

SURVEY of
ACCIDENTAL and INTENTIONAL
HYDROGEN SULFIDE (H₂S) RELEASES
CAUSING EVACUATIONS and/or INJURY

in Manistee and Mason Counties

from 1980 to 2002

Introduction added 2001

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CONTENTS

Introduction	3
Survey of Accidental and Intentional Releases	21
Endnotes	43
Appendix	46
A American Red Cross, <i>Shelter in Place</i>	
B Michigan Public Services Commission, Case No. U-11445, (State Filer 1-10 Pipeline) <i>Direct Testimony of Ron Gutowski</i> (available from the author)	
C Chart – Hydrogen Sulfide Levels Federal & State Ambient Air Quality Standards	
D Memorandum from Department of Community Health 4/21/98	
E MSU, Cattle Autopsy Report (available from the author)	
F Gerow, Fred. <i>Michigan Natural Gas Use and Production</i>	
G MPSC, DEQ, et al., meeting notes 2/18/98 - Hydrogen Sulfide Consortium	
H Personal statements regarding release experiences:	
➤ Mike and Suzanne Murphy, multiple self evacuations as a result of releases from Slocum Well 121 processing facility, August – December 1997	
➤ Rentsch Family, multiple self-evacuations as a result of releases from Murray-State 1-8 Well and Facility, 1994 to 1999.	
➤ Gilbert and Vicki Hoffman, multiple self-evacuations of area residents as a result of releases from State-Filer 1-33 “Lakeland” processing facility and three wells including two directionally drilled under Lake Michigan – 1985 to the present. Brook Biemer, 11 th grade Mason County Central High School, recounting of her family's midnight evacuation in May of 1994 as a result of the Victory 32 Compression Station valve failure. Del Rose Mikloajczak, request for public hearing regarding prospective drilling in a residential area, excessive noise during drilling, evacuation during the drilling process and concern regarding surface water contamination from drilling muds left on site.	
➤ Parkdale businesses, multiple self-evacuations as a result of releases from State-Filer 1-1 (Parkdale), and Aztec Producing Company (Manistee) 1996 –1998).	
I Filer Charter Township v Aztec Producing Company, Inc. Limited Liability Company, Circuit Court File No. 97-8384-CE. (available from author)	
J Incident Report, Geological Survey Division, Department of Environmental Quality: Murray-State 1-8 (PN 37657) Gas Well [and facility] – Release of October 28, 1998. (available from author)	
Photographs and Charts	
<i>Incident Report</i> and map Victory 32, 5/13&14, 1994	after page 23
Replacement of gathering line and contaminated soil, September 1996	after page 28
Erwin and Barbara Rentsch	after page 34
Business Closed	Appendix H

Survey of a few
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Many families in the Olson Road neighborhood of Manistee Township have been exposed to countless hydrogen sulfide or "petroleum distillate" releases since the Murray-State 1-8 gas well began production in 1994. Twelve of those releases occurred during one six month period in 1998, four of them occurring twice in two separate 24-hour periods. Many releases caused self-evacuations, emergency medical treatment and burdened families with accumulating unpaid hospital bills. Industry officials have suggested when people are affected they "take a couple aspirin and lay down" (9/2/98).¹

After five years of unremedied exposures; experiencing traumatic evacuations and hospitalizations on Thanksgiving of 1998 and again on January 11, 1999, the Rentsch family finally abandoned their retirement home.

The elder Rentschs, active and healthy, bought their retirement home in the fresh air of beautiful northern Michigan in 1991. In 1997, following multiple evacuations and emergency hospitalizations as a result of gas industry releases from the Murray-State facility and well (12,600 ppm H₂S), both Erwin and Barbara Rentsch required 24-hour, 7-day-a-week portable oxygen. Their hopes for remedial action regarding improved well and facility management was raised after the gas release of 10/28/98 when officials from the Michigan Department of Community Health visited and interviewed them. Ten months later they received the official state report, which minimized and insulted their evacuation and sickness. The report determined that "because no alarm sounded" and the uncalibrated monitors did not record H₂S emissions "over a length of time", therefore, there had not been a release which would have caused the negative health effects that resulted in the evacuation and emergency hospitalization of 11, including two paramedics, and three others not transported to the hospital during the ongoing releases from the Murray-State Facility between 4:30 and 11:00 PM.² The Rentsch's hope turned to hopelessness and resignation. It was clear they were victims placed in harm's way, condoned by the state.

Continuing to suffer from releases Erwin and Barbara Rentsch abandoned their home in January, 1999 and moved in with their daughter's family down state. Each of them suffered a heart attack in February. On March 14, 2000, Barbara Rentsch, age 67, died of respiratory failure due chronic emphysema.³

Releases continued as usual in the old neighborhood. Both May 6th and 7th, 35 mph winds blew off the shroud assembly, extinguishing the flare that burns off the H₂S, causing yet again, traumatic self-evacuations as a result of debilitating symptoms (see text, page 36). DEQ's Rick Henderson was quoted in the 5/13/99 Ludington Daily News as saying that "No laws were violated, only a small amount of H₂S was released...it's a fairly routine thing. It's really not a big deal."

In memory of Barbara J. Rentsch
1933 – 2000

INTRODUCTION

While expansion of directional drilling along our Great Lakes was being considered in spite of the very real and potential threat to one of the world's few sources of fresh water, very little consideration was being given to the real harm currently experienced by existing communities at surface locations of existing wells and facilities. Families have been forced to abandon homes and businesses, moving out of the community -- even out of the state. State mandated placement of wells, facilities and flowlines thwart sustainable land use decisions by local units of government and literally drive out business and tourism. Releases causing evacuation and emergency hospitalization are already well documented, and these neighborhoods will continue to be the most adversely impacted as a result of accidental and intentional releases of petroleum by-products such as hydrogen sulfide. As Hal Fitch, Supervisor of Wells states: "You can never rule out accidents" (Appendix G); and as Dr. Kilburn, Professor of Medicine; Environmental Sciences Laboratory, USC notes: "The most sensitive will have moved away, unless a home could not be sold or its devaluation absorbed. Uncaged canaries would leave the coal mines."¹⁶

This *Survey* of evacuations and injury in Manistee and Mason Counties resulting from accidental and intentional releases of hydrogen sulfide (H₂S) from gas drilling and processing, spans only a narrow 10 by 30 mile corridor within the Niagarian reef along the Lake Michigan coast, including bottomlands of the great lake.⁴ The releases documented herein which include homestead and business abandonment are merely representative, as releases are far from uncommon, even though they are rarely officially reported.⁵

The Federal Clean Air Act Section 112 (r) defines an extremely hazardous substance as "any agent which...may, as the result of short-term exposures associated with releases to the air cause death, injury or property damage..." By definition, hydrogen sulfide (H₂S) is an extremely hazardous substance. Hydrogen Sulfide, comparable to cyanide in toxicity, attacks the nervous system and is explosive. It is a common by-product of oil and gas extraction and processing, occurring in dangerous amounts in several geological reefs throughout Michigan, including the Niagarian Reef.

Carol Browner, former Director of the Federal Environmental Protection Agency (EPA), made no secret of the fact that hydrogen sulfide was eliminated from the Clean Air Act (CAA) list of extremely hazardous substances by powerful last minute oil and gas lobbying. This elimination occurred in spite of the fact that the EPA study, *Hydrogen Sulfide Air Emissions Associated with the Extraction of Oil and Natural Gas*, conducted as required under Section 112(n) of the CAA documented a large number of oil and gas related accidents occurring in North America and concluded that accidental releases of H₂S pose the greatest risk to public health.⁶

Yet, as small independent limited liability gas companies strive to extract all possible reserves, the drilling of gas wells and attendant flowlines and facilities are increasingly situated in small town neighborhoods and populated areas in which the primary emergency response team is comprised of volunteers. Situating these extremely hazardous lines, facilities and wells in populated areas place families, schools and businesses under a 24-hour threat of evacuation.⁷ (**Appendix A**) Most alarming, industry's highly touted plans of evacuation and/or methods of "sheltering-in-place"

are inefficient at best, and inoperable at worst, as testified under oath by Filer Charter Township's Fire Chief before the Michigan Public Services Commission (MPSC) ⁸ (**Appendix B**)

Studies of the past quarter century indicate exposure to H₂S, even in tiny amounts, can cause permanent damage to the brain and central nervous system. During the 1997 National Public Health Convention, several scientists presented their research on the dangers of H₂S exposure at low-levels (in the parts per *billion*). Dr. Marvin Legator of the University of Texas Medical Branch noted "studies have documented that H₂S causes persistent toxic effects after chronic low-level exposure."⁹ Also presenting research at the conference was Dr. Kaye Kilburn, Professor of Medicine at the University of Southern California, Environmental Sciences Laboratory. He concluded that "Hydrogen sulfide poisons the brain and the damage is irreversible."¹⁰ Dr. Kilburn's ongoing studies find that "Brief exposures to H₂S are neurotoxic, effects are persistent, and exposures to low doses appear cumulative."¹¹ Dr. Kilburn states, "The most surprising finding was that even moderate occupational exposure and insidious downwind environmental exposure to H₂S can cause permanent impairment." He continues, "H₂S exposure--from acute, with unconsciousness; to prolonged exposure to "nuisance levels" at or above the olfactory threshold (approximately 1 ppm to 50 ppm) -- showed chronic neurobehavioral impairment months to years after exposure....Such impairment occurred from downwind environmental exposures as well as in the workplace....[and] a few hours of occupational H₂S exposure without unconsciousness or respiratory distress permanently impaired neurobehavioral function." Kilburn concludes, "...neighborhoods near refineries and other industrial sites where H₂S is released deliberately or inadvertently are unsafe."¹²

The abundant research (harkening back to 1845)¹³; the 1997 case studies of Jim Morris reported in his four day series in the Houston Chronicle¹⁴ as well as the case studies of this *Survey*, find the most common symptoms affecting those exposed to chronic, periodic or puff releases of low levels of H₂S include headache, skin complications, respiratory and mucus membrane irritation, respiratory soft tissue damage and degeneration, depression, sleep disturbances, tension and fatigue, as well as confusion, impairment of verbal recall, memory loss and prolonged reaction time.¹⁵

While the scientific research and the case studies in this *Survey* and in the Morris report prove the commonality of neurologic and respiratory symptoms suffered by those exposed to H₂S, the difficulty and largest loophole which continues to afford industry the ease with which to continue operations in populated areas is that no ensuing "disease" can be immediately attributed to H₂S emissions. As Dr. Kilburn states,

"The absence of current full-blown "disease" dignified by classic diagnoses appears reassuring to physicians and public health workers who often downplay neighborhood concern because exposure estimates to chemicals do not support the "risk inference" or because questionnaire findings for disease...is too small...to be important. The dichotomy between upset, disorder, and troublesome or nearly incapacitating symptoms and no diagnosable disease becomes a chasm which is seldom bridged." Dr. Kilburn also notes the brain may have the greatest sensitivity to chemical toxins, stating, "The brain and nervous system which have evolved to perceive and sense the environment can plausibly be considered to be the most susceptible of the organ-systems to chemicals.... [and that] slowing of performance is the key to brain dysfunction [and as] the function of cell or cell groups *slows*...performance falls below a competitive or even safe minimum...." This progressive loss of function, Dr. Kilburn continues, from impairment to insufficiency and on to failure has characterized the sequence of acknowledged chronic diseases of the pulmonary, cardiac and renal organ systems. "Irreversible chemical encephalopathy and dementia, particularly

Alzheimer's disease, may exemplify chronic neurologic diseases which proceed from impairment....The documentation of a variety of symptoms of ill health in exposed persons, including headache, fatigue, and a constellation of neurobehavioral performance problems (Kilburn and Warshaw, 1992b, 1994a, 1994b), identifies a major direction for future inquiries. Low birth weight, cardiac anomalies (Budnick et al., 1984; Lagakos et al., 1986, Byers et al., 1988) immune abnormalities, and cancer suggest additional directions."¹⁶

As quoted in the 12/7/97 *Muskegon Chronicle*, Dr. Kilburn states, "Hydrogen sulfide poisons the brain and the damage is irreversible....H₂S is dangerous any time you can smell it."¹⁷ He summarizes our failure to actively pursue further studies and prohibit such toxic emissions in populated areas as "an epidemic of slow disablement."¹⁸

In spite of the clear recognition that H₂S is an extremely hazardous substance and scientific research corroborates the variety of maladies suffered by H₂S victims, wells and facilities with their attendant flares continue to be increasingly placed in proximity to homes, schools and playgrounds – a significant drawback inadequately addressed in the proposal to drill directionally under the great lakes.

Based on case studies and research of the past quarter century, sufficient protection *could* be afforded sensitive populations *as required by the CAA*, by prohibiting extraction and processing of reserves in populated areas. Yet, not only are the health studies ignored, and H₂S lobbied off the CAA list of hazardous substances, but Michigan, in particular, continues to increase neighborhood development and lags behind other gas and oil producing states in drafting a protective public exposure standard (**Appendix C**). The state recognizes that "accidents can never be ruled out", but fails to address a protective public standard and preventative guidelines regarding well and facility placement which would secure public safety in the event of accidental or intentional releases.

The Michigan Environmental Science Board (MESB) was commissioned by Governor John Engler in 1997 to research an ambient standard following the 8/27/96 intentional release that necessitated emergency treatment for 12, and the author's *Preliminary Survey* (1997) which documented several additional releases. While the MESB admits, "there exists a greater risk for potential impacts to the shoreline environments [i.e., neighborhoods] where well head and other equipment are located", the MESB determined that long-term exposure to "low levels of H₂S is not dangerous *for most people*," (author's italics) stating that the "no observable adverse effect level (NOAEL) of H₂S in ambient air is between 2 - 10 ppm." It is most noteworthy that the selected ESB panel responsible for researching and recommending an ambient standard which would serve to protect the health and safety of the people did not include even a single medical health professional. Yet they have determined that "H₂S is rapidly detoxified in the body and toxic effects *do not appear* to accumulate upon continued exposures to low levels of the gas; that toxic effects of H₂S appear to be determined by the concentration that is inhaled rather than the time over which the exposure occurs; that there is no direct evidence to indicate that children are more susceptible than adults to the toxic effects of the gas." (author's italics)¹⁹

The conclusion of the MESB two-year study which, according to the "Meeting Summaries and Major Findings and Conclusions" not only stands in opposition to the scientific research of the past 25 years or the case studies and follow-up interviews of gassed victims; *but also the Occupational Safety and Health Administration (OSHA) who has determined that the current OSHA standard may be insufficiently protective for even the most fit, healthy male worker.*²⁰

The attitude that 2 to 10 ppm exposure is acceptable allows Michigan to essentially rely on the current OSHA standard of 10 parts per million (ppm) as an acceptable public exposure limit. Hal Fitch, Department of Environmental Quality (DEQ) Supervisor of Wells repeatedly states that recent exposures (of the past decade) have "only been in the range of 2-10 ppm" which he opines, "could not cause anything but mild headaches and some nausea at most."²¹ Nevertheless, it is these very releases to which Mr. Fitch refers that have been responsible for hospitalizations, evacuations, out-of-court settlements, and the more difficult to prove, long term health effects.

There seems to be a general lack of awareness on the state level that OSHA standards are generally set 100 times higher than considered safe for the general population, placing an ambient standard in the range of .1 ppm as recommended by Jim Bedford, former Chief of Michigan's Division of Environmental Epidemiology, for "...this is the range people begin experiencing adverse symptoms." (Appendix D)

Aside from the fact that the existing OSHA standard continues to be nonchalantly regarded as an acceptable accidental exposure for the general population by Michigan's DEQ, even more alarming is that evacuations and hospitalizations of citizens both home and at work, as a result of H₂S concentrations in the 1 - 10 ppm range have occurred well beyond the expected radii of dispersion. The Dilution Factor Matrix upon which the state relies, is supposedly able to project H₂S concentrations at greater distances utilizing worst case scenario numbers.²² But these projections are completely out of sync with the reality of dispersions based on scrutiny of actual evacuations, hospitalizations and injury. The physical actuality of injuries indicate that, as Dr. James Skifstad, Professor of Propulsion Engineering, Purdue states, "The physical transport properties of released H₂S dissolved in water or liquid hydrocarbon oils can disperse in the form of a cloud or fog droplets, and that in water solutions these droplets outgas essentially as pure H₂S and could have physiological implications upon either respiratory ingestion or absorption through the skin..."²³

Many of the accidental and intentional releases of H₂S documented in the *Survey* confirm that escaping H₂S, readily soluble in atmospheric moisture, quickly settles into low areas of mists and fogs and is transported by gentle breezes sometime several miles, before adversely affecting the human or wild life that crosses its path. This scenario is most succinctly illustrated by the release of May 13, 1994 detailed herein, documented by industry's own *Incident Report* and hospital reports of the children from the Nickleson Day Care Center located a mile from the source of the release, *3/4ths mile outside the parameter of evacuation*. The children, some of whom had to be revived by rescue workers prior to hospital transport according to industry's *Report*, suffered ill effects from hydrogen sulfide that had become trapped in the basement facility *eight (8) hours after the release had been curtailed*. (Text 5/13/94) Comparable topographical actualities of evacuation and injury found repeatedly in the *Survey* certainly calls into question the dispersion data upon which Michigan currently relies.

