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Interim Hearing on Restricting the Use of Hydrogen Fluoride: AB 2857 (Tucker)

Assembly Committee on Environmental Safety and Toxic Materials

ASSEMBLY COMMITTEE ON ENVIRONMENTAL SAFETY AND TOXIC MATERIALS

INTERIM HEARING ON
RESTRICTING THE USE OF HYDROGEN FLUORIDE:

AB 2857 (TUCKER)
October 4, 1990

Room 447 - State Capitol
Sacramento, California

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CALIFORNIA LEGISLATURE

ASSEMBLY COMMITTEE on ENVIRONMENTAL SAFETY AND TOXIC MATERIALS

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INTERIM HEARING

RESTRICTING THE USE OF HYDROGEN FLUORIDE: AB 2857 (TUCKER)

October 4, 1990
Room 447, State Capitol
9:30 A.M.

Agenda

- Opening Statements by Chairwoman Sally Tanner and Assemblyman Curtis R. Tucker, Jr.
- Dr. Steven Book, Chief, Health Hazard Assessment Division, and Dr. George Alexeeff, Acting Chief, Air Toxicology and Epidemiological Studies Section, State Department of Health Services.
- Ms. Pat Nemeth, Deputy Executive Officer for Planning and Rules, South Coast Air Quality Management District.
- Mayor Carl Jacobson, City of El Segundo.
- Mayor Katy Geissert, City of Torrance.
- Mr. Louis Ervin, Plant Manager, Allied-Signal (El Segundo).
- Mr. David Dragt, Golden West Refining Company, Santa Fe Springs Refinery.

BACKGROUND PAPER

RESTRICTING THE USE OF HYDROGEN FLUORIDE: AB 2857 (TUCKER)

OCTOBER 4, 1990

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RESTRICTING THE USE OF HYDROGEN FLUORIDE: AB 2857 (TUCKER)

Introduction

Hydrogen Fluoride, or HF, is a strong acid and a colorless liquid or gas under normal conditions. It can be diluted in water to form hydrofluoric acid which is used industrially for several purposes including etching and polishing glass, cleaning metals, including copper, brass and steel alloys, and cleaning brick and stone. It is also used in the production of fluorinated organic compounds and metal fluorides such as aluminum fluoride and synthetic cryolite, which are used for the electrochemical manufacture of aluminum. Undiluted, or "anhydrous", HF (the subject of this paper) is used extensively by refrigerant makers as a reactant, by petroleum refineries to boost octane levels in unleaded gasoline, as an ingredient in rocket fuel, and in other processes requiring strong pure acid properties.

HF is also very dangerous and is classified as an acutely hazardous material. Direct physical contact with HF will burn the skin. Human exposure to HF vapor in a concentration of less than 100 parts per million (ppm) of air for a short amount of time can cause severe pulmonary damage and, perhaps, death. Liquid HF turns into a gas at 67° F at normal atmospheric pressure. Thus, at a high enough temperature, an uncontrolled release of anhydrous HF will vaporize upon contact with air and form a dense cloud. Depending on particular atmospheric and weather conditions, the HF cloud could migrate to other areas. If the cloud contains high enough concentrations of HF, it could pose a significant danger to anyone who comes into contact with it.

Anhydrous HF is handled in large quantities at manufacturing facilities throughout California which use it. Most of these facilities are located in urban areas. Though large-scale use of HF is limited to industrially-zoned areas, commercial and residential properties are being located close to these manufacturing facilities. Thus, an uncontrolled release of HF into the atmosphere may pose significant danger to nearby commercial and residential areas.

AB 2857 was introduced by Assemblyman Curtis R. Tucker, Jr. (Inglewood) on February 12, 1990. The bill required businesses which, at any time, handle more than 250 gallons of HF to convert to a known, significantly less hazardous substitute by the end of 1992. If this conversion cannot be made, the HF user had to, by the end of 1994, move to an area in the state where there are no residences or dwellings within a 2-mile radius. The bill was heard by this committee on April 4th, at which time its subject matter was referred to this hearing for interim study.

Characteristics of Hydrogen Fluoride

Anhydrous HF, an inorganic chemical, boils at 67° F and freezes at 117.4° F. It fumes strongly in moist air and dissolves readily in water to form hydrofluoric acid. At high temperatures, HF consists of very stable molecules. However, at low temperatures, strong bonding between molecules results in polymerization to render HF_2 and HF_6 units. This polymerization is responsible for the high boiling point of HF compared to Hydrogen Bromide and Hydrogen Chloride. HF is made by treating fluorspar (CaF_2) with sulfuric acid. Neutralizing HF forms salts called fluorides.

Health Effects from Exposure

HF can be toxic to human beings. Depending on the concentration of HF in the air and on the length of time, exposure to HF can result in short-term eye, nose and skin irritation at lower exposure levels to severe pulmonary damage or death at higher exposure levels. Attachment #1 shows various concentrations of HF in the air and their respective effects on human health.

The National Institutes for Occupational Safety and Health (NIOSH) recommends that workplace exposures to HF not exceed 3 ppm for an 8-hour workday in order to prevent skeletal fluorosis. Additionally, NIOSH recommends that workplace exposures not exceed 5 ppm in any 15-minute period in order to avoid irritation of the eyes, skin and respiratory tract.

As HF concentrations increase, the effects become more pronounced. At 20 ppm for 30 minutes, HF may present an immediate danger to life and health, while for 60 minutes, irreversible lung damage is possible. At 50 ppm for 60 minutes, HF concentrations may be lethal, while concentrations of 60 ppm to 120 ppm for just a few minutes are likely to cause lung damage. Finally, exposure to HF in concentrations greater than 120 ppm for just one minute is considered intolerable.

It is difficult to predict the concentration of any given release of anhydrous HF. Concentration will be determined by the volume, the flow rate, and the duration of the release, the

location of the release (whether indoor or outdoor), and the atmospheric and weather conditions existing at the time of release. In addition, the extent of human exposure to an HF release will depend on the adequacy of equipment designed to stop and contain such a release and the weather conditions which may cause any HF vapor to spread from the source.

HF Use

HF is used by petroleum refiners in California, primarily by the older facilities located in the industrial areas of the Los Angeles Basin. HF has been replaced by sulfuric acid at many newer and converted refineries and is considered to be relatively less dangerous to handle than HF, even though substantially more sulfuric acid must be transported and used to achieve the same level of octane. Thus, if large-scale use of HF is ever prohibited in a particular area, refineries would be forced either to convert to a process using sulfuric acid or some other, as yet unidentified substitute, at substantial cost, or to shut down.

HF is used by refrigerant makers in several locations in California. For instance, current production of the CFC-substitute hydrochlorofluorocarbons (HCFCs) is totally dependent on HF in the reaction stage. In addition, a number of the non-ozone depleting substitutes now being developed to slow the destruction of the earth's ozone layer need HF. There is currently no identified substitute for HF in these processes. Thus, a ban of large-volume HF use would require the facility to shut down.

HF is also used extensively by the semiconductor and general electronics industries in California. Although a large portion of HF volume used is in the form of hydrofluoric acid, and therefore not affected by AB 2857's prohibition, anhydrous HF is used by several electronics and related firms as an etchant.

HF Handling and Potential Release

HF is not manufactured in California. Thus, it must be transported into the state, primarily by rail and highway to the facilities which use it. HF is transported through heavily populated areas in specially designed pressurized tanks to maintain HF's liquid form. At the facility, HF is generally transferred to pressurized storage tanks, and depending on the particular manufacturing process, is controlled in a "closed" system to minimize worker exposure. Again depending on the particular use, HF may be totally consumed in the manufacturing process or waste HF may have to be neutralized.

Due to system failures and human error, unscheduled releases of HF occur. Releases may occur at the HF manufacturing facility, in transit to the user, when transferred to the storage tank, or

during the user's manufacturing process. Releases may be caused by conduit or valve failure at the HF manufacturing facility, as a result of train or motor vehicle accidents, or by conduit or valve failure at the HF user's facility. Major releases, involving hundreds, perhaps, thousands of gallons of HF could occur if tanks are ruptured or if a major pipe is severed. While system failures can be minimized with proper maintenance and use, the factor of human error seems to loom in many HF releases. Human error may be minimized with proper training and workload. However, no matter how many protections are built into the system that handles HF and no matter how well workers and others who handle HF are trained and supervised, there will always remain the potential for a major release of HF.

Attachment #2 lists the annual amount of HF released by state. The list shows that Indiana and Illinois alone combine to account for over a quarter of total annual HF releases nationwide. Add Washington, Oklahoma, and Texas, and over half of all HF released in the country occurs in these five states. California is 21st on the list of 45 states that reported HF releases, accounting for 0.5% of the national total. Thus, California's total contribution to HF releases is relatively minor. However, these figures do not speak to the nature of individual releases and do not shed much light on potential releases.

Mitigating HF Releases

Large-volume users of HF are required to have, in place, systems designed to respond to an unscheduled release. Ideally, these systems should keep the release from moving off-site to the area surrounding the facility until the flow of HF can be halted. Most large-scale systems involve shut-off valves to stop the flow of HF to the release point and water dousing equipment to "knock-down" the released HF, and convert it into hydrofluoric acid which can be more easily controlled. While these systems appear to be satisfactory for most HF releases, a large enough and fast enough release, perhaps from a rupture of a large storage tank, may overwhelm the capacity of the water system, and HF could escape from the site.

