

Toxic Scandal and Toxic Threat

The Plasma-Arc Garbage Incinerator in Disguise Proposed for Sacramento



**Greenaction for Health and Environmental Justice
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www.greenaction.org



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Plasma-Arc Technology for Waste Treatment: A Proven Technology or Incinerator in Disguise?

Greenaction for Health and Environmental Justice researched and produced this report as a public service to educate and alert residents, government officials and other members of the public to the toxic threat posed by the plasma-arc gasification facility proposed in Sacramento, California for the processing of municipal solid waste and a wide variety of waste materials.

As there has never been a commercial plasma-arc facility in the U.S. that processes garbage, and since there are only a few small ones in the world, it is vital that the public and government decision-makers become aware of the documented facts that demonstrate the dangers and problems of this technology.

Greenaction has researched the proposal and claims made by companies promoting a plasma-arc facility in Sacramento. We have also researched existing and proposed plasma-arc and gasification facilities in the U.S. and worldwide, and we have evaluated the implications on health, the environment and the economy.

This report evaluates the plasma-arc facility proposed in Sacramento and answers the question: “Is plasma-arc a proven technology or an incinerator in disguise that threatens the health, environment and economy of the community?”

The facts are clear: a plasma-arc waste treatment facility would be an incinerator in disguise that would pollute the air, undermine renewable energy, recycling and zero waste programs, and potentially be a financial disaster for Sacramento.

Using garbage as a fuel source is not renewable energy. A plasma-arc facility would pollute the air and would also undermine Sacramento’s stated commitment and mandate to pursue maximum recycling and waste reduction efforts and goals, as the City would have to commit to send large amounts of garbage to this facility for years to come. Committing to a problem-plagued technology for years to come poses a financial risk to the City and taxpayers as well.

Background on the Proposed Plasma-Arc Facility Project:

The City of Sacramento and the Sacramento Municipal Utility District (SMUD) have both stated that they are seeking renewable power sources and an alternative to the city’s current hauling of municipal solid waste (garbage) to a landfill near Sparks, Nevada (*California cities explore garbage-to-energy proposals*, Sacramento Bee, by Chris Bowman, March 5, 2008).

The City of Sacramento is actively considering the possible siting of a plasma-arc incineration facility for municipal solid waste (garbage) pursuant to a Request for Qualifications they published in August 2007.

The Request for Qualifications sought proposals for a technology to help the City meet five specific goals:

- 1) To be environmentally friendly and reduce greenhouse gas emissions
- 2) To be economically viable and cost-neutral
- 3) To leave little or no residual requiring treatment or landfill disposal
- 4) To continue the City's existing recycling program
- 5) To utilize a proven technology at a commercial scale

On February 26, 2008, the City Council authorized nonbinding negotiations exclusively with U.S. Science and Technology of Sacramento (USST). The City Council approved this decision after a presentation by the City Manager staff and USST officials. As discussed below, these presentations contained incorrect and misleading claims.

USST and its partners want to build a "Plasma-Arc Gasification" "waste to energy" facility in the Sacramento area using technology supplied by Westinghouse Plasma Corporation, a wholly-owned subsidiary of Alter NRG. The technology being considered by the City would involve subjecting the waste materials to intense heat from a plasma-arc. Then the resulting gases (called "syngas") would be incinerated in an internal combustion engine, with pollutants emitted into the air. USST and their project partners claim that the plasma-arc technology is proven, can generate large amounts of "renewable" electricity, and is environmentally friendly.

According to Jim Rinehart, the Economic Development Manager for the City of Sacramento, the plasma-arc facility proposed by USST and under active consideration by the City would treat 500 tons per day of municipal solid waste (July 1, 2008 email from Jim Rinehart to Bradley Angel, Greenaction). Other waste streams including medical waste, electronic waste, and industrial hazardous waste have also been discussed for a facility in the Sacramento area.

Other USST partners in the Sacramento project include Geoplasma/Jacoby Energy Development and Aerojet. Geoplasma is proposing a giant plasma-arc facility in St. Lucie County, Florida. Aerojet is a Sacramento-based company with a long and well-documented history of pollution.

Can the Technology and Industry Claims Be Trusted?

Sacramento residents may soon become guinea pigs for an unproven and polluting technology promoted with incorrect and questionable claims. As the USST project would be the first plasma-arc facility in the United States ever used for the commercial treatment of municipal solid waste, accurate information and a full public review of the project is essential.

Unfortunately, this project and the claims of the companies involved in this project have not received adequate scrutiny by government agencies. Instead, many government officials and agencies seem to have welcomed these companies despite serious problems with this technology in actual commercial operations, despite false, misleading and contradictory claims and despite a lack of truly verifiable independent data from actual operating conditions to back up key claims.

The Sacramento City Council Approved the Exclusive Right to Negotiate to USST Based on Questionable and Incorrect Statements Made by the Company and City Officials:

On February 26, 2007, USST officials made a presentation to the Sacramento City Council in support of their proposal to build and operate a large commercial plasma-arc waste treatment facility. A video of the City Council meeting can be viewed in its entirety on the City Council website. This presentation was filled with incorrect statements made by the representative of the City Manager and companies involved in the proposed project.

The presentation by the City Manager's office also included a glowing public relations video from Alter NRG. The Alter NRG public relations video is noteworthy for its repeated praises of the use of coal for energy generation – the main culprit in climate change and global warming. This should have been all the warning necessary of USST's bad ideas when it comes to environmental protection.

The Alter NRG video stated that “(T)he syngas is then cleaned up by removing the environmentally destructive elements”

The truth, however, is that toxic and criteria pollutants are emitted by the combustion of the syngas that is an essential component of the plasma-arc waste treatment process.