Until Michigan recognizes the scientific studies that implicate exposures to very low concentrations of H₂S from wells, lines and facilities pose an unacceptable health risk; that dispersions of harmful levels of H₂S far exceed accepted methods of computer modeling; and that public exposures to the OSHA level is totally unacceptable, then hundreds of Michigan citizens will continue to suffer the debilitating physical, neurological and psychological effects from accidental and intentional releases. Add to this list of state abdications the fact that record-keeping on accidental and intentional releases in Michigan is virtually non-existent, allowing both industry and the state to interpret "no record" as a "clean record" simply perpetuates the state's inaction in responsibly protecting the people.

Although DEQ rules proposed in 1998 address reporting criteria, according to Mel Kiogima, Technician from the Cadillac District Geological Survey Division, the rules, as of January 2001 had not yet been implemented. It is extremely relevant and imperative to address the continuing effect of having a very sparse record of releases, and the ramifications of that neglect on oil and gas practices in Michigan.

Historically, accidental releases have been reported only if a quantity of the mineral reserve had been lost or "wasted."²⁴ Since hydrogen sulfide, more recently euphemistically generalized as "mecsaptans" or "petroleum distillates", a reference to the entire chemical soup mixture, is 'merely' the harmful by-product of the "mineral reserve", releases which may result in evacuation and/or injury have been exempt from reporting. The reporting of any *intentional* release was not required at all. For example, the intentional release of August 27, 1996 for which 12 required emergency treatment, and whose effects, both physical and psychological, are still problematical today - six years later, was reported only as a consequence of public outcry which spurred media coverage since it did not officially "qualify" as a "reportable release" and would not have qualified even if it had been an accidental release.

A similar lack of reporting criteria exists for pipeline releases and explosions, which fall under the jurisdiction of the MPSC. *Accidental* releases require reporting only if they cause death, *in-patient* hospitalization or \$5,000 in damage.²⁵ Intentional releases are not mentioned. For example, during a gathering line replacement in September 1996, a release responsible for the death of at least 60 calves and one bull, which also sickened the farmer as he struggled to escape from the bottomland in his valley along the Lincoln River, did not necessitate reporting. The MSU autopsy reports on two of the calves indicated 50% and 75% lung tissue damage as a result of inhalation of a toxic substance. **(Appendix E)**

For the farmer to reclaim any loss, he would have to invest in costly legal fees, but without any official report of the release, the ability for industry to deny responsibility for a nebulous gas that passed through the farmer's valley is easily denied and readily brushed aside by both industry and government. State and industry, once again, exonerated.

Up until the gaping omissions in DEQ rules regarding reporting criteria became a public issue in the mid-90's, industry and the State consistently, deceptively and proudly paraded the gas and oil industry *reportable* accident record as "squeaky clean" thereby minimizing and obliterating the impact on victims of H₂S poisoning. Omitting the small detail that release-reporting criteria has been virtually non-existent, industry will lobby at local levels in pursuit of situating wells, flowlines and facilities in areas of heavier population density and repeatedly declare an exemplary record, free of any reportable mishaps. Industry uses this slight-of-hand to exonerate themselves even though they are, indeed, as this *Survey* illustrates through a mere scratching of the surface, responsible for releases which cause emergency evacuations and hospitalizations, as well as the more difficult to prove long-lasting physical conditions and psychological trauma. With industry claiming perfect neighborly compatibility, the state finds itself in a position from which it needs to exonerate itself of responsibility through absurd rationalization. For example, during a 4/17/97 joint Department of Environmental Quality/ Michigan Public Service Commission/Michigan Department of Community Health (DEQ/MPSC/MDCH) meeting, Hal Fitch stated that while he was confident citizens were exposed to "no more than 8 to 10 ppm, such a release of 900 ppm is normally not a concern [as] the workers had no effects" (re: text release 8/27/96). This deceptive attempt a logic rationalizes state abdication in regard to human health and safety by once again omitting the small detail that OSHA instructs workers to stand upwind of any potential release, while citizens downwind, caught unaware,

are completely oblivious to the waft of poison gas or chemical soup coming their way until it is too late.

As a result, the history of lax reporting has allowed the state to give industry wide latitude regarding well and facility placement. Citizens who complain, as a result of continual unreported releases and chronic suffering are soon spun into extremists who harbor an anti-industry sensationalistic agenda, since industry's spin would claim that one only need look at industry's exemplary (reportable) record after decades of production in Michigan and realize there simply have been no problems. "Not a single mishap" in industry's "squeaky clean (reportable) record."

For example, a November 13, 1998 interview in the *Ludington Daily News* quotes Jim Wells, Michigan Production official, stating that he believes most complaints are unfounded. "We feel there are a lot of unsubstantiated calls where we can't smell anything, and we feel there were a lot of reports turned in that were unconfirmed."²⁶ Industry repeatedly uses this line of exonerating rationalization failing to clarify that by the time industry officials arrive at the scene, sometime several hours later, as this *Survey* documents, the gas has naturally dissipated. As Kilburn states, "The trail is cold. Hot pursuit is impossible."²⁷

In the same article, John Merton, Oceana County Emergency Coordinator, in reference to complaints regarding the Hart dehydrator and well in Eldridge Township states, "Our biggest problem here is we have a hell of a lot of false alarms...and this has happened time and time and time again. There are some odors once in a while when they are working on the well but they haven't had an actual release." The author and victims remain chagrined by this meaningless differentiation between unreportable intentional releases that cause 'odors' versus unreportable accidental releases that cause the same odors. The harmful effect of the 'odor' is not altered. The State, once again in a compromising position, finds itself supporting industry with equally absurd logic. The Supervisor of Wells commented at the joint DEQ/MPSC/ MDCH meeting already referenced, "Occupants don't know --it's just a strong smell...[they] don't know whether to be calm or emotional or what."

The question is not whether releases are intentional, but whether they adversely impact surrounding populations. As Dr. Kilburn admonishes, the deciding factor should be: "If you can smell it, get out....Uncaged canaries would leave would leave the coal mines....Waiting for deaths to count is inhuman."²⁷

When releases are not reportable and first responders do not arrive until after the emission has dissipated, it is convenient and simplistic to claim, "time and time and time again" that a release is "unconfirmed" or "false." As Wells concludes in the 11/13/98 *Daily News* interview, the complaints come in because, as he calls the victims, the "*complainers*" are "just against oil and gas production."

Such spin tactics used by government and industry categorizing victims as alarmists serves only to sweep a very serious problem under the rug precipitating ignorant assessments by state enforcement agencies and politicians with the power and responsibility to protect the people.

In reality, families do not self-evacuate in the middle of the night or day unless their instincts tell them that *not* to flee would gravely endanger their lives. Families leave because they literally "cannot breathe" or it "hurts to breathe." And, they flee in fear of the all-too-real possibility of explosion while starting their automobiles.²⁸ It is, without question, a totally false conjecture as government and industry intimate, that families rouse their children from sleep in order to aimlessly drive around in the middle of the night out of some sort of perverse vendetta against the oil and gas industry.

To label victims of gas releases caught unaware in their homes and businesses as "complainers" even when they require emergency medical treatment clearly illustrates that vested-interest *opinions* carry more weight with state officials than actual documented hospitalizations and evacuations. This historical background has precipitated on-going abdication and inaction by the state.

Suffice it to say, since the beginning of oil and gas extraction in Michigan, accidental and intentional releases of hydrogen sulfide from wellheads, facilities, flowlines and gathering lines causing evacuations and emergency hospitalizations have gone virtually unreported. As this *Survey* illustrates, many families have evacuated multiple times, exacerbating both physical and psychological trauma. People who continue to suffer physical and/or post-traumatic symptoms as a result of accidental and intentional releases of hydrogen sulfide have never been counted among industry's victims. In fact, citizen cries for help and justice are ignored and literally mocked by the very agencies that should be protecting them.

For example, after the May 6 & 7, 1999 releases from the Murray-State complex in which 3 of the 3 fail-safe sensor/monitors failed, causing multiple evacuations due to severe chest pains, nausea, retching and vomiting; instantaneous debilitating headaches, painful and burning eyes, sinus pain, diarrhea, dizziness, unsteady gait and slurred speech,²⁹ the DEQ's Rick Henderson was quoted in the 5/13/99 Ludington Daily News as saying that no laws were violated and only a small amount of H₂S was released. "It's a fairly routine thing. It's really not a big deal. The volume of gas released was really very small."³⁰

The historical lack of reporting releases of H₂S or petroleum distillates has essentially backed the state into a corner in attempt to justify its abdication in protection of the people. A myth of the most egregious nature perpetuated by industry and the state, and swallowed by politicians afraid to buck the oil and gas industry, suggests that symptoms suffered by evacuees are psychological. A careful reading of the releases and evacuations herein will put to rest the notion hawked by officials and political figureheads who choose to hide, and hide from, the scientific data and case studies; choosing instead to surmise that victim's sufferings are "probably" psychological in nature. Political diplomacy may allow some to admit that, psychological or not, their suffering is, non-the-less real; but such patronization simply affords government officials the personal rationalization to wipe their hands of this serious issue in spite of the scientific data which indicates both long and short term physical repercussions as a result of instant or chronic exposures to H₂S, with multiple exposures increasing sensitivity and damage. If scientific studies aren't sufficient to dispel the myth, this *Survey* also clearly indicates that too many individuals who evacuated – leaving their homes because of an inability to breathe -- were caught totally unaware and completely ignorant regarding the potential harm that might be caused by the neighboring wells, lines and facilities. And surely, the documented cattle deaths were not psychological imaginings.

The DEQ continues to exonerate itself with a laissez-faire attitude toward releases that cause evacuation and injury claiming it is "impossible to legislate or prevent accidental releases." The state's rationalization becomes that those who are gas victims simply live, through luck of the draw, in the wrong place, and will inevitably be subject to this additional, "normal" hazard of life. "We do not live in a risk free society" as Fitch reiterates. "The gas must be extracted from where it lies." In other words, gassed and displaced families are simply the sacrificial lambs whenever small independent, *limited liability corporations* (LLC) choose to move in.

The caveat created by this line of reasoning is that it is okay to place families in harm's way, contorting it as a “natural” risk that is simply part of living in order to facilitate oil and gas extraction. With this caveat, preventative measures, which could and would protect populated areas, continue to be ignored.

Justification for the rationalization generally revolves around the ‘economic benefit for all’ assuming that the ‘good of the whole’ can be construed to justify this means to an end. **Appendix F** serves to illustrate, in fact, the very minimal amount of economic benefit for the whole, while the limited liability companies, who sacrifice the health and well being of the people, are the true beneficiaries.

The cavalier attitude of the state toward placing citizens in harm’s way is reiterated matter-of-factly by both DEQ and MPSC officials. During a February 1998 joint DEQ/MPSC meeting, both state agencies readily admitted that accidents can, had and will continue to happen. Michigan's Assistant Supervisor of Wells, Harold Fitch stated, “You can never rule out accidents. The guy in the field wants to go home and skips that last check.” Donald Mazuchowski, MPSC said, “I don’t think you can ever guarantee there will be no equipment failure. Equipment fails.”³¹ (**Appendix G**).

The ultimate irony of state abdication in regard to the health and safety of the people as a result of the lack of reporting criteria and the condoning of OSHA standards for general public exposure, is that State and industry officials, engineers, and supposed experts in the field of well, facility and flowline safety continue to base their public welfare judgement calls on statistics of probability which are based on the very severely flawed number of “reported” releases. For example, in January 2000, Manistee County’s Filer Township decision to approve a separating/sweetening facility and 7-1/2 mile flowline located in, and coursing through densely populated areas was based, in part, on the probability statistics offered by West Bay Energy Co. and accepted by the "expert" from the Texas-based INTERA, Inc. West Bay calculated the “probability of [two] valves failing [simultaneously] would be the square of the probability of one valve failing or .0000000178%.” Accepting this calculation, Township consultant Ronald Lanz, PhD, Chemical Engineer, INTERA stated “the chance of a worst case release coupled with the failure of both valves seem too remote to call reasonably foreseeable or reasonably possible.”³² *Yet, both industry and state reports note that three such multiple-valve/monitor failures occurred in the Survey area alone in 1999! (Refer to releases of May 6, May 7, 1999 and).*

With reporting criteria of accidental and intentional releases virtually non-existent in Michigan prior to 1998, statistics of probability upon which public health and safety decisions are made are egregiously flawed at the expense of citizens who continue to be placed in harm's way.

Although the 1998 DEQ rule revisions had not been officially implemented as of January, 2001, one might assume these revisions, which include release reporting criteria, (and in the case of the Murray-State release of 10/28/98, a Community Health Department interview with the victims), would indicate improved oversight of industry operations and increased protection of the people. Instead, using the Murray-State Report as an example, we find it is a poorly written, non-committal document with the end result serving primarily to afford industry additional scapegoat loopholes. It is the author’s opinion that the Murray-State Report and others inevitably to follow under DEQ guidelines will, in fact, facilitate continuation of the entrenched status quo -- namely, placing citizens in harm's way. This continued abdication in protecting the people is punctuated by official reports

and news releases in which the victims are humiliated and newspaper quotations from state and local officials and industry representatives who scoff at the plight of victims and downplay their symptoms.

Regarded as “complainers,” by both government and industry, generally unable to receive any compensation for hospital bills, unable to budge a government that is the recipient of oil and gas royalties, unable to stand against the multi-billion dollar oil and gas lobby in order to implement a public exposure ambient standard or enact preventative measures or laws that would responsibly protect citizens from intentional *and* accidental releases of H₂S/“petroleum distillates”/“mercaptans”; people continue to suffer from what is amounting to government-condoned legal gassing of families in their own homes. As a result, *families are being literally forced to abandon their homesteads* as summarized below and (Appendix H).

- Suzanne and Mike Murphy, living in the valley between the Hart well and dehydrator plant, gassed "time and time and time again", losing count how many nights they gathered their sleeping children, nauseous and gasping, to drive the night away, in a state of despair and worry for their farm animals; waiting until they thought they might chance returning home, -- finally abandoned their farm early in 1998. Suzanne Murphy, an asthmatic, who states her condition was exacerbated by the releases was criticized by representatives of industry, Oceana emergency responders and Congressmen as being a trouble-making exaggerator, simply out to give industry a hard time. Obviously, working families with school children don't drive around in the middle of the night, fighting for their very breath as some sort of vendetta against an industry with which they have no other connection. They evacuate their home because, as it is stated time and time and time again by victims exposed to these releases, it "hurts to breathe." Taking a breath becomes impossible. The Murphy's, able to sell the land to a wealthy downstate hunter, but not the home, moved -- children, horses, chickens, goats and dogs to Wisconsin -- "anywhere out of Michigan," still, of course, responsible for Michigan property tax on a home they would not sell without disclosing the poison gas emissions.
- Larry and Gabby DeRooy and their pre-school children, and Barb, Erwin and Dan Rentsch, living one-quarter mile from the Murray-State 1-8 Well and Facility in Manistee Township were exposed to countless releases which still continue as of this *Survey* revision. Many families in the area have evacuated multiple times or, after "sheltering-in-place" and wakening with symptoms ranging from headaches, conjunctivitis and vomiting -- *often evacuating after having sheltered in place*. The elder Rentsch's, active and healthy, Mr. Rentsch suffering only mild emphysema, bought their retirement home in the beautiful north country in 1991. By 1997, following multiple evacuations and hospitalizations as a result of H₂S/“petroleum distillate” releases, both Erwin and Barbara Rentsch required 24-hour portable respirators. Their hopes were raised after the 10/28/98 release when officials from the Michigan Department of Public Health visited and interviewed them. Ten months later they received the final report, which minimized and insulted their experience. Their hope turned to hopelessness and resignation. It was clear they were victims placed in harm's way and this was condoned by the state. As DEQ's Rick Henderson stated following the May 1999 Murray-State releases that caused evacuations, releases are “a fairly routine thing. It's not really a big deal.”³⁰ Burdened with a multitude of unpaid hospital bills and continuing releases; with industry officials suggesting they "take an aspirin and go to bed" (9/2/98); experiencing another traumatic evacuation Thanksgiving day 1998, and again January 11, 1999, they abandoned their retirement home, moving in with their daughter's family

downstate. Both Erwin and Barbara Rentsch suffered heart attacks in February, 1999. On March 14, 2000, Barbara Rentsch died of emphysema-induced heart failure.

