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RBT SITE

Preliminary Ground Water Investigation

Report to:

PACIFIC WOOD TREATING
Ridgefield, Washington

USEPA RCRA
3058179

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SUMMARY AND RECOMMENDATIONS

The material of primary concern at the RBT pit is ash from the PWT boiler which historically admixed wastewater treatment plant sludges with hog fuel. Only one fraction of that ash, i.e., the fly ash, failed to pass D.O.E. EP toxicity testing, and then only for arsenic.

A review of regional and local hydrogeological conditions as well as inventorying local beneficial uses of ground water has been carried out. Subsequent grab samples from the RBT pond, five adjacent water wells and one background well more than a mile away shows no apparent contamination of the deep Troutdale aquifer.

Some surface water drains from the RBT pond during the wetter, winter, months. A thin unit of mica sand reportedly underlies the excavated pond above the Troutdale formation, and it may locally include a perched saturated zone. Any further water quality investigations at the site should focus on these two potential avenues for off-site migration of contaminants.

We recommend that PWT/RBT either:

1. Consider further testing for declassification of the waste, or
2. Proceed with a closeout plan for the RBT site.

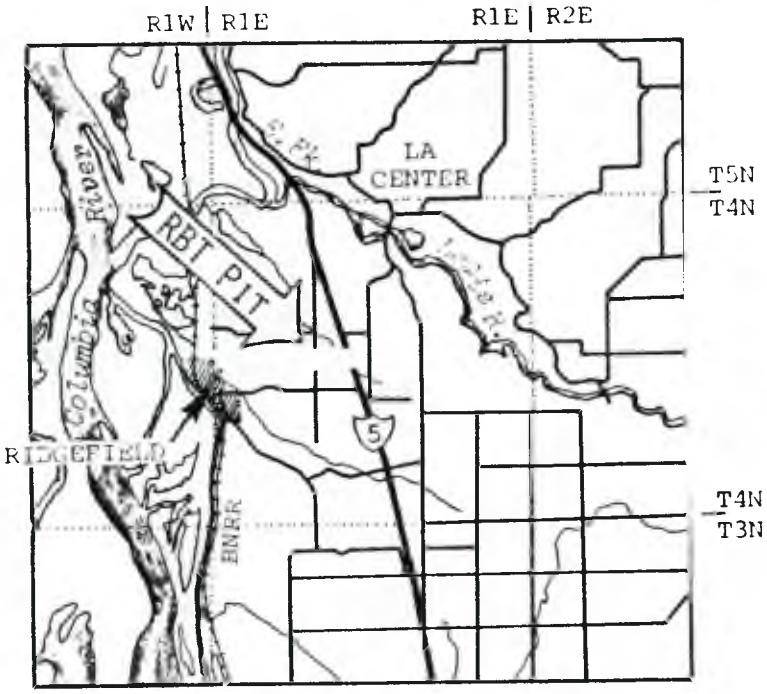
BACKGROUND

Since 1979 Pacific Wood Treating (PWT) has deposited about 4,700 cubic yards of material including log deck and yard clean up as well as ash at the Ridgefield Brick and Tile (RBT) clay pit. The pit is located 3510 N.W. 289th Street, Ridgefield, Washington 98642 (NW 1/4, SE 1/4, Sec. 17T. 4 N./R. 1 E., W.M.), see Figure 1.

The ash included in the materials deposited at the RBT site is of greatest concern in this evaluation. It includes incinerated bottom sludge from PWT wastewater treatment facility which treats wastewater from the PWT wood preserving process. Klinker, multicone and bag house ash is mixed somewhat homogeneously throughout the filled portion of the clay pit.

HYDROGEOLOGY

The regional geology of Clark County has been described by Mundorff (1964). The upland areas near the RBT site are reportedly underlain by Quarternary alluvial deposits including deltaic gravels, sands and silts. Underlying this unit is Tertiary Troutdale formation which is effectively ubiquitous to Clark County. The upper member of the Troutdale generally includes cemented sand and gravel while the lower member is predominately finer grained silts and clays. Mundorff (1964) maps the Troutdale as cropping out in the canyon west of the RBT pit as well as Allen Canyon to the north and northwest.



