March 17, 2022

From: Peter Sinsheimer, Technical Consultant to SCLA-PUSH

To: South Coast Air Quality Management District

Re: Comments on March 2022 Draft SLA CERP related to dry cleaning

My comments below are being made in my role as technical consultant to SCLA-PUSH's project focused on air quality.

By way of background, between 1994-1997, as a PhD student at UCLA, I served as a senior researcher associated on a SCAQMD/CARB/USEPA project focused on the potential viability of professional wet cleaning based on the evaluation of the first professional wet cleaner to operate in California. Between 2000-2004 I served as project director of the SCAQMD-funded project focused on converting the first set of perchloroethylene (perc) dry cleaners to convert to professional wet cleaning. Between 2005-2014 I served as director of the CARB-funded professional wet cleaning demonstration project. In addition, I served as the lead scientist on a utility-funded project – sponsored by SCE, SCGC, and LADWP, focusing on a comparative analysis of electricity and natural gas use of a range of professional apparel cleaning technologies.

In 2019, Physicians for Social Responsibility – Los Angeles, ask me to serve as technical consultant on their SCLA-PUSH project. As part of this project, I was asked to evaluate Best Available Control Technology associated with targeted sectors including professional apparel cleaning services. During Phase 1 of this project, I completed an analysis of SCAQMD criteria for BACT, evaluated evidence related to a range of professional apparel cleaning technologies related to each criteria, used this evidence to assess the extent to which each technology met each SCAQMD BACT criteria, and concluded that there was strong reliable evidence that both professional wet cleaning CO_2 dry cleaning met each SCAQMD criteria of BACT with professional wet cleaning being extremely cost-effective given that operating cost of this zero-emission technology was lower than no-perc dry cleaning technologies that SCAQMD regulated.

Based on this analysis, the SCLA-PUSH document entitled "Report on the First Phase of Air Quality Assessment in South Central Los Angeles, 2019-2020" listed professional wet cleaning and CO_2 dry cleaning as BACT for non-perc dry cleaning (see page 48). That said, due to page constraints of this report, the analysis I completed underlying this finding was not included. In consideration of the SLA CERP, I believe my 2019 analysis supporting this conclusion is important to provide.

Further, this analysis also recommended amending SCAQMD Rule 1102 eliminating the Rule 102 Group II exemption, including the exemption excludes siloxane-based solvent decamethylcyclopentasiloxane (or D5) from Rule 1102 regulation. Toxicity risk associated D5

has resulted in the European Union banning D5, including its use on dry cleaning. Further, the extremely high energy use associated with D5 dry cleaning compared to zero-emission professional wet cleaning and CO_2 dry cleaning further supports removing the Rule 102 Group II exemption to Rule 1102.

In additional, an amendment to SCAQMD Rule 1102 should be created phasing out non-perc dry cleaning machines regulated under this rule based on a fifteen (15) year life of this equipment. Since listing zero-emission professional wet cleaning and CO_2 dry cleaning would prohibit further permitting by SCAQMD on new non-perc dry cleaning machines, a phase out of existing non-perc dry cleaning machines regulated under Rule 1102 should be created based on the 15-year expected useful life of this equipment. This rule change is comparable to the CARB 2007 ruling phasing out perc dry cleaning based on a 15-year useful life of perc dry cleaning equipment. Phasing out existing non-perc dry cleaning machines is essential given that older machines are more prone to break down control systems, including break down in pollution control equipment resulting in greater emissions as well as break down fire suppression equipment for non-perc dry clean machines using combustible solvents. Most, if non all non-perc dry cleaning machines regulated under Rule 1102 use combustible solvents.

As non-perc dry cleaning machines regulated by SCAQMD Rule 1102 are being phased out, an early-adopter incentive program for dry cleaners switching to viable zero-emission alternatives should be created to jump start this transition. This early adopter incentive program should be coupled with a zero-emission technology demonstration program to further enhance this transition.

Beyond the community emissions reduction benefits created by transitioning from non-perc solvent-based dry cleaning technologies regulated by Rule 1102 to viable zero-emission professional wet cleaning and CO_2 dry cleaning, from the perspective of dry cleaners switching professional wet cleaning, reliable evidence demonstrates that they will experience greater profitability based on lower operating costs. From the perspective of SCAQMD, given that neither professional wet cleaning and CO_2 dry cleaning machines require SCAQMD permits, the benefits of phasing out non-perc dry cleaning regulated by Rule 1102 and transitional cleaners to zero-emission equipment not regulated by SCAQMD will demonstrate to the professional apparel cleaning community in particular and the broader business community in general that SCAQMD supports reduced regulatory oversight.

While the above serves as an overall summary of recommendations to the March 2022 draft SLA CERP, below I am providing the following. Appendix 1: A recent memo I sent to my PSR-LA colleagues, which included the complete 2019 analysis of BACT for non-perc dry cleaning equipment regulated under Rule 1102. Appendix 2: Track change recommendations to Table 5d-1 related to the SLA CERP for dry cleaning as support by my 2019 BACT analysis as well as the comments provided above.

