

DEPARTMENT OF ECOLOGY
NORTHWEST REGIONAL OFFICE
HAZARDOUS WASTE AND TOXICS REDUCTION PROGRAM

DATE: August 30, 2007

TO: Maralco Project File

FROM: Victoria Sutton, Dean Yasuda, Norm Peck

SUBJECT: Maralco Site Waste Characterization Project,
June 2004 to February 2007

This is a summary document to describe the Waste Characterization Project methods used at the Maralco Aluminum site. The characterization project was for determining the disposal method for the 20,000 cubic yard outdoor pile of aluminum dross left at the site after operations ceased due to bankruptcy in 1986. Additional details on this project and previous work performed on the site and background are located in the project files.

From 1980-1986, the Maralco company processed aluminum scrap for recycling into ingots. The company used the archaic molten salt process of smelting aluminum. The waste salt, aluminum oxide and impurities from the molten salt smelting process are called "black dross" or "salt cake", and were initially disposed of at a solid waste landfill for the first year. Subsequently, they piled the dross next to the building until 20,000 cubic yards accumulated. The company went bankrupt in 1983 and closed in 1986. The waste was left in place.

In 1987, Ecology and the Environmental Protection Agency (EPA) responded. The dross pile was sampled and book designated as dangerous waste due to rat toxicity. The salts were a Category D waste due to oral toxicity to rats. A portion of the dross pile contained high amounts of copper, causing it to fail the fish bioassay as extremely hazardous waste (EHW). This portion of the pile was moved inside the abandoned building. It, along with EHW baghouse dust from the operations, remains stored inside the building, but is not stored in full compliance with Chapter 173-330 WAC regulations. The 20,000 cubic yards of waste stored outdoors (excluding the waste stored inside the building) is the waste characterized for this Project.

In approximately 2000, Brown Dog Investments, LLC, a developing company, purchased the liens on the site, except for the lien held by Ecology for the response costs. They planned to perform the site remediation and wanted to cap the waste on site. The City of Kent required the waste to be removed prior to approving any permits, so the waste could not be capped in place.

Brown Dog needed to have the waste characterized to determine the appropriate disposal method, and hired the environmental consulting firm URS to assist with the project.

Brown Dog, Ecology's Hazardous Waste and Toxics Reduction Program (HWTR) and Toxics Cleanup Program (TCP) met in June of 2004 to discuss options for characterizing the dross pile. Brown Dog told Ecology that if the 20,000 cubic yards of aluminum dross had to be disposed as hazardous waste, it would not be economically feasible to develop the site and the remediation would not proceed.

Brown Dog and URS Corporation had spoken with the solid waste landfill staff and informed Ecology that only five composite samples were required to characterize the dross pile for disposal. Brown Dog wanted to collect and analyze only these five samples. If these samples met the landfill's criteria, they proposed to dispose of it at the solid waste landfill. Ecology did not agree to this approach because the waste was already book designated as a dangerous waste. Ecology required a thorough sampling and analysis if Brown Dog wanted to refute the book designation on all or part of the dross pile.

In addition, Brown Dog's consultant, URS Corporation, proposed to use the results of its 2000 sampling event where only the top portion of the dross pile was sampled by a hand auger. These composite samples passed the fish bioassay, so URS Corporation claimed the waste could likely be disposed as solid waste. Other potential contaminants were not analyzed.

Brown Dog also wanted Ecology to research and follow the waste characterization methods used on other state aluminum dross piles where the proposed approach was accepted. In addition, Brown Dog thought that the generator liability for waste disposal could be waived by Ecology in a Prospective Purchaser Agreement (PPA) as an incentive to get the site cleaned up. URS Corporation requested that composite samples be taken to minimize analytical costs in the interest of allowing a more financially optimal cleanup and land development.

Ecology considered these requests, weighing protection of the public with a justifiable and technically sound decision while imposing the least expense on the developer. The waste pile had been sitting for over 20 years since it had been book designated. The chemistry of the pile could have changed over the years (making it either more toxic or less toxic). The waste had been previously book designated by Ecology as WT02 for rat toxicity because of the salt. Because the waste was previously designated as a hazardous waste, and due to the large volume of the aluminum dross pile, a more comprehensive sampling and analysis effort would need to be performed in order to refute the previous book designation. Current waste designation data was needed in order to determine the proper disposal method as required by Chapter 173-303 WAC.

