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Tijuana River Watershed Toxics Data Project

Final Report

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Project Overview

As it flows north across the international boundary from Mexico, the Tijuana River forms one of the last remaining functional wetlands of southern California, the biological significance of which has been recognized by (among other things) the establishment by the US National Oceanic and Atmospheric Administration (NOAA) of the Tijuana River National Estuarine Research Reserve. Arising in and for three-quarters of its length flowing through the state of Baja California, before emptying into Imperial Bay on the Pacific coast, the Tijuana River suffers from channelization, damming and sedimentation on both sides of the border as well, as urban discharges and other insults as it drains the transboundary Tijuana-San Diego metropolis, with the result that the naturally intermittent stream in this semi-arid environment has become an effluent-dependent water carrying heavy loads of contaminants that significantly impact the estuarine wetland and present significant health hazards to people and wildlife (including several threatened and endangered species) using the water.

Sewage discharges into the river in recent years, for instance, have created a variety of public health problems and have been linked to outbreaks of gastrointestinal diseases, cholera, hepatitis B and malaria. Heavily contaminated outflows into the marine environment have forced repeated closures of beaches from the border to Coronado Island. Unless checked, contamination is expected to worsen rapidly as the explosive growth the area has experienced in the past quarter century increases dramatically in the next few years. Tijuana, for instance, with a current population of approximately 1.1 million, is expected to surpass that of Los Angeles by the year 2050. Urban industrialization, characterized by the installation of some 650 *maquiladora* plants discharging into the watershed between 1965 and 1991, is expected to increase similarly. The urban core of Tijuana, now covering some 60,000 acres, is projected to increase by more than 80% to cover 108,000 acres by the year 2013.

Until recently, the transboundary situation of the watershed has prevented pursuit of a coordinated, integrated approach to solving the problems, and at present there is no convenient location where one can find a listing of the existing data systems, databases, etc. for pollutants or potential pollutant sources in the Tijuana River Watershed.

In March 1994, however, NOAA provided initial funding for the development of a Geographic Information System (GIS) mapping of the watershed. At a binational "User-Needs Assessment Workshop" held in San Diego in eight months later as part of the GIS Project, some 120 people from a broad range of educational, scientific, planning, political and non-profit organization fields, identified water quality and contingency planning for toxic discharges into the river as a major concern of communities on both sides of the border.

As the first GIS project funded to map a transboundary watershed on the US-Mexico border, the TRY GIS Project is relevant to the whole border region. It is intended to integrate binational multi-media ecological and socio-demographic data to facilitate comprehensive understanding of relationships between human and environmental processes in the transboundary ecosystem,

thereby engaging planners on both sides of the border to explore solutions that address socio-economic and environmental issues in an integrated manner and to model impacts from various proposed activities so planners can be proactive rather than reactive in determining preventive and remedial actions.

In addition to addressing site-specific issues, the GIS Project has been proposed as a vehicle for several pilot projects with implications throughout the border region and beyond. In particular, it has been suggested, for instance, that the GIS Project could be the vehicle for developing a pilot binational integrated database which could in turn, become a basis for environmental data-sharing among NAFTA partners.

The current Toxics Data Project was designed to address some of the concerns of the 1994 needs assessment workshop, to provide an essential link between scientific-academic and grassroots NGO sectors called for by the GIS Project workplan, and otherwise to facilitate toxics data integration in the border region. For purposes of the Project, the term *toxics* was defined broadly, as synonymous with the terms *hazardous materials*, *hazardous substances* and *dangerous goods*, and inclusive of such other (often more legally limited) terms as *hazardous waste*, *toxic chemical*, *extremely hazardous substance*, *pollution* or *pollutant* or *contaminant*, *pesticide*, etc.

Specifically, the project was designed to:

- Further the objectives of the ongoing right to know programs of Arizona Toxics Information and Proyecto Fronterizo de Educación Ambiental
- assist the GIS managers in identifying information sources on toxics data on both sides of the border required for GIS mapping of the watershed, with particular attention to identifying Mexican information sources (e.g., agency and municipal data systems)
- develop the framework for a binationally integrated data dictionary on toxics impacting the Tijuana Watershed
- facilitate development of criteria for binational, multi-disciplinary data harmonization and other aspects of integrated data management to address issues of accessibility and interpretability, with particular regard to data management issues raised by the institutional framework of both countries and to the need for community involvement in environmental policy and planning.
- facilitate effective interface of Tijuana River Watershed GIS personnel with toxics decision-makers in Mexico, including government agencies, research institutions and community organizations.
- provide a basis for development of outreach materials and activities to facilitate transborder dialogue among governmental, academic, private and public sectors,

including other community groups, regarding the implications of integrated data for policy and planning decisions.

- provide a consistent basis for identifying pollutant sources in the watershed.

The project was carried out during the year beginning September 1995 through a collaborative effort of ATI and Proyecto Fronterizo de Educación Ambiental, non-profit organizations based in Bisbee, Arizona and Tijuana, Baja California, respectively. Funding was provided in part by the US Environmental Protection Agency under auspices of the joint EPA-SEMARNAP Border XXI program. This document and its appended attachments constitute the final report for the Project.

**Acronyms and Abbreviations Used in this Paper/
Siglas y Abreviaciones Utilizados in esta Reporte**

ADEQ	Arizona Department of Environmental Quality/ Secretaría del Medio Ambiente del Estatal de Arizona
ADMS	Aerometric Data Management System/ Sistema de Manejo de Datos Aerométricos
AIRS	Aerometric Information Retrieval System/ Sistema de Recuperación de Datos Aerométricos
ARB	Air Resources Board/ Comisión de Recursos del Aire
ARIP	Accidental Release Information Program/ Programa de Información sobre Emisiones Accidentales
ARP	Accidental Release Prevention/ Prevención de Emisiones Accidentales
ARS	Arizona Revised Statutes/ Estatutos Revisados de Arizona
ATEDS	Air Toxics Emission Data System/ Sistema de Datos sobre Emisiones Contaminantes a la Atmósfera
ATSDR	Agency for Toxic Substances and Disease Registry/ Agencia para Registro de Sustancias Toxicas y Enfermedades
BRS	Biennial Reporting System/ Sistema de Reporte Bienal
CalEPA	California Environmental Protection Agency/ Secretaría para la Protección Ambiental del Estado de California
CAS	Chemical Abstract Service/ Servicio de Química Abstracto
CEC	Commission on Environmental Cooperation/ Comisión para la Cooperación Ambiental
CEMPRA	Clasificación de Empresas de Alto Riesgo/ Classification of High Hazard Facilities
CENAPRED	Centro Nacional para la Prevención de Desastres/ National Center for Prevention of Disasters
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act/ Ley General de Respuesta, Compensación y Responsabilidad Ambiental
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System/ Sistema de Información sobre la Respuesta, Compensación y Responsabilidad Ambiental
CFR	Code of Federal Regulations/Código de Regalamentos Federal
CHMIRS	California Hazardous Materials Incident Reporting System/ Sistema de Reportes sobre Incidentes de Materiales Peligrosos de California
CICA	Center for Investigation of Contamination of Air/ Centro de Información sobre Contaminación del Aire
CICOPLAFEST	Comisión Intersecretarial para el Control de Plaguicidas, Fertilizantes y Sustancias Toxicas/ Interagency Commission for Control of Pesticides, Fertilizers and Toxic Substances
CILA	Comisión Internacional de Límites de Aguas/ International Boundary and Water Commission