Appendix 1

March 16, 2022 Memo to Physicians for Social Responsibility – Los Angeles on 2019 Analysis of Professional Wet Cleaning and CO_2 Dry Clean as BACT for Non-Perc Dry Cleaning Machines Regulated by SCAQMD Rule 1102

March 16, 2022

To: Paula Torrado, Marth Arguello – Physicians for Social Responsibility Los Angeles

From: Peter Sinsheimer – Green Analytics

Re: Professional wet cleaning as SCAQMD BACT for non-perc dry cleaning machines

As you know, the SCLA-Push document "Report on the First Phase of Air Quality Assessment in South Central Los Angeles, 2019-2020" identified dry cleaners as a targeted sector of high concern and classified zero-emission professional wet cleaning and CO_2 dry cleaning as best available control technology (BACT) for non-perchloroethylene (perc) dry cleaning solvent machines regulated by South Coast Air Quality Management District. As you requested, as a technical consultant on this First Phase work, I completed this analysis of BACT for non-perc dry cleaning. Below is the detailed analysis demonstrating that professional wet cleaning clearing meeting SCAQMD's criteria as BACT for non-perc dry cleaning.

1. INTRODUCTION

Within the SCAQMD, Regulation XIII requires BACT be used by facilities applying for permits for new sources, relocated sources, and modifications to existing sources that may result in an emission increase of any nonattainment air contaminant, any ozone depleting compound, or ammonia. SCAQMD periodically updates their BACT Guidelines which establish both the procedures determining BACT as well as the actual BACT for commonly permitted equipment."[i] SCAQMD invites written comments about BACT Guidelines and written comments are evaluated by SCAQMD staff and included in the BACT Docket.[ii]

SCAQMD divides facilities into two BACT groups – major polluting facilities and non-major polluting facilities.[iii] The SCAQMD document *Best Available Control Technology Guidelines* developed different policies and procedures for major and non-major polluting facilities. For major sources, BACT uses a Lowest Achievable Emission Rate (LAER) standard, evaluating what is achievable in practice with little consideration of cost. For non-major sources BACT, or MSBACT, BACT is based on the most stringent standard considered to be cost-effective.

In the SCAQMD BACT Guidelines, two parts focused specifically on MSBACT. "Part C – Policy and Procedures for Non-Major Polluting Facilities" provides specific criteria for determining MSBACT for each regulated equipment type or emission limit. "Part D: BACT Guidelines for Non-Major Polluting Facilities" provides the specific MSBACT requirements for each applicable piece of equipment or emissions limit. [iv]

Part D identified dry cleaning as a specific process applicable to MSBACT.

2. METHODS: MSBACT DRY CLEANING CASE STUDY

Methods used to evaluate the MSBACT for dry cleaner followed the following steps: (1) Review of MSBACT guidelines for developing MSBACT for a specific application, (2) Review of the current MSBACT for dry cleaning, and (3) Using MSBACT guidelines and a literature review of dry clean alternatives, complete an analysis to determine whether there is sufficient evidence to update the MSBACT for dry cleaning.

3. FINDINGS: MSBACT DRY CLEANING CASE STUDY

3.1 Procedures for Developing MSBACT for a Specific Application

Part C of the SCAQMD BACT guidelines entitled "Part C – Policy and Procedures for Non-Major Polluting Facilities" states that MSBACT for each source category is the most stringent emission limit or control technology that is either: (1) found in a state implementation plan (SIP), or (2) achieved in practice (AIP), or (3) is technologically feasible and cost effective. Of these options, SCAQMD states most MSBACT is based on AIP since it is more stringent that SIP and less constrained by state law than the technologically feasible/cost effective approach.

Part C cites a number of information sources where AIP may be identified including regional, state, and federal clearinghouses, regional and state BACT guidelines, and regional and state permits as well as "any other source for which the requirements of AIP can be demonstrated."

Given that SCAQMD uses AIP to establish most MSBACT, below provides additional detail in Part C on AIP.

PART C states four criteria used by SCAQMD for listing an AIP control technology or emissions limit:

- Commercial Availability: At least one vendor must offer this equipment for regular or full-scale operation in the United States. A performance warranty or guaranty must be available with the purchase of the control technology, as well as parts and service.

- Reliability: The control technology must have been installed and operated reliably for at least twelve months on a comparable commercial operation. If the operator did not require the basic equipment to operate continuously, such as only eight hours per day and 5 days per week, then the control technology must have operated whenever the basic equipment was in operation during the twelve months

- Effectiveness: The control technology must be verified to perform effectively over the range of operation expected for that type of equipment. If the control technology will be allowed to operate at lesser effectiveness during certain modes of operation, then those modes must be identified. The verification shall be based on a District-approved performance test or tests, when possible, or other performance data.

- Cost Effectiveness: The control technology or emission rate must be cost effective for a substantial number of sources within the class or category. Cost effectiveness criteria are described in detail in a later section. Cost criteria are not applicable to an individual permit but rather to a class or category of source. PART C includes an extensive section on cost effectiveness methodology to be applied.

