

**RESEARCHING EXPOSURE TO ENVIRONMENTAL
CHEMICALS AT CRI SITES IN OREGON**

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INTRODUCTION

Introduction

This research begins with a review of three types of sites defined by EPA. The Superfund Sites list is of sites selected for clean-up status. These sites in theory represent the most toxic sites in Oregon, although, as this study reveals, certain high risk sites avoided the label of Superfund status by way of changing the definition and public and social interpretations made regarding the definition of the site and its actual causes. Included with the Superfund Site information are details regarding the final listing of sites considered but not yet approved for Superfund status. The review of the Toxic Release Inventory (TRI) Listing for Oregon provides a description of more than 2500 sites where chemical release has been documented and steps taken to reduce or eliminate the danger they pose to people and the local environment. The Confirmed Release Inventory (CRI) is a listing of sites where extensive efforts have been made to assess the type of damage that occurred. Since CRI reports are “confirmed” reports, they are relied on heavily in this evaluation of each site and tend to contain more detail about the sites reviewed; such information includes documentation of the chemicals released, their concentrations in local soil and aquifers, and any important company data that can be used for this analysis.

Data provided for each of these three sets of pollution sites came from a variety of sources. The TRI reports came from a website sponsored by EPA. This information detailed approximately 2700 TRI sites in Oregon.

The information about CRIs came from a combination of TRI reports and state-generated information sources. The additional information this analysis provided consisted of approximately 4600 chemical reports of 250 chemicals for 540 sites.

The information on Superfund sites came from federal, state, and environmental group or non-profit organization sites on the web. This information provided details about 81 locations considered for Superfund Status. The current listing of Superfund site considerations is no doubt longer, for as this work progressed, so too did the length of each of the related databases.

In the end, these three types of data provided the information and insights needed to develop a method of evaluating the degree of toxicity each TRI, CRI and Superfund site presents to local communities.

This evaluation of the information served several purposes and was carried out in the following sequence:

- ✓ Evaluation of the Superfund application and Superfund Clean-up lists, with emphasis on where these sites are located and a brief review of the chemical make-up for the final Superfund Clean-up sites (the chemical make-up for unapproved sites is included in the analysis of CRIs).
- ✓ Evaluation of TRI site data, including a review of location and general, overall chemistry of the toxic waste produced and/or released by each of these sites.
- ✓ Evaluation of CRI sites, including a more detailed review of these chemical compounds released and an evaluation of the types of agencies, businesses and/or settings engaged in such practices.
- ✓ Evaluation of the 250 chemicals released in Oregon by the CRI sites, including a review of the types of chemicals in this listing and related environmental health concerns based on EPA and medical opinion; this portion of the review included an extensive review of the types of chemicals that are released in Oregon and how this compares with national chemical data as noted in a CERCLIS listing.
- ✓ Evaluation of the relationship between SIC and chemical release; for this part of the study SICs provided for each site were reclassified to produce sets of data for which there is a shared site chemistry; this chemistry in turn was used to produce chemical profiles or “signatures” useful for contrasting and comparing the relationship between business type, chemical release, and degree of risk posed by each of these sites. This portion of the work enabled chemical distinctions to be drawn between seemingly similar toxic release locations, showing that reclassified SIC data may be used to identify sites where particular sets of chemicals are released. In theory, this enables one to compare sites high in benzene-rich sites responsible for polycyclic aromatic hydrocarbon release with low benzene-rich sites suspected to be carcinogenic that are responsible for the release mostly of halogenic aliphatic chemicals.
- ✓ Evaluation of Oregon CRI data in order to define the most toxic, chemically diverse pollution sites. This resulted in the identification of 22 sites considered to be severely high risk for exposure locally due to high volume and complexity of chemical release. These 22 sites may be considered high risk along with the already approved Superfund Sites and any Superfund application sites not included in this listing of 22 High Risk sites.

The research is a review may be applied to the research of the Oregon cancer data and the applications of GIS to this research.

Research Issues

A number of problems with the current datasets was uncovered throughout the progress of this research. To date, each dataset is produced with the goal of being independently manageable and useful. The formats of the different datasets, and values or meanings assigned to each datum piece serve different roles for different types of researchers. The SIC related data for example was designed to serve economics and business researchers, and has to be well understood and modified to be used effectively in GIS-based analysis. The data provided by TRI and CRI databases was similar. Yet, each were of different formats or entries (i.e. addresses and business names), thereby requiring manipulation and re-entry before final comparisons could be made. The chemical data provided for CRI sites used naming methods that varied across the entire chemical list; these names in turn often had to be reviewed and at times modified so this data could be used to define chemical profiles for a given set of CRI sites. For comparison of this data to other important information sources, like the CERCLIS toxicity data or the environmental behavior/half-life data for each chemical, required extensive manipulation of datasets and in the end was excluded from this portion of the study.

In the end, the overall development of this project in the time allotted enabled formidable progress to ensue regarding the identification of flaws in this work and designing better ways to incorporate different sets of data into a GIS research project.

The results of this research are presented in the following sections:

1. Evaluation of all Superfund, TRI and CRI data, including the SIC and chemical reviews and the identification of 22 high risk sites in Oregon.
2. A review of the activities engaged in for the GIS portion of this project.