The Alter NRG video claimed that “(T)he carbon dioxide can also be easily captured to reduce greenhouse gas emissions.”

The truth is that there are no examples of commercial plasma-arc facilities capturing carbon dioxide, and USST and their partners have provided absolutely no information whatsoever about how this would be accomplished.

Bill Haynes, who identified himself as Vice-President of engineering with Jacoby and also Geoplasma, a partner of USST in this project, made numerous incorrect and misleading claims.

Mr. Haynes told the City Council that “...*there is not a single item* in the process that can't be contained with technology.”

This statement is not true, as the combustion of syngas created by the plasma-arc process results in emissions of toxic and criteria pollutants into the air.

Mr. Haynes told the City Council that “(T)he Japanese one is a 300 ton a day system...the electricity is put on the grid for local communities.”

In fact, the facility mentioned by Mr. Haynes is the Utashinai, Japan facility operated by Hitachi Metals that uses Westinghouse Plasma Corporation/Alter NRG technology. This facility has two 85 ton per day lines, for a total of 170 tons per day. Jim Rinehart of the City Economic Development agency learned on his visit to this facility that it was not generating any electricity to the grid, even though they use the dirty fossil fuel coke to help generate energy for the plasma process.

Mr. Haynes told the City Council “(W)e are designing *and building* the St. Lucie project in Florida,” certainly giving the impression the facility is under construction. A few minutes later Mr. Haynes made the misleading claim that that “(W)e're down in St. Lucie, *we're making about 59 megawatts of electricity and it's all being absorbed* in that county of 125,000 people.”

The truth is that there are zero megawatts being generated, as there is no plasma-arc facility operating or even under construction in St. Lucie County, Florida. Geoplasma has not even submitted the required permit application to the Florida Department of Environmental Protection.

Mr. Haynes went on to tell the City Council that “Syngas is hydrogen and carbon monoxide.”

The truth, however, is that syngas also contains toxic contaminants and is not just hydrogen and carbon monoxide.

Marty Henneman of the City Manager's office made the staff presentation to the City Council on February 26, 2008. To help make his claim that plasma-arc is supposedly a "proven technology," he told the Council members that the "first U.S. facility will be built in St. Lucie, Florida." That is a completely inaccurate statement made to promote the plasma proposal. The truth is that the company proposing that facility, who happens to be USST partner Geoplasma, has not even submitted a permit application to the Florida Department of Environmental Protection for such a facility, so there is certainly no guarantee the facility will ever be approved or built.

The claim that plasma-arc is a "proven technology" on a commercial scale is also contradicted by the experience and problems that plagued the only two commercial plasma-arc facilities in the United States. The Hawaii Medical Vitrification facility near Honolulu has had severe problems with the plasma-arc equipment including damage to the refractory in the kiln that forced the plant to close for months and resulted in serious violations at the plant due to stockpiling of wastes. The Hawaii plant is very small and has been unable to expand.

The closed Allied Technology Group facility in Richland, Washington shut in 2001 after chronic operational problems, triggering severe financial problems, stockpiles of untreated mixed radioactive and hazardous waste and laid-off workers. More information on these facilities can be read in this report and also in a study done by Greenaction and the Global Alliance for Incinerator Alternatives entitled "Case Studies: Incinerators in Disguise" 2006 (report available at www.greenaction.org and www.no-burn.org). Apparently, City staff never researched or even knew of these facilities prior to recommending plasma-arc to the City Council.

Alarming, the City is still spending large amounts of staff time while considering doing business with companies that made such misleading and incorrect claims in pursuit of a project that would earn them millions of dollars. In fact, in early July, City officials even traveled on a tour to Japan paid for by USST.

Critique of U.S. Science and Technology's "Statement of Qualifications" and Other Documents Submitted to the City of Sacramento, October 26, 2007:

The "Statement of Qualifications" submitted to the City of Sacramento on October 26, 2007 by USST is filled with incorrect, contradictory and misleading statements, diagrams and photos. Despite these problems, and without properly scrutinizing company claims, the City of Sacramento entered into exclusive negotiations with this company and has embraced the problematic technology being promoted by USST and their partners.

- **Pretty Picture, But Where Is the Stack?**

The cover of the "Statement of Qualifications" contains a photograph (below) of a building that is likely intended to show what a facility in Sacramento would look like. In fact, it is a deceptive and only a partial photo of a Hitachi Metals facility in Utashinai, Japan that shows a building with no visible stack for emissions from the plasma-arc process used at the facility – but does not show the whole facility. This photo provided by USST to the City of Sacramento is misleading, as this plasma-arc facility in Utashinai indeed has a stack for emitting pollutants into the air.



The next photo shows the front page of the Hitachi Metals publication (Hitachi Metals Reports, No. E -321) provided to the City of Sacramento by USST. This photo of a Hitachi Metals plasma-arc plant in Japan does not show a smokestack.



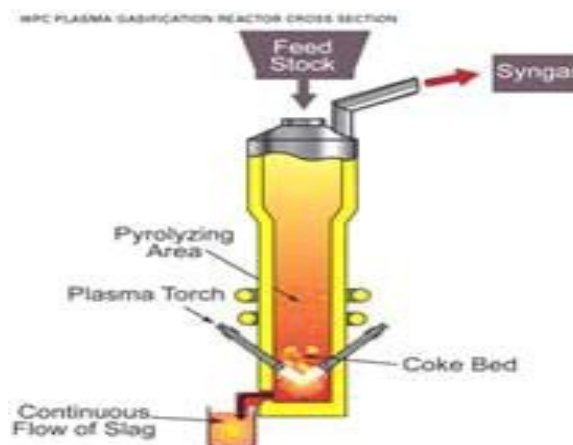
On the inside of this same Hitachi Metals publication is a photo, below, of a similar (or the same) Japanese facility that clearly shows a very large stack.