Part C then describes a five-step decision method for selecting MSBACT for each category of regulated equipment or emissions unit.

- Step 1: Identify all possible control technologies. In searching for options, Part C highlights a search for pollution prevention alternatives, cites the 1990 federal Pollution Prevention Act as establishing a "national policy that pollution should be prevented or reduced at the source whenever feasible" (p. 42), and lists five relevant pollution prevention/source reduction approaches:
  - Equipment or technology modifications
  - Process or procedure modifications
  - Reformulation or redesign of products
  - Substitution of raw materials
  - Improvements in housekeeping maintenance or inventory control

- Step 2: Eliminate technically infeasible options. This step is essentially comparable to the "effectiveness" criteria above.

- Step 3: Rank remaining control technologies. This ranking is based on the overall control effectiveness of the relevant pollutant(s). Part C states that this ranking not only be based on control efficiencies/emission rates/emission reduction but also take into account environmental impacts (e.g., toxic emissions, multi-media impacts) and energy impacts.

  Here it is important to note that these indirect environmental impacts are characterized in the next step and can be used as a basis for eliminating the highest-ranking option. It is also important to note that a pollution prevention alternative which eliminate the relevant pollutant(s) is likely to be selected as the highest-ranking option, being more stringent than options which reduce but do not eliminate the relevant pollutant(s).

- Step 4: Evaluation. The "most effective" options ranking highest is evaluate first. Part C provides some guidance on this evaluation – discuss each of the beneficial and adverse impacts, focus on direct impacts including a calculation of both incremental and average cost effectiveness. Part C provides detailed guidance on conducting cost effectiveness calculations If the evaluation of the "top option" is ruled out based on impacts and cost effectiveness, the next "most stringent alternative is evaluated.

It is important to note here that while the guidance provided in Part C for this evaluation is extremely clear on ruling out an option based on cost effectiveness, given the amount a detail provided on cost effectiveness in Part C, with respect to other impacts, Part C is extremely value concerning what constitutes a sufficient threshold from other impacts sufficient to rule out an option. Further, Part C in vague about what specific impacts are included. Presumably, these include the impacts listed in Step 3 -- environmental impacts (including toxic emissions and multi-media impacts) and energy impacts.

- Step 5: Select BACT. The most stringent option not eliminated in Step 4 is proposed as BACT and presented to SCAQMD for review and approval.

3.2 Current MSBACT for Non-Perc Dry Cleaning

Two SCAQMD rules are specifically related to dry cleaning: SCAQMD Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Systems and Rule 1102: Dry Cleaners Using Solvent Other Than Perchloroethylene. These two rules specify minimum equipment requirement and specify best practices associated with cleaners using perchloroethylene (Rule 1421) and non-perchloroethylene dry clean solvent.

Part D of the 2019 SCAQMD BACT Guidelines lists "Dry Cleaning" as a specific equipment or process category. Table 1 is a screenshot of the dry cleaning table listed on Part D.

The table shows MSBACT for dry cleaning was first created in 10-20-2000 "Rev. 0" and revised on 7-9-2004 "Rev. 1". The first column in the table, labeled "Subcategory/Rating/Size" lists two subcategories of dry cleaning equipment: Perchloroethylene and Petroleum Solvent. Within the row labeled "Criteria Pollutants", information on the two dry clean equipment sub-categories is provided for only one criteria pollutant, VOC/ODC. This listing of VOC/ODC shows that petroleum dry cleaning is directly associated with VOC/ODC emissions.

In the VOC/ODC column, perchloroethylene dry cleaning was said to be "delisted" as a VOC, citing SCAQMD Rule 1421 from June 13, 1997. As such, perchloroethylene dry cleaning was found to be exempted from MSBACT control technology or emissions reduction specifications. Here it is important to note that in 2002, SCAQMD amended Rule 1421, phasing out permitting of perc dry clean machines by December 2020.

For petroleum solvent dry cleaning, the table drops a footnote after "Petroleum Solvent" stating: "This Equipment may also be subject to AQMD Rule 1102 – Dry Cleaners Using Solvent Other Than Perchloroethylene." The Petroleum Solvents/VOC/ODC cell states: "Closed Loop, Dry-to-Dry Machine with a Refrigerated Condenser (10-20-2000) or Evaporatively Cooled Condenser (7-9-2004)." The two dates listed here are the identical dates for when this MSBACT for dry cleaning was first created and when it was revised, as shown in the top right corner of the table.

Table 1: SCAQMD MSBACT for Dry Cleaning

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

10-20-2000 Rev. 0
7-9-2004 Rev. 1

Equipment or Process: Dry Cleaning

	Criteria Pollutants					
Subcategory/ Rating/Size	**VOC/ODC**	**NOx**	**SOx**	**CO**	**PM_{10}**	**Inorganic**
Perchloroethylene	Delisted as a VOC. See SCAQMD Rule 1421 – Control of Perchloroethylene Dry Cleaning Operations[1] (06-13-97)					
Petroleum Solvent[2]	Closed Loop, Dry-to-Dry Machine with a Refrigerated Condenser (10-20-2000) or Evaporatively Cooled Condenser (7-9-2004)					

[1] Rule 1421 implements the federal National Emission Standard for Hazardous Air Pollutant for Perchloroethylene Dry Cleaning Facilities (40 Code of Federal Regulations [CFR] 63.320, *et seq*) and the state Airborne Toxic Control Measure (ATCM) for Emissions of Perchloroethylene from Dry Cleaning Operations (17 California of Regulation [CCR] 93109, *et seq*).