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Scale: 1"= approx. 20,000'

CLARK COUNTY

RBT PIT
Location Map

FIGURE 1

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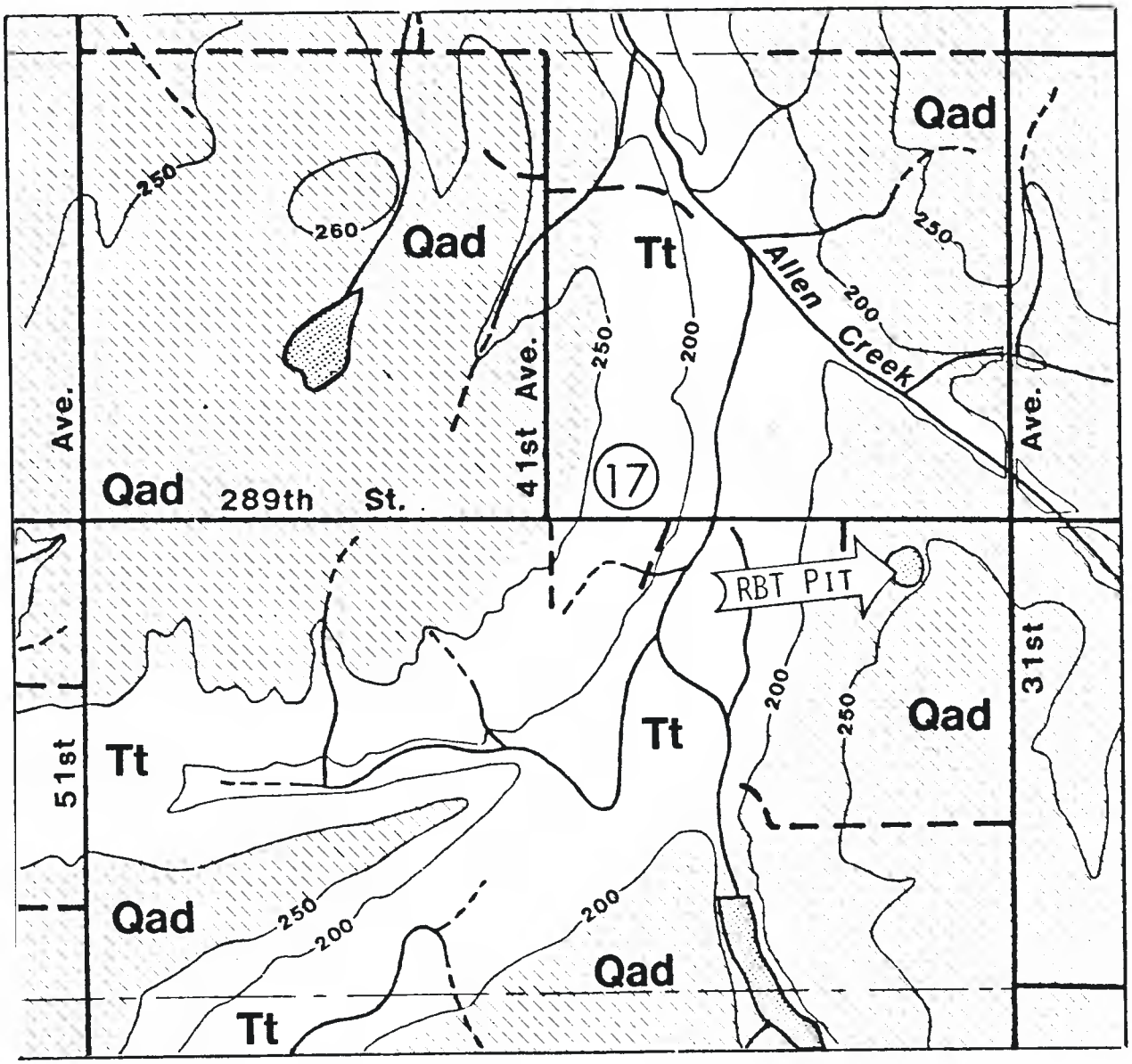

Geologic contacts based on: USGS W.S.P. 1600, Plate 2

N

Scale: 1"=1000'

EXPLANATION

Qad — ALLUVIAL DEPOSITS- DELTAIC SAND AND GRAVEL, FINE SAND, AND SILT

Tt — TROUTDALE FORMATION- UPPER MEMBER, SAND AND GRAVEL; LOWER MEMBER, SILT AND CLAY

Note: See Figure 3 for additional Explanation.