Despite the photo of part of the Utashinai facility that does not show any stack, Sacramento City official Jim Rinehart confirmed upon his return from a tour of the plant that there indeed is a stack. (phone conversation with Bradley Angel, Greenaction, July 28, 2009).

So why did USST's "Statement of Qualifications," and their power point presentation given to the City, omit a picture of the stack at the Utashinai facility? Of course, seeing a picture of a large stack conflicts with the image of this allegedly "clean" plasma-arc technology.

No pictures of stacks for emissions, or specific graphics or descriptions of the combustion of the syngas are shown in the USST "Statement of Qualifications." For example, on page 9, in a section entitled "Similar Project Descriptions and Additional Information" there is a graphic of the "Plasma-Arc Gasification" unit supplied by Alter NRG's subsidiary Westinghouse Plasma. This graphic shows no combustion device or emissions stack. The graphic ends with the syngas output, omitting two key components of the plasma-arc waste treatment process – the internal combustion engine that incinerates the syngas, and the stack where pollutants would be emitted into the air.



In fact, the "Statement of Qualifications" fails to mention, at all, the key part of the process that involves incineration of the syngas created by the heating of the waste materials.

- **Are the Hitachi Metals Facilities in Japan the Model of a “Proven Technology” and Are the Claims about This Facility True?**

Where Is the Emissions Data?

According to Jim Rinehart, Hitachi Metals officials informed him that they did not have emissions data to provide.

Small Size of “Models” and Different Waste Streams:

USST has never built or operated a plasma-arc facility. USST, Westinghouse Plasma Corporation/Alter NRG and Geoplasma point to the Hitachi Metals plant in Utashinai, Japan as a model. USST claims that the Westinghouse Plasma Corporation/Alter NRG Plasma Gasification/Vitrification Reactor was “...proven and perfected at three Hitachi Metals...facilities in Japan beginning in 1999...” (“Statement of Qualifications,” page 2). This is a curious and inaccurate claim as the same USST document confirms that none of these Hitachi Metals facilities are even close to the size proposed for Sacramento and have a different waste stream than what would be processed at a Sacramento facility.

USST’s “Statement of Qualifications” states that the Utashinai facility processes 200 tons per day: “The largest of these three facilities processes 200 T/day MSW and automobile shredder waste.” (USST’s “Statement of Qualifications”, page 2).

USST’s power point presentation provided to Sacramento officials claimed that the Utashinai facility was “designed for” 98% MSW and only 2% auto shredder waste.”

Contradicting USST’s claims, Sacramento officials were informed during their visit to Utashinai by Hitachi Metals that only 50% MSW was being treated at that plant (July 28, 2008 phone conversation between Jim Rinehart, City of Sacramento and Bradley Angel, Greenaction). According to Mr. Rinehart, he was told on his tour of the plant that the facility has two 85 tons per day lines, one for municipal solid waste and one for automobile shredder waste.

USST also points to Hitachi Metals’ plasma-arc facility in Yoshii, Japan, which they say was designed to process 26.4 tons per day, and is now closed. The facility in Mihama-Mikata, commissioned in 2002, is reported by USST as processing 19 tons per day of MSW and 5.3 tons of sewage sludge. (USST “Statement of Qualifications,” page 6) – far less than the 500 tons per day proposed in Sacramento.

Commercially Proven?

Westinghouse Plasma Corporation document entitled “Comparison Between Westinghouse Plasma Gasifier and Conventional Gasifier” claims that their technology has been “proven commercially in Japan on MSW since 1999.” This document was apparently given to the City of Sacramento by USST in support of their proposal.

The claim that this technology was proven commercially in Japan on MSW since 1999 is contradicted by USST’s own “Statement of Qualifications” which points out that the Yoshii facility was only a “pilot prototype,” not a commercial facility (“Statement of Qualifications,” page 6) and by their statement that the Yoshi facility was certified in September 2000, (page 10) – not in 1999.

What Electricity Generation?

As was clear from the February 26, 2008 City Council meeting about this project, City Council members were quite excited by the prospect of a plasma-arc facility generating electricity that could be sold to the grid. Their enthusiasm will be dampened by the reality.

Alter NRG's website says that the Utashinai facility generates 3.9 megawatts of electricity. Yet USST's power point presentation to the City of Sacramento claimed that the Utashinai facility "(G)enerates 7.9 MW of electricity (4.3 MW to grid)." However, Mr. Rinehart has stated that he was told during his tour of the plant that no electricity whatsoever was being sent to the grid.

USST's "Statement of Qualifications" (page 10) included a "project description" of a proposed plasma-arc facility in Florida that their partner Geoplasma claims would generate 80 megawatts per day with 60 of those megawatts going to the grid, certainly giving the impression that large amounts of electricity could somehow be generated at a facility in Sacramento. USST, Geoplasma and their partners can point to no plasma facility in the world that claims to generate even 10% of the amount of electricity mentioned by Geoplasma as part of their proposed facility in Florida.

There is no proof submitted by USST or their partners that any significant amount of energy can be generated at a facility in Sacramento, and the claims that the Utashinai generated even minimal amounts of electricity for the grid apparently are not accurate.

Plasma-arc facilities are normally generated in a high-energy electrical discharge or arc, and as such require considerable amounts of electrical energy to operate. It is yet to be proven that a full-scale plasma incineration can generate more electricity from the gas stream generated, than is put into the process to treat the waste.

