Regulation of **Auto Shredder Residue** in California

Public Workshops
Wilmington, CA
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Presentation Outline

- **Background**: Description of scrap metal shredding/recycling process and ASR.
- **Current Regulatory Structure**: How ASR is currently regulated and basis for historical approach.
- **Treatment Process**: Description of the treatment process and its effectiveness in minimizing potential threats to human health and the environment.
- **Treatability Study Workplan:** Purpose and goals of treatability study.

What is Scrap Metal Recycling ?

Benefits of Scrap Metal Recycling

- Scrap metal recycling provides a critical, beneficial service to California by converting discarded products into usable raw materials, diverting millions of tons of waste from landfills.

Benefits of Scrap Metal Recycling

- Scrap metal Recycling is one of the original Green Industries in the U.S.
- Reduces the amount of natural ores that must be mined to produce new products.
- Recycling of just one car saves the energy equivalent of 502 gallons of gasoline and reduces greenhouse gas emissions by 8,811 lbs. (of Co_2 equivalent).
- Industry diverts millions of tons of scrap metal from California landfills every year, conserving municipal landfill capacity.
- Minimizes number of vehicles and appliances that are “logged” and shipped overseas for recycling without regard to environmental standards.

Industry Statistics

- The U.S. recycling industry employs more than 130,000 men and women with high skilled and well-paid jobs.
  - Over 15,000 of those are employed in California.
  - Another 30,000 indirect jobs are created in California by the recycling sector.
- California's 11th Largest Export (by value) with a $4 billion economic impact on the state economy.
- California has six (6) DTSC-recognized shredder facilities in California.
  - Northern Cal (2)
  - Southern Cal (4)
- Annually, these facilities process millions of auto bodies, discarded appliances, and other miscellaneous metal products.
- Scrap metal recycling reduces landfill disposal of waste by over 2.2 million tons.

How The Shredding Process Works

- A shredder is a very large Hammer-mill that pulverizes scrap metal and allows it to be separated and sorted for later sale as commodities.
- Ferrous metals are removed first by magnets and stockpiled by stacking conveyors pending shipment, usually in ocean-going vessels to overseas markets.
- After recovery of the ferrous metal, the material is further processed for the remaining non-ferrous content (e.g., aluminum, copper, and stainless steel) through a Metal Recovery Plant (MRP).
- Remaining material is Auto Shredder Residue (ASR).
- The scrap metal recycling industry provides a critical, beneficial service to California by converting discarded products into usable raw materials for use by steel mills and foundries as a substitute for natural ores.

Background

Shredder Material Recovery










Shredder Material Recovery

Steel
1,790 Lbs.

Copper
1 Lbs.

Radiator
Elements
1 Lbs.

Breakage
10 Lbs.

Large
Aluminum
111 Lbs.

Medium
Aluminum
31 Lbs.

Small
Aluminum
10 Lbs.

Wire
10 Lbs.

Stainless
4 Lbs.

TASR
532 Lbs.

Typical shredding and material recovery process

Cars, appliances and household discards collected

↓

Remove hazardous materials

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Collected material sent through shredder.

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Magnet to recover Steel

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MRP to recover Non Ferrous.

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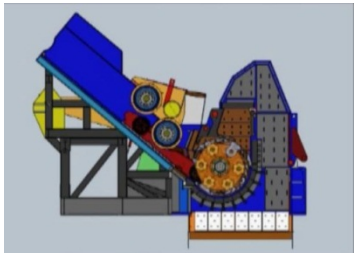
Non metal residue treated and shipped to land fill (ASR).



What kinds of Materials Are Processed At Shredder Facilities

Source Control of Shredder In-Feed

- Only receive source separated materials.
- Hazardous materials or wastes are not accepted. Shredders have written policies prohibiting the acceptance of prohibited materials including hazardous waste and materials.

Source Control of Shredder In-Feed

- California Certified Appliance Recyclers (C.A.R.) are required to remove all Freons and oils.

