TOXIC CHEMICAL AND HAZARDOUS MATERIAL STORAGE, HANDLING, AND DISPOSAL IN THE GRAYSON COUNTY AREA, AND ITS POSSIBLE EFFECT ON THE WATER SUPPLY.

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Special thanks to the government officials, agency employees and private citizens who made this information available.

SO WHAT'S

THE PROBLEM ???

In May, 1978, four water wells in Bedford, Mass. were contaminated with toxic chemicals. The contamination was discovered by accident when a resident engineer was testing the water for a paper he was writing.

In Tucson, Arizona, 55 drinking water wells have been closed because of traces of trichloroethylene (TCE), a carcinogenic substance.

In Silicon Valey in California 270 residents sued a camera and instrument corporation for leaking a solvent into the water supply, causing miscarriages and heart defects among children.

In Gray, Maine, 16 private drinking wells were closed in 1977 after it was discovered that they were contaminated with toxic organic chemicals. The wells were all located near an industrial waste handling facility. Wastes spilled and leached into the groundwater. Offensive odors were reported. The well water discolored laundry. Although samples were tested at the state laboratory, the contaminants were not identified.

In Washington State the well water on a farm was found to be contaminated with dichloroethylene and trichloroethylene once used at nearby McChord Air Force Base in cleaning solvents.

In Woodstock, NY, residents were told by the county health department not to drink or cook with their water because it is highly contaminated with asbestos leaching from old water pipes.

In Mineral Wells, TX, 1987, residents were told not to use the water for cooking or drinking because of gasoline contamination.

Are these isolated incidents? Some estimates place the extent of groundwater contamination at 1-2% of the nation's total available groundwater, but only a small portion of the groundwater has been sampled. The Environmental Protection Agency estimates that 20% of all municipal water systems have detectable levels of contaminants. Thirty-four states have recommended that wells be closed because of contamination by organic chemicals. Fifteen percent of Americans now depend on bottled water for drinking and cooking. This figure is 33% in Southern California. Contamination is not limited to industrialized, heavily populated areas; it also is a threat in some rural areas. Contamination may be present for years before it is detected. Contaminated groundwater also can threaten surface water quality, since it is a part of the overall hydrologic system (approximately 30% of the stream flow in the U.S. is supplied by groundwater).

Why is this happening? Industrial and agricultural activities and the demands of our modern lifestyle create increasing quantities of hazardous/toxic materials and by-products. Handling, storage, transportation, and disposal of these substances pose problems for which there are not yet adequate solutions. Federal, state, and local laws, regulations, and enforcement procedures exist to safeguard public health and to protect the environment, but the problem continues to overshadow the available solutions. Hazardous/toxic materials pose an especially serious threat to groundwater supplies.

What are the effects of contaminated drinking water? The effects of regular exposure to small amounts of contaminants over a long period of time are unknown. The effects will vary with length of exposure, the individual, the chemical involved and the combined effects of other chemicals. Some chemicals are mildly toxic while others are extremely toxic. Dioxin, for example, at levels of a few parts per billion (ppb) or even per trillion (ppt) has caused birth defects, cancer, miscarriages, and death in laboratory animals.

The symptoms of individuals exposed to toxic chemicals may be vague and could be attributed to many causes. The symptoms could include fatigue, headaches, loss of memory, liver ailments, nervous disorders, birth defects including mental retardation, miscarriages, and cancer. Symptoms in individual instances of exposure may vary from person to person.

What does this mean to us? Could the drinking water in Grayson County ever become contaminated? What is the quality of our drinking water? If our water was contaminated, would the contamination be detected quickly? Are toxic and hazardous materials handled in such a way as to prevent contamination of the water supply? What is the role of an individual to insure that the drinking water remains safe? These were the questions that the League of Women Voters set out to answer in the study of toxic chemical and hazardous material storage, handling and disposal in the Grayson County area, and its possible effect on the water supply. This was an enormous task. Our efforts were impeded by numerous obstacles including: the hesitancy of individuals to openly discuss the issue; the large number of governmental agencies, regulatory bodies, and departments involved with the issues; bureaucracy; poor interagency communication; and, in some cases, poor communication within an agency.

This report is divided into three sections: Handling of Hazardous Materials, Groundwater, and Household Hazardous Wastes. Our local facts are incomplete, at best, and are often scarce, but we will continue to ask the questions.

HAZARDOUS WASTE MANAGEMENT: THE SCOPE OF THE PROBLEM

EPA estimates that the needs of an average family result in the generation of 7,200 lbs. of hazardous waste annually. That's 580 billion lbs. nationwide every year, and Texas produces 1/5 of the total! About 10-15% of all wastes generated in the United States are hazardous. Storing, treating, and disposing of toxic, corrosive, ignitable, or explosive wastes pose monumental problems. Besides the huge quantities, other problems include:

*dumping- Many wastes are disposed of illegally or, even though we have laws to protect the public, carelessly. Many were disposed of long before we realized the extent of the problem and passed protective legislation.

*inaccessibility of information- Many states do not have community right-to-know laws that ensure citizens access to information about hazardous substances stored in their communities and about any releases into the communities. Even with freedom of information and right-to-know laws, the maze of federal and state agencies makes obtaining information very difficult.

*inadequate methods of technology- Even though great strides have been made, the available methods and technology for dealing with hazardous waste safely is still inadequate, given the immensity of the problem. Furthermore, all treatment and disposal methods have not yet been proven safe.

Incineration of some wastes at very high temperatures, for example, is an accepted method of treatment. Yet, a project to burn wastes on floating incinerators miles off the coast of New Jersey and Maryland was blocked because of unknown effects of ash and smoke that would blow back to shore.

Disposal in special landfills and containers raises questions about long-term safety. The sheer volume of hazardous wastes generated today and the extreme danger posed by some of them outstrip our current ability to manage wastes.