As a 2006 Nature Magazine article says, "despite its promise [plasma-arc] has not yet turned trash to gold" (Cyranski, David, *One Man's Trash...*, Nature, Volume 444, November 16, 2006, <http://www.nature.com/nature/journal/v444/n7117/full/444262a.html> - browsed February 27, 2008). In fact, the plasma-arc incinerator in Utashinai, Japan, "has struggled to make ends meet since opening in 2002." The incinerator has been unable to sell electricity, and on average processes only 60% of the trash volume that the company expected. The article also reports that the plasma-arc incinerator in Utashinai, Japan often suffers from operational problems, and one of the two lines is often down for maintenance.

In late February 2008, a SMUD official publicly questioned claims that Westinghouse Plasma's technology could generate more electricity than it would use. "It takes a lot of electricity," Jim Shetler, the SMUD's assistant general manager for energy supply, said in an interview. "Do you use more electricity in the process than you gain from the gas stream that you use to burn and generate electricity?" (*City Sees Green in Garbage Proposal*, Sacramento Bee, by Terry Hardy and Chris Bowman, February 27, 2008).

City and County of Honolulu Rejected Plasma-Arc and Critiqued Utashinai, Japan Facility:

In 2004, the City and County of Honolulu reviewed information about the Hitachi Metals plant in Utashinai, Japan and plasma-arc, ultimately rejecting a proposed plasma-arc facility to process garbage. Their research found that:

"Plasma-arc technology applied to solid waste is still in a research and development stage, raising significant questions of reliability. The current state of the technology

poses potential high risks of interrupted service operations due to technical complications. The Eco Valley facility in Utashinai is the largest and has a design capacity of 166 tons per day. The facility is presently running at half capacity and has not produced power for sale on a consistent basis.”

<http://www.honolulu.gov/refs/csd/publiccom/honnews04/plasmaarcrecommendations.htm>

- **USST claimed to be directly or indirectly associated with every large-scale plasma waste to energy project in the US today? Sounds impressive, but it is not true.**

Claim: USST’s “Statement of Qualifications” states on page 3 the following incorrect claim: “The USST Team is directly and indirectly associated with *every* large-scale plasma WTE project proposed in the United States today.”

Truth: This claim would certainly be news to USST competitor InEnTec that was actively pursuing plasma-arc “waste-to-energy” projects in Red Bluff, California and other locations at the very time USST made this claim in their proposal to the City of Sacramento.

- **Key Claims by USST about Geoplasma’s Florida Project Are Not Correct**

Claim: USST’s “Statement of Qualifications” on page 2 claims that the Jacoby Energy/Geoplasma facility proposed in St. Lucie County, Florida was “Currently approved, financed and scheduled for construction.” On page 10, USST claims that Geoplasma “...is currently in the final stages of permitting ... in St. Lucie County, FL.” Both of these statements are incorrect.

Truth: In fact, Geoplasma not only has no permit from the Florida DEP for the facility but as of August 24, 2008 still had not even submitted an application to the Florida DEP for the permit they need to get approved, eight months after USST claimed to the City of Sacramento that the Florida facility was “approved.” It is misleading to claim a company is in the “final stages of permitting” if no permit application has even been submitted to the Florida DEP for a permit required before any operation can begin or be considered approved.

- **USST’s Alarming Partnership with Chronic Toxic Polluter, Aerojet:**

USST describes the qualifications of their project partner the Aerojet Corporation in glowing terms:

Aerojet, a GenCorp company, is a world-recognized aerospace and defense leader principally serving the missile, space propulsion, and armaments markets. Aerojet's Sacramento-based operations include over 1,700 employees. The company brings relevant engineering expertise in combustion, thermal management, systems engineering, and chemistry capabilities related to synthetic fuel development. In addition, the company has identified several locations on its Sacramento County properties that are suitable for siting of USST’s proposed WTE facility. (USST “Statement of Qualifications” page 9).

USST conveniently but conspicuously omits any mention of Aerojet’s terrible and chronic track record of toxic pollution and City officials are ignoring the serious pollution violations. Involving Aerojet in the proposed plasma-arc project is an invitation to disaster, and it is alarming that USST is including them in their plasma-arc project.

Recently, on July 2, 2008, the Sacramento Metropolitan Air Quality Management District announced that Aerojet paid \$12,300 in penalties to the Air District for serious air quality violations that occurred at its aerospace painting facility in Sacramento in August and November 2007.

“Permit violations are a serious problem for Sacramento’s air quality,” said AQMD’s Executive Officer Larry Greene about Aerojet’s violations. (AQMD News, July 2, 2008, reviewed July 10, 2008 <http://www.airquality.org/new.shtml>).

Even more alarming and serious violations were revealed when state inspectors caught Aerojet committing over three dozen serious violations over a period of years. On March 24, 2004, the California Environmental Protection Agency’s Department of Toxic Substances Control announced an enormous \$1,200,000 settlement with Aerojet-General Corporation, Aerojet Fine Chemicals LLC and parent company GenCorp, Inc. for a series of repeat hazardous waste violations revealed during DTSC inspections at Aerojet’s Rancho Cordova facility located at U.S. Highway 50 and Aerojet Road near Sacramento.

Why are Sacramento City officials allowing a project that could harm public health proceed with notorious polluter Aerojet as a major partner? Aerojet committed serious and chronic violations for years, despite regulations and laws that prohibit such violations. The exact same situation could arise with a plasma-arc facility, where violations could occur and be allowed to continue for years by government regulators and company officials before anything is done about it.

More information on Aerojet’s violations are attached as Exhibit A.

Not an Incinerator - or Incinerator in Disguise?

Companies promoting plasma-arc and gasification all claim that the technology is not an incinerator. If you relied on company websites, diagrams and process descriptions, you probably would not realize that these are indeed incinerators disguised as “renewable energy” technologies.