[2]This Equipment may also be subject to AQMD Rule 1102 – Dry Cleaners Using Solvent Other Than Perchloroethylene.

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions

BACT Guidelines - Part D 43 Dry Cleaning

As such, the latest version SCAQMD's BACT Guidelines states that MSBACT for petroleum solvent dry cleaning are three emission control requirements build into a petroleum dry clean machine for reducing VOC emissions – (1) dry-to-dry – meaning apparel is put in dry and comes out dry thereby requiring that washing and drying be completed in the same drum, (2) closed loop – meaning that petroleum solvent evaporated during the dry cycle is captured and collected rather than being vented to the atmosphere, and (3) that the solvent capture system be condenser using either a refrigerant system or an evaporative cooling system.

To understand projected VOC emissions associated with this MSBACT for petroleum dry cleaning, it is fruitful to evaluate a 2007 SCAQMD document developed for permit streamlining entitled "PERMIT SAMPLE EVALUATION HYDROCARBON DRY CLEANING MACHINE (Based on applicable Rules & Regulations as of September 2007).[v] This six-page document is shown in Appendix A.

Page 2 of this document includes a heading entitled "EMISSIONS CALCULATIONS", shown in Figure 1 below, provides details related to how hydrocarbon emissions is projected for the applicant: the assumed volume of clothes cleaned of 600 lb/week, an estimated amount of hydrocarbon solvent use to process 600 lb/week of 10 gallons/month, an estimated 34% of the 10 gallons used will be emitted as VOCs, a density of hydrocarbon solvent of 6.41 lbs/gallon, and that monthly VOC emissions attributed to this activity comes to 21.8 pounds (10 gallons/month

* 34% * 6.41 lbs/gallon). In sum, a typical hydrocarbon dry cleaner cleaning 600 pounds of items a will use 10 gallons to hydrocarbon solvent per month, that 3.4 gallons/month is attributable to VOC emissions, and based on, 21.8 lb VOC/month, or 262 lb VOC/year.

EMISSION CALCULATIONS

Capacity [lb/load] :	50
Maximum Hydrocarbon consumption [gal/month] :	10
Clothes cleaned per week [lb/week] :	600
Density of HC/petroleum [lbs/gal] :	6.41
VOC emitted from HC dry cleaning system (based on Rule 1421 status report, 12/3/2004) :	34%
Control Efficiency (District policy on 12/3/2003) :	66%

Operating Schedule:	hr/day (average) =	9
	hr/day (max) =	10
	day/week =	6
	week/yr =	52

VOC Emission		Uncontrolled	Controlled
Monthly [lbs/mo]	= HC consumption x Petroleum density	64.1	21.8
Daily [lbs/day]	= Monthly / 4.33/ Max No of day per week	2.47	0.8
Hourly [lbs/hr]	= Daily / Max hours per day	0.25	0.08
Annual [lbs/year]	= Monthly controlled x 12 months	-	262
30-day avg [lbs/day]	= Monthly controlled/ 30 days	-	0.73

Figure 1: Hydrocarbon emissions calculation estimates from a SCAQMD a permit sample evaluation

3.3 Options Analysis for MSBACT for Non-Perc Dry Cleaning

An analysis of the literature shows a number of potential pollution prevention options that SCAQMD could considered as MSBACT for petroleum dry cleaning creating more stringent emission limits than the dry-to-dry closed-loop pollution control system currently listed as MSBACT. These potential pollution prevention options all use solvents not classified as VOCs including GreenEarth dry cleaning – using a siloxane-based solvent decamethylcyclopentasiloxane (or D5), CO_2 dry cleaning – using recycled CO2 as a solvent, and professional wet cleaning – using water as a solvent.

The first step in evaluating whether each of these zero-VOC alternatives could be used as MSBACT for petroleum dry cleaning is to assess each alternative with respect to the initial four baseline criteria stated in MSBACT guidance – commercial availability, reliability, effectiveness, and cost effectiveness. With respect to the first three, there is substantial evidence that GreenEarth, CO_2, and professional wet cleaning meet the minimum thresholds for each criterion detailed in SCAQMD BACT Guidelines PART C. The fact that SCAQMD has tracked professional

apparel cleaners in their own service territory using GreenEarth, CO_2, and professional wet cleaning over many years demonstrates the effectiveness and reliability of each of these options. For professional wet cleaning, additional support on effectiveness and reliability comes from a pair of peer review studies confirming the commercial viability of dry cleaners switching to professional wet cleaning in the greater Los Angeles region and in Massachusetts.[vi] With respect to cost-effectiveness, the fourth baseline criteria, each of these zero-VOC technologies meet the classification as cost-effectiveness based on the methods provided in the SCAQMD BACT Guidelines PART C, which uses $92,246/ton of ROG/VOC reduction as the threshold. For CO_2 dry cleaning and GreenEarth dry cleaning, cost per ton of ROG/VOC reduction are substantially lower than this threshold. For professional wet cleaning, with capital and operating costs being lower than petroleum dry cleaning, this technology shows a cost savings per ton of ROG/VOC reduced associated with cleaners switching to this technology option.[vii]

Since each of these zero-VOC technologies passes the four baseline criteria, the next step is to work through the SCAQMD's MSBACT Guidelines 5-step decision method for selecting MSBACT.