CNA	Comisión Nacional del Agua/ National Water Commission
COLEF	Colegio de la Frontera Norte/ Northern Border College
CUPA	Certified Uniform Program Agency/Agencia para el Programa de Certificación Uniforme
DHHS	Department of Health and Human Services/ Secretaría de Salud y Servicios Humanos
DOL	Department of Labor/ Secretaría de Trabajo
DPR	Department of Pesticide Regulation/ Departamento de Regulación de Pesticidas
DTSC	Department of Toxic Substances Control/ Departamento de Control de Substancias Peligrosas
EIDRS	Emissions Inventory Development and Reporting System/ Sistema de Desarrollo y Reporte de Inventario de Emisiones
EIS	Emissions Inventory System/ Sistema de Inventario de Emisiones
EPA	Environmental Protection Agency/ Secretaría de Protección al Ambiente
EPCRA	Emergency Planning and Community Right-to-Know Act/ Ley para Planeación de Emergencias y Derecho a Saber de la Comunidad
FIDS	Facility Information Data System/ Sistema de Información de Instalaciones
FINDS	Facility Index Data System/Sistema de Datos sobre Indices de Instalaciones
FR	Federal Register/ Registro Federal
GIS	Geographic Information System/Sistema de Información Geográfica
HAPS	Hazardous Air Pollutant/ Contaminante Atmosférico Peligroso
HAZTRAKS	Electronic Database for tracking hazardous materials crossing the US-Mexico border, funded and maintained by EPA, INE, and U.S.Customs/ Programa informático financiado y manejado por la EPA, INE y Aduana EE.UU. usado para el seguimiento de los materiales y los residuos peligrosos que cruzan la frontera entre México y los EE.UU.
HMMP	Hazardous Material Management Plan/ Plan de Manejo de Materiales Peligrosos
HSDB	Hazardous Substances Databank/ Banco de Datos sobre Substancias Peligrosas
HSEES	Hazardous Substances Emergency Events Surveillance/ Vigilancia sobre Eventos de Emergencias de Substancias Peligrosas
HWIS	Hazardous Waste Information System/ Sistema de Información sobre Residuos Peligrosos
IDLH	Immediately Dangerous to Life or Health/ Inmediatamente Peligroso para la Vida y la Salud
IBWC	International Boundary and Water Commission/ Comisión Internacional de Límites de Aguas
INE	Instituto Nacional de Ecología/ National Ecology Institute
IUPAC	International Union of Practical and Applied Chemists/ Union

	Internacional de Profesionistas en Química Práctica y Aplicada
LGEEPA	Ley General del Equilibrio Ecológico y la Protección al Ambiente/ General Law of Ecological Equilibrium and Environmental Protection
LGS	Ley General de Salud/General Health Law
LOL	List of Lists/ Lista de Listas
NATICH	National Air Toxics Information Clearinghouse/ Consejo Nacional de Información sobre Contaminantes de la Atmósfera
NCPD	National Coastal Pollutant Discharge/ Descargas Nacionales de Contaminantes Costeros
NHEXAS	National Human Exposure Data Survey/ Levantamiento Nacional de Datos sobre Exposición Humana
NIH	National Institutes of Health/ Institutos Nacionales de Salud
NIOSH	National Institute for Occupational Safety and Health/ Instituto Nacional para la Seguridad y Salud Ocupacional
NLM	National Library of Medicine/ Biblioteca Nacional de Medicina
NOAA	National Oceanic and Atmospheric Administration/ Adminstración Nacional de Oceánica y Atmosférica
NOM	Norma Oficial Mexicana/ Official Mexican Standard
NPL	National Priority List/ Lista de Prioridades Nacionales
NTE	Norma Técnica Mexicana/ Mexican Technical Standard
OAR	Office of Air and Radiation/ Oficina de Aire y Radiación
OECD	Organization for Economic Cooperaton and Development/ Organización para la Cooperación y el Desarrollo Económico
OES	Office of Emergency Services/ Oficina de Servicios Emergencios
OPPT	Office of Pollution Prevention and Toxics/Oficina de Prevención de Contaminación y Substancias Tóxicas
OSHA	Occupational Safety and Health Administration/Administración de Seguridad y Salud Ocupacional
OSWER	Office of Solid Waste and Emergency Response/Oficina de Desechos Sólidos y la Respuesta para Emergencias
OW	Office of Water/ Oficina de Agua
PNPC	Programa Nacional de Protección Civil/ National Civil Protection Program
POTW	Publicly Owned Treatment Works/ Plantas para Tratamiento, de Propriedad Publica
PSM	Process Safety Management/ Manejo de Seguridad en Procesos
PURS	Pesticide Use Reporting System/ Sistema de Reporte sobre Uso de Pesticidas
RCRA	Resource Conservation and Recovery Act/ Ley de Conservación y Recuperación de Recursos
RCRIS	Resource Conservation and Recovery Information System/ Sistema de Información sobre la Conservación y Recuperación de Recursos
RETC	Registro de Emisiones y Tranferencias des Contaminantes/ Pollutant

	Release and Transfer Register	
RODS	Record of Decision System/ Sistema de Registro de Decisiones	
RSPA	Research and Special Programs Administration/ Administración de Investigación y Programas Especiales	
Salud	Secretaría de Salud/ Ministry of Public Health	
SDSU	San Diego State University/ Universidad Estatal en San Diego	
SEDESOL	Secretaría de Desarrollo Social/ Ministry of Social Development	
SEMARNAP	Secretaría de Medio Ambiente, Recursos Naturales y Pesca/ Ministry of Environment, Natural Resources and Fisheries	
SIC	Standard Industrial Classification/ Clasificación Industrial Estandar	
SEC	Securities and Exchange Commission/ Comisión de Seguridades y Intercambios	
SNIFF	Sistema Nacional de Información de Fuentes Fijas/ National Information	System for Fixed Sources
SNICA	Sistema Nacional de la Calidad Ambiental/ National Environmental Quality System	
SNMA	Sistema Nacional de Monitoreo Atmosférico/ National Air Monitoring System	
SWIS	Solid Waste Information System/ Sistema de Información sobre Desechos Sólidos	
TNRCC	Texas Natural Resources Conservation Commission/Comisión/ Comisión para la Conservación de Recursos Naturales de Texas	
TRI	Toxics Release Inventory/ Inventario de Emisiones Tóxicos	
TRIS	Toxics Release Inventory System/ Sistema de Inventario de Emisiones Tóxicos	
TSCA	Toxic Substances Control Act/ Ley para el Control sobre Sustancias Tóxicas	
WRCB	Water Resources Control Board/ Comisión para Regulación de Recursos del Agua	

The Information Environment

Problems with the information environment of the Tijuana River Watershed are symptomatic of information access problems throughout the US-Mexico border region and indicative of toxics data management issues that are becoming increasingly urgent worldwide (perhaps especially in binational border regions) as economic integration and globalization promote widespread production and dissemination of hazardous materials.

Like companies in other areas of the border, those operating in the Tijuana River Watershed are often subject to what can be a bewildering array of environmental reporting requirements. The problem is especially acute for those operating on the US side of the border where, depending on the size, type and industrial sector of the operation, a facility manager may have to fill out and submit to one or more government agencies fifty or more environmental reports in any given year.

These reports can require, for instance, data on 1) the identity, quantity, quality, location, destination, physical and chemical make-up, and potential hazards of hazardous (i.e., dangerous or potentially dangerous) materials; which are 2) received, stored, handled, produced, processed, treated, disposed at or distributed from the site; 3) release or transfer of such materials as emissions, discharges, spills, shipments, etc., or efforts to prevent or reduce their release or transfer in or to the various environmental media (air, land, water, organisms) in the form of products (or product components), by-product or waste; and 4) measures taken by the company to protect workers, the public and the environment from adverse effects of such materials.

Data may be reported for purposes of monitoring, permitting or planning that is required by laws, regulations, court orders, business efficiency, social demands, public relations, ethics, etc. Furthermore, reports may be required by authorities at local, regional, state, federal and bi- or international jurisdictional levels, each using a different reporting format and calling for sometimes redundant, but typically different (though often only slightly different) data.

Such data may come from private businesses, government bodies, profit organizations or individuals. Data may be media-specific (e.g., a list of water contaminants or air pollutants) or multi-media (e.g., total releases from a site).

Data may also be site-, facility-, or incident-specific or may be aggregated by region, industrial sector or other source. Likewise, data may be substance-, product- or organism-specific, or may be aggregated by family, genus, type, or other category including effect (e.g., carcinogens, mutagens, corrosives), use (e.g., plasticizers, pesticides, solvents), or provenance (e.g., goods in commerce, substances regulated, household hazardous waste).

The variety and multiplicity of these data and the forms/formats in which they are reported place a significant burden on companies required to report, on agencies charged with recovering and processing the data, and on members of the public attempting to find and understand the data or to obtain an overall assessment of environmental conditions at the local, regional, national, binational

or global level.

No single report contains (or links to) all the data necessary to any given user, often because data is not available. The best-known and broadest-scope pollutant release and transfer reporting system in the world, for instance, the USEPA Toxics Release Inventory (TRI), provides limited information on only about 5% of the environmental releases in the US. Even less information is available in Mexico. These large data gaps result from a combination of factors, including the fact that equivalent information is not required from all industrial sectors nor for all environmental media. Mexico, for instance, requires some reporting on certain solvents when used as raw materials in certain industrial situations, but does not require equivalent reports on those same solvents when they are released to the air.

