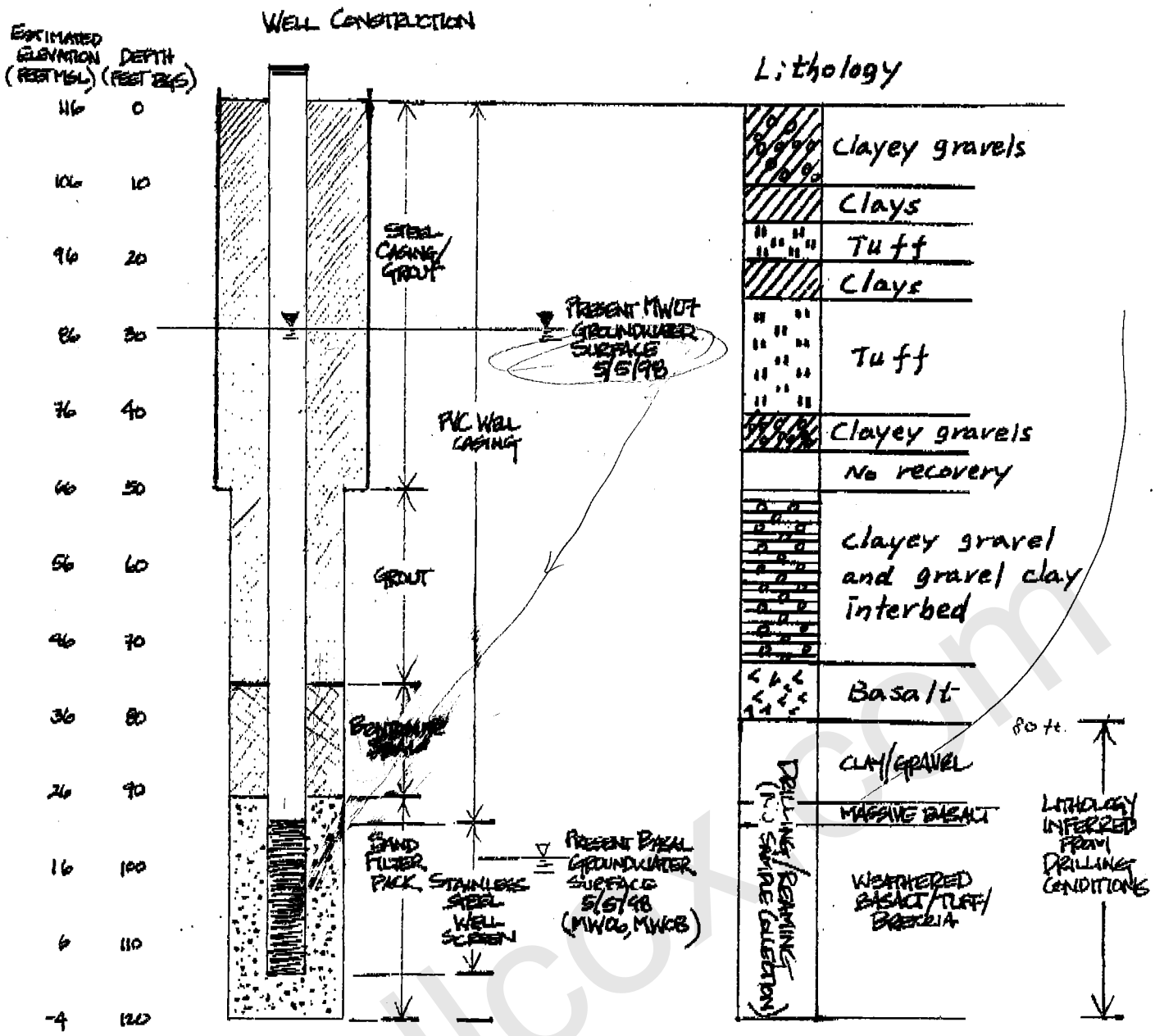
RH-MW07

WELL CONSTRUCTION



Recovery time -

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