



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

<p>Your Name (List all student names if multiple authors.) Heather Florence Johnston; Mary Eugene Vargas</p>	<p>Science Fair Use Only</p>
<p>Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Phase III: EDTA Treated Mercury Nitrate</p>	<p>S0409</p>
<p>Preferred Category (See page 5 for descriptions.) 4 - Chemistry</p>	<p>Division <u> </u> Junior (6-8) <u> X </u> Senior (9-12)</p>
<p>Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.</p> <p>For the past few years we have been working on solving the problem of plume contamination of mercury nitrate and other heavy metals at a cost-effective level. Such places as the Stringfellow Acid pits contain dangerous heavy metals, among the most deadly identified was mercury nitrate. Other treatments such as containment used to solve such problems worked but cost hundreds of thousands, even millions of dollars. Therefore, we were faced with the problem of finding a cost-effective solution that would neutralize mercury nitrate. The first step we took to solving this problem was to identify and then try to eliminate the lethal contaminant(s). So, in our first year, we identified, after simulating the plume environment and testing vinegar eels, that the synergistic combination of lead and mercury nitrate at 100 ppm proved to be the most dangerous. Then in the second year, we attempted to find a cost-effective solution to these two heavy metals and experimented with three methods: the precipitation reaction, acid-base neutralization, and EDTA treatment, a common solution used to flush out such cases of mercury poisoning. Using invertebrate test subjects, we concluded from our data that although the precipitation reaction worked at higher concentrations, at lower concentrations it would be of little use or produced a carcinogen; and that the EDTA reaction seemed to neutralize the subjects' reactions.</p> <p>This year, we felt that we needed to step up the project complexity and proof. Based on the theory concluded last year that EDTA did neutralize mercury nitrate, we decided to use more complex test subjects and question an additional problem. Were "safe" mercury levels as defined by the EPA really safe? There had been articles in our local newspapers asking this, for there had been similar symptoms of mercury poisoning in supposedly safe mercury levels that were close, but not reaching the limit. Therefore, with the testing of EDTA-treated mercury nitrate, we could help solidify our theories toward a solution for plume contamination and test questionable limits.</p>	
<p>Summary Statement (In one sentence, state what your project is about.) Our projects tests the EPA mercury concentration limits and the extent to which EDTA can neutralize the effects of mercury nitrate.</p>	
<p>Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Dr. Zanella supervised our procedures and preparation and father helped build display board.</p>	