In any case, no release mitigation system can guarantee absolute protection from human exposure, either by workers or a nearby community. The continued use of HF in a populated area, therefore, requires the acceptance of risk of human exposure. This notion of "acceptable risk" is repeated several times in many different human endeavors and is a central factor in determining whether a particular acutely hazardous material, such as HF, should be used.

State and Local Law

Large volume users of HF are subject to three main regulatory

processes regarding their handling of the acutely hazardous material. Current state law requires businesses which handle large volumes of hazardous materials on site to develop and implement a business plan for handling hazardous materials and for responding to problems. In addition, these businesses must develop and maintain an inventory of the materials handled on site so that local emergency services, such as fire departments, can safely and effectively respond to fires and other problems at the site.

In addition, HF handlers are likely to be subject to a local administering agency's requirement to register the acutely hazardous material. If individual administering agencies (usually fire departments) determine that there is a "significant likelihood of risk" that the handler's use of an acutely hazardous material may pose an accident risk, then the handler must prepare and submit a Risk Management and Prevention Plan (RMPP) to the agency. The RMPP must include, among other things, descriptions of site accidents involving the acutely hazardous materials, characteristics of equipment used to handle the material, controls designed to minimize risk of an accident, monitoring systems, and a schedule for implementing additional steps to minimize risk. In addition, the RMPP must be based on an "offsite consequence analysis" which, in turn, must assume "pessimistic air dispersion and other adverse environmental conditions".

As a rule, large-volume handlers of HF have been required by local administering agencies to prepare and submit RMPPs. The RMPP process may be an effective means by which to minimize the risk of an HF release and therefore to protect public health and the environment, if handlers cooperate and local administering agencies are able to adequately review these plans and follow-up on the implementation of appropriate safety measures. However, the RMPP may not lend itself well to addressing potential risks of accidents involving "human error".

HF is also classified as a potential toxic air contaminant and therefore can come under the regulatory framework of local air quality districts and the State Department of Health Services' Air Toxicology Section. Currently, the characteristics and potential dangers of HF are being studied by the latter, while the South Coast Air Quality Management District (SCAQMD), in particular, is pursuing a course of action which would ultimately result in a prohibition on the large-volume use of HF within the district. Several petroleum refineries and a major refrigerant producer would be affected by the ban. While these refineries can, at a cost, convert to sulfuric acid as a substitute to HF, there is no known substitute to HF for the refrigerant producer.

Transportation Considerations

Most HF is transported into California from Louisiana, Kentucky, Missouri and Texas to manufacturing facilities primarily

by rail and tanker truck, often using routes through densely-populated areas on their way to the facilities. According to the U.S. Department of Transportation, there were 15 transportation incidents in California involving an HF release between 1979 and 1988. Of these, most involved minor highway spills.

Sulfuric acid, the substitute identified for HF in the gasoline refining process, is transported in much greater volumes and with more frequency. As a result, there were 149 incidents primarily resulting in minor spills. Thus, there were approximately 10 times the number of incidents involving sulfuric acid as opposed to HF. However, a spill of sulfuric acid, because of its relatively high boiling point, does not present as immediate a danger as does an HF release. Finally, the use of sulfuric acid results in a greater volume of generated hazardous waste which must then be transported for treatment, recycling, and eventual disposal of the residue.

AB 2857 contains a provision which would require HF handlers to relocate their facilities to a site which is no closer than two miles from the nearest residence or dwelling. In California, these HF-use facilities would have to be located in the high desert or high mountain areas of the state, away from major transportation networks. It is likely, according to major HF users with no available substitute, that the impact of AB 2857 would either be shut down of the existing facility period or relocation of the facility out-of-state.

Development of Non-Ozone Depleting Compounds

In recent years, it has been determined that emissions of chlorofluorocarbons (CFCs) and other halogenated substances are primarily responsible for the destruction of an increasing portion of the earth's stratospheric ozone layer. These CFCs are emitted primarily from refrigeration and air cooling units in buildings and motor vehicles. As a result, the worldwide production of CFCs has been restricted, steps are being taken to completely eliminate production within a decade, and refrigerant makers have increased production of HCFCs (a short-term substitute to CFCs which is 95% less destructive to the ozone layer) and development of other compounds which are totally non-ozone affecting. A number of these substitutes would still depend on the use of HF as a reactant in the manufacturing process.

Thus, in these cases, prohibiting the large-volume use of HF may make it more difficult to develop these substitutes in a timely manner or may restrict the range of substitute compounds which would be eventually available to help solve the current problem of destruction of the earth's ozone layer.

Acceptable Risk

As noted a few times above, as long as anhydrous Hydrogen Fluoride is transported, stored and used in California, there will always be a risk of an accidental release. Safety regulations, RMPPs, business plans and inventories, elaborate equipment and extensive worker training will go a long way in reducing this risk, but it could never be totally eliminated. Indeed, the principal of "acceptable risk" is an implicit factor in the regulatory framework in California with regard to the handling of acutely hazardous materials.

SCAQMD's decisions to pursue elimination of HF handling within the district and the provisions of AB 2857 are apparently based on the belief that, with regards to HF, there is no acceptable level of risk or that the potential for reduction of the risk is not good enough to adequately protect the public health and safety.

Conclusion

Whether the Legislature should consider the prohibition of a particular acutely hazardous material, anhydrous Hydrogen Fluoride, depends upon whether the characteristics of that material render it so dangerous to public health and safety, that the risk of exposure cannot be adequately controlled by the regulatory framework now in place for all acutely hazardous materials.

Direct exposure to even small concentrations of anhydrous HF is potentially lethal. A major release of the compound, coupled with conducive atmospheric and weather conditions, can result in a major disaster, requiring substantial evacuation of downwind communities, and resulting in several cases of irritation to skin and other organs, respiratory damage and possibly death. As noted above, the only way to eliminate the risk of such a release and exposure, is to totally eliminate the handling of HF. However, this is also the case for most acutely hazardous materials used in populated areas.

Another discerning characteristic of the use of HF is that it is often transported, stored and used in relatively large quantities for an acutely hazardous material. In addition, except primarily for refrigerant production, there is a potentially, readily available substitute in sulfuric acid. However, this substitute also carries its own risks in terms of increased toxic air contamination, increased volume of the compound on the highways, and increased recyclable hazardous waste generated.

Whether the handling of acutely hazardous materials in California should be regulated within a general regulatory framework or regulated a compound-by-compound basis is a matter to be determined by state policymakers.

(f) Notification of a Hydrogen Fluoride or Hydrofluoric Acid Release

A facility owner, operator, or their designee shall report any hydrogen fluoride or hydrofluoric acid release within or outside of the facility to the District within one hour of such a release or within one hour of the time the release is known or reasonably should have been known. Such a report shall include, to the extent known, the following information:

(1) Name and specific location of company;

(2) Identification of the notifier, such as person's name and title;

(3) Starting and ending times of the release;

(4) Specific equipment involved in the release;

(5) Amount released;

(6) Cause of release;

(7) Type of repair used to mitigate and/or stop the release; and

(8) A description of any injuries or fatalities.

(g) Hydrogen Fluoride and Hydrofluoric Acid Inventory

On or before March 1, 1991, and on or before March 1 of every subsequent year, all facilities that use or store hydrogen fluoride or hydrofluoric acid shall submit, to the District, Office of Planning and Rules, a hydrogen fluoride and hydrofluoric acid inventory report. Such inventory report shall include the following information:

(1) Name of company and address;

(2) Name and title of the person conducting the inventory;

(3) Quantity of hydrogen fluoride and hydrofluoric acid received per year, in gallons;

(4) Number of deliveries per month;

(5) Concentrations of hydrofluoric acid:

(a) Specify acid concentration for each process;

(b) Specify acid concentration in storage.

(6) Quantities of hydrogen fluoride and hydrofluoric acid, in gallons:

(a) Total used per day;

(b) Used per process operation. Specify maximum amount and identify each process;

(7) Identify type of storage and specify maximum and minimum quantities of hydrogen fluoride and hydrofluoric acid within possession or control of the owner or operator of the facility in:

(a) Fixed or mobile storage containers on-site;

(b) Fixed or mobile storage within the South Coast Air Quality Management District

Attachment #1

EXPECTED EFFECTS OF RESPIRATORY HF EXPOSURE ON
A GROUP OF PERSONS FOLLOWING EXPOSURE

CONCENTRATION (ppm)	LENGTH OF EXPOSURE	EFFECT
0.04 - 0.13	ANY	ODOR THRESHOLD
LESS THAN 2.0	ANY	VERY LITTLE LIKELIHOOD OF IRRITATION OR OTHER ADVERSE EFFECT.
2.0 TO 5.0	MORE THAN A FEW MINUTES	IRRITATION OF EYES, SKIN, OR RESPIRATORY TRACT IS POSSIBLE.
3.0	8 HOUR WORKDAY	OSHA STANDARD; TLV; PEL; SET TO PREVENT CHRONIC OSTEOFLUOROSIS.
5.0	60 MINUTES	ERPG(1): EYE IRRITATION LIKELY.
6.0	15 MINUTES	CEILING LIMIT PROPOSED BY OSHA ON NIOSH RECOMMENDATION TO PREVENT RESPIRATORY PROBLEMS.
20.0	30 MINUTES	CONSIDERED BY NIOSH AND OSHA TO BE IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
20.0	60 MINUTES	ERPG(2):IRREVERSIBLE LUNG DAMAGE IS POSSIBLE.
6.0 TO 60.0	A FEW MINUTES	IRRITATION OF EYES, SKIN, OR RESPIRATORY TRACT IS COMMON, BUT REVERSIBLE.
6.0 TO 60.0	SEVERAL MINUTES TO 2 HOURS	SOME INDIVIDUALS MAY HAVE LUNG DAMAGE.
50.0	60 MINUTES	ERPG(3): TOXIC EXPOSURE LEVEL, RISK OF DEATH.
60.0 TO 120.0	A FEW MINUTES	LUNG DAMAGE IS INCREASINGLY LIKELY.
> 120 PPM	ONE MINUTE	INTOLERABLE. EXPOSURE BEYOND A FEW MINUTES IS VERY DANGEROUS.