- Visiting parents of the Hoffman's, Filer Township residents who live an eighth of mile from Michigan Production Company's Lakeland Facility complex and wells, including a directional drilling under Lake Michigan, cut their vacation short during one of many 1998 summer H₂S releases (text). Mrs. St. Dennis, with two coronary by-pass surgeries and congestive heart failure found the emissions caused extreme difficulty breathing; more than she believed her health could withstand. They have stated it is unlikely they shall return to the area.
- In the 1990's, Fourth of July vacationers at a Coho Bend Campground near the Shell Oil Fisk Road plant of Manistee Township cut their intended length of stay short and left the area after being sickened by a release.
- Subject to excessive noise, unable to sleep, distressed and sickened by the constant odors and self-evacuations; property owned by a single family for several generations were surprised upon returning home from a vacation in the mid 1990's, 500 feet from the newly constructed Victory 32 Compressor Station in Mason County. After releases and ongoing noise from the compressor, the family was finally bought-out and relocated by Basin Pipeline Limited Liability Co. who turned the home into operation headquarters in 1996. (Pat and John Yoe, one of many families who live within a mile of the station continue to complain of constant noise, pounding reverberation in their basement even visible in the vibrating of the bathtub water. Constant noise and reverberation is simply part of their constant daily living condition).
- Paul Miller, whose insurance business was located approximately 800 feet from the Manistee Township Petrostar 1-1 ("Parkdale") intentional release of 8/27/96, fell unconscious during the initial release. He abandoned his business site following his second emergency rescue and evacuation upon re-entering his place of business the following morning, 8/28/96, as it was still heavy with undissipated H₂S gas trapped inside the building.
- The Cools, also hospitalized during the Parkdale release, suffering ensuing health complications, struggled to maintain their once profitable, flourishing auto-electric business. Repair jobs that had been rote tasks became difficult. Instructions, long since put away, required reading and re-reading. Concentration was difficult; mood swings profuse. Taking medications several times a day to enable breathing due to damaged lung tissue, as well as suffering permanent vocal cord damage, they finally closed shop. Mr. Cools' doctor informed him a good 5 to 10 years had been taken off his life.³³

These are the lucky people.

Most families are simply unable to relocate. They are tax paying, working families whose lives have been literally sacrificed for the personal profit of small independent limited liability companies. They continue to pay their mortgages and taxes. They continue to pay on their outstanding hospital bills, refusing further treatment during on-going evacuations because they simply cannot afford more medical bills. Industry will not pay the bills because they refuse to admit responsibility even when evidence is clearly present³⁴ (**Appendix I**). Families suffer respiratory complications, watch their children fall behind in school and struggle with a life that becomes more difficult with every passing day.³⁵ Cost of litigation is prohibitive. The very few who can afford attorney fees spend years in pursuit of a settlement that never restores health and some have agreed not to discuss the release that precipitated the settlement.³⁶

The purpose of this *Survey* therefore, is to bring to the forefront an ongoing problem that continues to severely impact many lives. It is the position of the *Survey*, that in spite of the 1998 DEQ rule revisions, Judge Batzer's 1997 declaration during the *Filer Charter Township v Aztec Producing Co., Inc.* remains the status quo in Michigan. As Batzer states, "So my question is: Who in the hell stands for the public health? What do we have? A total abdication in this state?...I am amazed, and flabbergasted, and astonished – absolutely astonished. But there is an abdication in this area [protection of the public health and safety] by the state."³⁷ (**Appendix I**).

Although rule revisions were written in 1998 addressing some of the more flagrant loopholes that endangered the public, these rules did not officially go into effect until early 2001. With the exception of one rule, which prohibits intentional releases of hydrogen sulfide gas without the use of a flare, the new rule revisions only address problems caused by hazardous emissions *after a release has already occurred -- after the welfare of the public has been compromised*. The rules serve merely to document releases after the fact. This approach is inefficient and negligent when dealing with a known hazardous compound that continues to place families in harm's way. It is the contention of the author, as this introduction will illustrate, the quality of the new reporting criteria essentially serves to maintain the flagrant abusive status quo by demeaning the victims who suffer from gas and oil industry related releases.

The 1998 rule that addresses reporting criteria is being used by the state to uphold the status quo and is a mockery. It is an effort that serves to protect the established status quo and save face at the same time. The underlying attitude of the official state report on the Murray-State 1-8 release of 19/28/98 for example, carries the pre-disposed notion, as already addressed, that nothing was ever really wrong with the releases prior to the implementation of reporting criteria, and if anything *is* out of sorts, it's too late to change accepted permit policy and practice now because the entrenched industry must continue to have free economic reign as state coffers would suffer if industry were not given wide latitude. There would also be an obvious assortment of ramifications if years of citizen complaints were suddenly recognized as valid and just. So, in spite of the fact that 11 individuals (including 2 paramedics) received emergency hospital treatment for "acute" symptoms, the official state report of the 10/28/98 Murray State release matter-of-factly concludes that "...H₂S gas was monitored at the well and storage-tank area and these monitors did not maintain a record of readings over time. All that is known about the exposure is that the monitor alarm, which is set to trigger at 10 ppm, did not go off during the release of 2-4 gallons of oil."³⁸ Buried in the report it is noted that "...the operator was not able to produce records that show the dates of calibration of the sensor heads" which would trigger a shutdown.³⁹ Hand-written field notes report "Firemen state that people are dropping like flies (sic) because they heard about a possible gas leak on their scanners."⁴⁰ And D/Sgt. Thomas Wingate ends his *Interview Summary Oct,28'98 H2S Release* by quoting Mark Koenig, the lease operator/pumper for the Murray State: "He said that the gas wells in the area have gotten a bad name, and it is not deserved."⁴¹

A cursory reading of the report depicts an extreme bias by the writers of the report that downplays the impact on citizens and minimizes industry shortcomings. The *Incident Report* on this release essentially serves to protect the oil and gas industry. Reporting criteria and state follow-up when applied, has amounted to window-dressing that, in the end, will afford industry even greater loophole-ability by which to continue practice as usual. Consistent reporting of releases, if implemented, would at least eliminate industry's ability to declare a squeaky-clean "reportable record," although it is still merely another after-the-fact gesture. Accident reporting may have the

positive-sounding aspect of accumulating data, but this too has been thwarted by the State's subsequent serious and egregious mockery of the new rule that seems to be implemented with the direct intent of maintaining the status quo. A complete picture of the multitude of problems on that day is gleaned only through extraction of various sentences scattered throughout the lengthy report. For the record, it is important to scrutinize this DEQ *Incident Report* herein, for it serves to document the accusation that the revisions are a mockery and yet another injustice foisted upon innocent families. **(Appendix J)**

The afternoon and evening of multiple problems and releases from the Murray-State sent nine citizens and two paramedics for emergency medical treatment. It also affected at least four other citizens as reported by emergency responders. These figures are tallied by extraction from the *Incident Report* (Appendix J).⁴² Nevertheless, the *Report* summary indicates an hour-long release "was not the cause" for the late afternoon complaints and sickness, because of "conflicting wind direction" and "confused monitor readings."⁴³

A careful reading and re-reading of the *Incident Report* serves to exact what is actually meant by "confused monitor readings." The *Report* indicates that the sensors at the facility are set at a 20 ppm H₂S threshold for automatic shutdown, while four monitor alarms should alert employees if H₂S concentrations exceed 10 ppm. Apparently no alarm went off, but the system did automatically shut down about 3:00 pm⁴⁴ implying, of course, that the hour-long release may have been well over 20 ppm and should have triggered an alarm. That in itself should have created a red flag response on behalf of the state confirmed later in the *Report* where two sentences note that **no records were available that indicated any calibrating of the sensors or safety devices.**⁴⁵ **In spite of these red-flag alerts, the DEQ and Department of Community Health unequivocally state that even though 5 ppm H₂S was monitored a mile from the release, the hour long release where the "potentially higher volume of gas [would have been] escaping...was not the cause of citizens being negatively impacted" one-quarter mile from the release because "no alarms sounded" and the "general wind direction was incompatible."** (author's italics).⁴⁶ Both State and industry seem to be leaning more often on this erroneous enthymeme declaring that "no leak occurred because no alarm sounded and therefore no problem exists." The releases of 2/18/98, 10/10/98 and 11/26/98 are three of many where officials claim that because an alarm didn't go off, or the un-calibrated monitors did not register an H₂S reading, then there wasn't a release and victims merely suffer from psychological suggestion. Victims await the emergency responder, state or industry official that is as honest as the boy who declared the Emperor had on no clothes.

The *DEQ Incident Report* states that difficulties with operations at the Murray-State started with an "automatic shutdown of the well at 3:00 PM. A faulty O-ring was replaced "in the automatic safety shutdown valve pilot system" and production resumed approximately 4:30 PM when the Michigan Production Company foreman left. But also at 4:30 PM, ½ to 1 mile south, south-west (distances unstated in the report), "a motorist passing by on M-55 noticed an odor and called the Manistee 911...[and] at approximately 4:45 PM the Manistee Township Fire Department detected five parts per million (PPM) H₂S at the intersection of M-55 and Franklin Road...."⁴⁷ The *Geological Survey Division Report of Complaint* notes the MTFD reading was 23 ppm, corrected at midnight to "have been 2-3 ppm, not 23 ppm".⁴⁸

While the report states that the "faulty O-ring did not result in a release of gas or fluids, but did cause an automatic shutdown of the well,"⁴⁹ the field notes state that at 6:40 PM "all operations at Murry (sic) normal," but at 6:42, the well was once again shut in.⁵⁰ The *Report of Complaint* states that upon production resuming at 4:30 PM, the "large amount of liquids [that had accumulated while

shut-in] caused the dump valve to stick open...which allowed some gas...subsequently to atmosphere.”⁵¹ Turbulence and the “...high volume of liquids caused the high pressure separator to begin to rapidly dump liquids to the stock tanks. This activity continued for *approximately an hour*....At approximately 11:00 PM, WellTech Trucking hauled off 100 barrels of liquids for disposal⁵²

At midnight, as already stated, a spokesperson for the MTFD declared its 4:30 PM monitor reading on highway M-55 approximately ½ to ¾th mile south, southwest from the site was 2–3 ppm, not the 23-ppm originally indicated. Yet the *Complaint* also states that “23 ppm H₂S had been detected *where people had been impacted*” (author’s italics), a checkpoint located approximately ¼ to ½ mile north, northwest of the production facility in which “...lies a small residential neighborhood...bounded by M55, Olson Road, and Pine Creek Lane in the Pine Creek and Olson Road neighborhood...where the illnesses occurred.”⁵³

In the confusion of releases, changing wind directions and a wide variety of monitor readings, calls reporting odor and illnesses were logged between 4:30 and 11:00pm, yet the conclusion in the final *DEQ Report* states only that detection of 5 ppm at the Olson Road site were deemed by the DEQ as without “proper confirmation” since this checkpoint one-half mile north of Murray State “was opposite the wind direction during this time.”⁵⁴ And the official MDCH report states: “H₂S gas was monitored at the well and storage tank area, and “these monitors *did not maintain a record of reading overtime*. All that is known about the exposure is that the monitor alarm, which is set to trigger at 10 ppm, did not go off” (author’s italics).⁵⁵ (The report notably fails to indicate *what* the high monitor puff-reading was at the well and storage tank area).

Aside from the faulty reasoning "no alarm/no release", this statement also *falsely implies that puff releases of high parts per million are somehow innocuous. Case study documents that puff releases trapped in atmospheric moisture as mists or fogs may carry trapped hydrogen sulfide for miles.* (Release dated 5/13/94) *A steady stream release with constant high parts per million of H₂S is not a necessary criteria for harm.*⁵⁶

To excuse the release as innocuous and refer to it as "no big deal"⁵⁷, and for the state's official report to downplay the hospitalization of 11 individuals because the monitors did not maintain a record of the release *over time* is egregiously irresponsible. The official report purporting such a misleading presumption, unscientific to its very core, serves only to maintain the status quo of abdication enabling the state to continue endangering families, placing them directly in harm's way while inferring that the power of suggestion may cause dozens to “drop like flies (sic).”⁵⁸

The MDCH resolved that the “petroleum condensate vapors” released from the Murray-State throughout the afternoon of 10/28/98, which necessitated emergency medical treatment for 11, also affecting at least four others, causing “health effects...[that] *appear* to be acute in nature...”⁵⁹ were not responsible for the severe symptoms and repercussions of those affected and hospitalized (author’s italics). Of further insult, health department interviews of victims regarding what the MDCH terms an "alleged toxic release" comment in their official report that one individual “was observed to smoke cigarettes throughout the interview and numerous ash trays were noted in the house.” The report continues noting that some were on portable oxygen, and that they heard about the "smell" before they "eventually noticed it.”⁶⁰

Both condescensions are completely irrelevant and irresponsible coming from professional officials representing the people. First, to imply personal fault because a victim of gas poisoning is also a smoker is an appalling evasion of the issue, shifting the focus and contorting the facts. Air

quality standards must protect the most sensitive, at-risk populations, and state health officials beg the question by implying otherwise. Secondly, neighborhood families, after repeated evacuations naturally begin to call one another in warning. Citizens outside or closer to the facility may alert those who are farther away or indoors. For anyone who has experienced a release, evacuation is an act of self-preservation; nothing more, nothing less. Both MDCH arguments are completely irrelevant unless, as medical personnel, the doctors would have carried through in explanation with the crucial fact that the *general public, including smokers, those with hangovers or heart conditions, asthmatics, diabetics; any preexisting health condition, even those with a common cold or ear infection, and certainly those who have been sickened by previous H₂S releases, regardless of the label given to the chemical soup, have a lower tolerance to repeated exposure than healthy male workers.*⁶¹

For such unqualified statements to even appear in an official state report written by health professionals so obscures the citizen right to corrective action that state abdication in regard to health and safety cannot be denied. Instead of pursuing awareness and remedy of a serious problem which *will occur again*, the treatment by the state regarding a serious release causing emergency hospitalizations serves wholly and totally to exonerate industry and maintain the status quo. The very department that is supposed to offer protection and assure the public health and welfare assures instead that industry will continue to imperil the health of families, and Judge Batzer's words, continue to ring true: "... an abdication of the state's responsibility to protect the citizens."⁶²

The only responsible way of dealing with hydrogen sulfide emissions is *preventative*. Since it is clear that exposures of 2-10 ppm have caused evacuations, hospitalizations and serious repercussions, preventative measures would include a *public exposure standard not to be exceeded even during accidental releases*, meaning, strict regulations *preventing* the location of wells, flowlines and facilities in populated, residential areas.

Placement of wells, lines and facilities must also take into account *actual case history* of the dispersion of 'clouds' and mists laden with hydrogen sulfide gas and the subsequent outgassing when human or animal life enters the plume. This actuality is succinctly evidenced by the Victory-32 release of May, 1994 when children entering a day care basement one full mile from the release source were hospitalized *8 hours after the release had been curtailed*. Other comparable situations include the releases documented herein of 3/21/89; 5/13&14/94; 8/27/96; 9/96, 1/27/97 and 5/6 &7/99).

Atmospheric conditions, topography and wind direction, including the constant shift in wind direction as is common along the shoreline communities, should also be a factor in placement of wells and facilities. A simple computerized concentric radius of dispersion is a grossly misleading oversimplification, once again illustrated by the Victory-32 release which killed cattle a mile away in a northwesterly direction, sent day-care children for emergency hospital treatment due-south of the release, made students nauseous at West Shore College two miles northeast, and sent one woman for emergency treatment 2-3/4 miles southwest of the release. (Naturally the cause-effect relationship can never be proven beyond a reasonable doubt, but the continuing pattern necessitates responsible scrutiny, not flip rejection). Shifting winds for example, are more than likely the explanation for the Murray-State hospitalization of 11 in which the DEQ official report claims "the *general* wind direction was incompatible" and ignores completely any sense of atmospheric conditions which

would negate the report's "air modeling determination" of how far the release "should have gone" if it had behaved as on paper.