Even when data is available, frequently it is not accessible, for while the thousands of reports submitted by companies and generated by governments and academic institutions contain a wealth (some would say a glut) of data, that data often is difficult to access in the first place and is reported in formats that are not mutually compatible or not easily convertible to mutually readable systems, so comparing or aggregating data from various sources is often difficult to impossible.

The difficulty may be further compounded with data systems constructed by different agencies (e.g., the US Department of Transportation and the US-EPA), different states or different countries. The problem may be even more complicated if, as is often the case, the two information sources use different software, and the problem is compounded even more when the information seeker attempts to access and compile/compare/aggregate data from a variety of agencies or other sources at various jurisdictional levels.

The barrier to linkage may occur at the systemic structural level, or at the level of smallest detail, in what are known in electronic data management language as “data elements.” For instance, currently, there is not even a uniform definition of basic geographical locator terms like “site” and “facility” — so (depending on which form/system we look at), we may be asked to identify a *business*, a *company*, a *unit*, or a *source*; *sources* and *facilities* within a *site*; *sites* and *locations* within a *source* or *facility*; etc.

Chemical Nomenclature

Comparing data on hazardous materials is often difficult because they lack common alphabetic and/or numeric identifiers; a database compiled for one purpose or according to one classification scheme may be incompatible with or unintelligible to one compiled for a different purpose or according to a different scheme.

Sometimes the difference is only a relatively simple matter of spelling or syntax. Of the two lists of “toxic substances” issued the Secretaría de Salud, for instance, one prefers use of the letter “c” where the other prefers the letter “z”, so unless the researcher knows that *cinc* and *zinc* refer to the same

substance, a great deal of information may be missed.

Incompatibilities or noncomparabilities that are more difficult to resolve may occur even among databases compiled or held by a single agency. Within the US-EPA, for instance, a substance regulated by the Office of Water may be known by a different name from the same substance regulated as a pesticide by the Office of Prevention, Pesticides and Toxic Substances.

Hazardous waste (a subcategory of hazardous materials) presents another kind of data correlation problem in the border region, one that is typical of hazardous materials mixtures. Mexican and US federal and border state governments may assign identical names (or English and Spanish cognates) to certain wastes, but the names may refer to quite different substances, with definitions and characterizations (constituent substances, concentrations, percentages, etc.) differing substantially between jurisdictions. Conversely, while approximately 30% of federally listed hazardous wastes are substantially identical, not all of those have identical or cognate names.

Part of the problem is that chemical names themselves are confusing and, therefore, not very useful to members of the public seeking information on their hazards, sources and distribution. There is no universal standard nomenclature for hazardous materials. Names vary within chemical protocol and according to application and user (as well as between agencies, countries, languages and computer softwares).

Not only are there a variety of names for any given substance (e.g., proprietary brand or marketname[s], common names[s], chemical name[s], etc.), many of which are multi-syllabic and otherwise unfamiliar to most lay persons, but because different users choose different differing synonyms and nomenclatural protocols the public is confronted with several equally correct names for the same substance.

For instance, *Nitrochlorobenzene*, *Chloronitrobenzene*, *p-Nitrochlorobenzene* and *4-Nitrochloro-1-benzene* are all perfectly correct chemical names for exactly the same specific substance, according to the established protocols for chemical nomenclature (which are based on unique structural formulas rather than unique verbal identifiers). Similarly, the compound commonly known to millions of high school chemistry students as *Lead Sugar* or *Sugar of Lead*, may also be known more formally as either *Lead Acetate* or *Acetate of Lead* (*Acetato Plomo* or *Acetato de Plomo*), *Lead Dibasic Acetate*, *Plumbous Acetate*, *Lead Diacetate* or *Lead (2+) Salt of Acetic Acid*.

The chemical naming protocol allows for a wide range of synonyms, each of which is either a valid indicator of structural formula, and agencies may make different choices. The Secretaría de Salud, for instance, lists one chemical as *Ftalato de di-N-octilo*; INE includes the same chemical in the list of those subject to reporting for the Registro de Emisiones y Transferencia de Contaminantes, but calls it *bis(2-etil hexil) Ftalato*.

Terminological preferences may also change over time causing a chemical name to be generally replaced though still being historically valid (i.e., established thorough past usage and therefore still

found in standard reference works and some current parlance). *Tetrachlorethylene*, for instance, is increasingly the accepted name of the common dry-cleaning solvent historically known as *Perchlorethylene* or *Perc*; both names are correct, but due to something like a change in fashion within the community of chemists makes *tetrachlorethylene* “more correct” than the outmoded *Perc* (and the equally “traditional” but out of style cognates *Perchloroethylene* and *Tertrachloroethylene*). Similarly, the solvent now usually known as *Trichloroethane* was formerly known most commonly as *Chlorothene* or *Methyl Chloroform*.

Information Accessible to the Public

A first step in pollution- and disease-prevention is hazard identification, but anomalies such as those discussed above make identification of hazardous materials, their sources, disposition and effects, difficult to impossible. Furthermore, even when comparability and linkage are achieved, there may be a significant difficulty in dissemination of information. Data are not information until they are translated into language that lay persons can understand and provided in forms and venues where the affected public, those members of the community potentially most exposed, can find them.

Like the informational chaos described above, lack of effective information dissemination is tantamount to lack of data and contributes similarly to the widespread feeling of helplessness experienced by many people when faced with toxics issues. Unavailability and inaccessibility of information help to perpetuate the popular myth that chemical properties, behavior, management and effects are esoteric subjects, part of an *arcanum mysteriosum* beyond the reach of the uninitiated and knowable only by the specially-trained elite corps of technicians and scientists.

Under conditions of increasing proliferation of toxics such as characterize the Mexico-US border, lack of access not only contributes materially to disempowerment of individuals and communities (while at the same time contributing to psycho-social dis-ease and unrest by re-enforcing primal fears of the unknown), but substantially increases the potential for environmental contamination and adverse impacts on environmental health. De-mystification of toxics issues is an urgent public information need.

Public access to information and other aspects of community right to know are dependent to a great extent on the *form* in which information is provided, which in turn depends on the content of specific *data elements*. What is (to be) known inevitably/ultimately is the aggregate content of specific data elements, and these are the transferable units uploaded into the databases that are included in GISs or other retrieval systems.

For purposes of identifying, tracking and communicating about hazardous materials in commerce, in the environment or in on organism (including humans), the researcher needs to know the specific chemical substance and, therefore, requires specific (i.e., unique) identifiers. Such identifiers may be alphabetic (or “alpha”, what is commonly known as a “name”), numeric, or a combination of the two (i.e., “alpha-numeric,” e.g., P308).

As globalization of economic and communications systems increasingly tends to make the global village a reality, there is growing recognition of these problems and various efforts are underway to address these problems, including an increasing movement on some fronts towards international harmonization of hazardous materials data and management systems.

For instance, while there is no universal standard nomenclature for hazardous materials and may never be one, there is a growing acceptance by international bodies of the names established by the International Union of Practical and Applied Chemists (IUPAC) and, even more promising, a growing general concurrence worldwide that the coding system of unique numeric identifiers for chemical substances (CAS numbers) established by the Chemical Abstract Service should be the international standard.

Furthermore, the United Nations Environmental Program (UNEP) has put considerable effort into developing a standard international database of hazardous materials (the IRPTC/ International Register of Potentially Toxic Chemicals) and the newly-reorganized Intergovernmental Forum on Chemical Safety has undertaken a variety of projects to harmonize chemical and chemical data management.

In a related action, prompted by Agenda 21 (the so-called “Blueprint for the Future” endorsed by more than 100 nations at the 1992 Earth Summit in Rio), last spring the Organization for Economic Cooperation and Development (OECD) issued a guidance document for nations on how to construct Pollutant Release and Transfer Registers (PRTRs). Last year, Mexico conducted a pilot PRTR in the state of Querétaro and is planning a nationwide application in the near future. Simultaneously, the Commission on Environmental Cooperation is planning a North American PRTR. By their very nature, PRTRs necessitate standardization and other positive aspects of toxics data management.

A variety of projects addressing such specific aspects of toxics data management are underway in the US. Partly as a result of lessons learned from conducting the US Toxics Release Inventory (a precursor to PRTRs), for instance, in 1995 the US-EPA established a Key Identifiers Initiative. Recognizing that “the first step toward standardizing data is to identify those common data elements (termed key identifiers),” in its 1996 Executive Summary of the project the Initiative workgroup recommends that the term “facility” be defined as:

All buildings, equipment, structures, and other items located on a single site or contiguous or adjacent sites owned or operated by the same person or persons.