Source: "Health Effects Due to Hydrogen Fluoride Inhalation: A Literature Review", Prepared for the Hydrogen Fluoriode Task Force of the South Coast Air Quality Management District, March 1989.

Attachment #2

HYDROGEN FLUORIDE RELEASES BY STATE

RANK	STATE	RELEASE (LBs/YR)	% OF TOTAL	ACCUMULATED %
1	INDIANA	1,537,250	13.04	13.04
2	ILLINOIS	1,536,750	13.03	26.07
3	WASHINGTON	1,206,798	10.23	36.30
4	OKLAHOMA	945,308	8.02	44.32
5	TEXAS	869,287	7.37	51.69
6	NEW YORK	765,848	6.49	58.18
7	OHIO	701,091	5.94	64.12
8	KENTUCKY	652,733	5.53	69.65
9	LOUISIANA	496,387	4.21	73.86
10	MONTANA	465,420	3.95	77.81
11	TENNESSEE	439,432	3.73	81.54
12	MARYLAND	412,250	3.50	85.04
13	MISSISSIPPI	357,055	3.03	88.07
14	WEST VIRGINIA	267,622	2.27	90.34
15	PENNSYLVANIA	262,660	2.23	92.57
16	NORTH CAROLINA	168,844	1.43	94.00
17	IDAHO	103,500	0.88	94.88
18	MINNESOTA	99,700	0.85	95.73
19	SOUTH CAROLINA	94,902	0.80	96.53
20	KANSAS	83,857	0.71	97.24
21	**CALIFORNIA**	**59,034**	**0.50**	97.74
22	ALABAMA	48,510	0.41	98.15
23	UTAH	47,670	0.40	98.55
24	FLORIDA	35,176	0.30	98.85
25	WYOMING	30,983	0.26	99.11
26	MISSOURI	21,557	0.18	99.29
27	MICHIGAN	15,340	0.13	99.42
28	OREGON	12,558	0.11	99.53
29	NEW JERSEY	10,676	0.09	99.62
30	MASSACHUSETTS	7,609	0.06	99.68
31	CONNECTICUT	7,593	0.06	99.74
32	WISCONSIN	5,908	0.05	99.79
33	VIRGINIA	4,350	0.04	99.83
34	ARIZONA	4,080	0.03	99.86
35	NORTH DAKOTA	3,700	0.03	99.89
36	DELAWARE	2,940	0.02	99.91
37	VERMONT	2,700	0.02	99.93
38	GEORGIA	1,500	0.01	99.94
39	IOWA	1,250	0.01	99.95
40	NEVADA	1,000	0.01	99.96
41	RHODE ISLAND	787	0.01	99.97
42	MAINE	500		
43	PUERTO RICO	500		
44	COLORADO	361	0.03	100.00
45	NEW MEXICO	252		

Source: U.S. Environmental Protection Agency (March 1989), Preliminary Study on Toxic Release Inventory for 1987.

CHAIRWOMAN SALLY TANNER: Welcome to the hearing. I'm Sally Tanner. I Chair the Committee on Environmental Safety and Toxic Materials. This hearing will review AB 2857 which was introduced last year by Assemblyman Curtis Tucker, Jr. The bill was heard in Committee and held in Committee and we decided to have an interim hearing.

AB 2857 would have prohibited the large scale use of a particularly acutely hazardous material, hydrogen fluoride, in populated areas of the state. Manufacturers which use this compound would have had to switch to a less hazardous substitute or, if no substitute is available, close down their operation and move either to a remote part of the state or leave the state.

When the Committee held AB 2857, it did so because there was no adequate or compelling reason, we felt, to single out hydrogen fluoride for special state regulations from other acutely hazardous materials in use all over the state. This hearing, we wondered whether it was correct to ban this one acutely hazardous material or look at all of the acutely hazardous materials or see what program we should follow, so we decided to have this hearing.

Mr. Tucker, the author of the bill is here and he will make a statement; and then you have a cassette you want played, is that correct?

ASSEMBLYMAN CURTIS TUCKER, JR.: Yes, it is just a two or three minute blurb.

CHAIRWOMAN TANNER: Ok. Would it be best to aim that cassette toward the audience and then you and I could go over there because there is only the two of us here. Do you have a few words you would like to say?

ASSEMBLYMAN TUCKER: First of all, I'd like to thank Madam Chairwoman for agreeing to hold this interim hearing. As you all know, this issue came up last year and because of the sensitivity of the nature of the bill and the effect that it would possibly have on industry throughout the state, we decided that we needed some time to sit down and slowly talk about the issues and come to a better understanding of what we were attempting to do. In introducing this legislation, I saw the need to try to protect the people that live in the South Bay, Southern California, from the possibility of a chemical catastrophe. The AQMD did a study of a five-mile radius from any one of the plants that has the possibility of experiencing a hydrogen fluoride spill and just within a three-mile area of Allied Signal in El Segundo, there is LAX, there is the Los Angeles Air Force Base, there is about 200,000 people that reside there and many hundreds of thousands more that live and work there not to mention the schools and everything else that falls within that three-mile range. Clearly, it's my feeling that something needs to be done. We're not asking for hydrogen fluoride to be banned from this state. What we're doing is we're asking for the anhydrous form, which is the pure form of hydrogen fluoride, to be relocated if you're going to be using large, vast amounts of it at any one given time. One plant in El Segundo has 43,000 gallons of it every day. That's, to me that's an accident waiting to happen and the nature, people will say well our industry shows that we have a very good safety record, but the nature of accidents is that you can't predict them. It takes one person to have a bad day and then you have a major catastrophe on your hands. I challenge anyone to show me a person that is foolproof. We all make mistakes and I don't think our mistakes should cause hundreds of thousands of people their safety.

CHAIRWOMAN TANNER: Ok. Shall we go back there then and watch the tape.

---- SHOWING OF VIDEO TAPE.

ASSEMBLYMAN TUCKER: Madam Chair? Can you imagine the state of Southern California if that were to happen at like I said LAX. Can you imagine a thousand or two thousand people flooding our already overcrowded hospital systems down there. Could you imagine the traffic? Life as we know it would temporarily cease and I just think it's definitely an unacceptable risk to take.

CHAIRWOMAN TANNER: Well, it's rather frightening when you watch the film. That's what this hearing is about and, Ladies and Gentlemen, we hope that we can get some answers and some ideas on how to proceed. Our first witness will be Dr. Steven Book who is the Chief, Health Hazard Assessment Division and Dr. George Alexeeff, Acting Chief, Air Toxicology and Epidemiological Studies Section of the State Department of Health Services.

DR. STEVEN BOOK: Good morning Mrs. Tanner, nice to see you again. Mr. Tucker. I am pleased to be here this morning to discuss the health effects of hydrogen fluoride. With me is Dr. Alexeeff. We have prepared some specific testimony in reply to the questions that were given us by the Committee and then we would be happy to answer any questions that you may have afterwards.

We have been asked first to describe the potential health effects resulting from direct physical contact with anhydrous hydrogen fluoride and also the effects which may occur as a result of respiration of hydrogen fluoride vapor downwind. Hydrogen fluoride is a direct acting irritant to skin, eyes and lungs. It is one of the most corrosive acids. Upon skin contact it produces pain, reddening of the skin and deep slowly healing burn wounds. While large amounts produce effects immediately, smaller amounts can take up to 24 hours before the effects occur. In addition to burns the fluoride can replace calcium in the body and cause a heart attack. Exposure of the eyes to a solution or vapor of hydrogen fluoride causes tearing and burning of the eyes. It also causes abrasion and ulceration of the cornea which can continue to worsen over a period of 24 hours, but proper treatment by an opthomologist

is expected to lead to complete recovery. Respiration of hydrogen fluoride produces burning of the throat and cough. Higher levels cause inflammation of the respiratory tract which can progress to water accumulation in the lungs referred to as pulmonary edema. Such a condition makes it very difficult to breathe and can result in death. A person being exposed may not recognize the severity of the situation for hours or days after the incident so it is recommended that people exhibiting breathing difficulty or cough be admitted for consultation.