Protection of health and well being is the Constitutional right of the people. The primary responsibility of our government is to prevent the placement of citizens in harm's way. Economic promotion may not be justified by putting citizens at risk. Private capitalistic gain afforded independent *limited liability* oil and gas companies in populated areas is without justification when an entire community must be placed under 24-hour, 365-day threat of evacuation as is the case with the recently permitted West Bay State Filer 1-10 well located in the City of Manistee and its 7-1/2 mile flowline which virtually runs the entire length of one of the fastest growing communities in Manistee County. This flowline courses its way through residential districts to a facility *on top* of a hill, towering over the densely populated Filer City and Oak Hill subdivision. Schools, playgrounds, churches and fishermen on Manistee Lake as well as the 300 employees of Packaging Corporation of America will all be impacted during a release. According to Filer Township Fire Chief, under worst-case release scenarios the Charter Township Fire Department "could not" respond effectively to a serious leak and "several hundred families would be subjected to hazardous emissions of H₂S" with evacuation attempted for those "outside the hot zone", removing the ill inside the hot zone "if possible....If the leak ...affects enough homes, it may be too late when you get to the person most affected." The ultimate scenario in the event of a serious release is perfunctorily illustrated by the admission of Filer Township's Fire Chief under oath, that any evacuation would be inefficient at best, and impossible at worst (**Appendix B**).

In fact, the state-of-the-art West Bay facility has been in operation since August 2000. In less than one year Filer volunteer responders have made three emergency runs as a result of facility operations including emergency oxygen for five citizens on November 8, 2000. (These releases have not yet been added to the release section of this document).

Rules governing oil and gas wells and facilities must be preventative. It is a sidestepping song and dance insults the intelligence of citizens when the state and industry suggest that emergency preparedness is a viable safety precaution. This notion, above all else, is the most fantastic irrational scam foisted upon families. So-called emergency preparedness is a public panacea that exists *only* on paper as the releases and emergency evacuations compiled in this text succinctly illustrate.

In a total of 41 releases discussed in this *Survey*, (through research completed to 5/99), only 6 (six) *evacuations were called for by industry after receiving complaint.(and all of these prior to mid 1995). Twenty-three (23) evacuations were self-imposed.* (Twelve were citizen reports of strong odors without evacuation). These figures indicate that *families, being placed in potentially lethal guinea pig situations, have unwittingly become industry's watchdog.*

Standard emergency procedure which purports to "phone residents" in the event of a release in order to evacuate neighborhoods fails to take into consideration three significant factors. First, accidental releases are not planned and since the toxic effect of H₂S is virtually instantaneous, the emergency rescue teams are naturally informed of the release by victims already sickened, some of who have already evacuated.

Second, were the highly touted phone plan implemented (that is, rescue personnel telephoning all homes, business, schools, churches, etc. within a certain radius), to initiate immediate evacuation, there is first the simple impossibility of phoning all who might be affected simultaneously. And obviously, there is no guarantee that all families, even if home, would be *in* the home. Various area communities have even staged mock-evacuations with results illustrating not only mass confusion,

but clearly indicating multiple deaths of both citizens and rescue personnel had the evacuations been actual.⁶³

Experience undeniably proves that those in danger phone 911 for help, not the other way around. This *Survey* illustrates that many residents in proximity to wells, pipelines and facilities have been forced into the position of attempting to alert the often time unknowable or unreachable industry of a toxic emission. In compiling the *Survey* there was not one instance of industry *initiating* an evacuation. Seldom does industry ever admit fault even when evidence is undeniable.⁶⁴

Third, as the typical scenario plays and re-plays, release after release in Filer Township, the local volunteer rescue units and industry responders drive hither and yon, north and south, west and east, from this facility to that well, to this pipeline --or that landfill, *hunting* for the source of the release as the responders are fully aware that "current" wind direction may not be an accurate indicator of release-site. According to scanner reports, after spending as much as an hour hunting for the source of release, often times the result is complete uncertainty or best-guess.

Another plan of emergency preparedness suggests that families stuff rags around their doors and windows. Since stuffing rags would hardly be of benefit *after* the H₂S has permeated the home or building, one might assume this is suggested by industry as a preventative measure -- perhaps before going to bed each night? Aside from being totally impractical, the preposterous notion that such a measure somehow creates an airtight environment for the family within is too idiotic to even address. Nevertheless, what else is a family to do? For example, Daniel Rentsch, fatigued by numerous self-evacuations, assured by authorities during a Murray-State release that all was under control and the air would soon be clear -- he shut his window, went to bed and fell asleep. When he woke in the morning he immediately vomited with symptoms more severe than the night before. He experienced burning eyes and pain behind the eyes, a tremendous debilitating headache, diarrhea, dry cough, slurred speech, unsteady gait and chest pain. He evacuated. (text: May 7, 1999)

In Martinez, California, citizens have dubbed the 'Shelter-in-Place' plan as the "Get Gassed in your Home Plan." Local residents comment they feel like "lab rats." (Refer to releases dated 10/11/98, 5/6&7/99 and 10/20/99).

The picture presented here is neither sensationalistic nor flippant but in fact, very real. Families have been evacuated more than once. Some families now evacuate themselves at the least alarming odor, only too aware through experience what may happen if they don't, and thus labeled by authorities as "over-reacting" and "attempting to give industry a bad name."

What is not recorded in any of the following accident summaries is the psychological trauma that ensues following an evacuation. Once evacuated there is the keen recognition on the part of the family that their proximity to a well, a flowline, compressor station, a dehydrator unit or separating/sweetening facility has permanently changed their life. They no longer sleep in the peace of their own home as they once did. They now recognize they are on call -- any time of the day or night -- to gather their children, whether asleep or out playing, obligated to run, if not stumble, dizzy, nauseous and disoriented, for their very lives. In 1980 a woman near the Fisk Road facility fruitlessly asked the DEQ to pay for her nerve pills. Evacuated, hospitalized parents and children continue to wake from nightmares in 1999 as a result of a 1997 release, and this is probably not singular.

The fact is, there are pockets of people identically impacted throughout the entire country as Jim Morris documented in his *Houston Chronicle* series of November, 1997.⁶⁵ Individual companies in isolated areas may get away with their attempts at "pooh-poohing a few silly complaints" but the

big picture no longer makes this possible. Michigan is guilty of shoving a very serious situation under the rug.

Observations as a result of this Survey note that as years progress and, according to industry, technology improves, the detrimental consequences to human health and safety have become more, rather than less, serious. This situation is exacerbated by two factors. There is an increasing interest by small independent companies to extract minerals from the more "sour" reefs. And, based on industry's false and misleading claim of accident-free operation using the seriously flawed statistics of probability; wells, facilities and flowlines are being located in more densely populated areas, even though the DEQ and MPSC readily admit accidental releases of H₂S will continue to occur.

This most severe plight of citizens who have been placed in harm's way by the State, and the ensuing medical complications that are egregiously down-played and ignored by the variety of officials vested with protective authority, is beyond all precept of our nation. The continued permitting and operations by State authorities of wells, flowlines and facilities which trample and ignore a family's basic right to breathe without being forced to abandon their home in the middle of the night or day is unconscionable malignment of the constitutional right to health, safety and welfare. This type of malfeasance is fundamental to the cancer that continues to erode the people's faith in our government.

RECOMMENDATIONS

A comprehensive plan to remedy these flaws in state oversight, eliminating public health threats and providing sustainable land use decision-making that protects residents and land resource-based industry, including mining and tourism, while promoting community viability include the following recommendations:

- Establishment of a State and Local cooperative decision-making process for the placement of gas and oil wells, facilities and flowlines that respect local land use planning and development regulations.
- An interagency commission, including health professionals should immediately be formed to develop a coordinated oversight framework for implementing preventative measures that would end the health threats from H₂S accidental and intentional releases from oil and gas installations. The public should be invited to participate on the commission
- The evaluation of human suffering as a result of actual releases should be seriously addressed by medical professionals of an independent source without connection to the vested interests of the state or industry.
- A state public exposure standard of 0.1 ppm must be established for H₂S. This limit is based on the Department of Community Health's general recommendation for hazardous emissions that take 1/100th of the occupational limit as acceptable for public safety. If wells, pipelines or processing facilities cannot meet this standard, they should not be allowed.
- An upgraded air dispersion model based on the evaluation of actual dispersion studies based on actual releases should become an integral part of rules that regulate the permitting and siting of oil and gas wells, lines and facilities. These rules would apply the public exposure standard to accidental as well as intentional releases. If wells, pipelines or processing facilities cannot meet the standard, they should not be allowed.

ACCIDENTAL AND INTENTIONAL RELEASES OF HYDROGEN SULFIDE (H₂S)

May 20, 1980

Night - *evacuation* of 11 people

Rural Manistee Township

Shell Oil Gas Sweetening Plant (“Fisk Road” plant)

Leggett, Steve, *State pollution panel hears about Fisk Road gas facility*, Manistee News Advocate, 5/20/80.

Coombs, Doug, *Shell Plant gets extension*, Manistee News Advocate, 1980.

Gutschke, Jean Marie, victim. Letter to the Editor, Manistee News Advocate, 7/11/80.

Leggett, Steve. *Gas plant odor irks residents*, Manistee News Advocate, 2/8/80.

Story, Nancy. *Concerns voiced over gas sweetening plant*, Manistee News Advocate, 2/19/80.

Radlicki, John and Liz, victims. Letter to the Editor, Manistee News Advocate, 2/26/80.

Manistee Township residents complain about oil plant, Manistee News Advocate, 8/3/79.

UPI, *Appeals Court Upholds Against Shell*, Manistee News Advocate, 7/27/85.

Author interview of victims.

A power failure causing hydrogen sulfide emissions necessitated the evacuation of 11 people who spent several hours at the Manistee State Police Post. One man whose family “left home in fear” again told the State Air Pollution Control Division (APCC), “It’s always a malfunction –I don’t know how many times you can have malfunctions.” Another resident stated “This is the safest plant in the world they told us. You won’t even know we’re here. I wish they’d pay for my nerve pills.” In her Letter to the Editor one resident stated the regular ‘rotten egg’ odor causes “headaches, sinus trouble, loss of appetite, respiratory problems, irritation in the eyes, nose and throat, plus many others.” Excessive odors have been reported since 1979 with warning devices registering sulfur odors at irritation levels often exceeding 12 times per month. “Some people get the smell, some get the noise” as one woman stated to the Manistee News Advocate (8/3/97). Another resident described the noise as “a great jet taking off in the woods.” A third resident noted the warning devices are also a problem having to be set at high volume to be heard over the plant generators. On June 20, 1980 the APCC ordered the plant temporarily shut down following numerous complaints.

October 6, 1980

“Hill Road” Separating Facility

Paetschow, Bob. Manistee News Advocate, 10/7/80.

Valve failure creating pressure build-up caused an explosion and series of fires damaging four separators, several buildings and destroying, a car and semi-trailer tank.

February 3, 1982

3:15 am - *self-imposed evacuation* - several families

City of Manistee, adjacent to a residential area and one-half mile west of U.S. 10 and U.S. 31
Aztec Sweetening Facility

Fire at Aztec Plant, Manistee News Advocate, 2/3/82.

Johnson, Judy, victim. Letters to the Editor, *Can't afford what we owe now*, Manistee News Advocate, 2/82.

Odor Log, Air Quality Division, Department of Natural Resources filed by Johnson from 2/22/85 to 12/16/87 documenting 63 complaints against the Aztec Sweetening Facility from slight to extreme and unbearable odors lasting from 30 minutes to four days. Ms. Johnson's final log notes that Aztec's Bob Tipsword told her industry was not required by law to put an alarm system in for residents and odors were not causing health problems; residents were causing their own health problems by thinking about them.

Czap, Laurette. *Township hears odor complaints*, Manistee News Advocate, 10/2/81.

Author interview of victims.

Failure of a check valve caused a fire. Flames shot 30 feet into the air threatening the plant's several storage tanks. Empty 55-gallon drums exploded. Pressure in the line caused spilling of raw hydrogen sulfide gas over much of the area east of the plant. As one resident stated in her letter to the editor, "We keep our windows shut a good share of the time because of the smell both day and night.

April 10, 1985

Early morning *evacuation* - undisclosed number of families

Filer Township, resort/residential sub-division

Directional well drilling operation under Lake Michigan

Federated Natural Resources

'All Clear' Expected At Evacuation Area, Manistee News Advocate, 4/11/85.

A hydrogen sulfide fluid gas leak necessitated evacuation and a road barricade of more than 24 hours. Families could not return home until noon the next day.

June 10, 1985

6:15 AM - *evacuation* of more than 100 people

Filer Township, resort/residential sub-division

Directional well drilling operation under Lake Michigan

Federated Natural Resources

Conners, Dean, *Gas Leak Prompts Evacuation*, Manistee News Advocate, 6/10/85.

Conners, Dean, *Residents Returning Home*, Manistee News Advocate, 6/12/85.

Braciszkeski, Kevin, *The plant next door*, Manistee News Advocate, 4/13/89.

Author interview of victims.

A hydrogen sulfide gas leak with concentrations of 20 – 50 ppm Hydrogen Sulfide (H₂S) necessitated evacuation up to three - quarters of a mile from the surface location. The drilling procedure under way for 10 days was in the process of setting pipe in the hole to complete the well

when the leak occurred. The posting of a “road closed” sign was assumed to refer to the ongoing roadwork and did not prevent construction workers from entering the area that had no idea an evacuation was underway. Approximately one and a half-hours later, the contractor was not allowed through the barricade to alert his work crew. Another half hour passed as he drove into the City of Manistee to call and alert them. Families were not allowed to return home until noon the next day and provided motel accommodations. Responders included the State Police, Manistee County Sheriff’s Department, Emergency Services Coordinator, the DNR and State Fire Marshall.

September 4, 1988

Worker overcome by fumes
Filer Township resort-residential subdivision
Sweetening Facility serving a **directionally drilled well under Lake Michigan**
Federated Natural Resources

Braciszkeski, Kevin. *Worker overcome by fumes*, Manistee News Advocate, 9/5/88.

A Federated Natural Resources employee was overcome by fumes and passed out while attempting to cut some steel inside a tower. An industry spokesperson stated “We’re not sure what type of fumes they were and whether or not they were harmful fumes.” Workers extracted the victim. State Police, County Sheriff, West Shore Hospital and Filer Township Rescue and Fire-fighting teams responded.

March 20 and 21, 1989

March 20, 6:30 PM - - *evacuation* of 5 families
March 21, early morning - many *self-imposed evacuations*
Filer Township, resort/residential sub-division

Directional well operation under Lake Michigan

Sweetening Facility, Cherokee Resources

Filer families evacuated in gas leak, Manistee News Advocate, 3/20/89.

Correction, Manistee News Advocate, 3/21/89.

Braciszkeski, Kevin. *Oil and gas: no pain, no gain*, Manistee News Advocate, 4/12/89.

Braciszkeski, Kevin. *The Plant Next Door*, Manistee News Advocate, 4/13/89.

Braciszkeski, Kevin. *Petro interests want to be good corporate neighbors*, Manistee News Advocate, 4/14/98.

Author interview of victims.

A blown valve caused hydrogen sulfide vapor to shoot 50 to 75 feet into the air, threatening explosion and causing another evacuation. Only people downwind at the time of the initial leak were evacuated. One unaware downwind resident, returning home in the evening, found a note from the baby-sitter that she and his children had been evacuated. A phone call to the baby-sitter’s brother alerted him to also evacuate.

Other families, living closer to the well site, but upwind, were neither notified of the emergency nor told to evacuate. Early in the morning, several “upwind families” who inadvertently sheltered-in-place woke with headaches, nausea and a smell “so strong it brought tears.” They evacuated themselves at that time. “The thing that really upset me about the leak is the way it was handled. I can’t even call it an evacuation because they only evacuated families that were downwind” stated one resident who woke ill the next morning. The self-evacuated “upwind resident” recalled that he was home with his two children during the evacuation but didn’t find out about it until they all

awoke sick the next morning. He observed a State Police car parked near his home about 9:00 pm the night before, “but no one bothered to tell me what happened....A lot of people out here didn’t know what was going on, and it’s our right to know.” Another evacuee stated, “Not all people were evacuated, just those downwind. How can they predict which way the wind will blow one hour from now?...What bothers most people is it shouldn’t be here in the first place. Air inversions near Lake Michigan keep the air close to the ground and...take a long time to dissipate.” Recalling an evacuation in 1985 he stated, “We were never supposed to smell it.” Those who were evacuated spent the night in a motel. The Emergency Management Coordinator stated “They were very fortunate nothing went too far wrong, and no one was hurt.” According to the Manistee News Advocate, company spokesman stated the company was not aware of the release until two hours after it started.

