

# **Developing, Testing and Demonstrating Safer Alternatives in Solvent Applications**

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# **INSTITUTE FOR RESEARCH AND TECHNICAL ASSISTANCE**

- **SMALL TECHNICAL NONPROFIT ENVIRONMENTAL ORGANIZATION ESTABLISHED IN 1989**
- **IDENTIFIES, DEVELOPS, TESTS AND DEMONSTRATES SAFER ALTERNATIVES**
- **PRIMARY FOCUS IS SOLVENT APPLICATIONS**
  - **CLEANING, PAINT STRIPPING, DRY CLEANING, PRINTING, COATINGS, ADHESIVES**
- **RUNS AND OPERATES POLLUTION PREVENTION CENTER**



# **PRESENTATION OUTLINE**

- **IRTA APPROACH TO PROJECTS**
- **EXAMPLES OF PROJECTS COMPLETED BY IRTA**
- **REQUIREMENTS**
- **ISSUES / BARRIERS TO CHANGE**
- **GREEN CHEMISTRY INITIATIVES FOR FACILITATING  
CHANGE**



# **IRTA APPROACH TO PROJECTS**

- **SPONSORED BY LOCAL, STATE, FEDERAL GOVERNMENT AGENCIES**
- **FOCUS ON AREA OF SOLVENT USE**
  - **ODSs, GHGs, HIGH-VOC, TOXIC SUBSTANCES CURRENTLY USED**
- **WORK WITH SEVERAL FACILITIES USING SOLVENTS**
  - **REPRESENTATIVE OF INDUSTRY**
- **IDENTIFY, DEVELOP, TEST, DEMONSTRATE ALTERNATIVES WITH FACILITIES**
- **ASSIST SOME FACILITIES IN CONVERTING TO ALTERNATIVES**
- **ANALYZE / COMPARE PERFORMANCE AND COST**
- **EXAMINE CROSS-MEDIA, WORKER IMPLICATIONS**



# **AUTO REPAIR CLEANING PROJECT**

- **SPONSORED BY U.S EPA REGION IX**
- **WORKED WITH 18 AUTO REPAIR FACILITIES IN SOUTH COAST BASIN**
  - **LATER WORKED WITH INDUSTRIAL FACILITIES**
- **TESTED WATER-BASED CLEANERS FOR REPAIR AND MAINTENANCE CLEANING**
  - **MINERAL SPIRITS USED ROUTINELY**
- **DEMONSTRATED FEASIBILITY OF USING WATER-BASED CLEANERS**
  - **COST COMPARABLE**
- **SCAQMD PASSED REGULATION**
  - **EFFECTIVE ON JANUARY 1, 1999**
  - **REDUCED VOC EMISSIONS IN BASIN BY 18 TPD**
  - **40,000 PARTS CLEANERS CONVERTED**











# **AUTO REPAIR CONT'D**

- **WORK GROUP FOR CROSS-MEDIA ISSUES**
  - **DEVELOPED OUTREACH MATERIALS AND ACCEPTABLE PRACTICES**
- **OTHER AIR DISTRICTS HAVE PASSED OR ARE PASSING SIMILAR REGULATIONS**
  - **AS MANY AS 50,000 AUTO REPAIR SHOPS IN CALIFORNIA**
- **CHALLENGING TECHNICAL ISSUES**
  - **HEATED SYSTEMS**
  - **HIGHER CONCENTRATION**
- **INDUSTRY OPPOSED REGULATION**
- **MOST TECHNICIANS NOW HAVE NO MEMORY OF USING SOLVENTS**



# **LITHOGRAPHIC PRINTING CLEANUP PROJECT**

- **PROJECTS SPONSORED BY U.S. EPA REGION IX, DTSC, SCAQMD**
- **WORKED WITH 21 LITHOGRAPHIC PRINTING FACILITIES IN SOUTH COAST BASIN**
  - **RANGE OF INK, PRESS AND SUBSTRATE TYPES**
- **INDUSTRY USES HIGH VOC SOLVENTS AND MANY ARE ALSO TOXIC**
- **DEMONSTRATED FEASIBILITY OF USING SOY BASED, WATER-BASED AND ACETONE BASED ALTERNATIVES**
  - **LOW-VOC, LOW TOXICITY**