Several committees of the US-EPA Common Sense Initiative, the inter-agency National Response Team and several states are engaged in such painstaking data projects, including efforts to develop uniform consolidated environmental reporting systems. Furthermore, especially since the process of economic integration begun a few years before the advent of the North American Free Trade Agreement (NAFTA), several binational (and, more recently, trilateral) efforts have been undertaken to harmonize US and Mexican systems of chemical and hazardous waste nomenclature.

However, although the issues of standardization and harmonization, compatibility, comparability, convertability, etc., have been increasingly recognized since the information and communications revolution of the past few years, and great advances have been made in some quarters recently to meet the information exchange needs of the computer age, for the immediate future governments, industries and the concerned publics are still faced with a chaotic and apparently infinite and expanding universe of information, and with the utter impossibility of obtaining a comprehensive, accurate accounting of environmental contamination. Despite the wealth of data available in this Age of Information, we simply do not know what is out there (in our air, soil, water and food) or in here (in our blood, tissue, organs), and we do not know what dangers what is out there and in here pose to us, our fellow inhabitants of the earth, or to our progeny in future generations.

One of the more promising efforts to make sense out of the informational chaos is the recent boom in development of Geographic Information Systems (GISs). which provide a relatively convenient means of integrating geographically-based data (geo-data) from a wide range of information sources and facilitates predictive analysis for planning purposes. Two of the main limitations on the development and usefulness of GISs have been the lack of thematic data on toxics available in digital form and, as discussed above, the lack of standardized data definitions, identifiers, etc.

This report is an attempt to overcome at least part of those problems by facilitating entry of hazardous materials data into one GIS —the one being developed jointly by COLEF and SDSU for the binational Tijuana River Watershed. But the current project is also an attempt to use the process to develop a pilot for incorporating toxics data into other GISs, as well, several of which are currently being developed along the Mexico-US border (including border-wide efforts like those of the US Department of Interior and the Transboundary Resources Inventory Project being coordinated by the Texas Natural Resources Conservation Commission, as well as those of border communities such as that being developed by the Cochise County, Arizona, Planning Department).

To this end, the project developed three products:

- 1) A Toxics Data Sources matrix listing of governmental sources of toxics data pertinent to an understanding of potential contamination of the watershed;
- 2) A Toxics Data Dictionary consisting of categorized data elements drawn from a selection of reporting forms used to collect toxics data in the region and representing, therefore, the forms in which toxics data is likely to be available for entry into the GIS; and
- 3) A Border Toxics Reference List incorporating names and alpha-numeric identifiers of toxics likely to be present in the watershed.

Project Methodology

- 1) A search was made by phone and in person with academics, officials of various state and federal agencies, and representatives of environmental organizations, to identify existing sources of toxics data (agencies, institutions, firms, etc.) relevant to the study area (Tijuana River Watershed), including sources of monitoring, permitting and reporting data.
- 2) Interviews were followed by a search of existing literature and limited browsing of the Word Wide Web, resulting in a list of agencies, regulatory programs, reporting forms, hard copy and electronic databases, etc. Preliminary assessment of these led to the list of data sources found in Appendix A.
- 3) The identified data sources were queried to identify available databases.
- 4) Following extensive conversations with representatives of environmental organizations, academics and agency personnel, nearly one hundred identified data systems (including hardcopy files, databases and Internet websites) were assessed to determine provenance, purpose, structure, unique identifiers, etc. (Attachment A).
- 5) Evaluated reporting forms were screened to select those containing data on potential contaminants of the study area. Preliminary data assessment confirmed a great deal of redundancy or near-redundancy of data elements.
- 6) Time and other resources did not allow for a reduction of all the identified reporting forms to a table of data elements, so a manageable selection of 25 forms (10 Mexican, 15 US) was made by
 - a) limiting the choices to only government reporting forms,
 - b) focussing on geographically-fixed sources (including facilities, sites or incidents), more or less excluding data elements specific to distribution (e.g., transportation) or ambient conditions, and
 - c) keeping in mind that the final goal was to provide a list of elements that would be:
 - fairly representative of those elements actually reported in the Tijuana River Watershed
 - inclusive of the different environmental media (air, water, soil, organisms)
 - inclusive of the various regulatory programs requiring reports (air quality, water quality, emergency planning and response, agriculture, hazardous waste, pollution prevention, etc.)
 - inclusive of the toxics present in the watershed
 - applicable to other programs, including GIS projects, in the border region

- accessible to analysis through hard copy or electronically.

7) Selected data elements were consolidated/harmonized/normalized (conformed/standardized) into a Toxics Data Dictionary for the Tijuana River Watershed GIS (Attachment C).

8) Simultaneously with assessment of the reporting forms, a search was made for related toxics databases, especially chemical lists maintained by state and federal agencies. More than 100 governmental chemical lists were identified, including lists compiled for regulatory, health, emergency and land-use planning, pollution prevention, and other purposes.

9) Based on similar criteria to those applied to screen and select the reporting forms, with high priority for inclusion given to substances identified on databases addressing emergency planning and response databases, and keeping in mind the desirability of having a consolidated list with border-wide applicability, the identified toxics lists were screened.

10) Several screened lists were entered into the Arizona Toxics Information toxics database (TOXBASE). Acknowledging the high variability in names for materials and the need of GIS managers and other users for unique, easily-processed identifiers, to the degree practicable specific substances on the entered lists were matched with widely-recognized numeric and alphanumeric identifiers (CAS numbers, IUPAC names, etc) and a similar attempt was made to match non-specific materials (chemical classes or mixtures such as VOCs, cyanides, hazardous wastes, etc.) with recognized identifiers (e.g., INE or EPA codes or category names) .

11) A selection of lists was reported out. Although in theory the ideal Reference List would perhaps include all entered lists and all synonyms for each substance, practical considerations (for example, the goal of having the final document combine minimum length with maximum usefulness as a quick-reference for the lay public, while providing the GIS managers with a reasonably inclusive compendium of code-referenced materials likely to be reported in the Tijuana River Watershed), determined that each substance would occur on the Reference List only once, with one English and one Spanish name, both matched to the appropriate CAS number or other code.

12) No rigorous attempt was made to harmonize or regularize names. In general, English names chosen are those found on whichever US source list was first entered into the database (usually the USEPA TRI or the ADEQ Pollution Prevention planning list); those and most other English names on the Reference List are frequently those preferred by the two standard reference works readily available to the compilers: the 1986 edition of *The Registry of Toxic Effects of Chemical Substances* (US National Institute of Occupational Safety and Health) and Sax and Lewis's *Dangerous Properties of Industrial Materials* (7th edition, 1988, Van Nostrand). When an English name appearing on a given list without a CAS number matched the preferred name in one of those works, that name and corresponding CAS number were usually adopted without further question. When the two standard references disagree on preferred name for a CAS-specific substance, one or another was chosen more or less arbitrarily.

Selection of Spanish names followed a similar process. Spanish names on the Reference List are usually from one or another of the Mexican source lists, most often those of the Secretaría Gobernación or the Secretaría d Salud (again, determined principally by which source list was first entered into the ATI database). When Mexican source list names differ from each other, the one most nearly corresponding to the preferred Sax or RTECS names was usually selected. When the name on a given list applies to more than one CAS number (which often occurs due to incomplete or truncated names, but may result from one or more names being accepted “standards”), the name in question was usually assigned to all the CAS numbers that match the name, on the assumption that in matters of public health it is better to err on the side of over-protection. For instance, the Secretaría de Salud’s “First List of Hazardous Substances” includes *Oxalato de amonio*, a name which corresponds to at least four CAS numbers (1113-38-8;, 5972-73-6, 6009-70-7, 14258-49-2); all four were entered onto the Reference List with the Salud list indicated as a source, but in fact, the Secretaría de Salud may have intended only one of the four.

13) The lists thus selected were compiled into a bilingual US-Mexico Border Toxics Reference List of potential contaminants which may be reported through the various reporting systems relevant to the watershed and, therefore, are potentially available for entry into the Tijuana River Watershed GIS (Attachment C).