May 13 and May 14, 1994

May 13 - 11:30 PM - *undisclosed number of self-imposed evacuations*

May 14 - 10 AM - *Day Care Center evacuation, self-imposed*

Emergency hospitalizations: at least 11

Death of 10 cattle, minimum

Victory Township, rural area

Manistee Limited Liability Compressor Station - “Victory 32”

Stalmack, John, Basin Pipeline, *Manistee Gas Limited Liability Company, Basin Pipeline LLC Incident Report* 5/13/94.

Memorial Medical Center, (Mason County), Medical Records.

Staffore, Chuck and Higginson, Cheryl, *Gas leak forces some residents from their homes*, Ludington Daily News, 5/13/94.

Author interview of victims and Supervisor of Victory Township.

May 13, 1994 - A blown gasket caused a noise described as “a Lear jet taking off”, waking families who lived within 500 feet of the Compressor Station. The hydrogen sulfide emissions caused area residents to wake with headaches, and an inability to inhale without pain. They were choking, gagging and dizzy. Some vomited. Neighbors phoned neighbors. Some were already awake, others were roused. In order to reach their vehicles many covered their noses with wet towels. They feared explosion when starting their engines.

Dow was called. They no longer owned the facility. 911, the Sheriff, police, and fire departments were called. Each agency had no idea what to do other than tell the people to leave. One hour later, John Stalmack, operations engineer, was located. According to his written report, Stalmack told a citizen that “if he felt there was a threat he should take the necessary steps to protect himself”, and that he, Stalmack, could not recommend evacuation without appraising the situation. The citizen commented he wasn’t given any advice and had no idea what to do other than tell people to leave. He gathered his family and left. Families continued self-evacuating within a half-mile radius. One woman, with heart and respiratory problems was taken by her husband and son to the hospital where she received emergency treatment. (Industry has since provided her with, among other benefits, a permanent in-home respirator).

One hour after the onset of hydrogen sulfide emissions, a volunteer firefighter began blocking traffic, risking his life in attempt to rouse and evacuate remaining people.

Two hours after self-imposed evacuations began Mr. Stalmack arrived. As noted in the Incident Report he parked 300 feet away to prevent triggering an explosion, and proceeded to secure the emission.

At least one woman, two and three-quarters miles southwest of the Compressor Station was driving across the Jebavy Road Bridge. She sought emergency hospital treatment as a result of inhaling hydrogen sulfide from an H₂S cloud that had followed the Lincoln River.

Students at West Shore Community College parking lot, two miles northeast of the Compressor Station left campus feeling dizzy and nauseated.

May 14, 1994 - Six hours after the emissions were secured, one mile due south of the Compressor Station, all four members of the Nickelson family woke with headaches and nausea. The asthmatic son was having difficulty breathing. They left for school and work unaware of the cause of their symptoms.

At 10 AM, eight hours after the emissions were secured, four children, ages 13 months to 4 years entered the basement of the Nickelson Day Care Center. Three-year-old Jacob collapsed unconscious. Two-year-old JoAnne, usually active and vibrant, lay down on the floor in a state of lethargy. Four year old Joe, an asthmatic, had immediate difficulty breathing, severe abdominal pain, and vomited. Sleep or unconsciousness overtook 13-month-old Claire. Industry's "Incident Report" notes that one or more of the "kids...(were) revived by (a) fireman." All were then rushed to the Ludington Memorial Hospital where they were diagnosed as suffering from hydrogen sulfide exposure.

That afternoon, a farmer living three-quarters of a mile northwest of the Compressor Station went to check on his cattle who had wandered down to pasture along the Lincoln River valley. Ten of them were dead. The veterinarian ruled the cause of death as "respiratory failure." (Appendix C)

February 13, 1995

Evening *evacuation* of one family
Victory Township
OmiMex Pipeline
Interview of victims.

A pipeline rupture causing a release of hydrogen sulfide and brine contamination necessitated overnight evacuation. Meters in the house monitored hydrogen sulfide concentrations for a week. The entire family suffered headaches as well as discomfort of the eyes and nose. Clean up of contaminated ground water and soil took six months. Industry indicated the vegetation in the yard would come back within five years. The household water continues to be monitored.

April, 1995

Evacuation of 50 families
Victory Township
OmiMex Pipeline
Interview of victims

Another segment of the above pipeline ruptured causing brine contamination and the release of hydrogen sulfide necessitating evacuation.

January 5, 1996

2:37 AM

Victory Township

Miller Brothers Well

Boals, Patti, *Stuck valve causes gas leak today*, Ludington Daily News, 1/5/96.

Author interview of Victory Township Supervisor.

A stuck valve caused sufficient alarm that Michigan Consolidated Gas Company has on record 18 emergency calls complaining of hydrogen sulfide odor, headaches and difficult breathing. Residents asked if they should evacuate their families, and which industry was responsible for the leak. The leak was corrected mid-morning when it was determined who owned the well and how an operator could be reached.

June 25 to July 9, 1996

Self evacuations

Victory Township rural area

Basin Pipeline Limited Liability Company

Keast, Rob, *Crew continues work to contain suspected gas leak in Victory Twp.*, Manistee News Advocate, 6/30/96.

Higginson, Cheryl, *Repairs nearly done on sour gas rupture*, Ludington Daily News, 6/31/96.

O'Brien Sakura, *Review of sour gas leak under way in Mason Co.*, Manistee News Advocate, 8/17/96.

Author and companion interview with Basin Pipeline employee who was working on the pipeline repair
Author and companion interview of victims.

A ruptured sour gas gathering line created odors, nausea and headaches for a week before the hydrogen sulfide leak was located, and for another week during replacement of the damaged line. Residents complained of burning eyes and lived with wet towels over their noses, some vacating their homes for the duration. The landowner reported dead vegetation and a dead faun at the site of the leak but the animal was removed after industry inspected the site.

A leaking valve at the Compressor Station resulted in a continuous flow of hydrogen sulfide gas through the 8" pipe causing an explosion risk for welders, thus delaying the pipeline replacement.

August 11, 1996 to early September

6:30 PM - *self-evacuations*

Victory Township rural area

Basin Pipeline Limited Liability Company

Boals, Patti, *New sour gas leak repairs under way*, Ludington Daily News, 8/12/96

O'Brien, Sakura, *Review of sour gas leak under way in Mason Co.*, Manistee News Advocate, 8/17/96

Yoe, John and Pat, victims. *Message to Filer Township – Letter to the Editor*, Manistee News Advocate, 8/96.

Author interview of victims.

Another section of the gathering line ruptured. Residents called, complaining of strong hydrogen sulfide odors. No one was told to evacuate, but some left their homes once more during the ensuing days of another pipeline replacement. According to industry representative interviewed, the life expectancy of a maintained pipeline should exceed 15 to 20 years. Basin Pipeline LLC official guessed the line was over 10 years old, and then extended that guess upwards of 15 years but that BLLC did not construct or install the pipes. As Mike Kidd, Michigan Public Services Commission stated, pipeline “inspections are carried out according to the severity of potential need.” Inspections are “...based on inquiries and complaints. No inspections are required under Act 615.” (Appendix G)

August 27 and 28, 1996

August 27, afternoon - undisclosed number of *self-evacuations*

Emergency hospital treatment of 12

August 28 - self-actuation of emergency treatment for 1

Manistee, residential/commercial district

Petrostar well plugging procedure

Geological Survey Division-Department of Environmental Quality, *Incident Report- Sour gas Release Incident of August 27, 1996 from Petrostar's St. Filer 1-1 (PN 39065) Gas Well in Parkdale, Manistee County*

Department of Environmental Quality, Geological Survey Division, *Report of Complaint and Industry field notes, 8/27/96 – 9/3/96.*

Kenny, Kathryn, victim. Letter recounting experience, Appendix H

Keast, Robert & O'Brien, Sakura. *Gas well leak strikes down eight people*, Manistee News Advocate, 8/28/96. (Corrected to “eleven people”)

Gas leak sickens 11 in Manistee, Ludington Daily News, 8/28/96.

UPI, *Gas well fumes sicken 8 people*, Traverse City Record Eagle, 8/28/96.

Keast, Rob. *Well operator denies blame for gas incident*, Manistee News Advocate, 8/29/96.

Keast, Rob. *Petrostar to pay bills*, Manistee News Advocate, 8/31/96.

Schneider, Keith, *Silent Invasion*, Northern Express (10/1-7/97).

Memorandum written by victim, Kathryn Kenny, 10/25/97

Cools, Judy, victim, *Letter to the Editor*, Manistee News Advocate, 4/11/97.

O'Brien, Sakura. *Manistee Twp. Residents want gas issue aired – some still feel effects of recent release*, Manistee News Advocate, 9/13/96.

Wertz, Rich. *Victims of gas release wary of Manistee well plan*, Traverse City Record Eagle, 9/13/96.

Letter to the Editor – with 11 victim signatures, *Planned Release*, Manistee News Advocate, 10/18/96.

Wertz, Rich. *Gas well safety becomes state House race issue*, Traverse City Record Eagle, 10/21/96.

O'Brien, Sakura. *No guarantee against repeat of gas release – Aug. 27 problems blamed on too much volume*, Manistee News Advocate, 10/25/96.

Potential For Gas Release Discussed, Manistee Observer/Shoppers' Guide, 11/3/96.

Wertz, Rich. *Task force will drill into gas and oil*, Traverse City Record Eagle, 11/20/96.

Breathing Uneasy, Traverse Magazine, (p 5), 11/96.

O'Brien Sakura. *Memories, effects of sour gas leak linger in Parkdale*, Manistee News Advocate, 12/14/96.

Wertz, Rich. *Gas wells raise public safety concerns-Poison gas victim still suffers symptoms*, Traverse City Record Eagle, 4/8/97.

Braciszski, Kevin. *Residents relieved sour gas well being removed*, Ludington Daily News, 10/1/97.

Miller, Paul, victim. Letter to the Editor, *Stop poison gas before it kills*, Manistee News Advocate, 10/1/97.

Preib, Martin. *Parkdale Ave. businesses holding their breath*, Manistee News Advocate, 10/1/97.

Kenny, Kathryn, victim. Letter to the Editor, *Still asking the question: Is it safe?*, Manistee News Advocate, 10/6/97.

Parkdale business owner claims lingering health problems, Manistee News Advocate, 10/24/97.

Schneider, Keith. *Industry and State Indifferent to Poisoning of Residents*, Great Lakes Bulletin, (p12-13), Winter 1997

Author interview of victims and Supervisor of Wells, Hal Fitch.

August 27, 1996 - Intentional releases of hydrogen sulfide (approximately 900 ppm), during a standard plugging procedure necessitated self-evacuation of three businesses within 500 feet of the surface location and the emergency rescue and treatment of 11 people.

Recognizing an odor but unaware of the cause of their headaches or the odor source, employees continued to work. As the hours passed and the odor became more intense and symptoms increased to nausea and dizziness, the owner of one of the businesses called Michigan Consolidated Gas Company whose field representative arrived within minutes. Monitoring the site, the Mich. Con representative told them to evacuate immediately. He left. Two people affected had fallen unconscious. 911 was called. Eleven people were evacuated from the buildings but remained in the ambulances in the contaminated area since the rescue units were unaware it was a hydrogen sulfide emission. Taken to West Shore Hospital, victims received several hours of pure oxygen. One nurse also needed oxygen as a result of inhaling hydrogen sulfide residue from one of the victim's clothing.

Symptoms ranged from headaches to total blackout. Headaches were described as worse than any migraine. Other effects included an excruciating burning sensation of the nasal passage; a feeling of "prickles" all over the surface of the skin; rapid swelling of arms and legs, and intense chest pains upon inhalation, rendering breathing almost impossible. Burning eyes, nausea, light-headedness and dizziness prevented people from responding efficiently and normally. Pronounced effects lingered into the next day.

Industry spokesman was quoted in the Ludington Daily News as saying, "The wind was just blowing the wrong way."

August 28, 1996 - Evacuated the previous day, one businessman returned to his place of employment and was overcome by the residue of hydrogen sulfide fumes that remained in the building. He called 911 and again received oxygen. (Business Abandoned – photo, Appendix H).

Follow-up -- In December of 1996 victims uniformly stated that the memory of the event continued to bring tears and nightmares. It was agreed that no agency would take charge of addressing multiple ongoing ailments. Prescription costs for aggravated respiratory conditions and flu-like symptoms continued. Stamina notably decreased. One victim expressed alarm at having difficulty spelling – a once exceptional skill. Another finds he must read directions repeatedly in order to accomplish tasks that were once rote.

Eleven months after the intentional release of hydrogen sulfide, victims continued to suffer. Vocal cord damage remains; several continue to take medications for asthma, chronic emphysema, insomnia, and migraines. Nightmares have lessened, but still occur. Excessive irritability and task memory are still recorded as problems. All symptoms addressed were not suffered, or suffered only mildly before the poison gas release. A medical doctor informed one individual that he likely lost five to ten years of life. One child whose parents were evacuated is currently receiving psychiatric counseling to help overcome the fear that her parents will not come home from work.

One and a half years later at least two victims continue to suffer severe respiratory problems. For one, neither the Mayo Clinic nor the National Jewish Hospital in Denver, specializing in pulmonary and respiratory functions has been able to abate the disorders due to the extent of the soft tissue damage. Vocal cord damage also remains. Insomnia and irritability and long-term task functioning, all documented symptoms of H₂S poisoning also linger. Energy levels are low; business owners are suffering losses as a result of impaired energy, mental and physical stamina. As summarized in the Northern Express article *Silent Invasion*, "The state routinely ignores dangerous hydrogen sulfide gas accidents which have resulted in evacuation, human injury and cattle deaths across Northern Michigan."

September 11, 1996

Self evacuation of one person

Death of 60 to 91 cattle

Victory Township rural area (same as June to August, 1996 above)

Basin Pipeline Limited Liability Company

Keast, Rob, *New pipeline installed*, Manistee News Advocate, 9/20/96.

Autopsy Report, Michigan State University.

Author interview with victims and farmers.

Basin Pipeline determined to replace a significant length of the pipeline that had ruptured twice in three weeks (*Survey* notation June 25 - August 12, 1996). During the planned pipeline replacement procedure, lasting over several days, hydrogen sulfide was released, accumulating in a low-lying valley of the Lincoln River. One farmer caught unaware in an area of his pasture heavy with gaseous hydrogen sulfide described an immediate and sudden inability to breathe and had great difficulty returning home. A 1600-1800 pound bull and 20 three-week-old calves grazing in the river valley began dropping immediately. Over the next three days 30 more died. Of 91 animals buried, all but 20 died in the first couple weeks. Animals on high ground were unaffected. Two calves were sent to Michigan State University. The autopsy results indicated 50 and 75% lung damage had caused respiratory failure. With the onset of cold weather in the fall, 20 more of the calves that had been in the valley during the gas accumulation died. In order to compensate for their loss, the Egelers were obliged to sell 40 acres of land they would not have otherwise sold. In 1998, industry offered a one-time, "sign-off" settlement of \$3000.00 for the bull (for which Farmer Egeler had paid \$1000.00). The Egelers refused this offer. Another farmer was given a one-time payment for crop damage. He stated there have been three leaks over the 15 years the pipeline has been in operation across his property. The corn in the areas of pipeline explosions and replacements continues to be sparse and stalks that do grow never reach maturity. (2000 interview)

January 27, 1997

Noon - *self-evacuations of four (ages 4 to 59)*

500 feet from a Filer Township residential neighborhood

Aztec well drilling operation contested by Filer Charter Township and many residents.

Several citizen and the Township of Filer request of the DEQ-GSD for a public hearing on the proposed well and subsequent State refusal, claiming, "the township does not have standing as a person under Act 615". Individual requests were essentially discounted. 4/11/96 – 12/26/96.

Communications with the US Dept. of Agriculture regarding lack of Soil Erosion Permit and permit issuance after the fact. 12/26/96 – 3/3/97.

Communications regarding excessive noise at the drilling site. (Mufflers installed after 30 days after round the clock noise). 1/3/97 – 1-24/97.

Filer Charter Township v Aztec Producing Company in the Circuit Court for the County of Manistee before the Honorable James M. Batzer, April 28, 1997, *Transcript*.