RBT PIT
Geologic Map

FIGURE 2

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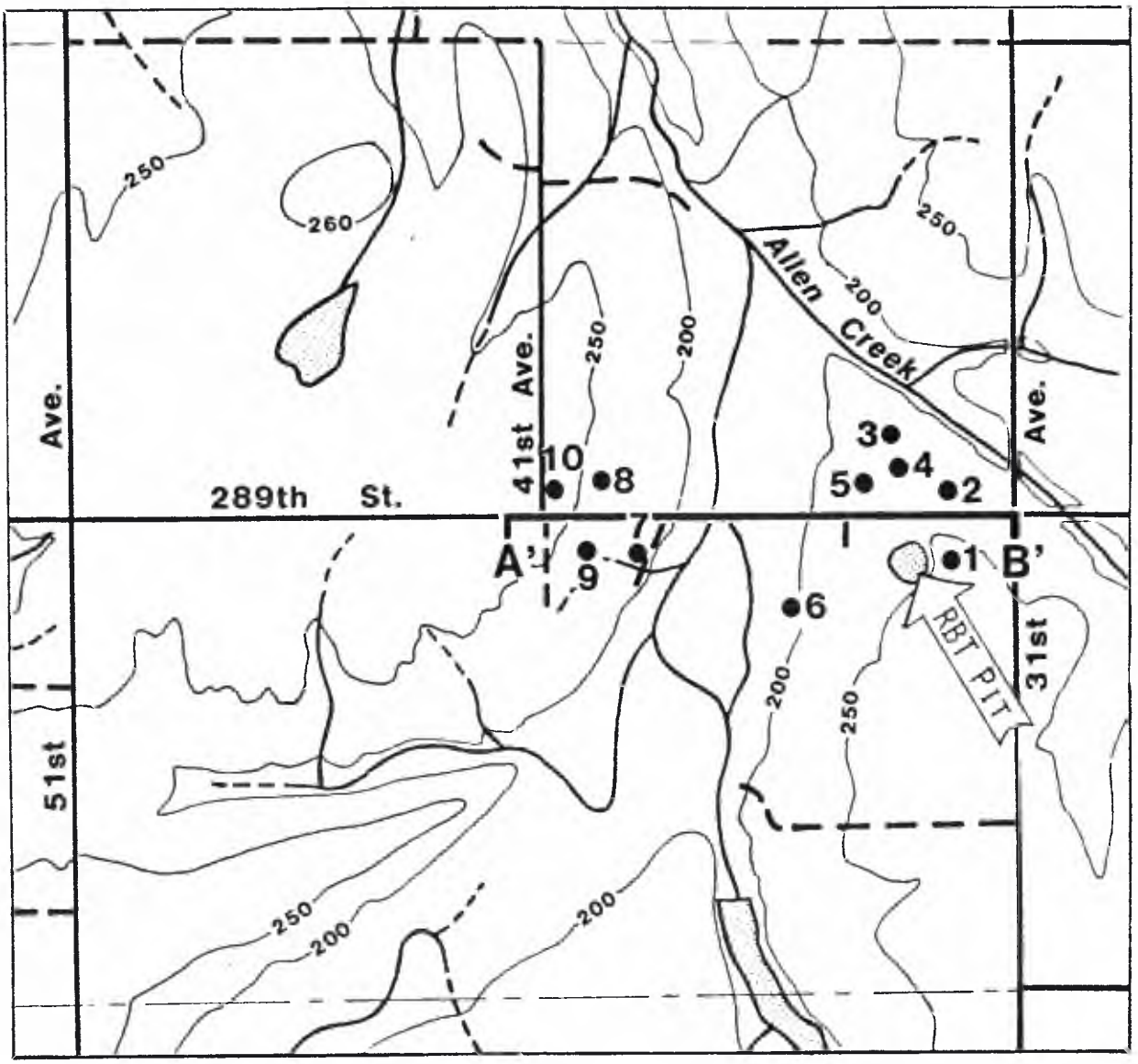
Discussions with Elmer Muffett, RBT owner, indicated that the pit was excavated through up to 30 feet of clay (bottom elev. ≈ 200 feet) before encountering 3 to 4 feet of mica sand. His local experience at the site showed the mica sand unit to be underlain by cemented gravel. This appears to be consistent with the Mundorff (1964) interpretation in that the cemented gravel is considered to be the part of the Troutdale formation, see Figure 2 and 4 as well as appended well logs.

