STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

CERTIFIED MAIL
7007 2560 0000 6214 0495

October 30, 2008

Mr. Ralph G. Rush
5003 Flagler Road
Nordland, WA 98358

Re: No Further Action at the following Site:

- **Site Name:** Ralph Rush Property Well
- **Site Address:** 5003 Flagler Road, Nordland
- **Facility/Site No.:** 8707950
- **VCP Project No.:** SW0961

Dear Mr. Rush:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Rush Property Well facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issue Presented and Opinion

Is further remedial action necessary to clean up contamination at the Site?

> **NO. Ecology has determined that no further remedial action is necessary to clean up contamination at the Site.**

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

Description of the Site

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following release:

- Petroleum hydrocarbons into the Ground Water.

Enclosure A includes a detailed description and diagram of the Site, as currently known to Ecology.

Please note that a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel(s) associated with this Site are affected by other sites.

Basis for the Opinion

This opinion is based on the information contained in the following document:

1. Pacific Groundwater Group, **Summary Report, Cleanup of Rush Residential Well, VCP #SW0961,** October 14, 2008.

This document is kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6267.

This opinion is void if any of the information contained in this document is materially false or misleading.

Analysis of the Cleanup

Ecology has concluded that **no further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

1. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards and select a cleanup action. The Site is described above and in **Enclosure A.**

2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA.

a. Cleanup levels.

The cleanup levels are based on MTCA Method A ground-water cleanup levels for petroleum hydrocarbons.

b. Points of compliance.

The point of compliance is the standard point of compliance for ground water throughout the site. The site is limited to the area within the cased well.

Please note that other requirements apply to the cleanup based on the type of the action and location of the Site. Those requirements are specified in the reports referenced above.

3. Selection of cleanup action.

Ecology has determined the cleanup action you selected for the Site meets the substantive requirements of MTCA.

The well was initially bailed to remove oil using a 3-inch diameter polyvinyl chloride (PVC) bailer with a ball-type check valve. Approximately 8 gallons of water and one to two cups of oil were removed. Based on the liquid volume, it is estimated that there was 1 inch of oil sitting on the top of the water column. During the well bailing, a sample of the oil was collected and delivered to the Friedman Bruja Inc. laboratory in Seattle. The drawdown during the bailing process was approximately 5 feet. The construction of the well was not known at that time and oil-absorptive socks were installed to continue initial cleaning. Gear oil removal continued in this way for approximately one month.

On May 15, 2008, Pacific Groundwater Group (PGG) and Gresham Well Drilling video photographed the well to complete initial well evaluation. The static water level was at 36 feet below the top of the casing (ft btoc). No floating oil was observed while photographing the well. A bed of soft sediment was observed at 118.7 ft btoc.

Although the initial well cleaning appeared to accomplish the removal of free product floating on the water column, small quantities of oil could not be removed from the well casing using hand operations. On August 14, 2008, Gresham Well Drilling mobilized a pump rig to Well 131 to complete the cleanup. The well casing (from the ground surface to approximately 90 ft below ground surface (bgs) was cleaned using a citrus-based solvent and brushes suspended from a sand line on the rig. The cleaning removed oil-impregnated scale from the inside of the casing. This scale was allowed to settle to the bottom of the well. A sand-pump bailer was used to

remove sediment from the bottom of the well. Approximately 10 ft of material was removed and the well total depth was tagged at 131.5 ft bgs. The sediment bailed from the bottom was stored in six 5-gallon buckets. A three-stage, DC purge pump was lowered to a depth of approximately 85 ft bgs to purge the well. The pumping rate was estimated to be ¾ gallon per minute (gpm). Purging continued until a sample was collected on August 22, 2008. The pump had been in continuous operation for until this date. Figure 7 shows the resulting chromatograph from this sample.

Analytical laboratory results from the last water sample collected indicate a "type of natural citrus-based cleaner". Based on this finding, it would appear that the well has been successfully cleaned.

4. Cleanup.

Ecology has determined the cleanup you performed meets the cleanup standards established for the Site.

Listing of the Site

Based on this opinion, Ecology will remove the Site from our Confirmed and Suspected Contaminated Sites List.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

Termination of Agreement

Thank you for cleaning up the Site under the Voluntary Cleanup Program (VCP). This opinion terminates the VCP Agreement governing this project (#SW0961).

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion or the termination of the Agreement, please contact me at (360) 407-6267.

Sincerely,

Charles S. Cline
SWRO Toxics Cleanup Program

CSC/ksc:Rush Property Well Site NFA 102008

Enclosures (#1): A – Description and Diagram of the Site

cc: Mr. Russell F. Prior, Pacific Groundwater Group
Mr. Scott Rose, Ecology
Ms. Dolores Mitchell, Ecology (w/o enclosures)

Enclosure A

Description and Diagram of the Site

Well-131 is located on property owned by Mr. Ralph Rush located on Scow Bay, a local name for this portion of Kilisut Harbor between Marrowstone and Indian Islands (Figure 1). The well is located about 5 feet (ft) south of the north property line of the Rush property. Figure 2 shows the relative location of the Rush Well. The Rush property is listed as 5003 Flagler Road, Nordland, Jefferson County, Washington State.