Keast Rob, *Gas released during normal procedures – Odor forces some to leave homes* Manistee News Advocate 1/29/97.

Mikolajczak, Carl and Delphine, victims. *H2S experience*, Manistee News Advocate, 1/30/97

Braciszkeski, Kevin, *Concerns surface with sour gas release*, Ludington Daily News, 2/1/97.

Olson, Noonan, Ursu & Ringsmuth, PC 1/28/97 FOIA Request of DEQ-GSD for release report information and 2/4/97 DEQ denial under confidentiality .

Keast, Rob. *Filer Twp files suit against two gas companies*, Manistee News Advocate, 2/4/97.

Mikolajczak, Carl, victim. Letter to the Editor, *Consultant made a bad decision*, Manistee News Advocate, 2/5/97.
Braciszewski, Kevin. *Company plugs disputed Filer Twp. sour gas wells*, Ludington Daily News, 2/11/97.
Schindler, Dana. Letter to the Editor, *Contrary opinion*, Manistee News Advocate, 2/27/97.
Communications regarding burying drilling muds on site at surface water level. 3/10/97–3/27/97.
Mikolajczak, Carl, victim. *Filer 1-23 will remain a problem until...*, Manistee News Advocate 3/10/97.
Mikolajczak, Del Rose, victim. Letter recounting experience, Appendix H
Author interview of victims, Supervisor of Wells, Hal Fitch and DEQ field men.

During a plugging operation of an unsuccessful directional hole, 1200 - 1700 ppm hydrogen sulfide, as monitored by industry, was released, necessitating self-evacuations up to three quarters of a mile from the surface location as a result of instantaneous nausea, headaches and skin burn. Dogs vomited, (one repeatedly), up to one-half mile away. Odors remained strong in garages and basements up to a mile away into the early evening when residents returned home from work, oblivious to the noon release. The symptoms of those who evacuated continued well into the night.

March 4, 1997

5:30 PM - Oaks Correctional Facility alerted authorities to a fire
No evacuations, but concern on behalf of the maximum-security prison inmates
Manistee Township rural area
Murray State Separation Production Facility, Basin Pipeline Limited Liability
*Braciszewski Kevin, Officials call fire at gas separation facility 'no big deal',
Ludington Daily News, 3/4/97.
Fire flares at gas plant, Traverse City Record Eagle, 3/9/97.
Minutes of the Community Liaison Meeting – Oaks Correctional Facility, 3/95 and 12/98.*

Emergency Coordinator for Basin Pipeline Limited Liability stated that a mechanical failure “burped” some fluid that dropped outside the flare stack and caught on fire as it dropped to the ground. The gas company extinguished the fire. Assistant Fire Chief of Manistee Township was quoted in the Traverse City Record Eagle as saying a supply pipe leading to the flare was “rusty, rotted or chewed by an animal allowing gas to seep out in small amounts...causing an air to gas mixture that flared the gas.” The incident was not reported to the DEQ. The Basin Pipeline official was unaware of the State Regulation requiring the DEQ be notified within eight hours of a fire at a gas facility according to DEQ geologist Derek Stadler.

March 27, 1997

Noon to 4:30 PM - *self-evacuations*
Manistee Township, commercial/residential area
Aztec complex, (**servicing directionally drilled Lake Michigan well**)
*Cools, Judy, victim. Let's discuss 'honest and accurate', Letter to Editor, Manistee Advocate 4/11/97.
Author interview of victims.*

An undisclosed problem caused strong odors of hydrogen sulfide wafting through the corridors of State highway 110 and U.S. 31 one-half mile east of the Aztec complex. Mid afternoon, three-quarters of a mile from the Aztec location, (in the same residential/commercial area which

experienced the August 27, 1996 self-evacuations and hospitalizations), hydrogen sulfide emissions collected in a business establishment and caused severe headaches, breathing problems and nausea.

After attempting to call the DEQ, whose number had changed, and the State Police, who indicated response was out of their jurisdiction, 911 was called. The Manistee Township Fire Department arrived immediately. Upon monitoring the ambient air, firemen prevented patrons from entering the business or the area. The owners closed and evacuated their business once again.

February 19, 1998

Self-evacuation of one

City of Manistee, commercial/residential area

Aztec complex (**servicing directionally drilled Lake Michigan well**)

Manistee Industrial Park, one-half mile west of State Highway 110 & US 31

T. Marquand, F. LaGuire, B. Sell, M. Marquand, victims. *Resident question safety of gas projects –Letter to the Editor, Manistee News Advocate, 4/6/98.*

Author interview of victims.

An asthmatic employee of Glass Specialties (one-third mile southeast of Aztec complex) was carrying a large pane of glass to the truck and immediately rendered unable to breathe upon stepping outside. Faint and dizzy he barely made it back inside. *Although the owner of Glass Specialties had been complaining about the abnormally nauseous odor for more than a week*, no action had been taken by industry. This time 911 was called. Arriving promptly, the Manistee Fire Department monitored the area with an industry-provided monitor. The monitor registered no detection of H₂S although all admitted the odor inside and outside was still strong. The victim and responder observed that the monitor had not been calibrated for 18 months even though instructions printed clearly on the instrument stated calibration was required every 30 days. Employee left the premises.

August 20, 1998

10:45 PM - *self-imposed evacuation* of one family

Filer Township, resort/residential sub-division

Michigan Production Gas Processing Plant - Filer 1-33

Directional well operation under Lake Michigan

Hoffman, Vicki, victim. Appendix H, *Survey of Accidental and Intentional Releases...*

Perry, James. *Odors draw resident's concern, Manistee News Advocate, 8/29/98.*

Author interview of victims.

A representative from Michigan Production stated a hatch was left open on one of the storage tanks due to liquids building up pressure in one of the lines creating a backpressure on the tank. After “stronger gas odors than the *unbearable smell endured all week*”, and an accumulation of strong odor in basements, one family with visiting in-laws evacuated. The in-laws, both with congestive heart failure, left the area and stated it is unlikely they will return as the problem with releases is continual.

October 11, 1998

7:00 to 11:00 PM - *evacuation of one family
emergency hospitalization of one*

Filer Township, resort/residential sub-division

Michigan Production Lakeland Complex - 3 wells and facility

Directional well drilling operation under Lake Michigan

Perry, James. *Gas Company denies release*, Manistee News Advocate, 10/12/98.

Perry, James. *Possible gas release sends woman to hospital*, Manistee News Advocate, 10/13/98.

Perry, James. *DEQ shuts down 4 wells*, Manistee News Advocate, 10/30/98.

Author report to 911 and interview with victims.

After the third release in a week, with a “stench worse than usual” multiple residents called 911. A roadblock was positioned at 10:25 PM. At 11:00 PM, the author, having just returned home from a northerly direction to air that was the characteristic “rotten egg” called 911 immediately. I was told the release from the Lakeland Facility (about 2-1/2 miles south of my home) was a “little bit of a problem” but that no “high” concentrations of H₂S were monitored and that the “fog was probably holding the gas there.” The roadblock was cancelled. At 8:00 AM the following morning one woman woke vomiting and nauseated, the gas trapped in her home. She required emergency hospital care. Although the DEQ subsequently required installation of high pressure shut downs on production separators, the oil storage tank and on the drip tank vessel, Michigan Production was quoted in the News Advocate as saying that *because no alarm went off at the facility or at the three wells in the area, therefore no release occurred.*

October 28, 1998

4:40 PM to 12:00 midnight - undisclosed number of *evacuations, some self-imposed*

Emergency hospitalization of 11 including two emergency responders

Manistee Township rural area adjacent to the Oaks Correctional Facility - maximum security

Michigan Production Company - Murray-State 1-8 (PN37657) Production Facility

Perry, James. *Oil release sends seven to hospital for treatment*, Manistee News Advocate, 10/29/98.

Braciszkeski, Kevin. *Poison gas release sends 11 to Manistee hospital*, Ludington Daily News, 10/29/98.

Perry, James. *DEQ checks out gas leak*, Manistee News Advocate, 2/2/98.

AP, *11 treated; foul wells shut down*, Grand Rapids Press, 10/30/98.

Geological Survey Division, Department of Environmental Quality *Incident Report* 10/28/98.

Michigan Production Company, LLC, Field Notes and Report, 10/28/98.

Paterson, Roger D, M.D., emergency medical doctor at West Shore Hospital during the release. *A Brief Unbiased Report – Logical Observations Regarding an Offensive Incident –Evening, October 28, 1998*, 10/28/98.

Braciszkeski, Kevin. *Petroleum aerosol caused illnesses*, Ludington Daily News, 11/3/98.

Perry, James. *DEQ shuts down 4 wells*, Manistee News Advocate, 10/30/98.

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Perry, James. *Investigation continues on well release*, Manistee News Advocate, 11/7/98.

O'Brien, Bill. *State changes gas-leak procedure*, Traverse City Record Eagle, 11/8/98.

Editorial. *Manistee incident proof of sour gas concerns*, Muskegon Chronicle, 11/12/98.

Braciszkeski, Kevin. *Manistee well that leaked sour gas reopened Friday*, Ludington Daily News, 11/14/98.
Perry, James. *DEQ okays wells, facility start-up*, Manistee News Advocate, 11/17/98.
Perry, James. *Oil company, DEQ address recent spill*, Manistee News Advocate, 11/19/98.
Braciszkeski, Kevin. *State officials decide well leak did cause illness*, Ludington Daily News, 11/19/98.
Braciszkeski, Kevin. *Officials still puzzled by illness after gas leak*, Ludington Daily News, 11/13/98.
Department of Community Health, *Manistee Gas Well Final Report*, 12/7/98.
Author interview of victims.

According to the DEQ-GSD *Incident Report*, at 3:00 PM, “a faulty O-ring in the automatic safety shut down valve pilot system caused an automatic shut down of the well” which was repaired and put back on line by 4:30. While shut-in, “the well had loaded up with fluids and when production resumed, a large amount of liquids caused the dump valve to stick open.” The turbulence from the gas in an almost full oil tank caused several gallons of sour crude oil to spill from the thief hatch at the top of the tank” which subsequently allowed gas to the atmosphere. “The high volume of liquids caused the high pressure separator to begin to rapidly dump liquids to the stock tanks [continuing] for approximately one hour.... At approximately 11:00 PM, Well Tech hauled off 100 barrels of liquid for disposal.”

The DEQ report states the odors and hospitalizations between the hours of 4:30 PM and midnight were caused by “exposure to petroleum condensate....a mixture of hydrocarbons ranging from methane to liquids in the gasoline and diesel oil range; brine; hydrogen sulfide; and other trace compounds.” The DEQ also concluded that H₂S was monitored at the well and storage-tank area and “*these monitors did not maintain a record of readings over time.* All that is known about the exposure[s] is that the monitor alarm...did not go off....” In an interview with the Ludington Daily News, Rick Henderson of the DEQ Cadillac office said hydrogen sulfide levels “measured at the well facility never reached above 10 PPM.” Emergency vehicles were dispatched to several area residents between 9:00 and 10:00 PM and again between 11:00 PM and midnight.

Dr. Roger Patterson, emergency physician on duty, reported symptoms of patients. He reported his findings in *A Brief Unbiased Report* and stated that “paramedics answering the 911 calls told him the “area where the people lived was ‘really bad’ [even leaving] the pungent odor of hydrocarbon residue...inside the ambulance later.” Dr. Patterson “found it impossible to mobilize the people who had the authority to coordinate efforts of a possible unfolding disaster.” He treated victims who “complained universally of severe headaches and nausea. Some were retching and vomiting, while others had additional symptoms of numbness, sore throat, chest pain, incoordination.”

As one victim who lives about 1300 feet from the leak recounted: “At first it was a bad smell and then I was light-headed and my chest started hurting real bad, and my legs didn’t feel like they were there.” He collapsed in his driveway. Never before with heart problems, he was given heart medication with chest pains continuing well into the next day. Another victim about 2400 feet from the leak stated, “My tongue and throat swelled up and it was hard to breathe. I was retching so hard but nothing was coming up. It felt like my feet were going to come up.” Still another, approximately 1600 feet from the leak could hardly breathe, was nauseated and felt completely numb from the neck down, nearly passing out. The emergency responder who aided him also became ill. The victims were advised not to return home and many spent the night in motels at their own expense. The victims are also covering their own hospital bills as industry continues to refuse to admit responsibility.

The Oaks maximum-security correctional facility, located approximately 530 feet from the wellhead noticed a “strong odor but took no action.” At a Community Liaison Committee Meeting in February 1995, the minutes state, “Although we have been assured by the gas company that the odor is not dangerous, staff and prisoners are sometimes hard to convince.”

By the end of November, the author’s interview with six of the victims determined that lingering symptoms include numbness in the arms and legs, extraordinary fatigue, inability to concentrate, remember telephone numbers or simple task functions. One victim, a car repairman, noted that repair tasks that had always been rote were now “forgotten.” He had to read the manual, which was also difficult because he wasn’t able to concentrate or remember what he had read.

Late January of 1999, two of the victims who had been placed on 24-hour oxygen for their emphysema prior to this most recent release from the Murray State complex, but since the releases began in 1991, relocated down-state upon the advice of their doctor. They each suffered heart attacks in February, one whose prognosis gives him less than a year to live. They had retired to Manistee Township in 1994, each smokers, one with mild emphysema, but otherwise healthy. The above-mentioned releases cannot be ruled out as a factor, which exacerbated their respiratory problems causing their recent dependence on oxygen. Symptoms that persist for other victims include headaches, never before a part of their lives; chemically induced asthma and bronchitis, fatigue and forgetfulness.

Interviews with area residents confirm that undocumented pipeline, well and facility releases from the Murray-State complex have plagued the area since production was initiated in 1994. Residents complained of odors occurring at least once a week during 1997 and 1998. Industry explanations have included “replacement of valves” to the “system was just purging itself, burping.” Symptoms over the years as a result of “rotten egg odor” include mild to pounding headaches, sore throats and “closing of the throat”, numbness around the mouth, lips and nausea.

By sheltering in place, closing doors and windows, residents have found they often wake with nausea and migraines – the home filled with the vile odor – only to find that *outside the air is clear* – and another day ruined, feeling lousy.

Finally determining to maintain a log, the following summary of H₂S releases span a period from July 29 to September 2, 1998.

MarkWest Odor Concern Reports 7/29, 7/31, 8/8 (11:25 am), 8/8 (8:15pm), 8/30
Victim interviews and scanner reports
Rentsch, Barbara and Erwin, Odor Log

July 29, 1998 – 1:30 AM -- “strong odors, worse than usual” were experienced by several families along Olson and Pine Creek Roads. Symptoms suffered included instantaneous headaches, a strange taste around the mouth, numbness of lips, nausea and dry retching. *Mark West’s Odor Concern Report* noted the Correctional Facility was also “picking up intermittent odors.” The facility and pipeline were checked. Victims were told ‘nothing was found.’

July 31, 1998 -- 6:50 AM – Complaints registered with authorities of

a “strong odor.” When ‘on-call’ field representative[s] arrived from Onekama and/or Scottville (approximately 25 miles north and 25 miles south of the release), no odor was detected.

August 8, 1998 --10:30 to 11:15 AM – Several families called in “strong odors.” 911 informed residents that *MarkWest* was having a problem controlling “something”. The *MarkWest Odor Concern Report* notes that Michigan Production Company responded they were “going to reduce production or shut the well in entirely,” although the cause of the problem was not explained.

8:15 PM – Authorities received several alerts of “strong odors.” *MarkWest’s Odor Concern Report* noted that Michigan Production Co. was “going to either reduce production or shut the well in entirely. Victims were told they would be notified when the well would be put on line again, that the system was “burping.”

August 30, 1998 -- between 10:05 and 10:48 PM –Several complaints alerted authorities to a “strong gas odor.” The *MarkWest Basin Pipeline Limited Liability Odor Concern Report* notes “Michigan Production Co personnel arrived on location and shut-in Murray State #1-18 well and facility.

September 2, 1998 – Authorities received several notifications of “strong gas odors” causing instantaneous headaches, nausea, difficulty swallowing and tingling around the mouth. Two pumpers, the Little River Band Conservation officer, and *MarkWest* lined Olson Road. According to the Rentsch’s, a *MarkWest* representative told them that “something is wrong at the facility;” that “gas was being released straight into the air”, but to “take a couple aspirin go lay down.” (sic)¹

November 26, 1998 – Thanksgiving

8:15 to 10:10 PM – several families *self- imposed evacuations*
One emergency hospitalization – diagnosis: “reactive airway disease”

Manistee Township rural area and Oaks Correctional Facility

Michigan Production Co. Separating Production Facility (Murray State complex)

Braciszkeski, Kevin. *Sour gas smells reported near Manistee*, Ludington Daily News, 11/27/98.