A records search and field location of wells in the immediate vicinity of the RBT pit provides a more detailed picture of the local geology. Figure 3 shows the RBT pit as well as field located wells. Well logs, locater sheets and published data from Mundorff (1964) is appended. Figure 4 shows an east-west cross section paralleling 289th Street. Well logs indicate that the water producing zones of the aquifer are sand in this area. The elevation of these zones is about 10 to 50 feet MSL. (Note; 150 - 300 feet below ground surface)

The irregular surface of the Troutdale, shown on Figure 4 indicates that the deltaic unit unconformably overlies the Troutdale. The weathered surface of the Troutdale may result in locally perched ground water. This is supported by reports of sporadic success in obtaining small quantities of water from shallow dug wells. The ponding in the RBT pit also supports this interpretation. However, no productive shallow wells were located in the immediate area of the site.



Base: Clark County Road Atlas-1982;
USGS-Ridgefield 7.5' Quad.-1970;
Clark County Aerial Photo-1978;
and field data.

N

Scale; 1"=1000'

EXPLANATION

●1 WELL LOCATION

200 TOPOGRAPHIC CONTOURS (FT. ABOVE MSL)

ROADS

SURFACE WATER

A' B' LOCATION SECTION A'-B'

Note: See Figure 4 and appendix well data.

RBT PIT

Topographic Map and Local Water Wells

FIGURE 3

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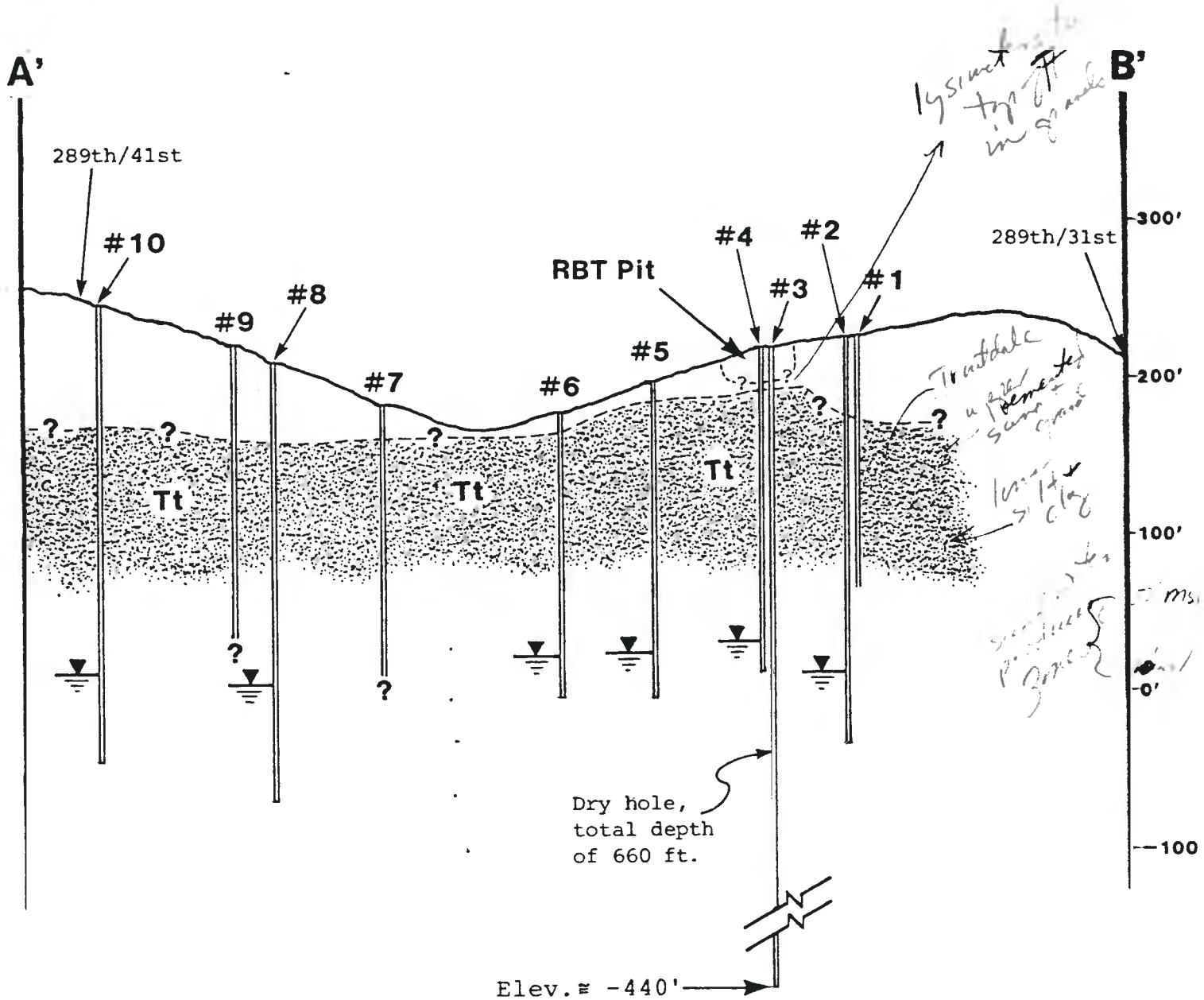

