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April 29, 2010

In reply refer to:
SL209154190:lberlad

Mr. Greg Salo
Environmental Health and Safety
Signet Armorlite, Inc.
1001 Armorlite Drive
San Marcos, California 92069

Dear Mr. Salo:

SUBJECT: NOTICE OF VIOLATION AND REVIEW AND COMMENT ON "TECHNICAL MEMO RE: CORRECTIVE ACTION PLAN" AND "CORRECTIVE PLAN SUPPLEMENT" FOR SIGNET ARMORLITE 1001 ARMORLITE DRIVE, SAN MARCOS, CALIFORNIA

Signet Armorlite, Inc., (Signet) is in violation of Investigative Order No. R9-2009-0015 (Order) for failure to submit a sufficient Corrective Action Plan (CAP). The Order requires Signet to prepare and submit a CAP to the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) no later than March 1, 2010. Signet submitted the following documents prepared by Hargis + Associates, Inc. (Hargis) to comply with the Order.

1. Technical Memorandum Re: Corrective Action Plan, Signet Armorlite Site, San Marcos, California, dated March 1, 2010; and,

2. Corrective Action Plan Supplement, Signet Armorlite Site, San Marcos, California, dated March 31, 2010.

As described below, the documents taken together fail to meet the performance standard to be considered a sufficient CAP. Therefore, **Signet is in violation of the Order.**

A. TECHNICAL MEMORANDUM RE: CORRECTIVE ACTION PLAN, SIGNET ARMORLITE SITE, SAN MARCOS, CALIFORNIA

The Technical Memorandum Re: Corrective Action Plan (CAP Memo) **does not meet the performance standards to be considered a sufficient CAP.** The County of San Diego Department of Environmental Health's Site Assessment and Mitigation Manual (SAM Manual) states that CAPs for a non-underground storage tank (UST) cleanup should follow guidance presented in the SAM Manual for a UST CAP. The San Diego Water Board considers the SAM Manual as describing the standard of practice in San

Diego County. The CAP Memo does not comply with the guidelines in the latest SAM Manual:

http://www.co.san-diego.ca.us/deh/water/sam_manual.html

According to the SAM Manual a CAP will, at a minimum, include the following elements.

1. Assessment of Impacts
   a. Hydrologic and Geologic Characteristics of the Site
   b. Contaminant Characteristics and their Impacts
2. Determination of Applicable Cleanup Levels
   a. Cleanup Levels for Groundwater in Areas with Designated Current or Potential Beneficial Uses
   b. Cleanup Levels for Soil
3. Feasibility Study and Corrective Action Workplan
4. Plan to Monitor and Report the Effectiveness of the Corrective Action

The CAP Memo does not address all of these elements.

B. CORRECTIVE ACTION PLAN SUPPLEMENT, SIGNET ARMORLITE SITE, SAN MARCOS, CALIFORNIA

The Corrective Action Plan Supplement (CAP Supplement) does not meet the performance standards to be considered a sufficient CAP. The San Diego Water Board is generally receptive to the remedies proposed in the CAP Supplement. However, the San Diego Water Board needs additional information, data, and analysis to support the remedial recommendations in the CAP Supplement. A CAP must provide critical documentation regarding the applicability, effectiveness, and cost/benefit of proposed remedies. It is essential that a CAP be a defensible, stand alone document without errors and omissions. To be considered adequate and acceptable, Signet's CAP must meet the performance standards as presented in the SAM Manual and adequately address the following issues.

1. Areas of Concern

The CAP should address groundwater pollution as one area of concern rather than piecemealing its analysis by separating them into Fuel-Related, MPE-3 and Deep Zone Volatile Organic Compounds (VOCs), and Methylene Chloride Areas of Concern (AOCs). For the following reasons the piecemeal approach to AOC analysis presented in the CAP Supplement does not adequately

address the cumulative impact on water quality from the various chemicals of concern (COC).

a. The Areas of Concern do not Include all Areas with Detectable Concentrations of the Chemicals of Concern

As shown on Table 1, the "MPE 3 and Deep VOC" AOC did not include all areas of detectable VOCs. This is needed to fully evaluate the potential threat to water quality and human health, and the effectiveness of the proposed corrective actions. The AOCs must include all areas with detectable concentrations of the compounds of concern.

b. The Area of Concern Should Include All Areas of Groundwater Pollution Regardless of the Specific Compound

All pollutants in groundwater need to be addressed to fully assess the potential impact to water quality and human health, and the efficacy of the proposed corrective actions. The Fuel-Related, Methylene Chloride, and VOC plumes are commingled. For example, 70 percent of the wells that have groundwater samples with reported detectable concentrations of VOCs also have detectable concentrations of benzene. Combining the analysis of several AOCs into a single, comprehensive analysis is needed to address the following.

i. The cumulative impact to water quality and human health of the compounds detected in groundwater.

ii. How natural attenuation will be affected by the various compounds. For example, benzene attenuation occurs best in aerobic groundwater conditions whereas reductive dechlorination of the chlorinated hydrocarbons (VOCs) occurs best with anaerobic groundwater conditions. Because benzene and VOCs occur in the same area, different groundwater conditions are needed to support natural attenuation. An analysis needs to be conducted regarding the various groundwater conditions needed to support natural degradation of benzene **and** VOCs present in the same area.