*inadequate enforcement and cleanup- Funding for federal and state enforcement and cleanup efforts is inadequate in the face of the immense problem. EPA has already identified 786 high priority sites for cleanup, and the Congressional Office of Technology Assessment has indicated that more than 10,000

sites will require priority cleanup. In a five year period between 1980-85, EPA began cleanup operations at only 330 sites and completed work at only 6 sites, one of which started leaking toxic wastes soon after it was certified by EPA as "clean."

*weak cleanup standards- Superfund legislation does not require cleanup projects to meet stricter health standards of other environmental laws, such as the Clean Water Act.

*opposition from industries- Industries that have historically been among the worst "dumpers" of hazardous substances have opposed passage of strong federal and state legislation to protect the public from the hazardous wastes. For example, oil companies, defense contractors, chemical manufacturers, and electronics firms in California have opposed passage of the Safe Drinking Water and Toxic Enforcement Act of 1986 which address the increasing problem of groundwater contamination and toxic waste management.

*risks of shipment- Deficiencies in regulating and managing shipment of hazardous materials pose a threat to public health and environment. In Texas, for example, there is no state agency to which all shipments, collisions, and spills are reported. Local safety officials are not informed about shipments through their communities. Also, Texas has failed to adopt federal standards for qualifications of drivers who transport hazardous substances. Other problems in Texas include the inadequacy of emergency response training, lack of special cleanup teams, and uneveness in the maintenance of trucks and railroad equipment. Nationwide there were 5,984 hazardous transport spills in 1985. Sixty percent of these were due to human error and 6% due to equipment failure.

*non-point source contamination- Seemingly insignificant releases by households and small businesses pose a cumulative threat by polluting groundwater supplies, lakes, rivers, and streams. The use of pesticides and fertilizers and run-off from parking lots also are sources of contamination. Management of non-point sources requires widespread public awareness of the problem. Laws and regulations are not enough.

*longterm health effects- Past dumping practices and future releases of hazardous substances threaten the public health with increased miscarriages, birth defects, cancer, and respiratory illnesses. The danger of dump sites like Love Canal is well known. Much less is known about how hazardous wastes from numerous small sources will affect groundwater and threaten public health.

WASTE MANAGEMENT METHODS

EPA has established a preferred hierarchy for managing hazardous wastes at active sites. The methods used for any given type of waste should be determined by its properties and available technology. These methods include 1) reduction; 2) recovery and recycling; 3) treatment; and 4) land disposal.

REDUCTION is the most preferred of the methods. Some industrial processes can be changed to eliminate or reduce hazardous wastes. New, safer chemicals can be developed, and aspects of our lifestyle can be altered. Changes in industrial processes need not always require costly investments, and it has already been shown that the development of safer chemicals is possible. When EPA banned production of extremely toxic polychlorinated biphenyls (PCBs), widely used as an insulator in electrical generators, Dow Corning developed a safe substitute. Changes in lifestyle may ultimately mean greater conservation and less consumption, an alternative rarely mentioned in the literature.

RECOVERY AND RECYCLING of hazardous wastes enable industries to reuse products in manufacturing processes or to produce useful by-products. A major advantage of recovery and recycling at a production site is that transportation of the hazardous waste can be avoided, thus reducing additional risks to health and environment. In the event recovery and recycling is not possible at a particular site, waste exchange systems similar to that developed by the Dutch government would allow some industries to exchange wastes for recycling.

TREATMENT methods allow industries to reduce the hazard levels of wastes that cannot be eliminated or recycled. Chemical treatment involves altering the properties of wastes, solidifying or binding contaminants in wastes, or coating wastes with an impermeable substance. The longterm effectiveness of chemical treatment remains unknown. A second type of treatment, biological, employs microorganisms that consume waste material. A third treatment method is incineration.

Incineration effectively destroys wastes such as oily sludges, chlorinated hydrocarbons, pesticides, PCBs, and solvents. The heat generated by the process is also a usable energy source. However, incineration is a relatively expensive method due to the costs of equipment, additional fuel, and transportation of the wastes. Also, extensive air pollution control and monitoring is necessary. Federal regulations now require a minimum 99.99% destruction of waste during incineration.

LAND DISPOSAL is the least satisfactory of the methods but has been the most widely used. Many of the hazardous waste "time bombs" that we hear so much about and that constitute a sizable part of the Superfund National Priority List are the result of inadequate or improper land disposal methods used prior to the passage of protective legislation. Today federal and state laws strictly regulate land disposal methods. Landfills and surface impoundments that were licensed for hazardous waste after November 8, 1984, must be equipped with double liners (often water resistant clay and synthetic impermeable products), systems for collecting leaking wastes (leachate), leak detection, and groundwater monitoring. Incompatible wastes must be separated. Wastes must also be covered with clay, a synthetic liner, and topsoil to prevent water infiltration. Impoundments and landfills with permits for hazardous wastes that were built before 1983 must meet these requirements before November, 1988. Even with these measures, there is still risk of leaks and contamination of groundwater. The other major land disposal method, waste injection wells, has been used since the 1930s. Through this method wastes are pumped below groundwater supplies and impervious rock into porous layers of sandstone and limestone. Federal law now requires that injection wells be located no closer than a quarter of a mile from underground sources of drinking water. Although injection wells are considered a promising technology, potential problems may exist with leaking casing used to pump the waste underground and with ground pressure forcing wastes up through fissures and into groundwater supplies.

REGULATING HAZARDOUS WASTES: THE LAWS AND THE AGENCIES

Before 1976 when the Resource Conservation and Recovery Act (RCRA, pronounced "Rick Ra") was passed, the American public received little protection from hazardous wastes that were produced or disposed of in their communities. Today RCRA and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, but commonly called "Superfund") require stringent management of hazardous waste generation and disposal and provide for cleanup of abandoned or inactive hazardous waste dumps. Although these laws do not address all the problems associated with hazardous waste, and do not provide sufficient funding to cleanup the dangerous dump sites already identified, they nevertheless go a long way toward protecting the public health and the environment from hazardous wastes.