SCALE: HORIZONTAL @ 1"= 400'
VERTICAL @ 1"= 100'

PROJECTED WELL LOCATIONS, DEPTHS AND REPORTED STATIC WATER LEVELS ALONG 289TH STREET, RIDGEFIELD, WASH.

RBT PIT
Cross Section

FIGURE 4

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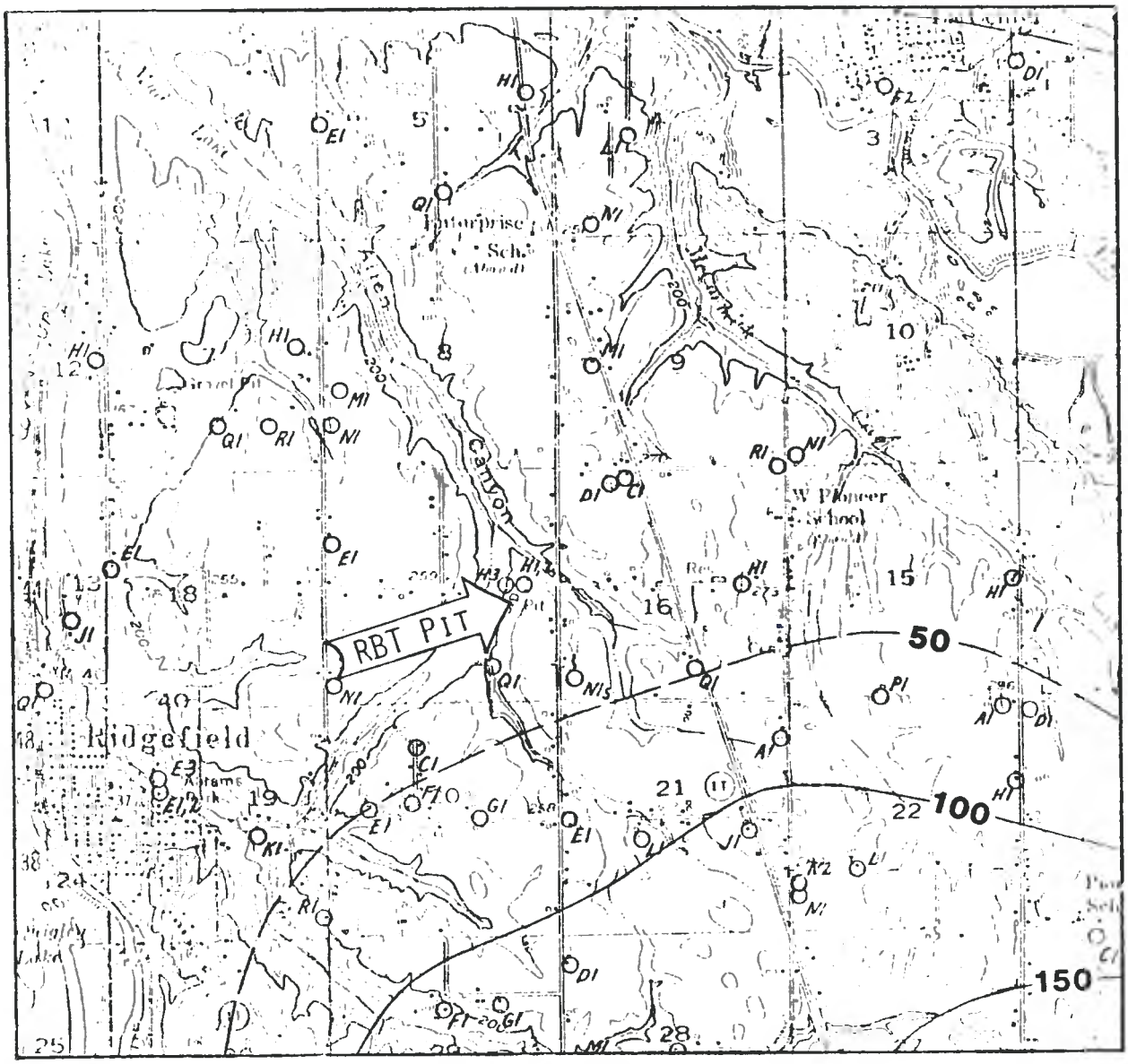