ATTACHMENTS

Attachment A

Selected Toxics Data Sources for the Tijuana River Watershed

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Selected Toxics Data Sources for the Tijuana River Watershed

Fuentes de Datos sobre Tóxicos
Seleccionadas para la Cuenca del Río Tijuana

Michael Gregory
Bruce G. Carey

Arizona Toxics Information

Laura Durazo

Proyecto Fronterizo de Educación Ambiental

October 1996

Introduction

The principal sources of toxics data for the Tijuana River Watershed are databases constructed by federal and state agencies, especially the Instituto Nacional de Ecología in Mexico and the US and California Environmental Protection Agencies in the US. There are many more US than Mexican databases. No attempt has been made to list them all here. [Visits to the US-EPA homepage (<http://epa.gov>) or a look at the California EPA's *Toxics Directory* (available from Cal-EPA's Office of Environmental Health Hazard Assessment at 510-540-3063) will provide the researcher with abundant lists.

No attempt has been made to conduct a thorough literature search to identify all toxics databases pertinent to the study area. Instead, sources were identified through discussion with researchers and other professionals, including agency personnel and non-profit organizations. The 1994 discussion paper entitled "Public Access to Environmental Information in Mexico and the United States: Issues and Policy Options" developed by Arizona Toxics Information, Proyecto Fronterizo de Educación Ambiental and Enlace Ecológico for the North American Commission on Environmental Cooperation provides a brief description of federal toxics information sources in the two countries, and the *Directory of Spatial Datasets to Support Environmental Research Along the United States-Mexico Border*, subtitled, *An inventory of United States and Mexican Agencies Along the Baja California-California Segment of the Border* (6-9-594-5423), published by the Institute for Regional Studies of the California at San Diego State University in 1995, contains a useful listing of both state and local agencies and the spatial datasets they hold.

Projects underway in several quarters are expected in the near future to provide more complete and descriptive listings. A broad sampling of such projects is included in the US-EPA's June *Compendium of EPA Binational and Domestic U.S./Mexico Activities* (EPA 160-B-95-001) and in the September 1996 *Arizona Border Environmental Health Resource Directory* published by the Arizona Department of Health Services and the US Agency for Toxic Substances and Disease Registry. Several of the researchers engaged in these projects have been generous in sharing their data, including, in particular, those at the Environmental Health Investigations branch of the California Department of Health Services currently constructing the *U.S.-Mexico Border Environmental Health Geographic Information System*.

In the following matrix, data sources have been categorized under two headings indicative of the two kinds of toxics information generally of most immediate interest to citizens and to those concerned with data management: 1) those containing primarily geographically-locatable information (i.e., Site, Facility and Incident data), and 2) those which primarily contain listings of hazardous materials (i.e., "toxics" in the broad sense).

Those data sources in the first category which were consulted in development of the accompanying Toxics Data Dictionary (Attachment B), and those of the second category which are included in the accompanying Toxics Reference List (Attachment C), are marked with an asterisk (*).

Citation of official place of publication or Internet pathway locations for current updates have been provided for some of the data sources.

Attachment B.

A Toxics Data Dictionary for the Tijuana River Watershed GIS

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A Toxics Data Dictionary for the Tijuana River Watershed Geographical Information System

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October 1996

Introduction

This Toxics Data Dictionary is not meant to be prescriptive or all-inclusive, but attempts to consolidate the most commonly-used data elements found in common toxics reports and records pertinent to the Tijuana River Watershed, as well as (in a few instances) unique but essential elements found in some.

A generic problem of all Geographic Information Systems is the lack of correspondence between political units used for data collection (cities, states, etc.) and actual ecological units of analysis (e.g., watersheds) or the functional region (e.g., transportation service areas, waste collection districts). The variety and complexity of jurisdictions, for instance, particularly complicates analysis of transboundary watersheds as ecological units.

Because emergency data is often of most immediate concern to communities, and because efforts at consolidation have gone furthest in revising emergency planning and response reporting forms; so we have been especially concerned to incorporate data elements from several such consolidation efforts (even when they are in only a draft stage of development) including the State of California “Certified Uniform Program Agency” (CUPA) form; the State of Arizona “Basic On-Line Disaster Emergency Response” (BOLDER) project; the US National Response Team “One-Plan Guidance” for an Integrated Contingency Plan (ICP); pertinent elements of the US-EPA ERNS [Emergency Response Notification System]; the US-EPA “Accidental Release Prevention Plan” application; and the City of Chandler (Arizona) “Hazardous Materials Management Plan” and “Hazardous Materials Information System” (both based on the US National Fire Code).

The following Data Dictionary is organized according to two broad general categories of data elements, 1) **Identification** elements (including identification geo-location as well as hazardous materials), and 2) **Material Activity and Use** elements (including release, transfer, prevention, etc.). Within these broad primary categories, listed in Column One of the matrix, elements are grouped under more specific categories (*kinds* of locational data, *kinds* of use data, etc.). The most specific data elements are grouped under categories, in Column Two of the matrix. Column Three of the matrix presents brief explanatory comments on some of the elements and element categories.

In order to minimize ambiguity and to facilitate data entry and retrieval, an attempt has been made to assign a unique verbal descriptor to each of the specific data elements in Column Two. Thus, although the descriptor *name* occurs as part of many categories and elements throughout the Dictionary, the term always appears with identifying prefixes (“**FSI**-name”, “Responsible Party Name”, etc.) indicating which specific category of data it belongs with.

This Data Dictionary was made possible in part by a grant from the US Environmental Protection Agency through the EPA/SEMARNAP Border XXI Program and was conceived and constructed

in furtherance of the ongoing right to know programs of Arizona Toxics Information and Proyecto Fronterizo de Educación Ambiental. The compilers will appreciate notice of any errors or suggestions for improving the Data Dictionary. Please notify:

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Attachment C

A US-Mexico Border Toxics Reference List for the Tijuana River Watershed GIS

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US-Mexico Border Hazardous Materials Reference List

Lista de Referencia de Materiales Peligrosos de la Frontera EU-México

Updated:
May 1997

Michael Gregory
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Arizona Toxics Information

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Proyecto Fronterizo de Educación Ambiental

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<i>Clave para la Lista de Referencia sobre las Materiales Peligrosas en la Frontera</i>	9
1. Alphabetical listing by chemical names in English with corresponding Spanish chemical names, CAS numbers and waste codes // <i>Listado Alfabético, por nombre químico en Inglés con sus nombres químicos en Español, números de CAS y códigos de residuos correspondientes</i>	1.1
2. Alphabetical listing by chemical names in Spanish with corresponding English chemical names, CAS numbers and waste codes // <i>Listado Alfabético, por nombre químico en Español con sus nombres químicos en Inglés, números de CAS y códigos de residuos correspondientes</i>	2.1
3. Numerical listing by CAS (Chemical Abstract Service) codes with corresponding English and Spanish chemical names and waste codes // <i>Listado Numérico, por números de CAS con sus nombres en Inglés y en Español y códigos de residuos</i>	3.1
4. Alpha-numerical listing by Mexican federal hazardous waste codes with English and Spanish chemical names, CAS numbers and US-EPA waste codes // <i>Listado Alfanumérico por códigos de residuos peligrosos establecidos por el Instituto Nacional de Ecología con sus nombres químicos en Inglés y en Español y números de CAS y los códigos de residuos de US-EPA</i>	4.1
5. Alpha-numerical listing by US federal hazardous waste codes with English and Spanish chemical names, CAS numbers and INE waste codes // <i>Listado Alfanumérico por códigos de residuos peligrosos establecidos por la US-EPA con sus nombres químicos en Inglés y en Español y números de CAS y los códigos de residuos de INE</i>	5.1

Key to the Border Hazardous Materials Reference List

- ***Format and Selection Rationale***

This Hazardous Materials Reference List combines several regulatory and reporting lists compiled by federal and state governments of Mexico and the United States. The Reference List includes five matrices which arrange the referenced materials in four different orders:

1. Alphabetically by chemical names in English with corresponding Spanish chemical names, CAS (Chemical Abstract Service) numbers and waste codes
2. Alphabetically by chemical names in Spanish with corresponding English chemical names, CAS numbers and waste codes
3. Numerically by CAS codes with corresponding English and Spanish chemical names and waste codes
4. Alpha-numerically by hazardous waste codes established by the Instituto Nacional de Ecología with English and Spanish chemical names, CAS numbers and US-EPA waste codes.
5. Alpha-numerically by hazardous waste codes established by the US Environmental Protection Agency with English and Spanish chemical names, CAS numbers and INE waste codes.