Texas has also passed laws that require more stringent hazardous waste management. These laws include:

- -The Solid Waste Disposal Act (1969, amended in 1985)
- -The Comprehensive Municipal Solid Waste Management, Resource Recovery, and Conservation Act (1983)
- -The Hazard Communication Act (1985)

Understanding the major provisions of Superfund, RCRA, and the Texas "hazardous waste" statutes is essential to knowing how these laws work to protect public health and the environment.

SUPERFUND (passed in 1980 and reauthorized for 5 years in 1986)

*authorizes funds for emergency cleanup and containment of **abandoned** or **inactive** hazardous waste dumps and spills from dump sites;
*administered by EPA, which develops list of hazardous substances eligible for cleanup funds, selects sites for priority attention, and coordinates participation of states and other federal agencies;
*has no jurisdiction over radioactive materials or oil spills, which are covered by the Price-Anderson Act and Clean Water Act;
*requires past or present owner of inactive waste sites to notify EPA about existence of the site;
*authorizes EPA regional offices to investigate sites identified by the public or by state, county, or local authorities-these sites are listed through the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS list), which identifies potential hazardous waste sites;
*authorizes EPA to establish a National Priority List of sites that constitute a significant threat to public health or to the environment, according to the following criteria: size of population at risk, potential dangers of waste, impact on drinking water supply, potential for destruction of sensitive ecosystems (such as wetlands), state's ability to assume its share of the cleanup cost;
*provides two types of action, emergency removal and longer-term remedial action. Removal action can involve removal of the waste, security fencing, provision of alternative water supplies, and temporary evacuation. Remedial action can involve treatment, confinement, permanent relocation of residents;
*requires present or past owners to pay for removal or remediation, otherwise EPA and the state share the cost;
*authorizes restoration of natural resources destroyed by dump sites as well as epidemiologic studies to determine long-term health effects of a release

RCRA (passed in 1976 and reauthorized in 1984)

*requires more stringent management of hazardous wastes than the 1976 version of the law required;
*regulates **currently operating** facilities for treatment, impoundment, or disposal of hazardous wastes;
*mandates greater use of recycling, waste reduction, and treatment;
*requires small quantity generators (producers and users) of hazardous wastes to comply with RCRA regulations. Industries involved in vehicle maintenance, metal manufacturing, printing, photography, dry cleaning, wood preserving, laboratory work, construction, and pesticide application are covered by the new RCRA. A business is designated a small quantity generator if it produces 100-1,000 kilograms (220-2,205 lbs.) of hazardous waste per month;
*places more stringent requirements on land disposal;
*regulates underground storage tanks. EPA estimates that there are over 1 million storage tanks and approximately 100,000 are leaking;
*requires groundwater monitoring at all landfills licensed for hazardous wastes, impoundments, waste piles, and treatment units;
*requires by law that incinerators permitted after November, 1984, must attain minimum destruction and removal efficiency of 99.9%;
*provides for an ombudsman program that assists with requests for information, individual grievances, and reporting a concern or problem;
*requires corrective action for all releases of hazardous waste at permitted facilities;
*bans bulk liquid hazardous waste and nonhazardous liquid waste from landfills

TEXAS SOLID WASTE DISPOSAL ACT AMENDMENT (The Comprehensive Hazardous Waste Bill)

*passed in 1969 and amended in June, 1985, declares that it is state policy to support hierarchy of waste management methods, beginning with reduction and ending with land disposal, gives preference to on-site destruction or treatment;

*creates interagency coordination council for agencies involved in solid waste regulation and enforcement;
*prohibits or restricts siting of hazardous waste facilities in floodplains, wetlands, recharge zones, or near residences, schools and parks, restricts storage of hazardous wastes;
*allows local government to petition for a rule restricting or prohibiting a hazardous waste site;
*encourages public involvement in siting process;
*allows state to order cleanups and to set inspection schedules;
*allows for appeals to site cleanup orders and apportionment of cleanup costs;
*requires identification and assessment of facilities needing cleanup;
*establishes hierarchy of parties who will undertake cleanup, including third parties and the state "superfund";
*authorizes fees for facilities that generate, process, store, or dispose of hazardous waste. Funds are dedicated to increased enforcement and permitting activities by the Texas Water Commission (about $3.4 million per year) and monitoring impact of hazardous waste activity on fish and wildlife;
*authorizes use of state superfund for assessing sites not eligible for federal monies, for state cleanup if monies from liable parties and federal government are not sufficient, and for providing state matching money for federal superfund cleanups

COMPREHENSIVE MUNICIPAL SOLID WASTE MANAGEMENT, RESOURCE RECOVERY, AND CONSERVATION ACT (1983)

*designed to safeguard health, general welfare, and physical property and to protect the environment by encouraging reduction in solid waste generation and proper management of solid waste, including disposal and processing to extract usable materials or energy;
*provides state financing to assist local government in planning and implementing solid waste management practices that encourage safe disposal of solid waste and recovery of material and energy;
*establishes authority for planning regions identified by the governor;
*specifically covers hazardous wastes and encourages such processing methods as reduction, recyling, and treatment to render wastes nonhazardous or less hazardous

TEXAS HAZARD COMMUNICATION ACT

*provides persons access to information about hazardous chemicals to which they may be exposed during their normal employment, during emergency situations, or as a result of proximity to manufacturing or use of chemicals;
*allows the commissioner of health to make information available to the general public through specific procedures;
*establishes strict guidelines for employers using or storing hazardous chemicals in excess of 55 gallons or 500 lbs.