Perry, James. *DEQ checks out gas leak*, Manistee News Advocate, 12/2/98.

Author interview of victims.

Although the facility was subsequently temporarily shut down, the Operations Manager found no problems. Families gathering during the holiday complained of a “rotten-egg/propane odor” Emergency responders searched for the source and were getting readings of 0 to 12 PPM H₂S with responders indicating the monitors had not been calibrated recently. Families evacuating for the night were told by *MarkWest* representatives that the “company will not pay for it.” Lingering

symptoms well into October, 1999, include chronic headaches and tiredness. One child who had asthma has a worsened condition. Another, diagnosed with chemically induced chronic asthma and bronchitis had never before suffered respiratory problems. A two-year old child is having a difficult time remembering words, completing sentences. His speech development has regressed.

November 29, 1998

Complaints of strong odor

Manistee Township rural area and Oaks Correctional Facility

Michigan Production Company Separating Production Facility (Murray State complex)

Perry, James. *DEQ checks out gas leak*, Manistee News Advocate, 12/2/98.

Author interview of victims

Cause of odor at facility unknown. DEQ's Rick Henderson indicated inefficient burning at the flare as probable cause. Victims recognize moving is their only solution but realize no one will purchase their homes under these conditions.

January 11, 1999

*Evacuation of one family and **emergency hospital treatment of one***

Manistee Township rural area and Oaks Correctional Facility

Murray State complex – facility and well

Scanner report

Official complaints registered of “strong gas odors” created chest pains. Individual was treated and released.

January 23, 1999

3:00 PM – *evacuation and **emergency hospital treatment of 1***

Manistee Township rural area – 1 mile from

Shell Separating Processing Plant (“Fisk Road” plant)

Braciszkeski, Kevin. *Gas escapes near Manistee*, Ludington Daily News, 1/25/99.

Perry, James. *Shell Oil, fire department, and DEQ investigating leak*,

Manistee News Advocate, 1/28/99.

Correction, Manistee News Advocate, 1/29/99.

Author interview of victim.

While working on a sump pump inside the plant, hydrogen sulfide gas escaped when the pump was opened during normal operations. Authorities received several complaints of the ‘rotten egg odor’ one mile from the processing plant. Rescue responders noted a reading of 2-ppm hydrogen sulfide. The victim’s eyes watered, she was coughing, gasping for air, vomited and had a sore throat. She was given oxygen and transported to the hospital emergency and diagnosed with “exposure to toxic fumes.” Shell spokesmen Rich Hansen said the gas did not register on company monitors even though workers could also smell the characteristic ‘rotten egg’ odor. Hansen is quoted in the Ludington Daily News as saying, “It’s hard to believe this low level could cause odor about a mile away.” The Manistee News Advocate quoted the emergency personnel as saying, “It was not psycho-somatic...there was not doubt she was exposed to something.

February 4, 1999

11:00 AM – Complaints of “odors stronger than usual” one-half mile from the facility
Manistee Township rural area

Shell Separating Processing Plant (“Fisk Road” plant)

Perry, James. *Second leak in two weeks affects residents*, Manistee News Advocate, 2/5/99

Braciszkeski, Kevin. *Sour gas escapes from Shell plant-second incident in two weeks*,

Ludington Daily News, 2/5/99.

Author interview of victims and DEQ Cadillac District Office.

Victim stated, “It smells here regularly, but never as strong as Wednesday [2/4/99]. It really scared me. I began coughing and my throat burned even though I closed my window.” The Manistee Township Fire Department measured 1 ppm H₂S near the victim’s home while a DEQ representative at the site said the company’s H₂S monitor didn’t register any H₂S although he admitted to the victim that he did smell gas in the area. Symptoms included a burning throat, coughing and nausea. Upon investigation a Shell official noted the cryogenic plant shut down causing one sulfur plant to shut down. A safety switch then shut down a compressor (cause unknown), which created a surge to the incinerator flare used to burn off the excess gasses and caused the release of hydrogen sulfide. DEQ’s Rick Henderson was quoted in the Ludington Daily News as saying, “The gas escaped when the pilot light of an incinerator went out.” DEQ officials noted the safety mechanisms at the plant worked properly as the burner automatically relit within one minute. It was the gas released during that one minute which caused the victim’s ill effects.

May 6, 1999 and May 7, 1999

May 6 – 5:22 PM – *undisclosed number of self-evacuations*

Refusal of medical treatment as residents not able to afford additional hospital bills

May 7 – 7:15 AM – *undisclosed number of self-imposed evacuations*

Manistee Township rural area and Oaks Correctional Facility

Michigan Production Co. -- Murray State complex

Perry, James. *DEQ shuts down gas well*, Manistee News Advocate, 5/8/99.

Braciszkeski, Kevin. *DEQ Sour gas release was minimal*, Ludington Daily News, 5/13/99.

Channel 7&4, Newscast, 6 O'clock News.

Aldrich, Brenda, victim. Letter to all State House Representatives, 8/3/99 (Appendix H)

Author interview of victims.

May 6, 1999 - Thirty-five mile an hour winds blew off a shroud assembly that extinguished a flare. Three sensors failed and therefore, three “fail-safe” check valves failed. But, as Rick Henderson was quoted in the Manistee News Advocate, “The only equipment malfunction was in a sensor designed to instruct the production company that the flare was out.”

Residents complained of an odor that disappeared and a “brownish cloud coming from the flare stack.” 911 reported that victims were having difficulty breathing but were refusing medical treatment. Victims stated to the author that the families simply cannot afford the hospital bills from the continual gas releases. “The doctors can’t do anything. The respiratory damage is permanent.

The brain damage is permanent.”

One man frustrated by sickness from sheltering in place decided to evacuate. Running to his car caused chest pains lasting four hours. Symptoms of others included nausea, pounding headaches, burning eyes, and nasal and sinus pain.

Evacuees drove around – waiting to return home and resume their lives. Returning home about 10:30 PM, they were informed by the DEQ the “situation” was repaired. The facility had been shut-in. One man responded that wasn’t true. He saw the flare on his way home. He was then told it had been relit at 7:00 PM.

Sometime during the night as families slept, thirty-five mile an hour winds once again extinguished the flare with a repeat of failed sensors and check-valves.

May 7, 1999 -- Upon waking at 7:15-AM following the evacuation of the evening before, one man threw-up immediately with symptoms more severe than the night before. He experienced burning eyes and pain behind the eyes, a tremendous debilitating headache, diarrhea, dry cough, slurred speech, unsteady gait and chest pains. Several families once again evacuated.

Channel 7 & 4 reported that the facility was shut down until the flame tower could be replaced.

Lingering symptoms on May 8th included total exhaustion, major pounding headache, conjunctivitis, chest sore from coughing, dry cough, and inability to concentrate.

Long-term ailments since *October 1998* include the continued inability to remember names, phone numbers, social security numbers; mechanical tasks, simple procedures; irritability and fatigue; difficulty concentrating (must read same sentence over and over). One victim, an author, quit writing. He could not remember the names of his characters.

DEQ’s Rick Henderson was quoted in the 5/13/99 Ludington Daily News as saying that “No laws were violated, only a small amount of H₂S was released....it’s **a fairly routine thing. It’s really not a big deal.**”

The following releases are essentially yet un-researched and merely compose a partial listing of ongoing releases from 1999 through 2002

April 2, 1999

2:35-PM – Complaints of “strong odors”
Filer Township resort/residential sub-division
Michigan Production Company – Lakeland wells and separating facility
directionally drilled under Lake Michigan
Scanner reports.

911 dispatched – the road barricaded.

April 12, 1999

11:00 –PM – *evacuation and emergency hospitalization of one* – “Priority 3”
Manistee Township rural area
Shell Production Separating Facility
Scanner report and interview of victim.

Cause unknown. Complaint of strong gas odor and extreme difficulty breathing. Response team set up command stating, “We don’t like what’s going on. The smell is awful strong coming in....One patient going to West Shore [Hospital], priority 3.” (Scale of 1 to 5 – 5 is deceased). 911 notified the company.

June 1, 1999

Day Care Evacuation and Emergency hospitalizations of 4
Victory Township, rural area
OmiMex Energy (formerly Manistee Limited Liability) Compressor Station –
“Victory 32” (see also text release of 5/13 & 14/94).
Braciszkeski, Kevin. *Four taken to hospital; sour gas suspected*, Ludington Daily News, 6/2/99.

Cause being investigated by DEQ. Adults and child from day care center required oxygen at the scene and transport to hospital. Symptoms included dizziness, nausea, tingling arms and legs and headaches lasting into the next day.

September 17, 1999

7:15-AM – Complaints of “strong gas odors” two miles south of
Filer Township resort/residential sub-division
Michigan Production Company – Lakeland wells and separating facility
directionally drilled under Lake Michigan
Author interview of victims.

911 dispatched.

September 17, 1999 (again)

11:55-PM – “Strong gas odor”
Filer Township resort/residential sub-division
Michigan Production Company – Lakeland wells and separating facility
directionally drilled under Lake Michigan
Scanner report and author interview of victims.

911 dispatched – commenting, “A diesel motor inside the gate is smoking. Send back up.”

October 20, 1999

9:00-PM – Complaint of “strong gas odor”
Manistee Township rural area and Oaks Correctional Facility
Michigan Production Company – Murray State complex
Author interview of victim.

Caller was told by 911 that “nothing major is going on.” He went to bed and woke with a headache, nausea, dizziness, burning eyes. “Another day shot” he said, “I feel like a lab rat.”

May 26, 2000

Lakeland complex **servicing directionally drilled Lake Michigan wells**

Filer Township dense residential area. Citizen alert regarding strong odor. 911 dispatched.
Scanner report.

June 7, 2000

Lakeland complex **servicing directionally drilled Lake Michigan wells**

Filer Township dense residential area. *Citizen complaint for three consecutive days.* Report of instant headache. 911 dispatched.

Scanner report and author interview of victims.

September 19, 2000

“Manistee Golf Course” well **directionally drilled under Lake Michigan**

City of Manistee dense residential area. (Well operations commenced 8/7/00). Odor complaint called in by Linke Lumber Company, in a low area of Filer Township, one mile north of processing facility, which serves *only* the golf course well. West Bay Energy Foreman, Chris Wood stated fluids were being loaded into truck and the system was not operating properly.

Charter Township of Filer Emergency Response Report

October 17, 2000

Lakeland complex **servicing directionally drilled Lake Michigan wells**

Filer Township dense residential area. Citizen call to 911 of “strong odor.” Basin Pipeline Limited Liability (BPLL) estimated time of arrival, one-half hour. Hatch at top of tank leaking. Facility shut down.

Scanner report

Author interview with Filer Township Fire Chief and victims.

November 8, 2000

“Manistee Golf Course” well **directionally drilled under Lake Michigan**

City of Manistee dense residential area. *Persons ill* at Packaging Corporation of America (PCA) ½ - 1 mile north of facility (which serves only the golf course well) situated in the low-lying area of Filer Township. *Five employees received emergency oxygen suffering from headache, nausea, dizziness and chest tightness* caused by gas that had entered the building they were in through a west-facing open door. Emergency responders interviewed West Bay and found they were changing out a tower at the facility site. The spent material was loaded into an open dump truck for disposal at the landfill. The truck route took them directly past the storeroom where the persons were made ill.

Charter Township of Filer Emergency Rescue Memorandum, 3/1/01.

Author interview with PCA employees and Township Fire Chief.

January 17, 2001

Filer Township Facility serving **directionally drilled Lake Michigan "Golf Course well"**
Odor complaint from Linke Lumber Company in low-lying area beneath the processing facility. Filer Rescue Unit dispatched. Captain Janowiak measured explosive gas level readings of .1% and .2% outside the gate of the facility. Captain Janowiak asked if they had vented gas to the atmosphere. The facility attendant stated the gas had been released to the flare, but it had not burned.

Charter Township of Filer Emergency Rescue Memorandum. 3/1/01.

Author interview of Filer Township Fire Chief and Mel Kieogema, DEQ, Cadillac Office.

January 19, 2001

Lakeland Complex serving **Lake Michigan directionally drilled wells**

In the densely populated coast sub division of Filer Township, Filer Rescue and West Shore Hospital ambulance responded to an "unbearable strong odor of petroleum." Two residents (four people) experienced illness, one necessitating emergency treatment at West Shore Hospital and officially reported as a casualty of the incident by the Filer Township Emergency Rescue and Fire Department. Basin Pipeline Limited Liability shut down its facility as a result of the malfunctioning pressure relief valve that released a large quantity of gas as well as pushing fluids out the flare stack.

Residents evacuated due to gas odor, Manistee News Advocate, 1/22/01.

Charter Township of Filer Emergency Rescue Memorandum. 3/1/01.

December 31, 2001

West Bay Exploration Filer 1-19 Separating Facility serving **Lake Michigan directionally drilled "Golf Course well"** located 7.5 miles southwest in the City of Manistee

Odors from the separating-sweetening facility located in the blue collar densely populated area of Filer Township, operating since August, 2000 are beginning to cause unrest in the community. The "New Year's eve" odor was originally noticed in the low pocket of the residential area located beneath the facility approximately 10:30 PM, December 30th. Filer Township Fire Chief contacted West Bay 6:45 AM, December 31. West Bay arrived within an hour discovering a leak in the heater treater separator that caused a spill into the containment area as a result of a completely disintegrated pipe within the heater treater.

Author interview with Township Fire Chief and assistant.

West Bay Exploration field notes

January 14, 2002

West Bay Exploration Filer 1-19 Separating Facility serving **directionally drilled Lake Michigan "Golf Course" well.**

Four complaints of "very strong sour gas odor" were registered with 911 and the Filer Township Hall, extending to the Lake Michigan coast, two-and-one-half miles west of the facility in an eighth to quarter-mile wide corridor. Intentional releases of gas were the result of opening the heater-treater vessel for cleaning and replacement of the flame tube from damage on 12/31/01. Attempts to deodorize the process were unsuccessful.