The geology of the southern portion of Marrowstone Island comprises glacial deposits of Vashon age that occur over bedrock. Based on information reported in Sinclair, K.A., & Garrigues, R.S., Geology, Washington State Department of Ecology, **Water Resources, and Seawater Intrusion Assessment of Marrowstone Island, Jefferson County, Washington, Water Supply Bulletin No. 59,** 1994, Vashon deposits consist of Vashon Till and Vashon Advance Outwash. The till is generally 50 to 100 ft thick, but pinches out and is gone near the upland edges. At the Rush property, the Vashon Till appears to be around 25 ft thick near Flagler Road and pinches out near the shoreline bluff. The Vashon Advance Outwash appears to be generally around 75 ft thick in the vicinity of the Rush property. Bedrock of the Scow Bay Formation occurs beneath the southern half of Marrowstone Island. A buried east-west trending valley exists on the bedrock surface. The buried valley extends from beneath the southern highpoint of the island downward in a westerly direction toward the Rush property. The log for Well-165, owned by Mr. Rush, indicates the well did not encounter bedrock to an elevation of -99 ft. Likewise, Well-131 probably did not encounter bedrock since it was cased to approximately -89 ft elevation. Well-131 probably taps glacially-deposited sediments that are constrained within a buried east-west bedrock valley. According to Kirk Sinclair, the Scow Bay Formation bedrock is composed of hard rock, and wells that penetrate into this formation are rarely cased.

Based on the three wells located on the Rush property, two aquifers may be present within the Vashon deposits lying beneath the Rush property. Well-37 was drilled in October 1995 and taps a 2-ft thick layer of sand (29 to 31 ft below ground surface [bgs]). Well-165 was drilled in 1976 and taps a 3-ft thick layer of fine to coarse sand with a 5-ft screen set from 160 to 165 ft bgs. Well-165 and Well-131 would appear to tap similar zones. The water levels in these two wells would also indicate that they tap the same aquifer.

Gear oil contamination was first discovered on July 1, 2005 when Gresham Well Drilling was hired to decommission the well. Decommissioning was required by Jefferson County Public Health (JCPH) as part of a project to construct a new on-site sewage system by Mr. Rush's neighbor to the north. In the process of removing the pump, contamination was observed on the outside of the pump and inside the well. However, no contamination was observed inside the pump.

After the contamination was discovered, the Washington State Department of Ecology (Ecology) was notified. JCPH staff collected a sample from the well and sent this sample to Columbia Analytical Systems for analysis within a few days of the initial discovery.

On July 12, 2005, Ecology and JCPH staff met at the well and collected additional samples. One sample of oil from the well was collected along with a sample collected from the potable water of the residence. Both samples were sent to joint Ecology/Environmental Protection Agency (EPA) Manchester Laboratory. This suite of samples indicated the potable water sample contained no detectable petroleum hydrocarbons, but the oil sample indicated the oil was "some type of lube oil".

Well-131 has been identified as a 6-inch diameter well that was reportedly drilled in the 1930s. There is no available well log. The depth to water was measured in 2008 as 36 ft below the top of casing (btoc). It appears that the water level is tidally influenced based on water-level measurements conducted during the course of the project. The total depth of the well is approximately 131 ft bgs as determined following the bailing of accumulated sediment at the bottom of the well. A sketch of the well is presented in Figure 3.