HAZARDOUS WASTE MANAGEMENT IN GRAYSON COUNTY

No one person is designated as a hazardous waste management officer in Grayson County. Responsibility for the various components of hazardous waste management belong to the following agencies:

SHERMAN and DENISON PUBLIC WORKS DEPARTMENTS- provide solid waste collection (primarily residential and some commercial). Most commercial waste and hazardous waste transported by licensed private companies. Provide waste water treatment that eliminates hazardous wastes before emissions, provide drinking water treatment, monitors both.

SHERMAN and DENISON FIRE MARSHALLS- enforce fire and safety codes and storage of combustible, corrosive, and explosive materials, inspects gasoline tanks, maintains material safety data sheets on local industries that use hazardous chemicals.

GRAYSON COUNTY HEALTH DEPT- monitors and receives reports of hazardous waste spills, reports spills to EPA and Texas Water Commission.

GREATER TEXOMA UTILITY AUTHORITY- manages landfill, visually inspects solid waste to detect hazardous waste, ensures compliance of landfill with state and federal regulations.

Most authority for monitoring hazardous waste sites and for enforcement rests with EPA's regional office in Dallas and the Texas Water Commission. County and city governments in Grayson County are involved little in the coordination of hazardous waste management.

SUPERFUND SITES IN GRAYSON COUNTY

At present, Grayson County has no hazardous waste sites listed on the Superfund National Priority List, which includes 26 sites in Texas. These sites are located in 12 counties. Ten sites are located in Harris County (Houston area) alone.

Eleven sites in Grayson County are listed on the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list. This is a list of potential hazardous waste sites that have been identified to EPA by public citizens or state, county, and local agencies. Of all CERLIS sites identified nationwide, only about 35% are actually problem sites. The others either pose no threat or were mistakenly identified. Only 4 in Grayson county remain on the active investigation list, and one of these has apparently been cleared. The Toxic Waste Committee of the Grayson County League of Women Voters currently has information about two of these:

> Former Perrin U.S. Air Force Base/Grayson County College- radioactive waste dump with concrete containment, judged by the Texas Department of Health and City of Sherman Emergency Management Radiological Officer not to be a hazard at this time. According to the latter, the site could emit dangerous radiation if disturbed. Additional information from EPA and the U.S. Air Force has not been received. Technically, this site falls under the jurisdiction of the Texas Low-Level Radioactive Waste Disposal Authority.

W.J. Smith Wood Preserving Company in Denison- the EPA Enforcement Log dated 2 February 1987 received by the LWV committee shows that this company was the county's major violator in 1986. On 11 April 1986 the EPA cited W.J. Smith for a class I violation in 4 areas (groundwater monitoring, closure/post-closure of wastes, financial responsibility, and "other," usually a procedural violation). According to EPA, a class I violation "results in a release or serious threat of release of hazardous waste to the environment, or involves the failure to assure that groundwater will be protected, that proper closure and post-closure activities will be undertaken, or that hazardous wastes will be destined for and delivered to permitted or interim status facilities." On 23 July 1986 the company was cited again for a class I groundwater monitoring violation. W.J. Smith did not respond to a LWV letter of inquiry.

RECENT VIOLATIONS AND SPILLS IN GRAYSON COUNTY

Number of class I violations during 1985-86 period: 3 (W.J. Smith Wood Preserving and Reedrill, Inc.)

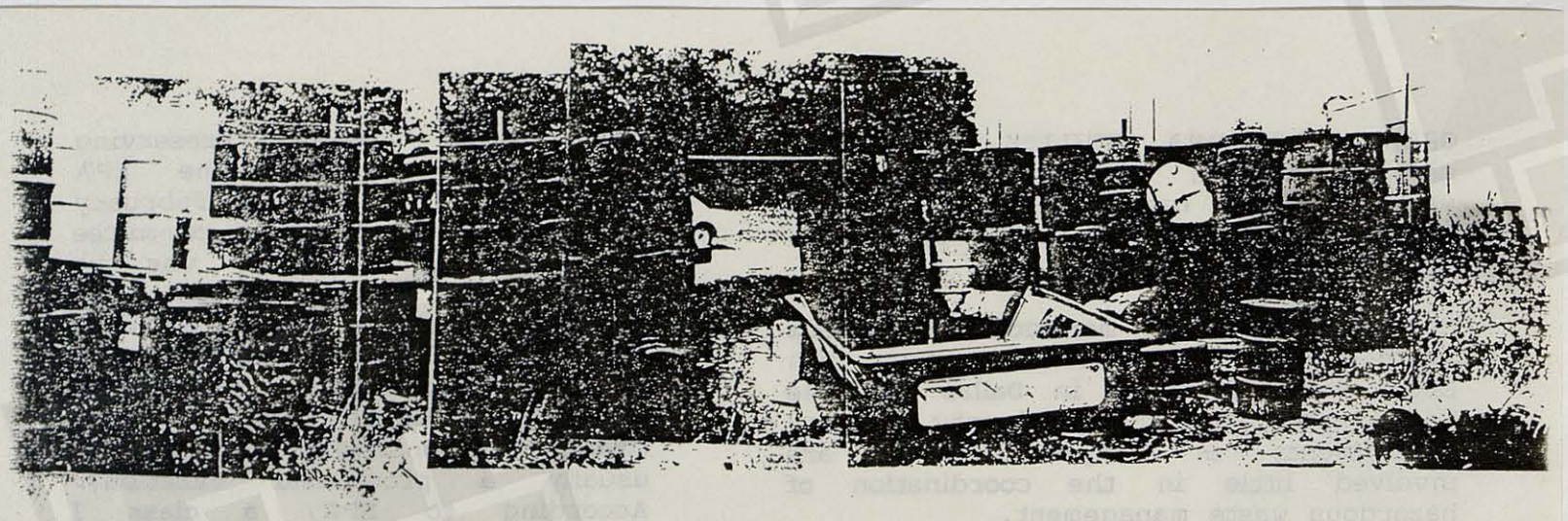
Numerous discharges (spills) of hazardous substances of various quantities were reported by companies to EPA in 1984-86. Examples of these include:

7-6-86 Texas Instruments- 500 gals. of 50% caustic soda solution as result of transfer line rupture; 100 gals. soaked into the ground

5-10-85 Texas Power & Light- .5 gal. PCB oil, result of a transformer failure

12-2-84 Union Pacific Railroad- unknown quantity (described as a "steady drip") of vinyl ascetate in Denison railroad yard

7-29-86 Anderson Clayton Food- 1,500 lbs. of diphenol oxide and diphenol were discharged and contained in a holding pond; 4 employees were injured



One situation involving an abandoned hazardous waste dump is described in EPA materials sent to the LWV. EPA records construct the history of a Denison site that posed an extremely serious threat to human health and life and to the environment. As is often the case, the story began with a company that went bankrupt. A producer of paint thinners and strippers and swimming pool chemicals, the company abandoned the site in 1981 after attempting to dispose of an unknown quantity of 55 gal. drums at a local landfill. One of the drums exploded when struck by a bulldozer. Since 1981, 136 drums remained at the site in deteriorating condition. The site is now a business park within several blocks of Denison High School. EPA chronicles the cleanup of the site that began with a citizen's complaint in June, 1985, about leaking drums. The episode in the summer of 1985 included such events as 1) testing which identified 8 categories of chemicals (including flammables, acids, gases, halogens, and PCBs), many of which were classified as hazardous wastes; 2) action by the owners to dispose of the contents of several drums by knocking holes in them and letting the contents drain down a street into a storm sewer that emptied into a tributary of Iron Ore Creek (the substance was not contained due to a 10-inch rain two days later); 3) refusal by the owners to employ a qualified disposal team; and 4) discovery by the state-employed technical assistance team that the first removal attempt resulted in the release of highly toxic fumes. Removal was completed in September 1985. Such an incident illustrates one type of problem that hazardous wastes pose for the public.

Other Findings

In Grayson County there are 27 large quantity (1,000+ kg, or 2,205+ lbs. per month) generators of hazardous waste and 14 small quantity (100-1,000 kg/per month) generators registered with EPA. Many small businesses such as dry cleaners and auto repair shops generate hazardous wastes in quantities of less than 100 kg/per month.

There are no companies in Grayson County that hold EPA permits for treatment, storage, or disposal. However, several have applied for permits.

Waste water is tested for hazardous materials before emission, but drinking water is not tested for toxic or hazardous substances other than bacteria, etc., unless a complaint is made.

The county landfill is licensed for only small quantities of hazardous wastes. Loads of solid waste are visually inspected for irregularities.

Grayson County is in a "critical groundwater" area; additional information is needed about the status of our groundwater supplies.

Large quantity generators are inspected annually and small quantity generators about every two years.

Sherman, Denison, and Grayson County do not have ordinances that control the transportation of hazardous materials and wastes through their respective jurisdictions. Public officials are not informed by trucking firms or the railroads about the shipment of hazardous

substances. Fire Marshalls regard the shipment of hazardous materials through town as a big problem. The Denison Fire Marshall did a thirty-minute sampling of traffic and found that 54 of 218 (24.7%) trucks and 27 of 104 (26%) of railroad cars had placards indicating that they contained hazardous materials.

The new Denison Fire Marshall has said that the industries he has inspected "look really good" to him and have been very cooperative. Many have invited his team to present safety demonstrations.

Johnson and Johnson produces cobalt waste that is shipped to Canada for disposal. Hospitals in the area strictly monitor radioactive wastes. State of Texas and suppliers of radioactive isotopes inspect hospital records and procedures for handling and disposing of radioactive wastes.

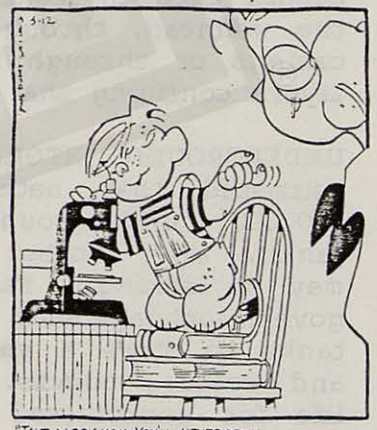
DENNIS THE MENACE

PROTECTING

GROUNDWATER:

THE

HIDDEN RESOURCE



Little is known about the effect of toxic waste on groundwater supplies in Grayson County except for conclusions drawn from bits of information we have picked up.

According to Bruce Butcher, assistant director of engineering for the city of Sherman, local wells are artesian. Local well sources are the Trinity and Goodbine aquifer. The flow of water in these aquifers is northwest to southeast. Artesian wells, otherwise known as confined aquifers, are trapped by materials of low-permability such as rock. Fortunately for us, whatever material shelters the aquifer also limits infiltration from overlying ground.

Dave Gattis, also with the Sherman Public Works Department, testified in a panel discussion on toxic waste and ground water that wells here are sampled "constantly" for bacteria. The tests are conducted according to state law, Gattis said.

Information from the Dallas Public Library states that water in Grayson County is tested for iron, calcium, magnesium, sodium, potassium, silica, bicarbonate, sulfate chloride, fluoride, nitrate, boron, dissolved solids, sodium absorption ratio, specific condutance and pH balance.

In Denison, most of the water is from Lake Randall, some is from wells located at the Grayson County Airport. Public Works Director Dewey Brown was not sure what kind of wells the city used.

Dean Rylant, superintendent of the water treatment plant at Lake Randall, said water there is tested for certain characteristics each day. Turbidity, alkalinity, hardness and chloride tests are run daily.

Also daily, every two hours tests are conducted on chlorine residual to determine the level of disfectatn in the water, and on phenol alkalinity and total alkalinity.

Annually, Rylant said, the State Health Department runs tests for chemical and physical content. The tests cover heavy metals such as iron, zinc, lead, copper, nitrates, pesticides, insecticides and radioactivity.