We have been asked to discuss the basic variables such as weather and atmospheric conditions which would determine the concentration of an anhydrous hydrogen fluoride release into air. There are so many possible release scenarios that it would be difficult to consider all the variables. However, a reasonable scenario would be the rupture of a storage tank. To our knowledge, a precise description or model of what can happen after release of hydrogen fluoride has not been developed. However, several important factors can effect the quantity of release and the type of public exposure that could occur. The method of release is an important variable. That is, is it released under pressure, as a slow leak, or in conjunction with another catastrophic event, such as an earthquake or fire? Unless there is some pressure or force, the gas will tend to stay close to ground level. Once released the concentration will depend on outside temperature. Below 68 degrees Fahrenheit it is nearly a colorless liquid. Above 68 degrees Fahrenheit it becomes a gas. On a warm or hot day, higher concentrations will be released. The hydrogen fluoride vapor cloud would move in the direction that the wind is blowing. A mild breeze during an inversion would probably result in the worst conditions, while a strong wind would be more likely to disburse the cloud. However, if there is a very large sudden release, a strong wind could distribute a toxic dose to a fairly large area.

We have been asked to comment on the expected effects on human health of exposure to hydrogen fluoride in concentrations ranging

from 2 to 200 parts per million for a period of thirty minutes. At 2 parts per million, hydrogen fluoride would be expected to produce some respiratory irritation. This is based on the limited human study where irritation was reported above 1.9 parts per million. In the same study a concentration of 3.4 parts per million caused "distasteful" sourness in the mouth and "considerable discomfort" to an individual with a cold. Subjects exposed to concentrations of 31 parts per million for three minutes have stinging pain in the nose and eyes and lung irritation. Subjects exposed to 61 parts per million for one minute had sharp stinging pain in the eyes and strong nose irritation. Subjects exposed to 120 parts per million had stinging of the skin within one minute in addition to eye and lung irritation. Animal studies reported similar responses. There was irritation within 5 to 15 minutes at the lowest concentration tested of 29 parts per million based on closing of eyes, slowing of the respiratory rate, sneezing, coughing and an expression of discomfort. At 61 parts per million for 15 minutes the animals exhibited weakness and appeared ill. Concentrations of 278 parts per million and above for one hour were lethal for mice. Based on expected fluoride levels from studies of anesthetics in humans it has also been reported that a 50 part per million for one hour could be lethal.

We have been asked to comment on whether there is an agreed upon exposure level...

CHAIRWOMAN TANNER: Doctor, is that extremely more dangerous than a release of other, less acutely hazardous materials? Is that considerably different? The results, like 60 parts per million would have this effect, and...

DR. BOOK: Oh, for other chemicals? It really, George may have some comments too, but it's really sort of a chemical specific situation where you get into individual concentrations. It really depends on the toxicity of the particular chemical. George, would you have anything to add?

DR. GEORGE ALEXEEFF: If I think I understand the question, hydrogen fluoride is one of the more toxic acids and acid gases. However, there are other toxic gases which are more toxic than hydrogen fluoride. I wasn't sure exactly how you were ...

CHAIRWOMAN TANNER: That's sort of the question I was asking.

ASSEMBLYMAN TUCKER: Madam Chair, if I may? If, let's say you have an equal amount spill of hydrogen fluoride and sulfuric acid, which is worse?

DR. ALEXEEFF: Well, one would expect that the hydrogen fluoride would be more toxic and would cause a greater effect and one of the reasons it would cause a greater effect is it vaporizes more so than sulfuric acid.

ASSEMBLYMAN TUCKER: Thank you.

CHAIRWOMAN TANNER: Alright. Continue.

STEVEN BOOK: We've been asked to comment upon whether there is an agreed upon exposure level which will result in death within a certain amount of time. Based upon the studies in mice, a one hour exposure to above 150 parts per million would be expected to be lethal. The presence of severe toxicity in animal studies and in human case reports indicates that the lethal level for humans may be as low as 50 parts per million for a one hour exposure.

We've been asked if there are any data which imply that certain categories of human beings such as infants, children and the elderly would be more susceptible to hydrogen fluoride releases. Children would be expected to be more susceptible than adults to an exposure of hydrogen fluoride because of their greater breathing rate compared to their body weight. However, there is insufficient information to know if age is an important risk factor.

We've been also asked if there are individuals that may be hypersensitive to hydrogen fluoride exposure. People with colds, and I feel sympathy for people with colds right now, are likely to experience more severe irritation than those without colds based on one study with hydrogen fluoride in humans. Studies with asthmatics indicate that they are more susceptible than others to the effects of respiratory irritants. Asthmatics and people with upper respiratory diseases or infections would be considered hypersensitive.

We've also been asked about what other information on health effects of exposure to hydrogen fluoride is pertinent to the discussion on restricting its use. The odor threshold for hydrogen fluoride is approximately 1/10th of a part per million so the effects we have been discussing are above the odor threshold. Considering the high potential for a catastrophic event for hydrogen fluoride relatively little is known about its toxicity. Most of the information available is from studies conducted before 1962. Modeling of releases of hydrogen fluoride in the 1987 incident in Texas City, Texas, indicates that severe effects may occur in the range of 3 parts per million. However, the precise concentration or length of exposure that occurred in Texas is not known. This ends our formal presentation. Thank you very much. Do you have any other questions?

CHAIRWOMAN TANNER: Yes. I'm interested in the fact that in the last statement that you made that those studies were completed in 1960?

DR. BOOK: In the 1960's.

CHAIRWOMAN TANNER: That seems odd doesn't it?

DR. BOOK: I think if you're looking in terms of acute toxicity and those sorts of things, I don't know that it's necessarily

unusual that a lot of acute toxicity studies were done early on. I think a lot of focus has been towards chronic long-term toxicity studies in other chemicals.

CHAIRWOMAN TANNER: And the results wouldn't be different in 1990 than they would be in 1960...

DR. BOOK: With regard to short-term acute toxicity studies I suspect so. George do you have anything to add?

DR. ALEXEEEFF: Well, I think the timing of the studies that occurred, there was one major study in 1961 and the other ones were in the 1930's, that's pretty typical for some of our major bulk chemicals. Studies were initiated at those times and there have not been a lot of other follow-up studies. Particularly the study in 1961 was a human study and human studies are not as readily conducted these days. And, in the 1961 study, the investigator tested himself, exposing himself, so that kind of thing isn't conducted more recently. In terms of the effect, it's hard for us to judge based upon the report, there is sketchy information in there, if we could interview the investigators we'd have a better idea of exactly what they might have seen. It's hard to know precisely how well their study would match up today, but for their time they were definitely among the top-notch studies available.

CHAIRWOMAN TANNER: I'm going to allow the minority consultant to ask questions if you choose, Mr. Betts. Because we don't have any members from the Minority Caucus here. So, if you choose, don't hesitate. Thank you both very much.

Our next witness will be Ms. Pat Nemeth, Deputy Executive Officer of Planning and Rules of the South Coast Air Quality Management District. Thank you for being here.

PAT NEMETH: My pleasure. Good morning, Assemblywoman Tanner, Assemblyman Tucker. I'm Pat Nemeth, Deputy Executive Officer for

Planning and Rules of the South Coast Air Quality Management District and I thank you for an opportunity to be here today. Certainly we look to Assemblyman Tucker's bill as an important piece of state legislation and urge your positive consideration of it this morning.

I'd like to take a few moments and share with you the work that we are doing at South Coast to look at the issue, particularly we are involved in the development of a "Proposed Rule 1401" which addresses the storage and use of large quantities of anhydrous hydrogen fluoride and I have provided you with a copy of that rule before you this morning. The rule proposes to phase out of the South Coast air basin, the large scale storage of anhydrous hydrogen fluoride no later than 1995. The purpose of the rule was to prevent a catastrophic HF incident that could have a devastating impact upon our community. As you have heard and as you know, hydrogen fluoride is a highly toxic, highly corrosive substance, that is a gas under standard conditions. Human exposures at concentrations of 20 parts per million for longer than 30 minutes is considered to be imminently dangerous to life and health.

The district is interested in controlling HF emissions and that interest was really triggered in 1987 after the occurrence of two serious accidents at petroleum refineries involving HF releases. You saw a very dramatic example of the problem at the Marathon Refinery on the tape this morning at Texas City, Texas. At the same time or in a close proximity, there was an accident at the Mobile Refinery in Torrance, which destroyed a processing vessel and released approximately 100 pounds of HF. These events coupled with the publication of an Environmental Policy Institute document describing the risks associated with HF use, made us realize the potential for a major accident in our area and we formed a multi-agency task force to further study the dangers associated with the transportation, storage, transfer and use of HF in the district.

The task force issued its final report in April of this year.

The report addressed three major areas. First, what could be done to immediately improve safety procedures on site at each of the facilities. Secondly, the report looked at what did we need to do to provide better earthquake safety protection measures at these facilities and then the third area looked at whether or not we should seek to discontinue altogether the use of HF in the basin. The task force had consensus on the first two points, the rule before you incorporates those concepts within the body of the rule. The task force did not reach a recommendation on the issue of whether or not to phase out HF. However, our staff did feel, looking especially at the fact that the best safety measures in place nonetheless do not eliminate the probability of an incident. This is a high-risk substance and a very problematic heavy urban area we then went to the board as part of that deliberation and recommended that the board direct staff to begin a rule-making process to consider the phase-out of HF.

CHAIRWOMAN TANNER: How many facilities would that affect?

PAT NEMETH: There are five facilities that would be affected by the rule. Looking at those that store over 250 gallons of the substance. The same threshold limit reflected in Assemblyman Tucker's bill. Four refineries and the Allied Signal facility.