2. Freon-113 Plume

The CAP needs to address the northern and southern Freon-113 plumes as one plume. Because the plumes are located in close proximity to each other, they should be treated as a commingled plume when evaluating the impact to water quality and the applicability of the selected remedial method. The San Diego Water Board staff has repeatedly requested this analysis, and is strongly considering issuance of a Cleanup and Abatement Order naming both Signet and North County Factory Outlet as responsible parties and

requiring both to prepare a CAP specifically addressing the commingled Freon-113 plumes.

3. Vapor Intrusion/Human Health Risk Assessment

Soil vapor sampling and a human health risk assessment are needed to evaluate the potential risk due to upward migration and inhalation of VOCs, as well as the effectiveness of the previously conducted soil and groundwater remediation. An assessment of the potential risk is needed to determine if active remediation will be required. The CAP Supplement states that the remaining VOCs in soil, soil gas, and groundwater do not represent a potential risk to site occupants for the following reasons.

a. Buildings 1A and 2A, the building located over the groundwater plume, "has remained unoccupied since July 2006 and therefore there is no exposure pathway."

b. Hargis conducted soil vapor sampling and a human health risk assessment in 2006. [1] Based on the results Hargis concluded that there was an acceptable incremental cancer risk to site occupants.

The San Diego Water Board disagrees with the conclusions presented by Hargis for the following reasons:

a. A Complete Pathway Exists

i. The statement that Buildings 1A and 2A have been unoccupied since July 2006 **is false**. During a site inspection by San Diego Water Board staff on June 24, 2009, a worker was observed in Building 2A. The worker was observed in the southern portion of the building in a "tool crib" or "repair area". The presence of a radio and other personal items indicate that his occupancy was not an occasional occurrence and that **existing institutional controls have failed in preventing building occupancy**.

ii. Vapor intrusion guidance documents do not make a distinction between occupied and unoccupied buildings.[2]

iii. Signet has not provided any supportable documentation that Buildings 1A and 2A will not be occupied, nor has it explained how the use

[1] Hargis + Associates, December 20, 2006, *Benzene Indoor Air Vapor Intrusion Evaluation Update, Signet Armorlite Facility.*

[2] DTSC, February 7, 2002, *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*; San Diego County Department of Environmental Health, 1999, *Users Guide to the Vapor Risk 2000*; San Diego County Department of Environmental Health, February 18, 2004, *Site Assessment and Mitigation Manual 2004.*

restriction will be enforced. Examples of documentation that could be sufficient to support this claim include:

a. An executed and filed Deed Restriction that prohibits occupancy of Building 1A and 2A.

b. Documentation that the Building 1A and 2A no longer have occupancy permits with the City of San Marcos.

iv. The potential for occupancy of Buildings 1A and 2A is supported by the CAP Supplement. The CAP Supplement states that "Signet operates an active manufacturing facility" suggesting that the potential exists for use of these buildings.

b. Recent Groundwater Monitoring Results Require Additional Soil Vapor Sampling and Human Health Risk Assessment

i. Increases in benzene in groundwater beneath Building 1A and 2A since the soil vapor sampling was conducted in 2006 require that soil vapor sampling and human health risk assessment be done. As shown on Table 2 benzene concentrations are higher in nine wells.[3] This indicates that conditions have changed for the worse since the 2006 soil vapor survey and additional testing is needed.

4. Methylene Chloride Plume

The San Diego Water Board generally agrees that monitored natural attenuation is an appropriate remedial action for the methylene chloride plume located near the former methylene chloride still. However, the CAP needs to address the following.

a. A calibration of the model used to estimate time to reach maximum contaminant levels (MCLs). The CAP Supplement states that using a half life of 7 months and a methylene chloride concentration of 200,000 micrograms per liter (µg/l) the methlyene chloride concentration will reach the MCL of 5 µg/l in 10 years. The CAP should evaluate whether or not this model is consistent with actual conditions.

b. The CAP should evaluate the cost-effectiveness of using a multi-phase extraction (MPE) to clean up the hot spot in the vicinity of groundwater monitoring well P-5. MPE has been proven to effectively remove methylene chloride from soil and groundwater at the site. There are mobile high vacuum dual phase extraction systems available that can

[3] For wells that were not sampled in 2006 the most recent pre-2006 groundwater data was used. The date of the sampling is noted on the table.

treat methylene chloride very cost effectively. Also, sufficient mass reduction in the area of groundwater monitoring well P-5 may reduce overall remediation costs by:

i. Eliminating the need to install additional groundwater monitoring wells in the vicinity of existing well P-5 to monitor natural attenuation.

ii. Reducing the number of wells in the vicinity of existing well P-5 to be monitored and sampled to demonstrate natural attenuation.

iii. Reducing the time needed to monitor existing well P-5 to demonstrate that MCLs will be reached in a reasonable time.

