

## **PROJECT MEMORANDUM**

**PROJECT:** 191143; Ingersoll-Rand Corporation, 1944 Marina Blvd., San Leandro, CA

**SUBJECT:** Vertical profiling for groundwater quality

**TASK DATES:** September 21, 1992

**Prepared By:** William Schaal, <sup>WCS</sup> IT Corporation

### **PURPOSE**

Vertical profiling for groundwater quality was performed in an attempt to establish the distribution of dissolved-phase gasoline contamination in three dimensions and to identify the maximum depth to set groundwater recovery well(s) for a future pump and treat system.

### **METHODS**

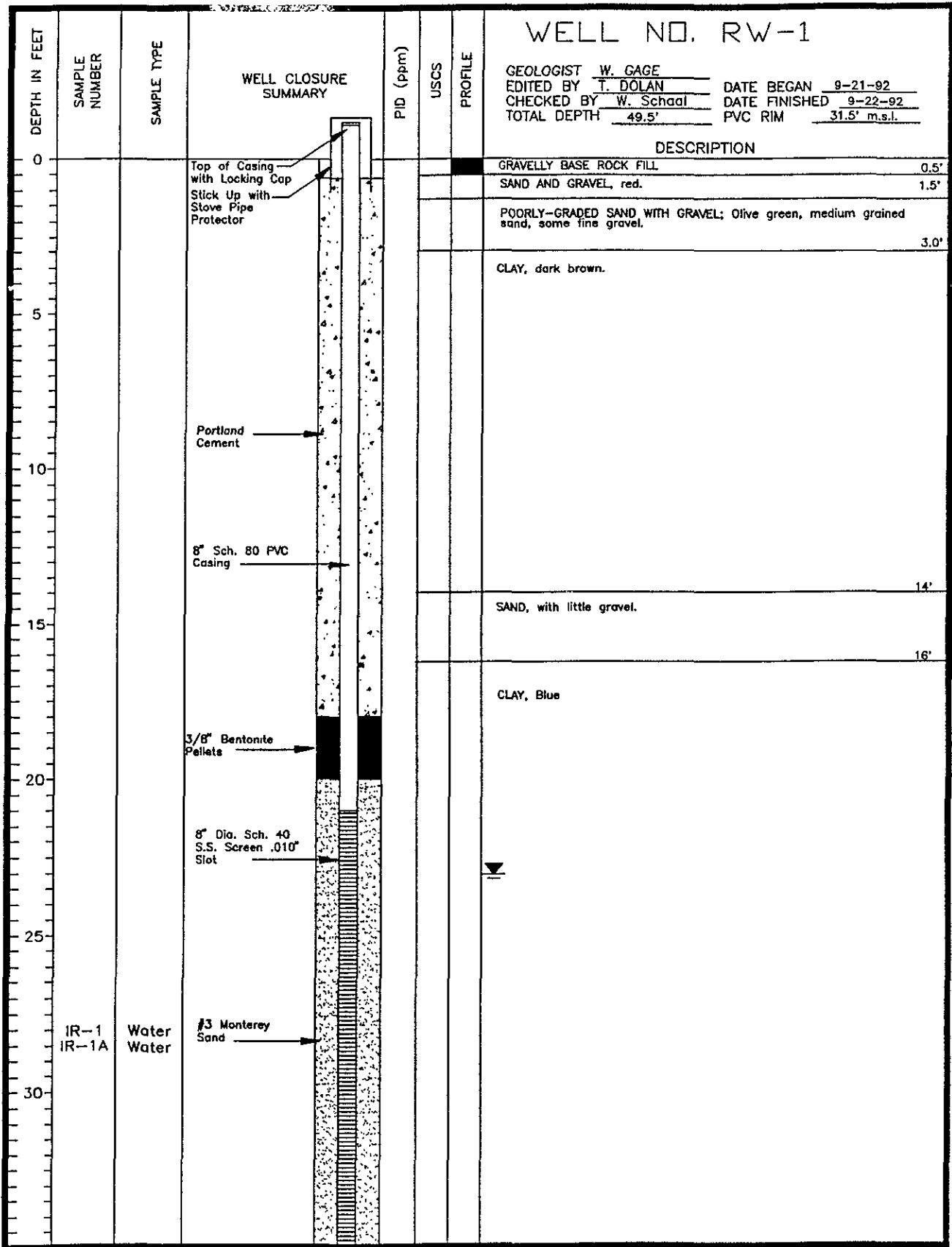
The air rotary casing hammer drilling procedure was utilized to advance through the subsurface to collect samples of groundwater and soil from the shallow water bearing zone. The four groundwater samples were collected by drilling to the specified depth, raising the bit and casing two to three feet to allow the borehole to charge with water, purging the borehole with a downhole pump, and grabbing a sample of water with a pre-cleaned bailer once the borehole recharged. The soil sample recovered from the shallow water bearing zone aquitard was grabbed with a split spoon sampler lined with pre-cleaned brass sleeves. Collected groundwater and soil samples were analyzed by a State certified mobile laboratory stationed on-site. Samples were analyzed for benzene, toluene, ethyl benzene, total xylenes (BTEX) and total petroleum hydrocarbons as gasoline (TPH) using modified EPA methods 8015 and 8020, respectively.