While there are differences with traditional incineration technologies, the plasma-arc, gasification and pyrolysis processes all involve incineration/combustion as an essential component. One difference is that while traditional incinerators burn the waste directly, plasma-arc heats the waste, creating a synthetic gas (“syngas”). The heating of the waste and the creation of the syngas is the stage where the plasma-arc companies often fail to fully describe the process.

These technologies emit dioxins and other harmful pollutants, and are defined as incineration by the U.S. Environmental Protection Agency (U.S. Environmental Protection Agency, Title 40: Protection of Environment, Hazardous Waste Management System: General, subpart B definitions, 260.10, current as of April 24, 2008).

Key to the process is the burning of the syngas. This combustion process is the incineration that results in emissions of toxic and criteria pollutants into the air. These emissions will include dioxins and furans, highly toxic chemicals linked to a wide range of profound illnesses including cancer, reproductive, developmental and immunological diseases.

Westinghouse Plasma Corporation and Alter NRG:

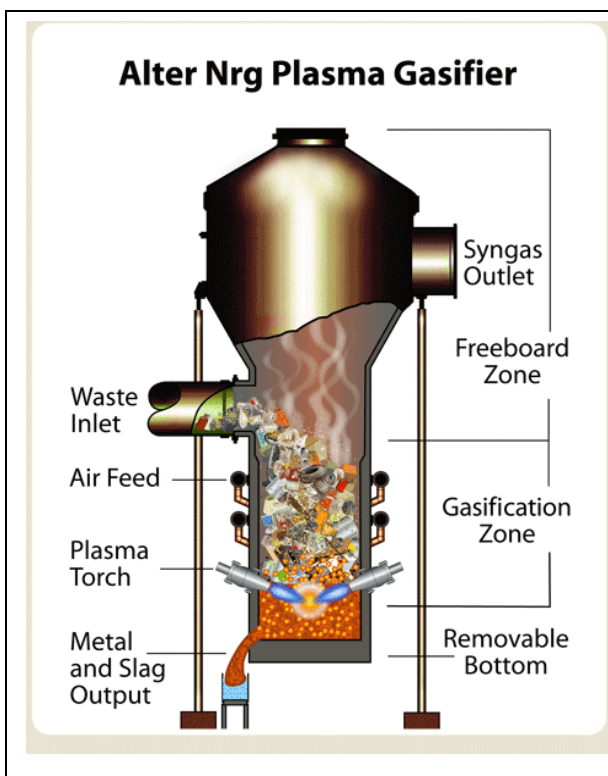
USST and their project partners state that they plan to use Westinghouse Plasma Corporation and Alter NRG's plasma technology. These companies point to Westinghouse Plasma's allegedly successful experience with plasma technology.

However, a review of Westinghouse Plasma's website (www.westinghouse-plasma.com) and that of their parent company Alter NRG (www.alternrg.com) reveals conflicting and troubling statements, and raises important questions about the effectiveness, reliability and safety of the proposed facilities. Westinghouse claims their technology heats the solid waste in an "oxygen starved" environment, but in fact oxygen is present. Municipal solid waste has oxygen in it, so it is already in the chamber being heated by the plasma torch. Westinghouse Plasma's website first claims the process is "oxygen starved" but by reading their material closely you can see they admit this is not the case in several places: for example on one page they claim an oxygen starved environment, then on another page they admit that they might be even feeding oxygen and air into the system, then on the same page they refer to the presence of "controlled amounts of oxygen" --- so which one is it?

Even if there is less oxygen in the plasma chamber than in conventional mass-burn incinerators, this does not prevent the formation of harmful pollutants. As one study that examined the formation of dioxins and furans under pyrolysis conditions concludes, even at oxygen concentrations lower than 2%, considerable amounts of highly toxic polychlorinated dioxins and furans were formed. (Weber, R., Sakurai, T., 2001. Formation characteristics of PCDD and PCDF during pyrolysis processes. *Chemosphere* 45: 1111-1117).

Westinghouse's website (their section entitled "Environmental Benefits") admits dioxins and furans (and NOx and SOx) are emitted from their process. They directly contradict this admission of toxic emissions elsewhere on their website where they discuss output from Geoplasma's St. Lucie project (in the section entitled "Projects Under Development") where they write that in addition to energy, "the only other output from the facility will be an inert slag which can be used for aggregate in road construction." They seem to have left out the dioxin and furan emissions, as well as NOx and SOx.

What is Wrong with This Picture? Where's the Combustion Equipment? Where Is the Stack?



Westinghouse Plasma's website omits any mention of stacks, yet the facilities - if built - would have a stack to emit pollutants into Sacramento's air. Westinghouse Plasma's website lacks a description of how the energy would supposedly be generated, nor do they discuss how much energy would be required to be imported for the facility to operate.

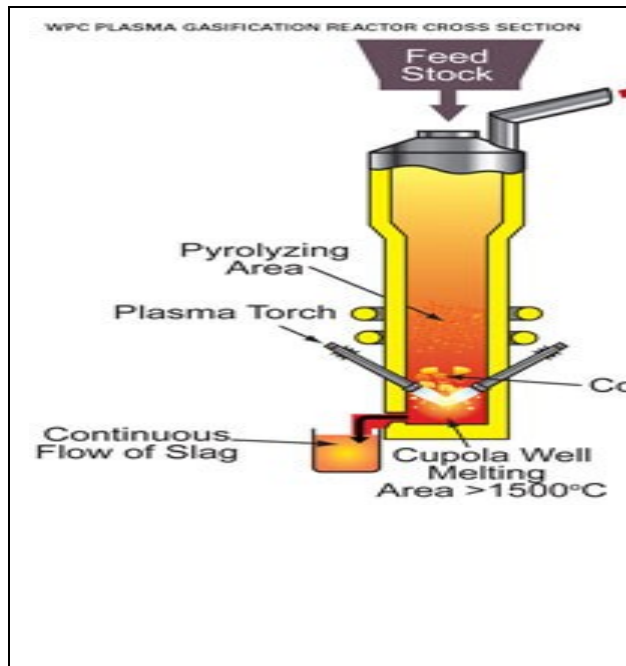
This diagram is from http://www.westinghouse-plasma.com/technology_solutions/pgvr.php labeled "Alter Nrg Plasma Gasifier", May 1, 2008:

A major concern is the fact that all the technology diagrams on Westinghouse Plasma's website omit any drawing or picture showing the equipment that would be used to generate the electricity.