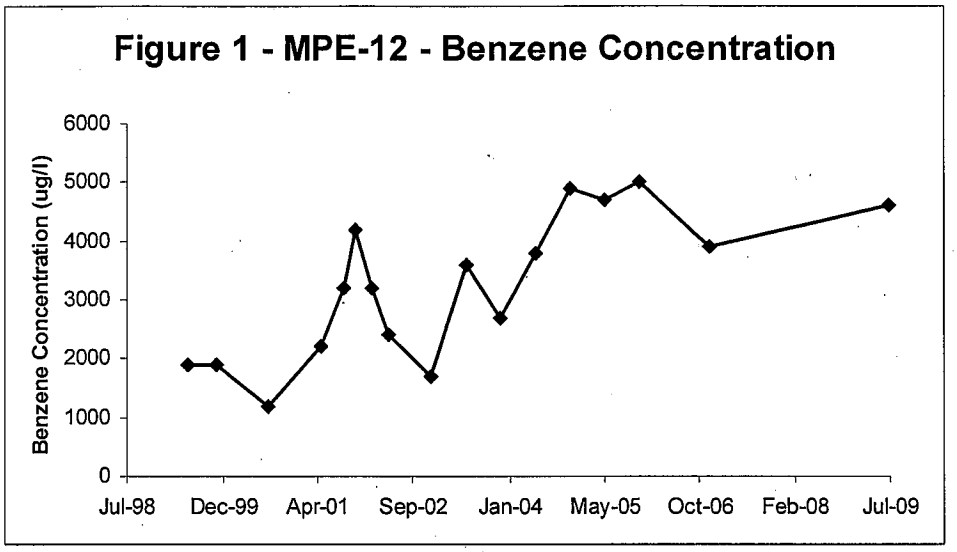
5. Hot Zone Source Reduction

The CAP should evaluate the cost-effectiveness of conducting limited source removal in the vicinity of the current "hot spots". Groundwater monitoring wells W-3, and MPE-3 have some of the highest concentrations (i.e. mass) of the compounds of concern. An analysis should be made of the incremental costs to conduct limited source removal at these and other wells using such techniques as mobile high vacuum MPE systems in light of the incremental benefits to water quality from timely mass removal.

6. Plume Stability

The CAP must demonstrate plume stability. The CAP Supplement states that the horizontal extent of the dissolved benzene plume is stable and that benzene concentrations are generally stable or reducing. To support this contention, data should be presented that clearly illustrates that all COC concentrations are stable or reducing *since the termination of active groundwater remediation.*

Not all the data supports this contention. As shown on Figure 1, groundwater samples collected from well MPE-12 have shown increasing benzene concentrations since the termination of the active groundwater remediation.



7. Estimates of Time to Reach Maximum Contaminant Levels

The CAP should include estimates of when groundwater pollution will reach maximum contaminant levels (MCLs) under the proposed remedial option. This information is needed to support the contention that MCLs will be reached by implementing the proposed remedial option within a reasonable time. The analysis should include all data points and consider the documented changes in chemical concentration over time.

8. Institutional Controls

The CAP should include details and supporting information on how the land use restrictions will be implemented such as:

a. Restricting below grade construction.

b. Providing site occupant notification.

c. Enforcing Health and Safety requirements for construction workers involved in activities that may expose them so impacted soil, soil vapor, or groundwater.

d. Influencing the City of San Marcos' potential decision to change the existing zoning to residential. This is a concern because the zoning for an adjacent property was recently changed to mixed use combining residential and retail.

e. A copy of the proposed Deed Restriction and a certified statement from the property owner, Milano Holdings, Inc., that they will:

i. Accept the terms of the Deed Restriction;

ii. File the Deed Restriction within 30 days of acceptance of the proposed Corrective Action;

iii. Submit a copy of the fully executed Deed Restriction and documentation that the Deed Restriction has been recorded to the San Diego Water Board; and

iv. Notify the San Diego Water Board 60 days prior to making any changes in the Deed Restriction.