Analytical results, reported in real-time, were used by the project geologist with the data necessary to determine the depth at which to terminate the drilling and construct the groundwater recovery well needed for future restoration activities.

### **RESULTS**

Analysis of the collected samples reveals that dissolved-phase gasoline components decrease in concentration from near the top to the bottom of the water column and that the aquitard underlying the shallow water bearing zone is not contaminated with the gasoline components included in the testing protocol.

Specific information regarding borehole parameters, recovery well construction, and laboratory measurements gathered during the pilot test is included in the accompanying attachments.



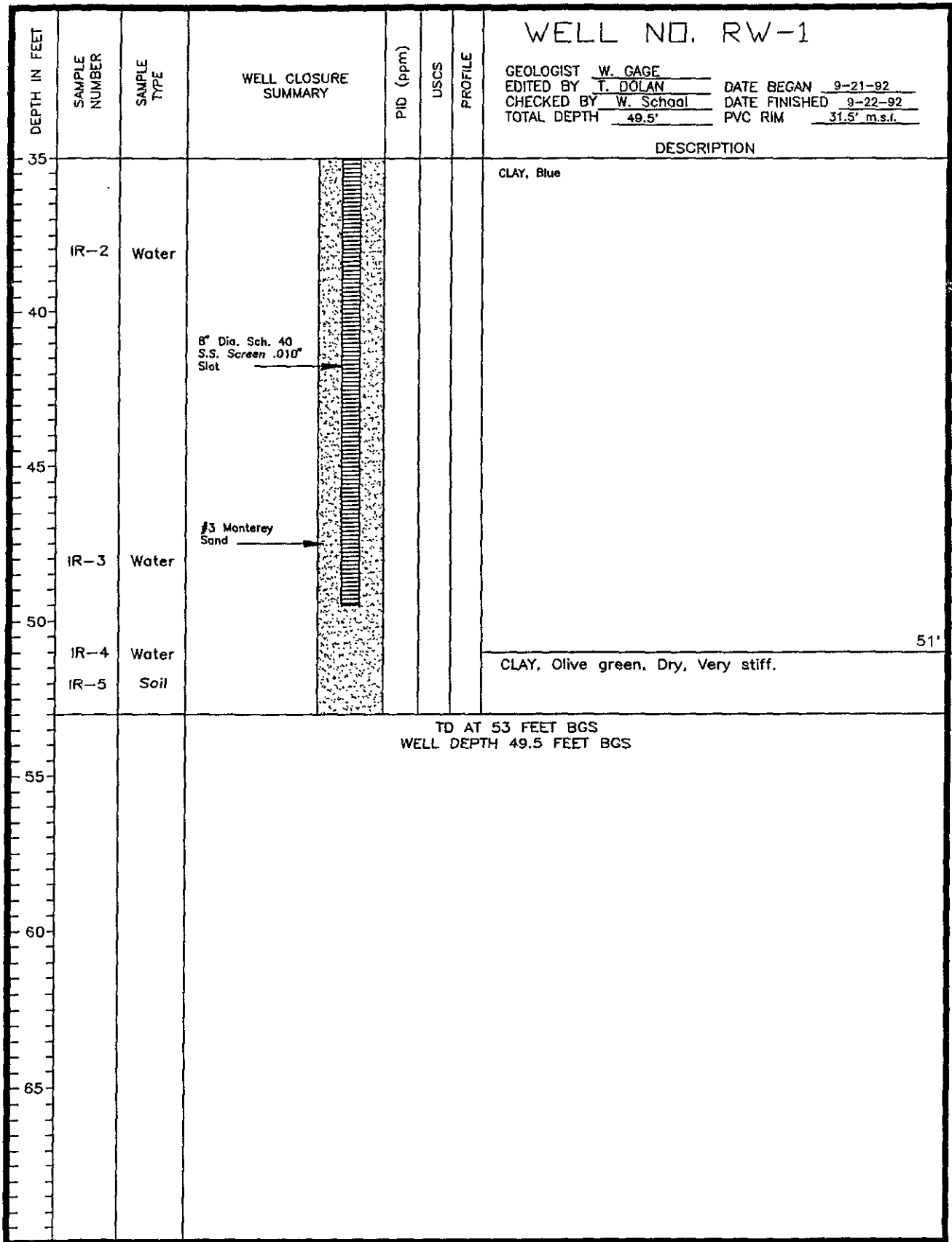
DRILLING CO.: WEST HAZMAT DRILLING  
 DRILL METHOD: AIR ROTARY CASING HAMMER  
 SAMPLING METHOD: SOIL: CALIFORNIA SPLIT SPOON SAMPLER  
 WATER: VOC PROBE