Base: USGS W.S.P. 1600, Plate 3

Scale: 1"=4000'

N

EXPLANATION

O_{El} REPRESENTATIVE WELL

100 PRINCIPAL GROUND WATER CONTOUR

50 INTERMEDIATE GROUND WATER CONTOUR

RBT PIT

Ground Water Contour and Well Location Map

FIGURE 5

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Water Supply Paper 1600 has shown the general direction of ground water flow in the Troutdale aquifer to be from the southeast toward the northwest, see Figure 5. The aquifer has relatively high transmissive capabilities ranging from estimates of 800 to 6,000 gal/day/ft in the vicinity of the site. Assuming an effective thickness of 24 to 42 feet and a specific yield of 20 percent, the local pore or seepage velocity of underflow is calculated to range from about 0.2 to 1.6 ft/day from the southeast toward the northwest.

The local beneficial use of the aquifer is limited to domestic and agricultural supplies to wells. Wells located immediately downgradient are shown on Figure 3.

From Figure 4, it is obvious that the aquifer does not provide base flow to the intermittent perched stream which is located west of the RBT pit. However, it should be noted that some runoff and/or overflow drainage from the RBT site and pond periodically discharge to the 289th Street ditch and subsequently the intermittent drainage during the wetter, winter, months.

WATER QUALITY

Ambient quality in the Troutdale aquifer is generally good with regard to the Primary Drinking Water Standards (U.S.E.P.A., 1976) and as summarized by Mundorff (1964). Some Secondary constituents, most notably iron, locally approach or exceed recommended levels

for drinking water. For example, the owner of well No. 6 complained of iron in the well water and well No. 7 had noticable iron precipitation around the casing and plumbing fixtures.

As previously noted, the waste constituent of major concern in this evaluation is the ash from the PWT power boiler. Sludges containing copper, chrome and arsenic (CCA) residuals from the inorganic treating process wastewaters are admixed with hog fuel and incinerated in the boiler.

Department of Ecology (DOE) sampling and laboratory testing of the ash sources was carried out in 1982 and fully reported to PWT in September, 1982, see appended data. That test showed the presence of all of the heavy metals tested, except silver, beryllium and mercury. They were reportedly present in the various ash fractions in minor amounts. EP toxicity tests, i.e. eluting metals from the ash with a pH 5 solution, resulted in many of the remaining metals exceeding Primary Drinking Water Standards, see appended data. However, only arsenic exceeded EP toxicity limits in any ash fraction, see appended data.

Field sampling of the ponded water adjacent to the materials deposited at RBT as well as 5 nearby wells was carried out May 31, 1983. The pond water sample was taken at the face of the fill. It is noteworthy that fish, tadpoles and frogs were observed in the pond during that sampling. Well samples were collected at spigots closest to the well head but in most cases, i.e. all except well No. 6, sample residence time in water lines and/or pressure tanks could not be avoided. The sampling is not in strict compliance with Sweet-Edwards QA/QC procedures but does provide an indicator of

potential health hazards to the water users. Results of the tests run by PWT at their Ridgefield laboratory are included in Table 1.

