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February 4, 2004

Michael W. Thomas
Attorney
Trainer Robertson
701 University Avenue
Sacramento, CA 95825-6700

Ref: Hidden Lakes Estates Homeowners - Tony Wood / Ted Allegra Properties

Dear Mr. Thomas

The above noted property owners have described a situation of excessive water flowing through their properties and across Jon Way causing them concern for the health of their families and quality of their properties. This is in response to your interest in obtaining data that would allow the quality of the impounded water in the upper Hidden Lakes Estates pond to be determined as well as the quality of the water running through the properties or flowing from a "sump" located between the properties. It is assumed that others have addressed satisfactorily the hydraulic questions and corrective actions required.

0. Summary

The upper pond of Hidden Lakes Estate was sampled below the surface and near the shore adjacent to the two properties. The water quality was shown to be of little concern. The bottom layers of the pond were not sampled. Two sample points were located in the backyards of both properties at just over 3 feet deep. These points produced large volumes of collected water quickly indicating permeable soils and high water pressure in the soils. While the water quality in the sample points demonstrated additional chemicals to the pond water quality samples, the materials found and the concentrations did not suggest significant concern. The down gradient surface water collected between the two properties coming from the "sump" associated with the emergency overflow of the pond did not contain significant levels of chemicals of concern. The specific identity of the sheen floating on the accumulated drainage water was not confirmed, but appears to not be fuel related and may be a wax or toluene related material. The biological floc was shown to be primarily a filamentous bacterial growth often found in stagnant waste waters that can be addressed by cleaning and flushing the cobble lined drain.

1. Background

Under separate study by others¹, the soil levee impounding the water was determined to be allowing seepage to the extent this flow has affected the two properties. An emergency overflow outlet pipe was described as consisting of a 15 inch CMP that discharges on the joint property line up gradient from the Jon Way and Hidden Lakes Drive intersection. The surface elevation of the pond appears to be about nine feet above the ground surface of portions of the two properties.

If the continuous flow of water across Jon Way is coming from the emergency overflow pipe ("sump") and this flow is year round, it may be a reasonable assumption to consider this system leaking either around the pipe or through the pipe.

Youngdahl 8/18/03

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2. Site observations and preparations

The surface of the pond is well above the yards and the homes of the subject properties. [There is a several foot hydraulic head difference.] The pond is retained by a dirt berm (dam or levee) then ends of which connect into higher ground on each side of the subject properties. [How the levee is keyed into the higher ground or the bottom is not known] The pond bank adjacent the properties demonstrated little or no grass growth compared to other bank portions of the pond. [Herbicides may be routinely being used.] The top of the pond bank was not muddy or unstable. [The visible soil appeared to contain a lot of decomposed granite.] There are some yards that slope toward the pond. [Drainage of fertilizers and pesticides is possible.] The pond water was very clear. [The water appears to have been maintained.] There were no weeds or littoral growths in the shallow water or along the wetted perimeter of the pond, especially on the side toward the subject properties. [Weed killer or herbicides appear to be routinely used to keep the water clean and the shores clear.] There were fallen leaves on the bottom of the pond in the shallow water. [Decay of leaves can produce tanning and lignins.] There was no sheen on the surface of the water other than some floating dust or pollen accumulations. There was no sheen on the water surface near the pond edge or the dock. The cobble based inlet stream was not flowing and there was no obvious discoloration to the stones or puddles. [Potential releases into the pond would like flow through this inlet.] A picnic area with sports and parking areas is located up gradient of the pond. There are homes with steep paved driveways and raised garages across Hidden Lakes Drive from the pond. [Even just washing a car, rinsing off and engine, rain washing off oil dripping from a driveway would contribute to a sheen on the pond.]

The soil in both yards was very soggy² such that walking caused mud and water splashes with each step. [The soggy areas were of limited size.] The newly dug hole for the sample points filled quickly with clouded water from the shallow soil. [There was a lot of saturated soil in the backyards.] As it was the winter season, it was difficult to tell if there was any plant stress in this area. [There may have been stunted tree growth due to too much standing water, but that was not obvious.]