SHEET 1 OF 2

PROJECT NO.: 191143  
 CLIENT: INGERSOLL-RAND EQUIPMENT SALES  
 SITE ADDRESS: 1944 MARINA BOULEVARD  
 SAN LEANDRO, CALIFORNIA



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TEG Project #920921-C

BTEX (EPA 602) & TPH (EPA 8015mod) ANALYSES OF WATER

SAMPLE NUMBER	DATE RECEIVED	DATE ANALYZED	GASOLINE (ug/l)	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYLBENZ (ug/l)	XYLENES (ug/l)
IR-1	09/21/92	09/21/92	5483	638.1	518.7	93.0	578.5
IR-1a	09/21/92	09/21/92	4239	536.6	189.7	35.7	181.5
IR-2	09/21/92	09/21/92	2198	236.0	161.2	19.7	88.8
IR-3	09/21/92	09/21/92	2888	429.5	81.2	14.7	58.1
IR-4	09/21/92	09/21/92	915	165.7	47.2	8.6	39.4
DETECTION LIMITS			500	0.3	0.3	0.3	0.6

BTEX (EPA 8020) & TPH (EPA 8015mod) ANALYSES OF SOIL

SAMPLE NUMBER	DATE RECEIVED	DATE ANALYZED	GASOLINE (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)
IR-5	09/21/92	09/21/92	nd	nd	nd	nd	nd
DETECTION LIMITS			10	0.005	0.005	0.005	0.015

ND INDICATES NOT DETECTED AT LISTED DETECTION LIMITS

ANALYSES PERFORMED IN TEG'S DOHS CERTIFIED MOBILE LAB (#1671)

Analyses Performed By: Mr. Leif Jonsson

Data Reviewed By: Mr. Mark Jerpbak

*Mark Jerpbak* 9-25-92

Transglobal Environmental Geochemistry



INTERNATIONAL TECHNOLOGY CORPORATION  
INGERSOL RAND SITE  
SAN LEANDRO, CA

TEG Project #920921-C

QA/QC DATA - MATRIX SPIKE ANALYSIS - WATER

SAMPLE NUMBER	DATE ANALYZED	GASOLINE (ug/l)	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYLBENZ (ug/l)	XYLENES (ug/l)
Spiked Conc.	09/21/92	2000	10.0	10.0	10.0	30.0
Measured Conc.		1941	7.76	8.73	9.21	26.01
% Recovery		97.1%	77.6%	87.3%	92.1%	86.7%
Spiked Conc.	09/21/92	2000	10.0	10.0	10.0	30.0
Measured Conc.		1844	8.54	8.2	8.91	25.06
% Recovery		92.2%	85.4%	82.0%	89.1%	83.5%
%RSD:		5.1%	9.6%	6.3%	3.3%	3.7%

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Analyses Performed By: Mr. Leif Jonsson

Data Reviewed By: Mr. Mark Jerpbak

*Mark Jerpbak 9-25-92*