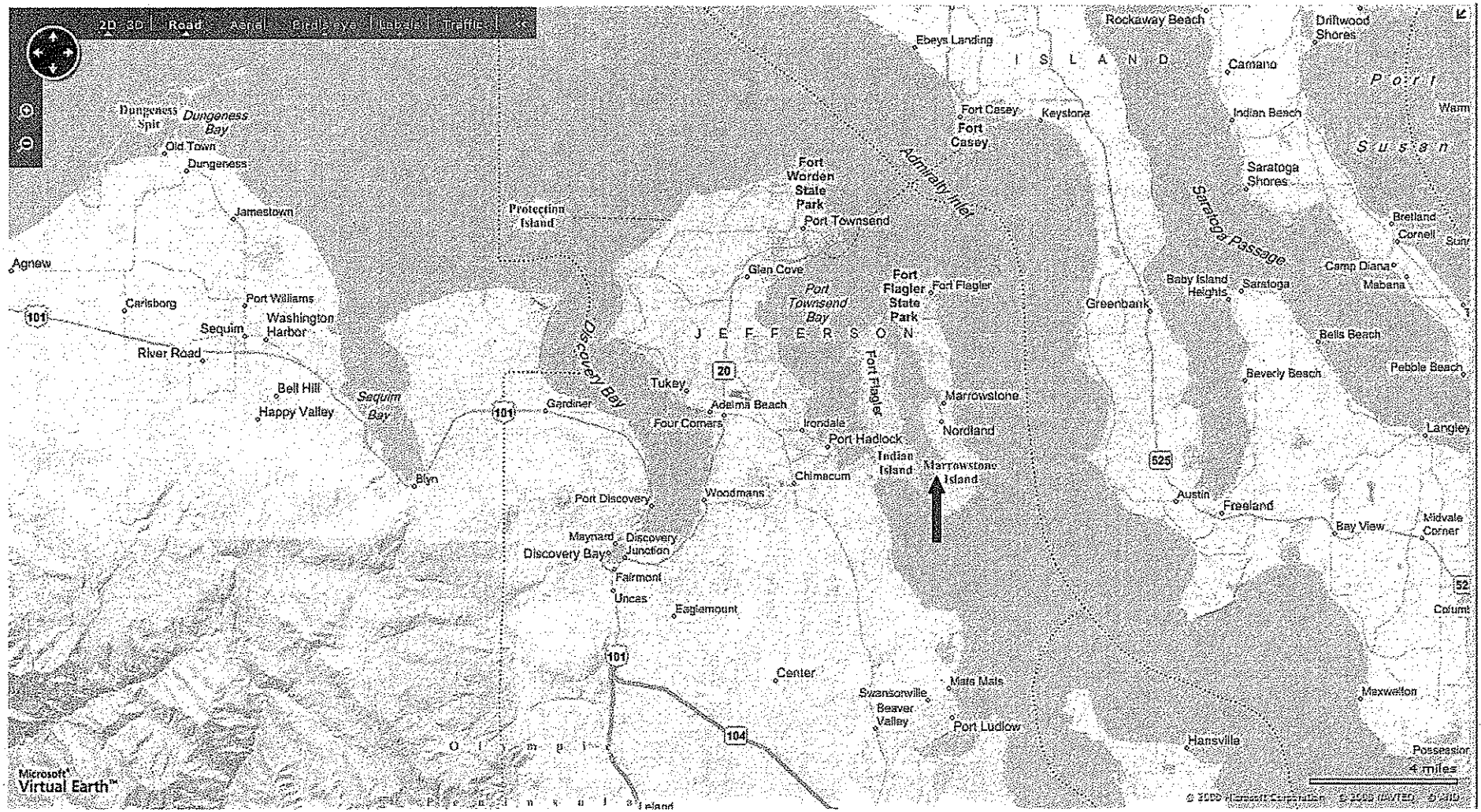
The well has an open-bottom completion with no visible perforations and no well screen. Three separate video logs were conducted during this project and casing welds were visible, which indicates that perforations should have been visible as well, if present.

The well pump is a 1½-inch diameter piston pump. The pump cylinder and 15 ft of pump intake combination extended to 97 ft btoc. The piston pump works by actuation of a central rod in a reciprocating motion. This motion is developed by a gearbox located at the top of the casing. The gearbox contains approximately one quart of oil for lubrication. For Well-131, the pump was powered by an electric motor that operated a pump jack through the gearbox. The understanding is that the motor and gearbox formed an integral unit bolted to a mounting plate shown in Figure 4. The mounting plate was bolted to a 4-inch thick concrete slab. The slab was 12 ft by 18 ft