- Step 1, identifying possible control technologies: Each of these solvent substitute technologies can be considered a pollution prevention alternative, highlighted in the MSBACT PART C Guidelines as highly desirable.

- Step 2, eliminating technically infeasible options: As noted above, commercial viability on each zero-VOC alternatives, demonstrates all three options as passing through this gate.

- Step 3, rank remaining control technologies: MSBACT guidelines requires ranking to take into account both emissions reduction as well as other factors including environmental impacts. Each of these options eliminates VOC emissions associated with petroleum dry cleaning. With respect to toxicity, CO_2 dry cleaning and professional wet cleaning have been classified by the California Air Resources Board (CARB) as non-toxic and non-smog forming technologies; CARB created this classification in response to its authority to implement California law AB998 which provides incentives to perc dry cleaners switching to "non-toxic and non-smog-forming alternatives."[viii] While GreenEarth's D5 solvent does not appear to be smog-forming, CARB did not classified GreenEarth's D5 solvent as "non-toxic and non-smog-forming", specifically noting problems with toxicity concerning with D5.[ix] Further, in 2018 the European Union's regulatory agency implementing the EU's chemical legislation (ECHA) recently classified D5 as both a PBT (Persistent, Bioaccumulative, and Toxic), vPvB (very persistent and very Bioaccumulative), a substance of very high concern, placing D5 on a list of chemicals to be banned unless no other viable substitutes can be identified for a specific use.[x] Since MSBACT takes into account environmental impacts in rank ordering options for the most stringent emissions reduction, CARB's decision to reject listing D5 as non-toxic and ECHA's classification of D5 as a PBT and vPvB substance, suggests eliminating D5 as an option for MSBACT. At a minimum, GreenEarth would rank substantially lower than CO_2 and professional wet cleaning. These findings also suggest increased regulation of D5 dry cleaning by SCAQMD in Rule 1102 (see below).

- Step 4: Evaluation. While this step requires the "most effective" option be evaluated first, CO_2 dry cleaning and professional wet cleaning are tied as most effective given that both eliminate VOCs from petroleum dry cleaning, both are classified as non-toxic, and no other environmental impact

clearly separates these two alternatives at this time.[xi] The MSBACT Guidelines do provide some specific guidance for this evaluation step, including takings into account cost effectiveness calculations. As noted above, while both CO_2 and professional wet cleaning meet MSBACT Guidelines threshold as cost effective technologies, while CO_2's incremental cost effectiveness was estimated at slightly over $30,000 per ton of VOC reduced, a switch to professional wet cleaning resulted in a cost savings of slightly over $15,000 per tons of VOC reduced. As such, based on the evaluation criteria in MSBACT Guidelines, professional wet cleaning appears as the highest ranked "most effective" VOC-free alternative with no adverse impacts identified that would rule out this option.

- Step 5: Select BACT. Since professional wet cleaning was shown as the most stringent option not eliminated in Step 4, professional wet cleaning should be proposed as MSBACT for petroleum dry cleaning and be presented to SCAQMD for review and approval.

4. CONCLUSION: PROFESSIONAL WET CLEANING AS MSBACT DRY CLEANING

Based on SCAQMD MSBACT 5-step decision method guidelines, reliable evidence related to each criterion shows that zero-emission professional wet cleaning clearly meet the selection criterion as MSBACT for non-perc solvent-based dry cleaning.

The practical consequence of setting professional wet cleaning as BACT for non-perc dry cleaning is to prohibit further permitting of new non-perc dry cleaning in SCAQMD.

This classification of professional wet cleaning as BACT for non-perc dry cleaning should, in turn, trigger an amendment to Rule 1102 to include a phase out date for existing non-perc dry cleaning machine based on a fifteen year expected life.

The amendment of Rule 1102 provides SCAQMD the opportunity to remove the Rule 1102 exemption of siloxane-based D5 dry cleaning. As revealed in Step 3 of MSBACT completed above, based on an analysis of current toxicity evidence of D5, the European Union is move forward with steps to ban D5 from dry cleaning. Amending Rule 1102 provide SCAQMD the opportunity to remote D5 from the exemption list based on evidence substantially more recent than the date when Rule 1102 was last revised.