The diagram, entitled the Alter Nrg Plasma Gasifier, shows a "Syngas Outlet" but it is not attached to anything. In actual operation, this would be attached to piping that takes the syngas to the combustion/incineration device (an industrial boiler or internal combustion engine) and then to a stack that would emit dioxin and other pollutants into the air.

The diagram below was copied from http://www.alternrg.ca/gasification/plasma_gas.html labeled "WPC Plasma Gasification Cross Section", on May 1, 2008:

Again, Where is the Stack? Where is the Combustion Equipment?



Even the Plasma Technology's Manufacturer Warns Not to Rely on Their Information

Debunking the assurances that this technology is proven and reliable, one only needs to read the repeated disclaimers in Alter NRG's website and documents. These disclaimers would be funny if not so serious. Claims that their technology is proven are followed by disclaimers saying these are only "forward-looking statements" and that actual results might differ from what is claimed:

"The projections, estimates and beliefs contained in such forward-looking information necessarily involve known and unknown risks, uncertainties and other factors which may cause Alter Nrg's actual results, performance or achievements in future periods to differ materially from any estimates or projections of future results, performance or achievements expressed or implied by such forward-looking information." (Alter NRG website, Legal Disclaimer, <http://www.alternrg.com/common/disclaimer.html>).

Should the protection of the health and environment of Sacramento rely on a company and technology that disclaims responsibility for their information and performance of the technology?

Misleading and Incorrect Claims from the Westinghouse Plasma Corporation/Alter NRG and Green Power Systems Proposed Project in Tallahassee, Florida:

Green Power Systems proposes to build and operate a plasma-arc facility using Westinghouse Plasma/Alter NRG's technology to process 1,000 tons per day of municipal solid waste (garbage) in Tallahassee, Florida. Geoplasma proposes to build a similar facility for up to 3,000 tons of solid waste per day in St. Lucie County, Florida.

Green Power Systems' website claims "(T)he reactor has no need for a stack as there are no emissions from the gasification process." This statement is inaccurate, yet Westinghouse Plasma Corporation and Alter NRG maintain public silence in the face of this claim by their partner.

Greenaction challenged the claim that there would be no stack or emissions after a January 22, 2008 phone conversation with Ingo Krieg, President of Green Power Systems, in which he admitted there would be a 90 or 100 foot stack and that there would be emissions. After being challenged by Greenaction, on February 10, 2008, Green Power Systems finally admitted in an email to Greenaction that their claim of "no stack" "could be misleading:"

"During my discussion with Westinghouse, they also made me aware that the process page could be mi(s)leading as you had pointed out. I never liked it, I was not the author of the website and hated when someone would say no stack. It was a clarification that is long overdue." (February 10, 2008 email from Ingo Krieg, Green Power Systems to Bradley Angel, Greenaction)

As of August 7, 2008, Green Power Systems' website still contained the statements that the company's President admits he "hated" and "could be misleading." Westinghouse Plasma/ Alter NRG continue their partnership with this company despite the boldly incorrect "no stack" claim.

The Poor Track Record of Plasma-Arc Facilities in the U.S.:

Unfortunately, the City of Sacramento did not bother to investigate the problem-plagued history of the few plasma-arc waste treatment facilities in the United States before deciding to spend so much staff time and resources on a proposed plasma-arc facility.

There has never been a commercial facility in the U.S. using plasma-arc technology for municipal solid waste. But there have been two commercial plasma-arc facilities processing other wastes, and both have had serious problems.

- **Allied Technology Group, Richland, Washington: Closed and Failed**

Allied Technology Group operated a commercial plasma-arc facility for mixed radioactive and hazardous wastes in Richland, Washington, and the facility closed due to operational problems with the plasma-arc equipment as well as financial problems. A company called PECOS has apparently opened a plasma-arc facility at the ATG site but little information is available at this time.

- **Hawaii Medical Vitrification, Oahu, Hawaii: Breakdowns and Violations**

The Hawaii Medical Vitrification facility run by Asian Pacific Environmental Technologies near Honolulu has also had serious operational problems as well as serious permit violations. For

example, the Hawaii Medical Vitrification facility was closed for approximately eight months due to refractory damage in the kiln of the plasma-arc equipment.

Both the Allied Technology Group and the Hawaii Medical Vitrification facilities used InEnTec/Integrated Environmental Technologies' "Plasma Enhanced Melter" equipment. IET (now called InEnTec) claimed on their website that these two facilities were successful commercial operations using their technology, but the facts show that both facilities had severe problems with the plasma-arc equipment. InEnTec/IET had also claimed that their technology was "pollution free" and "closed loop." Once challenged, IET President Jeffrey Surma testified truthfully under oath that his company's claims that these two facilities were "already successfully operating," "pollution free" and "closed loop" were not correct. InEnTec had proposed a commercial plasma-arc facility in Red Bluff, California, but after Mr. Surma made his truthful admissions during an appeal of his company's permits, a public uproar grew even larger. On June 13, 2008, InEnTec abandoned their plans for a plasma-arc facility in Red Bluff.