A written sampling plan was required for approval prior to performing the sampling. The sampling plan was finalized on September 9, 2005.

Each decision unit thus represented about 600 cubic yards of waste. Composite samples were not allowed because the waste stream was not homogenous over the extent of the pile.

The *Guidance for Remediation of Petroleum Contaminated Soil, Publication 91-30*, Table 1. 'Number of Samples for Excavated Soil' suggests a general, statistically valid number of samples that should be taken for a given waste pile. Using this table, as well as best professional judgment given the size of the dross pile and the potential human health and environmental impacts of improper characterization, Ecology required one discrete sample from 44 decision units be taken.

Based on the reviews of the previous sampling work performed at the site, the parameters of concern for the dross pile were heavy metals and state toxicity criteria.

The 44 decision units were required to be sampled through the entire depth (top to bottom) of the dross pile for Toxicity Characteristic Leaching Procedures (TCLP) metals, total metals, and salt cation/anions species potassium, sodium, and chloride. Dross samples were taken and analyzed for total copper, nickel, and zinc to determine if each (or any) decision unit would fail the book designation criteria for fish toxicity. Sampling and analysis of each decision unit for salts and book designation for oral rat toxicity was also required. The details for calculating the book designation equivalent concentrations are explained in the September 2005 Sampling and Analysis Plan. If the results of these chemical analyses concluded that the dross sample(s) book designated for oral rat or fish toxicity, then Ecology would decide which additional dross samples from those respective decision units would need to undergo further fish and/or rat bioassay testing to refute the book designation.

URS Corporation argued that only fish bioassay results would be required since the regulations say that a fish or rat bioassay can be used (WAC 173-303-100(5)(d)). A letter from HWTR's Institutional Memory (Reference 3100.911218) clearly stated that the bioassay for the appropriate toxic constituent must be performed. Because the waste was originally book designated for salt toxicity to rats, a rat bioassay was required to refute the book designation for rat toxicity.

If any of the dross samples representing a decision unit designated as hazardous waste, then the option would be to manage the entire decision unit as hazardous waste or conduct further sampling and analyses on the decision unit to determine if only part of the decision unit designated. As an incentive, Ecology's Toxics Cleanup Program offered to pay a portion of the sampling and analysis costs in case further waste designation sampling was needed.

The results showed no TCLP failures in any decision unit dross samples. However, all dross pile decision units book designated as hazardous waste for fish toxicity. Most of the dross pile decision units book designated for rat toxicity. Since bioassay samples can be used to refute the book designation, Ecology decided that the eight most contaminated samples representing decision units containing total metals copper, nickel and zinc were chosen to perform fish bioassays. Ecology also decided that the four samples representing decision units containing the highest amount of salt were chosen to perform rat bioassays to attempt to refute the book designation for rat toxicity.

The rationale for this decision was that if the most contaminated dross samples passed the bioassay tests, Ecology could assume that the less contaminated dross pile decision units would also pass the bioassay test. If any dross samples from the most contaminated decision units failed the bioassay test(s), then Ecology would need to consider if additional bioassay testing on other less contaminated decision units was required. Ecology used this phased approach for sample bioassay testing as an effort to minimize the analytical costs that would otherwise be incurred if samples from all decision units (that failed either the fish or rat toxicity book designation) were subjected to the required bioassay tests.

All eight fish bioassay and all four rat bioassay samples passed. Based on the available information (see References) that Ecology has reviewed to date, the outdoor 20,000 cubic yard pile of aluminum dross does not designate as hazardous waste and can be disposed as solid waste at a permitted Subtitle D landfill or Chapter 173-351 WAC compliant solid waste landfill within Washington State. This Ecology determination pertains only to the **offsite** disposal of this 20,000 cubic yard aluminum dross pile and does not make any regulatory decisions with respect to site cleanup.