9. Soil

The CAP should include an evaluation of COCs in soil. The CAP Supplement states that residual COC mass may exist in soil and "maintain contaminant concentration for some period of time in the vicinity of monitor wells and result in variable concentrations in plume wells over time." This potential ongoing contribution to groundwater pollution needs to be considered in the evaluation of the applicability of natural attenuation and the time to reach MCLs.

10. Criteria to Demonstrate Effectiveness of Natural Attenuation

The CAP should include performance standards and milestones to be used to evaluate whether or not natural attenuation is occurring at the rate anticipated, and a contingency plan in the event that natural attenuation is not proceeding as proposed.

11. Containment Zone

The CAP should consider establishing a Containment Zone pursuant to State Water Resources Control Board Resolution No. 92-49.

While the San Diego Water Board is generally receptive to the corrective actions and remedies proposed by Hargis in the CAP Supplement, the additional analyses set forth above remain necessary for this agency to validate and finally approve those remedies. **Signet remains in violation of the Order and subject to formal enforcement action, including the imposition of administrative civil liabilities under California Water Code section 13267, between now and the time we receive the required analyses.** Staff will take into account both the time it takes for Signet to provide the additional analyses, and the sufficiency of those analyses in determining whether to take formal enforcement action.

In the subject line of any response, please include the requested "**In reply refer to:**" information located in the heading of this letter. If you have any questions regarding this letter, please contact Ms. Lynn Berlad at (858) 268-5363, via e-mail at *lberlad@waterboards.ca.gov*, or by mail to the San Diego Water Board office.

Sincerely,

BARRY S. PULVER, PG 4236, CEG 1364, CHG 696
Engineering Geologist
Groundwater Basins Branch

LYNN G. BERLAD, M.Sc.
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cc via e-mail:

Mr. Greg Cranham, Senior Hydrogeologist, Hargis + Associates, Inc., *cranham@hargis.com*

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Table 1
Comparison of Areas of Concern and Areas of Groundwater Pollution

Well	Benzene AOC	MPE 3 and Deep VOC AOC	Freon 113	1,4 - Dioxane	1,1 - DCE	1,1,1- TCA	TCE	Methylene Chloride	Deep
W-1	√	Ø		√					
W-2	√								
W-3	√	Ø		√					
MPE 1	√								
MPE 2	√	Ø		√	√				
MPE 3	√	√	√	√	√	√	√		
MPE 4	√	√	√	√	√				
MPE 5	√	Ø	√	√					
MPE 6	√								
MPE 7	√	√	√	√	√				
MPE 8	√								
MPE 9	√								
MPE 10	√	Ø	√		√				
MPE 11	√								
MPE 12	√	√	√	√	√				
MPE 13	√								
MPE 14	√								
MPE 15	√								
MPE 16	√	√		√					
MPE 17		√		√	√				
MPE 18	√								
MPE 19	√	Ø		√					
MPE 20	√	Ø		√					
P 2		√	√	√	√		√		
P 4		Ø			√				
P 5		√						√	
P 6		√			√		√		
D 1		√							√
D 4		√							√

Notes:

1. 1,1 – DCE = 1,1 – dichloroethylene
2. 1,1,1 – TCA = 1,1,1 – trichloroethane
3. TCE = trichloroethylene
4. Deep = All chemicals of concern in the deep zone were detected in the same wells. Therefore, they are grouped together.
5. √ = Well is included in the AOC, or compound was detected in groundwater samples collected from the well.
6. Ø = Compound was detected in well but well was not included in AOC.
7. Shaded areas highlight compounds detected in a well but well were not included in AOC.

Table 2

Comparison of Benzene Concentration

Building	Well No.	Benzene 2006	Benzene 2009	Percent Difference
1A	**W-2 (2005)**	**3,200**	**3,700**	**16**
	MPE 3	920	110	-88
	MPE 5 (2003)	**4.1**	**5.8**	**41**
	MPE 6 (2003)	**47**	**66**	**40**
	MPE 9 (2005)	750	360	-52
2A	**W-1**	**440**	**3,600**	**718**
	W-3 (2005)	4,100	4,000	-2
	MPE 2	1,600	830	-48
	MPE 3	920	110	-88
	MPE 4 (2004)	10	1.6	-84
	MPE 7 (2005)	**220**	**1,100**	**400**
	MPE 8 (2003)	**13**	**100**	**669**
	MPE 10 (2005)	2,000	700	-65
	MPE 12	**3,900**	**4,000**	**3**
	MPE 13 (2003)	**3.2**	**460**	**14,275**
	MPE 14 (2003)	<2	<0.50	0
	MPE 15 (2002)	<2	2.8	0
	MPE 16 (2003)	<2	<0.5	0
	MPE 19 (2002)	<2	<0.50	0
	MPE 20 (2002)	**58**	**60**	**3**