Appendix A: SCAQMD: PERMIT SAMPLE EVALUATION HYDROCARBON DRY CLEANING MACHINE

PERMIT SAMPLE EVALUATION
HYDROCARBON DRY CLEANING MACHINE
(Based on applicable Rules & Regulations as of September 2007)

ENGINEERING EVALUATION FOR PERMIT TO CONSTRUCT/OPERATE

APPLICANT ABC CLEANER (Facility ID: 123456)

MAILING ADDRESS 12345 Abc St., Chino Hills, CA 91709

EQUIPMENT LOCATION Same as above.

PERMIT HISTORY

The permit application for the hydrocarbon dry-cleaning machine was filed on August 16, 2007 as a new construction. This unit will replace the existing perchloroethylene dry-cleaning machine to comply with the requirements of Rule 1421 and Rule 1402.

There is no history of any violation or nuisance complaints for this facility.

Fees: Fee Schedule A. Permit Processing fee for new construction is $1170.20 for fiscal year 2007-2008.

EQUIPMENT DESCRIPTION

DRY CLEANING MACHINE, PETROLEUM SOLVENT, UNION MODEL HL-850, CLOSED LOOP, WITH A REFRIGERATED CONDENSER.

BACKGROUND/SUMMARY

This model, Union HL 850 has a design capacity of 45-50 pounds. The solvent used in this machine is DF 2000 Fluid, distributed by Exxon Mobil Chemical (MSDS included). This is a synthetic, C12 to C13 aliphatic hydrocarbon with a density of 6.41 pounds/gallon. This unit has a mileage of 120 pounds cleaned a day.

CEQA ANALYSIS

This equipment is not part of a project that is subject to CEQA. There is no significant impact.

EMISSION CONTROL DESCRIPTION

PERMIT SAMPLE EVALUATION
HYDROCARBON DRY CLEANING MACHINE
(Based on applicable Rules & Regulations as of September 2007)

This unit has a refrigerated condenser to reduce solvent losses during the cleaning and drying processes. Based on a staff report for Rule 1421 (December 3, 2004), it is estimated that the unit is 66% efficient in controlling the hydrocarbon emissions.

EMISSION CALCULATIONS

Capacity [lb/load] :		50
Maximum Hydrocarbon consumption [gal/month] :		10
Clothes cleaned per week [lb/week] :		600
Density of HC/petroleum [lbs/gal] :		6.41
VOC emitted from HC dry cleaning system (based on Rule 1421 status report, 12/3/2004) :		34%
Control Efficiency (District policy on 12/3/2003) :		66%
Operating Schedule:	hr/day (average) =	9
	hr/day (max) =	10
	day/week =	6
	week/yr =	52

VOC Emission		Uncontrolled	Controlled
Monthly [lbs/mo]	= HC consumption x Petroleum density	64.1	21.8
Daily [lbs/day]	= Monthly / 4.33/ Max No of day per week	2.47	0.8
Hourly [lbs/hr]	= Daily / Max hours per day	0.25	0.08
Annual [lbs/year]	= Monthly controlled x 12 months	-	262
30-day avg [lbs/day]	= Monthly controlled/ 30 days	-	0.73

RULES EVALUATION

RULE 212 – STANDARDS FOR APPROVING PERMITS

No public notice required as none of the criteria for public notice listed below is triggered.

(c)(1): Unit located within 1,000 feet of the outer boundary of a school.
(c)(2): Emission increases exceeding the daily maximums specified in subdivision (g) of this rule (VOC limit is 30 lbs per day)
(c)(3): Increases in emissions of toxic air contaminants such that Maximum Individual Cancer Risk (MICR) of greater than 1 x 10^{-6} for facilities with more than one permitted unit and greater than 10 x 10^{-6} for facilities with one permit unit.

RULE 401 – VISIBLE EMISSIONS

Compliance is expected with well maintained and properly operated equipment.

RULE 402 – NUISANCE

No nuisance is expected with well maintained and properly operated equipment.

RULE 442 - USAGE OF SOLVENTS

Monthly VOC emissions from this equipment are less than 833 pounds/month.

RULE 1102 - DRY CLEANERS USING SOLVENT OTHER THAN PERCHLOROETHYLENE

The dry cleaning machine is equipped with a refrigerated vapor condenser which is a primary control system for the equipment. Liquid leaks and solvent exposure to the atmosphere are expected to be minimal with proper care and maintenance. Compliance is expected.

REGULATION XIII – NEW SOURCE REVIEW

RULE 1303(a) – BEST AVAILABLE CONTROL TECHNOLOGY (BACT)
Emission increase is more than one pound per day for VOC, so BACT is applicable.
This is a minor source BACT. Per Part D of the BACT guidelines [http://www.aqmd.gov/bact/part-d-final-7-14-2006-update.pdf], current BACT for dry cleaning equipment using petroleum solvent is a closed loop, dry-to-dry machine with a refrigerated condenser or evaporative cooled condenser. The facility is proposing closed loop system that utilizes a refrigerated condenser. BACT requirements are met.

RULE 1303(b)(1) – MODELING
The unit emits only VOC which is exempt from modeling requirements.