The area described as the "sump" is a cobble based drainage swale between the two properties. Large plants have grown and screen between the properties. Sampling was performed on the flowing water moving around the cobbles. It was suggested by the homeowners that there was some sort of a drain "sump" located in these plants. It was suggested that this drain was part of the impoundment, but surface water draining from the two yard could also be collected. There was clearly a small but continuous flow from this "sump" that had been a sustained flow for many months (due to biological slime build up). The weather A thick orange - tan biological floc had formed below the water surface between the cobbles. The color, apparent density, volume, texture, and tensile strength of the floc was reminiscent of filamentous bacteria that may be found in extended aeration activated sludge treatment systems. Other blue-green algae were also present to a limited extent. An iridescent film similar to an oil film was observed to cover a considerable portion of the quiescent water around the cobbles. This film demonstrated wax - like properties as it would break into small flakes (1/4") when the water surface was disturbed. The film remained in quiescent portions of the cobble drainage way, but there was a large enough quantity that it has also spread down stream to the storm drain drop inlet and could be observed on the water in the drop inlet. The film was not obvious on rocks or other materials above the water-line. [Streams, bogs and other wet areas do have the propensity of developing plant generated sheens.]

A shallow sampling point was constructed on each property in the backyard at about the same distance (~35') from the top shoulder of the levee. This sample point consisted of a capped 4" diameter PVC pipe covered with geotextile fabric being placed into a hand dug hole approximately 3 to 3 1/2 feet deep. The annular space around the pipe was filled with clean pea gravel. The top 3 to 6 inches of the annular space was filled with dry chips of bentonite clay and allowed to hydrate, swell, and therefore seal the top of this space to surface sheet flow. The sample points were test pumped to verify that they would make sufficient water to produce the sample volumes required.

² HTA sites visits in December 03 and January 04

3. Sampling techniques

The sample points were purged of accumulated water prior to sampling (3 well volumes). The sampling was performed using a peristaltic pump and dedicated tubing for each sample location. Standard clean laboratory containers were supplied by CLS Laboratories that included various amber and clear glass closed bottles. Sample containers were marked in the field, the chain of custody was completed, and the samples were transported to the laboratory on ice in sealed coolers. The introduction of the water sample into the bottles was by the submerged tube technique and filled to a meniscus at the top before capping, and inverting to check for absence of air bubbles.

Samples of the impoundment pond water were obtained from 6 to 8 inches below the surface and about 3 feet from shore of the pond at a wooden platform close to the properties. The peristaltic pump was used following the same procedure as the well sample points. Sampling the full depth of the pond and/or the sediment was deferred as was sampling below any thermocline.

Samples were obtained from the water flowing from the "sump" at a point about 15 feet upstream from where the water was flowing across Jon Way. The peristaltic pump was used to sample water from a small pool in the cobbles about 3 inches below the surface and 4 or 5 feet down stream from the large vegetation.

Samples of the iridescent surface film were obtained using a charged surface plastic sheet (Saran Wrap) about 1 square foot in area. The plastic sheet was gently placed on the surface of the water in the area where the film was visible. Once the plastic sheet was in contact with the film, it was removed and folded upon itself, then rolled and placed into a VOA bottle and capped. A control was handled in the same manner without contacting it to the water/film surface. The laboratory was requested³ to rinse the surface of the plastic sheet with hexane into an analytical container, measure the surface area of the plastic sheet rinsed and to analyze for petroleum hydrocarbons. The results were to be reported in mg of oil per area.

4. Analytical testing rationale

There was available little to no historical water quality information pertaining to former land uses, current chemical or fuel uses, spill histories, or use of pond maintenance chemicals. Seeking information from others was not desirable, at this point of time. Therefore, a broad spectrum water quality screening assessment was selected to be implemented.