with 4- to 6-inch thick foundation walls that supported a well house. A 100-gallon pressure tank was located inside the well house. The concrete floor and foundation walls would have precluded leakage of oil outside of the well casing.

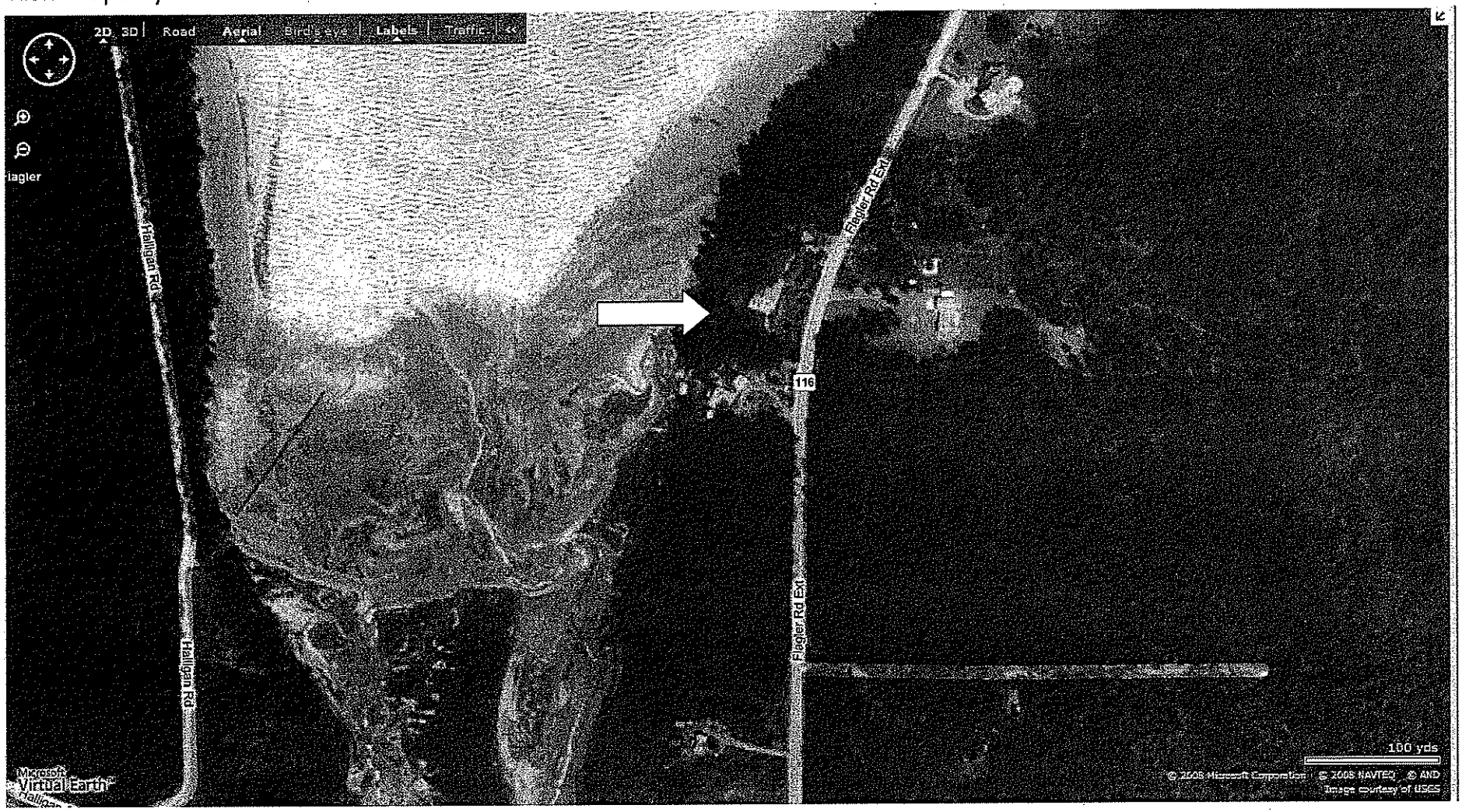
Figure 5 is a photograph of the uppermost portion of the pump assembly that is attached to the mounting plate. The photograph shows the location of an opening and a drip pattern that appears to be traces of an oil drip mark. It is apparent that leakage occurred on the outside of the pump discharge pipe, which contaminated the water in the well. The well was contaminated with the gear oil at some unknown time because of the apparent failure of packing at the top of the discharge pipe. Because the discharge pipe is located within the well, leaking oil flowed down the discharge pipe onto the water within the well. No pathway is present to allow a release outside the well casing.