Author interview with Township Fire Chief and Chief's Memorandum

ENDNOTES

1. During the release of September 2, 1998 as noted in text, residents were advised by authorities that “something is wrong” but to shelter-in-place, “take a couple aspirin and go lay down.” (Sic)
2. Incident Report, Geological Survey Division, Department of Environmental Quality, Murray-State et al 1-8 (PN 37657) Gas Well, Michigan Production Co., Limited Liability Corporation, Manistee Township, Manistee County, Gas Release of October 28, 1998. (6, 8, 32, 33,50, 51).
3. The Certificate of Death reads that the underlying cause of her congestive heart failure and atherosclerotic heart disease was “chronic hypoxemic hypercapnec respiratory failure and emphysema”, translated by a medical doctor as meaning she wasn’t getting enough oxygen throughout her body because her lungs were destroyed. As documented by medical research, inhalation of H₂S gas may cause respiratory soft tissue (lung) damage.
4. Reference to the Hart well and dehydrator plant of Oceana County also covered in this *Survey* is admittedly outside the 10 X 30 mile stretch but is included as a notable example of multiple releases at a single site, downplayed and ignored by authorities, finally causing the family’s homestead abandonment and financial loss.
5. Prior to the 1998 rule revisions, (not officially implemented until February 2001), Department of Environmental Quality (DEQ) criteria only required the reporting of a “serious *accidental* release which...may cause waste [of the oil or gas].” The rules contained no qualifying definition for the term “serious.” The rule revisions implemented reporting criteria formerly absent. Rule 1008(2) states "A permittee of a well shall promptly report, within 8 hours of a loss, release, or spill discovery, by telephone or in person, all losses or releases of gas that result in, or may result in, a nuisance odor or a threat to the public health or safety and, all losses or spills of 42 gallons or more of brine, crude oil, or oil and gas field waste to the supervisor or authorized representative..."
6. Ms Browner's comments were stated during her presentation at the November 1997 National Public Health Convention in Indianapolis, Indiana, and aired nationally during the documentary narrated by Ed Bradley "*Town Under Siege*" 12/23/97.
7. A regular public announcement on WKLA Ludington, alerts citizens of action necessary in the event citizens detect gas escaping from any flowlines in the road rights-of-way or other easements, related facilities or wells. Listeners are warned that if the strong odor of natural gas or rotten eggs is apparent; if there is a hissing or bubbling sound, or blowing dust or soil is perceived, they should leave the area immediately and call 911 or the number on the numerous poison gas warning stakes. Citizens also receive a flyer they are informed to post in a conspicuous place in their home informing them of action in the event of an H₂S release. (**Appendix A**)
8. *State of Michigan Before the Michigan Public Service Commission in the Matter of: The application of West Bay Exploration Company for Authority to Construct and Operate the State Filer #1-10 Pipeline in Manistee County, Michigan - Cause (sic) No. U-11445.* The direct testimony of Ron Gutowski, Filer Township Fire Chief clearly states that Filer Charter Township Fire Department could not respond effectively to a major pipeline leak from the State Filer 1-10 well. This well had a predicted H₂S content of 100 ppm. Gutowski based his calculation on a well content of 100 to 200 ppm considering it is not unusual for the H₂S content to double over the lifetime of the well. The actual H₂S concentration was determined at 190 ppm when production commenced in August 2000 according to Mel Kiogema, Cadillac District DEQ. This would, of course, proportionately increase all calculations on which Mr. Gutowski based his original evaluations. During the MPSC judicial hearing, Mr. Gutowski stated: "The factors having the most effect would be the weather and wind direction....access to the leak could be impassable due to the close proximity to Lake Michigan...effectively eliminates a response from the west. Vehicles could not be driven in since they provide an excellent ignition source for flammable gas. Personnel may not be able to walk in because of their limited air supply....Depending on the location of the leak...200 homes [could be affected]....Evacuation of residents at a level of 1 ppm...could apply to those in the affected area but outside the "hot" zone. Protection *in place* for those inside the hot zone but not physically ill from exposure to the gas. Those suffering ill effects would have to be removed by a rescue team *if possible*. Each residence not reached by phone would have to be visited by a rescue team. Each rescue team must consist of six (6) fire fighters. Three fire fighters to make entry to the home and three as an emergency back up to those making entry. Each fire fighter must be in full turnout gear with self-contained breathing apparatus. This equipment weighs approximately sixty to seventy pounds. Each SCBA contains approximately fifteen to twenty minutes of air. This allows each fire fighter to walk 7 1/2 to 10 minutes into a scene and 7 1/2 to

10 minutes out again. Each fire fighter is allowed to wear three bottles before being replaced and sent to rehab for rest. The point I am making is that the operation is very personnel intensive. If the leak is large enough and affects enough homes, it may be too late when you get to the person most affected. It should also be noted that each affected residence must be checked with a meter to insure that H₂S has not accumulated in the basement or other areas. Another factor is the local landscape. After the leak is stopped and the homes are declared safe, each low lying area must be checked for accumulations of gas."(author's italics) (**Appendix B**).

9. Alexander, Jeff. The Sunday Muskegon Chronicle, *Gas exploration may affect health*, 12/7/97.

10. Editorial, The Muskegon Chronicle, *Sour Gas Risks Should Merit a New Evaluation*, 12/21/97

11. Kilburn, Kaye, MD, The American Journal of the Medical Sciences, *Case Report: Profound Neurobehavioral Deficits in an Oil Field Worker Overcome by Hydrogen Sulfide*, 1993, (304).

12. Kilburn, Kaye H. MD, Southern Medical Journal, Vol. 90, Number 10, *Exposure to Reduced Sulfur Gases Impairs Neurobehavioral Function*, 1997, (1004-1005).

13. In spite of the recent studies, it is well to note that in 1845 Dr. Robert Christison wrote that "daily exposures to minute quantities [of H₂S caused] extraordinary lassitude, severe headache, irregular pulse, defective appetite and general debility." He also notes the ability of the gas to "exhaust the vitality of plants analogous to narcotic poisoning in animals." Christison, Robert MD, A Treatise on Poisons in Relation to Medical Jurisprudence, 4th edition, Edinburgh: Adam & Chas. Black, 1845, (809 & 806).

14. Morris, Jim, Special Projects Reporter. Houston Chronicle, *The Brimstone Battles*, November 5-11, 1997.

15. Kilburn, Kaye MD. Toxicology and Industrial Health, Vol. 11, No. 2, *Hydrogen Sulfide and Reduced-Sulfur Gases Adversely Affect Neurophysiological Functions*, 1995, (192-193). While symptoms suffered by families interviewed by Morris in Alabama, Texas, Georgia, Louisiana, and Canada and by the author in Michigan corroborate the neuralgic and respiratory complications scientifically assessed by the health professionals and scientists, it is important to observe that the lives and experiences of the victims from state to state never had occasion to cross paths. Neither were they knowledgeable of the scientific studies from which to taint their perspective. And contrary to accusation, *Survey* interviews and recording of symptoms experienced by victims during and after evacuations and hospitalizations were documented long before the author had any knowledge of scientific research on H₂S exposures.

16. Kilburn, Kaye H. MD, Warshaw, Raphael H. *Epidemiology of Adverse Health Effects from Environmental Chemicals*. Princeton Scientific Publishing Co., (34).

17. Alexander, Jeff. Op. cit.

18. Kilburn and Warshaw, op. cit. (49).

19. Michigan Environmental Science Board, *Health Effects of Low Level Hydrogen sulfide in Ambient Air*, August 2000, (vii, viii).

20. Infante, Peter, F., Penniman, L., and Perry, W., Occupational Safety and Health Administration, *A New Permissible Exposure Limit for Hydrogen Sulfide*. Abstract states: "OSHA's current permissible exposure limits (PELS for hydrogen sulfide (H₂S) are 20 ppm short-term exposure-limit (STEL) (10 minute maximum duration) and a 50 ppm ceiling limit. The PELs established in 1989 and enforced until the 11th Circuit Court ruling in 1992 (and currently being enforced in approximately 24 states, including Michigan) were 10 ppm as an eight-hour time-weighted-average (TWA) and 15 ppm as a 15-minute short-term-exposure-limit (STEL) These limits were based on a report that voluntary adoption of a 10-ppm TWA at two heavy-water plants eliminated complaints of eye irritation and conjunctivitis among H₂S workers. NIOSH NOES data (1983-4) estimate approximately 95,000 workers exposed to H₂S. OSHA IMIS data show that of the 133 employees sampled for exposure to H₂S are those with exposed membranes and those with high oxygen demands, i.e., eyes, nervous system, respiratory tract and olfactory nerves. OSHA plans to update the current PEL for H₂S based on best available data."

21. Harold Fitch, Michigan's Supervisor of Wells made this statement during the 4/17/97 joint DEQ, MPSC, MDCH meeting precipitated by Carl Levin after the evacuation and hospitalization of 11 during the intentional Petrostar 1-1 release 8/27/96. Fitch has reiterated this sentiment as a generic qualification for public exposure

acceptance numerous times, including public township meetings in Filer and Manistee, and as quotations in local newspapers. Mr. Fitch makes this unequivocal statement even though the victims, in varying degrees of health had received emergency hospital treatment for symptoms ranging from nausea to total blackout. The DEQ/MPSC/MDPH meeting was also attended by a representative from Carl Levin's office, Representative Bill Bobier and the author who took voluminous "secretarial" notes and tape-recorded the meeting. No official minutes of the meeting were taken. At the joint meeting, Mr. Fitch implied that any symptoms other than headaches or nausea, even during the time of the release were "psychosomatic." The "unreportable" 8/96 intentional release to which he referred required the emergency evacuation of 12 citizens all receiving several hours of pure oxygen. One nurse also required oxygen as a result of the H₂S residue from one of the victim's clothing. As a result of this release, businesses have been abandoned and closed and medical repercussions continue well into the year 2001. Of the 12 citizens hospitalized only two had the perseverance, doggedness and funds to pursue litigation that resulted in a settlement in their favor in June 2000. Others who still suffer the consequences of this exposure simply add to the numbers of the state's ignored victims.

22. Incident Report, GSD, DEQ. Op. cit. (5)

23. Propulsion Engineer Dr. James G. Skifstad, Purdue, has addressed dispersion of mists or fogs carrying trapped H₂S and the subsequent outgassing miles from the source of release including, *Liquid Emissions from Gas Wells and Pipelines*, 1996 and *Some Notes on the Possible Effects of Condensation on the Dispersion of H₂S Emissions*, 1996.

24. Michigan's Oil and Gas Regulations, 1996 generally define waste as "inefficient or excessive waste", which would "tend to reduce the total quantity of oil or gas ultimately recoverable from any pool." PA 451, Part 615 (324.61501).

25. While Michigan requires reporting of accidents that cause \$5000.00 in damage, a federal reporting criterion starts at \$50,000.00. According to the G.A.O., an average of 22 people died annually from 1988 to 1998 from pipeline accidents with an increase of 4% per year. Rep. John Dingell, D-Mi., requested a GAO investigation on pipeline accidents. The GAO found the Federal Office of Pipeline Safety has not enforced 22 of 49 safety regulations passed by Congress since 1988, including periodic inspections of pipelines, relying instead on "letters of concern" as an enforcement tool.

26. Braciszkeski, Kevin. Ludington Daily News, *Officials still puzzled by illness after gas leak*, 11/13/98.

27. Kilburn, op. cit. *Epidemiology* (37, 50).

28. The <<*Incident Report*>> filed by Basin Pipeline Limited Liability on the release of 5/12/94 notes that the first responder, arriving two hours after the release started, parked 300 feet away, recognizing the explosive potential and shutting his engine off "to reduce any ignition sources in the event the leak direction shifted toward my vehicle." **This is the very same fearful situation families are placed in when they wake gasping for air in the middle of the night attempting to rouse family and neighbors and self-evacuate.** (text)

29. Symptoms recounted to author on May 7 and 8, 1999, by victim Dan Rentsch, 17617 Olson Road. All symptoms verified by scientific literature as referenced in this article and elsewhere; Perry, James. Manistee News Advocate, *DEQ shuts down gas well*, 5/8/99; Braciszkeski, Kevin. Ludington Daily News, *DEQ: Sour Gas release was minimal*, 5/13/99.

30. Braciszkeski, Kevin. Ludington Daily News, *DEQ: Sour gas release was minimal*, 5/13/99.

31. By invitation, the meeting was also attended by the Attorney General's office, Filer Township's Human Health and Safety (H₂S) Committee, Michigan Lung Association, Michigan Land Use Institute and citizens from Mason County with the notable omission of any recording secretary or device. Once again, the only record of the meeting exists in the form of secretarial notes I was taking (**Appendix G**).

32. *Draft Staff Report – Issues to Consider for Findings of Fact* [for Special Use Permit Application, West Bay Energy Co., 12/7/99, (15,16).

33. The Cools, one of the few families able to invest in attorney fees received a favorable settlement during the summer of 2000 -- four years after the intentional release.

34. Filer Charter Township v Aztec Producing Co., Inc., Transcript, File No. 97-8384-CE (23-26).
35. Following the Murray-State release of 10/28/98, a four-year-old son of the DeRooy's developed severe difficulty in word recollection. Dan Rentsch, a small engine repair man found that what had been rote tasks were lost. He needed to read and re-read the instructions because he could neither remember nor assimilate what he was reading. The identical difficulty was experienced by several victims following the intentional Parkdale release of 8/27/96, while another, who was to give a speech the day following the "Parkdale" release had word-recollection difficulty and was unable to remember the words to the *Star Spangled Banner*. The studies of Dr. Kilburn and others address this phenomenon as a clear result of H₂S poisoning. Kilburn, University of Southern California School of Medicine, Environmental Sciences Laboratory, Los Angeles, California and Warshaw, Raphael H., Workers Disease Detection Services, Inc., Claremont, California. *Hydrogen Sulfide and Reduced-Sulfur Gases Adversely Affect Neurophysiological Functions*, 1995.
36. An exception to long-term litigation, Mrs. Mazure, rushed to the hospital by her son and husband during the Victory 32 release of 5/13/94 received an immediate settlement but would not speak with the author indicating "they [Basin Pipeline] had been good neighbors" and would not discuss the details of the release or the terms of her settlement.
37. Filer v Aztec Transcript. Op. cit. (11,22).
38. Miller, Mark, Chief Operating Officer Michigan Department of Community Health. *Manistee Gas Well Final Report* 12/7/98, (Appendix J - 51).
39. Shuster, Donald P.E. *Field Safety Review of Murray-State 1-8 and Lakeland Facilities*, 10/30/98, (Appendix J - 32).
40. *Murray-State 1-9 Series of Events*, 10/28/98. (Appendix J - 11).
41. Wingate, D/Sgt. Thomas. *Interview Summary, Oct 28'98 H2S Release*, 11/09/98-(Appendix J - 47).
42. Incident Report, op cit. (Appendix J - 1,2,7,8,12,14,15,43,50).
43. Ibid. (Appendix J - 6).
44. Incident Report op cit. (1); Shuster, Miller, op cit. (Appendix J – 32,49,51)
45. Ibid. (Appendix J 32, 33).
46. Incident Report, op cit. (Appendix J - 1, 2, 6); Miller, op. cit. (Appendix J - 51).
47. Ibid. (1); Shuster, op. cit., (Appendix J – 31).
48. Ibid. (2,6); Van Otteren, Bruce ERD. *Department of Environmental Quality Geological Survey Division Report of Complaint*, 10/28-29/98. Appendix J – 8); Miller, op. cit. (Appendix J – 49).
49. Incident Report, op cit. (1,2)
50. Wells, Jim. *Murry (sic) State 1-8 Series of Events 10/28/98*. Field notes (Appendix J – 11, 12).
51. Incident Report, *Complaint*, op cit. (Appendix J – 7).
52. Incident Report, op cit. (5).
53. Incident Report, op cit. (2); Miller, (Appendix J - 49); *Complaint*, (Appendix J – 7, 8).
54. Incident Report, op cit. (6).
55. Miller, op. cit. (Appendix J – 49,51).
56. Skifstad, op. cit.

57. Braciszski, op. cit. 5/13/99.
58. Wells, op cit. (Appendix J – 11).
59. Miller, op cit. (Appendix J - 51).
60. Ibid. (49, 51); Miller, op cit. (Appendix J 49, 51); Wells, op cit. (Appendix J –12).
61. Kilburn, op cit. *Epidemiology* (50).
62. Filer v Aztec, op cit. (11, 22).
63. Gray, Jane. Ludington Daily News, *Communication confusion hampers mock disaster exercise*, 3/29/99 and Braciszski, Kevin. Ludington Daily News, *Mock plane crash serves as good test for responders*, 5/3/99.
64. Filer v Aztec, op cit. (23-26).
65. Morris, op cit.
66. Appendix G
67. Kilburn, op cit. *Epidemiology* (50).

APPENDIX

- A American Red Cross, *Shelter in Place*
- B Michigan Public Services Commission, Case No. U-11445,
(State Filer 1-10 Pipeline) *Direct Testimony of
Ron Gutowski* (available from the author)
- C Chart – Hydrogen Sulfide Levels
Federal & State Ambient Air Quality Standards
- D Memorandum from Department of Community Health 4/21/98
- E MSU, Cattle Autopsy Report (available from the author)
- F Gerow, Fred. *Michigan Natural Gas Use and Production*
- G MPSC, DEQ, et al., meeting notes 2/18/98 – Hydrogen Sulfide
Consortium
- H Personal statements regarding release experiences:
 - Mike and Suzanne Murphy, multiple self evacuations as a result of releases from Slocum Well 121 processing facility, August – December 1997
 - Rentsch Family, multiple self-evacuations as a result of releases from Murray-State 1-8 Well and Facility 1994 to 1999.
 - Gilbert and Vicki Hoffman, multiple self-evacuations of area residents as a result of releases from State-Filer 1-33 “Lakeland” processing facility and three wells including two directionally drilled under Lake Michigan – 1985 to the present.
 - Brook Biemer, 11th grade, Mason County Central High School recounting of family evacuation due to the May 1994 valve failure at the Victory 32 Compression Station.
 - Del Rose Mikolajczak, request for public hearing regarding prospective drilling in a residential area, excessive noise during drilling, evacuation during the drilling process and concern regarding surface water contamination from drilling muds left on site.
 - Parkdale businesses, multiple self-evacuations as a result of releases from State-Filer 1 – 1 (Parkdale), and Aztec Producing Company (Manistee) 1996-1998).
- I Filer Charter Township v Aztec Producing Company, Inc. Limited
Liability Company, Circuit Court File No. 97-8384-CE.
(available from author)
- J Incident Report, Geological Survey Division, Department of Environmental
Quality: Murray-State 1-8 (PN 37657) Gas Well [and facility] – Release
of October 28, 1998. (available from author)