This assessment was designed to examine several groups of elements and compounds. Metals or other products in the water associated with historical mining operations in the area suggested the method CAM 17 metals and the TTLC metals digestion analysis. Anions were examined by APHA and EPA methods to look for elevated levels of health affective nitrates and nitrites as well as chlorides and sulfates, etc. The potential uses of herbicides and other pesticides in and around the pond established the need to look for these chlorinated hydrocarbon compounds by EPA method 8081A. In addition, we examined the water by EPA method 8141A to see if organo-phosphorus pesticides were being used and left a residue. The Conventional chemistry parameters APHA/EPA methods provided information on anions as well as other materials. Extractable petroleum hydrocarbons were analyzed by EPA method 8015M to learn if various oils and fuels were getting into the water. We also looked specifically for total petroleum hydrocarbons - gasoline by method using gas chromatograph with a flame ionization detector. A broad spectrum of volatile organic compounds were carefully sampled from below the water surface and tested by EPA method 8260B.

The plastic sheet sample was not analyzed as requested. The plastic sheet was wiped with methylene chloride, rather than rinsed with hexane. The area was not recorded. It was analyzed as if it were motor oil using method EPA 8015M.

³ HTA Chain of Custody: pg 3, special instructions 1/13/04

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The biological growth found in the "sump" cobbled drain area between the two properties was sampled and taken to a microbiology laboratory. The floc was examined by direct microscopic examination and subsequently cultured.

5. Results of sampling

The following report summarizes the findings we have made pertaining to an initial assessment of water quality of the upper pond at Hidden Lakes Estates. Samples were obtained from: the pond (3 feet out), 2 shallow ground water sampling points (3' deep), and water flowing from a "sump" (6" to 12" deep) located between the Wood's and Allegra's properties upstream of the Jon Way and Hidden Lakes Drive. All samples were stored on ice and transported that afternoon under chain of custody to a California Certified Laboratory - CLS Laboratories in Rancho Cordova. The Laboratory Data Sheets and comments are attached to this report. A control test for volatile organics was run on a distilled water blank that was obtained through a new dedicated tubing that demonstrated 1.4 µg/l of Toluene in this sample, but no other volatile organics. The source of the Toluene could be: a) the distilled water, b) the glassware, or c) the tubing. However, since the lake sample and the Allegra sample demonstrated non-detectable toluene using new dedicated pieces of tubing from the same role and new glassware from the same lot as was used on the blank, the suggestion is the Toluene may be in the distilled water.

5.1 Water Sample from the pond closest to the properties

The water was reasonably clear, little odor, 55 °F, and a neutral pH of 7.07 and was shown to contain:

Chemical	conc.	MCL, Secondary or equal standards
CAM 17 Metals		
Barium	34 µg/l	22CCR64431 level 1000 µg/l
Conventional Chemistry Parameters APHA/EPA		
Fluoride	110 µg/l	" " 2000 µg/l
Chloride	11000 µg/l	40CFR143.3 level 250,000 µg/l
Bromide	190 µg/l	SNARL (NAS) 2,300 µg/l
Nitrate	830 µg/l	40CFR141.11 level µg/l 45,000 (20,000)
Sulfate	6600 µg/l	40CFR143.3 level 250,000 µg/l
Extractable Petroleum Hydrocarbons	ND	
Organochlorine Pesticides	ND	

* MicroTest Laboratory, Fair Oaks, CA accession # 401304

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Organophosphorus Pesticides	ND
TPH - gasoline	ND
Volatile Organic Compounds	ND

5.2 Water Sample from the Wood's shallow well point

The water was reasonably slightly cloudy, little odor, 62 °F, and a neutral pH of 6.65 and was shown to contain:

Chemical	conc.	MCL, Secondary or equal standards	
CAM 17 Metals			
Barium	100 µg/l	22CCR64431 level	1000 µg/l
Conventional Chemistry Parameters APHA/EPA			
Fluoride	180 µg/l	" "	2000 µg/l
Chloride	16,000 µg/l	40CFR143.3 level	250,000 µg/l
Bromide	310 µg/l		
Nitrate	1,300 µg/l	40CFR141.11 level µg/l	45,000 (20,000)
Sulfate	6800 µg/l	40CFR143.3 level	250,000 µg/l
Orthophosphate	150 µg/l		
Extractable Petroleum Hydrocarbons	ND		
Organochlorine Pesticides	ND		
Organophosphorus Pesticides	ND		
TPH - gasoline	ND		
Volatile Organic Compounds	ND (except)		
Toluene	.71 µg/l	22 CCR Table 64444-A	150 µg/l

5.3 Water Sample from the Allegra's shallow well point

The water was reasonably slightly cloudy, little odor, 59 °F, and a neutral pH of 6.26 and was shown to contain:

Chemical	conc.	MCL, Secondary or equal standards	
CAM 17 Metals			

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Barium	130 µg/l	22CCR64431 level	1000 µg/l
Nickel	24 µg/l	" "	100 µg/l
Mercury	0.27 µg/l	" "	2 µg/l
Conventional Chemistry Parameters APHA/EPA			
Fluoride	140 µg/l	" "	2000 µg/l
Chloride	50,000 µg/l	40CFR143.3 level	250,000 µg/l
Bromide	220 µg/l		
Nitrate	ND µg/l	40CFR141.11 level µg/l	45,000 (20,000)
Sulfate	8700 µg/l	40CFR143.3 level	250,000 µg/l
Extractable Petroleum Hydrocarbons	ND		
Organochlorine Pesticides	ND		
Organophosphorus Pesticides	ND		
TPH - gasoline	ND		
Volatile Organic Compounds	ND (except)		
1,1-dichloropropene	1.1 µg/l	?	
ethylbenzene	0.61 µg/l	22 CCR 64444 -A	700 µg/l

5.4 Water Sample from the cobble rock sump between Wood's and Allegra's properties

The water was reasonably clear with iridescent film, some flocc below surface, slight fish odor, 57 °F, and a neutral pH of 6.72 and was shown to contain:

Chemical	conc.	MCL, Secondary or equal standards	
CAM 17 Metals			
Barium	51 µg/l	22CCR64431 level	1000 µg/l
Mercury	0.27 µg/l	22CCR64431 level	2 µg/l
Conventional Chemistry Parameters APHA/EPA			
Fluoride	170 µg/l	" "	2000 µg/l
Chloride	15,000 µg/l	40CFR143.3 level	250,000 µg/l

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Bromide	290 µg/l		
Nitrate	ND µg/l	40CFR141.11 level µg/l	45,000 (20,000)
Sulfate	2,200 µg/l	40CFR143.3 level	250,000 µg/l
Extractable Petroleum Hydrocarbons	ND (except)		
Floating film was detected roughly as motor oil at 110 mg/wipe for the control; 120 mg/wipe for one film sample and 160 mg/wipe for the other sample. The analysis peak and curve shape did not support defining this as motor oil.			
Organochlorine Pesticides	ND		
Organophosphorus Pesticides	ND		
TPH - gasoline	ND		
Volatile Organic Compounds	ND (except)		
Toluene	0.95 µg/l	22 CCR Table 64444-A	150 µg/l

Biological growth within water column predominantly filamentous bacteria, in a mixed populations of gram positive and gram negative cocci and bacilli - molds were observed. From plating the water onto a Petri dish, approximately 68,500 CFU of bacteria per ml of water grew as well as 140 CFU of mold per ml of water sample with no predominant organism.

6. Conclusions & Recommendations

The water quality of the upper pond in the Hidden Lakes Estate system appears to be of little concern from a public health or the environmental perspective when compared to common standards. The shallow sample points placed into the back yards of the Wood's and Allegra's properties did show some increased levels of chemicals of concern. However, those chemicals were still below most water quality criteria including primary and secondary drinking water standards. As these samples were taken during the season of most precipitation, it is reasonable to conclude that these levels are close to the minimum levels that could exist and they would increase as there is less water available for dilution. Consider the Mercury found was less than 1/10th the standard. The likelihood of getting a ten fold increase in this concentration is possible, but the chances would appear small.