The first two matrices reference all materials in the Reference List. The third matrix references only those for which CAS numbers have been identified by this study (a single digit preceded by a hyphen and two digits, preceded by another hyphen and up to seven more digits, e.g., 000000-00-0). The fourth and fifth matrices reference only those materials with hazardous waste codes designated in several lists published by the Mexican Instituto Nacional de Ecología and the US Environmental Protection Agency. Materials in these matrices are arranged first alphabetically by the letter or letters prefixed to the codes, then numerically within each alphabetic grouping. The code formats listed in this matrix are as follows:

- US-Environmental Protection Agency (US-EPA) hazardous waste codes, known as RCRA (Resource Conservation and Recovery Act) codes (a single capital letter followed by three digits, e.g., P000, U000, F000)
- Instituto Nacional de Ecología (INE) waste codes (three capital letters followed by 4 digits and punctuation in set sequence, e.g., RPE0.0/00).

A blank space in a column of any matrix indicates that the appropriate name or code has not been found—either because none has been assigned by designated authorities (e.g., CAS numbers

usually are assigned only to specific chemicals and not to mixtures or generic classes of chemicals) or because lack of time and other resources has precluded a thorough search to discover designators matching those which occur in a given Source List.

When the name on a given Source List applies to more than one CAS number or alpha-numeric code (which often occurs due to incomplete, truncated or colloquial usage of names, but may result from one or more names being accepted “standards”), this Reference List (on the assumption that in matters of public health it is better to err on the side of over-protection) generally assigns the name to all the CAS numbers and alpha-numeric codes that match the name.

In all five matrices, an additional column following the names and codes indicates by a single letter the source list in which each included hazardous material is found.

Although in theory the ideal Reference List would perhaps include all relevant lists and all synonyms for each substance, several significant lists (including, for instance, the US Department of Transportation list of regulated hazardous substances and the State of Texas list of monitored substances) are not incorporated due to difficulties in matching identifiers or format incompatibilities and other practical considerations (for example, the goal of having the final document combine minimum length with maximum usefulness as a quick-reference for the lay public, while providing the environmental managers with a reasonably inclusive compendium of code-referenced materials likely to be reported in the border region). Similar constraints also determined that each substance would occur on this Reference List only once, with one English and one Spanish name, both matched to the appropriate CAS number or alpha-numeric code.

No rigorous attempt was made to harmonize or regularize names. In general, English names on the Reference List are those found on whichever US source list was first entered into the database (usually the US-EPA TRI or the Arizona Department of Environmental Protection Pollution Prevention planning list); those and most other English names on the Reference List are frequently those preferred by the two standard reference works readily available to the compilers: the 1986 edition of *The Registry of Toxic Effects of Chemical Substances* (US National Institute of Occupational Safety and Health) and Sax and Lewis's *Dangerous Properties of Industrial Materials* (7th edition, 1988, Van Nostrand). When an English name appearing on a given source list without a CAS number matched the preferred name in one of those works, that name and corresponding CAS number were usually adopted without further question. When the two standard references disagree on preferred name for a CAS-specific substance, one or another was chosen more or less arbitrarily.

Selection of Spanish names followed a similar process. Spanish names on the Reference List are usually from one or another of the Mexican source lists, most often those of the Secretaría Gobernación or the Secretaría d Salud (again, determined principally by which source list was first entered into the ATI database). When Mexican source list names differ from each other, the one most nearly corresponding to the preferred Sax or RTECS names was usually selected.

- **Source Lists**

The Source Lists and identifying letters are as follows:

A. “Toxic Air Pollutants” listed in §112(b)(1) of the Clean Air Act Amendments of 1990.

B. “Toxic substances” subject to Pollution Prevention Plans and first published August 1, 1992 by the Arizona Department of Environmental Quality pursuant to Arizona Revised Statutes 49-961; the list includes any "toxic substance" which is:

- an “Extremely Hazardous Substance” subject to emergency planning reporting under §§302/304 of the federal Emergency Planning and Community Right to Know Act (EPCRA)
- a “Toxic Chemical” subject annual release and transfer reporting under section §313 of EPCRA
- an imminently hazardous substance which the EPA has taken action on under section 7 of the federal Toxic Substances Control Act (TSCA)
- a substance that is known or reasonably anticipated to be a carcinogen and therefore listed by the US Secretary of Health and Human Services pursuant to US Code section 241(b)(4)
- a “hazardous substance” listed pursuant to section 101 or 102 of the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, the “Superfund”)
- a “hazardous substance” subject to the Arizona aquifer protection program (as defined at Arizona Revised Statutes 49-281, which incorporates by reference substances on several other lists, including, with the exception of certain petroleum products (defined at ARS 1001), the following: a) any substance designated pursuant to sections 311(b)(2)(a) and 307(a) of the federal Clean Water Act; b) any element, compound, mixture, solution or substance designated pursuant to section 102 of CERCLA; c) any hazardous waste listed or having characteristics designated by the US-EPA; d) any hazardous air pollutant listed under section 112 of the federal Clean Air Act; e) any imminently hazardous substance listed pursuant to Section 7 of TSCA; and f) any substance determined by the director of the Arizona Department of Environmental Quality to present an imminent and substantial endangerment to public health.

C. “Regulated substances” subject to Accidental Release Prevention planning rules

established by the US Environmental Protection Agency at 40CFR59 and 68 pursuant to §112(r) of the federal Clean Air Act Amendments of 1990 and published in 59FR4478 (31 January 1994)

D. “High hazard substances” designated by the Secretaría Gobernación and SEDESOL in the “First List of High Hazard Activities” in the Diario Oficial on 28 March 1990 pursuant to the *General Law of Ecological Equilibrium*.

E. “High hazard substances” designated by the Secretaría Gobernación and SEDESOL in the “Second List of High Hazard Activities” in the Diario Oficial on 4 May 1992 pursuant to the *General Law of Ecological Equilibrium*.

F. “Highly hazardous chemicals” subject to Process Safety Management requirements established by the US Occupational Safety and Health Administration at 29CFR1910.119 pursuant to §112(r) of the federal Clean Air Act Amendments of 1990 and published in 57FR6356 (24 February 1992).

G. “Contaminants “ listed by INE pursuant to the 1995-1996 pilot Registro de Emisiones y Transferencia de Contaminates

H. “Toxic chemicals” subject to Toxics Release Inventory (TRI) reporting pursuant to §313 of the Emergency Planning and Community Right to Know Act (EPCRA; also known as SARA Title III) [US-EPA *List of Lists*, EPA Homepage, February 1997].

I. “Known Human Carcinogens” listed by the International Agency for Research on Cancer (*IARC Monographs, Supplement 7*, 1987, including 1997 upgrade of TCDD).

J. “Probable Human Carcinogens” listed by the International Agency for Research on Cancer, *IARC Monographs, Supplement 7*, 1987).

K. “Substances and Groups of Substances Known to be Carcinogenic” listed by the National Toxicology Program, including substances previously listed but now excluded solely because there are considered to be no exposures in the US, *Seventh Annual Report on Carcinogens: Summary* (US Department of Health and Human Services, 1996) [NTP Homepage, March 1997, as supplemented (May 1997) with pre-publication notice of additions to be in the *Eighth Annual Report*].

L. “Substances and Groups of Substances Reasonably Anticipated to be Carcinogenic” listed by the National Toxicology Program, *Seventh Annual Report on Carcinogens: Summary* (US Department of Health and Human Services, 1996) [NTP Homepage, March 1997, as supplemented (May 1997) with pre-publication notice of additions to be in the *Eighth Annual Report*].

M. “Toxic substances” in the “First List” published by the Secretaría de Salud in the Gaceta Sanitaria of October 1987 pursuant to the *General Law of Health*.

N. “Toxic substances” in the “Second List” published by the Secretaría de Salud in the Gaceta Sanitaria of December 1987 pursuant to the *General Law of Health*.

O. “Hazardous waste” listed by INE in the Norma Oficial Mexicana NOM-CRP-001-ECOL/93 due to the toxicity of constituents, pursuant to Article 3 of the Ley General del Equilibrio Ecológico y la Protección al Ambiente.

P. “Wastes of raw materials considered hazardous” listed by INE in Norma Oficial Mexicana NOM-CRP-001-ECOL/93, Anexo 4, Tabla 3 pursuant to Article 3 of the Ley General del Equilibrio Ecológico y la Protección al Ambiente.

Q. “Wastes and packages or bags of raw materials considered hazardous” listed by INE in Norma Oficial Mexicana NOM-CRP-001-ECOL/93, Anexo 4, Tabla 4 pursuant to Article 3 of the Ley General del Equilibrio Ecológico y la Protección al Ambiente.