The gear oil is sticky and viscous. A sample of the oil was collected on April 28, 2008 and was submitted to Friedman Bruja, Inc. of Seattle, Washington. The laboratory describes the oil as "…. medium to high boiling compounds." The material present "… is consistent with high boiling product such as lube oil…". The laboratory included a gas chromatograph that is shown as Figure 6.

Figure 1 – Rush Property Residential Well



Rush Property Well Location



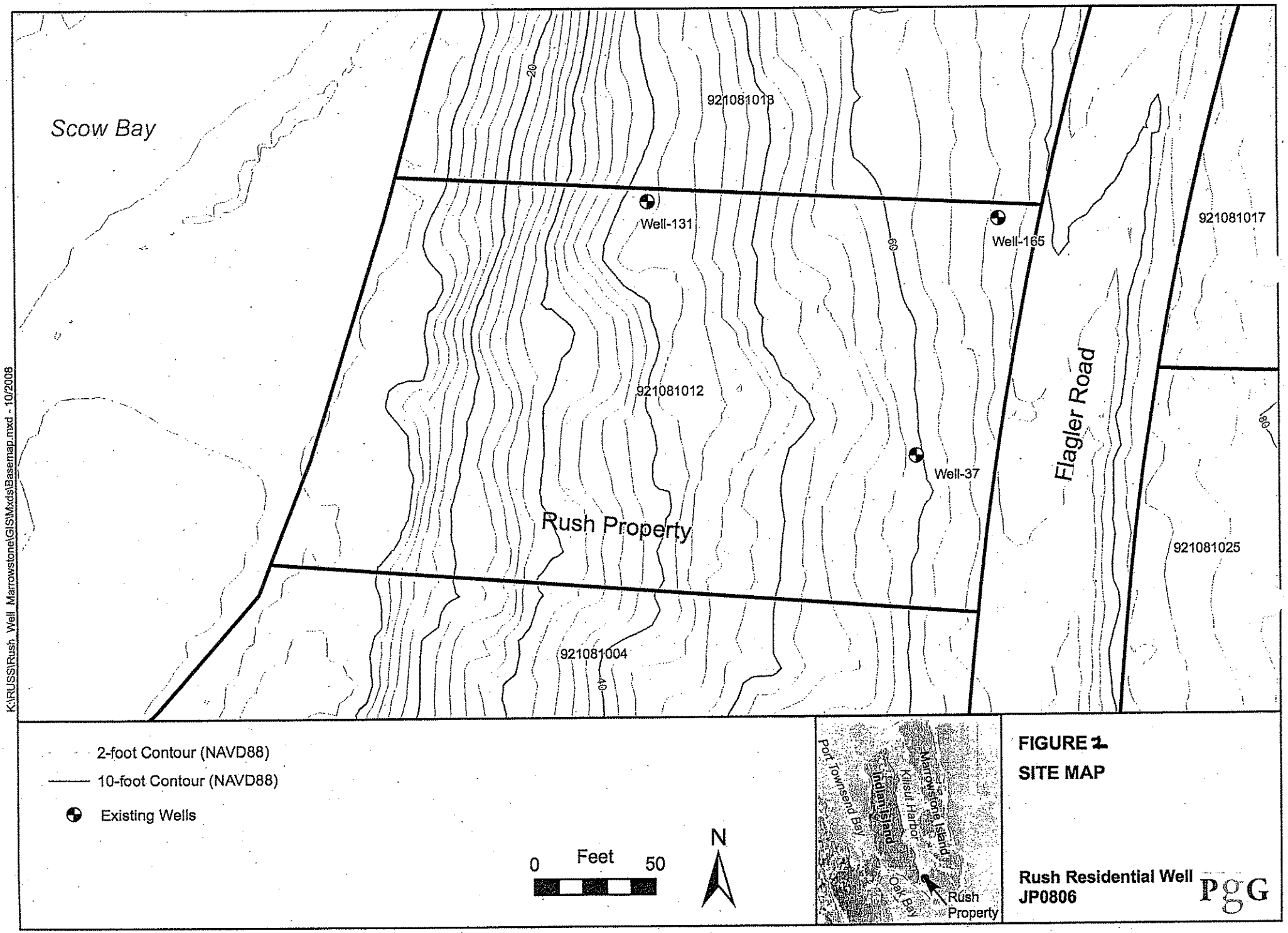


FIGURE 2.
SITE MAP

Rush Residential Well
JP0806

PgG