The governing board did direct staff to begin the rulemaking process and that rule is tentatively scheduled for the board's consideration at the end of this calendar year. The rule has been drafted, we've held public workshops on the rule and we are currently at work in developing an environmental impact report for the rule and a socioeconomic analysis. At the same time, part of this process is also working with the affected industries looking at their own reports on all their alternate processes and what are the issues of acceptable risk. The draft rule requires the elimination of HF manufactured after 1993. It requires the removal of HF used in the alkylation process by 1995 and the installation of added interim controls for safety by December 1, 1991. We believe the

phase-out date for alkylation allows a reasonable amount of time for conversion to viable alternative processes while the phase-out date for the HCFC manufacturing is designed to give an adequate period for gradually reducing production. The staff analysis indicated that there are two present processes for refinery alkylation that are currently widespread. One of course uses HF as the catalyst the other uses sulfuric acid. Some 61 refineries nationwide use the HF process and 50 use sulfuric acid. In California, 9 refineries have alkylation processes, four of these use HF and these four are all located in Los Angeles County. Hydrogen fluoride is a highly corrosive, toxic gas at ambient conditions and thus tends to disperse readily when released. In contrast, sulfuric acid is a heavy liquid under ambient conditions and has a propensity to fall to the ground and pool when released. Additionally, due to operating procedures, HF would form an aerosol upon release in all stages of the alkylation process, whereas sulfuric acid would only form an aerosol if a leak occurred in the reactor vessel. HF also would rapidly spread in the event of a transportation incident, whereas sulfuric acid again, would not. For these reasons and others we believe that sulfuric acid is a more environmentally benign product to be used in the alkylation process.

CHAIRWOMAN TANNER: How about HCFCs?

PAT NEMETH: I'll address that in just a moment. The other major use of HF affected by our rule is HCFC production. Allied Signal, located near the Los Angeles International Airport, is the only HCFC manufacturer in California. We recognize there are no other viable methods of HCFC production than that of using HF. We also recognize that HCFC's are an important temporary substitute to CFC's since they have a much lower ozone depleting characteristic but they are not a permanent solution and in accordance with the Montreal Protocol and the district's adopted policies on ozone depletion we are seeking collectively to phase-out the use of HCFCs.

According to Allied-Signal's latest information, the El Segundo plant produces 10% of the nation's HCFC supply. Currently, HCFCs represent 22% of the national refrigerant/propellant production, the majority consisting of CFCs. With the ban on CFC usage, we can expect the HCFC market to expand significantly when CFC manufacturers convert in the short term to HCFC. Thus, we have a facility that represents the largest HF use in the basin producing roughly 10% of the nation's supply of HCFCs in all probability standing on the edge of seeing demands for increased production at that site. They represent, Allied Signal represents 85% of the HF consumption within the South Coast Air Basin and in order for this plant to produce HCFCs it must transport these large quantities of HF across the country. If an accident occurs during transport that causes the HF to be released, there is no way to mitigate the release or even to adequately protect the public. One alternative for Allied Signal to consider is to manufacture the solvent close to the HF manufacturing facility, thus removing the hazardous material from the railways instead of transporting it across the country.

The largest HF accident that occurred in the South Coast Air Basin in terms of the amount of HF release was the Mobil explosion and fire in November of 1987. The accident originated in the alkylation unit and the potassium hydroxide treater was destroyed. According to Mobil, 100 pounds of HF was released but there were no injuries associated with the HF contact. In January of 1990, Powerine refinery located in Santa Fe Springs had an accident in which about a pound of HF was reportedly released. Eight workers were treated for HF exposure, two of which constituted OSHA lost-time accidents. In the period between these two incidents, the five major users in the South Coast district have reported 16 HF incidences to the district which averages to about two accidents per year per facility. And, interestingly enough, as we have been in the last couple of months of rule development with a fair amount of concern from the industry, a fair amount of attempt to address the issue of is the risk diminimus during this last two month period we have had two of those accidents occur at the Mobil Refinery.

There are two aspects to consider when examining HF usage, concentration and amount. Studies indicate that the tendency of HF to fume, measured as vapor pressure, and dispersion decreases as the concentration decreases, with vapor pressure dropping markedly at concentrations below 50 percent. Allied Signal uses approximately 1.4 million gallons of anhydrous hydrogen fluoride per year and the four refineries combined use a total of about 300,000 gallons per year. That concentration is all above the 70% level and all at the high risk level from our perspective.

In summary, the district feels that the use of large quantities of anhydrous HF in our densely populated region poses a serious threat to the health and safety of the public and we are pursuing the most appropriate means of reducing that threat. Our staff will continue to evaluate information provided by the regulated community and other agencies. And again I want to thank you for the opportunity to talk to you this morning.

CHAIRWOMAN TANNER: Questions? Well, it appears that whether we act or not in the Legislature, the South Coast Air Quality Management District will be acting and I don't want that to mean that we're not going to do something about it because it is rather frightening when we hear this testimony. You left us with this material. Very interesting testimony, scary too. Thank you very much.

PAT NEMETH: Thank you very much.

CHAIRWOMAN TANNER: We have the Major of the City of El Segundo and the Mayor of the City of Torrance here. Mayor Carl Jacobson and Mayor Katy Geissert. Would you both come up please? Mayor Jacobson, would you like to begin?

MAYOR CARL JACOBSON: Thank you for this opportunity to testify before this honorable body to express the concerns of the City of El

Segundo as they relate to hydrogen fluoride. I am Carl Jacobson, Mayor of the City of El Segundo. On March 20th of this year, the El Segundo City Council voted to support Assembly Bill 2857 by Assemblyman Tucker. Even though this bill did not become law, the City of El Segundo still supports the concept of removing hydrogen fluoride from businesses or relocating businesses with hydrogen fluoride to a more appropriate location.

Hydrogen fluoride is a highly toxic and highly corrosive mineral acid that, if released, creates a deadly toxic cloud. The City of El Segundo has several facilities within its boundaries that use hydrogen fluoride. The largest has been the user of hydrogen fluoride since 1964 and has on-site at any given time about 75,000 gallons. The hydrogen fluoride storage facility is within 1/2 mile of major north-south and east-west thoroughfares. To the north of the facility is a large aerospace company, to the south is a major shopping mall. The mall and two nearby hotels are located within one mile of the facility in the neighboring city of Manhattan Beach. Directly to the east of the hydrogen fluoride facility is an area of industrial commercial facilities and just to the east of these is a residential area in the City of Hawthorne which is within one mile of the hydrogen fluoride storage.

Users of hydrogen fluoride advocate that the current situation can be made more safe by implementing prevention and mitigation measures. Statistically, the probability of a catastrophic release of hydrogen fluoride could be reduced to a very small number. However, regardless of the statistical probability of a release, the possibility of unforeseeable and unpreventable accidental releases could occur as a result of earthquake, mechanical or structural defects in equipment, human error or sabotage. In addition, El Segundo is located in an area with considerable air traffic and the potential for aircraft disasters which could impact these facilities. We know that the possibility of a catastrophic release of hydrogen fluoride still will exist. A large release of hydrogen fluoride in a highly-populated area such as El Segundo has the

potential of seriously injuring or killing hundreds and even thousands of people.

The City of El Segundo has concluded that even with the best available and best foreseeable control and mitigation technology, the potentially adverse public health impact of a catastrophic hydrogen fluoride release will remain unacceptably high. As I mentioned earlier, the City of El Segundo opposes the use or storage of hydrogen fluoride in populated areas. As a result, the City of El Segundo strongly supports the South Coast Air Quality Management's direction to eliminate large-scale hydrogen fluoride use within this district. The major handler of HF has submitted its RMPP for hydrogen fluoride. A consultant will be selected by the City to thoroughly review this RMPP. Therefore, the City must withhold comment on the adequacy of that plan until it has been reviewed by the consultant. The City feels that HF presents an extreme hazard to the surrounding businesses and residential communities. While measures have been proposed to reduce the chance of a catastrophic incident, the fact remains that hydrogen fluoride is extremely hazardous and this cannot be changed. So, even though the probability of an incident may be low, the potential consequences are unacceptable. Thank you again for the opportunity to speak before this honorable body and on behalf of the El Segundo City Council, we strongly support any effort made to remove hydrogen fluoride storage and use from populated areas.

CHAIRWOMAN TANNER: Thank you very much Mayor. We've had Mayor Geissert here before. Welcome again.

MAYOR KATY GEISSERT: Nice being back and thank you for this opportunity Chairwoman Tanner, Assemblyman Tucker. There is a problem if you're the fourth witness, you are bound to be repetitious, so I hope you will bear with me and I'll try...

CHAIRWOMAN TANNER: Good.