R. “Hazardous substances” listed by US-EPA at 40CFR302.4 pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (Superfund) [US-EPA *List of Lists*, EPA Homepage, February 1997].

S. “Extremely Hazardous Substances” with numeric Threshold Planning Quantities established and subject to reporting pursuant to §§302-304 of the Emergency Planning and Community Right to Know Act (EPCRA; also known as SARA Title III) [US-EPA *List of Lists*, EPA Homepage, February 1997].

T. “Extremely Hazardous Substances” subject to reporting pursuant to §§302-304 of the Emergency Planning and Community Right to Know Act (EPCRA; also known as SARA Title III) with numeric “Reportable Quantities” established by US-EPA at 40CFR302.4 pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (Superfund) [US-EPA *List of Lists*, EPA Homepage, February 1997].

U. “Priority pollutants” subject to regulations established at 40CFR423 by the US-EPA pursuant to §307(a) of the Clean Water Act.

V. “Hazardous substances” subject to regulations established at 40CFR116-117 by the US-EPA pursuant to §311(b)(2)(A) of the Clean Water Act.

In addition, the matrix indicates hazardous waste codes for “hazardous wastes” listed by US-EPA at 40CFR261 pursuant to the Resource Conservation and Recovery Act (RCRA).

This Reference List is a subfile of the Arizona Toxics Information toxics database (TOXBASE) which is continually under construction. The Reference List was made possible in part by a grant from the US Environmental Protection Agency through the EPA/SEMARNAP Border XXI Program. The compilers will appreciate notice of any errors or suggestions for improving the Reference List. Please notify:

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Clave para la Lista de Referencia de Materiales Peligrosos en la Frontera

- ***Criterios para el Formato y la Selección***

La siguiente Lista de Referencia combina varias listas reglamentarias y de reporte recopiladas por los gobiernos federales de México y EU. La Lista de Referencia incluye cuatro matrices que ordenan los mismos datos de cuatro diferentes maneras:

- 1.- Alfabéticamente, por nombre químico en Inglés con sus nombres químicos en Español, números de CAS (Servicio de Química Abstracto) y códigos de residuos correspondientes.
- 2.- Alfabéticamente, por nombre químico en Español con sus nombres químicos en Inglés, números de CAS y códigos de residuos correspondientes.
- 3.- Numéricamente, por números de CAS con sus nombres en Inglés y en Español y códigos de residuos.
- 4.- Alfanuméricamente por códigos de residuos peligrosos establecidos por el Instituto Nacional de Ecología con sus nombres químicos en Inglés y en Español y números de CAS y los códigos de residuos de US-EPA.
5. Alfanuméricamente por códigos de residuos peligrosos establecidos por el US-EPA con sus nombres químicos en Inglés y en Español y números de CAS y los códigos residuos de la INE.

Las primeras dos matrices referencian todas las sustancias en la Lista de Referencia. La tercera matriz referencia únicamente aquellas para las cuáles se han identificado números de CAS durante este estudio (un dígito único precedido por un guión y dos dígitos, precedidos por otro guión así sucesivamente hasta siete o más dígitos, p. ej, 000000-00-0). La cuarta y quinta matrices refrencian solamente aquellas sustancias con códigos para residuos peligrosos designados en varias listas publicadas por el Instituto Nacional de Ecología de México y la US-EPA. Las sustancias en estas matrices estan ordenadas primeramente en orden alfabéticamente por letra o letras que preceden a los códigos, y luego, numéricamente dentro de cada agrupamiento alfabético. Los códigos de los formatos enlistados en esta matriz son los siguientes

- Códigos de US- EPA para residuos peligrosos, conocidos como códigos RCRA por la Ley de EU sobre Conservación y Recuperación de Recursos (una letra mayúscula seguida de tres dígitos, por ejemplo, P000, U000, F000);
- Codigos para residuos peligrosos asignados por el Instituto Nacional de Ecología (INE), (tres of más letras mayúsculas seguidas de 4 dígitos y puntuación en secuencia, p.ej.

RPE0.0/00).

Un espacio en blanco en la columna de códigos indica que no se ha encontrado el código apropiado--ya sea porque no se le ha sido asignado por las autoridades (p.ej. los números CAS generalmente se asignan solamente a sustancias químicas específicas y no a mezclas o clases genéricas de sustancias), o porque la falta de tiempo y otros recursos ha impedido una búsqueda minuciosa que permita descubrir los designadores comunes para sustancias que aparecen en una Lista de Fuentes determinada.

Cuando un nombre que ocurre en una Lista de Fuentes es aplicable a más de un número CAS u otro código (lo cual sucede frecuentemente debido al uso incompleto o coloquial de nombres, aunque pudiera ser resultado de que uno o más nombres sean aceptados como “estandar”), esta Lista de Referencias (en el supuesto de que en materia de salud pública es mejor errar a favor de la sobreprotección), generalmente asigna un nombre a todos los números de CAS y códigos alfanuméricos que corresponden a ese nombre.

En las cinco matrices, una columna adicional indica, mediante una letra sola, la lista de fuentes en la cual cada material peligroso puede ser encontrado.

Aunque en teoría la Lista de Referencia ideal tal vez incluyera todas las listas relevantes y los sinónimos para cada sustancia, varias listas significativas (incluyendo, por ejemplo la lista del Departamento de Transporte de los Estados Unidos, que reglamenta sustancias peligrosas y la lista sobre sustancias monitoreadas establecida por el Estado de Texas) no se han incorporado debido a dificultades con la homologación de identificadores o con las incompatibilidades de los formatos y por otras consideraciones prácticas, (por ejemplo, la meta de que el documento final combinara las características de tamaño mínimo y máxima utilidad para el público general al mismo tiempo que proporcionara a los administradores del ambiente con un compendio razonablemente incluyente de aquellos materiales referenciados a códigos que pudieran ser reportados en la región de la frontera). Este tipo de limitaciones determinaron que cada sustancia apareciera en esta Lista de Referencia una sola vez, con un nombre en Inglés y un en Español, ambos correspondientes al número de CAS o código alfanumérico.

No se realizó ningún intento muy riguroso de armonizar o regularizar los nombres de las sustancias. En general, los nombres utilizados en inglés son los que se encuentran en cualquier lista norteamericana cargada a la base datos (usualmente la USEPA TRI o la lista de planeación de Prevención de Contaminación de Secretaría del Medio Ambiente del Estatal de Arizona); éstos y la mayoría de los nombres en inglés de la Lista de Referencia son frecuentemente los preferidos por las dos obras estándar de referencia más disponibles para los recopiladores: la edición de 1986 del *Registro de Efectos Tóxicos de las Sustancias Químicas* (Instituto Nacional Norteamericano de Seguridad y Salud Ocupacional) y *Propiedades Peligrosas de los Materiales Industriales* de Sax y Lewis (7a edición, 1988, Van Nostrand). Cuando un nombre en inglés aparecía en cualquiera de las listas sin un número CAS pero correspondía al nombre preferido en las otras obras, generalmente se adoptaron el nombre y número CAS sin mayor problema.

Cuando dos referencias estándar están en desacuerdo sobre el nombre preferente para una sustancia específica de CAS, se escogió uno u otro de manera más o menos arbitraria.

La selección de los nombres en español siguió un proceso similar. Los nombres en español de la Lista de Referencia son los que se encuentran en una u otra de las listas mexicanas de fuentes; la mayoría de las veces son de la Secretaría de Gobernación o de la Secretaría de Salud (nuevamente determinados principalmente por la lista de fuentes que se cargó primero a la base de datos de ATI). Cuando los nombres de la lista de fuentes mexicana difieren uno del otro, generalmente se seleccionaron los que corresponden más cercanamente a los nombres preferidos de Sax o RTECs.

- ***Listas de Fuentes***

Las Listas de Fuentes y las letras que las identifican son las siguientes:

A. "Contaminantes Tóxicos de Aire" listados bajo el inciso §112 (b) de las Reformas de la Ley de Aire Limpio de EEUU de 1990.