# LITHOGRAPHIC PRINTING CONT'D

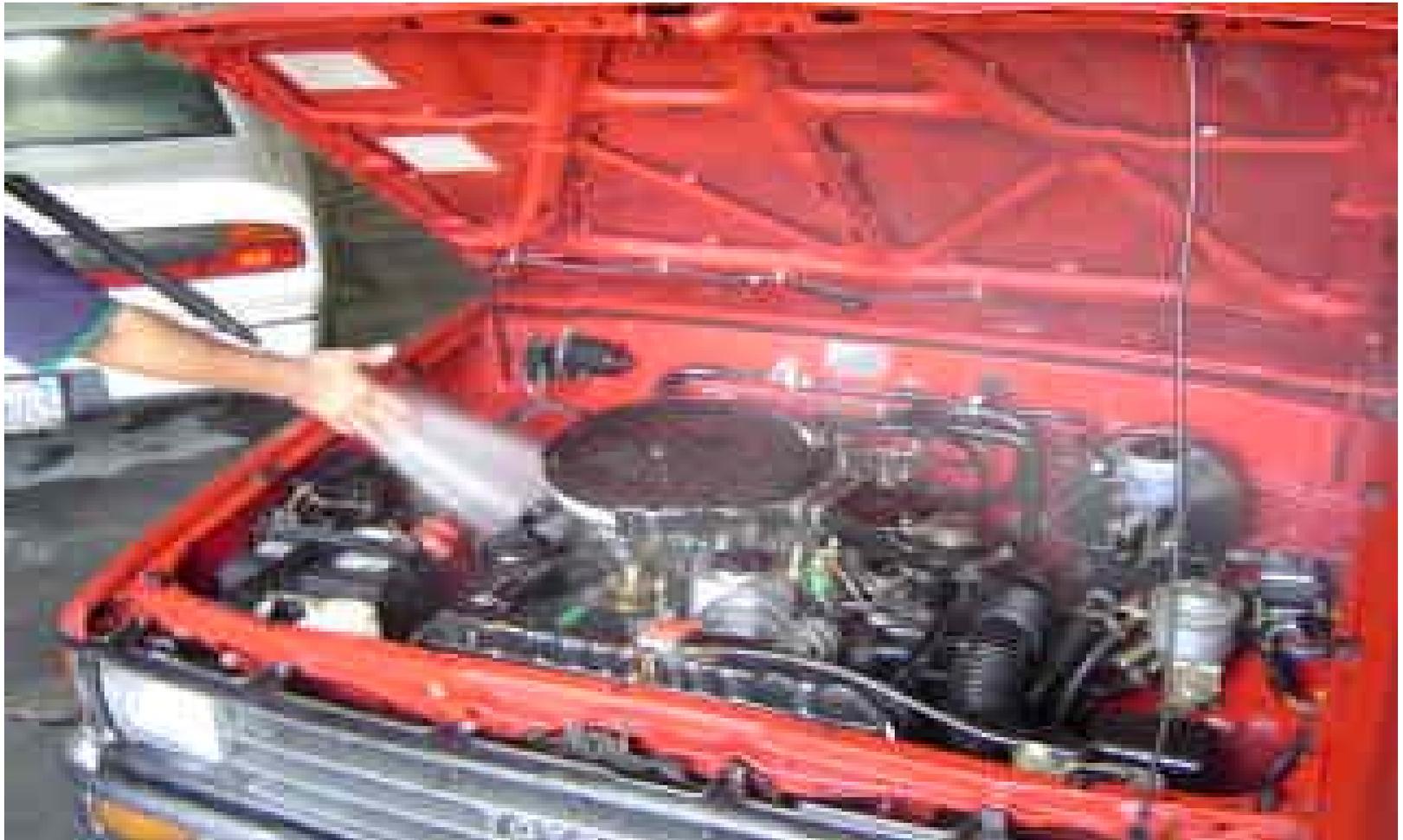
- **SCAQMD PASSED REGULATION**
  - INTERIM VOC LIMIT CURRENTLY IN EFFECT
  - LOWER VOC LIMIT BECOMES EFFECTIVE ON JANUARY 1, 2008
  - WILL REDUCE VOC EMISSIONS BY ABOUT 4 TPD
- **OTHER DISTRICTS, STATES CAN ADOPT SIMILAR REGULATIONS**
  - AS MANY AS 8,000 LITHOGRAPHIC PRINTERS IN CALIFORNIA
- **CHALLENGING TECHNICAL ISSUES**
  - LOW VAPOR PRESSURE CLEANERS
  - RINSING
- **SUPPLIERS DEVELOPING ALTERNATIVES**