Note that arsenic, chromium and copper levels are well below the DOE ash testing results at all sites. The pond would be most likely to exhibit some metals due to the reducing environment resulting from the generation of weak organic acids as the wood waste in the deck cleanup decomposes. The pond did have the only arsenic and pentachlorophenol (PCP) concentrations above the detection limit. However, the arsenic level is well below the Primary Drinking Water Standard of 50 μg/l. The pond water sample exceeded PCP reported acute toxicity (i.e. freshwater aquatic) limits of 55 μg/l but is well below the reported human health water consumption limit of 1010 μg/l (U.S.E.P.A., 1981). Well No. 2 also exceeded the detection limit, but was well below the human health water consumption limit. Multiple samples would be necessary to check these concentrations for significance.

Two well samples, Nos. 4 and background, exceed the Primary Drinking Water Standard of 50 μg/l for chromium. Given the location of the wells and the lack of other "high" levels of waste material constituents, these are considered to be artifacts of the plumbing system or lab variance. Similarly, the copper concentration noted for well No. 7 was above the testing detection limit, but below the Secondary Drinking Water Standard of 100 μg/l. This well is some distance from the spigot sampled at the house and copper plumbing in this newer home may be the source of the contamination.

TABLE 1

RBT SITE WATER TESTING DATA (5/31/83)

Bottle No.	Well or Site	Temp. °F(2)	pH	Cu mg/l	Cr mg/l	As mg/l	Fe mg/l	Total Phenol. mg/l	PCP mg/l	SO_4 mg/l	TDS mg/l	E.C. µ mho/cm
		Constituent										
(4)	No. 2	54	7.51	< .03	<.06	< .01	.17	< 0.1	0.100	< 80	[illegible]	210
(5)	No. 4	56	7.04	< .03	0.08	< .01	.17	< 0.1	<0.1	< 80	[illegible]	240
(2)	No. 5	52	7.20	< .03	<.06	< .01	.30	< 0.1	<0.1	< 80	[illegible]	260
(1)	No. 6	50	7.05	< .03	<.06	< .01	.14	< 0.1	<0.1	< 80	[illegible]	270
(6)	No. 7	56	7.20	0.08	<.06	< .01	.17	< 0.1	<0.1	< 80	[illegible]	190
(3)	Pond	58	7.24	< .03	<.06	WQS = .05 0.017	.24	< 0.1	0.134	< 80	[illegible]	300
(7) .30	Backgrd. (Ryf)		7.04	< .03	0.10	< .01	.16	< 0.1	<0.1	< 80	[illegible]	200

NOTES: 1) Grab samples collected by Sweet-Edwards 5/31/83 and tested by PWT.

2) Temperatures at all sites except No. 2 and pond may be biased by pressure tank and/or pipe line residence time.

Note the pH level in the pond may be buffered or raised by the ash and it does not approach the level used for the EP toxicity testing. Other factors may retard the mobility of metals from the deposited materials. Silts, clays, gravel, etc., materials commonly make up 50 to 60 percent of the materials in log deck cleanup. These have some capacity to adsorb metals. Some carbon is included with the ash, and although not activated, it too has some sorptive capacity and may reduce mobility.

Finally, lateral migration from the site will be significantly retarded by the low hydraulic conductivity or permeability as well as the cation exchange capacity of the native clays surrounding the site. Similarly fine materials, silt and clay, in the unsaturated portion of the Troutdale formation provide for adsorption of vertically percolating liquids. This in combination with dispersion, dilution, etc., apparently provides protection to the aquifer.

REFERENCES

MUNDORFF, M. J. 1964, Geology and Ground Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River, U.S. Geological Survey Water Supply Paper 1600, 268 p. plus 3 plates.

U.S. ENVIRONMENTAL PROTECTION AGENCY, 1976, National Interim Primary Drinking Water Regulations, Federal Register, Vol. 41, No. 133.

U.S. ENVIRONMENTAL PROTECTION AGENCY, 1981, Out:l Chemical Criteria Summary Listing, Surveillance and Analysis Division, Region X, Seattle, Washington.