MAYOR GEISSERT: We are emotional about this issue though because the Mobil Refinery that has been referred to by the previous speakers is located in the very heart of our city. We are strongly supportive not only of this piece of legislation introduced by Assemblyman Tucker but also of the proposed Air Quality Management District rule governing hydrogen fluoride and our people, or staff people as well as our elected people have been working very closely with the AQMD staff on this. And, of course, we do have a real concern because as you've heard already we're not concerned about the possibility of an accident involving hydrogen fluoride, this has occurred in our city and we have experienced this and certainly the release in November of 1987 involving hydrogen fluoride and the very dramatic fire that took place after that over a long period of time had the potential of being a catastrophic event certainly and is something that can't be ignored by us or I don't believe it could be ignored by the State Legislature or by other people who have the power to regulate. Just to orient you geographically the Mobil Oil Refinery is located in what is now just about the center of our city. It is located on 700 acres of land. It is a very significant part of our landscape if you will and a part of our city. Although there are four refineries in the Los Angeles basin using hydrogen fluoride, the Mobil Refinery is by far the largest of these refineries using HF in the alkylation process. The location of the refinery, the chemicals used and the nature of the process by which those chemicals are used have caused our City Council and our residents to become increasingly concerned with the HF used at Mobil.

I'm going to just give you a very personal account of the effect that this particular incident had at the refinery. On the evening of November 24, 1987 an explosion and fire in the alkylation unit at the Mobil Oil Refinery shattered the quiet of our residential community. The impact of that explosion was so intense that people five miles away, and I happen to be about five miles away, reported that it felt like an earthquake, I truly did feel that it was that and it resulted in a fire that lit the sky

throughout the night. Certainly for the people in close proximity to the refinery, this was a very terrifying and traumatic experience. That explosion and fire involved the accidental release of a relatively small amount of HF. Faulty equipment, bad judgment, and human error were the culprits in that incident and that's what concerns us.

Even though there were no fatalities in the 1987 incident, one can only imagine the potential for a catastrophic event had more of the 29,000 gallons of HF stored at the Mobil Torrance refinery been released that night.

The Torrance fire followed closely on the heels of another event in Texas City, Texas. In that southern Texas town, people were forced to flee their homes when a leaking tank from an oil refinery produced a cloud of hydrogen fluoride. As a result of that incident, over 1,000 area residents flocked to local hospitals with complaints of burning eyes, skin and severe respiratory distress. Several hundred citizens were admitted for in-patient care. In addition to the human element, most vegetation in the path of the HF plume between 1-1/2 and 2 miles were scorched. The day after the incident, lawns had turned brown and trees had dropped their leaves. Corrosive property damage was reported over 1-1/2 miles away including corrosion of galvanized metal and the etching of glass windows on automobiles.

In order to better understand our extreme concerns about HF, it is necessary to know more about the material and some of this, of course, has already been covered by people much more expert than I. Hydrogen fluoride is used as a catalyst in the production of high octane alkylate in the oil refinery industry. It is also used in other processes such as the manufacture of aerosol sprays and microcomputer chips such as at the Allied Signal plant. This acutely hazardous chemical has properties which set it apart from other acutely hazardous materials. It has the propensity to become a neutrally buoyant cloud which can travel great distances downwind

from the source of an accidental leak, especially when released at high temperature and pressure.

The geographic location of our city makes it a crossroads of rail lines between two large users of HF, one in the southern United States and the other in El Segundo, just a few miles from our city's borders. It is known that approximately eight rail cars per month pass through Torrance on their way to other destinations, and each car holds 21,000 gallons of this acutely hazardous material.

CHAIRWOMAN TANNER: How much?

MAYOR GEISSERT: Each car holds 21,000 gallons and there are approximately eight cars per month that pass through the city, each carrying 21,000 gallons. As we all know in Southern California the rail lines, cities have built up around rail lines and very often the rail lines pass through residential areas and places where people are highly concentrated.

As a local legislative body, the City Council of Torrance is attempting to make the Torrance Mobil Refinery a safer place and to deal with the unreasonable risk of danger to the life and health of persons living and working in the areas near the refinery. First, the City has filed a lawsuit with the Superior Court of the State of California seeking the abatement of unsafe practices at the refinery. This suit is scheduled to go to trial very soon, November 5th as a matter of fact. Secondly, the City has retained petroleum experts to conduct a safety audit at the Mobil Refinery. Additionally, the City has required Mobil to prepare a risk management and prevention plan (RMPP) on the use of HF as required by State law. Even if the refinery puts in place all of the required improvements that are recommended in the safety audit and the RMPP, there will still be the possibility of a significant HF release. The fact still remains that 29,000 gallons of hydrofluoric acid are used at the Mobil refinery, and no amount of monitoring, risk assessment or safety procedures will change that. There is no

acceptable risk involving the use of HF in large quantities. If even one Torrance resident, or I'd have to say going beyond Torrance, South Bay resident is seriously injured or worse yet killed by a release of HF the risk is just too high. The only way to eliminate the risk of a release of HF is to eliminate the storage and use by large industrial manufacturers. The people of Torrance don't want a Texas City disaster or worse to occur in their community. The potential for human error that could cause the creation of a toxic cloud of HF makes the continued use of this substance unacceptable.

There are alternatives to HF as you have been told. It appears that there is considerable research being conducted to develop an alternative to HF for the alkylation process. At this time sulfuric acid is the only viable alternative technology available. Sulfuric acid alkylation is not without its own ancillary risks. It is also an acutely hazardous material, however, it does not have the tendency to form large toxic clouds which might impact the public considerable distances from the release point. The primary concern with HF is its propensity to travel great distances in harmful concentrations if released. And, of course you have heard about the qualities that it has for destruction and damage to the human body. A change in process technology to sulfuric acid alkylation would not eliminate all risk, it would however eliminate the potential for a truly catastrophic event which could seriously injure or kill many innocent people. I might add that Mobil does not use HF in its largest refinery which is in Beaumont, Texas. No other major oil company in California uses HF for alkylation. I therefore urge this Committee to proceed with support of Assemblyman Tucker's bill and if we can be of any assistance to you in that process we stand ready to help because it is very important to us. Thank you very much.

CHAIRWOMAN TANNER: Thank you very much. Thank you both. Now we'll hear from Mr. Louis Ervin who is the Plant Manager for Allied Signal at El Segundo. Welcome.

MR. LOUIS ERVIN: Thank you. Good morning. I brought with me Mr. Bill Hague from our Corporate Office who would be able to answer any technical questions you might have concerning HF. Madam Chair, Assemblyman Tucker, thank you for the opportunity to speak before you this morning. I have given a copy of my statement to Cynthia. I would like to just kind of read through it a little bit and answer any questions you might have.

As you know, I am Plant Manager for Allied-Signal in El Segundo. And, if you'll recall from my testimony before this Committee earlier in April, our plant is a manufacturer of HCFCs. HCFCs are used in the refrigeration of commercial buildings and also in food store refrigeration for the preservation of food and a few other minor uses for the product. In your correspondence to us you had several questions you would like us to answer and I'll try to address those to you today through my testimony.

In the process of producing Refrigerant 22, what we call Genetron, Allied uses hydrogen fluoride as a raw material. There is no alternate method to manufacture Refrigerant 22 that we know of at this time without the use of HF. As was mentioned by Mayor Jacobson earlier, Allied's El Segundo facility manufactures about 10% of the national supply of HCFC 22. And, as you know, HCFCs are the best near-term alternative to the use of CFCs - certainly for the next 30 to 50 years. Let me take a moment to describe the use of HF at our facility to put a little perspective for you. We receive HF by rail car, approximately one to two cars per week. The HF is unloaded at a relatively slow rate from the car into our storage vessel. We have one storage vessel on site, which is operating at low pressure and low temperature. The HF is then transferred to our production process where it's consumed; at the beginning of the process. The product, G-22, along with other byproducts are then distilled and recovered in the storages. This is a very simple description of how we use HF and we've been doing this since 1964.

CHAIRWOMAN TANNER: As the CFCs are phased out and more and

more dependency on the HCFC, it appears to me that the amount of HF that will be coming to you because the market will grow, will be much larger than you have even now coming to you. Is your company considering moving closer to where HF is manufactured. The Legislature doesn't feel comfortable about saying to a company that you will have to close your doors, but there is no question in my mind that you will be receiving more and more of the HF...

LOUIS ERVIN: Perhaps and perhaps not. May I address that for you. One of the things that you may be aware of is that we announced just this year a new facility in Geismar, Louisiana to manufacture HCFC-141B so that is the near-term replacement for R-11 which is a solvent and also a blowing agent and so forth. That will be located near our HF facility there in Geismar. The use of HCFC-22 will, I agree, be growing and we hope it does and we've seen this year, as a good example, the use of CFC-12 and 11 has dropped off drastically. Certainly Allied will remain in the refrigerant business because that is one of our foundation businesses. Whether we expand our plant here at El Segundo or not that I can't answer, I don't know.

CHAIRWOMAN TANNER: We held this bill in this Committee last year. I and my staff have done a great deal of research on this bill and I really believe that what Mr. Tucker is proposing is reasonable. The fact that we're going to have to accept even more hydrogen fluoride in the community, and have the trains pass through the state and other states as well, is frightening.

LOUIS ERVIN: Well certainly, as we discussed previously Assemblywoman Tanner, we would like as I was planning to speak of in the rest of my presentation but let me just jump right to it, there is no question that HF is a hazardous material, an acutely hazardous material, we recognize that and we have recognized it for over 50 years in the use of it. What we're requesting is that your Committee or any other regulatory agency look at the use of HF in the same context as other acutely hazardous materials. I'm sure

your staff has also made you aware that there are a number of other hazardous chemicals out there, some of which we also handle for other companies.

