

Proposed Project: **Pilot study to reduce hexavalent chromium emissions from stainless steel welding – a community health project.**

Applicant: Air Resources Board

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P.O. Box 2815
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Funding: \$100,000.

Project Period: September 2004 - October 2006.

Reporting Requirements: ARB will provide a detailed report to all stakeholders on the Internet and via an email listserve no later than December 2006, which will provide an analysis of the effectiveness of each of the control devices. ARB will also publish outreach material that summarizes the lessons learned from the project with contact information to learn more about emission control equipment for welding.

Summary of Proposal:

1. Contact welding shops in low-income neighborhoods in Los Angeles that use more than 300 lbs of stainless steel welding consumables per year, and therefore exceed our preliminary risk-based screening levels.
2. Conduct on-site evaluations and confirm emission inventory and receptor proximity.
3. Identify welding shops with the highest risk that will participate in pilot project. *(NOTE: number of welding shops depends on available funds. \$100k will allow us to include up to 5 welding shops, \$60k will include 2 participants for the project.)*
4. Contact control equipment distributors and ask them to submit site-specific cost estimates for installing a variety of control equipment. Different types of control equipment will be included to demonstrate several possible options *(e.g. fume extraction welding guns coupled with pulsed arc techniques and inert shielding gas, or standard central or portable high vacuum - low volume local exhaust ventilation systems with low-fume consumables)*.
5. Install emission control equipment at welding shops (at no cost to the business).
6. Conduct particulate matter (PM_{2.5}) and air toxics measurements of emissions before and after control device.
7. Determine emission and risk reductions, as well as total cost of control equipment.
8. Invite interested stakeholders to visit participating welding shops following installation of the control equipment. This is an opportunity for participating small businesses to build a relationship with their neighbors and to provide information about ways to reduce risk.
9. Follow-up with welding shop participants to determine if control equipment is still operating effectively, and to survey welders as to the ease-of-use of the equipment.

Background

The Air Resources Board and the University of California, Davis, recently completed a research project to measure hexavalent chromium emissions from welding. We completed the two major objectives in 2002-2003 which were to: (1) develop a comprehensive sampling protocol for measuring particulate and hexavalent chromium emissions from welding; and (2) compare different types of welding to determine which processes emit the highest amounts of hexavalent chromium. The results indicate that uncontrolled stainless steel welding has emissions of hexavalent chromium that can significantly impact public health.

ARB staff developed a screening risk assessment methodology which was used to determine the amount of welding consumables that provide an increased risk of 10 per million to a receptor at 20 and 200 meters from a typical welding shop. This type of screening analysis has been used to support several recent ARB regulations, including an update to an existing regulation to further reduce hexavalent chromium emissions from metal platers, and a proposed regulation to reduce emissions from facilities that conduct metal spraying using chromium. We expect to complete the same analysis for welding using both the uncontrolled and the controlled emissions estimate after installing control equipment at these facilities.

Project Objectives/Implementation Plan

How will this project reduce risks?

This pilot project will demonstrate quantifiable risk reductions at several stainless steel welding shops in Los Angeles. Because many businesses may be required to install control equipment in the future to reduce emissions from stainless steel welding, it is critical to demonstrate the real costs and benefits associated with several types of control equipment. At the completion of this pilot project, ARB will be able to demonstrate examples of emission control equipment that perform well, and quantify the real costs and benefits associated with this equipment.

How will this project increase local capacity to address risks?

This pilot project will: (1) provide a methodology to determine whether a facility's welding operations may impact the community; (2) provide information about what kind of control equipment is appropriate to reduce welding emissions and to what extent will the emissions be reduced.

Community Involvement and Effective Partnerships

How will ARB promote multi-stakeholder collaboration?

This project has a significant potential for improved worker safety for welders, since the removal of air toxics by filtration to improve overall air quality will also reduce the welder's exposure to those emissions. The ARB will coordinate with the California Division of Occupational Safety and Health (DOSH, Cal-OSHA) to quantify the reduction of air toxics in the welder's breathing zone when control equipment is utilized, and to communicate this benefit to the entire welding community. DOSH will provide this testing service at no cost. We expect these results to promote collaboration between

health-advocacy groups, as well as environmental justice groups, with the dual purpose of reducing risks for the worker and the community.

How can the results of this project be shared with other communities?

Several environmental groups have identified welding as a source category of concern and will help identify environmental justice areas and distribute outreach materials (results of this pilot project) to local businesses in order to promote multi-stakeholder collaboration. Local groups are often better able to work with local businesses than government agencies and we expect this portion of the grant to be very successful.

How do we leverage stakeholder efforts to result in action?