The water quality of the sump drainage area between the Wood's and Allegra's property may be an aesthetic concern, however consider the following:

There is definitely a film or scum on the surface of the cobble property line drainage area from the sump to the intersection. This material produces an iridescent sheen similar to that created by petroleum floating on water. The material has a wax like texture and when disturbed on the water surface breaks into flakes that continue to float on the water. With time (overnight) the flakes re-combine to form the film once again. The quantity of the film was significantly reduced by the volume of the rains and runoff experienced in early to mid-January. The Laboratory did not follow the sample preparation instructions that were written on the chain of custody and were also verbally explained. The captured film from the water surface was analyzed by the Laboratory as a hydrocarbon oil using a wipe sample technique, rather than the specified rinse technique, to remove the sample from the plastic sheet. However, there was a

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positive hit that the film was similar to motor oil. However, the shape of the analytical detection curve was not consistent with what the Laboratory routinely observes as motor oil. The solvent used and the upper temperature range of the instruments available were not capable of performing a "wax" analysis. If such an analysis were to be performed more sampling of the film will be required. This was not undertaken as this analysis did provide useful information to conclude the film was shown to not contain measurable levels of diesel, true motor oil, hydraulic oil, mineral oil, or kerosene. The control blank of the plastic sheet sampler produced almost the same level of the "similar to motor oil" reading that the sampled water film produced. The conservative conclusion must be that the Laboratory measured something that was evidently on the plastic sampling sheet rather than the film floating on the water. It should be noted that trees, and other plants produce lignin and other metabolites that are fatty-oil like materials that can produce a floating oil looking sheens. If this sheen is determined to be a significant issue in the future, more effort can be spent to more fully define it.

Also this standing water that slowly drains toward the intersection contains a visible growth. Just below the surface and extending almost to the bottom of any puddle, there was found an extensive orange-ran biological growth. This growth was shown to be predominantly a filamentous bacteria, with other microbiological life forms present in minimum numbers. The limited biological information does not support a conclusion of a biological based concern for health.

If there were a broken sewer line, a septic tank over flow, or a gray water discharge line to the yards, this growth and film would be consistent with films and growths commonly associated with stagnant waste water such as in portions of treatment operations such as an oxidation lagoon. Toluene was found in this water and is known to be only very slightly soluble in water and to be lighter than water (0.866) so it would rise to the surface. Its boiling point is 111 °C so it would be slow to evaporate. A candidate for further evaluation for the characteristics of the floating film would be to look for toluene.

The *shallow sample points* located in the backyards of the Wood's and Allegra's property demonstrated rapid re-filling of the well suggesting highly permeable soils and high shallow ground water pressures. The water quality data demonstrated a slight presence of materials not found in the top and near shore edge of the Hidden Lakes upper pond. While it is reasonable to consider during the dry season that the total volume of water moving through the soils may be reduced, it is too complicated to project how that will affect chemical concentrations in these sampling points. The trace of phosphate in the Wood's sample point may be associated with lawn fertilizer, while the toluene might be associated with fuel or coatings being used in the landscaping. Toluene is only very slightly soluble in water and less dense than water. As noted above, toluene was also found in the down gradient water collected from the sump - in the surface water cobbled drain area. Toluene is also considered a building block, and therefore a degradation product of gasoline. However, the levels measured do not support a concern pertaining to leaking underground tanks or fuel spills. The traces of 1,1-dichloropropene and ethylbenzene found in the Allegra's sample point are interesting. Ethylbenzene is rather insolvent in water and is used in some plastics and resins as a solvent. The dichloropropene is an isomer of materials used as soil fumigants.

Sincerely,



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