B. "Substancias tóxicas" sujetas a Planes de Prevención de Contaminación y publicadas el 1o de agosto de 1992 por el Departamento de Calidad Ambiental de Arizona conforme a los Estatutos Enmendados de Arizona 49-961; la lista incluye cualquier "sustancia tóxica" que es:

- una "Substancia Extremadamente Tóxica" sujeta a planeación y reporte en caso de contingencia bajo el §§302/304 de la Ley Federal de Planeación en caso de Contingencia y el Derecho de la Comunidad a la Información (EPCRA)
- una "Substancia Química Tóxica" sujeto a un reporte de liberación y transferencia bajo la sección §313 de EPCRA
- una sustancia inminentemente peligrosa sobre la cual la EPA ha tomado acción bajo la sección 7 de la Ley federal de Control de Substancias Tóxicas (TSCA)
- una sustancia que se sabe o se anticipa razonablemente que es un carcinógeno y por lo cual se lista por la Secretaría de Salud y Servicios Humanos de EU conforme a la Sección 241 (b) (4) del Código de los EEUU.
- una "sustancia peligrosa" listada conforme a la sección 101 o 102 de la Ley General de Respuesta Compensación y Responsabilidad Ambiental

(CERCLA, el "Superfund").

- una "sustancia peligrosa" sujeta al Programa de Protección de Aguas Subterráneas de Arizona (como se define en los Estatutos Enmendados de Arizona 49- 281), que incorporan por referencia las sustancias de otras listas, incluyendo, con excepción de ciertos productos del petróleo cualquier sustancia designada conforme a las secciones 311 (b) (2a) y 307(a) de la Ley Federal de Aguas; b) cualquier elemento, compuesto, mezcla, solución o sustancia designada conforme a la sección 102 de CERCLA; c) cualquier residuo peligroso listado o que tenga características designadas por la US-EPA; d) cualquier contaminante peligroso para la atmósfera listado bajo la sección 112 de la Ley Federal de Aire Limpio; e) cualquier sustancia inminentemente peligrosa listada conforme a la sección 7 de TSCA; y f) cualquier sustancia determinada por el director del Departamento de Calidad Ambiental de Arizona que presente un inminente y substancial peligro para la salud pública.

C. "Sustancias Reglamentadas" sujetas a los reglamentos de planeación de la Prevención de Emisiones Accidentales (40CFR Parte 59 y 68) conforme al inciso §112(r) de las Reformas de la Ley de Aire Limpio de EEUU de 1990

D. "Sustancias altamente riesgosas" designadas por la Secretaría de Gobernación/ SEDESOL en el Primer Listado de "Actividades Altamente Riesgosas" publicado en el Diario Oficial el día 28 de marzo de 1990 conforme a la Ley General de Equilibrio Ecológico y Protección al Ambiente.

E. "Sustancias altamente riesgosas" designadas por la Secretaría de Gobernación/ SEDESOL en el Segundo Listado de "Actividades Altamente Riesgosas" publicado en el Diario Oficial el día 4 de mayo de 1992 conforme a la Ley General de Equilibrio Ecológico y Protección al Ambiente.

F. "Sustancias Químicas Altamente Peligrosas" sujetas a los requerimientos de Manejo de Seguridad en el Proceso de OSHA 29CFR conforme al inciso §112(r) de las Reformas de la Ley Federal de Aire Limpio de 1990 y publicadas in 57FR6356 (24 de febrero 1992)

G. "Sustancias" listadas por INE conforme al Estudio Piloto para el Registro de Emisiones y Transferencia de Contaminantes de 1995-1996

H. "Sustancias Químicas Tóxicas" sujetas a ser reportadas por §313 del Toxics Release Inventory (TRI) conforme a Ley para Planeación de Emergencias y Derecho a Saber de la Comunidad (EPCRA; o SARA Título III) [*Lista de las Listas* de EPA, EPA Homepage, febrero 1997].

I. “Carcinogenicos Humanos Conocidos” designados por la Agencia Internacional para Investigación sobre Cancer (*Monografía de IARC, Suplemento 7, 1987*, incluyendo la clasificación de Febrero de 1997 de TCDD).

J. “Carcinogenicos Humanos Probables” designados por la Agencia Internacional para Investigación sobre Cancer (*Monografía de IARC, Suplemento 7, 1987*).

K. “Sustancias y Grupos de Sustancias Conocidas como Carcinogenicas” designados por el Programa Nacional de Toxicología, incluyendo sustancias previamente listadas pero ahora excluidas solo porque se considera que no hay exposiciones en los EEUU. *Reporte Anual Septimo sobre Carcinogenicos: Sumario* (Departamento de Salud y Servicios Humanos de EEUU, 1991) [NTP Homepage, marzo 1997, como ha sido suplementado (mayo 1997) con la noticia de pre-publicación de adiciones estará en el *Reporte Anual Octavo*].

L. “Sustancias y Grupos de Sustancias Razonablemente Anticipadas que sera Carcinogenicas” designadas por el Programa Nacional de Toxicología, *Reporte Anual Septimo sobre Carcinogenicos: Sumario* (Departamento de Salud y Servicios Humanos de EEUU, 1991) [NTP Homepage, marzo 1997, como ha sido suplementado (mayo 1997) con la noticia de pre-publicación de adiciones estará en el *Reporte Anual Octavo*].

M. Sustancias Tóxicas del "Primer Listado" publicado por la Secretaría de Salud en la Gaceta Sanitaria de octubre de 1987 conforme a la Ley General de Salud.

N. Sustancias Tóxicas del "Segundo Listado" publicado por la Secretaría de Salud en la Gaceta Sanitaria de diciembre de 1987 conforme a la Ley General de Salud.

O. "Constituyentes que hacen peligroso a un residuo por su toxicidad al ambiente" listados por INE conforme a la Norma Oficial Mexicana NOM- PA- CRP-001/ ECOL/93 conforme al Artículo 3 de la Ley General de Equilibrio Ecológico y la Protección al Ambiente.

P. "Residuos de Materias Primas que se Consideran Peligrosas" listadas por INE en la Norma Oficial Mexicana NOM- PA- CRP-001/ECO/93 Anexo 4, Tabla 3 conforme al Artículo 3 de la Ley General de Equilibrio Ecológico y la Protección al Ambiente.

Q. "Residuos y Bolsas o Envases de Materias Primas que se Consideran Peligrosas" listadas por INE en la Norma Oficial Mexicana NOM- PA- CRP-001/ECOL/93 Anexo 4, Tabla 4 conforme al Artículo 3 de la Ley General de Equilibrio Ecológico y la Protección al Ambiente.

R. "Sustancias Peligrosas" sujetas a reglamentos establecidos en 40CFR Tabla 302.4 por la US-EPA conforme a la Ley General de Respuesta Compensación y Responsabilidad Ambiental (CERCLA, el "Superfund") [*Lista de las Listas* de EPA, EPA Homepage, febrero 1997].

S. "Substancias Extremadamente Peligrosas" con "Cantidades Umbrales" numericas y sujetas a reporte conforme a §§302-304 de la Ley para Planeación de Emergencias y Derecho a Saber de la Comunidad (EPCRA; o SARA Titulo III) [*Lista de las Listas* de EPA, EPA Homepage, febrero 1997].

T. "Substancias Extremadamente Peligrosas" sujetas a reporte conforme a §§302-304 de la Ley para Planeación de Emergencias y Derecho a Saber de la Comunidad (EPCRA; o SARA Titulo III) y con "Cantidades Reportables" establecidas en 40CFR Tabla 302.4 por la US-EPA conforme a la Ley General de Respuesta Compensación y Responsabilidad Ambiental (CERCLA, el "Superfund") [*Lista de las Listas* de EPA, EPA Homepage, febrero 1997].

U. "Contaminantes Prioritarios" sujetos a reglamentos establecidos en 40CFR243 por la US-EPA bajo el inciso &307(a) conforme a la Ley de Agua Limpia.

V. "Sustancias peligrosas" sujetos a reglamentos establecidos en 40CFR116-117 por la US-EPA bajo el inciso &311(b)(2)(a) conforme a la Ley de Agua Limpia.

Además, el matriz indica los codigos para los "Residuos Peligrosos" listados por la US-EPA en 40CFR261 conforme a la Ley de Conservación y Recuperación de Recursos.

Esta Lista de Referencias es un sub-archivo de la base de datos sobre tóxicos de Arizona Toxics Information, la cual esta continuamente en proceso de actualización. El desarrollo de la Lista de Referencia fue posible en gran parte a una donación por parte de la Secretaría de Protección Ambiental de los Estados Unidos a travez del Programa Frontera XXI EPA/ SEMARNAP. Los compiladores agradecerán la notificación sobre cualquier error o las sugerencias para mejorar la Lista de Referencia. Favor de dirigirse a:

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