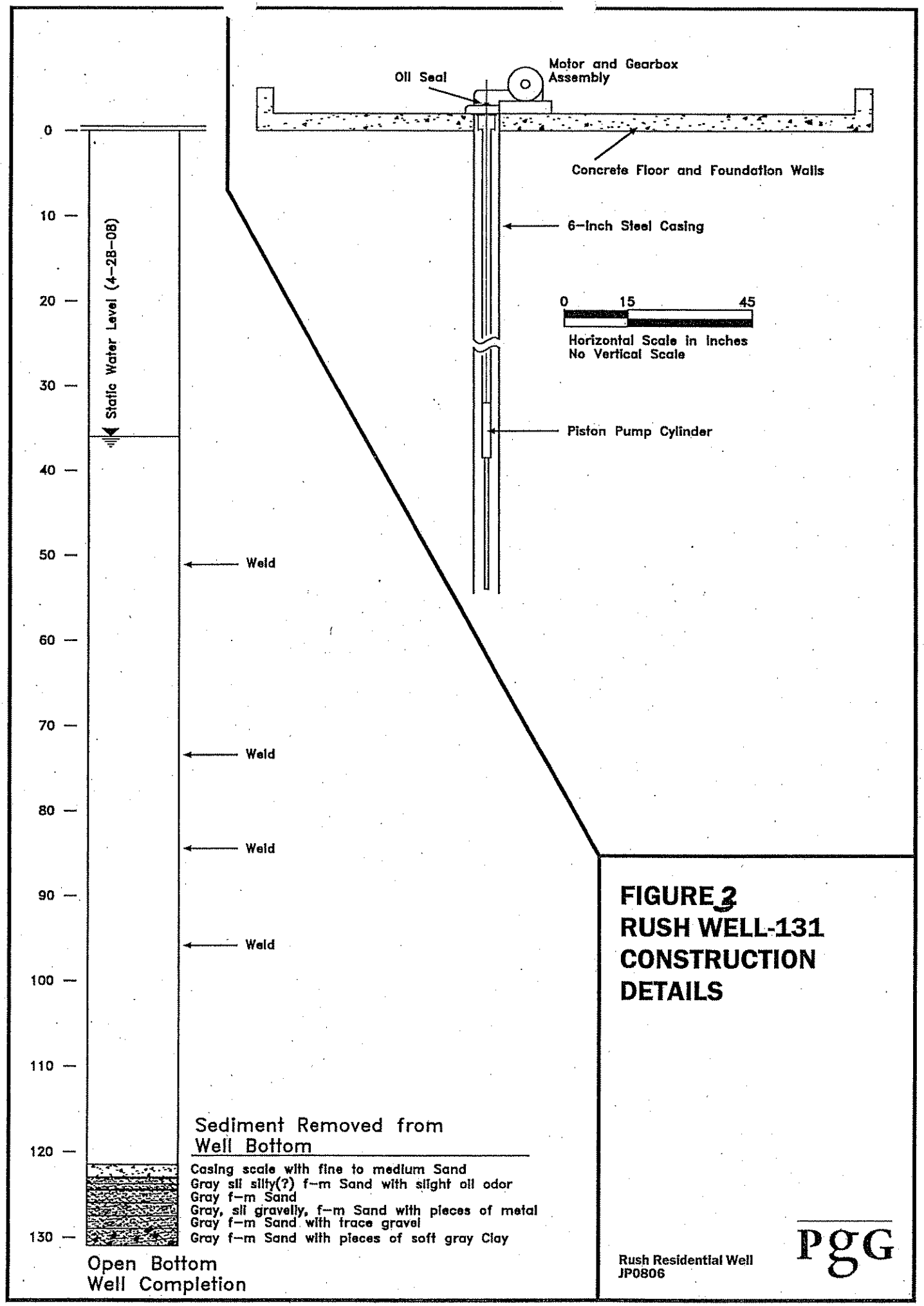


FIGURE 2
RUSH WELL-131 CONSTRUCTION DETAILS

Rush Residential Well
JP0806

PgG

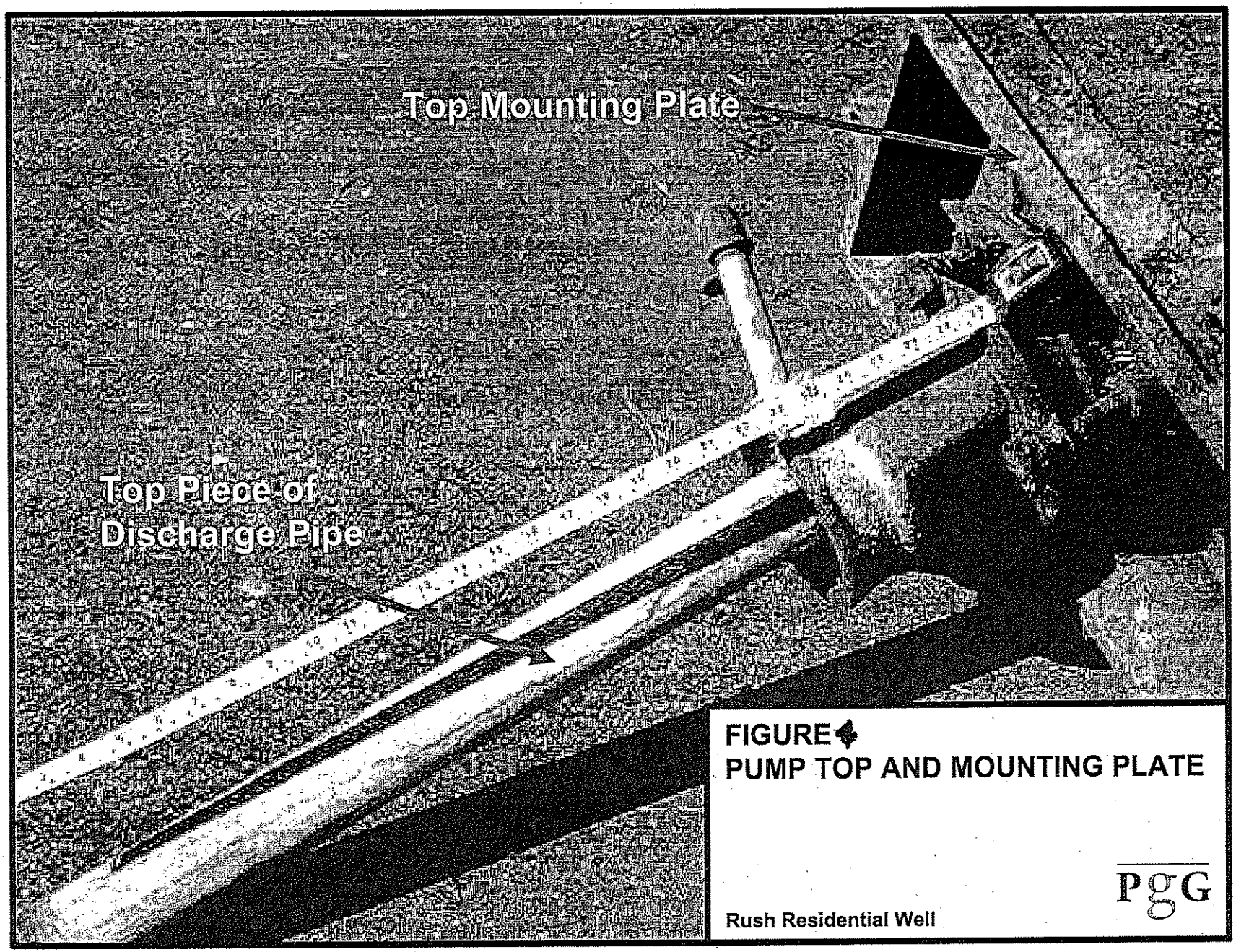


FIGURE 4
PUMP TOP AND MOUNTING PLATE

PgG

Rush Residential Well

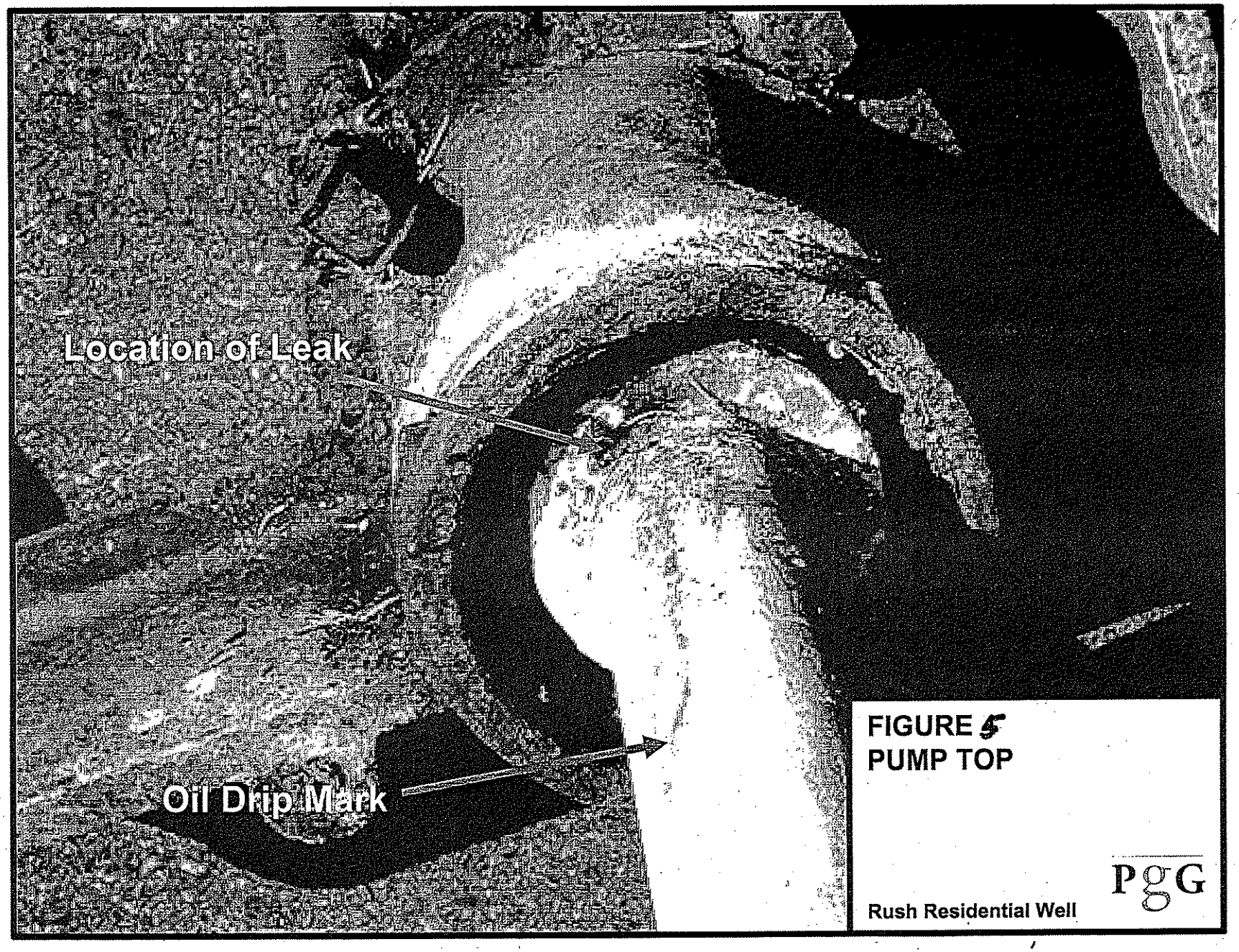