We have contacted welding industry trade groups, as well as local air districts to publicize our efforts to reduce emissions from stainless steel welding and we intend to involve all of these stakeholders in the pilot project. Businesses will accept free control equipment this year because control equipment may be required in future years, and the immediate benefits to worker's safety can be significant.

Does this project benefit sensitive populations?

Welding often occurs near residential neighborhoods, including low-income and minority communities. Beginning in the lowest income areas of Los Angeles using Census data, ARB and community groups will target these communities for participation in this pilot project. Welding shops with vulnerable populations in close proximity will be given priority for funding, although this must be balanced with the need to focus on the highest risk welding shops first. Because there are less than 100 welding shops that do stainless steel welding in the greater Los Angeles area (and many of these are larger manufacturing facilities), we expect to be able to contact a large number of these businesses and target specific environmental justice areas.

Resources

Is the budget clearly stated?

We have provided two budgets for review. A budget for \$100,000 has been submitted that allows us to include 5 welding shops.

Other sources of funding?

ARB will provide funding for all personnel expenses during the project, including 50% of the costs of the toxics analyses. The major budget items funded by this grant are for travel and purchasing and installing control equipment.

The ARB will measure control equipment performance using standard techniques, including size fractionation of particulate (PM₁₀ and PM_{2.5}), and chromium (CARB Method 425 for total and hexavalent chromium). The ARB will provide staff time at a reduced cost. Grant monies will subsidize laboratory analyses and be used to purchase control equipment at welding shops for demonstration purposes.

Commitments from other stakeholders?

DOSH will provide testing services at no cost. Generally a welder will wear a personal sampler during an 8-hour shift and the results will be provided as an average concentration for those 8 hours. Detailed activity data will be collected during the day

for each welder so that exposure results can be matched with expected emission estimates.

The South Coast Air Quality Management District (District) has agreed to participate in this project to help ensure that participating businesses fulfill their commitment to operate the control equipment properly. The District will conduct site visits along with ARB staff at no cost to discuss the project with potential participants (welding shop owners) in September 2004, and evaluate the control equipment on an ongoing basis as part of their regular permit review program.

As described earlier, environmental groups are eager to partner with ARB to distribute outreach material to affected industries and work with the local air district to increase public awareness of possible emission control equipment options.

Total project costs:

The requested grant funds will provide for travel expenses and for the purchase of emissions control equipment, in-kind costs were not included in the budget. Estimated staff time in excess of 500 hours is expected (350 hours for planning and management, 150 hours for sampling and analysis). In-kind cost of staff time estimated in excess of \$25,000.

ARB routinely conducts monitoring studies and is able to mobilize resources for this type of testing project. Since the ARB is committed to adopting a regulation to reduce emissions from welding, this project will receive a high priority. In-kind cost of laboratory analyses estimated in excess of \$15,000 for particulate matter and hexavalent chromium for all 5 welding shops.

Subsequent analyses for other toxics (nickel, manganese, etc.) could be included with only a small increase in total cost for the project. In-kind cost for additional metal analyses estimated at \$3,000.

Budget (\$100,000)

This budget provides control equipment for up to 5 welding shops.

Note: 64% of total costs are used to purchase control equipment.

Personnel, Fringe Benefits, Contractual Costs, Outreach, Other Costs

\$0

Travel

October 2004 site-evaluation visit	
Flight (roundtrip Sacramento - Los Angeles)	\$200
Hotel (3 days @ \$80)	\$240
Expenses	\$100
Rental car (3 days @ \$50)	\$150
Subtotal per person	\$690 x 3 people
TOTAL for 3 people	\$2,070

February 2005 equipment installation visit	
Flight \$180 (roundtrip Sacramento - Los Angeles)	\$200
Hotel (4 days @ \$80)	\$320
Expenses	\$100
Rental car (4 days @ \$50)	\$200
Subtotal	\$820 x 3 people
TOTAL for 3 people	\$2,460

Measurements and Analysis (April 2005)

Equipment Shipment	\$700
Sampling Supplies	\$4,000
Laboratory Analysis (50% of total 15k cost)	\$7,500
Travel (3 in test team x \$610)	\$1,830
TOTAL	\$14,030

Control Equipment

Purchase Local Exhaust Ventilation and Filtration System	
Hoods, extension arms, ducting, filter assembly, power, installation, optic sensors (\$19,000 x 3)	\$57,000 (for 3 shops)
Portable filter and extension arms (\$7,000 x 2)	\$14,000 (for 2 shops)

Conduct On-Site Tours of New Control Equipment

September 2005	\$5,440 (for all 5 shops)
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Printing and Distribution Costs of Report

\$5,000

TOTAL **\$100,000 (for all 5 shops)**

[Note: Cost savings can be achieved with a larger number of participating welding shops.]