Source Control of Shredder in-feed

- **Metal Discards Act: All "materials requiring special handling" must be removed from major appliances and vehicles before they are shredded.**

Source Control of Shredder In-Feed

- Manufacturing process uses less environmentally sensitive material.
  - No PCBs are used.
  - No lead is used in paint.
  - New solder is using less lead.
  - No mercury switches are used in manufacturing cars.
- The Institute of Scrap Recycling Industries (ISRI), a national recycling trade association, adopted a policy 15 years ago to work with manufacturers to change manufacturing processes to make material more recyclable.

What is ASR?

- ASR is the material that remains after completion of all metal recovery processes.
  - 20% of Cars
  - 27% of Appliances
- ASR consists largely of ground-up foams, fabrics, plastics, rubber, tires, glass, wood, soil and other non-metallic components. Only a very small portion of ASR consists of metal.
- Over the past 30 years the MRP has evolved to allow recovery of virtually all metals.
- ASR is chemically treated to stabilize residual soluble metals.
- Use of metals such as lead and cadmium in manufacturing process has decreased in the past 30 years.
- Treated ASR is currently beneficially used as alternative daily cover (ADC) at receiving landfills.

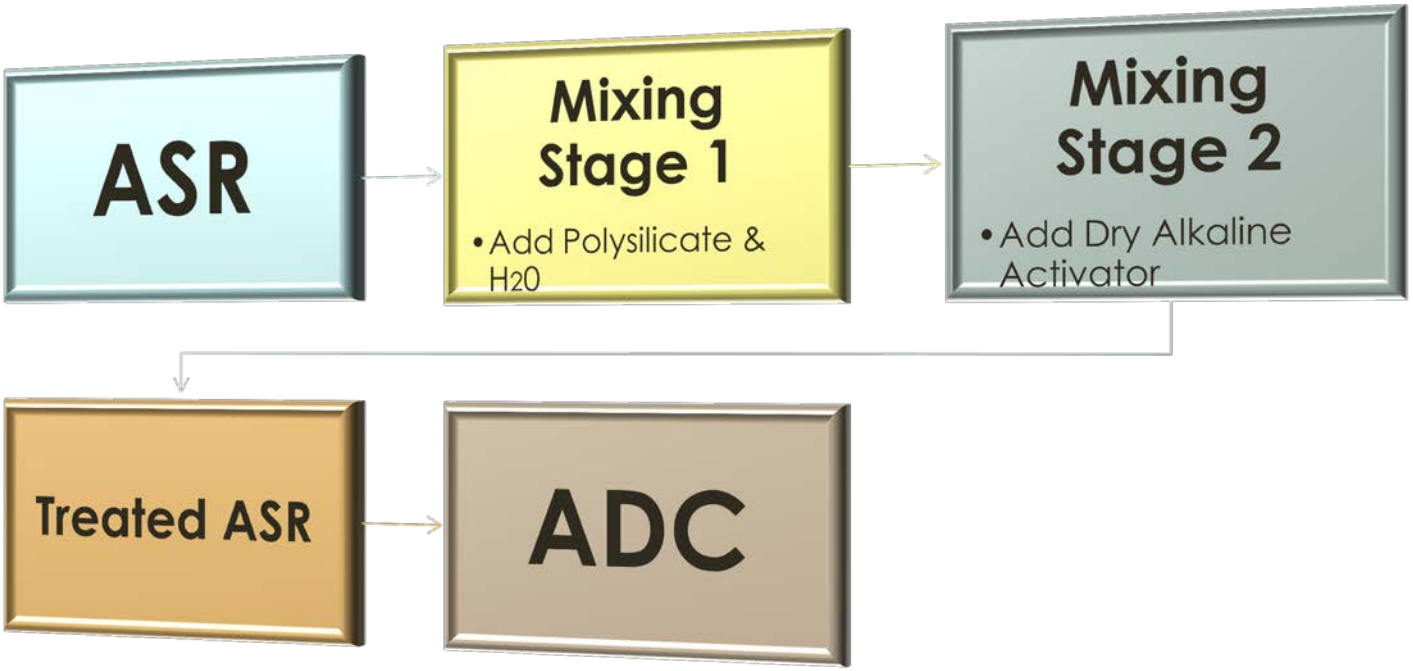
ASR Regulations

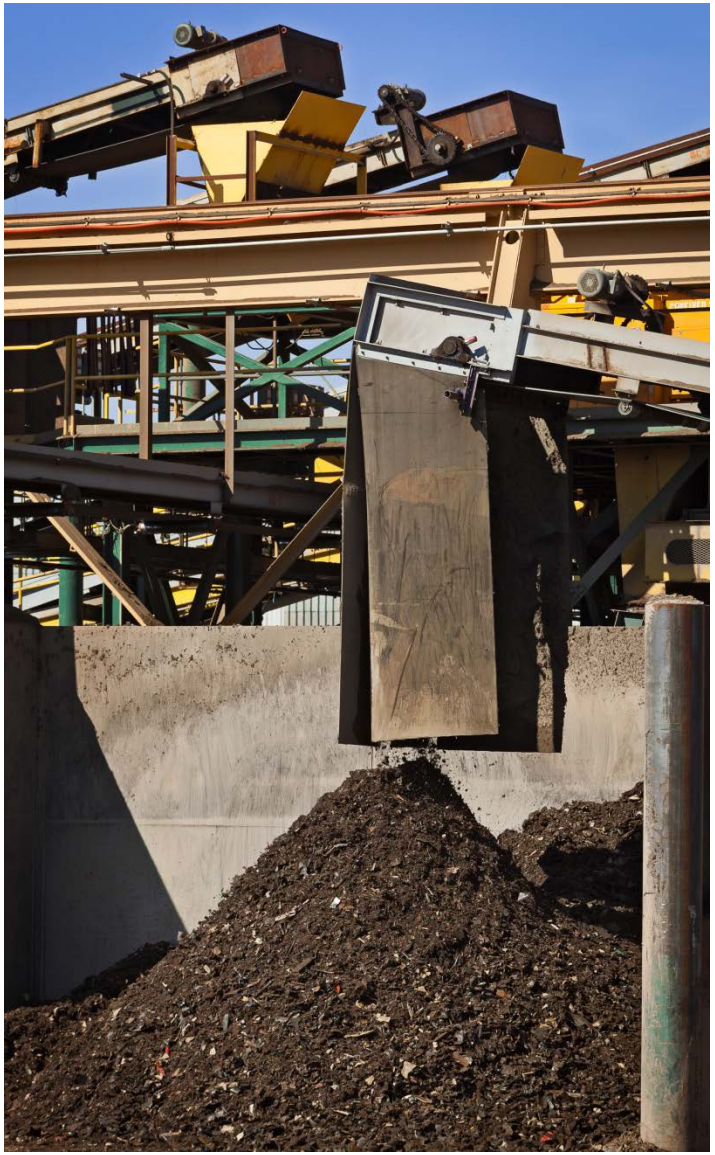
- Under Federal standards, ASR is NOT classified as a hazardous waste.
- The vast majority of ASR generated in the U.S. is disposed of in landfills <u>without any treatment</u>.
- Prior to 1984, ASR was managed in California as a non-hazardous waste similar to current federal guidelines.