Rylant said he feels the tests done on Lake Randall are complete. But, he wished the Health Department would test Lake Texoma. Lake Texoma water is only combined with Lake Randall when necessary. He said Lake Texoma is only tested in the summer for fecal coliform, a disease producing waste.

This is all the information we have on local water sources so far.

We have sent questionaires for more in-depth information to the cities of Sherman, Denison, Whitesboro and Pottsboro. Also the Red River Authority, the Desert Water System and Texoma Service.

We asked for general information on water treatment and contaminants (regulated and non-regulated). Some of the specific questions asked were:

1. How old is your treatment plant?
2. Where does the water come from? Please identify well locations for groundwater and location of intake pipes for surface water.)
3. How is water treated?
4. What procedures are used to monitor contaminants in drinking water?
5. List the regulated contaminants for which the drinking water is monitored.
6. At what levels were unregulated contaminants present in the drinking water?

GETTING DOWN TO EARTH (OR GROUND WATER BASICS)

Groundwater contamination occurs when wastes and other unwanted materials seep through the soil into aquifers, invisibly polluting water supplies.

There are two types of aquifers: confined (artesian) and unconfined. In unconfined, or water table, aquifers precipitation seeps down from overlying land until it encounters some impervious geological structure, such as rock or clay. Because precipitation and runoff water easily percolate to the water table from the surface, unconfined aquifers are very susceptible to contamination.

Sources of contamination to ground water are septic tanks, landfills, surface impoundments, underground injection wells, underground storage tanks, and agricultural activities.

SEPTIC TANKS- Septic tanks and cesspools directly discharge the largest volume of wastewater into subsurface waters, increasing potential for groundwater contamination in shallow aquifers. In Grayson County last year, 160 complaints were filed regarding septic tanks. Apparently most septic tanks are located on the lake.

Contamination by septic tanks here begins when the tank is overloaded and discharges from the surface. The waste then drains in the lake.

One official, who requested anonymity, said "We all have common efforts to prevent this, but we really need a sewage plant on the lake."

LANDFILLS- Some studies estimate that 75% of all active and inactive landfill sites leak contaminants into the ground and groundwater.

SURFACE IMPOUNDMENTS (Ponds or lagoons)- Approximately 40% may be located over thin or permeable soils above aquifers that are used for drinking water or that could be tapped for future water supplies.

UNDERGROUND INJECTION WELLS- Industrial wastewater, brine from oil and gas production, radioactive wastes and toxic chemicals are often disposed of through injection into deep aquifers that have limited usefulness as drinking water due to high concentrations of mineral salts. Contamination of fresh groundwater occurs through leakage of pollutants from the wellhead, through improperly installed casings or through fractures in the rock layers confining the wastes.

UNDERGROUND STORAGE TANKS- It is estimated that nationwide as many as 100,000 underground gasoline storage tanks, most located at service stations, may be leaking. Farmers, industries and government agencies also use underground tanks to store a variety of raw material and waste products. The typical design life for unprotected steel tanks is 15-20 years, depending on environmental conditions.

AGRICULTURAL ACTIVITIES- Irrigation, which accounts for almost 70% of groundwater use, can increase the salinity of groundwater by washing salts from the soil as water percolates down to the aquifer. Additionally, improper fertilization practice can raise nitrate levels in groundwater so high that it is unsafe to drink. It is estimated that of the 700 million lbs. of pesticides used annually in the United States, 3.5 million to 21 million lbs. reach groundwater or surface water before degrading.

Some pollutants and contaminants undergo physical, chemical or biological changes that lessen their toxicity, but other toxics, such as heavy metals, are not readily subject to biological breakdown.

Groundwater generally moves very slowly between the particles of rock and soil. Rates of flow depend on the composition of surrounding geological material and slope of the water table. Once underground, contaminants tend to remain concentrated in slow-moving groundwater.

Grayson County has been designated as a "Critical groundwater area," or an area that is experiencing serious groundwater problems or is expected to during the next 20 years. These include shortages of surface or underground water, land subsidence due to underground water pumping and contamination of underground water supplies.

BRIDGE OVER TROUBLED WATERS (OR LAWS AND DRINKING WATER)

Federal legislation is expected in 1987 to provide guidelines for states to develop comprehensive groundwater programs. The choice may come down to setting a goal to require nondegradation of any groundwater supplies.

Nondegradation policies protect groundwater quality at existing levels. A nondegradation goal does not differentiate among different types of groundwater but assumes that all groundwater is valuable and deserves protection.

There are now 16 different federal laws with provisions affecting groundwater protection. But most were designed for other purposes such as controlling leaks of hazardous, solid or nuclear waste, protecting surface waters or regulating the use and disposal of chemicals.

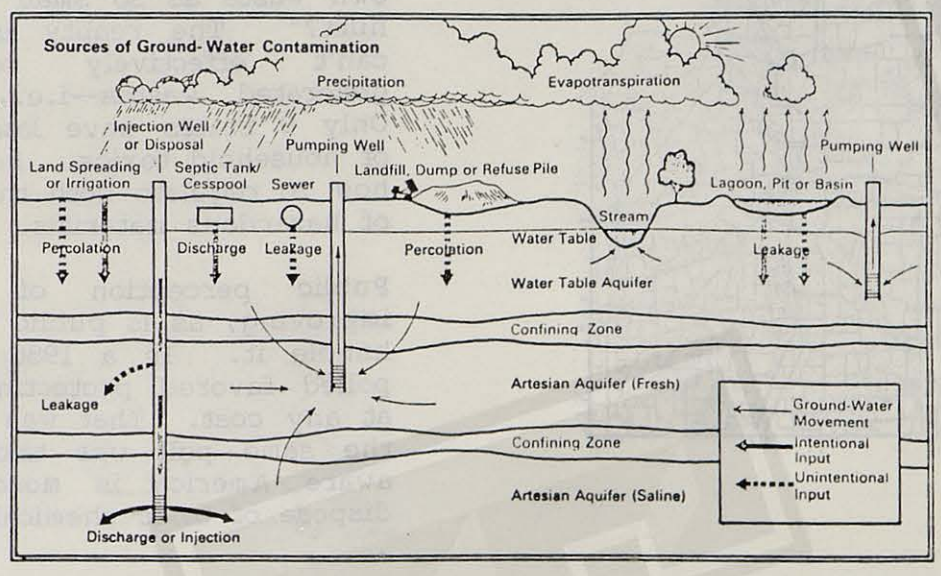
However, the good news is groundwater is no longer out of mind just because it is out of sight! Superfund and RCRA, for instance, contain provisions for protecting groundwater supplies from hazardous wastes. Other major federal laws that protect groundwater include the Clean Water Act of 1977 (reauthorized in 1987), the Safe Drinking Water Act of 1974, and the Federal Insecticide, Fungicide and Rodenticide Act.