RULE 1303(b)(2) – EMISSION OFFSETS
The potential to emit from this facility in AQMD's NSR system shows 0 tons a year. The emissions from the current machine using perchloroethylene are not considered a VOC. The offset threshold is 4 tons per year or 22 lbs per day. The emission increase from the use of the hydrocarbon solvent is less than 22 lbs per day therefore no offset are needed.

PERMIT SAMPLE EVALUATION
HYDROCARBON DRY CLEANING MACHINE
(Based on applicable Rules & Regulations as of September 2007)

Pollutant	Facility Potential to Emit [lbs/ year]			Offset Threshold [lbs/day]	Offset Required? Yes/No
	Before Construction	From Equipment	Total (After Construction)		
VOC	0	0.8	0.8	22	No

REGULATION XIV

RULE 1401 – NEW SOURCE REVIEW OF TOXIC AIR CONTAMINANTS

As per the MSDS, the DF 2000 Fluid contains no toxic air contaminants listed in Rule 1401. (Amended March 4, 2005). Therefore this rule does not apply.

RULE 1401.1 – REQUIREMENTS FOR NEW AND RELOCATED FACILITIES NEAR SCHOOLS
Not applicable.

RECOMMENDATION

All applicable Rules and Regulations have been met. A permit to construct is recommended with the conditions shown on the sample permit pending completion public notice if required.

PERMIT SAMPLE EVALUATION
HYDROCARBON DRY CLEANING MACHINE
(Based on applicable Rules & Regulations as of September 2007)

PERMIT CONDITIONS

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

3. THIS EQUIPMENT SHALL ONLY USE, AS A DRY CLEANING FLUID, PETROLEUM SOLVENT WITH AN INITIAL BOILING POINT OF NOT LESS THAN 375 DEGREES FAHRENHEIT.

4. THE TOTAL QUANTITY OF PETROLEUM SOLVENT THAT IS REPLENISHED IN THIS EQUIPMENT SHALL NOT EXCEED 10 GALLONS PER MONTH, AVERAGED OVER ANY 12-MONTH PERIOD.

5. EACH WORKING DAY, THE OPERATOR OF THIS EQUIPMENT SHALL INSPECT AND CLEAN WITH A WET CLOTH THE FOLLOWING COMPONENTS:
   A. GASKETS AND EDGES OF THE LOADING DOOR
   B. LOADING DOOR LINER
   C. LINT FILTER
   D. AIR FILTER
   E. WASTE WATER SEPARATOR

   IF ANY OF THE SEALS AND/OR GASKETS SHOW SIGNS OF WEAR (E.G. CUTS OR TEARS) SUCH THAT THEY CANNOT PROVIDE AN IMPERVIOUS SEAL AGAINST LIQUID, VAPOR OR AIR LEAKAGE FROM THE DRY CLEANING MACHINE, THE EQUIPMENT SHALL NOT BE OPERATED UNTIL THOSE SEALS AND/OR GASKETS ARE REPLACED.

6. IN ADDITION TO THE RECORD KEEPING REQUIREMENTS OF RULE 1102, THE OPERATOR SHALL KEEP RECORDS OF SOLVENT USAGE, INSPECTIONS AND REPAIRS TO SHOW COMPLIANCE WITH CONDITION NO.4 AND 5. THESE RECORDS SHALL BE PREPARED IN A FORMAT WHICH IS ACCEPTABLE TO THE DISTRICT

7. ALL WASTE MATERIALS WHICH COME INTO CONTACT WITH ANY PETROLEUM SOLVENT SHALL BE STORED IN CLOSED CONTAINERS, AND DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS OF THE DEPARTMENT OF HEALTH SERVICES.

8. PETROLEUM SOLVENTS USED IN THE EQUIPMENT SHALL NOT CONTAIN ANY CARCINOGENIC AIR CONTAMINANTS AS IDENTIFIED IN RULE 1401 AS AMENDED ON MARCH 4, 2005.

9. MATERIAL SAFETY DATA SHEETS FOR ALL DRY CLEANING SOLVENTS USED AT THIS FACILITY SHALL BE KEPT CURRENT AND MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.

10. ALL RECORDS REQUIRED BY THIS PERMIT SHALL BE RETAINED AT THE FACILITY FOR AT LEAST TWO YEARS AND MADE AVAILABLE TO ANY DISTRICT PERSONNEL UPON REQUEST.

11. THIS EQUIPMENT SHALL COMPLY WITH RULE 1102.

Appendix 2

Track Changes to March 2022 Draft SLA CERP

Table 5d-1: Actions to Reduce Emissions from and Exposure to General Industrial Facilities