Risks to Public Safety and Health Consequences for Sacramento Communities:

Dioxin is the common name for 75 toxic chemicals that are unwanted by-products of manufacturing and combustion processes when chlorine and carbon-containing materials are combined. Garbage and medical incinerators were identified as the largest sources of dioxins in the United States Environmental Protection Agency's reassessment report on dioxin in 1994/2004. According to the EPA, dioxin travels long distances in the atmosphere and is found on plants, in water, soil, grazing animals and humans. Dioxin particles are stored in fatty tissue and will accumulate to create "buildup" when low-level exposure is continual.

In 1997, the International Agency for Research on Cancer concluded that dioxin is a human carcinogen. Non-Hodgkin's lymphoma and cancers of the liver, lung, stomach, soft and connective tissue have been associated with dioxin. Even at very low levels of exposure, at levels of parts per trillion, dioxin can cause immune system damage, hormone disruption, and reproductive and development effects.

There is no safe level of additional exposure to dioxins. This is because the average daily dioxin intake is already 200 times higher for Americans than what the EPA defines as a safe dose for adults (*America's Choice Children's Health or Corporate Profit The American People's Dioxin Report Technical Support Document* November 1999 Center for Health, Environment and Justice Falls Church, VA, Schecter, A. (1999) Personal communication. Available online at <http://www.chej.org/BESAFE/report.html>) (U.S. Environmental Protection Agency (USEPA) EPA (1994a) Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds, Volume III of III, USEPA, Office of Research and Development, EPA/600/BP-92/001c, External Review Draft, Washington, D.C.).

Those most at risk of receiving the highest concentrations are babies (Tangri, Neil, A Dying Technology, 2003, p. 13). Studies also show elevated levels of dioxin in the blood of people living near municipal solid waste incinerators when compared to the general population (Ends Europe Daily *Study reignites French incinerator health row*, Found at <http://www.endseuropedaily.com/articles/index.cfm?action=article&ref=22174&searchtext=incinerator%2Bcancer&searchtype=All> (browsed on February 8, 2008); P. Elliott and others, "Cancer incidence near municipal solid waste incinerators in Great Britain," BRITISH JOURNAL OF CANCER Vol. 73 (1996), pgs. 702-710; Leem et al.,

2006. Risk Factors Affecting Blood PCDDs and PCDFs in Residents Living near an Industrial Incinerator in Korea. Arch. Environ. Contam. Toxicol. 51:478–484.

Why Garbage is Not a “Renewable” Energy Source and How a Plasma-Arc Facility Will Undermine Sacramento’s Commitment to Maximum Recycling and Zero Waste Programs:

Despite industry claims that garbage is a “renewable” resource, no thermal technology including plasma-arc gasification would qualify as recycling under California’s waste reduction and recycling law (AB 939). As documented in a March 19, 2008 letter from Scott Smithline, Director of Legal and Regulatory Affairs for Californians Against Waste (CAW), to Mayor Heather Fargo, “(W)hile Sacramento may be in compliance with AB 939 mandates at this time, it is clear that cities will be called upon to increase their diversion rates in the coming years. Committing our municipal solid waste to a facility that does not qualify for diversion credit will create a barrier to compliance.”

The CAW letter also points out that Sacramento is far behind many other cities in curbside recycling: “Effective curbside programs in similarly sized cities are collecting more than twice the per capita recyclables than Sacramento’s program.” Sacramento needs to increase recycling and zero waste programs, not undermine these programs with a plasma-arc facility that would require the ongoing generation of large amounts of garbage.

The CAW letter also concluded that “...the current strategy chosen by the city staff ... will inevitably require the city to cede control of its solid waste and risks creating a fiscal catastrophe which would burden the city for decades to come.”

Today's "waste-to-energy" incinerator companies falsely claim that they can safely, cost-effectively and sustainably turn materials such as household trash, tires, medical waste, biomass and hazardous waste into "renewable" electricity and fuels like ethanol and bio-diesel.

Far from being sources of renewable energy, incinerators and landfills emit harmful pollutants into the air, soil and water, waste more energy than they generate, and contribute to climate change.

More than two thirds of the materials we use in the U.S. are still burned or buried, despite the fact that we have the technical capacity to cost-effectively recycle, reuse or compost the vast majority of what we waste. For every item that is incinerated or hauled to landfill, a new one must be created from raw resources rather than reused materials. This requires a constant flow of resources to be pulled out of the earth, processed in factories, shipped around the world, and burned or buried in our communities. The impact of this wasteful cycle reaches far beyond local disposal projects, causing greenhouse gas emissions, wasted energy and pollution thousands of miles away.

Telling facts include:

- The U.S. Environmental Protection Agency's 2006 report Solid Waste Management and Greenhouse Gases shows that it is far better for the climate to recycle, rather than incinerate or landfill discarded materials. For example, the report shows that incinerating a ton of mixed plastic rather than recycling it causes more than six times as many greenhouse gas emissions.
- According to research published by Friends of the Earth in 2006, getting energy from incinerating waste produces 33% more greenhouse gas emissions than burning coal in power plants.

- Recycling materials saves 50% more energy than incinerating those same materials generates. For example, recycling mixed paper saves more than ten times more energy than what can be generated and offset by incinerating it.
- Studies show elevated levels of dioxin -a known carcinogen -in the blood of people living near municipal solid waste incinerators when compared to the general population.
- Incinerators oblige communities to waste valuable resources and taxpayer dollars for decades to come. For example, by the end of the contract in 2009, Detroit taxpayers will have paid over \$1 billion to build and operate the incinerator. Detroit could have saved over \$55 million in just one year if it had never built the incinerator.
- Plasma, pyrolysis and gasification incinerators may even have a larger climate footprint than conventional mass burn incinerators. These incinerators treat waste in a chamber that requires large inputs of additional fuels and/or electricity to operate. This requires the combustion of greenhouse gas intensive fossil fuels such as natural gas and coal.