# **AUTOMOTIVE AEROSOL PROJECT**

- **SPONSORED BY U.S. EPA REGION IX, CARB, HESIS, DTSC, CITY OF SANTA MONICA**
- **WORKED WITH MORE THAN 20 AUTO REPAIR SHOPS**
  - **DEALERSHIPS, GENERAL AUTOMOTIVE, BRAKE SHOPS, DETAILERS**
- **INDUSTRY USED CHLORINATED, VOC SOLVENT AEROSOL PRODUCTS**
  - **CARB BANNED CHLORINATED SOLVENT PRODUCTS**
  - **INDUSTRY SWITCHED TO VOC SOLVENTS INCLUDING HEXANE**
- **IDENTIFIED DEVELOPED AND TESTED LOW-VOC, LOW TOXICITY AEROSOL CLEANERS**
  - **SOY BASED, WATER-BASED AND ACETONE BASED CLEANERS**









# **AUTOMOTIVE AEROSOL CONT'D**

- **ALSO IDENTIFIED, DEVELOPED, TESTED NON-AEROSOL ALTERNATIVES**
  - WATER-BASED BRAKE CLEANING SYSTEMS
  - WATER-BASED CLEANERS IN SPRAY BOTTLES
  - CANISTERS
- **CARB PASSED REGULATION**
  - INTERIM VOC LIMIT - 2008
  - FINAL VOC LIMIT - 2010
  - WILL REDUCE VOC EMISSIONS BY 10 TPD
- **CHALLENGING TECHNICAL ISSUES**
  - DEVELOP NON-FOAMING WATER-BASED AEROSOLS
- **CHALLENGING POLICY ISSUE**
  - CARB REGULATION BASED ON VOC LIMIT OF ALTERNATIVE AEROSOL PRODUCTS
  - CANNOT BAN WHOLE PRODUCT TYPE





# **CONSUMER PRODUCT PAINT THINNER AND CLEANUP SOLVENT PROJECT**

- **SPONSORED BY DTSC**
- **WORKED WITH SMALL BUSINESSES**
  - **AUTOBODY SHOPS, CONTRACTORS, WOOD REFINISHERS, METAL REFINISHERS**
- **COMPANIES AND CONSUMERS USE PAINT OR LACQUER THINNER**
  - **VOC AND TOXIC SOLVENTS**
  - **SOLD AT HOME IMPROVEMENT, HARDWARE AND PAINT SUPPLY STORES**
- **IDENTIFIED, DEVELOPED AND TESTED ALTERNATIVE THINNERS, CLEANUP MATERIALS**
  - **WATER-BASED AND ACETONE BASED BLENDS**











# **PAINT THINNER CONT'D**

- **ANALYZED FEASIBILITY AND COST OF ALTERNATIVES**
  - COSTS ARE COMPARABLE
- **SCAQMD PASSED REGULATION ON CLEANUP MATERIALS**
  - REDUCED VOC EMISSIONS BY 10 TPD
- **CARB PROPOSING REGULATION FOR PAINT AND LACQUER THINNER**
  - VERY LOW VOC LIMIT
  - WOULD REDUCE VOC EMISSIONS BY 13 TPD
- **CHALLENGING TECHNICAL ISSUE**
  - ACETONE EVAPORATION RATE FOR THINNERS
  - CAN COMBINE WITH LOW VAPOR PRESSURE SOLVENT



# **LUBRICANT AND RUST INHIBITOR PROJECT**

- **SPONSORED BY U.S. EPA REGION IX AND SCAQMD**
- **WORKED WITH 13 COMPANIES USING LUBRICANTS, RUST INHIBITORS**
- **USE VOC EMITTING PRODUCTS**
  - **MAY ALSO CONTAIN TOXICS**
- **IDENTIFIED, DEVELOPED, TESTED LOW-VOC, LOW TOXICITY ALTERNATIVES**
  - **VEGETABLE BASED MATERIALS**
  - **WATER-BASED MATERIALS**
- **SOME OF COMPANIES CONVERTED TO ALTERNATIVES**
- **ANALYZED / COMPARED PERFORMANCE AND COST**











# LUBRICANT CONT'D

- **SCAQMD PLANNING FUTURE REGULATION**
  - **COULD REDUCE VOC EMISSIONS BY 12 TPD IN SOUTH COAST BASIN**
- **CONSUMER PRODUCT LUBRICANTS, RUST INHIBITORS ALSO SOLD IN STATE**
  - **CARB COULD REGULATE BASED ON RESULTS**
  - **COULD REDUCE VOC EMISSIONS BY 4 TPD**