- In 1984, California adopted new, more stringent metals standards, and ASR exceeded those standards.
- The shredder industry proactively developed a treatment process that chemically binds residual metals in ASR, making the material even safer.
- DTSC reclassified treated ASR as a non-hazardous waste based on a determination that it poses an insignificant risk to human health and the environment due to its low potential for leachability.
- Management of untreated and treated ASR in California landfills for over 50 years has not resulted in any known harm to human health or the environment.

ABC's of the Treatment Process

- What: ASR is mixed in a pug mill with chemical reagents, including polysilicates and an alkaline activator (typically cement).
- Why: The purpose of the treatment process is to reduce the concentration of residual soluble metals in the ASR, to minimize the leaching potential of the treated material in the landfill environment.
- How: Solubility is reduced by reactions occurring at the level of the metal species and the broader matrix. This process is also known as chemical stabilization and is widely used to reduce solubility of soil-like wastes.

ASR Treatment Process





AUTO SHREDDER RESIDUE

Post Treatment

ASR Treatment Review

- Reason for Review
  - Passage of time since issuance of the declassification letters.
  - Changes in the composition of automobiles and appliances.
  - Advancements in the treatment process.
- Major component of this review (and the subject of today's workshop) is a renewed demonstration of the effectiveness of the treatment process.
- Industry is cooperating with the DTSC in this review and has advocated for the development of statewide management standards for ASR to ensure a level playing field.