FIGURE 5
PUMP TOP

PgG

Rush Residential Well

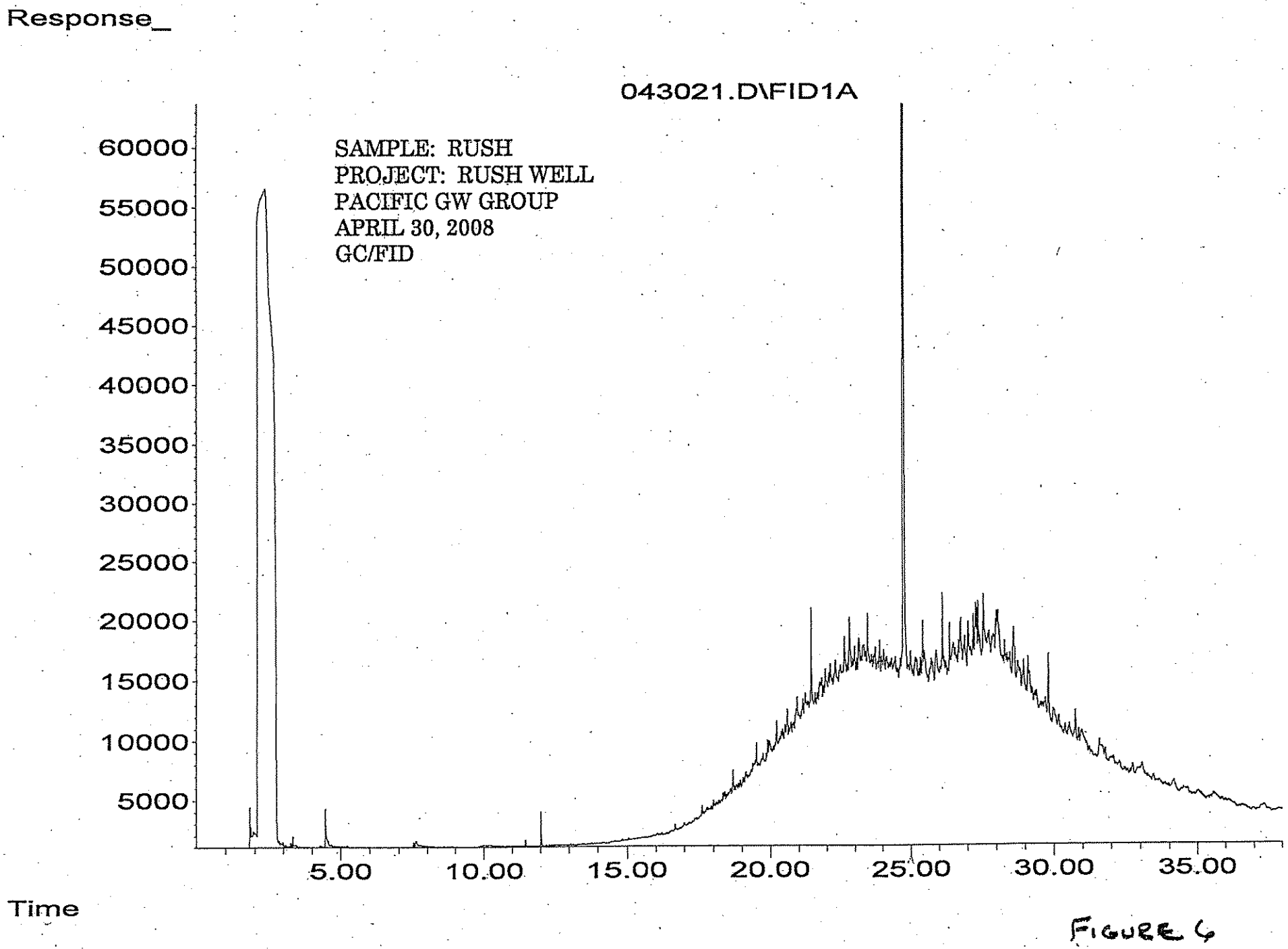

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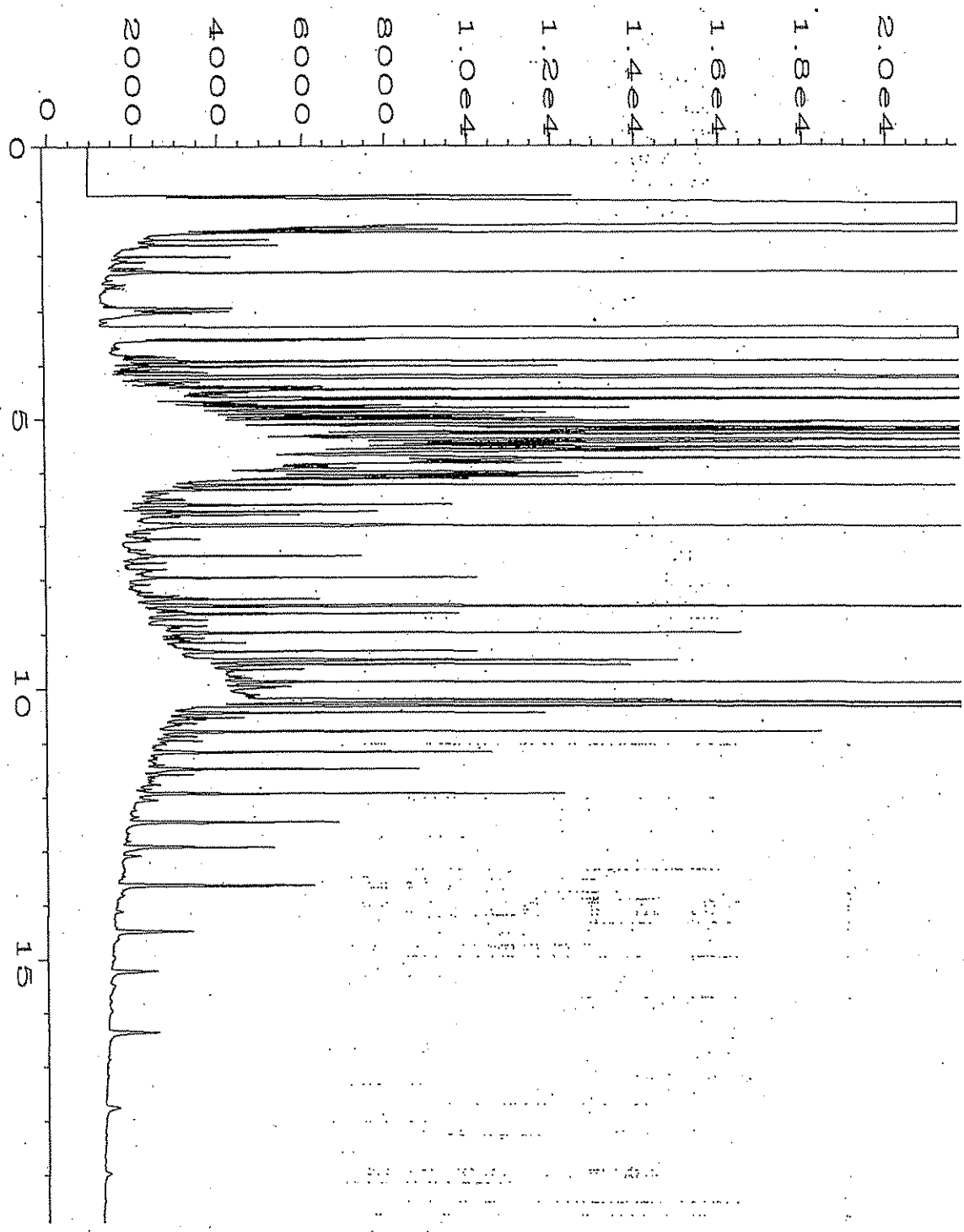
FIGURE 6



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Analysis Method : TPHD.MTH

FIGURE 7