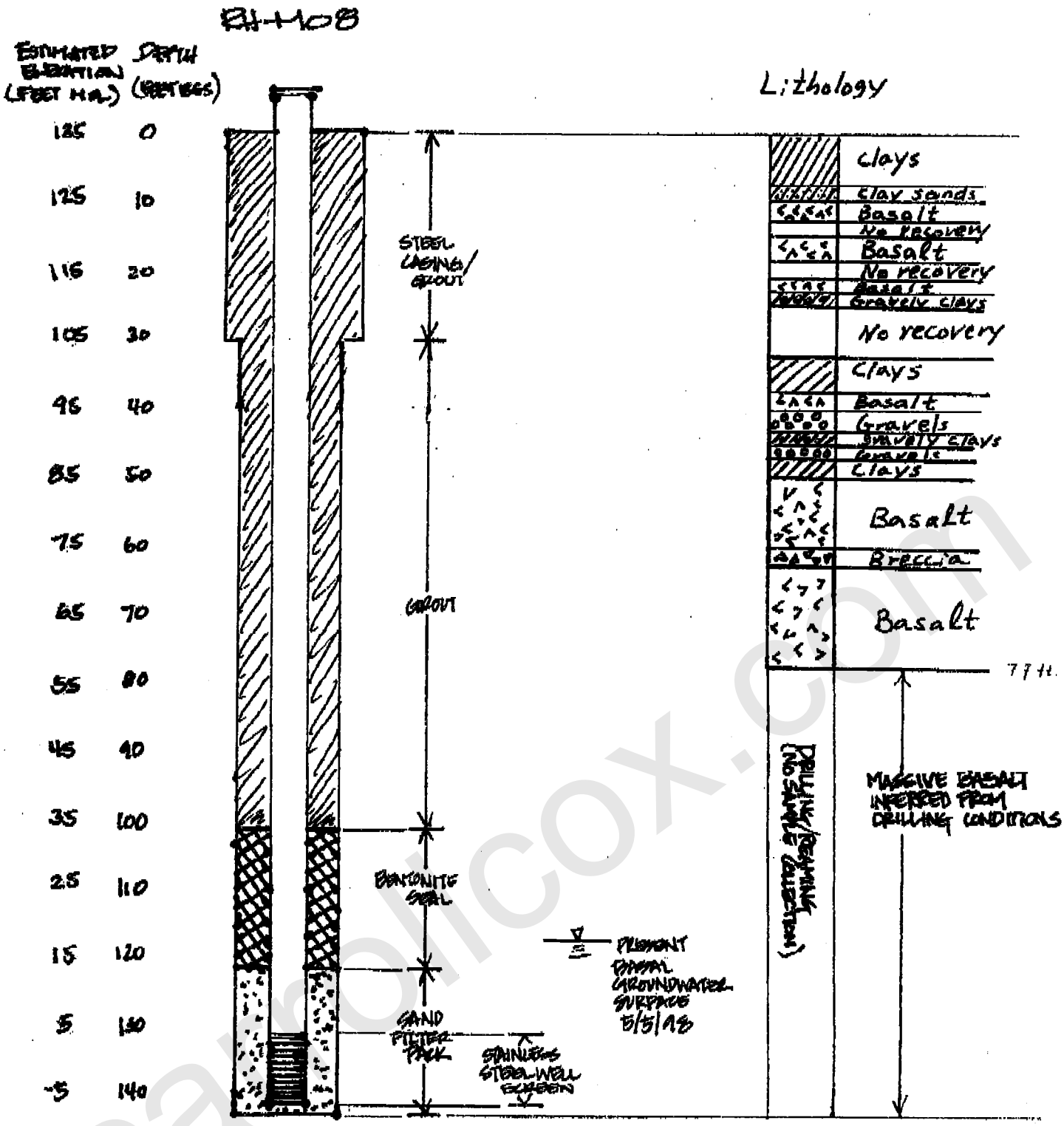
WELL CONSTRUCTION

BH-108



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