Goal of Treatability Study

To demonstrate the continued effectiveness of the treatment process of Auto Shredder Residue (ASR).

Study Parameters

- The study will be focused on California's shredder companies.
- Study will analyze effect of treatment on soluble metals.
- Study will be based on contemporary data.
- Studies will be presented in an industry-wide report and submitted to DTSC.

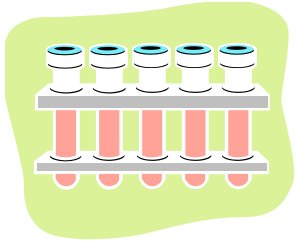
Study Variables

The following information will be considered in order to achieve the data collection and analytic goals set forth for the study.

- The type of treatment chemicals used.
- The rate of treatment chemical addition.
- The ratio of treatment chemicals to ASR.
- Particle size.
- Effects, if any, of scaling up the treatment process.
- The cost of the treatment options.
- The impacts of untreated and treated ASR in the landfill environment, including the potential toxicity of ASR in the landfill environment.
- Evaluation of variants on stabilization / fixation technology.
- Facility-specific data will be collected to account for differences in equipment or processes.

Sample Collection

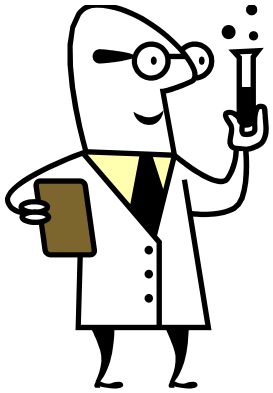
- Samples will be collected pursuant to a specific sample collection plan to ensure representativeness.
- Same sample collection method will be used pre- and post-treatment.
- Individual samples are prepared for analysis through a process known as "coning and quartering." This assures all components of the waste are represented in the sample.
- A sufficient number of samples will be analyzed during each batch of tests to adequately reflect the variability in the material.



Sample Testing

A certified laboratory will test the samples for the following:

- Total concentration of all regulated metals
- Extractable concentrations of all regulated metals
- PCBs
- Aquatic toxicity (bioassay)



Testing Results

- Analytical results from all samples will be included in the final report submitted to the agency.
- Statistical analysis will be applied to the data, as appropriate.
- The analysis will focus on determining the optimal level of treatment required to effectively treat soluble lead and other metals.
- Correlations between soluble lead and zinc will be established to assess options for the most cost-effective protective level of treatment.

Long-Term Efficacy

- The long-term efficacy of the treatment in terms of impacts in solid waste landfills will also be presented in the results.
- That analysis will involve sequential analysis of treated samples using a variety of extraction procedures to simulate different landfill conditions.
- Process will follow a methodology utilized and approved by the EPA for long-term leaching analysis.
- Past testing and actual experience has successfully demonstrated that treated ASR has a very low leaching potential.
- Absence of ASR-derived metals in landfill leachate is the hallmark of successful treatment.

Treatability Study Report

- The ASR Treatability Study and its report will:
  - Provide new data to historical data sets to generate more statistically robust data set.
  - Establish the baseline characteristics of untreated ASR using a combination of new and existing data.
- Confirm that treated ASR does not contain other hazardous constituents (other than metals) that would render it hazardous.
- Determine whether total concentrations of metals are affected by the treatment process.
- Determine whether the treatment process achieves applicable Soluble Threshold Limit Concentrations (STLCs) for the metals identified for treatment.
- Determine the relative cost effectiveness of different treatment formulas that could be used to achieve alternate levels of reduction in solubility.
- Demonstrate the role of pH in the analytical protocol.
- Demonstrate that the treatment process will have long-term effectiveness in a landfill environment using appropriate extraction procedures.

Proposed Study Timeline

Task	Completion Date
Baseline characterization of untreated ASR	March 30, 2014
Design treatment scenarios	May 31, 2014
Conduct treatment studies	July 31, 2014
Data analysis	September 30, 2014
Submission of final report to DTSC	October 31, 2014

Questions?

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