References in Chronological Order

1. URS Corporation, "Proposed Supplemental Waste Characterization Sampling, Maralco Restoration Project, Kent, Washington", Letter from Vance Atkins and James Flynn to Victoria Sutton, Ecology Hazardous Waste and Toxics Reduction Program, October 13, 2004.
2. Ecology, "Proposed Supplemental Waste Characterization Sampling, Maralco Restoration Project, Kent, Washington", Letter from Victoria Sutton to Jim Flynn and Vance Atkins, URS Corporation, November 8, 2004.
3. URS Corporation, "URS Response to Comments, Maralco Site, Kent", Email from Vance Atkins to Victoria Sutton, Ecology Hazardous Waste and Toxics Reduction Program, February 10, 2005.
4. Analytical Resources Incorporated (ARI), "Sample Results-Conventionals", Memo from ARI to Washington State Department of Ecology (Ecology split sample for dross pile 10-19-05), November 16, 2005.
5. Manchester Environmental Laboratory, "Metals Maralco", Memo from Dean Momohara to Norm Peck, (Ecology split sample for dross pile 10-19-05), November 17, 2005.
6. Ecology, "Re: URS Response to Ecology Comments on Proposed Supplemental Waste Characterization Sampling, Maralco Restoration Project, Kent, Washington", February 10, 2005, Letter from Victoria Sutton to Jim Flynn and Vance Atkins, URS Corporation, April 21, 2005
7. URS Corporation, "Sampling and Analysis Plan/Quality Assurance Project Plan, Maralco Restoration Project, 7730 South 202nd Street, Kent, Washington", Prepared for Brown Dog, LLC, Seattle, Washington, September 9, 2005.
8. URS Corporation, "Tables for Ecology.xls; DVR-Maralco 2005-Draft for Jim Flynn.pdf", Four emails from James Flynn to Norm Peck, Ecology Toxics Cleanup Program, (Dross Sampling - NCA Analytical Laboratory Reports dated November 14, 2005, December 1, 2005).
9. Ecology, "Maralco Bioassays", Email from Victoria Sutton, Ecology Hazardous Waste and Toxics Reduction Program, to James Flynn, URS Corporation, January 25, 2006.
10. URS Corporation, "RE: Bioassay Questions", Email Series between Victoria Sutton, Ecology Hazardous Waste and Toxics Reduction Program, and James Flynn, URS Corporation, February 8, 2006.

11. Nautilus Environmental, "Dangerous Waste Characterization: Maralco Restoration Project", Letter and Data Report from Stacie Singleton to Jennifer Garner, URS Corporation, (Samples B-2-S, B-4-M, B-6-S, B-7-M, B-11-S, B-12-S, B-12-D, and B-17-D), February 14, 2006.
12. Bio Research Laboratories, Inc., "Acute Oral Rat Toxicity Test", Letter from John J. Majnarich, Ph.D., to Jennifer Garner, URS Corporation, (Samples B-6-S, B-7-M, B-7-D, and B-17-M), March 20, 2006.
13. URS Corporation, "Addendum to Sampling and Analysis Plan, Maralco Restoration Project", Letter to Chad Moore, Brown Dog LLC, from Matt Hommeyer and James H. Flynn, June 8, 2006.
14. Test America, "Re: Maralco", Memo and Lab Report from Jeff Gerdes to Jim Flynn, URS Corporation, (Dross pile resampling at deeper intervals on June 13/14, 2006) June 30, 2006.
15. Manchester Environmental Laboratory, "Metals Maralco" Memo and Analytical Data Report from Dean Momohara to Dean Yasuda, Ecology Hazardous Waste and Toxics Reduction Program, (Ecology split sample analytical-metals results for dross pile sampling at deeper intervals on June 13/14, 2006), July 5, 2006.
16. Manchester Environmental Laboratory, "Maralco", Memo and Analytical Data Report from Analytical Resources, Inc. (ARI), Memo from Pam Covey, (Ecology split sample analytical-chloride results for dross pile resampling at deeper intervals on June 13/14, 2006), July 7, 2006.
17. Bio Research Laboratories, Inc., "Acute Oral Rat Toxicity Test for Washington State Department of Ecology", Letter and Report from John Majnarich, Ph.D. to Pam Covey, Manchester Laboratory, (Sample B-D-9), September 8, 2006.
18. URS Corporation, "Draft Dross Sampling and Waste Determination, Maralco Restoration Project, Kent, Washington", Prepared for Brown Dog, LLC, Seattle, Washington, April 27, 2006.
19. URS Corporation, "Black Dross Pile Characterization, Maralco Aluminum Site, Kent, Washington", Prepared for Loeb and Loeb, LLP, August 31, 2000