In 1984 the EPA established a national groundwater protection strategy that gives states the lead role in setting and implementing groundwater programs and includes guidelines for groundwater protection and clean up.

The major feature of the guidelines is a classification system to designate classes of groundwater based on their value and their vulnerability to contamination.

That brings us up to 1987 and degradation, one of three groundwater management strategies. Other strategies are limited degradation and groundwater classification and differential protection.

Limited degradation involves setting water-quality standards either numerically or narratively. Numerical standards set a maximum allowable concentration level of



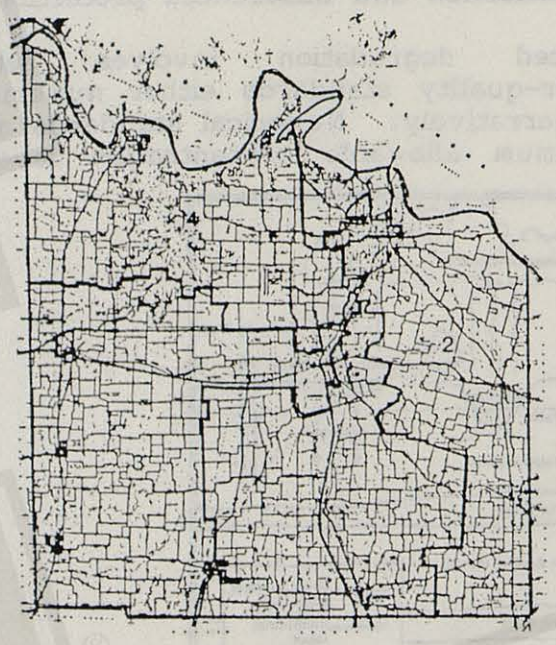
specific contaminants. Narrative standards are general guidelines implemented on a case-by-case basis.

*Note: Groundwater standards do not prevent contamination, they only define the goals or levels of contamination that trigger enforcement or clean-up operations.

Groundwater classification or differential protection is a way of distinguishing different kinds of aquifers on the basis of water quality and present or potential uses. Classifications are based on water quality, vulnerability to contamination, the average use rate, the affected population and the availiability of alternative water resources.

The problem with differential protection is the assumption that aquifers or groundwater regions are geologically discrete with uniform characteristics that can be differentiated. However, even regions within the same aquifer can be very different and the movement of groundwater from one area to another makes classification difficult.

An example of a single aquifer that expands to different types of territories is the Ogallala aquifer that spans from the Texas panhandle to Nebraska and Wyoming. Its average thickness varies from 200-1200 feet.



HAZARDOUS WASTES

AT HOME

You and I are the biggest polluters in this country. Surprised? Based on the number of American households, we represent the largest single group of polluters and hazardous waste generators in the United States. Although hazardous waste makes up only about 1% of residential trash, that 1% is still too much. Hopefully it is a figure which can be reduced through education on what constitutes a hazard and how to dispose of it. Even though industrial hazardous wastes continue to be the focus of environmental groups and government agencies, **WE CAN** make a difference.

What is household hazardous waste? How much is there?

As many as 20,000 products commonly found in household use have been identified as "hazardous waste," chiefly because they do not break down quickly into other "dilute" compounds. A recent estimate from Massachusetts concludes that each of us generates 3-10 gallons of hazardous waste per year. We also generate about 2,000 lbs. of garbage per year/per person. Breaking the amount of industrial hazardous waste generated annually in Texas into a per capita figure gives us an appalling 3,000 lbs. per year.

Basic to the problem is the fact that most people are lax about safety and see their own waste as so small that "how could it hurt?" The reality is that government can't effectively regulate privately generated wastes--i.e., those at home. Only 9 states have laws for the disposal of household toxics. People have to learn how to regulate both the use and disposal of hazardous materials.

Public perception of the problem is improving, as is public attitude on how to handle it. In a 1986 poll, 66% of those polled favored protecting the environment at any cost. That was up from 45% when the same poll was taken in 1981. An aware America is more likely to safely dispose of toxic chemicals in the home.

One result of this awareness is the removal of many toxic chemicals from our homes, reducing both exposure to the substances and potential injury. It is important to THINK, managing what we must use but also consciously planning how we will use it, store it and dispose of it.

*Do we need to use a hazardous product or can we substitute one that is less hazardous?

*Would more frequent cleaning lessen the need for super-strength products?

*Could we share toxic substances with friends instead of each buying a bottle?

*Can we learn to properly recycle?

*Do we keep all hazardous products in their original, labeled containers?

*Do we store hazardous materials in a way that will prolong their useful life so we don't have to keep buying more (i.e., prevent rusting of the container, closing the lid tightly, keeping away from pets and children, READING THE LABEL)?

Public health measures, not miracle drugs, have made the most significant improvements in our health during the last century. We are now using materials that didn't exist when the awareness of germs and infection led to sweeping changes in public health. Detergents, plastics, paint, glue and petroleum products which we accept as part of our daily life pose as great a threat to our future as the lack of sewers or safe water lines did years ago.