Goal	Action	Responsible Entity(ies)	Matic(s)	Timeline	
				Start	Complete
C: Dry Cleaners	~~• Enforcement of existing South Coast AQMD and CARB regulations (e.g., South Coast AQMD Rule 1102, South Coast AQMD Rule 1421, CARB Airborne Toxic Control Measure for Emissions of Perchloroethylene (Perc) from Dry Cleaning Operations (Dry Cleaning ATCM))~~ Set acceptable emissions from non-perc solvent-based dry clean systems regulated by Rule 1102 to zero based on viability of zero-emission alternatives. • Phase out existing non-perc dry clean solvent machines after useful life and remove regulatory exemptions for non-perc dry clean solvent machines • ~~Identify~~ Create incentive opportunities to transition to ~~community-identified green alternatives~~professio	South Coast AQMD CSC	• ~~Number of Rule 1102 and Rule 1421 inspections~~ Modify BACT (Best Available Control Technology) for non-perc solvent dry clean machines using professional wet cleaning, setting the acceptable VOC emissions at zero • Amend Rule 1102 to eliminated Rule 102 Group II exemption [by striking (b) 13 and (h) II] and phase out non-perc dry clean machines after fifteen years for the date of installation • Provide list of incentive opportunities to support transition to ~~green alternatives~~professional wet cleaning, ~~if incentive opportunities are identified~~ (and other commercially viable zero-emission technology when identified) • Notify all dry cleaners in SCAQMD – including cleaners with Rule 1102	3rd quarter 2022 ~~2023~~ 3rd quarter 2022 3rd quarter 2022 4th quarter 2022	4th quarter 2022 3rd quarter 2023 2027 (note: assess need after 5 years)

	nal wet cleaning (and other commercially viable zero-emission technologies when identified) • Community outreach to owners and operators regarding regulatory changes, incentives for zero-emissions technologies, and demonstration workshops on ~~green alternative practices~~professional wet cleaning (and other commercially viable zero-emission technology when identified)		permits as well as other non-perc dry cleaners not currently regulated by Rule 1102 of new BACT classification for non-perc solvents machines • Notify all dry cleaners in SCAQMD – including cleaners with Rule 1102 permits as well as other non-perc dry cleaners not currently regulated by Rule 1102 of Rule 1102 rule change • Support creating professional wet cleaning demonstration program to jump start transition to zero emission professional apparel cleaning alternatives. • Number of outreach materials distributed to owners and operators be published on the website concerning new BACT, changes in Rule 1102, availability of incentives, and ongoing demo workshops on zero-emission technologies	3rd quarter 2023 3rd quarter 2022 3rd quarter 2022	2027 (Note assess need for demo program after five years) 2027 (Note assess need if demo program extended

[i] http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/overview.pdf
[ii] http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/overview.pdf
[iii] http://www.aqmd.gov/home/permits/bact/guidelines
[iv] http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/part-d---bact-guidelines-for-non-major-polluting-facilities.pdf
[v] http://www.aqmd.gov/docs/default-source/permitting/dryclean_template.pdf
[vi] Sinsheimer, P., Grout, C., Namkoong, A., Gottlieb, R., & Latif, A. (2007). The viability of professional wet cleaning as a pollution prevention alternative to perchloroethylene dry cleaning. *Journal of the Air & Waste Management Association*, *57*(2), 172-178; Onasch, J., Jacobs, M., & Biddle, E. (2017). From Perchloroethylene Dry Cleaning to Professional Wet Cleaning: Making the Health and Business Case for Reducing Toxics. *Journal of Environmental Health*, *79*(6).
[vii] For CO2 dry cleaning, capital cost of the CO2 system is estimated to be $60,000 greater than a petroleum/hydrocarbon system. This amounts to a total present value of $40,533 based on the assumptions provided in PART C of a 4% interest rate over the 10-year equipment life. Using the figure of 261 lbs/year of VOC emissions, total emissions over 10 years comes to 2,610 lbs or 1.3 tons. Cost per ton of VOC/ROG reduced for CO2 dry cleaning versus petroleum dry cleaning comes to $31,179 per ton of VOC/ROG reduced ($40,533/1.3 tons). For GreenEarth, capital costs are relatively comparable to petroleum dry cleaning. Assuming a $1 increase in net present value, the cost of ton of professional wet cleaning compared to petroleum dry cleaning comes to a cost of $0.77/ton ($1/1.3 tons) of VOC/ROG reduced. For professional wet cleaning, both capital costs and operating costs have been shown to be lower than for petroleum dry clean. Assuming a $20,000 decrease in net present value, $15,385 savings (-$20,000/1.3 tons) per ton of VOC/ROG reduced.
[viii] http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200320040AB998
[ix] California Air Resources Board. Alternative Solvents: Health and Environmental Impacts. (https://www.arb.ca.gov/toxics/dryclean/notice2015_alt_solvents.pdf) (September 4, 2015).
[x] 2018 6 20 European Chemical Agency. Inclusion of substances of very high concern in the Candidate List for eventual inclusion in Annex XIV (Decision of the European Chemicals Agency),
[xi] Note: While CO2 is classified as a greenhouse gas, CO2 dry clean machine manufacturers claim that the CO2 used in CO2 dry cleaning machines is captured from locations where the CO2 would otherwise be emitted to the atmosphere, such as from landfills or industrial production, and thus should not be considered as creating new CO2 emissions. That said, if capturing CO2 from landfills or industrial production can cost-effectively be sequestered, permanently eliminating these CO2, CO2 emissions from CO2 dry cleaning should be considered as creating an adverse environmental impact.