CHAIRWOMAN TANNER: I think that what's going to have to happen eventually is these acutely hazardous materials shouldn't be, great amounts shouldn't be in the middle of a city. I mean right dead center of a very highly-populated area. That's the problem. And I know in many cases you have a plant and then the houses are built around and people move in. Nevertheless, it's just that we're asking for trouble whether it's HF or another acutely hazardous material.

LOUIS ERVIN: That's all that we request is that when you're looking at HF by itself, don't look at it in a vacuum. Look at it along with the other hazardous materials that you have to deal with and I'm sure your staff is very familiar. Certainly Allied is committed, as we've talked to Assemblyman Tucker and other representatives of the government, to the safety of not only the community but also to our employees. And we are doing the things that are the leading edge or state of the art, if you will, to protect the community and we will continue to do that.

ASSEMBLYMAN TUCKER: Could you explain for the education of the Committee, what the process is for manufacturing HF.

LOUIS ERVIN: Manufacturing HF? I wouldn't say that I was technically qualified to do that Assemblyman Tucker because I have not run an HF plant.

ASSEMBLYMAN TUCKER: Your facility in Geismart does manufacture HF. Is it a prohibitively expensive procedure?

LOUIS ERVIN: To manufacture HF?

ASSEMBLYMAN TUCKER: To manufacture it. The reason I am asking

is we understand the service that your business serves in the business community and just the modern conveniences that we've all grown accustomed to and we're not saying that you have to shut down or you cannot operate your facility in California, you've heard a lot of people talk about the transportation of HF through highly populated areas where no safety backup systems or mitigation plans will help mitigate a spill and we had talked earlier about moving your facility and manufacturing HF at that new facility along with your HCFCs and therefore eliminating the need to transport those hundreds of thousands of gallons of HF through the South Bay area.

LOUIS ERVIN: Well certainly the construction and installation of an HF plant along with the refrigerant plant is probably a good idea on a grassroots facility. I would highly recommend that. But one question or one area that I'm not sure of the answer to is given the grown of the HCFCs as you were talking about Assemblywoman Tanner, I know that the 141B plant for example will not be consuming as much HF because it's a different compound. Refrigerant 22 uses more HFs than 141B. The additional HFCs which are the third generation of refrigerants and solvents will also be using HF so I guess what's really unclear in my mind certainly is our national strategy on how we're going to meet all this and certainly we want to stay in that business and I'm sure other companies do too because the refrigerants as you know are very important not only to comforts like today, but also to preservation of food and so forth.

ASSEMBLYMAN TUCKER: Right, no one is arguing the fact that you should go out of business. We need what you produce. We're just saying that you don't necessarily have to produce it in a highly populated area. A move to a lesser populated area certainly will not put you out of business.

LOUIS ERVIN: Well, certainly I agree that we need to have a national strategy on the management of acutely hazardous materials. HF is one of those.

CHAIRWOMAN TANNER: How long has Allied been there?

LOUIS ERVIN: Seventy years. We're going to celebrate our 70th Anniversary in January.

ASSEMBLYMAN TUCKER: Am I invited?

LOUIS ERVIN: Certainly. Always.

CHAIRWOMAN TANNER: The zoning, the local land use and the zoning was the area around you...

LOUIS ERVIN: There wasn't anything.

CHAIRWOMAN TANNER: And then, so there was nothing there.

LOUIS ERVIN: Right.

CHAIRWOMAN TANNER: I think cities have to recognize they have a responsibility too. Here is a company that handles an acutely hazardous material and then the city allows homes to be built around this plant. Now that's wrong.

LOUIS ERVIN: It's irresponsible. But the one of the factors is that right across the street from Allied Signal is another city, the City of Manhattan Beach. And one city has enough trouble figuring out what it's going to do let along what another city has already done. So there ...

CHAIRWOMAN TANNER: We have laws now that effect that kind of situation.

LOUIS ERVIN: Right now, but it wasn't in effect when the houses were being built.

CHAIRWOMAN TANNER: I had a Class I disposal site in one of my

cities and after the disposal site was given a permit, I mean the company, the facility was given a permit to have this disposal site there. Following that and after the Class I site was built, and the facility was built, the city allowed the homes to be built right around it. Now you know that's irresponsible. I suppose it means more money, more revenues to the city but then we suddenly say the airport has to go, the Class I facility has to go, the plant has to go and it has to because we can't threaten the lives and the health of the lives of the people who live there, but boy, I think cities come to the state and say now do something about it after they've made some pretty serious mistakes. We will try to do something about it. But 70 years of being there and now we are going to I think we're going to have to say we can't afford to have that kind of material that close to all the people who live there. It's tough. It's awful. Awful for you but awful for the people who live there. You want to continue.

LOUIS ERVIN: You have my written statement and we've discussed the points already so rather than be repetitive, any further questions?

CHAIRWOMAN TANNER: Mr. Hague, do you want to add anything?

BILL HAGUE: I would just like to add a couple of points with respect to at least, let's say, our stewardship of this chemical. To remind the Committee that Allied has had a very aggressive program in identifying the hazards associated with HF and over the years making the appropriate adjustments in our technology to be state of the art. In 1986, as you are probably aware, we co-sponsored a series of tests at the Nevada DOE test facility to look at the dispersion characteristics of HF when released accidentally. That series of tests has been misquoted extensively over the years into such issues as HF will always form a dense cloud and the ground hugging etc. And that is unfortunate because a better understanding of HF and its dispersion characteristics is warranted when one conducts risk assessment analyses. Furthermore

in 1989, we went back to the desert and conducted about 90 tests with respect to determination of the effectiveness of water sprays on HF mitigation. Both these programs, the cumulative fiscal effort was in the neighborhood of $8 million shared equally by several industrial companies so the point I wish at least to leave you with is that we deal, as Louis said, we manage a hazardous material, we do not deny that this is a hazardous material, but we feel as an industry, specifically the HF production and using industry, we very aggressively identify what those hazards are and attempt at least to design with state of the art technology. So, I would encourage you in your thought process here to evaluate where do we stand as an industry with respect to other industries that pose risks. Has this industry attempted to be aggressive and follow through. The TV show had a suggestion of maybe that not all the facts are at the table but in fact I feel the facts are very much on the table. Issues with respect to is sulfuric more toxic, I think that question was raised or less, we need to stop the confusion with respect to one science of toxicity and another one of dispersion. They are separate and discrete. In fact, you would find for sulfuric, the TLV for worker exposure is a lower number than HF inferring its toxicity is greater. With respect to the risks of processing sulfuric, one could argue as was today presented that there is a potential for aerosol formation in a reactor session. Before anyone, I think, would judge that that substitution is warranted, a full and detailed analysis of the risk of those differences are in order.

So again, I just would like to leave you at least with the thought that we have aggressive engineering, design and people who look at these issues and I hope handle them in a very responsible manner and certainly we're always willing to discuss those specific issues with anyone.

CHAIRWOMAN TANNER: Thank you very much. Mr. Tucker.

ASSEMBLYMAN TUCKER: Let me just state for the record, that no

one is picking on Allied-Signal. We know that you have been good neighbors and good employers in the City of El Segundo and we know that you're doing a good job. However, you're not manufacturing strawberry jam. We're talking about something that if released could be a catastrophe in the South Bay area. As the tape showed, they had to evacuate thousands of people from their homes. Now can you imagine trying to evacuate the South Bay if there was an accidental release of HF. No way could you do it. You'd have thousands of people dead in their cars. That type of risk I don't feel is a good tradeoff to how good you've been in the community and it's unfortunate that the community grew up around you as it did, but now that it's there I think we would be remiss to say well local zoning laws let it happen and there's nothing we can do now. It's unfortunate but I also think we have to move ahead.

LOUIS ERVIN: Assemblyman Tucker, if I may. The issue of whether evacuation is even an appropriate issue in emergency response, I'll put aside for a minute and just at least ask you to deal with the consideration that there are many chemicals and many industrial activities outside the chemical industry that occur in your basin and uniformity with respect to acceptability of risk would seem in order and the point I tried to bring out is that we as an industry do research, do conduct safety hazards analysis, and before you if you will attempt to ban or remove that industry, the question should be raised has this industry dealt more responsibly than maybe some others so all I really request is uniformity in analysis. Thank you.

CHAIRWOMAN TANNER: I think we have to do that. I think we have to be fair and I think we have to look at other industries at the whole industrial picture. I think so, I don't think you're asking too much. I also don't think that the Mayor of El Segundo and the Mayor of Torrance are asking too much so it's very difficult, it's a tough, very tough question but we certainly. I know that Mr. Tucker is going to be working on legislation and my staff and I will be working with Mr. Tucker and I'm sure that he

welcomes industry as well as the cities and the people and AQMD to work with him on legislation.

ASSEMBLYMAN TUCKER: Certainly, we'd be happy as we.

CHAIRWOMAN TANNER: Thank you very much.

LOUIS ERVIN: Thank you for your time.

CHAIRWOMAN TANNER: Mr. David Dragt from the Golden West Refining Company of Santa Fe Springs is here with us and he is our last witness. Mr. Dragt, welcome.

DAVID DRAGT: Good morning. Thank you for this opportunity to be here. My name is David Dragt, I am the Manager of the Environmental Department for Golden West Refining in Santa Fe Springs, a suburb of Los Angeles, in the South Coast Air Basin. Many of the comments that I had prepared which have been submitted to you are similar to the comments made by the two previous gentlemen. So I don't know whether I want to really recap that again or just state that we have been using HF...