What are hazardous wastes? The EPA has identified about 400 specific substances as "hazardous" because they are either toxic, corrosive, explosive, infectious or radioactive. Many of these substances are used in the manufacture of things we use at home.

Some of the products we use are acutely toxic. Oven cleaner, for example, can seriously damage lungs if accidentally inhaled. Exposure to some of the stronger solvents in spot removers or strippers can cause long term kidney and liver damage.

HOUSEHOLD HAZARDOUS WASTES

Pesticides
-mothballs & flakes
-herbicides (weed killer)
-insecticides

Household Cleaners
-drain cleaners
-furniture polish
-air fresheners

Paint Products
-oil based paint
-thinners, removers
-wood preservatives

Automobile Products
-waste oil
-antifreeze
-brake fluid

Most of us dispose of waste either by throwing it in the trash, flushing it down the drain or toilet, or burning it. Better ways to handle it include first reducing the amount of waste which we produce, recycling products (such as motor oil) whenever possible, treating waste to make it non-hazardous and, as a last resort, placing hazardous household waste in specially designed sealed landfills.

In Grayson County we have very few restrictions concerning the disposal of toxic household substances. Garbage collectors will not accept motor oil, ashes, liquid paint, or anything explosive. There are no reports of sanitation workers in this county being hurt by substances they have picked up, but it has happened elsewhere. There is no officially designated hazardous waste dump in Grayson County.

WHERE DO WE GO FROM HERE ???

Questions which remain to be answered:

1. Do the local health statistics suggest the need for further research?
2. What is the quality of water in Grayson County?
3. Are water supplies adequately monitored for contamination; are groundwater supplies threatened by contamination?
4. What is the status of the acquafiers and groundwater supplies in Grayson County? (Information requested from EPA has not yet been received)
5. Does oil and gas exploration threaten groundwater in Grayson County?
6. What is the current status of the potential hazardous waste sites still listed as active cases on EPA's CERLIS list?
7. Where are private dumps located in the county and are they accepting hazardous wastes?
8. What is EPA and the Texas Water Commission doing to bring violators into compliance?

What can citizens do?

1. Make sure that existing regulations for handling hazardous materials are adequately enforced by going to public hearings, city council meetings, asking for a list of violators.
2. Report witnessed or suspected violations of regulations for handling hazardous materials to the proper authorities (you may remain anonymous if you wish).
3. Raise citizen awareness of the problems or potential problems by distributing information on drinking water and groundwater to the community.
4. Make sure that elected officials know of citizen concern about drinking water and groundwater safety.
5. Ask local officials to consider the protection of water sources when making decisions.
6. Support efforts to monitor and protect groundwater statewide.
7. Ask to be put on mailing lists of state and local planning agencies so that you can comment on groundwater management plans as they are being developed.
8. Promote environmentally sound use of septic tanks.
9. Use and dispose of household hazardous materials responsibly.

LEAGUE of WOMEN VOTERS

The material contained in this report was obtained from numerous sources including books, pamphlets, agency reports, panel discussions, and interviews. Information regarding a specific source is available upon request.

HOUSEHOLD WASTE DISPOSAL CHART

*When studying this chart, please remember two key points to help protect our ground water supplies: 1) DON'T PUT ANYTHING FLAMMABLE DOWN THE DRAIN, and 2) DON'T PUT ANYTHING DOWN THE DRAIN THAT YOU WOULDN'T PUT IN YOUR AQUARIUM! Saving our precious ground water is what this exercise is all about. Examples as close to us as Mineral Wells, an entire community which discovered gasoline in its water supply, should encourage us to increase our vigilance.

SAFE FOR DRAIN DISPOSAL WITH LOTS OF WATER (Use caution with septic tank)

KITCHEN

-aluminum cleaners
-ammonia based cleaners
-drain cleaners
-oven cleaners (lye based)

BATHROOM

-alcohol based perfumes & lotions
-bathroom cleaners
-depilatories
-disinfectants
-permanent lotions
-hair relaxers
-medicines (expired)
-toilet bowl cleaners
-tub and tile cleaners

GARAGE/WORKSHOP

-metal polish with solvent
-paint brush cleaner with TSP
-glue (water based)
-paint (latex)
-paint stripper (lye based)

SAFE FOR DISPOSAL IN SANITARY LANDFILL

-aerosol cans (empty)
-nail polish (allow to harden)
-auto body repair products (hardened)
-shoe polish

RECYCLABLE MATERIALS (Most require a recycling center)

-insecticides
-battery acid/batteries
-diesel fuel
-fuel oil
-gasoline
-kerosene
-motor oil
-paint brush cleaner with solvent
-paint thinner

**You may also obtain a household chart by writing: WATER POLLUTION CONTROL FEDERATION, 601 Wythe St., Alexandria, VA 22314-1994

REQUIRING A SPECIAL HAZARDOUS WASTE COLLECTION PROGRAM

KITCHEN

-insecticides
-floor care products
-furniture polish
-metal polish
-window cleaner
-nail polish remover

GARAGE/WORKSHOP

-antifreeze
-automatic transmission fluid
-battery acid/batteries
-brake fluid
-car wax with solvent
-diesel fuel
-fuel oil
-gasoline
-kerosene
-motor oil
-other oils
-paint brush cleaner with solvent
-cutting oil
-glue (solvent based)
-paint (oil based)
-paint (auto)
-paint (model)
-paint thinner
-paint stripper
-primer
-rust remover
-turpentine and varnish
-wood preservatives

GARDENING

-fertilizers
-fungicides
-insecticides
-rat poisons
-weed killers

MISCELLANEOUS

-ammunition
-artists' paints and mediums
-dry cleaning solvents
-fiberglass epoxy
-gun cleaning solvents
-lighter fluid
-mercury batteries
-mothballs
-smoke and fire alarms
-swimming pool acid