# **OTHER RECENTLY COMPLETED PROJECTS**

- **ALTERNATIVES TO METHYLENE CHLORIDE CONSUMER PRODUCT PAINT STRIPPERS**
- **ALTERNATIVES TO TRICHLOROETHYLENE AND PERCHLOROETHYLENE SPOTTING CHEMICALS IN THE TEXTILE CLEANING INDUSTRY**
- **ALTERNATIVES TO VOC AND TOXIC CLEANUP SOLVENTS IN THE SCREEN PRINTING INDUSTRY**
- **ALTERNATIVES TO TERT-BUTYL ACETATE IN CLEANING AND THINNING APPLICATIONS**
- **ALTERNATIVES TO FIVE EMERGING SOLVENTS D5, N-PROPYL BROMIDE, PARACHLOROENZOTRIFLUORIDE, 1,2-TRANS-DICHLOROETHYLENE AND NMP, IN THEIR MAJOR APPLICATIONS**



# REQUIREMENTS FOR ALTERNATIVES PROJECTS

- **MUST KNOW INDUSTRIAL PROCESSES**
- **MUST KNOW REGULATIONS**
  - LOCAL, STATE, FEDERAL
  - AIR, WATER, WASTE, WORKER EXPOSURE
- **MUST AVOID TRANSFERRING PROBLEM**
  - CROSS-MEDIA, WORKER
- **ALTERNATIVES MUST WORK**
- **USE OF ALTERNATIVES MUST BE REASONABLY COST EFFECTIVE**
- **FIELD WORK VERY DIFFICULT AND RESOURCE INTENSIVE**
- **FUNDING DIFFICULT TO OBTAIN**



# **ISSUES/BARRIERS TO CHANGE IN ALTERNATIVES WORK**

- **NEW SOLVENTS COME ON MARKET AND USERS ADOPT THEM**
  - MAY BE ODSs, GHGs, VOCs OR TOXICS
  - EXAMPLES INCLUDE NPB, D5, TBAC
- **IF CHEMICAL IS NOT A VOC OR LISTED TAC, HARD TO ELIMINATE IT**
  - OEHHA, HESIS MUST EVALUATE TOXICITY DATA
  - CATCH 22 BECAUSE MANY CHEMICALS NOT TESTED FOR TOXICITY
- **MUST USE SURROGATE REGULATORY METHOD TO ELIMINATE FROM USE**
  - APPLICATION BY APPLICATION
  - CHEMICAL BY CHEMICAL



# ISSUES/BARRIERS CONT'D

- **FOX/CHICKEN COOP PROBLEM**
  - **MUST GO OUTSIDE INDUSTRY TO FIND ALTERNATIVES**
  - **MUST HAVE “PROOF”**
- **USERS WILL NOT GO OUTSIDE CURRENT SUPPLY CHAIN**
- **USERS DO NOT ADOPT ALTERNATIVES UNLESS REQUIRED**
- **AGENCY AUTHORITY RESTRICTIONS**
  - **CARB PROVISION FOR PRODUCT TYPES**
  - **OEHHA DOES NOT ALWAYS FOCUS ON HIGH USE/EXPOSURE CHEMICALS**
  - **HESIS HAS INSUFFICIENT RESOURCES**



# **GREEN CHEMISTRY INITIATIVES**

- **NEED CALIFORNIA TSCA LEGISLATION**
  - **NEW PRODUCTS / EXISTING PRODUCTS**
- **OEHHA NEEDS MORE RESOURCES**
- **HESIS NEEDS MORE RESOURCES**
- **CARB PROVISION ON PRODUCT TYPES NEEDS TO BE CHANGED**
  - **COULD BAN AEROSOL PRODUCTS IF NON-AEROSOL ALTERNATIVES AVAILABLE**
- **CARB NEEDS TO CONSIDER WORKER EXPOSURE WITH HESIS INPUT**
- **SHOULD NOT EXEMPT CHEMICALS FROM VOC REGULATIONS UNTIL ALL PROBLEMS HAVE BEEN EVALUATED**



# CONCLUSIONS

- **CURRENT SYSTEM RESTRICTIONS ARE BARRIERS TO ADOPTION OF SAFER ALTERNATIVES**
- **MANY YEARS OF WORK NECESSARY TO FORCE ADOPTION OF SAFER ALTERNATIVES**
- **MUST USE COMPLEX SURROGATE METHODS TO PREVENT USE OF UNSAFE MATERIALS**
- **WORKER EXPOSURE NOT CONSIDERED CURRENTLY**
- **NEED NEW LEGISLATION AND POLICIES**