CHAIRWOMAN TANNER: Just summarize what ...

DAVID DRAGT: We have been using HF in excess of 45 years. The plant was originally built as a war-time plant during World War II. We have always been sincerely concerned for the safety of our employees and also the people who live around us. We have a very good operating record with the use of HF. We would again echo that not only this chemical which we admit is acutely hazardous must be assessed on a level playing field with all of the other acutely hazardous materials. And we feel that the risk for the use of HF and what is proposed as a substitute for it is probably of equal risk and for us to really condemn a facility with a value of about $20 million and build a new one which has equal risk doesn't seem to me to be economically a very sound choice to make and it's a cost

that has to be assumed by the populous that buys the product.

ASSEMBLYMAN TUCKER: Now no one here is talking about condemning a facility.

DAVID DRAGT: Well, it will be closed down. It has to be closed down if we can no longer use HF.

ASSEMBLYMAN TUCKER: Why couldn't you use sulfuric acid or ...

DAVID DRAGT: Because the design for a sulfuric acid alkylation plant is done differently than that of an HF sulfuric plant.

ASSEMBLYMAN TUCKER: Right but other refineries can retrofit, why couldn't yours?

DAVID DRAGT: I don't think any of the refineries that are currently using HF will be retrofitting but they will be building from scratch.

ASSEMBLYMAN TUCKER: But that's just a choice that they will be making because you, I have heard otherwise that refineries that go from HF to sulfuric acid do not have to start from ground zero and build up.

DAVID DRAGT: The whole concept of the reactor systems with the necessity of refrigeration and handling and treatment subsequent to the production is different than it is with HF.

ASSEMBLYMAN TUCKER: Yeah, I know it's different but it, this is the first I'm hearing that it would necessitate condemning the existing facility and building an entirely new one.

DAVID DRAGT: Well, I believe the other plants are also looking at facing the same situation that they have to build from scratch.

I know that we're looking at building a new plant ...

ASSEMBLYMAN TUCKER: You're the first one that's ever said that.

DAVID DRAGT: Well, then it's brand new, but I know the others are looking at the same thing. That the plants that they currently have are obsolete then and must be started from scratch. And for our case it's another $20 million. It is a $20 million investment that makes no additional money for us. It has no return on that investment whatsoever.

ASSEMBLYMAN TUCKER: You could possibly save lives.

DAVID DRAGT: Possibly save lives, but again, we feel the risk for sulfuric acid is just as great as it is for HF, so if we spend $20 million and we have the same level of risk, we have accomplished nothing.

ASSEMBLYMAN TUCKER: Even though experts will tell you that it's not the same level of toxicity.

DAVID DRAGT: I think there are experts who will tell that it is ...

ASSEMBLYMAN TUCKER: Oh yeah, the same experts that will say that you have to build a brand new facility, I think you should get new experts.

DAVID DRAGT: That's our position. We obviously have a difference of opinion and I think it is a difference that we would be very happy to talk about and we could substantiate.

CHAIRWOMAN TANNER: I think that would be a good idea for you to work with us and talk about it.

ASSEMBLYMAN TUCKER: I just have one question about wasn't your facility fined recently for an HF spill that wasn't reported.

DAVID DRAGT: No sir. We have reported every spill responsibly.

ASSEMBLYMAN TUCKER: Ok.

CHAIRWOMAN TANNER: Thank you very much. Well you can see it's going to be very tough to be fair and we have a responsibility, of course, to protect the health and lives of the people who we represent and so we want to be fair. I hope that we can put a good bill together Mr. Tucker. I hope that it can be a fair bill, one that will protect the public.

ASSEMBLYMAN TUCKER: One thing that I'd like to add is when the bill was heard last year we had a lot of industry in Northern California, Silicon Valley opposed it because they use the watered down version of HF in their etching processes. That is not in the bill. We're talking strictly the anhydrous form, the pure form, it would not impact on any of the lesser quantities or less toxic forms of HF and their concerns though while real were not founded by the bill.

CHAIRWOMAN TANNER: Is there anyone else who would like to be heard before we close the hearing? Alright, thank you very much. By the way, we have taped this hearing and we will make it available to the other members of this Committee and there will be a transcript. Anyone who is interested in reading the transcript may contact us.

Thank you very much for being here. That ends our hearing.

July 9, 1990

PROPOSED RULE 1410. HYDROGEN FLUORIDE STORAGE AND USE

(a) Purpose

This Rule specifies restrictions on the storage and use of hydrogen fluoride and hydrofluoric acid. The Rule requires preventive measures to minimize hydrogen fluoride or hydrofluoric acid emissions in the event of an accidental release, specifies reporting requirements for the storage and use of such material, and requires a phase-out of hydrogen fluoride and hydrofluoric acid at large use facilities.

(b) Applicability

All sections of this Rule apply to hydrochlorofluorocarbon production facilities and petroleum refineries. Any other facility which stores or uses hydrogen fluoride or hydrofluoric acid must comply with sections (f) and (g).

(c) Definitions

(1) **ALKYLATION** is any process that utilizes hydrogen fluoride as a catalyst to react with isobutane and olefins to produce high molecular weight gasoline components.

(2) **ATMOSPHERIC HYDROGEN FLUORIDE DETECTION AND ALARM SYSTEM** is any continuous sensor that is capable of detecting a concentration of 2 part per million hydrogen fluoride release into the ambient air and activates a local and/or remote audible alarm system(s).

(3) **PUMP-OUT SYSTEM** is any method capable of emptying all equipment containing any hydrogen fluoride or hydrofluoric acid, such as, but not limited to, storage tanks, pumps, lines, and hydrogen fluoride or hydrofluoric acid process equipment.

(4) **CONTAINMENT SYSTEM** is any collection basin that holds the released material (hydrogen fluoride or hydrofluoric acid) prior to appropriate neutralization and/or treatment of such material, in the case of an accidental release.

(5) **EMERGENCY ISOLATION VALVE** is any valve that can be activated by remote control and that is designed to shut off the flow of materials to or from a processing unit.

(6) **FACILITY** is any collection of equipment that handles hydrogen fluoride or hydrofluoric acid, including equipment that stores, processes, loads, unloads or transfers hydrogen fluoride; located on one or more contiguous properties within the South Coast Air Quality Management District, in actual physical contact or separated solely by a public roadway or other public right-of-way; and, are owned or operated by the same person (or by persons under common control).

(7) **HYDROCHLOROFLUOROCARBON PRODUCTION** is any process that uses hydrogen fluoride as a chemical reactant to produce hydrochlorofluorocarbons (HCFCs).

(8) **HYDROGEN FLUORIDE SENSITIVE PAINT** is any pigmented coating formulated to change its color upon hydrogen fluoride contact.

(d) Requirements

(1) Phase Out Schedule

(A) On and after January 1, 1993, no person shall store or use hydrogen fluoride or hydrofluoric acid for hydrochlorofluorocarbon production at any facility.

(B) On and after January 1, 1995, no person shall store or use hydrogen fluoride or hydrofluoric acid for an alkylation process at any facility.

(2) Interim Control Measures

On or before December 1, 1991, all owners and operators of each facility subject to paragraph (d)(1) shall:

(A) Install and maintain containment systems beneath all hydrogen fluoride loading, unloading, transfer, storage, and processing equipment;

(B) Reduce and maintain inventory to the minimum amount of hydrogen fluoride required for the process;

(C) Maintain hydrogen fluoride-sensitive paint for leak detection on all valves and flanges for pipes and vessels handling hydrogen fluoride;

(D) Install and maintain automatic atmospheric hydrogen fluoride detection and alarm systems for the loading, unloading, transfer, storage and processing areas;

(E) Install and maintain emergency isolation valves and remote switches in the control room or in an appropriately safe location;

(F) Install and maintain automated pump-out systems for all hydrogen fluoride or hydrofluoric acid vessels, lines, and associated equipment capable of emptying the system within a maximum pump-out time of ten (10) minutes to a hydrogen fluoride or hydrofluoric acid-dedicated emergency holding vessel;

(G) Install and maintain automated water spray systems in the hydrogen fluoride loading, unloading, transfer, storage and processing areas that are designed to achieve, at a minimum, a demonstrated hydrogen fluoride removal efficiency of ninety (90%) percent; and

(H) Perform structural upgrade of support structures for all hydrogen fluoride or hydrofluoric acid-related process equipment, such as, but not limited to, vessels, heat exchangers, fixed heaters, pumps, compressors, storage tanks, and piping, to successfully resist a maximum credible earthquake on the fault closest to the facility site, as specified in "SEAOSC Seminar-1988 UBC & Bluebook, View & Perspectives," Allan Porush, Dames & Moore, 1988.

(I) Develop, install, and maintain safety procedures/devices to neutralize accidental releases on the ground.

(e) Interim Measure Compliance Plan

The owner or operator of any facility subject to paragraph (d)(1) shall fulfill the following increments of progress:

(1) By March 1, 1991, submit a plan to demonstrate compliance with paragraph (d)(2) to the Executive Officer, for approval;

(2) By May 1, 1991, submit any required application(s) for permits to construct and operate;

(3) By December 1, 1991, demonstrate to the satisfaction of the Executive Officer compliance with paragraph (d)(2)