Incinerators negatively impact public health and the environment, and gobble up public taxpayer money meant for real renewable energy, waste reduction and climate solutions. Protecting community health and stopping climate change requires that we strengthen waste reduction, source separation, reuse, recycling and composting as a means to reduce greenhouse gas emissions and energy use. It also requires that we not view incineration as a renewable source of energy.

For decades, everyone has been encouraged to do the 3 R's: Reduce, Reuse and Recycle. But today, some companies are saying we should all stop worrying about creating so much garbage because we are now told it is a "renewable" energy source.

Not only is garbage not a renewable source, but an expensive plasma-arc facility will require the generation of vast amounts of garbage forever – endangering real recycling and renewable energy programs. We need to support the sun and wind, not garbage, as renewable resources.

Zero Waste: A Healthy and Sustainable Solution for Our Solid Waste Problem

Despite several existing models in U.S. cities that prove otherwise, disposal of valuable natural resources in incinerators and landfills is all too often considered inevitable. Alternatively, we can choose to invest in community-based "Zero Waste" solutions such as waste-reduction, reuse, recycling, and composting as a vehicle for environmental, job and economic renewal.

Zero Waste means investing in the workforce, infrastructure and strategies needed to reduce what we trash in incinerators and landfills to zero. It means stopping even another dime of taxpayer money from subsidizing waste projects that contaminate environments and the people who live there. It means investing public money in innovative waste reduction, reuse and recycling programs, and requiring that products are made and handled in ways that are healthy for people and the planet.

Cities around the world including Buenos Aires, Canberra, Oakland, Nova Scotia, Seattle and San Francisco have passed groundbreaking Zero Waste measures. These cities are working towards Zero Waste by building state-of-art recycling and composting parks, implementing innovative collection systems, requiring products to be made in ways that are safe, and creating locally-based green-collar jobs. These cities have developed plans to invest in sound economic development and

jobs that will benefit their residents, rather than pouring money into harmful waste disposal projects. They have specific and achievable plans to dramatically reduce waste disposal levels.

Leading the way, San Francisco and Oakland are on track to reuse 75% of discarded materials by the year 2010, and 100% by the year 2020. Already, 63% of San Francisco's discarded materials are reused, recycled, or composted, and the city has passed groundbreaking laws to shift the unjust and unsustainable ways in which products are made. Stopping polluting incinerators in communities and achieving critical greenhouse gas emission reductions depends on Zero Waste gaining increased support from decision-makers at the local, regional and federal level.

For more information on plasma-arc and gasification, contact:

Greenaction for Health and Environmental Justice www.greenaction.org (415) 248-5010
Global Alliance for Incinerator Alternatives www.no-burn.org (510) 883-9490 x 102

EXHIBIT A –AEROJET VIOLATIONS

On July 2, 2008, the Sacramento Metropolitan Air Quality Management District announced that Aerojet paid \$12,300 in penalties to the Air District for serious air quality violations that occurred at its aerospace painting facility in Sacramento in August and November 2007.

District enforcement staff cited Aerojet for two violations, involving the use of non-compliant cleaning solvent at their aerospace facility and the use of uncertified abrasive blasting grit at their motor dissection facility. The Notices of Violation were issued for District Rule 201, *General Permit Requirements* and Rule 456, *Aerospace Coating Operations*.

Even more alarming and serious violations were revealed when state inspectors caught Aerojet committing over three dozen serious violations over a period of years. On March 24, 2004, the California Environmental Protection Agency's Department of Toxic Substances Control announced an enormous \$1,200,000 settlement with Aerojet-General Corporation, Aerojet Fine Chemicals LLC and their parent company GenCorp, Inc. for a series of hazardous waste violations revealed during DTSC inspections at Aerojet's Rancho Cordova facility located at U.S. Highway 50 and Aerojet Road near Sacramento.

DTSC's Director Ed Lowry said of the enormous fine: "This settlement is a demonstration of DTSC's intent to enforce hazardous waste management laws and bring this facility back into compliance. Repeated violations were revealed during three inspections that spanned three years."

The dozens of violations committed by Aerojet included:

October 2000

DTSC inspectors noted 18 violations of Aerojet's permit including: failure to submit a request for a permit modification prior to instituting modifications....; incorrect packaging of lab packs; cracks and gaps in secondary containment; storage of hazardous waste in an unauthorized area; lack of an eyewash/shower at a hazardous waste unit; and numerous labeling inadequacies.

June 2002

DTSC inspectors noted 16 violations of the permit including: repeat violations regarding cracks and gaps in secondary containment; labeling problems; incorrect packaging of lab packs; and storage in unauthorized areas. New violations cited during the inspection included failure to minimize the potential for accidental release; inadequately reporting the explosion of a drum; storing incompatible wastes in the same drum; failure to correctly categorize a waste stream; bulging drums, leaking drums and failure to maintain an eyewash/shower.

June 2003

DTSC inspectors found five violations including: repeat violations regarding cracks and gaps in secondary containment; a labeling problem; and failure to have a working eyewash/shower. New violations cited during the inspection included; reducing a post-closure estimate for underground injection wells without prior DTSC approval and using the wrong inflation calculator to calculate closure and post-closure cost estimates. (California Environmental Protection Agency Department of Toxic Substances Control News Release, March 26, 2004).